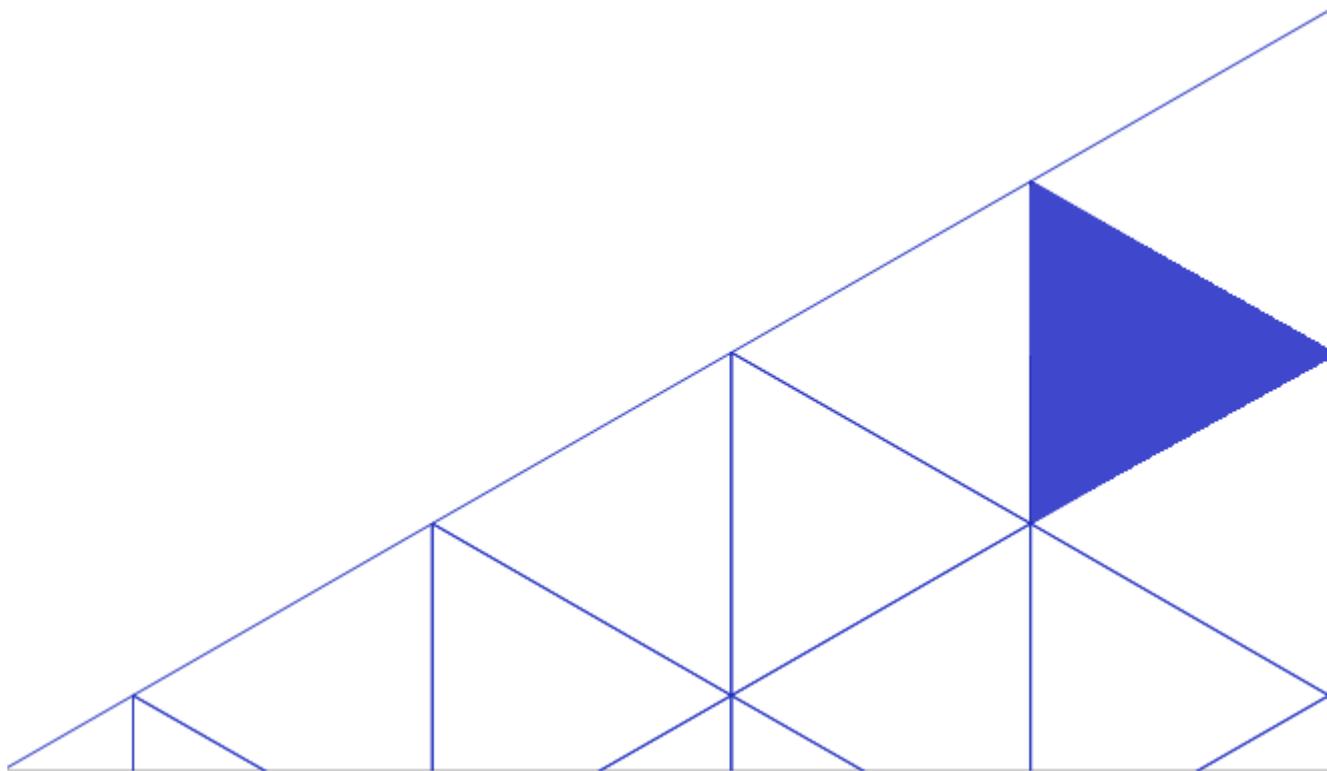




CYPRUS

# ► Third Report to the Health Insurance Organization

**Actuarial valuation of the General  
Healthcare System as of 31 December 2022,  
covering the period 2023–2032**





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## ► Foreword

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The present report has been prepared in the framework of the Trust-in-Fund project between the Health Insurance Organization (HIO) and the International Labour Organization, entitled “Technical collaboration with the HIO for the development of a health actuarial model, the actuarial valuations of the General Healthcare System (GHS) and capacity building of HIO staff on actuarial valuation studies” (CYP/18/01/CYP).

The project aims at conducting actuarial valuation studies for assessing the financial sustainability of the Healthcare Insurance Fund (GHS Fund), using the ILO modelling approach designed for health insurance schemes, which is built on the principles of social security that underlie the ILO Conventions. The project also focuses on building up national capacities within the HIO in the field of social security financial, actuarial and statistical studies.

This report, which has been carried out as of 31 December 2022 in compliance with relevant international actuarial standards, presents the financial results of the third actuarial valuation of the GHS since its inception in June 2019, covering the period from 2023 to 2032.

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The ILO extends its gratitude to the executive directors of the HIO for their fruitful collaboration and contribution throughout the project.



## ► Executive summary

This report presents the results of the actuarial valuation of the GHS of the Republic of Cyprus as of 31 December 2022.

Projections have been made over a period of ten years, that is until 31 December 2032, as GHS provides short-term benefits highly influenced by the expansion of healthcare services and continuing advances in medical technology. The projection period is in line with actuarial practice for this kind of scheme.

The historical data provided by HIO for the GHS income and expenditure projection have been sufficient and reliable. Nonetheless, the present actuarial valuation holds a high degree of uncertainty due to relatively insufficient historical series of GHS expenditure data to set relatively stable actuarial assumptions in many aspects. Subsequent actuarial valuations are expected for continuous monitoring of the financial evolution of the GHS and to hold a higher degree of certainty as they will gradually be based on longer series of historical data.

### Base scenario

Financial projections as shown in table ES.1, indicates that the GHS Fund is financially sustainable over the period 2023–2032 under the current GHS provisions, including the legislated schedule of contribution rates. The above projections assume no policy change in terms of adding new GHS healthcare services other than those which had been anticipated to be introduced at the time of writing this report. Therefore, considering the reserve,<sup>1</sup> contribution rates are assessed to be appropriate to sustain the scheme financially in the short term and medium term and thus ensuring the maintenance of a constantly positive reserve.

► **Table ES.1. Projected financial situation of GHS, 2023–2032 (in million of Euros)**

