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HEALTH SYSTEMS STRENGTHENING ACCELERATOR

Report on Rehabilitation Data Flow in Georgia's Health Information System

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List of Acronyms

CIF	Curatio International Foundation
FIM	Functional Independence Measure
GeoStat	National Statistics Office of Georgia
HIS	Health Information System
HMN	Health Metrics Network
HR	Human Resource
ICD-10	International Classification of Diseases, Tenth Revision
ICF	The International Classification of Functioning, Disability and Health
LMICs	Low- and middle-income countries
M&E	Monitoring and evaluation
MoIDPLHSA, MoH	The Ministry of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia
NCDC	National Center for Disease Control and Public Health
NCSP	Nomesco Classification of Surgical Procedures
NHA	National Health Agency
RHIS	Routine Health Information System
UHC	Universal Healthcare
UHCP	Universal Healthcare Program

Introduction

Introduction

Health information systems (HIS) are one of the health system "building blocks," providing the essential data to inform decision-making across all dimensions of health system planning and development (World Health Organization, 2010). However, in many LMICs, Routine health information systems (RHIS) are deficient in capturing essential data on rehabilitation services. Namely, there is a lack of data regarding disability burden and volume of services, which is often due to under-developed HIS infrastructure (McPherson et al., 2016). The situation in Georgia is similar, with a significant lack of information regarding the outcomes, quality, and efficiency of rehabilitation services in the country (World Health Organization, 2020). Integrating rehabilitation data into national information systems is crucial for identifying rehabilitation needs, evaluating service utilization, monitoring the provision and geographical accessibility of the services, and especially for monitoring the service outcomes (World Health Organization Organization, 2022).

In collaboration with the Health Systems Strengthening Accelerator (the Accelerator), supported by the Inclusive Development Hub of USAID, the Georgian government has initiated efforts to strengthen and integrate rehabilitation in health systems. The Accelerator issued a subgrant to Curatio International Foundation (CIF) to facilitate these efforts by integrating rehabilitation services into Georgia's state-funded healthcare systems. CIF was tasked with providing technical assistance to the Ministry of Internally Displaced Persons from the Occupied Territories, Labour, Health, and Social Affairs of Georgia (MoH) to support the implementation of related reforms.

Acknowledging the crucial role that robust HIS plays in evidence-based decision-making and comprehensive monitoring and evaluation (M&E) of rehabilitation services, CIF's project supported the development of recommendations for enhancing Rehabilitation Services within HIS. The primary objective of this support was to integrate rehabilitation-related data into the routine data collection system. This report describes how this objective has been accomplished and what was recommended to the government.

Purpose and objectives

The overall purpose of this study was to investigate how information related to rehabilitation currently flows within the HIS of Georgia to identify strengths and shortcomings and elaborate recommendations for enhancing the rehabilitation information system. The specific objectives were to:

1. Assess on a provider level what types of data are being collected and how.
2. Assess which information is reported and how it is shared within Georgia's HIS.
3. Provide recommendations for improving the rehabilitation information system that could help in routinely informing the selected national indicators.

Rehabilitation Indicator Selection

As a prerequisite to this study, CIF needed to identify and agree on the set of national indicators for monitoring the development and delivery of rehabilitation services within Georgia's Universal Healthcare Program (UHCP). Because Georgia has a significantly underdeveloped and weak supplier capacity relative to population needs, the list of indicators also encompassed monitoring the readiness and capacity of the rehabilitation field in the country. Therefore, understanding the current state of supplier capacity was important to guide the decisions on which rehabilitation services to include in the UHCP to promote optimal access to state-funded services. This process was informed by two documents: (a) The Georgia Rehabilitation Service Development Strategy (2023-2027) and its M&E framework as a primary source for indicator selection, and (b) the WHO Rehabilitation indicator menu (World Health Organization, 2023a) for additional indicators that were missing in the previous document.

The selected indicators were categorized according to the framework for the 'Rehabilitation Results Chain', covering inputs, outputs, outcomes, and Health System Attribute domains (World Health Organization, 2023a). These indicators were evaluated against the availability and feasibility of collecting the necessary data for the indicators with the help of existing HIS or with minor adjustments. Please refer to Table 1 for details on the rehabilitation indicators passport.

Context

Integration of rehabilitation services into Georgia's health system

The Government of Georgia's National Health Protection Strategy (2022-2030) and the Rehabilitation Service Development Strategy (2023-2027) both emphasize the critical need to improve the delivery of rehabilitation services. Although the 2013 reforms initiated by the then-newly elected government through the UHCP expanded the breadth and depth of population coverage with publicly funded benefits, rehabilitation services were not originally included, resulting in a significant coverage gap. Consequently, rehabilitation service users had to pay out-of-pocket, imposing significant financial barriers for many patients and their households.

Additionally, several supply-side challenges persist in the system. These include a critical need for workforce development in key rehabilitation specialties such as physical, occupational, speech, and prosthetic therapy. Regional provider capacity is also insufficient to meet the demand and reduce geographical access barriers to services.

Another critical shortcoming of the current healthcare system is the scarcity of rehabilitation data and weak HIS. The Georgia Rehabilitation Service Development Strategy (2023-2027) highlights the critical nature of this problem, recognizing that robust data is pivotal for informed decision-making and prioritizes its improvement in this area. The National Health Protection Strategy of Georgia (2022-2030) aims to strengthen the HIS by enhancing digital health governance, e-health infrastructure, data exchange, and data quality.

In November 2022, Georgia made an important step forward by integrating rehabilitation services into the UHCP. The initial phase of program roll-out offers a limited set of services targeting individuals with conditions such as stroke, traumatic brain injuries, and spinal cord injuries.

Licensed inpatient rehabilitation facilities seeking to become recognized and contracted service providers must submit an official application to the MoH. The sub-program specifies the approved interventions and establishes reimbursement rules and rates. Meanwhile, the physician determines the intensity of a rehabilitation treatment course. Patients who complete their prescribed course and show at least a 10% improvement in their Functional Independence Measure (FIM) score are eligible for re-enrollment to continue receiving state-supported rehabilitation. The government covers 4,177 GEL for each rehabilitation course related to stroke and brain injuries and 5,031 GEL for spinal cord injuries (Government of Georgia, 2013a).

Key Agencies Involved in Information Collection

In Georgia, several agencies are responsible for managing data related to rehabilitation services, including individual health records, service records, and resource records. These agencies are central to data collection and management, facilitate rehabilitation service delivery, and oversee regulatory compliance. Below, we describe the agencies' roles and the HIS modules/forms they use to capture rehabilitation-related data.

Ministry of Internally Displaced Persons from the Occupied Territories, Labor, Health and Social Affairs – MoIDPLHSA

In 2019, the Ministry launched electronic health records (EHR), initially collecting information only from inpatient medical facilities delivering services funded under the Universal Health Care Program (UHCP). Later, outpatient facilities were also included in this mandate. By 2020, all inpatient and outpatient medical facilities must report patient information, regardless of funding source. Starting in 2023, facilities must report patient health information and financial information for cases involving UHCP beneficiaries.

However, these reporting requirements do not apply to primary healthcare providers, long-term and hospice care, or antenatal and prenatal care. For rehabilitation services, only cases funded through the UHCP are subject to reporting, and all other rehabilitation services are exempted. MoH owns and regulates the EHR system, defining reporting requirements and procedures, managing access, and ensuring data security (The Minister of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia, 2019a).

In 2023, the MoH introduced new regulations and established a minimum wage for physicians and nurses for medical facilities delivering services under UHCP, excluding outpatient providers. The minimum wage policy expanded in 2024 to cover junior doctors, nurse assistants, midwives, and sanitary workers (Government of Georgia, 2013a). To ensure compliance, the MoH introduced an electronic system that allows clinics contracted under the UHCP to report hours worked by staff and the wages paid. Facilities use this system to report staff time and salary data, ensuring that medical staff receive appropriate compensation according to the minimum wage standards within the UHCP framework. Providers must submit their data monthly by the 10th day of next month (LLC "Information Technologies Agency," 2023).

National Statistics Office of Georgia (GeoStat)

GeoStat generates official statistics about the nation's social, demographic, economic, and environmental aspects, following internationally recognized statistical principles. A key component of this mandate

involves conducting a general population census (Government of Georgia, 2013b), which includes gathering data on individuals with disabilities. The latest 2014 census collected information on individuals' disabilities and functioning (World Health Organization, 2020) used for service planning in 2023.

