Consider the medical insurance application of similar but different products--medical devices and drugs.

1. Introduction

When discussing the insurance reimbursement system for medical devices and materials at the Central Social Insurance Medical Council (Chuikyo) and other organizations, there are arguments that the reimbursement system should be aligned with the NHI drug price system, or that they should be treated separately because they are different things.

As the MHLW secretariat summarized at a Chuikyo meeting, medical devices and pharmaceuticals have very different characteristics in various aspects. As such, the insurance reimbursement system cannot be the same and is in fact designed differently in many respects.

On the other hand, the frameworks of the two systems are similar, as will be seen below. It is also true that systems introduced for pharmaceuticals (NHI prices) are later introduced for medical devices and materials in many cases.

The insurance reimbursement system for medical devices and materials is discussed below in relation to NHI drug price system, as we believe it is important to look at the similarities to and differences of the two systems in considering the appropriate mechanism for that of medical devices and materials.

2. Similar institutional framework

Table 1 summarizes the insurance reimbursement system for medical devices and materials and pharmaceuticals. Although there are many differences, the "framework" of the medical insurance is similar for medical devices and pharmaceuticals.

First, rules are defined for newly listed and already listed products, respectively.

Further, newly listed products approved by the pharmaceutical affairs bodies are priced using either a Comparable-based Method by similar Functional Classification for medical devices and by similar efficacy for pharmaceutical products if similar products are available, or the Cost-based Method for both medical devices and pharmaceuticals if similar products do not exist.

In addition, listed prices of both products are subject to revision through which such prices are periodically reduced in line with prevailing market prices. Likewise, application rules of the Cost-Effectiveness Evaluation introduced in 2019 are similar, and the Market Expansion Re-pricing Rule, which has long existed for pharmaceuticals, was introduced for medical devices in 2020.

3. Yet, individual rules are different

However, there are also many differences. Medical devices include both Specified Insured Medical Materials, for which reimbursement prices are set for individual products, and other products for which reimbursement values are determined inclusive of technical fees, whereas pharmaceuticals are listed only at NHI prices, for

which reimbursement prices are determined for individual products. In addition, while the price of Specified Insured Medical Materials is determined by functional classification, the NHI price is listed by brand name.

Although the rules for reduction of reimbursement prices based on prevailing market prices are the same, pharmaceuticals are subject to Premium to Promote the Development of New Drugs and Eliminate Off-label Use rule under which reimbursement prices of new drugs that meet certain requirements are not reduced until generics are launched in principle, whereas there is no such rule for medical devices.

As for the price review rule for previously listed products, medical devices have a rule for reduction based on average foreign prices, while no such rule exists for pharmaceutical products (except for ones for which no foreign prices existed at the time of NHI price listing).

In the following sections, the complicated reimbursement price rules for medical devices and pharmaceutical products are compared in terms of the recently introduced Cost-Effectiveness Evaluation scheme and Market Expansion Re-pricing scheme to examine whether they may cause problems in the evaluation of innovation and stable supply of medical devices.

Table 1: Overall Organization of the Insured Medical Material System (Statements Specific to Pharmaceuticals are Highlighted in Red and Underlined)

	Newly Listed Product	Previously Listed Product
Specified Insured Medical Materials	◆ Evaluation by B1-B3, C1/C2, R (Functional Classification System) → Do not exist in pharmaceuticals (Pharmaceuticals are listed by brand name) ◆ Premium rule (premiums for innovativeness, usefulness, improvement, *sakigake* (pioneering), specific use, etc.) ◆ Foreign average price adjustment	◆ A constant range of weighted average value of market price (reduction) For pharmaceuticals, annual revision with the R range of 2%; premium for new drug creation; reduction rules for long-listed drugs, generic drugs, etc. ◆ Foreign average price re-pricing (reduction) → Not for pharmaceuticals ◆ Cost-Effectiveness Evaluation (mainly reduction) ◆ Market expansion re-pricing (reduction) ◆ Challenge Application (mainly raise) → Premium for a true clinical usefulness for pharmaceutical products ◆ Subdivision and rationalization of functional categories (raise & reduction) → Not for pharmaceuticals ◆ Re-pricing of unprofitable products (increase) →Basic drugs in pharmaceuticals
Inclusive of Technical Fee	◆ Evaluation by A1-A3, C2 ◆ Establishment of fees for application of existing technics (new technical fees will be set at the time of revision) (There are no pharmaceuticals inclusive of technical fees.)	◆ Review at the time of medical fee revision (raise & reduction) ◆ Challenge Application (mainly raise) ◆ (Proposal for evaluation of medical technology from the Society)

[1]Central Social Insurance Medical Council, Expert Subcommittee on Insured Medical Materials (88th Meeting) November 24, 2009 (Source: CSIMC Material-1, p.29)

4. Cost-Effectiveness Evaluation System

Table 2 summarizes differences in the institutional handling between medical devices and pharmaceuticals as to the Cost-Effectiveness Evaluation system introduced in 2019.

