HGPI Health and Global Policy Institute

政策提言
「がんゲノム医療」への患者アクセスの改善に向けて

日本医療政策機構（HGPI）

Policy Recommendations
Improving Patient Access to Genomic Cancer Medicine

HGPI

2023年 8月 10日（木）
Thursday, August 10th, 2023

OVERVIEW

Genomic cancer medicine was viewed as an advanced form of medical treatment when Comprehensive Genomic Profiling (CGP; or cancer gene panel tests) was granted health insurance coverage in 2019. Since then, people serving in clinical settings have accumulated experience handling this form of treatment. We are now at a stage to make genomic cancer medicine a form of technology from which anyone should be able to benefit. To achieve this, we should improve patient access to deliver genomic cancer medicine more broadly to the public.

From the perspective of patient access opportunities, policy challenges with respect to delivering genomic cancer medicine may be sorted into three categories:

A: Constraints related to human resources in medicine (shortages of specialized personnel, etc.)

B: Constraints related to genetic testing (restrictions on the timing/frequency of CGP that can be conducted)

C: Constraints related to geographic factors or information (lack of easy access to testing facilities and clinical trials)

We must take wherever possible actions to address each issue one by one, and expand opportunities for patients to access genomic cancer medicine.

Based on these understandings, Health and Global Policy Institute (HGPI) offers the following recommendations:

RECOMMENDATION I: Streamline operations and secure human resources

In view of the further spread of genomic cancer medicine, streamline operations thoroughly, and adopt systems to secure human resources commensurate with workloads.

RECOMMENDATION II: Review genetic testing practices including how tests are performed

Based on the accumulated clinical experiences, revise the genetic tests and related practices to meet the needs of those serving in clinical settings, and to suit the characteristics of each type of cancer.

RECOMMENDATION III: Improve patient access to testing centers and clinical trials

While paying attention to the constraints and disparities related to geographic factors/information, make drastic improvements to patient access to testing centers and clinical trials.

It is also important to take active steps to build public awareness toward genomic cancer medicine, and to improve post-graduate education for physicians.

HGPI strongly hopes that these recommendations be utilized in developing further policy measures for genomic cancer medicine, and patient-centered healthcare.

TABLE OF CONTENTS

0. INTRODUCTION

When genomic cancer medicine was first introduced, it was viewed as a particularly advanced form of medical treatment. However, several years have now passed since Comprehensive Genomic Profiling (CGP; or cancer gene panel tests) was granted health insurance coverage in 2019, and those serving in clinical settings are starting to gain experience with this form of medicine.

Given current circumstances, we believe it is now the time to make further improvements to patient access to genomic cancer medicine so it can be delivered more broadly to the public. It should be recognized as a form of technology from which everyone should be able to benefit.

As we expand genomic cancer medicine, multiple policy issues must be overcome. While proactively advancing R&D on pharmaceuticals that target genetic mutations[1] and related efforts, it will be important to address issues preventing the dissemination of genomic cancer medicine one by one, from the perspective of expanding access opportunities for patients.

As for precision cancer medicine, Health and Global Policy Institute (HGPI) launched an initiative in FY2021 ("Project for Considering the Future of Precision Medicine with Industry, Government, Academia, and Civil Society"), and has made expert hearings and conducted surveys to examine the issue. Based on our findings, we offered comprehensive policy recommendations in September 2022[2] (see Column 1).

For the second phase of this project, we conducted additional, expansive surveys and hearings with our focus on measures for better patient access to genomic cancer medicine.

This report describes current circumstances and sorts issues for genomic cancer medicine based on those surveys and hearings. After categorizing policy issues into three key areas, we have also compiled recommendations from the perspective of improving access opportunities for patients.

We strongly hope these recommendations will further patient-centered healthcare and be useful when mounting policy responses for genomic cancer medicine in the future.

---

[1] In addition to genetic mutations, this includes other changes such as amplifications, deletions, and fusions. (This document uses "genetic mutations, etc." depending on the context.)

[2] [Policy Recommendations] Furthering the Development of Precision Cancer Medicine —Proposals for Effective Policy Changes Based on Key Characteristics of Precision Medicine in Cancer Treatment— (September 20, 2022) (https://hgpi.org/en/research/ncd-pm-20220920.html)

Column 1 – Overview of HGPI's September 2022 policy recommendations for precision cancer medicine

Personalized cancer medicine (precision medicine), in which treatment is tailored to individuals in accordance with the genetic mutations and other characteristics of their cancer, is expected to play an important role in the future. In order to further develop this, it will be necessary to overcome policy issues in various areas including healthcare access, human resource development, R&D, regulatory approval and insurance coverage, and patient support.

To effectively address these issues, it will be vital to fully take into account the three key characteristics of precision cancer medicine, namely **(a) the number of indications is still quite limited**; **(b) it involves the use of genetic information**; and **(c) testing and treatment tend to be expensive**.

In recognition of these issues, HGPI offered the following recommendations in a proposal presented in September 2022.

RECOMMENDATION I: Aggregate medical resources (human, equipment, information)

To effectively allocate human resources and aggregate knowledge, a "hub-and-spokes" network should be developed across all areas, including healthcare delivery systems, human resources, research and clinical trials, and patient support measures. When doing so, proactive steps to adopt information and communication technology (ICT) and to make effective use of online services should be taken to streamline the aggregation of information and medical resources.

RECOMMENDATION II: Manage genetic information appropriately

While establishing data repositories for genetic information, legislation[3] prohibiting discrimination based on genetic information should be enacted and public awareness activities should be conducted.

RECOMMENDATION III: Revise the use of precision cancer medicine from health economics and scientific perspectives

Regulatory approval, health insurance coverage, and other conditions governing the use of precision cancer medicine should be revised to be made more scientific and rational in a manner that complements the key characteristics of precision cancer medicine and practical needs in clinical settings.

[3] After these recommendations were presented, a bill to promote genomic cancer medicine (the "Bill on the Comprehensive and Systematic Promotion of Measures to Ensure the Public Can Access High-Quality, Suitable Genomic Medicine with Peace of Mind") was passed in June 2023.

1. OVERVIEW: WHAT IS GENOMIC CANCER MEDICINE

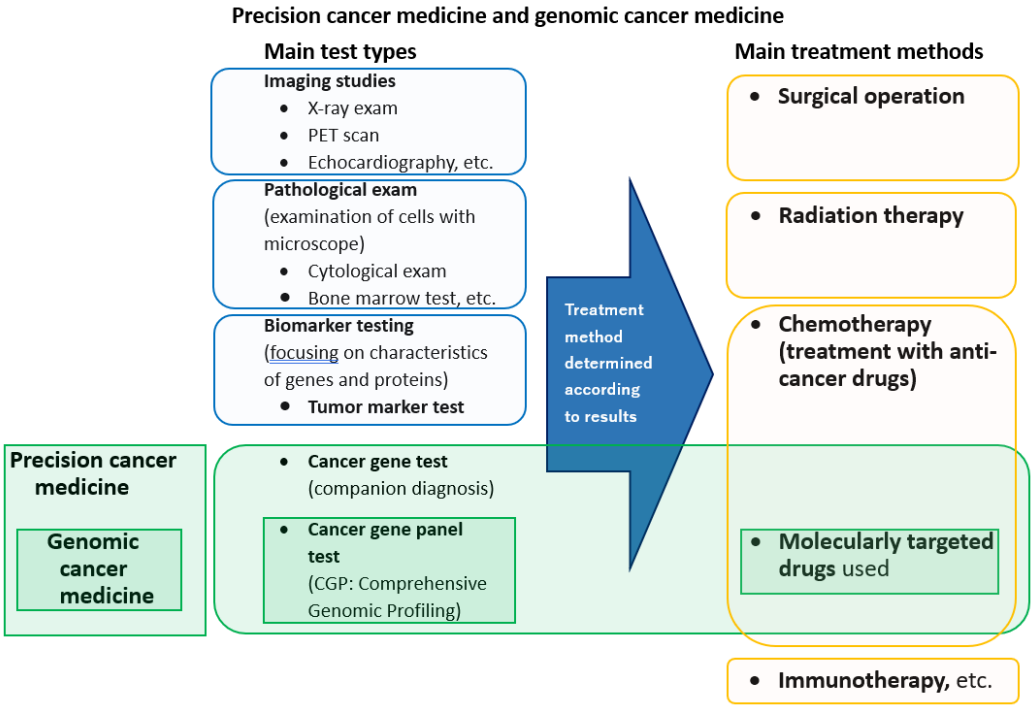
1.1 What is genomic cancer medicine?

Genomic cancer medicine is a form of cancer medicine—they examine cancer cells of an individual undergoing treatment using Comprehensive Genomic Profiling (CGP; or "cancer gene panel tests") to identify the sections of genes that are mutated, and select and administer drugs that are particularly effective on those mutated genes and molecules ("molecularly targeted drugs"). (For more details, please see Column 2 and Column 3.)

It is understood that cancer medicine cannot be clearly divided into genomic cancer medicine and others—rather, it is a combination of various testing and treatment options according to the patient's condition. For the sake of convenience, however, this document organizes policy challenges related to genomic cancer medicine with a focus on conducting CGP followed by providing treatment that is appropriate for the genetic mutations detected.

Column 2 – Precision cancer medicine and genomic cancer medicine

In addition to the three most common forms of treating cancer, namely (1) surgery, (2) radiation therapy, and (3) chemotherapy, treatment options have increased in recent years to include items like (4) cancer immunotherapy, which is also known as immuno-oncology.



In conventional cancer drug therapy, cancers are usually perceived in terms of the affected organ, and drugs are administered with the expectation they will be effective

for that type of cancer. In contrast, precision cancer medicine focuses on genetic mutations, etc. to narrow the focus of treatment to the level of the individual. It has attracted a lot of attention in recent years.

Furthermore, generally speaking, genomic cancer medicine is often used to refer to a field of precision cancer medicine, particularly that in which CGPs are performed at the testing stage.

Column 3 – Comprehensive Genomic Profiling (CGP; cancer gene panel tests)

Generally, cancer gene tests performed in precision cancer medicine aim to detect one or more genetic mutations that can be effectively targeted by a particular molecularly-targeted drug (or, when said drugs will result in side effects). Because these tests use diagnostic agents that are paired with the molecularly-targeted drugs, they are called companion diagnostics, or CDx. CDx are currently being utilized in real-world clinical settings for certain types of lung or breast cancer.

In contrast to this, in genomic cancer medicine, which aims to detect the genetic mutations in a more comprehensive manner, Comprehensive Genomic Profilings (CGPs; or "cancer gene panel tests") are conducted to analyze multiple (hundreds) of genes simultaneously. In addition to tissue from tumors, these panels can use blood (liquid biopsies) to detect circulating tumor DNA (ctDNA), which is cancer cell DNA that has leaked into the bloodstream due to causes like cell death. (See table.)

Test name	Genes targeted	Material analyzed	Names of tests with health insurance coverage[4]
Comprehensive Genomic Profiling (CGP)	124	Tumor tissue	・OncoGuide™ NCC Oncopanel System (NOP)
	324	Tumor tissue	・FoundationOne® CDx (F1CDx) comprehensive genomic profiling assay
		Blood	・FoundationOne® Liquid CDx (F1LiquidCDx) comprehensive genomic profiling assay
	74	Blood	・Guardant 360
[Reference] Companion diagnostics (CDx)	1 to many	Tumor tissue or Blood	(Various diagnostic agents[5])

[4] There are also a number of tests that have yet to receive insurance coverage such as Genmine TOP (which has received regulatory approval), and Illumina TruSight Oncology 500 (which is currently undergoing review).

[5] For examples, please refer to "Information regarding companion diagnostics and related items" (https://www.pmda.go.jp/review-services/drug-reviews/review-information/cd/0001.html). F1CDx and F1LiquidCDx are also being used as companion diagnostics.

Furthermore, to ensure that people can access high-quality care throughout Japan, hospitals specializing in genomic cancer medicine have been assigned one of three designations such as “designated core hospitals for genomic cancer medicine.” Currently, a total of 251 facilities have received designations (see Figure 1).[6,7]

Figure 1: Types of hospitals providing genomic cancer treatment and number of facilities

	Name	Main functions	Number of facilities
(1)	Designated core hospitals for genomic cancer medicine	Leads the way in genomic cancer medicine (Conducts expert panel reviews)	13
(2)	Designated hospitals for genomic cancer medicine	Makes independent decisions regarding treatment strategies (Conducts expert panel reviews)	32
(3)	Cooperative hospitals for genomic cancer medicine	Provides treatment while coordinating with (1) and (2)	206

1.2 Recent trends in genomic cancer medicine

In June 2019, a CGP was granted insurance coverage in Japan for the first time, and those serving in clinical settings are gradually building experience with genomic cancer medicine. The fourth-term Basic Plan to Promote Cancer Control Programs (approved by the Cabinet on March 28, 2023) also states, “further promote genomic cancer medicine.”[8] (See Figure 2 for a history of events.)

---

[6] “Designated core hospitals for genomic cancer medicine, etc. in the genomic cancer treatment provision system: List of facilities” from the MHLW. (as of August 1, 2023. https://www.mhlw.go.jp/content/000928433.pdf.)

[7] To treat cancer, there are 4 types of facilities classified as “core hospitals for coordinated cancer care” throughout Japan (456 facilities total). Details are provided below (as of April 1, 2023).

