JOINT LEARNING NETWORK
For Universal Health Coverage

Toolkit to Develop and Strengthen Medical Audit Systems

Practical Guide by Implementers for Implementers

December 2018 (Second Edition)

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This guide was produced by the Joint Learning Network for Universal Health Coverage (JLN), an innovative network of practitioners and policymakers from around the globe who engage in practitioner-to-practitioner learning and collaboratively develop practical tools to help countries work toward universal health coverage.

For inquiries about this guide or other related JLN activities, please contact the JLN at jln@accessh.org.

This work was funded by a grant from the Rockefeller Foundation and by the Government of South Korea. The views expressed herein are solely those of the authors and do not necessarily reflect the views of the organizations.

Note: This is the second edition of the Medical Audits Toolkit.
The toolkit had been reviewed by the participants of JLN's Medical Audits collaborative, under which the product was developed. Technical facilitators of the JLN have also reviewed the toolkit and provided feedback for this second edition. No external expert on medical audits have reviewed the toolkit. A more rigorous feedback from external people, as they read and use this toolkit, will be incorporated to make it a comprehensive guide for use by countries looking to strengthen their medical audit systems. Revised version(s) of the toolkit will be available at www.jointlearningnetwork.org.

Version: December 2018

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ACKNOWLEDGEMENTS

This work was made possible with generous support from the government of South Korea. The Health Insurance Review and Assessment Service of South Korea contributed valuable technical expertise, organized all three learning events in Wonju for the Medical Audits Collaborative, and provided generous financial support.

We would also like to thank all the governments of the members of the Medical Audits Collaborative for allowing members of the collaborative to leave their busy daily jobs in their home countries to make their contributions.

We gratefully acknowledge the financial support of the Rockefeller Foundation. Special thanks go to Natalie Phaholyothin at the Rockefeller Foundation for introducing John Ryu at the Health Insurance Review and Assessment Service, who then took the technical lead for the collaborative.

The authors of this toolkit include all members of the Medical Audits Collaborative. They must each be acknowledged for the experiences, data, and materials they contributed from their respective countries.

The editors wish to acknowledge JLN Country Core Group leads and international partners, and Dr. György Bèla Fritsche MD, Senior Health Specialist, World Bank, who reviewed and provided valuable feedback on draft versions of this document. Finally, the authors acknowledge the support of technical initiatives of the Joint Learning Network, including the Information Technology and Provider Payment Mechanisms for important groundwork on data analysis for provider payment systems. Caren Althasuser from the Information Technology Initiative was particularly helpful in determining the process for the chapter on functional requirements.

During revision of toolkit, Trudy Bearden at Qualis Health provided comments and suggestions on chapters which greatly improved the toolkit. Seungyoun Cho at HIRA provided a range of assistance in reviewing feedback on revision and checking materials. We are grateful to them.

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LIST OF ACRONYMS

ATC	Anatomical Therapeutic Chemical
CMI	Case Mix Index
CPSU	Clinical Performance Surveillance Unit
CT	Computed Tomography
DB	database
DCI	Day Costliness Index
DRG	Diagnosis Related Group
DUR	Drug Utilization Review
DW	data warehouse
E-ADS	Electronic medical record Assessment Data Submission
ECI	Episode Costliness Index
EDC	empanelment and disciplinary committee
EDI	Electronic Data Interchange
EFCC	Economic and Financial Crimes Commission
FFS	fee-for-service
GDP	Gross Domestic Product
HCDMD	Health Care Delivery Management Division
HCPPAS	Health Care Provider Performance Assessment System
HCPs	healthcare providers
HCQI	Health Care Quality Indicator
HIRA	Health Insurance Review and Assessment Service
ICD	International Statistical Classification of Diseases
ICT	Information and communication technology
ICU	Intensive Care Unit
IT	Information technology
JLN	Joint Learning Network
LI	Lengthiness Index
LO	Legal Office
MCPos	Medical Claim Portal Service
MMHR	Monthly Mandatory Hospital Report
MoH	Ministry of Health
MOHW	Ministry of Health and Welfare
NHIA	National Health Insurance Authority (Ghana)
NHI	National Health Insurance

NHIF	National Hospital Insurance Fund
NHIS	National Health Insurance Service
OECD	Organization for Economic Cooperation and Development
OJT	on-the-job training
ORVP	Office of the Regional Vice President
PAS	Performance Assessment System
PCB	Primary Care Benefit
PSB	Personnel Selection Board
QA	Quality Assessment
QI	Quality Improvement
RVS	Relative Value Scale
SAST	Suvarna Arogya Suraksha Trust (India)
SMD	Standards and Monitoring Department (Philippines)
SOP	standard operating procedure
VI	Visit Index

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Introduction to the Toolkit

CHAPTER 02

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CHAPTER 04

Outcomes of Medical Audits

CHAPTER

01

INTRODUCTION TO THE TOOLKIT

Many practitioners and policymakers across JLN membership have expressed a strong interest in establishing or strengthening their medical audit systems. Countries face challenges in creating appropriate governance and structuring human resources for setting up medical audits in their health insurance agencies. Even if a medical audit system is already in place, they face issues in assuring that the medical audits are efficient and effective. Finally, the practitioners were also eager to understand how the results of medical audits can be used to improve quality of care and reduce the cost of services. The Medical Audits Collaborative was formed with the objective of improving the quality of healthcare services through designing and strengthening medical audit systems. To that end, the collaborative decided to develop a practical toolkit on how to design, implement, and strengthen a medical audit system.

This toolkit was created to address gaps in practical knowledge by providing guidance on setting up medical audit units, conducting investigations, and using the results of the medical audits. The toolkit also was made from the perspective of a purchaser of healthcare services. The toolkit provides a step-by-step review of claims to identify provider patterns that reveal opportunities to improve quality of care and to decrease risk of fraudulent behavior. It covers technical guidance and gives practical examples from participating JLN member countries. To support the demand for new knowledge on medical audit systems, South Korea hosted the Medical Audits Collaborative to help other countries learn from the advanced system in South Korea, as well as from each other. All members of the collaborative developed the toolkit together, based on their respective experiences, while getting firsthand exposure to the established medical audit system in South Korea. The toolkit provides a detailed case study of South Korea as a reference case.

The toolkit was developed by a group of medical audit practitioners, policymakers, and quality improvement managers from eight countries. Examples and experiences of medical audit systems in member countries appear throughout the toolkit to illustrate how they selected options and identified solutions to some of the common challenges they faced. The toolkit is a collection of advice from practitioners to practitioners.

1.1 WHO CAN BENEFIT FROM THIS TOOLKIT?

The toolkit aims to equip the purchasers of healthcare services, like Ministries of Health and National Health Insurance Agencies, with practical lessons to design and implement medical audit systems.

1.2 MEDICAL AUDIT SYSTEM FRAMEWORK

The objective of an effective medical audit system is to ensure an effective, efficient, and financially sustainable healthcare system. The goal is to improve patient outcomes, patient satisfaction, and financial sustainability. This toolkit uses the following definition, developed by the Medical Audits Collaborative based on a review of global terminology:

"A medical audit system is a quality improvement process with a step-by-step analysis of healthcare services against explicit criteria of quality of care and cost."

The results of medical audits guide actions and help implement change at an individual, team, service, and system level. These changes should be further monitored to confirm progress toward an effective and efficient healthcare system.

The toolkit takes a holistic approach to medical audits as a system. This system comprises the following three factors:

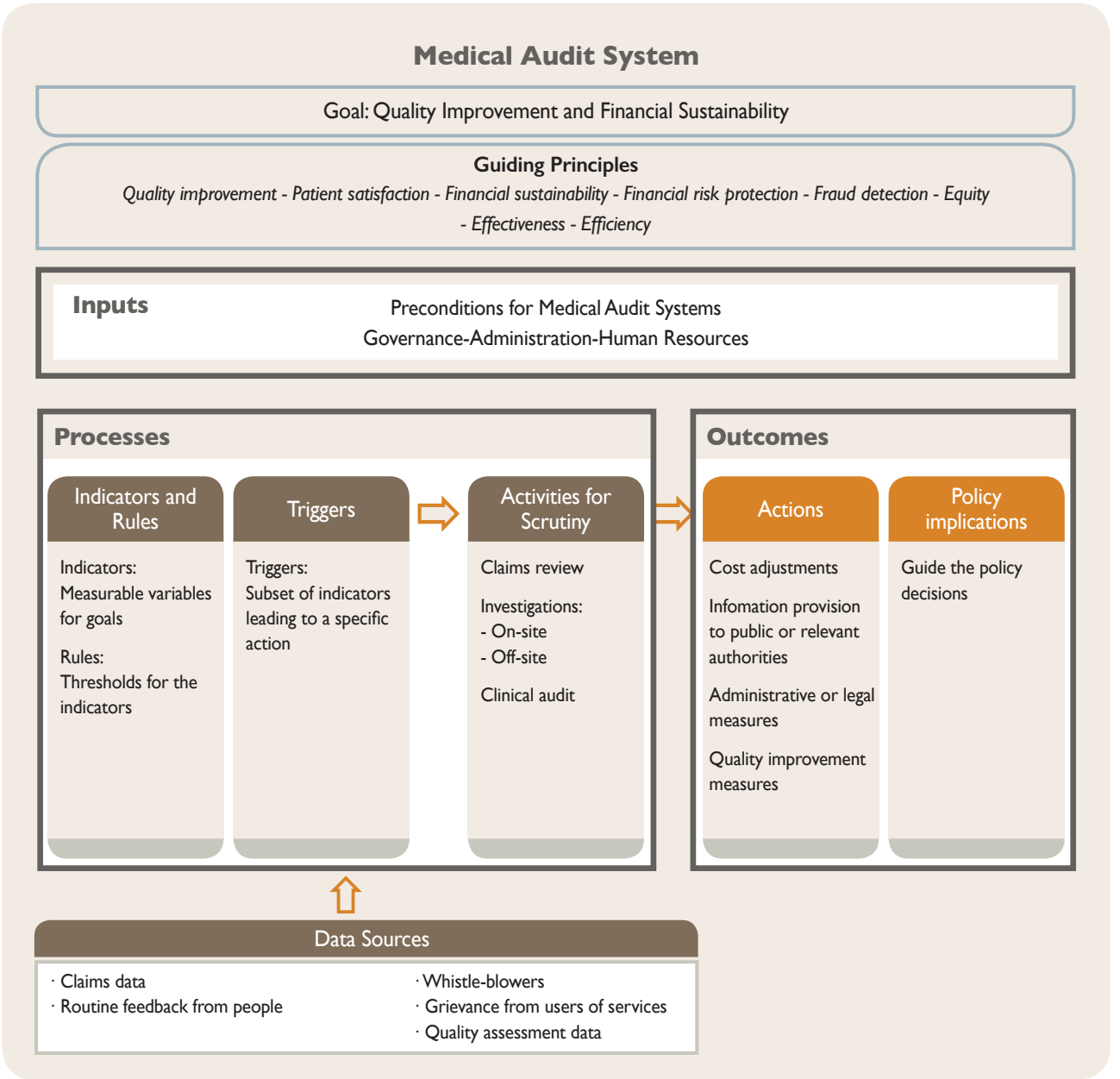
Inputs preconditions to enable a successful medical audit system,

Processes including the development of indicators, rules, and triggers to assure effective medical audits, and the process of conducting the audit, including on- and off-site investigations, and

Outcomes the results of medical audits, linked to the overarching goals of improved quality, patient outcomes, and the financial elements of risks protection and sustainability.

The Figure 1 below illustrates the medical audit system framework. It includes the perspectives of multiple groups, including policymakers, purchasers of healthcare services (such as insurers), healthcare providers, and patients. This toolkit is developed with an emphasis on the perspective and role of purchasers of care.

Figure 1 **Medical Audit System Framework**



1.3 HOW THIS TOOLKIT IS ORGANIZED

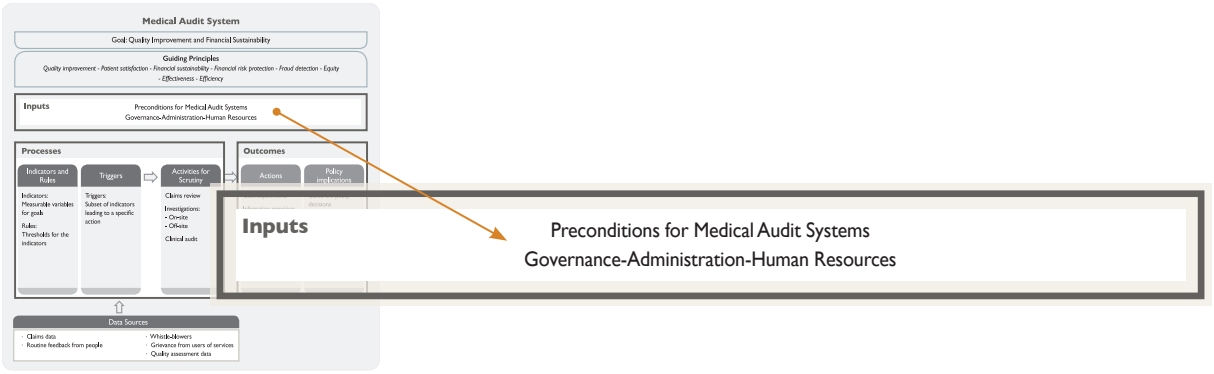
Using a medical audit system framework as an overarching guide, this toolkit is organized around the three key elements of the system: Inputs, Processes, and Outcomes. The toolkit walks through the key steps to establish and improve medical audit systems. Each chapter provides practical advice, challenges, and solutions from the experiences of participating countries. Many chapters are structured with a stepwise format. The Appendices to the toolkit consist of various examples of indicators, forms used during medical audits (e.g. investigations, reporting of results, etc.), and the details of the processes used by South Korea and other countries.

The toolkit is organized in the following chapters, with detailed definitions outlined below.

- **PART 1 (Chapter 2): Inputs:** Preconditions to enable an effective medical audit system
  - **Chapter 2.1:** Develop an Effective Governance and Administration Structure
  - **Chapter 2.2:** Human Resources (Build an Effective Team)
- **PART 2 (Chapter 3): Processes:** Development of indicators, rules, and triggers for medical audits and activities for scrutiny
  - **Chapter 3.1:** Indicators
  - **Chapter 3.2:** Triggers and Actions
  - **Chapter 3.3:** Activities for Scrutiny
  - **Chapter 3.4:** Functional requirements
- **PART 3 (Chapter 4): Outcomes of Medical Audits**

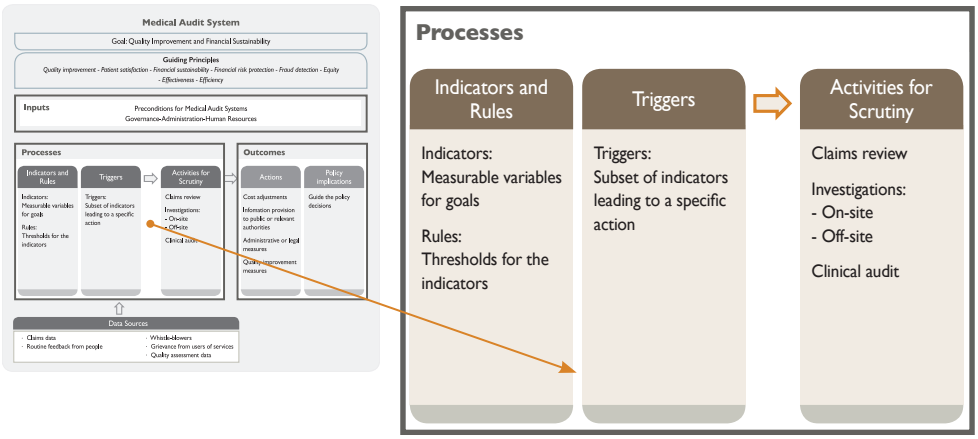
  Continuous improvement: How to use the medical audit results to improve health services and achieve the triple aim of improving quality of care, patient outcomes and lower costs.

Figure 2 **Medical Audit System Framework: Inputs**



PART 1 (Chapter 2) discusses necessary **Inputs** for a medical audit system, e.g. enabling factors and structural elements. The collaborative narrowed down the key structural components that are most helpful to countries working to set up and improve their medical audit systems. Chapter 2.1 describes how to develop an effective governance and administration structure; chapter 2.2 explores how to build an effective team.

Figure 3 **Medical Audit System Framework: Processes**



PART 2 (Chapter 3) dives into implementation of the medical audit, examining step-by-step **Processes** along with challenges and potential solutions. In Chapter 3.1, indicators need to be identified. Chapter 3.2 includes helping to define rules and design triggers for audit, which are keys to efficiently flag the need for further investigations. These investigations can be on-site or off-site.

It is important to keep in mind that there are multiple events that may trigger an investigation. Data from claims are common sources of information for triggers. Other triggers for a medical audit include requests

by the Ministry of Health or professional associations, grievances, publicized adverse events, or internal whistle-blowers at the facility level. While this toolkit acknowledges these other avenues, collaborative members have identified triggers from indicators based on claims data to be the most important and relevant focus. Thus, the chapter on triggers introduces how triggers are developed from data analysis of prioritized indicators.

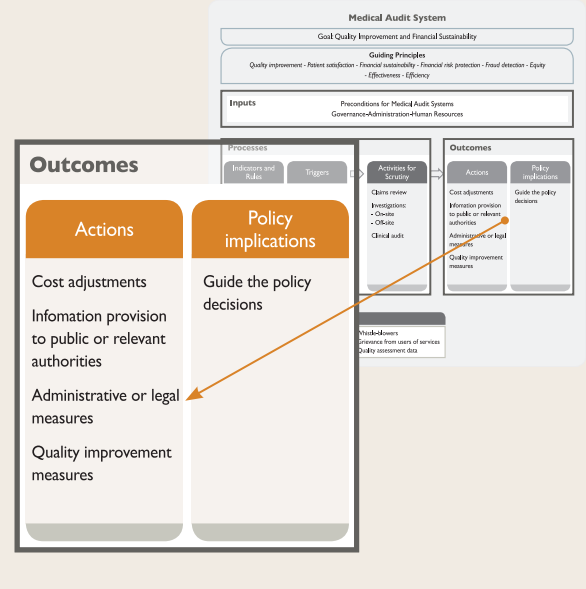
Triggers can result in a range of different actions, such as on-site and off-site investigations. The toolkit provides details about on-site investigations and an introduction to clinical audits.

Once the triggers are in place, Chapter 3.3 segues into conducting investigations, with the acknowledgement that on-site investigations can, and often do, comprise both clinical and financial elements.

Medical audit systems need to integrate with the information technology function of the health insurance operations. Chapter 3.4 in this toolkit includes common functional requirements for medical audit systems to be integrated into countries' existing claims processing.

Figure 4 **Medical Audit System Framework: Outcomes**

Finally, **PART 3 (Chapter 4)** describes the **Outcomes** of the medical audit process and what happens after the investigation. Chapter 4 looks at using medical audit results—the outcomes of cost and quality, and the attendant policy implications. Administrative and quality measures are undertaken based on audit results and linked to the overarching goals of improving quality of care, patient outcomes, and the financial considerations of risk protection for beneficiaries and purchasers' sustainability.



Outputs are the immediate actions that may be taken after an investigation, based on findings relevant to explicit criteria.

Outcomes of medical audits refer to the ongoing quality improvement that occurs at a provider, facility, and system level based on the process of a medical audit.

1.4 KEY DEFINITIONS

The definitions of "medical audit" differ globally based on country context; some countries use the term "clinical audit" interchangeably, and some contexts narrowly focus on the medical or clinical review itself. This toolkit looks at the holistic **Medical Audit System,** which consists of **Inputs** as preconditions for medical audit process, the **Processes** to prioritize and conduct medical audits, and **Outcomes** as a result of the medical audit process.

1. Medical Audit System

A **medical audit system** is a quality improvement process with a step-by-step analysis against explicit criteria of cost and quality of care that seeks to improve patient outcomes and financial risk protection for an effective and efficient healthcare system, where indicated changes are implemented at an individual, team, or service level and further monitoring is used to confirm improvements in healthcare delivery.[1)]

2. Indicator

An **indicator** is a measurement, event, or other data point used to understand a system or service that may warrant further monitoring, analysis, information sharing, or intervention, such as a medical audit.[2)]

1) Definition developed by the JLN Medical Audit Collaborative based on review and analysis of global definitions of "medical audit systems" from leading institutions, such as the United Kingdom's National Institute for Health and Care Excellence (NICE), AAPC in the US, PhilHealth in the Philippines, and Health Insurance Review and Assessment Service (HIRA) in South Korea.

2) Definition based on "Crisis Standards of Care: A Toolkit for Indicators and Triggers" (The National Academies Press, 2013) and adapted for the Medical Audit Collaborative.

3. Rule

In the context of this toolkit, a **rule** is a set of explicit principles governing conduct. In the case of medical audits, a rule is often

- synonymous with the term "threshold" e.g. "An indicator should not be above or below a certain level in terms of quality, quantity, or cost";
- based on evidence-based standards of quality care, e.g. "Admissions in Intensive Care Unit should be there less than seven days," or "A hysterectomy should only be performed for patients above forty years of age";
- a result of the statistical analysis of indicators, e.g. determining standard deviation from an average mean to identify any outliers.

4. Trigger

A **trigger** elicits a specific action.[3] In the case of a medical audit system, a trigger point may be designed to occur at a threshold or rule recognized by the purchaser to elicit a specific response. For example, data above or below a certain threshold can trigger the flagging of a claim for further review and analysis. Used in conjunction with rules, a trigger can be automated to make medical audits more targeted and efficient.

5. Investigation

An **investigation** is the act of formal and systematic examination and analysis; it is a mechanism to improve the overall quality of care. It is brought on by a trigger and often involves both a clinical audit and cost analysis.[4] In the case of a medical audit system, an investigation can be triggered by a variety of sources and ideally should be conducted with the overall goal of improving quality.[5]

3) Definition based on Oxford Dictionary entry and adapted to the context of medical audit systems.

4) Definition based on Oxford Dictionary entry and adapted to the context of medical audit systems.

5) Triggers for investigation can include data showing that a certain "rule" has been violated or a certain "threshold" exceeded; a request by the Ministry of Health and Welfare; a whistle-blower within a facility exposing wrongful actions; etc. Investigations can be off-site (relying on documentation) or on-site at the facility; periodic (conducted regularly), special (conducted involving a social issue, e.g. unethical medical practice), or urgent (conducted in case of emergency, when there is a risk of destruction of evidence or the closing down of a health facility).

5a. On-site Investigation

On-site investigation is an administrative investigation at the provider's premises by the medical audit team to ascertain whether healthcare services were provided in accordance with standard guidelines and whether medical costs were charged in accordance to medical fee schedules. It is an investigation to determine the lawfulness of claims and to detect fraudulent or adverse healthcare practices.

5b. Off-site Investigation

Off-site investigation refers to the method of investigation into the legitimacy of the claimed benefit costs via report on the benefits or relevant documents without visiting the healthcare provider for probe. Most processes are the same with on-site investigation except where to investigate.

6. Clinical Audit

A component of medical audits, a **clinical audit** examines quality-related aspects of healthcare through three different angles: patient experience, adherence to clinical guidelines, and service delivery (including infrastructural components, staffing levels, and other resource management factors). While some country contexts limit a clinical audit to adherence to clinical guidelines, this toolkit uses a broader definition of the term to include all elements of quality.

7. Continuous Quality Improvement

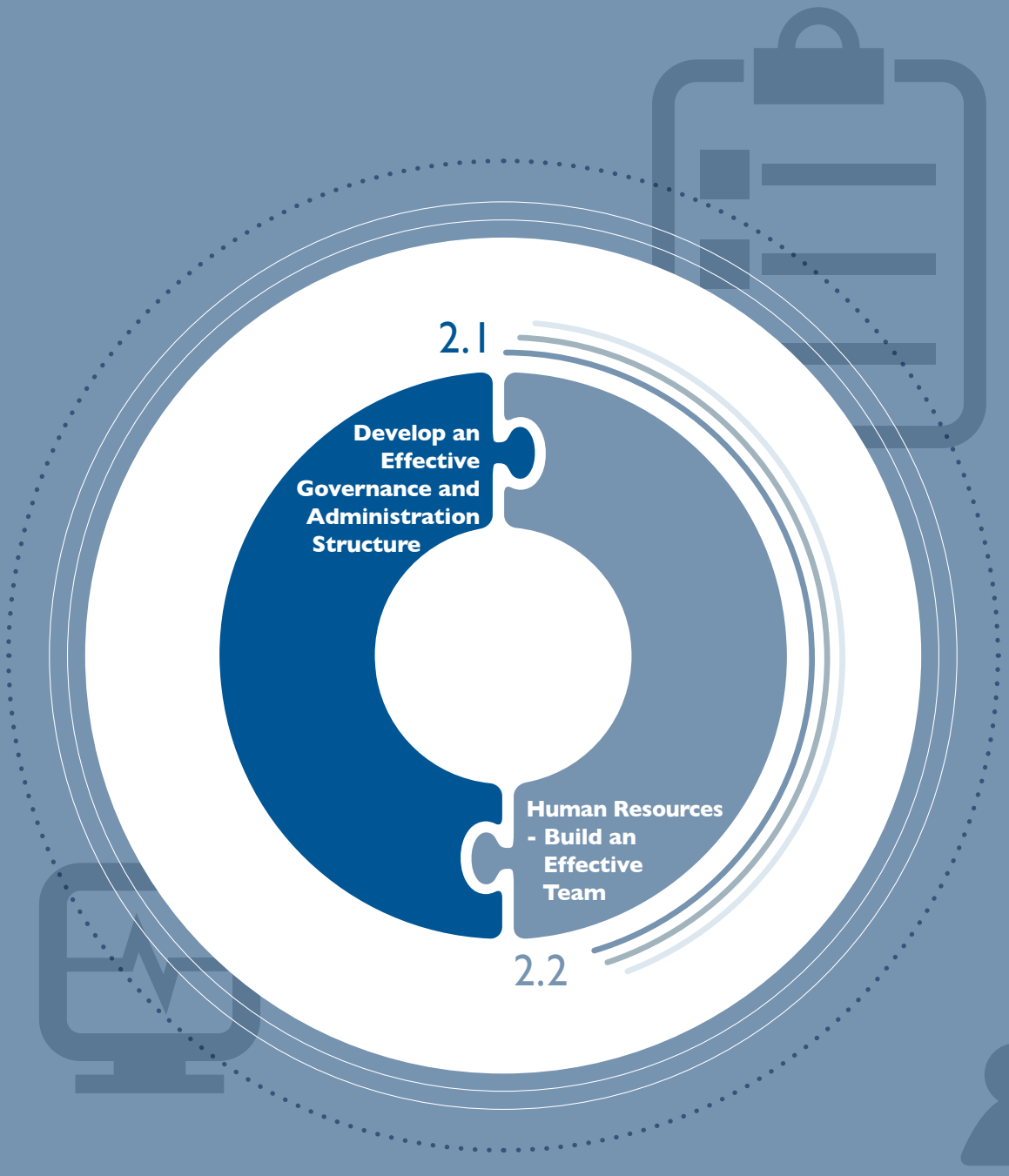
Continuous quality improvement is an approach to quality management that builds upon traditional quality assurance methods by emphasizing organization and systems; it focuses on "process" rather than the individual; it recognizes both internal and external "customers"; and it promotes the need for objective data to analyze and improve processes.[6] Continuous quality improvement is included in this set of key definitions to highlight the use of medical audit as a tool to identify and expand positive elements of the system ("what's working well" and "bright lights") rather than purely focusing on the punitive.

6) Adapted from the Institute for Healthcare Improvement.

CHAPTER

02

PRECONDITIONS FOR MEDICAL AUDIT SYSTEMS



2.1 Develop an Effective Governance and Administration Structure

OBJECTIVE

This chapter presents the key steps to set up an effective governance and administration structure, highlighting decision-making principles that enable policymakers and implementers to choose the most appropriate structures for their country contexts.

DEFINITION

An effective structure is imperative in enabling good outcomes. As Avedis Donabedian, a pioneer in the study of quality in healthcare, has stated: "Good structure increases the likelihood of good process, and good process increases the likelihood of good outcome."[7)]

Governance and administration are the foundation for the functioning of the system. This includes regulations and organizational design which control and manage both the functioning of an effective medical audit unit and system ("governance") and the day-to-day process for running this unit ("administration"). Setting up an effective governance system is crucial for the well-functioning administration of a medical audit system because an effective governance system defines clear roles and responsibilities for effective administration, thus improving coordination, efficiency, and effectiveness.

SCOPE

This chapter introduces 7 steps to develop an effective governance and administration structure. It includes how to identify and select governance and administration options and models with country examples and an in-depth study.

7) Donabedian A. The quality of care. How can it be assessed?. JAMA. 1988; 260: 1743-1748. Doi: 10.1001/jama.260.1988.034101200890003.

OVERVIEW

This chapter of the toolkit presents:

- Seven key steps in developing an effective governance and administration structure
  - **Step 1:** Define the goals for the medical audit system
  - **Step 2:** Ensure a formal mandate through legislation
  - **Step 3:** Choose the most appropriate and effective organizational model: single agency vs. independent agency
  - **Step 4:** Based on the organizational model chosen, develop an appropriate organizational structure
  - **Step 5:** Determine the degree of centralization or decentralization of the audit function
  - **Step 6:** Decide whether the medical audit function will be in-house or outsourced
  - **Step 7:** Identify financial resources to conduct medical audits
- Challenges and potential solutions
- Detailed case study: HIRA, South Korea
- Takeaways

KEY STEPS

Step 1. Define the goals for the medical audit system

Clear goals for the medical audit system are important when designing an effective governance and administrative structure for medical audits. The goals serve to guide the scope of medical audit functions and can help when advocating for the budget of the medical audit system.

The goals for medical audits should be aligned with the objectives of the purchaser of healthcare services and the goals of the Ministry of Health. These can differ depending on the provider payment system in place. Some provider payment systems (e.g. fee for service) are associated with overuse of care; others are associated with underuse of care (global budget and capitation-based payments). The Joint Learning Network has developed a toolkit titled "Using Data Analytics to Monitor Health Provider Payment Systems: A Toolkit for Countries Working Toward Universal Health Coverage," [8] in which the objectives of different provider payment systems are presented, along with common unintended consequences. That toolkit provides good examples to keep in mind when determining the goals of a medical audit system.

8) http://www.jointlearningnetwork.org/resources/data-analytics-for-monitoring-provider-payment-toolkit

The members of the Medical Audits Collaborative identified the following goals as important considerations for the medical audit system:

Quality of care related goals:

- Continuity of care
- Timeliness of care
- Equity and fairness
- Effectiveness
- Efficiency
- Patient Centeredness

Finance related goals:

- Financial sustainability of the National Healthcare System
- Financial risk protection for beneficiaries
- Fraud detection at all levels

Step 2. Ensure a formal mandate through legislation

In most countries, the Ministry of Health serves as the regulator, the authoritative body in charge of regulating and supervising the medical audit system. The agency mandated to manage medical audits is often linked to the agency responsible for quality assurance under the Ministry of Health.

It is important that the agency responsible for conducting medical audits has a formal mandate. This mandate typically comes from formal legislation introduced to the country's national assembly by the Ministry of Health. When legislation is not possible, a policy or guidance document should provide clarity on the role, responsibilities, functions, tasks, and budget provisions for the agency mandated to manage medical audits. The Ministry of Health may decide to translate the roles and responsibilities into formal legislation at a later stage. Without a formal and clear mandate for managing medical audits, questions of legitimacy and legality will remain (For more information, see Step 1 of "2. On-site Investigation" and "3. Clinical Audit" in Chapter 3.3).

Step 3. Choose the most appropriate and effective organizational model: single agency vs. independent agency

One of the most important governance decisions that must be made (and reassessed when necessary) is whether medical audits are managed as part of the agency purchasing healthcare services or managed by an independent agency.

Benefits of managing medical audits as a function of the purchasing agency: The purchaser of care holds the contracts with healthcare providers and as such has authority in relation to them. The purchaser manages claims from healthcare providers, and claims are one of the most important sources for conducting medical audits. There are also administrative benefits of managing purchasing and medical audits under same agency.

Benefits of managing medical audits as a function of the independent agency: The purchaser of care can have incentives to minimize expenditures and may manage the audit function with the objective of addressing fraud and unnecessary procedures, but may not focus on audits to improve quality of care.

It is therefore important to consider which values are viewed as important in public opinion, as well as the goals and the direction of the health insurance system and even the national health system at large. Some guiding principles to consider include the following:

- whether efficiency or expertise/fairness is more important
- the scope of the audit function
- the possibility of integrated management with other social insurance systems

If the medical audit agency is to become an independent agency, there needs to be a clear legal basis for the scope of its roles and responsibilities. Each agency's roles and functions may need to be defined as the health insurance system continues to develop. This approach of clearly defining roles, backed by a legal framework, will help in avoiding futile conflicts (For more information, see Step 1 of "2.On-site Investigation" and "3.Clinical Audit" in Chapter 3.3).

Country examples of medical audits as a function of the purchaser of services

PhilHealth in the Philippines, the National Hospital Insurance Fund in Kenya, and Suvarna Arogya Suraksha Trust in India all act as both the purchaser of healthcare services and manager of medical audits. The main reason for these arrangements is that the purchaser of care manages claims and contracts with the providers who may be subjected to a medical audit. The medical audit team works closely with the staff responsible for paying the healthcare providers. There are also examples in which staff have multiple

assignments due to lack of resources. The National Health Insurance Act in the Philippines mandates PhilHealth as the purchaser of healthcare services and specifies its responsibility as the performance monitoring system of healthcare providers. The Health Care Provider Performance Assessment System in PhilHealth was developed to monitor the healthcare providers and serve as the medical audit system.

Country example of medical audit separated from the purchaser of services

In the independent agency model, one agency manages the purchasing of healthcare services and a separate agency manages the medical audit system. South Korea is an example of this independent agency model. The National Health Insurance Service (NHIS) is the insurer of health services, whereas HIRA is a separate, independent agency that conducts medical audits. South Korea decided to have two separate agencies to assure that monitoring systems are designed to manage cost and continuous improvement of the quality of care. Initially, the National Federation of Medical Insurance (the former organization of HIRA) was in charge of medical audits. One of the challenges was ensuring fairness, objectivity, and expertise. There were complaints that the only factor considered in medical auditing was the stability of the insurance fund, which was thought to be achieved by focusing on regulative aspects, such as detection of quantitative abuse and fraudulent claims, rather than quality improvement and the advancement of medicine. That led to the discussion of building an independent and objective medical audit organization.

South Korea believed that securing objectivity and fairness was most important, and decided to build a separate agency for medical audits.

The new agency (HIRA) was tasked with claims review and quality assessment, which ensured connection between the two roles. By conducting strict and appropriate audits, the agency contributed to the balance between stakeholders in the National Health Insurance. The agency was also able to respond in a more flexible manner, and maintained the potential to link medical auditing with other insurance programs in the country. Since 2005, HIRA has conducted medical audits on other insurance scheme such as veterans insurance and auto insurance.

Step 4. Based on the organizational model chosen, develop an appropriate organizational structure

The preferred organizational model depends on the country context. The organizational structure can be presented in an organizational chart where all functions have a logical place in relation to other functions. Before developing the organizational structure, it is helpful to articulate guiding principles. Here are a few examples of guiding principles for developing an organizational structure:

- Integrity – the medical audit system needs to operate without conflicts of interest and should be seen as a neutral organization or department
- Evidence-based action – the medical audit system should be linked to the entity responsible for clinical standards in order to perform audits using the latest evidence and to inform when there is a need to review existing standards
- Flexibility – the healthcare system changes over time and the medical audit system needs to respond to change (for example, advancements in information technology)
- Commitment to system-level improvement – medical audits should be linked to policy making so that information about the performance of the healthcare providers and health seeking patterns can be communicated to policy makers
- Excellence – the organization needs to be able to attract talent for medical audits

The operations of medical audits largely require three functional units. One unit is concerned with rule making, including decisions related to benefit coverage and medical fee schedules. This unit does analysis of aggregate data to assess patterns in the provision of services, compares the performance of the healthcare system with international standards, etc. The second unit is directly involved in audits, identifying the cases for audit, conducting clinical audits, and on- and off-site investigations. The third unit is involved in the overall operations of medical audits, including designing organization, planning, budgeting, and human resources management. The units should be divided as such to promote efficiency. Each functional unit can be divided into departments with more specific specializations. It is also advisable to have formal partnerships with academic institutions to allow faculty time on review committees, support for designing audit protocols, etc.

Step 5. Determine the degree of centralization or decentralization of the audit function

The medical audit function can either be centralized at the national level or decentralized at the regional level. In a centralized system, all of the functions of conducting medical audits are carried out by the national level agency, and all processes (including monitoring, claims processing and review, investigations, and verifications) are carried out by the national team. In a decentralized system, some or all of these functions are carried out by the regional health authorities.

Medical audit requires expert personnel and human resources, which is discussed in the next chapter on Human Resources. When choosing between centralized and decentralized medical audit systems (and how much of which area needs to be decentralized), it is important to consider efficiency and effectiveness in operating the system. Choosing one model over another depends on country context, though the following principles can serve as helpful guidance:

Volume and difficulty of audit operations

The first factor to consider is the volume of claims required for a medical audit. It would be advisable to have a centralized system for increased efficiency if there is an insufficient number of capable personnel. HIRA took an approach where the branch offices' work was expanded in phases. Initially, branch offices only conducted medical audits of clinics and pharmacies, but in time they also took over medical audits of hospital-level medical institutions (with relatively simple treatment records) to distribute some of the work that was once concentrated at HIRA's headquarters. HIRA's headquarters was in charge of medical audits of general hospitals and tertiary hospitals because the treatment records are complex (due to patients' severity of illness being higher at these institutions), but in 2017 branch offices were handed over medical audits of general hospitals from headquarters and started to review claims of general hospitals.

Consistency

Another factor to keep in mind when adopting a decentralized system is whether it is possible to maintain consistency in medical audits. If the different branch offices show different audit results for the same case, it could undermine trust in audit results and even medical audit as a whole. For example, when issues related to medical audit consistency were raised in Korea; HIRA was established to improve consistency. The central division in charge at HIRA acts as the control tower, and calculates the rate of claim adjustments made by each branch office for the same item. In addition, electronic review has been expanded, so there are joint meetings between the branches in order to reach a consistent agreement regarding result difference of review on similar claims among branch offices depending on their contexts. In the meeting, branches shared information and some cases of medical audits.

Nature of the work

If it is efficient to manage an area of work in a focused manner in one place, then the centralized system is more suitable. An example of such an area may be one that affects the entire operation, such as the development of indicators for management. In HIRA's case, such areas include the setting of medical audit standards, the development of monitoring indicators, and quality assessment.

Social demand

Depending on the characteristics of the patients and the healthcare providers, there may be regional differences in treatment practices. A decentralized system is more suitable for meeting the needs and characteristics of a region with tailored responses.

Administrative expenses

Management and operating expenses can vary greatly depending on factors such as the degree of medical audit computerization, travel time required for on-site investigations, and the number and scale of branch offices, etc.

All of the above factors need to be considered. At the same time, expenses caused not only by the medical audit agency but also by the healthcare providers should be considered. For example, there may be costs related to the transport, storage, and mailing of documents in the case of paper claims.

HIRA's experience provides a helpful model for deciding between a centralized or decentralized function. When HIRA started, it began as a centralized hub of medical auditing. In the late seventies, it became mandatory to offer employee health insurance for companies with 500 or more employees in South Korea, and the medical audit system was introduced simultaneously. Initially, there were 574 unions that could conduct separate medical audits, which had many issues and low efficiency. It was difficult to consult with medical specialists for better medical audits because the number of medical specialists in various fields was restricted at that time. Due to the limitations, medical audit at the time was practically neglected. Some unions started to integrate the medical audit function, and in 1988 claim review and payment systems were fully integrated.

However, HIRA has been moving from a centralized to a decentralized system of medical audit, with the branch offices of HIRA increasingly playing a bigger role. For timely reimbursement and fairness in auditing, the centralized medical audit system was changed to a decentralized system. By dividing the nation into five regions, branch offices were created, and difficulties in storing and moving paper claims were relieved. Efficiency was also improved, even when the volume of claims dramatically increased due to the adoption of universal coverage.

Since then, the volume of claims has kept rising due to increases of population and the number of hospitals, but the development of an information technology system has made it possible to process all claims at the headquarters and branch offices. The reason branch offices continued to expand despite the development of information technology systems was that HIRA's role became more specialized, diversified, and detailed due to new technologies and increased medical service consumption. The headquarters now takes care of specialized functions and planning, and branch offices focus on medical audits. Another reason was customer service, which the public demanded. As staff capacity at branch offices rose, HIRA transferred the audit functions for general hospitals to the branches.

The merits of a centralized system include high efficiency when claims have a similar level of difficulty. But it is not effective in providing tailored services to different regions. A decentralized system tends to have overlapping management costs and low efficiency, and it requires much effort to maintain. But it is beneficial because it disperses the headquarters' responsibilities and provides customized service to the regions.

Step 6. Decide whether the medical audit function will be in-house or outsourced

A final structural decision regarding organization and governance is whether the medical audit function should be performed in-house or outsourced. The pros and cons of each option (outlined below) can be weighed against the individual country context.

Table 1 **Pros and Cons of In-house or Outsourced Model**

Category	In-house	Outsourced
Pros	• Aligned to organizational management and operations • Vested interest to make improvements, build capacity, and control/improve quality • Better understanding of internal processes and functions	• Access to leading best practices and optimum standards of care • Objective and fair • Can be less costly than maintaining a full staff on payroll
Cons	• Potential for conflict of interest due to interpersonal relationships and vested interest • Specialized skill set may not be available • No advantage of gaining exposure to sectoral best practices or market view	• Reduced administrative efficiency due to redundant administrative expenses • Lack of ownership in the improvement process • No internal capacity building for long-term effectiveness

While each country must make the decision most appropriate for its context, generally an in-house model (whereby audits are conducted by the internal agency mandated to conduct them) is deemed a better

practice for in-house capacity building and quality control. Finding credible external organizations to entrust with the responsibility of medical auditing is often a challenge.

However, an in-house agency may not have adequate human resources, capacity, or required expertise and infrastructure–especially at first–and the agency may decide to either outsource the entire function or part of the audit function to a for-profit or non-profit private agency.

There are some functions that may have synergies with the work of other organizations. For example, universities may have departments of data science with an interest in advanced data analytics to support the development of indicators with thresholds and simulate the use of triggers. There might also be medical colleges with an interest in supporting the review of evidence-based standards to use in investigation protocols.

Step 7. Identify financial resources to conduct medical audits

Once the organizational structure of the medical audit agency has been set, it is important to identify financial resources to support the functioning of this agency. In general, the Ministry of Health provides financial resources to the agency mandated for the medical audit function. At the same time, direct funding from a single body has implications on the degree of independence of any unit, and therefore (depending upon specific country regulation) the medical audit unit may wish to explore other sources of funding. This is especially true in the cases whereby the medical audit unit may conduct reviews beyond health insurance.

In South Korea, for instance, HIRA reviews not only health insurance, but also medical aid, auto insurance, and veterans insurance, among other things. Therefore, HIRA receives funding not only from the National Health Insurance Service, but also from other agencies for which HIRA conducts reviews.

In general, multiple sources of funding allow the medical audit agency to maintain autonomy in functioning. These other sources of funds can include:

- A fixed proportion of health insurance contributions
- Direct funding from the Ministry of Finance
- Sin taxes or earmarked taxes (alcohol tax, tobacco tax, etc)
- Agreements with purchasers of care that savings from audits go to the medical audit function
- Fines and penalties from service providers (it is important not to depend on this income source, as there should be an incentive in the medical audit system to minimize situations warranting penalties)
- Others (fees for information, interest revenue, funding for training, etc.)

CHALLENGES AND POTENTIAL SOLUTIONS

Across each of the steps outlined above, there tend to be common challenges across countries. Here we highlight some potential solutions based on country examples.

Table 2 **Challenges and Potential Solutions for the Steps of Developing Effective Governance and Administration Structure**

Step	Area	Specific Challenge	Potential Solutions	Country Examples
2	Ensure a formal mandate	Lack of legal framework for audits and national health insurance not mandatory Lack of a unitary audit system without data exchange across healthcare programs Small percentage of all healthcare providers contracted by purchaser, limiting the reach of the medical audit system	Introducing new legislation for clear mandate after stakeholder consultation Shared data standards across healthcare programs, and a process for sharing data across programs for medical audits	Philippines: The Implementing Rules and Regulations of Republic Act 7875, also known as the National Health Insurance Act of 2013, mandates PhilHealth to develop and implement a performance monitoring system for all healthcare providers. Among the activities listed under this mandate are the following: 1. Periodic actual inspection of facilities; 2. Analysis of mandatory monthly hospital reports and other reportorial requirements; 3. Periodic review of health facility data, and patients' chart review for purposes of determining quality, cost-effectiveness, and adherence to practice guidelines; 4. Utilization review; 5. Peer review, adverse reports; 6. Patient satisfaction surveys; 7. Periodic assessments of performance of healthcare providers; 8. Inspection and audit of books, records, billing statements, medical charts, doctor's notes, and other documents; among others.

Step	Area	Specific Challenge	Potential Solutions	Country Examples
3	Choose the most appropriate and effective organizational model	Conflicting views on preferred model	The discussion on preferred model can be anchored at a higher level with: the goal of quality of care from the Ministry of Health; articulated guiding principles; and different organizational scenarios with budget estimates. Then engage different stakeholders to review the options for organizational model keeping the goal of the Ministry of Health in mind.	India: Suvarna Arogya Suraksha Trust in India has a limited budget for medical audits. This was one of the reasons to manage medical audits within the purchaser of care and establish partnerships with medical colleges to benefit from their expertise and independent views.
4	Developing appropriate organizational structure	Shortage of staff and budget to secure several of the critical functions in the framework for medical audit systems	Develop a transition plan from a simple audit system to a more advanced and integrated system. Secure a core team for medical audits to oversee the system and all functions. Draw on expertise across different departments and potentially external partners, and formalize functions over time.	Ghana: The Quality Assurance Directorate within NHIA (National Health Insurance Authority in Ghana) is responsible for medical audits. It has a Director, a Deputy Director, and other staff, comprising about fifteen in all. They are mainly clinicians, along with some statisticians. The audits are done with trained auditors from the provider groups who are clinicians. Every six months a pool of fifty auditors are trained, and they are used on a rotational basis with NHIA staff. The auditors sign an oath of secrecy and a code of conduct, and are remunerated per day for work done. (Please refer to Appendix no.6.)
5	Deciding on the degree of centralization and decentralization	Countries with large or difficult geographies can struggle with accessibility and communication with providers A decentralized system can suffer from lack of standardization in managing audits across the jurisdictions.	Some functions can be decentralized and supported by a central system to standardize the process and tools used for monitoring.	Philippines: PhilHealth works across geographies that are hard to reach, and ultimately needed to decentralize medical audit functions. They developed the Health Care Provider Performance Assessment System (HCPPAS), which standardized the process and tools for monitoring. This resulted in uniform interpretation of monitoring findings.

Step	Area	Specific Challenge	Potential Solutions	Country Examples
6	Decide whether function should be in-house or outsourced	Lack of human resources and capabilities within the agency managing medical audits Lack of credible agencies to outsource Data privacy issues with outsourcing	Make sure there is a core team for medical audit functions in-house with clear responsibilities for quality control. They can then assess the trade-off between using in-house resources or trusting an external party. If there is a decision to outsource, make sure there are systems to assess effectiveness.	India: Suvarna Arogya Suraksha Trust initiated the process to outsource some of the audit function to an external agency. Due to lack of a credible partner, it was not sustainable. They then decided to build internal capacity. No other collaborative member had outsourced medical audit functions.
7	Identifying financial resources	Medical audit is not a high priority in many countries. It is often an afterthought and something that gets attention after adverse events reach the media. Given the lack of priority, there is often an absent or very limited budget assigned for medical audit systems.	A proof of concept to demonstrate the value of audits by reducing fraud and hence reducing expenditures for the purchaser of care can serve to motivate larger budget allocations. A proof of concept can potentially be developed in partnership with others, e.g. universities, at a low cost. Alternative sources of income for medical audit systems: • Fixed part of premium • Income from penalties • Paid audit services to other insurances	South Korea: The Ministry of Health and Welfare in South Korea oversees the budget for HIRA and NHIS. HIRA assesses the impact it has on cost saving through the audit functions. HIRA audits other insurances, providing additional income.