National Health Agency (NHA)

NHA serves as a single national service purchasing entity and oversees the provision of services under UHCP, including rehabilitation services. It reimburses providers following the regulations set by the MoH. Additionally, the NHA analyses expenditures and develops budget proposals for the MoH's consideration (Government of Georgia, 2020).

The NHA collects claims from healthcare facilities through the case registration module (i.e., claims module), a crucial component of the unified healthcare information system. This module enables healthcare providers to register online medical cases funded under the UHCP (Ministry of Labor, Health and Social Protection of Georgia, 2013) and claim the payment for rendered services.

National Center for Disease Control and Public Health (NCDC)

The Medical Statistics Department at the NCDC is responsible for monitoring, evaluating, and analyzing the population's health status. The NCDC collects healthcare-related data from medical facilities, including rehabilitation services, through electronic modules and forms (The Minister of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia, 2019b). The forms relevant to rehabilitation service delivery include:

- Annual healthcare facility report (from No.01): This annual form collects data on various aspects of a healthcare establishment, including the equipment, human resources, and volume and type of services rendered to the population.
- Form No.025: An electronic system (almost real-time) designed to register new disease cases in the institution providing ambulatory service.
- System user's electronic module (e-health users, Form No.079): This platform facilitates the reporting of human resource data by facilities, enabling user management and role-based access to the NCDC's electronic modules.

Methods

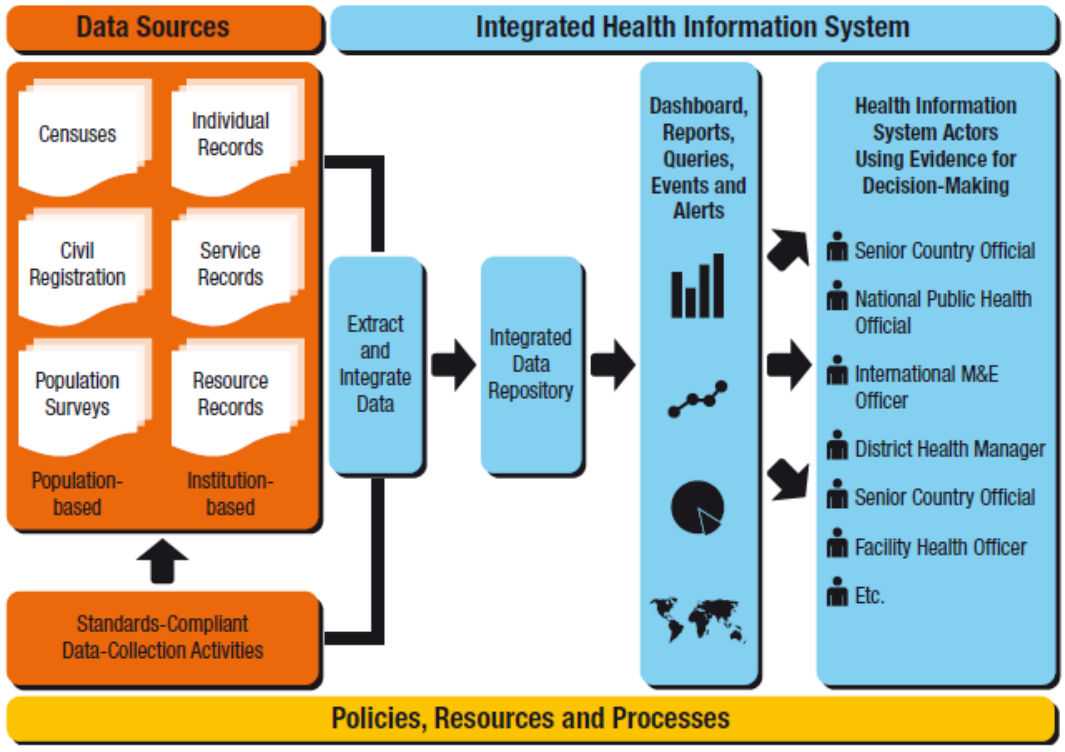
This cross-sectional study uses qualitative methods, including desk review and semi-structured interviews conducted with representatives from rehabilitation service facilities and key policymakers. The sampling was purposive and included two groups of health facilities providing rehabilitation services: four facilities that participate in the state-funded rehabilitation program and two that do not. This differentiation aimed to identify variations in data collection and reporting processes between these facilities. Furthermore, two policymakers knowledgeable about state-funded rehabilitation programs were also interviewed.

A total of 24 interviews were conducted, including 22 face-to-face interviews and two via Microsoft Teams®. The data was collected from four facilities in Tbilisi and two in other regions, with 22 respondents from healthcare facilities and two policymakers. An interview guide (IDI) was used to standardize the semi-structured interviews. All interviews were audio recorded after securing written consent from the respondent. The interviews lasted 30 to 90 minutes, and all recordings were transcribed verbatim for further analysis.

The study used The Health Metrics Network's (HMN) framework, depicted in Figure 1 (Health Metrics Network & World Health Organization, 2008) , to organize, code, and analyze the data using deductive and inductive approaches. The collected data elements, i.e., data fields within the forms and/or HIS modules, were captured and organized in MS Excel for further analysis.

The study's scope was limited to institutional-based data sources, encompassing individual, service, and resource records (see Figure 1). It did not cover population-based data sources (census, civil registration, and/or population surveys).

Figure 1- Health Metrics Network's framework for health information system.



Results

Objective 1. What data is being collected, and how is it collected in the rehabilitation facilities?

How is data being collected?

This section of the report looks at the data collection process and formats across facilities to understand what patient-level data is being collected and how, and if data collection across facilities ensures uniformity for further exchange through HIS. Six rehabilitation service providers engaged; four confirmed they utilize facility-level electronic information systems for data collection. In contrast, the two providers continue to rely on paper documentation or Microsoft Word.

Data collection by rehabilitation service providers is governed by two principal ministerial orders, which stipulate the requirements and mandatory procedures for individual-level data collection:

- Decree Order No. 01-41/N dated 15 August 2011, titled "On Approval of the Procedure for the Production of Outpatient Medical Documentation."
- Decree Order No. 338/N dated 9 August 2007, concerning "The Procedure for Filling Out the Health Status Report and Approving the Health Status Report Form."

Primary responsibility for data recording within the facility falls to physicians and rehabilitologists, who utilize state-mandated standardized forms such as the Patient Examination Form № IV-200-5/a, Outpatient Medical Card Form №IV-200/a, and the Patient Summary Form № IV-100/a. According to state regulations, providers participating in the state rehabilitation program must carry out an Interdisciplinary Team Assessment to plan for the rehabilitative interventions necessary for the patients. However, there is no government-mandated form defining requirements/content for interdisciplinary team assessments; therefore, providers create their own forms for this purpose. The methodology for medical data recording diverges significantly among rehabilitation specialists, including physical therapists and psychotherapists, who often independently manage case notes using mobile devices or digital word processing applications. Some facilities with electronic information systems have adapted the interface of their information systems with the Medical Intervention Protocol (Form № IV-200-7/a), which allows compliance with the state regulations for data recording.

Among the studied providers, data storage practices were categorized as follows: 50% of the facilities adopted a *hybrid approach* involving electronic data collection and storage and storing physical paper-based records. Only one facility (16.7%) had a *fully electronic storage* system, and the remaining 33.3% relied only on *paper-based storage* methods, obviously limiting data exchange and use.

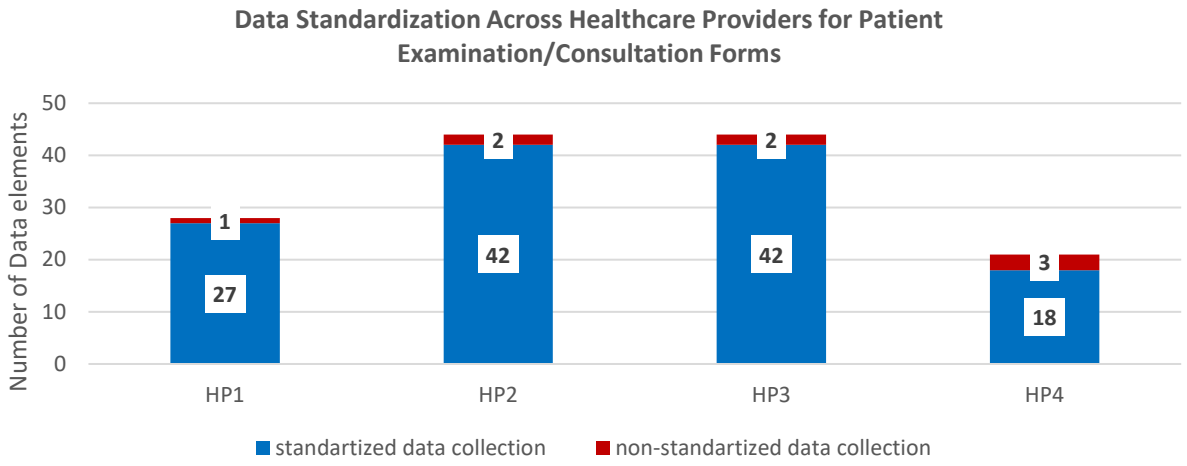
What data is being collected?