Although it appears that more medical devices were included in Improvement Premium (c) of selection criteria for applicable items, this is not actually the case. Rather, Improvement Premium items other than (c), i.e. requirements for premiums not related to ICER/QALY, an indicator for Cost-Effectiveness Evaluation, such as products with reduced risk of occupational infection and products with low environmental impact, are excluded,

reflecting the unique characteristics of medical devices and the reimbursement system associated with them.

Cost-Effectiveness Evaluation is applied to products with a peak market size of 10 billion yen (or 5 billion yen) or more and those with a significantly high unit price, but the products similar to them (H5 category) are also subject to the evaluation. The selection criteria are products in the same functional classification for specified insured medical materials and pharmaceutical products compared in calculation of reimbursement price for pharmaceuticals and drug prices. The differences in criteria represents the difference between the Functional Classification System and the Brand Name Listing System.

The analytical guidelines for Cost-Effectiveness Evaluation reflect the unique characteristics of medical devices, such as the learning effect (improvement of therapeutic effect, etc. due to the accumulation of experience) and the effect of product improvement.

Similarly, "descriptions related to RCTs and small number of cases" of the guidelines is not a rule that applies only to medical devices, but Chuikyo and other organizations repeatedly stated that this is a point that requires attention for medical devices when conducting Cost-Effectiveness Evaluations.

More than 30 items have been subject to the Cost-Effectiveness Evaluation system so far, of which only medical devices have accounted for only two. Although the Cost-Effectiveness Evaluation system (including guidelines) has given a certain degree of consideration to medical devices in accordance with their characteristics, it has not yet known whether Cost-Effectiveness Evaluation can be appropriately performed for medical devices. In particular, there is an issue that should be examined in the future as to whether the statements in the current guidelines are sufficient to deal with RCT and the small number of cases, which is a difficult issue in evaluating the cost-effectiveness of medical devices.

Table 2 Major Differences between Medical Devices and Pharmaceuticals in the Cost-Effectiveness Evaluation System

	Medical device (Specified insured medical materials)	Pharmaceutical
Selection Criteria for Target Items	Items for which either one of the premiums for innovativeness, usefulness, and improvement (c) (medical device) has been added.	Items for which either one of the premiums for innovativeness and usefulness has been added.
Selection Criteria for H5 Classification	Medical devices that belong to the same functional classification as the relevant representative item	Drugs covered by insurance with the representative item or an item similar to the representative item as a comparator
Analytical Guidelines for Cost-Effectiveness Evaluation at the Central Social Insurance Medical Council (3rd edition); device-specific descriptions	9.4 In the evaluation of medical devices, etc., if scientifically reliable quantitative data are available, an analysis reflecting the so-called proficiency effect (improvement of therapeutic effect, etc. due to accumulation of experience) or the effect of product improvement may be submitted together with the analysis based on the above data, upon agreement of both parties in the consultation.	N/A

Analytical Guidelines for Cost-Effectiveness Evaluation at the Central Social Insurance Medical Council (3rd edition); Statements related to RCT and small number of cases	5.3	If no appropriate SRs exist as a result of the SRs in "5.2," SRs of non-RCTs (e.g., observational studies) comparing outcomes should be conducted to assess additional usefulness, based on the process described in "5.2." However, the quality of the study (study design, differences in patient background between groups, statistical analysis methods, number of samples and sites, etc.) must be fully explained.
	5.4	If more reliable results can be obtained, the presence or absence of additional usefulness may be assessed based on the results of reanalysis of existing observational studies, registry data, etc., if deemed appropriate after consultation. However, the quality of the study (study design, differences in patient background between groups, statistical analysis methods, number of samples and sites, etc.) must be fully explained.
	5.5	If there is no RCT with the comparator technology selected in "4." but other RCTs exist, the results of the SR may be used to evaluate additional utility through indirect comparison.
	5.6	If only a single-arm study exists, indirect comparisons will be conducted based on SRs of each of the technologies under evaluation and the comparator technology.
	5.8	If the results obtained in methods "5.3" through "5.7" indicate that there are issues with the quality of the study but the treatment effect is not considered inferior, the analysis in "6." will be conducted on the assumption that the outcomes of the technology under evaluation are equivalent to those of the comparator technology.
	5.9	In the absence of appropriate clinical studies on human, if appropriate, the analysis in "6." will be performed on the assumption that the technology is equivalent to the comparative control technology, with approval from the Pharmaceuticals and Medical Devices Agency.

5. Market Expansion Re-pricing

The Market Expansion Re-pricing was introduced to medical devices in 2020. Table 3 summarizes the differences in the institutional treatment of the Market Expansion Re-pricing between medical devices and pharmaceuticals.