DETAILED CASE STUDY: HIRA, SOUTH KOREA

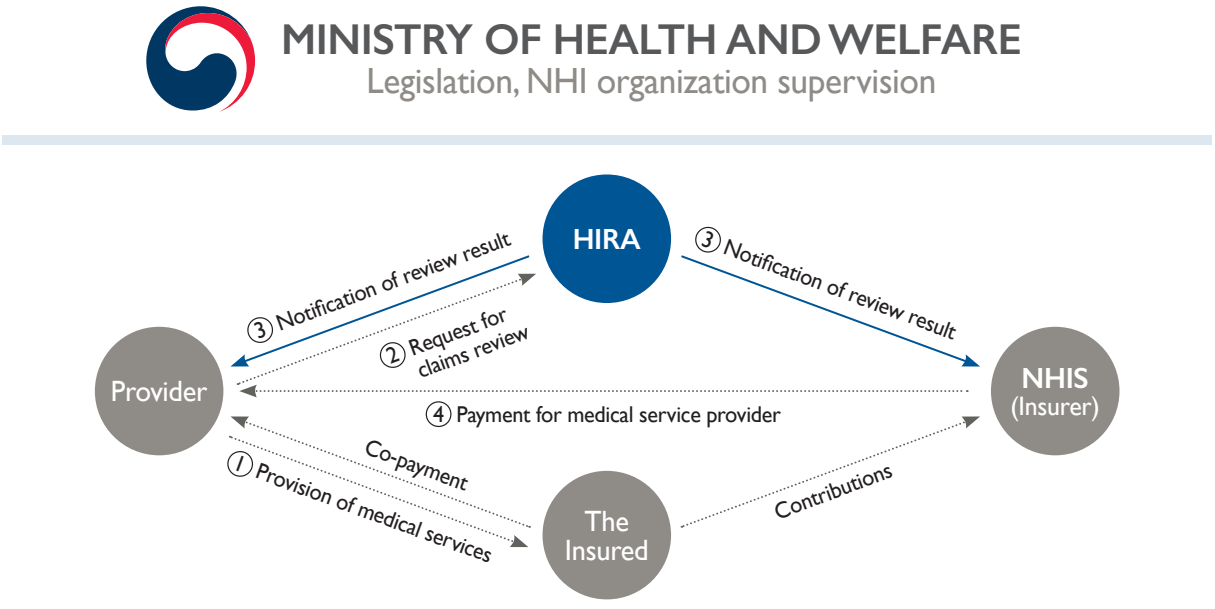
Step 1. Define the goals for the medical audit system

Korea's National Health Insurance System is a government-supervised, single-payer health insurance system that covers all Koreans. After enactment of the Medical Insurance Act in 1963, mandatory National Health Insurance was introduced in 1977 with rapid expansion to the present day. All citizens and healthcare service providers are mandated to join the National Health Insurance. This case study details the development of HIRA and the guiding principles that led to its current governance and administration system.

Step 2. Ensure a formal mandate

The Ministry of Health and Welfare is the regulator of the National Health Insurance in Korea. It oversees the operation of National Health Insurance and delegates its authority to NHIS and HIRA through the National Health Insurance Act and the relevant enforcement decree as Figure 5 shows. The National Health Insurance Act provides HIRA with the mandate of reviewing medical claims and assessing quality in connection with National Health Insurance.

Figure 5 **Governance of health system in South Korea**



Step 3. Choose the most appropriate and effective organizational model

South Korea chose an independent agency model for HIRA, whereby HIRA is a separate, independent agency that conducts medical audits and NHIS is the insurer of health services.
At the time, the decision to choose an independent agency model was not straightforward. Some argued for the need to establish a neutral and independent claims review agency to maintain a balance between supply and demand, while others argued that the Federation of Medical Insurance (an organization comprised of insurers) should continue to be entrusted with conducting claims review for the protection of health insurance finance. Issues raised included the inadequate quality of medical services due to a disproportionate focus on preventing excessive use of medical resources and fraudulent claims, as well as criticisms that the main goal was short-term cost reduction, rather than a more macro-level goal of managing national healthcare expenditure.

Those who were for the independence argued that service quality improvement and financial stability can both be achieved by securing review expertise and conducting quality assessment. Moreover, the independent agency can play a mediating role between the insurer and providers, and having an independent organization makes it easier to conduct claims review for insurance plans other than health insurance. Those who were against it argued that it would result in inefficiency due to increased administrative costs, that the insurer's control over the budget would weaken, and that healthcare providers would have too much influence.

Table 3 **Pros and Cons of the Korea's Independent Agency Model**

Pros	Cons
• It is possible to conduct a fair and professional review of medical fees. • An agency is put in charge of quality assessment. • Both quality improvement and financial protection can be achieved. • A mediator exists between the insurer and healthcare providers. • It is easier to conduct reviews and assessments of insurance plans other than health insurance.	• There are increased administrative costs stemming from establishment of a new agency. (Inefficiency) • It has not been proven whether an independent agency can ensure the adequate quality of healthcare services and protection of insurance finances. • There are limitations to the insurer's ability to control the flow of finances. • There are worries that medical providers will have too much influence due to an emphasis on medical judgments.

After debates between those arguing that the review function is the insurer's unique authority and therefore should be carried out by the insurer, and those arguing that the review function should be independently carried out by a neutral agency, it was decided that an independent agency would be established.

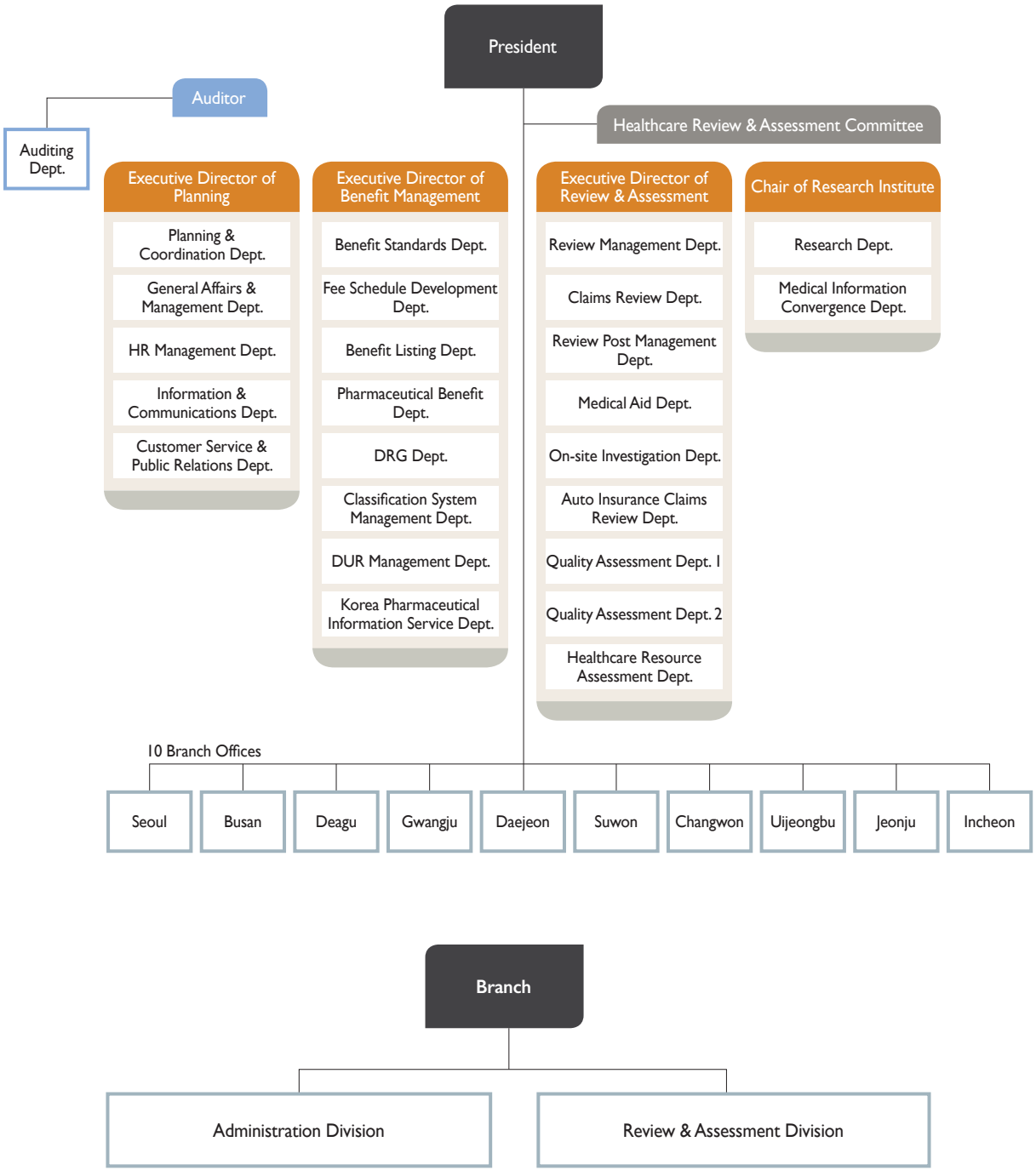
The decision served as an opportunity to reduce conflicts with healthcare providers and secure fairness of claims review and quality assessment. Moreover, quality of healthcare services could be guaranteed by reviewing claims based on medical and pharmaceutical grounds, instead of uniformly reducing benefit costs based on financial reasoning.

Step 4. Develop an appropriate organizational structure

As of December 2018, the HIRA headquarters in Wonju consists of one research institute and twenty-six departments with 2,346 workers. HIRA has ten branch offices with a total of 823 workers.

HIRA's top management at the headquarters includes the president, the Executive Director of Planning, the Executive Director of Benefit Management, the Executive Director of Review and Assessment, and the Chair of the Research Institute. Departments have been assigned under each executive director according to the nature of the work. The Executive Director of Planning is in charge of infrastructure management and administrative support, the Executive Director of Benefit Management is in charge of rule making, and the Executive Director of Review and Assessment is mainly in charge of monitoring and feedback. The working-level claims review and quality assessment departments are under the Executive Director of Review and Assessment, but the Healthcare Review and Assessment Committee (Please see Appendix 1. Healthcare Review and Assessment Committee) is directly under the President as seen in Figure 6.

Figure 6 **Organizational structure (HIRA)**



Step 5. Determine the degree of centralization and decentralization

Due to regional differences in the supply and demand of medical services, HIRA has moved from a centralized to a decentralized system, where the responsibilities of medical audits are now divided between central and regional offices. As such, claims review tasks were moved to regional branches to incorporate more regional characteristics into claims review. In addition, regional branches are better equipped to provide swift and effective on-site support (e.g. services tailored to each healthcare provider) that meets the demand of medical and pharmaceutical organizations, healthcare providers, and the public.

The headquarters is responsible for tertiary hospitals claims review, quality assessment, and the development of review standards. The branch offices conduct claims review for small hospitals, clinics, and pharmacies.

HIRA gradually transferred claims review to branch offices. In January 2017, the responsibility of general hospitals claims review was transferred to the branches. The headquarters now focuses more on policy development and rule making, while branch offices execute claims review.

Step 6. Decide whether the function should be in-house or outsourced

South Korea has an in-house model for medical audits, whereby HIRA itself carries out the audit functions.

Step 7. Identify financial resources

Legislation in South Korea specifies that the budget of HIRA[9] is funded from the NHIS (90.4 percent), review commission fee[10] (7.8 percent), and other sources (1.8 percent). Other sources include fees for information, interest revenue, funding for training, corporate card reward points, and the balance carried over from the previous year. HIRA's budget sourced from National Health Insurance is an amount under 3 percent of the insurance contribution collected by the NHIS two years prior and approved by the Minister of Health and Welfare.

For reference, 84 percent of NHIS's budget is funded by contributions, 13 percent by government subsidies (10 percent by government subsidies of insurance finances, 3 percent by tobacco surcharges), and 3 percent by other sources (leasing business, NHIS hospital revenue, asset management revenue, fees for information, etc.). The National Health Insurance contribution in South Korea is 6.12 percent (as of 2016) for the employee insured; the amount for the self-employed insured is calculated taking into consideration their age, income, property, and car ownership.

9) The total budget based on 2017 Final Supplementary Schedule by Business is KRW 437 billion.
10) Review commission fee: claims review fee for the Medical Aid, Korea Veterans Service, Auto Insurance, etc.

TAKEAWAYS

Setting up an effective governance system is crucial for the well-functioning administration of a medical audit system since it defines clear roles and responsibilities for effective administration, thus improving coordination, efficiency, and effectiveness.

The seven key steps in developing an effective governance and administration structure are:

- **Step 1:** Define the goals for the medical audit system
- **Step 2:** Ensure a formal mandate through legislation
- **Step 3:** Choose the most appropriate and effective organizational model: single agency vs. independent agency
- **Step 4:** Based on the organizational model chosen, develop an appropriate organizational structure
- **Step 5:** Determine the degree of centralization or decentralization of the audit function
- **Step 6:** Decide whether the medical audit function will be in-house or outsourced
- **Step 7:** Identify financial resources to conduct medical audits

Table 4 **Country Examples of Regulation and Mandate**

Country	Ghana	Kenya	Nigeria	the Philippines	S. Korea
Regulator	Ministry of Health	Ministry of Health	Federal and State Ministries of Health	Department of Health	Ministry of Health and Welfare
Mandated Agency	National Health Insurance Agency	National Hospital Insurance Fund	National Health Insurance Scheme and State Health Insurance Agencies	PhilHealth	Health Insurance Review and Assessment Service (HIRA)
Legal Basis	Act of parliament in 2003 (Act 650), revised in 2012 Ghana National Insurance Act 852	National Hospital Insurance Fund Act of 1998, revised in 2014	NHI Act in 2014 Act 35 of 1999	Rule III Section 64 of the Implementing Rules and Regulations of Republic Act 7875 as amended, otherwise known as the National Health Insurance Act of 2013, III, Section 5 of RA 7875	National Health Insurance Act Article 62 (Establishment), 63 (Services, etc.)

Country	Ghana	Kenya	Nigeria	the Philippines	S. Korea
Functions of mandated agency	• Medical Audit • Adherence to benefit package • Adherence to national treatment protocols • Adherence to the prescribing levels set by MOH • Quality standards • Safety standards • Legitimacy of claims – eliminating fraud and abuse • Cost recovery	• Claims management • Monitoring and evaluation and medical audits on an annual basis • Audits on a quarterly basis along with regulatory bodies to assess level of adherence to standards	• Certification of standard • Making policies • Development guidelines • MA of tertiary and secondary health facilities and establishment • Quality of care and Claims review	• Develop and implement performance monitoring systems • Periodic actual inspections of facilities and offices • Periodic review of health facilities and patients' charts to determine quality and cost-effectiveness and adherence to practice guidelines • Utilization review • Peer review, adverse report, and other pertinent information • Conduct of patient satisfaction surveys • Periodic assessment of the performance of all healthcare providers based on performance commitment and standards • Inspection of audit books, records, billing statements, medical charts, doctors' notes, and other documents and processes deemed important by the corporation • Inspection of account books, ledgers, invoices, receipts, and other accountable forms deemed relevant by the corporation • Other mechanisms or analogous processes that would be necessary to complete audit and investigation	• Review of the costs of benefit in kind • Evaluation of the appropriateness of benefit in kind • Development of standards for claims review and quality assessment • Investigative research and international cooperation related to the operations • Services delegated to it in connection with the health insurance program
Department of mandated agency	Quality Assurance Directorate	• Department of policy and Health Financing • Department of Health standards Quality Assurance and Regulation	• Monitoring and Regulations Unit • Department of Standards and Quality Assurance	Quality Assurance Group, which has the following departments: Accreditation Department • Standards & Monitoring Department (SMD)	Refer to the Figure 5 of the chapter

2.2 Human Resources - Build an Effective Team

OBJECTIVE

This chapter describes how to provide guidance on building an effective team for medical audits.

DEFINITION

Team effectiveness is the capacity a team has to accomplish the goals or objectives administered by authorized personnel in an organization, in this case a medical audit system.

SCOPE

The scope of this chapter is to provide guidance on how to identify and address the human resource requirements for medical audit systems. This includes the positions, skills, and mechanisms to continuously improve the performance of the team.

OVERVIEW

This chapter of the toolkit presents:

- Key steps to build an effective team for medical audit systems:
  - **Step 1:** Define the scope of the medical audit system
  - **Step 2:** Determine human resource requirements for the medical audit system
  - **Step 3:** Identify human resource gaps
  - **Step 4:** Address human resource gaps and build capacity
- Detailed case study: HIRA, South Korea
- Takeaways

KEY STEPS

Step 1. Define the scope of the medical audit system

The first step is to define the scope of the medical audit system. The inputs, processes, and outcomes framework for the medical audit system, as per Figure 1 of Medical Audit System Framework in this toolkit, can be used to guide the scope. The scope should include all the functions needed to operate the medical audit system.

Step 2. Determine human resource requirements for the medical audit system

Based on the scope and needed functions of the medical audit system, the next step is determining human resource requirements within those functions. The department responsible for human resources for the medical audit system can develop a human resource strategy with clear roles and responsibilities. The inputs, processes, and outcomes framework for the medical audit system can be used as a guide to identify the functions where human resources are needed and the technical skills required.

Inputs: structural preconditions to enable an effective medical audit system

The human resource requirements may include:

- Leadership capacity to oversee and guide a medical audit system
- Human resource function to oversee implementation of human resource strategy

Processes: development of indicators, rules, and triggers that lead to specific actions and activities

The human resource requirements may include:

- Establishing a core medical audit team to oversee the medical audit process
- A technical team to develop indicators, rules, and triggers for targeted medical audits based on claims data
- Clarity on responsibilities of the information technology team to respond to the needs of the medical audit system
- Clarity on responsibilities of the claims review staff for the medical audit system Additional part-time personnel for clinical audits
- Partnering with universities, or establishing an in-house research team, to review evidence-based standards for investigation protocols
- Establishing and training teams for investigations, including clinicians, administrators, pharmacists, medical laboratory technicians, and other relevant members (responsibilities include planning and performing investigation and writing investigation reports)

Outcomes of Medical Audit Results: continuous improvement to achieve the triple aim of improved quality of care, improved patient outcomes, and lower costs

The human resource requirements may include:

- Clarity on responsibility and skills for the communication of medical audit results to healthcare providers, the public, and other relevant groups
- Clarity on responsibility and skills to follow up on actions taken after communication of medical audit results
- Clarity on responsibility and skills to make changes to policies (e.g. standard treatment guidelines) as a result of medical audits
- A quality improvement team to support healthcare providers in improving services with guidance from the medical audit results

The human resource strategy should define the positions needed across the functions and the technical skills required.

The core medical audit team should include people with different capabilities. The composition can include:

- Nurses and midwives
- Medical officers or doctors
- Pharmacists
- Medical laboratory scientists and technicians
- Administrators
- Data entry operators
- Programmers
- Statisticians, researchers, and analysts
- Financial accountants

It is recommended that all audit team members have:

- Understanding of the medical audit system
- Understanding of, and commitment to, the plans and objectives of the medical audit system
- Understanding of expectations of the medical audit team—this should be clarified at the outset and may be expressed in a "terms of reference" or standard operating procedures (SOP) form
- Effective communication skills

The audit teams should also possess the following skills, though each staff member does not need to be an expert on all:

- Use of information technology systems – audit teams should have the skills to retrieve information from different information technology systems to help gather evidence.
- Knowledge of standards and benchmarks – the team should have knowledge of the clinical standards for audit, and ability to do an analysis of compliance with clinical standards.
- Data management – medical audit staff should have expertise in data collection, entry, analysis, storage, and presentation.
- Facilitation – some medical audit staff should have particular training or skills in group dynamics. The role of a facilitator in the context of a medical audit is to help the audit team assimilate the evidence, to come to a common understanding of the medical audit methodology, to guide the project from planning to reporting, and to enable the group to work together effectively.
- Training – in many countries, audit staff are involved in training and support on a wide range of skills, e.g. data analytics for newly inducted audit staff (For more information, see Step 1 of "2. On-site Investigation" and "3. Clinical Audit" in Chapter 3.3).

Step 3. Identify human resource gaps

The third step is to compare human resource requirements with the available resources. This serves to identify the positions that need to be filled and the capacities that need strengthening. There are often insufficient budgets to meet the requirements of the medical audit system. The human resource strategy should include priorities for what positions and what capabilities are to be addressed first. Gap analysis can include an estimate of the financial gap to meeting the human resource requirements.

Step 4. Address human resource gaps and build capacity

Shortfall in the number of staff available to undertake medical audits is common across countries. Few practitioners have the experience of managing medical audits. There are different ways that countries can address the shortfall in staff and build capacity over time.

Many countries have a small core team to manage medical audits and bring in other team members on a part-time basis. There are different strategies to finding people to augment the medical audit team part-time:

- Collaboration with different government departments and regulatory bodies allowing some personnel to allocate a certain number of days per year to work on medical audits
- Collaboration with medical colleges to identify and prioritize standards for clinical audits and to engage students to participate in on-site investigations
- Offering credits toward the annual quota for continuous education for the health practitioners who engage in medical auditing
- Outsource some of the medical audit work to companies with expertise in medical audits

It is important to build the capacity of full-time and part-time staff. It is advisable that all staff of the medical audit system receive standardized training including an overview of the medical audit system. Different functions of the medical audit system will also require specialized training. For example, staff that carry out investigation should be trained on how to use a standardized checklist and how to manage confidentiality and situations with conflicts of interest.

Trainings can be organized internally, seeking input from senior experts. When training is needed in a core specialization or thematic area, the department may choose to outsource the training to an external agency.

It is advisable to have a system for coaching medical audit staff, and real-time support for staff during audit exercises. The coaching can be arranged by assigning an experienced member from the medical audit core team to be responsible for guiding the audit exercise. The responsibility can be to assure that investigation team members receive orientation, review the investigation plan before investigation, and audit the report after investigation. The same person can be available on call during audit exercises to provide guidance if need.

Table 5 **Country Examples: Building Capacities for Medical Audit Systems**

Medical Audits Teams and Training	India	Ghana
Step 1. Define the scope	Severna Arogya Suraksha Trust (SAST): SAST is a special purpose entity established in the state of Karnataka. SAST is registered as a "Trust" under the aegis of Health and Family Welfare Department. The scope of a medical audit would be to ensure the adherence to guidelines by providers so that appropriate care is rendered to patients at a cost as per agreed benefit package rates. The medical audits are both a routine monitoring tool and also performed based on identified issues.	National Health Insurance Authority: The authority is to secure the implementation of a national health insurance policy that ensures access to basic healthcare services to all residents. The authority is responsible for credentialing healthcare providers to ensure that they are in a position to provide basic quality health services in accordance with the benefit packages within the National Health Insurance Program.
Step 2. Determine human resource requirements	*Across functions:* The Trust has a team of doctors working as project managers for implementation of the health assurance program. Additional teams of doctors are available for pre-authorization of medical procedures and reviewing claims. A number of coordinators assist in areas such as management of IT infrastructure, quality initiatives, education and communication activities, verification, monitoring, and grievance redressal. *For verification:* The Trust has four regional consultants and four deputy directors who double up as medical audit team leads. The medical audit team are supported by data analysts, administration, and field district coordinators for documentation. All the staff of the medical audit team work on a part-time basis. They addressed the issue of staff for medical auditing by requesting that the Department of Health periodically deploy their staff to the Trust on a rotation basis for specific functions like conducting on-site investigation. The Trust also invites volunteers from medical colleges and interns from management institutions.	There are seventeen members in the Quality Assurance Directorate who conduct clinical and compliance audits, out of whom twelve are clinicians (two medical officers, one nurse/midwife, one pharmacist, one physician assistant, four general nurses, three pharmacy technicians). This represents 67 percent of the staff within the department. Some of the sixty external health professionals who are trained in NHIA clinical and compliance audit processes are always hired to augment the team. *Staff selection criteria:* For medical audits, staff (health professionals) who have been trained in the audit processes are selected from the various stakeholder groups—Ghana Health Service, Society for Private Medical and Dental Practitioners, Christian Health Association of Ghana, and Ghana Quasi Health Clinicians from NHIA and Claims Staff. NHIS district office staff, representatives of regulatory bodies are also invited to augment the team.

	the Philippines	Malaysia
	Philippine Health Insurance Corporation (PhilHealth): The Medical audit for PhilHealth is conducted in the form of the Health Care Provider Performance Assessment System (HCPPAS). The scope is to monitor the performance of all accredited healthcare providers in terms of access, quality service, financial risk protection, and patient satisfaction. The functions include but are not limited to claims review, on-site and off-site investigations, and communication with the healthcare facilities and the Department of Health and other regulatory bodies about the results of medical audits.	Ministry of Health: In Malaysia, the Ministry of Health conducts quality assurance programs for all the public and private hospitals in the country and reports patient safety indicators. In terms of medical audit activities, it is done mainly for performance surveillance coordinated by Clinical Performance Surveillance Unit (CPSU), MOH, with the collaboration of State Health Department. The country example of Malaysia was written based on its performance audit system. Claim audits are performed and set up by the specific insurance company.
	PhilHealth's Human Resource Department is in charge of recruitment, selection, and hiring of personnel. The Quality Assurance Group and/or Standards and Monitoring Department (SMD), as end user, sits in with the Personnel Selection Board (PSB) during the deliberation of applicants. In PhilHealth, the estimated number working part- or full-time on medical audits (the Health Care Provider Performance Assessment System [HCPPAS]) is currently about 1,224 persons. ***Staff selection criteria:*** Minimum requirements for Medical Audit Team members: 1. Medical Auditor • Doctor of medicine • Two years' relevant work experience • At least eight hours relevant training • Eligibility: RA 1080 (Professional Licensure) 2. Quality Assurance Officer • Allied Medical (Nurse, Pharmacist, Dentist) • Two years' relevant work experience • At least eight hours relevant training • Eligibility: RA 1080 (Professional Licensure) or Career Service Eligibility (Professional)/Second Level Eligibility	A total of 467 appointed doctors/paramedics are appointed by the Ministry of Health. They are involved in the audit activities in 144 Ministry of Health hospitals and in each hospital, the ministry has appointed three auditors. In addition, Malaysia has 15 State Health Departments and in each state, the Ministry has appointed two auditors (total 30 auditors). At the level of Ministry 5 auditors are appointed. A total of 467 performance auditors are appointed, all on a part-time basis. ***Staff selection criteria:*** For performance audit 1. MOH Staff with working experience for at least six years. 2. Priority is given to the Staff with experience of working in Quality Unit or involved in performance surveillance activity. 3. The Staff must be proposed by State Health Office (support). Aligned with the Term of Reference (competent, independence, professional, confidential, obligate, responsible).

Medical Audits Teams and Training	India	Ghana
Step 2. Determine human resource requirements	*Staff selection criteria:* Based on qualifications and experience in the public health sphere. The Trust has included minimum requirements, such as doctors with post-graduate experience in data analysis or monitoring and evaluation, and a master's in social work for beneficiary interviewers and field staff.	
Steps 3 and 4. Identify and address human resource gaps, and build capacity	Handholding support and need-based training is provided. Workshops and continuous medical education, collaborative work and project partnerships, seminars and workshops (Joint Learning Network, Indian Council of Medical Research, etc.).	The national health insurance provides refresher training with an overview of the audit process, training on how to present audit findings, and the organization's code of conduct. Trainers are from within the insurance agency. Regulators are also called to make presentations on standards of practice. Refresher training is done once a year for auditors. During the training sessions, all auditors are taken through the code of conduct, which includes confidentiality and how auditors can deal with conflict of interest situations. (Please refer to Appendix 6.) Three out of the seventeen clinical and compliance audit staff were trained by Performant Group in the United Kingdom and are members of the Health Insurance Counter Fraud Group association.
In-house or outsourced	In-house	Medical or clinical audits are done in-house, but external clinicians are hired to participate. Each team is always led by a clinician from the national health insurance.

	the Philippines	Malaysia
	3. Legal Researchers • Bachelor's degree relevant to job • Career Service Eligibility (Professional)/Second Level Eligibility • Preferred to have at least one year relevant work experience in social health insurance • At least sixteen hours of training in social health insurance 4. Anti-fraud Team: • Bachelor's degree graduate relevant to the job, preferably with legal, medical, allied health educational background, criminology graduate, previous law enforcer or military special security officer, office management and/or communication skills; • Not related to any accredited hospital owners, officers, or accredited healthcare professional within the 4th civil degree by consanguinity of affinity. Must be computer literate. • Those with experience in claims evaluation and/or processing, or in legal investigation of the corporation is preferred. Should pass the pre-hiring and post-hiring investigative skills assessment and qualifying examination.	
	Basic training on the following: • PhilHealth policies and procedures updating through quarterly conference • Basic use of Microsoft Excel (generation of tables, chart, pivot tables, etc.) and business intelligence or data analytics software • Interview skills • Basic field validation and/or investigation skills • Negotiation and conflict resolution (desirable but not yet available) • Critical analysis (desirable but not yet available) • Communication • Completed staff work[11]	All auditors have basic training on: • Audit policies • Interview skills • Field data validation skills • Performance audit skills • Technical specifications Capacity-building initiatives at the Ministry include yearly regional performance surveillance meetings, updates and training (and subscriptions of training module). Biannual meeting with state quality coordinators are also held.
	In-house	In-house

11) "Completed Staff Work is the study of a problem and presentation of a solution by a staff officer in such form that all that remains to be done on the part of the head of the staff division, or the commander, is to indicate his approval or disapproval of the completed action."

DETAILED CASE STUDY: HIRA, SOUTH KOREA

Step 1. Define the scope of the medical audit system

The scope of the medical audit system in South Korea includes all departments of HIRA. HIRA has a dedicated human resource department responsible for hiring and training audit personnel.

Step 2. Determine human resource requirements for the medical audit system

The human resource department develops a human resource strategy based on the operational priorities of HIRA. The total number of staff members in headquarters and branch offices is 3,169 (as of Dec. 2018). A majority of staff at HIRA are registered nurses who have clinical experience in performing claims review, on-site investigation, quality assessment, and rule making. Details of staff occupations along with their qualifications are tabulated as follows at Table 6.

Table 6 Staff Occupation, Qualifications and Responsibilities (HIRA)

Occupation	Qualifications	Main Responsibilities
Review staff (59.6%)	Registered nurses, pharmacists, medical record administrators, medical technicians with a minimum of 1 year experience in the related field	Benefit criteria setting / Claims review / Quality assessment / On-site investigation
IT staff (8.5%)	IT-related license holders	Designing / Implementing / Testing the software function / Distributing to users / Improving performance of products and services
Researcher (2.2%)	Master's or PhD degree holders	Health insurance–related policy research / Healthcare system and resources research / Information development and analysis (Big Data)
Administrative staff (21.8%)	Varies depending on responsibility	Planning / Public relations / Human resources management / Financial management / Accounting

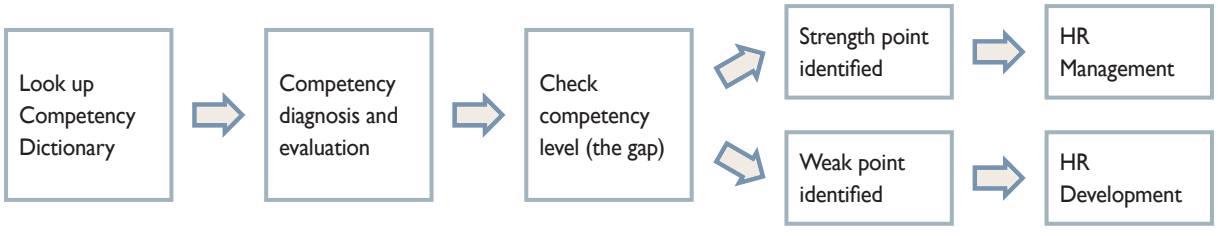
Occupation	Qualifications	Main Responsibilities
Full-time member of Healthcare Review and Assessment Committee (2.4%)	Medical (including dental and oriental medicine) license holder of over 10 years with work experience at a medical school or institution Pharmacist's license holder of over 10 years with work experience at a pharmacy school, medical institution, pharmacy, or the Korea Orphan Drug Center Person who has worked as a full-time lecturer or higher and has at least 10 years of experience in health-related fields Person with at least 10 years of experience in health- or health insurance–related fields, determined to be qualified as a standing member by the Minister of Health and Welfare	Members of claims review and quality assessment committee Peer Review

Step 3. Identify human resource gaps

HIRA has compiled a list of core competencies for its employees (knowledge and skills) for the work duties in four categories to manage human resources. This compiled list is called the "Competency Dictionary," which describes the expected competency level of an employee. As HIRA's employees regularly measure their own competencies through competency diagnosis and evaluation, their competency level is decided based on the gap between their measured competencies and the expected competency level.
The employees can identify their strengths and weaknesses. HIRA provides training programs to improve the employees' capacity after identifying their competencies.

Although the hiring process has its own set of standards, more expert knowledge and skills are required on the job. It is inevitable that each staff will have different experiences and capacities, and that their capability levels vary. The HR department has a system for narrowing such gaps between staff, including capacity diagnosis and training programs as seen in Figure 7.

Figure 7 Flow to Identify Human Resource gaps (HIRA)



Step 4. Address human resource gaps and build capacity

Attracting talent to address human resource gaps is a major challenge for large organizations in South Korea's competitive landscape. HIRA has invested in the culture of the organization and is now one of the most attractive employers in the country. HIRA received a grand prize among the 100 best companies to work for in Korea. HIRA has achieved this status by offering extensive on-the-job training and a nice working environment. HIRA offers benefits such as in-company daycare and weekly cultural events. All these investments have paid off in ease of recruitment and attracting talent.

HIRA regularly runs various education programs to strengthen expertise in the organization. The Human Resources department in HIRA has two divisions: Management and Development. The management division is responsible for planning and recruitment. The Human Resource Development Division fosters and supervises the basic training programs, while the advanced and intensive programs are conducted by individual departments or divisions. These include case conferences, seminars, mentoring, and community of practice. The claims review department holds case conferences for sharing specific review cases and seminars for acquiring medical knowledge. Mentoring allows experienced review staff members to act as mentors to other employees and give them case-by-case, informal training on how to interpret indicator values and analyze medical claims trends and past review cases.

HIRA's capacity building is categorized into four programs: Core Values, Leadership, Job Competency, and Development Process.

The **Core Value** is a compulsory training course based on core values of each employee grade, consisting of five levels from new employee training to executive or managerial-level capacity building. The program helps employees of HIRA internalize the core values of the organization so that they can use them as guidelines for making work-related decisions. HIRA's core values are "People First," "Communication Pathway Fostering," "Fairness and Balance," and "Access to Open Expertise." Employees learn about these values through "action learning." Action learning refers to a training method that involves HIRA employees forming teams and finding solutions to real-life work-related issues through group discussions and teamwork-building activities with the help of facilitators. HIRA's capacity is built on continued training and efforts of this kind.

Leadership program is provided based on the employee grade. This program helps improve the leadership capacity (encouraging employees to realize their potential to achieve HIRA's goals) of those in the supervisor's position. The capabilities required of supervisors for the achievement of HIRA's goals are as follows: risk management based on understanding of change, strategic acquisition of support from employees through their empowerment and networking, and efficient goal management. Every year, all managers' capabilities are evaluated to identify leadership-related areas that need improvement. Based on

the results of the evaluation, the program is modified and supplemented each year.

Job Competency is a program that improves employees' capacities related to their duties. This program consists of two sub-programs: the General Competency Program and the Professional Competency Program. The General Competency Program is designed to improve the capabilities commonly applicable to all of HIRA's work. The program includes courses on writing business reports, using Microsoft Excel, planning, and communication. The Professional Competency Program is designed to foster experts who can carry out core business functions, and programs are separately operated for five distinct areas: claims review & investigation, quality assessment, standard setting, IT and business management.

In addition, there are in-house certifications for employees in the core professional areas of the Professional Competency Program. The four in-house certifications are described below.

1. Medical fee analysis and consultation expert: The medical fee analysis and consultation expert certification was started in 2010 to nurture in-house experts who can promote improvements in the quality of healthcare institutions' medical practices while performing duties such as integrated analysis of treatment information and provision of customized information. Employees who have worked at HIRA for at least one year are eligible to apply.
2. Evidence-based review expert: The evidence-based review manual master was created in 2007 to firmly establish an evidence-based decision-making system by spurring the use of the evidence-based review manual and reinforcing the expertise of the review and assessment expert organization workforce. Employees who have completed an evidence-based healthcare expert training course at HIRA or other organization at home or abroad are eligible to apply.
3. Healthcare information certified analyst: This certification was started in 2004 to build reliability by analyzing HIRA's big data for conducting medical audits. The overall objective is to improve utilization of healthcare convergence information and to secure confidence both within and outside the organization with accurate and swift job performance based on statistics. The certification has two levels, with different qualifications for each level.
   - **Level 1:** Employees who obtained 'level 2' a year ago.
   - **Level 2:** Employees who have worked at HIRA for at least six months and completed online basic training.
4. The certification of healthcare legislation utilization: The course on healthcare legislation was created to enhance employees' basic legal ability to perform their duties in a lawful manner. Employees who have worked at HIRA for at least a year and completed training on utilization of healthcare legislation are eligible to apply.

The **Development Process Program** comprises the following: in-house instructor fostering course for delivering knowledge and know-how related to indispensable duties in the organization and improving the quality of training courses; funding for self-directed learning to establish a culture of self-learning; courses in compliance with the

government's policies and administration; cyber education that enables self-directed studies anywhere and anytime.
Training related to Triggers for review practitioners to be able to identify triggers. They should have the ability to detect and monitor healthcare providers' abnormal treatment behaviors and signs by analyzing various indicators that are useful for decision making. This ability is founded on one's ability to analyze data and claims trends, one's ability to interpret indicator values, and one's understanding of benefit standards, treatment guidelines, and medical terms.

HIRA educates the review staff on how to search for information on benefit standards, treatment guidelines, and medical terms through an on-the-job training (OJT) program in the form of online education so that they can study on their own and ultimately check whether certain treatment history is abnormal.

One must be able to use the Data Warehouse Analytics System in order to be able to analyze data. As such, HIRA frequently offers its staff online education on the meaning and structure of data that is accumulated in the Data Warehouse Analytics System. Off-the-job training on theory and practice is given around twenty times a year.

Motivation

HIRA has many capacity-building programs. This investment is the key to fostering core talent in the national health insurance system in South Korea. HIRA does more than simply offer these training courses, but also reflects the training results in performance evaluation to encourage employees' participation in the training courses.

In-house or outsourced

Sixty percent of the HIRA's training programs are conducted in-house by relevant HIRA experts. Some of the prominent education programs are on data analytics, evidence-based review, quality assessment, Information and Communication Technology (ICT), statistics, and claims review.

HIRA also offers various external programs for both staff and high-level directors. For staff, statistics and advanced IT training programs are provided. High-level directors are offered programs on healthcare policy and management, policy-making strategy, etc.

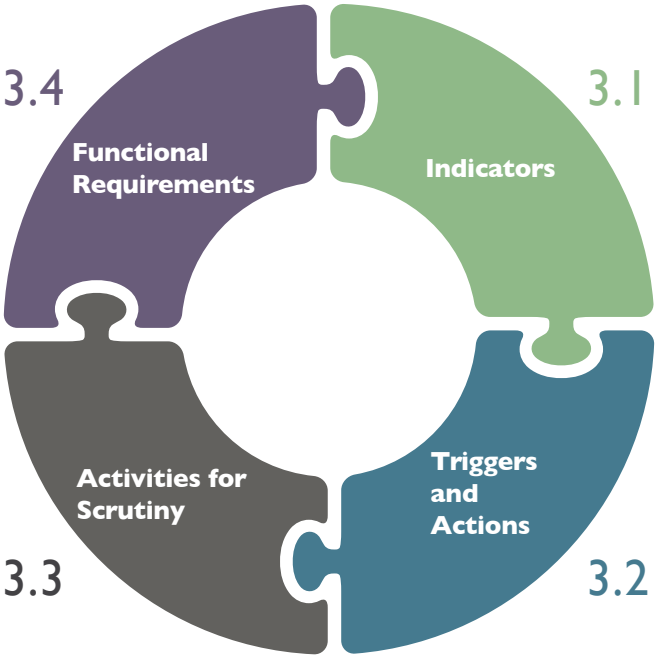
TAKEAWAYS

It is important to have a clear human resource strategy to manage the functions of the medical audit system. Most countries face a shortage of human resources with skills for medical audits. It is therefore important to have a plan for capacity building and retention as a part of the human resource strategy. Continuous training and capacity building is also required in light of the changes in healthcare markets, medical technologies, and information technology systems.

CHAPTER

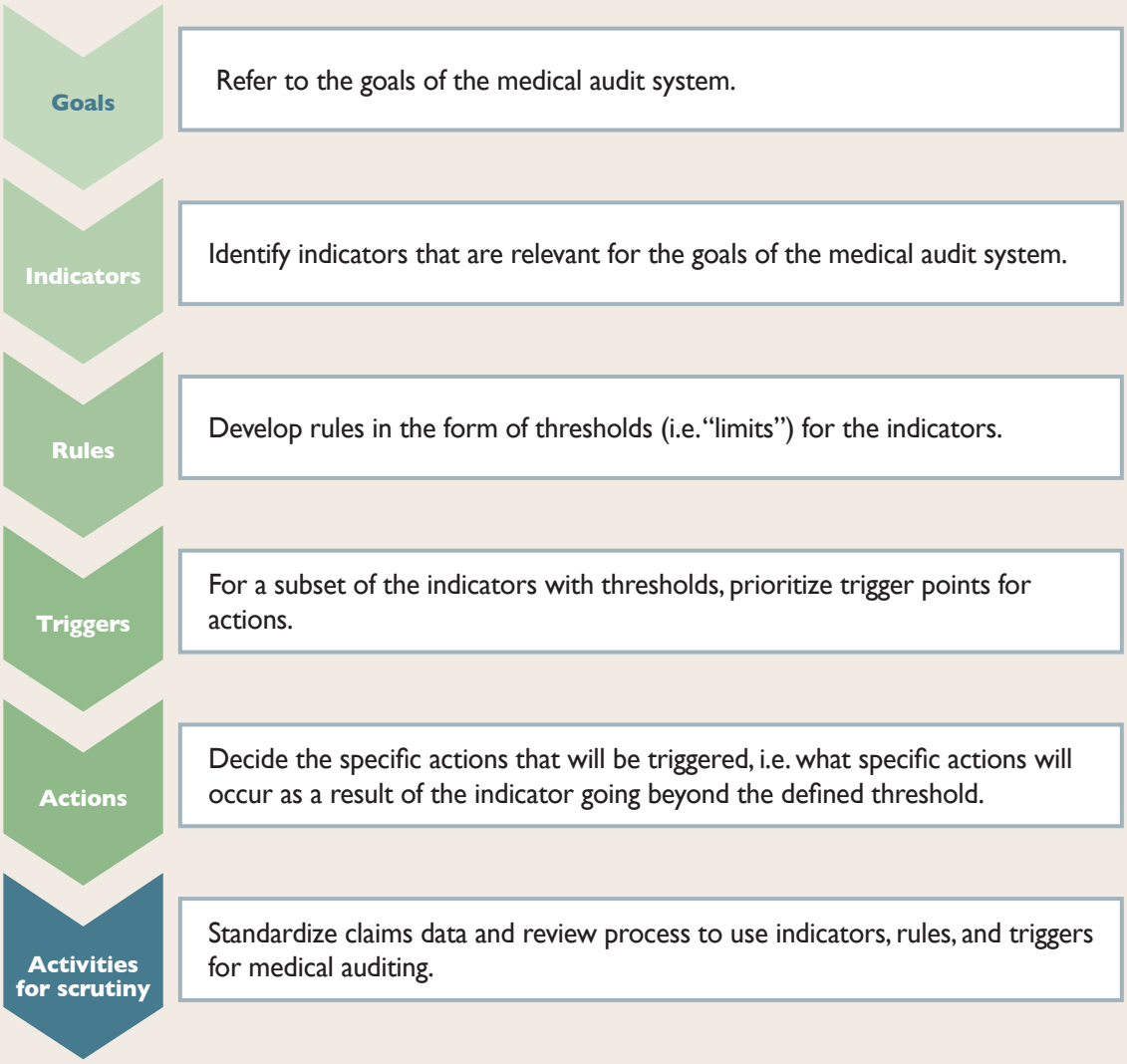
03

PROCESSES OF MEDICAL AUDIT SYSTEMS



In the previous chapter, we defined the scope of medical audits and the essential governance structures for the medical audit system. In this section, we focus on the process of medical auditing itself. We discuss the detailed steps to design the process for medical audits outlined below.

Figure 8 **Medical Audit System Process**



Once the system is designed and regularly reviewed using the essential steps above, the ongoing process of management is comprised of three key steps:

1. Claims review and clinical audit ("quality assessment") using selected indicators
2. The results of claims review and quality assessment considered a trigger for further investigation
3. Investigations

3.1 Indicators

OBJECTIVE

This section presents steps to identify and prioritize indicators to guide the medical audit system.

DEFINITION

Indicators are defined in this toolkit as measurable variables employed to monitor the performance of healthcare providers in relation to the goals of the medical audit system.

SCOPE

This chapter introduces steps to identify, prioritize, and use indicators for the medical audit system. Given that indicators used by the purchaser of care can have multiple benefits, it is recommended that different stakeholders are engaged in the process to develop, test, and use the indicators.

The steps in this chapter draw on the work available in "Using Data Analytics to Monitor Health Provider Payment Systems: A Toolkit for Countries Working Toward Universal Health Coverage", which covers processes and steps for developing indicators.

OVERVIEW

This chapter of the toolkit presents:

- Key steps to identify and prioritize indicators to guide the medical audit system
  - **Step 1:** Refer to the goals of the medical audit system
  - **Step 2:** Identify and select indicators that are relevant to the goals of the medical audit system
- Detailed case study: HIRA, South Korea
- Takeaways

KEY STEPS

Step 1. Refer to the goals of the medical audit system

It is important to develop indicators that are aligned with the goals of the medical audit system. The section on how to define goals for the medical audit system is available in the chapter 2.1 as Step 1 of "Develop an Effective Governance and Administration Structure".

Step 2. Identify and select indicators that are relevant to the goals of the medical audit system

A process to identify and select indicators is explained in detail in the toolkit "Using Data Analytics to Monitor Health Provider Payment Systems: A Toolkit for Countries Working Toward Universal Health Coverage" developed by the Joint Learning Network. That toolkit also includes an example of a menu of indicators. Below are additional observations from the Medical Audit Collaborative.

Table 7 **Steps for Identifying and Selecting Indicators**

Steps	General lessons	
Plan	Based on medical audit goals[12]	Define a committee to be responsible for indicators, allow different groups to have representatives in the group, and be transparent in the planning process.
Draft	SMART Criteria **S** – Specific **M** – Measurable **A** – Achievable **R** – Reliable **T** – Timely	New indicators can be proposed by any actor in the healthcare system. Assure common understanding of the proposed indicator within the committee developing new indicators. Follow a standard process to validate SMART criteria. Assign responsibilities within the committee.
Examine	Shortlisted indicators should be examined by a larger group to asses relevance and understanding. Validate the initial assessment with SMART criteria. For example, assumptions about the quality of data.	
Review standards	Review the standards based on international evidence and retrospective trend analysis. This can either be done by the committee working on the indicator, or by an external committee with clinicians and researchers, depending on the type of indicator.	
Define formula	Define rules and thresholds for measurement: clearly defined numerator and denominator, data source, performance index.	

12) Refer to "Consequence Categories" in "Using Data Analytics to Monitor Health Provider Payment Systems: A Toolkit for Countries Working Toward Universal Health Coverage." (http://www.jointlearningnetwork.org/resources/data-analytics-for-monitoring-provider-payment-toolkit)

Steps	General lessons
Test	Simulate the indicator with thresholds using historic data. Review results with all relevant users of the results, including the medical audit team and healthcare providers. Pilot test among a subset of healthcare providers and do proactive study to potentially verify quality of data. Review pilot results with all relevant actors and assure common understanding of the rationale and use of the indicator.
Release	Finalize technical specifications and prepare any information technology system. Prepare a guide on how to monitor the indicator (surveillance mechanisms) and communicate any relevant results. Release the indicator in the system.
Review	Assure regular review of the usefulness of the indicator. It is important to let indicators retire if they are not used.

Having information technology systems with electronic claims makes it easier to analyze data for the development of indicators. Countries with paper-based information can still benefit from the use of indicators and can use simple Excel sheets for data analytics. When the purchaser of care is able to digitize data, information technology developers can develop basic programs for generating and analyzing indicators.

Examples of Indicators

The Medical Audit Collaborative members listed indicators from their respective countries to guide the process for individual countries embarking on the process to identify and prioritize indicators. Many indicators are important for the purchaser of care to monitor the performance of healthcare providers. Some indicators are more relevant than others for the medical audit.

