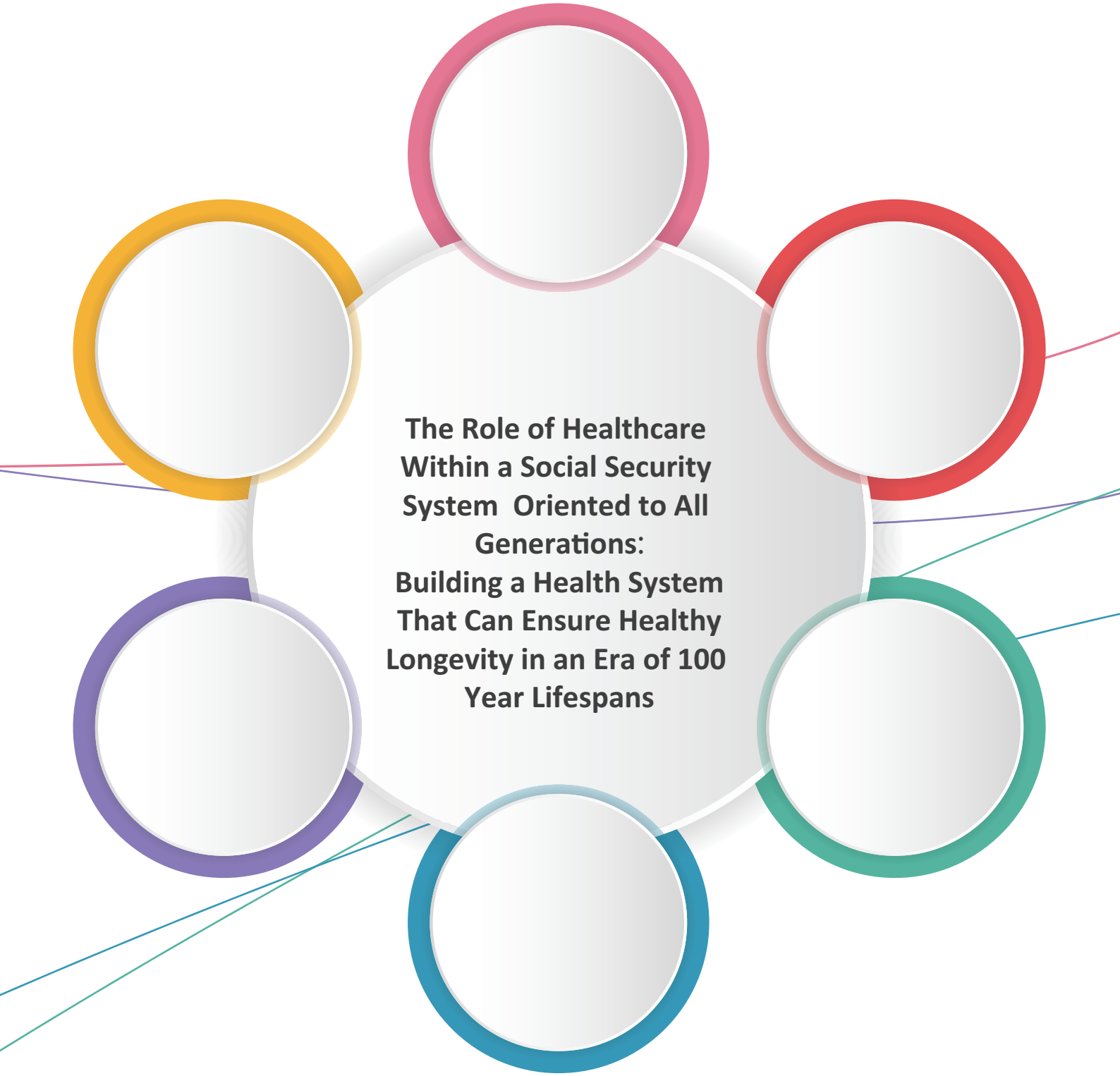
HGPI Health and Global Policy Institute

**Rebalancing Innovation and Sustainability Taskforce Report**



# The Role of Healthcare Within a Social Security System Oriented to All Generations: Building a Health System That Can Ensure Healthy Longevity in an Era of 100 Year Lifespans

Report by Health and Global Policy Institute (HGPI)

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# Introduction

Since the achievement of universal health coverage in 1961, the Japanese health system has supported the growth of the one of the healthiest and longest living populations in the world. As that population continues to age, Japan is being presented with a tremendous opportunity: to show the rest of the world how a super-aging society can successfully maintain a national health insurance system that works for all generations, and that can incorporate medical innovations and ensure healthy longevity even under circumstances in which members of the population might regularly live to over 100-years of age.

Since FY2016, the Health and Global Policy Institute (HGPI) has supported Japanese leadership on the creation of a next-generation health system through its "Rebalancing Healthcare Systems: Innovation and Sustainability" project. This report is one product of that work.

In 2019, HGPI interviewed and surveyed key opinion leaders on the issues that experts felt most important to improving the Japanese healthcare system in the future. Based on HGPI's discussion with stakeholders, and referencing *Pharmaceutical Innovation and Access to Medicine,* an OECD report released on 2018 on health system sustainability and innovation, HGPI identified six themes as health system policy topics that require further, intensive debate.

Over the course of FY2019, HGPI formed an expert taskforce comprising members from the public and private sector to debate the following themes and produce this report. That debate was further supplemented by an expert forum on the social security system, featuring the participation of such outside experts as Minister of State for Economic and Fiscal Policy Yasutoshi Nishimura.

- Measures to increase spending efficiency
- Measures to reduce the costs of R&D and improve market access
- The further development of push and pull incentives for innovation
- Measures to strengthen the information base / data infrastructure to better inform policy debates
- Innovative financing mechanisms to help fund new treatments and health interventions
- Value-based healthcare

We believe that through the advancement of policy on each of these themes, we can achieve a health system that is sustainable, that guarantees access to healthcare innovation, and that actively works to improve the health outcomes of the population and supports the vitalization of the Japanese economy.

It is our hope that this report will help everyone who reads it to understand the current state of the Japanese health system and provide hints to policymakers about the best way forward for each theme.

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"Rebalancing Healthcare Systems: Innovation and Sustainability" Taskforce

Members:

**Mamoru Ichikawa** (Principal Program Director, Japan Broadcasting Corporation (NHK))
**Satoshi Imamura** (Vice-President, Japan Medical Association)
**Toshio Nagase** (Government Affairs Japan, Gilead Science K.K.)
**Naokazu Saito** (Director, Policy Intelligence Department, Janssen Pharmaceutical K.K.)
**Naomi Sakurai** (President, Cancer Solutions Co., Ltd.)
**Hirokazu Yoshii** (Special Advisor to the President, Health Insurance Claims Review & Reimbursement Services)

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**Ataru Igarashi** (Associate Professor, Unit of Public Health and Preventive Medicine, Yokohama City University of Medicine)
**Isao Kamae** (Project Professor, Graduate School of Public Policy, The University of Tokyo)
**Hiroshi Nakamura** (Professor, Graduate School of Business Administration, Keio University)
**Kazumasa Oguro** (Professor, Faculty of Economics, Hosei University)
**Eiko Shimizu** (Project Associate Professor, ITHC, Graduate School of Pharmaceutical Sciences, The University of Tokyo)
**Mitsuo Umezu** (Director, Institute for Medical Regulatory Science, Waseda University)

Observers:

**Michinori Haba** (Director for Budget, Budget Bureau, Ministry of Finance)
**Toshinori Kawaguchi** (Director for Policy Planning, Healthcare Industries Division, Ministry of Economy, Trade and Industry of Japan (METI))
**Kazumi Nishikawa** (Director, Healthcare Industries Division, Ministry of Economy, Trade and Industry (METI))
**Masami Sakoi** (Assistant Minister, Minister's Secretariat, Ministry of Health, Labour and Welfare (MHLW))

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**Hisao Endo** (Chairman, Social Security Council (Director-General, National Institute of Population and Social Security Research))
**Kiyoshi Kurokawa** (Chairman, HGPI)
**Masahiro Sano** (Executive Managing Director, National Federation of Health Insurance Societies (Kenporen))
**Kenji Shimazaki** (Professor, National Graduate Institute for Policy Studies)
**Hirotaka Unami** (Deputy Director-General, Budget Bureau, Ministry of Finance)

Within HGPI, this report was prepared by:

**Narihiro Bono** (Program Specialist, HGPI)
**Matt McEnany** (Senior Manager, HGPI)
**Takahiro Sakauchi** (Program Specialist, HGPI)
**Daisuke Sato** (Intern, HGPI)
**Tomohito Shibata** (Senior Associate, HGPI)
**Joji Sugawara** (Senior Associate, HGPI)

# Grand Concept for the Reform of the Japanese Healthcare System

## Building a Health System that can Ensure Healthy Longevity in an Era of 100 Year Lifespans

This Grand Concept for the Reform of the Japanese Healthcare System was prepared by Health and Global Policy Institute (HGPI) based on discussions within the multi-stakeholder taskforce formed in FY2019 as part of the "Rebalancing Innovation and Sustainability" project.

Recognizing that numerous definitions exist for terms such as "healthcare," "value," "waste," and "cost," the taskforce debated various issues on Japan's healthcare system from the perspective of the three following fundamental concepts:

1. To ensure the sustainable delivery of effective healthcare, it is important to seek out ways to optimize the healthcare system and make it more efficient
2. Money is not "spent" on the healthcare system, it is invested. It produces returns in the form of better health outcomes, increased productivity, and other benefits
3. The purpose of the healthcare system should not just be to cure, but to increase healthy life expectancy for the entire population it serves

The novel coronavirus (COVID-19) pandemic has changed the way that people think about various elements of the healthcare system, including people (medical personnel), things (respirators, personal protective equipment, etc.) and infrastructure (including medical facilities and hospital beds). Certain aspects of the healthcare system once considered "waste" actually helped to protect Japan during the pandemic. As a result, the idea that a certain degree of excess may be needed in the system in order for it to remain prepared for future events, including natural disasters, is growing more popular.

Over the past 60 years, since the achievement of universal healthcare coverage, the Japanese healthcare system has succeeded in supporting one of the world's longest-lived populations. However, the sustainability of this system is currently being threatened by demographic changes such as the declining birthrate, coupled with population aging. As Japan moves toward an era in which 100-year lifespans are the norm, in is important that reforms be undertaken within the healthcare system to ensure that the system can continue to increase healthy life expectancy while also remaining agile enough to respond to further social changes and the possibility of natural disasters. The realization of the three concepts listed above through policy is important to the creation of such a healthcare system.

### 1. Promoting Efficiency and Optimizing the Healthcare System

In order to promote healthy longevity, Japan needs to find ways to optimize its healthcare system while also maintaining its effectiveness. In doing so, it is crucial to carefully debate how to define issues like efficiency, and what is truly considered "non-essential" by society. Efforts should be made to promote efficiency and the optimization of the healthcare system based on such debate. Policy decisions on this topic should consider social values and medical ethics, including issues such as whether Japan wants to aim for equality or utilitarianism. The following policies are believed to be necessary for achieving this concept.

#### Develop Healthcare Policies that Consider Diverse Value Systems

Policy decisions should consider the diverse perspectives of patients and society. This could be done by evaluating innovation using stricter standards that include considerations about how the technology in question impacts the patient's productivity or other facets of their life. Another possibility would be to expand the Health Technology Assessment system to cover the entire healthcare system, not just pharmaceutical prices.

#### Promote Efficiency through the Use of Healthcare Data

It is important that limited funding, personnel, and resources be distributed throughout the healthcare system in the most effective way possible. One way to help encourage that would be to implement the ideas behind the "Choosing Wisely" campaigns. This could help to incentivize behavior change. It might also promote optimization stemming from greater uptake of prevention, testing, and treatment measures. For instance, incentives to change behaviors could be designed to combat excessive polypharmacy or promote antimicrobial stewardship.

Novel coronavirus highlighted the importance of ensuring that Japan has a robust healthcare system. The construction of an effective and appropriate healthcare system requires that policies be debated based on objective facts and data. Japan is

promoting the creation of various databases, including the National Database of Health Insurance Claims and Specific Health Checkups of Japan (NDB), databases of personal health records, and other databases. These databases could serve as the foundation for Evidence-based Policymaking (EBPM) efforts. However, in order to make the most use of these databases to that end, urgent action is needed to improve database-related infrastructure, including related to usage restrictions and the management of master data dictionary files.

**Ensure Rapid Access to Innovation**

It is important to ensure that truly effective innovation be accessible to patients soon after it is developed. From the perspective of ensuring safety as well as rapid access to new medical technology, it is important to promote the greater use of non-clinical and post-market data within the technology approval process. Furthermore, more should be done to promote efficiency in R&D both in Japan and overseas, including through mutual recognition initiatives. Japan should pursue multilateral discussions toward efforts that would enable the simultaneous approval of technology in multiple countries at once. This initiative itself could serve as a shared incentive for the promotion of R&D.

## 2. Money is not "spent" on the healthcare system, it is invested

Money is not "spent" on the healthcare system, it is invested. It produces returns in the form of better health outcomes, increased productivity, and other benefits. By providing a balance of individual assistance, mutual assistance, and public assistance, the social security system provides a safety net that protects the public from risk and uncertainty and helps the public to overcome anxiety related to a loss of health. Debate must be advanced on how to set clear priorities for the social security system and appropriately distribute limited resources in order to ensure its important role in society is fulfilled in a sustainable manner. The following policies are thought necessary to achieve this concept.

**Secure Financial Resources for the Healthcare System**

It is important to allocate resources appropriately in order to enhance the sustainability of the healthcare system. For example, the Government could introduce a "macroeconomic slide" mechanism that would adjust medical fees within the Medical Care System for Elderly in the Latter Stage of Life alongside GDP growth in order to avoid a sudden increase in expenditures. Decisions about the budget of the healthcare system should be based on a philosophy of "sharing large risks as a society" and "shouldering smalls risks individually." In order to protect against catastrophic expenditures due to medical fees, the Government might also consider increasing the portion of medical fees borne by individuals for illnesses with low severity or high prevalence, while simultaneously reducing the portion of medical fees paid by individuals living with severe or rare diseases.

If the macroeconomic slide mechanism described were to be introduced, it is may also be conceivable to apply the system to insurance premiums while considering the financial burden these premiums place on businesses and individual households. Moreover, as social security is comprised of self-assistance, mutual assistance, and public assistance support measures, it is important to discuss the how to create a system that can consider each of these measure categories in line with the changes that society is undergoing, and based on that, effectively balance the size of healthcare system premiums and benefits. For instance, the Government might consider setting premiums according to income level or and total assets, financing public assistance through consumption tax, or finding other sources of income for the healthcare system, including tax measures such as a "Sin Tax" on behaviors that increase risk.

**Invest in Innovation**

In order to encourage innovations that improve health, it is important to ensure that the healthcare market in Japan is predictable. Japan should pursue balanced healthcare system reforms through a mix of incentive measures, including disincentives to reduce polypharmacy, push and pull incentives to encourage investment, and risk reduction incentives to enhance market predictability. The Government should create a forum to discuss the implementation of a mix of incentives for the systemic improvement of the healthcare system.

In addition, from the perspective of promoting the sustainability of the healthcare system and competitiveness in the healthcare market, as well as depoliticizing funding issues and ensuring the provision of highly effective treatments for which there are no alternative therapies, the Government should consider the creation of a 1 trillion yen framework (0.2% of GDP) to allow for such treatments to be excluded from reductions in medical fee prices over the span of ten years.

**Build Databases that Can Function as Basic Infrastructure for the Healthcare System**

The creation of a comprehensive healthcare database is necessary in order to guide decisions about where to invest and to pursue the further optimization of the healthcare system. While NDB plays a central role in the landscape of Japan's healthcare data, its data lacks accessibility due to issues such as the complex structure of the data, the significant time required for the

application process to gain data access, issues related to the management of master data dictionary files and patient IDs, and so on. It is therefore currently difficult to make full use of NDB. Japan should create a grand design to promote the use of big data in healthcare, and construct a data analysis platform based on that grand design. It is hoped that such a grand design could also promote the use of Personal Health Records (PHRs), which contain a high level of granular information and could help the healthcare sector to better understand patient/disease risk factors and outcomes. The increased use of PHRs could also help to encourage patient empowerment, and contribute to the promotion of better healthcare choices.

Further investment into data infrastructure could encourage innovation that in turn improves the overall quality and effectiveness of the healthcare system, such as the creation of artificial intelligence technology to support testing and diagnoses, the greater use of mobile applications in healthcare, and technology to rapidly gathering useful information during times of crisis. Japan should invest more into the creation of a next-generation data infrastructure. To that end, it is important that the stakeholders that wish to use data do work to steer debate on this topic away from discussions about personal information leaks and other data security issues, and do more to paint a picture of the beneficial possibilities that could be achieved by a healthcare system that more fully uses data.

**Foster Human Resources that Can Recognize Innovation**

Japan needs to develop more experts in health economics (health technology assessment), regulatory science, and data science in order to carry out the healthcare policies discussed above.

### 3. The Healthcare System Should Not Just Cure Diseases, but Increase Healthy Life Expectancy

The purpose of the healthcare system should not just be to cure, but to increase healthy life expectancy for the entire population it serves. Japan needs to change the design its healthcare system – from a “cure”-centered system to a ”care”-centered system that focuses on improving health and quality of life. This could help ensure that even more people are able to actively participate in society, which is crucial in improving Japan’s productivity and the public’s satisfaction with Japanese society. It is thought that this change is indispensable for Japan to overcome the demographic challenges it faces, such as the declining birthrate and aging population. By establishing a foundation of policies that promote efficiency and optimize the healthcare system, as well as and invest in the future, Japan can achieve a sustainable healthcare system that continues to produce exceptional health outcomes in an era of 100-year lifespans.

# Executive Summary

Japan achieved universal health coverage in 1961, enabling all residents to enjoy access to high quality medical care. At that time, the population of Japan was approximately 95 million people. Japan had a birthrate of 1.96 births per couple. Approximately 6% of the population was over the age of 65. Life expectancy was 68.31 years.[1]

Since then, the population that the health system serves has changed.

There are now approximately 127 million people living in Japan. The birthrate is 1.45 births per couple, and 27.2% of the population is over age 65.1 This figure is expected to grow to up to 40% by 2060. At the same time, advances in medicine have helped life expectancy to grow to approximately 84 years.[2]

This shift in the structure of the population has changed the cost structure of the healthcare system, putting pressure on the system's finances.

For example, since 1990, the growth rate of Japan's social security expenditures has outstripped economic growth.[3] The aged dependency ratio is rising, and is expected to increase to nearly 80% by 2060.[4] Meanwhile, average healthcare expenditures for people 65 years and over are on average five times the expenditures of those age 0 to 64.[3] Statistics like these have fueled discussions in recent years about the future sustainability of the Japanese healthcare system.

Recognizing the role that the healthcare system plays in society, and the need to create a system that is suited to the demographic changes that Japan is undergoing, the Japanese Government has begun a number of initiatives in recent years aimed at reforming the structure of the healthcare system. These efforts have included policies aimed at promoting healthy aging, discussions toward reorienting the social security system in such a way that it can effectively serve all generations, and measures to rebalance healthcare system expenditures and premiums.

These efforts are all being done out of the recognition that health will be foundational to society in an era in which people are regularly living to 100 years of age. The Japanese Government aims to use the health system to improve quality of life, increase life expectancies and raise productivity, based on the idea that the achievement of these goals will also support the sustainability of the healthcare system.[5]

How exactly can the healthcare system be reformed to achieve these goals? The healthcare system is complex, and serves a wide variety of diverse stakeholders. It is important that efforts to reform such a system be conducted carefully, and with the input of the people who will be affected by policy changes.

HGPI has been working since 2016 to promote carefully considered, multistakeholder debate on health system reform through its "Rebalancing Healthcare Systems: Innovation and Sustainability" project. In 2019, this project surveyed health system experts to identify the key topics that most require intensive debate in order to advance the policy discourse.

Around the same time that HGPI was doing that survey work, the OECD released a report, *Pharmaceutical Innovation and Access to Medicine* which covered much of the same issues that our own stakeholders were raising. Inspired by that report, HGPI summarized the above list into the six themes listed below.

HGPI then formed an expert taskforce to debate each theme and the possible ways forward for Japan. This report is the result of that taskforce's work. Each chapter offers a detailed explanation from an expert author on the current situation in Japan, and the policy options available to the Japanese healthcare system in the future.

Below is a brief overview of the contents of each section. It is hoped that this report will serve to educate and stimulate further discussion on the next steps for Japan's health system.

### Themes of the Expert Task Force:

- Measures to increase spending efficiency
- Measures to reduce the costs of R&D and improve market access
- The further development of push and pull incentives for innovation
- Measures to strengthen the information base / data infrastructure to better inform policy debates
- Innovative financing mechanisms to help fund new treatments and health interventions
- Value-based healthcare

### Chapter 1 – "Measures to increase spending efficiency" by Isao Kamae

In recent years, the healthcare system has seen the introduction of targeted therapies, regenerative medicine, and other innovative yet costly medical technology that has given rise to debate about the ability of the healthcare system to pay for innovative technology in the future. It is crucial that such debate consider not just costs, but how to maximize the value of

medical technology for patients. This chapter compares the current situation in Japan around this debate with the information contained in the OECD's 2018 report, *Pharmaceutical Innovation and Access to Medicine.* It considers healthcare policy from three questions related to universal health coverage (UHC): 1) Who is covered? 2) Which services are covered? 3) What proportion of the costs are covered? Based on a consideration of these questions, the chapter proposes a new investment loop toward balancing positives and negatives in the healthcare system, thereby improving the system's sustainability and ability to pay for medical technology. The chapter explains that health technology assessment (HTA) is key to linking the concepts of UHC to the new circulatory investment system, and emphasizes the urgent need to foster HTA experts within Japan.

**Chapter 2 – "Measures to reduce the costs of R&D and improve market access" by Mitsuo Umezu**

Japan will require innovation that can promote better health if it is to realize an era in which its population regularly lives to 100 years of age. However, the creation of innovation in medical technology – from the development of hypotheses all the way to proof of effectiveness – requires a tremendous amount of funding, time, and effort. New means of evaluating and approving technology are needed in order to reduce the effort and time required for innovation, and deliver the benefits of new medical technology to patients faster. This chapter considers mainly the research and development process for medical devices from the perspective of cost, efficiency, and market access. It also examines the market conditions for medical devices and pharmaceuticals within Japan, including trends in balances of trade over time. The fourth section of this chapter considers recommendations made by the OECD (harmonization of regulatory standards, measures to accelerate market access), while emphasizing the need to foster experts on regulatory science in the future if improvements on this topic are going to be achieved. This chapter uses the examples of EVAHEART (a ventricular assist device) and the evaluation process for class IV medical devices to explain the regulatory process.

**Chapter 3 – "The further development of push and pull incentives for innovation" by Hiroshi Nakamura**

Japan, along with the rest of the world, is seeking out methods that will allow for a balance to be struck between the promotion of research and development into innovative new pharmaceuticals, and the control of rising pharmaceutical costs. Issues like development lags, the recent introductions of notable high-priced pharmaceuticals, polypharmacy, and problems with prescription adherence have all prevented this balance from being found thus far. With limited financial resources available to the healthcare system, it is crucial that debate be advanced on the reconsideration of approval systems and new incentives that can help to resolve these issues in Japan. Section 3 of this chapter examines the promotion of innovation through policy from the three perspectives of access, cost, and quality. In section 4, this chapter explains the philosophy behind reform from these perspectives, and explains concrete policy options related to push incentives, pull incentives, reverse pull incentives, and risk reduction incentives. Lastly, this chapter summarizes points that must be considered in the future in order to make incentive policies a reality with the healthcare system.

**Chapter 4 – "Measures to strengthen the information base / data infrastructure to better inform policy debates" by Eiko Shimizu**

In order to further improve the healthcare field and patient outcomes, it is important to advance the development of medical information databases, and analysis platforms based on those databases. However, Japan does not currently have any "big data" databases in the healthcare field. Instead, it has many, disparate "small data" databases, including National Database (NDB) Open Data and Diagnosis Procedure Combination (DPC) data, which taken together, have enough granularity and data to cover the entire healthcare system. Doing big data analyses in Japan can thereby take a tremendous amount of money, time, and effort. Furthermore, Japan currently lacks sufficient infrastructure for the spread and use of personal health records, including legal frameworks related to the use of personal information. This chapter examines ways to enhance data infrastructure in Japan toward the balancing of innovation and sustainability in the healthcare system. Sections 2 and 3 examine the traceability and coverage of medical databases in Japan, with a more in-depth analysis of the issues presented when trying to use NDB, which contains nearly all of Japan's claims data. Sections 4 and 5 lay out a concrete way forward for policies, organized by time frame and feasibility.