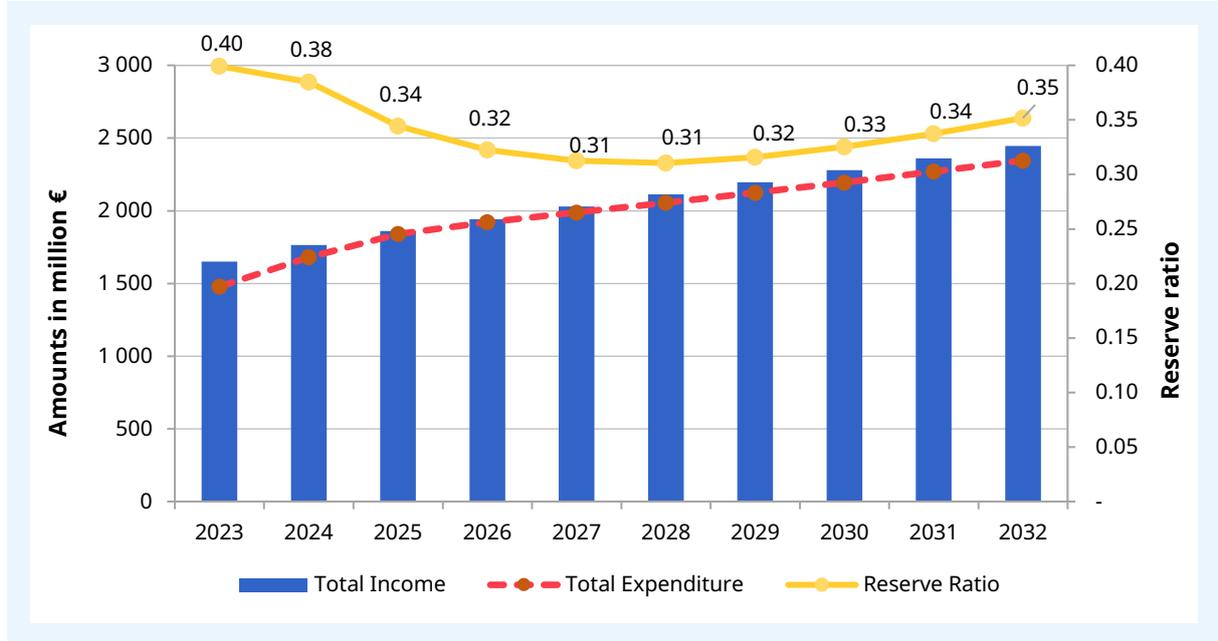
Year	2023 <sup>1</sup>	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Reserve (start of year)</b>	<b>436</b>	<b>591</b>	<b>647</b>	<b>634</b>	<b>620</b>	<b>622</b>	<b>639</b>	<b>671</b>	<b>715</b>	<b>766</b>
Total GHS income	1 651	1 764	1 861	1 942	2 030	2 112	2 196	2 280	2 361	2 445
Total GHS benefits expenditure	1 479	1 681	1 840	1 922	1 989	2 056	2 124	2 195	2 270	2 345
Total other income	6	16	12	12	9	9	9	9	10	11
Total administrative expenses	23	43	46	46	48	48	49	50	50	52
<b>Surplus/Deficit</b>	<b>155</b>	<b>56</b>	<b>-13</b>	<b>-14</b>	<b>2</b>	<b>17</b>	<b>32</b>	<b>44</b>	<b>51</b>	<b>59</b>
<b>Reserve (end of year)</b>	<b>591</b>	<b>647</b>	<b>634</b>	<b>620</b>	<b>622</b>	<b>639</b>	<b>671</b>	<b>715</b>	<b>766</b>	<b>825</b>
Reserve ratio <sup>2</sup>	0.40	0.38	0.34	0.32	0.31	0.31	0.32	0.33	0.34	0.35
<b>Administrative expense ratio<sup>3</sup> (%)</b>	<b>1.4</b>	<b>2.4</b>	<b>2.5</b>	<b>2.4</b>	<b>2.3</b>	<b>2.3</b>	<b>2.2</b>	<b>2.2</b>	<b>2.1</b>	<b>2.1</b>
<b>Total GHS benefits expenditure/ Nominal GDP (%)</b>	<b>4.7</b>	<b>5.0</b>	<b>5.2</b>	<b>5.2</b>	<b>5.1</b>	<b>5.0</b>	<b>5.0</b>	<b>4.9</b>	<b>4.9</b>	<b>4.9</b>

<sup>1</sup> The estimated financial figures for 2023 are derived from actual experience data. <sup>2</sup> Reserve ratio refers to the level of reserve at the end of one year to the level of GHS expenditure for the same year. For example, a reserve ratio of 8.3% (one twelfth) indicates that the level of reserve covers one month's expenditure. <sup>3</sup> Administrative expense ratio refers to the ratio of the level of administrative expenses in any year to the total GHS income amount of the same year.

<sup>1</sup> For the purposes of the present report, reserve refers to the GHS Fund accumulated surplus.

Figure ES.1 shows graphically the evolution of total income, total expenditure and reserve ratio of the GHS for 2023–2032.

► **Figure ES.1. Total income, total expenditure and reserve ratio of the GHS, 2023–2032 (in million of Euros)**



It follows from table ES.1 and figure ES.1 that the projected reserve ratio remains positive throughout the projection period indicating the sufficiency of the annual GHS income and the level of reserve to cover the annual GHS expenditure. Nevertheless, over the period 2024–2028, there is a downward trend in the reserve ratio, while for the years 2025 and 2026 total GHS annual income alone is not sufficient to meet the GHS annual expenditure. From 2029 onwards, the reserve ratio starts to increase since the total GHS annual income alone is sufficient to meet the GHS annual expenditure, primarily due to relative favourable economic conditions. By 2032, the reserve ratio becomes sufficient to cover four months' expenditure.

## Sensitivity scenarios and tests

Since all projections have a degree of uncertainty, a variety of sensitivity scenarios and tests were carried out in order to measure the sensitivity of the projected financial position of the GHS Fund to future changes in the demographic and economic environments.

Two sensitivity scenarios were performed on the results of the actuarial valuation to examine their sensitivity to changes in the following set of assumptions or measures:

- economic adverse scenario, resulting to lower net migration, lower GDP growth rates, lower nominal wage increases, lower employment growth rates and lower labour-force participation rates from 2025 onwards, when compared to base scenario; and
- introduction of new healthcare services, which are not currently covered by the GHS legislation.

In addition, individual sensitivity tests were performed on the results of the actuarial valuation to assess their sensitivity to changes, either more or less favourable for the GHS, in the following five key GHS variables which are subject to a relatively high degree of uncertainty:

- cost resulting from the introduction of new/innovative drugs;
- medical inflation: progressive growth to a higher or a lower level by 0.5 per cent over the projection period;
- Z items price: increase or decrease of  $\pm 5$  per cent;
- increases or decreases in utilization rates; and
- increases or decreases of inpatient utilization rates.

The above sensitivity scenarios and tests show that, even though the projected financial status of the GHS Fund is sensitive to the above measures and assumptions, the reserve remains constantly positive over the next decade, until 2032, securing the viability of the GHS Fund. Nevertheless, certain sensitivity scenarios and tests have greater financial impact than others, resulting to, by the end of 2032:

- Higher reserve covering more than five months' expenditure – namely the sensitivity test of introducing new pharmaceuticals - lower expenditure, the assumption of favourable medical inflation progressively reaching a lower-than-expected figure by 0.5 percentage points, the assumption of decreases in utilization rates and the assumption of decreases in the inpatient utilization rates.
- Lower reserve reaching a level slightly above two-and-a-half months' expenditure – namely the scenario for introduction of new services which are not currently covered by the GHS legislation and the assumption of increases in the inpatient utilization rates.
- Lower reserve covering slightly lower than two months' expenditure (one-and-a-half month's expenditure) – namely the economic adverse scenario and the assumption of increases in utilization rates.

Given the high degree of uncertainty associated with the projected financial results of the present actuarial valuation, as illustrated by sensitivity analyses, it is vital that the financial position of the GHS Fund is monitored closely and on a regular basis, so that, where necessary, corrective measures are taken in a timely manner.



