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Report on Rehabilitation Service Costing and Budgeting

Author:

Ketevan Gogvadze, MD
George Gotsadze, MD, Ph.D.

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Abbreviations

CIF	Curatio International Foundation
DDI	Development, Democracy, and Innovation
EHIF	Estonia Health Insurance Fund
HSL	Health Service List
ICD	International Classification of Diseases
MoIDPLHSA	Ministry of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia
NHA	National Health Agency
NCSP	Nordic Classification of Surgical Procedures
SSA	Social Service Agency
PIR	Package of Interventions for Rehabilitation
TBI	Traumatic Brain Injury
TWG	Technical Working Group
UHCP	Universal Health Coverage Program
USAID	United States Agency for International Development
WHO	World Health Organization

Rehabilitation Service Costing and Budgeting

Introduction

The Inclusive Development Hub of USAID's Bureau for Development, Democracy, and Innovation has partnered with the Accelerator to support countries in strengthening and integrating rehabilitation services in the health systems.

Georgia was selected as one of the priority countries for program support, which entails direct technical assistance and regional and global level activities to catalyze country-level work. The program is implemented during July 2021-September 2023 in close collaboration with USAID in Georgia and the DDI Bureau in Washington.

The Accelerator issued a subgrant to Curatio International Foundation (CIF) to support the program's implementation of activities to achieve program objectives on the ground. This includes operational support and technical expertise on Georgia's health systems and financing context to complement the Accelerator's global expertise and translation of existing knowledge into locally feasible solutions.

The project's primary goal is to improve the financial protection of the population requiring medical rehabilitation services.

The project collaborates with the Ministry of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia (MoIDPLHSA), and other critical stakeholders toward the following objectives:

1. Integration of rehabilitation in Georgian health systems and health financing programs.
2. Creating support systems for implementing programs from Objective 1.

Identifying the priority health conditions amenable to rehabilitation and establishing priority rehabilitation interventions and eligibility criteria for publicly financed State Health Programs was the first step in achieving these objectives. The second step included estimating the costs of rehabilitation intervention packages and financial needs for rehabilitation services in Georgia. This report describes how the costs and budget estimates were accomplished.

Purpose

The overall purpose of the exercise was to estimate the costs of rehabilitation service provision in Georgia and make financial (budgetary) forecasts for rehabilitation services to be included in the Universal Health Coverage Program (UHCP) starting from 2023.

Approach for defining package of rehabilitation interventions

To develop packages of rehabilitation interventions for five prioritized conditions (Fractures, Stroke, Traumatic Brain Injury (TBI), Spinal Cord Injury, and Amputation), we used the WHO “Package of Interventions for Rehabilitation” (PIR) document. The process of selecting rehabilitation interventions in Georgia is described in detail in the “Report on prioritization of rehabilitation services in Georgia”¹.

PIR was instrumental in determining each intervention's duration (in minutes). The TWG also identified the necessary human resources by specialty area (e.g., rehabilitation doctor, occupational therapist, physical therapist, psychological therapist, speech therapist, etc.) involved in the delivery of the specific intervention.

Approach for costing of rehabilitation interventions

Different approaches and methodologies are described in the literature for estimating the costs of rehabilitation services. Activity-Based Costing², Time-driven Activity-Based Costing³, Pathway Costing⁴.

The activity-Based Costing is a bottom-up methodology that establishes a) a causal relationship between services and activities needed to provide the services and a causative relationship between activities and resources needed to conduct the activities, and b) assigns the expenses of each activity with resources to all services based on the actual consumption by each.

Time-driven Activity-Based Costing is a bottom-up costing methodology that calculates the costs of healthcare resources consumed as a patient moves along a care process. The method focuses on the relationship between time and cost measurement to determine costs for the services⁵. A per-minute cost for each resource expended is generated, known as the capacity cost rate multiplied by its time requirement.

Pathway costing methodology generates a per-minute staff cost multiplied by the staff time required to provide the service.

All the above-described costing approach requires historical, reliable service utilization and cost and financial data. Rehabilitation services are not well developed in Georgia, there is a limited number of service providers, and the cost and financial data, as well as service utilization data required for estimating national prices of rehabilitation interventions, are not available. Therefore, we decided to use the most relevant benchmark prices and macroeconomically adjust them to Georgia's reality.

Our choice fell on Estonia that has a well-established pricing and payment system for rehabilitation services functioning since 2005. We looked at Estonia's rehabilitation intervention list defined by Governmental regulation #29⁶ and decided to use Estonia prices and their structure for further adjustment. Therefore, Technical Working Group TWG (established in support of implementation) has cross-walked interventions selected for Georgia to the Estonian set of rehabilitation services/interventions. The Estonian state regulation includes a complete list of rehabilitation services

¹ Curatio International Foundation; Report on prioritization of rehabilitation services in Georgia, July 2022, Georgia

² Developed by Kaplan and Bruns

³ Developed by Kaplan and Anderson

⁴ NHS, COPD Commissioning Toolkit; Costing Model Guidance: Spirometry and Pulmonary Rehabilitation Costing Model

⁵ Kaplan RS, Anderson SR. The innovation of time-driven activity-based costing. *Journal of cost management*. 2007;21(2):5–15.

⁶ Government regulation #29 adopted on March 18, 2021, List of health care services of the Estonian Health Insurance Fund <https://www.riigiteataja.ee/akt/123032021022>

delivered in the country and sets maximum prices for each intervention and also provides the structure of the prices (cost elements). In total, 30 rehabilitation interventions are included in Estonia's Health Service List (HSL)⁷.

Table 1 presents only those selected for Georgia, considering service availability and providers' capacity.

Table 1: Selected list of rehabilitation interventions and their maximum prices in Estonia

#	Intervention Name	Estonian Code	Established Max. Price (EUR)
1.	Individual Physical therapy (30 min)	7050	12.02
2.	Individual Occupational therapy (30 min)	7053	12.94
3.	Individual physical therapy in the pool (30 min)	7056	12.46
4.	Lymphatic therapy (60 min)	7058	23.96
5.	Speech therapy (45 min)	7621	18.01
6.	Psychotherapy session for one patient	7601	33.33
7.	Preparation or modification of the initial treatment plan for an outpatient by a multidisciplinary committee	3114	64.1
8.	Consultation of doctor	3002	25.2

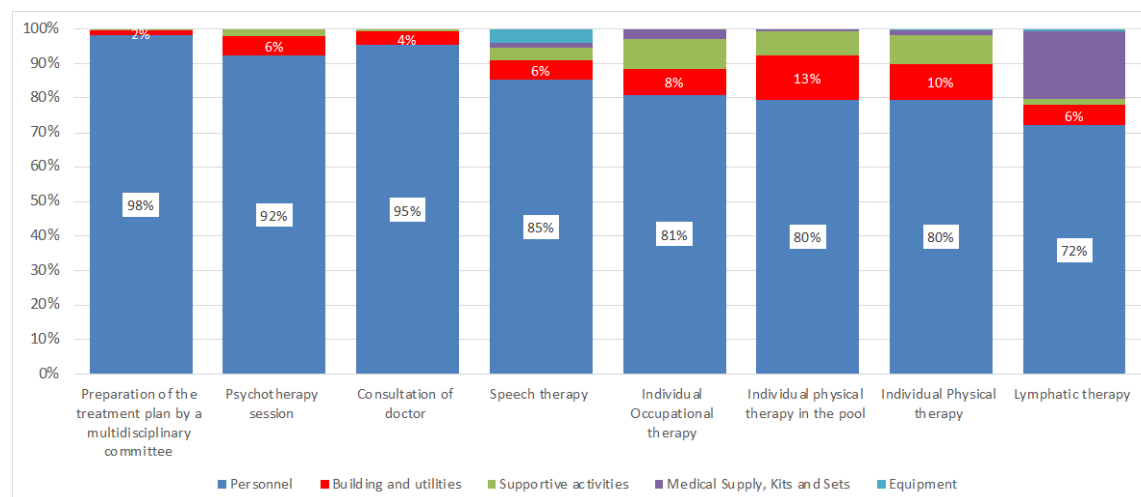
Besides the above-listed eight Estonian rehabilitation interventions, the Georgia working group members selected two additional interventions: a) training of beneficiary family members and b) selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls. Therefore, in total, 10 rehabilitation interventions were included in the package of interventions for Georgia.