Table 8 Country Examples of Indicators

Goal	Indicator
Quality improvement	
Continuity of care	• Length of stay – disease specific • Disease specific readmission rate within a certain time period • Adherence to clinical practice guidelines • Proof that patients are informed of the continued management plan • Rate of continued prescription
Timeliness of care	• All drugs are administered in a timely, safe, appropriate, controlled manner to the right patient • All patients have comprehensive history and physical exam within twenty-four hours of admission • Timely care for emergencies • Denial of care

Goal	Indicator
Equity and fairness	• Quality of care and percentage of utilization of care by socioeconomic group (inpatient and outpatient) • Denial of care • Percent of insured members that cannot access services due to delay in providing care by hospitals
Effectiveness	• Patient outcome (mortality rate, morbidity rate, readmission, complication, drug reaction, failed treatment) • Timely care for emergencies • Compliance to evidence-based standard operating procedure/clinical practice guidelines • All drugs are administered in a timely, safe, appropriate, controlled manner to the right patient • Number of claims from non-accredited facilities
Efficiency (service and system)	• Utilization rate • Turnaround time of claim • Average length of stay • Health personnel to patient ratio • Average unit cost of medicines and supplies • Average number of hospitalized days by disease group
Financing	
Financial sustainability of program	• Claims payout ratio (the total claims payout against the total premium collected) across regions • Evidence of delay vs. timely release of allocated funds to insurer/provider • Average value of claims per month per facility • Overutilization depends on provider payment mechanism: capitation and global budget = No; Diagnosis Related Groups (DRG) and fee for service = Yes • Costliness index • Percentage of generic drug usage • Average total allocation, payment, or claims per provider
Financial Risk protection for beneficiaries	• High copayment or no balance billing compliance rate • Underservice and underutilization of services • Number of patients with out-of-pocket expenditure • Referral rate (frequent referral by providers) • Number of claims from nonaccredited facilities • Average total amount claimed per person across facilities with the same services
Fraud detection at all levels	• Overuse of services • Denial of care – number of complaints about medical officer or facility • Percentage of overreaching or inappropriate claims • Incidence of fabrication of claims • Incidence of duplication of claims • Incidence of postdating of claims • Incidence of misrepresentation by false or incorrect information • Incidence of upcoding of disease • Incidence of misrepresentation by false info • Incidence of claims for non-admitted patients • Rate of disapproval of appeal case

The RAND Appropriateness Method is a helpful tool to develop measures for under and over use of care. The user guide is available here:
https://www.rand.org/content/dam/rand/pubs/monograph_reports/2011/MR1269.pdf

Country examples

In Malaysia, indicators are drafted with specific technical specifications by the program managers and clinicians. The indicators are reviewed and finally endorsed by the top level managers in the Ministry of Health. Indicators are reviewed regularly. Data is collected by each department in the hospitals, certified and verified and reported by the State Health Office Quality Unit, and sent to the Key Performance Indicator Secretariat of the Ministry of Health. The secretariat develops a standard matrix for providers to report the key performance indicators.

These indicators will be analyzed by the Secretariat and the Performance Index is generated. The Performance Index is a relative value of each indicator's performance. It can be composited and given to the average performance value. A good indicator's performance will have a value of more than 1; a poor performance indicator will have value of less than 1. Performance is audited twice a year. Indicators will be updated by the program or by clinicians, based on feedback from by the Secretariat. Challenges in reporting and monitoring are discussed during regional meetings with all the State and Hospital Quality Coordinators.

In Nigeria, the indicators for medical audit are developed by the National Health Insurance Scheme by the Department of Standards and Quality Assurance. Healthcare providers, regulatory bodies, the Ministry of Health, and external consultants are involved in the selection of indicators. These consultants are from tertiary healthcare institutions and development partners. The major challenges are funding and the availability of technical partners.

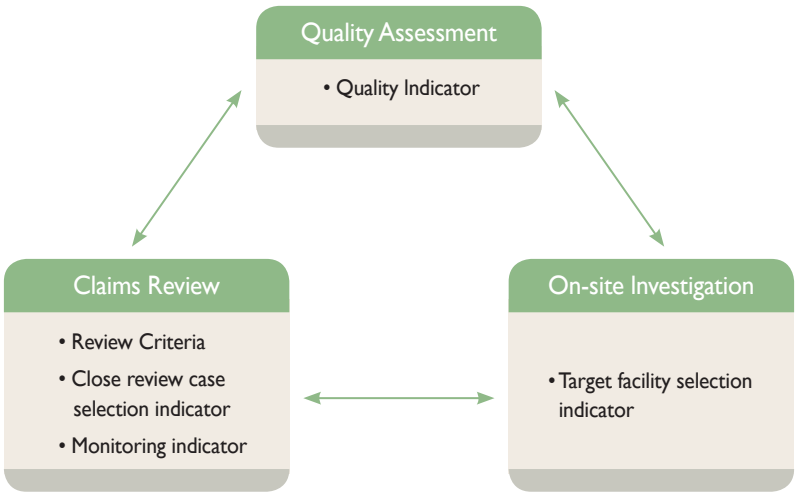
In the Philippines, when the Health Care Provider Performance Assessment System was developed, PhilHealth identified indicators to measure financial risk protection, patient satisfaction, quality of care, and commission of fraud and adverse practices. Identified indicators were those that are already used locally and internationally. Some of the indicators may already be measured using the current tools and sourced from the claims database. However, there are indicators in the list that are already included but would only be measured when electronic claims are implemented.

DETAILED CASE STUDY: HIRA, SOUTH KOREA

Step 1. Refer to the goals of the medical audit system

Since the introduction of National Health Insurance in 1977, the main provider payment system in South Korea has been the fee-for-service (FFS) system. The ultimate goal of medical auditing is to prevent inappropriate expenditure and improve the quality of healthcare. As defined in Figure 1, major activities in medical audits include investigation and clinical auditing. HIRA has defined these activities as medical claims review, on-site investigation, and quality assessment. Claims review is the process of determining the reimbursement amount using review criteria and monitoring indicators. Quality assessment mainly refers to the evaluation of clinical quality; there are quality indicators independent of the claims review process. On-site investigation is the process of fact-checking and verifying the legality of claims at institutions with a high probability of fraudulent or false claims. Although these three activities are linked, they should be individually described as there are differences in their purposes, indicators, and methods. The Figure 9 below is a conceptual diagram of the relationship between the three activities and the indicators used in each.

Figure 9 **Conceptual Diagram of the Relationship between the Three Activities and the Indicators (HIRA)**



Step 2. Identify and select indicators that are relevant to the goals of the medical audit system

The most fundamental indicators used for claims review are the review criteria. There are about 1,800 review criteria related to approximately 9,000 medical procedures, 20,000 drugs, and 23,000 medical supplies that are covered under the National Health Insurance. Review criteria specify the scope of insurance benefit coverage for each medical service, including the approved indications, maximum number of application, dose, and period. These criteria are usually set when cost control is deemed necessary because a particular service is high cost or may be abused, or when quality control is deemed necessary because misuse of the service could have grave consequences on therapeutic outcomes.

HIRA builds on its review of clinical guidelines, textbooks, clinical research literature, data on other countries' insurance benefits, and discussions with experts and considers medical services' therapeutic necessity, clinical validity, and cost-effectiveness to prepare drafts of claims review criteria. The review criteria are then publicly notified by the Minister of Health and Welfare.

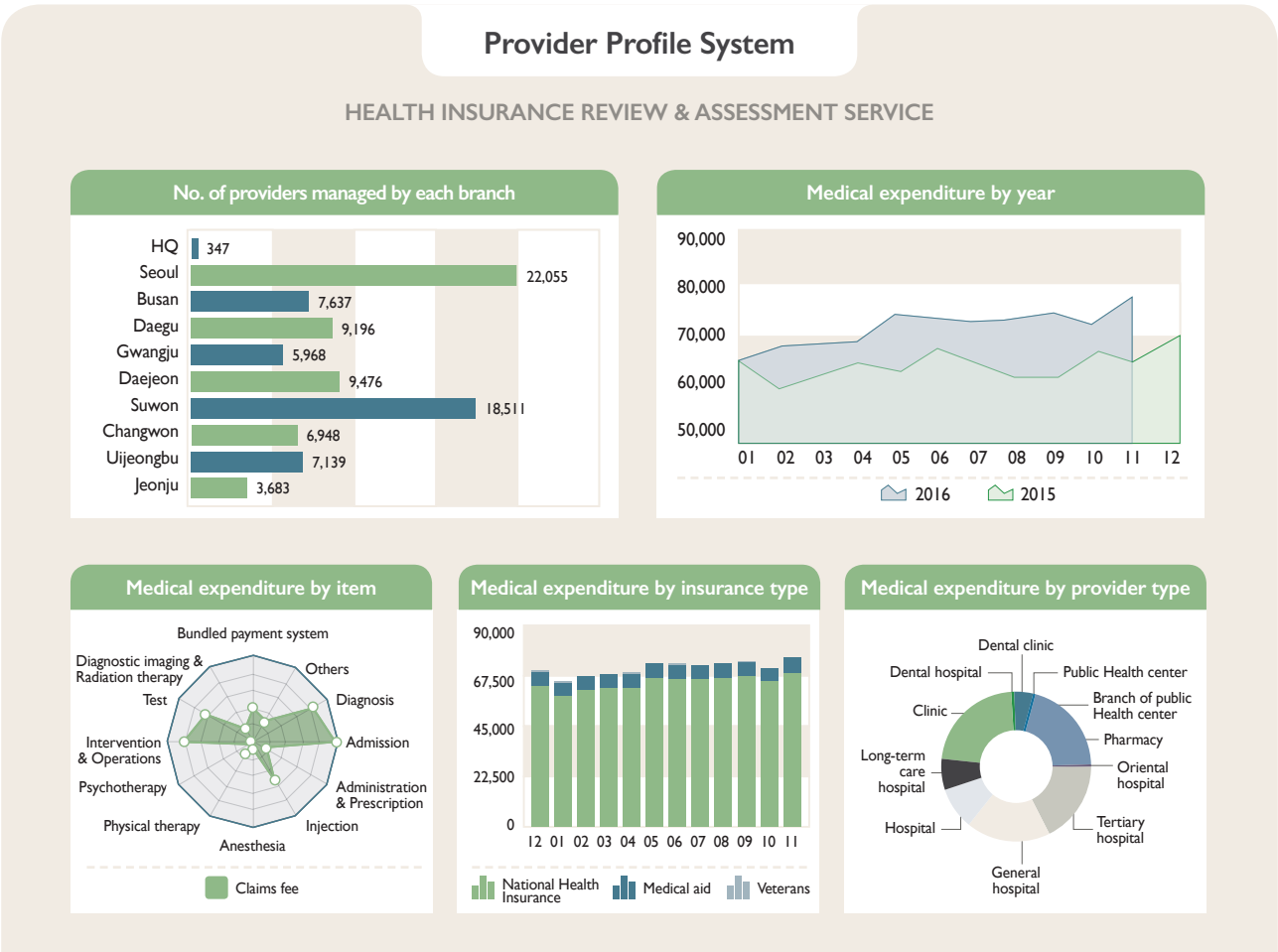
For example, bone density examination is reimbursed for women 65 years and older, and for men seventy years and older.

Claims Review is largely divided into electronic review and close review. Some of the review criteria are applied to electronic review using HIRA's information communication and technology system (refer to "1. Claims Review" in Chpater 3.3 for a detailed description of the claims review method). It would be impossible for human reviewers to review all 1.53 billion claims review requests annually submitted by around 90,000 healthcare providers. Therefore, HIRA uses electronic review and has developed various indicators to efficiently manage health expenditure and improve healthcare quality. Since electronic review is conducted electronically, it can be applied to all submitted claims review cases. Close review, on the other hand, is a more focused review by human reviewers.

Cases subject to close review are selected using a multi-dimensional model with multiple variables, or are submitted by the providers with the highest rate of claim adjustment, abnormal fluctuations in medical claims (including the treatment cost per case), frequent claim errors, delayed claims, etc.

Currently, there are indicators for identifying claim errors or inappropriate healthcare services in the dashboard used by HIRA. The claims reviewers check the indicators regarding characteristics and trends of the healthcare providers through a provider profile system. When some indicators cross threshold limits, the reviewers conduct detailed analyses and develop additional indicators based on the need for further analysis. These indicators are selected and prioritized based on cost, variation, and additional selection criteria as needed.

Figure 10 **Provider Profile System (HIRA)**



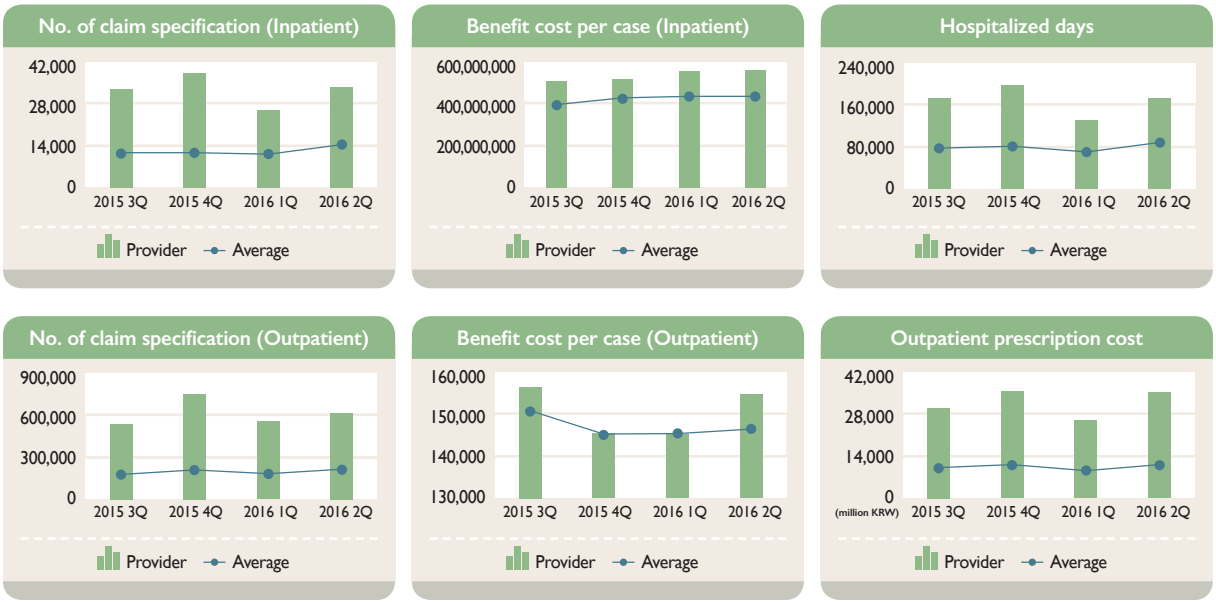
The provider profile system in the Figure 10 provides absolute and relative indicators to HIRA staff members and healthcare providers so that they can compare different providers' performance levels. The absolute indicators include treatment costs of each provider, the number of claims, and treatment cost per claim, without taking into account the severity of the patients illness. These indicators are useful when comparing changes of institutions by time series or comparing with the average of the other institutions.

As shown in the Figure 11, the number of claims as well as the treatment costs of the selected provider are above average compared to other providers of the same level. It is also shown that the number of claims (inpatient) has increased by 7,000 claims in the second quarter of 2016 compared to the first quarter of the same year.

Figure 11 **Example of Absolute Indicators (HIRA)**

(Unit : case, million KRW (Total benefit cost), day)

Review quarter		2015 3Q		2015 4Q		2016 1Q		2016 2Q	
Classification		Average	Provider	Average	Provider	Average	Provider	Average	Provider
Inpatient	No. of claim specification	11,310	31,979	11,624	37,294	11,157	25,270	14,330	32,361
	No. of patient	9,521	25,121	9,926	28,375	9,412	20,800	12,411	26,476
	Hospitalized days	80,022	174,538	81,192	199,559	71,169	132,185	87,372	172,920
	Total benefit costs	3,221,402	8,851,832	3,439,681	10,341,348	3,081,416	7,311,569	3,797,901	9,692,736
	Total benefit costs (including outpatient prescription)	3,222,273	8,855,088	3,440,512	10,345,933	3,082,150	7,313,725	3,798,948	9,695,864
	Benefit cost per case (including outpatient prescription)	2,848,927	2,769,032	2,959,893	2,774,155	2,762,609	2,894,232	2,651,006	2,996,157
	Benefit cost per hospitalized day (including outpatient prescription)	402,672	507,344	423,751	518,440	433,074	553,295	434,800	560,714
Outpatient	No. of claim specification	186,584	543,884	213,902	752,777	189,510	563,376	216,015	619,527
	No. of patient	106,716	282,649	121,546	387,345	109,765	318,971	123,263	342,776
	Visit days	185,631	536,734	212,720	744,543	188,438	554,722	214,904	611,172
	Total benefit costs	1,802,308	5,381,726	2,009,310	7,283,605	1,802,312	5,557,283	2,037,991	6,041,241
	Total benefit costs (including outpatient prescription)	2,809,299	8,485,551	3,105,668	10,945,422	2,758,085	8,173,943	3,164,458	9,561,387
	Benefit cost per case (including outpatient prescription)	150,565	156,018	145,191	145,401	145,538	145,089	146,493	154,334
	Benefit cost per visit day (including outpatient prescription)	151,338	158,096	145,998	147,009	146,366	147,352	147,250	156,443
	Outpatient prescription cost (million KRW)	1,006,992	3,103,825	1,096,358	3,661,817	955,774	2,616,660	1,126,468	3,520,146



The relative indicators are case-mix adjusted indicators, and they are useful in comparing treatment costs, length of stay (the number of visiting days), and the case-mix index of the providers in the same level. The major relative indicators generated by HIRA include Episode Costliness Index (ECI), Day Costliness Index (DCI), Lengthiness Index (LI) for inpatient, Visit Index (VI) for outpatient, and Case Mix Index (CMI). Please see Appendix 2 for details of the relative indicators of HIRA.

For example, ECI is the comparative value of the relevant institution regarding the expected medical fees per claim (per patient) considering the case mix of the provider. Even if the medical fee per patient is low, ECI could be above average when the case mix is taken into consideration, as demonstrated by the Episode-Costliness Index value of more than 1 in Figure 12 below. ECI 1.10 means the medical fee is 10 percent higher than average. More details can be found in the Appendix 3.

Figure 12 **Example of Relative Indicators (HIRA)**

	Indicators	2016 3Q	2016 4Q	2017 1Q	2017 2Q
Outpatient	Episode Costliness Index (ECI)	1.13	1.04	1.12	1.10
	Days Costliness Index (DCI)	<1.0	<1.0	<1.0	<1.0
	Visit Index (VI)	1.25	1.11	1.25	1.21
	Outpt prescribing Costliness Index	<1.0	<1.0	<1.0	<1.0
	Case-Mix Index (CMI)	1.26	1.31	1.31	1.29

The development of new indicators is needed when there is a dramatic increase in the treatment cost during a certain period of time, or the proportion a certain medical service takes up out of the total medical fee changes dramatically from the total medical fee. It is also necessary when indicator values are considerably high compared with OECD average, or when a need for the development of indicators arises during the execution of the other projects.

In Korea, HIRA or external expert organizations are in charge of developing the indicators. The indicators are defined based on considerations of the nature, influence, and acceptability of the indicators. In principle, indicators are developed by HIRA's experts. However, relevant medical societies are asked to develop them in cases where objectivity is prioritized (because a sharp conflict with stakeholders can be foreseen) or where a high level of expertise is required. A case in point is the development of quality assessment indicators. Since quality assessment areas are expanding and the assessment results are being used in a wider range of areas, medical societies and medical institutions are showing a growing interest in the quality

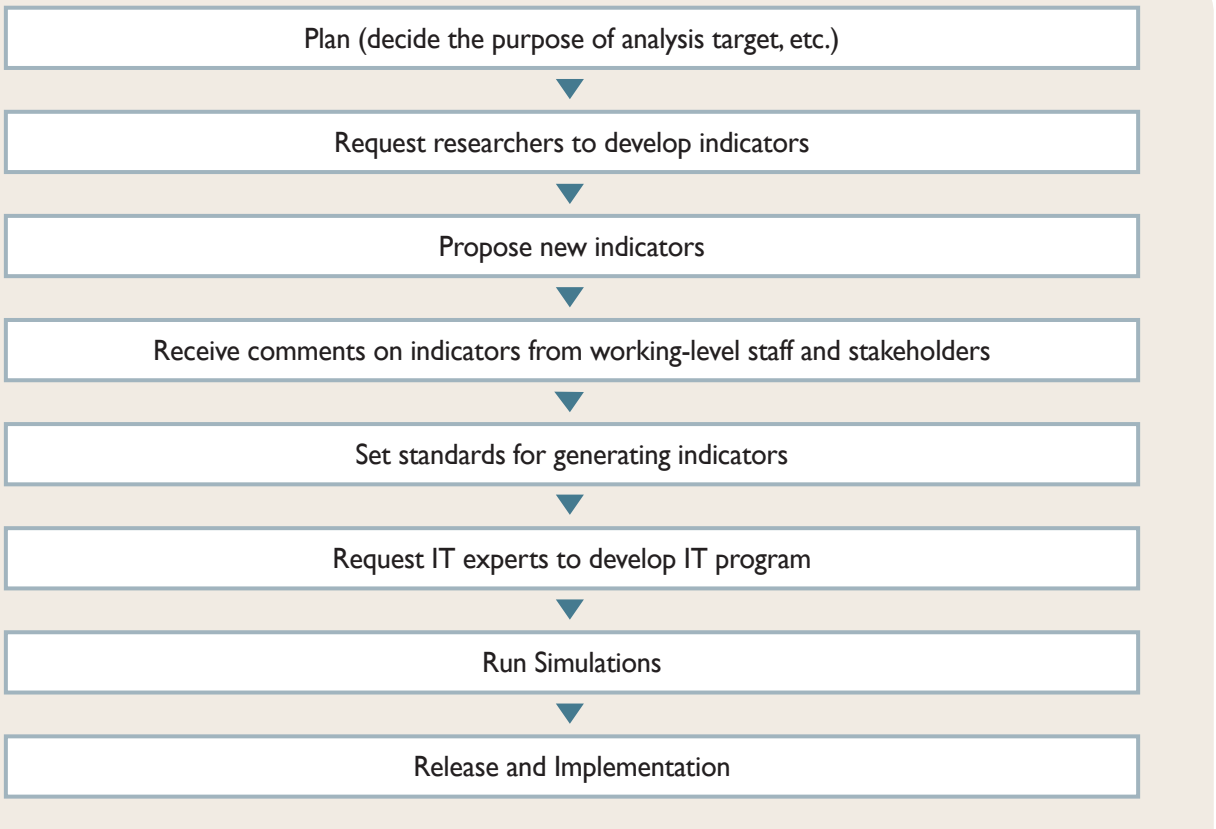
assessment indicators. Therefore, relevant medical societies are asked to develop indicators for all new assessment items nowadays to increase stakeholders' acceptance of assessment results.

Indicators independently developed by HIRA are mostly claims review indicators. Of them, absolute indicators are usually developed by review staff and relative indicators are developed by researchers in the Research Department. Regardless of who develops the indicators, HIRA staff in charge of the task continues to review the indicators until they are finalized and stakeholder engagement in the process is guaranteed to raise the validity and acceptance of the indicators. When HIRA independently develops the indicators, there are no additional costs because HIRA's employees carry out the work, but there are additional research costs if the development process is outsourced.

When selecting the indicators, HIRA researches other countries' cases (OECD countries, US, Australia, UK, etc.) and takes them into consideration. However, it is more appropriate to base the development of triggers on the medical/treatment conditions in Korea. Accordingly, HIRA analyzes the medical claim and quality assessment data to calculate valid values and determines the triggers by incorporating the opinions of various stakeholders, including experts.

Examples of the indicator development process of HIRA, South Korea, is presented below in Figure 13.

Figure 13 **Process of Indicator Development (HIRA)**



EXAMPLE:
INDICATOR DEVELOPMENT OF BENZODIAZEPINE

Overview

- Objective: To evaluate efficacy of existing six monitoring indicators and to develop a new indicator
- Development team: Six persons – three researchers and three staff from department in charge (Review Administration Department)
- Requestor: Department in charge

Development process

- *Step 1. Plan*

Upon the demand from the organization and external parties, the department in charge planned for efficacy evaluation and improvement of indicators that had been used for a long time.

- *Step 2. Request researchers to develop indicators*

After discussing the need for research in a preliminary meeting with researchers of HIRA, the request for new indicator development was submitted.

In the preliminary meeting, a researcher introduced a long-term prescription indicator for benzodiazepine. There were issues with the use of psychotropic drugs; this was seen as a social problem. The issue was pointed out at the inspection of state administration, and heavy media coverage followed. According to the OECD, South Korea has the highest prescription rate of long-acting benzodiazepine among people aged 65 and older among OECD member countries.

- *Step 3. Propose new indicators*

The development team analyzed the current status of benzodiazepine prescriptions and other psychiatric drugs: benzodiazepine-related drugs, prescription rate of benzodiazepine-related drugs among psychiatric drugs, and prescription data of benzodiazepine (by age, by department, by ATC code, etc.).
Rather than developing a separate indicator for long-acting benzodiazepine, psychiatrists recommended targeting the entire benzodiazepine family for management. Therefore, they proposed "Long-term

prescription of benzodiazepine drugs among patients 65 and older" as a draft for a new indicator for the Indicator Linkage Management System.
According to analysis by age in the fourth quarter of 2015, over 65 percent of patients who claimed for benzodiazepine and 50 percent of consumption volume and claimed reimbursement came from people at the age of 60 and older. They reviewed "Drug stability" and indicators in other nations (Australia, UK, etc.). They compared the Defined Daily Dose, the number of prescription days per prescription, and the number of prescription days per patient.

The development team proposed the following three indicator drafts on benzodiazepine prescription:
Long-term prescription rate (30 or 60 days per prescription) by quarter in patients 65 and older
Long-term prescription day rate (30 or 60 days per patient) by quarter in patients 65 and older
Long-term prescription patient rate by quarter in patients 65 and older (Defined Daily Dose)

The conclusion was that Long-term prescription day rate (30 days per patient) by quarter in 65 and older patients is a good indicator to develop a trigger to identify institutions with high benzodiazepine long-term prescription rates because it is based on episode.

- *Step 4. Receive comments on new indicators from working-level staff and stakeholders*

Collection of external opinions from the medical circle and academia, as well as internal working-level staff can be done before, during, and after the study by the development team. This is subject to change depending on the urgency and character of the given task.

In this benzodiazepine indicator study, the development team attempted to hear from the medical societies during the research. The advisors included the Healthcare Review and Assessment Committee of HIRA (department of neuropsychiatry, department of pharmacy), an external academic society (Korean Society of Psychiatrics), the Korean Hospital Association, and the Korean Medical Association.

- *Step 5. Setting standards for developing indicators*

Considering the acceptance of medical societies, the Review Administration Department prepared the following standards:

– Indicator name: Long-term prescription rate of benzodiazepine drugs in 65 or older patients
– Threshold: over 30 percent, because this is the prescription rate level of institutions between 80th and 100th in rank from 2012 to 2015, and it is double the average prescription rate of 14.74 percent
– Target provider: clinic, hospital (excluding neurology and psychiatry)

– Formula

$$\frac{\text{No. of benzodiazepine prescriptions exceeding 30 days among patients 65 and older}}{\text{No. of benzodiazepine prescriptions among patients 65 and older}} \times 100$$

– Data creation standard: by provider, by quarter

- *Step 6. Request IT experts to develop IT program*

Request system development for indicator value calculation, check, post-management screen, etc.

- *Step 7. Run Simulations*

Staff in charge and IT specialists worked together to simulate a trigger using the basic data to check that the system produced the correct indicator values, and whether the determined threshold level (20 percent or 30 percent) was an appropriate trigger for investigation.

- *Step 8. Release new indicators and Implement them*

In a meeting, the medical circle that would be affected by the new indicator was informed of the details of the new indicator and management method recommended by specialists. Medical circles informed their members and gave HIRA feedback.

Before the actual introduction, information about the new indicator was released to the media in December 2016.

The purpose of Quality Assessment (QA) is to improve the quality of healthcare services and to minimize the variance of treatment between healthcare providers and doctors. As of 2017, there were 375 indicators of 32 quality assessment items in 10 areas, including acute disease and chronic disease. Assessment indicators are based on either absolute or relative assessment. If the objective of assessment is precise, absolute assessment is done with a threshold. Relative assessment is conducted when it is hard to set an objective assessment, or when there is a need for competition among providers due to low quality. (Please see Appendix 3 for HIRA's indicators.)

Indicators are used for on-site investigation to identify and select providers that have a high probability of fraudulent claims, complaints from the public, or are the subject of investigation requests from NHIS. This part will be explained in more detail in on-site investigation.

TAKEAWAYS

Effective indicators depend on the quality of data. It is important to assess the quality of data before finalizing indicators. There can be situations where measures need to be taken to improve the quality of data (i.e. training or penalties if quality of data is below a certain standard).

It is important to revisit indicators over time and change when necessary based on an assessment of how useful the indicator is toward the overall medical audit system goals.

Building capacity for simulations can be important for the selection of effective indicators.

Use of indicators is important for systems with manual information systems (e.g. paper-based claims). Information technology can help automate analysis and use of a larger set of indicators, but at least a few indicators are important to have for manual systems.

A panel of professionals including academicians should be engaged to develop and finalize indicators using an evidence-based process of review and development.

Regarding selection of indicators, there is no right or wrong indicator. The indicators depend on the overall medical audit system goals, requirements of the payment system, the type of healthcare providers available, etc.

3.2 Triggers and Actions

OBJECTIVE

This section introduces the benefit of medical audit triggers for actions. The triggers can make the audit system more effective and efficient. In countries with advanced medical audit systems, automated triggers based on indicators flag when to engage in further investigation and auditing—but scant information exists publicly on how to develop these triggers. Due to the large cost and resource burden of on-site audits and investigation, understanding what makes effective triggers and how to develop these internally is a crucial element in building a strong medical audit system.

DEFINITION

A trigger elicits a specific action—in the case of a medical audit system, the action following the trigger is a detailed review process (e.g. a request for supplementary information and potential off- or on-site investigation). Triggers are used to identify providers suspected of inappropriate treatment or fraudulent claims.

Triggers are defined based on indicators and the thresholds assigned to those indicators. In the case of medical audits, a threshold is often based on evidence-based standards of care, e.g. an indicator should not be above or below a certain level of quality or cost, or above a certain standard deviation from the statistical average of claims data.

Thresholds should be developed based on evidence, baseline analysis of the local context, and consultation with specialists.

Purchasers of care use thresholds to define triggers and elicit a specific response. For example, purchasers of care specify that claims data submitted above or below a specific threshold will trigger the flagging of a claim for further review and analysis. Purchasers with electronic claims management can automate triggers for further investigations.

SCOPE

Medical audits and investigations can be triggered by a number of events (e.g. a request from the Ministry of Health, whistle-blowers, patient complaints, etc.). For the scope of this toolkit, trigger development will focus primarily on the analysis of claims data.

OVERVIEW

This chapter of the toolkit presents:

- Six key steps in developing medical audit triggers
    - **Step 1:** Select Indicators that will be used to develop triggers
    - **Step 2:** Review data and evidence for each indicator chosen for triggers
    - **Step 3:** Define thresholds based on evidence review and country context
    - **Step 4:** Develop effective triggers for the whole system
    - **Step 5:** Test and refine prior to rollout
    - **Step 6:** Automate and launch finalized medical audit triggers
- Detailed case study: HIRA, South Korea
- Takeaways

KEY STEPS

Step 1. Select indicators that will be used to develop triggers.

The first foundational step is choosing indicators that triggers will be based on. This is usually a subset of total indicators chosen by the medical audit team of a health insurance agency (see previous section). The decision can be strategic (based on goals on service delivery quality and cost) and opportunistic (a routine review of specific indicators can identify the need to develop triggers if analysts begin to notice a particular trend for a more detailed review). As described in further detail below, though triggers based on relative indicators may often be more effective than triggers based on absolute indicators, both absolute as well as relative indicators are kept in mind while indicator selection for triggers is determined. Relative indicators are useful for medical cost management and providers of big claim volume fluctuation among similar groups. In quality assessment, a relative indicator is used when setting a target is difficult or there is a need for competition encouragement among providers due to low quality. However, when using indicators for triggers, indicators should be prioritized and selected based on whether they:

a) Have high impact on medical expenditures: for example, a cochlear implant may not be harmful but has limited benefit for people above a certain age and is costly for the system
b) Show large differences in claims size between similar providers for that particular service
c) Show large differences in quality of care between providers for that particular service
d) Are based on social & contextual issues.

Step 2. Review data and evidence for each indicator chosen for triggers.

It is important to organize teams to develop triggers. Teams are often comprised of representatives from the purchaser of care (e.g. data analysts), representatives from academic institutions, and professionals working on quality assurance (for example, a national accreditation bureau). The teams are responsible for designing and testing the triggers. The first step is to review historical data and existing evidence. Claims data is an important source but can sometimes be complemented with data from other studies, such as epidemiological studies.

The development of teams differs by country context. These options will depend on availability of existing resources and governance structure of audit team.

Step 3. Define thresholds based on evidence review and country context.

Rules are developed to guide the analysis of indicators and to inform triggers. Rules are often based on evidence review of international or national standards, protocols, and guidelines, as well as internal analysis of existing claims data. A rule might be, for example, "Admissions in the Intensive Care Unit should be less than 7 days" or "A hysterectomy should only be performed for patients above 40 years of age." Thresholds are then defined for trigger points. For example, hysterectomy for women below 40 years exceeds one percent of all hysterectomies in one facility in one month.

Country context is crucial in developing rules, particularly related to the specific payment system used in each country. Countries with capitation-based payment systems need to watch for underprovision of services, while countries with fee-for-service payment systems need to watch for overuse. Please refer to the tool No. 1 List of Common Objectives and Potential Unintended Consequences of Provider Payment Methods in the toolkit "Using Data Analytics to Monitor Health Provider Payment Systems: A Toolkit for Countries Working Toward Universal Health Coverage." Countries within each of these payment systems will likely use identical indicators (e.g. length of hospital stay or drug price), but the triggers will be set differently. For example, countries with capitation-based payment will set a threshold that is lower than average for length of hospital stay, while fee-for-service countries will set a threshold that is higher than average for length of hospital stay.

Step 4. Develop effective triggers for the whole system.

Triggers are developed to guide actions, for example on- and off-site investigations. Actions require resources, and it is important that triggers be well defined. Analysts defining triggers consider different aspects such as comparisons within the same provider groups (e.g. size of hospital and specialties available), changing relations between absolute and relative indicators, and changes in case mix.

Developing triggers is challenging, for obvious reasons: the purchaser does not want an overactive trigger that flags valid claims. Yet on the other hand, the purchaser does not want a weak trigger that lets questionable claims go unnoticed. A trigger is considered effective if it appropriately flags a facility for investigation, and this investigation is legitimate—thus leading to action for further improvement and positive change in the system (For more information, see Step 1 of "2. On-site Investigation" and "3.Clinical Audit" in the Chapter 3.3).

Data scientists developing triggers need to revisit the outcomes of using triggers to improve precision over time. The following three guidelines are helpful for developing an effective trigger:

1. **Getting the basics right:**
    a. **Quality** – The quality and standardization of data is crucial for effective work with triggers.[13)]
    b. **Feasibility** – Preparing immediate estimates should be possible as soon as claims are filed in the claims database.
    c. **Specificity** – The definitions of indicators should be specific to ensure the reliability of trigger values.
    d. **Action orientation** – Triggers must lead to a specific action or set of actions and follow-up. Actions can be in the form of multiple steps, such as further analysis based on available data, request for additional information, followed by on- or off-site investigation. It is advised to define the action steps, or process guide, for each trigger.
2. **Triggers based on relative indicators are often more effective than triggers based on absolute indicators.** Using relative indicators allows for comparison with performance over time, and with other providers within the same category, region, or patient profile. It can help audits to be more targeted and more effective.

13) Purchasers of care can still benefit from the use of triggers if the quality of data is substandard. Triggers can be used to identify providers with poor quality of data; this can trigger interventions to improve the quality of data.

3. **Incorporating local contexts into the trigger.** This includes risk adjustment for facilities to appropriately weigh risks, as not to overflag a facility that treats higher-risk patients or performs higher-risk health interventions. It also incorporates seasonal trends into triggers. For instance, many countries see seasonal variation with a rise in certain types of claims during the rainy season.

When developing triggers, it is important to keep impacts across the health system in mind, such as:

- Patient level – triggers based on length of long-term hospitalization and insurance expenses or benefits for each patient
- Doctor or clinical team level – triggers based on inappropriate treatments (e.g. compare volume per doctor or team within a given timeframe)
- Facility – triggers based on comparison of facilities of the same size and the same area of specialization
- District – triggers based on district-level comparisons when treatment characteristics vary across regions
- Whole system – triggers that consider the payment system and changes made in the payment system (e.g. Diagnostic Related Groups versus fee-for-service, and introduction of performance based payments)

As the quality of data improves and experience is gained from developing effective triggers, data scientists can construct algorithms that can predict what effective triggers may be. No matter how the triggers are developed by a working group with a diverse set of experts or through computational statistics, the triggers need to be tested before being implemented at a system level.

Step 5. Test and refine before roll out.

A crucial question in developing triggers is: "How do you assess if a trigger is effective and will give you what you are looking for?". The only way to do this is to test through simulations and small pilots.

Simulations can be done using historic claims data and results from earlier medical audits. A simulation can be done to estimate how many actions would be triggered, and an assessment made as to the availability of resources to carry out those actions.

It is good to test triggers using a subset of facilities. During this pilot phase, the key question is whether the developed indicators are considered effective, correctly identifying cases that should be further flagged for analysis and investigation. The medical audit team refines where needed, e.g. if the percentage of false negatives is too high, the rule and triggers need adjustment.

Step 6. Automate and launch finalized medical audit triggers.

One of the benefits of systems with electronic claims is the ability to automate. Automation can reduce time for claims review and dependence on human resources. When a trigger is finalized, the software for claims management can be programmed to include the triggers with automatic flags for claims data in the system. These triggers are then launched across the whole healthcare system.

It is important to note that the process does not end here. The healthcare system and the behaviors of healthcare providers change over time. Triggers should need to be modified or new triggers need to be developed to improve the effectiveness of the medical audit system.

Functional requirements such as business process will be dealt with in Chapter 3.4.

BOX 1 **HIRA's Largest Change in 10 Years**

The largest change that HIRA has done related to developing and changing triggers over the last ten years is the following:

Since the separation of drug prescription and dispensing in 2000, handling benefit claims case by case became too burdensome due to the dramatic increase in volume. Also, there were issues in accuracy in audit outcome because staffs responsible for claims review hurried to complete it by due date. Therefore, in order to improve the existing audit system, we decided to utilize different tools. For example, the Indicator Linkage Management System was introduced for this reason. To reduce the quality gap between providers, we developed and managed relative indicators such as costliness and quality assessment indicators.

For the last decade, quality assessment has expanded to serious chronic diseases such as hypertension and cancer. That is, relative indicators for triggers have been increased by assessing quality of care. This led to improved service quality, and significant reduction in the quality gap between providers.

DETAILED CASE STUDY: HIRA, SOUTH KOREA

South Korea's medical audit trigger process is one of the world's most advanced and most efficient: HIRA processes approximately 1.5 billion cases per year (with a total claim amount of about 7.2 billion USD) within 15 days of the filing date. HIRA makes various efforts to prevent fraudulent and inappropriate claims, such as publishing previous cases of medical audits, as well as criteria to be applied to medical audits, cases of on-site investigation, and lists of institutions with fraudulent claims. While the specific algorithms used by South Korea understandably must remain confidential to prevent fraud and inappropriate treatment, this chapter seeks to generalize learning and best practices that can be applied to other countries looking to develop, automate, and strengthen their own internal medical audit triggers.

HIRA has developed about 420 indicators for medical audits.

Step 1. Select indicators that will be used to develop triggers

When HIRA wants to select an indicator that needs a trigger for action among the many aforementioned indicators, it considers the influence over medical cost increases, large variation compared to similar providers, and social issues or needs of quality improvement. The most representative indicators are those for voluntary improvement, which is a set of five indicators (ECI, VI, rate of antibiotics prescribed for acute upper respiratory infection, injection prescription rate, rate of prescriptions with six or more drugs). Depending upon the type of provider, the composition of the five indicators is determined.

Quality assessment indicators are all trigger-setting indicators for action, because HIRA considers the frequency and share of the cost out of the total treatment cost, the importance in medicine, the level of social attention, the expected improvement effect, the ease of assessment, etc. from the selection stage of assessment item and indicator.

Step 2. Review data and evidence for each indicator chosen for triggers

Reviewing and setting triggers are done by a review team or an assessment department. Quality indicators have a team for each assessment item, and the team takes care of the whole process from planning of assessment, data collection, outcome analysis, and trigger setting, to result utilization. A research team may lead the process when planning a complicated model with a number of variables such as a selection model for close review. Base data for such processes include claim data and quality assessment data from the HIRA Data Warehouse.

Step 3. Define thresholds based on evidence review and country context

Because Korea uses a fee-for-service payment method, most thresholds are set "higher than average". The analysis is done by type of provider, specialty, and diagnosis to investigate average, variation, distribution, etc. Most indicators have thresholds, but thresholds may differ for the same indicator, depending on the situation. This is because there are different thresholds depending on the provider type, specialty, region, and payment system.

For instance, in this clinic's case, physiotherapy of those 17 years old and older takes up 94 percent, and the medical fee of each patient (ECI) is 11 percent higher than other institutions; the number of visits (Visit Index) is 22 percent higher. Please see Figure 14 below. If this clinic has higher values than other clinics of the same disease, it can be a trigger for action.

Figure 14 **Disease-group Analysis from the Claims Review Software (HIRA)**

Disease code	Disease name	No	Rate	Total amount including Outpt prescribing	Rate	Outpt prescripti-on cost	Rate	Medical fee per claim specification	Outpt prescription cost per prescription	Total medical fee by day	Average visit day per claim specification	ECI	DCI	VI
SN0522	Physiotherapy, age≥17	305	87.90	20,923,833	93,98	1,667,753	83,87	68,603	5,468	18,599	3.69	1.11	0.91	1.22

This Table 9 is about the standards for the indicator linkage management system. The set of indicators are: Visit Index, Episode Costliness Index, Rate of antibiotics prescription, Injection Prescription Rate, and the rate of prescriptions with six or more drugs. The baseline figures (for instance, "Episode Costliness Index 1.35 and over in inpatient") serve as a trigger. For more information about the use of index in South Korea, please see Appendix 2.

Table 9 Standards for the Indicator Linkage Management System (HIRA)

Item		Selection standard
Out-patient	No. of visits	Providers with Visit Index 1.1 or above, Costliness Index 1.0 or above, and top 15% among all providers
	Rate of antibiotics prescribed for acute upper respiratory infection	Providers of 70% or above
	Injection prescription rate	Providers of 40% or above
	Rate of prescriptions with six or more drugs	Providers of 40% or above
In-patient	Episode Costliness Index (ECI) of inpatient	Costliness Index of inpatient 1.35 or above (1.20 for general and tertiary hospitals)

Step 4. Develop effective triggers for the whole system

The HIRA staff shares results with the hospital providers to inform them of the deviation observed. In case observed patterns are not changed, HIRA staff members visit and counsel the concerned hospital. If the indicators still reflect deviations, necessary action is taken. Pay-for-performance incentives are available for providers based on these indicators.

Step 5. Test and refine before rollout

HIRA tests statistical analysis results for each indicator (average, median, quarter-based, etc.); calculation standards and validity; possibility of data collection; number of sample for statistical significance; validity of indicator composition; and threshold.

Step 6. Automate and launch finalized medical audit triggers

In the case of HIRA, indicators are reviewed and changed when it is considered necessary according to monitoring results. The cycle of change varies according to the indicator, but quality assessment is usually conducted within a one-year cycle, and assessment outcome is analyzed every year. So the monitoring cycle of indicators and triggers is also one year.

TAKEAWAYS

First, the team developing indicators and the team actually carrying out medical audits need to work in close cooperation and have discussions. Therefore, it is advisable to include the medical audit team as part of the team developing indicators, if possible. The medical audit team has a vast amount of experience and knowledge, including overall trends and awareness of relevant issues. Because they are the ones to actually put the indicators to use, they need to have an excellent understanding of the indicators.

Second, there should be a process for verifying the validity of the developed indicators and triggers. Pilot tests can provide opportunities to make improvements on any issues.

Third, acceptance of the indicators needs to be increased by engaging stakeholders, including the medical community. If it is difficult to include stakeholders in the team developing the indicators, it is advisable to have a process for gathering their feedback at the very least.

Fourth, to develop indicators and triggers, there should be personnel with training and knowledge in data structures, analysis tools, statistical methods, etc.

Fifth, because treatment behaviors and environments change with time, there needs to be regular monitoring of the stability of indicators and triggers. Equations for calculating indicators, triggers, and other data need to be modified and updated based on monitoring results.

To address the issues mentioned above, HIRA organizes appropriate teams; strengthens staff's capacity; engages stakeholders by seeking advice from medical experts, gathering opinions online and including them in teams developing indicators; and monitors the indicators.

3.3 Activities for Scrutiny

3.3.1. Claims Review

OBJECTIVE

Claims data is one of the most efficient sources of information for an efficient and effective medical audit system. This section on the claims review process provides a basic introduction on establishing or improving the claims review process to aid a medical audit system. A variety of measures may be taken when a claim gets flagged. The healthcare provider with the flagged claim may be monitored, required to receive relevant training, receive warnings, or undergo close review or possibly on-site investigations.

DEFINITION

A claim is a request sent from a healthcare provider to a purchaser of care for reimbursement based on services that have been provided to a person eligible for a covered service. The claims review process is the steps by a purchaser of care to determine liability (beneficiary and healthcare services) and amount of payment for the healthcare services.[14)]

SCOPE

The claims review can be done before the healthcare provider is paid, or after the healthcare provider is paid. This chapter is relevant for both scenarios.

14) Source:http://www.reference.md/ les/D007/mD007345.htmlaccessedon17Sept.2017.

OVERVIEW

This chapter of the toolkit presents:

- Key steps in the undertaking the claims review process
    - **Step 1:** Define data requirements and standards
    - **Step 2:** Develop the process and determine the type of claims review
- Challenges and Potential Solutions
- Detailed Case Study: HIRA, South Korea
- Takeaways

KEY STEPS

Step 1: Define data requirements and standards

Claims review is a key phase in the medical audit systems. It is undertaken both periodically and based on the needs of a specific situation. The scope of review can change depending on health insurance program, provider payment system, and scope of benefits of each country. The data sets consist of all claims from a healthcare provider, both claims that are paid and claims that are denied.

The claims review process and the medical audit systems depend on the quantity and quality of data. Quality of the data includes accuracy, validity, and compliance to standards.
Data standards can be viewed as a cornerstone for an efficient medical audit system. The Information Technology Initiative of the Joint Learning Network has developed an open data dictionary that provides an excellent guide to develop and improve data definitions and standards. The tool is available here: www.openhdd.org.

The purchasers that use an electronic claims management system can improve standardization of data with the use of drop-down menus.

One of the key prerequisites for effective claims review systems is a level of data standardization. Crucial within this is a standard coding system of each data field for claims. Currently the claims data from many countries do not follow standards for disease-specific coding, types of providers, etc. This situation becomes a challenge for undertaking analysis. Therefore, standardization and the use of information technology becomes important.

It is advisable to train the personnel responsible for submitting claims among the healthcare providers. This can save major efforts needed to clean data by the purchaser.

In the Philippines, PhilHealth had acquired business intelligence software to aid the standardization process and the regional staff in claims profiling and coding. However, there is an apparent need for training and capacity building on data analytics, especially since claims profiling had been decentralized to the regions for better monitoring and faster decision making. The software serves as a guide for standardization for the regions.

Step 2: Develop the process and determine the type of claims review

Claims review takes place from three perspectives. First, it confirms whether the healthcare services and the person who received the services are covered under the service agreement between the healthcare provider and the purchaser of care, and if the claim is filled in the standardized form provided by the purchaser. Second, it determines the validity of the services provided. For example, if the services should have been provided given the diagnosis. Third, it examines whether the claimed costs are correctly calculated according to the fee schedule and benefit standards set by the purchaser of care or regulator of care.

Where there are audit steps prior to payment to the healthcare provider, and when the medical audit unit is mandated to undertake an audit for the claims of a health insurance agency, the scope of claims review is for the services under the standard benefit package defined by the healthcare purchaser or Ministry of Health. This scope of the review is for service quality and other indicators in the network hospitals. Some insurance agencies conduct an audit of the claims after making payments. In the Philippines, the providers are paid immediately for every claim and subject the claims to post-audit or past-payment evaluation. The objective is to achieve operational efficiency in payments and help the providers in maintaining their cash flow. South Korea pre-pays 80 percent of the claim amount when the claims review deadline passes to ensure healthcare providers' adequate cash flow.

The claims review process differs depending on the use of information technology. Systems with electronic claims from providers allow for automated claims review where only a subset of claims need to undergo close review (or verification) by review staff. The review staff should only receive claims that require additional review. It is also recommended that a small percentage based on a random or target sample of the regular claims go to the review staff for close review.