## ► Abbreviations and acronyms

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<b>BE</b>	benefits expenditure
<b>CI</b>	contribution income
<b>CR</b>	contribution rate
<b>CPI</b>	consumer price index
<b>DRG</b>	Diagnosis Related Group
<b>GDP</b>	gross domestic product
<b>GEPS</b>	Government Employees Pension Scheme
<b>GHS</b>	General Healthcare System
<b>GSIS</b>	General Social Insurance Scheme
<b>HIO</b>	Health Insurance Organization
<b>FFS</b>	Fee for Service
<b>IAA</b>	International Actuarial Association
<b>ILO</b>	International Labour Office/Organization
<b>ISSA</b>	International Social Security Association
<b>PD</b>	personal doctor
<b>SHSO</b>	organization managing public hospitals
<b>SPS</b>	Social Pension Scheme
<b>GHS Fund</b>	Healthcare Insurance Fund



## ► 1. Introduction

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The present actuarial valuation report of the Cyprus General Healthcare System (GHS) has been carried out in compliance with the provisions of Part II, Article 4(2)(e) of the General Healthcare System Law of 2001 (N.89(I)/2001), which stipulates that the HIO has the authority to conduct actuarial valuations of the GHS on an annual basis. This report presents the financial situation of the GHS as of 31 December 2022 and the financial results of an ILO actuarial assessment for measuring the financial sustainability of the GHS up to 2032. The present actuarial valuation represents the third actuarial valuation of the GHS since its inception in June 2019.

Given the recent implementation of the GHS as of 1 June 2019 and 2020 for Phase I and Phase II respectively, the present actuarial valuation holds a high degree of uncertainty due to the relatively insufficient historical series of data to set relatively stable actuarial assumptions for many aspects. Therefore, a number of sensitivity scenarios and tests are undertaken in Chapter 8 of this report in order to evaluate the sensitivity of results under different evolution paths of key demographic, economic and GHS-specific assumptions. Continuous monitoring of the financial evolution of the GHS is paramount in this context, as well as the reconciliation of results with subsequent actuarial valuations. In particular, reconciliation of results facilitates the evaluation of the soundness and reasonableness of the actuarial assumptions and the necessary adjustments during future valuations.

### 1.1. Objectives of the actuarial valuation

The main objective of the present actuarial valuation is to evaluate the financial situation of the GHS in the short and medium term, within the framework of the principles of social security that underlie the ILO Conventions.

In particular, the present report aims to provide visibility on the financial sustainability of the GHS by reviewing the financial condition of GHS Fund in relation to its obligations arising from the implementation of the General Healthcare System Law of 2001. The main aims are to:

- review the current and projected financial situation of the GHS as of 31 December 2022;
- assess the medium-term financial viability of the GHS until 2032, assuming the legislation remains unchanged, and make recommendations on its financing; and
- assess the sensitivity of the medium-term projected financial position of the GHS to changes in demographic and economic environments, as well as changes in GHS-specific assumptions.

Communication of the results of actuarial valuations is very important to the HIO, enabling it to transmit a faithful picture of the financial position of the GHS and build members' trust, which has a direct impact on the solid financial and social sustainability of the GHS.

Finally, the present actuarial valuation has been undertaken in compliance with relevant international standards of actuarial practice, as promulgated by the International Actuarial Association (IAA) as well as the ISSA-ILO Guidelines on actuarial work for social security, thus aiming towards attaining the highest level of quality and transparency in actuarial practice for social security healthcare. The recommendations formulated therein are also in conformity with the relevant social security standards of the ILO.

## 1.2. Scope of the report

The present report is structured as follows:

- Chapter 2 gives an overview of the provisions of the GHS.
- Chapter 3 describes the methodologies used to project the income and expenditure of the GHS as well as relevant financial sustainability indicators.
- Chapter 4 presents the demographic, economic and labour market framework of the actuarial valuation.
- Chapter 5 shows the past experience of the GHS and the assumptions made for the future based on that observed past experience.
- Chapter 6 presents the GHS projection results under the base scenario.
- Chapter 7 presents the reconciliation of the results with those presented in the previous actuarial valuation.
- Chapter 8 presents sensitivity scenarios and tests, which assess the sensitivity of base scenario projection results to future changes in the demographic and economic environments, as well as changes in GHS-specific assumptions.
- Chapter 9 presents the conclusions and recommendations.
- Chapter 10 presents the actuarial opinion of the present valuation.

## ► 2. Description of the General Healthcare System provisions

This chapter gives an overview of the GHS provisions. A more complete description is provided in Annex 1.

### 2.1. Covered population

The GHS covers the following categories of beneficiaries:

- Citizens of the Republic of Cyprus who have their ordinary residence in the areas controlled by the Government of the Republic of Cyprus.
- European Union citizens who have their ordinary residence and either work or have acquired the right of permanent residence in the Republic of Cyprus.
- Third-country citizens who have their ordinary residence in the Republic of Cyprus and have acquired legally either the right of permanent residence or the right to equal treatment in the sectors of social insurance, according to the provisions of the Cyprus National Law.
- Other categories (such as refugees) under certain conditions.
- Persons who are family members of the first two points or persons who are family members of the third point and who have also acquired legally the right of permanent residence.

Family members are the spouse of the beneficiary and the children under the age of 21, or over the age of 21 who are dependent on them or their spouse, as determined by Regulations.

### 2.2. Healthcare services under GHS

All beneficiaries have access to the same healthcare services covered by the GHS. The healthcare services covered are described in table 2.1.

► **Table 2.1. Healthcare services covered by GHS by implementation date**

Date implemented	Healthcare service
1 June 2019	Personal doctors for adults and children
	Specialist doctors for outpatient care
	Pharmacies and pharmaceuticals for outpatient care
	Laboratories for outpatient care
1 June 2020	Inpatient care
1 September 2020	Accident & emergency care and ambulance services
1 December 2020	Dentists for preventive dental care
	Nurses and allied health professionals: physiotherapists, clinical psychologists, clinical dietitians, speech therapists, occupational therapists for outpatient care
1 October 2021	Midwives
1 January 2022	Palliative care
1 January 2023	Institutional rehabilitation services
1 November 2023	Allied health professionals: podologists for outpatient care

## 2.3. Financing approach

For the implementation of the GHS, a GHS Fund has been established for the purpose of gathering the relevant contributions, and from which all payments to providers of healthcare services are made. The GHS Fund is administered by the Health Insurance Organization (HIO).

The HIO sets an individual global budget for each segment of healthcare following consultations with the respective representatives of the healthcare providers. The total global budget corresponds to the annual expenditure for healthcare services covered by the GHS. In any given financial year, the actual expenditure for any segment of healthcare within the framework of the GHS cannot exceed the predetermined global budget, irrespective of the volume of services provided. This practice aims at containing the cost and ensuring the sustainability of the scheme. The annual global budget of each healthcare segment is allocated to the 12 months of the calendar year.

## 2.4. Source of funding

The GHS Fund revenues come from contributions, co-payments, personal contributions (contribution I)<sup>2</sup>, donations and legacies, investment income from assets of the HIO and any other income accrued from the activities of the HIO. The main GHS source of financing is contributions.