(1) Prefectural core hospitals for coordinated cancer care: 51 facilities
(2) Regional core hospitals for coordinated cancer care: 357 facilities
(3) Core hospital for coordinated cancer care for specific cancer type: 1 facility
(4) Regional hospitals for cancer care: 47 facilities

(MHLW. “What are core hospitals for coordinated cancer care?” https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/kenkou_iryou/kenkou/gan/gan_byoin.html)

[8] In addition, the "Basic Policies for Economic and Fiscal Management and Reform 2023" (approved by the Cabinet on June 16, 2023) also states that they should promote cancer control measures, such as implementing cancer gene panel tests at appropriate times (https://www5.cao.go.jp/keizai-shimon/kaigi/cabinet/honebuto/2023/decision0616.html).

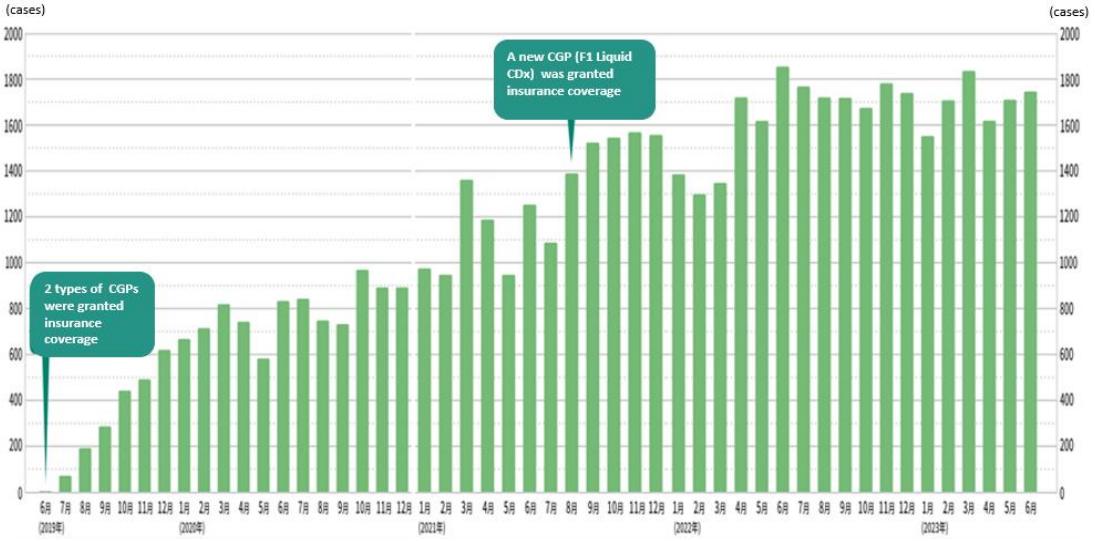
Figure 2: History of the introduction and dissemination of genomic cancer medicine (2017-Present)

Yr.	Mo.	Item	Key organizations	Notes
2017	3-6	Roundtable Consortium on the Promotion of Cancer Genomic Medicine (Four meetings held; report presented June 2017)	MHLW	Discussions to determine basic policy direction
	6	*Guidance for Cancer Treatment Based on Gene Panel Testing Using Next-Generation Sequencers (1st edition)*	Japanese Society of Medical Oncology, Japanese Society of Clinical Oncology, and the Japanese Cancer Association	Provided rationale for the principle of conducting CGP tests "after standard treatments"
2018	2	*Establishing Designated Hospitals for Genomic Cancer Medicine, etc.* (Revised several times since initial presentation)	MHLW	Established centers for genomic cancer medicine
	6	Center for Cancer Genomics and Advanced Therapeutics (C-CAT) established	National Cancer Center Japan	This organization aggregates and utilizes genome test information
	8	Council for Consortium on the Promotion of Cancer Genomic Medicine (Four meetings held by March 2021)	MHLW	
2019	**6**	**CGP granted insurance coverage for the first time**	**MHLW**	**Genomic cancer treatments begin in earnest**
2020	3	*Guidance for Cancer Treatment Based on Gene Panel Testing Using Next-Generation Sequencers (2nd edition)* (Edition 2.1 released in May)	Japanese Society of Medical Oncology, Japanese Society of Clinical Oncology, and the Japanese Cancer Association	Recommended more flexibility in the timing of CGPs
2022	3	*Regarding Conditions for Convening Expert Panels*; *Details for Conditions for Convening Expert Panels*	MHLW	Provided conditions for simplified expert panels
	9	*Action Plan for Whole Genome Analysis 2022*	MHLW	As for genomic cancer medicine, (i) targeted patients with intractable cancers, and (ii) provided broad guidance on topics like the roles of data centers and testing centers; ethical, legal, and social issues (ELSI); and patient and public involvement (PPI)
2023	**3**	***Basic Plan to Promote***	**MHLW**	**While further promoting**

		Cancer Control Programs (Fourth term) **(in effect until March 2029)**		**genomic cancer medicine, it covers many items like (i) establishing a healthcare provision system and (ii) reviewing existing systems, including the timing of CGP**
	6	**"Bill on the Comprehensive and Systematic Promotion of Measures to Ensure the Public Can Access High-Quality, Suitable Genomic Medicine with Peace of Mind" passed**	**Parliamentary Association for Genomics[9]**	**Covers broad discussion points including (i) establishing an R&D system, (ii) bioethics considerations (iii) prohibiting unfair discrimination, etc., and provides for the formulation of basic plans to promote measures**

The number of CGPs being conducted is gradually increasing. From June 2019 to June 2023, the total number of entries registered at the Center for Cancer Genomics and Advanced Therapeutics (C-CAT)[10] reached 57,000 (Figure 3).

Figure 3: Cancer gene panel tests (CGPs) registered at C-CAT (June 2019-June 2023)



Source: Center for Cancer Genomics and Advanced Therapeutics（C-CAT）"CGPs registered at C-CAT (monthly data)"（https://for-patients.c-cat.ncc.go.jp/registration_status/）

[9] A parliamentary association for the development of a social environment to promote appropriate genetic medicine.

[10] An institution that aggregates, stores, and utilizes medical information and genome sequence information gathered using cancer genome analyses from each patient. (https://for-patients.c-cat.ncc.go.jp/)

However, genomic cancer medicine has yet to be sufficiently disseminated to reach all people with cancer and, depending on the cancer type, there are major differences in how it is handled.

For example, among the 380,000 people who died of cancer in FY2021, over half of them were likely to have been candidates for genomic cancer medicine, but only around 14,000 CGPs were conducted that year.[11]

Furthermore, in most cases where CGPs are performed, treatments that match patients' genetic mutations (e.g. the administration of approved drugs, joining clinical trials) are not ultimately selected.[12] Even when clear CGP results have been obtained, the majority of patients continue to select standard therapies or other treatments.

[11] "The 113th HGPI Seminar – Current Circumstances and Issues in Precision (Genomic) Cancer Medicine." (March 2, 2023. Lecturer: Dr. Atsushi Otsu. https://hgpi.org/en/events/hs113-1.html.)

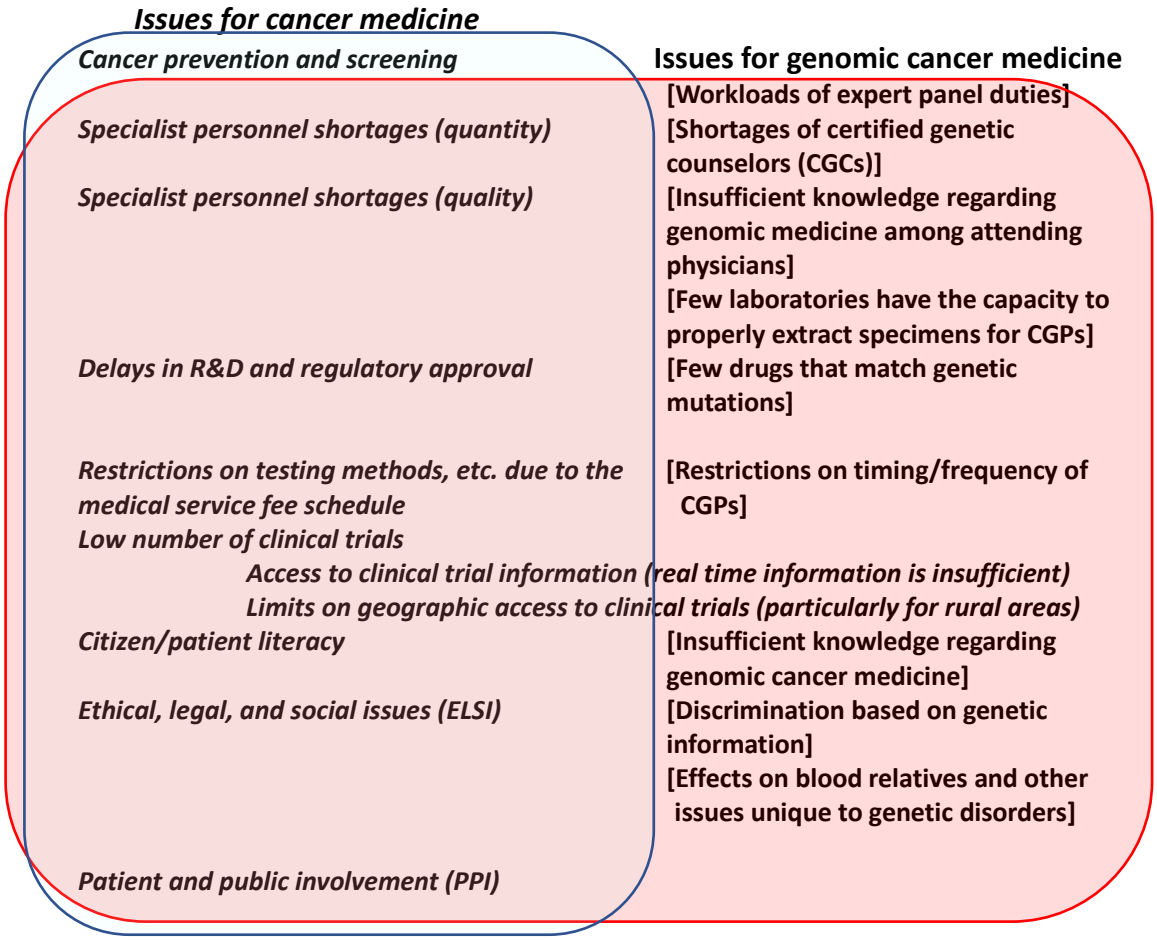
[12] While the rate at which patients select a drug or other therapy applicable to their genetic mutation after CGPs is gradually increasing, such cases still only account for around 9.4% of patients (based on the 30,822 cases of expert panels from June 2019 to June 2022).

1.3 Key policy issues of genomic cancer medicine (overview)

Viewed as an advanced form of treatment, genomic cancer medicine was utilized in a limited manner when it was first introduced. Now that several years have passed since it was granted insurance coverage, those serving in real-world clinical settings have steadily built experience with this form of medicine. We are now at a stage to make genomic cancer medicine a form of technology from which anyone should be able to benefit. We should deliver genomic cancer medicine more broadly to the public by improving patient access.

There are a wide range of policy issues that must be overcome in order to further promote cancer genome medicine. While many of these issues are common to those faced by cancer medicine in general, there are also many issues that are unique to genomic cancer medicine. For example, while various departments and healthcare facilities are facing shortages of cancer treatment specialists in addition to general shortages of specialized personnel, the field of genomic cancer medicine also faces significant challenges in the form of expert panel workloads and shortages of certified genetic counselors (CGCs) (Figure 4).

Figure 4: Key policy issues of cancer medicine and genomic cancer medicine
(Items in brackets are unique to genomic cancer medicine)



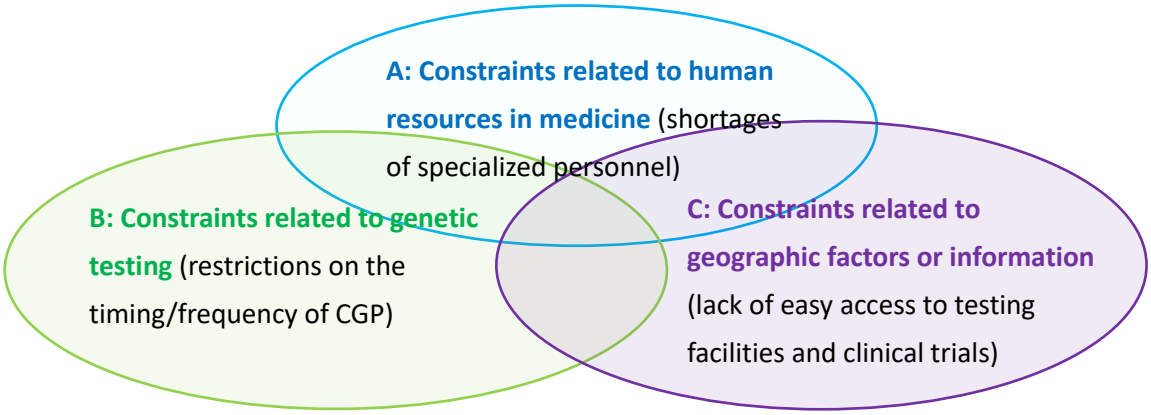
2. POLICY CHALLENGES

2.1 Summary

As described in the previous section, the policy issues that must be resolved to further promote genomic cancer medicine span a broad variety of items, which we can rearrange in three broad categories[13] to focus on patient access opportunities as follows (Figure 5).[14]

A: Constraints related to human resources in medicine
B: Constraints related to genetic testing
C: Constraints related to geographic factors or information

Figure 5: Issues facing genomic cancer medicine from the perspective of patient access opportunities (Overview)



A: Constraints related to human resources in medicine (shortages of specialized personnel, etc.)