A total of 38 variables are collected across all participating facilities. These variables are primarily recorded following requirements of Form № IV-200-5/a, Form № IV-200/a, and Form № IV-100/a (detailed in Table 2 on page 34).

Facilities equipped with electronic HIS, the degree of data standardization, and the number of variables tracked vary across facilities. Standard data collection for this report refers to recording digital information in a uniform format or coding system, guided by the information system to ensure consistency, as opposed to free-text entry. This includes pre-coded fields such as drop-down menus for demographics (gender, age, etc.), electronic calendars for enforcing standard format for a date, pre-codified entries like ICD-10 diagnosis codes, Nomesco Classification of Surgical Procedures (NCSP) intervention codes, and medication names. Free-text entries, such as patient medical history/anamnesis, are not subjected to standardization. In the following parts of our analysis, we focus exclusively on the data elements subject to standardization.

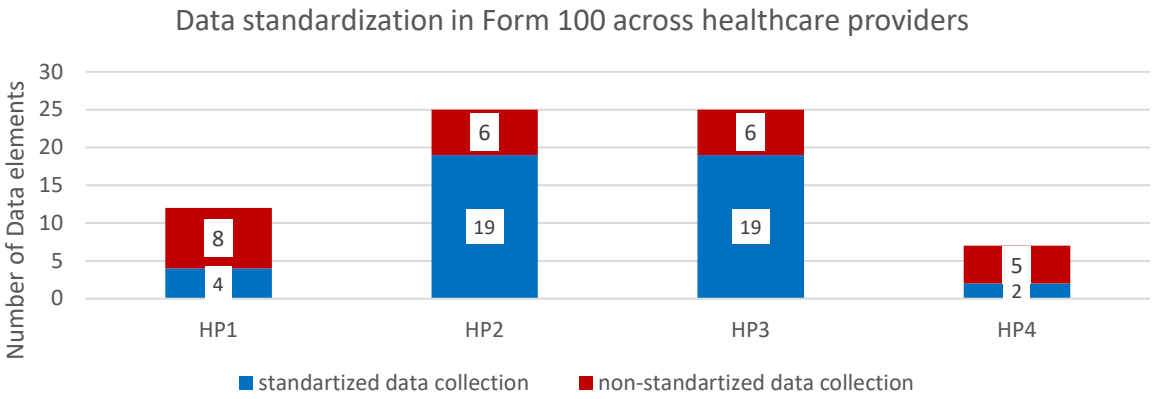
Patient examination/consultation form: The number of variables recorded on this form varies between 32 and 82 across institutions. The rate of data standardization at two institutions was 95%, while others reported slightly less - 86% (for more details, see Figure 2). Institutions N1, N2, and N3 have incorporated additional variables into the form required by the EHR systems to ensure the automatic exchange of facility-level data with the state EHR platforms and, in doing so, reduce demand on staff time. Institution N4 records these variables on two separate forms: the examination form IV-200-5/a and the medical card form IV-200/a. Without EHR integration, data reporting would be more time-consuming (see later in the report).

Figure 2- The Degree of Data Standardization.



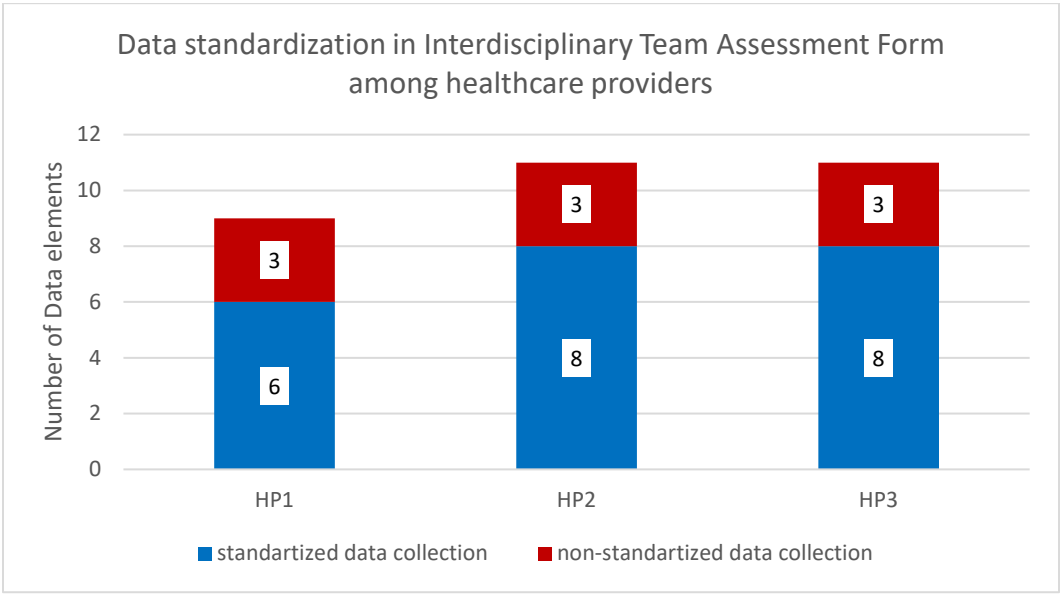
Form № IV-100/a (Patient Summary): Form № IV-100/a is an important form in Georgia's healthcare sector used for patient-related information exchange across providers involved in care provision, between providers and NHA, and has a significant legal bearing. The number of variables collected on this form ranged from 20 to 46, depending on the health condition of a patient and rendered services. Similarly, the standardization of data collection varied, with - 76% at two institutions and only 29% at others (For more information, see Figure 3). This low standardization rate could be due to national HIS system limitations, which do not allow a digital exchange of these forms with other institutions or state entities. If necessary, this form is submitted to the state electronic systems in a PDF format, which limits information standardization, accessibility, and usability.

Figure 3-Data standardization in Form 100.



Interdisciplinary Team Assessment Form: This form is used by facilities participating in the state rehabilitation sub-program to record patient assessment outcomes and recommendations for rehabilitative interventions. In an environment where the Ministry does not officially mandate the format and content of the form, the providers opted to design the form individually. Consequently, the average standardization rate for collected information fluctuates between 67% and 73%. (See more details in Figure 4). The lack of standardization and variability in these forms is mainly due to a) the absence of ICD-10 search engine integration, b) the absence of an intervention classification system search engine integration, and c) the lack of a standardized data recording format, such as a calendar or other structured format.

Figure 4-Data standardization in Interdisciplinary team assessment form.



Standards Used for Information Collection

The studied facilities use several classifications for information standardization. Namely, the International Classification of Diseases, tenth revision (ICD-10), is the nationally mandated classification for recording

diagnoses across healthcare providers in accordance with the Ministerial Order on outpatient medical documentation (Ministry of Labor, Health and Social Protection of Georgia, 2011). However, there is variability in applying the NCSP codes for rehabilitative interventions. The facilities in the state rehabilitation program use NCSP codes for interventions, but others do not. Besides, the state mandates the use of NCSP codes for some rehabilitative interventions, while interventions not available in the national NCSP coding system are assigned "artificial" codes developed by MoH instead of updating the national NCSP classification system. As for facilities not engaged in service provision under UHCP, no classification system is being used to code and record delivered rehabilitative interventions.

The Functional Independence Measure[1] (FIM) is a standardized assessment tool mandated by the state program to evaluate functional independence and monitor the outcomes of rehabilitative interventions on an individual patient level. In contrast, providers not involved in the state program use different tools, leading to non-comparable data to measure patient outcomes. This impedes adequate monitoring of the volumes of service provision on a national level and patient outcomes, and therefore imposes challenges on future program planning and expansion. Furthermore, FIM is still primarily reported in paper format due to the lack of respective fields in the digital institutional level HIS and the NHA claims management system.