## 2.5. Reimbursement methods

The HIO reimburses providers through various reimbursement methods; these are:

- 1. Price list (fixed fee):** Reimbursement is calculated based on the list price of each item for the specific date.
- 2. Point system:** Reimbursement is calculated based on the number of points of each activity in a group, the total claimed number of points per group and the group budget of each month. Point values are calculated monthly, based on the monthly budget and the total number of points for the specific month. The HIO can define minimum or maximum amounts for point values. Claims reimbursements are based on the calculated point value of the specific group.
- 3. Capitation reimbursement:** Reimbursement is not claim-based. It concerns the personal doctors and the services they offer to beneficiaries registered in their list. It is calculated based on the number of days each beneficiary is registered to a personal doctor list according to a daily rate corresponding to the age group of the beneficiary.
- 4. Performance reimbursement:** Implemented in 2022 and aiming at improving quality of services. The reimbursement amount for each provider is calculated based on various key performance indicators (KPIs).
- 5. Inpatient diagnosis related group (DRG) point system reimbursement:** Inpatient services are reimbursed per case based on a DRG reimbursement method. The DRG cases are separated into normal, specialised and births. The Standard Base Rates (point value) which apply for each hospital for normal and specialised cases, are determined based on the score of each hospital on specific qualitative criteria. The Standard Base Rates for specialised cases are higher than the Standard Base Rates for normal cases. The Base Rate for all birth cases is fixed and it is the same for all hospitals. A pre-agreed number of points is defined

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<sup>2</sup> Personal Contribution I will be paid in case a beneficiary goes directly to an outpatient specialist without a referral. Some exemptions are applied, as per section A1.5.2 of Annex 1.

for each hospital for normal and for specialised cases, up to which no discount factors apply on each hospital's respective Standard Base Rates. In case a hospital exceeds its pre-agreed number of points, discount factors apply in order not to exceed the global budget.

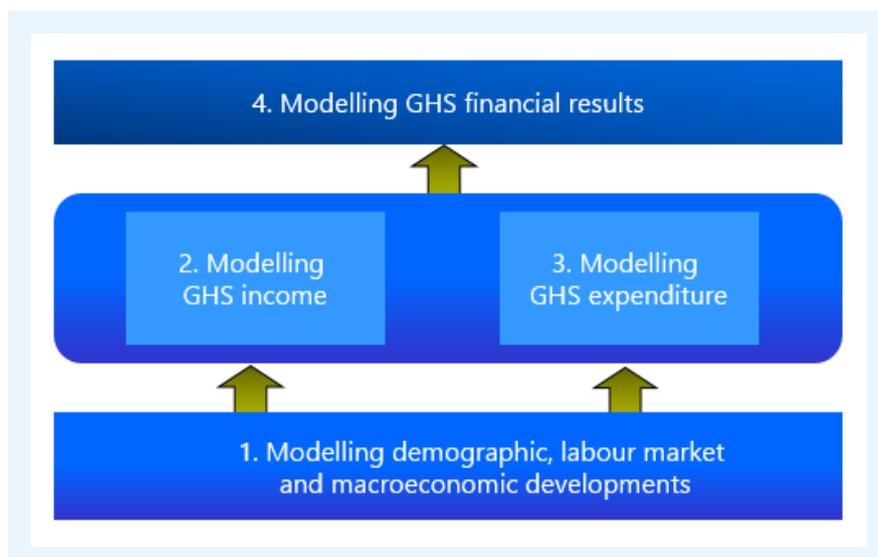
6. **Fixed annual amount:** A&E Department for public hospitals and ambulances of public hospitals.

## ► 3. Projection methodologies

The present actuarial valuation of the GHS involves cash-flow projections of its revenue and expenditures over a medium term, until 2032, so as to be able to estimate changes in the reserve. These changes vary from one year to the next as a function of the difference between the GHS revenue and expenditures. The actuarial projections in this report are based on: (i) the current legal provisions and governance of the GHS, such as eligible beneficiary population, healthcare services covered, financing approach and reimbursement methods; (ii) data regarding the starting point for the projections including data on the GHS contributors and registered beneficiaries; (iii) actual past experience and trends in the GHS contributory income and expenditure of each GHS healthcare service; and (iv) assumptions regarding future demographic and economic experience, as well as scheme-specific assumptions such as utilization rates and unit costs.

Figure 3.1 shows graphically the methodological modelling framework used in this actuarial valuation. Details of that modelling framework are provided in Annex 2.

► **Figure 3.1. Actuarial methodological modelling framework**



It follows from figure 3.1 that the actuarial methodological modelling framework has the following four components:

1. The demographic, labour market and macroeconomic component that provides a projection of the population, labour force, employment levels and macroeconomic data that are needed as input for the modelling of the GHS expenditure and revenues.
2. The GHS income component that calculates GHS contribution income, other GHS income and other items treated as GHS income as described in section 3.1. GHS contribution income is calculated by projecting the assessment base for contributions, resulting from working income of the employed population and pension income of the pensioner population, using the economic and demographic data supplied by the above component together with scheme-specific assumptions, including the coverage of the contributing employed population.
3. The GHS expenditure component that projects expenditure in various GHS healthcare services, on the basis of the projection of the eligible beneficiary population and scheme-

specific assumptions of future utilization and cost developments, as well as GHS administrative expenditure.

4. The GHS financial results component that calculates the annual balance of GHS income and expenditure and produces the indicators used for assessing the GHS financial sustainability, as well as determining the adequacy of current contribution rates.

### 3.1. Methodology for modelling GHS income

The revenue of the GHS includes contribution income, other income and other items treated as income. The GHS contribution income, which represents the largest share of GHS income, results from working income of the employed population and pension income of the pensioner population. In particular, it is based on the following sources of income:

- Earnings of employees: salaried and self-employed persons. Employed and self-employed persons are the General Social Insurance Scheme (GSIS) contributors.
- GSIS pensions.
- Other pensions, such as Government Employees Pension Scheme (GEPS) and Social Pension Scheme (SPS).

Other GHS income includes revenues from rental income, interest on cash deposits, dividends of shares, other investment income sources, other taxable income related to GHS as well as EU pensioners' and tourists' medical expenses, all of which are of lesser financial importance.

Other items treated as GHS income include co-payments, personal contribution I (see Annex 1) and discounts/clawbacks from pharmaceutical companies.

For each year in the projection period 2023–2032, the GHS contribution income (CI) for each source of contributory income is projected by multiplying the legislated contribution rate (CR) by the size of the contributing population and its corresponding assessment base for the payment of contributions. The assessment base is the total amount of income subject to contributions.

$$CI_t = CR_t * \text{Contributing Population}_t * \text{Assessment Base}_t$$

The total GHS contribution income (CI) of all sources of income is the summation of each income source's CI.

The legislated contribution rate (CR) of each source of income is presented in table 3.1.

► **Table 3.1. Legislated contribution rates (percentages)**

Source of Income	Contributor			Total
	Individual	Employer	State	
<b>Employed</b>				
Salaried employees	2.65	2.90	4.70	<b>10.25</b>
Self-employed	4.00	-	4.70	<b>8.70</b>
<b>Pensioners</b>				
GSIS, GEPS, other	2.65	-	4.70	<b>7.35</b>
<b>Other income</b>				
Rent, interest, dividends, other	2.65	-	-	<b>2.65</b>

The contributing population consists of the employed population, salaried and self-employed persons, as well as the pensioner population.