Deploying genomic cancer medicine effectively requires expanding human resources in terms of both quantity and quality. In addition to the current lack of manpower, as genomic cancer medicine gradually becomes more common, the number of CGPs being conducted is increasing rapidly compared to when it was first introduced. This is exacerbating the manpower shortage.

B: Constraints related to genetic testing (restrictions on the timing/frequency of CGP that can be conducted)

---

[13] There are situations in which certain policy issues appear to be related to more than one of the three categories.

[14] As the focus of this report is improving patient access opportunities, it will not explicitly address certain items included in "Key policy issues of cancer medicine and genomic cancer medicine" such as "R&D," "Ethical, legal, and social issues (ELSI)," and "Patient and public participation (PPI)." It goes without saying that it will be vital to resolve issues in these areas in a simultaneous manner in order to achieve better genomic cancer medicine for cancer patients.

Right now, the medical service fee schedule only provides coverage for one CGP per lifetime, and in principle only after standard treatments have been completed. This means that in the clinic, it is not always possible to provide the necessary tests at the necessary times. This is resulting in cases in which patients face more limited options with regards to receiving genomic cancer treatment.

C: Constraints related to geographic factors or information (lack of easy access to testing facilities and clinical trials)

The presence of constraints related to both geography and information is hindering cancer patient access to testing facilities and clinical trials where they can receive genomic cancer treatment. Voices sharing this opinion are particularly strong from healthcare institutions in rural areas.

It will be necessary to resolve policy challenges such as those represented by A through C above, starting from wherever possible, and expand patient access opportunities to genomic cancer medicine.[15]

In the following sections, we will take a more detailed look into each area.

[15] We must note that improving patient access and expanding genomic cancer medicine does not necessarily lead to a rosy future for the patients. For example, CGPs may find that (i) a patient does not possess genetic mutations that can be targeted for treatment with genomic cancer medicine, or that there is no approved drug or other treatment that is suitable for them; or (ii) a patient has genetic mutations that are inheritable ("genetic disorders"). In such cases, their blood relatives may also be at risk, and this can be a source of great mental burden for the patient or their family members. As such, patients and their families may also need to be provided with psychological care and other support at the same time.

2.2 Policy challenges by key area

A: Constraints related to human resources in medicine (shortages of specialized personnel, etc.)

Due to the significant increase in the number of CGPs being conducted in recent years, administrative workloads in the field of genomic cancer medicine have been growing. Sufficient human resources for handling these workloads have not been secured. This shortage is not only limited to healthcare professionals, but also includes personnel who handle data entry and other office work.

(i) Expert panel (EP) workloads

Designated core hospitals and designated hospitals for genomic cancer medicine are required to hold expert panels (EPs)[16] on every case for which a CGP has been conducted including those from partnered cooperative hospitals for genomic cancer medicine.

At hospitals that perform many tests, these panels review dozens of cases each week. As the number of CGPs being performed continues to increase, the workloads associated with EP operations have become enormous (see Column 4).

A number of initiatives aiming to streamline operations and reduce workloads for EPs have made a certain degree of progress. They include (i) changing the rules under which EPs are operated (by narrowing down the cases they must examine);[17] (ii) promoting the adoption of ICT;[18] and (iii) simplifying the reference materials that are created.[19] However, these efforts have yet to sufficiently reduce

---

[16] Expert panels (EPs): Review committees that make decisions on items such as treatments to be recommended to each patient based on CGP results.

[17] It was deemed no longer necessary to convene EPs (in a manner in which attendees can discuss in real time basis) when (i) genetic mutations have not been detected for the case in question or when (ii) evidence has already been established for treatment selection for all detected mutations, or in similar situations. (MHLW Health Service Bureau, "Regarding Conditions for Convening Expert Panels," "Details for Conditions for Convening Expert Panels." March 3, 2023. https://www.hgminkanhp.com/members/login/070307-2.pdf, https://www.hgminkanhp.com/members/login/040307-3.pdf)

[18] For example, together with 18 designated hospitals for genomic cancer medicine, Kyoto University is developing cloud systems (such as OncoGuideTM NET) to enable collaboration on EP-related duties. Such systems perform such tasks as (i) consolidating patients' genomic test results, case summaries, and C-CAT reports for EPs to examine, (ii) coordinating EP schedules and (iii) automating the creation of reports on EP results.

[19] For cases with no recommended form of chemotherapy or for cases where the recommended treatment is clear, some hospitals have introduced greatly simplified presentations and summaries for use during EP review.

the heavy workloads.[20]

Column 4 – Expert Panels (EPs) and related administrative workloads

Reviews of CGP results conducted at designated core hospitals for genomic cancer medicine follow a four-step process that is centered around EPs. Each step is accompanied by a massive administrative workload, as shown below.[21]

(1) Preliminary preparations (to confirm recommended treatments or the presence of secondary findings; to prepare various documents, etc.)

(2) Preliminary review (to hold preliminary "Pre-EPs," confirm recommended treatments, etc.)

(3) Expert Panels (to determine recommended treatments, etc.)

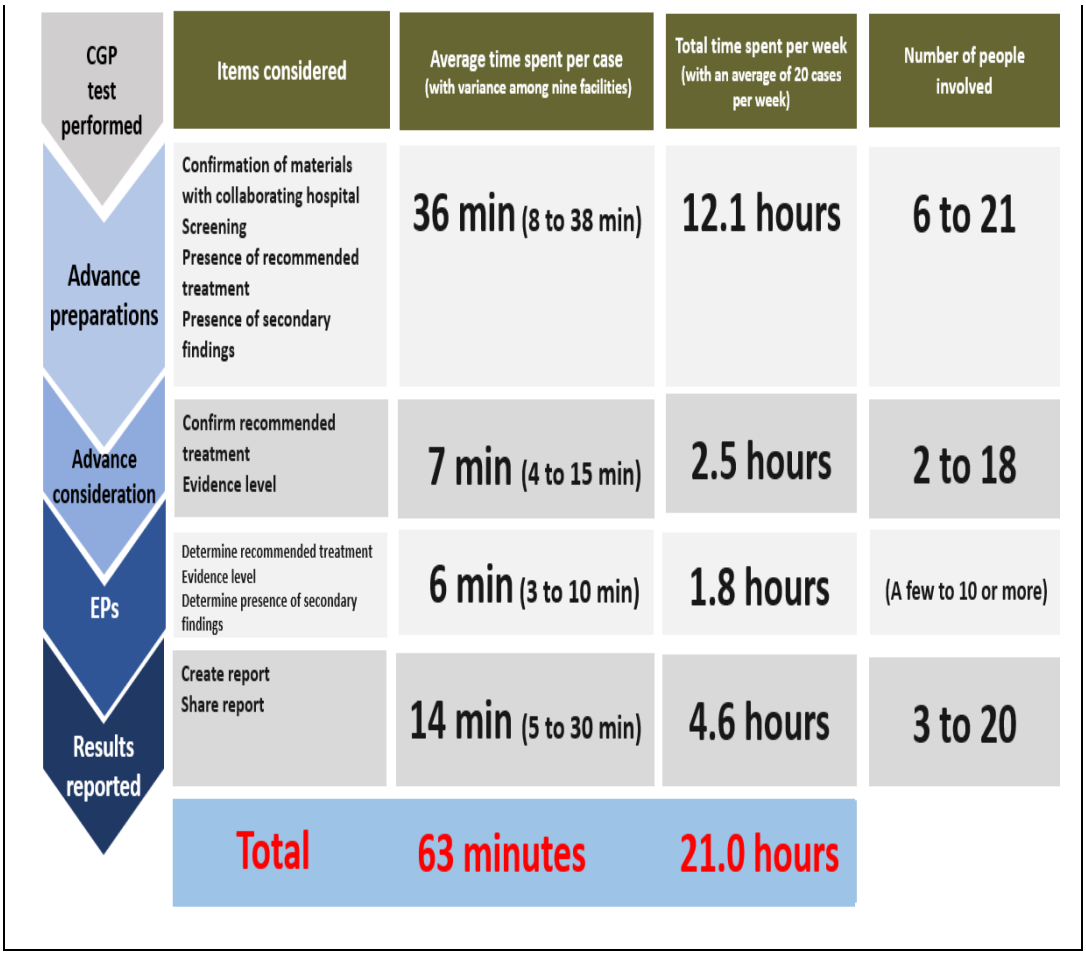
(4) Report results (to create and share reports)

For example, at designated core hospitals for genomic cancer medicine, it takes an average of over 60 minutes to review a single case (or, if 20 cases are reviewed in a week, it takes a total of 21 hours).[22] In addition to this, each step of the review process requires intervention from many specialists and other personnel in addition to physicians, meaning a significant amount of manpower is also necessary (see following chart).

[20] For example, according to an estimate from the Japanese Society of Clinical Oncology Working Group, reducing the number of cases reviewed by EPs in accordance with the aforementioned MHLW's Notification (see footnote 16) and other directives would result in a workload reduction of about 7.5%.

[21] Aside from these steps related to reviews of CGP results, there are a number of other affairs that precede or accompany performing CGPs or convening EPs and that also present heavy administrative workloads. They include (i) case data entry; (ii) procedures to inspect items detected; and (iii) transferring test reports, C-CAT investigation results, and other files onto the C-CAT portal. (MHLW. Fourth Meeting of the Council for Consortium on the Promotion of Cancer Genomic Medicine, Reference 6. "Designated Core Hospitals For Genomic Cancer Medicine Liaison Conference, Medical Care Working Group Reference Materials." March 5, 2021. https://www.mhlw.go.jp/content/10901000/000748592.pdf)

[22] Figures were calculated by HGPI, using weighted averages, etc. for the nine designated core hospitals for genomic cancer medicine for which relevant data was available using counts provided in the Second Expert Panel Manual WG Charts in *Manual on the Efficient and Effective Operation of Expert Panels in Genomic Cancer Medicine* (First ed., July 4, 2022; https://www.jsmo.or.jp/about/kanko.html#guideline) from the Japanese Society of Medical Oncology (JSMO). We must note that weighted averages do not show factors such as variations in times required to review cases. For example, even if many cases were swiftly reviewed, the weighted average may vary greatly due to the presence of a few very time-consuming cases.



(ii) Shortages of other specialized personnel (CGCs, etc.)

In addition to physicians specializing in genomic cancer medicine, a broad variety of specialized human resources is necessary to provide genomic cancer treatment. These include certified genetic counselors (CGCs), cancer genome medical coordinators (CGMCs),[23] and administrative personnel who handle tasks

[23] Cancer genome medical coordinators (CGMCs) are mediators in genomic cancer medicine that assist in explaining genomic cancer medicine and provide genetic counseling. Their main duties include (1)(i) explaining to patients the content and process of testing before CGPs are conducted and (ii) making arrangements to refer patients to CGCs, clinical trials, and other support they may need after CGPs are performed. They also (2) serve as hubs that connect genomic cancer medicine with other departments (specialists in cancer pharmacotherapy, medical researchers, pathology departments, patient support, etc.). (Genomic Cancer Medicine Professional Training Program Secretariat, "Training cancer genome medical coordinators." http://www.jsmocgt.jp/coordinator.html)

A number of professionals such as nurses, pharmacists, and clinical laboratory technicians have completed CGMC training from the MHLW (specifically, the Genomic Cancer Medicine Professional Training Program which began in FY2017) and are actively serving as CGMCs. Few hospitals have dedicated CGMCs on staff. Rather, in many cases, these roles are fulfilled by people who have other concurrent positions, such as nurses.

like data entry. Overall, the number of people assigned to these positions is insufficient. Voices sharing this issue are particularly strong from cooperative hospitals for genomic cancer medicine and other facilities in rural areas (see Column 5 and Column 6).[24]