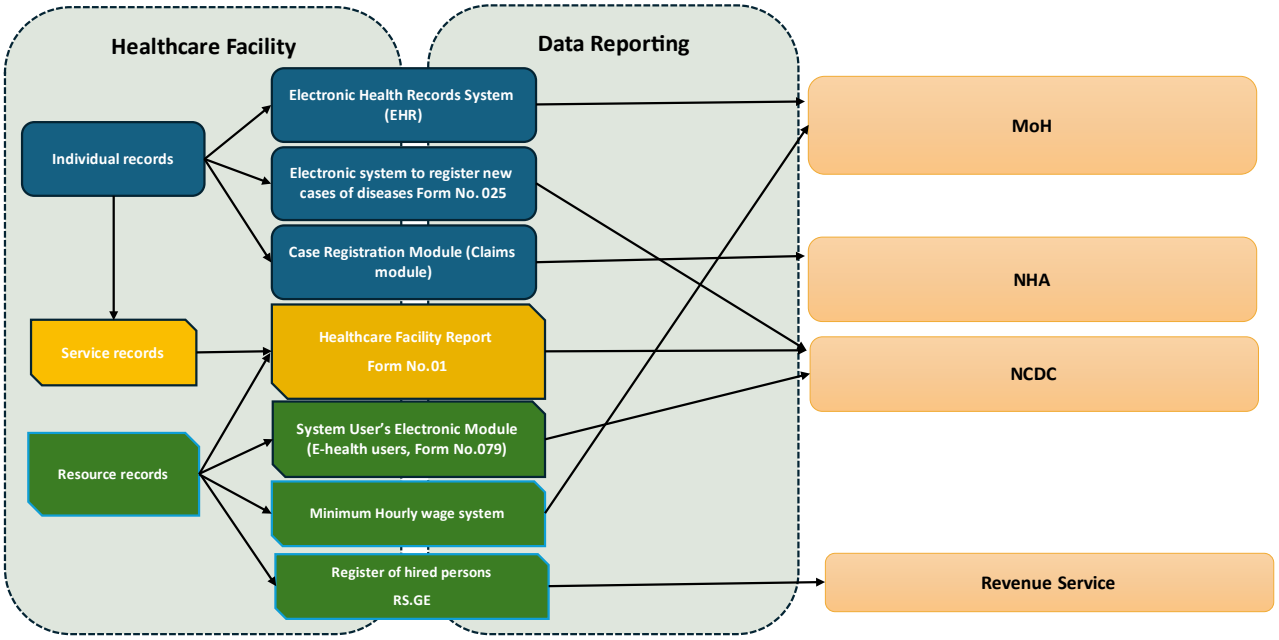
Another issue is the inconsistency in digital recording standards across various forms. For example, even within the same institution, dates might be recorded in different digital formats, such as "30-Nov-2023" in one field and "30.11.2023" in another. All of these discrepancies impede digital data exchange and use for analysis and decision-making.

Objective 2. How information is reported and shared within Georgia's HIS.

This section examines the practices surrounding data reporting and sharing from a facility level across various modules/forms within Georgia's HIS. Figure 5 illustrates the data flow from the facility to the system level, with the data recipients revealed at each level.

[1] Provides a uniform system of measurement for disability based on the International Classification of Impairment, Disabilities and Handicaps; measures the level of a patient's disability and indicates how much assistance is required for the individual to carry out activities of daily living (Functional Independence Measure (FIM) | APTA).

Figure 5-Data flow from the facility level to the system level.

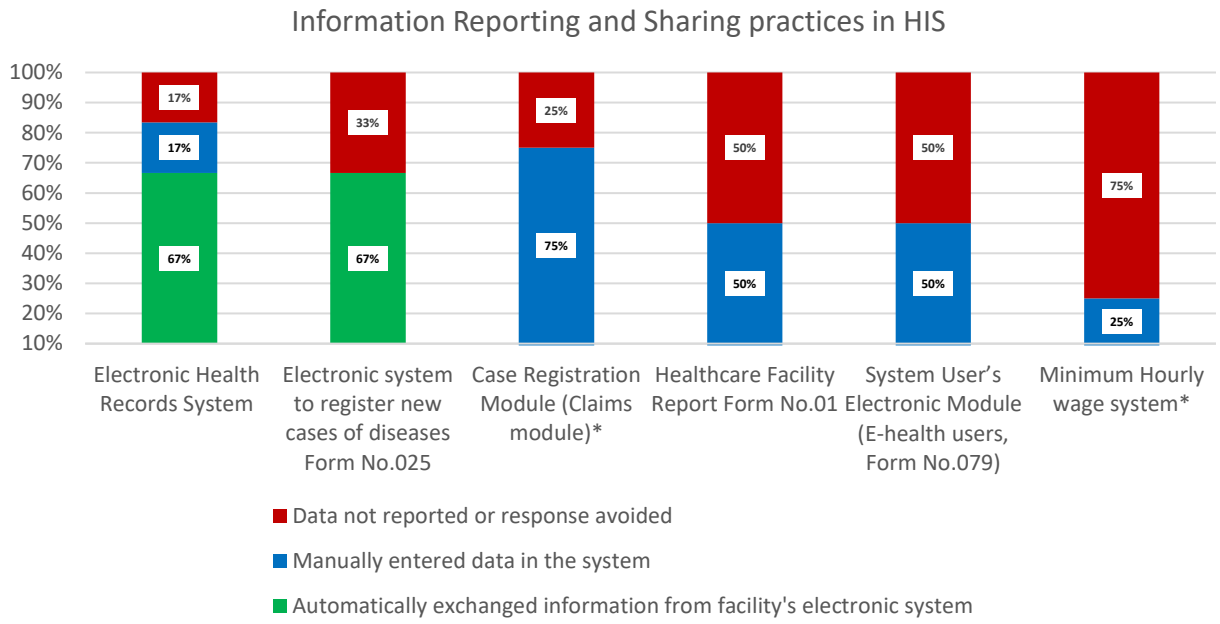


The study has identified seven data reporting modules/forms within the HIS. These modules are:

- Electronic Health Record (EHR)
- Form 025
- Case registration module (i.e., Claims module)
- Annual Statistical Form 01
- User of the Electronic System module (e-health users, Form No.079)
- Minimal wage module
- Register of hired/employed individual (RS.ge)

As depicted in Figure 6, reporting practices vary notably across these modules/forms. This analysis draws on insights from six institutions that were interviewed. Data from four institutions participating in the UHCP was used for the medical case registration module and the minimum hourly wage system.

Figure 6- Information reporting and sharing practices in HIS



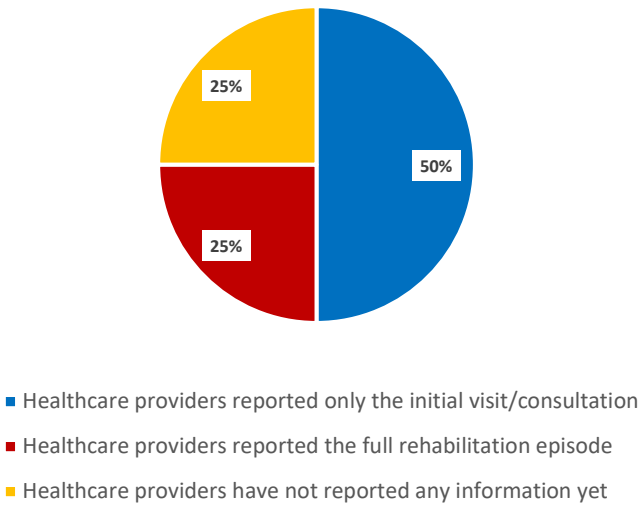
Electronic Health Record (EHR) System

Health record

Physicians must report inpatient and outpatient cases in the EHR system within 14 calendar days following a patient's discharge or outpatient visit. However, doctors do not typically exchange information about rehabilitation services unless the service is delivered under the UHCP (The Minister of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia, 2019a).

The volume of information reported for the state rehabilitation sub-program varies. Some healthcare providers report every rehabilitation episode and every intervention from the start to the end of the rehabilitation course, while others only report the initial visit. An initial visit involves the first consultation with a rehabilitation physician or neurologist, during which rehabilitation services are recommended. Essential details regarding the patient's health status and the proposed rehabilitation plan are recorded in the EHR. This disparity in reporting practices is depicted in Figure 7.

Figure 7- Reporting practices in EHR.



Facilities that do not participate in the state sub-program report only the initial visits/consultations, adhering to the general mandates for patient information reporting within the EHR system.