The assessment base represents the total amount of earnings of employed persons and the total amount of pension income of the pensioner population, which are subject to contribution payments.

Figure 3.2 presents the methodological modelling approach used for calculating the GHS contribution income, resulting from GSIS insurable earnings of employed persons and GSIS pension income of the pensioner population, using the ILO actuarial pension model, which is currently used for actuarial valuation purposes of the GSIS.

► **Figure 3.2. Methodology: GHS contribution income from GSIS income sources**

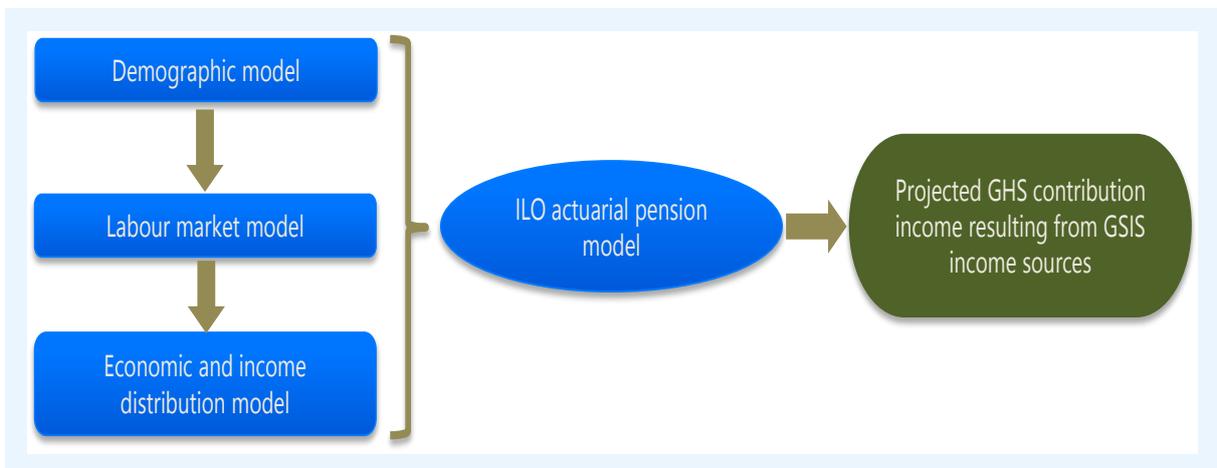
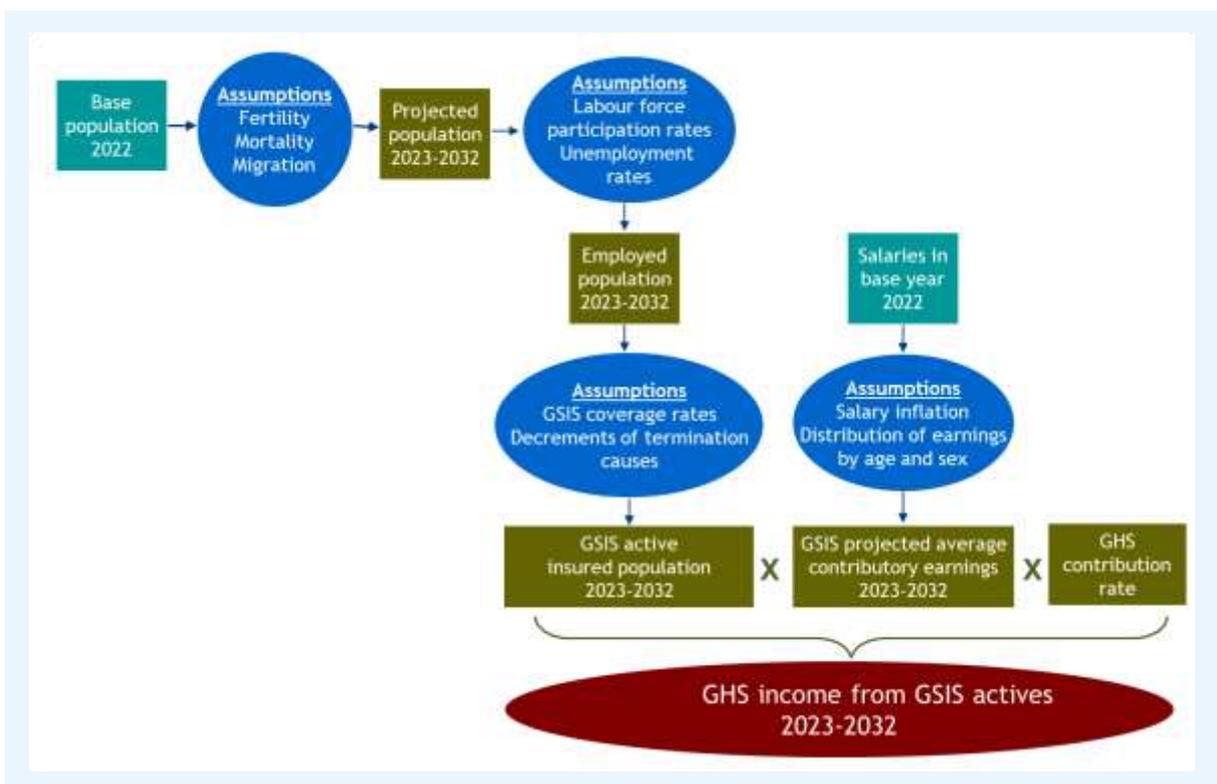


Figure 3.3 presents the methodology used for calculating the GHS income from the GSIS active insured population, while figure 3.4 presents the methodology used for calculating the GHS income from the GSIS pensioner population.