Estonia applies an activity-based costing methodology to estimate the costs of rehabilitation services. Each input is assigned a name, specific code, measurement unit, and unit cost. Mapping out resource costs is undertaken by the Estonia Health Insurance Fund (HIF) in close collaboration with each provider's financial department. The prices of Estonia rehabilitation interventions include all resources such as personnel (direct as well as management/administrative), supportive activities (IT support, doing laundry, waste management, etc.), rehabilitation-specific supplies, consumables, devices, equipment, depreciation of buildings, and utility costs.

We contacted Estonia Health Insurance Fund (EHIF) and obtained the Estonia costing tool/ Excel-based instrument used to cost rehabilitation services. We used Estonia costing tool to a) look at the cost structure for each selected intervention by type of inputs (e.g., labor, building and utilities, supportive activities, etc.) and b) conduct adjustment of cost components to Georgian reality (assuming that the cost structure and elements of service provision in Georgia would be comparable to the Estonian). Figure 2 presents the cost structure of rehabilitation interventions in Estonia.

⁷ <https://www.riigiteataja.ee/akt/123032021022>

Figure 1: Cost structure of rehabilitation interventions in Estonia



Based on the international evidence, the cost of personnel is the main cost driver, and its share out of the total cost of rehabilitation services ranges between 71% to 75%^{8, 9, 10, 11}. In Estonia share of the personnel cost varies by intervention from 72% to 98% (see Figure 2). The percentage of “Building and Utilities” cost out of total intervention cost ranges from 2%-to 13%. Therefore, if we adjusted the cost of these two components, we would have adjusted about 78-99% of the total costs of rehabilitation interventions.

Personnel costs in Estonia comprised all labor inputs, including management and administrative staff costs. As mentioned above, to estimate the duration of each intervention, Georgia TWG used the WHO PIR document. In addition to the direct time required for the delivery of each intervention, personnel spends time on a) record keeping/patient data management and b) preparing the room and necessary materials for serving the next patient (so-called “transitional time”). Through interviewing health care providers, and group discussions, we estimated time for both mentioned activities and further allocated it to each intervention. For record-keeping, the average time allocated to each intervention equals 10 minutes, and “transitional time” (time between patients) is estimated to be five minutes. To estimate personnel costs for rehabilitation interventions in Georgia, we collected information on the Gross salary per hour for each type of personnel from Georgian healthcare providers. The gross wage and time required for each intervention (including record keeping/patient data management and “transitional time”) were used to estimate direct labor costs per intervention.

To estimate indirect labor (management, administrative staff) costs, we increased direct labor costs by 18%, an average percentage derived from the financial documentation of Georgian healthcare providers. Therefore, we have estimated nominal personnel costs by summarizing direct and indirect labor costs.

“Building and Utilities” cost estimates in Estonia include depreciation of buildings and utility costs (heating, electricity, water, sewerage, and security). To adjust the Estonian “Building and Utilities” cost to Georgian reality and equalize the price of “Building and Utilities” across two jurisdictions, we estimated adjustment indexes separately for real estate, electricity, natural gas, and water and sewerage services.

⁸ Analyses to Inform the Potential Use of Standardized Patient Assessment Data Elements in the Inpatient Rehabilitation Facility Prospective Payment System; Centers for Medicare & Medicaid Services [CMS], Report; 2018

⁹ RTI: How to Define and Pay for Rehabilitation Services to Achieve Quality and Efficiency? United States of America Country Presentation; Rehabilitation in Health Financing - Webinar 3

¹⁰ Medicare Program; Inpatient Rehabilitation Facility Prospective Payment System for Federal Fiscal Year 2022 and Updates to the IRF Quality Reporting Program; 42362 Federal Register / Vol. 86, No. 147 / Wednesday, August 4, 2021 / Rules and Regulations

¹¹ Kate Baxter and Parvaneh Rabiee, Estimating the unit costs of vision rehabilitation services; Unit Costs of Health and Social Care 2015

Because no information was available about the portion of those four elements out of the total, we assumed that all four parts have the same weights and calculated the average adjustment Indexes (Table 2).

Table 2: Adjustment Indexes for “Capital” cost elements

Title	Measurement Unit	Estonia Price (Gel) ¹²	Georgia Price (Gel)	Adjustment Index
Real Estates	sq. m	10,233 ¹³	3,698 ¹⁴	0.36
Electricity	kW/h	0.34 ¹⁵	0.3103 ¹⁶	0.98
Natural Gas	kW/h	0.11 ¹⁷	0.10 ^{18;19}	0.88
Water and sewerage services	m ³	16 ²⁰	6.503 ²¹	0.41
Average adjustment index				0.66

We multiplied the Estonian total price of each intervention by the share of the “Building and Utilities” out of the total intervention cost and further multiplied by the average adjustment index and converted it into GEL using Geostat annual average exchange rate for 2021 between Gel and Euro²².

Costs of the other three components, such as a) supportive activities, b) rehabilitation-specific medical supplies, consumables, and devices, and c) equipment, have been estimated by multiplying the total Estonian price of intervention by the percentage of relevant components out of the total intervention price and converted into GEL. All cost components were summarized to estimate the intervention's total price, and facility profit at 15% was added.

A full list of rehabilitation interventions that are included in the package of rehabilitation services for selected five priority conditions in Georgia and the price estimates for each rehabilitation intervention are presented in Table 3.

Table 3: Georgia rehabilitation intervention prices

#	Intervention Name	Georgia price (GEL)
1.	Physical therapy	39
2.	Occupational therapy	45
3.	Physical therapy in the pool /Aqua therapy	40
4.	Lymphatic therapy	78
5.	Speech therapy	50
6.	Cognitive behavioral therapy, psychological support/counseling	76
7.	Preparation or modification of the initial treatment plan for an outpatient by a multidisciplinary committee	227

¹² For converting Euro to Gel we applied Exchange Rate between Gel and Euro for 2021

¹³ Source: Estonian Land Board, transactions database: <https://www.maaamet.ee/kinnisvara/htraru/>

¹⁴ <https://tbccapital.ge/static/reports/uploads/files/CommercialRealEstate.WindofChanges-GEO.pdf>

¹⁵ https://www.globalpetrolprices.com/Estonia/electricity_prices/#:~:text=Estonia%2C%20September%202021%3A%20The%20price,of%20power%2C%20distribution%20and%20taxes.

¹⁶ <https://gnerc.org/ge/tariffs/tariff-el-energy/distribution> Accessed on July 1st, 2022

¹⁷ <https://www.statista.com/statistics/595729/natural-gas-average-price-estonia/#:~:text=In%202020%2C%20natural%20gas%20prices,euro%20cents%20per%20kilowatt%20hour.>

¹⁸ <https://gnerc.org/ge/tariffs/tariff-natural-gaz/informatsia-misatsodebeli-bunebrivi-gazis-fasis-shesakheb> Accessed on July 1st, 2022

¹⁹ As Estonian price for natural Gaz was provided in KW/h and Georgian price in m³ to convert m³ to Kw/h we used following formula: 1m³ =10.55kwh <https://learnmetrics.com/m3-gas-to-kwh/#:~:text=m3%20C3%97%20Calorific%20Value%20C3%97,it%20can%20deviate%20%2B%2F%2D5%25.>

²⁰ <https://tallinnavesi.ee/en/customers-2/paying-bills/price-lists-for-water-and-sewerage-services/>

²¹ <https://gnerc.org/ge/tariffs/tariff-water/tskalmomargeba> Accessed on July 1st, 2022