**Chapter 5 – "Innovative financing mechanisms to help fund new treatments and health interventions" by Kazumasa Oguro**

The balance of national debt in Japan to GDP has exceeded what it was prior to World War II, and continues to grow. It is increasingly difficult to advance fiscal policy under such circumstances. Growth in social security expenses and medical expenses is a big part of this problem, with the size of social security benefits expected to grow by 2.5% per year to 2040. Further debate is needed on measures to control the size of benefits in order to realize sustainability within the healthcare system. This chapter explains the need to develop priorities for reform while ensuring that the system can continue to play its primary role of financial risk protection. Section 2 in this chapter analyzes select pharmaceuticals in terms of their market size

and annual costs as variable to help determine coverage priorities. Section 3 considers measures being implemented in other countries and the financial impact of various policy options, including changes to the range of pharmaceuticals covered by the healthcare system, the introduction of macroeconomic policies that would connect healthcare system funding to GDP growth, and other ways to procure funds, including through consumption tax.

### Chapter 6 – "The goal of value-based healthcare - defining the value of health technology" by Ataru Igarashi

The promotion of value-based healthcare is essential to the achievement of an increase in healthy life expectancy. Japan has introduced a health technology assessment (HTA) system, but since cost-effectiveness analyses do not necessarily measure value, there is a need for further consideration about how to improve the applicable range of this system. There are many different kinds of values, and the way that health technology is evaluated may change greatly depending on what value framework is used. This chapter examines issues that should be considered when attempting to create a health technology evaluation system that looks at technology from multiple perspectives. It considers the value of a quality-adjusted life year (QALY), as well as the extent that QALYs should be used to determine value, and ways to set standards that can measure value. It introduces examples from other countries to that end. It considers the risks entailed with creating standards (the possibility that high-priced cancer treatments might end up not being covered by the healthcare system, limits to market access), and countermeasures to those risks (Patient access schemes that lay out compromise points between companies and regulatory agencies) based on examples from the United Kingdom, and considers the thinking behind not establishing standards (the need for true outcome data) based on examples from France. This chapter ends with a consideration of the state of the Japanese healthcare system in the future.


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# Chapter 1.
## Measures for Improving Expenditure Efficiency

**Isao Kamae**
Project Professor, Graduate School of Public Policy, the University of Tokyo

In his capacity as Project Professor at the University of Tokyo's Graduate School of Public Policy, Professor Kamae heads the research unit on healthcare policies and technology assessment. In addition to his role at the University of Tokyo, he is research director at the Canon Institute for Global Studies. He holds an M.S. in Information Science from Kyoto University, an M.D. from the Kobe University School of Medicine, an M.S. in Biostatistics from the Harvard School of Public Health, and a PhD in Health Decision Science from Harvard, making him the first Japanese national to obtain a PhD in this discipline. He is also a director at the International Society for Pharmaeconomics and Outcomes Research and Health Technology Assessment International. He also assumes roles in international organizations, including expert committees at the WHO and the OECD.

## 1. Introduction

In recent years, a significant change has occurred in the environment surrounding medical science and healthcare. As the dual issues of population aging and a declining birthrate continue to advance, medical technology grows more sophisticated and more reliant on information technology. At the same time, innovative yet expensive health technologies such as targeted therapies, regenerative medicine, and genetic screening are being introduced one after another. As national healthcare expenditures continue to grow, so does a sense of danger towards problems that may appear as demographic change shifts the balance of socioeconomic burdens. The sustainability of the universal health insurance system, and efforts to redistribute resources to that end, have become issues affecting the entirety of society.

Awareness is growing around Health Technology Assessment (HTA) as a tool for responding to this issue.[1,2] According to EunetHTA,

> "Health technology assessment is a multidisciplinary process that summarises information about the medical, social, economic and ethical issues related to the use of a health technology in a systematic, transparent, unbiased, robust manner. Its aim is to inform the formulation of safe, effective, health policies that are patient focused and seek to achieve best value."

As such, an important goal of HTA is creating efficiency to maximize the returns on investments in healthcare, those returns being the value health technology provides to healthcare users.

Measures to use HTA as a part of public policy at the government level have been underway since the 90s, when HTA was implemented in Australia and Canada. The use of HTA spread rapidly after the turn of the century, particularly in the U.K. and European countries. Some well-known HTA organizations are the National Institute for Health and Clinical Excellence (NICE) in the U.K., the French National Authority for Health (Haute Autorité de santé, or HAS), and the German Institute for Quality and Efficiency in Health Care (Instituts für Qualität und Wirtschaftlichkeit im Gesundheitswesen, or IQWiG). That momentum carried HTA to Asia, where public HTA organizations are being created one after another in countries like Korea, Taiwan, Thailand, and Malaysia. Generally, HTA organizations focus on recommending health technologies based on cost-effectiveness and value.

As part of this international trend, the Central Social Insurance Medical Council (Chuikyo) at the Ministry of Health, Labour and Welfare (MHLW) introduced cost-effectiveness analyses (CEA) on a trial basis in Japan in April 2016.[3] Originally, CEA for health technologies was just one aspect of HTA, but after a three-year trial period, Chuikyo reached a consensus on CEA and fully implemented it into the healthcare system in April 2019. A notable characteristic of Chuikyo's new HTA system is that it is the first HTA system in the world to use Incremental Cost Effectiveness Ratios (ICERs) to price pharmaceuticals.

Generally, efficiency refers to a lack of waste when distributing resources, but within the context of HTA, it is defined in terms of the Efficiency Frontier (EF). I*n Health Technology Assessment in Japan*, I described the EF as follows:

> "The 'efficiency frontier' is obtained by presenting the cost-effectiveness of a given set of health technologies (e.g., different drug therapies for diabetes) on a two-dimensional cost-effectiveness plane and refers to the boundary of areas where interventions are either cost-effective or not."

For example, assume the four points Q1 through Q4 on Figure 1 represent the costs and effectiveness of the health technologies for four products (such as pharmaceuticals). Plotting cost and effectiveness on a two-dimensional plane in this manner allows us to interpret the efficiency of those technologies in terms of cost-effectiveness. For example, reducing the resources spent on technology Q4 to create a technology that is just as effective results in a clear improvement to cost-effectiveness. This is represented by Type A (Q4 to Q*4) and is an example of improving efficiency by reducing cost. However, if an increase in cost is unavoidable when creating a new technology, but effectiveness is improved accordingly, there are two possible types of innovation that are acceptable within the EF. These are represented by Type B (Q4 to Q*4), which is a natural extension of the frontier curve, and Type C (Q4 to Q*4), which is a jump to a higher frontier curve. The EF curve shows that a certain amount of deterioration to cost-effectiveness is unavoidable in order to achieve innovation through standard technological improvements. Type B represents the standard level of technological improvement and shows that a certain degree of deterioration to cost-effectiveness is unavoidable. Meanwhile, the Q*4 points with improved cost-effectiveness represent desirable breakthrough innovations.

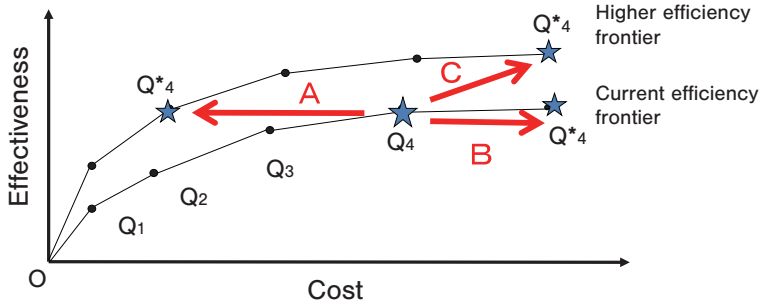


**Figure 1. The Efficiency Frontier (EF) Curve**

The three types of innovation (from technology Q4 to Q*4)

- Type A: Improve efficiency by lowering cost
- Type B: Extend EF curve
- Type C: Jump to higher EF curve

To address concerns about cost and efficiency related to health technology, the Organisation for Economic Co-operation and Development (OECD) published Pharmaceutical Innovation and Access to Medicines at the end of November 2018.[4] This report was made in response to the 2016 G7 Health Ministers' Meeting in Kobe. [5] This chapter will examine how the proposals in that OECD report apply to Japan's healthcare system, share points raised at taskforce discussions concerning the current situation and future issues for Japan, and propose measures for the future.

## 2. Background and History of Issues

According to the OECD, Pharmaceutical Innovation and Access to Medicines was compiled in 2017 to satisfy a request from the Health Ministers of its (at the time) 35 member economies that participated in the 2016 G7 Health Ministers' Meeting, which was included in the Kobe Communiqué. Their request read:

> "We look forward to OECD work on sustainable access to innovative medicines. In line with the ambitions of the G7, this work can help us improve our understanding of ways to keep innovation robust, treatments accessible and health systems sustainable. We encourage ongoing reflection, supported by high-level expertise, and international co-operation in this area." [3]

In other words, the report was the OECD's answer to the issues raised at the 2016 G7 Health Ministers' Meeting in Kobe.

The 2016 event was the first time a G7 Health Ministers' Meeting was held in Japan. The discussion at that meeting went into depth on the international health issues discussed at the G7 Ise-Shima Summit, which Japan hosted in May 2016, and was an important opportunity to discuss efforts for promoting policy through harmonization between G7 countries. G7 Health Ministers' Meeting participants included representatives and senior officials from the World Health Organization (WHO), the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), the OECD, the World Bank, and Health Ministers from Laos, Myanmar, Singapore, and Thailand. The conclusions reached through that discussion were adopted as the Kobe Communiqué. [6]

The main points of the Kobe Communiqué are:

1. Reinforcing the Global Health Architecture for Public Health Emergencies
2. Attaining Universal Health Coverage (UHC) and Promotion of Health throughout the Life Course focusing on Population Ageing

On the topic of UHC, the G7 Health Ministers' Kobe Communiqué says:

> "In light of rising health care costs, we reaffirm that investments to strengthen health systems, through evidence-based and transparent prioritization methodologies, particularly health technology assessment are crucial in the decision-making process toward UHC. Economic evaluation of interventions is essential for the efficient and sustainable allocation of finite resources within health systems, and we encourage research and improved information sharing on this matter.
>
> We highlight the interdependence of the SDGs, including the specific contribution of progress on Water, Sanitation and Hygiene (WASH), along with other infection prevention and control measures, including immunization as one of the key cost-effective measures in combating infectious diseases, halting the spread of antimicrobial-resistant infections as well as in contributing to individual well-being throughout the life course." [4]

3. Antimicrobial Resistance (AMR)
4. Research and Development (R&D) and Innovation

At first glance, it may appear that these four themes are independent from one another. However, each theme is connected with HTA-related concepts and phrases such as "economic evaluation," "efficient and sustainable," and "key cost-effective measures." If one considers the fact that a new pharmaceutical pricing system using CEA was introduced in Japan by a Chuikyo trial that began in FY2016, we can conclude that the MHLW not only showed its recognition of the importance of HTA to people in Japan, but also broadcasted that recognition to the world at the G7 Kobe Health Ministers' Meeting.
After holding hearings with industry representatives, the OECD released a finalized version of the report at the end of November 2018 as a proposal on pharmaceutical innovation and access to medicines.

## 3. The Current Situation in Japan and Japan's Strengths

Japan introduced the first UHC system in Asia more than half a century ago and has achieved and maintained a high standard of health for its people ever since. According to statistics compiled by the OECD in 2017, Japan was ranked among the top countries in the world in terms of life expectancy and health spending (Figure 2). In Figure 2, the vertical axis represents average life expectancy, the horizontal axis represents health spending per capita, and Japan appears as JPN. The regression curve on Figure 2 corresponds to an efficiency frontier, so it can also be interpreted as a threshold for high and low cost-efficiency. According to that interpretation, Japan has achieved efficient healthcare along the efficiency frontier. The U.S. (USA in Figure 2) is the only country not on the EF curve, suggesting that its efficiency between healthcare expenditures and life expectancies is significantly worse than countries on the curve.

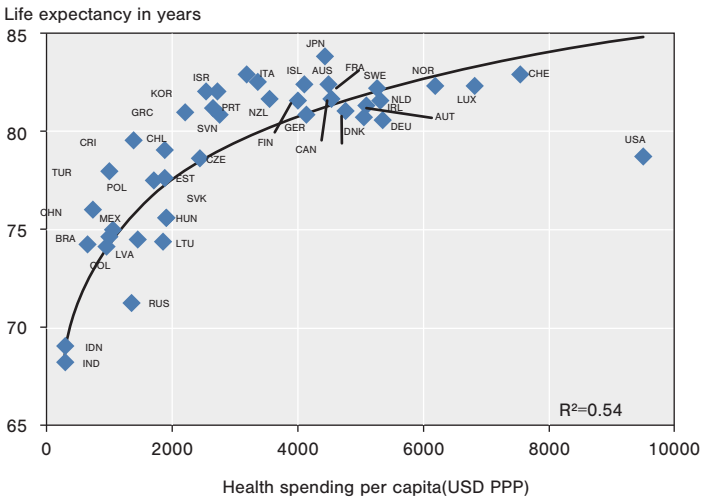


**Figure 2. Life Expectancy and Health Spending in the World**
Source: OECD Health Statistics 2017

Consequently, concerning "Measures for Improving Expenditure Efficiency" – the theme of this chapter – continuous, innovative efforts undertaken in Japan have already started to bear fruit. We could call this a strength borne from all the conditions that exist in Japan. However, it must be noted that although Chuikyo officially implemented CEA in the evaluation system in FY2019 to address concerns regarding rising healthcare expenditures, Japan was the last G7 member country to adopt CEA, raising lingering issues not only in terms of reform speed but also for future efforts concerning HTA.

## 4. Potential Policy Options

The *Pharmaceutical Innovation and Access to Medicines* outlines the following five broad principles on which to base policy options.

1. Increase the value of spending on medicines.
2. Ensure access in countries at different levels of development.
3. Support a rules-based system.
4. Foster competition in both on-patent and off-patent markets.
5. Promote better communication and dialogue between payers, policy makers, pharmaceutical companies, and the general public.

Policy options based on these five broad principles are arranged in five categories within Chart 1. These categories are labeled A through E. "Measures for Improving Expenditure Efficiency" are included in category B. In one form or another, the six policy options described in category B have already been implemented in Japan.

**Chart 1. 5 Policy Options from the OECD Report**

**A. Involve stakeholders in joint efforts to reduce the costs of R&D and accelerate market access**
- Option 1: Harmonise regulatory standards and promote mutual recognition
- Option 2: Accelerate market access for medicines with significant potential benefits

**B. Increase spending efficiency**
- Option 3: Facilitate co-operation in health technology assessment (HTA)
- Option 4: Encourage co-operation in negotiation, contracting or procurement
- Option 5: Assess performance of medicines in routine clinical practice and adjust coverage and pricing accordingly
- Option 6: Promote competition in on-patent markets
- Option 7: Explore bundled payments for episodes of care in oncology
- Option 8: Promote competition in off-patent market

**C. Determine willingness to pay for new treatments or health benefits**
- Option 9: Define explicit and firm criteria for coverage and pricing
- Option 9: Special rules when the budget impact is high
- Option 10: Optimise the use of Managed Entry Agreements

**D. Develop new push and pull incentives to encourage innovations in areas of high unmet need**
- Option 11: Develop push incentives targeting product development
- Option 12: Explore alternative pull incentives to encourage R&D for unmet medical needs
- Option 13: Review orphan drug policies to target more closely areas of unmet need

**E. Strengthen information base to better inform policy debates**
- Option 14: Publish authoritative information on industry's activities, R&D risks, costs and returns to better inform policy decisions
- Option 15: Increase price transparency in pharmaceutical markets
- Option 16: Improve horizon scanning activities and envisage co-operation at the regional level

From an efficiency perspective, HTA is a common thread that can be found in each of the six policy options under B. B-1 reads, "Facilitating cooperation in health technology assessment (HTA)." Chuikyo implemented CEA into the evaluation system in FY2019, so we can say that was Japan's response to B-1. B-2 refers to the kind of international cooperation demonstrated by measures like the BeNeLuxA agreement in Europe (which includes Belgium, the Netherlands, and Luxemburg).[7] Whether or not a similar measure is possible in Asia is an issue that also concerns Japan. B-3 directly correlates with Japan's New HTA, which has been incorporated into the pharmaceutical pricing system adjustment process. B-4 and B-6 address issues related to patents and generic pharmaceuticals. Although various pharmaceutical pricing rules have already been implemented in Japan, clarifying the concept of efficiency in terms of HTA will be an issue moving forward. B-5 has already been implemented through the diagnosis procedure combination (DPC) payment system, but whether or not Japan will apply HTA cost-effectiveness assessments, for example, to the DPC system's pharmaceutical pricing rules, will remain an issue to address in the future.

We can point out that problems related to efficiency that category B policy options attempt to address are directly and indirectly related to various topics from both the perspectives of HTA and from the other categories. For more details, please see the appendix at the end of this chapter.

The following points and issues concerning the OECD report and category B policy options were raised at taskforce discussions.

**Concerning the report overall**

- While the OECD report makes valid criticisms, few points apply to Japan. Japan has already kicked off sufficient efforts for four of the six policy options in category B. The use of Quality Adjusted Life-Years (QALYs) and cost-effectiveness are recognized as new elements in pharmaceutical pricing. Expenditures have been controlled effectively until now, although more quantitative measures are needed.

**Concerning value**

- When discussing efficiency, it is important to ask what the meaning of value is in the first place. The issues Japan's healthcare and social security systems face are not the result of acute diseases, as they were in the past. Japan must now ask how to assess technology in relation to chronic diseases like lifestyle diseases and cancer.
- Japan must decide in advance what returns it wants from investments. In other words, there needs to be a clear definition of what 'value for money' means.
- In OECD international rankings, Japan receives the highest marks in most categories, including infant mortality rate, deaths from cancer, and suicides among people with psychiatric disorders. The only area in which Japan performs poorly is in self-rated health. If value is unclear to begin with, it is impossible to measure benefits in terms of expenditures, making it difficult to hold policy discussions on the topic.

In response to problems concerning how to define or perceive value, it is helpful to consider the value "flower" developed by an ISPOR Special Task Force, which contains twelve elements of value in relation to recommended efforts for Augmented Cost-Effectiveness Analyses[8] Figure 3 illustrates those twelve elements. In addition to the four elements that are currently incorporated in current value assessments, namely (1) QALYs gained, (2) net costs, (3) productivity, and (4) adherence-improving factors, the flower also highlights eight novel elements. These are (1) reduction in uncertainty, (2) fear of contagion, (3) insurance value, (4) severity of disease, (5) value of hope, (6) real option-value, (7) equity, and (8) scientific spillovers.

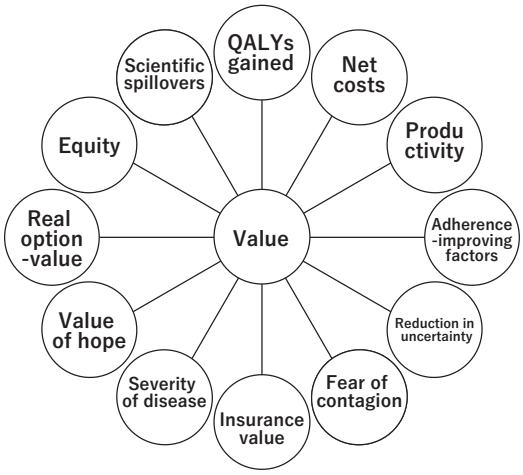


**Figure 3. The Value Flower (12 Elements for Analysis)**

Source: STF Final Report, Section 3 by Lakdawalla et al, Value in Health, Feb 2018

These twelve values were identified to broaden the scope of value recognition in healthcare and to encourage new research that incorporates more elements of value than what was covered by CEA in the past. The ISPOR Special Task Force believes many of these twelve elements are related to well-being and can be used to determine standards for multiple-criteria decision analysis (MCDA). However, the notes that "equity" and "scientific spillovers" require more theoretical development and consensus. The ISPOR guidelines can be used to guide efforts in Japan.

**Concerning outcomes**

- The U.S. improved healthcare safety by introducing novel medical devices like pulse oximeters. Cancer screenings are assessed by mortality rates. It is important to decide which outcomes to focus on.
- When the OECD visited Japan, they pointed out that outcomes are not collected at healthcare institutions.

**Concerning communication, the fifth of the five categories identified in the OECD report**

- Japan can serve as a leader in efforts to help patients become more informed about their own healthcare and make educated decisions based on that information.

## 5. Analysis of Budget Impact and Feasibility of Policy Options

Instead of examining the policy options included in category B of the OECD report individually, our taskforce discussed the following points related to the budget impact and feasibility of policy options.

**Problems related to financial resources**

- Japan is facing problems related to the costs of healthcare and social security while also experiencing population aging and a falling birthrate. This is obvious even without it being pointed out by the OECD, and no country facing this problem has yet to find a solution.
- When determining the efficiency of health technology, if there is shared value created by the technology which multiple parties might benefit from whether they pay for the technology or not, it is important to have discussions as to who will cover expenditures related to the technology and how.
- Technological advances do not guarantee lower healthcare expenditures because the financial burden of implementing new technology is also shouldered by healthcare expenditures. Discussions on this topic will remain purely academic if we do not actually discuss who will pay and how much.

**Problems facing value assessment for medical services and examinations**

- The reason that Japan appears to have high efficiency in Figure 2 is because personnel costs have been kept low. While there is wide recognition for the inclusion of cost-effectiveness when determining the value of premiums in Japan's pharmaceutical pricing system, expanding those methods to apply them to the entire medical service fee schedule is difficult. There is not enough discussion on the value of medical services and examinations.
- Technical fees are lower in Japan compared to abroad, so some healthcare providers secure income by increasing the number of tests and other examinations conducted. Steps like increasing the value of medical services and evaluations and lowering the value of pharmaceuticals are required to achieve balance.

**Problems related to patient population sizes and user count**

- Healthcare expenditures are calculated by multiplying unit price by user count, so total healthcare expenditures increase when unnecessary tests are conducted or when wasteful prescriptions are written. This is the problem of user count. Medical service fees that physicians receive, and the prices of each pharmaceutical are kept low, so unnecessary tests are a significant source of pressure on healthcare expenditures. It is important to note that Figure 2 does not consider user count.
- Comparing countries, we find that pharmaceutical prices and medical service fees are low in Japan, but user counts are higher because the elderly population is large. This increases overall healthcare expenditures. Policy debates ought to consider perspectives on the adjustment of expenditures according to the aging rate. High healthcare expenditures are not only caused by unit prices.
- When considering wasted resources in quantitative terms, Japan faces a triple handicap: there are no appropriate guidelines for discussing the validity of tests, medications, etc.; payment funds encounter difficulty when checking for redundant or overlapping treatments when people use multiple medical institutions; and there is no data on which to base discussions on these problems. These three problems are discussed in detail below.

**The absence of guidelines**: Since there are no guidelines on which tests and treatments are considered appropriate for coverage by public health insurance, the total cost of unnecessary tests and treatments is unclear. Insurance assessments conducted by third parties include a check that is meant to prevent the waste of resources on unnecessary tests and treatments, but there are some situations when even necessary tests are not granted coverage. The absence of guidelines means that it is difficult to systematically examine the details of medical services performed and treatments provided when attempting to tackle wasteful spending. Unit prices are easier to understand, so discussions tend to focus on unit prices.

**Problems facing efforts to check for redundancy or overlap**: In insurance assessments, checks are not conducted when someone changes to a new healthcare institution. The same problem exists for prescriptions. Payment funds do inspect invoices from individual healthcare institutions, but it is difficult for them to track redundant tests or overlapping prescriptions from multiple healthcare institutions.

**The lack of data**: The main condition for overcoming the aforementioned two problems is achieving efficient data management. As long as appropriate data is inaccessible, there is no solution to these problems in sight. Reducing unnecessary tests is a critical issue for achieving efficiency. The policy options proposed by the OECD include "Facilitating cooperation in HTA," but HTA exists at both the micro- and macro levels. Including elements such as patient population sizes and prescription and testing habits among physicians to conduct thorough assessments is an important role of HTA. For that reason and for various other reasons, publicly-accessible databases are essential. This is also a problem related to the institutionalization of healthcare data, which is described below.

The qualitative aspect of the patient population size problem must also not go overlooked. Specifically,

- Inefficiency in clinical settings is either unavoidable (such as when inexperienced physicians conduct wide-ranging tests) or deliberate (such as when unnecessary endoscopies are conducted). The differences between the two are significant and a system that distinguishes between them is needed.
- Regardless of the resource in question, the scope of waste is important. Current measures for clearly identifying wasteful practices including redundant tests and overlapping medications are insufficient.

**Problems facing the creation of healthcare data infrastructure**

Some of the problems facing efficiency can be solved if the efforts and investments are made toward the creation of more useful healthcare data infrastructure. Opinions expressed at the taskforce on this topic are detailed below.

- In other countries, there are examples of cloud storage being used to provide remote access to patient x-rays. It is necessary to improve the efficiency of the Japanese healthcare system through the use of such systems.
- Data health is important. It is important to educate the public and build awareness about the creation of better healthcare data systems. This perspective should also be integrated into cancer education.
- It is possible to solve redundancy problems such as when a test is conducted multiple times at different healthcare institutions (the user count problem) by through the strengthening of healthcare data infrastructure. During former Minister of Health, Labour and Welfare Yasuhisa Shiozaki's time in office, there was a plan to introduce AI to that end. The creation of that system could eliminate standard differences in costs between tests paid for by social security, National Health Insurance, and payment funds, but the cost to build the necessary infrastructure is several trillion yen. A business model should be developed that can cover the operational costs of such a system.
- The need for stronger healthcare data infrastructure is not a problem that can be solved only through greater financial investment. Even if everyone understands the need for better data, unless investments are done in a way that is based on a firm understanding of the priorities that need to be tackled for the creation of a better data system, investment will not help. This issue seems to be more of a political nature than a technological one. This point needs to be thoroughly considered when tackling data system issues in the future.