Financial record

Commencing November 1st, 2023, all inpatient and outpatient establishments participating in state healthcare programs must document detailed costs associated with medical cases in the financial module of the EHR system. Such documentation is required within 14 calendar days post-discharge or after the end of an outpatient visit (The Minister of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia, 2019a).

Providers engaged in service delivery under the state program face a lack of standardization when it comes to reporting financial data within the EHR. The study found that only half of the providers input financial data into the EHR system. Those who do report often encounter issues, such as errors and missing cost data. The main problem is the incomplete integration between the facility-level HIS and the EHR system. Table 3 on page 35 lists the financial variables currently reported in the EHR system. MoH has obligated facilities to report financial data in the case registration module, which experienced issues, as described below.

Case registration module – Claims Module

Among the state rehabilitation program providers, 67% reported sharing information about rehabilitation interventions in the case registration module. These facilities have not integrated their internal HIS with the claims module, resulting in manual data reporting. Within this module, medical cases are registered online, including details about the commencement and end of the patient's treatment, medical diagnoses, and interventions.

The study identified several challenges in the current reporting process:

- Non-standardized – “artificial codes” designed by MoH are used to classify/code rehabilitation interventions rather than utilizing established international classification, which will challenge international comparability and benchmarking of the national data with international data.
- The module lacks specific fields to input initial and final patient functional assessment scores, i.e., rehabilitation outcomes. Consequently, providers record this information on Form 100, which is uploaded in a PDF format. This renders the data difficult to analyze and challenges monitoring rehabilitation program performance unless major time and effort are invested in extracting data from PDF files and analyzing them manually thereafter.
- Financial information is similarly reported in PDF format. The reliance on PDFs for data reporting presents significant barriers to data exchange, analysis, and practical utilization for further evidence-based decision-making. There is a lack of detailed guidance on how elements of financial reports should be grouped and/or estimated, which results in a lack of comparability across the reported data and could lead to misclassification of the expenses or incorrect cost estimates.

Form 025

Healthcare providers use Form 025 to report new cases when the disease is first diagnosed. Some studied facilities indicated that they report information using this form, while others do not. Those that use Form 025 have automated data exchange with the help of facility-level HIS. To see a detailed list of the variables reported on this form, refer to Table 4 on page 36.

Human resource data modules

The study identified several modules for reporting human resource (HR) information:

Electronic System user module (e-health)

The NCDC introduced e-health, an electronic form where providers must register personnel within three working days after hiring or a change in employment status (The Minister of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia, 2019b). Facilities that claim to report data in the system do so manually. The human resource-related variables reported on this form are detailed in Table 5 on page 37.

An interview with a policymaker revealed that this system was introduced during the COVID-19 pandemic, mainly supporting COVID-19 vaccination campaigns to adequately plan for required human resources using real-time data on healthcare personnel. COVID-19 helped uncover that the registry of healthcare personnel used by MoH before COVID-19 included information about licensed and certified medical personnel, but its utility for human resource planning was limited due to outdated information in the registry. To remedy the situation, NCDC introduced the e-health module. This system helps record employed medical personnel with a unique national identification number (ID) and allows analysis of currently employed doctors and nurse volumes. Future plans include enhancing the module and adding a classification of human resources by specialization to provide more comprehensive information on the available personnel within the healthcare system.

Minimum wage module

MoH introduced this module for clinics contracted for service provision under UHCP. The module captures information about the hours worked and corresponding wages for the personnel to ensure that medical staff are compensated appropriately, according to the minimum wage standards set by the MoH. Initially, the system was designed for doctors and nurses only, but recently, it has been expanded to include junior doctors, nurse assistants, midwives, and medical attendants. In the study sample, only one facility claimed to report data into this electronic module on a monthly basis. A comprehensive list of the variables reported can be found in Table 5 on page 37.

Register of hired/employed individuals (RS.ge)

The Revenue Service (the national body for Tax collection) also collects data on employed personnel. According to the Ministry of Finance's 2010 directive on tax administration, employers are required to submit report detailing personnel information and their salaries (Ministry of Finance, 2010). As of February 1, 2021, employers must report employee details on a monthly basis in this electronic register about employed individuals and required to update any changes in employment status within five days (Revenue Service, 2021). The variables recorded in this system are listed in Table 5.

Annual Statistical Form 01 (Healthcare facility report)

The Annual Statistical Form-01, collected by NCDC, is due on February 28 of the following year and contains data about the equipment, staffing, and volume of services etc. delivered by the facility during the previous year. Facilities manually report data in electronic form. For detailed information about data reported related to rehabilitation, refer to Table 6 on page 39.

Data duplication between HIS modules

Our analysis reveals duplication rates ranging from 21% to 80% within HIS modules such as Form 025, the case registration module, and EHR. Such redundancies are visualized in *Figure 8* and *Figure 9*. Similarly, variable duplication rates within human resource modules are demonstrated in *Figure 10*. All of this underlines the need to eliminate duplications and streamline data acquisition, sharing, and management practices, which could help reduce the compliance burden imposed on providers, enhance enforcement, and increase efficiency.

Figure 8- Data duplication in key health information modules.

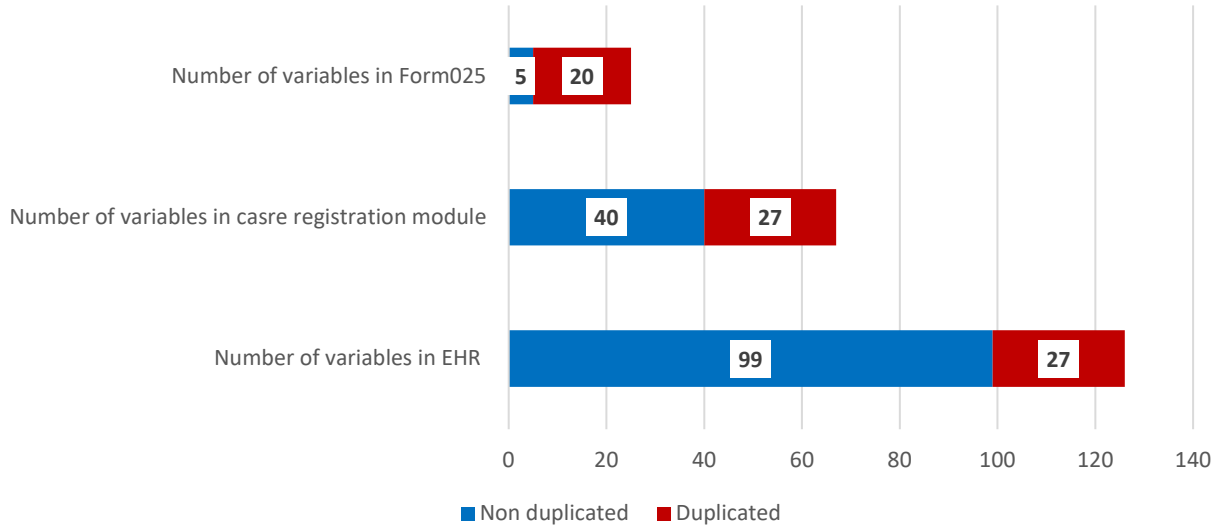


Figure 9- Inter-module data duplication.