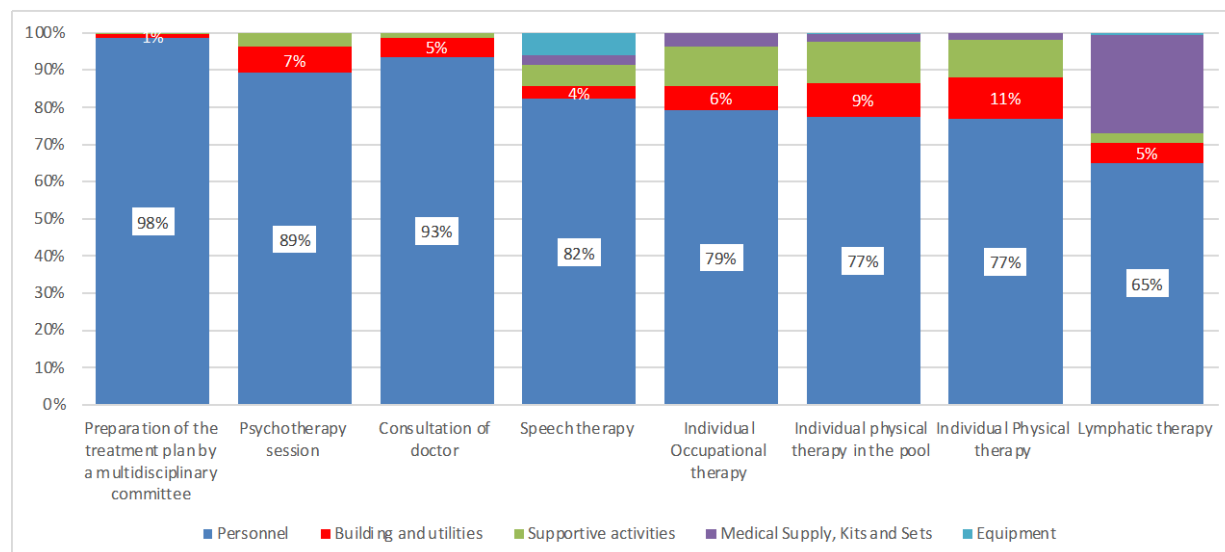
²² Exchange Rate between Gel and Euro for 2021 equals 3.814. <https://www.geostat.ge/ka/modules/categories/92/monetaruli-statistika>

8.	Training of beneficiary family members	72
9.	Consultation/supervision of rehabilitation doctor	54
10.	Selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls	56

The cost structure of the rehabilitation interventions in Georgia is presented in Figure 3

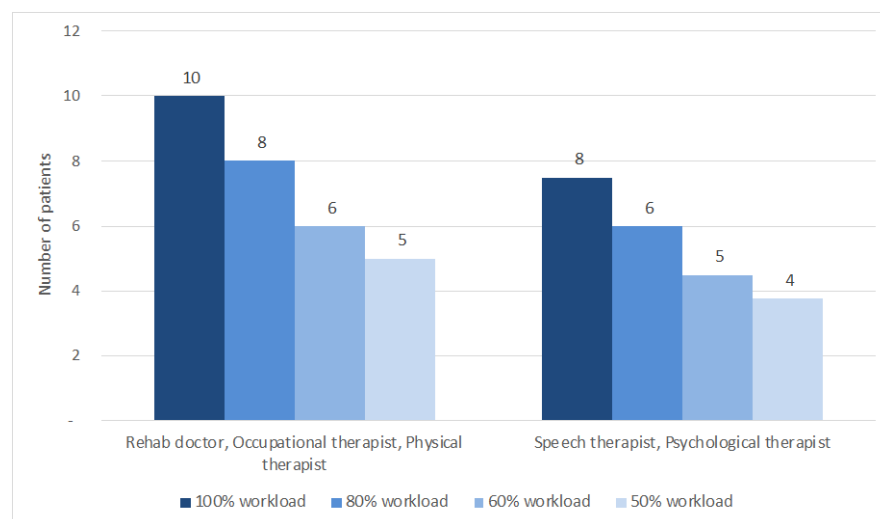
Share of the Personnel cost out of total intervention price varies across interventions from 65% to 98%, which is comparable to the international evidence. The percentage of “Building and Utilities” cost out of total intervention price in Georgia ranges between 1%-to 11%. Georgia's Intervention cost structure is comparable to Estonia's intervention cost composition.

Figure 2: Cost structure of rehabilitation interventions in Georgia



Based on the working hours per day²³ and the duration of the intervention (including time allocated for record keeping/patient data management and “transitional time”), we estimated the number of patients per day that could be served based on the personnel workload (100%, 80%, 60%, and 50%) (Figure 4).

Figure 3: Number of patients to be served per day by type of personnel and workload



²³ Practical working hours per day is defined as 7.5 hours

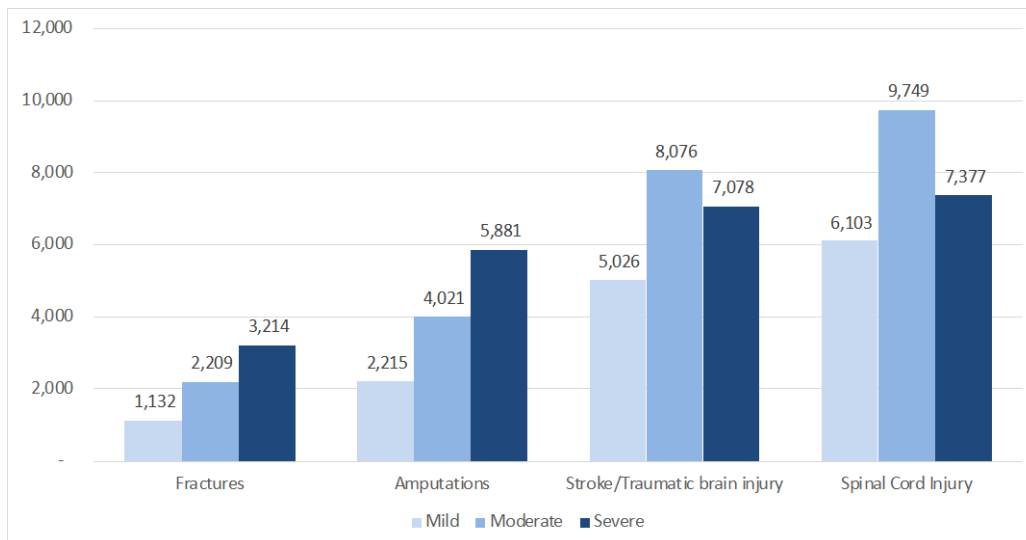
The Rehabilitation intervention package costs

We have calculated the costs of rehabilitation intervention packages for selected priority conditions separately for outpatient and inpatient settings. The technical working group defined a maximum number of interventions per patient per course for outpatient and inpatient rehabilitation.

Outpatient rehabilitation

For outpatient rehabilitation, selected priority conditions were divided by severity of the condition (mild, moderate, and severe), and a **maximum number of rehabilitation interventions per patient per course** was set for each sub-condition. In outpatient settings cost of the rehabilitation services per patient per course by the severity of the condition is presented in Figure 5. The intervention price was multiplied by the number of rehabilitation interventions required for one patient per course. Detailed cost calculations are presented in Annex 1.