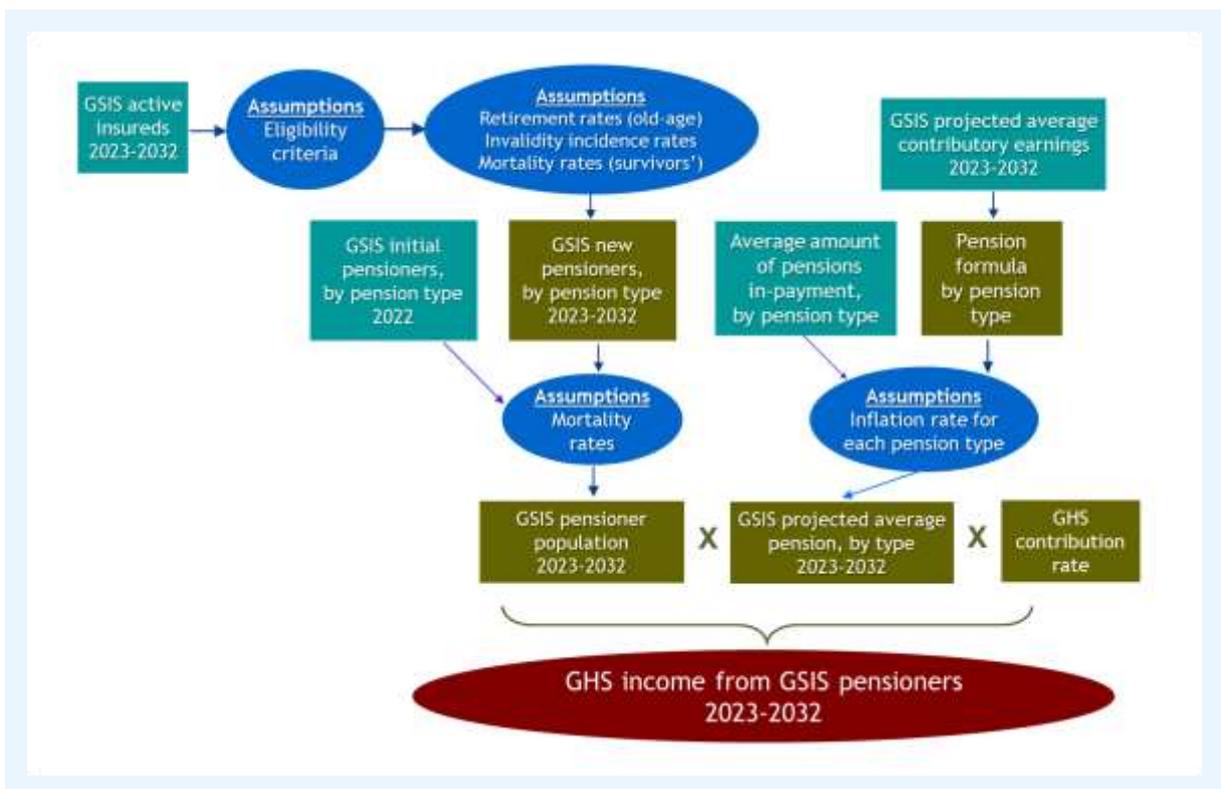
► **Figure 3.3. Methodology regarding GHS income from GSIS contributing population**



As shown in figure 3.3, the demographic projections of the active insured population are derived from the following:

- The total population is projected starting with the actual population by age and sex, and projecting that population over the next decade using appropriate assumptions concerning fertility, mortality and migration.
- Labour force participation rates are applied to the total population to obtain the labour force, distributed by age and sex.
- The labour force is then separated into employed and unemployed persons.
- Finally, GHS active contributors, which in essence are the GSIS active contributors, are projected by using appropriate assumptions about the rate of coverage of the employed population under the GSIS and annual decrements of termination causes under the cohort method.

► **Figure 3.4. Methodology regarding GHS income from the GSIS pensioner population**



As illustrated in figure 3.4, in order to determine the projected number of GSIS pensioners, by type of pension, the following income development process is applied:

- Starting with the number of active insured persons and using past service records, it is determined whether these persons are eligible for the various types of pensions.
- Once this potential population of beneficiaries is established, a probability of occurrence of the risk involved (type of benefit) is applied to the eligible population in order to determine the number of new pensioners that will emerge each year.

The probability of occurrence of the benefit varies according to the benefit involved. It may be:

- retirement rates for determining statutory pensions;
- invalidity incidence rate for determining invalidity pensions; and
- mortality rates for determining survivors' pensions.

These new GSIS pensioners are then projected into the future using survival rates.

The GHS income resulting from pension income other than the GSIS is projected by multiplying the projected total pension amount for each source, such as the GEPS and SPS, by the relevant contribution rate, using pension models other than ILO models.

The GHS income resulting from other income is projected by multiplying the projected income from each of the above sources by the corresponding legislated contribution rate.

The GHS investment income is projected by multiplying each year the GHS Fund accumulated surplus by the corresponding year's interest rate.

Finally, the GHS income resulting from other items treated as income for co-payments and contribution I is projected by multiplying the projected utilization with the corresponding co-payment and contribution I amounts. Discounts and clawbacks from pharmaceutical companies are projected based on the development of expenditure on pharmaceuticals.

### 3.2. Methodology for modelling the GHS expenditure

The expenditure of the GHS consists of the benefit expenditure and administrative costs. The benefit expenditure represents the largest share of GHS expenditure, while administration cost is only tiny fraction of total GHS expenditure.

The projection of future benefit expenditure implies the estimation of the covered beneficiary population, which is different from the contributing population. The covered beneficiary population includes all persons who are entitled to benefits, who according to the GHS legislation also includes people who do not contribute, such as covered dependants and other inactive people such as the unemployed.

For each year in the projection period 2023–2032, the benefits expenditure (BE) for each healthcare service is projected by multiplying the covered beneficiary population (CovPop), i.e., the number of potential beneficiaries, by a utilization rate and the average unit cost.

$$BE_t = CovPop_t * Utilization\ rate_t * Average\ Unit\ Cost_t$$

The total benefit expenditure of all GHS healthcare services is the summation of each healthcare service BE.

*Utilization rate<sub>t</sub>* is the number of invoices per capita (1 in case of capitation reimbursement).

*Average Unit Cost<sub>t</sub>* is the average cost weight (average number of points) multiplied by the average point value.

Administrative expenditure consists of staff costs and non-staff costs and is projected using factors which reflect wages and prices respectively.

### 3.2.1. GHS healthcare services modelled

Following is a list of GHS healthcare services modelled using the ILO/Health modelling framework:

- Personal doctors for adults and children;
- Specialist doctors for outpatient care;
- Dentists, nurses, midwives and allied health professionals for outpatient care;
- Inpatient care;
- Pharmacies and pharmaceuticals for outpatient care;
- Laboratories for outpatient care;
- Accident & emergency care and ambulance services; and
- Palliative care and rehabilitation services.

### 3.2.2. Principles of modelling methodology

There is a high degree of uncertainty when projecting GHS utilization rates and unit costs, and ultimately healthcare benefit expenditure, due to the interaction of demand-side factors such as morbidity and national income, and supply-side factors such as human resource and infrastructure inputs, as well as the institutional features of GHS which include global budget, gatekeeping, reimbursement methods and financing. In addition, exogenous factors such as behaviour, technological advances, socio-economic developments and climate change, which are also determinants of healthcare benefit expenditure, are most often unpredictable, and thus increase further the level of uncertainty in modelling healthcare benefit expenditure.

In view of the above uncertainties, projections of healthcare expenditure are made for a medium-term projection period. In particular, for the purposes of this GHS actuarial valuation, a projection period of 10 years (2023–2032) is selected.

Furthermore, in order to achieve a valid assessment of the future financial development of the GHS, in addition to the base scenario projections, a number of alternative sensitivity scenarios and tests were undertaken (see Chapter 8). These scenarios and tests were chosen in order to reflect the uncertainty of assumptions regarding key parameters that describe the GHS utilization and cost of healthcare services, as well as to better understand the interactions between the various factors affecting healthcare expenditure, as mentioned above (demand-side factors, supply-side factors, institutional features of GHS and exogenous factors).

## 3.3. Indicators to assess financial sustainability

In order to examine the financial sustainability of the GHS, two financial indicators are considered and estimated in this actuarial valuation. They are:

- the reserve amount at each year end; and
- the reserve ratio: the ratio of the level of reserve at the end of one year to the level of expenditures for the same year.