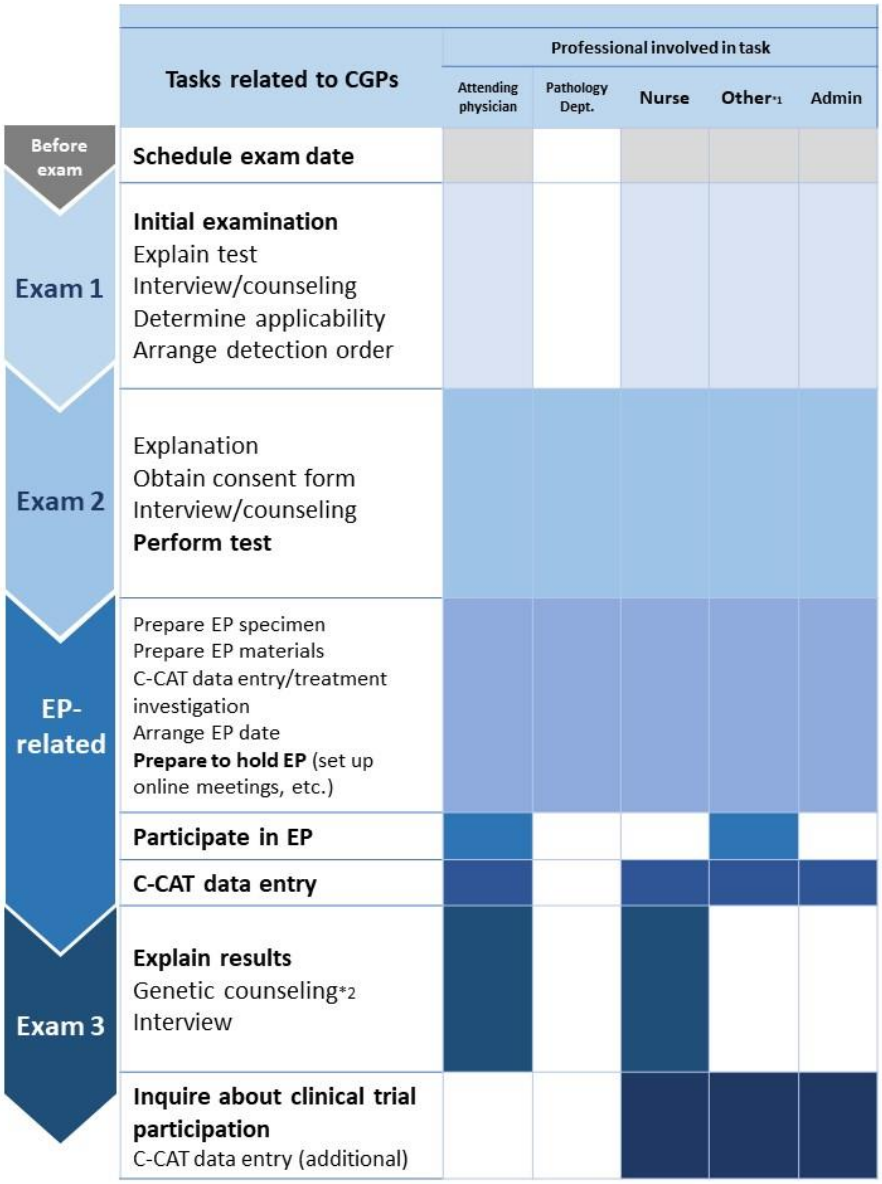
Furthermore, the pressure being placed on staff continues to grow more severe as the number of CGPs they handle continues to increase.

Column 5 – Tasks related to genomic cancer medicine at cooperative hospitals for genomic cancer medicine and other facilities

As discussed in Column 4, many personnel are involved in the process for reviewing CGP results. In addition to those duties, a number of administrative tasks related to genomic cancer medicine are performed by various personnel at cooperative hospitals for genomic cancer medicine and other facilities.

For example, patients are provided with multiple interviews and counseling sessions including preliminary explanations of CGPs and explanations of test results. There are also many liaison and coordination-related tasks related to providing tests and convening EPs, which include coordinating schedules with designated core hospitals for genomic cancer medicine and other facilities. A large variety of other tasks must also be performed with various other departments, from investigations related to C-CAT reports to data entry (for details, see below).

[24] For example, to provide patients with explanations, consultations, etc. on genetic disorders (within genetic cancer medicine, the duties that are expected to be mostly performed by CGCs), (i) outpatient physicians may be required to perform these duties, further increasing the workloads of attending physicians; or (ii) patients may be required to travel long distances to designated core hospitals or designated hospitals for genomic cancer medicine to receive genetic counseling. In the latter scenario, geographic constraints may also be present. As such, there are cases in which patients do not actually get to receive genetic counseling, so this is an obstacle to patient access to care.



*1 Pharmacists, certified genetic counselors, etc.

*2 Held when a genetic disease is detected or suspected, or similar circumstances.

Column 6 – Certified genetic counselors (CGCs): roles and shortages of staffs[25]

(1) The roles of CGCs in genomic cancer medicine

CGCs fill key roles in genomic cancer medicine. In addition to participating on

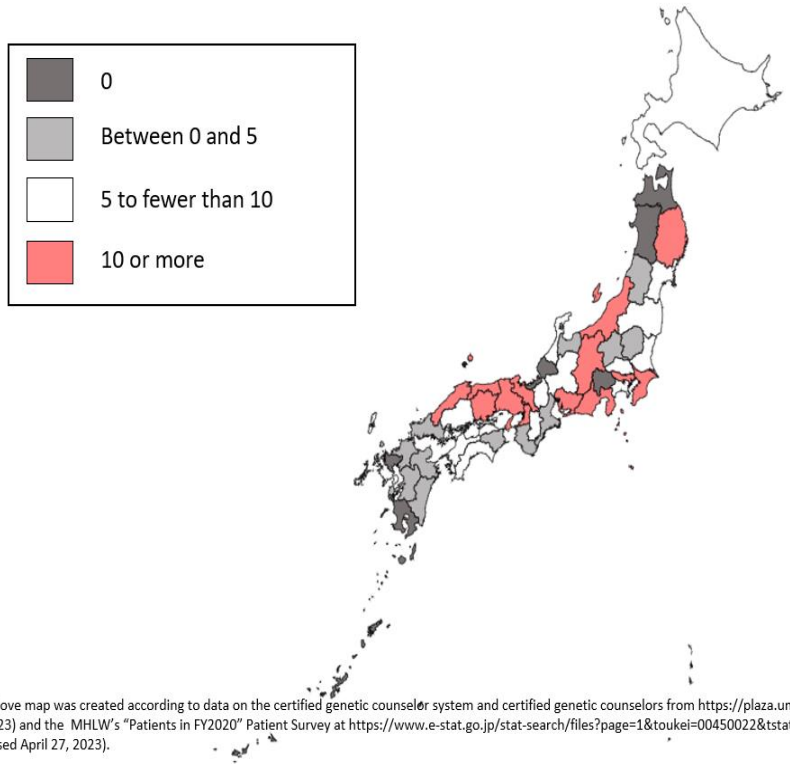
[25] "Certified genetic counselor (CGC)" is a type of specialist that is certified after obtaining a certain amount of on-the-job training in genetic counseling who provides patients and their families with various forms of information as well as psychological and social support not limited to genomic cancer medicine ("The Certified Genetic Counselor System – What are certified genetic counselors?" https://plaza.umin.ac.jp/~GC/About.html).

EPs,[26] CGCs also provide cancer patients and their families with (i) preparatory explanations before CGPs and support after results are obtained and (ii) consultations when tests detect conditions like genetic mutations associated with hereditary tumors. Throughout these activities, they provide information on genetic information, support systems, and similar topics, and provide a broad range of support.

(2) The lack of personnel and their uneven distribution

The increase in the number of CGPs being conducted has led to even greater demand for CGCs, but the nationwide personnel shortage is overwhelming – there were approximately 350 CGCs as of April 2023. This shortage is particularly severe in rural areas, with six prefectures having no CGCs at all (see map below).

Number of Certified genetic counselors (per 100,000 patients of malignant neoplasms)



The above map was created according to data on the certified genetic counselor system and certified genetic counselors from https://plaza.umin.ac.jp/~GC/About.html (accessed April 21, 2023) and the MHLW's "Patients in FY2020" Patient Survey at https://www.e-stat.go.jp/stat-search/files?page=1&toukei=00450022&tstat=000010311167&tclass1=000001166809 (accessed April 27, 2023).

As a result, physicians and other personnel are performing genomic cancer medicine-related duties that would originally be performed by CGCs.

[26] Expert panels convened at designated core and designated hospitals for genomic cancer medicine are required to have one or more members who "possess specialized genetic counseling techniques related to medical genetics."

B: Constraints related to genetic testing (restrictions on the timing/frequency of CGPs that can be conducted)

(i) CGPs in principle can only be performed "after standard treatments have been completed"

As a general rule, the medical service fee schedule only allows for CGPs to be performed in principle "after standard treatments have been completed."[27] This limitation also comes with mention of cases in which standard treatments are expected to be completed, so there appears to be significant leeway for people serving in clinical settings to exercise their own judgment.

When we talked to healthcare professionals in each region, many told us that CGPs are performed extremely early (within the scope of what is covered by insurance) according to cancer patients' conditions and other factors, based on the judgment of those serving on the clinical frontlines.

On the other hand, there are also a few health institutions that are extremely cautious about performing CGPs at early stages. For example, some cooperative hospitals for genomic cancer medicine in rural areas place the use of CGPs under strict control based on a strong awareness of medical service fee rules. There have also been cases at community hospitals where the start of genomic cancer treatment was delayed significantly because they waited until standard treatments had been completed, before referring patients to cooperative hospitals for genomic cancer medicine. Practices such as these may be a significant restriction on patient access to genomic cancer medicine.

There are also cases in which current rules of the medical service fee schedule related to advancing clinical trials seem to be in contradiction with each other. For example, there are times when even if some therapeutic target gene mutation is found when CGP is conducted, the patient cannot enter a clinical trial because of the restriction such as "subjects (patients) must be untreated," and as a result, it may not lead to a promising treatment. In the end, they are unable to access promising treatments.

Given these challenges, in recent years, academic societies and other groups have said there are cases in which it is better to perform CGPs at earlier stages (for more details, please see 3.3 Recommendation II).

(ii) Each patient can only take one CGP per lifetime

It is medically known that depending on the type of cancer, it is possible for genetic mutations, etc. to progress even during treatment, but the medical service fee rules place a uniform limit on all patients of one CGP per lifetime in principle,

[27] Specifically, "patients with solid tumors for which no standard treatment is available, or with local progression or metastasis for which standard treatment has been terminated (including those for whom termination is expected)."

regardless of their condition.

It is common practice in clinical settings to test patients and flexibly select treatment methods based on their condition. In this respect, a one-time-only restriction may limit the patient's treatment options—for example, if a test is performed during the initial stage of the disease, the same type of test cannot be performed at the time of recurrence or relapse.

C. Constraints related to geographic factors or information (lack of easy access to testing facilities and clinical trials)

Designated core hospitals, designated hospitals, and cooperative hospitals for genomic cancer medicine have been named throughout Japan to give citizens equal opportunities to undergo testing and receive treatment in genomic cancer medicine. Looking at the actual situation, however, it cannot be said that sufficient access opportunities have been secured, especially for patients living in rural areas.

(i) Constraints related to testing facilities

To begin, few clinics have laboratories with the capacity to properly handle specimens for CGPs. Namely, when collecting CGP specimens,[28] even greater care than usual must be taken to prevent problems like contamination. This can make it difficult to conduct CGPs at community hospitals or clinics.[29] When this is the case, depending on where a patient lives, they may have to spend several hours traveling so specimens can be collected at a cooperative hospital for genomic cancer medicine.

Furthermore, some cooperative hospitals for genomic cancer medicine in rural areas have said that the persistent shortage of pathologists means specimen extraction for CGP becomes delayed due to the weight of their normal workloads.

(ii) Constraints related to clinical trials

In genomic cancer medicine, drugs approved for genetic mutations are still few in number. This means participating in clinical trials is the main method for patients to access genomic cancer medicine.[30]

Given these circumstances, opportunities for patients who live in rural areas to participate in clinical trials are extremely limited. In addition to information-related constraints, this is also due to economic, geographic, and physical reasons. In other words, for a patient living in a rural area, the fact that a clinical trial site is located far away could be called the highest hurdle to clinical trial access.

---

[28] Regarding tissue specimen extraction for CGPs, liquid biopsy is recommended only when tissue cannot be collected.

[29] In this document, “community hospital” refers to public or private health institutions that have not been designated as “designated core hospitals, designated hospitals, or coordinating cancer hospitals for genomic cancer medicine” and are central hospitals in their communities.

[30] Among cases in which patients who underwent CGPs successfully arrived at pharmaceuticals, treatments, etc. that were applicable to their genetic mutations, no more than one in three were administered drugs that had already been approved, while the remaining two-thirds were registered in clinical trials for investigational new drugs. (This data was derived from the 2,295 patients who underwent CGPs at designated core hospitals for genomic cancer medicine from February 2020 to January 2021.)

(a) Clinical trial information cannot be obtained easily

At health institutions, C-CAT reports are the main resource used to obtain information on clinical trials for which patients who will receive genomic cancer treatment may be eligible.[31]

C-CAT reports summarize the results of patients' CGPs and list a broad range of candidate clinical trials that correspond to their genetic mutations. However, in practice, the information contained in those reports is not updated in real-time basis, so they may include many trials that have already completed participant recruitment.

This means cooperative hospitals for genomic cancer medicine must contact the trial sites one by one to check the status of each clinical trial, which poses a heavy administrative burden.[32]

(b) Patients must sometimes visit distant clinical trial sites for screening

Furthermore, even when options have been narrowed down to clinical trial candidates that match a patient's genetic mutations, patients must undergo screening (tests, etc.) to determine if they are actually eligible to participate. This means the patient must visit the facility conducting the clinical trial.

Given the fact that the vast majority of clinical trials are conducted in the Tokyo metropolitan or Kansai areas,[33] participating in these screening processes places a major burden on patients who live far from these regions.[34]

(c) It is unrealistic for participants to continuously visit distant clinical trial sites

Finally, even if a patient who lives far away from a clinical trial is found to be eligible to participate, there are a few cases in which they have to give up on doing so due to economic, geographic, or physical reasons.[35]

---

[31] There are certain cases where attending physicians are directly acquainted with physicians serving at institutions conducting clinical trials, or designated core hospitals for genomic cancer medicine are proactively providing clinical data to coordinating hospitals. It is, however, generally difficult for patients in rural areas to obtain adequate information on clinical trials.