**The problem of investments to cover expenditures**

- Up to this point, healthcare system liabilities were covered by economic growth. However, demographic changes due to population aging and a declining birthrate have made it difficult to maintain a sustainable economic growth model. Some are concerned that cost cutting in the healthcare sector will be detrimental to the economy. The health system requires new business models that aim to create efficiency through innovation.
- It is unproductive for stakeholders such as insurers, healthcare providers, and people who receive healthcare to only point out each other's wasteful use of resources. Such a discussion can have no winner. Instead, all stakeholders must decide together who will shoulder burdens, and how much of each burden they will shoulder. A different approach is needed from what has been used for discussions up to this point.

**Problems related to compliance and cost awareness**

- Discussions on efficiency should also consider the issue of compliance to prescriptions among patients.
- It may be possible to improve compliance by developing once-a-day pharmaceuticals or by improving prescription practices.
- Academic societies should create medication guidelines for physicians that take pharmaceutical prices into account.
- Moral hazards pose a problem from the perspective of efficiency. One example would be the perception that a physician who prescribes many pharmaceuticals and conducts many tests is a good physician.
- Efforts are needed to build awareness towards the fact that just 30% of treatment costs are covered by copayments and the other 70% is paid by taxes.
- Population aging has normalized polypharmacy. It is important to work toward the creation of a culture in which patients refuse inefficient prescriptions. To do so, healthcare system users must be made aware of the value of pharmaceuticals and physicians must be educated and encouraged to raise awareness about prescription inefficiency.
- The actions people that patients should take to support efficiency in the healthcare system should be clarified.
- People using healthcare should be aware of their own needs and the value of healthcare so they can learn how to skillfully engage with it. Healthcare providers should publicize information related to these topics.
- Insurers should build awareness towards medical tests and medication and explain that having more awareness towards these topics will improve the daily lives of people receiving healthcare and their families.
- Just as computer literacy was increased during the transition to an information society, it is desirable that efforts to increase HTA literacy be encouraged in an aging society in order to encourage healthcare efficiency.

## 6. Proposals for Future Efforts

If we consider the final report presented by the OECD on pharmaceutical innovation and access within the context of HTA, the policy options it proposes should not be considered as independent from each other. They can be linked with the thread of HTA. In other words, the problems facing innovation in health technology and access are the same as those facing HTA.

In addition, outside of the context of HTA, several of the OECD's proposed policy options have already been discussed at Chuikyo or in Government committees. As we saw from the taskforce comments in the previous section, many of those policy options can be, or have already been implemented to a certain extent in Japan.

Therefore, if Japan publicizes information concerning its existing rules or New HTA system to the rest of the world while using the OECD policy options as templates, it could convince people that other countries should learn more from Japan's system.

However, to achieve that, Japanese stakeholders should learn to focus on the vision behind the concepts and policies like the OECD proposals did while envisioning the specific systems they describe. Information on healthcare systems in Japan should be publicized from that viewpoint. Taskforce members  rovided various hints for doing that.

- No country has yet to successfully control costs with HTA. We must conduct a thorough investigation to discover if current costs are actually excessive. Japan has the highest rate of population aging worldwide. Is a future with moderate costs but low benefits acceptable? If it is, it should be possible to set out a framework showing how much cost cutting is needed to achieve that. After cutting costs according to that framework, it should then be possible to determine the amount of additional investment the system requires to achieve our goal. The 2012 edition of the White Paper on Health, Labour and Welfare provided the first estimate for this. It stated that the needs of society can be met if an additional 1.7 trillion yen is added to the system (while making minor budget adjustments). However, the policy response to that estimate was slow. Only recently was the consumption tax rate increased to 10 percent.
- The healthcare team managed jointly by MHLW and the Ministry of Economy, Trade and Industry (METI) is holding investigative meetings on technology in the year 2040. If the discussions there and at our taskforce can address certain topics – namely, the balance between benefits and premiums in the healthcare system, how much of the public burden must be absorbed, and what services the National Health Insurance system should cover – it is likely that the reports generated will create positive value.

I believe comments like the above suggest that it is urgent we reexamine measures from the perspectives of National Health Insurance system coverage, coverage scope for services, and the financial burden created by the healthcare system. Moreover, learning from the OECD proposals, it is crucial to connect these topics to HTA in order to make progress on them. From an international point of view, Japan's National Health Insurance system is a form of UHC. Internationally, the three dimensions of UHC coverage are the covered population, the scope of covered services, and the proportion of costs covered (Figure 4).

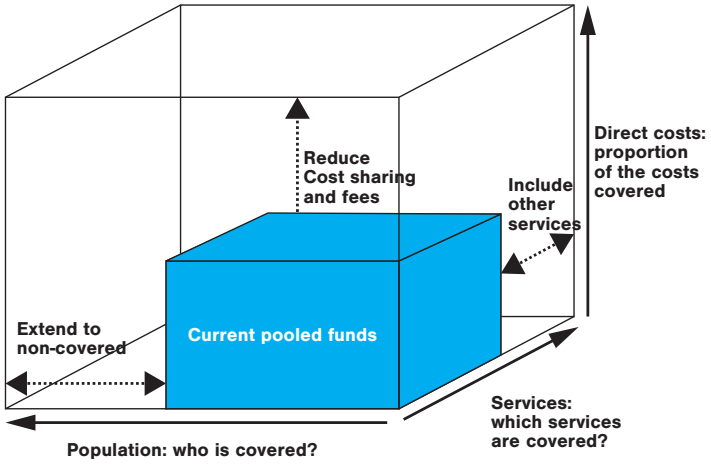


**Figure 4. Three dimensions to consider when moving towards universal coverage**

source: Health Systems Financing, The path to universal coverage, WHO

**Therefore, the first proposal of this chapter is:**

1. Reexamine the mutual relationships between the three dimensions of UHC in Japan from both the perspectives of HTA theory and policy theory to realize a universal coverage system that can guarantee affordability.

It is also worth noting that, in terms of the three dimensions of UHC, the CEA process incorporated into the pricing system by Chuikyo in FY2019 is a new system for determining the value of individual pharmaceuticals using two dimensions: the scope of covered services and the proportion of costs. Therefore, the creation of Chuikyo's new pharmaceutical pricing system was the first step towards achieving this first proposal. However, efforts should not end with the creation of a system for determining the values of individual pharmaceuticals. In the future, a systematic approach that encompasses the entire UHC system will be needed. Only through such an approach could the achievement of a financially sustainable system begin to seem possible.

**On that note, my second proposal is:**

2. In addition to assessing the value of individual technologies, build a sustainable new cyclical investment system by utilizing HTA to regulate the entire National Health Insurance system to improve efficiency and attain balance between positive and negative investments (Figure 5).

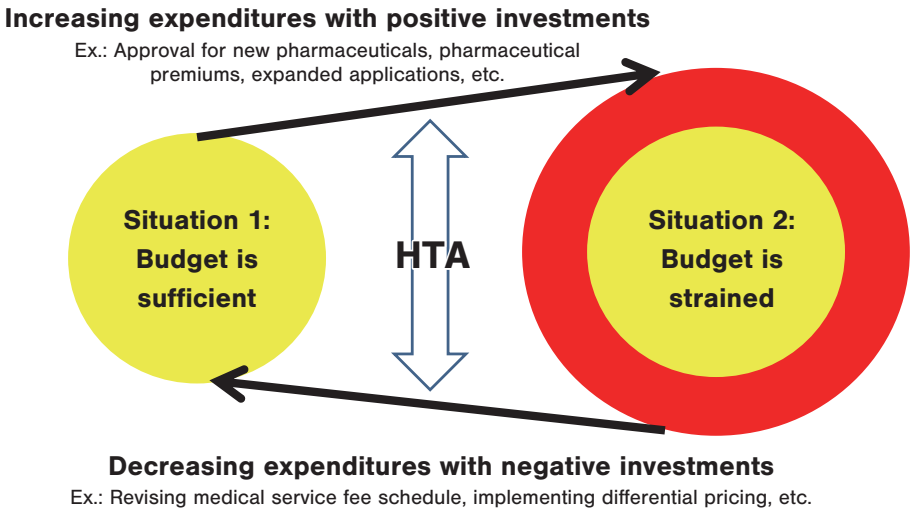


**Figure 5. A new cyclical investment system**

Source: Kamae, I. MHLW's Fourth Meeting on the New HTA System: Achieving Sustainability in the Healthcare System. Pharmaceutical and Medical Device Regulatory Science. Vol.48,No.9,p.588-593(2017)

Existing systems that could be considered tools for cyclical investments include pharmaceutical premiums (which are positive investments) and revisions that decrease medical service fees (which are negative investments). However, the new cyclical investment system that I am proposing would regulate expenditure hikes created by positive investments using value assessment (specifically, the New HTA system that was implemented by Chuikyo in FY2019) and incorporate various measures that utilize HTA (for example, value-based differential pricing) to supplement the existing method of managing negative investments with medical service fee revisions.

In the end, for HTA to fulfill its key role as the element that ties together the three dimensions of UHC and the new cyclical investment system, it will be important to train additional experts who understand HTA, and raise the HTA literacy of health system stakeholders. Our ability to achieve this will determine the success of future efforts.

**Appendix – Connecting Policy Options with HTA and Discussing Policy Options outside of Category B**

Excerpt from Kamae, I. MHLW HTA Systems: Issues Facing Systematization from Perspectives Raised in the Ninth OECD Proposal, *Pharmaceutical and Medical Device Regulatory Science*, December 2019.

Category C addresses problems related to determining Willingness to Pay (WTP). C-1 says, "Define explicit criteria for coverage and pricing," but Japan has already responded to this option by implementing a pricing system based on ICERs. According to the view of the OECD report, it is also possible for standards to include considerations for budget impact or equity in addition to cost-effectiveness. Generally speaking, WTP increases when the disease in question is serious or rare, so the fact that this policy option suggests introducing value-based WTP is very interesting. Introducing value-based WTP would make it possible to determine WTP by disease, so when defining value-based WTP, it becomes necessary to compare the benefits of the treatment in question with the benefits obtained from the same amount of spending on other treatments.

Although value-based pricing was supported by the WHO forum on appropriate pricing,[9] the OECD report gave no clear response on the topic. While the WHO tends to focus on low-income countries, the OECD focuses on promoting health technology innovation in middle- and high-income countries, which I believe is the source of the difference in support.

Japan has already implemented measures that correspond to policy option C-2, such as the Repricing for Market Expansion system. However, as demonstrated by the problems that led to the repricing of Opdivo, the Japanese approach to repricing is to combine CEA with existing repricing rules. As a general rule, the target populations for high-priced pharmaceuticals are limited to the smallest size possible to minimize budget impact. However, since it is possible that pharmaceuticals might be used for non-approved purposes or that their usage is expanded, we must be prepared for situations in which it is impossible to optimize expenditures as expected. Also, when there is a massive increase in the size of the target population, such as when an infectious disease causes a worldwide pandemic, it is important to be prepared for the possibility that even pharmaceuticals with excellent cost-effectiveness according to ICER can pose a significant threat in terms of budget impact. Policy option C-3 discusses managed entry agreements (MEAs), but MEAs have yet to be appropriately arranged in Japan and the topic of MEAs has not yet been addressed in discussions on the New HTA system. This is a problem that affects everything from horizon scanning to projections of post-market real-world cost-effectiveness, so future efforts to address it are desirable.

Category D policy proposals aim to promote innovation, but before we discuss innovation, we must first distinguish between types of innovation. For physicians, innovation refers to improvements to medical effectiveness, but from a social perspective, it is more desirable for innovation to improve cost-efficiency. The Government is already pursuing various measures that correspond to D-1, which addresses contributions to R&D funding or establishing Public-Private Partnerships (PPPs). D-2 includes HTA-related issues. The OECD has made statements addressing AMR and it was also mentioned in the Kobe Communiqué. Measures to combat AMR are already underway in Japan. For example, Japan established a premium to support pediatric antimicrobial stewardship measures. From the perspective of HTA, this is a problem related to value assessment (or at least cost-effectiveness) for the main portion of the medical service fee.[10] D-2 also proposes the establishment of market entry rewards, a type of pull incentive. Market entry rewards have not received much consideration in the past, but because they are related to CEA, they must be explored in the future.

Generally speaking, Government publications mentioned in policy option E-1 have obtained significant results within Japan. From the perspective of HTA, Chuikyo created the second edition of the CEA guidelines when CEA was systematized.[11] E-2 discusses pricing transparency in the pharmaceutical market, which is normally a difficult issue for industry. However, in Japan, pharmaceutical prices are determined using a cost accounting system. Efforts should be made to improve the cost accounting system with an HTA perspective. E-3 discusses horizon scanning, a topic that lacked sufficient awareness in Japan. That is because R&D in Japan focuses on clinical trials. However, to assess value, HTA has come to emphasize a holistic view that encompasses all steps from preclinical research to post-market clinical practices. This is another reason HTA literacy must be widely promoted. Although IT was previously one of Japan's strengths, Japan is now lagging behind advanced countries in North America and Europe in responding to IT needs in healthcare, particularly in the creation and use of databases. The OECD's 2017 *Recommendation on Health Data Governance* included an international comparison of the development status of electronic health records (EHR) systems. This comparison was made by plotting data governance readiness and technical and operational readiness along a two-dimensional plane. Out of the 30 countries examined, Japan ranked last. [12] This is a clear indicator that the creation of an information infrastructure is an urgent issue.

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# Chapter 2.
## Regulatory Science Measures to Promote Research and Development and Improve Market Access



**Mitsuo UMEZU**
Professor, Department of School of Creative Science and Engineering, Waseda University

Mitsuo Umezu is a biomedical engineer in the research field of cardiovascular system modeling and simulation. He received two PhDs; a Doctor of Engineering from Waseda University and a Doctor of Medical Science from Tokyo Women's Medical University. He previously worked as a research associate and laboratory head of a department of Artificial Organs at the National Cardiovascular Center Research Institute, Osaka between 1979 and 1988. Following that, he was appointed the first project leader of Australian Artificial Heart Program at St. Vincent's Hospital, Sydney. He has been a professor of the Department of Mechanical Engineering, Waseda University since 1992. He is one of the founders of the "Center for Advanced Biomedical Sciences, TWIns," and also a department head of he Joint Graduate School with Tokyo Women's Medical University. His recent research interests includes the development and evaluation of artificial organs, and regulatory science for advanced medical treatments.

## 1. Introduction

Based on the discussions held by the HGPI task force, this chapter will examine methods to improve the efficiency of medical research and development (R&D) process and enhance market access toward the creation of a social security system that can overcome issues arising from a declining birthrate and an aging population.

For those unfamiliar with the term, throughout this document, the term "regulatory science" (or "RS") is used according to the definition issued by Waseda University Institute for Medical Regulatory Science in 2015:

> "'An evaluation, forecasting, and decision-making science' for harmonizing and coordinating advanced sciences and technologies related to health and medical care in the 21st century (pharmaceuticals, medical devices, and regenerative medicine) with people and society to bring about true advantages and happiness for patients, and a multi-trans-inter-disciplinary science that is a new creative science combining the natural sciences and humanities and social sciences." [1]

In other words, we define regulatory science as an interdisciplinary science that works to improve evaluation, forecasting, and decision-making methods related to the approval of health technology, all from the perspective of improving patient lives.

Before we discuss measures to improve the efficiency of R&D and enhance market access, it is important to understand the current state of these topics in Japan. To that end, section 2 first describes the background and issues facing R&D. Section 3 then focuses on the state of Japan's pharmaceutical and medical device industries. In section 4, I consider proposed policy options for solving the issues identified in sections 2 and 3. Finally, in section 5, I consider the impact of the proposed policy options.

## 2. Background and Issues of Research and Development

In order to understand how regulatory policy is formed for medical innovations, it is crucial to first understand that different premises are used for the regulation of pharmaceuticals and medical devices. I will first outline these differences here, and then examine the background concepts for the approval of medical innovations in general from the perspectives of cost, efficiency, and the need to ensure market access.

### The Differences between Pharmaceuticals and Medical Products

In the past, from a regulatory perspective, medical devices were classified as a subset of pharmaceuticals. Ever since the Pharmaceuticals and Medical Devices Act was revised in fall 2014, medical devices have been regulated separately under the Act on Securing Quality, Efficacy and Safety of Products Including Pharmaceuticals and Medical Devices. This Act clarifies specific methods for reviewing the quality, efficacy, and safety of medical devices in the same manner as pharmaceuticals.

The similarities and differences between medical devices and pharmaceuticals from a regulatory perspective have been analyzed in detail already by Ms. Tomiko Tawaragi, formerly of the Ministry of Health, Labour and Welfare (MHLW), whose work I reference for this section.[2] My explanation here is based on her definitions. Medical devices are manufactured products based on sciences like mechanical engineering, electrical engineering, radiochemistry, pharmacology, and material engineering, and their use generally has minor biological effects. Pharmaceuticals, on the other hand, are chemical substances

based on pharmaceutical sciences that function through biological reactions. Another significant difference is that medical devices are developed by designing solutions for specific needs at healthcare facilities, while pharmaceuticals are developed through continuous exploratory research.

Pharmaceuticals and medical devices also differ in the methods used to review them. Specific review methods have been established over the history of pharmaceutical review. In contrast, reviewing medical devices requires carrying out a risk assessment for every device. Medical device reviews can be conducted using clinical research methods or they can be conducted according to the Pharmaceutical Act. These two approaches are radically different. The former allows people receiving treatment to rapidly access new prototypes. With the latter method, approval can only be obtained after exploratory trials and verification trials have been completed. This process is generally very time-consuming. Currently, the Government is considering a law to shorten the approval period and legislation has been developed to allow for conditional early approval. Details about conditional early approval are provided in the description for Option 2 in Section 4, "Policy Options."

As I already mentioned, there are many differences in the way that the Government thinks about pharmaceutical and medical device regulation. In general though, there are three basic elements that form the basis for considerations about the approval of new medical innovations. I will discuss these in the following sections. They are: cost, efficiency, and market access.

**Cost**

There are two main issues related to cost that must be considered when designing R&D-related regulatory policies. The following two issues related to cost were identified during an interview with Ms. Sara Takahashi of the Pharmaceuticals and Medical Devices Agency (PMDA). [3]

1. Clinical trials are an order of magnitude more expensive than other phases of development (such as non-clinical and post-market studies).
2. If clinical trials are to be held, they must be held over as short a period of time as possible. There are recent examples when academic societies helped with patient registration to save time.

**Efficiency**

Related to efficiency, when designing regulatory policies, it is important to consider how innovation takes place. Specifically, according to Mr. Masami Sakoi of the MHLW, innovation takes place over three stages:[4]

1. Stage of searching for new technologies that outperform existing technologies.
2. Stage in which experts work to ensure the quality of the new technology as they move toward its completion/ commercialization
3. Stage in which an environment is created in which the finished technology can spread via commercialization, etc.

During stage two, long periods of time and vast amounts of effort from experts are required to establish hypotheses concerning treatment and diagnosis and to conduct reviews. Methodologies have been established for conducting this process during clinical trials for pharmaceuticals. However, for medical devices, this phase usually begins with an examination of whether or not clinical trials are necessary. If they are, clinical trials must designed and end goals must be determined.

Therefore, to lower personnel costs and shorten the time required until new technologies can be used for practical applications, new review systems must be created using new approaches rather than by expanding conventional ones. To accomplish this, cooperation from RS professionals with the capacity to create new review systems will be necessary. I explain the need for the development of human resources in more depth within section 4.

**Market Access**

Lastly, the need to ensure access to new innovations is an important consideration when developing regulatory policies. For this section, I will focus on efforts to improve access to medical devices. Such efforts are implemented both pre-approval and post-approval.

One pre-market measure for early approval is RS Strategy Consultations, which have been offered by the PMDA since 2017. First, meetings are held in advance to prepare for RS General Consultations or RS Strategy Consultations by deciding consultation content and identifying discussion points. Then, based on a post-market risk management plan prepared by the applicant, a face-to-face consultation is held to determine the necessity of clinical trials and to finalize plan details. There have been cases in which clinical trials were deemed unnecessary, and there have been others in which accelerated approval was granted for partial amendments. One example of the latter occurred during an application for stents.

When safety cannot be evaluated during pre-market review, thorough plans for post-market safety measures must be created. There are limits as to which aspects of medical devices can be covered during pre-market reviews, so it is important that plans to ensure safety through post-market safety measures are created in advance. For advanced medical equipment, the following items are often added as supplementary conditions during approval:

1. Conduct appropriate training
2. Limit installation locations and plan for gradual expansion
3. Draw up standards for institutions where equipment can be used and which healthcare professionals are allowed to operate said equipment
4. Build a registry with academic societies and other such organizations
5. Build the necessary systems for information gathering and sharing
6. Provide post-market risk information quickly

Regulatory agencies such as the MHLW and PMDA cooperate on the measures mentioned above to ensure safety and efficacy. This cooperation extends to the post-market period.

## 3. The State of Japan's Pharmaceutical and Medical Device Industries

While it is important to understand the basic premises of medical innovation regulatory policies, in order to consider the way forward for these policies, it is also crucial to understand the context – the markets – that policies are regulating. In this section, I provide a brief overview of the medical device and pharmaceuticals markets in Japan, before discussing policy options in section 4.

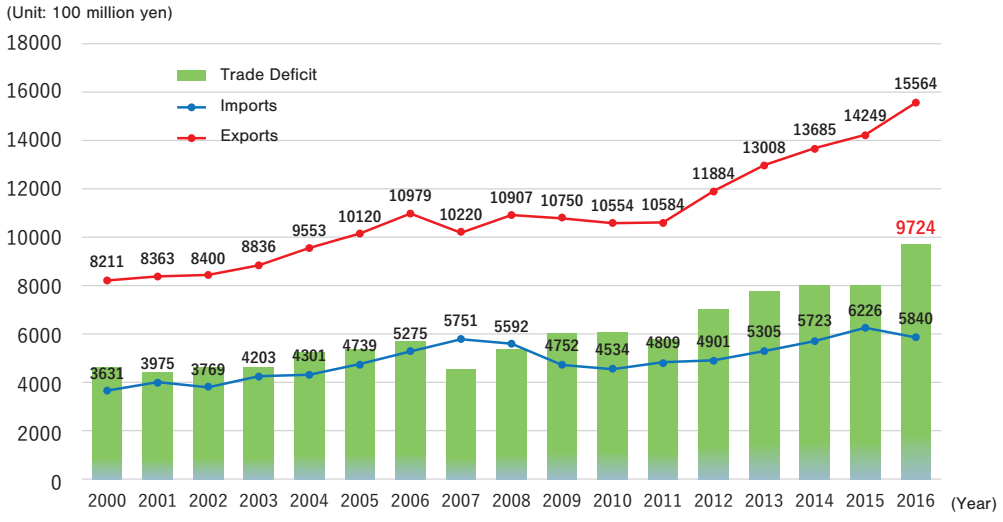
### The State of the Medical Device Industry in Japan and Current Issues

As shown in Figure 1, "Japan Trade in Medical Devices," the trade deficit for medical devices is growing every year. In 2016, the trade deficit for medical devices was approximately 972.4 billion yen.

Medical devices produced in Japan span a variety of fields, and some come from major corporations while others are produced by small and medium-sized enterprises. As a general trend, development is mostly concentrated in fields that require highly invasive, advanced technologies (such as artificial organs, robotics, and high-resolution images) or cutting-edge technologies that combine both medical sciences and engineering. Coordination with healthcare institutions is crucial to ensure these devices are used and maintained appropriately. In response to these issues, measures such as the Basic Plan for Medical Devices or the All Japan Support Network for Medical Devices Development have been established. While promoting the development of infrastructure to support R&D and to train human resources in the medical field, these measures support the spread of medical technologies produced in Japan around the world.

**Figure 1. Japan's Trade in Medical Devices**

In 2016, there was a trade deficit for medical devices of approximately 972.4 billion yen.
The trade deficit for medical devices is growing every year.




Source: MHLW "Annual Report on Statistics of Production by Pharmaceutical Industry"

**The State of the Pharmaceuticals Industry in Japan**

I will also provide an overview of the situation for pharmaceuticals. The costs associated with developing pharmaceuticals are increasing rapidly worldwide. Because Japanese pharmaceutical companies are small in scale and many major companies rely on long-listed items to maintain revenues, encouraging them to transition away from long-listed items is an urgent issue. Also, repeated pharmaceutical price revisions have caused profitability for certain essential medicines to deteriorate, so measures must be taken to stabilize their supply. The generic pharmaceuticals market has many small-scale enterprises and they are struggling to strengthen their financial standings.

While the R&D process for pharmaceuticals generally requires ten years or more, R&D success rates are falling every year and development is growing more difficult. Ten years ago, the success rate was 1 in 13,000. Today, it is 1 in 25,000. At the same time, R&D expenditures per company have increased steadily from 62.1 billion yen in 2004 to 141.4 billion yen in 2017. In 2014, the cost of R&D for introducing a new pharmaceutical to the international market increased to 170 billion yen.