Minimum target levels of reserve ratio, based on benchmarking data from other jurisdictions, are typically set at least two months (16.7 per cent) of annual healthcare expenditure for mature, well-established social security healthcare programmes. The GHS is at its early stages of maturity and over the next few years, new services are expected to be introduced and new providers are expected to be affiliated with the GHS. Therefore, it is reasonable and appropriate, during the early years of GHS, to maintain a reserve ratio of more than two months of annual healthcare expenditure (16.7 per cent). Such a higher level in the short-term is necessary, primarily to cover

potential annual deficits which are anticipated to incur from the above introduction of new services/ providers.

Furthermore, given the high degree of uncertainty associated with the projected financial results of the present actuarial valuation, as illustrated by sensitivity analyses (see Chapter 8), in the context of sound financial governance of the GHS, HIO should aim to maintain an adequate reserve ratio throughout the projection period 2023–2032, taking into account:

- the HIO Board of Directors' desired level of reserve, necessary to safeguard the GHS against potential future financial risks; and
- the ability of the level of reserve, at that time, to provide sufficient "buffer" to face events of sudden adverse economic and morbidity developments that could disrupt the financial sustainability of the GHS Fund.

## ► 4. Demographic, economic and labour market framework

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The actuarial valuation of the GHS must be positioned in the specific demographic and economic context of Cyprus. This requires making assumptions on the demographic and economic environment as well as a certain number of scheme-specific assumptions. This chapter presents the main demographic and economic assumptions made for the purpose of conducting the present actuarial valuation. Chapter 5 and Annex 3 presents the scheme-specific assumptions used in this valuation.

It should be noted that the demographic and economic framework used as a basis for the present actuarial valuation concern both the GHS income and expenditure and are limited to the government-controlled area of Cyprus, as the GHS covers almost exclusively persons in that area.

Since the main aim of this valuation is to review the GHS financial position until 2032, the assumptions should reflect a medium-term perspective. The assumptions take into account historical trends, the present economic environment and GHS situation as well as likely future trends.

The determination of demographic and economic assumptions relied on historical demographic and labour market data mainly obtained from the Cyprus Statistical Service and macroeconomic data mainly obtained from the Ministry of Finance of Cyprus. The opinions and forecasts of international organizations, such as the European Commission with regards to economic assumptions and Eurostat with regards to demographic assumptions were also taken into account.

These assumptions reflect the Actuary's best estimates of demographic and economic changes. They were chosen to be, independently and in aggregate, reasonable and appropriate, taking into account certain interrelationships between them.

Although assumptions are determined in a reasonable manner, there will be differences between the future reality and assumptions made. These differences may have a positive or negative impact on the financial position of the GHS, compared with the results of this actuarial valuation. Nevertheless, they will be analysed and taken into account in subsequent actuarial valuations.

### 4.1. Demographic framework

A projection of the general population of the country is the basis for determining the number of contributors and beneficiaries. The projection begins with the latest available statistical data on population estimated by the Statistical Service of Cyprus as at 31 December 2021 in the context of the 2021 population census, to which the assumptions on the future development of fertility, mortality and migration are applied. For the year 2022, fertility, mortality and migration rates were derived from aggregate estimates for the number of births, deaths and net migrants, as provided by the Statistical Service of Cyprus, while for the prior years, up to 2021, explicit data on the above variables were available.

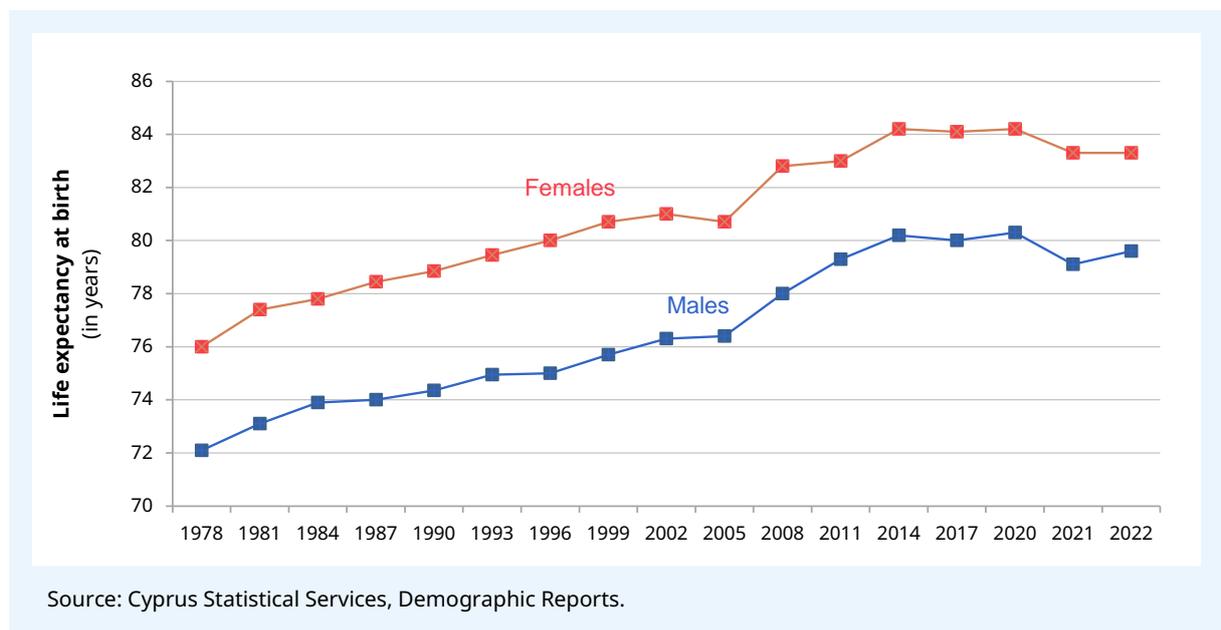
The current population structure strongly influences the results of the projections for the coming years. The age distribution of the starting population shows an increasing ageing of the population in Cyprus, as is the case in many other developed countries.

### 4.1.1. Life expectancy

The first cause of the ageing of the population in Cyprus is the large reduction in age-specific mortality rates. This can be best measured by the increase in life expectancy.

As figure 4.1 indicates, male life expectancy at birth increased by 10.4 per cent between 1978 and 2022, rising from 72.1 to 79.6 years. For females, life expectancy at birth increased from 76.0 to 83.3 years during the same period, representing an increase of 9.6 per cent. The increase in life expectancy has been particularly important over the decade 2005–2014 for both males and females. Since 2015, the life expectancy has been relatively stable.