[32] Health institutions devote great amounts of time and effort searching for clinical trials that patients may be eligible for, but even when they find a trial, there is no system in place to provide them with an economic return on administrative costs (such as referral fees).

[33] Specifically, early phase clinical trials for genomic cancer medicine are only conducted at two National Cancer Center (NCC) hospitals and at certain university hospitals and cancer centers in the Tokyo metropolitan area and Kansai region.

[34] Considering that there are many cancer patients who are deemed ineligible for a clinical trial after the screening stage, it is extremely important to reduce the burdens, etc. placed on participants (candidates) during the preparatory stages for clinical trials.

[35] For example, clinical trials may include conditions like, "Participants must be able to visit the

2.3 Awareness levels toward genomic cancer medicine among patients, their families, and attending physicians

In addition to the issues described above, genomic cancer medicine is a relatively new form of healthcare and citizens do not yet possess adequate awareness of it. Even among cancer patients and their families, fewer than 40% have heard of genomic cancer medicine.[36] It is often the case that attending physicians (especially when they do not work at designated core hospitals or designated hospitals) are also unfamiliar with genomic cancer medicine.

For this reason, when cancer patients are being treated at health institutions in rural areas, sufficient consideration is not given to genomic cancer medicine (testing, clinical trials) as an option.[37] Factors like this also end up delaying patient referrals to cooperative hospitals for genomic cancer medicine.

facility conducting the trial once per week." This means the vast majority of patients who can participate in clinical trials are those who live in the Tokyo metropolitan or Kansai areas.

[36] HGPI, "Results of Internet Survey on Genomic Cancer Medicine (Summary)." (May 11, 2023. Conducted jointly with the Tokyo Women's Medical University in March 2023. Subjects: A total of 1,000 men and women ages 20 years or older who had been diagnosed with cancer (or who had a family member who had been diagnosed with cancer). https://hgpi.org/en/research/ncd-20230511.html)

[37] It is widely known that even when patients receive CGPs, success rates for genomic cancer treatments are low. For physicians in communities, this makes it difficult to go so far as to place heavy physical and mental burdens on patients by attempting to actively pursue genomic cancer treatment.

Column 7 – A flowchart of challenges from testing to treatment

Rearranging the issues discussed above in chronological order (as shown in the table below) shows that improving patient access opportunities will require issues to be addressed at each stage, from the time patients are first diagnosed with cancer to the time they begin receiving genomic cancer treatment (through use of approved drugs or by participating in clinical trials).

	Area	Issue		Issue shared with cancer medicine	A: Constraints in human resources in healthcare	B: Constraints in genetic testing	C: Geographic or information constraints	Awareness among citizens or community health institutions
		Key issues	Other issues					
1	**Awareness of genomic cancer medicine as a treatment option**	Insufficient knowledge among citizens (patients and their families)		○				◎
		Insufficient knowledge at community healthcare facilities						◎
2	**Refining search for treatment methods**	Delays in referrals from community healthcare facilities	Emphasis of reimbursement rules ("after standard treatments are completed")			◎		○
		Delayed responses at receiving hospitals	Insufficient certified genetic counselors		◎			
			Insufficient specialized staff (other)	◎	○			
3	**Access to CGPs**	Delays in specimen extraction	Insufficient pathologists	◎	○			
		Long distances to testing centers	Few facilities can extract specimens to submit for CGPs		○		◎	
		Restrictions on the timing of CGPs				◎		
		Restrictions on the frequency of CGPs				◎		
4	**Period from testing to treatment**	Low frequency of Expert Panels	Workloads at central hospitals for genomic cancer treatment and other facilities		◎			
		Long periods between obtaining test results and providing explanations to patients	Examining all cases at EPs		◎			
5	**Access to approved drugs and clinical trials**	Low rate of patients arriving at therapies applicable to genetic mutations	Delays to conducting tests ("after standard treatments are completed")			◎		
			Issues facing R&D	◎				
			Drug lag	◎				
		Insufficient clinical trial information	Insufficient information contained in C-CAT reports				◎	
		Patient access during the preparatory stages of clinical trials	Lack of knowledge concerning clinical trial protocols among attending physicians		○		◎	
		Long distances to clinical test sites	Uneven distribution of clinical trial sites (mostly conducted in Tokyo metropolitan or Kansai areas)				◎	
			Delays in dissemination of DCTs				◎	

3. POLICY RECOMMENDATIONS

3.1 Key points of the three recommendations

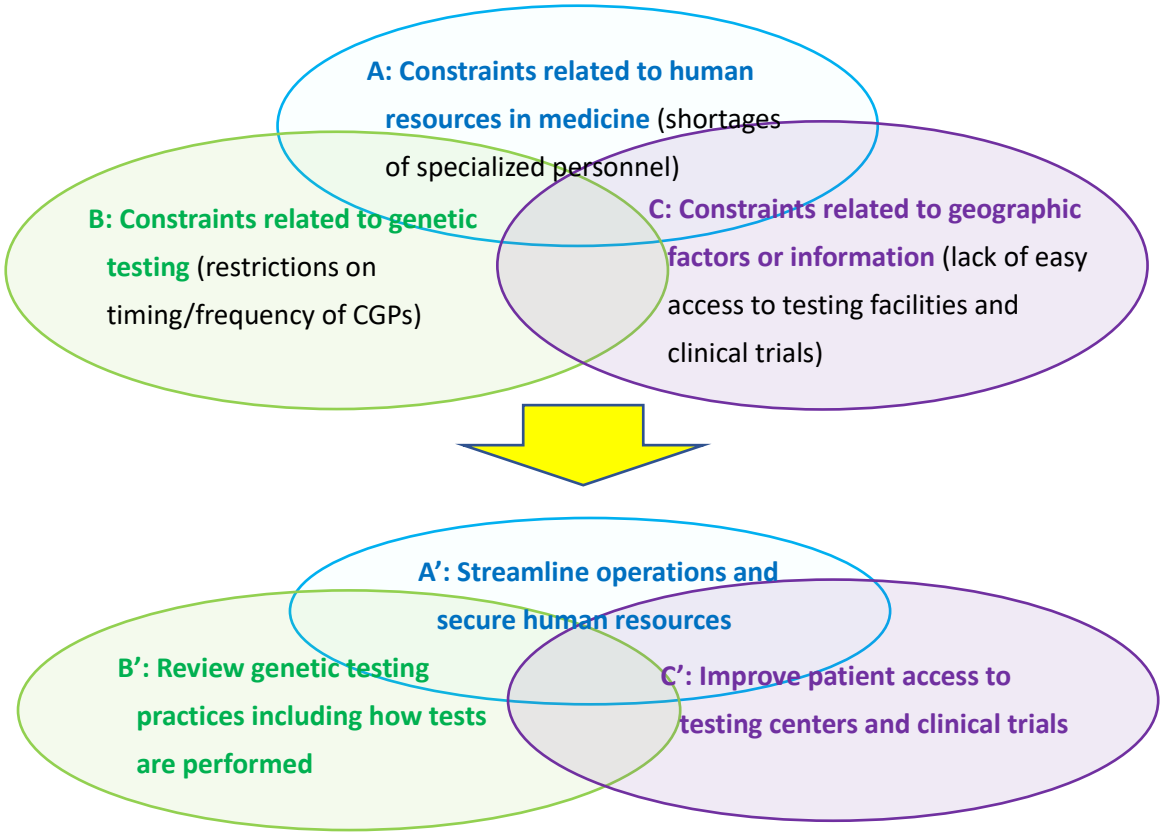
As we saw in Section 2, policy issues related to opportunities for patients to access genomic cancer medicine span a broad range of items. Many of these issues can be categorized into the following three areas:

A: Constraints related to human resources in medicine
B: Constraints related to genetic testing
C: Constraints related to geographic factors or information

As such, it is appropriate to examine policy responses from the following three perspectives, which generally correspond to the three areas described above (Figure 6):

A': Streamline operations and secure human resources
B': Review genetic testing practices including how tests are performed
C': Improve patient access to testing centers and clinical trials

Figure 6: Issues and policy responses for genomic cancer medicine when viewed in terms of patient access



Specifically, it is desirable that solutions are steadily implemented to issues facing

practical duties based on the pillars of the three recommendations described below (Figure 7).

Figure 7 – Responding to policy issues in genomic cancer medicine (Three recommendations)

Issues	Recommendations
A: Constraints related to human resources in medicine	**RECOMMENDATION I: Streamline operations and secure human resources** **In view of the further spread of genomic cancer medicine, streamline operations thoroughly, and adopt systems to secure human resources commensurate with workloads.** (i) Refine the scope of cases reviewed at Expert Panels (EPs) to a significant degree (ii) Implement online genetic counseling (iii) Review reimbursements provided to facilities and for personnel involved in genomic cancer medicine
B: Constraints related to genetic testing	**RECOMMENDATION II: Review genetic testing practices including how tests are performed** **Based on the accumulated clinical experiences, revise the genetic tests and related practices to meet the needs of those serving in clinical settings, and to suit the characteristics of each type of cancer.** (i) Make reimbursement rules regarding the timing/frequency of CGPs more flexible (ii) Create testing algorithms for each type of cancer, with the initiative from academic societies (iii) Disseminate genetic tests for which the number of genes tested has been narrowed down (as compared to CGPs)
C. Constraints related to geographic factors or information	**RECOMMENDATION III: Improve patient access to testing centers and clinical trials** **While paying attention to the constraints and disparities related to geographic factors/information, make drastic improvements to patient access to testing centers and clinical trials.** (i) Greatly expand testing opportunities, while utilizing liquid biopsies and other tests (ii) Simplify access during the preparatory stages of clinical trials (iii) Disseminate low-cost decentralized clinical trials (DCTs) that utilize low-tech methods

3.2 Recommendation I : Streamline operations and secure human resources

[Basic concept]

It has been several years since genomic cancer medicine was first granted insurance coverage, when it was considered an advanced form of medical treatment. This means, many tasks related to genomic cancer medicine are to be performed through cooperation among many highly-specialized, multidisciplinary personnel, in a manner that is careful and thorough. The expert panels involved in genomic cancer medicine are representative of this concept. However, the workloads and expenses associated with these duties are not adequately reflected in the medical service fee schedule.

Meanwhile, a dramatic rise in the number of cases being handled in recent years is increasing workloads and exhausting those in the field. However, experiences accumulated over the past several years have also made it abundantly clear that labor can be saved in various areas and that certain tasks should be simplified.

Given these circumstances, it is desirable that steps are taken to improve quality in genomic cancer medicine by advancing efforts to thoroughly streamline overall duties to open up options and make it possible to concentrate cases. In addition, a rational review of the medical service fee schedule should be conducted so health institutions can expand staff to keep pace with the growing workload.

[Content of Recommendation I]

Issue		Recommendation
A: Constraints related to human resources in medicine		**RECOMMENDATION I: Streamline operations and secure human resources** **In view of the further spread of genomic cancer medicine, streamline operations thoroughly, and adopt systems to secure human resources commensurate with workloads.** (i) Refine the scope of cases reviewed at Expert Panels (EPs) to a significant degree (ii) Implement online genetic counseling (iii) Review reimbursements provided to facilities and for personnel involved in genomic cancer medicine

(i) Refine the scope of cases reviewed at Expert Panels (EPs) to a significant degree

Based on the concept that each CGP result must be given appropriate examination from an expert's point of view, all cases in genomic cancer medicine are reviewed by Expert Panels (EPs). However, in the past few years, outpatient departments that attend patients have accumulated experience with this form of medicine, and a certain degree of consensus has been reached that, from a medical standpoint, it is

not necessary to review all CGPs.

As discussed in Section 2.2 above, the MHLW and health institutions have advanced concrete efforts to review, simplify, and streamline EP operations.[38] However, past measures have not gone so far as to revisit the basic concept that all cases must undergo EP review.

From now on, we should fundamentally change the role of EPs, and refine the scope of cases reviewed at EPs to a significant degree,[39] while fully taking into account the actual need for EP reviews in real-world clinical settings.

Specifically, (1) it is desirable that attending physicians submit the cases for EP review only when it is difficult to determine a treatment strategy based on CGP results, or in similar circumstances, based on the principle that the attending outpatient department should determine a patient's treatment strategy directly.[40]

In the past, when health professionals had less experience with CGPs, it was somewhat rational to have all cases reviewed by EPs. Health professionals in every region of Japan have now accumulated experience with interpreting CGP results. In cases where a consensus can be reached on applicable treatments for a genetic mutation, attending physicians should now be allowed to determine the treatment strategy. Gradually adopting this and similar methods is also likely to help those serving at cooperative hospitals for genomic cancer medicine and other facilities gain more experience making decisions regarding cases.[41]

---

[38] Academic societies have also recommended conducting reviews on certain aspects of operations (The Japanese Society of Medical Oncology "Manual for Efficient and Effective Expert Panel Operations," July 2022; https://www.jsmo.or.jp/about/kanko.html).