Efforts are underway to reduce costs and improve the efficiency of medical R&D in Japan through measures like the Japan Drug Discovery Enhancement Plan's emergency policy package or through pharmaceutical regulation reforms. These measures have improved pharmaceutical production (including for biosimilar pharmaceuticals) and production infrastructure and have helped create an environment for conducting appropriate reviews. These developments are helping the international growth of pharmaceuticals developed in Japan and are creating global ventures that promote the renewal of the pharmaceutical discovery industry. They are also contributing to further measures for improving the distribution of ethical pharmaceuticals.

In the next section, I will propose and explain specific policy options to make R&D regulations more efficient and improve market access from an RS perspective.

## 4. Potential Policy Options

In section 4, I summarize the main, feasible policy options that could be considered related to medical innovation regulation in order to further encourage R&D and improve market access, in light of the concepts and market issues that I have discussed thus far. In section 5, I discuss the positive impact that these options could have.

**Proposed Policy Options**

In 2018, the Organisation for Economic Co-operation and Development (OECD) released a statement calling for joint efforts with stakeholders to reduce R&D costs and to accelerate market access. Options for doing so are described below with my thoughts on future developments.

**Option 1: Harmonize regulatory standards and promote mutual recognition**

To begin with, measures proposed for internationalizing Japan's medical device industry are premised on the belief that Japan will not be able to compete in the international market unless it develops highly-controlled Class IV medical devices.

> According the OECD,
>
> "Cooperation among regulatory agencies could further accelerate patient access and potentially reduce costs of the later phases of R&D. Such co-operation could span the exchange of information on assessed products or harmonization of evidence requirements, to reliance on assessments by other agencies to inform decision making." (OECD, Pharmaceutical Innovation and Access to Medicines, pp 119)

For Japan to accomplish its mission of developing high-performance medical devices, it is important that it commits to international standards. It will not be able to compete internationally otherwise.

A Global Harmonization Task Force (GHTF) was set up at the WHO to discuss international consistency between each country's medical device regulations. Each member country made voluntary efforts to alter regulations according to GHTF guidance documents, which outline basic requirements for medical devices, classifications, and summary technical documentation (STED) formats. Many of those requirements contained elements of regulations from Japan. The work of the GHTF was inherited by the International Medical Device Regulators Forum (IMDRF), established in February 2011, which promotes harmonization and convergence of international regulations for medical devices based on the solid foundations built by the GHTF. Japan's participation in this group is crucial for developing international standards for medical devices.

Although the issues of approval lag has mostly been solved in Japan compared to the situation in the past, Japan continues to face the issue of how to further speed up the approval of innovative healthcare technologies for people who are currently without treatment options. To foster the healthcare industry and overcome this issue, efforts are currently being made towards the following five goals.

1. Support the creation of an evaluation index and guidelines to further clarify regulations related to promoting development. This is to be done through cooperative efforts involving regulatory agencies, academia, and industry. Points for the PMDA Science Board to consider should also be determined.
2. Clarify development strategies from early stages in development through PMDA RS Strategy Consultations on topics related to development.
3. Investigate comprehensive evaluation methods that cover both the pre-market and post-market periods.
4. Make good use of real world data to build registries.
5. Strengthen ties to academic societies that support the proper use of medical devices.

Legislation for the Sakigake Review system was finalized when the Act on Securing Quality, Efficacy and Safety of Products Including Pharmaceuticals and Medical Devices was revised at the end of 2019. This created a priority review system for pharmaceuticals and other medical products that are new and innovative on a global level. In addition, preferential tax measures were established to promote priority reviews and research on pharmaceuticals and other medical products for childhood diseases and for rare diseases, which are to be designated as “pharmaceuticals and other medical products with specific uses.”

To date, the Sakigake Review System has been used to review five pharmaceuticals, one regenerative medical product, one medical device, and one in vitro diagnostic agent. Among the pharmaceuticals reviewed, most were approved within six months – half the usual review period. It can be considered a successful example of an effort for promoting the rapid introduction of innovative pharmaceuticals or medical devices to the market. In addition, to enhance post-marketing safety measures, the reexamination period will be extended from eight years to a maximum of ten years. I believe the public will readily accept this proposal.

**Option 2: Accelerate market access for medicines with significant potential benefits**

The OECD has stated,

> “Accelerated and adaptive approval pathways can not only provide more rapid access to treatments for unmet medical needs but also have the potential to reduce the cost of producing evidence prior to marketing approval. However, in shifting some evidence requirements to after marketing approval, they also increase uncertainty about the safety and efficacy of new treatments and pose potential risks to patients who receive treatments early. Accelerated and adaptive approval may be most appropriate when used highly selectively, for those medicines promising the greatest potential benefit and in conjunction with stringent rules for compliance with post-market evidence requirements and patient information adequately conveying uncertainty as to the risks and benefits of treatment.” (OECD, Pharmaceutical Innovation and Access to Medicines, pp 122)

When it is difficult to collect sufficient clinical data for a medical device, post-production and marketing risk management must be considered with academic societies while collecting clinical data. Applicants have been allowed to attach documents applying to do so since the introduction of a flexible amendment process in December 2019. This process allows applicants to file for partial amendments pertaining to approval, post-marketing risk management measures, and expansions of indications.

The conditional early approval system could be considered more advantageous for medical devices than for pharmaceuticals because some situations allow for medical devices to be submitted for approval using limited numbers of users under effective and safe conditions. The conditional early approval product consultation service that was established in November 2018 incorporates post-market performance analysis methods while greatly accelerating the review application process. Conditional early approval is a significant piece of legislation that unites the Government, industry, and academia to promote new treatments and accelerate market access while popularizing methods to predict and manage risk.

As for market access, whether or not insurance payments are granted for health insurance materials can cause variations in market accessibility, particularly for disposable medical devices. However, insurance payment calculation methods separate from those used for pharmaceuticals have yet to be established, so discussions on insurance payments for disposable medical devices should be held alongside discussions on pharmaceutical approval. It is especially important for the Government, industry, and academia to cooperate on establishing review methods for new medical device technologies to calculate the premiums makers are allowed to add to base prices.

**Option 3: Train RS professionals who will reinforce links between Government, industry, and academia to achieve Options 1 and 2**

Since few in academia understand Japan's unique RS culture, and because RS will be necessary to achieve the policy options mentioned above, it is urgent that RS professionals are trained. The following five items are unique characteristics of medical device development in Japan.

1. Japan possesses many assets that could potentially be developed into innovative medical devices, but this lacks an environment which encourages such development.
2. There is little connection between the needs that Japanese society faces and the assets that Japan possesses. The fields of medicine and engineering tend to not collaborate very much.
3. The culture does not allow for mistakes.
4. Few in academia (particularly in engineering) understand pharmaceuticals.
5. There are almost no consultants for medical device development.

RS professionals trained to address these characteristics must be placed at core clinical research hospitals. There, they must work to establish environments in which Japan's advanced medical care can be accepted and utilized.

It is important to understand the regulatory process in order to successfully develop high-quality medical devices. The kinds of people needed to further innovation in the medical device field must be educated in regulations, medical engineering, and natural sciences. Waseda University Institute for Medical Regulatory Science considers medical RS to span three fields: assessment science, predictive science, and decision science. Innovation and regulation should not be thought of having a "gas pedal" and "brake pedal" relationship. Rather, it is important that regulators understand that their job is to establish the optimal control conditions to allow for the effective and appropriate testing and approval of innovations. It is important that more professionals be fostered who understand that if we are going to encourage further innovation and the improvement of access in this space.

## 5. Conclusion

To conclude this chapter, I would like to provide further details on what I see as the most promising policy options in this field – the spread of accelerate approval practices, the further development of human resources, and other options.

**Providing Accelerated Reviews and Earlier Market Access for Medical Devices Using RS**

At the Waseda University Institute for Medical Regulatory Science, a ventricular assist device (the EVAHEART) was improved through partial design changes made using an independently-developed, non-clinical evaluation method. This resulted in earlier clinical use and provided a practical demonstration of how innovation can be approved without the need for extensive clinical trials. The new evaluation methods developed during that project were used by MHLW to establish various Japanese Industrial Standards (JIS) and promote International Organization for Standardization (ISO) revisions (see Table 1). They include unique evaluation methods such as durability testing for coronary, aortic, and bioabsorbable stents.

The spread of evaluation methods which allow for the approval of medical technology that shows tremendous benefits for patients without the need for extensive clinical trials, could greatly contribute to the streamlining of R&D and improve market access. This is one way to create an environment in which it is easier to harmonize regulatory standards and promote mutual recognition as discussed in Option 1.

I believe that the spread of such evaluation methods could also contribute to the more efficient management of R&D expenditures. Clinical trials are extremely expensive and time-consuming. If we could standardize the use of evaluation methods which allow for approval without extensive clinical trials, we would be able to further streamline the approval of medical innovations and improve market access. These methods could also form the basis of a new international standard proposed by Japan.

This idea is not just important for medical devices, but could also benefit pharmaceuticals, where it could decrease clinical R&D costs, increase efficiency, and improve market access.

Allow me to explain how this concept might be applied to pharmaceuticals. Recently, it has become possible to test the efficacy and safety of a pharmaceutical in just select human cells using patches and other technology. It is now possible to examine the efficacy of a pharmaceutical in multiple cancers having the same mechanism, even if those cancers occur in different organs. The U.S. Food and Drug Administration (FDA) has recognized the value of such methods, and has begun to consider the data they produce when approving pharmaceuticals. However, this is not the case in Japan. In addition, the fact that monkey testing cannot be skipped when developing vaccines in Japan is brought up frequently. While discussions about omitting animal testing are advancing, these discussions have not yet produced any results. Meanwhile, the FDA began

allowing animal trials to be skipped for certain pharmaceuticals several years ago.

Additionally, over 90% of pharmaceuticals undergo international joint clinical trials. While global development should allow for approvals to occur simultaneously, regulations make it difficult to do this in practice. I have high hopes about the positive impact of efforts to streamline such regulations.

**Table 1: JIS Additions and ISO Revisions Resulting from TWIns Waseda R&D Results**

| New Evaluation Method | Notices issued by MHLW | JIS enacted / ISO revision | Related notices issued |
|---|---|---|---|
| Coronary stent durability test | PAB/ELD Notification No. 0831-1 dated 2016-8-31, Attachment 1 | JIST 0402:2016 revision; ISO 25539-2 reflected in pending standard (DIS) | |
| In vitro thrombosis test for left ventricular assist device | PAB/ELD Notification No. 0831-1 dated 2016-8-31, Attachment 2 | JIS pending; ISO 25539-2 reflected in pending standard (DIS) | |
| In vitro thrombosis test for continuous hemofilter | PAB/ELD Notification No. 0831-1 dated 2016-8-31, Attachment 3 | Was listed in first option for clinical in vitro thrombosis testing in ISO 10993-4 based on research results; JIS T0403:2018 established | |
| Aortic stent durability test | PAB/ELD Notification No. 1122-1 dated 2016-11-22, Attachment 1 | JIS T 0404 enacted 2019-3-1 | |
| Bioabsorbable stent durability test | PAB/ELD Notification No. 0522-1 dated 2019-5-22, Attachment 1 | Currently pending as a revision to ISO/TS 17137 (TS) Cardiovascular implants and extracorporeal systems — Cardiovascular absorbable implants | PFSB/ELD Notification No. 0510-7 dated 2018-5-10; Revision of approval standards for hemodialyzers, hemodiafiltration filters, and hemofilter, Item 3 |
| Bioabsorbable stent extended retention test | PAB/ELD Notification No. 0522-1 dated 2019-5-22, Attachment 2 | | PAB/ELD Notification No. 0630-1 dated 2018-6-30; Evaluation indicators for bioabsorbable vascular stents |
| Promoting domestic development, practical application, and global expansion of innovative class IV medical devices | | | |

If we were to allow for the spread of conditional early approvals in Japan with less stringent regulations related to clinical trials, it would be crucial to thoroughly test the safety and efficacy of advanced medicines via non-clinical reviews that simulate real-world clinical use as accurately as possible. Long-term safety follow-ups are crucial to that process. Discussions must be deepened on the practical application of databases like the Japanese registry for Mechanically Assisted Circulatory Support (J-MACS), the Medical Information Database Network (MID-NET), or the Clinical Innovation Network (CIN), which make such follow-up work possible. Discussions to couple MID-NET and CIN to unify patient data management are already underway.

**Additional Ideas to Improve Efficiency and Market Access for Pharmaceuticals, from an RS Perspective**

For pharmaceuticals specifically, there are multiple other ways that efficiency and market access might be improved further, outside of easing requirements related to clinical trials.

For instance, access could also be improved by adopting a system that allows for multiple pharmaceuticals to be approved at the same time if they meet certain conditions, much like Europe's Innovative Medicines Initiative (IMI). This kind of initiative can reduce the number of people receiving placebos, enhance benefits to patients, and accelerate development. It is important that Japan consider such efforts being promoted abroad like the IMI.

The enhanced use of Managed Entry Agreements (MEAs) could also help to encourage R&D. However, these agreements are not yet being used in Japan.

Furthermore, there is the issue of using big data to find patients for clinical trials. When the Japanese Government debated the linkage of the National Database (NDB) and the Kaigo DB (the long-term care insurance database), the idea of providing data about members of the public to assist pharmaceutical development did not elicit a positive response, but this is an idea that could help to improve R&D efficiency, and should be examined further. For further details on that discussion, please refer to the materials written by Prof. Eiko Shimizu (Project Associate Professor, ITHC, Graduate School of Pharmaceutical Sciences, The University of Tokyo) in this report.

Lastly, Ministry of Economy, Trade and Industry (METI) has also kicked off an initiative to build an innovation hub of approximately 100 organizations that includes doctors, pharmaceutical companies, medical device makers, chemical manufacturers, trading companies, venture capital firms, and public and private funds. This hub has the potential to accelerate R&D on medical innovation, and should be supported.

**The Need for More RS Professionals**

As discussed above, there are many policy options that could further encourage medical R&D and improve market access in Japan. The most immediately impactful option among these is the development of human resources. People who understand regulation and medical innovation will be needed if we are going to implement any one of the other options. While the education of such people will take time, this is a crucial next step.

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# Chapter 3.
## Developing Incentives for Further Innovation



**Hiroshi NAKAMURA**
Professor, Graduate School of Business Administration, Keio University / Public Member, Central Social Insurance Medical Council (Chuikyo) / Chairperson, Chuikyo Special Committee on Drug Prices / Acting Chairperson, Chuikyo Committee for Cost Effectiveness Assessment

Hiroshi Nakamura is a professor at Keio University, Japan. He graduated from Hitotsubashi University and received his Ph.D. from Stanford University. In 1996, He joined Keio Business School, Keio University, as an assistant professor. In 2005, He was promoted to professor. His research interests include industrial organization (life-science and healthcare industries), healthcare policy, diversity management, and R&D management. He is an editor-in-chief of the Journal of Health Care and Society, a trustee at the Health Care Science Institute, and a trustee at the Japan Health Economics Association. He also serves as a faculty member of the Graduate School of Medicine at Keio University. He is also a member of some committees in the Ministry of Health, Labour and Welfare, such as a public member of the Central Social Insurance Medical Council ("Chuikyo") and a chairperson of the Special Committee on Drug Prices under "Chuikyo."

## 1. Introduction

In this report, I will examine the development and dissemination of incentives for further innovation as a part of efforts to rebalance innovation and sustainability in Japan's healthcare system.

The importance of promoting innovation is readily accepted. However, when attempting to promote innovation, various debates tend to arise over which incentives should be implemented and what types of innovations should be emphasized.

Below, starting from Section 2, I will define types of incentives while identifying and examining relevant issues and their backgrounds. Section 3 will provide a general outline of the current situation in Japan and examine which types of innovation and incentives are needed. Section 4 will discuss reform philosophy and potential policy options. After providing a review of observations made in the first four sections, Section 5 will examine the financial impact of policy options and methods to advance discussions on improving their feasibility.

Please bear in mind that the proposals in this document were created by gathering opinions expressed during our task force meetings and do not represent the views of any individual task force member.

## 2. Backgrounds of Issues

The first issue we will address is which types of incentives must be developed and disseminated. This issue is rooted in the strained financial conditions of the Government and health insurance system. Due to strict fiscal constraints, it is unlikely that any incentive requiring vast financial resources will be implemented even if it is widely recognized as an effective measure for promoting innovation.

Therefore, this section will categorize incentives and examine which ones are needed. Below, incentives are categorized by type, starting with push and pull incentives. Push incentives lower costs for pharmaceutical companies and medical device makers, while pull incentives increase their future revenues (see Figure 1 below).

However, there are types of both push and pull incentives that have the potential to worsen the Government's fiscal balance. For example, creating a tax break for research and development (R&D) would be a type of push incentive that lowers costs for businesses but decreases Government revenue. Another push incentive, increasing insurance payments for pharmaceuticals and medical devices, increases Government expenditures through higher pharmaceutical and healthcare costs (40% of the national health expenditure is provided by public funds). Under strict fiscal constraints, the degree to which incentives that may have negative effects on public finance can be developed and disseminated is limited.

Innovation can also be incentivized through other avenues. For example, measures that decrease revenues for pharmaceutical companies and medical device makers can also be considered a type of incentive, in that they can encourage companies to pursue new methods of increasing future revenues through innovation. Below, I refer to these disincentives as "reverse pull incentives" (see Figure 1). Reverse pull incentives lower revenue for companies by lowering Government spending on their products, thus saving the Government money. Specific examples of reverse pull incentives are promoted use of generic pharmaceuticals or pharmaceutical price reductions for long-listed products. These measures have the potential to make R&D companies that are highly reliant on long-listed products more wary and are likely to motivate said companies to pursue new pharmaceutical development.

Given the fact that financial resources for health insurance are limited, implementing reverse pull incentives like the ones I mentioned together with other measures has the potential to rebalance sustainability and innovation in the healthcare system. For example, promoting generic pharmaceuticals and reducing prices for long-listed products could help control rising pharmaceutical prices while a portion of the funds saved could be used to finance the creation of innovative new pharmaceuticals.

Finally, policy measures that reduce the risks companies face from policy reform could be considered another type of incentive (see Figure 1). An example of one such risk reduction incentive could be any policy that makes insurance payments for pharmaceuticals and medical devices more predictable. Increasing payment predictability can have positive effects on R&D investments. [1,2] The key point to note about risk reduction incentives is not their lack of direct effects on revenues and costs for pharmaceutical companies and medical device makers, but that they do not have negative effects on the Government's fiscal balance.

**Figure 1: Types of Incentives**

| Incentive type | Direct effect on revenues/costs for pharmaceutical companies or medical device makers | Examples (See note) |
|---|---|---|
| 1. Push | Decrease costs | • Subsidy systems or tax breaks for R&D costs<br>• R&D support for technologies that lower R&D and production costs<br>• Simplified review procedures |
| 2. Pull | Increase revenue | • Increased insurance payment amounts<br>• Favorable reviews for products that perform well in cost-effectiveness analysis during insurance payment review<br>• Early approval or early insurance payments<br>• Longer market exclusivity rights for other products<br>• Advance purchase commitments<br>• Support for fluctuations in market conditions or demand |
| 3. Reverse pull | Decrease revenue | • Decreased insurance payment amounts<br>• Quantity control |
| 4. Risk reduction | (None) | • Increased predictability of insurance payments<br>• Increased predictability of scope and timing of insurance payments |

Note: The 2018 OECD report was as a reference for the examples listed above.[3]

## 3. Overview of the Current Situation in Japan

Next, I will provide an overview of the current situation surrounding innovation in healthcare systems in Japan from the perspectives of access, cost, and quality. Continuing from the previous section, in addition to examining what types of incentives are necessary for innovation, I will also explore which types of innovation should be emphasized.

**Access**

The first point to note concerning access is that Japan provides universal healthcare which allows anyone with an insurance card to access healthcare anytime, anywhere. Although this system functions as a type of social insurance, it also uses public funds, so it is financed by a combination of insurance premiums and taxes.

In Japan, insurance payments are widely and rapidly provided for approved pharmaceuticals and medical devices.[4] This is because the Japanese Government determines and controls insurance payment amounts to maintain financial resources for health insurance with the premise of providing said insurance payments. In many other countries, companies determine prices instead of the Government or the insured. In such countries, governments or the insured hold time-consuming discussions to weigh the pros and cons of insurance payments and to reach decisions concerning them. (It also bears mentioning that in such countries, governments and the insured can limit insurance payments as a bargaining chip to encourage lower prices, but

doing so can affect how long it takes to reach a decision concerning price.)

There are lingering concerns in Japan that the time it takes to complete the approval process could cause a resurgence in drug lag and device lag. Drug and device lags clearly demonstrate delays caused by the approval process. For example, looking at approvals for pharmaceuticals targeting cancers over time, the total number of drugs that have already been approved in Europe and the U.S. but have not yet been approved in Japan is on an upwards trend.[5] Also, there are concerns that further effects from various reforms – namely, the 2018 Update of Drug Pricing System (which was a major reform), the 2018 Revision of the Medical Products and Equipment Insurance System, and revisions to both in 2020 – will manifest in the future. The effects of these reforms on drug and device lag must continue to be measured. If it seems that lags are worsening, it will be necessary to plan stronger incentives toward improving access.

**Cost**

Health expenditure as a percentage of GDP can be used as an indicator for the total cost of healthcare. Considering the high rate of population aging in Japan, this percentage is relatively low compared to other advanced countries. [6]

Another cause for concern related to pharmaceutical costs is that high-priced pharmaceuticals are being introduced to the market one after another. However, we must not forget that it is pharmaceutical expenditures that cause financial problems for the health insurance system, not pharmaceutical prices. Even if a pharmaceutical is expensive, its effects on overall finances can be controlled for if said pharmaceutical is prescribed appropriately. On the other hand, low-priced pharmaceuticals can have significant effects if they are prescribed in great numbers.

Policies to control pharmaceutical prices and quantities can act as reverse pull incentives to slow the increase of pharmaceutical expenditures. In addition to controls placed on pharmaceutical prices at market introduction, methods to control pharmaceutical prices already in use include flexible price recalculation and the use of cost-effectiveness analysis based on incremental cost-effectiveness ratio (ICER) and quality-adjusted life years (QALYs). Examples of quantity control include measures to assure proper pharmaceutical use by limiting the people to which a given pharmaceutical can be prescribed or expanding the scope to which Optimal Clinical Use Guidelines can be applied.

However, since it is likely that high-priced pharmaceuticals will continue to enter the market in the future, it is reasonable to assume that further measures will be necessary. In addition to aforementioned price and quantity control measures, measures that might be necessary in the future include the introduction of cost-cutting technologies (for R&D or manufacture) or measures to further promote R&D for pharmaceuticals with high cost-effectiveness. [7]

One prominent issue related to medical device costs is the amount of expensive medical devices like CT and MRI machines per capita. Japan has been criticized for having a particularly high number of said machines per capita compared to the rest of the world.[8] Relatively few examinations are conducted per device compared to other countries, so the use of high-priced medical devices must be made more efficient. If they are not used in an efficient manner, the costs of purchase, maintenance, and upkeep will continue to place heavy financial burdens on healthcare institutions. Therefore, it is necessary to promote shared usage of expensive medical devices between healthcare institutions. Doing so will lower sales for medical devices and act as a reverse pull incentive for medical device makers.

**Quality**

Healthy life years and average life expectancy can be used as indicators to measure the overall quality of healthcare. In global rankings measuring both indicators for men and women, Japan has maintained a position near the top for many years. [9] However, Japan has been criticized on various points. For example, the Organisation for Economic Co-operation and Development's (OECD) Health at a Glance 2019 report pointed out that Japan has a high 30-day mortality rates for heart attack and high smoking rates among men compared to other OECD countries. [10]

From the perspectives of the people who receive healthcare, further improvements are needed for antimicrobial resistance (AMR), unused pharmaceuticals, and excessive polypharmacy. Problems related to AMR tend to crop up easily with certain antimicrobials which are effective for wide ranges of microbes – namely cephalosporins, quinolones, and macrolides. Compared to other countries, Japan has extremely high usage rates for these types of antimicrobials. [11]

It is difficult to accurately gauge the cost of leftover pharmaceuticals, but its causes are not limited to situations in which people forget to take their entire prescription. Another likely cause is that insufficient information is being shared between healthcare providers, causing them to write unnecessary prescriptions.

Excessive polypharmacy can cause various side effects, including disturbed consciousness, hypoglycemia, and hepatic dysfunction.[12] Polypharmacy is not defined only according the number of pharmaceuticals prescribed; it is a state in which related problems such as increased risk of adverse drug events, mistaken intake, and lower medication adherence begin to occur.[13] While there is no exact rule that states how many prescriptions constitutes polypharmacy, some define it as situations in which five or more pharmaceuticals are being used simultaneously.[14] According to one survey, nearly 60% of people age 75 years and over that regularly visited healthcare institutions and received prescriptions and 40% of all respondents were

taking six pharmaceuticals or more. [15]

It is possible to decrease pharmaceuticals use while increasing the quality of healthcare by responding to AMR, leftover pharmaceuticals, and polypharmacy. The types of policies required to do so will act as reverse pull incentives and decrease revenues for pharmaceutical companies.