There are many differences due to the difference between the Similar Function Classification System and the Brand Name Listing System, and the descriptions in Table 3 are difficult to understand. The key issues are the ones described below.

The first is the base annual sales value for market expansion. While the value is based on the sales value of individual products for pharmaceuticals, the value for medical devices is based on the sales value of the entire functional classification. The estimated sales value for the entire functional classification of a medical device is defined as the annual sales value calculated based on the estimated number of applicable patients for all medical devices in the functional classification, and the estimated number of applicable patients is defined as "the total number of patients who are considered to be eligible for the device within the scope of the purpose of use or efficacy approved by the pharmaceutical affairs bodies.

It is expected that a variety of products will fall into the functional classification, and use of the estimated number of applicable patients is considered reasonable in the scope of the purpose or efficacy approved by the pharmaceutical affairs bodies as the basis.

However, the estimated number of applicable patients was not defined as "the total number of patients who are considered to be eligible for the product within the scope of the purpose of use or efficacy approved by the pharmaceutical affairs bodies" until the 2020 revision. As such, the products listed before the revision are considered outside the scope of the Market Expansion Re-pricing, but this is not clearly stated.

Second, there is a time limit for the application of Market Expansion Re-pricing. For pharmaceuticals, once a generic product is launched, the sales value of the original product declines. Therefore, the Market Expansion Re-pricing will virtually not applied to the original product since then. On the other hand, as new products will be added to the functional classification of medical devices later, there is a good chance for the sales value of medical devices to continue to increase.

In addition, while the Market Expansion Re-pricing will continue "as long as there is a change in indication in the regulatory approval" for pharmaceutical products, it will continue "as long as there is a change in the definition of functional classification or in the points to be considered in the pricing" for medical devices. Therefore, in the case of medical devices, a minor change in insurance may be a trigger for the application of the Market Expansion Re-pricing, and the product may be subject to the Market Expansion Re-pricing on a semi-permanent basis. In addition, in the event of subdivision or streamlining of functional categories, "a change in the definition of functional classification or in the points to be considered in the pricing" could occur without any action on the part of the company. Therefore, under the current rules, any functional classification may be subject to the Market Expansion Re-pricing, making the system less predictable for manufacturing and marketing companies.

No items have been subject to the Market Expansion Re-pricing since it was introduced in 2020, and it will be necessary to verify future application. However, without clarity on the two points presented here, the Market Expansion Re-pricing is unlikely to be predictable and could have negative impact on the introduction of innovation and stable supply.

Table 3 Major Differences between Medical Devices and Pharmaceuticals in the Market Expansion Re-pricing System

	Medical Device (Specified insured medical material)	Pharmaceutical
Base annual sales	Projected annual sales value of the entire functional classification at the time when the functional classification is set (the projected annual sales amount calculated based on the estimated number of applicable patients* for all medical devices that belong to the functional classification at the time when the functional classification is established).	Total value of expected annual sales at the time when the listed product group with the same composition are included in the NHI drug price list
Treatment of base annual sales amounts after 10 years of listing	Annual sales of the functional classification as a whole at the time of the material price revision immediately preceding the date of the change in the definition of functional classification or in the points to be considered in the pricing	Total annual sales amount of the listed product group with the same composition at the time of the NHI price revision immediately preceding the date of approval of the efficacy change, etc.
Time limit for application	None (continued as long as there is a change in the definition of functional classification or in the points to be considered in the pricing) Existing functional classification that has not gone through the first material price revision after ten years from the date when the functional classification is established, or a change is made to the definition of functional classification or to the points to be considered in the pricing.	None (continued as long as there is a change in indication in the pharmaceutical approval) Listed products that has not gone through the first NHI price revision (excluding the FY2021 NHI price revision) after the ten years from the date of NHI drug price listing (the date when the change in indication, etc. was approved for listed products of which change in indication was approved based on Article 14, Paragraph 9 of the Pharmaceuticals and Medical Devices Act.)

Scope of impact of re-pricing	Functional classification Excluding those recognized as having little competitiveness in the market by the organization specialized in insurance medical materials, etc.	• Listed products with pharmacological functions similar to the product in question that are already listed. • Listed products that are identical in composition to the product in question or the product similar to the product subject to Market Expansion Re-pricing However, excluding the ones that is deemed to have little market competitiveness with the product in question, considering market size, timing of inclusion in the NHI drug price standard, scope of indications, etc.

6. Conclusion

This paper summarized validity and problems of differences in insurance reimbursement between medical devices and pharmaceuticals, which have both similarities and differences from each other. In particular, we have looked specifically at the recently introduced Cost-Effectiveness Evaluation system and Market Expansion Re-pricing, and found that the Cost-Effectiveness Evaluation system takes into account the characteristics of medical devices to a certain degree, whereas the Market Expansion Re-pricing system does not necessarily suit the characteristics of medical devices.

However, both systems have not had a sufficient track record of application to medical devices, and thus further verification is needed.