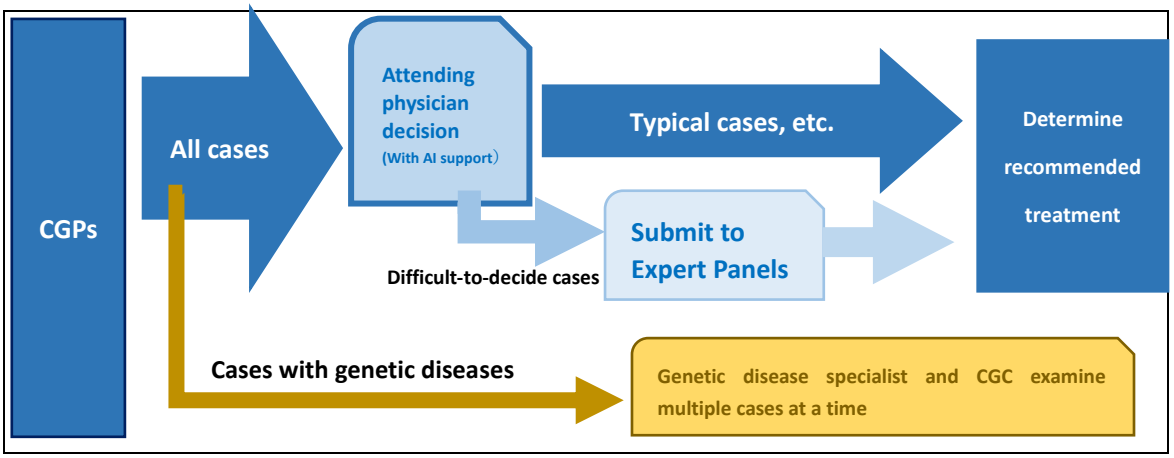
[39] It is important not to overlook that EP reviews have been, to a certain extent, vital for ensuring the quality of genomic cancer treatments, especially at health institutions with limited medical resources. Therefore, it will be necessary to pay sufficient care to ensure that medical institutions that submit cases to EP can select cases to be submitted according to their actual conditions, so that the treatment quality does not decrease by uniformly omitting EP reviews.

[40] It is important to sharing the latest information on clinical trials among hospitals, since there are many cases in which different EPs offer different recommendations for treatments when said treatments are still in the research stages, such as clinical trials with little established evidence ("Disseminating the Latest Research Findings in Genomic Cancer Medicine from Japan to the World: Recommendations for Addressing of Expert Panel-Related Issues Based on an Analysis of Current Circumstances at Designated Core Hospitals for Genomic Cancer Medicine," March 8, 2023, National Cancer Center Japan; https://www.ncc.go.jp/jp/information/pr_release/2023/0308/index.html).

[41] To prevent such developments from resulting in excessive workloads for attending physicians, we should improve the environment for decision-making support in clinical settings, such as (i) deriving recommended treatments through partially-automated processes using AI and other tools for cases where the genetic mutations detected in CGPs are typical, and (ii) making C-CAT reports and other reports easier to read.

In addition, (2) for genetic diseases, it is desirable that separate opportunities are established for physicians specializing in genetic diseases, CGCs, and other genetic disease specialists to review only those cases which require specialist review.[42] Doing so would streamline duties to a significant degree (see Figure 8).

Figure 8: Visual representation of refining the scope of cases reviewed at Expert Panels (EPs) (related to Recommendation I)



Using these methods to drastically reduce the number of cases handled by EPs is also likely to help patients receive treatments earlier.

(ii) Implement online genetic counseling

To overcome the extreme shortage of CGCs, hospitals throughout Japan should actively collaborate with each other and make effective use of online genetic counseling in the future (see Column 8).[43]

Certain aspects of in-person counseling are superior to online counseling. For

---

[42] From the perspectives of patients, a conclusion regarding how their tumors will be treated is reached as soon as possible is their top priority. Rather than attempting to determine if they have genetic diseases during EP reviews (which are conducted to decide on the recommended treatment for each patient), it is likely that sufficient responses can be mounted even if some time passes before the presence of genetic diseases is considered. Doing so would also eliminate the need for EPs to have genetic disease specialists (such as CGCs) in attendance, streamlining the process.

[43] Insurance currently covers genetic counseling for patients and their families who have been tested for intractable diseases (totaling 190) and hereditary tumors (cancer). Among those diseases, remote genetic counseling (online counseling) was already approved for genetic counseling related to intractable diseases in the 2022 revision of the medical service fee schedule. Efforts to expand online counseling for genetic diseases (outside of insurance coverage) have also been launched in some areas.

The current medical service fee schedule does not allow patients to access online counseling from home, so they must visit nearby health institutions to undergo counseling. However, it is still highly beneficial for patients to be able to access online counseling from health institutions that are close to where they live.

example, in-person counseling allows counselors to see patients' facial expressions and grasp their degree of understanding more accurately. However, making conversation online has become quite common due to the COVID-19 pandemic, so communication hurdles for patients and their families are likely to be low.

While it is reasonable to enable staff at each community hospital to handle cases with genetic mutations that appear very frequently, it is still desirable for there to be consultations with specialists (who are located at distant hospitals) for rare cases and other situations. This is another reason why it would be highly beneficial to make online genetic counseling a common practice.

Column 8 – An initiative to introduce online counseling

Here is an example how hospitals work together and cooperate to provide online genetic counseling:

Genetic counseling is an essential part of subsequent cancer treatment and follow-ups, and the CGC of Hospital A and the medical team of Hospital B are working together to ensure these health services are provided (while Hospital A is located in the Tokyo metropolitan area, Hospital B is located in a rural area).

The following provides details on a number of actions they are taking to ensure needs for genetic counseling can be met to a reasonable degree and within existing systems.

(1) Working conditions for the certified genetic counselor

Hospital A has permitted the full-time CGC on its staff to serve as a part-time employee of Hospital B.[44] The CGC spends two half-days per month providing online genetic counseling to patients at Hospital B.

(2) Interactions with patients

At Hospital B, patients undergo genetic counseling via online tools like Zoom for Healthcare with staff from Hospital B participating alongside them. Using such tools means that they do not require any special online equipment for genetic counseling.

(3) Preliminary information sharing and preliminary meetings

The CGC does not have direct access to electronic medical records held at Hospital B and the physical distance makes it difficult for the CGC to provide follow-ups later on. Nurses at Hospital B help with this by providing patient record summaries and by handling post-consultation follow-ups.

The CGC also participates remotely in related regular meetings at Hospital B, where they share information. This allows the CGC to make effective use of his/her expertise,

[44] Through a framework similar to the one that allows hospital staff members teach seminars outside of the hospital that employs them, this cooperative system between the two hospitals allows the CGC to serve part-time at Hospital B on their days off at Hospital A. Because the CGC works as a part-time Hospital B employee, this addresses various issues between the hospitals such as how reimbursements are distributed.

even while working on a part-time basis.

(iii) Review reimbursements provided to facilities and for personnel involved in genomic cancer medicine

(a) Review reimbursements for CGPs

While CGPs are indeed expensive, this is mostly due to the testing fee, which is paid to the testing company. Some have said that even if a cooperative hospital for genomic cancer medicine performs over 100 CGPs in one year, the income for the hospital would not even cover the salary of a single staff member involved in performing the tests.[45] Even though the number of CGPs they handle continues to increase, this shortfall means that health facilities cannot hire more staff as one might expect. Many people serving at those facilities are now exhausted.

While mismatches between reimbursements and workloads are not something that only affects genomic cancer medicine, these circumstances must not go overlooked in efforts to ensure sustainability in this area.

To ensure that designated and cooperative hospitals for genomic cancer medicine can expand their staff to match the increased workload and continue to handle a certain number of CGPs in the future, this reimbursement should be revised to be commensurate with actual working conditions based on an objective analysis of duties that accompany genomic cancer treatment.[46]

(b) Introduce a rule requiring certified genetic counselors (CGCs) to be placed at health institutions

While CGCs have key roles to play in the provision of genomic cancer medicine,

---

[45] CGPs and related tests are reimbursed at a rate of 56,000 points (560,000 yen) per test (CGPs: 44,000 points; CGP evaluation provision premium 1: 12,000 points).

Cooperative hospitals for genomic cancer medicine pay part of this reimbursement to testing companies for testing fees. In fact, most of the test evaluation and explanation premium is devoted to testing fees. They also pay outsourcing fees to designated core hospitals (or designated hospitals) for genomic cancer medicine for EPs. After these expenses, they are only left with several tens of thousands of yen.

Furthermore, at designated core hospitals and designated hospitals for genomic cancer medicine, EP outsourcing fees alone are not sufficient to cover the costs of labor for EP administration, which consumes considerable amounts of time for specialized personnel and other staff members.

[46] Academic societies have submitted written requests and opinions to the MHLW regarding the allocation of points for conducting and interpreting CGPs in the medical service fee schedule. They asked for points to be allocated appropriately so reimbursements are sufficient to cover the actual costs for test providers and health professionals. (These include the “Written Request Regarding Issues for Insurance Coverage of Cancer Medicine” presented on December 27, 2021 by the Japanese Society of Medical Oncology, the Japan Society of Clinical Oncology, and the Japanese Cancer Association. https://www.jsco.or.jp/news/detail.html?itemid=96&dispmid=767).

there are no criteria regarding the number of CGCs that must be placed at each hospital, and their compensation is not commensurate with the content of their duties. These issues are partially due to the fact that their certification is not recognized at the national level.

This factor is one reason for the absolute shortage in human resources, so specialized human resources who have key roles to fulfill in providing genomic cancer treatments should be designated as positions that hospitals are obligated to fill. Furthermore, they should introduce institutional measures that secure human resource development measures, as well as compensation that is commensurate with those roles.[47]

[47] Criteria regarding the placement of cancer genomic medicine coordinators (CGMCs), who face similar issues, should also be clearly stated, and steps should be taken to establish an educational system for training these coordinators as well as to improve their compensation.

3.3 Recommendation II : Review genetic testing practices including how tests are performed

[Basic concept]

As to the medical service fee schedule, strict restrictions on the timing/frequency of CGPs have been in place since they were first granted coverage. From a health economics perspective, it is safe to say that these restrictions were somewhat reasonable when they were first introduced.

However, many cases in genomic cancer medicine have accumulated over the past few years. Because of this, we may now be able to significantly improve clinical outcomes by exercising more flexibility in terms of the timing/frequency of CGPs, depending on the type of cancer. This point should also be given active consideration from a health economics perspective.

As such, it would be appropriate to review the medical service fee schedule rules related to timing/frequency of CGPs for each cancer type while taking opinions from academic societies and the needs of those serving in clinical settings into account.[48]

[Content of Recommendation II]

Issue		Recommendation
B: Constraints related to genetic testing	⇒	**RECOMMENDATION II: Review genetic testing practices including how tests are performed** **Based on the accumulated clinical experiences, revise the genetic tests and related practices to meet the needs of those serving in clinical settings, and to suit the characteristics of each type of cancer.** (i) Make reimbursement rules regarding the timing/frequency of CGPs more flexible (ii) Create testing algorithms for each type of cancer, with the initiative from academic societies (iii) Disseminate genetic tests for which the number of genes tested has been narrowed down (as compared to CGPs)

(i) Make reimbursement rules regarding the timing/frequency of CGPs more flexible

Depending on cancer type and a patient's condition, there may be cases where patients can receive treatments that match their genetic mutations by performing

[48] The Japanese Society of Medical Oncology and other academic societies have stated that there is little scientific basis for limiting CGP eligibility to those who have completed standard treatments (Japanese Society of Medical Oncology, the Japan Society of Clinical Oncology, and the Japanese Cancer Association. *Clinical Practice Guidance for Next-Generation Sequencing in Cancer Diagnosis and Treatment* (May 15, 2020; Version 2.1), p89 (CQ6), https://www.jsmo.or.jp/about/doc/20200310.pdf)

CGPs before standard treatments have been completed.[49] In particular, it is extremely important to test early when treating highly-malignant types of cancer that require treatment to be delivered quickly, like pancreatic cancer.

In addition, it may be possible to provide more precise treatments by (i) actively utilizing liquid biopsies for CGPs and (ii) performing CGPs multiple times.

Thus, we should review the rules of the medical service fee schedule from both medical/clinical and health economics perspectives and make them more flexible as soon as possible, while taking into account cancer types and patient conditions.

(ii) Create testing algorithms for each type of cancer, with the initiative from academic societies

From both medical and health economics perspectives, a great amount of knowledge regarding the most effective stages to perform CGPs has accumulated over the past several years. It is also gradually becoming clearer that which testing algorithms are optimal may vary by cancer type.[50]

Generally, CDx tests are taken to determine if there is an approved drug that is applicable to the disease in question, but even when those tests show that there are no genetic mutations with a compatible approved drug, CDx still carry a certain degree of significance. Knowing that there is no approved drug available makes it possible to make decisions regarding the next steps for testing and treatment early on, particularly whether to (i) follow up with a CGP to search for a path forward for treatment or to (ii) perform standard treatments.

In the future, it is desirable that testing algorithms that are optimal from medical and clinical perspectives are developed for each type of cancer and with the initiative from related academic societies.[51]

---

[49] For example, a recent clinical study reported that the ratio of patients receiving recommended treatments after undergoing CGPs was about three times higher when CGPs were performed before starting standard treatments (approximately 19.8%) than when they were performed after standard treatments (which is currently a general pre-condition for insurance coverage). ("First-Line Genomic Profiling in Previously Untreated Advanced Solid Tumors for Identification of Targeted Therapy Opportunities," July 17, 2023; https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2807341). Rates at which patients arrive at applicable drugs is extremely low, which is currently a problem facing genomic cancer medicine. Reviewing the timings at which CGPs are performed and applying more flexible testing practices is likely to result in significant improvement for this issue.