Figure 4: Cost per patient by the severity of the condition for outpatient rehabilitation



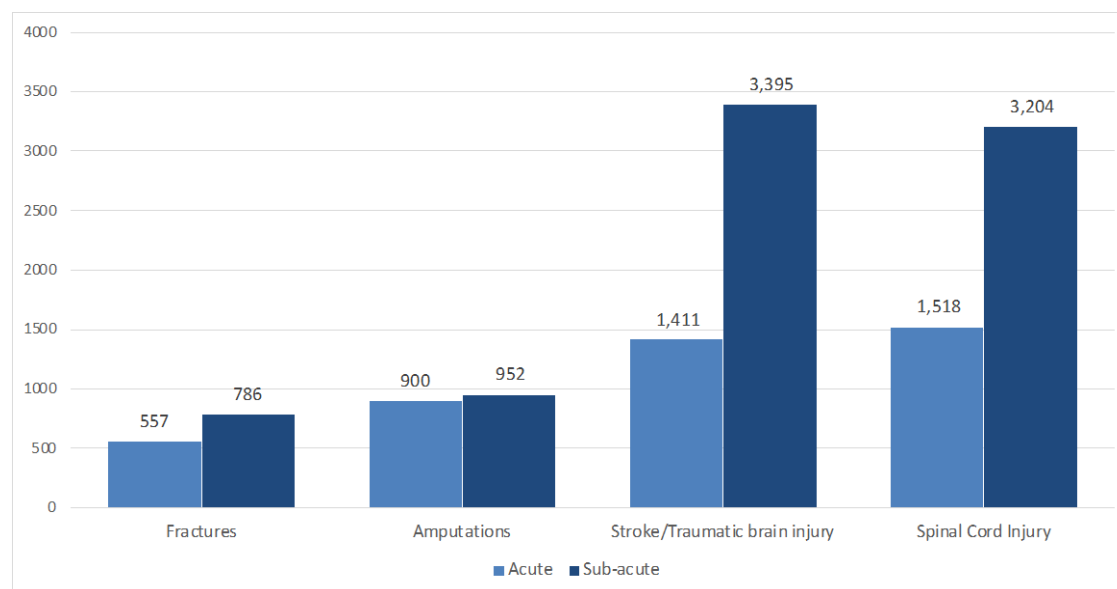
Inpatient Rehabilitation

Inpatient rehabilitation consists of two phases: a) acute rehabilitation, which considers the provision of rehabilitation services at the early stage of illness, after injury, or surgical care while the patient is still hospitalized. The aim of rehabilitation in this period is to prevent complications that may occur long-term²⁴. b) Sub-acute rehabilitation, which means the provision of rehabilitation services in inpatient settings after discharging the patients from acute care hospitals. Sub-acute rehabilitation could be provided at stand-alone inpatient rehabilitation facilities or rehabilitation departments/units at general/multi-profile hospitals.

The length of sub-acute rehabilitation courses for stroke/traumatic brain injury and spinal cord injury in inpatient rehabilitation facilities/units was estimated as 14 days and seven days for fractures and amputations.

The TWG defined the maximum number of rehabilitation interventions needed for patients for acute and sub-acute phases. Based on the number of interventions required per patient per course and intervention price, we estimated the costs of acute and sub-acute rehabilitation packages per patient per course. The cost of the inpatient rehabilitation packages per patient per course by acute and sub-acute phases is presented in Figure 6. Detailed cost calculations are presented in Annex 2.

Figure 5: Cost of acute and sub-acute inpatient rehabilitation per patient



²⁴ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4303793/>

Financial needs estimate

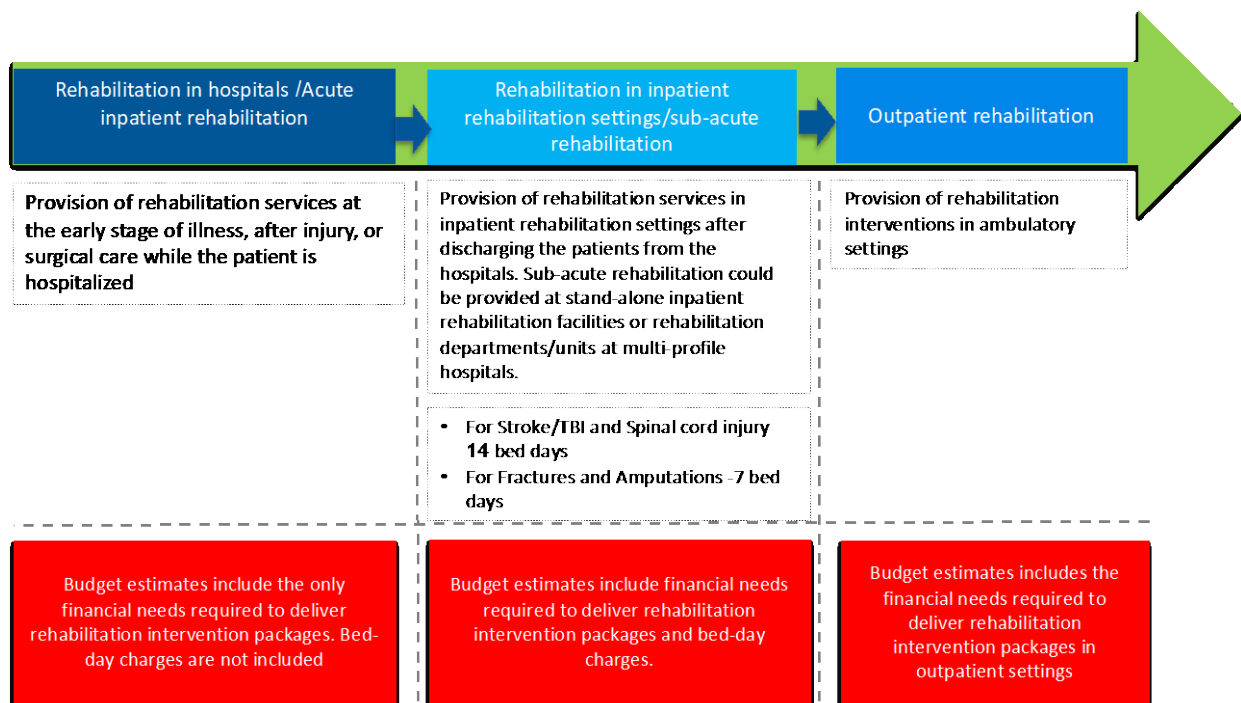
Approach to Estimating Financial Needs for Rehabilitation for 2023

We estimated the financial needs separately for each level of rehabilitation services: outpatient, acute inpatient, and sub-acute inpatient rehabilitation.

1. **The budget for outpatient rehabilitation** includes the financial needs required to deliver rehabilitation intervention packages in outpatient settings.
2. **The budget for acute inpatient rehabilitation** includes the only financial needs required to deliver rehabilitation intervention packages to a patient while hospitalized due to illness, after injury, or surgical care. As the Government reimburses the costs of the bed-days through UHCP, we have not included bed-day charges in the budget estimates for acute inpatient rehabilitation.
3. **The budget for sub-acute inpatient rehabilitation** includes a) the financial needs required to deliver rehabilitation packages to a patient in rehabilitation hospitals/rehabilitation units at the general hospitals and b) bed-day costs. As mentioned above, the maximum length of stay for sub-acute rehabilitation in inpatient rehabilitation facilities/units was estimated as 14 days for stroke/traumatic brain injury and spinal cord injury and seven days for fractures and amputations; therefore, we included 14 bed-day costs per patient for stroke/traumatic brain injury and spinal cord injury and seven bed-day costs for fractures and amputations.

Figure 7 summarizes and presents levels of rehabilitation services and budget components for each level.

Figure 6: levels of rehabilitation services



Financial needs for the provision of rehabilitation intervention packages were estimated by multiplying the projected number of patients who requires rehabilitation for each priority condition by the cost of the intervention package for the respective condition.

To project the number of patients requiring rehabilitation services for each priority condition, we analyzed national statistical data for the 2016-2021 years. We obtained a case-based database for the YY2016-2021 from the National Health Agency (NHA)²⁵.

The technical working group selected ICD codes relevant to Stroke/Traumatic Brain Injury and Spinal Cord Injury and NCSP codes relevant to fractures (only Endoprosthesis of Hip and Knee Joints) and Amputations. In total, 46 ICD codes were assigned to Stroke/Traumatic Brain Injury and 11 ICD codes to Spinal Cord Injury; 4 NCSP codes were selected for Amputation and 57 for Fractures/ endoprosthesis of Hip and Knee Joints. A list of ICD and NCSP codes applicable to the priority conditions is presented in Annex 3.