## 4. Reform Philosophy and Potential Policy Options

After describing a reform philosophy, this section will examine potential policy options based on said philosophy. From the perspectives of access, cost, and quality, the two points of the reform philosophy are:

I. The Government must control costs (such as medical service fees and the prices of pharmaceuticals and insured materials) while maintaining ready and widespread access to healthcare.

II. World-class healthcare services must be provided for both medical and long-term care.

When implementing reforms, it is necessary to think of policy options that are compatible with the philosophy described above. Specific policy options generated from opinions that were shared at our task force for each type of incentive are described below.

**Push Incentives**

Technology that dramatically lowers R&D or manufacturing costs would help control the rising costs of pharmaceuticals and healthcare. Additionally, significantly lowering R&D or manufacturing costs for companies would enable them to maintain profits even without receiving high insurance payments. Japan must play a leading role in promoting R&D for such technologies or products through coordination between the Government, industry, and academia.

Promoting the effective use of big data in clinical trials is also important. Easier participant recruitment and data gathering for clinical trials (including follow-up studies) will shorten clinical trial periods and lower costs for companies. Another future goal that has been identified is the creation of an environment in which the high costs of constructing big data systems have been eliminated and it is easier for companies to use data effectively.

Simplifying review procedures is another method of decreasing costs for companies. Doing so is also important to improve access to innovative pharmaceuticals and medical devices and to achieve working style reform. To maintain review quality, it will be crucial to consider third party perspectives without focusing solely on the perspectives of those from industry.

**Pull Incentives**

Pull incentives to increase revenues for companies are needed to promote R&D for innovative products that can satisfy unmet needs in healthcare. However, given the current strain on financial resources for health insurance, pull incentives that increase insurance payments can only be implemented to a limited degree. It is important that measures focus on priority items.

Specific opinions shared at the task force included:

- The policy of rapidly covering a wide range of pharmaceuticals should be maintained.
- Pharmaceuticals that aid AMR countermeasures should be evaluated more favorably, with evaluation results reflected in pricing.
- Eligibility for the new drug promotion premium system should be expanded.
- Every element that factors into calculating insurance payments should be expanded during reviews for products with excellent cost effectiveness.
- Application requirements for the priority review system and Sakigake Designation System (a system for fast-track approvals) should be relaxed to improve usability and to help companies secure revenue faster.

**Reverse Pull Incentives**

As described above, push and pull incentives have the potential to increase the financial burden on the Government, so they must be implemented alongside disincentives that can encourage innovation while saving the Government money. I call these incentives “reverse pull incentives.” They decrease revenue for pharmaceutical companies and medical device makers.

Some examples of past measures that function as reverse pull incentives are:

- Lowering insurance payments based on rate of divergence between what is being paid by the health system and the actual price of the pharmaceutical
- Promoting cost-effectiveness analyses (particularly for products targeting large sectors of the market)
- Lowering prices for long-listed items
- Narrowing the gaps between domestic and foreign prices for medical devices

- Promoting generic pharmaceuticals, including efforts to correct for regional disparities in their use and to promote the spread of biosimilar or biosame products to increase their share by sales amount
- Promoting shared use of high-cost medical equipment
- Promoting appropriate use for antimicrobials that easily cause AMR-related problems
- Expanding the scope of Optimal Clinical Use Guidelines
- Measures to correcting for problems related to unused pharmaceuticals and excessive polypharmacy

These policies must be continued in the future. Additionally, the introduction of a formulary (guidelines on how to use medicines in clinical settings) has the potential to lower pharmaceutical expenditures by promoting appropriate pharmaceutical use. It was also pointed out that formulary adoption should not be mandatory. Rather, appropriate pharmaceutical choices must be made while taking price and the circumstances at both the hospital and regional level into account to preserve individuality in healthcare.

**Risk Reduction Incentives**

Concerning the risks created for companies through policy changes, one opinion expressed during task force meetings was that companies cannot make significant R&D investments if there is no indication they will recover development costs. However, increasing transparency would make it easier for them to foresee when product prices can be maintained. This could serve as a significant incentive.

Specific policy options that function as risk reduction incentives include the aforementioned policy for increasing the predictability of pharmaceutical and medical device insurance payments. It will also be important that rapid and widespread insurance payments continue to be made to prevent said payments from growing unpredictable.

## 5. Summary: The Impact of Policy Options on Public Finances and Methods to Advance Discussions on Improving Feasibility

When considering the financial impact of the various policy options for developing and disseminating the incentives discussed above, it is important to focus on how to combine them to avoid negative effects on public finances rather than considering the impact of each policy individually. This is because although push and pull incentives require increased public spending in order to increase revenues and lower costs for pharmaceutical companies and medical device makers. Therefore, it is important to combine these incentives with reverse pull incentives that lower revenues, and with risk reduction incentives that do not have a direct impact on Government finances.

To summarize:

1) Developing and disseminating incentives is important to further promote innovation.
2) From the perspectives of access, cost, and quality, it is necessary to consider policy options that align with the reform philosophy detailed below when implementing reforms.
    I. The Government must control costs (such as medical service fees and the prices of pharmaceuticals and insured materials) while maintaining ready and widespread access to healthcare.
    II. World-class healthcare services must be provided for both medical and long-term care.
3) There are various types of incentives for promoting innovation, namely (1) push incentives, (2) pull incentives, (3) reverse pull incentives, and (4) risk reduction incentives. To rebalance innovation and sustainability in the healthcare system, it is important to combine incentives that have negative effects on public or health insurance finances with reverse pull incentives that decrease revenues and risk reduction incentives that do not have direct financial effects.
4) When implementing reverse pull incentives (which decrease revenues), a portion of healthcare costs saved must be used to promote the development of innovative new pharmaceuticals or medical devices. R&D companies must be encouraged to further intensify efforts to develop new pharmaceuticals by creating a sense of tension.

To conclude, I would like to raise five points to keep in mind when advancing discussions on improving policy option feasibility based on opinions shared at task force discussions. If these points are not kept in mind, it will be difficult to win support from related parties and make it much more unlikely that policies will be enacted.

First, it is necessary to clarify a reform philosophy before implementing reforms, and reforms must be implemented according to that philosophy.

Second, when altering the reform philosophy, it is not enough to only have discussions that address individual arguments. Consensus must be built based on public discussions on the reform philosophy.

Third, to gain understanding and consent from the public for reforms, it is necessary to show a clear path to reform from the perspectives of members of the public and to fulfill duties related to explaining reforms. For example, when introducing

incentives that will increase public burden, measures to decrease that burden must also be implemented and steps must be taken to gain public consent.

Fourth, evidence-based discussions must be held, and consensus must be built to determine where and how positive and negative incentives will be implemented.

Finally, medical care and patient behavior must be considered in addition to incentives for industry. It is difficult to gain consent from related parties for incentives that will disadvantage healthcare providers or the people receiving healthcare.



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# Chapter 4.
## Enhancing Information and Data Infrastructure to Improve Policy Discussions and Encourage Innovation



**Eiko Shimizu**
Project Associate Professor, Graduate School of Pharmaceutical Sciences, the University of Tokyo

Dr. Eiko Shimizu obtained a BS and MS in statistics and holds a PhD in medical regulatory sciences from Tokyo Medical and Dental University. After 20 years of experience in pharmaceutical and medical device companies, leading data analytics and marketing strategy departments as a director, Dr. Shimizu is currently a project associate professor at the Social Cooperation Program of IT Healthcare, Graduate School of Pharmaceutical Sciences, the University of Tokyo. Dr. Shimizu's main research field examines how to maximize the value of medical big data and RWD analytics for analysts as well as for patients.

## 1. Introduction

Many years have passed since words and phrases like “big data,” “real world data,” and “statistics” became commonplace in discussions about healthcare. Effective use of these tools is progressing in Japan, particularly through the use of information from insurance claims collected under the National Healthcare System. This healthcare data is used to the benefit of a wide variety of fields, including evidence-based healthcare policymaking, optimizing healthcare economics, innovation and the clinical development needed for innovation, and individual health management. The information provided by health insurance claims benefits all stakeholders, but the focus of this document is to clarify issues facing the use of healthcare data within the information infrastructure to improve policy discussions, to determine the most appropriate data infrastructure for Japan, and to propose measures to reinforce said infrastructure as part of efforts to rebalance sustainability and innovation in the healthcare system.

Please note that the discussion below is based on the opinions of the author and opinions shared at taskforce meetings collected by the author. They do not represent the opinions of any specific taskforce participant.

## 2. The General Situation and Issues of Healthcare Data in Japan

### The State of Healthcare Data in Japan

Japan and the entire world are currently making every effort to respond to Coronavirus Disease 2019. The most basic indicator for tracking the spread of the disease and for holding policy discussions is the number of people infected. One can gain a sense for the number of people infected nationwide (or by prefecture) using the number of polymerase chain reaction (PCR) tests conducted, the number of positive results, the number of people hospitalized, and the number of casualties.

On average, how many people are examined annually for symptoms of respiratory diseases, pneumonia, and similar diseases, and how many of those people are diagnosed with influenza? What is their age distribution? Among the cases when symptoms grow severe, how many people die? There is currently no environment in Japan that allows one to grasp basic information for identifying trends and other real-world circumstances in a timely manner. Although insurance coverage for PCR tests and antibody tests is currently being debated, it has been reported that simple influenza tests (using quantitative influenza antigen tests) were conducted 24.57 million times in 2016 and 32.03 million times in 2017.[1] As of the time of writing in May 2020, the number of tests conducted in the previous influenza season (the 2018-2019 season) has yet to be reported, so there is no way to know more recent test counts.

Discussions are advancing on various issues like ensuring treatment safety, revitalizing healthcare economics, the waste of healthcare resources caused by redundant testing, and polypharmacy among the elderly. Setting aside issues facing the entire country, the fact remains that the current method of managing individual pharmaceutical use is analog. People rely on written records in prescription notebooks.

**Insurance Claim Records are Central to Healthcare Data in Japan**

Under Japan's National Health Insurance system, information on every covered treatment provided to every resident is reflected in insurance claims. Because these claims serve as invoices for the portion of medical fees not covered by user copayments (in most cases, copayments are 30%, so these claims contain the remaining 70%), they list the bare minimum necessary for that purpose. This information is easily structured, and its digitization has progressed more than medical record digitization, [2] so it is relatively easy to collect in databases.

Data that is collected on-site over the course of clinical operations such as claims, medical records, examination records, or medical image data is called Real World Data (RWD).[3] Efforts to use RWD to accurately portray the state of treatment are advancing. Other types of medical and health data include clinical trial data, genetics data, and vital statistics data for individuals. The use of these records in a wide variety of fields such as policymaking, optimizing healthcare economics, clinical development, and epidemiological research is anticipated. The Government is currently verifying measures to use such records for postmarketing surveillance (PMS) for pharmaceuticals.

When healthcare databases are created using claims, they contain details from medical claims and prescription claims that describe treatments provided, which pharmaceuticals were dispensed, and the quantities of pharmaceuticals dispensed, making it possible to determine the examination or treatment status of an individual. At the same time, they also make it possible to calculate the cost of a treatment based on the insurance fee. In addition, these databases have the capacity to allow users to trace an individual's treatment history across multiple healthcare facilities, which can be used to grasp the course of a treatment and concurrent treatments at an individual level. Meanwhile, insurance claims have various shortcomings. Claim disease names (which indicate the injury or disease and are used to calculate medical service fees) are often criticized, as is the fact that the outcomes of treatments are not included. It is also difficult to link claims records and uncovered treatments, such as vaccinations or the use of over-the-counter (OTC) pharmaceuticals.

In Japan, private companies such as Japan Medical Data Center Co., Ltd. (JMDC),[4] Japan Medical Information Research Institute, Inc. (JMIRI),[5] and Medical Data Vision Co., Ltd. (MDV) [6] provide databases using anonymized data obtained from institutions that they possess contracts with. JMDC data is based on health insurance societies, JMIRI data is based on out-of-hospital pharmacies, and MDV data is based on acute care hospitals. Since these companies provide web tools that allow for data search and accumulation and offer various tools with excellent usability, their databases have been used for over a decade, mostly by pharmaceutical companies.

**Visualizing the State of Healthcare Data in Japan**

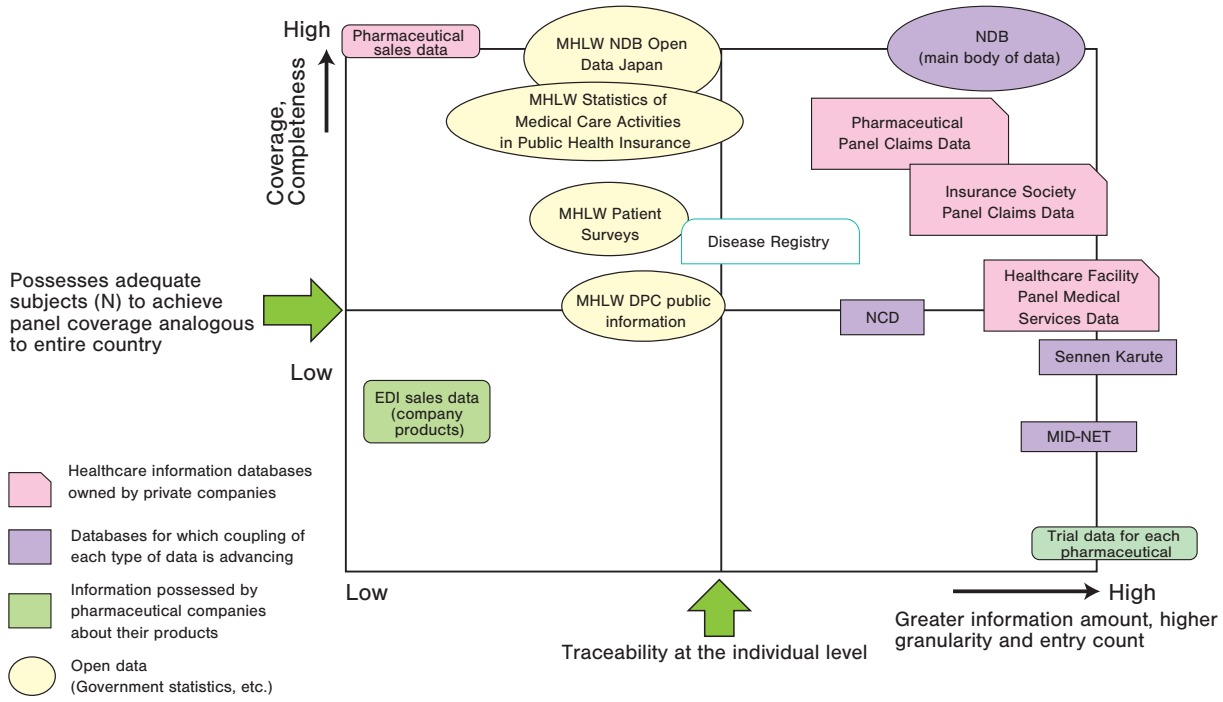
Figure 1 plots each healthcare database containing information collected in Japan by granularity or entry count and nationwide coverage. Collecting vast amounts of information naturally results in a limited nationwide capture rate, so by limiting information collected to the number of doses sold to each individual, like when calculating pharmaceutical sales data, it becomes possible to achieve nationwide coverage.

Based on this situation, I believe that "big data" does not current exist in the healthcare field in Japan, at least not if we define the term as I believe was originally intended. At the same time, I think it is possible to construct big data by combining the small data that is distributed among the various databases. That is to say, although progress in information and communications technology (ICT) has made it possible to capture and collect large amounts of medical and healthcare information of every type in a timely manner, because said information is distributed among multiple databases, the amount of information that can be obtained from any individual database is limited. However, if the data from each is combined effectively, it can be a rich source of information. It could be said that combining databases in this manner creates an environment in which it can be used as "big data." Introducing tools like artificial intelligence (AI) to manage these vast amounts of data will open up new possibilities to obtain even more beneficial knowledge from the information stored in each database.

**Healthcare Data Collected by the Government**

As shown in Figure 1, two of the largest healthcare databases are operated by the Government, namely the National Database (NDB)[7] and the Medical Information Database Network (MID-NET) [8] (which began operations in April 2018). Figure 2 shows types of open data for health and healthcare from information collected through periodic surveys conducted by the Ministry of Health, Labour and Welfare (MHLW). These databases have a high level of national coverage, many offer data on the prefectural level, and many allow users to track long-term trends because their information has been collected using the same definitions and formats for many years. On the other hand, not only are they updated infrequently, the information made public are combined totals of predetermined items. This often hinders analysts from obtaining the specific values that they require.

**Figure 1**




**Japan's Largest Healthcare Database, the National Database (NDB)**

As discussed above, the central element in healthcare information in Japan is RWD provided by the public, and almost all insurance claims and information pertaining to certain health checkups and health guidance consultations are collected in the NDB. Full-scale provision of this information to third parties began in FY2013. The scale of the NDB is massive, even on a global level. It contains virtually 100% of the claims made in nationwide health insurance systems for a country with a population of over 100 million people and approximately 2 billion new records are added every year. As the foundation of Japan's information infrastructure for healthcare, expectations for its effective use are high.

The description of the NDB given by the MHLW is:

> "Based on the Act on Assurance of Medical Care for Elderly People, the NDB is a database built by collecting insurance claim information and information from certain health checkups and health guidance consultations to be used for surveys and analysis to formulate, implement, and evaluate plans to optimize healthcare costs."

Although patient information is anonymized to remove identifying information, the NDB contains sensitive information such as the medical history of each individual. Therefore, the only people currently permitted to use the NDB outside of national Government agencies and central organizations in national health insurance are researchers belonging to research institutions that have passed an expert committee review. In addition, there are various requirements that must be met to conduct an analysis using the NDB and they pose major hurdles for users. While an on-site research center was originally established in an attempt to overcome those hurdles, lack of budgetary resources means that the provided analysis hardware has limited data capacity. The physical environment is also poor and there are no windows. Needless to say, the on-site research center cannot serve as part of the analysis infrastructure. This means that efforts to use the NDB effectively are at a standstill. Instead, the healthcare databases used most frequently in Japan are those provided by private companies such as the aforementioned JMDC database. While private databases are high quality, they are expensive to use, and it is difficult to use them for conducting policy discussions at the national Government or at Government agencies. Given the current situation, it is safe to say that an environment that allows for evidence-based discussions does not currently exist in Japan.

In this document, I will examine measures that can be taken in the short term for promoting the use of databases that are already in operation with a particular focus on the NDB. In addition, from a medium- to long-term perspective, I will illustrate a

grand design of an information infrastructure for better policy discussions and examine frameworks and measures for building a data analysis platform. I will also explore frameworks for incorporating existing data into that platform and methods of promoting the creation of new data based on that platform.

## 3. Issues Facing the NDB and Its Use



The NDB can provide data in three formats, which are: (1) special extraction, which provides the data set required for user-side analysis, (2) totalization tables, which provide data as aggregate values in a specified format, and (3) sampling data sets, in which data from a single month is provided. I will discuss (1) special extraction, as it can be used for a wide variety of applications.

Since the NDB contains claim data, it inherits many of the issues already mentioned for claims, but because it offers high nationwide coverage (almost 100% of claims are digitized) and allows users to grasp the content of all covered medical services provided (using points assigned to items on the medical service fee schedule), it could be called one of the most appropriate databases for understanding the state of health insurance and its cost. In addition, it contains data collected since April 2009, which not only makes it possible to track diagnosis and treatment status on an individual level over a long term, it also makes it possible to track individual medical histories covering multiple illnesses or treatment records from multiple healthcare facilities for a single illness.

Some of the issues encountered when conducting an analysis using special extraction are described below.

**Ease of use and analysis**

Technical and regulatory issues one encounters when conducting analyses with the NDB include:

- Master data files (files that act as data dictionaries, explaining which values correspond to which pharmaceuticals or healthcare facilities, etc.) is not provided, so each applicant must prepare their own before they can set data extraction conditions.
- As a general rule, exploratory research is not allowed, and data sets containing only the bare minimum amount of information necessary for the pre-approved purposes listed on the application are provided. If changes to the content or written format of the data to be analyzed become necessary while waiting one's turn to extract data (a process which normally requires about one year after applying for access), there are situations when the application must undergo an additional review according to the content of those changes. In practice, applicants are advised to avoid making changes.
- Individual entries in the NDB are assigned two patient IDs[9] which can be checked against each other to monitor changes such as when someone changes their name (for example, after marriage) or when they change insurance societies. According to Noda et al.,[10] the match rate between these IDs is 80-98%. However, matching IDs places a significant burden on analysts, who must complete said matching after they receive their data set and before they can begin their analysis. Assigning healthcare IDs (such as My Numbers) has long been discussed, but from the perspective of protecting private information, such a change has not been implemented, so the process of ID matching itself has become a topic of research.
- The analysts whose names appear on the application are allowed to conduct their research according to the initial plan that was submitted, but when they wish to share data with experts on the target disease or treatment to obtain their advice, there are various rules concerning format that must be followed.[11] Analysts are only allowed to share data using the same table format that was specified on the advance application. If less than ten values are listed on that table, empty cells must contain a hyphen. Hurdles like these create the risk that analysts will only be able to access a limited amount of knowledge from experts.

**Accessibility**

Currently, the only people allowed to use the NDB are those belonging to Government agencies, central organizations for health insurance, and researchers with affiliations to research institutions. Its use is not granted to private enterprises like pharmaceutical companies. Current issues related to the application process to use the NDB are below and are the source of significant burdens for applicants.

- The application process is extremely complex, and applicants must possess a vast amount of knowledge concerning how data is stored within the NDB. Meanwhile, vast resources are required to complete the process from when one

submits an application to when one obtains the requested data, including both preliminary reviews – one from the company managing applications and application instructions (currently NTT Data), one from the MHLW, and one from an expert committee – and any issues that arise thereafter.

- The current lead-in time required to acquire data from time of application (there are four application windows in FY2020) is approximately one year, so it is currently impossible to conduct data analysis in a timely manner.



**Conditions for the physical environment for handling NDB data**

Currently, after obtaining a data set, the following basic conditions concerning the physical environment for analysis must be met. [12]

1. Information related to claims and similar items may only be used in Japan.
2. The use, management, and storage locations of information systems containing copies of claim information and other types of information are limited to lockable physical spaces that have been declared in advance when submitting the application. As a general rule, said information systems may not be removed from said spaces.
3. Information systems containing copies of claim information may not be connected to outside networks such as the internet.
4. The provided claims information and other information may only be used by those whose names appear on the advance application. They may not transfer, lend, trade said information for other information, etc., to or with other parties.

To meet these conditions, many applicants take measures such as:

- Establishing an NDB-only room into which only the registered researchers are granted entry. There, the data sets provided are stored using high-capacity hard disc drives or servers and are analyzed with hardware (such as PCs or other terminals) and analysis software (such as SAS) that has been specially prepared for that purpose.
- Carefully managing entry and exit into the lockable NDB-only room. The hardware mentioned above must be stored securely when not in use, such as in lockable cabinets. In addition, to prevent theft, said hardware must be secured with chains or with similar methods. Furthermore, within the “Risk Analysis and Response Chart” published by MHLW, it is recommended that methods of handling missed entry records (a source of residual risk) be put on clear display.

At the on-site research centers at the University of Tokyo and Kyoto University, rooms specifically for these purposes were established as a trial, but due to budget restraints, not only does the provided analysis hardware have limited data capacity, they are set up in poor environments without windows. Furthermore, they can currently only be used by applicants with past experience conducting analyses using the NDB, so at the moment, they cannot be used as part of the data infrastructure for analysts.

This document will refrain from explaining any more specific issues than those already mentioned, outside of issues related to master data files (data dictionaries) that can be addressed in the short term, which will be explained in detail.

In addition to NDB analyses, many analyses that require information from multiple databases to be matched require the four types of master data files listed below.

| Master data file type | Example; Entry count |
|---|---|
| Disease names | Disease names used to process digital claims; Approx. 26,000 |
| Pharmaceuticals | Pharmaceuticals for medical use; Approximately 21,000 specification numbers |
| Medical service fee codes | Medical services and examinations; Approximately 7,500 |
| Healthcare facilities | Healthcare facilities nationwide; Approximately 180,000 institutions |

Although data has been collected in the NDB for a long period of time (since 2009), to make use of past data, information that contains the change history from the targeted point of time within the master data files must also be collected. Lists and master data files made public as sources of information were originally compiled for other purposes, such as to record claim applications and reviews or to manage pharmaceutical logistics, so a considerable amount of effort is required to construct master data files for analysis with them. Below, I have gathered issues facing the use of master data files for pharmaceuticals and healthcare facilities among sources that can be relatively easy to utilize even without a high level of expertise.