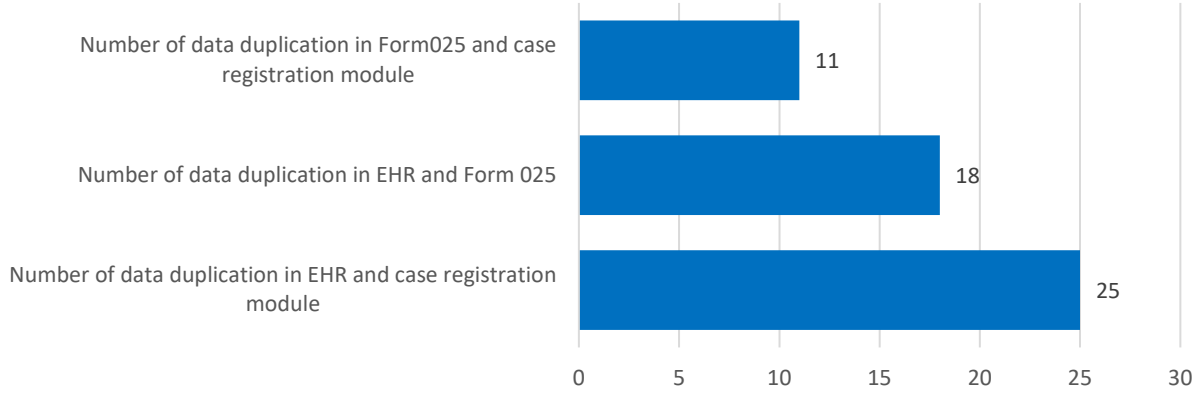
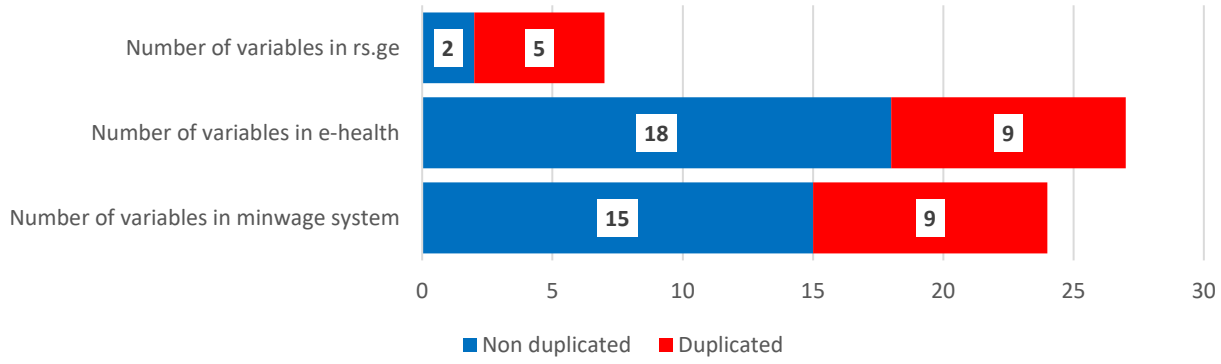


Figure 10- Comparison of data duplication in HR modules.



Discussion and Recommendations

Data related to disability and rehabilitation are often missing from HIS, particularly in LMICs, where health information systems are generally weak (McPherson et al., 2016). This study revealed that Georgia is not an exception. Although the country collects some data, its HIS requires significant improvements to properly inform the monitoring and evaluation indicators for rehabilitation services proposed in Table 1 on page 25 which aims to help inform future decisions on rehabilitation service integration in health systems and evaluate the results. Information systems of the 21st century rely on quality and standardized data. Accurate data in health systems is essential for proper functioning and enables policymakers to assess the impact of health system improvements on the population's health (Lemma et al., 2020). For Georgia to foster more reliable and effective data collection systems, it's crucial to understand the policy imperatives driving data collection – why the data is needed, and how it can be used. Several related shortcomings are described below.

Resolving Facility-Level Challenges with Data Collection

On one hand, we need to acknowledge Georgia's progress on EHR. The growing use of EHR is beneficial, as it eliminates the limitations of paper records and allows data to be accessed from various locations at any time *(Syed et al., 2023)*. However, our study found that data collection is still paper-based in some facilities, posing data availability and accessibility challenges within and outside the facility. Furthermore, not all facilities operating facility-level HIS can automatically exchange data with EHR systems. Instead, they double-burden the staff with recording and reporting tasks, which risks negatively affecting data quality. Thus, ensuring a higher degree of automation seems essential to enhance EHR functionality and the value it could afford to the country. **Thus, to meet the demands of the 21st century, it seems necessary for the Government to mandate the use of electronic health systems on a facility level. To operationalize this recommendation, the government could make the facility's electronic health information systems mandatory during the provider licensing process.** This mandate could be announced now with a target date set in the future, allowing for gradual adjustment in the provider marketplace. Because providers will be expected to mobilize investments for HIS systems and staff development/training, a proper definition of the lead time before this requirement enters full force would be critically important.

Next, we also noted variable data standards used by the facilities when recording the data. This challenges the comparability of data elements, data exchange, and eventual use of the data for analysis and policy. Therefore, setting digital standards seems necessary for seizing greater value from the digital system. Thoughts to achieve this is to (a) establish standards through regulatory actions issued by respective/authorized state entities so that market players such as software developers are aware of the requirements and develop products that are compliant with these standards and/or "force" the users to follow these standards when imputing data in the digital systems and (b) allow for permitting/accrediting the facility level HIS, developed by companies, that are compliant with the established standards. **Thus, it seems essential to establish and enforce digital standards for data recording to facilitate data exchange, interoperability, analysis, and use for decision-making.**

Furthermore, we noted systemic shortcomings related to the lack of national classification for certain important areas necessary for standardized data collection and comparability or inadequate coverage with

the state mandate. Addressing these shortcomings would also help improve the quality and comparability of the data collected at the facility level.

1. Firstly, while the country uses FIM to measure functional status and/or improvements resulting from rehabilitation, it is not universally required from all rehabilitative facilities but only for those engaged in state programs. Similarly, standard coding of rehabilitative interventions using NCSP classification is only required for providers delivering services under UHCP and not for others. Thus, it would be beneficial to expand the coverage of used classification(s) on all providers for data standardization and not segregate providers by participation or non-participation in the UCHP.
2. Secondly, in the claim's module, we noted that NHA requires providers to use "artificial codes" developed by the MoH to classify rehabilitation interventions. The country should strive to use widely accepted international standards instead of these "ratification codes" to ensure the international comparability of Georgia's data.
3. Thirdly, enhancing patient functioning is a critical indicator of rehabilitation services (Prodinger et al., 2018). As our study shows, systematically measuring this indicator is often missing from existing digital systems. Functional assessment tools are crucial for evaluating patients, but facilities often use different instruments, generating non-comparable data and limiting the state's ability to compare provider performance. This lack of standardization creates inconsistency in assessing patient needs and/or tracking progress over time. **Thus, unified functional status assessment tool(s) for assessing patient functional status across all healthcare institutions must be mandated, regardless of their participation in state programs.**

Furthermore, Georgia needs more classifications to fill the noted gaps in rehabilitation services. Specialists must select such classifications from the ones available and used internationally. When selected, it would be necessary to mandate this classification for all providers in the country. These steps will ensure that the country collects comparable data across the providers about the needs of the population, services delivered, and health outcomes achieved. The use of international classifications would also help international comparability and benchmarking. This should help inform national M&E indicators described in Table 1 on page 25.

Resolving Data Exchange Challenges

Improving data collection and quality on the facility level is important because the birth of the patient or service-related data emerges on this level. Our study reveals that there is also a need to address issues related to the current culture of data sharing and reporting. This is extremely important to ensure that collected data can meaningfully inform decision-making processes on a population level. Therefore, adequate data exchange helps answer the critical question, "Why do we need this data?".

Firstly, completeness is a significant dimension of data quality, defined as the extent to which all necessary data is present and accessible *(Lemma et al., 2020)*. This dimension poses a challenge in our system, as there's no standardized definition of the volume of data necessary to be reported on rehabilitation services. **Variable practice of facilities reporting different volumes of data to various reporting systems indicates the need to set the minimum data required for outpatient service delivery and/or establish a**

standard for automatic information exchange between the facility and the national systems. This should help achieve completeness of the data on a national level, necessary to make informed decisions.

Furthermore, the step above could help define the scope of data to be systematically collected from the facilities within the EHR system, including:

a. Patient health and related information and the services delivered with outcomes achieved.

b. Financial information about the cost/price of services rendered to an individual.

However, the proposed step may not be sufficient unless the guidelines for data reporting are properly developed and disseminated. The weaknesses noted in financial data collection or in collecting information about the rehabilitation services have pointed to the need for more elaborate guidelines that allow comparable (in terms of volume and definition) data reporting across the facilities. **Thus, it is recommended that supplementary guidelines be developed and distributed to clearly outline reporting requirements (volume/type of information and methodological definition of data elements, especially for the financial part) and govern the exchange of information, thereby standardizing reporting processes and improving data governance across the system.**

Furthermore, to evaluate the impact of rehabilitation services on patients, it is important to measure the functional improvements achieved with the help of rehabilitative interventions, especially for those included in the UHCP. However, as noted in the results section, this patient-level information is only submitted in PDF format, limiting its usability, analysis, and utility. **Thus, NHA is recommended to establish a dedicated field for functional assessment scores to accurately capture and store patient functional assessment outcomes and allow for real-time assessment of intervention impact on a population level without significant time and resource investment.**

Finally, data duplication across the reporting modules/forms was identified as an issue placing unnecessary reporting burdens (and consequently costs) on the facilities while not helping improve the quality of collected data and/or its use for evidence-based decision-making. In an environment where different digital data modules are not fully interoperable (World Health Organization, 2023b), duplicate data production undermines the value of collected information. It also has significant resource implications for healthcare providers and managers. **Therefore, it is recommended that such duplications be eliminated, and the benefits afforded by case-based digital reports be seized. Eliminating duplication would be possible by abolishing Form 025 and instead defining the primary source for this data for the EHR system, reducing duplication of information reported about human resources and streamlining the data collection in a way that informs all existing online modules more efficiently.**

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Tables and Figures

Table 1- Rehabilitation Indicators passport

The symbol * denotes indicators selected from The Georgia Rehabilitation Service Development Strategy (2023-2027) and the symbol ** refers to the rehabilitation indicators menu (World Health Organization, 2019).