We analyzed the total number of patients with the conditions of our interest by years and estimated a six-year average, that was used for the projection of the number of patients in 2023. We also estimated the incidence rate per 100,000 population that could be used for budget estimates in the next years.

Analysis of national statistical data for 2016-2021 years by conditions is presented below in Table 4.

Table 4: 2016-2021 National statistical data by conditions

Condition	2016	2017	2018	2019	2020	2021	6-year Average	Per 100,000 pop.
Stroke/Traumatic brain injury	3,482	4,162	3,554	3,795	3,869	3,981	3,808	103
Spinal Cord Injury	27	22	35	23	14	6	21	0.6
Fractures/ Endoprosthesis of Hip and Knee Joints	3,364	4,229	4,205	4,869	4,271	4,873	4,302	117
Amputation	295	423	466	567	599	645	500	14

Assumptions used to project the number of patients who will require rehabilitation

At the suggestion of TWG the following set of assumptions were used while projecting the number of patients who may require rehabilitation in 2023:

Stroke/Traumatic Brain Injury

1. Only 40% of surviving stroke and traumatic brain injury patients will require rehabilitation. This assumption is based on international evidence suggesting that about 40% of stroke survivors are left with some functional impairment. Reducing this burden requires optimizing stroke prevention and improving acute care, but rehabilitation is equally essential²⁶.
2. All of them (40% out of the total number of surviving patients with stroke and traumatic brain injury) will receive acute and sub-acute inpatient rehabilitation services.
3. All patients who receive inpatient rehabilitation will require outpatient rehabilitation.
4. Out of total outpatient patients, 60% will be mild cases, 25%-moderate, and 15% severe²⁷.

Spinal Cord Injury

1. All patients with spinal cord injuries will be eligible to receive acute, sub-acute inpatient, and outpatient rehabilitation.

²⁵ National Health Agency a single national purchaser

²⁶ Review of stroke rehabilitation; BMJ. 2007 Jan 13; 334(7584): 86–90. doi: 10.1136/bmj.39059.456794.68

²⁷ Because there are no international benchmarks, the distribution of outpatient patients by severity was done based on the expert opinion

- The same proportion was applied to distribute outpatient patients by severity: 60% - mild cases, 25%-moderate, and 15% severe.

Fractures

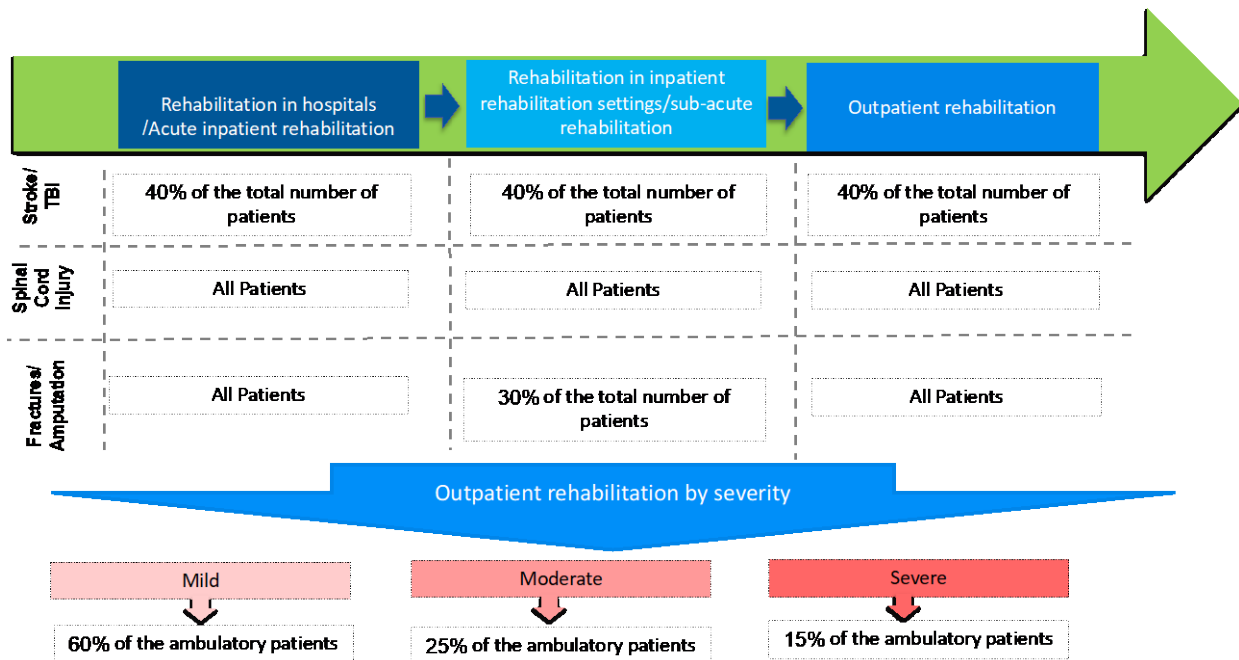
- All patients who underwent surgery/ Endoprosthesis of Hip and Knee Joints will be eligible to receive acute inpatient rehabilitation.
- Out of the total patients who received acute inpatient rehabilitation, only 30% will require sub-acute inpatient rehabilitation.
- All patients will receive outpatient rehabilitation.
- Out of total outpatient patients, 60% will be mild cases, 25%-moderate, and 15% severe.

Amputations

- All patients who underwent limb amputation will be eligible to receive acute inpatient rehabilitation.
- Out of the total patients who received acute inpatient rehabilitation, only 30% will require sub-acute inpatient rehabilitation.
- All patients will receive outpatient rehabilitation.
- Out of total outpatient patients, 60% will be mild cases, 25%-moderate, and 15% severe.

Figure 8 summarizes all assumptions the technical experts/ TWG members elaborated to project the number of patients who will require rehabilitation by the level of service provision.

Figure 7: Assumptions for projecting the number of patients requiring rehabilitation.



Bed-day costs

We have collected bed-day costs from eight hospitals/providers, including general/multi-profile and rehabilitation hospitals. Bed-day costs included personnel, utilities, capital depreciation, maintenance, catering, expenses on medicines and laboratory diagnostics, other overhead expenses, and profit. The percentage of Profit out of total bed day costs varied by providers. To estimate standard bed day cost, firstly, we excluded costs of the medicines, laboratory diagnostics, and profit and estimated net bed day

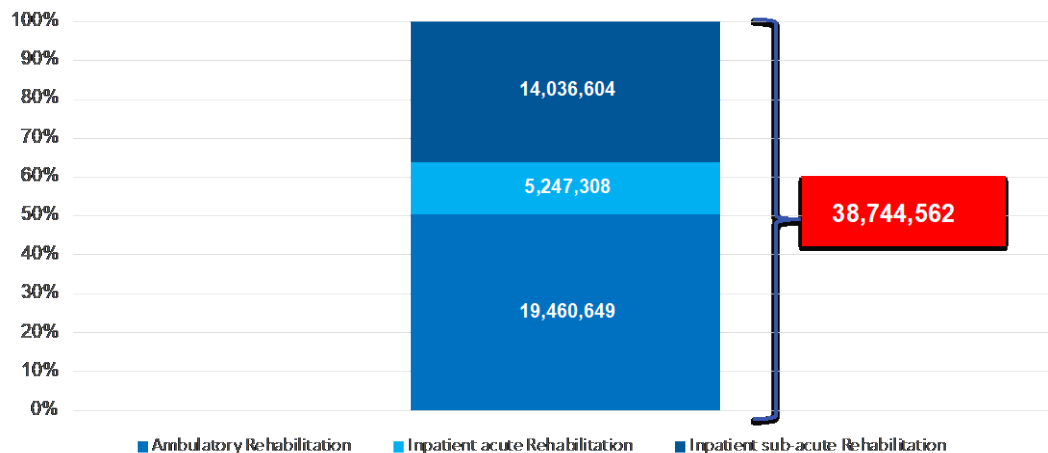
cost; then added gain at 15% (we used the same approach as for calculating prices of interventions) and derived median bed day cost which equals 213 GEL.