[50] For example, specialists for lung cancer and gastrointestinal cancer have different views on when to use CGPs and when to use CDx tests, if it becomes possible to conduct CGPs during the initial stage of drug therapy, ("Opinions on CGPs During Initial Stages of Drug Therapy Differ by Cancer Type," *The Nikkan Yakugyo*, March 17, 2023, No. 16063).

[51] It goes without saying that experts should hold discussions on testing algorithms which are rational from both clinical and health economics perspectives, and this is already being partially

(iii) Disseminate genetic tests for which the number of targeted genes has been narrowed down (as compared to CGPs)

Most CDx tests are performed under the assumption that a therapeutic which is applicable to the identified gene mutation, etc. will be used later, but as seen in (ii) above, CDx tests also have a role to play when dividing cases according to testing algorithms.

From this perspective, it will also be effective to make more active utilization of CDx tests that can test multiple driver genes simultaneously (which we can refer to as "multi-CDx" tests). These multi-CDx tests can detect specific gene mutations more rapidly and at less cost compared to CGPs, so utilizing them would be a rational decision from both medical and health economic perspectives.

Given these circumstances, from medical and clinical points of view (and while leading the way in creating testing algorithms that are optimized for each type of cancer), it is desirable that each academic society actively recommends the use of diagnostics for which the number of targeted genes has been narrowed down.

---

practiced in real-world clinical settings at certain facilities. Fully aware of this, we would like to introduce some ideas that might be helpful:

To begin, (i) in lung cancer, a number of existing approved drugs that are applicable for several common genetic mutations have already been identified. As such, it could be considered rational from both clinical and health economics perspectives to utilize "multi-CDx" tests to detect such genetic mutations. For example, they could be used to simultaneously test for around ten driver genes (that are likely to show results in around one to two weeks (faster than CGPs can)) and then CGPs could be performed only on the patients who test negative (meaning those with no obvious treatment strategy at the time of testing).

(ii) Although 90% of patients with pancreatic cancer test positive for KRAS, there are no drugs targeting KRAS which have received regulatory approval in the field of genomic cancer medicine. However, given the severe prognosis of the disease, it is desirable that a treatment strategy is established as soon as possible. As such, one potential testing algorithm might include (a) performing KRAS testing immediately, even before standard treatments begin, (b) rapidly initiating standard treatments for the approximately 90% of patients who test positive for KRAS, and (c) performing additional CGPs at early stages for the approximately 10% of patients who test negative for KRAS and exploring genomic cancer treatment options, including clinical trials.

Conversely, (iii) for colorectal cancer, only around four genetic mutations can be detected by CDx tests, so it may be more reasonable to start with CGP.

3.4 Recommendation III : Improve patient access to testing centers and clinical trials

[Basic concept]

To ensure equitable access to genomic cancer medicine nationwide, hospitals throughout Japan have been assigned the roles of designated core hospitals, designated hospitals, and cooperative cancer hospitals for genomic cancer medicine, and these assignments are reviewed regularly.

However, only establishing networks of these hospitals will not be enough to ensure access opportunities, especially for patients who live in rural areas.

This is especially true for clinical trials, which are mainly conducted at cancer centers and certain university hospitals in the Tokyo metropolitan and Kansai regions. For patients living outside these areas, the fact that these facilities are so far away is the greatest constraint to healthcare access.[52]

Domestic stakeholders agree that more clinical trials should be conducted in Japan. However, among facilities conducting clinical trials and other stakeholders in the Tokyo metropolitan/Kansai areas, there seems to be little awareness toward the issue of improving access for patients in rural areas.

Strongly recognizing that improving access for patients in rural areas is important, we should take actions to correct information disparities and reduce geographic hurdles, through the active utilization of various technologies including ICT.

[Content of Recommendation III]

Issue		Recommendation
C: Constraints related to geographic factors or information	→	**RECOMMENDATION III: Improve patient access to testing centers and clinical trials** **While paying attention to the constraints and disparities related to geographic factors/information, make drastic improvements to patient access to testing centers and clinical trials.** (i) Greatly expand testing opportunities, while utilizing liquid biopsies and other tests (ii) Simplify access during the preparatory stages of clinical trials (iii) Popularize low-budget decentralized clinical trials (DCTs) that utilize low-tech methods

(i) Greatly expand testing opportunities, while utilizing liquid biopsies and other tests

[52] Further expanding the content of Patient-Proposed Healthcare Services will also help improve access.

(a) Expand the use of liquid biopsies

In addition to CGPs which use tissue samples, CGPs which use liquid biopsy has become more common in recent years. This alternative method examines the DNA from cancer cells that has entered the bloodstream.[53]

From the perspective of test sensitivity, tests that show tumor tissue DNA are usually thought to be preferable for solid tumors.

Liquid biopsies, however, provide a number of significant benefits:

For example, since they are taken by blood tests, liquid biopsies place a relatively small burden on patients in terms of specimen collection; it is also highly likely that institutions like community hospitals in rural areas may handle them in a safe and reliable manner. Liquid biopsies also provide results more quickly than standard CGPs.[54]

Therefore, while taking the conditions of each patient into account, liquid biopsies should be clearly positioned as a regular part of initial testing in situations where they can be expected to be have strong merits (such as for gastrointestinal cancers) and be utilized more actively.[55]

(b) Expand genomic cancer testing centers to include core hospitals for coordinated cancer care

Currently, the collection of tumor specimens for use in CGPs is supposed to be conducted at designated core hospitals, designated hospitals, and cooperative cancer hospitals for genomic cancer medicine. Visiting facilities far from home to undergo testing, however, can impose great physical and mental burdens on cancer patients.[56] To improve patient access with regards to specimen collection, it is

---

[53] According to the current medical service fee schedule rules, liquid biopsy is only recommended for certain cases, such as when specimen extraction is difficult. This may have caused liquid biopsies to remain a low-priority testing option in clinical settings.

[54] For example, when testing gastrointestinal cancer, histopathology takes about one month to obtain results while liquid biopsy takes about 10 days. Using liquid biopsies is likely to contribute to shorter turnaround times (TATs) and greatly improve clinical trial enrollment. (For example, see National Cancer Center Japan, "Development of Precision Medicine for Gastrointestinal Cancers: Utility of Liquid Biopsy in Genomic Analysis," https://www.ncc.go.jp/jp/information/pr_release/2020/1006/index.html.)

[55] For example, SCRUM-Japan (an industry-academia collaborative project called the Cancer Genome Screening Project for Individualized Medicine in Japan, http://www.scrum-japan.ncc.go.jp/) uses liquid biopsies as its main form of initial testing.

[56] Specimen collection for CGPs is considered to be somewhat difficult because of the high number of tumor specimens required and for other reasons. In addition to providing reimbursements in the medical service fee schedule, it will be necessary to establish a system that ensures specimens can be collected in a safe and reliable manner by actively providing education, training, and human

desirable that centers where specimens are collected for CGPs are expanded to include core hospitals for coordinated cancer care.[57]

(ii) Simplify access during the preparatory stages of clinical trials

(a) Simplify information gathered during testing

As previously discussed, C-CAT reports are a topic discussed at EPs and a key source of information that patients can use to learn about clinical trials they might be able to join. In particular, health facilities in rural areas rely heavily on C-CAT reports.

This means it will be important to first revise C-CAT reports to make them more useful within the context of clinical practice. C-CAT reports should be revised to more accurately reflect the perspectives of those in clinical settings. Specifically, they should (i) provide information closer to real-time basis and (ii) adopt a system that allows attending physicians to easily sort through the large amounts of information they contain according to patient condition and place of residence or (iii) direct the health facility staffs to where inquiries can be submitted, such as the URL of the clinical trial site or the e-mail addresses of the principal investigator (PI) and clinical trial coordinator.[58]

(b) Simplify participation in clinical trials during the preparatory stages

Steps must also be taken to alleviate the need for patients in rural areas to visit clinical trial sites (which are often located in the Tokyo metropolitan/Kansai areas) to undergo screening (genetic testing, etc.) during the preparatory stages of clinical trials.

---

resources.

At the same time, tumor specimens needed for general cancer treatment are collected at core hospitals for coordinated cancer care, and there is no practical difference in terms of the technical aspects of collecting specimens. Because the technical capacity to collect tumor specimens for CGP is in place, it is likely that core hospitals for coordinated cancer care can gradually develop the capacity to gather specimens for CGP if an environment that fosters such practices is established.

[57] In genomic cancer medicine, even when tests find a genetic mutation, the chances of finding applicable treatments (approved drugs or clinical trials) are still low. (For reference, please see "Chronological improvement in precision oncology implementation in Japan," https://pubmed.ncbi.nlm.nih.gov/35976133/.) Because of this, it is desirable that steps are taken to lighten the burdens on patients (for whom applicable genomic cancer treatments have not been found) by allowing them to learn their test results through online medical consultations with genomic cancer centers.

[58] The National Cancer Center Hospital East is currently leading efforts to build an organization called the "Academic Assembly" which will enable physicians to share clinical trial-related information in a more timely manner. (The 113th HGPI Seminar – Current Circumstances and Issues in Precision (Genomic) Cancer Medicine (March 2, 2023); Lecturer: Atsushi Otsu; https://hgpi.org/en/events/hs113-1.html)

Specifically, it will be important to partially adopt decentralized clinical trials (DCTs) (see item (iii) for further discussion) and institutionalize a system in which patients can complete initial screenings at satellite clinics located closer to where they live.

(iii) Popularize low-budget decentralized clinical trials (DCTs) that utilize low-tech methods

For patients living in rural areas, the need to commute to faraway clinical trial sites is the greatest constraint to clinical trial access.

Decentralized clinical trials (DCTs) are clinical trials in which patients can participate without the need to visit a clinical trial site, by using online medical services with digital devices or by having pharmaceuticals delivered to their homes. Actively implementing DCTs may significantly reduce regional disparities in clinical trials in Japan.[59,60]

It had been perceived that implementing DCTs face a number of extremely high hurdles, such as high costs of developing new systems, increased workloads, the delay in the adoption of ICT in healthcare settings, and the lack of complete guidelines regarding methods of obtaining patient consent through electromagnetic means.[61]

However, the success of physician-led, fully remote DCT that began in March 2022 at the Aichi Cancer Center provides one clear example that conducting DCTs does not require special skills or vast financial resources (see Column 9).

Improving access to clinical trials for patients in rural areas should be one of the top priorities for promoting cancer genomic medicine.[62] It is desirable to ensure that DCT-based elements are incorporated into every domestic clinical trial, while actively sharing know-how on methods for conducting DCTs in a low-tech, low-cost manner.

---

[59] During the COVID-19 pandemic, DCTs were disseminated rapidly in the U.S., since staying in contact with participants was difficult.

[60] Since DCTs facilitates the enrollment of eligible patients in clinical trials, it is likely to shorten clinical trial launch times while improving patient retention rates.

[61] As guidance on electronic consent (e-Consent) was published recently, there are growing expectations for it to be used as a gateway to DCTs (MHLW, "Items of Note Regarding the Use of Electromagnetic Methods for Explanations and Consent in Clinical Trials and Postmarketing Studies," March 30, 2023, https://www.mhlw.go.jp/hourei/doc/tsuchi/T230331I0140.pdf).

[62] It is not absolutely necessary to achieve fully remote DCTs. Even making clinical trials partially remote would increase treatment options for patients and greatly improve patient access.

Column 9 - Conducting low-tech, low-cost Decentralized Clinical Trials (DCTs)

Decentralized clinical trials (DCTs) may well be conducted with extremely low budgets and without the need to introduce large-scale systems and other such tools.

Starting in February 2022, Aichi Cancer Center has been conducting a fully remote DCT, i.e., participants have not visited the trial site even once during the clinical trial.[63] Taking a look at this initiative, we see that the Aichi Cancer Center has adopted a number of sensible practices to reduce the physical and psychological burdens for participants and other related parties at both the trial site and at satellite facilities (hospitals that participants regularly visit). These practices are described below.

(1) Preparatory stages of the clinical trial (participant recruitment, etc.)

Efforts were made so clinical trial preparations could be completed in an extremely short period (approximately 4 weeks): (i) local hospitals were able to rapidly submit inquiries to the clinical trial site, based on information in C-CAT reports provided by the clinical trial site,[64] and (ii) the outsourcing contracts to satellite sites were smooth concluded, by adopting a template for the contract.

(2) Communication with patients

Patient consent (eConsent) was obtained and medical examinations were conducted via Zoom for Healthcare using patients' smartphones, with patients' family doctors present (D to P with D[65]). This eliminated the need for special online equipment or similar tools.

(3) Collection of test data and other information

As a general rule, patient tests and other examinations (vital signs, blood tests or CT scans, etc.) were performed at satellite facilities. Test data and related information was exchanged among hospitals using traditional methods like fax and mail. These practices eliminated the need for special online systems or security measures.