A paper-based claims management system relies on manual review of the claims. It is still recommended that there be a system to elevate some claims for further review based on set indicators, and that a small percentage of claims, based on a random sample, is subject to additional verification to monitor the quality of claims review over time.

In the Philippines, PhilHealth uses case-based payment and pays the claims without review of the medical details. The paid claims, however, are subjected to post-audit claims profiling and monitoring through the Health Care Provider Performance Assessment System (HCPPAS). HCPPAS lays down the process and tools to be used to monitor accredited healthcare providers (HCPs) using indicators for financial risk protection, quality of care, patient satisfaction, and detection of adverse practices (formerly referred to as fraud). The medical post-audit involves the tagging of claims from red-flagged hospitals; claims of conditions to be mandatorily audited; and a certain proportion (usually 10 percent) of claims randomly selected. These claims are checked for a number of parameters, such as compliance to the no balance billing (NBB) policy; unjustified admissions; over and underutilization of services; and irrational medication and prescription, to name a few. Red flags are usually determined by the regions based on the unusual practices they see among providers. These providers are then subjected to validation through hospital or facility visits and chart review, among other steps.

Claims profiling may show unusual trends and patterns in claims utilization, which may necessitate additional validation. After validation and claims are found to have quality issues, these are elevated to a Quality Assurance Committee consisting of representatives of professional and specialty societies and regulatory bodies for expert opinion. If found to have legal issues, they are elevated to the Legal Service Sector for investigation. Claims may have quality as well as legal issues—these are elevated to the concerned bodies.

Close reviews

Close reviews are needed when standards are not met, additional information is required, or the claim is rare or for a high amount, or for a claim area that frequently has errors. Countries without advanced electronic claims data, can manually identify claims for close review.

It is recommended to have a triage system for close review. Here is an example of three levels:

1. Staff review
2. Committee member and peer review
3. Committee review

In the staff review, one member of the claims review team looks at the claim trends of providers and the appropriateness of claim specifications (for example, a close review of claim areas with a high probability of error, such as daily dose of medication).

After a staff has reviewed the claim against the standards such as benefit criteria and Ministry of Food and Drug Safety approval, a review can be requested from a medical professional who is member of an audit committee. This can be requested when a pharmaceutical or medical judgment is needed or when expensive claims are filed. The review committee member can request supplementary materials for review (for example, laboratory reports) or propose an on-site investigation.

It is also recommended to have a peer review committee with members that are employed as part-time members for specialized, fair, and enhanced review. These review committees can meet on a regular basis to review complicated claims. These committees can also suggest changes to indicators and data standards to improve the review process.

When it is difficult to review by documents alone, interviews can be conducted to listen to the explanations of the provider in charge of the treatment or to listen to opinions on the details of the treatment with the cooperation of the provider concerned. If it is necessary to confirm the facts about benefit-cost calculation details, such as data submitted from providers and reported status of providers, it is possible to review after on-site investigation is carried out.

CHALLENGES AND POTENTIAL SOLUTIONS

An effective claim review requires accurate and standardized data. Poor quality of data is one of the main issues in many countries. It is advisable to develop a system to continuously assess the quality of data and explore interventions to improve data over time.

Interventions can include training of staff among healthcare providers submitting claims. There can also be penalties for substandard quality of claims data (e.g. a certain percentage of claims with errors or missing data) or recognition of healthcare providers that are found to have the best quality of data.

Electronic review of claims is sensitive for data standards, and it is important that the standards evolve over time. For example, the use of certain acronyms may always be flagged for staff review. Over time these acronyms may be added to the standards that are accepted by electronic claims review. Recently, HIRA has introduced "knowledge-based review." It is a process where data scientists analyze unstructured data (such as text data obtained through the claims review process) to develop algorithms that will enable electronic review of areas that are currently subject to close review.

HIRA received and analyzed data from the Philippines, Ghana and India.[15] As for the Philippines, 36 variables of data were collected, however some of them were not suitable for standardization and coding. So after cleaning some of data such as ICD-10 code, RVS (Relative Value Scale) code, gender and age, 77% effective data were analyzed. Analysis of Philippines data found some of the types of standard errors as follows:

- Male claiming a female-specific illness or condition: male with preterm labor
- Female claiming a male-specific illness or condition: female with prostate cancer
- Age-specific condition: sixty-two-year-old female having a miscarriage
- Age-specific condition: adult male with infantile cerebral palsy

Specific fields, and coding patterns that will help to better identify claims for further medical auditing and to avoid errors in the identification of cases. Ghana data consisted of 4,866,351 claims with 24 categories. The data from 57 providers included provider code, patient personal information such as NHI number and age, diagnosis, treatment, drug code, amount and etc. Data analysis showed big difference in data standardization among providers. Most providers demonstrated over 95% accuracy in required fields such as NHI number and diagnosis G-DRG code, however 7 providers (12%)' birthdate data had less than 50% of valid value. Most providers inputted ICD-10 code and text together.

15) HIRA could identify or develop triggers with Philippinces 20,785,713 claims data from 2014 to 2016. Also, HIRA received 13,176,371 claims data from Ghana and 32,5 3 claims data from India.

India has different data variable numbers and variable names by state. And some values of variables in data such as administration, treatment and examination were text type which made it impossible to standardize and analyze.

To improve efficiency in review, data integrity needs to be enhanced using standardized data collection method. Review process can be efficient through the development of electronic claims program where only valid values can be entered or training course to teach how to submit claims.

DETAILED CASE STUDY: HIRA, SOUTH KOREA

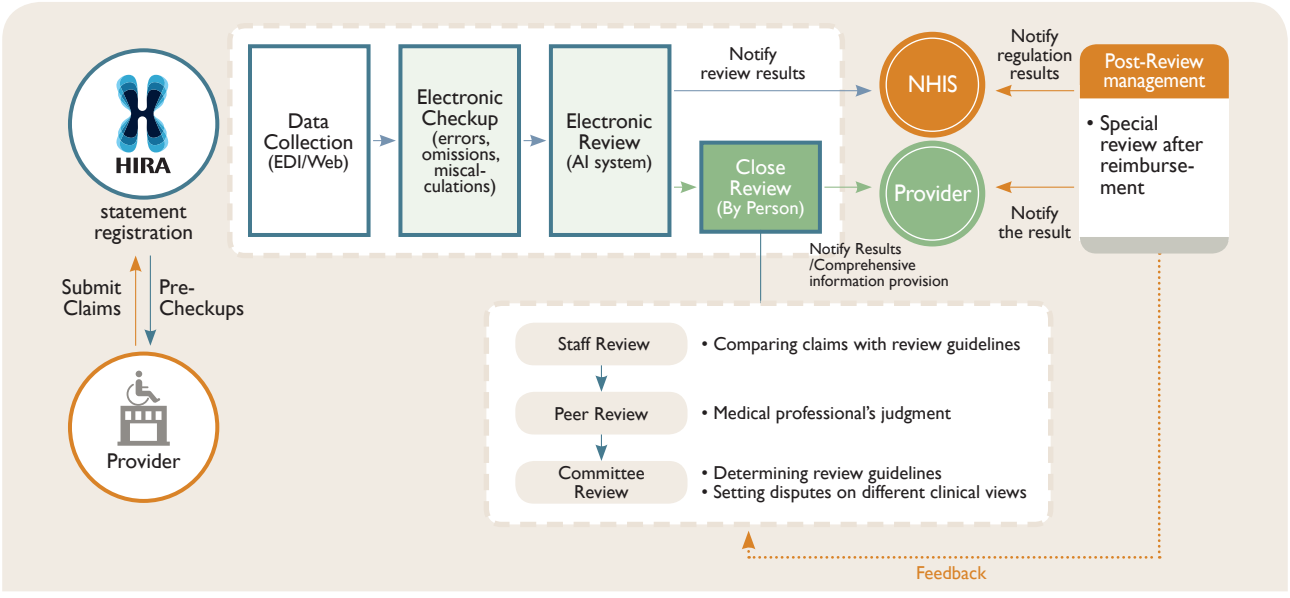
HIRA has developed an advanced system for claims review. The following Figure 15 presents the step-by-step claims review process followed at HIRA. Though most of the steps and processes mentioned below are conducted in an automated manner, the steps are generic in nature and can be used to determine logical steps for processing.

South Korea developed its own computerized system for claims in 1982, and established an electronic media (disk, Compact Disc) claim system in 1994. In 1996, the Electronic Data Interchange (EDI) system was established, as was the healthcare data analysis (Data Warehouse) system. HIRA developed the Drug Utilization Review (DUR) system in 2010 and Medical Claim Portal Service (MCPos). In 2011, HIRA's IT systems, including EDI review system, obtained ISO9001 and ISO20000 certification.

In an effort to enhance review expertise, staff received capacity-building training and the review committee system was expanded. The central review committee was established in 1979, and branch offices built their own review committees in 1988; a peer review system was adopted in 2000. As of today, HIRA has 90 full-time members and 1,000 part-time members, and there are 32 subcommittees.

Figure 15 shows the overall flow from claim submission from providers to HIRA, to review and post-management. Almost all data are collected digitally, and all data go through error check. Then, claims for standardized e-review are processed through the electronic review system, and some selected claims are sent to close review.

Figure 15 **Flow of Claims Review Process (HIRA)**



To expand the number of institutions that use electronic data interchange, a provider help desk was built in headquarters, as well as in all branch offices in collaboration with the electronic data interchange project organization. The computerized claims did not require providers to attach proof of purchase for materials and drugs and drastically simplified claim processes such as printing, binding, and transporting claim specifications. In addition, it provided diverse advantages such as shortened time for reimbursement from 40 days to 15 days, access to detailed review results, and reduced work volume for post-settlement and appeal applications.

To ensure quantity as well as quality of data, HIRA develops claim forms and codes (refer to Appendix 4), certifies claim software used by healthcare institutions, and provides a vast amount of coded information. The benefit lists are provided by HIRA in a master file[16] with the fee schedules (procedures, drugs, and medical supplies). The file can be downloaded by anyone through the website. The age and gender related to specific diseases, as well as communicable disease information are also provided through the master files. These are used for validation checks (error check) of fee schedules, drugs, and medical supplies, as well as codes of disease.

HIRA also trains claim personnel of newly established providers, or educates claim software developers about methods of filing claims. HIRA has developed programs to provide the pre-checkup service, and the revise/supplemental service allows the providers to check claim errors themselves. The pre-checkup service sends the specifications prepared in the claim forms to HIRA's temporary server and checks the results to confirm claim errors. The revise/supplement service corrects claim errors through WEB after the claims have been filed. Efforts are being made to receive claims electronically and in a standardized form for data standardization.

When the error check is done, the review process begins. The following Table 10 presents the step-by-step claims review process followed at HIRA. Step 1 and step 2 are the process for error check; they are conducted 100 percent electronically. Step 3 is review according to review standards, which can be either an electronic review or a close review by human reviewers. (For more information, see Table 10, Appendix 5) Close review takes place when the related review standards are not structured and therefore the claims cannot be electronically processed, or when review of the cases requires medical professional judgment. Close review consists of staff review (where review staff members check that the filed claims are compliant with the review standards) and peer review (where review committee members check cases the review staff refer to them). A claim is sent to committee review when a new review standard needs to be made, opinions vary on the application of existing standards, or other consensus is needed.

Though most of these steps are automatically carried out by HIRA's ICT system, the flow of the steps is generic in nature and can be followed to organize a logical claims review process.

16) A version of a data file that is kept for reference and regularly updated, and from which copies are refreshed (Oxford Dictionary). In the South Korean fee schedule master file, the information such as fee-schedule code, date of benefit listing, classification number, Korean name, English name, additional charge, surgery, and unit price per type are included.

Table 10	Electronic Review Processes (HIRA)
Step 1. Validation check (Error Check)	**Data Field Check** Verify that the essential fields are complete and correct in the claims submitted. The essential fields refer to the information included in general information and diagnosis information, such as a patient's personal identification number, gender, and hospital code. For example, return the entire claim file if there is an error in the hospital number. If a disease specific to women (e.g. benign neoplasm of ovary) is recorded under men, then the corresponding specification is invalid.
Step 2. Validation check (Error Check)	**Auto Check** Check to identify any price or coding errors. It is a step to check treatment and prescription data from providers with master files of benefit lists (procedures, drugs, and medical supplies). This is a stage where unit error, code error, and calculation error are reviewed and adjusted. For example, if the unit price for a specific drug is one dollar, but the claim is for one dollar twenty cents, then the amount is adjusted to one dollar.
Step 3. Standards Review	**Drug Permission Check** Verify that the drug matches the diagnosis. This is a step to check for drug permission by the Ministry of Food and Drug Safety. For example, in case of ibuprofen, the maximum permitted daily dose by the Ministry of Food and Drug Safety is 3,200 mg. If it is over the permitted dosage, then it is reviewed and adjusted.
Step 4. Standards Review	**Review Standard Check** Compare services received against standard medical practices set by law; This is a computerized review based on standards. Many adjustments are made automatically while some are brought forward for staff review. For example, if a hospital has provided a medical treatment within normal working hours based on the records, but the healthcare provider has filed a claim including additional charges for work after hours, this is automatically corrected, deducting the charges for work after hours.
Step 5. Standards Review	**Special Case Disease Check** Review by specific disease type (for example, chronic lower respiratory disease, etc.) against standards. Based on frequent diseases managed by outpatient care, claims for certain diseases are selected for routine check against standards. For example, claims for oral Meloxicam used in cases of postmenopausal arthritis accompanied by a pathologic fracture are adjusted. • Approved uses of oral Meloxicam: short-term symptomatic treatment of acutely exacerbated osteoarthritis (degenerative arthritis) accompanied by pain and ataxia, symptomatic treatment of rheumatoid arthritis, symptomatic treatment of ankylosing spondylitis
Step 6. Standards Review	**Drug Utilization Review (DUR) Check** Check for drug-drug, drug-age, and pregnancy contraindications. For example, make an adjustment if prohibited drugs during pregnancy were given to pregnant women.
Step 7. Standards Review	**Maximum Number Check** Compares to a medically-defined standard that sets number of administrations per day, total number of administrations, number of procedures per day, and also comparing total number of cases per healthcare practitioner. For example, make an adjustment if alpha-fetoprotein tests are performed more than twice a day.
Step 8. Standards Review	**Knowledge-based review** Provider-level and specialty-specific electronic review is conducted based on analyses of structured and unstructured claims review data, such as HIRA's claims review data, as well as providers' claim data, including texts entered by providers.

In Korea, the results of the claims review are notified to the providers and NHIS. NHIS reimburses the providers with the amount determined through the claims review.

After reimbursement, post-review management is conducted on items whose review requires more comprehensive data. That is, post-review management is conducted on items that are hard to review during the claims review process due a lack of data linkage (by patient, by period, by claim specification form). For example, bone density testing is covered once a year and therefore needs to be reviewed using accumulated annual data. The post-review management process complements the current claims review system and improves its accuracy.

TAKEAWAYS

Quality data sets are a prerequisite for conducting an effective claims review.

Standardization of data elements and coding is key to effective claims reviews.

Systematic steps should be followed in the claims review process to reduce errors in identification of claims for medical audit.

Countries should gradually move to electronic data systems and integrate their information systems at the provider level.

3.3.2. On-site investigation

OBJECTIVE

This chapter guides the user through the key steps needed to ensure a successful investigation. Investigations can be expensive and require extensive time from scarce human resources. It is therefore important to understand what makes for a successful investigation. Often much energy goes toward the actual on-site investigation itself, without adequate preparation and follow-up. Based on experiences from all members of the Medical Audit Collaborative and best practices from South Korea, this chapter highlights key lessons across the three phases of preparing, executing, and following up on on-site investigations.

DEFINITION

A medical audit investigation is a formal inquiry to review healthcare practices. While the name may imply a punitive examination, an investigation is best viewed as a supportive action, whose ultimate aim is helping healthcare providers to improve quality of care at an affordable cost. Off-site investigations include a request for more data and a closer review of the information; on-site investigations occur at the provider's premises and include interviews and on-site verification and review.

SCOPE

While investigations can be either off-site or on-site, this chapter focuses on the more resource intensive on-site investigation. On-site investigations can occur as a result of multiple triggers: claims data triggers (as discussed in the previous section), request from the Ministry of Health, reports by the whistle-blowers or the public, etc.

OVERVIEW

This chapter of the toolkit presents:

- Seven key steps to a successful on-site investigation, across three overall phases
  - I. Preparation
    - Step 1: Ensure structural components are in place
    - Step 2: Select cases
    - Step 3: Plan for on-site investigation
  - II. Execution
    - Step 4: Conduct on-site investigation
  - III. Follow-up
    - Step 5: Review and analyze findings
    - Step 6: Develop and communicate recommended actions for facility
    - Step 7: Monitor enforcement and provide ongoing facility support
- Detailed case study: HIRA, South Korea
- Takeaways

KEY STEPS

I. Preparation

Step 1. Ensure structural components are in place

There are four key structures that should be in place prior to commencing an on-site investigation (many of which have been described in previous chapters of this toolkit):

a) **Organizational requirements:** The Ministry of Health typically supervises and regulates the investigation process, with the agency/trust in charge of implementing the health insurance programs undertaking the investigation. (See Chapter 1 for more information)

b) **Legal requirements:** Legal support for the investigation process often comes via a national or state health policy or a health insurance act. A best practice is for the rationale, scope of work, and roles and responsibilities of the site investigation to be explicitly defined in the national health insurance program guidelines, linked with the standard treatment guidelines or protocols in use. (See Chapter 1 for more information)

c) **Human resource requirements:** For each investigation, the medical audit department forms a skilled, experienced, and multidisciplinary team—with specific knowledge and skills determined based on the reason for investigation. Broadly, the on-site investigation team generally consists of medical, paramedical, legal, and administrative staff. Set guidelines for team selection are generally used to avoid conflict of interest and ensure transparency. (See Chapter 2 for more information)

d) **Information technology:** In countries with electronic claims management systems, analysis of claims data can drive the identification of the healthcare providers and clinical areas that should be audited. All countries do not have electronic claims management systems, but the claims data remains an important source to prioritize providers for investigation and to prepare for investigation. (See Chapter 3.2 on Triggers for medical audit for more information)

Step 2. Select cases

It is important to have a well-defined process to identify providers to be the subject of investigations. Triggers to identify healthcare providers for investigation can be built into the claims review process (see Chapter 3.3.1 on claims review for more information). It is recommended that a committee review the information about a healthcare provider, including trends in claims, before deciding that an on-site investigation should go forward. There are also sources that can trigger an investigation, such as patient grievances (e.g. denial of services or provision of low-quality services), whistle-blowers, requests from the Ministry of Health, etc.

The number of investigations depends on the available resources.

Step 3. Plan for on-site investigation

Once cases have been selected, there are seven broad steps related to plan the investigation:

a) **Ensure legal paperwork is in place.** This is often in the form of an official order to investigate from a government authority.

b) **Prepare a budget and time table** for investigation. The cost of an investigation depends on the geography, the specialties that need to be investigated, security measures that may have to be considered, etc. It is recommended that a budget is developed by the medical audit team, and internally approved for each on-site investigation.

c) **Assemble a multidisciplinary team** to conduct the investigation, **being sure to avoid conflict of interest.** Some countries have dedicated teams for investigations; other countries assemble teams for each investigation from a pool of professionals who are committed to a minimum

number of investigations per year. Benefits of dedicated teams include efficiency, as they become specialized at using the protocols for investigation. Benefits of assembling new teams include the opportunity to specialize the team based on the type of investigation, and avoiding peer pressure in situations of conflict of interest. It may be ideal to have a core team of dedicated staff managing the routine investigations, paired with team members from a pool of professionals with other jobs in the healthcare system. It is advised to have a code of conduct for the medical audit team and ask all members of the team to read a conflict of interest policy and sign a conflict of interest questionnaire to disclose any potential conflicts. Please refer to Appendix 6 for a code of conduct and oath of secrecy sample from Ghana.

d) **Training of the team for investigation** varies by country. It tends to include basic investigation skills, hospital administration, management training, and knowledge of medical terminology. It is important to ensure transparency and avoid conflict of interest, as investigation teams can be subject to bribes and sometimes even threats. In addition to signing conflict of interest questionnaires, it is advisable to offer training on how to handle situations of conflict.

e) **Define team roles and investigation objectives; compile preparatory research and analysis.** A team leader is designated and every team member is assigned their respective roles and responsibilities. The team defines the objective of the investigation and, based on this goal, collects data from at least the six months prior to the scheduled investigation. This includes statistical analysis of claims data, comparing the results with setting standards and guidelines. There may be occasions when additional data is requested from the healthcare providers prior to the on-site investigation.

f) **Design or adapt tools for investigation.** Teams design or adapt tools, which include inspection checklists, questionnaires, and standard treatment protocols. A team should also bring any technology needed for the investigation, e.g. cameras needed to take photos or videos at the facility.

BOX 2 **Tools for on-site investigation**

- Checklist for facility inspection at hospital, evaluation of inpatient case records, evaluation of operation theater, evaluation of ICU, evaluation of wards and availability of staff
- Questionnaire for interview of beneficiary, treating healthcare provider, and supporting staff
- Standard treatment protocol or pathways (see more in the next section on clinical audits)

(Please refer to Appendix 7 for a sample on-site investigation format.)

g) **Set date and decide whether the on-site investigation will be announced or unannounced. If announced, send communication to facility informing them of upcoming on-site investigation.** Whether the visit will be announced or unannounced (i.e. a surprise visit) will depend on the rationale and expected outcomes of the on-site investigation. For instance, if it is important that key staff be available and ready with required documentation, it is better to notify the provider in advance (a majority of the countries in the medical audit collaborative primarily conduct announced on-site investigations). On the other hand, if the on-site investigation is triggered urgently, and there is a risk of destruction of evidence, an unannounced on-site investigation may be more appropriate. The benefits and challenges of announced and unannounced on-site investigations are as follows:

Table 11 **Pros and Cons of Announced and Unannounced On-site Investigations**

Announced On-site investigation	
Pros	**Cons**
• Provider buy-in • Proper documentation available • Key staff available • Better planning and time saving	• Interference possible at multiple levels • Data potentially manipulated • Data likely sanitized • Risk of buy-off/bribery of investigative staff
Unannounced On-site investigation	
Pros	**Cons**
• True picture of healthcare facility • True data – Opportunity to interact with beneficiary, staff, etc. • Minimal interference	• Lack of cooperation from healthcare providers • Provider trust compromised • Security of team compromised • Key staff members may be gone that day • Inefficient use of time and resources • Legitimacy of findings may be compromised

II. Execution

Step 4. Conduct on-site investigation

The team visits the health facility on the scheduled date and conducts the on-site investigation, using tools like checklists, questionnaires, and standard treatment protocols. While undertaking the investigation, the team should keep in mind the working hours, values, and norms of the facility, the auditor ethical code, and medical ethics. The elements of on-site investigation can be broadly divided into the following seven elements, with observations recorded on camera, video recorders, and field notes:

a) **Explanation of purpose and objectives of on-site investigation.** This is generally done in two ways: (1) Displaying the official order to investigate, which tends to happen immediately upon arriving at the facility. This official order clearly states the purpose of the on-site investigation. (2) Conducting an entrance conference to further explain the purpose of the on-site investigation. The nature of this entrance conference varies from country to country, though a best practice is highlighting the supportive nature of the on-site investigation to help improve the quality of care provided at an affordable cost. In the Philippines, the investigation team conducts an entrance conference with the facility management to explain the purpose and process of the investigation. In Ghana, the entrance conference is held at the District and Regional Health Directorates and National Health Insurance Authority District and Regional Offices to discuss the purpose and expectations of the investigation.

b) **Facility inspection.** This includes a survey of infrastructure, equipment, and healthcare workforce at the facility, based on the objectives of the investigation. This may include the operation theater, wards, intensive care units, laboratory, patient waiting area, etc.

c) **Verification of regulatory licenses and documents.** A verification of regulatory licenses includes confirmation of health facility registration, hospital accreditation, laboratory accreditation, pharmacy license, blood bank license, etc. Document verification can include a comparison of claims data with the admission registers, patient case sheets, discharge registers, laboratory registers, operation theater maintenance registers, etc.

d) **Walk-through of patient process from registration to discharge,** reviewing and evaluating the entire scheme process using checklists, clinical protocol, and scheme guidelines.

e) **Detailed review of patient case records.** Depending on the purpose of the investigation, a sample of patient records can be taken and compared to standard treatment guidelines.

f) **Interviews with doctors, staff, inpatients, and post-discharged beneficiaries.** The team can interview treating doctors and supporting staff related to specific medical practices discovered by the audit team, as well as inpatient interviews at the facility regarding patient experiences, satisfaction, and any complaints against the facility. Post-discharged beneficiaries are also often interviewed through domiciliary visits to ask about quality of service, any fraudulent activities, and validation of findings.

g) **Confirmation by the health facility.** On the last day of the investigation, the on-site investigation team generally receives a confirmation document from the health facility acknowledging the investigation process. In the Philippines, an exit conference is usually conducted.

III. Follow-up

Step 5. Review and analyze findings

The investigation team reviews all the documents and evidence collected from the on-site visit in detail. Upon completion of the on-site investigation and review, the team may choose to disclose the findings to the provider, depending on the country's rules and regulations. The level of disclosure to the provider varies from complete confidentiality to full disclosure, with a formal report with detailed findings shared subsequently. Malaysia maintains full confidentiality upon exit. In Kenya, Indonesia, and the Philippines, the team discusses broad objectives, process, standards, and overall results and recommendations with the provider.

A detailed report of findings and opinion of the team are reported to the appropriate authority, e.g. Medical Audit Director, after validation of investigation findings. The appropriate authority takes the decision on any required legal action or penalty of the health facility. The leadership of the medical audit team generally decides if there is a need for follow-up action.

Step 6. Develop and communicate recommended actions for facility

In most cases, the Ministry of Health decides on necessary action after review of the investigation report. Decisions about legal action such as closing of facilities generally rest with the Ministry of Health, for example the Board of Medical Ethics. The purchaser makes decisions if the healthcare provider is eligible to continue to be reimbursed for services.

In cases where fraud is verified, recommended actions include:

a) **Redemption of unlawful profits:** Unlawful profit (amount claimed for the service provided) by the health facility is calculated and announced.
b) **Suspension of operations or license:** If it is determined that the health facility or provider engaged in fraudulent activities, the facility's operations may be suspended or the facility's license may be cancelled.
c) **Imposition of fine:** If the state decides that suspension of the facility will cause significant harm or inconvenience to the patients, another option is to impose a monetary fine to the facility, along with a warning to stop further fraudulent activities.
d) **Criminal prosecution:** Depending on the nature of the fraudulent activity, the Ministry of Health may decide to prosecute with help from the crime/law department.

These actions and potential penalties are then shared with the audited facility, along with a time schedule. Apart from the audited facility, results also tend to be communicated to the healthcare regulatory agencies, patient groups, health insurance program trust or governance board, and sometimes to the public at large. Often, disclosure to the public happens in an open domain in electronic media (e.g. press conference or website) with the recommended course of action, ensuring transparency in a public forum and acting as a warning to other facilities who may be engaged in fraudulent activities.

Step 7. Monitor enforcement and provide ongoing facility support

Longer-term follow-up generally consists of two parallel processes:

a) **Enforcement monitoring and follow-up:** This process ensures that penalties against a health facility are fulfilled and often includes regular checks to ensure fraudulent activities do not resume in the future.

b) **Support to the facility to prevent relapse:** As a measure to prevent future relapse, it is helpful for the facility to be reminded about regulations, policies, and protocols. Best practices include hospital employees being trained through capacity-building workshops to address areas found deficient during the on-site investigation and review process. In Indonesia, the on-site investigation process has led to improvements in hand hygiene, patient identification, and safe pregnancy and delivery.

DETAILED CASE STUDY: HIRA, SOUTH KOREA

Step 1. Ensure structural components are in place

In Korea, the Ministry of Health and Welfare holds the legal authority and oversees the on-site investigation with support from HIRA and NHIS. The experts from HIRA support the overall process related to on-site investigation, such as the establishment of an investigation plan, selection of target providers, execution of investigation, reimbursement account review, and administrative measures. NHIS provides support for post-benefit management during the on-site investigation, including inquiring whether patients received certain insurance benefits.

The legal basis for the on-site investigation is the National Health Insurance Act. In HIRA, there is a department that is dedicated to on-site investigation. It is organized into three divisions: the first in charge of planning and selecting healthcare providers subject to on-site investigation, the second in charge of conducting the investigation and analyzing the investigation results, and the third in charge of post-management including administrative measures. During the on-site investigation process, South Korea uses HIRA's data from the claim submission and review system, provider healthcare resource management system, and data analytics system, in linkage with data from external sources including immigration data and subscriber eligibility data.

Step 2. Select cases

The process of selecting healthcare providers subject to on-site investigation is the starting point of on-site investigation, and it is a crucial step. In South Korea, all healthcare providers, numbered at around 90,000, are mandatorily required to participate in the National Health Insurance system. In order to increase the efficiency of on-site investigation, it is necessary to be able to sort out the providers with a high probability of fraudulent or false claims. HIRA has a detection system that can sort out these providers. The average detection rate was 86 percent, which means 86 percent of on-site investigations confirmed fraudulent activity. The types of on-site investigation conducted by HIRA are as follows:

- **Regular investigation:** Conducted regularly as a part of the monitoring and evaluation system
- **Special investigation:** Conducted when there is a social issue such as unethical medical practices or when a collective fraudulent claim practice necessitates a general investigation of multiple providers
- **Urgent investigation:** Conducted on providers with a high probability of false and fraudulent claims that are like to destroy evidence or close the business
- **Enforcement monitoring:** Monitoring of administrative measures like suspension of operation of health facility

For periodic investigations, the potential target providers (providers suspected of fraud) are selected based on patient grievances and requests from HIRA, NHIS, and other institutions (Anti-Corruption and Civil Rights Commission, Prosecutor's Office, etc.). NHIS requests investigations based on their inquiries to patients regarding the insurance benefits they received and whistleblowers' reports. HIRA requests investigations of providers that showed a probability of fraudulent claims through claims review, quality assessment, healthcare resource management, and the fraudulent claims detection system, and that frequently overcharged patients with a high copayment amount. For example, the Indicator Linkage Management System classifies healthcare providers as subject to on-site investigation if they have been requested on multiple occasions to improve their Episodes-Costliness Index (ECI) because it is over 1.35 but they have not shown any improvements. Providers are also subject to on-site investigation if their monthly average number of fraudulent claims is shown to exceed five cases for several consecutive months during the claims review process or if they refuse to submit relevant documents on two or more occasions without any special reasons, making it impossible to verify fraud.

Of all the candidates for on-site investigation, MOHW selects an appropriate number to undergo on-site investigation by considering the efficiency and urgency of the investigation based on the annual on-site investigation plans and conditions.

Step 3. Plan for on-site investigation

The Minister of Health and Welfare develops an appropriate investigation plan including the number of providers, investigation personnel, duration of investigation, period under investigation, etc. The investigation plan is devised by factoring in HIRA's and NHIS's available resources (budget, human resources, etc.). Once the plan is in place, MOHW gives the order to carry out the investigation.

The on-site investigation team consists of personnel from MOHW, HIRA, and NHIS. The personnel from HIRA are mostly claims review personnel with some administrative and IT personnel.

The duration of investigation and number of investigation team members are flexible and change according to the type of investigation and the provider level. On average, three investigators conduct the investigation for three days; at most, seven investigators conduct investigation for fourteen days. If it is necessary to extend the duration of investigation, prior approval is required from MOHW.

The person in charge of investigation from MOHW will be the head of the team, the senior member of HIRA will be the leader of the team, and the investigation personnel are appropriately allocated according to the characteristics of providers such as the provider level, number of specialties, and reimbursement amount.

If one has any relationship with the representatives of providers, any previous work experience at the target provider, any special interest relationship (such as school or regional connection), or any other case where objective and fair investigation may be at stake, that member is excluded from the investigation team.

South Korea provides training on changes of standards related to the execution of investigations, main points of investigation, and how to manage situations of corruption and threats, which includes a pledge that prohibits receipt of money or entertainment, tightened discipline among public officials, and confidentiality of private information. Investigators analyze the corresponding healthcare provider's data such as claim records, claim adjustment records, and current status of healthcare resources related to the requested area of investigation. In addition, they prepare checklists to be used during the investigation, the list of materials to request for submission, the benefit criteria, etc.

In South Korea, the healthcare providers are not notified of on-site investigation in advance to prevent flight risk and the destruction of evidence.

Step 4. Conduct on-site investigation

The investigators present their identifications and the official order of investigation to the representative(s) of the healthcare provider. Then they explain the grounds for the investigation as well as its duration. In order to fact-check the claim data, the investigators verify documents such as the provider's medical records, dispensing records, and copayment ledger, etc. If necessary, they inquire patients whether they received certain insurance benefits and conduct interviews with the hospital personnel, which may be recorded or videotaped with consent from the representative(s) of the healthcare provider. After the investigation is complete, the investigation team receives a documented confirmation from the representative of the provider acknowledging the investigation findings, and reports the results (estimated fraud amount, type of fraud, etc.) to the Minister of Health and Welfare.

The investigators examine a minimum of six months' records on average but may extend it to a maximum of three years' records if they find severe cases of false and fraudulent claims.

Step 5. Review and analyze findings

Since the length of suspension is determined based on the amount of unlawful profit, the amount must be calculated accurately. Using the On-site Investigation Confirmation Form as the basis, the fraud amount is aggregated for each of the following: item of treatment, type of fraudulent claim, and method of re-review

and refund. The investigators then produce an itemized statement including the total fraud amount, monthly average fraud amount, fraud rate, detailed records of fraud for each healthcare provider, and the length of suspension to impose administrative measures. Finally, the investigators prepare an advance notification letter to send to the healthcare provider regarding the administrative measures along with the results of re-review and records for administrative measures. They then make a report to MOHW.

Step 6. Develop and communicate recommended actions for facility

Since the results of on-site investigation can lead to grave consequences such as the healthcare provider's suspension of operations, providers are notified of their administrative measures in advance and given a chance to explain themselves. When providers choose to provide their input, they need to have objective evidence to support their statements, and the submitted input is reviewed by HIRA.

The investigation results can give rise to the following types of actions:
First, there can be administrative measures including claw back of fraudulently obtained profits and suspension of operations. Of the unlawful profits discovered, the unlawful copayment amounts are recovered by NHIS and returned to the patients. The suspension period is determined to be a period of up to one year depending on the monthly fraud amount and fraud rate. Instead of suspending their operations, the provider may pay penalties, which depends on the length of suspension. Second, there can be suspension of medical or pharmacist licenses for a period of up to one year according to the Medical Service Act and the Pharmaceutical Affairs Act.

Criminal charges are possible as a result of document submission violations. For example, if providers were ordered to submit documents and refused, submitted false claims, refuse investigation, or send false reports. In 2014, there were 57 criminal prosecution cases.

Providers can file a formal objection against any administrative measures imposed. There are two types of objections – administrative trial and administrative litigation. Administrative trials are filed with the Central Administrative Appeals Commission while administrative litigations are filed with the Administrative Court. Since 2010, the list of providers with false (fabricated) claims has been made public in South Korea. If the amount of benefit costs caused by false claims is over 15,000 USD or more than 20 percent of the total benefit cost claimed among the providers, the motive, frequency and results of the offense are considered in deciding whether to make a public announcement. The name of the provider, the address, the name of the representative, its violations, and the resulting measures are announced on the websites of MOHW, NHIS, HIRA and local and regional municipalities for six months. Serious offenses are announced in the media.

Step 7. Monitor enforcement and provide ongoing facility support

There is monitoring to ensure that healthcare providers are carrying out the measures imposed on them as the result of on-site investigation and to ensure that the same types of fraudulent activities are not recurring. Enforcement monitoring, which checks whether the suspended provider is continuing its operations in illegal or expedient ways, is conducted in the same manner as periodic investigations. Moreover, the representatives (and related persons) of providers that filed false claims are managed using a separate tracking system.

After administrative measures are imposed on providers, their total benefit amount is analyzed. Providers whose benefit amount increased over 30 percent are selected for more focused management, which includes close review. If they continue to submit fraudulent claims, they are once again subjected to on-site investigation.

TAKEAWAYS

Well-defined and established organizational and legal support is essential for efficient on-site investigations.

Link claims analysis with indicators and triggers to on-site investigations, and have a committee or panel review information about the provider to decide that an on-site investigation is needed.

Planning the Investigation: Official investigation order, multidisciplinary and well-trained team of investigators, conflict of interest policy, data collection tools, well-defined roles and responsibilities, logistical arrangements, intimation to concerned facility, and an entrance conference.

Conducting the Investigation: Facility inspection with checklist, documentary verification, license and regulatory verification, examination of case records compared with treatment guidelines, inpatient interviews, and staff interviews.

BOX 3

Off-site investigation

The Ministry of Health and Welfare in South Korea introduced off-site investigation as an alternative to on-site investigation in January 2017 in order to decrease administrative burden on on-site investigation for healthcare providers. Also off-site investigation aims to alleviate tiredness between on-site investigation team and providers, and to cover the needs to increase the number of healthcare providers subject to investigation for fraudulency.

Off-site investigation refers to the method of investigation into the legitimacy of the claimed benefit costs via requesting submission of relevant documents such as treatment records and prescriptions without visiting the healthcare provider in question.

The process of off-site investigation consists of below steps:

1. Determine target providers for off-site investigation among providers suspected for fraudulent claims by Investigation Selection Deliberation Committee. Among healthcare providers of which HIRA secured evidence of fraudulent claims, this committee selects target providers for off-site investigation. Target providers should be unlikely to manipulate related documents and clear evidence.
2. Develop off-site investigation plan and make a detected fraud list for each target provider. MOHW makes a document for conducting off-site investigation. Send an investigation order and a request letter for cooperation to each target provider by registered mail, and also give a notice on off-site investigation implementation by phone.
3. Check the list of detected fraudulent claims and submit answers to the list of fraudulent claims or explanatory materials by target provider. HIRA off-site investigation team reviews submitted documents and sends a confirmation letter regarding to review results of fraudulent claims by registered mail. And inform the target providers that they should return the letter with signature within 7 days after its arrival.
4. Calculate fraud amount based on off-site investigation results.
5. Carry out the same administrative measures and post-management as those of on-site investigation.

3.3.3. Clinical Audit

OBJECTIVE

This section delves deeper into investigation and specifically focuses on the key steps required for a successful clinical audit. While the overall steps for clinical audits are largely similar to the steps required for a successful on-site investigation, there are activities that are unique to the clinical audit process.

DEFINITION

A clinical audit is generally performed for a subset of healthcare providers and focuses exclusively on clinical elements and quality-related aspects of healthcare. In South Korea, it is called quality assessment.

SCOPE

While on-site investigations are generally comprised of both clinical and financial considerations, this chapter focuses on the methodology for clinical auditing. The main focus is on clinical audits' structure, clinical process, and outcome as compared to evidence-based standards. The clinical audit also offers an opportunity to compare claims data with records of the healthcare provider.

OVERVIEW

This chapter of the toolkit presents:

- Seven key steps to a successful clinical audit, which are similar to the steps described previous section of on-site investigation
  - I. Preparation
    - **Step 1:** Ensure structural components are in place
    - **Step 2:** Select topics
    - **Step 3:** Plan for clinical audit
  - II. Execution
    - **Step 4:** Conduct clinical audit

III. Follow-up

- Step 5: Review and analyze findings
- Step 6: Develop and communicate recommended actions for facility
- Step 7: Monitor enforcement and provide ongoing facility support

- Detailed case study: HIRA, South Korea

KEY STEPS

I. Preparation

Step 1. Ensure structural components are in place

Structural components include mandate or approval from the medical audit department or agency for the clinical audit, agreement among healthcare providers that they may be subject to external clinical audit (generally included in contract with the purchaser of care), availability of budget for the activities, ethical approval (generally not required for audit, but for research), etc. As with on-site investigation, there are four key structures that should be in place prior to commencing a clinical audit. This section does not include a detailed description of the four key structures since they are mostly similar to what was explained in the section on on-site investigation.

a) Organizational requirements (See Chapter 1 for more information)
b) Legal requirements (See Chapter 1 for more information)
c) Human resource requirements (See Chapter 2.2 for more information)
d) Information technology (See Chapter 3.2 on triggers for medical audit for more information)

Step 2. Select topics

Selection of the clinical topic for verification should be based on clinical importance, scientific evidence available (e.g. standard treatment guidelines or pathways based on evidence), and feasibility to access data for clinical audit. The objective of the clinical audit can be to understand how one healthcare provider performs in a clinical area (e.g. suspected malpractice) or how the clinical area is managed across all healthcare providers managing the clinical area (e.g. to identify areas for quality improvement).

Step 3. Plan for clinical audit

a) **Assemble team for clinical audit.** It is important to include professionals with clinical authority to make decisions regarding what available standards will be used for the clinical audit. It is also important to include professionals with different clinical and administrative backgrounds.

b) **Develop relevant standards for chosen topic.** The standards should include information on structure (qualification of staff, standards of equipment), clinical process (for example, diagnostic tests, communication with patient, post-operative pain management), administrative process (discharge protocol, medical records management), and outcome (expected effect on health status). It is important to consider how the government, professional associates, or other groups communicate standard treatment guidelines or pathways to the healthcare providers, and the expected level of awareness of these standards.

There are sometimes standard treatment guidelines or pathways endorsed by the government or professional associations in the country. These standards (based on evidence, and endorsed in the local context) should be the main source of clinical audit standards. It is always good to conduct a literature review to identify other relevant standards to be considered (standards with more recent international evidence). If there are major differences between the government-endorsed standards and the latest evidence, it may be best to bring this up with the authority developing and endorsing standards before they are used as a base for clinical audit.

c) **Develop a written protocol** that explains the rational for conducting the clinical audit, details the verification standard with defined data sources, and specifies the healthcare provider and patient profile to be subject to verification. The written protocol should also define the sample, including the sample size (number of cases) and how to make sure the sample is representable. The sample size depends on the desired degree of confidence and the available resources. Thirty to forty cases are often sufficient for a fair clinical audit (clinical research requires a much larger sample). In some cases, purposive sampling targets a specific set of facilities or providers. It is always good to include a data sheet to standardize how the data will be collected. Guidelines for patient confidentiality to anonymize patient information is good to include in the protocol.

II. Execution of the clinical audit

Step 4. Conduct clinical audit

The actual execution process of a clinical audit is comprised of two processes: Data collection, and Constructing a dataset for analysis.

a) **Collect data:** Data collection is mainly done through medical records available at the healthcare facility. Multiple sources of data are often required. This can include radiology reports, laboratory reports, pharmacy records, and community health records. There are instances where data may not be available but is nonetheless critical for the fair assessment of the clinical topic. It may be necessary to collect data prospectively through direct observations or with patients or healthcare providers filling out data collection forms.

b) **Construct a dataset for analysis:** The collected data should be checked for its accuracy and then coded into a format that is suitable for analysis. Data analysis benefits from a coding manual. Each data field gets an assigned numeric value, including the data fields with text answers (for example: Was blood pressure recorded? Yes=1 No=2). Create categories with assigned numeric values for questions with multiple text answers. If possible, data should be collected in coded (rather than text) format, or the system should be designed to automatically code the data. If the country or the purchaser of care has a data dictionary defining data standards, make sure those standards are used (see the open data dictionary as a resource to develop a data dictionary). Some information may be collected manually during verification. It is good to then digitize the data from the verification to ease analysis. Expectations for each question or indicator should be assigned based on the standards for verification.

III. Follow-up on a clinical audit

Step 5. Review and analyze findings

The analysis can be done in Excel or any basic software for statistical analysis. If the purchaser does not have an internal team to manage statistical analysis, the verification team can partner with a university or other trusted group with existing expertise for the data analysis.

Data analysis results should be able to show levels of healthcare quality and quality variance among healthcare providers. It is recommended that data is analyzed from different perspectives: the national level, regional level, healthcare provider type level, and healthcare provider level. Analysis from multiple perspectives makes

it easier to select the subjects of action or supportive activities that take place as the result of clinical audit. Fundamentally, the units of analysis should be the individual indicators. This is to help healthcare providers to identify areas in need of quality improvement and to conduct the necessary quality improvement activities.

Outcome indicators are risk adjusted for a fair comparison among providers because providers' treatment results depend on their patients' risk factors. Additionally, all values from the clinical audit can then be added up to one assessment score. The aggregate score is calculated to make it easier to see overall quality at a glance, facilitating comparisons among healthcare providers. The aggregate score is especially useful when the clinical audit results are disclosed to the public and when incentives and disincentives are applied.
Analysis can lead to either an absolute assessment or a relative assessment with ranking. Absolute assessments are recommended, as they reward institutions that achieve a previously agreed upon quality of healthcare (versus a ranking system of providers).

Step 6. Develop and communicate recommended actions for facility

The results of clinical audit can be provided to various stakeholders, used to determine consequent monetary compensations, and linked to claims review and on-site investigation. Based on analysis, the clinical audit team develops a report that is presented to the providers. The verification team can (together with the provider) do a root cause analysis to understand the reasons for the results. The provider should be able to use the information to improve quality. Besides providers, the clinical audit results can be used by other entities, including the Ministry of Health (as input for making policy decisions to improve the nation's healthcare quality), and the public. Disclosing the results to the public can allow patients to make informed choices when choosing providers.

Step 7. Monitor enforcement and provide ongoing facility support

Diverse support should be offered to medical institutions so that they can carry out voluntary healthcare quality improvement activities. Information such as quality improvement strategies and their latest trends can be made available, and training and capacity building can be provided to help providers to make an improvement.

DETAILED CASE STUDY: HIRA, SOUTH KOREA

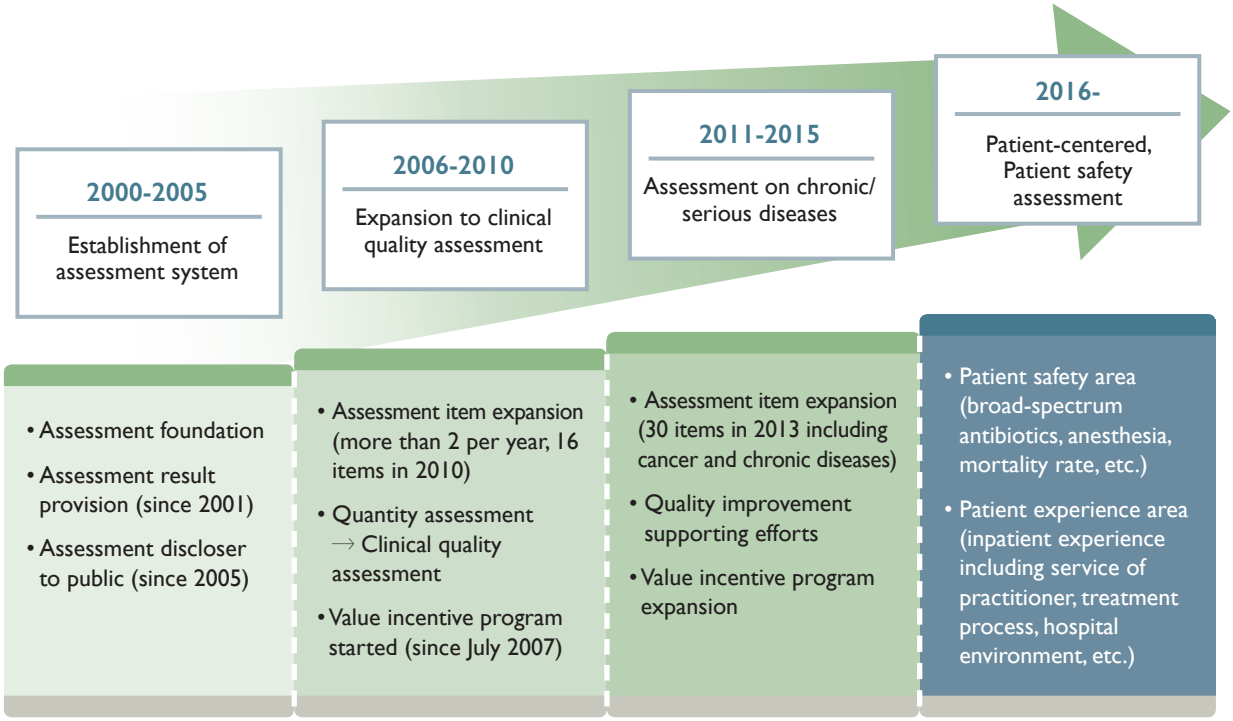
Since the 1990s, there has been increasing demand in Korean society to secure appropriate and quality healthcare services. Providers have been proactive in making improvements independently. In 1995, a government-led assessment system was introduced to improve the quality of providers' services. However, what constitutes "quality healthcare service" was not properly established at the state level.