Overall budget estimates based on the needs

The total rehabilitation budget estimated based on the country's needs equals about 38.8 mln. GEL.

As shown in Figure 9 about 50% of financial needs are necessary for outpatient rehabilitation. In-patient sub-acute rehabilitation is the second largest financial component representing 36% of the total budget. Bed day costs that are included in the sub-acute inpatient rehabilitation budget equal 7,176,696 GEL.

Figure 8: Needs-based budget



Budget estimates based on the available provider capacity

To derive a realistic budget estimate for 2023, we considered several factors related to the country's capacity for providing rehabilitation services. Such factors included a) the geographical distribution of cases (for outpatient and acute inpatient rehabilitation) and b) the current throughput capacity of the inpatient rehabilitation hospitals.

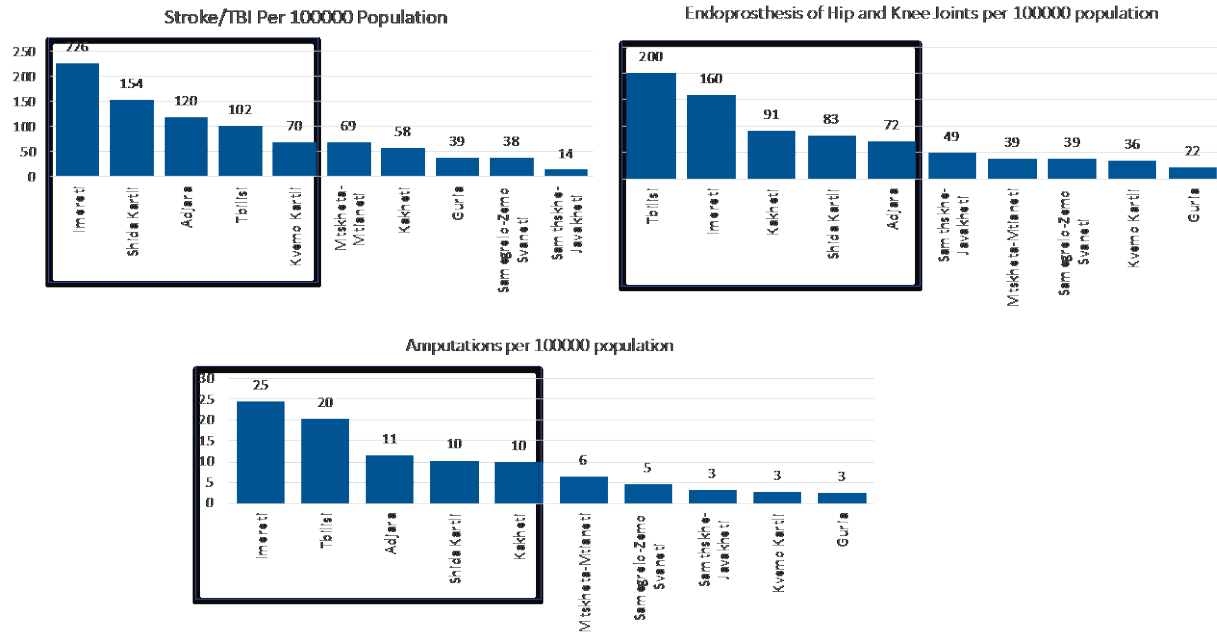
Firstly, we analyzed national statistical data (2016-2021) by region to identify the regions where the cases are mainly concentrated and where the development/provision of rehabilitation services is feasible in 2023.

The distribution of cases per 100,000 population by region is presented in Figure 10

- Stroke/TBI cases per 100,000 population are highest in Imereti, Shida Kartli, Adjara, Tbilisi, and Kvemo Kartli regions.
- The following regions have high incidence rates for Endoprosthesis of Hip and Knee Joints: Tbilisi, Imereti, Kakheti, Shida Kartli, and Adjara.
- Amputation cases per 100,000 population are high in Imereti, Tbilisi, Adjara, Shida Kartli, and Kakheti.
- Spinal Cord injury cases are located only in four regions: Tbilisi, Imereti, Adjara, and Shida Kartli.

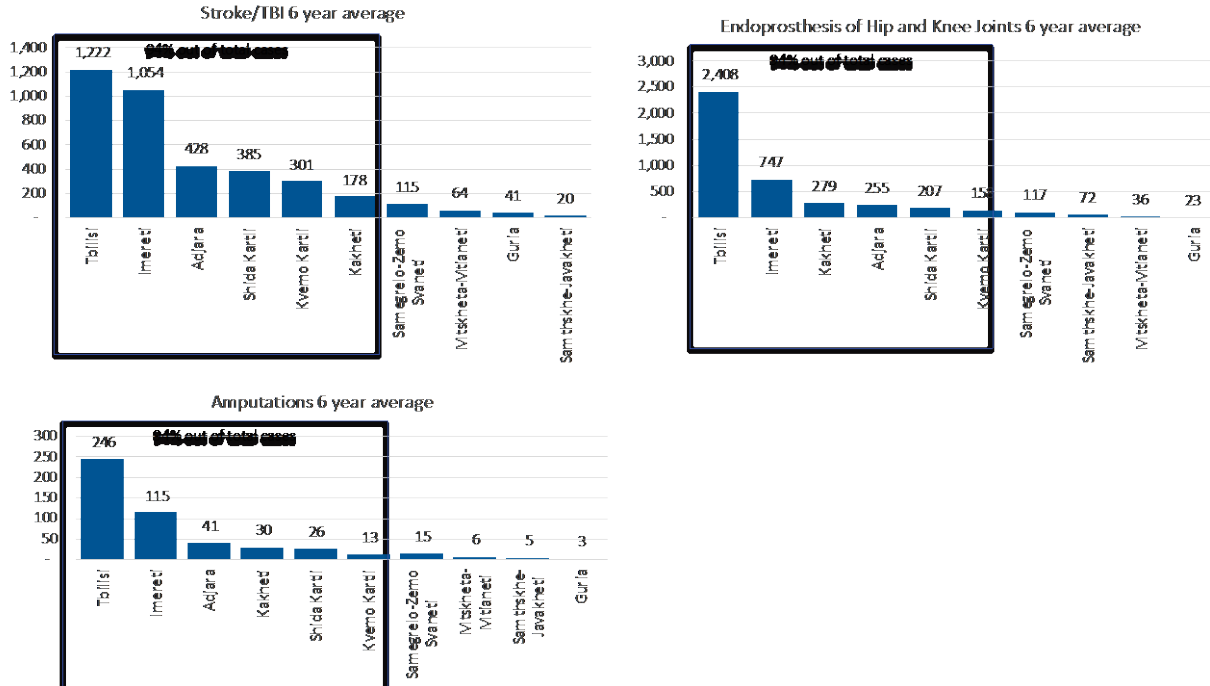
If we consider all priority conditions together, in 2023 development of rehabilitation services seems appropriate in the following six regions: Tbilisi, Imereti, Adjara, Shida Kartli, Kakheti, and Kvemo Kartli.

Figure 9: Cases per 100,000 population by region and condition



Secondly, we looked at the total number of cases in these six regions. For all priority conditions, 94% of total cases are concentrated in six selected regions.

Figure 10: Total Cases by region and condition



Therefore, we used the projected number of patients in selected six regions to estimate the realistic budget for outpatient and acute inpatient rehabilitation for 2023.

According to 2016-2021 statistical data, Spinal Cord Injury cases are shallow- on average, 21 cases per year; Based on WHO estimates, the annual global incidence is 40 to 80 cases per million population²⁸, which is a total of 148 – 295 cases, (average 221 cases) for Georgia; The adult population is 75% out of the total Georgia Population²⁹; therefore, for estimating the budget for the adult population, we used 165 cases instead of (21 cases) because Georgia statistical data are significantly low compared to global estimates.