N	Indicator name	Indicator description	Method of measurement	Possible data sources	Primary steward	Frequency	Comment
Input and process							
	Rehabilitation workforce						
1.	*Density of rehabilitation specialists (PT, OT, SLT, P&O, PRM)[2] per 10,000 inhabitants	The indicator measures the density of rehabilitation specialists per 10,000 inhabitants	**Numerator:** Total number of rehabilitation specialists (PT, OT, SLT, P&O, PRM) in the country **Denominator:** Total population **Calculation method:** Total number of specialists in the field of rehabilitation in the country divided by the total population, multiplied by 10,000 Disaggregation: by region	**a) Statistical reports of the medical facilities** *In form IV- 01(report of medical facilities), information on the following specialists is entered:* **1. Doctor of physical medicine and spa treatment** **2. Doctor of medical rehabilitation and sports medicine** 3. **General rehabilitologist, specialist rehabilitologist (with**	National Center for Disease Control and Public Health	Annually The deadline for submitting the Form-IV-01 medical facilities report is no later than February 28 of the following year	a) In Form-IV-01 information is not collected on Speech and Language Therapists (SLT). Information about specialists in this field may be obtained from the official statistics of graduates from educational institutions. For example, since 2017, Ilia State University has a master's program titled 'Communication, Language, and Speech Therapy. b) In Form IV-01 information is not collected about Prosthetist and orthotist (P&O). As per the order of the Minister of Health No. 01-43/N dated April 29, 2021, approving the minimum standards of service with assistive devices, prosthetist-orthotist technologists are required to have

[2] According to the strategy for the development of rehabilitation services in Georgia (2023-2027), medical doctors employed in the field of rehabilitation are subject to state regulation and are required to hold a certificate of independent medical activity. However, there are no similar requirements for PT, OT, and SLT.

N	Indicator name	Indicator description	Method of measurement	Possible data sources	Primary steward	Frequency	Comment
				higher non-medical education) 4. **Occupational therapist**			completed the 2/3-year course of prosthetist-orthotist. However, there is no enforcement mechanism in the country.
2.	*The total number of rehabilitation specialties that are state-regulated	The indicator determines how many of the 5 specialties employed in the field of rehabilitation (PRM, PT, OT, SLT, P&O) are state-regulated	**Numerator:** Number of specialists that are state regulated *In our case, out of the 5 specialties (PRM, PT, OT, SLT, P&O), only one, PMR, is subject to regulation[3]	Normative Act of the Ministry of Labor, Health, and Social Protection for Internally Displaced Persons (IDPs) from the Occupied Territories of Georgia, in collaboration with the Ministry of Education and Science of Georgia	Ministry of Health (MoH)	Annually	
3.	**Number of rehabilitation graduates	The indicator determines the number of rehabilitation graduates per 10,000 inhabitants.	**Numerator:** Number of graduates of a rehabilitation workforce (by available categoris) from educational and training programs (e.g. diploma, bachelor's degree or postgraduate	Report forms designed to collect information about graduates in education	Ministry of Education and Science of Georgia	Annually	For PT, OT, SLT, and PRM, there are higher education programs available, including Bachelor's and Master's degrees. Additionally, PRM has a residency program.[4]

[3] According to the strategy for the development of rehabilitation services in Georgia (2023-2027), medical doctors employed in the field of rehabilitation are subject to state regulation and are required to hold a certificate of independent medical activity. However, there are no similar requirements for PT, OT, and SLT.

[4] For P&O, as per the order of the Minister of Health No. 01-43/N dated April 29, 2021, approving the minimum standards of service with assistive devices, prosthetist-orthotist technologists are required to have completed the 2/3-year course of prosthetist-orthotist. However, there is no enforcement mechanism in the country.

N	Indicator name	Indicator description	Method of measurement	Possible data sources	Primary steward	Frequency	Comment
		Annual supply of graduates into rehabilitation labour force.	degree). **Calculation Method:** Number of annual graduates **Disaggregation:** by specialty, in our case PT, OT, SLT, PRM				
	Rehabilitation financing						
4.	**Rehabilitation expenditure	Total national rehabilitation expenditure as the percentage of total national health expenditure. Total health expenditure is the sum of total private and public spend on health in the country annually.	**Numerator:** Total national rehabilitation expenditure (annual) **Denominator:** Total annual health expenditure (THE) **Calculation method:** Total national rehabilitation expenditure (annual)/ Total national health expenditure (annual)x 100 **Disaggregation and additional dimensions:** To measure annual rehabilitation expenditure per capita, change denominator from “THE” to total population.	National health account	Ministry of Health (MoH)	Every 2-3 years	

N	Indicator name	Indicator description	Method of measurement	Possible data sources	Primary steward	Frequency	Comment
5.	*The share of expenditures on rehabilitation services within health protection programs[5] **Proposed Indicator/our recommendation:** The share of expenditures on rehabilitation services within health protection programs	The indicator determines the share (%) of expenditures allocated to rehabilitation services within State Budget Programs	**Numerator:** State expenditures on the rehabilitation services (annual) **Denominator:** Total Budget expenditure on healthcare programs (annual) **Calculation Method:** State expenditures on the rehabilitation services (annual)/ Total Budget expenditure on a halthcare programs (annual) x 100	National health account Budget/expenditure reports	Ministry of Health (MoH)	Annually	
6.	*The number of state-funded priority assistive products	The indicator determines the number of priority assistive products financed by the state.	**a) n case of number of priority assistive products** Numerator: Number of state funded priority assistive products[6] **b) in case of volume of financing** Numerator: Expenditure on priority	A) Normative Acts of the Ministry of Labor, Health, and Social Protection for Internally Displaced Persons (IDPs) from the Occupied Territories of Georgia	Ministry of Health (MoH)	Annually	

[5] If it considers only health protection programs, this indicator may ignore the services and assistive technologies provided on the social side of the Ministry.
[6] According to the strategy for the development of rehabilitation services in Georgia (2023-2027), the country offers 14 types of assistive products within the framework of state programs, with an additional 50 assistive products recommended and prioritized by WHO

N	Indicator name	Indicator description	Method of measurement	Possible data sources	Primary steward	Frequency	Comment
			assistive products (both state and out-of-pocket)				
	Rehabilitation information						
7.	*Integration of rehabilitation-related data collection tool into the Health Information System (HIS)	The indicator assesses the integration of the rehabilitation- related data collection tools into the Health Information System (HIS). *Our recommendation:* assess whether the HIS collects information related to indicators 1, 4, 5, 6, 8, 9, 10, 12, 13, and 14.	**Numerator:** The number of indicators- specifically 1, 4, 5, 6, 8, 9, 10, 12, 13, and 14- integrated into the HIS system		Ministry of Health (MoH)	Annually	
Output							
8.	*Number of medical facilities (all levels) providing rehabilitation services for adults and children	The indicator determines the number of medical facilities in Georgia that provide rehabilitation services to the population	**Numerator:** [type of medical facility] that provides rehabilitation services. **Disaggregation:** by type of medical facilities (e.g., outpatient facility, inpatient facility) and by region.	Statistical reports of the medical facilities	National Center for Disease Control and Public Health	Annually	In Form IV-01, medical facilities report departmental information involved in the following areas: a) Physiotherapeutic, b) Medical physical culture, c) Reflexotherapy

N	Indicator name	Indicator description	Method of measurement	Possible data sources	Primary steward	Frequency	Comment
9.	**Individualized care plan[7]	**The indicator measures the percentage of new patients at a rehabilitation ward or unit receiving an individualized care plan for rehabilitation. **Proposed indicator/ our recommendation:** The indicator measures the percentage of applications with a positive response within the state sub-program of rehabilitation that have completed the patient's individual rehabilitation plan (comprising more than 50% of the prescribed manipulation)[8]	**Proposed measurement/ our recommendation:** **Numerator:** In the reporting period (1 year), the total number of cases where more than 50% of the prescribed manipulations were performed**.** **Denominator:** the total number of applications with a positive response within the state rehabilitation sub-program, encompassing cases where both more and less than 50% of the prescribed manipulations were performed. **Disaggregation:** by facility, gender, age, and condition.	National Health Agency Reports	National Health Agency	Annually	

[7] This indicator has been developed for data collection at dedicated rehabilitation wards but could be used for other settings (i.e. other wards, outpatient rehabilitation).