In the past, since medical claims review was primarily focused on whether the claims complied with review standards, there was inadequate focus on benefit quality assessment. Under the fee-for-service model followed by Korea, there is a risk of the excessive provision of unnecessary services. This necessitated improvements in the benefit quality assessment system. Quality assessment is a systematic method of assessing the clinical effectiveness and cost effectiveness of healthcare services. Quality assessment is undertaken with the following objectives in mind:

- To improve the quality of healthcare services
- To minimize the variance of treatment between medical institutions and doctors
- To optimize cost level

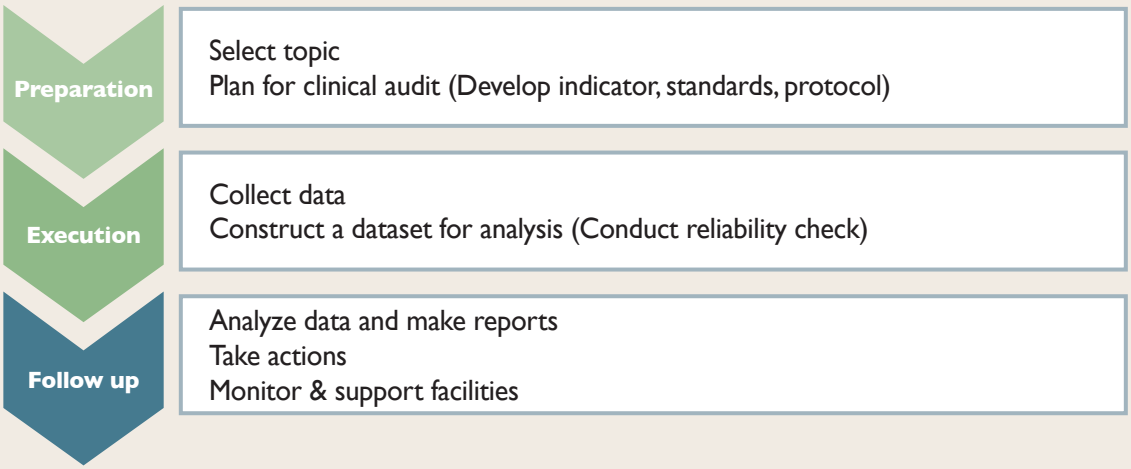
Since the introduction of clinical auditing (or "quality assessment" (QA) in the South Korean context) in 2000, HIRA has continued to expand QA items and areas and to advance the QA system encompassing the public disclosure of QA results, the application of incentives/disincentives, and the reinforcement of supportive activities for providers' quality improvement efforts.

Figure 16 **Development Process of Quality Assessment (HIRA)**



The Figure below shows HIRA's QA process as it fits into the steps presented in this section. The following paragraphs will present details of HIRA's case according to the process.

Figure 17 **Quality Assessment Process (HIRA)**



Step 1. Ensure structural components are in place

South Korea introduced the QA system in July 2000, when the National Health Insurance Act was amended. Article 63 of the Act prescribes QA as HIRA's responsibility. Public notifications of the Minister of Health and Welfare define the details of QA concerning the selection of topics, relevant standards, and assessment methods.

A department within HIRA has been dedicated to QA. In addition, there are the Central Quality Assessment Committee and Quality Assessment Subcommittees to deliberate on important issues and to conduct expert review, respectively. Various stakeholders including the medical circle, academia, civic organizations, and the government participate in the Central Quality Assessment Committee.

HIRA established an IT system dedicated to QA. The QA system consists of the assessment data collection system for providers and the management and analysis system for internal use. The assessment data collection system is designed to facilitate providers in filling out and submitting questionnaires. The management and analysis system is designed to check and analyze the collected data.

Step 2. Select topics

To plan for the quality assessment process, the clinical audit team makes a selection of candidate items. The priorities for selecting candidate items are determined based on five factors. These are: volume or frequency of service within benefit reimbursement, clinical importance, social interest, expected improvement due to quality assessment, and possible difficulty of assessment execution.

All healthcare services are subject to HIRA's quality assessment. A total of 32 items including acute diseases, chronic diseases, drug utilization, severity-adjusted hospital mortality ratio, risk-adjusted unplanned readmissions rate, and patient experience have been assessed.

Table 12 **Areas of Quality Assessment and Specific Indicator Items (HIRA)**

Areas (32 items)	Specific items (59)
Patient-centered (1)	Patient Experience
Communicable Disease (1)	Tuberculosis

Areas (32 items)	Specific items (59)
Acute Disease (5)	Acute stroke, pneumonia, coronary artery bypass grafting, ischemic heart disease (acute myocardial infarction, percutaneous coronary intervention)
Chronic Disease (5)	Hypertension, diabetes, asthma, chronic obstructive pulmonary disease, hemodialysis
Cancer (5)	Colorectal, breast, lung, gastric, liver (treatment outcome)
Drug (8)	Antibiotic prescription rate, antibiotic prescription rate by ingredient, injection prescription rate, number of drugs per prescription, drug cost per administration day, overlapping prescription rate of antipyretic, analgesic, and anti-inflammatory drugs for osteoarthritis, antibiotic use for acute middle ear infection in children, surgical antibiotic prophylaxis (15 types of surgeries)
Case Payment (3)	Long-term care hospital, psychiatric department of medical aid, DRG for 7 diseases
ICU (1)	Intensive Care Unit
Treatment Volume (1)	Number of specific surgery cases (4 types of surgery)
General Quality (2)	Severity-adjusted hospital mortality rate, risk-adjusted readmissions rate

Step 3. Plan for clinical audit

A working-level QA group, a committee to deliberate on important issues, and subcommittees for clinical expert review have been organized for QA. HIRA's working-level group consists of 2 departments, 8 divisions, and around 100 staff members. The Central Quality Assessment Committee consists of 18 members from medical society (6), public interest groups (6), and health insurance (6). It is responsible for an annual quality assessment plan, and addresses deliberations on the overall quality assessment policy (including the yearly assessment plan), issues in the Quality Assessment Committee, and the VIP (Pay-for-Performance Program of HIRA) program. Quality Assessment Subcommittees are composed of clinical experts recommended by academia, industry, consumer groups, and full-time committee members. Each team, organized by assessment item, is composed of 3–5 staff and full-time committee members of HIRA.

After item selection, indicator development and preliminary assessment are followed. Assessment Indicators are developed by HIRA and academic society, which reviews literature and the indicators of other countries. They have developed a total of 375 indicators, including 49 structure indicators, 213 process indicators, 84 outcome indicators, and 29 others. Standardization and quantification are key hallmarks of selected indicators. They should be based on existing standardized clinical guidelines, recent medical and pharmaceutical expert knowledge, and economic aspects. The team undertakes a preliminary assessment of selected items. Clinical experts participate in the whole process of preliminary assessment in order to test the feasibility and

acceptability of the assessment indicators. Indicators are not permanent, but rather are continuously updated with each round of assessment.

At the end of every year, an annual assessment plan is prepared for the following year and approved by the Quality Assessment Committee and the Ministry of Health and Welfare. Thereafter, more concrete QA implementation plans are set, including QA protocol for each item, data collection and assessment method, target providers, target cases, and schedule. Since the detailed plan is released two months prior to the implementation date, providers are able to provide healthcare services in compliance with the announced standards and autonomously make efforts to improve its quality of care. Target providers, assessment period, and the number of cases to be assessed depend on the assessment items. Assessment period is usually three months or one year. Target providers and the number of cases vary considerably according to the number of instances of the relevant medical treatment. For example, the number of target providers and cases of acute stroke assessment are 189 and 9,803 respectively; however, 16,445 institutions are targeted for diabetes assessment.

Step 4. Conduct clinical audit

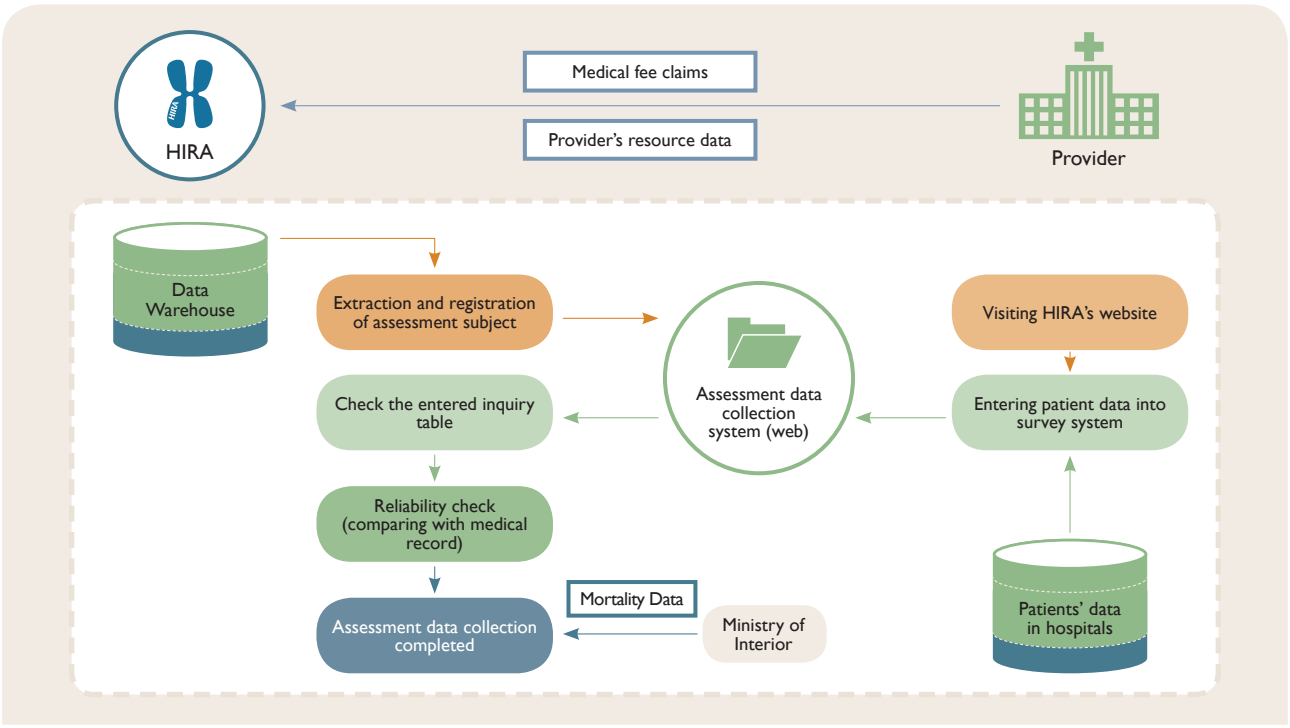
The execution process is divided into data collection and a reliability check.

Data collection: The source of data is divided into administrative and survey data. Administrative data includes claims data, providers' resource data, and mortality data. Resource (facility, workforce, and equipment) data and claims data are extracted from HIRA's data warehouse (DW). Mortality data is collected from the Ministry of the Interior. If it is not possible to collect patient information or detailed treatment information (e.g. examination and treatment results, complication occurrence) using only administrative data, survey data is needed. Providers enter and submit survey data using a web-based QA data collection system. This system was introduced in 2007.

The E-ADS (Electronic medical record Assessment Data Submission) System was introduced in 2015. This pilot project was expanded to include 146 institutions in 2016. Using this system, electronic medical records are automatically converted into assessment data in real time.

Reliability Check: The survey data is checked for validity and accuracy by comparing their consistency with medical records. In order to confirm the survey table data submitted by providers, a certain percentage (within 5 percent) or a certain fixed number of assessment cases for each institution are randomly selected. The medical records related to selected cases are requested for submission. Data that do not match the medical records are corrected; the providers are notified of the results of the reliability check. After the reliability check, data for analysis is prepared by identifying exceptions according to the definition of the indicator.

Figure 18 Information Flow for Quality Assessment (HIRA)



Step 5. Review and analyze findings

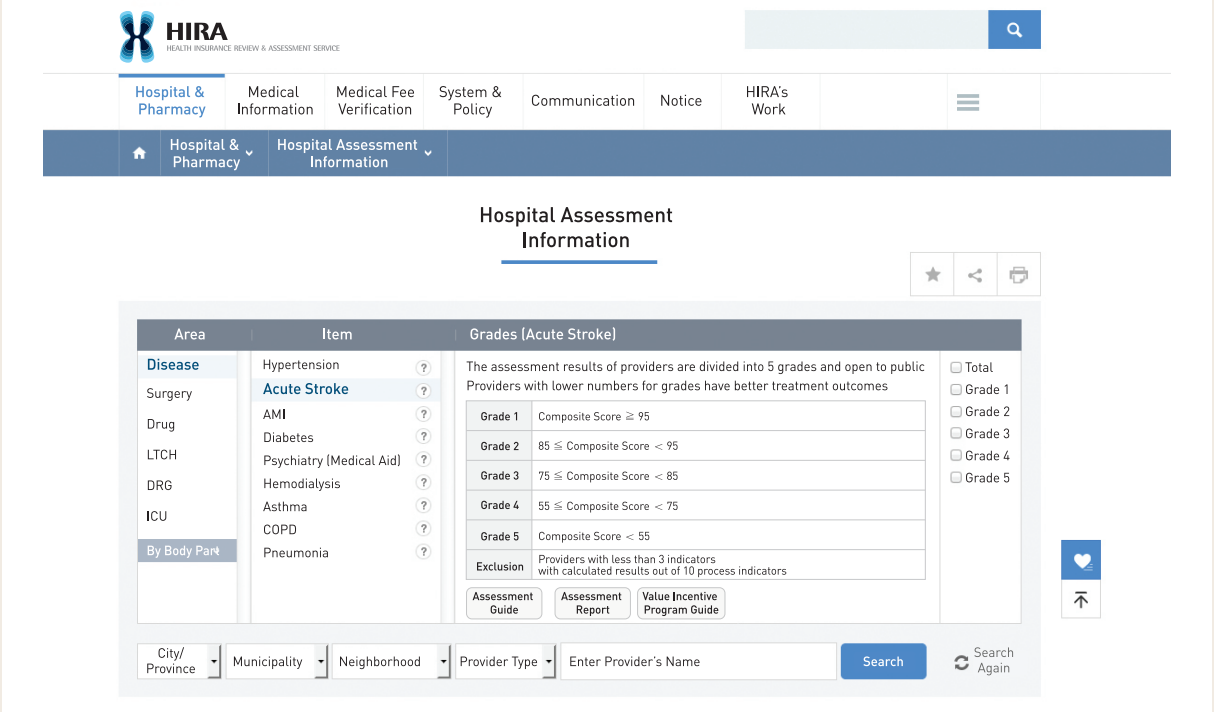
Each assessment indicator is calculated by provider, and quality variations among providers are identified. According to the definition of indicators, exceptions are applied and analysis data is finalized. The indicators of patients' outcomes (mortality rate, length of stay, re-admission rate) are adjusted in consideration of the degree of severity of illness when comparing assessment results among providers. Patient information for severity adjustment is surveyed when assessment data is collected. For items with multiple indicators, the indicator scores are integrated to produce one overall score that can be representative of the quality of healthcare for that item. Whether a weighted value is applied to an indicator differs depending on the item. The target healthcare providers are ranked (into two or five grades) based on the overall score of each item.

Step 6. Develop and communicate recommended actions for facility

The assessment results are utilized by many entities including the public, the providers, the government, HIRA, and NHIS. As Figure 19 shows, individual providers' assessment grades are disclosed on the HIRA website for the public, to inform their choice of providers. Providers are supplied with benchmarking information along with their assessment results, and HIRA carries out a Quality Improvement (QI) support

program to support providers with their systematic and voluntary QI efforts. The assessment results are used as data for the government's other assessments[17] and also shared with relevant organizations, such as the National Emergency Management Agency and consumer organizations, as well as regional and local governments. NHIS is notified of assessment results based on which incentives/disincentives are provided to each area. HIRA also uses the results to inform and strengthen its other work, such as claims review and on-site investigation.

Figure 19 **Disclosure of quality assessment results (HIRA website)**

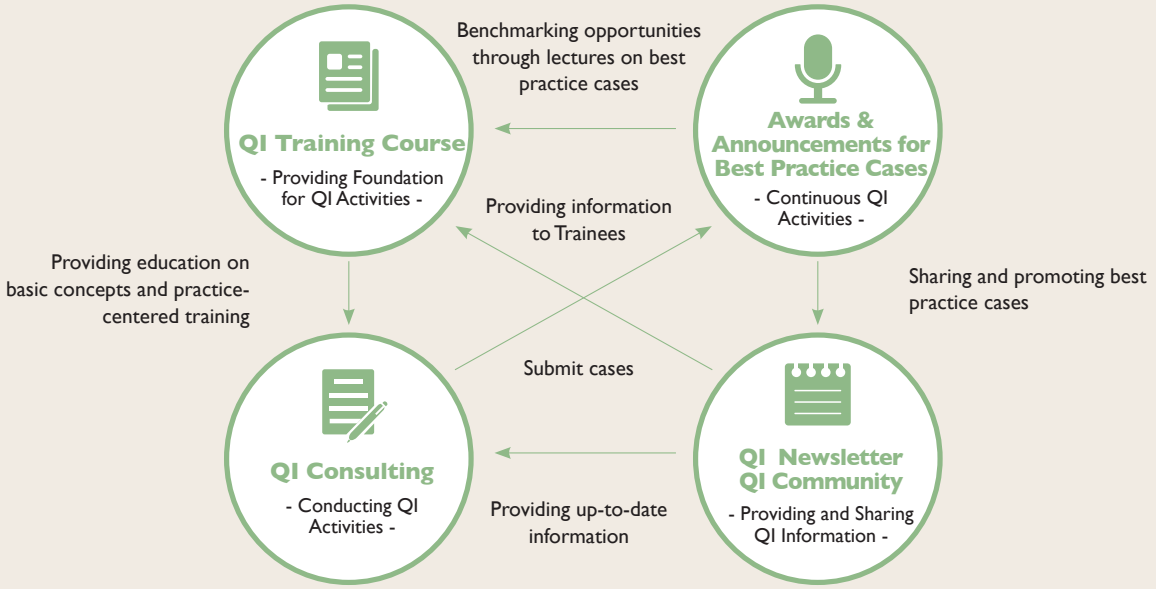


Step 7. Monitor enforcement and provide ongoing facility support

In 2007, HIRA began its Quality Improvement (QI) Support Program using QA results to enable providers' systematic and voluntary QI activities. This program includes the publication of the QI newsletter, the selection of and awarding for best practice cases of QI, an online QI community, a QI training course, and QI Consulting. QI consulting for individual providers has been offered since 2011. These QI support activities are happening in a virtuous cycle: healthcare providers conduct QI activities using the most up-to-date QI information continuously provided by HIRA, HIRA publicizes best practice cases, and the best practice cases are provided as benchmarking materials for other providers.

17) Subsidies for Healthcare Quality Assessment, Regional Hub Public Hospital Evaluation, National Action Plan on Antimicrobial Resistance, designation of cardio-cerebrovascular centers, designation and evaluation of emergency medical centers, etc.

Figure 20 **Quality Improvement Support Program Structure**



A Steering Group is organized so that the supporter (HIRA), main entities (providers), and collaborators (medical community) cooperate for the effective operation of the QI Support Program. Regional QI networks are established to involve QI experts and providers with outstanding performance so that providers, who are the main recipients of QI activities, can conduct their own quality improvement efforts. The medical community mainly acts as an advisor to the overall program and sometimes participates as lecturers or advisors in specific activities.

TAKEAWAYS

Evidence-based clinical audit is essential for quality improvement. Topic of clinical audit should be selected based on clinical importance, scientific evidence and feasibility of access data.

Data collection and dataset construction is important for efficient implementation of clinical audit.

Results of clinical audit should be notified healthcare providers, stakeholders and further the public. By disclosing the results, healthcare providers can voluntarily improve quality of care and the public can strengthen right to make informed choices of providers.

3.4 Functional Requirements

OBJECTIVE

This chapter provides guidance to countries in developing functional requirements for information technology for medical audit systems. Information technology systems can improve the effectiveness and the efficiency of medical audit systems. The chapter should be useful to countries that are looking to develop new information technology systems or looking to advance existing systems.

DEFINITION

Functional requirements describe what a software system should do. Functional requirements present a complete description of how the system will function from a user's perspective. Functional requirements may be calculations, technical details, data manipulation and processing, and other specific functionalities that define what a system is supposed to accomplish. Functional requirements state "WHAT" needs to be done from a user's perspective; functional specifications state "HOW" it needs to be done.

The medical audit framework and processes should be built into the existing health insurance business process, workflow, and information systems.

The Information Technology Initiative of the Joint Learning Network (JLN) has developed functional requirements for different business processes at various levels of health insurance functions. As per the JLN guidebook on "Determining Common Requirements for National Health Insurance Information Systems", functional requirements are essentially the 'rules' of the system and represent in common language 'what' the system is supposed to do to achieve its goals (e.g., process a claim within 24 hours).[18)]

Functional requirements are developed by documenting workflow process flows, which often called business processes. A business process is a set of activities and tasks that are logically grouped together to accomplish a goal. An example of a goal is to assure high quality of healthcare services are paid for by a health insurance program.

18) http://www.jointlearningnetwork.org/uploads/ les/resources/NHIIS Phase 1 Public Report JLN IT Workshop FINAL Jan182012 A4 0.pdf

SCOPE

Many countries use information technology (IT) to manage key functions of health insurance programs, such as reviewing and processing claims from healthcare providers. There are also many countries that are still managing all processes manually, or have only partially introduced information technology. This chapter introduces some basic steps to consider when developing or revising information technology systems to improve medical audits. The information is prepared by people working in systems with very different levels of information technology. Based on the key functions of claims review and medical auditing, this section of the toolkit provides a business process for medical audit systems within the claims processing module of the health insurance information systems.

OVERVIEW

Why functional requirements for medical audit systems?

Information technology can be an efficient and critical tool to help support medical audit systems. Applying medical audit rules during claims processing can trigger cases for further review. Manual reviews and paper based systems are expensive and time consuming. Using information systems to automate these rules supports consistency (reduced errors) and efficiency (ability to process large volumes). Information technology can also support the analysis required for reviews and investigations by looking at large volumes of data and trends over time.

Countries with manual health insurance systems are gradually moving to health insurance information systems. A systematic business process and set of functional requirements for medical audit processes can ease the introduction and improvement of information technology solutions for auditing.

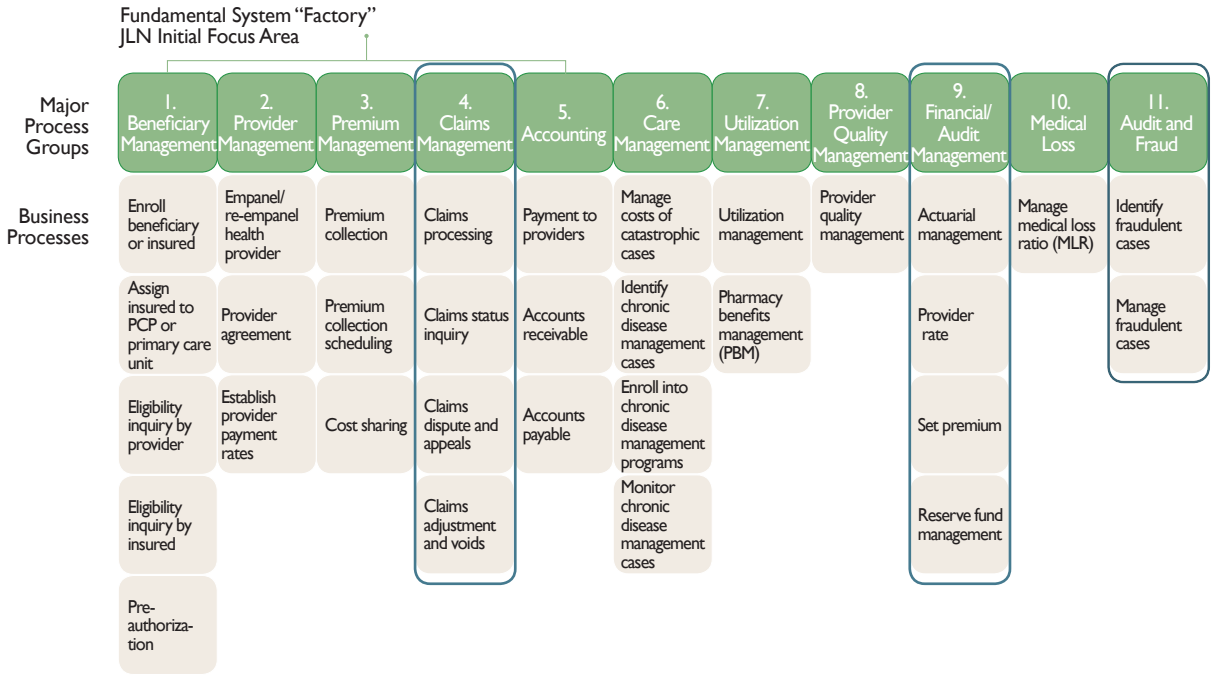
This chapter of the toolkit presents:

- Three key steps for building functional requirements for medical audit systems
    - **Step 1:** Develop business processes for medical audit systems
    - **Step 2:** Create the activity task flow of information for business processes
    - **Step 3:** Build functional requirements
- Detailed Case Study: HIRA. South Korea
- Takeaways

KEY STEPS

Step 1. Develop business processes for medical audit systems

Figure 21 **Common Business Process Framework for Purchasers (JLN)**



Documented processes and system requirements available at: www.jointlearningnetwork.org

Figure 21 provides a business process framework for purchasers of healthcare services with a focus on health insurance programs. The framework is merely a way to organize business processes by the major functions that a health insurer or purchaser performs. The Joint Learning Network has developed a business process for key functional areas of health insurance information systems, including claims processing. Medical audit systems should be integrated or built into health insurance information systems because medical audit systems require information from the claims processing function, financial management function and other key functions.

In the JLN guidebook on determining common requirements, a business process matrix is available for each of the functions of purchasers' systems presented in Figure 21. It shows the business processes as a coherent list of key activities under each function presenting information about the input, process, and output for a particular function of purchasers. The guidebook lists key activities for each of the purchaser's functions, including fraud management. However, the scope of medical audit systems also cuts across other

functions of purchaser, such as claims management, the financial audit function, and audit/fraud management. For the purposes of the Medical Audits Collaborative, this toolkit focuses on developing the functional requirements for the audit function. Below Table 13 is the business process matrix for each of the roles under the medical audit function.

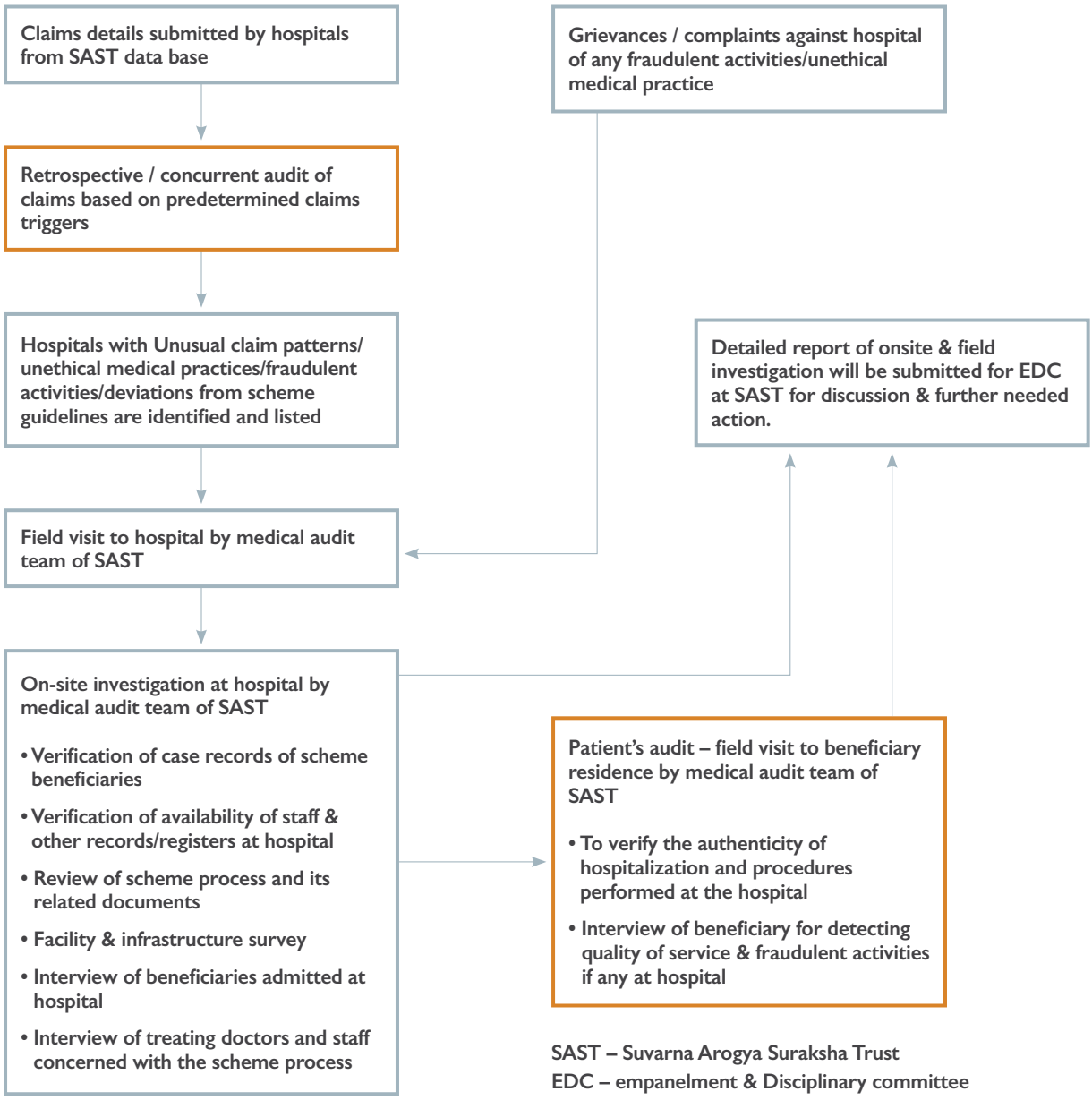
Table 13 **Example of Business Process Matrix of Medical Audit Function in Purchasers' Information Systems**

Ref. No	Process category	Process	Objective	Input	Output	Measureable outcome for each step of the process
1.1	Medical Audit Management	• Identify fraudulent cases using claims review, patient experiences data, and other data sets (See Appendix 8 for more information) • Identify cases of substandard quality of care	• Identify cases of unusual patterns of insurance use that demonstrate suspicious utilization of program benefits by providers and beneficiaries	• Provider identifier • Beneficiary identifier • Benefit plan • Claims identifier • Provider accumulators • Beneficiary accumulators • Medical history • Provider performance • Beneficiary benefits utilization	• List of suspected cases • Fraud case identifier • Case inquiry • Off-site Investigations • On-site investigations • Clinical audits • External clinical reviews from experts	• List of suspected cases • Status on case inquiries • Percentage of fraudulent claims • Percentage of amount of frauds • Percentage of cases of low-quality care providers
1.2	Medical Audit Management	Manage fraudulent cases	Manage identified cases of suspicious program benefit utilization to closure	• List of suspected cases • Inquiries • Evidence	Corrective action (i.e. remove beneficiary, remove provider, file charges with court)	• List of verified fraudulent claims • Plan of corrective actions and policy revisions in payments and quality standards

Step 2. Create the activity task flow of information for business processes

Mapping activity task flows for each business process is an important step for developing IT requirements. Activity task flows help IT professionals to visualize the process and users of the information at each level of activity. This activity is generally undertaken by IT professionals, in-house medical audit teams, providers, and Ministry of Health officials. A core working group of all the parties can be formed, which can help integrate different perspectives. The group can ensure a timely and smooth flow of information across the system. The medical audit function needs to be built into the existing work process and the guidelines of health insurance functions. The collaborative looked at the business process for medical audit systems from India, the Philippines, and South Korea. Figure 22 presents the business process followed in the Suvarna Arogya Surksha Trust (SAST), Karnataka, India.

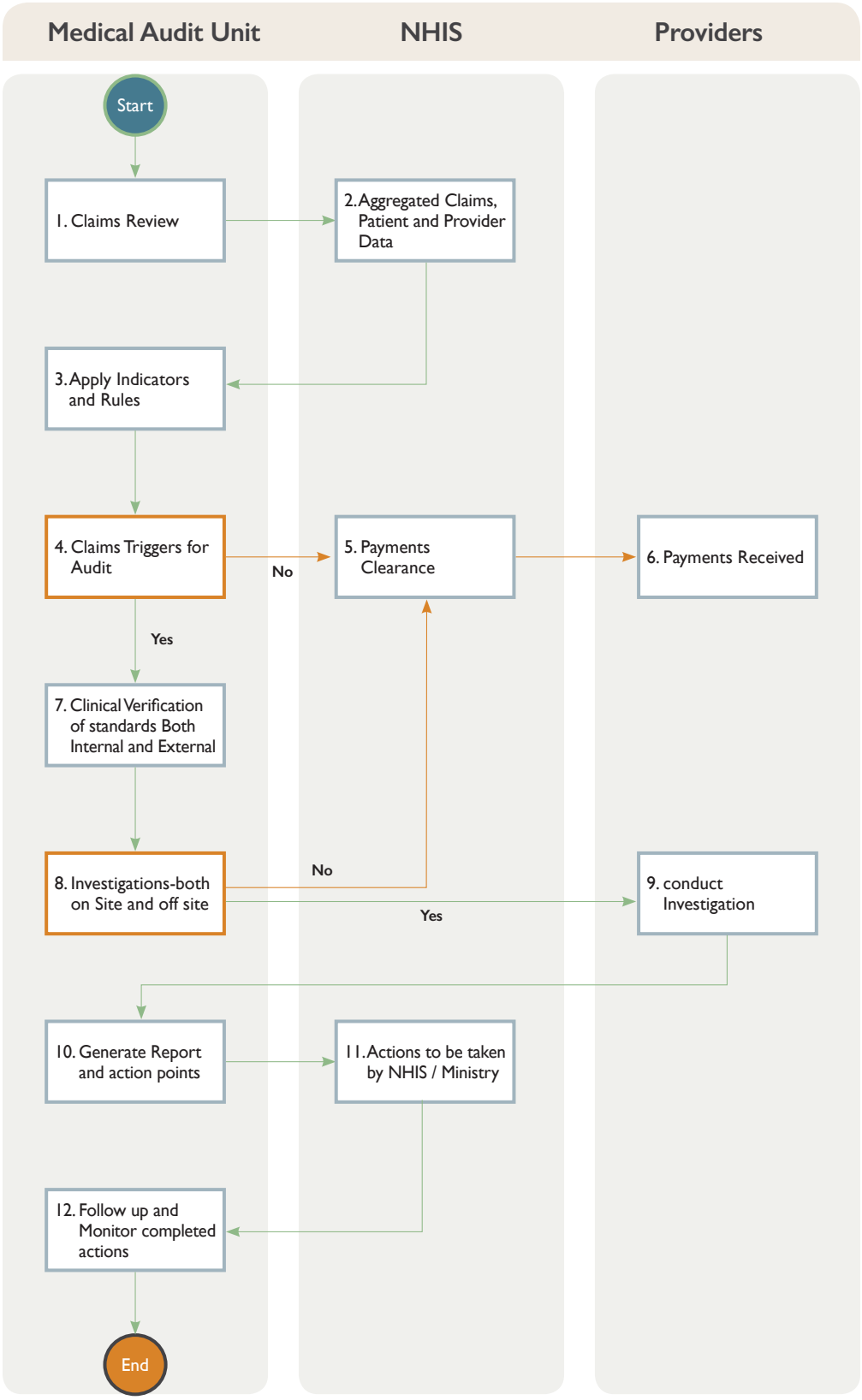
Figure 22 **Medical audit process in Karnataka, India**



A standard activity task flow for the medical audit function has been developed as a sample. As Figure 23 shows, this task flow including activities and decision points is based on the experiences shared by JLN member countries and the JLN guidebook on determining common requirements. For the purpose of this toolkit, the formal medical audit function will be initiated during claims processing and before claims payment. The scope of the medical audit should be defined considering the country context.

Figure 23

Sample task flow process based on the activities and decisions required for conducting the medical audit function



BOX 4

Activity Narrative for Figure 23 task flow diagram

1. Claims Review

   Conducting claims review by the medical audit and gathering necessary claims, plus beneficiary and provider data sets from NHIS and other sources

2. Aggregate Claims Information

   NHIS (Payer) or the Ministry of Health to provide aggregate claims data received from providers and beneficiaries

3. Apply Indicators and Rules

   List of indicators and rules developed based on goals of the insurance or health assurance program

4. Claims Triggers for Audit

   Claims reviewed with indicators and rules built into the systems triggers for further audit and investigation if required; otherwise payments can be made to providers

5. Payment Clearance and 6. Payment Received

   Payments to be cleared to providers if there is no further investigation required by the medical audit team

7. Clinical Audit

   Claims identified for further audit can be verified for adherence to accepted clinical guidelines and quality standards requirements

8. Investigations

   Based on review and clinical audit information, claims can be selected for on-site investigation; if clinically verified and investigation is not required, then the claims can be cleared for payments

9. Conduct Investigation

   Conduct detailed investigation at the identified healthcare facility.

10. Generate Audit and Action Report

    Based on the complete investigation and claims review, a detailed report of finding and recommended actions to be prepared

11. Action for NHIS

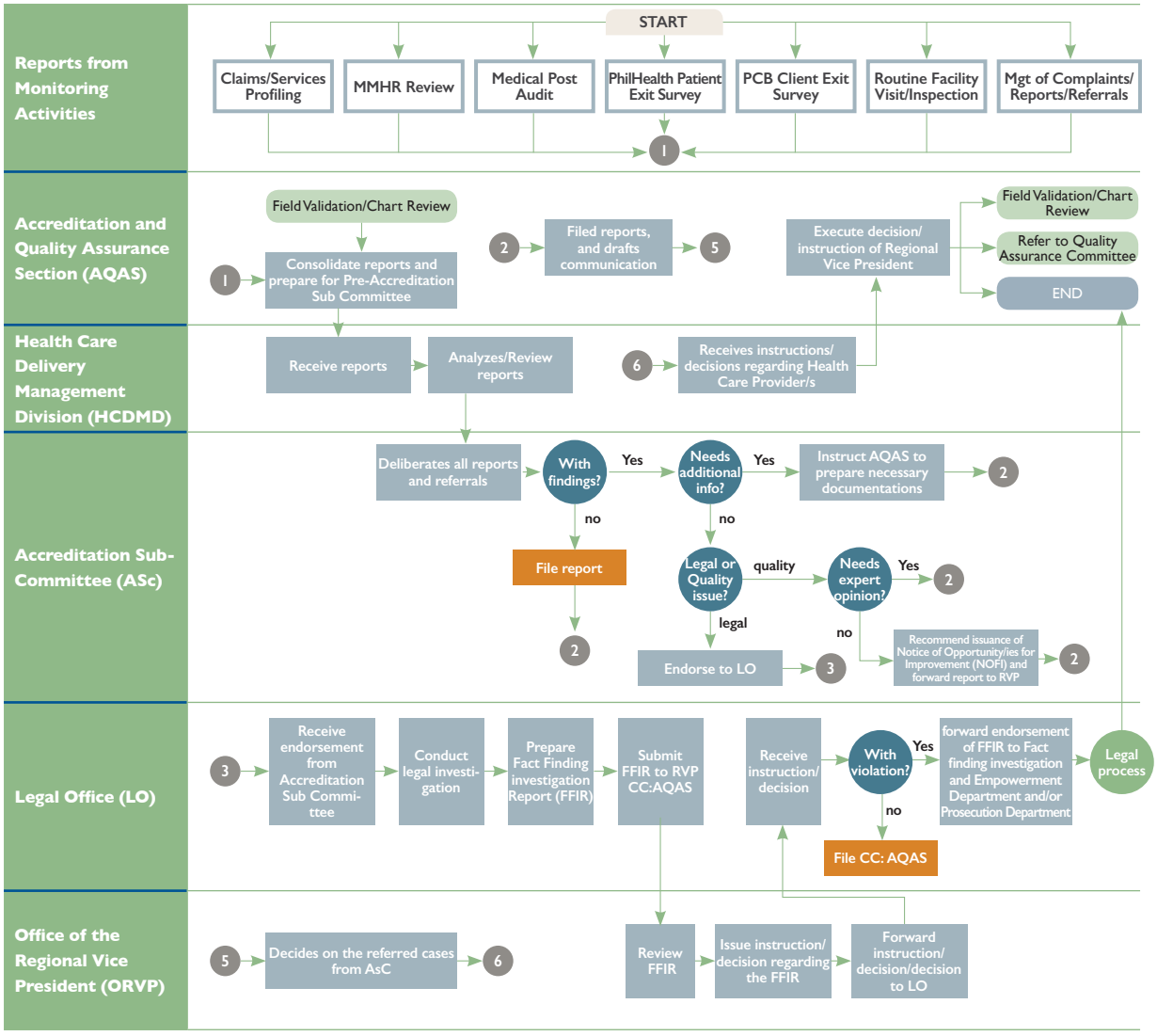
    Action report for NHIS is communicated to take necessary action against the providers or beneficiaries

12. Follow-up and Closing

    Follow up from the NHIS/Ministry of Health on the actions taken and collate policy implications of the action taken

Figure 24 **Activity Task Flow for Medical Audit Systems in PhilHealth (the Philippines)**

Management of HCP PAS Monitoring Findings by the ASc and concerned offices in the PRO (General Swimlane)



SOP on HCP PAS General Process

* PhilHealth Health Care Providers Performance Assessment System
* PCB – Primary Care Benefit
* MMHR - Monthly Mandatory Hospital Report

Step 3. Build functional requirements

Once the business process framework, business processes, and activity task flows are identified for a specific health insurance or purchaser system, functional requirements need to be developed. Functional requirements are the statements that describe what an information system needs to do to support the

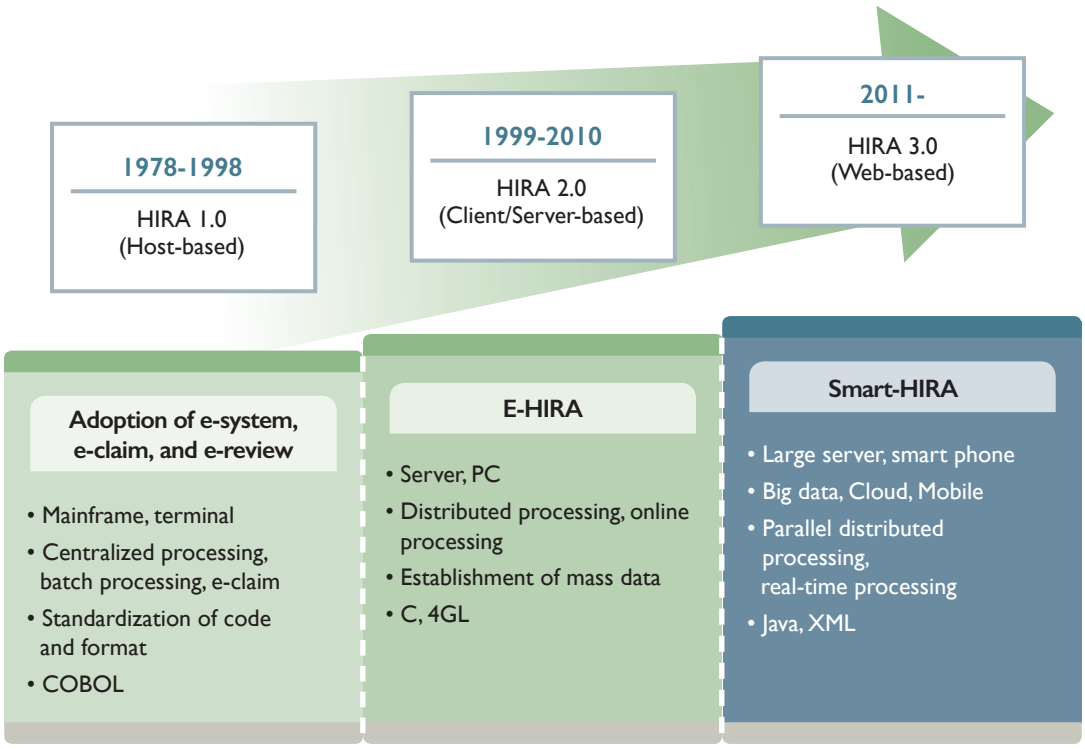
activities within the medical audit system. Functional requirements generally precede technical specifications ("how" the systems undertake activities). The following Table 14 illustrates examples of system functional requirements. These functional requirements can be modified as needed to support country specific business process task flows.

Table 14 **Sample Functional Requirements for the Medical Audit Function of the National Health Insurance Information System**

ID	Business Process	Activity	Requirements (The system must or should...)	Comments
1	Medical Audit	Claims Review	Capture the claim data from the payer information system with other sources of data	
2	Medical Audit	Claims Review	Generate regular reports – daily, weekly, or monthly reports based on standard set of Indicators	
3	Medical Audit	Claims Review	Allows medical audit team to generate and create audit findings based on input received from patients in a free text or standard format for specific diseases, beneficiary groups, providers, and geography	
4	Medical Audit	Trigger Audit	Allows medical audit team to use trigger points for further investigations and verification of the claims based on benefit policy and standard quality guidelines	
5	Medical Audit	Trigger Audit	Allows insurer to list, earmark, and track claims required for further audit, verification, and investigation	
6	Medical Audit	Clinical audit	Allows clinical audit to compare services provided with clinical guidelines and quality standards	
7	Medical Audit	Clinical audit	Allows team to recommend further off-site and on-site investigation for a list of claims with clear comments for each claim, and to assign claims to investigation teams on a random basis	
8	Medical Audit	Investigations	Allows investigation team to create a list of claims	
9	Medical Audit	Investigations	Allows investigation team to plan and schedule an on-site investigation	
10	Medical Audit	Investigations	Allows investigation team to input findings and observations from the visit in the standard format	
11	Medical Audit	Investigations	Allows the audit team and investigation team to communicate the results to providers	
12	Medical Audit	Audit team	Allows the audit team to finalize the report	
13	Medical Audit	Audit Report and Findings	Generate audit reports with clear action points with timelines built into the systems	
14	Medical Audit	Audit Report and Findings	Allows medical audit team to follow up actions and communicate	
15	Medical Audit	Audit Report and Findings	Purchaser or the medical audit team to prepare public reporting on specific findings of providers	
16	Medical Audit	Follow up of actions by audit team and purchaser's end	Allows tracking of action points with specific stakeholders (e.g. ministry, HIRA, NHIS, providers, beneficiaries, regulators, etc.)	
17	Medical Audit	Payment instructions	Allows instructions for payment to be sent to the purchaser, NHIS, or the ministry	

DETAILED CASE STUDY: HIRA, SOUTH KOREA

Figure 25 **Development of HIRA System**



HIRA 1.0 (1979–1998): Host-based

This was a period of digitalization and computerization. South Korea initiated implementation of information technology (IT) in the year 1982 by establishing independent IT systems with IBM and adopting IT systems in their health insurance program. They also developed a connection with the branch offices in 1988. Claims data transfer initially took place through compact discs and diskettes beginning in 1994.

Meanwhile, the development of the system for performing medical audits continued. As the electronic data interchange (EDI) system was developed in 1996, a dedicated operator was selected to develop HIRA's internal system. EDI is a method of electronic document exchange using communication networks—it was the first application of international standards for electronic document exchange. The budget was USD 40 million and the project period was 23 months. The network bandwidth was enhanced by establishing a comprehensive computer network and eligibility linkage system. This system drastically shortened the reimbursement period, from 45 days to 15 days.

HIRA 2.0 (1999–2010): Client/Server-based

The period leading up to 2010 was the era of the internet and mobile when systems went online and informatization took place. In 1999, a client/server-based system that enabled claims review on computer screens was developed. This meant that claims submitted through diskettes, CDs, and EDI no longer had to be printed out to be reviewed—they could be reviewed directly on computer screens. As such, the new system eliminated administrative waste related to printing, binding, and transporting of claim specification forms. In 2000, HIRA was established and designs for comprehensive networks for claims submission, review, and statistical information also came into being. HIRA developed a data warehouse in 2004, Korea Pharmaceutical Information Service in 2008, and the Drug Utilization Review System in 2010.

HIRA 3.0 (2011–present): Web-based

In 2011, the Medical Claim Portal Service (MCPoS), a business portal service for healthcare providers (Biznet), and a website for citizens were all established. The computerized claim method did not require providers to attach proof of purchase for materials and drugs and drastically simplified claim processes. In addition, it provided diverse advantages, such as access to detailed review results and reduced work volume for post-settlement and appeal applications.