As for other conditions, Georgia's statistical data are comparable to the international evidence; accordingly, we used national data. E.g., according to the literature, the mean incidence of major amputation varied between 7.2/100,000 (New Zealand) and 41.4/100,000 (Hungary)³⁰, and the incidence of amputation in Georgia is 14 per 100,000 (Table 4)

According to the Global Perspectives on Arthroplasty of Hip and Knee Joint³¹, which explores data from 11 developed countries (USA, Australia, Canada, New Zealand, UK, Germany, France, Italy, Sweden, Norway, and Spain), the total Hip Arthroplasty per 100,000 ranges between 106 (Spain) and 233 (France) and Knee Arthroplasty per 100,000 is 128 in Italy and 280.5 in the USA. In Georgia, Hip and Knee Arthroplasty per 100,000 equals 117 (Table 4).

The budget for sub-acute inpatient rehabilitation was developed based on the throughput capacity of the inpatient rehabilitation hospitals. We estimated the number of beds (with 100% and 90% workload) required to serve the projected number of patients for the sub-acute inpatient rehabilitation phase. Currently, there are only 19 inpatient rehabilitation beds in Georgia, but the country has the potential to expand the number of hospital beds up to 50 in 2023. Neither the current nor the planned throughput capacity of 50 rehabilitation hospital beds is insufficient to serve all patients requiring sub-acute inpatient rehabilitation. Therefore, our estimates assume that in 2023, Georgia will have 50 inpatient rehabilitation beds, and the workload will be 90%. Based on this assumption, we estimated the number of patients rehabilitation hospitals could serve in the sub-acute phase.

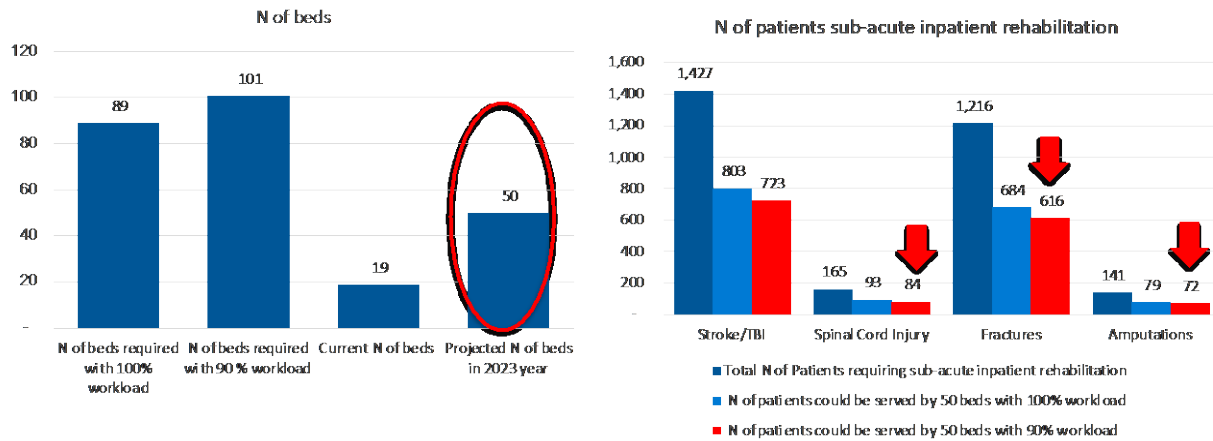
²⁸ <https://www.who.int/news-room/fact-sheets/detail/spinal-cord-injury>

²⁹ <https://www.geostat.ge/ka/modules/categories/41/mosakhleoba>

³⁰ Behrendt, C. A., Sigvant, B., Szeberin, Z., Beiles, B., Eldrup, N., Thomson, I. A., Venermo, M., Altreuther, M., Menyhei, G., Nordanstig, J., Clarke, M., Rieß, H. C., Björck, M., & Debus, E. S. (2018). International Variations in Amputation Practice: A VASCUNET Report. *European journal of vascular and endovascular surgery : the official journal of the European Society for Vascular Surgery*, 56(3), 391–399. <https://doi.org/10.1016/j.ejvs.2018.04.017>

³¹ Abdelaal, M. S., Restrepo, C., & Sharkey, P. F. (2020). Global Perspectives on Arthroplasty of Hip and Knee Joints. *The Orthopedic clinics of North America*, 51(2), 169–176. <https://doi.org/10.1016/j.ocl.2019.11.003>

Figure 11: Throughput capacity of the inpatient rehabilitation hospitals

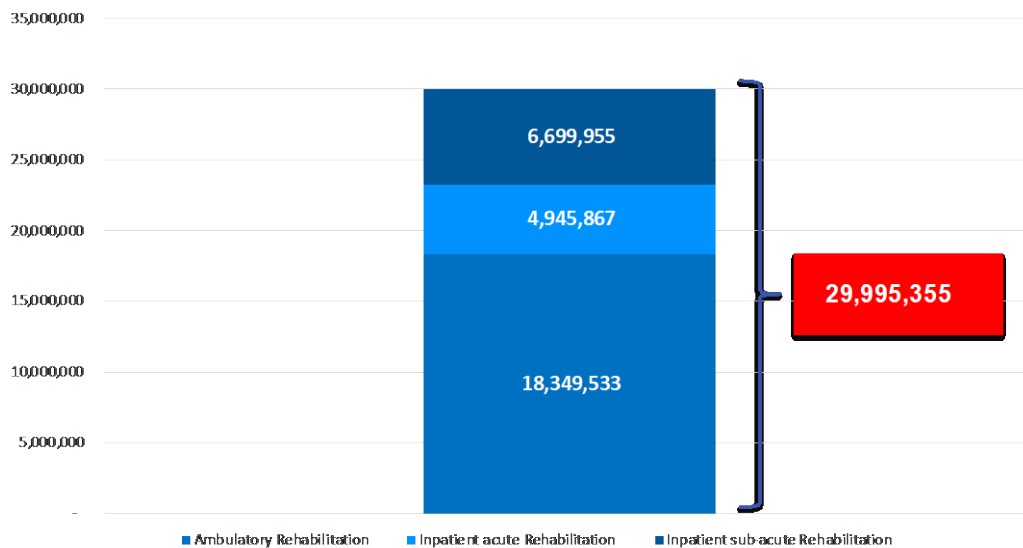


Considering Georgia's capacity, the estimated number of patients for acute, sub-acute inpatient, and outpatient rehabilitation in 2023 is presented in Annex 4.

Considering all the factors mentioned above capacity-based budget for 2023 equal about 30 mln. GEL. (See Figure 13) which is lower than the needs-based budget (38.75 mln. Figure 9) by 8.75 mln GEL.

The budget for outpatient rehabilitation was decreased by 1.1 mln GEL; financial needs for acute inpatient rehabilitation were reduced by 301,440 GEL, and the budget for sub-acute inpatient rehabilitation diminished by 7.3 mln GEL. Bed day costs for inpatient sub-acute rehabilitation decreased to 3,425,957 GEL.

Figure 12: Capacity-based budget



To summarize, our proposal to the MoIDPLHSA considers expanding the pilot program for rehabilitation³² (which includes only outpatient rehabilitation for Traumatic Brain Injury/Stroke and Spinal Cord Injury) and, starting from 2023, integrating rehabilitation of other selected priority conditions (Fractures, Amputation) in the UHCP financing. In addition to expanding a list of the conditions for ambulatory rehabilitation, we propose financing acute and sub-acute inpatient rehabilitation services as well.

For the first year, the maximum budget for the ambulatory, sub-acute, and acute rehabilitation for all selected priority conditions was estimated at about 30 mln. GEL. The budget estimates consider the country's current capacity related to the provision of rehabilitation services. As the capacity develops, the required financial needs for the second and third years are expected to increase. A phased approach to integrating rehabilitation in health system financing is described in a stepwise plan.