**Master data files for pharmaceuticals**

There are various sources of public information that can be used as reference when compiling master data files for pharmaceuticals, such as the Medical Information System Development Center (MEDIS),[13] but the information contained within those sources was originally collected for purposes like claims application and review or managing pharmaceutical logistics, so there are various issues that arise when attempting to use them to construct pharmaceutical master data files for healthcare data analysis.[14]

- The master data files created reflect the data as it was at the time the list was made public, and lists that show the change history do not exist. They do not include pharmaceuticals that were once in use in the past but are currently off the market. Even if one obtains a list that contains past products, due to the fact that pharmaceutical identification numbers change when their names change, matching each pharmaceutical with its current equivalent is not easy.
- They do not include entries for the following data elements that are important when analyzing pharmaceutical data.
  - ♢ Information related to components can be found on the MHLW site called, "Information concerning pharmaceuticals on The National Health Insurance (NHI) Price List and generic pharmaceuticals," but the component listings are not always uniform, and there are many cases when it is difficult to match each component in two pharmaceuticals.
    Example: Taxotere for intravenous injection, 20mg (the brand name pharmaceutical) has docetaxel hydrate listed in its components, but many of its generic versions only list "docetaxel."
  - ♢ When conducting quantitative analyses on pharmaceuticals with multiple dosage forms or specifications, there is no information listed indicating component amounts in a way that meets the requirements for analyses in which component amounts are converted. The fact that this is a source of medical errors and not only a problem for analytical purposes must also not be ignored.
    Example: Tamiflu Dry Syrup 3% contains 30mg of oseltamivir phosphate per gram of NHI pharmaceutical price unit, but this information is not included in the master data files.

Such information is included in the package inserts and other documents for every pharmaceutical, but since those are not a type of structured information, it is unrealistic to read every package insert for every product that is the subject of analysis.

**Master data files for healthcare facilities**

When using data provided by the NDB, it is impossible to determine the healthcare facility at which treatments were provided. However, when requesting data, it is possible to set flags for facility attributes, such as location, number of beds, and advanced treatment hospital status. This makes it possible to conduct analyses on differences in treatments according to said facility attributes. To do so, it is necessary to prepare master data files that includes the desired facility attribute for approximately 180,000 healthcare facilities nationwide. That is to say, every analyst must download and combine healthcare facility lists (which are unstructured data) from each municipality that are provided under the jurisdiction of eight regional health bureaus nationwide. Additionally, only the most recent list is made public, and it is impossible to extract any facilities that were open in the past but are currently closed or that have had their identification number changed due to organizational changes or other such changes. For this reason, there have been cases in which analyses were conducted using lists with errors or missing entries.

Although master data files should be prepared by the time one extracts data from a database, due to limited operational budgets, analysts are relying on master data files provided by third parties from the outset. Although many concerned parties are aware of this issue, they are not moving to construct master data files.

## 4. Potential Policy Options

Based on the issues brought up in the previous sections, below are specific measures that should be taken in the short, medium, and long term when building an information infrastructure for healthcare.

**Short term measures (Within one year):** These measures can be started immediately if stakeholder consensus can be obtained. Only a limited amount of funding would be necessary.

First are measures to improve utilization methods for the current NDB to promote more active use. The first step toward achieving this is preparing master data files for analyses (the aforementioned master data files for pharmaceuticals and

healthcare facilities). After preparing master data files for that include change histories compiled with data contained within the NDB from its establishment in April 2009 to the present, the next step would be to cooperate with the MHLW to improve future monthly updates. This will require creating specifications for publicizing information and building a framework for automatic updates. We should consider having users cover the operational costs of preparing the master data files through these steps by charging them minimal usage fees. As for compiling master data files for healthcare facilities, the NDB User Association has started an initiative to improve master data files for healthcare facilities and has recently begun efforts to compile said master data files through collaboration with the author of this document.



Furthermore, it is time to update or remove outdated practices and regulations related to data presentation methods. Many of the regulations for data presentation were created according to the technology and prevailing circumstances of 2009, when the third-party builders of the NDB were first determined. Since then, responsible parties have had their hands full with everyday operations, so efforts to revise the regulations themselves have never built initial momentum. It would be better to return to the drawing board on this issue and examine how to use data collected in the NDB and in other places and which operational methods are required to make the best use of them. We have arrived at the point that we should think about using new technology.

Another measure that can be undertaken with minimal costs is the revision of regulations for physical analysis environments. Requiring every applicant to set up a room for the exclusive use of NDB analysis places a heavy burden on them. Instead, creating a shared, high-security network environment for NDB analysis operated with usage fees from each applicant would not only lower the risk of data leaks, it would have the potential to make large-scale data analysis easier while minimizing burdens on analysts themselves. Such a measure can be expected to lead to wider use of the NDB.

Additionally, as measures to implement telework are advancing in response to Coronavirus, the time is right to consider easing the rule that requires an exclusive room for analysis so that each researcher can set up their own working environment for conducting analysis.

**Medium term measures (one to three years):** These goals are feasible, but will require some differences in opinions among experts to be reconciled. While they will require budgets, limited amounts of additional funding can be generated by charging for data provision.

First, budgets for maintenance and operational expenses must be supplemented to promote the stable and continuous operations of the NDB. In addition to the costs of constructing and operating the database system itself, to promote the use of large-scale data, it is necessary to reinforce the human resources involved in its operations while simplifying various processes, like application and review processes or data extraction procedures. Specific areas that require reinforcement are the resources for constructing and operating the database system and the support structure for analysts.

Second, to secure a budget for these measures, we should advance discussions about expanding permission to use the NDB beyond related parties in the Government or researchers so that private companies can use the database if they fulfill certain conditions and pay usage fees. Charging usage fees will allow the Government to obtain the funding needed for operational expenses. Because the NDB contains a massive amount of data that includes the entire country, providing randomly-extracted subsets containing approximately 5% of that data will prevent any individuals in the database from being identified. Doing so may expand the scope of NDB use by allowing for a greater range of ideas, so this is another measure that should be considered.

Ideas are being discussed toward the construction of a new version of the NDB that would it possible to analyze data linked with long-term care databases and other public data (DPC database, national cancer registry, database of specific intractable and pediatric chronic diseases, MID-NET). It is likely that the scope of NDB use will expand significantly when the new NDB is online and the short- to medium-term measures described above are implemented.

**Long-term measures (three to five years):** Gather points from past discussions to reconstruct a grand design for the healthcare data infrastructure and expand the scope of data collected with legal revisions.

As discussed above, it is practical to focus efforts on the NDB in the short term, but in the long term, it is important to construct a shared platform (a grand design) that is based on the NDB and is mutually compatible with the various existing types of healthcare information and databases which are operating in a decentralized manner.

One of the data types that should be included in that platform is Personal Health Records (PHRs), which contain information related to healthcare and health on the individual level. These records should not only include healthcare and

related information, but other types of information such as sleeping patterns, vital information, and treatments not covered by insurance (such as OTC medications and vaccinations) as well. If they are collected in a machine-readable format and in a way that provides researchers an overhead view, they will be extremely useful. However, people in Japan tend to rely on doctors more than people do in Western countries, so it is likely that many in Japan will not feel it is necessary to have their own health information collected in a PHR. While making efforts to raise awareness towards the importance of PHRs, it is important to implement attractive aspects into services that members of the general public will perceive as convenient.

When constructing and using a healthcare information platform built to serve as a national information infrastructure, the goals behind construction and use should be clearly indicated, and it is extremely important to obtain mutual understanding towards those goals by sharing them with each stakeholder (not only Government institutions, healthcare providers, and individuals and their family members, but also stakeholders like payment funds, pharmaceutical companies, and medical device makers). To that end, it is crucial to promote the safety and beneficial use of anonymized individual healthcare records with a shared interpretation of the Personal Information Protection Law. In the past, discussions on the use of healthcare records were predominantly negative and focused on risks. It is now the time to shift the focus of discussions to how to operate moving forward so that databases become more widely used, and it is urgent for legislation to be developed to that end.

Various topics must be discussed to construct a stable and sustainable data platform that can serve as a policy base. These topics include how to supplement the costs incurred by healthcare facilities or insurance societies when providing medical records and claims information and how to offer them some type of incentive. Meanwhile, people using healthcare services must benefit from sharing their information and be provided with feedback. Incentives must also be created for other data providers and cooperating parties. In addition to data usage fees charged to researchers, companies, and other users, various incentives could be created using a portion of the financial resources generated by optimizing health insurance through the effective use of information gained from data. The construction of mechanisms that secure financial resources for incentives from the health insurance system itself should also be considered. For example, when providing data, healthcare facilities could be awarded extra payments, or individuals could receive discounts on their health insurance premiums.

In Estonia, an example of successful electronic governance, basic information concerning medical treatments is collected in a central location. While this carries certain risks for members of the public, these risks have been present since the country was founded in 1991, and the usefulness of this system has become widely recognized amongst the Estonian public. If the people feel that providing healthcare data benefits them and makes life more convenient, it creates a positive feedback loop. Estonia provides a good example where one such loop was successfully created.

## 5. Discussions on the Nature of Issues and Determining Policy Feasibility

As discussed in the previous section, healthcare information is currently decentralized and stored in various databases and other locations, so a shared platform that is mutually compatible with each source of information must be designed and built. It is extremely important for that shared platform to make the most of the information gained from each source to contribute to overcoming various issues in healthcare and to improve the quality and safety of healthcare, achieve innovation, and restore healthcare economics. Although the NDB forms the foundation of these efforts, there are various restrictions in place concerning the provision of information from the NDB to third parties, and systems for promoting said sharing are currently insufficient. In other words, because operational issues are hindering the progress of NDB use, it is difficult to communicate the significance and purpose of healthcare data collection.

To escape this negative cycle, steps must be taken in the short, medium, and long terms. In the short term, it is necessary to compile master data files and revise each type of regulation to promote usability and the use of data. In the medium- to long-term, it will be necessary to construct an analysis platform for Japan's healthcare data based on the NDB and to promote widespread recognition of the purposes of data use among healthcare providers and individuals to gain the entire public as a stakeholder. When doing so, the perspective of protecting private information must be addressed. To conclude this document, I would like to examine the risks of private information leaks when collecting RWD from sources of healthcare information like the NDB. First is the chance that information contained within databases is leaked during transmission or analysis. Not only is private information anonymized when it is entered into a database, implementing modern security technology will minimize the risk that data is leaked when it is transferred to a storage server or during the transmission process.

To prevent the risk that individual identities are leaked, detailed analyses using small numbers of subjects are not allowed when using the NDB. If you consider the fact that analysts do not conduct research with the goal of identifying individuals, it is reasonable to assume that placing analysts under the same confidentiality obligations that clinical doctors have to their patients

would be sufficient to avoid this risk, even in the event a specific individual is identified during analysis.

Meanwhile, the unease members of the public may feel towards providing their data must be addressed. In addition to using PHRs in ways that members of the public will feel is beneficial, such as by providing services or insurance premium reductions, it will also be necessary to publicize examples of how PHRs can be used to achieve innovation in healthcare. To monitor the spread of Coronavirus Disease 2019, measures were implemented in China and South Korea in which the movement patterns of infected people were analyzed using surveillance cameras and GPS records. This information was used to develop an application that provides users with maps so they can know if they had close contact with an infected person. Although such a service cannot be provided in Japan for both legal and technological reasons, whether one supports or opposes the use of technology in this way, it is deeply interesting that the governments of China and South Korea were able to gain a certain amount of understanding towards governments storing private information by allowing people to use such a service.

The stakeholders for healthcare data are healthcare service providers, businesses and organizations involved in healthcare, researchers, and people receiving healthcare and their family members – in other words, every member of the public. Under the shared goals of promoting evidence-based healthcare policy, optimizing the healthcare economy, and achieving innovation in healthcare, I have high hopes that we can promote discussions toward increasing the value of the healthcare data in the future.

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1. The third and fourth NDB Open Data Japan reports (https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000177182.html)
2. In 2017, approx. 32% of medical records in Japan were digitized. Static/Dynamic Survey of Medical Institutions and Hospital Report, 2017, Vol. 1, Charts 64 and 122
3. Real World Data (RWD): Databases containing anonymized personal information for the secondary use of records and other information obtained in clinical settings, such as insurance claims or medical records. The term “Real World Data” is named so for the fact that said records reflect the actual conditions in the clinic.
4. Japan Medical Data Center Co., Ltd. (JMDC) https://www.jmdc.co.jp/
5. Japan Medical Information Research Institute, Inc. (JMIRI) https://www.jmiri.jp/
6. Medical Data Vision Co., Ltd. (MDV) https://www.mdv.co.jp/
7. The National Database or NDB is a nationwide database containing information from insurance claims, certain medical services, and other types of healthcare information.
8. http://www.pmda.go.jp/safety/midnet/0001.html
9. The first patient ID contains hash values for their insurance number, the code and number on their insurance card, date of birth, and gender, while the second has hash values for name, date of birth, and gender.
10. Noda et al., (October 2017) “Improving and Validating Patient Matching Methods in an Insurance Claims and Specified Medical Service Information Database (NDB),” Journal of Health and Welfare Statistics, 64, No. 12
11. Excerpt from the MHLW’s Guidelines Pertaining to Request for Production of Statistics, etc., by Entrustment, Part 12-2, Item 1. https://www.mhlw.go.jp/file/05-Shingikai-12401000-Hokenkyoku-Soumuka/0000135460.pdf (Japanese version)https://www.mhlw.go.jp/english/database/order_made/dl/02.pdf (provisional English version, original translation below)(1) Minimum sample unit size As a general rule, do not include sample units with less than ten people in published research results. In addition, when sample units are municipalities (including cities designated by Government ordinance; also applies hereinafter), restrictions placed on published research results are as follows:i) For municipalities with less than 2,000 people, do not disclose sample unit sizes. ii) For municipalities with populations 2,000 or more and under 25,000, do not include sample units with less than twenty people. iii) For municipalities of populations 25,000 or over, do not include sample units with less than ten people.
12. From “Guidelines for the Provision of Information for Insurance Claims, Specific Health Checkups, etc.” Examination Guidelines No. 6-4, (4) Use location, storage location, and management of claims information, etc.
13. Medical Information System Development Center (MEDIS) http://www.medis.or.jp/
14. Eiko Shimizu, et al. Optimal drug master that enhances real world data analysis and improves medical safety. ACPE2019; October 11-13, 2019; Kyoto

# Chapter 5.
## Developing Innovative Financing and Payment Mechanisms to Support the Healthcare System

**Kazumasa Oguro**
Professor, Faculty of Economics, Hosei University

Professor Kazumasa Oguro belongs to the Hosei University Faculty of Economics. He was born in 1974 and graduated from the Faculty of Science at Kyoto University. He then attended the Graduate School of Economics at Hitotsubashi University, where he earned his Doctorate of Economics. After joining the Ministry of the Treasury (current the Ministry of Finance) in 1997, he served as Assistant Legal Examiner at the Minister's Secretariat Documentation Division; Deputy Director-General of the Monitoring Division at the Bureau of Customs; Senior Researcher at the Ministry of Finance Policy Research Institute; and Associate Professor at Hitotsubashi University's Institute of Economic Research. He assumed his current position in April 2015. He is a Senior Visiting Fellow at the Ministry of Finance Policy Research Institute and a Consulting Fellow at the Research Institute of Economy, Trade, and Industry (RIETI). He is also a member of the Cabinet Secretariat's Innovative Business Activity Evaluation Committee; a special investigator of the Board of Audit of Japan; Executive Director at the Kajima Institute of International Peace; Director at the Institute for New Era Strategy (INES); and Senior Researcher at the Canon Institute for Global Studies. He specializes in public economics.



## 1. Introduction and Background of Issues

While facilitating necessary and appropriate healthcare services, public health insurance plays an important role in society in the way that it contributes to the stability of the everyday lives of members of the public and improves welfare by allocating resources to offset the risks posed by treatment and medication costs for serious diseases. This has been highlighted by the spread of the novel coronavirus pandemic, which has reminded Japan and the world of the importance of the development of vaccines and other pharmaceuticals, and the medical system as a whole. However, with an outstanding public debt to gross domestic product (GDP) ratio of over 200% and rising, Japan is facing severe fiscal issues. In the Government's initial budget for FY2020, social welfare spending reached a record high of 35.8 trillion yen and total expenditures for social security benefits – which are funded by public funds and insurance premiums collected by the national and municipal governments – grew to over 120 trillion yen (including approximately 60 trillion yen for pensions, 40 trillion yen for healthcare, and 10 trillion yen for long-term care).

Given these circumstances, Japan's consumption tax rate was raised to 10% on October 1, 2019, signifying the end of the Comprehensive Reform of Social Security and Tax that began in the latter half of the 2000s. However, the crucial moment for social security reform has yet to come. Growth continues to be low and poverty continues to spread as population decline becomes more serious due to population aging and a falling birthrate. The Government is now being asked to rebuild the social security system and restructure financial resources for healthcare to achieve sustainability.

Discussions on reform at the national Government level are often based on social security spending projections for 2040 presented by the Council on Economic and Fiscal Policy (CEFP) in May 2018. However, as the baby boomer generation will be age 75 or over by 2025, basing discussions on uncertain projections for 2040 carries certain risks.

The CEFP projections include two estimates for social security spending, one with high growth and the other with low growth. The low growth estimate is the baseline case and it shows an increase in social security spending from 121.3 trillion yen (21.5% of GDP) in FY2018 to approximately 140 trillion yen (21.8% of GDP) in FY2025, which then grows to approximately 190 trillion yen (24% of GDP) in FY2040. The ratio of social security spending to GDP is projected to increase by 2.5% by FY2040 (from 21.5% to 24%).

Because an increase in the consumption tax rate of 1% increases tax revenue by approximately 0.5% of GDP, if social security spending increases by 2.5% relative to GDP from FY2018 to FY2040, financial resources equivalent to a consumption tax hike of approximately 5% will be necessary to cover it, whether or not we consider the current decline in deficit spending. However, at a press conference before the House of Councillors election in July 2019, Prime Minister Shinzo Abe said that there will be no need to increase the consumption tax rate for a decade. Therefore, discussions about additional consumption tax increases carry the risk of political stagnation for the next few years. For the time being, it is likely that the important topics in discussions on fiscal reconstruction will entail long-term strategies and expenditure reform centered on social security.

## 2. The Basic Reform Philosophy and Reform Priorities

How should we respond to these problems? After clearly identifying which parts of the public health insurance system should be protected, reform priorities must be determined under the basic philosophy of "Share greater risks as a community, and shoulder smaller risks as individuals." This philosophy makes it possible to protect the most basic functions of the public health insurance system while advancing fiscal reform measures. This means revising the philosophy of benefit coverage. It is no exaggeration to say that doing so is central to public health insurance reform.



If we are going to consider fiscal reforms, we should first consider which parts of the health insurance system must be protected. Japan's public health insurance system achieved universal health coverage (UHC) in 1961. By providing a highly stable, generous safety net, UHC allows people to use necessary and appropriate healthcare services without going bankrupt or falling into poverty. This is called "financial risk protection" and it is one of the most important roles of public health insurance.

Simply put, the insurance system protects households from going bankrupt or falling into poverty over the costs of treating serious, unexpected illnesses. Financial risk protection is the most important role of public health insurance. Therefore, when altering the scope of public health insurance benefits due to fiscal reforms, it is necessary to understand how the burdens placed on household finances and property will be distributed post-reform, to ensure that we are still able to maintain the basic function of financial risk protection.

There are three types of variables that are particularly important to efforts to determine priorities for public health insurance reform. First is fees – medical service fees and pharmaceutical prices. Second is market size, calculated by multiplying price (P) per unit and quantity (Q) sold to determine total revenue (P×Q). Third is cost, i.e., the standard annual costs of treatments, for which we usually consider means, medians, and variances. Of these three types of variables, the latter two are important when determining the impact that reform proposals will have on health insurance finances and household budgets. While medical service fees and pharmaceutical prices are somewhat significant when predicting earnings stability for medical institutions and pharmaceutical makers, as variables for determining priorities during public health insurance reform, they are not as important as they might initially appear.

On the other hand, market size (P×Q) is needed to balance the sustainability of financial resources for public health insurance and industrial competitiveness, while standardized annual treatment costs provide perspective on financial risk protection. To deepen our understanding of these variables, consider the following four types of pharmaceuticals:

Type I: Low annual treatment costs, large market size
Type II: Low annual treatment costs, small market size
Type III: High annual treatment costs, large market size
Type IV: High annual treatment costs, small market size

Among these types of pharmaceuticals, a typical example of a Type I pharmaceutical would be pain relief patches (which have low unit prices but nevertheless generate over 100 billion yen in sales annually). A representative example of a Type IV pharmaceutical is Kymriah (which is priced at 33.49 million yen per dose and targets an estimated 216 users, making its potential market size 7.2 billion yen).

In Japan's public health insurance system, a portion of total revenues (P×Q) are provided by insurance fees and public funding. Because financial resources are limited, public health insurance could become less sustainable if pharmaceuticals with large market sizes were listed in greater numbers. From a macroeconomic perspective, this encourages the fiscal authorities charged with maintaining financial resources for health insurance to prioritize reforms that focus on pharmaceuticals with large market sizes. However, to members of the public, the standardized annual cost of treatment is a more important variable than market size (P×Q). Therefore, when carrying out reform measures, it is desirable that attention is also paid to a microeconomic perspective – the increased burden on household budgets. From the perspective of financial risk protection, it is best to prioritize reforms that target pharmaceuticals with standardized annual costs of treatment small enough that they can be absorbed by household budgets. Also, from the perspective of industrial competitiveness, stable revenues (P×Q) are important, as they allow companies to recover development costs. To promote the development of innovative pharmaceuticals and other medical products, it is important that market sizes can be maintained in a predictable manner for innovative products over a certain period of time after they enter the market. Specifically, sales for most products tend to peak five or six years after entering the market, about halfway through the ten-year term for which their patents are in effect. They tend to peak

earlier than their tenth and final patent year. Although it is important that market size be maintained during that period, it is not uncommon for certain constraints to be placed on pharmaceuticals with large market sizes from the perspective of maintaining the sustainability of the healthcare system.

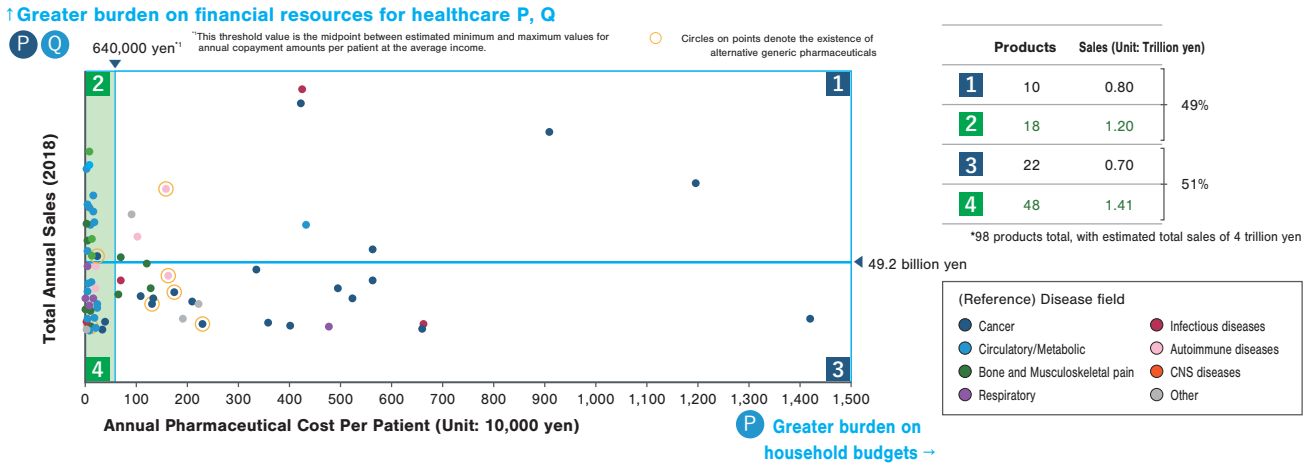
In terms of how these concepts play out in pricing policy, consider the Repricing for Market Expansion system introduced in 2000, or the Special Provisions for Repricing for Market Expansion introduced in 2016. The former is used to lower pharmaceutical prices by initiating price revisions when a listed pharmaceutical's total annual sales exceed projections by a certain factor. This occurs when either (1) annual sales are two or more times projected annual sales and greater than 15 billion yen or (2) annual sales are ten or more times projected annual sales and greater than 10 billion yen. In either case, the price for the pharmaceutical in question is lowered by up to 25%. In addition, for pharmaceuticals with extremely high annual sales, the Special Provisions for Repricing for Market Expansion allows for (1) price cuts of up to 25% for pharmaceuticals with annual sales of 100 to 150 billion yen that exceed sales projections by 1.5 times or more, and (2) price cuts of up to 50% for pharmaceuticals with annual sales over 150 billion yen that exceed sales projections by 1.3 times or more.

The point is, when carrying out fiscal reforms, in order to preserve the basic health insurance system function of financial risk protection, the ideal priority for price reforms would be to start with Type I pharmaceuticals, and then move on to Type II, Type III, then Type IV pharmaceuticals. Another important aspect to consider for pharmaceuticals of all types is the availability of alternatives. When undertaking reforms, it is better to prioritize pharmaceuticals without alternatives over those with alternatives.

Next, we will take a look at what happens when these rules are applied to real-world pharmaceutical data. These implications are shown in Figure 1. Figure 1 was created with 2018 Japan Pharmaceutical Market (JPM) data from IQVIA Japan and data maintained by Chuikyo of new pharmaceuticals for 98 listed items with annual sales of 20 billion yen or more. Annual cost per patient was estimated by dividing peak sales by peak user count using peak market size projections (peak sales, peak user count).