[8] Pursuant to Resolution N72 of the Government of Georgia dated February 21, 2023, within the framework of the rehabilitation sub-program, reimbursement for the cases is granted at 100% if more than 50% of the manipulations appointed by the commission are completed

N	Indicator name	Indicator description	Method of measurement	Possible data sources	Primary steward	Frequency	Comment
10.	**Clinical guidelines for rehabilitation	The indicator determines the number of up-to-date clinical practice guideliness for rehabilitation.	**Numerator:** Number of up-to-date clinical practice guidelines		Ministry of Health (MoH)	**Biennially	
11.	*Percentage of medical facilities that meet rehabilitation infrastructure standards/technical regulations **Proposed indicator/ recommendation:** The number of medical facilities that meet the minimum requirements of a rehabilitation service provider	The indicator determines the number of medical facilities that meet the minimum requirements of the rehabilitation service provider defined by the state	**Numerator** The number of medical facilities that meet the minimum requirements of a rehabilitation service provider. **Disaggregation:** by region, type of facility.	Reports of the State Regulator	Ministry of Health (MoH)	Annually	
12.	Rehabilitation service utilization	Indicator measures accessability and utilization of rehabilitation services at facility level per 10 000 population,	**Numerator:** Number of cases that receive rehabilitation services at facility level. **Denominator:** Total population. **Calculation method:** Number of cases that	Rehabilitation service records, National health agency reports, Ministry of health HMIS	MoH	Annually	

N	Indicator name	Indicator description	Method of measurement	Possible data sources	Primary steward	Frequency	Comment
		categorized by health condition group.	receive rehabilitation services/Total population x 10 000. **Disaggregation:** For numerator: health condition group, sex, age group, facility type (administrative level of care, public/private), in- and outpatient, geographic region. For denominator: geographic region				
Outcome							
	Rehabilitation effectiveness						
13.	**Functioning change	The indicator measures the change in client functioning over a rehabilitation episode produces a measure of the outcome of the rehabilitation episode.	**Numerator**: The difference between the client's average functioning assessment score at admission (or commencement)and at discharge (or completion of the rehabilitation episode), by health condition.	For state rehabilitation program patients, this information is currently collected in Form 100 issued by the medical facilities[9]	National Health Agency	Annually	Collecting this information in the National Health Information System is essential for calculating the indicator

[9] Pursuant to Resolution N72 of the Government of Georgia dated February 21, 2023, medical facilities are required to issue Form 100 at the end of the rehabilitation course, documenting the patient's functional status at the beginning and end of the rehabilitation course.

N	Indicator name	Indicator description	Method of measurement	Possible data sources	Primary steward	Frequency	Comment
			Disaggregation: by health conditions, geographic region.				
Health system attributes							
	Rehabilitation efficiency						
14.	**Rehabilitation waiting time	Rehabilitation waiting time is defined as Average of waiting days until the first rehabilitation session. This includes all waiting days, including weekends and holidays, for new. Outpatients from the time of contact in arranging an appointment (whether made in-person, by telephone or online) to the first encounter with a rehabilitation health care worker.	**Numerator:** Total of waiting days until the first rehabilitation session for new outpatient cases. **Denominator:** Number of new outpatient cases. **Disaggregation**: by facility type, age	National Health Agency Reports	National Health Agency	Monthly	If the data is not collected in electronic reports and remains on paper, the indicator cannot be calculated

Table 2- Forms with variables

Outpatient medical card Form №IV-200/a	Patient examination Form № IV-200-5/a	Form № -IV-100/a (patient summary)
Patient name, surname	Consultation type	Name of the certificate issuing medical facility
Sex	Medical history N	
Date of birth	Patient name, surname, age	Patient name, surname
Phone number	In the event of an injury: Admission carried out within minutes of the injury	Date of birth
Identification number	Type of Injury	Identification number
Address		Address
Occupation		Occupation
Disability status		Outpatient admission date
Blood type, Rhesus factor		Diagnosis (major, comorbid, complication)
Transfusion		Past illness
Allergy		Anamnesis
Past surgery procedures		Conducted diagnostic examinations and consultations
Past infectious diseases		Nature of a disease (acute, subacute, chronic)
Chronic disease, bad habits		Performed treatment
		Admission Status (patient's health status at the time they are admitted to the hospital)
		Discharge Status
		Prescribed treatment and activity recommendations
		Doctor/ Certification issue doctor

		Signature of the head of the institution
		Certification issue date

Table 3- List of the financial variables in EHR system

Financial information in EHR system	
Direct Costs	**Indirect Costs**
Salary of personnel participating in the procedure	Administration salary
Medical equipment	Operating costs
Clinical-diagnostic tests	Amortization/Depreciation of real estate
Blood transfusion	Amortization/Depreciation of medical equipment
Laboratory tests	Amortization/Depreciation of non-medical equipment
Histomorphology test	Overhead
Consultations	
Medicines	
Food	

Table 4-List of the variables in Form 025

Form 025 variables
Patient Identification Number
Patient Birth Date
Adress (Region or City)
Actual address (region or street)
Medical card number
Patient admission date
Type of hospitalization/case
Disease ICD-10 (major diagnosis)
Nature of a disease (acute, subacute, chronic) of major diagnosis
Disease ICD-10 (disease complication)
Disease ICD-10 (comorbid disease)
Organization ID (TAX)
Name of the organization
Region of the organization
Organization District
Organization Adress
Other identification document of the patient
Patient name
Patient surname
Age
Sex
Education
Reason for encounter (ICPC2)

External cause in case of injury (ICD-10)
Minor surgical procedures

Table 5- List of variables related to HR in modules.

Minimal wage system	System user module (e-health)	Register of hired person (RS.ge)
Region (organization data)	Region (organization data)	Status (active, suspended, terminated (rs.ge))
Municipality/city (organization data)	Municipality/city (organization data)	Personal number (Staff)
Address (organization data)	Address (organization data)	Last name (Staff)
Contact person	Identification code (organization data)	Name (Staff)
Phone number of contact person	Name (organization data)	Mobile phone (Staff)
E-mail of contact person	Mobile phone (organization data)	Working time (half time, full time)
Brand name (organization)	E-mail (organization data)	Citizen of Georgia (yes, no)
Status (active, suspended, terminated (rs.ge))	Settlement (organization data)	
Resident (Staff)	Address (organization data)	
Non-resident (Staff)	Personal number (head of the organization)	
Personal number (Staff)	Name (head of the organization)	
Last name (Staff)	Surname (head of the organization)	
Name (Staff)	Mobile phone (head of the organization)	
Branch (Staff)	E-mail (head of the organization)	
Position (*min. on salary portal only: doctor, nurse)	Personal number (Staff)	
Start Date (Staff)	Last name (Staff)	
Termination date (Staff)	Name (Staff)	
Number of days worked	Branch (Staff)	

Total hours worked	Position (*min. on salary portal only: doctor, nurse)	
Overtime (number of hours worked)	Date of birth (Staff)	
Night (number of hours worked)	Gender (Staff)	
Work hours during rest days		
Other (number of other work hours, if any)		
Labor compensation issued (by the clinic to a specific person)		

Table 6- List of variables related to rehabilitation in Form 01

The number of employees:	Work of the physiotherapy department (cabinet):	Work of the Medical Physical Culture department/ cabinet:	Work of reflexotherapy department/ cabinet:
Doctor of medical rehabilitation and sports medicine	Total number of patients who completed treatment, including those treated in a polyclinic and at home.	Total number of patients who completed treatment, including those treated in a polyclinic and at home.	Number of individuals who completed treatment.
General rehabilitologist	Out of the total, the number of children up to 15 years old, including those treated in a polyclinic and at home.	Out of the total, the number of children up to 15 years old, including those treated in a polyclinic and at home.	Total number of procedures performed.
Rehabilitation specialist	Total number of procedures performed, including those for outpatients at the polyclinic.	Total number of procedures performed, including those for outpatients at the polyclinic.	
Massage therapist			
Occupational therapist			