(4) Delivery of pharmaceuticals

By using ordinary delivery services to send investigational drugs to patients' homes,

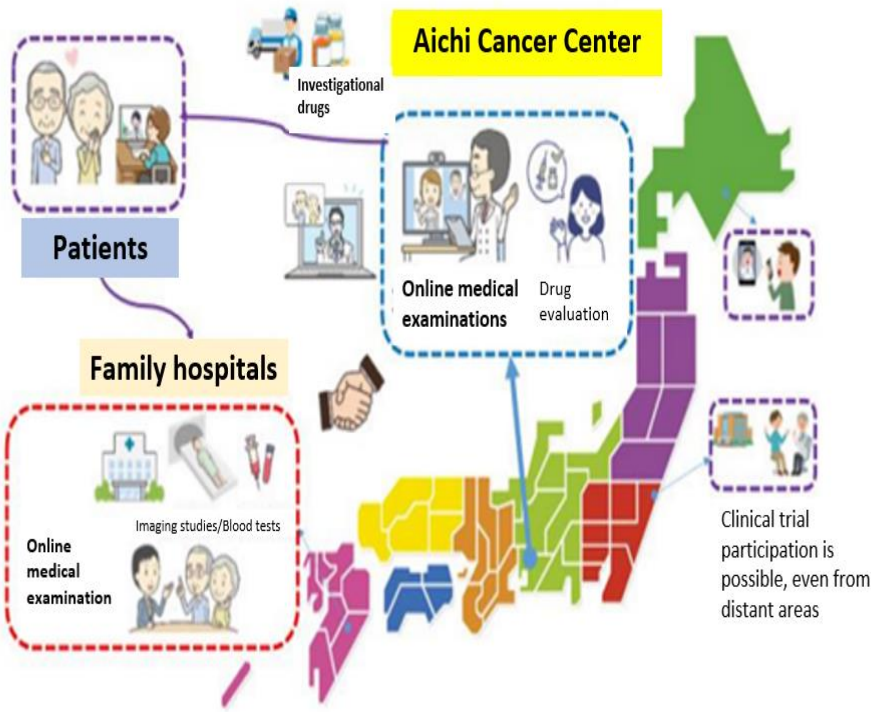
[63] https://cancer-c.pref.aichi.jp/uploaded/attachment/1206.pdf

[64] This clinical trial targeted rare diseases (namely, solid tumors harboring anaplastic lymphoma kinase (ALK) fusion genes (excluding non-small cell lung cancer)). When Aichi Cancer Center included the information of clinical trial site and its contact information to all C-CAT reports of the patients who were ALK-positive, almost 100% of those patients' family hospitals (including cooperative hospitals for genomic cancer medicine) made contact.

[65] Doctor to Patient with Doctor; online medical care that takes place while the attending physician or other health care provider is next to the patient.

drug delivery costs were reduced to one-tenth of what they had been previously.[66]

Fully-remote Decentralized Clinical Trial (using online medical services)



Source: Aichi Cancer Center

As demonstrated by Aichi Cancer Center's DCT, DCTs can be conducted with low-technology, low budget practices without the need to introduce particularly large-scale systems. When conducting clinical trials, we should take active steps to adopt DCTs to facilitate participation among patients in remote areas.[67]

The current rules for clinical trials allow DCTs to be conducted for medicines for internal use. It is desirable that these rules be changed to allow therapeutics to be administered (through intravenous infusions or injections) at satellite facilities.

---

[66] After a thorough exchange of opinions with the Pharmaceuticals and Medical Devices Agency (PMDA; https://www.pmda.go.jp/index.html), it was agreed that there was no need to use services specializing in the delivery of investigational drugs as long as quality could be ensured. (MHLW, "Questions and Answers (Q&A) on Ministerial Ordinance on Good Clinical Practice for Drugs (Office Communication)," January 31, 2023, https://www.mhlw.go.jp/web/t_doc?dataId=00tc7305&dataType=1&pageNo=1)

[67] It is not necessary to have all trial participants participate in the clinical trials in a fully decentralized manner. In the Aichi Cancer Center case, only a portion of clinical trial participants is participating remotely.

3.5 Actively raise public awareness, and expand education and training for community hospitals

Genomic cancer medicine is a new area within the field of medicine, so it is desirable that steps are taken to actively inform the public of its significance in information resources and publications on general cancer medicine.

Furthermore, it will not be possible to connect family health institutions to core hospitals and other such hospitals if understanding toward genomic medicine (including testing) among family doctors is not improved. Raising awareness at community hospitals is the key element to establish a system that provides access to genomic cancer treatment to all patients regardless of where they live.

Cooperative hospitals for genomic cancer medicine in rural areas are currently making efforts to notify, educate, and train their communities and local health institutions on genomic cancer medicine, but they have to cover the costs of these activities themselves.

Many community hospitals are short on staff to begin with, and their staff members often do not possess sufficient understanding of genomic cancer medicine. It is often the case that these hospitals turn down invitations to participate in publicity and training programs.

In order to extend the benefits of cancer genome medicine to the entire population, it is necessary to enhance opportunities for the public and physicians to learn about genomic cancer medicine by introducing a framework to subsidize these publicity, education, and training programs.

4. CONCLUSION

As we have seen, improving patient access is the key factor in disseminating genomic cancer medicine. If related parties gradually advance such efforts, more patients will be able to benefit from genomic cancer medicine.

Since know-how regarding genomic cancer medicine was insufficient when it was first introduced, it was somewhat rational to handle it with great caution and only allow it to be provided by those with high levels of expertise. However, there has been a significant increase in the number of CGPs being handled and this number is likely to continue increasing. We should be proactive about transitioning to a system designed to handle a large number of cases nationwide, by adopting more flexible attitudes toward a wide range of items, from specimen collection to the positioning of EPs and the dissemination of DCTs.

At the same time, while cancer genome analysis is advancing, few driver genes (genetic mutations that drive the progression of cancer) have been discovered in recent years. For this reason, in the U.S., only about 8% of patients who undergo CGPs end up receiving genomic cancer treatment through an applicable drug or clinical trial. R&D for therapeutics will continue to be important, but we see the limits of what can be accomplished with therapeutics.

As such, from the broader perspective of cancer medicine, it goes without saying that efforts to promote R&D for other promising treatment methods should continue,[68] while taking steps to actively promote genomic cancer medicine. Such treatments should be combined in optimal manner to match the needs of individual patients.

Bearing this in mind, this report presents a number of practical ideas of policy actions with respect to improving patient access in genomic cancer medicine. We hope that this report will be of some help in promoting cancer care and further development of patient-oriented medicine through the cooperation and collaboration of all parties concerned.

---

[68] For example, in recent years, there has been a series of successes in drug discovery. This includes the development of antibody-drug conjugates (ADCs), radiopharmaceuticals, and middle molecule drugs. This emphasis on the drug discovery environment is driving a shift toward an approach in which therapeutic drug targets are identified by analyzing a broad range of information including RNA and proteins (known as "multi-omics analysis"). ("The 113th HGPI Seminar – Current Circumstances and Issues in Precision (Genomic) Cancer Medicine," March 2, 2023. Lecturer: Atsushi Otsu; https://hgpi.org/en/events/hs113-1.html)

ACKNOWLEDGEMENTS

We conducted hearings with healthcare professionals and patient groups in every region of Japan (including some whose names withheld by request). We express our deepest gratitude for their cooperation.

The recommendations in this document are based on surveys and hearings conducted by HGPI and have been compiled in HGPI's capacity as an independent health policy think-tank. They do not, in any capacity, represent the opinions of any party who participated in those hearings or the organizations to which they are affiliated.

Collaborating parties (who participated in hearings, provided reference materials, etc.) (Titles omitted; In alphabetical order)

Cancer Genome Medical Coordinators
Kimi Fujiwara (Kochi Medical School Hospital)
Misa Hirosue (Kochi Medical School Hospital)
Miho Komatsu (Kochi Medical School Hospital)

Certified Genetic Counselors
Keika Kaneko (Clinical Genetic Medicine Department, Cancer Institute Hospital of JFCR)
Noriko Tanabe (Genetic Medicine and Services, National Cancer Center Hospital)

Clinical laboratory testing company
SRL, Ltd.

Medical office workers
Etsuko Sato (Medical Affairs Section, Nihonkai General Hospital)
Akari Yamaguchi (Medical Affairs Section, Nihonkai General Hospital)

Patient advocacy group representatives
Kazuo Hasegawa (NPO Lung Cancer Patient Network One Step)
Yoshiyuki Majima (NPO PanCAN Japan)
Naomi Sakurai (Cancer Solutions Co., Ltd.)

Pharmaceutical companies and pharmaceutical company representatives
Kosuke Iijima (Foundation Medicine Business Promotion Department, Chugai Pharmaceutical Co., Ltd.)
Kiyoma Itabashi (EFPIA Japan; Clinical Department, Bayer Yakuhin, Ltd.)
Hiroyuki Kakiki (DCT Japan Co., Ltd.)
MSD, K.K.
Takuya Sato (Integrated Market Access Division, Janssen Pharmaceutical K.K.)
Daisuke Yasumizu (Integrated Market Access Division, Janssen Pharmaceutical K.K.)
Dianne A Ledesma (Market Access Division, Bayer Yakuhin, Ltd.)

Pharmacist

Kotone Matsuyama (Center for Strategic Research Initiative (CSRI), Nippon Medical School)

Physicians

Tatsuru Ikeda (Genomic Cancer Medicine Center, Hakodate Goryoukaku Hospital)

Mitsuho Imai (Genetic Medicine Department/Division of Pharmaceutical Research and Development, National Cancer Center Hospital East)

Yushi Kato

Junichi Kitazawa (Genomic Medicine Department, Aomori Prefectural Central Hospital)

Shinji Kosugi (Genomic Medicine Course, Graduate School of Medicine and Faculty of Medicine, Kyoto University)

Kinya Matsuoka (Department of Breast and Endocrine Surgery, Ehime Prefectural Central Hospital)

Tetsuya Mitsutomi (Division of Thoracic Surgery, Department of Surgery, Faculty of Medicine, Kinki University)

Chigusa Morizane (Department of Hepatobiliary and Pancreatic Oncology, National Cancer Center Hospital)

Manabu Muto (Department of Therapeutic Oncology, Graduate School of Medicine, Kyoto University)

Kazuto Nishio (Department of Genome Biology, Kinki University Faculty of Medicine)

Atsushi Otsu (Hospital Director, National Cancer Center Hospital East)

Shigehira Saji (Department of Medical Oncology, School of Medicine, Fukushima Medical University)

Miyako Satouchi (Genomic Medicine Clinical Trial Center, Hyogo Cancer Center)

Kentaro Sawada (Department of Oncology, Kushiro Rosai Hospital)

Toshio Shimizu (Third Lecture of Internal Medicine, School of Clinical Medicine, Wakayama Medical University)

Kenki Sugimoto (Genomic Cancer Medicine Center, Kochi Medical School Hospital)

Kuniko Sumina (Clinical Laboratories, National Cancer Center Hospital)

Yu Sunakawa (Department of Clinical Oncology, St. Marianna University School of Medicine)

Shuhei Suzuki (Department of Oncology, Faculty of Medicine, Yamagata University)

Hiroya Taniguchi (Department of Pharmacy, Aichi Cancer Center)

Arisa Ueki (Genetic Clinical Medicine Department, Cancer Institute Hospital of the Japanese Foundation For Cancer Research (JFCR))

Yasushi Yatabe (Division of Molecular Pathology, National Cancer Center Hospital)

Takayuki Yoshino (Department of Gastrointestinal Oncology, National Cancer Center Hospital East)

Project sponsors (In alphabetical order)**:**

Bayer Yakuhin, Ltd.
Chugai Pharmaceutical Co., Ltd.
Janssen Pharmaceutical K.K.
MSD K.K.

◆ About Health and Global Policy Institute

Health and Global Policy Institute (HGPI) is a non-profit, independent, non-partisan health policy think tank established in 2004.

In its capacity as a neutral think-tank, HGPI involves stakeholders from wide-ranging fields of expertise to provide policy options to the public to successfully create citizen-focused healthcare policies. Looking to the future, HGPI produces novel ideas and values from a standpoint that offers a wide perspective. It aims to realize a healthy and fair society while holding fast to its independence to avoid being bound to the specific interests of political parties and other organizations. HGPI will continue working actively to generate policy options that will be effective in Japan and around the world and that will contribute to resolving global health challenges.

HGPI's activities have received global recognition. HGPI was ranked second in the "Domestic Health Policy Think Tanks" category and third in the "Global Health Policy Think Tanks" category in the Global Go To Think Tank Index Report presented by the University of Pennsylvania (as of January 2021, the most recent report).

◆For inquiries, please contact:

Haruka Sakamoto	(Senior Manager, HGPI)
Shu Suzuki	(Senior Associate, HGPI)
Honoka Hiraka	(Associate, HGPI)
Osamu Takemoto	(Program Specialist, HGPI)

Health and Global Policy Institute
Otemachi Financial City Grand Cube 3F 1-9-2,
Otemachi Chiyoda-ku, Tokyo
100-0004 JAPAN
TEL: +81-3-4243-7156 FAX: +81-3-4243-7378
Info: info@hgpi.org
Website: https://www.hgpi.org

特定非営利活動法人 日本医療政策機構
〒100-0004 東京都千代田区大手町1-9-2 大手町フィナンシャルシティ グランキューブ3 階
Global Business Hub Tokyo
Tel: 03-4243-7156 Fax: 03-4243-7378 E-mail: info@hgpi.org

Health and Global Policy Institute (HGPI)
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