Figure 1 has been split into four quadrants with horizontal and vertical lines. Clockwise from the top right, the quadrants are marked 1, 3, 4, and 2. The total sales of all 98 products is approximately 4 trillion yen. The combined sales of quadrants 1 and 2 and quadrants 3 and 4 are both approximately 2 trillion yen. The horizontal line has been placed at a sales threshold value of 49.2 billion yen. Additionally, copayments for people with annual incomes of 3.7 million yen are limited to 57,600 yen per month, and when the High-Cost Medical Care Benefit System is applied, the annual limit on copayments is 640,000 yen for the average income. The vertical line has been placed there (at that limit) to separate quadrants 1 and 3 and quadrants 2 and 4. As such, we end up with Type III pharmaceuticals in quadrant 1, while Type I pharmaceuticals are in quadrant 2, Type IV pharmaceuticals are in quadrant 3, and Type II pharmaceuticals are in quadrant 4.

**Figure 1. Total Annual Pharmaceutical Sales and Annual Pharmaceutical Cost Per Patient**




Source: Selected from materials presented at The 2nd Opinion Exchange Meeting on the Significance and Issues of Evaluating Pharmaceutical Innovation 2019, sponsored by Pfizer

What can we gather from Figure 1? First, in quadrant 1, which contains innovative pharmaceuticals, there are ten products with total sales of only 800 billion yen. Quadrant 2, on the other hand, contains 18 products with total sales of 1.2 trillion yen. Quadrant 3 has 33 products with total sales of 700 billion yen, and quadrant 4 has 48 products that generated 1.4 trillion yen in sales. It also shows that pharmaceuticals with low annual costs per patient (located in quadrants 2 and 4) had total sales of approximately 2.6 trillion yen. Additionally, pharmaceuticals with alternatives on the market are circled. Comparing circled points in quadrants 1 and 3 with those in 2 and 4, we find that there are more pharmaceuticals with alternatives available in quadrants 2 and 4, where we also find pharmaceuticals with low annual costs per patient.

It is important to note there is a risk that market sizes for extremely expensive pharmaceuticals expand beyond expectations if their use becomes more widespread. To ensure cost-effectiveness, the Government introduced the Japanese Health Technology Assessment (Japanese HTA) program in April 2019. During the planning stages for Japanese HTA, there was some talk about its use for determining insurance coverage like its counterpart system in the U.K. However, it was decided not to use Japanese HTA to determine insurance coverage, and instead it is now used for price adjustments, where it is an effective method of controlling market size. It is often applied to extremely expensive pharmaceuticals, which tend to attract a lot of attention in the media, even though many of these pharmaceuticals are for rare diseases and only used by a few people each year. This means that in many cases, the impact of these pharmaceuticals on financial resources for health insurance are insignificant. When conducting HTA, it is necessary to consider a wide range of healthcare costs from the perspectives of the individual or from society as a whole. Instead of focusing on any single pharmaceutical, it is better to determine reform priorities after conducting comprehensive, evidence-based analyses (including the total amount of medical service fees) on market size (P×Q) or annual costs of treatment. [1]

## 3. Potential Policy Options and Their Impacts on Public Finance

**Reform Proposal 1 – Reexamine the Scope of Coverage for Pharmaceuticals and Define Special Limits**

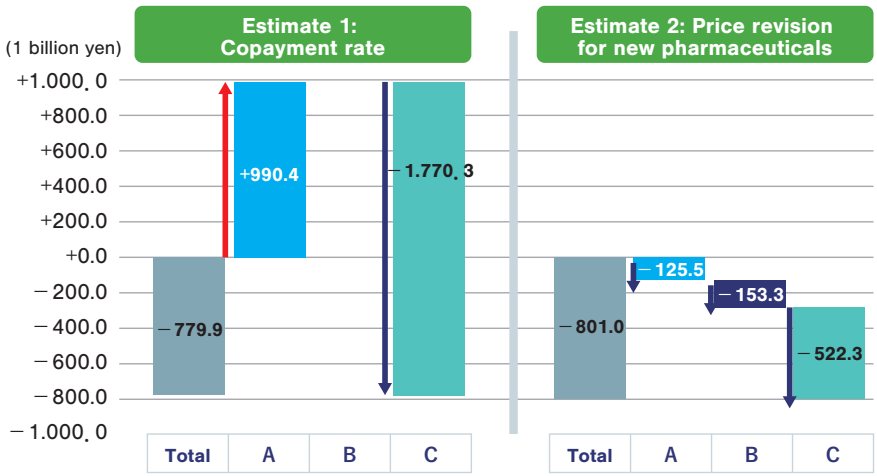
Based on the priorities for reforms described above, let us examine the impact of insurance coverage reform for pharmaceuticals. When thinking about revising insurance coverage to optimize healthcare expenditures, policy proposals generally tend to focus either on reforming copayment ratios for people receiving healthcare, or on revising medical service fees, pharmaceutical price standards, or the scope of health insurance coverage. For example, in France, the copayment rate is gradually shifted according to a pharmaceutical's added therapeutic value, usefulness, and other benefits. Copayment rates are as follows: for high-priced pharmaceuticals without alternatives such as anti-cancer agents – 0%; for general pharmaceuticals – 35%; for stomach medicines and the like – 70%; for pharmaceuticals considered to be of low usefulness – 85%; and for vitamins and tonic medicines – 100%. [2]

This first reform proposal references France's system for insurance coverage. It proposes that copayments be determined by the severity of the applicable disease or other factors related to the pharmaceutical in question (such as its usefulness). This differs from the current system, in which copayment rates vary by age group (30% as a general rule; 20% for preschoolers and people ages 70 to 74; 10% for people age 75 and over). In Reform Proposal 2 below, severity is also considered, but that proposal does not include any adjustment to current copayment rates. Pharmaceutical price standards are uniformly increased or decreased according to the severity of the applicable disease for or the benefits of the pharmaceutical in question.

For Proposal 1, we follow France's lead and propose listing pharmaceuticals following an examination, evaluation, and assignment to one of three categories by multiple experts. Category A would be pharmaceuticals for diseases that result in severe sequelae or death. Category B would be pharmaceuticals that are not indicated for severe diseases but do not have generic alternatives available. Category C would be other pharmaceuticals. Each category would have a different copayment rate. The most generous coverage decisions would be reserved for pharmaceuticals for severe diseases (Category A), which would be assigned copayment rates of 0%. To promote the use of generics, pharmaceuticals with inexpensive generic equivalents would require 70% copayments (Category B). The current copayment rate of 30% would be maintained for other pharmaceuticals (Category C).

Based on the above proposal, we analyzed big data from IQVIA Japan, which contains quantitative data for almost all pharmaceutical sales in Japan. Our results can be seen in Figure 2. They suggest that Reform Proposal 1 may make it possible to prioritize coverage for more important pharmaceuticals without significantly impairing current measures to optimize financial resources. This analysis is based on gross estimates, so we keep in mind points that require separate consideration, such as the effects of the High-Cost Medical Care Benefit System or changes in healthcare demand resulting from changes in copayments.

**Figure 2. The Effects of Proposed Reforms**




Source: Author

The estimate for Reform Proposal 2 calculates the effects on financial resources using current copayment rates while multiplying each pharmaceutical's price by 1.05, 1.03, or 0.97 after adjusting for divergence rates from prevailing market price. These factors correspond to the pharmaceutical categories used here in Reform Proposal 1: pharmaceuticals for diseases that result in severe sequelae or death, pharmaceuticals that are not for severe diseases but do not have generic versions available, and other pharmaceuticals, respectively. This is the same concept as introducing a multiple adjustment system based on a 2% adjustment, which is the acceptable adjustment range defined by current pharmaceutical repricing rules. This estimate suggests that it may be possible to reduce insurance expenditures for pharmaceuticals by approximately 800 billion yen while allowing for a higher concentration of financial resources to be placed on more important pharmaceuticals.

As a countermeasure against antimicrobial resistance (AMR), a trial introduction of a subscription model is currently underway in the U.K. (Subscription models are a type of pull incentive in which usage rights for certain antimicrobials and other pharmaceuticals are granted by contracts for predetermined annual payments.) Subscription models eliminate the uncertainty that may be caused by price adjustments by granting special status for a specified period of time, such as ten years, to pharmaceuticals without alternatives that have been recognized as highly useful. This method is equivalent to exempting the pharmaceuticals in question from price reductions.

For example, let us consider a case in which a limit of 1 trillion yen (2% of GDP) is placed on total sales for pharmaceuticals that receive special status. Let us also assume total sales are approximately 10 trillion yen, and the price reduction rate is Z% for pharmaceuticals without special status. In this scenario, a price reduction will reduce total sales by approximately (10×Z/100) trillion yen. To reduce the burden on financial resources by an equivalent amount when a limit of 1 trillion yen is in place, the price reduction for pharmaceuticals without special status must be changed to (Z×10/9)%. Although the yearly average sales for pharmaceuticals with special status is 100 billion yen, if sales exceeded the special limit of 1 trillion yen, it is important to have measures in place to uniformly adjust the effects of the portion over 1 trillion yen. Therefore, it is important to consider how to best apply current systems for price adjustments – such as the Special Provisions for Repricing for Market Expansion and Japanese HTA.

**Reform Proposal 2 – Implement a Macroeconomic Slide for Healthcare**

It is clear that the reforms discussed above can secure no more than a few trillion yen and that placing controls on the continued growth of social security expenses is unavoidable.

Naturally, the Government is currently examining that possibility. The Basic Policy on Economic and Fiscal Management and Reform 2018 (also known as the "Basic Policy") which was approved by Cabinet decision in July 2018 defines the three years immediately before the baby boomer generation becomes age 75 or over (namely, FY2019 to FY2021) as a "Foundation-Reinforcement Period." The Basic Policy contains various reforms related to healthcare and long-term care. For example, to manage the rising cost of healthcare, it proposes (1) introducing fixed fees for outpatient visits, (2) revising copayments for late

elderly people and other groups, and (3) introducing an automatic adjustment mechanism or implementing regional medical service fee schedules.

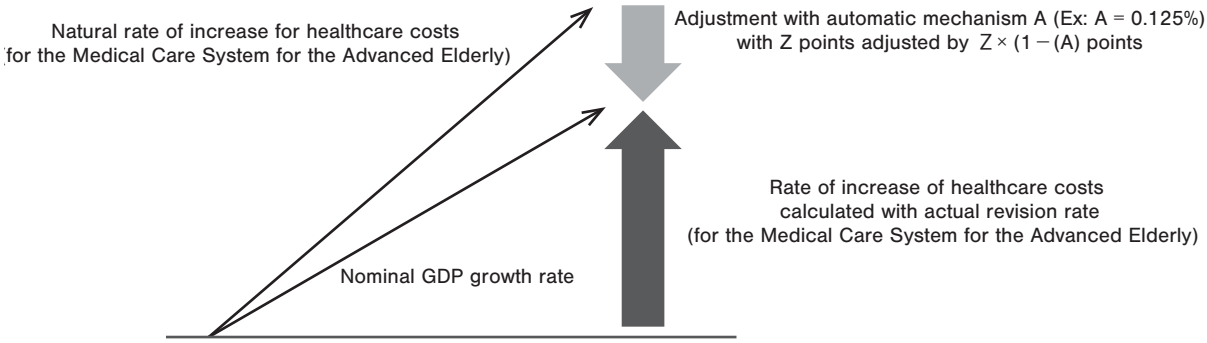
We will focus here on (3) introducing an automatic adjustment mechanism or implementing regional medical service fee schedules. Generally, there are two methods of establishing an automatic adjustment mechanism to manage the rising cost of healthcare. The first, which is outlined in a Ministry of Finance (MOF) proposal, automatically increases out-of-pocket examination fees for people receiving healthcare when healthcare expenses increase. The rate of said automatic increase is determined by factors like economic growth or the speed of population decline. However, there are limits to this method for reasons related to financial risk protection.



The other method is introducing an automatic adjustment mechanism for medical service fees. In the past, the author has proposed measures to introduce such a mechanism for medical service fees in the Medical Care System for the Advanced Elderly (for those age 75 and over) system, and this could be called a "macroeconomic slide for healthcare."

The financial resources (to cover benefits) for 90% of said fees would be funded through public funds collected through insurance fees from the working generation, while the remaining 10% would be covered by insurance fees from people age 75 and over. This would give it a similar structure to a pay-as-you-go pension system. The mechanism in this proposal is based on the macroeconomic slide introduced as part of the 2004 Pension Reform.

**Figure 3. The Macroeconomic Slide for Healthcare**




Source: Oguro, Kazumasa. Rebuilding the Japanese Economy. Nikkei Publishing, 2020.

As a general rule, medical service fees are calculated using the points assigned to each medical service performed according to their medical service fee categories. The healthcare facility or other institution that provided said medical services is paid 10 yen per point. This calculation is generally the same for every age group, but there are certain situations in which medical service fees vary according to the age of the person who received care. For example, when the Medical Care System for the Advanced Elderly came into effect in 2008, new medical service fee categories were established that are exclusive to the late elderly (defined in Japan as people age 75 and over). They include the Basic Fee for Special Hospitalization for the Advanced Elderly (which lowers the medical service fees paid to the healthcare facility when someone age 75 years or over is hospitalized for over 90 days, with certain exceptions), Medical Service Fees for the Advanced Elderly, and the Support Fee for End-of-Life Counseling for the Advanced Elderly.

Some of these medical service fee categories have been removed or altered by reforms to the medical service fee schedule, but the examples listed above are meant to illustrate that it is possible to build different medical service fee system frameworks for people age 75 and over and people under age 75.

To serve this purpose, a macroeconomic slide like the one for the public pension plan could be implemented to control increases in total spending. It could be used to determine an adjustment rate according to changes caused by factors like population decline in the working generation and longer life expectancies. The simplest method of administering such an adjustment would be to assign a value of Z for every item in the medical service fee schedule for the previous fiscal year and apply an adjustment of Z× (1-Adjustment rate) points to each item when medical services are provided to people age 75 and over to determine their medical service fees in the current fiscal year. Because copayments are proportional to medical service fees, this would result in virtually no increase in copayments for people age 75 years and over even if controls are placed on medical service fees.

The past trend was that personnel expenses accounted for about half of healthcare costs, but with this mechanism, healthcare costs as a portion of GDP will remain at a certain level and personnel expenses will increase according to the rate of growth.

How much ought the adjustment rate be? According to the Economic and Fiscal Projections for Medium to Long Term Analysis (revised edition) provided by the Ministry of Finance (MOF), healthcare expenses and related expenses will increase by approximately 5% over the next 40 years. Since the average annual increase is 0.125%, the adjustment rate needed to control for that increase is only 0.125%. Is it not surprising that lowering medical service fees with an average annual adjustment rate of only 0.125% has the potential to stabilize healthcare finances? From a medium- to long-term perspective, it goes without saying that we must pay close attention to impacts on the administration of healthcare facilities and other institutions, but it is also important to develop an environment in which private health insurance can partially replace public health insurance and generate enough money to cover said impact.



It is also necessary to reexamine the medical service fee payment system, which generally pays 10 yen per point. Article 14 of the Act on Assurance of Medical Care for Elderly People provides special provisions for medical service fees, specifically that "The Minister of Health, Labour and Welfare may stipulate that different medical fees may be implemented in one prefecture from other prefectures if he/she finds it necessary for promoting the optimization of healthcare costs as a result of evaluations conducted as part of the Plan for Appropriate Healthcare Expenditures." A translation of the Article in question is provided below.

**"(Special Provisions for Medical Service Fees)**

Article 14 - The Minister of Health, Labour and Welfare may determine medical service fees within one prefecture that differ from those within another prefecture to a reasonable extent from the viewpoint of providing fair and appropriate healthcare in all prefectures and, while taking local conditions into consideration, when he/she deems it necessary to achieve the targets defined in Article 8, paragraph (4), item (ii) and in Article 9, paragraph (3), item (ii) in each prefecture and to promote the optimization of healthcare costs as a result of the evaluation described in Article 12, paragraph (3).

(2) When determining medical service fees according to the previous paragraph, the Minister of Health, Labour and Welfare shall consult with the governors of the affected prefectures in advance."

Although the powers granted by the special provision in Article 14 of the Act on Assurance of Medical Care for Elderly People have yet to be exercised, the Basic Policy on Economic and Fiscal Management and Reform 2015 said that the Government will determine "how to take advantage of the special provision in Article 14." There are already regional variations in medical service fee points for long-term care service fees, so if this special provision is used, it is possible to reduce medical service fees to 9 yen per point for certain regions.

If such measures are to be taken, however, it will be necessary to consider regional disparities such as the uneven distribution of doctors or variations in regional price levels to determine how to best implement region-specific medical service fees. Using the special provision to establish a mechanism that automatically adjusts medical service fees is also possible.

As a general rule, copayments increase and decrease together with medical service fees. It may be necessary to more closely examine which methods are best for implementing regional service fees with a flexible approach and for altering copayment amounts by disease as previously described.

Still, among both the elderly generation and the working generation, some households have strained household budgets and some do not. The principle that "Those who can shoulder the burden, should" applies to this situation. To reform the current system in which out-of-pocket expenses are unfairly distributed among age groups, it is important to change copayment ratios to match the user's capacity to shoulder the financial burden. For example, it might be possible to implement a system which ignores user age, charges a standard copayment fee of 30%, and uses a system such as the My Number system to lower that fee to 10% or 20% for poorer households according to income or assets.

**Reform Proposal 3 – Generate Revenue through Consumption Taxes and Similar Methods**

To secure funding for social security, it is desirable that a gradual increase of the consumption tax rate from 10% to 15% be considered in addition to the previously-discussed proposals. A sin tax or similar types of taxes should also be considered.

For example, in countries like the U.K., Thailand, and the Philippines, sweetened beverages are subject to a sugar tax. (Note: a sugar tax was introduced in the U.K. in April 2018 and the initial estimate for revenue generated in its first fiscal year was 275 million pounds, or approximately 38.5 billion yen.) These taxes aim to control for increases in healthcare costs caused by preventable lifestyle diseases to improve the sustainability of financial resources for healthcare. Such experiments are not only methods of controlling the cost of healthcare within Government finances; they can also be expected to boost tax revenue, killing two birds with one stone.

In the Japan Vision: Health Care 2035 proposal presented a few years ago, it was suggested that "To ensure the sustainability of public funding, various strategies must be considered, including increasing taxes or imposing new taxes on products that affect health, such as tobacco, alcohol, and sugar," and that "Environmental taxes could also be used to fund social security." These ideas should be further advanced.



1. A national discussion will be required to truly and clearly decide the priority order for fiscal reforms in the health system (this will require a strategy on how to convince the public of the need for reform, and how to help people understand the order for reforms). However, the Japanese healthcare system faces the major challenge that there is no forum for comprehensive discussion on both macro- and micro-economic issues. The Ministry of Health, Labour and Welfare, or other organizations, should consider the creation of a forum where experts can meet in a highly transparent manner and advance evidence-based debate.
2. In France, each pharmaceutical's medical benefit (or service medical rendu [SMR]) is determined by its efficacy and safety compared to placebo. Pricing is then decided by also considering the improvement of medical benefit (or amelioration du service medical rendu [ASMR]) – the pharmaceutical's effectiveness compared to other pharmaceuticals already on the market. Decisions about SMR and ASMR do not consider fiscal issues or cost-effectiveness. In principle, a pharmaceutical's SMR and ASMR are reconsidered every five years. The Haute Autorité de Santé (HAS) is in charge of this process, and of procuring resources. The payment rate determined by the SMR is covered by public insurance. Any portion (or, sometimes the entire portion) of the cost that remains beyond that rate is usually covered by private insurance. Private insurance generally plays a complimentary role to public insurance in France, helping to reduce the amount of cost borne by the healthcare system user. The Government is still able to place strong restrictions on private insurance. In this way, France differs from Japan, in that health insurance in Japan tends to mean public insurance (health insurance, National Health Insurance, and so on), with any costs not covered by public insurance usually being paid out of pocket.

# Chapter 6.
## The Goal of Value-based Healthcare - Defining the Value of Health Technology

**Ataru Igarashi**
Associate Professor, Yokohama City University School of Medicine, Unit of Public Health and Preventive Medicine/ Visiting Associate Professor, Graduate School of Pharmaceutical Sciences, The University of Tokyo/ Fellow, Health and Global Policy Institute

Ataru Igarashi, Ph.D., is an associate professor at Yokohama City University School of Medicine, Unit of Public Health and Preventive Medicine. In 2002, he graduated from the Faculty of Pharmaceutical Sciences, The University of Tokyo. He started his career at The University of Tokyo as an assistant professor, just after he received his Ph.D. degree in 2008. His areas of expertise are health economics and pharmacoeconomics. His research on vaccination policy, anti-smoking policy and pharmacoeconomics have been used in the governmental decision making process.



## 1. Introduction

The theme of this chapter is rebalancing sustainability and innovation in Japan's healthcare system. As discussed in Chapters 1 and 2, expenditure efficiency is absolutely necessary when considering the sustainability of healthcare systems, particularly social security systems. On the other hand, securing appropriate evaluation axes to assess innovative health technology is the driving force for innovation or for ensuring sustainability in innovation, so that one innovation can lead to the next.

If we think of resource distribution as a gradient, with the darker portion of the gradient representing efforts that consume more resources and the lighter portion representing efforts that consume less resources, the focus of policy in the darker portion would be assessing innovative technology, while the focus for the lighter portion would be making expenditures efficient.

The concept of cost-effective has grown more important in recent memory, particularly as a measuring rod for the efficiency of health technology and for value. The research field that uses cost-effectiveness data to determine insurance coverage or to adjust treatment prices in pursuit of achieving efficient healthcare systems is called Health Technology Assessment (HTA). Although the concept of HTA originally includes a wider range of concepts, in this chapter, I will use this narrower definition of HTA. HTA is not only a tool used to generate numerical figures denoting cost-effectiveness, it is a field that includes efforts to determine the best use of those numerical figures in policy.

It is inevitable that cost-effectiveness – specifically, measuring efficiency by calculating cost per Quality Adjusted Life-Year (QALY) – is used as a constituent element of value in health technology. However, discussions tend to perceive cost-efficiency as a direct indicator of efficiency and HTA as a tool for applying cost-efficiency to policy, but cost-efficiency was originally only supposed to be one indicator of value among several. Some mistakenly believe cost-efficiency is the only measuring rod for assessing value. In this chapter, I would like to examine the ideal method for expressing value using a wider range of elements while referring to assessment examples and research results from other countries.

## 2. The Measuring Rod of Cost-effectiveness – The Discussion around QALYs

The most commonly used tool for measuring cost-effectiveness for policy applications is Incremental Cost-Effectiveness Ratio (ICER), which is the cost per quality-adjusted life year (QALY) gained. A textbook explanation of this process might read: "To calculate ICER, calculate the difference between the costs of two treatments and divide it by the difference in life-years adjusted for quality of life (QOL) (Quality-Adjusted Life Years, or QALYs) for those two treatments. Compare that result with the approval threshold (which varies by country) to determine if cost-effectiveness is good or poor and if insurance coverage is granted." However, real-world policy applications require a more multifaceted approach to determining value.

First, we must ask if every QALY is equivalent in value. Diligently following the principle of optimal resource distribution leads one to conclude that "A QALY is a QALY is a QALY."[1] In this case, one QALY is worth one year in perfect health for everyone, regardless of age or gender. This means, for example, that we would consider the following two pharmaceuticals to

have equivalent value: a treatment providing one year of perfect health to someone near death (1 year * 1.0 = 1QALY) and a treatment that increases a person's QOL utility value from 0.9 to 1.0 for ten years (10 years * 0.1 = 1QALY).

However, there are objections to the principle that each QALY is of equal value. The main objection is called the "Rule of Rescue," which argues that, "Our moral response to the imminence of death demands that we rescue the doomed" no matter the cost.[2,3] This means that a QALY gained through a treatment that saves someone from certain death should be considered of greater value than QALYs gained through other treatments. It is easy to intuitively understand the concept of the Rule of Rescue: life-saving interventions should be prioritized. However, this line of thought may lead to the consistent prioritization of interventions which save people from imminent risks over measures that save people from potential risks, such as preventive measures. Another criticism aimed at QALYs is that they have the potential to discriminate against elderly people or people with disabilities. First, on people with disabilities, Harris raises the problem of "double jeopardy."[4] In that problem, the first hardship faced by people with disabilities is that they experience lower QOL due to the existence of their disability. The second hardship is that because their QOL is inherently lower, more QALYs can be gained from interventions that save the lives of people without disabilities compared to treatments that save the lives of people with disabilities. This results in interventions for people with disabilities receiving lower priority. Similarly, elderly people experience slightly lower QOL even if they have no particular illness, and they have shorter life expectancies, so they also face the potential risk of being assigned lower priority. While QALY is criticized for its potential to place elderly people and people with disabilities at a disadvantage, the "fair innings" argument presented by Farrant suggests that people over a certain age should receive lower priority when distributing limited healthcare resources because elderly people have already enjoyed a sufficient period of active living. [5]

## 3. The Discussion around Measuring Standard Cost per QALY – Is It Even Necessary in the First Place?

What is the acceptable range of spending to gain one QALY? The National Institute for Health and Care Excellence (NICE) in the U.K. has specified a basic standard value of 20,000-30,000 pounds per QALY. The U.K. is one of few countries that has explicitly specified a threshold on cost per QALY. According to systematic reviews of thresholds in multiple countries, only three countries other than the U.K. provide specific ICER thresholds: Thailand, Poland, and Slovenia.[6,7] In addition, the ICER thresholds in these three countries are generally determined by linking them to economic indicators such as per capita gross domestic product (GDP) or per capita national incomes (NI), and these countries do not have HTA organizations that define thresholds after determining willingness to pay (WTP) in advance like was once considered in Japan. The most commonly referenced publication for linking ICER thresholds to economic indicators are the standards published by the World Health Organization (WHO) in 2002.[8] Instead of using QALYs gained, the WHO's standards are based on disability-adjusted life years (DALYs) avoided. It considers interventions that cost less than once the national annual GDP per capita per DALY avoided to be "highly cost–effective" while those that cost less than three times the national annual GDP per capita per DALY avoided are considered "cost–effective." The basis for defining cost-effectiveness at three times the national annual GDP per capita is unclear. Additionally, because these methods determine ICERs using DALYs, they are technically founded upon a different concept.