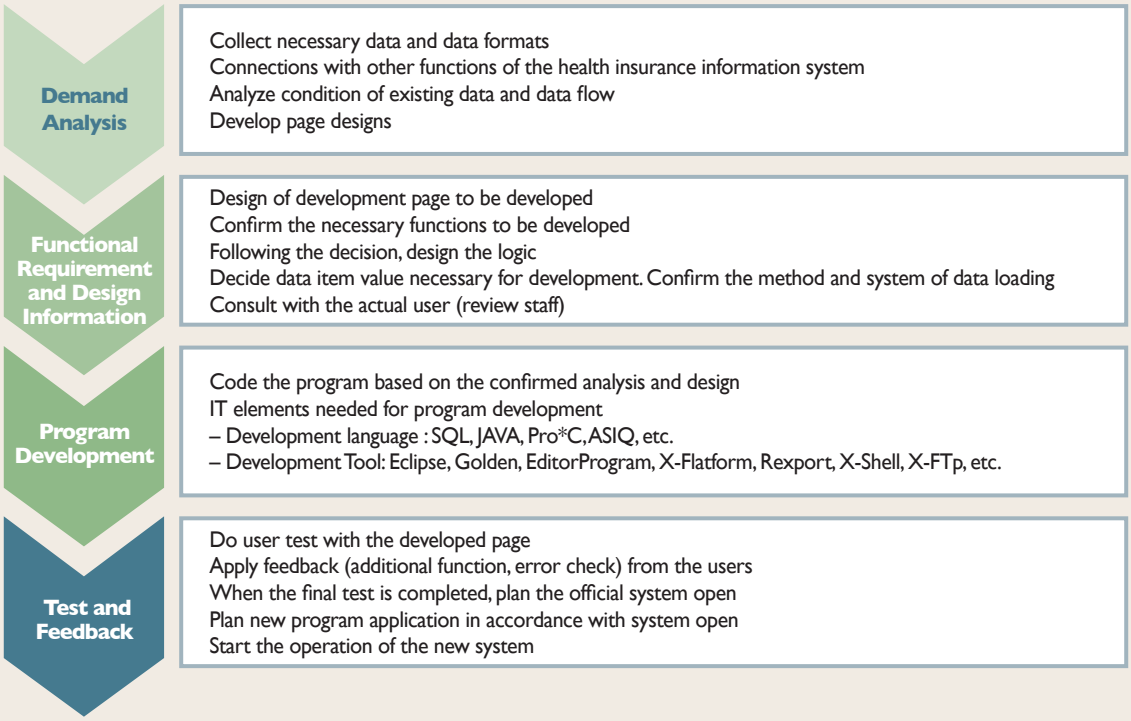
2013 saw the introduction of HIRA Plus, a web-based next generation claims review and quality assessment service system. The service enabled the integrated operation of information systems of the headquarters and all branch offices. To date, all these information systems are web-based. Over time (and through influence from the internet environment) the demand for information protection increased. Therefore, HIRA provided services through the MCPoS. Moreover, HIRA's information security was reinforced by separating the business-only intranet from the internet-only extranet. In the process of system establishment, HIRA prepared a platform for exchanging ideas with various stakeholders such as providers, claim software suppliers, medical and pharmaceutical associations, and the Ministry of Health and Welfare to actively gather users' demands in advance to establish an optimized system.
Furthermore, a healthcare big data system was established and used to support national healthcare statistics production and R&D.

Since data processing speeds can slow down when there is a lot of data to process or when too many users access the system, the HIRA System is operated based on four separate databases (DBs: collection, processing, analysis, and utilization) to enable efficient business processing. Each DB contains tables dedicated to a particular type of work. For instance, while there are around 2,000 tables for the collection stage, there are around 2,200 for the processing stage.

While a comprehensive computer network was established, systematic computer education was also conducted. Basic and advanced education was provided to frontline service workers and system operators, as well as developers. In particular, commissioned education related to computer technology was conducted to cultivate IT employees' program operational capacity.

The development of information systems put a comprehensive database at South Korea's disposal for detailed data analysis and access to critical health sector information for claims review. A detailed process was followed by HIRA for digitization of health insurance information systems. These trends and the development of IT systems in South Korea helped HIRA conduct web-based claims management audit systems. The following Figure presents the digitization process adopted by South Korea for the various functions in the health insurance information systems.

Figure 26 **Health System Digitization Process Adopted by South Korea (HIRA)**

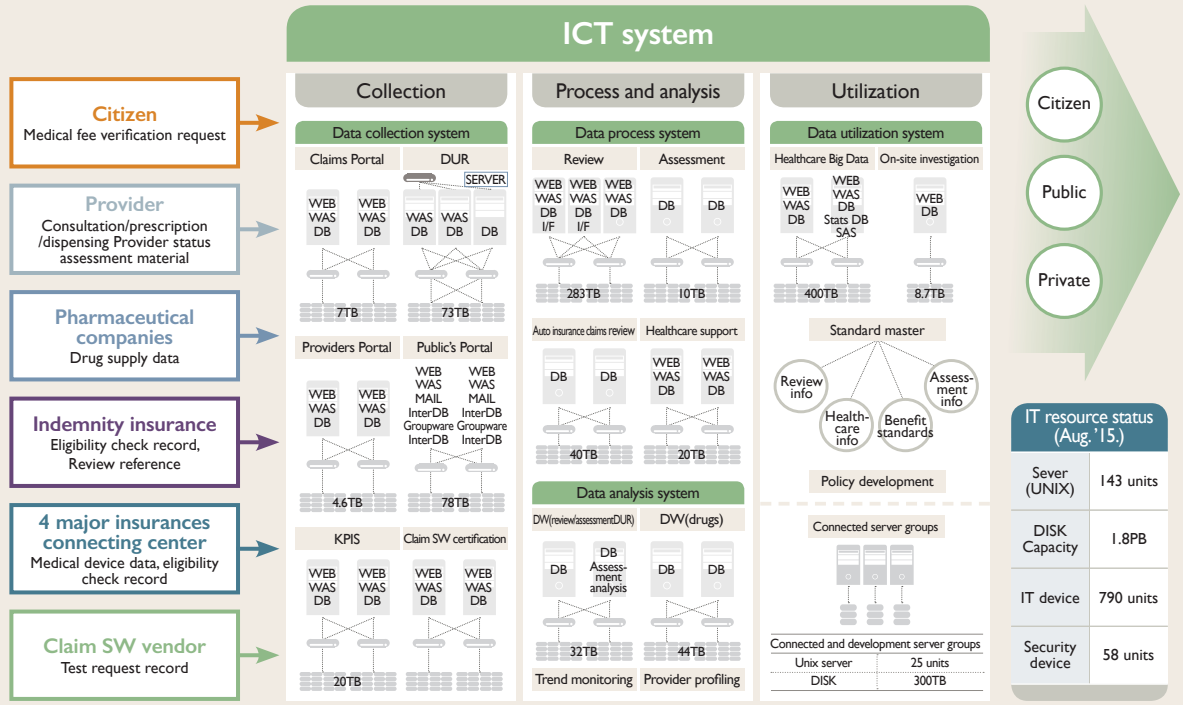


Some of the essential elements/characteristics in the process of digitization included developing social consensus for claims submission and data exchange methods. Standardization of the coding helped in monitoring cost and quality across various healthcare providers. South Korea also developed in-house capacity for the development of IT staff to manage and maintain software, hardware, and network capabilities. The following Figure provides a depiction of the ICT System at HIRA.

Figure 27 ICT Structure (HIRA)

STRUCTURE OF HIRA ICT SYSTEM

• Analyze data for policy support and provide useful information, using healthcare big data, benefit standards, and healthcare resources data. (total storage size 1.8 PB / total cost KRW 25 billion (USD 210 billion) / during 38 years)



TAKEAWAYS

Developing business processes, activity task, and functional requirements will help establish clear and specific tasks and roles for various functionaries inside the systems and for external parties.

Sustained investment is critical in building IT infrastructure, and in training an in-house team for developing, managing, and upgrading information systems.

Linking various data sets with other health information systems is key to validation and detailed analysis of claims and payment information.

Involvement of stakeholders in building the information technology process will help ensure a smooth and timely flow of information.

CHAPTER

04

OUTCOMES OF MEDICAL AUDITS

OBJECTIVE

This chapter explores outcomes, which are actions or measures of medical audit results. Evidence emerging from on-site investigations and clinical audits often provides a strong impetus for appropriate actions that lead to improvements in the quality of healthcare services, as well as a reduction in cost and an increase in financial sustainability.

DEFINITION

We define "outcome" as the consequence of medical audit results, particularly around quality and financial sustainability.

SCOPE

This chapter presents the use of medical audits to improve quality and reduce costs at both the facility and the national levels.

OVERVIEW

This chapter of the toolkit presents:

- Key steps toward improvement utilizing medical audit results include the following:
    - **Step 1:** Identify potential users ("customers") of medical audit results
    - **Step 2:** Report and publish medical audit results
    - **Step 3:** Take supportive & disciplinary measures as follow-up actions
    - **Step 4:** Undertake evaluation to assess the extent to which follow-up actions were achieved
    - **Step 5:** Measure improvements in outcome as a result of the actions (improvements in quality and reductions in cost)
    - **Step 6:** Develop policy implications to improve quality at the national level
- Detailed Case Study: HIRA, South Korea

KEY STEPS

Step 1. Identify potential users ("customers") of medical audit results

The primary user of medical audit results is usually the purchaser of healthcare services, who can take follow-up actions at their own level to improve quality of care and at the best value, as well as the facilities themselves, who are presented data for improvement. Other potential users include the following:

Table 15 **Potential Users of Medical Audit Results**

Users	Rationale for Sharing Medical Audit Results
Ministry of Health	Inform health benefit package, cost, and budget controls; governance of healthcare providers
Purchaser	Control fraud, reduce cost, and improve quality
Healthcare Provider	Follow clinical guidelines and obey the rules or regulations
Insurance Companies/Health Maintenance Organizations	Inform mechanisms of cost control; provision of better services to members
Professional Medical Associations	Help manage, recognize, and monitor their professional groups
Regulatory Bodies (provider accreditation agencies, fire control agencies, environmental agencies)	Take appropriate actions against healthcare service providers and ensure safety of patients and protection of consumer rights
Patients/beneficiaries (including patient groups/associations, civil society, and the general public)	Ensure access to quality healthcare and protect rights of beneficiaries, advocating and demanding for quality healthcare from providers
Mass Media	Create awareness about the quality and results of the medical audit among population groups and the general public
Academics	Inform and advance the discourse on quality of healthcare services and train future health personnel

Focusing on the users of medical audit results helps address the common challenges of a lack of stakeholder buy-in. It is common for healthcare providers to exhibit opposition to corrective measures and recommended changes in practice; therefore, focusing on a broad range of stakeholder buy-in can help address this challenge.

Step 2. Report and publish medical audit results

Reports are submitted to both the facility and relevant agencies. Reporting mechanisms are ideally documented in the form of standard operating procedures (SOP) and guidelines in order to be as specific and clear as possible. Additionally, documentary evidence for all reports is considered a best practice across countries.

Coupled with publishing results, it is suggested that the medical audit team place mechanisms to address feedback and complaints from providers and beneficiaries against the recommended actions in order to address grievances.

National Health Insurance Scheme (NHIS), Nigeria: The medical audit report is first submitted to the NHIS management board for review and approval. The recommended measures or punishment is approved for implementation as per provisions under operational guidelines. If the recommended course of action is beyond the mandate of the scheme, it is sent to the regulatory agencies responsible for economic and financial matters for further review. In Nigeria, fraud is reported to the Economic and Financial Crimes Commission (EFCC). Cases of negligence in professional or clinical practice are reported to the Medical and Dental Council of Nigeria, the Midwifery Council of Nigeria, the Pharmaceutical Council, and the Medical Laboratory Council. Other non-ethical issues can be reported to the police and other security outfits for enforcement.

Suvarna Arogya Suraksha Trust (SAST), Karnataka, India: The medical audit results are reviewed during the Trust Review meeting and decisions are recommended to the Empanelment and Disciplinary Committee (EDC). The EDC reviews the results and recommendations and arrives at a decision. Based on the decision by the EDC, the team is mandated to either conduct further investigation or take punitive or corrective actions against the concerned facility.

Step 3. Take supportive and disciplinary measures as follow-up actions

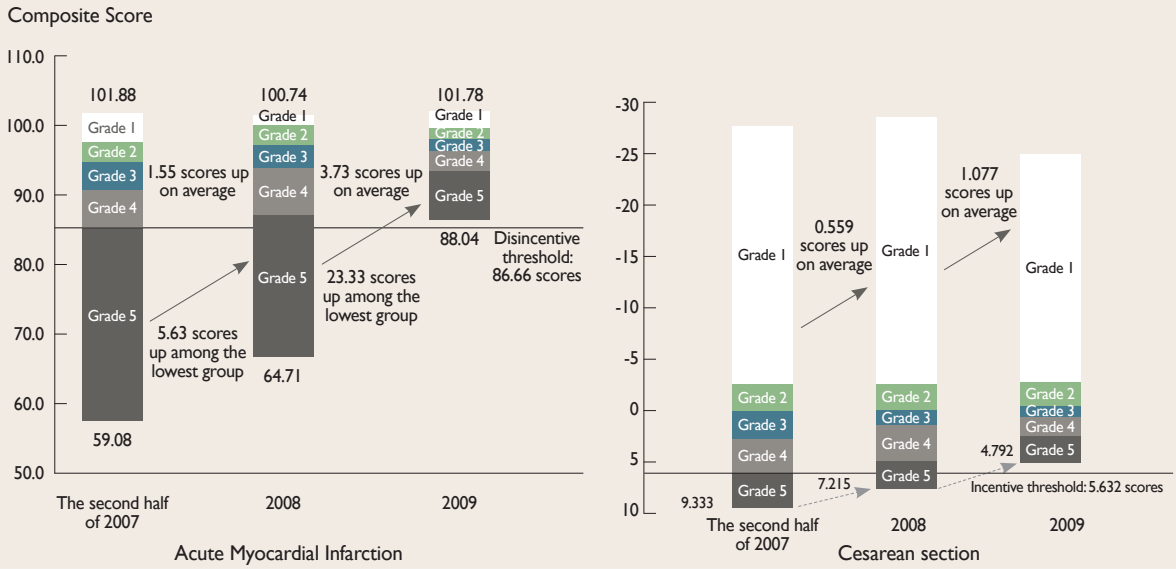
Once the medical audit results are published, appropriate actions are recommended in order to improve the quality of services and reduce costs. These include both supportive and disciplinary measures. Strong political will and commitment are important for effective follow-up actions based on medical audit results. The primary goal of medical audits is to improve the quality of healthcare services. Therefore, supportive measures aimed at guiding the improvement of performance should be the first line of action. All stakeholders must recognize that medical audits are not intended to be retributive or punitive in nature. The main objective is to improve the healthcare system. Supportive and disciplinary measures can take a variety of forms depending on the degree of deviance or non-compliance. These include issuance of warning, regular monitoring, training and capacity building in areas needing improvement, sustained education on guidelines. Also clinical standards, legal action, suspension of license, or empanelment can be included in these measures.

Reward Mechanisms:

Pay for performance measures are adopted to reward the healthcare providers if the performance is found to be according to benchmark and quality standards. For example, until 2007, South Korea followed a

system of public reporting of audit results. The expectation was that this would be sufficient to motivate providers to voluntarily improve service quality. Public reporting is important to increase patient awareness, but has limits in the extent to which it can lead to quality improvement. Therefore, in 2007, pay for performance was introduced in addition to regular quality improvement programs to support providers. In South Korea, the introduction of pay for performance (called the HIRA Value Incentive program) has resulted in the improvement of quality in the delivery of healthcare services as seen in Figure 28.

Figure 28 **Impact of pay for performance in HIRA on short-term service delivery and quality (HIRA)**



Disciplinary Mechanisms:

In cases where medical audit findings reveal severe non-compliance and deviance that can compromise quality or patient outcomes, strict disciplinary action tends to be taken against concerned parties. This often includes imposition of financial penalties, redemption of unlawful profits, and suspension of license.

For example, in the Philippines, if serious quality issues are identified and are non-fraudulent in nature, an incrementing series of penalties are levied on the healthcare provider. Penalties are imposed on cases involving administrative offenses committed by healthcare providers in addition to the restitution of payments for health and medical services paid for by PhilHealth and classified according to the following:

- First Offense: Suspension of three to five months and/or fine from a minimum of USD 197 to a maximum of USD 591
- Second Offense: Suspension of six to eight months and/or fine from a minimum of USD 788 to a maximum of USD 1,182

- Third Offense: Suspension of ten to twelve months and/or fine from a minimum of USD 1,379 to a maximum of USD 1,970
- Fourth Offense: Suspension of whole term of accreditation and/or denial of accreditation and/or fine of USD 1,970

Similarly, at SAST, Karnataka, India, if the Empanelment and Disciplinary Committee finds that the deviations are serious in nature, the following penalties are imposed:

- For first violation, show cause notice is issued.
- For second violation, penalty of double the amount collected is imposed.
- For third violation, four times the amount collected is levied.
- For repeated violations, the provider is disallowed the full claim amount. If there are no improvements in spite of taking these actions, the concerned facility is blacklisted.

The National Health Insurance Agency of Nigeria undertakes suspension, fine, and delisting as punitive mechanisms. "Name and shame" is already followed in countries like India and Ghana. In India, the names of the hospitals committing fraud are published in the regional newspaper. In Colombia, the concerned facility is denied payment and dropped from the list of empanelled or network facilities. Similarly, in Ghana, a suspended or discredited facility is not allowed to attend to NHIS subscribers. The National Hospital Insurance Fund in Kenya de-gazettes/de-lists any provider who is involved in fraud.

Step 4. Undertake evaluation to assess the extent to which follow-up actions were achieved

The purpose of the medical audit system is to undertake appropriate measures to correct healthcare service delivery and address gaps in the system. Therefore, it becomes important to ensure that the recommended steps and follow-up actions are taken by respective agencies. It is suggested that the monitoring of these steps and follow-up should be undertaken by another team to avoid conflicts of interest. Additionally, to address the challenge of monitoring in general, the establishment of IT infrastructure can help.

In Nigeria, the Audit Recommendations Implementation Committee (ARIC) at management level and board level of the National Health Insurance Agency is responsible for monitoring the follow-up actions. All audit reports and actions taken go there and they monitor the outcomes. The Board of the Audit Recommendations Implementation Committee has three members on the board of the National Health Insurance and two independent board members. They meet quarterly and can summon the medical audit team to answer questions on the outcomes. National Health Insurance Agency management has also

answered questions at the Public Accounts Committee of Parliament on audit outcomes.
In Suvarna Arogya Suraksha Trust, India, the empanelment and disciplinary committee is responsible for directing the medical audit team to take necessary follow-up actions. The committee also monitors the output of those actions, including taking necessary administrative actions (like rewards), punitive actions, and supportive actions. It becomes important to involve stakeholders in the process to monitor the improvement and actions to reduce unnecessary cost and fraud in the healthcare service delivery. In Colombia, providers have to design an improvement plan when benchmarks are not achieved, and they are monitored by the regulatory authority of the health system. This authority is independent from the Ministry of Health. When wrongdoing is detected, a formal investigation is launched by the regulatory authority. There are sanctions according to the size of the problem, from fines to jail.

To address challenges of the provider not complying with proper corrective actions, creating legislative foundations for action might be helpful. For instance, in Kenya, the National Hospital Insurance Fund Act of 1998 (revised 2004) spells out the implications for non-compliance by hospitals. Any hospital that knowingly falsifies any information with intent to fraud is liable under the act and the following immediate actions are taken: (i) a fine not exceeding five hundred thousand shillings; (ii) suspension from the list of declared hospitals for the purposes of this act for a period not exceeding five years.

Step 5. Measure improvements in outcome as a result of actions (improvements in quality and reductions in cost)

Findings emerging from the medical audits can contribute to improvement in patient outcomes, service delivery, health coverage, and efficient health expenditure. Additionally, results can have an impact on processes of accreditation, claims management, reimbursement, enhancements of services and human resources, And they can affect structural and organizational development, and can even influence health policies.

In Nigeria, medical audit results led to a review of guidelines, prices, and standard procedures. In Kenya, the results contributed to modifications in reimbursement models. Over time, the National Hospital Insurance Fund (NHIF) has used claims utilization reports to develop new benefit packages. For instance, delivery cases under a daily fee for service were noted to have unnecessarily long stays. These have been reviewed and the method of paying for the deliveries revised to a fee-for-service bundled package of delivery. Other changes have been made in unbundling some services like provision of chemotherapy, CT scans, renal dialysis, and other specialized diagnostic tests. In India, the National Health Protection Scheme to be launched in 2017 will make medical auditing an integrated part of the monitoring and evaluation process. In this section, we discuss the target outcomes for the use of medical audit results.

Improvement in Quality of Care

Medical audit results and ensuing actions play a vital role in the improvement of quality of healthcare services through various supporting interventions and programs. Improving facility-level quality is one of the immediate outcomes based on the action taken. Medical audit results and taken actions feed into the implementation program. A supportive approach is desirable for providers that recently joined insurance programs.

In Andhra Pradesh in India, the medical audit team looked at the outcomes of newborn care and found major variations across the public and private hospitals. They did on-site investigations and found that the services were very poor in many facilities. They decided, however, that the facilities with the highest newborn mortality and poorest conditions should not be blacklisted. They would continue to serve patients. They decided to support the hospitals to improve services to reduce the mortality and morbidity among the newborns. The government trust, the manager of the insurance program, launched Safe Care, Saving Lives,[19] a program with collaborative learning to improve newborn care across close to one hundred hospitals. They established a quality cell in addition to the medical audit team to support healthcare providers with quality improvement.

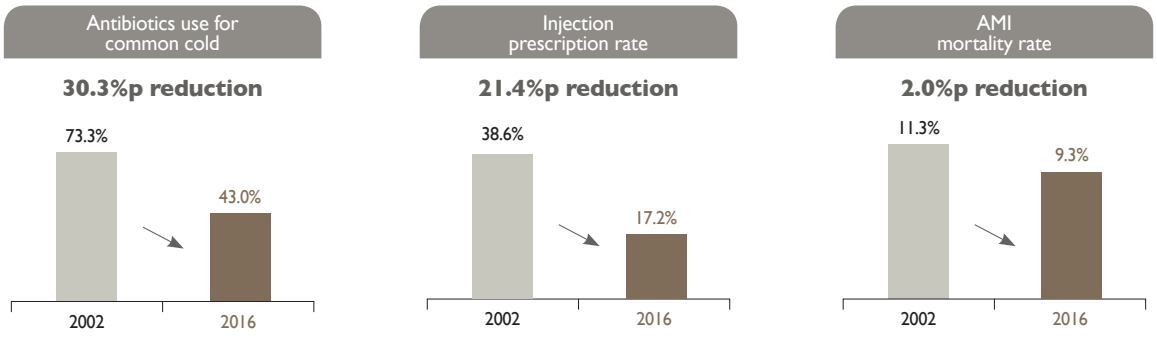
In the Philippines, healthcare providers with negative monitoring findings are given a warning and sanctions based on the severity of the offense. This is supplemented with human resource training, recommendations to improve procedures, and infrastructure at the facility level. A feedback mechanism plays a significant role in the improvement of quality of service at the facility level. Healthcare providers with positive monitoring findings are given commendations. PhilHealth conducts activities such as "Reach Out," Health Care Providers Dialogues and Forums, where policies and regulations are discussed.

Therefore, the use of medical audit results also contributes to the quality improvement programs of the ministry and the health insurance agencies. In Nigeria, it is used to produce new disease treatment guidelines, new drug lists, treatment exclusion criteria, the revision of operational guidelines, and the revamping of quality monitoring indicators.

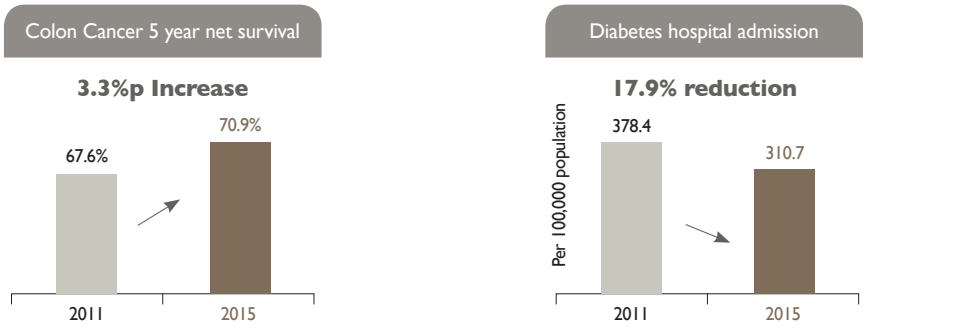
In South Korea, after the introduction of the medical audit system and pay for performance, proactive initiatives of quality improvement programs evolved. This program has led to better services and health outcomes. For example, it has led to a reduction in the use of antibiotics for common colds. The Figures 29 provides an illustration of the outcomes on quality improvements.

19) http://accessh.org/project/safe-care-saving-lives/

Figure 29 **Outcomes of quality improvement in South Korea (HIRA)**



※ As of the baseline year and the most recent year of quality assessment result publication



※ As of OECD HCQI publication years

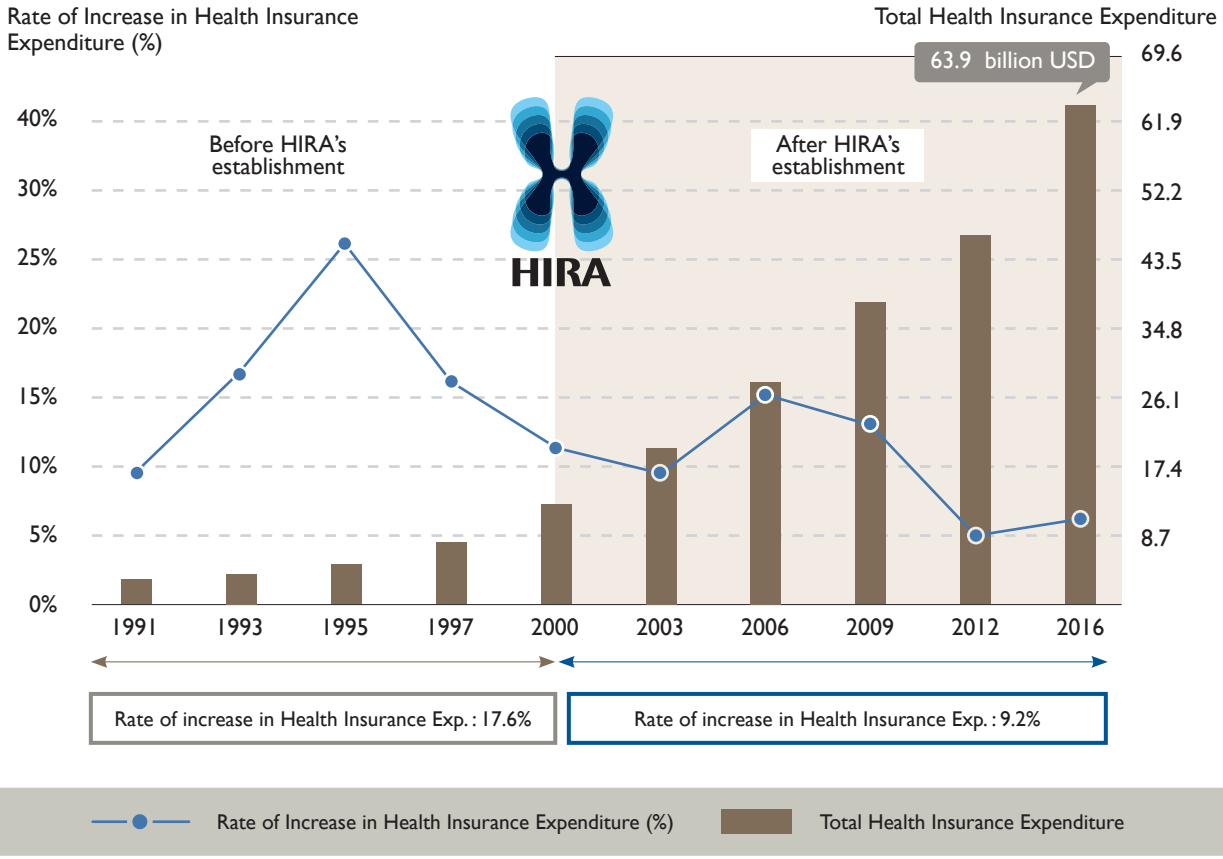
Payment Reforms and Reduction in Cost of Services

One of the immediate outcomes of the use of medical audit results pertains to the financing of the health insurance programs. The medical audit results help the purchaser push for cost-effective treatment regimes, reduce payment fraud, and encourage financial sustainability. South Korea has managed to review their claims and take appropriate actions in time to reduce the services provided, instilling confidence in the people through open sharing of information from the health insurance program. This eventually helped reduce the financial burden of the National Health Insurance Service. South Korea's current health expenditure as a share of GDP stood at 7.1% in 2014, which was lower than the OECD average of 9.0%.

In 2016, inappropriate health expenditure amounting to 1.1 billion USD was saved through pre-checks before claim submission and other services which screen claims for inappropriate medical fees, claims review using the information communication technology and by expert review personnel, and finally post-management. These efforts contributed to the average annual growth rate (AAGR) of the health insurance expenditure dropping from 17.6% before HIRA's establishment to 9.2% after its establishment as seen in Figure 30.

Figure 30

The Average Annual Growth Rate (AAGR) of the Health Insurance Expenditure in South Korea



The claims review and audit results help the audit team identify concentration and volume handled by provider. This helps the team understand the cost of medical procedures across providers and provides an edge to the purchaser for better negotiations, especially in fee-for-service payment systems.

Step 6. Develop policy implications to improve quality at the national level

Medical audit results can bring not only improvement of quality and reduction of cost, but can also help guide the policy decisions related to service provision, purchasing of services, and partnership with private-sector providers.

Countries such as the Philippines, India, Nigeria, and Malaysia have used medical auditing to influence policies that strengthen the key components of the health system, including infrastructure, human resources, organizational units, monitoring and evaluations, and enhanced stakeholder engagement. PhilHealth used medical audit results to change the accreditation status of healthcare institutions. PhilHealth used compliance to a No Balance Billing Policy (among government healthcare institutions) as one of the bases for granting renewal of accreditation or instituting stricter monitoring on non-complying institutions.

In Suvarna Arogya Suraksha Trust, India, contracts with providers were extended without preconditions. The results from the medical audits led to the introduction of performance reviews of providers; facility inspection formats were revised. Additional safeguards like mentioning of batch number of drugs were made mandatory. For renewing contracts, hospitals have to provide fresh licenses of doctors and paramedical staff.

Below are examples of policy implications that can come from medical audit results:

- Changes in payment mechanisms
- Changes in regulatory mechanisms of providers
- Implications for the national guidelines on use of medicines (e.g. essential medicines list)
- Changes in contracting mechanism with the hospitals (e.g. payment rates, monitoring the quality of care)

DETAILED CASE STUDY: HIRA, SOUTH KOREA

Step 1. Identify potential users of medical audit results

HIRA is an institution that is in charge of claims review and quality assessment. On-site investigation is overseen by the Ministry of Health and Welfare (MOHW), but HIRA provides overall support for MOHW's tasks related to on-site investigation. As system structures vary according to the different entities in charge of claims review, quality assessment, and on-site investigations, as well as the characteristics of each of these duties, they will be explained separately.

Step 2. Report and publish medical audit results

HIRA reports or provides medical audit results to many users, including healthcare providers. All users suggested as potential users are included here. As each user's purpose of utilizing the medical audit results is similar to what was previously described, it will not be separately presented here.

There are times when reports need to be made to MOHW or a related committee before medical audit results are provided to healthcare providers or other users, while reports may not be necessary at other times.

Quality assessment results need to be reported to and approved by the Medical Assessment Moderation Committee after being reviewed by the subcommittee of the corresponding quality assessment area. Approval by the Minister of Health and Welfare is also required when there are incentives (reimbursement increases) or disincentives (reimbursement reductions).

Since on-site investigation is overseen by MOHW, the investigation results are reported to MOHW. Claims review results are directly notified by HIRA to the healthcare providers and NHIS.
(For the notification form sent to healthcare providers and its contents, refer to the appendix.9 Medical Audit Result Notice of South. Korea)

Step 3. Take supportive and disciplinary measures as follow-up actions

HIRA employs a variety of methods to encourage healthcare providers to improve their quality of service and keep costs at an appropriate level. There is the warning stage that lets providers know they need to improve their performance based on various indicator results; the support stage where information,

consulting, training, and other support are provided; and the sanction stage with measures such as claims review reinforcement, requests for on-site investigation, pay for performance, publication of the list of providers with poor performance, administrative disposition, criminal prosecution, etc.
The following Table 16 shows measures taken in each stage according to medical audit results. Each stage can take place either consecutively or simultaneously.

Table 16 **Measures and Actions Taken at Each Stage of Medical Audit (HIRA)**

Category	Claims Review	Quality Assessment	On-site Investigation
Warning Stage	Notification and monitoring	–	–
Support Stage	Information provision, consulting, training	Quality Improvement Programs (Specialized consulting tailored to each provider, training courses, sharing of best practice cases, etc.)	Publication of fraud cases and relevant training
Sanction Stage	Adjustment of the reimbursement amount Claims review reinforcement (close review, on-site verification and review) Request for on-site investigation	Publication of the list of providers with poor performance Pay for performance	Administrative disposition (claw back of fraudulently obtained reimbursements, suspension of operation, penalties) Criminal prosecution Publication of the list of providers with poor performance

The Value Incentive Program (the pay-for-performance program in South Korea) continued to expand after the pilot program in 2007 and switched to the full-scale program in 2011. It has been shown that quality improvement efforts are more effective when the Value Incentive Program is in place rather than when the assessment results are simply published. Therefore, South Korea intends to continue expanding the program.

Additionally, South Korea had a system called "selective treatment" where the patients were charged additional fees for treatments according to the doctor's qualifications (e.g. how long doctor experiences in specific department). However, the country is transitioning to a reward system based on healthcare quality assessment results instead of doctors' qualifications. This type of reward system based on healthcare quality, along with the expansion of the Value Incentive Program, will serve as an important policy direction for healthcare quality improvement.

Depending on the on-site investigation results, the following penalties are imposed by the Ministry of Health and Welfare:
Period of suspension of operation for providers is decided depending on the monthly average of fraudulent

claim amounts and the fraudulent claim ratio. As the fraudulent ratio increases by 1 percent, the period of suspension of operation increases by ten days.
For example, if 130 USD ≤ fraudulent amount < 217 USD & 2% ≤ fraudulent rate < 5%, the suspension period is ten days, twenty days or up to thirty days, respectively. If the fraudulent amount is over 50 million won and the fraudulent rate is less than 5 percent, the suspension period is up to ninety days.

If suspension of operation causes a serious inconvenience to persons who use a healthcare provider, or if there are special reasons determined by the MoHW, a fine of an amount not exceeding five times the amount of fraudulent receipts can be levied.

Depending on the suspension period, penalties can vary, as described here:

- suspension of 10 days: 2 times the fraudulent amount
- suspension of 10 to 30 days: 3 times the fraudulent amount
- suspension of 30 to 50 days: 4 times the fraudulent amount
- suspension of over 50 days: 5 times the fraudulent amount

When a medical professional makes a claim for medical expenses by fraudulent or other wrongful means, such as falsification or alteration of related documents, the minister imposes a suspension of license of up to one year.

Step 4. Undertake evaluation to assess the extent to which follow-up actions were achieved

In South Korea, the respective departments in HIRA assess the extent to which improvements were made as the result of measures taken on individual medical institutions. The IT system and various indicators are used to track monthly, quarterly, and annual changes; to compare performance before and after follow-up actions are taken; and to conduct other detailed analyses.
Assessment of all healthcare providers' performance as a whole is done through evaluations and audits by external bodies, such as the government.

Step 5. Measure improvements in outcome as a result of actions (improvements in quality and reductions in cost)

Through medical audits, healthcare services quality has been improved and healthcare costs have been kept at an appropriate level, thereby enabling the reasonable spending of health insurance finances.

South Korea has developed indicators and criteria that healthcare providers must follow. Currently, there are 375 quality assessment indicators related to 32 assessment items and 1800 claims review criteria. Most quality assessment indicators have shown notable changes through quality assessment. Quality variation among healthcare providers has been reduced while the overall quality of the providers has been improved.

Take quality assessment of outpatient pharmaceutical use, for example. There was an approximately 23 percent increase year-over-year in the number of providers that received incentives as the result of assessment in this area, while there was a 10 percent decrease in providers that were subject to disincentives.

For the Figures showing the outcomes on quality improvement and cost reduction, see Figure 29 and 30.

Step 6. Develop policy implications to improve quality at the national level

Medical audit results are used as base data that influence not only health insurance policies but also national health policies in general. The data produced from medical audits are particularly important for national health policies in South Korea because all citizens and healthcare providers are part of the country's health insurance system.

The affected areas include health insurance benefits like benefit coverage standards, guidelines, medical fee schedules, and payment systems; the referral system; policies on managing the quality of healthcare services and providers, including designation of hospitals (cardiovascular centers, emergency medical centers, specialty hospitals, tertiary hospitals, etc.) and accreditation of hospitals; antimicrobial resistance management; evaluation of health technologies; generation of national statistics; evaluation of the healthcare system's performance.

TAKEAWAYS

To better utilize the results of claims review and clinical audit, these results lead to appropriate actions or measures and serve as evidence to be reflected in policy-making.
Release of medical audit results to the public and healthcare providers can improve transparency, expertise and responsibility of healthcare system for health insurance. Also it can encourage providers to minimize fraudulent claims and enhance quality of care. Medical audit systems can be advanced by developing policy implication and helping the policy decision-making.

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APPENDICES

1. Healthcare Review and Assessment Committee (HIRA, KOREA)

2. Relative Indicators (HIRA, KOREA)

3. HIRA's Indicators (HIRA, KOREA)

4. INDIA's Fraud Triggers (National Health Agency, INDIA)

5. Benefit Claim Specification Forms (HIRA, KOREA)

6. Development Process of Electronic Review (HIRA, KOREA)

7. Code of Conduct and Oath of Secrecy (NHIA, GHANA)

8. On-site Investigation Format (SAST, INDIA)

9. Components of Data Set (HIRA, KOREA)

10. Medical Audit Result Notice (HIRA, KOREA)

1. Healthcare review and Assessment Committee (HIRA, KOREA)

A healthcare review and assessment committee is an organization devoted to the efficient management of HIRA's business. It consist of 90 full-time and 1,000 part-time committee members. It is a deliberative body for reviewing and assessing the medical fees that require professional medical judgment among the medical fee claims by providers and medical institutions, and for setting review standards. The healthcare review and assessment committee is meaningful in that it secures professionalism and fairness in its review and assessment of medical fees through efficient operation of healthcare. The review and assessment committee creates an environment for quality medical treatment.

The following shows the organization of the healthcare review and assessment committee. The assessment committee will be discussed in detail.

Figure 31 **Organization of healthcare review and assessment committee**

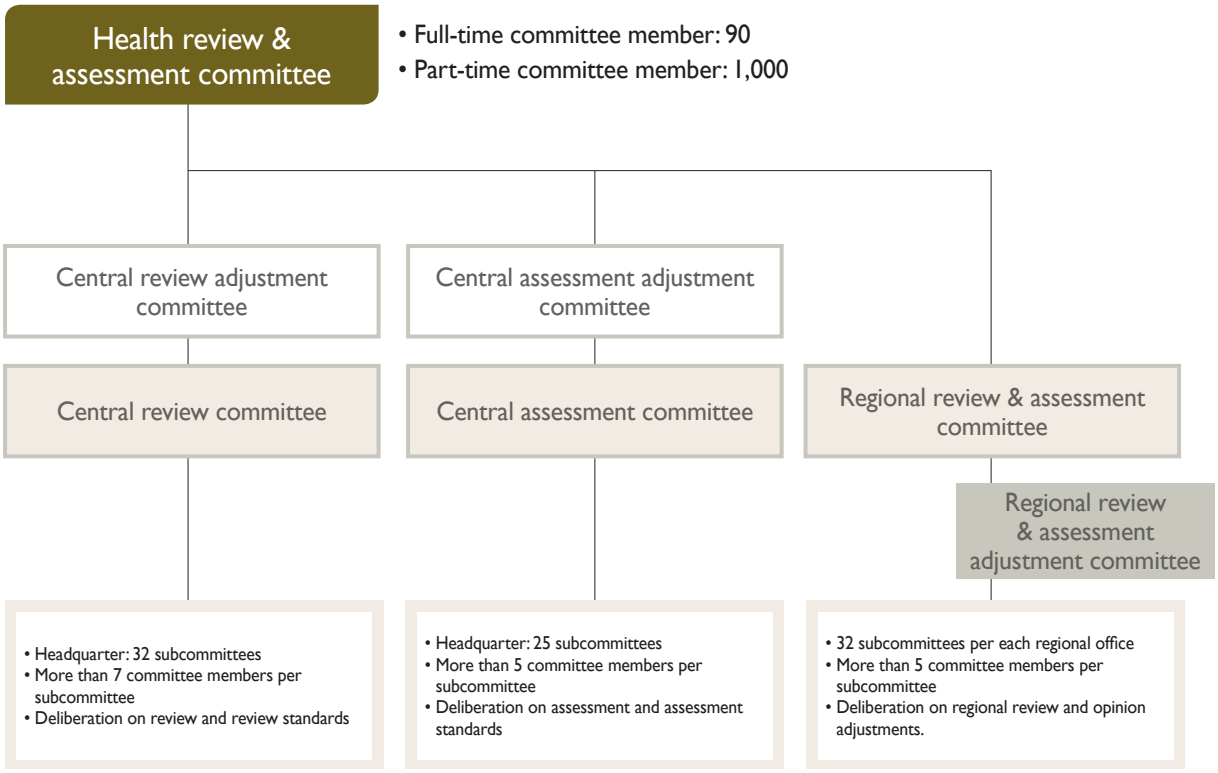


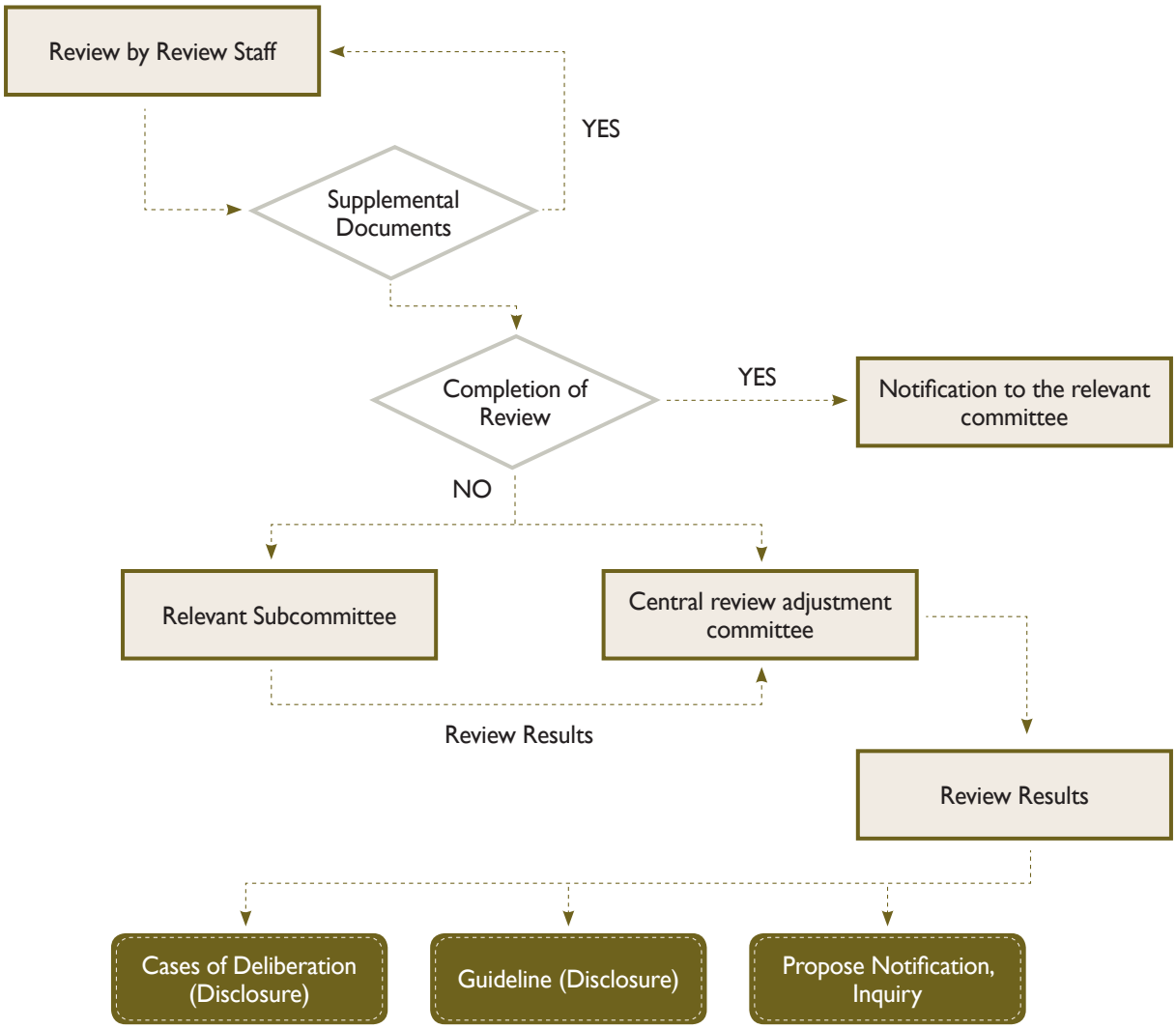
Table 17 **The status of subcommittee composition by specialization**

Gastroenterology	Neurology	Obstetrics and gynecology	Pathology
Cardiology	Psychiatry	Pediatrics	Clinical pathology
Respiratory-allergy	General surgery	Ophthalmology	Rehabilitation medicine
Endocrinology-metabolism	Orthopedic surgery	Otorhinolaryngology	Nuclear medicine
Nephrology	Neurosurgery	Dermatology	Dentistry
Hematology	Cardiothoracic surgery	Urology	Oriental medicine
Infectious disease	Plastic surgery	Radiology	Pharmacology
Rheumatology	Anesthesiology	Radiation oncology	Spinal medicine

The subcommittee of the central or regional review committee deliberates on cases that require medical and pharmaceutical professional judgment among review cases, cases that require medical and pharmaceutical professional judgment among appeal and restitution cases, the medical procedures that require medical professional judgment, and benefit coverage of drugs and medical supplies and the relative value. The issues not resolved by the subcommittee are submitted to the regional review and assessment adjustment committee or the central review and assessment adjustment committee.

The central review and assessment adjustment committee coordinates the subcommittee's comments, reviews those matters that the chairperson has deemed necessary to discuss, and considers matters related to the coordination of the opinions of the regional review and assessment adjustment committee. They deliberate on matters that require consensus or need development of review standards among the review cases. The review process of the review committee is as follows.

Figure 32 **Review process of the review committee**



2. Relative Indicators of HIRA

A patient classification system considering the amount of medical fees and clinical similarity [KDRG for inpatients and KOPG (oriental medicine: KOPG-KM) for outpatient] is used to classify the amount of medical fees claimed by providers by types and specialty. It is used to set indicators of the relevant institutions by disease group and to classify institutions and manage counseling. It is represented as the relative comparative value of the providers based on the average value of 1.

Table 18 Type of indicators

A. Types of indicators

indicator	full name	definition
ECI	Episode-Costliness Index	Comparative value of the relevant institution regarding the expected medical fees (including outpatient prescription drug costs) per claim (per patient) considering the case mix of the provider.
DCI	Days-Costliness Index	Comparative value of the relevant institution regarding the expected medical fees for hospitalization considering the case mix of the provider.
LI	Lengthiness Index	Comparative value of the relevant institution regarding the expected average days in hospital considering the case mix of the provider.
VI	Visit Index	Comparative value of the relevant institution regarding the expected average visits (outpatient) considering the case mix of the provider.
CMI	Case-Mix Index	Indicator monitoring the case mix of the provider. For a detailed description, please refer to the calculation formulas below.
PCI	Prescribing Costliness Index	Relative indicator representing the prescription drug cost of the relevant provider. It determines the standards of incurred costs by comparing with the drug cost per administration days (per patient) of the same provider type.
CI by treatment category		CI by category in HIRA's specification form (See Appendix 4), e.g. Item 1: Consultation Fee, 2: Administration Fee, 4: Injection Fee.