³² Approved by the Governmental resolution on November 9, 2022 and launched from November

Annex 1: Number of rehabilitation interventions and costs per patient/course by severity and conditions for outpatient rehabilitation

Condition	List of Interventions	Unit Price (Gel)	Number of interventions			Cost of Intervention per patient (Gel)		
			Mild	Moderate	Severe	Mild	Moderate	Severe
Amputation	Preparation and modification of the initial treatment plan by a multidisciplinary group	227	2	3	4	455	682	910
	Occupational therapy	45	10	20	30	449	898	1,347
	Physical therapy	39	10	20	30	394	788	1,183
	Training of beneficiary family members	72	2	3	4	145	217	290
	Selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls	56	5	10	15	282	564	846
	Psychotherapy session	76	5	10	15	381	762	1,143
	Consultation/supervision of doctor	54	2	2	3	109	109	163
TOTAL						2,215	4,021	5,881
Fractures	Preparation and modification of the initial treatment plan by a multidisciplinary group	227	2	4	6	455	910	1365
	Occupational therapy	45	1	2	3	45	90	135
	Physical therapy	39	10	20	30	394	788	1183
	Training of beneficiary family members	72	1	2	2	72	145	145
	Selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls	56	1	2	3	56	113	169
	Consultation/supervision of doctor	54	2	3	4	109	163	218
TOTAL						1,132	2,209	3,214
Stroke/Traumatic brain injury	Preparation and modification of the initial treatment plan by a multidisciplinary group	227	2	2	2	455	455	455
	Occupational therapy	45	15	30	22	674	1,347	988
	Physical therapy	39	25	45	40	986	1,774	1577
	Physical therapy in the pool/Aqua therapy	40	10	20	16	397	795	636
	Training of beneficiary family members	72	5	5	10	362	362	725
	Psychotherapy session	76	8	12	9	609	914	686
	Speech therapy	50	10	20	15	496	992	744
	Selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls	56	10	15	12	564	846	676
	Lymphatic therapy	78	2	2	2	156	156	156

Condition	List of Interventions	Unit Price (Gel)	Number of interventions			Cost of Intervention per patient (Gel)		
			Mild	Moderate	Severe	Mild	Moderate	Severe
	Consultation/supervision of doctor	54	6	8	8	327	436	436
TOTAL						5,026	8,076	7,078
Spinal Cord Injury	Preparation and modification of the initial treatment plan by a multidisciplinary group	227	3	3	3	682	682	682
	Occupational therapy	45	25	32	30	1123	1,437	1347
	Physical therapy	39	30	50	42	1183	1971	1656
	Physical therapy in the pool/Aqua therapy	40	10	10	0	397	397	0
	Training of beneficiary family members	72	5	5	8	362	362	580
	Psychotherapy session	76	8	12	10	609	914	762
	Speech therapy	50	10	40	15	496	1984	744
	Selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls	56	15	25	18	846	1,409	1015
	Lymphatic therapy	78	1	2	2	78	156	156
Consultation/supervision of doctor	54	6	8	8	327	436	436	
TOTAL						6,103	9,749	7,377

Annex 2: Number of rehabilitation interventions and costs per patient/course for acute and sub-acute inpatient rehabilitation

Condition	List of Interventions	Unit Price (Gel)	Number of interventions		Cost of Intervention per patient (Gel)	
			Acute	Sub-acute	Acute	Sub-acute
Amputation	Preparation and modification of the initial treatment plan by a multidisciplinary group	227	2	1	455	227
	Occupational therapy	45	1	3	45	135
	Physical therapy	39	5	7	197	276
	Training of beneficiary family members	72	1	1	72	72
	Selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls	56	0	1	0	56
	Psychotherapy session	76	1	1	76	76
	Consultation/supervision of doctor	54	1	2	54	109
TOTAL					900	952
Fractures	Preparation and modification of the initial treatment plan by a multidisciplinary group	227	1	1	227	227
	Occupational therapy	45	1	1	45	45
	Physical therapy	39	4	7	158	276
	Training of beneficiary family members	72	1	1	72	72
	Selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls	56	0	1	0	56
	Consultation/supervision of doctor	54	1	2	54	109
TOTAL					557	786
Stroke/Traumatic brain injury	Preparation and modification of the initial treatment plan by a multidisciplinary group	227	2	2	455	455
	Occupational therapy	45	1	10	45	449
	Physical therapy	39	10	28	394	1,104
	Physical therapy in the pool/Aqua therapy	40	0	4	0	159
	Training of beneficiary family members	72	1	2	72	145
	Psychotherapy session	76	1	2	76	152
	Speech therapy	50	3	8	149	397
	Selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls	56	1	2	56	113
	Lymphatic therapy	78	0	4	0	312
Consultation/supervision of doctor	54	3	2	163	109	
TOTAL					1,411	3,395

Condition	List of Interventions	Unit Price (Gel)	Number of interventions		Cost of Intervention per patient (Gel)	
			Acute	Sub-acute	Acute	Sub-acute
Spinal Cord Injury	Preparation and modification of the initial treatment plan by a multidisciplinary group	227	2	2	455	455
	Occupational therapy	45	1	8	45	359
	Physical therapy	39	10	28	394	1,104
	Physical therapy in the pool/Aqua therapy	40	0	0	0	0
	Training of beneficiary family members	72	1	3	72	217
	Psychotherapy session	76	1	6	76	457
	Speech therapy	50	2	2	99	99
	Selection of auxiliary (adaptive) means and teaching of their use for recovery of walking and prevention of falls	56	1	3	56	169
	Lymphatic therapy	78	2	3	156	234
Consultation/supervision of doctor	54	3	2	163	109	
TOTAL					1,518	3,204

Annex 3: Selected ICD and NCSP Codes for priority conditions

Condition	ICD Codes	NCSP Codes
Stroke/Traumatic Brain Injury	G93.1; G95.1; I60.0; I60.1; I60.2; I60.3; I60.4; I60.5; I60.6; I60.7; I60.8; I60.9; I61.0; I61.1; I61.2; I61.3; I61.4; I61.5; I61.6; I61.8; I61.9; I62.0; I62.1; I62.9; I63.0; I63.1; I63.2; I63.3; I63.4; I63.5; I63.6; I63.8; I69.0; I69.1; I69.3; I69.4; S06.1; S06.2; S06.3; S06.4; S06.5; S06.6; S06.7; T90.5; T90.8; T90.9	
Spinal Cord Injury	S14.0; S14.1; S24.0; S24.1; S34.0; S34.1; S34.2; S34.3; T91.1; T91.3; T91.9	
Fractures		NFSB00; NFSB01; NFSB02; NFSB03; NFSB09; NFSB10; NFSB11; NFSB12; NFSB13; NFSB19; NFSB20; NFSB30; NFSB40; NFSB59; NFSB60; NFSB99; NFSC00; NFSC01; NFSC02; NFSC03; NFSC09; NFSC10; NFSC12; NFSC13; NFSC19; NFSC20; NFSC21; NFSC22; NFSC23; NFSC29; NFSC30; NFSC31; NFSC32; NFSC33; NFSC39; NFSC40; NFSC41; NFSC42; NFSC43; NFSC49; NFSC50; NFSC59; NFSC99; NGSB00; NGSB02; NGSB10; NGSB12; NGSB20; NGSB30; NGSB40; NGSB99; NGSC00; NGSC02; NGSC04; NGSC10; NGSC20; NGSC99
Amputation		NFSQ19; NFSQ99; NGSQ19; NGSQ99

Annex 4: Projected number of patients in 2023 in selected six regions and considering inpatient sub-acute rehabilitation throughput capacity

Condition	Total N of Patients	N of Patients for acute in-patient rehab	N of Patients for sub-acute in-patient rehab	Total N of Patients for ambulatory rehab	Among them mild cases	Among them moderate cases	Among them severe cases
Stroke/TBI	3,567	1,427	723	1,427	856	357	214
Spinal Cord Injury	165	165	84	165	99	41	25
Fractures/ Endoprosthesis of Hip and Knee Joints	4,054	4,054	616	4,054	2,432	1,013	608
Amputations	471	471	72	471	283	118	71