As mentioned above, NICE's 20,000 to 30,000 pounds per QALY threshold is the most famous standard, but that threshold has no scientific basis. Some HTA authorities do not set thresholds, like the Pharmaceutical Benefits Advisory Committee (PBAC) in Australia. The PBAC states that cost-effectiveness data is only one of many decision-making tools they use, and that they make recommendations after completing a comprehensive decision-making process that considers various criteria like the existence of alternative therapies, impact on the healthcare budget, and the severity of the disease in question. The French National Authority for Health (Haute Auto rite de santé, or HAS), which uses cost-effectiveness analysis (CEA) to adjust prices, also does not define an ICER threshold, although they do point out that is possible to make an inductive estimate of a threshold after gathering sufficient real-world examples.

Even though the U.K. has a formal threshold, in practice, NICE exercises a degree of flexibility when determining cost-effectiveness. After all, a threshold was not defined when NICE was first established.[9,10] Estimates conducted on assessment results after it was established estimated that there was a threshold of 20,000 to 30,000 pounds, which NICE guidelines later referred to as a "range."[11,12,13] However, reviewing NICE assessment results reveals that a nominal value of 20,000 to 30,000 pounds is not strictly enforced, and approximately half of the interventions with ICERs of 40,000 pounds per QALY gained are covered. [14]

The system used by NICE in the U.K. has sometimes been criticized in relation to its use of QALYs, including the criticism that by setting the system is putting a price tag on human life as it is less likely to cover a treatment that costs more than

30,000 pounds to provide one year of health. However, NICE makes coverage decisions after considering criteria other than cost-effectiveness in their appraisals. The threshold is by no means applied consistently.

## 4. What Solutions Are Available within the Framework of Cost-Effectiveness? NICE's Decision Rules

In the previous section, we discussed the fluidity of standard values and thresholds for determining the value of one QALY. To keep assessments robust, NICE in the U.K. has established various "decision rules." When applied, these rules provide coverage through various means for health technologies that are difficult to grant coverage for using standard cost-effectiveness evaluation axes.



The most prominent cases are when standard values themselves are more or less openly increased. For example, for pharmaceuticals that can extend the lives of people in the terminal phases of disease, there is a terminal phase exemption that allows the threshold to be increased to 50,000 pounds per QALY. This exemption applies to medications in many cancer fields (including hematological malignancies). For highly specialized technology (HTS), the standard cost per QALY can be raised even more to 100,000 to 300,000 pounds. This exemption applies to therapies for certain ultra-rare diseases, but there have yet to be any real-world examples of an HST exemption in the cancer field.

There are methods of improving cost-effectiveness by lowering the financial burden on governments. For pharmaceuticals with poor cost-effectiveness, Patient Access Schemes (PASs) might allow people seeking treatment to find ways to compromise with companies when seeking discounts. Many expensive pharmaceuticals can be granted coverage under the conditions of a PAS, which might include conditions like price discounts or requiring the pharmaceutical company to cover pharmaceutical expenses after a predetermined period.

There is a natural contradiction between the two goals of providing people rapid access to treatment and requiring sufficient evidence based on real-world outcomes to accurately assess the value of treatments. The Cancer Drugs Fund (CDF) is one tool to help solve this dilemma. The CDF is a special, stand-alone budget that provides coverage for new anticancer agents for which sufficient data has not yet been obtained. In exchange for data, said anticancer agents are provided at a discount until sufficient data is gathered. Coverage has been provided for famous immunotherapy treatments such as Opdivo, Keytruda, Imfinzi, and Kymriah by combining various decision rules. As such, when it is difficult to provide treatments to all who need them, efforts are frequently made to consider who can be treated most efficiently to optimize the target populations (for example, by testing responsiveness to PD-1 inhibitors). A review of 143 NICE assessment results dating back to 2010 found that 23 treatments (15.8%) were ultimately denied, compared to 84 treatments (57.5%) that were denied initially. In other words, 61 of the 84 treatments (72.6%) that were initially denied were eventually approved. We can conclude that, over repeated assessments, NICE pays detailed attention to the conditions that a treatment must meet before it is granted coverage.

## 5. Considering Values Other Than Cost-Effectiveness – Examples of Appraisal

As discussed previously, although many agree that cost-effectiveness should be used as an evaluation criterion to determine QALYs, one encounters difficulties when attempting to faithfully apply the concept that "A QALY is a QALY is a QALY." After all, if two treatments are not of equal value, which QALY should be prioritized? Also, is it possible to quantify the standards for determining which QALY receives priority? These questions are extremely difficult to answer. Hence, the actual decision-making process used during appraisal – a process that considers the qualitative aspects of criteria other than cost-effectiveness – is extremely important. Different HTA organizations incorporate different criteria other than cost-effectiveness into appraisal. In the U.K., NICE considers these five elements: (1) the degree of uncertainty in ICER estimates, (2) if changes in QOL for people receiving healthcare are being measured appropriately or not, (3) if the treatment possesses technological innovation not adequately captured in the QALY measurement, (4) whether or not the end-of-life exemption applies, and (5) the presence of elements that impact aspects of the public health insurance system not related to health.

As touched upon in a previous section, end-of-life exemptions granted by NICE allow the standard value per QALY to be increased from the normal range of 20,000 to 30,000 pounds to 50,000 pounds for treatments that extend the lives of people with low life expectancies. (As a general rule, treatments must provide three or more months of life for people whose life expectancies are two or fewer years.) For people near the end of life to whom the Rule of Rescue applies, it could be argued that there is consensus they should be given higher priority (at least in the U.K.). Many health technologies fail to meet the

conditions mentioned above, particularly technological innovation as mentioned in (3). Although the importance of "innovative nature" is recognized, there are many examples of treatments whose innovative nature is adequately captured in the QALY measurement or measured on the axis of cost per QALY. (For example, among 86 treatments that mention an "innovative nature" in their application, this element was considered non-applicable for 55 of them.) If an innovation makes significant improvements to vital prognoses or QOL, it naturally results in a QALY gain and a better ICER. If an innovation decreases severe adverse events, it is considered a QOL improvement and lowers healthcare expenditures, which again results in a better ICER. It is difficult to imagine a health technology that would be universally recognized as "innovative" without affecting either expenditures or effectiveness when measuring it in terms of cost per QALY. On the other hand, even if such a technology were developed, opinions are split as to whether or not it could justifiably be assigned a value exceeding its original intended benefit to public health.



Concerning the rules for appraising HST for treating ultra-rare diseases, various elements are considered both explicitly and implicitly. I was involved in a review of eleven HST appraisals conducted up to 2019 which found that degree of innovation was explicitly mentioned in the appraisal results for eight of those eleven technologies.[15] Seven of them were considered to be beneficial for decreasing burdens placed on caregiving family members while similar references can be found in some sections of the remaining four. Many ultra-rare diseases are hereditary, and in the past, they have been difficult to assess within the framework of end-of-life exemptions. There are no examples of said exemptions being applied to ultra-rare diseases. Concerning decreased burden for family members, there have been past examples of assessments for certain pharmaceuticals that mentioned lost productivity caused by caregiving. Quantitative evaluations on lost productivity have been attempted in various forms. For example, a 2010 study found that for parents of children whose everyday activities are limited, there is a 0.08-point decrease in QOL utility value compared to the parents of children whose activities are not limited. In the assessment of Luxturna, a pharmaceutical for treating inherited retinal dystrophy, which is estimated to affect fewer than 100 people in England, this study was referred to when caregiver QOL utility values were linked to decreases in visual function according to the progression of the disease in their children. In addition to quantitative assessments of QOL utility values and elements such as leaving employment to provide care, new burdens related to home renovation, and ability to participate in society if visual abilities can be maintained, the assessment also said that maintaining a child's vision has merits that cannot be expressed numerically, which must be considered qualitatively during appraisal. On these grounds, coverage for Luxturna was recommended.

Given current circumstances in which discussions about money are unavoidable even for rare diseases, there is a certain significance to taking an approach in which rare diseases are not exempted from evaluation but are instead assessed by incorporating various qualitative and quantitative factors other than cost effectiveness. Although it is possible to avoid criticism over ultra-rare diseases coverage by not evaluating them in the first place, I believe this causes even less stability in the present age when stakeholders other than the government – healthcare providers and the public in particular – require explanations about price.

## 6. Assessing Clinical Usefulness – an Example from France

The wider meaning of HTA does not only consider cost-effectiveness. It measures usefulness in many aspects, such as effectiveness and safety. To examine methods of determining price or coverage rate based on clinical usefulness, let us look at some examples from France.

In France, cost-effectiveness is not used to determine insurance reimbursement and ICER values are not directly involved in pricing. It is for these reasons that many discussions are based on the assumption that cost-effectiveness is used to determine insurance reimbursement in the U.K. and price adjustments in France. However, there are many cases in which copayment rates have been increased or insurance reimbursement has been stopped for treatments for chronic diseases and similar diseases due to the results they obtain from medical benefit assessments (service medical rendu or SMR). It must be noted that reimbursement potential in France is based on practical usefulness even if cost-effectiveness is not used to decide insurance reimbursement. For example, in March 2006, France dropped coverage for a group of 282 products including bronchodilators, cold remedies, natural remedies, and digestive medicines.[16] In 2016, coverage for the antihypertensive Olmesartan was also dropped because there was no evidence indicating Olmesartan was more useful than other ARBs despite its relatively higher risk of adverse events. In 2018, coverage was dropped for four pharmaceuticals used to treat dementia, drawing a great amount of discussion. Citing limited evidence of effectiveness despite significant problems related to safety and tolerability, coverage for those for these four pharmaceuticals was lowered to 15% in 2011. A 2016 reevaluation found no

further evidence of usefulness and recommended that coverage be dropped.

For dementia and for other treatments as well, it is important that clinical usefulness be demonstrated, but there is an even stronger need for data that shows improvements to real-world outcomes. This is demonstrated in the example of PCSK9 inhibitors evolocumab and arilocumab. Although both treatments had the same assessment results from NICE in the U.K. (coverage for both depends on the presence or absence of familial cholesterolemia and risk of cardiovascular disease), HAS only grants coverage in ultra-high risk cases. To define an ultra-high risk case, they use same definition that was used to select clinical trial participants (the FOURIER trial for evolocumab and the ODYSSEY Outcomes trial for arilocumab), which measured long-term prognoses for both treatments (i.e. their effectiveness at suppressing cardiovascular events). Whether the pharmaceutical in question is for dementia or for dyslipidemia, we can conclude that HAS applies stricter standards than NICE, where decision-making is done using predictive long-term outcomes based on model analysis.

Among the fifty top-selling products in Japan in FY2016, there were some that received an SMR result of "insufficient" in France. Including dementia medications other than memantine, the market size for these pharmaceuticals is over 3 trillion yen. I believe that France's assessment methods, which prioritize coverage based on the clinical usefulness for a broad range of pharmaceuticals, need to be redefined from a broader perspective that extends beyond the context of simply using cost-effectiveness in pricing.



| Drug | Indication |
|---|---|
| Bevacizumab | Breast cancer (HER2-negative metastatic breast cancer) |
| Infliximab | Rheumatoid arthritis<br>(first-line treatment, no prior treatment with other anti-rheumatic drugs) |
| Adalimumab | Rheumatoid arthritis<br>(first-line treatment, no prior treatment with other anti-rheumatic drugs) |
| Etanercept | Rheumatoid arthritis<br>(first-line treatment, no prior treatment with other anti-rheumatic drugs) |
| Somatropin | Growth hormone deficiency (adult) |
| Tacrolimus hydrate | Atopic dermatitis |
| Memantine hydrochloride | Dementia |
| Adalimumab | Uveitis |
| Denosumab | Bone metastasis-prostate cancer |
| Mirabegron | Overactive bladder |
| Rosuvastatin calcium | Dyslipidemia |
| Sitagliptin | Diabetes |
| Tegafur/gimeracil/oteracil combination | |

**Table 1. Drugs rated as SMR "insuffisant" in France**

## 7. Evaluation Axes for Capturing A Multifaceted Definition of Value – Lessons from an ISPOR Task Force Report

Pharmaceutical value is naturally multifaceted. As we have already seen, despite the common perception that pharmaceutical assessment in the U.K. is defined almost entirely in terms of cost-effectiveness, various quantitative and qualitative criteria are incorporated into their assessment process. Although various studies have been conducted on which evaluation axes can provide a multidimensional portrayal of value, in this section, I would like to introduce the definition of value proposed by an ISPOR Task Force report on this issue. [17]

The definition of value that the ISPOR report advocates for is composed of twelve elements, which are shown in the value "flower." ISPOR further categorizes these twelve elements into three types of elements (core elements of value; common but

inconsistently used elements of value; and potential novel elements of value) and two types values (value elements included in traditional payer or health plan perspectives and value elements that are also included in societal perspectives).

| Element | Overview |
|---|---|
| QALY gained | The main element used for cost-effectiveness analyses. Places emphasis on years of healthy life lives (scored in terms of QOL). Ten years at a QOL of 0.3 would be 10 x 0.3 = 3 QALYs. A midpoint between years of life lived and healthy life expectancy. |
| Net costs | Calculated based on the difference between the cost of introducing a new medical technology (pharmaceutical fees etc.) from and the cost that can be saved in the future (from medical fees due to comorbidities, etc.). Even if the total cost increases due to a technology, if it has equivalent value (=improvement in effectiveness), it is considered reasonable from a health economics perspective. |
| Productivity | Generally classified in terms of absenteeism (absence from work due to illness) and presenteeism (lack of productivity while being present at work). Sometimes considers impact on caregivers in cases of diseases affecting children or the elderly. |
| Adherence-improving factors | When pharmaceutical adherence increases, dosage increases over the short-term, increasing cost. However, over the long term, adherence-improving factors improve effectiveness, so we can expect decreased medical costs. |
| Reduction in uncertainty | If it is possible to determine what treatments will be effective or ineffective for which populations, and which populations are more or less likely to experience side effects through genetic testing and so on, cost-effectiveness should improve. |
| Fear of contagion | When vaccination rates go up, the incidence of infectious diseases outside of even the unvaccinated goes down (herd immunity). Fear of contagion doesn't just include the technology's impact on herd immunity, but also its impact in easing fear about infectious diseases itself during pandemics and other times. |
| Insurance value | This includes a new treatments value in terms of physical risk protection – how it reduces the impact of a disease on health – and its value in terms of financial risk protection – how well patients in general are able to secure the resources needed to pay for the treatment. |
| Severity of disease | Even among treatments that have the same value in terms of QALYs, treatments that treat severe cases or those at the end of their lives are considered more valuable. |
| Value of Hope | Even if it is only a small chance, treatments that can potentially greatly improve a patient's condition have a value that cannot otherwise be measured. |
| Real Option value | Some treatments extend life enough to allow for the possibility that other, revolutionary treatments might be developed while current patients still live. |
| Equity | A certain level of healthcare should be ensured for all patients, regardless of how rich or poor they are. |
| Scientific spillover | Innovative treatments spur on innovation in the future. |

**Table 2**

Regardless of the situation, total cost and QALYs gained are components of value. Another element that is particularly important to include in cost-of-illness studies is loss productivity, a somewhat expansive element. It should be noted that various factors influence assessments, especially for interventions. These include employment potential (elderly people are already retired) and potential of returning to work (which can be low even for successful treatments). It must be noted that these factors limit the number of cases for which including productivity losses will improve results. A 2017 review conducted by Hirozane et al. analyzed the results of 394 assessments conducted from 2007 to August 2017 by ZonMw, the organization responsible for HTA in the Netherlands.*18* Among those 394 results, 64 (16%) mentioned productivity losses and only 23 (5.8%) actually incorporated productivity losses into their assessment. Also, if productivity losses caused by contracting a disease (morbidity loss) are incorporated into assessments of vaccines and other preventive interventions, then it is also appropriate to incorporate productivity lost for the person in question related to the time it takes to go to a medical facility and receive the injection. For diseases with relatively light symptoms, it is important to measure not only absenteeism (an employee's absence

from work because of illness or a health condition), but also presenteeism (decreases in performance when attending work while sick). There are examples of post-market clinical studies that include presenteeism when measuring productivity losses. However, it is important to note that there are also productivity losses among the employees who have not contracted a disease, especially when including presenteeism in a study.

There are few examples of "reduction in uncertainty" or the value elements listed after that in the value flower being incorporated into assessments. Examining systems like Cancer Drug Funds (which provide initial coverage under the condition that a reassessment will be conducted after sufficient evidence is obtained), outcomes-based rebate arrangements that can be found in certain PASs (in which insurers pay only for cases when treatments are effective, and the company that provides the treatment pays for the rest), and optimization practices in which coverage is provided to select groups, we can conclude that "reduction in uncertainty" is already included in value assessments to a certain degree. Also, "severity of disease" and "equity" are quantitatively incorporated into assessments to a certain degree in assessment methods like the aforementioned end-of-life exemptions. Although there are no examples of the other elements of value (namely, fear of contagion, insurance value, value of hope, real option value, equity, and scientific spillovers) being used to assess individual products, they sometimes appear in studies that assess the qualitative and quantitative impact of those elements.



## 8. Future Developments for Japan – Transitioning to the Era of Optimal Resource Distribution

For over half a century, Japan has maintained an insurance system that covers everything that has been approved. However, since the appearance of high-priced pharmaceuticals, other countries have introduced a degree of variation in coverage to ensure healthcare system sustainability. Current discussions are examining the possibility of Japan doing so as well. The National Federation of Health Insurance Societies has repeatedly proposed dropping coverage for pain relief patches, mouthwash, and other treatments for non-serious symptoms such as eye fatigue, stomachache, and muscle pain. By 2018, these proposals had yet to receive much attention from society and their influence was limited. However, in 2019, a proposal to drop coverage for seasonal allergy medications with the same active ingredients as OTC products received wide-ranging attention and media coverage. Although this proposal targeted an extremely narrow field, it was a significant event for advancing discussions that directly address the topic of dropping coverage for certain treatments. Unlike in the past, when even mentioning coverage variation was taboo, I believe it is now time to identify specific issues to address, such as which fields should be addressed, where to set standards, how to position technologies for which coverage has been dropped within the healthcare system, and how we can incorporate rescue measures such as PASs into Japan's healthcare system.

The data standards necessary for approval and the data standards necessary for real-world use are based on fundamentally different concepts. It is insufficient if data to be used for real-world applications only covers matters such as whether or not a pharmaceutical is covered by insurance – data must portray actual use in real-world clinical settings. Examples from France and other countries show a visible trend in which data is required to be more detailed than the data used to obtain approval before the treatment in question can be used in real-world clinical settings. As for what kinds of data provides said level of detail, it can vary from case to case. If the target group in a clinical study has different characteristics than a patient group in a real-world clinical setting, data on real-world clinical usefulness is required. If clinical trials use substitute endpoints or if their results are limited to only measuring treatment effectiveness in the short term, real-world clinical use then requires long-term data on the real outcomes. If the trial includes placebo or is a one-group test, data on the relative and additional usefulness compared to existing pharmaceuticals is necessary. Of course, data on efficiency and cost-effectiveness will also be considered important if the treatment in question is a high-priced pharmaceutical or has significant effects on financial resources.

In terms of both time and money, it is unrealistic to attempt to gather preliminary data to respond to all possible additional data requirements that may result from various factors post-market during the clinical trial phase. Therefore, even if real-world data cannot completely replace trial phase data, its role will grow even more important in the future. Discussions on the possibility of using insurance claims data are already underway. However, it is desirable that measures are taken to gather a wider range of real-world data that is not only limited to claims, but also includes observational studies and patient registry (while taking sufficient care to protect private information).

There have been many cases in which people only considered the financial side of the health economics principle of optimal distribution of limited healthcare resources. That resulted in focus being placed on measures like increasing copayments or insurance premiums or cutting back on waste in other fields. Many discussions never got so far as to address measures to optimize benefits. The worldwide spread of Novel Coronavirus 2019 (COVID-19) in early 2020 caused shortages

in infectious disease beds and ventilators in Japan and other countries that advanced to the point that the media began to discuss "healthcare collapse" as a real threat. To avoid exhausting physical resources at healthcare institutions and overloading healthcare staff, the U.K published guidelines for treating people who were undergoing treatment for existing diseases. Those guidelines aimed to maintain healthcare quality while minimizing the risk of COVID-19 infection for patients and healthcare providers. Completing treatments with fewer hospital visits over the shortest possible period of time was previously only perceived as a method of decreasing the burdens placed on the people receiving healthcare. However, in face of COVID-19, awareness towards the potential for such measures to benefit healthcare providers has grown to the point it has been specifically included in guidelines.

The current circumstances have made it plainly visible that healthcare resources are limited. Accurately measuring and assessing the value of health technology is essential. After all, even if evaluation axes are blindly expanded, getting various stakeholders to agree on a definition of value is difficult. As demonstrated by Luxturna's assessment in the U.K., in which decreases to the QOL of the family members of patients was incorporated into the evaluation process, it is important to establish a basis for adding new evaluation axes when expanding the scope of assessments. It is unrealistic to expect the simultaneous expansion of evaluation axes for all technologies right away. It is important to start by advancing a minimum amount of qualitative research in order to first achieve a wide recognition of a multifaceted definition of value, especially for quantitative assessments.

It is unrealistic to expect all of the various evaluation axes to be incorporated into assessments immediately, and there are some axes that cannot be evaluated quantitatively in the first place. Moving forward, it will be important to stick to the evaluation axes that have been considered up to this point, and to implement empirical studies on the potential of quantitative and qualitative assessment methods for those axes.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# Conclusion

This report is the result of six taskforce meetings, an expert forum on the social security system, and two expert roundtables.

**Taskforce meetings**

October 16, 2019
First Meeting of the "Rebalancing Healthcare Systems: Innovation and Sustainability" Taskforce: Measures to Increase Spending Efficiency

November 18, 2019
Second Meeting of the "Rebalancing Healthcare Systems: Innovation and Sustainability" Taskforce: Measures to Effectively Control Costs for Research and Development and to Improve Market Access

December 12, 2019
Third Meeting of the "Rebalancing Healthcare Systems: Innovation and Sustainability" Taskforce: The Further Development of Push and Pull Incentives for Innovation

January 16, 2020
Fourth Meeting of the "Rebalancing Healthcare Systems: Innovation and Sustainability" Taskforce: Measures to Strengthen the Information Base / Data Infrastructure to Better Inform Policy Debates

February 17, 2020
Fifth Meeting of the "Rebalancing Healthcare Systems: Innovation and Sustainability" Taskforce: Innovative Financing Mechanisms to Help Fund New Treatments and Health Interventions

March 16, 2020
Sixth Meeting of the "Rebalancing Healthcare Systems: Innovation and Sustainability" Taskforce: Value Based Medicine – Philosophy and Methods

**Expert Forum**

November 5, 2019
Rethinking Social Security: Ensuring an Ideal Balance between Health Insurance Benefits and Premiums – A Multistakeholder Conversation on Japan's Universal Healthcare System

**Expert Roundtables**

June 2, 2020
"Eliminating Waste While Ensuring Access to the Highest Quality of Medical Care" Expert Roundtable

June 4, 2020
"Investments Needed to Improve the Health of the Public" Expert Roundtable

HGPI compiled the major discussion points of these meetings into the "Grand Concept for the Reform of the Japanese Healthcare System: Building a Health System that can Ensure Healthy Longevity in an Era of 100 Year Lifespans," which can be found near the beginning of this report.

We hope that this report can help all stakeholders to reach a shared understanding of the issues the system now faces, and hints about what to do next. We ask that policymakers consider the information of this report as they continue the important work of healthcare policy development.

## About Health and Global Policy Institute (HGPI)

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**Health and Global Policy Institute**
Grand Cube 3F, Otemachi Financial City, Global Business Hub Tokyo 1-9-2,
Otemachi, Chiyoda-ku, Tokyo, 100-0004 Japan
Tel: 03-4243-7156 Fax: 03-4243-7378 E-mail: info@hgpi.org