B. Calculation formula for indicators

1) Costliness Index (CI)

It refers to the actual costs incurred per claim compared to the expected cost per claim considering the case mix of providers. The ECI of 1.2 means that the actual cost per claim is 20 percent higher than the expected cost per claim when considering the case mix of the target provider.

$$CI_h = \frac{\sum_i C_{hi} \times N_{hi}}{\sum_i C_i \times N_{hi}}$$

h : target provider
i : by disease group
N_{hi} : number of claims by disease group of the target provider
C_i : medical fee per claim by indicated specialty and disease group
C_{hi} : medical fee per claim by disease group of the target provider
CI_h : costliness index of medical fee per claim of the target provider

2) Case-Mix Index (CMI)

It refers to an index that reflects the severity of the case mix in the target provider. CMI 1.2 means that the cost per claim should be 1.2 times the cost of the total patients (in the indicated specialty) considering the case mix of the target provider; it is possible that there are more patients who generate high medical fees compared to the average.

$$CMI_h = \frac{(\sum_i C_{hi} \times N_{hi}) \div (\sum_i N_{hi})}{C}$$

h : target provider
i : by disease group
N_{hi} : number of claims by disease group of the target provider
C_i : medical fee per claim by indicated specialty and disease group
C : total medical fee per claim
CMI_h : case-mix index of the target provider

3) PIC

$$PCI_h = \frac{\sum_i C_{hi} \times N_{hi}}{\sum_i C_i \times N_{hi}}$$

h : target provider
i : by disease group
N_{hi} : administration days (number of patients) of target provider
C_i : drug cost per administration days (per patient) of the same provider type
C_{hi} : drug cost per administration days (per patient) of target provider
PCI_h : prescribing costliness index of the target provider

3. HIRA's Indicators (HIRA, KOREA)

Acute Stroke

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Availability of a specialist workforce (neurologists, neurosurgeons, physiatrists)		Depending on the number of full-time medical specialists in neurology, neurosurgery and rehabilitation medicine, grades are categorized into 4 groups. -A: a medical institution with full-time medical specialists in those three departments above. -B: a medical institution with full-time medical specialists in two of those deaprtments above. -C: a medical institution with full-time medical specialists in one of those departments above. -D: a medical institution with no full-time medical specialists in those deaprtments above.
Process	Rate of brain imaging test performance (within 1 hour)	No. of visits for acute stroke (I60-I63) within 6 hours of symptom onset (yet finally classified as normal state)	No. of cases of conducting brain imaging (CT or MRI) within a hour of a patient's visit to a hospital
Process	Rate of intravenous thrombolytic agent (t-PA) administration (within 60 minutes)	No. of t-PA administrations within 60 minutes after arrival at hospital	No. of t-PA administrations within 4.5 hours of symptom onset (yet finally classified as normal state)
Process	Rate of consideration for intravenous thrombolytic agent (t-PA) administration	No. of cases of considering t-PA administration	No. of visits for acute ischemic stroke (I63) within 3 hours of symptom onset (yet finally classified as normal state)
Process	Rate of early rehabilitation assessment (within 5 days)	No. of cases of acute stroke (I60-I63)	No. of cases of conducting assessment of a need for rehabilitation treatment within 5 days of hospitalization
Process	Rate of dysphagia screening test performance (before the first meal)	No. of cases of dietary intake during hospitalization due to acute stroke (I60~I63)	No. of cases of conducting a screening test for dysphasia
Process	Rate of antithrombotic prescription at discharge	No. of cases of acute ischemic stroke (I63)	No. of antithrombotic prescriptions at discharge
Process	Rate of anticoagulant prescription at discharge (patients with atrial fibrillation)	No. of cases of acute ischemic stroke (I63) with atrial fibrilation	No. of anticoagulant prescriptions at discharge
Outcome	Case-mix adjusted average length of stay (Lengthiness Index, LI)		
Structure	Rate of ambulance use	No. of acute stroke (I60-I63) patients	No. of acute stroke (I60-I63) patients who were taken to a hospital by ambulance
Structure	Median time to emergency room arrival after symptom onset		Median time (minute) to emergency room arrival after acute stroke ((I60~I63)) symptom onset (symptom found)

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Operation of a Stroke Unit		Depending on the availability of Stroke Unit and certification of Korean Stroke Society, institutions graded into 3 groups - A: institutions with Stroke Unit and certification of Korean Stroke Society - B: institutions with Stroke Unit and no certification of Korean Stroke Society - C: institutions with no Stroke Unit
Process	Rate of intravenous thrombolytic agent (t-PA) administration	No. of visits for acute ischemic stroke (I63) within 4.5 hours of symptom onset (yet finally classified as normal state)	No. of t-PA administration within 4.5 hours of symptom onset (yet finally classified as normal state)
Process	Rate of anti-thrombotic agent administration (within 48 hours)	No. of acute ischemic strokes (I63)	No. of antithrombotic administrations within 48 hours of arrival at hospital
Process	Rate of stroke scale performance (within 2 days)	No. of acute strokes (I60~I63)	No. of cases of stroke scale used within 2 days of hospitalization
Process	Rate of functional outcome scale performance (at discharge)	No. of acute strokes (I60~I63)	No. of cases of functional outcome scale used at discharge
Process	Rate of lipid test performance	No. of acute ischemic strokes (I63)	No. of cases of conducting a lipid panel during hospitalization or within 30 days before hospitalization
Process	Rate of anti-smoking education performance (documented by doctors)	No. of acute ischemic stroke (I63) cases of patients with less than 1 year of smoking history	No. of cases of anti-smoking education provided after doctor's smoking history survey
Process	Rate of early rehabilitation treatment	No. of rehabilitation treatment-required inpatient acute stroke (I60~I63) cases out of acute stroke cases sent to rehabilitation treatment department which is requested for joint treatment	No. of cases of rehabilitation treatment rendered after doctor's smoking history survey
Process	Median number of days taken until early rehabilitation treatment		Rehabilitation treatment-rendered acute stroke cases' median time (day) to rehabilitation treatment provided after rehabilitation treatment room arrival
Outcome	In-hospital mortality rate (hemorrhagic/ischemic)	No. of acute strokes (I60~I63)	No. of deaths within hospital
Outcome	Mortality rate within 30 days of admission (hemorrhagic/ischemic)	No. of acute strokes (I60~I63)	No. of deaths within 30 days of hospitalization
Outcome	Case-mix adjusted average treatment cost (Costliness Index, CI)		
Outcome	Rate of pneumonia onset after admission	No. of hemorrhagic strokes (I60~I62)	No. of cases of pneumonia occurrence in 48 hours after hospitalization

Pneumonia

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Rate of oxygen saturation test performance within 24 hours of hospital arrival	No. of target cases	No. of cases of conducting SpO2 measurement within 24 hours of hospital arrival
Process	Rate of severity assessment tool use upon hospital arrival	No. of assesment target cases	No. of cases of using severity measuring tools
Process	Rate of sputum smear exam prescription within 24 hours of hospital arrival	No. of assesment target cases	No. of prescribed sputum smear exam within 24 hours of hospital arrival
Process	Rate of sputum culture exam prescription within 24 hours of hospital arrival	No. of assesment target cases	No. of prescribed sputum culture exam within 24 hours of hospital arrival
Process	Rate of blood culture testing before antibiotic administration	No. of blood culture testing conducted	No. of cases of conducting blood culture testing before the first administration of antibitoics
Process	Rate of antibiotic administration within 8 hours of hospital arrival	No. of cases of the first administration of antibiotics within 8 hours of hospital arrival	No. of assesment target cases
Process	Rate of anti-smoking education	No. of cases of pneumonia occurrence among patients with one year of smoking history	No. of cases of providing anti-smoking education by doctors
Process	Rate of pneumococcal vaccination screening	No. of cases of pneumonia occurrence among patients aged 65 or older	No. of cases of identied pneumoccoccal vaccination
Process	Median time until initial antibiotic administration		Median time to initial antibiotic administration after hospital arrival
Process	Appropriateness of initial antibiotic selection	No. of assesment target cases	No. of cases of appropriate antibiotic administration
Process	Median number of antibiotic injection administration days		Median number of parenteral antibiotic administration days during hospitalization due to pneumonia
Outcome	Case-mix adjusted average length of stay (Lengthiness Index, LI)		
Outcome	Case-mix adjusted average treatment cost (Costliness Index, CI)		
Outcome	Readmission rate for pneumonia (within 30 days of discharge)	No. of assesment target cases	No. of re-hospitalizations within 30 days of discharge due to pneumonia
Outcome	Mortality rate (within 30 days of admission)	No. of assesment target cases	No. of deaths within 30 days of hospitalization

Coronary artery bypass graft (CABG)

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Total number of CABG surgeries/ Total number of isolated CABG surgeries		① Total number of CABG surgeries ② Total number of isolated CABG surgeries
Process	Rate of CABG using internal thoracic artery	No. of patients with isolated CABG surgery experience	No. of patients for isolated CABG surgery using internal thoracic artery
Process	Rate of Aspirin prescription at discharge	No. of patients with isolated CABG surgery experience	No. of patients for isolated CABG surgery
Outcome	Rate of re-operation due to postoperative hemorrhage or hematoma	No. of patients with isolated CABG surgery experience	No. of patients who underwent open thoracotomy after surgery due to hemorrhage or hematoma
Outcome	Mortality rate (during hospitalization/ within 7 days of discharge/within 30 days of operation)	No. of patients with isolated CABG surgery experience	No. of patients who died during hospitalization/ within 7 days of discharge/ after surgery
Outcome	Postoperative length of stay	No. of patients with isolated CABG surgery experience	Total number of patient's hospitalization days after isolated CABG surgery provided
Process	Rate of initial antibiotic prophylaxis use within the hour preceding skin incision in CABG	No. of patients with CABG surgery experience	No. of patients who were administered parental prophylatic antibiotic firstly within a hour of skin incision
Process	Rate of PCI performance before CABG	No. of patients with CABG surgery experience	No. of patients with PIC surgery experience before CABG surgery
Process	Rate of concomitant CABG (Aorta/ Valve/LV aneurysm/CEA/VSD)	No. of patients with CABG surgery experience	No. of patients who underwent concomitant surgery
Process	Rate of off-pump CABG performance	No. of patients with isolated CABG surgery experience	No. of patients who underwent isolated off-pump CABG surgery
Process	Rate of extubation within 24 hours after CABG	No. of patients with isolated CABG surgery experience	No. of patients who experienced extubation within 24 hours of isolated CABG rendered
Outcome	Rate of re-operation due to postoperative infections	No. of patients with isolated CABG surgery experience	No. of patients who underwent re-surgery due to postoperative infection (including mediastinitis)
Outcome	Readmission rate after CABG (within 7 days/30 days of discharge)	No. of patients with isolated CABG surgery experience	No. of patients who were re-admitted within 7 days/30 days of discharge due to CABG related diseases
Outcome	Case-mix adjusted average length of stay (Lengthiness Index, LI)		No. of average hospitalization days of patients discharged after the treatment of diseases in DRG
Outcome	Case-mix adjusted average treatment cost (Costliness Index, CI)		Avarege total treatment costs of patients discharged after the treatment of diseases in DRG

Acute myocardial infarction (AMI)

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Number of admissions		No. of hospitalizations by episode for confirmed AMI
Process	Rate of thrombolytic agent administration within 30 minutes of hospital arrival	No. of revascularization targets (patients with ST elevation in ECG or new onset LBBB) who were administered t-PA within 6 hours of hospital arrival	No. of revascularization targets who were administered t-PA within 30 minutes of hospital arrival
Process	Rate of primary PCI performance within 90 minutes of hospital arrival	No. of revascularization targets who underwent P.PCI within 12 hours of hospital arrival	No. of revascularization targets who underwent P.PCI within 90 minutes of hospital arrival
Outcome	Mortality rate within 30 days of admission	No. of AMI patients who are hospitalized via emergency room	No. of patients who died within 20 days of hospitalization
Outcome	Case-mix adjusted average length of stay (Lengthiness Index, LI)		Avarege number of hospitalization of patients discharged after treatment of diseases in DRG
Outcome	Case-mix adjusted average treatment cost (Costliness Index, CI)		Average treatment costs of patients discharged after the treatment of diseases in DRG
Structure	Rate of ambulance use	No. of AMI patients who are hospitalized via emergency room	No. of AMI patients taken to a hospital by ambulance
Structure	Median time to hospital arrival after onset of chest pain (minutes)		Median time to hospital arrival from onset of pain of AMI patients who were hospitalized via emergency room
Process	Rate of Aspirin prescription at discharge	No. of AMI patients who are hospitalized via emergency room	No. of AMI patients who were prescribed Aspirin at discharge
Process	Rate of beta-blocker prescription at discharge	No. of AMI patients who are hospitalized via emergency room	No. of AMI patients who were prescribed beta blockers at discharge
Process	Rate of statin prescription at discharge for patients with LDL-C above 100mg/dL		
Process	Rate of thrombolytic agent administration in AMI patients	No. of AMI patients who are hospitalized via emergency room and revascularization targets (with ST elevation in ECG or new onset LBBB)	No. of AMI patients who were administered thrombolytic agent
Process	Rate of PPCI performance in AMI patients	No. of AMI patients who are hospitalized via emergency room and revascularization targets	No. of patients who underwent P.PCI
Process	Median time from hospital arrival to thrombolytic agent administration (minutes)		Median time to t-PA administration from hospital arrival of AMI patients subject to vascularization
Process	Median time from hospital arrival to balloon inflation in case of PPCI (minutes)		Median time to ballon inflation from hospital arrival of AMI patients subject to revascularization
Outcome	Mortality rate (in-hospital/within 1 year of discharge)	No. of AMI patients who are hospitalized via emergency room	No. of patients who died within 1 year during/after hospitalization

Percutaneous coronary intervention (PCI)

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Number of PCI performed		
Process	Rate of Aspirin prescription at discharge		
Process	Rate of antiplatelet agent (excl. Aspirin) prescription at discharge		
Outcome	Mortality rate within 30 days of PCI		
Structure	Rate of PCI performance in ischemic heart disease (IHD)		
Structure	Rate of PCI performance in stable coronary artery disease (CAD)		
Structure	Rate of acute coronary syndrome (ACS) in ischemic heart disease (IHD)		
Process	Rate of statin prescription at discharge for patients with LDL-C above 100mg/dL		
Outcome	Mortality rate (in-hospital/within 1 year of discharge)		
Outcome	Readmission rate within 30 days of discharge		
Outcome	Case-mix adjusted average length of stay (Lengthiness Index, LI)		
Outcome	Case-mix adjusted average treatment cost (Costliness Index, CI)		

Hypertension

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Percent of prescription days out of the total target assessment days	Total number of days of assessment target period	Total number of antihypertensive prescription days
Process	Percent of patients with continued prescriptions	No. of assessment targets whose prescription continuity is assessed	No. of assessment targets whose percent of prescription days out of the total corresponding assessment days is 80% or higher
Process	Rate of duplicate prescription from the same ingredient group	No. of antihypertensive precriptions	No. of duplicate prescriptions from the same ingredient group
Process	Coadministration rate of diuretics without comorbidities such as cardio/cerebrovascular diseases (recommended indicator)	No. of antihypertensive concomitant prescriptions from 3 or more ingredient groups	No. of prescriptions with diuretic drugs
Process	Rate of prescription for combination therapy unrecommended without comorbidities such as cardio/ cerebrovascular diseases	No. of antihypertensive concomitant prescriptions from 2 or more ingredient groups	No. of concomitant prescriptions hardly recommended for the first concomitent one
Process	Rate of antihypertensive prescription from more than 4 ingredient groups (without comorbidities such as cardio/cerebrovascular diseases)	No. of antihypertensive precriptions	No. of antihypertensive concomitant prescriptions from 4 or more ingredient groups
Process	Drug cost per day of antihypertensive drug administration	No. of antihypertensive prescription days	Total drug costs of antihypertensive
Process	Average number of visits	No. of assessment targets whose prescription continuity is assessed	Total number of targets' inpatient visits for hypertension
Process	Average number of prescriptions issued for antihypertensives	No. of assessment targets whose prescription continuity is assessed	Total number of assessment subjects' prescriptions of antihypertensive
Process	Rate of blood test performance in new patients	No. of new patients	No. of new patients who underwent a blood test
Process	Rate of general urine analysis in new patients	No. of new patients	No. of new patients who underwent general urinalysis
Process	Rate of ECG performance in new patients	No. of new patients	No. of new patietns who underwent ECG

Diabetes

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Percent of patients who visit once or more per quarter	No. of assessment targets (inpatient visits)	No. of patients who visited hospital once or more every quarter
Process	Percent of prescription days out of the total target assessment days	Total number of days of assessment target period	Total number of prescription days of assessment target period
Process	Rate of duplicate prescription from the same ingredient group	Total number of antihypertensive precriptions	No. of duplicate prescriptions from the same ingredient group
Process	Rate of prescription from more than 4 ingredient groups	No. of antihypertensive precriptions	No. of presriptions from 4 or more ingredient groups
Process	Rate of HbA1c test performance	No. of assessment targets	No. of patients who underwent a HbA1c test
Process	Rate of lipid test performance	No. of assessment targets	No. of patients who underwent a lipid test
Process	Rate of fundus exam performance	No. of assessment targets	No. of patients who underwent a fundus exam
Process	Drug cost per medication day	Total number of prescription days of antihypertensive	Total drug costs of antihypertensive
Process	Rate of concomitant drug prescriptions noncompliant with standards	No. of antihypertensive prescriptions from 2 or more ingredient groups	No. of concomitant drug prescriptions noncompliant with standards
Process	Rate of microalbuminuria test performance	No. of assessment targets	No. of patients who underwent a microalbuminuria test

Asthma

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Rate of pulmonary function test performance	No. of test targets	No. of patients who underwent a pulmonary function test
Process	Percent of continuously visiting patients	No. of assessment targets whose prescription continuity is assessed	No. of continously visiting patients
Process	Percent of patients who are prescribed ICS	No. of assessment targets	No. of patients who were prescribed ICS
Process	Percent of patients who are prescribed essential drugs (ICS or LTRA)	No. of assessment targets	No. of patients who were prescribed ICS or LTRA
Process	Percent of patients who are prescribed long-acting beta2-agonists (LABA) without ICS	No. of assessment targets	No. of patients who were prescribed LABA and no ICS
Process	Percent of patients who are prescribed short-acting beta2-agonists (SABA) without ICS	No. of assessment targets	No. of patients whe were prescribed SABA and no ICS
Process	Percent of patients who are prescribed oral corticosteroids (OCS) without ICS	No. of assessment targets	No. of patients who were prescribed OCS and no ICS

Chronic obstructive pulmonary disease (COPD)

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Rate of pulmonary function test performance	No. of assessment targets	No. of patients who underwent a pulmonary function test
Process	Percent of continuously visiting patients	No. of targets whose prescription continuity is assessed	No. of continously visiting patients
Process	Percent of patients who are prescribed inhaled bronchodilators	No. of assessment targets	No. of patients who were prescribed inhaled bronchodilators
Process	Percent of patients with hospitalization experience due to COPD	No. of assessment targets	No. of patients with hospitalization experience due to COPD
Process	Percent of patients with emergency room visit experience due to COPD	No. of assessment targets	No. of patients with emergency room visit experience due to COPD
Process	Share of COPD or asthma out of all respiratory diseases	No. of sepcifications with respiratory diseases	No. of specifications with COPD, asthma and comorbidity of COPD and asthma

Hemodialysis

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Percent of doctors specialized in hemodialysis	A sum of employment days of doctors in hemodialysis department	A sum of employment days of doctors specializing in dialysis
Structure	Number of hemodialysis performed per doctor per day	A sum of working days of doctors in hemodialysis department	Total number of dialysis
Structure	Percent of nurses with 2 or more years' experience in hemodialysis	A sum of employment days of nurses in hemodialysis department	Sum of employment days of nurses with 2 years or longer experience in hemodialysis
Structure	Number of hemodialysis performed per nurse per day	A sum of working days of nurses in hemodialysis department	Total number of dialysis
Structure	Satisfaction of the minimum required number of isolated hemodialysis equipment for hepatitis B patients	Satisfaction of the minimum required number of isolated hemodialysis equipment for hepatitis B patients	No. of Isolated hemodialysis equipment for hepatitis B patients ≥ minimum required number of isolated hemodialysis equipment No. of hepatitis B patients [(3× No. of nocturnal hemodialysis) + (2× daytime hemodialysis)]/ 3
Structure	Availability of emergency equipment in hemodialysis room		Availability of emergency equipment ※ Emergency equipment: ventilator, suction apparatus, endotracheal intubation equipment, EKG unit, defibrilator
Structure	Satisfaction of the required frequency of water quality tests	No. of items for water quality test	No. of items satisfying required frequency of water quality tests
Process	Satisfaction rate of the required frequency of adequacy testing for hemodialysis	No. of target in outpatient setting	No. of patients satisfying required frequency of adequacy testing for hemodialysis
Process	Satisfaction rate of the minimum requirement for arteriovenous fistula (AVF) stenosis monitoring	No. of targets in outpatient setting	No. of patients who receive regular vascular access monitoring
Process	Satisfaction rate of the required frequency of regular tests	No. of targets in outpatient setting	No. of patients satisfying required frequency of regular check-up by item (※No. of patients satisfying required frequency of regular check-up by item= ∑No. of items satisfying required frequency of regular check-up/No. of items of regular check-up)
Outcome	Satisfaction rate of hemodialysis adequacy	No. of targets in outpatient setting	No. of patients satisfying the required results of adequacy testing + No. of patients with re-testing experience within minimum 2 months after getting unsatisfied results of adequacy testing
Outcome	Satisfaction rate of calcium x phosphorus	No. of patients who underwent a test more than once during target assessment period	No. of patients with a level of Ca× P < 55mg2/dℓ2
Process	Rate of iron administration	No. of those with reduced ability to store iron among patients who suffered animea or were administered hematopoietics during target assessment period	No. of patients were administered intravenous iron
Outcome	Percent of patients with Hb below 10g/dl	No. of patients who were administered hematopoietics during target assessment period	No. of patients with a level of Hb<10g/dℓ
Outcome	Satisfaction rate of systolic blood pressure	No. of targets in outpatient setting	No. of patients with systolic blood pressure at 100-140mmHg
Outcome	Satisfaction rate of diastolic blood pressure	No. of targets in outpatient setting	No. of patients with diastolic blood pressure at 60-90mmHg

Colorectal cancer

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Availability of a specialist workforce		One or more specialist * Specialist type: surgeon, hemato-oncologist, pathologist
Process	Rate of preoperative pain assessment	No. of patients who underwent colectomy	No. of patients who underwent pre-operative pain assessment using pain assessment tools
Process	Rate of taking family history of cancer	No. of patients who underwent colectomy	No. of patients who have family history of cancer
Process	Rate of preoperative workups	No. of patients who underwent colectomy	No. of patients who underwent pre-operative in-dept medical examination
Process	Rate of documenting assessments of the completeness of resection	No. of patients who underwent colectomy	No. of patients whose compeleteness of resection was evaluated and medically recorded
Process	Rate of CEA test performance within 3 months after surgery	No. of patients who underwent colectomy 3 months (90) days ago	No. of patients whose Carcinoembryonic antigen(CEA) was measured
Process	Rate of pathology report completeness	No. of patients who underwent colectomy	No. of patients whose pathology report has been compeleted
Process	Rate of 12 or more regional lymph node resection and examination	No. of patients who underwent colectomy	No. of patients who underwent the disection of 12 or more regional lymph nodes and pathology examination
Process	Rate of documenting clinical information on cancer	No. of patients who underwent colectomy	No. of patients whose TNM was medically recorded by clinician
Process	Rate of stoma care education performance	No. of patients who suffer intestinal fistula after colectomy	No. of patients who received education about intestinal fistula management before discharge
Process	Percent of patients who did not receive chemotherapy (Stage I)	No. of patients who underwent colectomy due to colon cancer (Stage I) and rectal cancer (Stage I)	No. of patients who did not undergo adjuvant chemotherapy
Process	Rate of chemotherapy performed within 8 weeks after surgery (Stage II [or IIb]–III)	No. of patients who underwent colectomy due to colon cancer (Stage IIb~II) and rectal cancer (Stage II~III)	No. of patients who underwent adjuvant chemotherapy recommended within 8 weeks of surgery
Process	Percent of patients who received explanations of chemotherapy plans	No. of patients who underwent chemotherapy	No. of patients with records saying that they (or their family members) were explained about chemotherapy plans
Process	Rate of flow sheet use	No. of patients who underwent chemotherapy	No. of patients whose flow sheet was used

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Rate of chemotherapy performance recommended by clinical guidelines	No. of colon cancer patients who underwent chemotherapy alone after surgery	No. of patients whose recommended frequency of chemotherapy and actual frequncy of conducted chemotherapy are the same
Process	Percent of patients who were administered antiemetics	No. of colon cancer patients who underwent chemotherapy with probablity of severe or higher level of nausea	No. of patients who were prescribed Serotonin antagonist
Process	Rate of postoperative radiation therapy (rectal cancer)	No. of patients who satisfy applicable criteria among patients who underwent resection for rectal cancer (Stage II~III)	No. of patients who underwent post-operative radiation therapy
Process	Rate of combined chemotherapy and radiation therapy (rectal cancer)	No. of rectal cancer (Stage II~III) patients who underwent radiation therapy	No. of patients who underwent concomitant 5-fluorouracil-based chemotherapy plus radiation therapy
Outcome	Case-mix adjusted average length of stay (incl. postoperative length of stay)		
Outcome	Operative mortality rate (In-hospital mortality and 30-day postoperative mortality)	No. of patients who underwent colectomy	No. of patients who died during hospitalization or within 30 days of colectomy
Outcome	Case-mix adjusted average treatment cost (Costliness Index, CI)		

Breast cancer

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Availability of a specialist workforce		one or more specialists : surgeon, hemato-oncologist, pathologist, radiation oncologist
Process	Rate of taking family history of breast cancer	No. of patients who underwent mastectomy	No. of patients who have family history of breast cancer
Process	Rate of documenting assessments of patients' general condition	No. of patients who underwent chemotherapy	No. of patients whose assessment results of general condition were recorded before chemotherapy conducted
Process	Rate of obtaining consent forms on adjuvant therapy	No. of patients who underwent adjuvant therapy	No. of adjuvant therapy-receiving patients who signed consent form for the therapy
Process	Rate of documenting chemotherapy	No. of breast cancer patients who underwent chemotherapy	No. of patients whose chemotherapy details are recorded
Process	Rate of documenting radiation therapy	No. of patients who underwent radiation therapy	No. of patients whose radiation therapy results are recorded
Process	Rate of pathology report completeness	No. of patients who underwent mastectomy	No. of patients whose pathology report has been compeleted
Process	Rate of documenting clinical information on cancer	No. of patients who underwent mastectomy	No. of patients whose cancer-related clinical information is recorded
Process	Rate of sentinel lymph node biopsy or axillary lymph node resection	No. of patients who underwent mastectomy	No. of patients who underwent sentinel lymph node biopsy or axillary lymph node dissection
Process	Percent of final surgical margins clear of invasive breast cancer (negative margins)	No. of patients who underwent lumpectomy	No. of patients with final surgical margins clear of invasive breast cancer (negative margins)
Process	Rate of adjuvant therapy performed within 8 weeks after surgery (chemotherapy or endocrine therapy)	No. of patients with tumors of over 1cm in size or with positive lymph nodes regardless of tumer size	No. of patients who underwent adjuvant therapy (chemotherapy or endocrine therapy) within 8 weeks of surgery
Process	Rate of adjuvant endocrine therapy	No. of patients with hormone receptor positive	No. of patients who underwent adjuvant endocrine therapy
Process	Rate of chemotherapy performance recommended by clinical guidelines	No. of breast cancer patients who underwent adjuvant chemotherapy	No. of patients who underwent recommended adjuvant chemotherapy
Process	Percent of patients who were administered antiemetics	No. of breast cancer patients who underwent chemothrapy with probablity of severe or higher level of nausea	No. of patients who were prescribed serotonin antagonist
Process	Rate of targeted therapy	No. of patients with HER2 results of 3+ or amplified HER2 gene in FISH or SISH	No. of patients who underwent targeted therapy
Process	Rate of bone density test performed in patients before aromatase inhibitor (AI) administration	No. of patients who were administered AI	No. of patients who underwent bone density therapy before AI administration
Process	Timing of radiation therapy	No. of patients who underwent lumpectomy	No. of patients who underwent radiation therapy after surgery or within 6 weeks of post-operative chemotheraapy completion
Process	Rate of radiation therapy after mastectomy	No. of mastectomy patients who satisfy the applicable criteria	No. of patients who underwent radiation therapy
Outcome	Average length of stay (Lengthiness Index, LI)		
Outcome	Average inpatient treatment cost (Costliness Index, CI)		

Lung cancer

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Availability of a specialist workforce		One or more specialists *Specialist type: pulmonologist, hemato-oncologist, thoracic surgery specialist, pathologist, nuclear medicine specialist, radiation oncologist, radiology specialist
Process	Rate of documenting history of smoking	No. of assessment targets with lung cancer	No. of patients whose smoking history is recorded
Process	Rate of documenting assessments of patients' general condition	No. of targets with lung cancer	No. of patients whose general condition were evalulated before treatment
Process	Rate of workup performed before treatment (monitor only EGFR mutation tests)	No. of target patients with lung cancer for each applicable examination	No. of patients who underwent applicable in-depth examination before treatment
Process	Rate of cancer stage documentation by a clinician	No. of assessment targets with lung cancer	No. of patients whose medical history was recorded by clinicians (internalist, thoracic surgeon, radiation oncologist)
Process	Percent of confirmed pathological diagnoses before treatment	No. of patients who will undergo treatment other than radical operation for lung cancer	No. of patients whose tissue or cytologic diagnosis has been confirmed
Process	Rate of pathology report completeness	No. of patients who underwent resection for lung cancer	No. of patients whose surgical pathology records were completed
Process	Rate of lymphadenectomy or lymph node sampling performance	No. of patients who underwent resection for lung cancer	No. of patients who underwent lymph node resection or lymph node sampling
Process	Rate of obtaining consent forms on chemotherapy	No. of patients who underwent chemotherapy	No. of patients who signed consent form with explanation of chemotherapy
Process	Rate of flow sheet use	No. of lung cancer patients who underwent chemotherapy	No. of patients whose flow sheet was used
Process	Percent of patients who did not receive chemotherapy (Stage IA)	No. of patients who underwent resection for lung cancer (stage ⅠA)	No. of patients who did not undergo adjuvant chemotherapy
Process	Rate of adjuvant chemotherapy performance within 8 weeks after surgery	No. of stage II/IIIA non-small cell lung cancer patients (aged below 70) who underwent surgery	No. of patients who underwent adjuvant chemotherapy within 8 weeks of surgery
Process	Percent of patients who were administered antiemetics	No. of patients who underwent chemotherapy with moderate or higher emetic risk level	No. of patients who were administered antiemetics before chemotherapy with moderate or higher emetic risk level firstly conducted
Process	Rate of concomitant radiochemotherapy performance in limited stage small cell lung cancer patients	No. of patients aged below 70 with good general condition but limited stage small cell lung cancer	No. of patients who underwent concomitant radiochemotherapy
Process	Assessment rate of adverse effects of anticancer drugs during administration	No. of lung cancer patients who underwent chemotherapy	No. of patients with evaluations of adverse effects of anti-cancer drugs before every chemotherapy conducted

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Documentation rate of regular evaluations of tumor response to chemotherapy in stage IIIB/IV non-small cell lung cancer patients	No. of stage II/IIIA non-small cell lung cancer patients who underwent only chemotherapy	No. of patients with regular evaluations of tumor response to chemotherapy
Process	Rate of radiation therapy documentation	No. of patients who underwent radiation therapy	No. of patients whose radiation therapy treatment details (total radiation dose and radiation dose per fraction (or No. of fraction, treatment area) were recorded
Process	Assessment rate of adverse effects during radical radiation therapy, documentation rate of electronic portal imaging verficiation and correction	No. of patients who underwent radical surgery	No. of patients with weekly evaluation of adverse effect and records of electronic portal imaging verification and correction
Process	Documentation rate of evaluations of tumor response and adverse effects within 2 months after radical radiation therapy	No. of patients who underwent radical surgery	No. of patients who received evaluations of tumor response and adverse effects within 2 months after radical radiation therapy
Process	Rate of concomitant radiochemotherapy performance in patients with inoperable stage III non-small cell lung cancer	No. of inoperable stage III non-small cell lung cancer patients aged below 70 with good general condition	No. of patients who underwent CCRT
Outcome	Average length of stay (Lengthiness Index, LI)		
Outcome	Average inpatient treatment cost (Costliness Index, CI)		

Stomach cancer

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Availability of a specialist workforce		One or more full-time specialists for each department
Process	Rate of abdominal CT scan with contrast before gastrectomy	No. of patients who underwent endoscopic ressection or gasterectomy	No. of patients who underwent endoscopic ressection or gastrectomy before abdominal CT angiography
Process	Documentation rate of diagnostic endoscopies performed before gastrectomy	No. of patients who underwent endoscopic ressection or gastrectomy	No. of patients whose endoscopy results were completed before endoscopic ressection or gastrectomy
Process	Rate of histopathological examination before gastrectomy	No. of patients who underwent endoscopic ressection or gastrectomy	No. of patients who underwent histopathological examination of tumors before endoscopic ressection or gastrectomy
Process	Rate of documenting assessments of patients' general condition	No. of patients who underwent chemotherapy	No. of patients whose general condition was recorded before chemotherapy
Process	Rate of cancer stage documentation by a radiation oncologist	No. of patients who underwent chemotherapy	No. of patients whose medical records on TNM were medically recorded by specialist in chemotherapy
Process	Rate of endoscopic resection record completeness	No. of patients who underwent endoscopic ressection	No. of patients whose endoscopic resection was completely recorded
Process	Rate of additional gastrectomy performed after incomplete endoscopic resection	No. of patients who require additional gastrectomy after endoscopic resection	No. of patients who underwent additional gastrectomy
Process	Rate of pathology report completeness	No. of patients who underwent endoscopic submucosal disection or gastrectomy	No. of patients whose pathology report has been compeleted
Process	Rate of gastrectomy record competeness	No. of patients who underwent gastrectomy	No. of patients whose operation records were completed
Process	Rate of regional lymph node resection and examination	No. of patients who underwent gastrectomy	No. of patients who underwent regional lymph node dissection in 15 areas before histopathological examination
Process	Rate of radical surgery in gastric cancer	No. of patients with cT2 or higher level gastric cancer	No. of patients who underwent radical surgery in gastric cancer as the first treatment
Process	Rate of unrecommended adjuvant chemotherapy performance [stage Ia]	No. of stage I a patients who underwent endoscopic ressection or gastrectomy	No. of patients who underwent adjuvant chemotherapy (or anti-cancer radiation therapy)
Process	Rate of recommended adjuvant chemotherapy performed within 8 weeks after surgery (Stage II–III)	No. of stage Ⅱ~Ⅲ patients who underwent radical surgery in gastric cancer	No. of patients who underwent adjuvant chemotherapy firstly recommended within 8 weeks of surgery
Process	Rate of recommended adjuvant chemotherapy performance	No. of patients who underwent adjuvant chemotherapy after surgery	No. of patients who underwent recommended adjuvant chemotherapy
Process	Rate of flow sheet use	No. of patients who underwent chemotherapy	No. of patients whose flow sheet was used
Outcome	Average length of stay (Lengthiness Index, LI)		
Outcome	Operative mortality rate	No. of patients who underwent gastrectomy	No. of patients who died during hospitalization or within 30 days of gastrectomy
Outcome	Average inpatient treatment cost (Costliness Index, CI)		

Liver cancer treatment outcome (For monitoring purpose only)

Type of Indicator	Indicator Name	Dominator	Numerator
Outcome	Operative mortality rate (In-hospital mortality and 30-day postoperative mortality)	No. of patients who underwent hepatic resection	No. of patients who died during hospitalization or within 30 days of hepatic resection

Pharmaceutical benefits–Injection prescription rate

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Rate of injection prescription	Total number of visits	Total number of injection prescriptions
Process	Rate of antibiotic prescription for acute upper respiratory infections (AURI)	Total number of visits	Total number of antibiotic prescriptions
Process	Rate of 3rd or later generation cephalosporin antibiotic prescription (AURI)	Total number of antibiotic prescriptions	Total number of applicable antiboitic presciptions
Process	Rate of quinolone antibiotic prescription (AURI)	Total number of antibiotic prescriptions	Total number of applicable antiboitic presciptions
Process	Number of drugs per prescription (all diseases)	Total number of outpatient presciptions	Total number of drug items for outpatient prescription
Process	Number of drugs per prescription (respiratory tract diseases)	Total number of outpatient presciptions	Total number of drug items for outpatient prescriptions
Process	Number of drugs per prescription (musculoskeletal disease)	Total number of outpatient presciptions	Total number of drug items for outpatient prescriptions
Process	Percent of prescriptions with 6 or more drugs	Total number of outpatient presciptions	No. of prescriptions with 6 or more drugs
Process	Rate of digestive medicine prescription	Total number of outpatient presciptions	No. of digestive medicine prescriptions
Process	Drug cost per medication day	Total number of administration days	Total drug costs
Process	Rate of duplicate prescriptions for NSAIDs	Total number of prescriptions	No. of duplicate NSAIDs prescriptions
Process	Rate of adrenocortical hormone prescription	Total number of visits	No. of adrenocortical hormone prescriptions
Process	Rate of antibiotic prescription (all diseases)	Total number of visits	Total number of antibiotic prescriptions
Process	Rate of antibiotic prescription (respiratory diseases)	Total number of visits	Total number of antibiotic prescriptions
Process	Rate of antibiotic prescription (respiratory diseases excl. acute upper respiratory tract infections)	Total number of visits	Total number of antibiotic prescriptions

Antibiotic use in pediatric acute otitis media

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Rate of antibiotic prescription	Total number of visits	Total number of antibiotic prescriptionst
Process	Rate of antibiotic prescription by ingredient class	Total number of antibiotic prescriptions	Total number of prescriptions by Amoxicillin, Amoxicillin/Clavulanate, Cephalosporin and Macrolide group
Process	Rate of adrenocortical hormone prescription	Total number of visits	No. of adrenocortical hormone prescriptions
Process	Share of (acute/chronic/unspecified) otitis media	Total number of visits	No. of visits for acute (suppurative · non-suppurative) conditions, chronic (suppurative · non-suppurative) conditions and unspecified condition (suppurative · non-suppurative)
Process	Rate of antibiotic prescription in acute otitis, unspecified	Total number of visits	Total number of antibiotic prescriptions (unspecified otitis media)

Use of antibiotic prophylaxis in surgery

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Rate of initial antibiotic prophylaxis use during the hour preceding skin incision	Total number of patients who were administered prophylactic antibiotics (In the case of gallbladder surgery, total no. of patients who underwent surgery under evaluation)	No. of patients who were administered prophylactic parenteral antibiotics during the hour preceding skin incision
Process	Rate of aminoglycoside antibiotic administration	Total number of patients who were administered prophylactic antibiotics (In the case of gallbladder or glaucoma surgery, total no. of patients who underwent surgery under evaluation)	No. of patients who were administered aminoglycoside antibiotics
Process	Rate of 3rd or later generation cephalosporin antibiotic administration	Total number of patients who were administered prophylactic antibiotics	No. of patients who were administered 3rd or later generation cephalosporin antibiotics
Process	Rate of concomitant antibiotic prophylaxis administration	Total number of patients who were administered prophylactic antibiotics	No. of patients who were administered 2 or more classes of antibiotics
Process	Rate of antibiotic prescription at discharge	Total number of patients who underwent target surgery	No. of patients who were administered antibiotics at discharge
Process	Total average number of days of antibiotic prophylaxis administration (in-hospital administration & prescription at discharge)	Total number of patients who were administered prophylactic antibiotics	Total number of antibiotic prescription days (including inpatient and outpatient setting) of patients administered prophylatic antibiotics
Process	Documentaton rate of past medical history of antibiotic allergy	Total number of patients who were administered prophylactic antibiotics	No. of patients whose past medical history of antibiotic allergy was recorded
Process	Rate of ASA class documentation	Total number of patients who underwent target surgery	No. of patients who have ASA class records
Process	Percent of patients on postoperative blood glucose control	Total number of patients who underwent heart surgery	No. of patients whose highest fasting blood sugar level in the morning was 200mg/dl or lower on the first or second day of surgery

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Percent of patients with appropriate hair removal	Total number of patients who underwent target surgery	No. of patients who did not shave + No. of patients who did not use a razor for shaving
Process	Percent of patients maintaining a normal postoperative temperature	Total number of patients who underwent target surgery	No. of patients who were actively kept warm + no. of patients whose body temperature was kept at 36°c or higher from 30 minutes before the completion of anesthesia to 15 minutes after the completion of anesthesia
Outcome	Rate of exemption related to postoperative infections	Total number of patients who underwent target surgery	No. of patients with post-operative infection corresponding to applicable item

Inpatient benefits at long-term care hospitals (LTCH)

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Number of patients per physician	Average number of doctors during a given period	Average number of patients during a given period
Structure	Number of patients per nurse	Average number of nurses during a given period	Average number of patients during a given period
Structure	Number of patients per nursing staff (nurse & nurse aide)	Average number of nursing staff during a given period	Average number of patients during a given period
Structure	Number of patients per physical therapist	Average number of nursing staff during a given period	Average number of patients during a given period
Structure	Percent of employment days of pharmacist(s) out of the total target assessment days	Average number of physical therapists during a given period	No. of employment days of pharmacist during a given period
Structure	Percent of employment days of radiological technologist(s) (incl. radiography equipment) out of the total target assessment days	Total number of employment days during a given period	No. of employment days of radiological technologist during a given period
Structure	Percent of employment days of medical technologist(s) (incl. clinical laboratory) out of the total target assessment days	Total number of employment days during a given period	No. of employment days of medical technologist during a given period
Structure	Percent of employment days of social worker(s) out of the total target assessment days	Total number of employment days during a given period	No. of employment days of radiological technologist during a given period
Structure	Percent of employment days of medical record administrator(s) out of the total target assessment days	Total number of employment days during a given period	No. of employment days of social worker during a given period
Process	Rate of MMSE performance at admission for patients aged 65 and older	No. of hospitalized patients aged 65 or older	Patients who have undergone the MMSE within the last 6 months at the time of hospital's decision on their hospitalization
Process	Percent of patients with indwelling catheters_high risk group	Among patients who received an evaluation in the applicable month, those of high risk group	Patients with indwelling catheters
Process	Percent of patients with indwelling catheters_low risk group	Among those who received a montly evaluation, Patients of low risk group	Patients with indwelling catheters

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Percent of diabetes patients who received HbA1c tests	Diabetics	Patients who underwent a HbA1c test over the last one year
Process	Percent of patients weighed monthly	Patients who received an evaluation in the applicable month	No. of patients weighed
Outcome	Percent of patients with reduced ability to perform activities of daily living (ADL)_dementia group	Dementia patients who received an evaluation both in the applicable month and the month before the applicable month	Patients whose ability to perform activities of daily living in the applicable month reduced, compared to that in the month before the applicable month
Outcome	Percent of patients with reduced ability to perform activities of daily living (ADL)_non-dementia group	Non-dementia patients who received an evaluation both in the applicable month and the month before the applicable month	Patients whose ability to perform activities of daily living in the applicable month reduced, compared to that in the month before the applicable month
Outcome	Percent of patients with new bedsores_high risk group	Among patients who received an evaluation both in the applicable month and the month before the applicable month, those of high risk group in those two months	Patients who did not have bed sores in an evaluation of the month before the applicable month but were diagnosed with bedsores at one or higher stage in an evaluation of the applicable month
Outcome	Percent of patients with new bedsores_low risk group	Among patients who received an evaluation both in the applicable month and the month before the applicable month, those of low risk group in those two months	Patients who did not have bed sores in an evaluation of the month before the applicable month but were diagnosed with bedsores at one or higher stage in an evaluation of the applicable month
Outcome	Percent of patients whose bedsores worsened_high risk group	Among patients who received an evaluation both in the applicable month and the month before the applicable month, those of high risk group in those two months	Patients whose bedsores worsened in an evaluation of the applicable month, compared to those in an evaluation of the month before the applicable month
Outcome	Percent of patients with reduced ability to leave their rooms_dementia group	Dementia patients who received an evaluation both in the applicable month and the month before the applicable month	Patients with reduced ability of the activity ⌜9. leaving their rooms⌟among activities of daily living in the applicable month compared to that in the month before the applicable month
Outcome	Percent of patients with reduced ability to leave their rooms_non-dementia group	Non-dementia patients who received an evaluation both in the applicable month and the month before the applicable month	Patients with reduced ability of the activity ⌜9. leaving their rooms⌟among activities of daily living in the applicable month compared to that in the month before the applicable month
Outcome	Percent of patients whose bedsores improved_high risk group	Among patients who received an evaluation both in the applicable month and the month before the applicable month, those of high risk group in those two months	Patients with improved bedsores in an evaluation of the applicable month compared to those in an evaluation of the month before the applicable month
Structure	Turnover rate of nursing staff	Average number of nurses during a given period	Total number of nurseses employed during a given period ×100
Process	Average number of treatment days per pneumonia patient	A sum of pneumonia treatment days by pneumonia patient during a given period	A sum of patients who developed pneumonia during a given period
Process	Percent of patients on urination control program among patients with urinary incontinence or indwelling catheters	Among patients who received an evaluation in the appliable month, those who were diagnosed with urinary incontinence or indwelling catheters	Patients who joined a better uniration control program
Process	Percent of inpatients whose length of stay is less than 7 days	Patients who are being hospitalized during an evaluation period	Patients hospitalized for less than 7 days
Process	Percent of patients hospitalized for specialized rehabilitation care of 180 days or more	Patients who received specialized rehabilitation care during an evaluation	Patients hospitalized for 181 days or longer

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Percent of long-term hospitalized patients (361 days or more)	Patients who are being hospitalized during an evaluation period	Patients hospitalized for 361 days or longer
Outcome	Rate of pneumonia onset	A sum of total hospitalized patients' hospitalization days except for their treatment days for pneumonia during a given period	A sum of occurrence of pneumonia during a given period
Outcome	Percent of patients with improved ability to perform activities of daily living (ADL)_dementia group	Dementia patients who received an evaluation both in the applicable month and the month before the applicable month	Patients whose ability to perform activities of daily living in the applicable month improved, compared to that in the month before the applicable month
Outcome	Percent of patients with improved ability to perform activities of daily living (ADL)_non-dementia group	Non-dementia patients who received an evaluation both in the applicable month and the month before the applicable month	Patients whose ability to perform activities of daily living in the applicable month improved, compared to that in the month before the applicable month
Outcome	Percent of patients with improved ability to perform activities of daily living (ADL)_Specialized rehabilitation care group	Patients who received specialized rehabilitation care both in the applicable month and the month before the applicable month	Patients whose ability to perform activities of daily living in the applicable month improved, compared to that in the month before the applicable month
Outcome	Percent of patients with improved ability to leave their rooms_dementia group	Dementia patients who received an evaluation both in the applicable month and the month before the applicable month	Patients with improved ability of the activity 「9. leaving their rooms」 among activities of daily living in the applicable month compared to that in the month before the applicable month
Outcome	Percent of patients with improved ability to leave their rooms_non-dementia group	Non-dementia patients who received an evaluation both in the applicable month and the month before the applicable month	Patients with improved ability of the activity 「9. leaving their rooms」 among activities of daily living in the applicable month compared to that in the month before the applicable month
Outcome	Percent of patients with weight loss of 5% or more	Patients who received an evaluation in the applicable month and the month before the applicable month, those with weight results	Patients who lost weight by 5% or more in the applicable month compared to the level in the month before the applicable month
Outcome	Percent of patients with moderate or higher level of pain	Patients who received an evaluation in the applicable month	Patients with severe or higher pain
Outcome	Percent of urinary incontinence patients_low risk group	Patients who received an evaluation in the applicable month, those who are not included in high risk group	Patients who were diagnosed with urinary incontinence in the applicable month

Psychiatric department of Medical Aid

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Number of inpatients per psychiatrist per day	Average number of psychiatrists per day	Average number of inpatients per day
Structure	Number of inpatients per nurse of the psychiatric department per day	Average number of nurses of the psychiatric department per day	Average number of inpatients per day
Structure	Number of inpatients per nursing staff of the psychiatric department per day	Average number of nursing staff of the psychiatric department per day	Average number of inpatients per day
Structure	Number of inpatients per mental health professional per day	Average number of mental health professionals per day	Average number of inpatients per day
Structure	Number of inpatients per social worker per day	Average number of social workers per day	Average number of inpatients per day
Structure	Occupancy per hospital room	Total number of hospital rooms	Total number of inpatient occupancy
Structure	Percent of beds out of the total inpatient occupancy	Total number of inpatient occupancy in psychiatric department	No. of beds
Structure	Number of beds per toilet in inpatient wards	Total number of toilets	Total number of inpatient occupancy
Structure	Availability of a rest area, strolling area, and exercise area with exercise equipment		Availability of a rest area, strolling area, and exercise area with exercise equipment
Process	Rate of atypical drug prescription (schizophrenia)	No. of antipsychotic drug prescriptions	No. of atypical drug prescriptions
Process	Number of psychiatric treatments	Total number of hospitalization days	Number of psychiatric treatments
Process	Number of individual psychotherapy sessions	Total number of hospitalization days	Number of individual psychotherapy sessions
Process	(Entrusted) Operation of a day care ward or mental health center (Y/N)		(Entrusted) Operation of a day care ward or mental health center (Y/N) at a given time
Outcome	Length of stay of daily inpatients_ median (schizophrenia)		Median accumulative length of stays of patients who are being hospitalized due to schizophrenia (F20~F29) during a given period
Outcome	Length of stay of discharged patients_ median (schizophrenia)		Median accumulative length of stays of schizophrenia (F20~F29) patients who were discharged during a given period (a given period: 1 year)
Outcome	Length of stay of daily inpatients_ median (alcohol disorder)		Median accumulative length of stays of patients who are being hospitalized due to alcohol-related disorder (F100~F109) during a given period
Outcome	Length of stay of discharged patients_ median (alcohol disorder)		Median accumulative length of stays of alcohol-related disorder (F100~F109) patients who were discharged during a given period (a given period: 1 year)

Type of Indicator	Indicator Name	Dominator	Numerator
Outcome	Readmission rate within 7 days of discharge (schizophrenia)	Total number of discharged patients	No. of patients re-hospitalized within 7 days of discharge
Outcome	Readmission rate within 7 days of discharge (alcohol disorder)	Total number of discharged patients	No. of patients re-hospitalized within 7 days of discharge
Outcome	Rate of outpatient visits within 30 days of discharge (schizophrenia)	Total number of discharged patients	No. of outpatient visits within 30 days of discharge
Process	Rate of voluntary admission	Total number of patients	No. of patients voluntarily hospitalized
Process	Rate of overnight leave (schizophrenia)	Total number of hospitalization days	Total number of overnight leaves
Outcome	Readmission rate within 30 days of discharge (schizophrenia)	Total number of discharged patients	No. of outpatient visits within 30 days of discharge
Outcome	Rate of community linkage (schizophrenia)	Total number of discharged patients - No. of patients rejecting referral	No. of recorded cases of community linkage
Outcome	Rate of conducting patient experience surveys	Total number of discharged patients	No. of patients who underwent patient experience surveys

DRG for 7 diseases

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Rate of abnormal findings in discharge patients	Applicable institution's no. of discharge of DRG patients	No. of cases with more than one item 'checked' out of 5 items
Process	Length of stay ratio	∑ (Entire institutions' Length of stay per case by disease group by institution type × No. of discharges by disease group in the applicable institution	∑(Applicable institution's length of stay per case by disease group × No. of spplicable institution's discharges by disease group)
Process	Performance rate of basic services (preoperative tests)	Applicable institution's no. of discharges of DRG patients	No. of performance cases of basic service
Outcome	Rate of accidents during hospitalization	Applicable institution's no. of discharges of DRG patients	No. of accidents occuring during hospitalization
Outcome	Rate of infection during hospitalization	Applicable institution's no. of discharges of DRG patients	No. of infections occuring during hospitalization
Outcome	Rate of surgical complications and adverse events	Applicable institution's no. of discharges of DRG patients	No. of post-operative complications and general complications occuring during hospitalization

Type of Indicator	Indicator Name	Dominator	Numerator
Outcome	Readmission rate	Applicable institution's no. of discharges of DRG patients	No. of re-admissions within 30 days of discharge
Outcome	Rate of emergency room use after discharge	Applicable institution's no. of discharges of DRG patients	No. of emergency room visits within 30 days of discharge
Process	Service volume ratio for each diagnosis-related group (DRG)	∑ (Entire institution's FFS-based average treatment costs per case by disease group by institution ×Applicable institution's no. of discharges by disease group	∑ (Applicable institution's FFS-based average treatment costs per case by disease group × Applicable institution's no. of discharges by disease group
Process	Assessment of antibiotic prophylaxis use in surgery	Applicable institution's no. of discharges of DRG patients	Application of assessment results of preoperative antibiotic prophylaxis
Outcome	Rate of operation and treatment during hospitalization due to complications	Applicable institution's no. of discharges of DRG patients	No. of cases of surgery and care provided for treating complications during hospitalization
Outcome	Rate of ICU use during hospitalization	Applicable institution's no. of discharges of DRG patients	No. of patients using ICU
Outcome	Mortality rate	Applicable institution's no. of discharges of DRG patients	No. of deaths during hospitalization (including death at discharge and after outpatient surgery)
Case mix ratio	Percent of cases with severity of 1 or higher	Applicable institution's no. of discharges of DRG patients	No. of cases with severity of 1 or higher level
Case mix ratio	Case mix index by provider	(∑ standard treatment costs by disease group) x entire institution's cases by disease group/∑entire institution's cases by disease group	(∑(standard treatment costs by disease group x applicable institution's no. of cases by disease group)/∑(applicable institution's no. of cases by disease group)
Outpatient visit ratio	Percent of outpatient visits during a 14-day period before admission or after discharge	∑(No. of entire institutions' outpatient visits per disease group by institution type before hospitalization · 14 days after discharge ×No. of applicable institution's discharges per disease group)	∑(No. of applicable institution's outpatient visits per disease group before hospitalization · 14 days after discharge ×No. of applicable institution's discharges per disease group)
Outpatient visit ratio	Percent of outpatient treatment costs during a 14-day period before admission or after discharge	∑(No. of entire institutions' outpatient visits per disease group by institution type before hospitalization · 14 days after discharge ×No. of applicable institution's discharges per disease group)	∑(No. of applicable institution's outpatient visits per disease group before hospitalization · 14 days after discharge ×No. of applicable institution's discharges per disease group)
	Rate of consistency between claim data and medical records	Total number of items inspected	Total number of items inspected consistent with conducted items

ICU

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Number of ICU beds per designated specialist	No. of ICU designated specialists	No. of beds in intensive care unit
Structure	Number of ICU beds per nurse	No. of nurses	No. of beds in intensive care unit
Structure	Availability of specialized equipment and facilities in the ICU		Each section is given one point: 6 points in total
Structure	Availability of intensive care protocol	No. of equipped protocols of ICU patient treatment	No. of equipped protocols of ICU patient treatment
Process	Rate of prophylactic therapy performance for deep vein thrombosis	No. of patients put on ventilator	No. of patients who underwent deep vein thrombosis prophylactic therapy
Process	Assessment of standardized mortality rates (Y/N)		Non applicable
Outcome	Rate of ICU readmission within 48 hours	No. of cases of ICU patients moved to a general ward	No. of patients readmitted to ICU within 48 days after moved to a general ward
Structure	Percent of days with multiprofessional rounds		No. of ICU readmissions
Structure	Percent of patients using mechanical ventilators	No. of ICU admissions	No. of patients put on ventilator in ICU
Process	Execution of infection-related bundles		Whether bundles for infection prevention are conducted in ICU
Outcome	ICU mortality rate	No. of patients discharged from ICU	No. of patients who died in ICU
Outcome	Rate of central venous catheter (CVC)-related blood stream infection	No. of days of central venous catheter put	No. of central venous catheter (CVC)-related blood stream infections
Outcome	Rate of pneumonia onset in patients using mechanical ventilators	No. of days of ventilator conducted	No. of pneumonia occurrence after ventilator put
Outcome	Rate of catheter-associated urinary tract infection (UTI)	No. of days of urinary catheter put	No. of catheter-associated urinary tract infections

Volume of services

Type of Indicator	Indicator Name	Dominator	Numerator
Structure	Threshold volume of services		

HSMR, RSRR

Type of Indicator	Indicator Name	Dominator	Numerator
Outcome	Hospital standardized mortality rate (HSMR)	Expected deaths	Obserbed deaths
Outcome	Risk-standardized readmission rate (RSRR)	Expected readmissions	Obserbed readmissions

Patient experience

Type of Indicator	Indicator Name	Dominator	Numerator
Nurses' service	Courtesy/respsect		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Nurses' service	Active listening		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Nurses' service	Explanations regarding hospital stay		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Nurses' service	Response to patient needs		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Doctors' service	Courtesy/respsect		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Doctors' service	Active listening		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100

Type of Indicator	Indicator Name	Dominator	Numerator
Doctors' service	Opportunity to speak with doctors		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Doctors' service	Information provided on doctors' rounding times		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Drug administration and treatment process	Explanations before drug administration/test/treatment		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Drug administration and treatment process	Explanations regarding side effects after drug administration/test/ treatment		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Drug administration and treatment process	Pain management efforts		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Drug administration and treatment process	Consolation and empathy regarding illness		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Drug administration and treatment process	Provision of discharge instructions/ treatment plan		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Hospital environment	Clean environment		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Hospital environment	Safe environment		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100

Type of Indicator	Indicator Name	Dominator	Numerator
Patient rights	Fair treatment		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Patient rights	Patient complaints		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Patient rights	Opportunity to participate in the treatment decision-making process		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Patient rights	Considerate attitude that keeps patients from feeling ashamed		① Never ☞ a score of 0 ② Hardly ☞ a score of 33 ③ usually ☞ a score of 67 ④ Always ☞ a score of 100
Overall assessment	Assessment of the inpatient experience		Scores are given in unit of 10 from 0 to 100.
Overall assessment	Willingness to recommend to others		Scores are given in unit of 10 from 0 to 100.
Personal characteristics	Route of admission (whether admitted through the emergency room)		1. Yes 2. No
Personal characteristics	Subjective health status		1. very good 2. good 3. normal 4. bad 5. very bad
Personal characteristics	Education level		1. Middle (or lower) school graduate 2. High school graduate 3. college student 4. college graduate 5. graduate student or master's degree holder

TB

Type of Indicator	Indicator Name	Dominator	Numerator
Process	Rate of acid-fast bacilli (AFB) smear performance		No. of examinees who underwent acid fast bacilli smear
Process	Rate of acid-fast bacilli (AFB) culture performance		No. of examinees who underwent acid fast bacilli culture
Process	Rate of nucleic acid amplification test (NAAT) performance		No. of examinees who underwent nucleic acid amplification
Process	Rate of compliance with standard prescription for initial treatment		No. of patients who complied with standard short-course chemotherapy
Process	Rate of TB patients' visits		Average number of visits per pneumonia patient
Process	Percent of prescription days out of the total target assessment days		Total number of presciption days of drugs for pneumonia

Claims review

Indicator Name	Dominator	Numerator
Number of claims		
Number of normal groups		total claims-(number of top outliers+number of bottom outliers)
Number of claims of upper exemption group		
Number of claims of lower exemption group		
Total medical cost		
Medical cost of normal group		
Medical cost of top outlier		
Medical cost of bottom outlier		
Average number of claims of top outlier		
Medical fee per claim	total number of claims	total medical fee
Medical fee per day	total length of stay	total medical fee
Length of stay per claim	total number of claims	total length of stay
Number of claims per medical procedure		
Total cost by item		
Average cost by item		
Episodes- costliness Index(ECI)		
Days-costliness Index(DCI)		
Lengthness index(LI)		
Case-Mix Index		

Indicator Name	Dominator	Numerator
Episode costliness Index per item group to the total		
Length of stay		
outpatient prescription cost		
outpatient prescription cost per claim	total number of claims	total cost of outpatient prescription drug
outpatient prescription cost per visit	total number of visits	total cost of outpatient prescription drug
Number of drug per prescription	total number of prescriptions	totla number of drug items with outpatient prescription
Number of presctiption per claim	total number of claims	total number of prescriptions
Number of prescribing days per claim	total number of claims	total number of outpatient drug administration days
Rate of available beds	the number of beds	the sum of annaul length of stay per bed
Rate of hospitalization with 16 and more days	total number of inpatient	the number of inpatients with more than 6-day of hospital stay
Outpatient prescribing costliness index per claim		
Outpatient prescribing costliness index per visit		
claims rate per diseas	total number of claims	the number of claims per disease
the number of patients with duplicate claims for hospital stays		
Number of code of disease per claim		
long-term benzodiazepine prescription rate for the elderly over the age of 65	the number of benzodiazepine prescriptions for the elderly over the age of 65	the number of longer than 30-day benzodiazepine prescription for the elderly over the age of 65
rate of prescription including more than 6 drug items	total number of prescriptions	the number of prescriptions including more than 6 drug items
Adjustment rate by claim	total number of claims	total number of adjusted claims
Adjustment rate by claim amount	total medical fee	total adjustment amount
Rate of Appeals	the number of adjusted claims	the number of appeals

Indicator Name	Dominator	Numerator
Rate of approval of appeal cases	the number of appeals	the number of sustained appeals
Rate of approved amount of appeals	the amount of appeals	the amount of sustained appeals
Number of complaints		
Number of multi-drug prescription		
Antibiotics prescription rate	total number of visits for acute upper respiratory infection patients	antibiotics prescription rate for acute upper respiratory infection
Injection prescription rate	total number of visits	the number of prescribed injections

4. INDIA's Fraud Triggers (National Health Agency, INDIA)

Category	No	Items
Claim History Triggers	1	Impersonation
	2	Mismatch of in house document with submitted documents
	3	Claims without signature of the beneficiary on pre-authorisation form
	4	Second claim in the same year for an acute medical illness/surgical
	5	Claims form multiple hospitals with same owner
	6	Claims form a hospital located far away from beneficiary's residence, pharmacy bills away from hospital/residence
	7	Claims for hospitalization at a hospital already identified on a "watch" list or black listed hospital
	8	Claims from members with no claim free years, i.e. regular claim history
	9	Same beneficiary claimed in multiple places at the same time
	10	Excessive utilization by a specific member belonging to the beneficiary Family Unit
	11	Deliberate blocking of higher-priced package rates to claim higher amounts
	12	Claims with incomplete/poor medical history: complaints/ presenting symptoms not mentioned, only line of treatment given, supporting documentation vague or insufficient
	13	Claims with missing information like post-operative histopathology reports, surgical / anaesthetist notes missing in surgical cases
	14	Multiple claims with repeated hospitalization (under a specific policy at different hospitals or at one hospital of one member of the beneficiary family unit and different hospitals for other members of the beneficiary family unit
	15	Multiple claims towards the end of policy cover period, close proximity of claims
Admissions Specific Triggers	16	Members of the same beneficiary family getting admitted and discharged together
	17	High number of admissions
	18	Repeated admissions
	19	Repeated admissions of members of the same beneficiary family unit
	20	High number of admission in odd hours
	21	High number of admission in weekends/ holidays
	22	Admission beyond capacity of hospital
	23	Average admission is beyond bed capacity of the provider in a month
	24	Excessive ICU (Intensive Care Unit) admission
	25	High number of admission at the end of the Policy Cover Period
	26	Claims for medical management admission for exactly 24 hours to cover OPD treatment, expensive investigations
	27	Claims with Length of Stay (LOS) which is in significant variance with the average LoS for a particular ailment
Diagnosis Specific Triggers	28	Diagnosis and treatment contradict each other.
	29	Diagnostic and treatment in different geographic locations
	30	Claims for acute medical Illness which are uncommon e.g. encephalitis, cerebral malaria, monkey bite, snake bite etc

Category	No	Items
Diagnosis Specific Triggers	31	Ailment and gender mismatch
	32	Ailment and age mismatch
	33	Multiple procedures for same beneficiary – blocking of multiple packages even though not required
	34	One-time procedure reported many times
	35	Treatment of diseases, illnesses or accidents for which an Empanelled Health Care Provider is not equipped or empanelled for
	36	Substitution of packages, for example, Hernia as Appendicitis, Conservative treatment as Surgical
	37	Part of the expenses collected from beneficiary for medicines and screening in addition to amounts received by the Insurer
	38	ICU/ Medical Treatment blocking done for more than 5 days of stay, other than in the case of critical illnesses
	39	Overall medical management exceeds more than 5 days, other than in the case of critical illness
	40	High number of cases treated on an out-of-pocket payment basis at a given provider, post consumption of financial limit
Billing and Tariff based Triggers	41	Claims without supporting pre/ post hospitalisation papers/ bills
	42	Multiple specialty consultations in a single bill
	43	Claims where the cost of treatment is much higher than expected for underlying etiology
	44	High value claim from a small hospital/nursing home, particularly in class B or C cities not consistent with ailment and/or provider profile
	45	Irregular or inordinately delayed synchronization of transactions to avoid concurrent investigations.
	46	Claims submitted that cause suspicion due to format or content that looks "too perfect" in order. Pharmacy bills in chronological/running serial number or claim documents with colour photocopies. Perfect claim file with all criteria fulfilled with no deficiencies
	47	Claims with visible tempering of documents, overwriting in diagnosis/ treatment papers, discharge summary, bills etc. Same handwriting and flow in all documents from first prescription to admission to discharge. X-ray plates without date and side printed. Bills generated on a "Word" document or documents without proper signature, name and stamp
General	48	Qualification of practitioner doesn't match treatment
	49	Specialty not available in hospital
	50	Delayed information of claim details to the Insurer
	51	Conversion of out-patient to in-patient cases (compare with historical data)
	52	Non-payment of transportation allowance
	53	Not dispensing post-hospitalization medication to beneficiaries

5. Benefit Claims Specification Forms (HIRA, KOREA)

A. Inpatient

(**Attachment format 10**)

In patient

Format No.	G	I	O	2	**Benefit Claim Statement**							Provider			
Registration No.					Insurance No							Provider ID			
Patient					Type of Subscriber							Provider Name			
Policy Holder							-								

Diagnosis	Diagnosis No.	Surgery	Department	Cause of Condition	Additional benefit Code	License Type	License No.	Service Starting Day of the Month / Date of admission	Number of benefit receiving days (including drug administered days)	Treatment Result
	.								days	
	.								days	
	.								days	

Length of Stay	days	Basic Consultation, Drugs, Special Material (Ⅰ)	treatment (Ⅱ)	Prescription No.			Length of Treatment	
Category				Extended Prescription No.				

			Night/Holiday (times)	Drug Code (Common Name or Product Code)	Name of Code (General Name or Product Name)		Standard Dosage	No. of administration per day	No. of administration days			
1. Consultation Fee	① Initial Consultation		Night/Holiday (times)	Code	Category (Special Code for Exceptional Cases)	Unit Price	Standard Dosage	Administered Dosage per day or No. of admin.	No. of administration days or No. of admin	Sum	License Type	License No.
	② Follow-up Consultation											
	③Drug Management Fee ④Emergency Surcharge											
2. Administration Fee	①General											
	②Internal/Mental patients and children under 8											
	③ICU											
	④Isolated Ward											
	⑤Infant											
	⑥Else											
	⑦Meal Fee											
	⑧Additional Meal Fee											
3. Drugs (except for injection) and Prescription Fee	①Internal Medicine ②External Application											
	③Prescription											
4. Injection Fee	①Subcutaneous or Intramuscular ②Intravenous ③Fluid ④Else ⑤Materials of Additional Benefit ⑥Blood Transfusion											
5. Anesthesia Fee	①											
6. Physiotherapy Fee	①											
7. Psychotherapy Fee	①											
8. Treatment and Surgery Fee	①Treatment and Surgery ③Cast											
9. Test Fee	①Test ②Entrusted Test Management ③Entrusted Test											
10. Image Diagnosis and Radiation Therapy Fee	①Diagnosis ②Treatment											
S. Special Equipment	①CT											
	②MRI											
	③PET											
U. NHI Price Controlled Services with 100 % Co-payment	①Drug ②Material ③Treatment			Details of Additional Benefit Code								
V. MPVA Price Controlled Services with 100 % Co-payment	①Drug ②Material ③Treatment											
W. Uncovered Services	①Drug ②Material ③treatment			Surgery Code								

The total of S		19. Claimed Benefit		※ Review Result	Category	Code	Adjustment	Ⅰ,Ⅱ
The total of V		20. Co-payment Limit Excess						
The total of W		21. Subtotal of Benefit 2, Total Medical Fee						
11. Subtotal		22. Benefit Claim to MPVA						
12. Additional Charge	%	23. The total of U						
15. Subtotal of Benefit 1		24. Veteran Subscriber Co-payment						
16. Co-payment								Cut Ⅰ
17. Subsidies								Cut Ⅱ
18. Medical Fee of the Disabled								Add Ⅰ
								Add Ⅱ
Serial No.	※Adjustments				Total			

Multi-format Bar code

B. Outpatient

(**Attachment format 11**)

Out-patient

Format No.	G	I	O	3	**Benefit Claim Statement**							Provider			
Registration No.					Insurance No.							Provider ID			
Policy Holder					Type of Subscriber							Provider Name			
Patient						-									

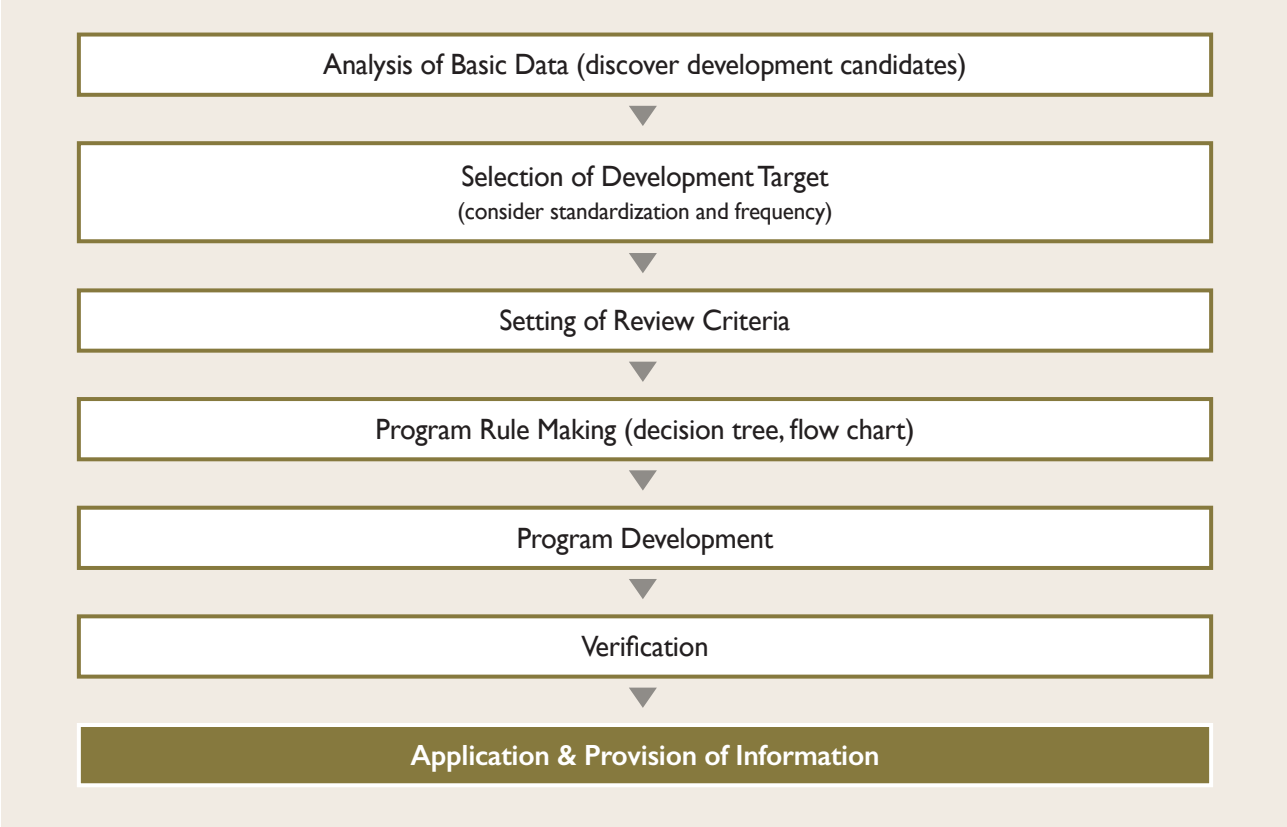
Diagnosis	Diagnosis No.	Surgery	Department	Cause of Condition	Additional Benefit Code	License Type	License No.	Date of Visit	No. of benefit receiving days (inc. drug dispensing days)	Treatment Result
	.								days	
	.								days	
	.								days	

Category		Basic Consultation, Drugs, Special Material (I)	Treatment (II)	Prescription No.		Length of prescription		Co-payment Occurrence (times)		Inhouse Dispensing (times)	
				Extended Prescription No.							
1. Consultation Fee	①Initial Consultation			Drug Code (Common Name or Product Code)	Name of Code (General Name or Product Name)		Standard Dosage	No. of Administration per day	No. of administration day		
	②Follow-up Consultation			Code	Category (Special Code for Exceptional Cases)	Unit Price	Standard Dosage	Administered Dosage per day or No. of admin.	No. of Admin. Days or No. of Admin.	Sum	License Type / License No.
	③Drug Management Fee ④Emergency Surcharge ⑤Home Care Fee										
	⑥Chronic Disease Management fee										
3. Drugs (except for injection) and Prescription Fee	①Internal Medicine ②External Application										
	③Prescription										
4. Injection Fee	①Subcutaneous or Intramuscular ②Intravenous ③Fluid ④Else ⑤Materials of Additional Benefit ⑥Blood Transfusion										
5. Anesthesia Fee	①										
6. Physiotherapy Fee	①										
7. Psychotherapy Fee	①										
8. Treatment and Surgery Fee	①Treatment and Surgery ③Cast										
9. Test Fee	①Test ②Entrusted Test Management ③Entrusted Test										
10. Image diagnosis and Radiation Therapy Fee	①Diagnosis ②Treatment										
S. Special Equipment	①CT										
	②MRI										
	③PET										
T. Special Material	①Material ②Treatment										
U. NHI Price controlled services with 100% co-payment	①Drug ②Material ③Treatment			Details of Additional Benefit Code							
V. MPVA Price controlled services with 100% co-payment	①Drug ②Material ③Treatment										
W. Uncovered Services	①Drug ②Material ③Treatment			Surgery Code							

The total of 3 + 4		17. Subsidies		※ Review Result	Category	Code	Adjustment	I . II
The total of S		18. Medical Fee for the disabled						
The total of T		19. Claimed Benefit			20. Co-payment Limit Excess			
The total of V		20. Co-payment Limit Excess			22. Benefit Claim to MPVA			
The total of W		21. Subtotal of Benefit 2, Total Medical Fee			24. MPVA Co-payment			
11. Subtotal		22. Benefit Claim to MPVA			23. The total of U			
13. Total Sum of Price Difference from the Upper Limit	%	23. The total of U						Cut I
15. Subtotal of Benefit 1		24. MPVA Co-payment						Cut II
16. Co-payment								Add I
Serial No.		※ Adjustments						Add II
Patient Serial No.	-					Total		

Multi-format Bar code

6. Development Process of Electronic Claims Review (HIRA, KOREA)



① Analysis of basic data (discover development candidates)

Reviewing the basic data for the selection of the development target, and analyzing annual claims by disease group, review, and adjustment status.

② Selection of development target

Reviewing which diseases to develop, and receiving consultation from members of the review committee in the relevant field. Selecting diseases with high volumes of claims and many standardized criteria.

③ Setting of review criteria

a. Reviewing specification of targets.

- Select target institution, target disease, and excluded specification.

b. Analyzing details of treatments.

- Analyze histories of claimed cases, such as frequent drugs, fee schedule, medical supplies, and adjusted cases.

c. Collecting opinions from review staff.

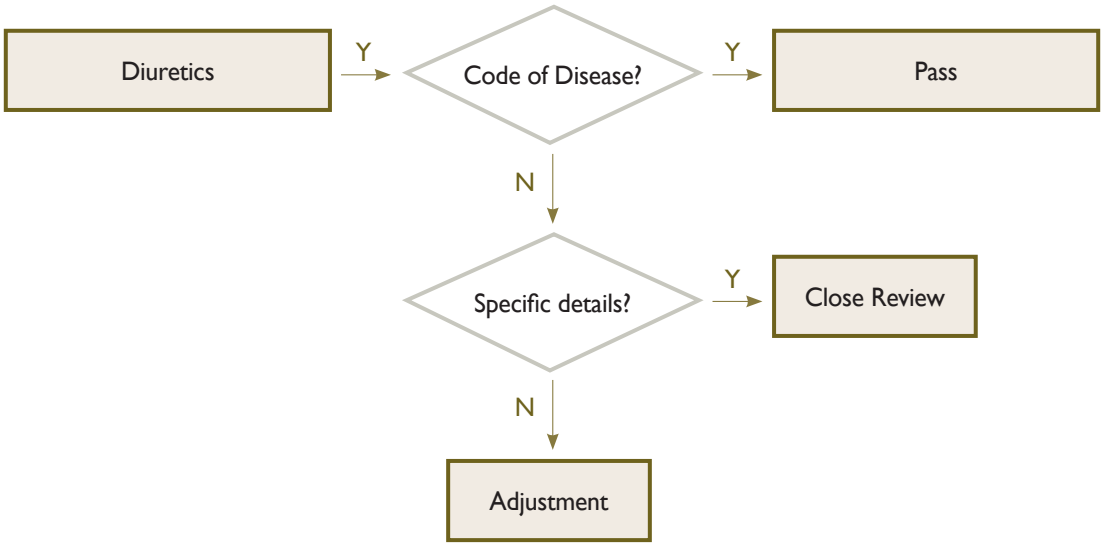
d. Undertaking advisory consultation.

④ Program rule making

a. Preparing review scope of fee schedule, medical supplies, and drugs.

b. Preparing flow charts, such as review units and target items.

Tip) Making a flow chart is a linkage process of converting analyzed review standards to IT language. Therefore, close co-work between review staff who conduct the standard review and the IT program development staff is important. Here is an example for creating flow-chart:



⑤ Program development

IT staff developing the program on a temporary server based on the created flow chart.

⑥ Verification

Entering made-up data into the development program to verify that it was developed correctly in the program. Analyzing the results of the simulated operation and supplement by collecting the opinions from the working-level staff.

⑦ Application and provision of information

Applying and providing guidance to the medical institution and providers and training internal staff. The program is supplemented by monitoring at all times.

7. Code of Conduct and Oath of Secrecy (NHIA, GHANA)

A. CODE OF CONDUCT

1) Be punctual
2) Dress decently
3) Be sensitive and professional in the use of language
4) Do not compromise your integrity and neutrality
5) In a conflict of interest situation declare your interest and stay off the facility
6) Treat staff and patients with utmost courtesy, dignity, and respect
7) Maintain confidentiality of incidents observed in the course of the exercise
8) Do not interfere or interrupt when care is being given
9) If you observe a serious deficiency in care being given, draw the attention of the care giver in a polite and unobtrusive manner
10) During debriefing avoid arguments, controversies, and details
11) Be civil in the use of mobile phones at meetings and during fieldwork

B. TERMS AND CONDITIONS

1) You will be paid an all-inclusive amount of GH₵..... for the period covered as honorarium.
2) The auditors shall reside in the district or the next closest district of the exercise.
3) The team is required to stay at one place/hotel except in isolated cases.
4) Each team member is required to participate in the feedback sessions each morning.
5) In case a member does not complete the exercise, the day(s) worked will be calculated and paid for and the rest of the money shall be refunded to NHIA.

I agree to the terms and conditions stated above.

Name of Auditor ..... Signature ..... Date ..... Name of witness (on behalf of NHIA) ..... Signature ..... Date .....

Oath of Secrecy Format

Declaration of integrity

I, ..., holding the office as an External Clinician/Surveyor of the National Health Insurance Authority, acknowledge the need to preserve the confidentiality and secrecy of all information concerning patients and healthcare facilities during and after Credentialing, Clinical and Compliance audit, and exercises.

I further declare that I shall not directly or indirectly disclose, reveal, scan, or take pictures of patients' information or divulge to any person any matter or information which is brought under my consideration or which comes to my knowledge as a result of my participation in a Clinical or Compliance audit or Credentialing exercise, except as it may be required and/or authorized by the National Health Insurance Authority, or as compelled by law to do so.

The foregoing obligations shall not apply to any information that is already available to the public.
I further declare that any breach of this Confidentiality Agreement shall constitute gross professional misconduct for which the National Health Insurance Authority reserves the right to apply appropriate legal sanctions against me, and a report made to the appropriate regulatory body.

Name ..... Signed .....
Date .....

IN WITNESS WHEREOF, the undersigned has executed and delivered this oath as of the date hereof.
Name ..... Signed .....
Date .....

8. On-site Investigation Format (SAST, INDIA)

CHECKLIST FOR EVALUATION OF INPATIENT CASE SHEET

QUESTION	RESPONSE	REMARKS / COMMENTS
Any discrepancy between patients and smart card details	Yes / No	
Inpatient case sheets are complete	Yes / No	
Details of patients' physical examination and full medical history is present, dated, timed and signed	Yes / No	
Investigation report / correlating diagnosis is available	Yes / No	
Do patients' complaints and treatment justify hospitalization?	Yes / No	
Do patients' complaints corroborate with package blocked?	Yes / No	
IPD patients were evaluated at least twice a day	Yes / No	
Doctors examination notes and the course of action is endorsed in case sheet	Yes / No	
Daily monitoring chart is maintained	Yes / No	
OT notes are available	Yes / No / NA	
A written informed consent was taken from patients undergoing a procedure; informed consent to be signed by patient / next of kin and treating doctor wherever applicable	Yes / No / NA	
A copy of completed discharge card attached	Yes / No	
Proof of payment of transportation charge present	Yes / No	
Proof of food provided present	Yes / No	
If patient is transferred to another hospital, copies of their clinical notes maintained	Yes / No / NA	
When payment was called for, the patient was properly guided (written estimate)	Yes / No / NA	

CHECKLIST FOR OPERATION THEATRE / DEPARTMENT

QUESTION	RESPONSE	REMARKS / COMMENTS
OT sterilization facilities functional	Yes / No	
Adequate lights (general level illumination) and air conditioning is provided in each OT	Yes / No	
A height adjustable OT table and shadowless operating light is available	Yes / No	
The OT is equipped for its purpose and includes: - Anaesthetic machine and ventilator - Laryngoscopes (Adult / Paediatric) - Endotracheal tubes / laryngeal masks - Airways - Nasal tubes - Suction apparatus and connectors - Oxygen - Drugs for emergency situations - Monitoring equipment including ECG, ETCO2 (where applicable), pulse oximeter and blood pressure, cardiac monitor, defibrillator	Yes / No	
Running tap water supply in OT; hot water supply in OT	Yes / No	
Procedures are available and up to date for: - Informed patient consent - Pre-operative assessment - Post-operative care	Yes / No	
Emergency power supply connection is available for all OT equipment (embedded UPS)	Yes / No	
Sterilabels are used for maintaining the quality of autoclaving (mandatory for ophthalmic specialty)	Yes / No	
Functional annual maintenance contract for all major equipment	Yes / No	
The OT complex is divided into sterile, clean, protective, and disposal zones (maintained physically)	Yes / No	
Regular documented autoclaving of instruments and linen	Yes / No	
Carbonization of the OT, labor room after every procedure (documented)	Yes / No	
Regular validation tests for sterilization (carried out and documented)	Yes / No	

CHECKLIST FOR EVALUATION OF INTENSIVE CARE UNIT (ICU)

QUESTION	RESPONSE	REMARKS / COMMENTS
ICU-designated air-conditioned space with Standard ICU bed, equipment for the constant monitoring for vitals, emergency crash cart, defibrillator, ventilators, suction pumps, bedside oxygen facility	Yes / No	
Anesthesiologist-intensivist nursing staff: B Sc Nursing Diploma, have two years of ICU experience Nurse patient ratio: 1:1 to 2:1	Yes / No	
Standby generator / inverter installed in ICU for emergency power supply	Yes / No	
Policies and procedures for admission, discharge criteria for its intensive and high dependency unit, documented control of infection rate in ICU, re-admission rate, re-intubation rates	Yes / No	

REGISTRATION / HELP DESK CHECKLIST

QUESTION	RESPONSE	REMARKS
Is there any signboard outside hospital showing that it is empanelled in scheme?	Yes / No	
Is there any signage inside the hospital giving information about the scheme?	Yes / No	
Is there a scheme help desk at the hospital?	Yes / No	
Is there staff managing the help desk?	Yes / No	
Were any scheme patients admitted to the hospital at the time of the visit?	Yes / No	
If yes, how many scheme patients were admitted?		
Is any package blocked without patient being admitted?	Yes / No	
If yes, how many packages blocked?		

QUESTIONNAIRRE FOR PATIENT (BENEFICIARY) ADMITTED TO THE HOSPITAL

QUESTION	RESPONSE	REMARKS / COMMENTS
Age	_____ Years	
Gender		
Relation to Head of Household		
Does patient have RSBY Card with him / her?	Yes / No	
Smart Card number		
Date of admission to the hospital		
How many days has it been since the patient was admitted?		
Was fingerprint verification done through a fingerprint scanner?	Yes / No	
Do you know about any provision for transport cost allowance?	Yes / No	
Was the patient provided with food during stay at the hospital?	Yes / No	
Were all your patient-related queries answered during your visit to the hospital for treatment?	Yes / No	
How would you rate your satisfaction about the treatment provided at the hospital?	Excellent-1	
	Very good-2	
	Good-3	
	Average-4	
	Poor-5	
Were you / your family forced to give money for treatment?	Yes / No	
If yes, total amount medical expenditure paid by patient / family for treatment		
Will you recommend that your relatives / friends receive treatment at the same hospital?	Yes / No	
If no, why not?	Treated badly-1	
	Poor quality care-2	
	Not receptive to RSBY patients-3	
What are the patient's suggestions for improving the scheme?		

CHECKLIST FOR AVAILABILITY OF STAFF AT THE HOSPITAL

QUESTION	RESPONSE	REMARKS / COMMENTS
At least 1 medical officer (RMP) is available at all times	Yes / No	
At least 1 nurse (RNP) is available at all times	Yes / No	
At least 1 information provider is present (staff) at all times.	Yes / No	
There is a registered nurse appropriately qualified and/or experienced who is responsible for the management of each ward on a 24/7 basis	Yes / No	
There is a system for calling specialists in an emergency	Yes / No	
Emergency department is manned by an MBBS doctor on a 24/7 basis	Yes / No	
Are all treating doctors' details available at the hospital?	Yes / No	

CHECKLIST FOR EVALUATION OF SURGICAL PROCEDURES

QUESTION	RESPONSE	REMARKS / COMMENTS
Documented pre-anesthesia assessment by a qualified anesthesiologist	Yes / No	
Informed consent for administration of anesthesia is obtained by the anesthetist	Yes / No	
Details of recorded monitoring of heart rate, cardiac rhythm, respiratory rate, BP, O2 saturation, airway security, and potency and level of anesthesia	Yes / No	
OT NOTES – Details of procedure done by respective surgeon of concerned specialty	Yes / No	
Patient's post-anesthesia status is monitored and documented	Yes / No	

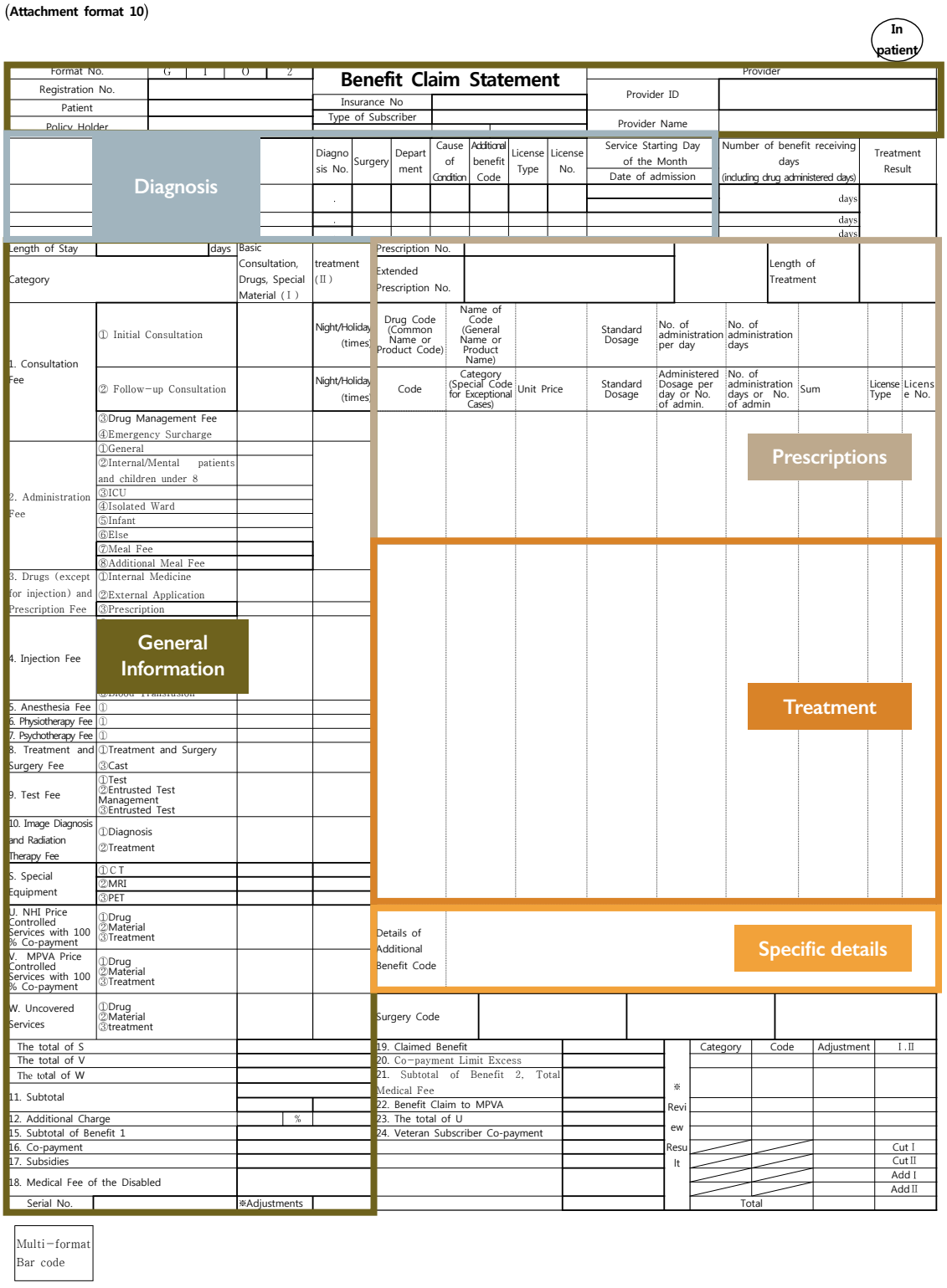
9. Components of Data Set (HIRA, KOREA)

In Korea, five categories of information are collected through claim specification forms: A) general information B) diagnosis C) treatment D) prescription E) specific details. The following shows the names of items by composition.

Category	Compositions	Items
1	General information (A)	Patient information (name, type of insurer, resident registration number, etc.), benefit payment days, treatment results, total cost of benefits, claimed amount, amount of copayment, etc.
2	Diagnosis (B)	Primary disease, secondary disease, specialty, license number, dental formula classification, etc.
3	Treatment (C)	Category number, code classification (1: fee schedule, 3:drugs, 8: medical supplies, etc.), code
4	Prescription (D)	Prescription issue number, prescribed drugs (code, number of administrations per day, number of administration days)
5	Specific details (E)	Occurrence unit classification (per specification, per line, etc.), identification code, specific details

The composition of the data set examined above is in line with the components of claim specification shown below.

(**Attachment format 10**)



(**Attachment format 11**)

Out-patient

Format No.	G I 0 3	**Benefit Claim Statement**		Provider	
Registration No.		Insurance No.		Provider ID	
Policy Holder		Type of Subscriber		Provider Name	
Patient		-			

Diagnosis

	Diagnosis No.	Surgery	Department	Cause of Condition	Additional Benefit Code	License Type	License No.	Date of Visit	No. of benefit receiving days (inc. drug dispensing days)	Treatment Result
	.								days	
	.								days	
									days	

General Information

Category		Basic Consultation, Drugs, Special Material (Ⅰ)	Treatment (Ⅱ)
. Consultation ee	①Initial Consultation		
	②Follow-up Consultation		
	③Drug Management Fee ④Emergency Surcharge ⑤Home Care Fee		
	⑥Chronic Disease Management fee		
. Drugs (except or injection) and Prescription Fee	①Internal Medicine ②External Application		
	③Prescription		
. Injection Fee	①Subcutaneous or Intramuscular ②Intravenous ③Fluid ④Else ⑤Materials of Additional Benefit ⑥Blood Transfusion		
. Anesthesia Fee			
. Physiotherapy Fee			
. Psychotherapy Fee			
. Treatment and urgery Fee			
. Test Fee	②Entrusted Test Management ③Entrusted Test		
0. Diagnosis Image and Radiation herapy Fee	①Diagnosis ②Treatment		
. Special quipment	①CT		
	②MRI		
	③PET		
. Special Material	①Material ②Treatment		
. NHI Price ontrolled ervices with 00% co-payment	①Drug ②Material ③Treatment		
. MPVA Price ontrolled ervices with 00% co-payment	①Drug ②Material ③Treatment		
V. Uncovered ervices	①Drug ②Material ③Treatment		
The total of 3 + 4			
The total of S			
The total of T			
The total of V			
he total of W			
1. Subtotal			
3. Total Sum of Price Difference from the pper Limit		%	
5. Subtotal of Benefit 1			
6. Co-payment			
erial No.			
atient Serial No.	-	※ Adjustments	

Prescriptions

Prescription No.		Length of prescription		Co-payment Occurrence (times)		Inhouse Dispensing (times)	
Extended Prescription No.							

Drug Code (Common Name or Product Code)	Name of Code (General Name or Product Name)		Standard Dosage	No. of Administration per day	No. of administration day			
Code	Category (Special Code for Exceptional Cases)	Unit Price	Standard Dosage	Administered Dosage per day or No. of admin.	No. of Admin. Days or No. of Admin.	Sum	License Type	License No.

Treatment

Specific details

Details of Additional Benefit Code			
Surgery Code			

17. Subsidies		※ Review Result	Category	Code	Adjustment	Ⅰ.Ⅱ
18. Medical Fee for the disabled						
19. Claimed Benefit			20. Co-payment Limit Excess			
20. Co-payment Limit Excess			22. Benefit Claim to MPVA			
21. Subtotal of Benefit 2, Total Medical Fee			24. MPVA Co-payment			
22. Benefit Claim to MPVA			23. The total of U			
23. The total of U						Cut Ⅰ
24. MPVA Co-payment						Cut Ⅱ
						Add Ⅰ
						Add Ⅱ
			Total			

Multi-format Bar code

10. Medical Audit Result Notice (HIRA, KOREA)

A. Contents of claim review results notice

- **General details**

  Code of provider, name of provider, name of owner, No. of claim review applied, date of claim results notified and received to providers
- **Claim form details**
  - No. of claims requested for review and the amount of the requested claims (① Total medical fees, ② Total out of pocket money, ③ Total amount reimbursed by the insurer)
  - No. of finalized claim review and final benefit amount (①, ②, ③)
  - No. of denied claims and the amount of the denied claims (①) and their reasons
- **Details of adjustment by patient: Reason for adjustment and adjusted benefit amount (①, ②, ③)**
- **Information on benefit reviewers:** Department the pertinent reviewers belong to, name of reviewer, phone number

B. Contents of quality assessment results notice

- **General details:** Provider Name, code, QA Period
- **Overview:** Explanation of Target Providers, Target Patients
- **QA result:** QA Grade, Composite Score, Overall Average of Composite Score, Average Composite Score of the same level of Providers

Your comprehensive results		Overall Average of Composite Score	Average Composite Score of the same level of Providers
QA Grade	Composite Score		
1	93.1	71.4	85.2

- **QA Indicator Results:** Present the position of the target institution compared with the same level of providers and all providers by indicator

(unit: %)

Indicator	All	Same Level of pro-vider	Your Institution	Your Position 0 10 20 30 40 50 60 70 80 90 100
(Within 24 hours of hospital arrival) Rate of oxygen saturation	75.1	88.5	100	
(Within 24 hours of hospital arrival) Rate of Severity Assessment Tool Utilization	66.6	81.2	88.9	

* Your position: Total (Blue color), your position (Orange color)

C. Contents of suspension of operation decided after on-site investigation

- **General details**

  Name (code) of provider, name of provider, name of owner, date of sending these details, Ministry of Health and Welfare (taking punitive action)
- **Provider received punitive action:** Name of provider, name of owner (ID number), address
- **Details of punitive action:** ◯◯ days of suspension of operation (Period of suspension of operation: from ◯◯ to ◯◯)
- **Legal grounds**
- **Reason for suspension**
- **Identified fraudulent details and details of fraudulent claim amount**
- **Details of numbers related to punitive action:** Total benefit amount decided by claim review results of the pertinent provider, total fraudulent claim amount, monthly average amount of fraudulent claims, fraudulent claim ratio, punitive action (period of suspension of operation, penalty)

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