► **Figure 4.1. Historical life expectancies at birth, 1978–2022**

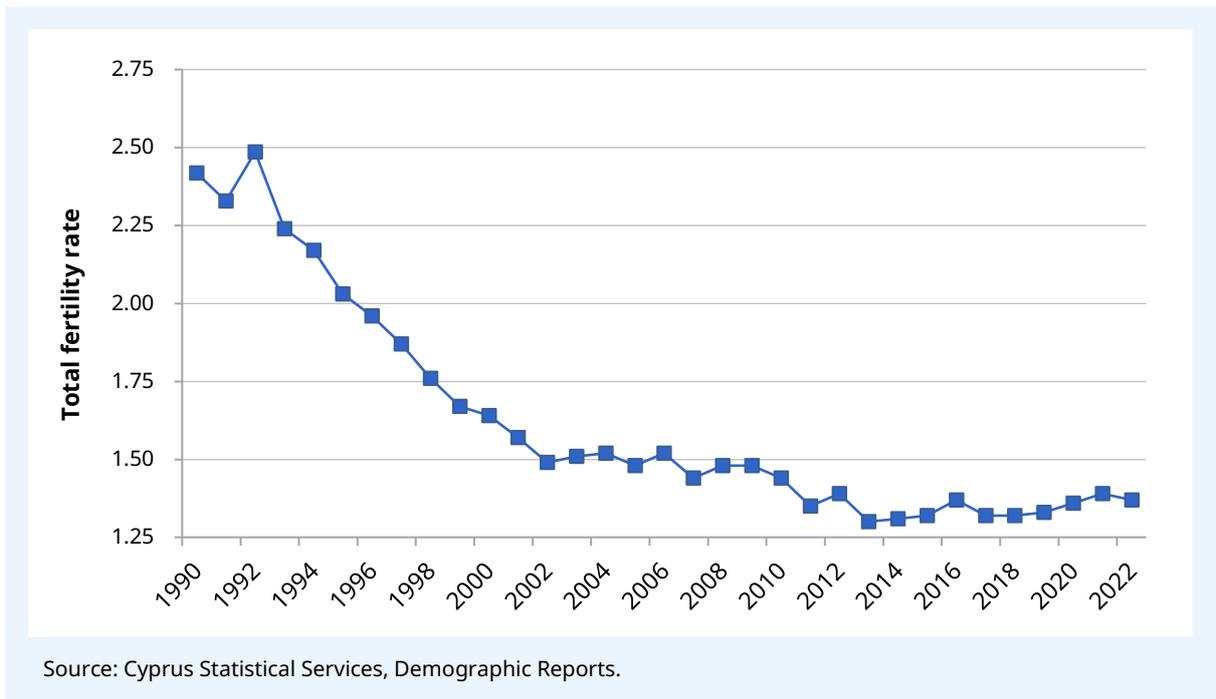


For the present valuation, mortality rates are in line with Eurostat’s mortality rates. For the determination of future mortality rates, it is assumed that mortality improvements continue in the future, but at a slower pace than in the past. In particular, it is assumed that the life expectancies at birth observed in 2022, which were 79.6 for males and 83.3 for females, are gradually increased to 82.0 for males and 85.9 for females in 2032. Finally, the gap between the life expectancy of men and women is expected to slightly increase from 3.7 years in 2022 to 3.9 years in 2032. Sample mortality rates can be found in Annex 3.

### 4.1.2. Fertility rate

The other significant cause of this ageing is the large drop in the birth rates in the 1990s and a continuing low level thereafter. In particular, the total fertility rate in Cyprus has decreased sharply from an average level of 2.5 children per woman in the early 1990s to a level below 1.4 since 2011. In particular, the total fertility rate has been 1.33 on average for the years 2011–2019 while for the years 2020–2022 average fertility rate slightly increased to 1.37. Figure 4.2 shows the historical total fertility rates for the period from 1990 to 2022.

► **Figure 4.2. Historical total fertility rates, 1990–2022**



The overall significant decrease in the total fertility rate in the 1990s occurred primarily as a result of changes in a number of social and economic factors. It is unlikely that fertility rates will return to historical levels in the absence of significant societal changes.

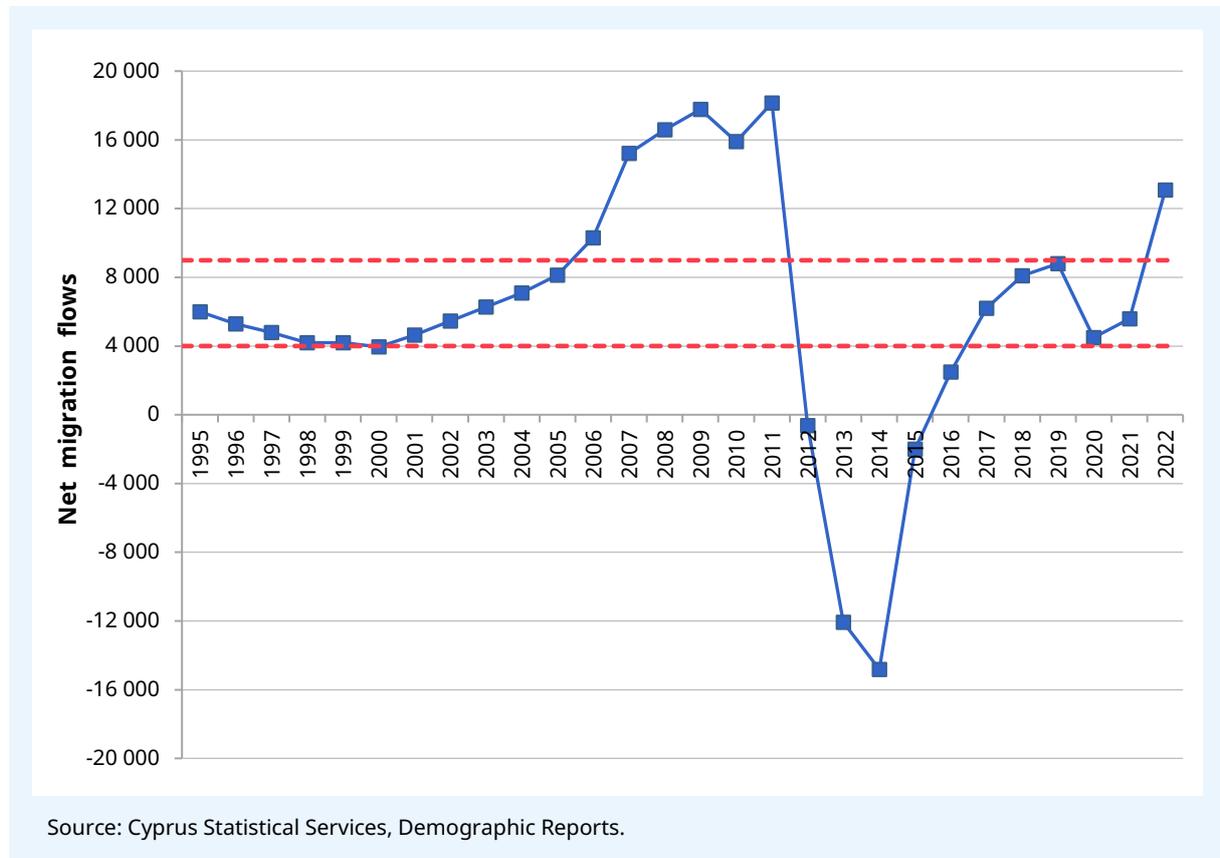
In the present valuation, the total fertility rate is estimated at 1.38 children per woman in 2023, increasing gradually to 1.41 in 2032.

### 4.1.3. Migration

Net migration in Cyprus (i.e., the excess of immigration over emigration) has been positive and relatively stable over the period 1995–2005, fluctuating between 4,000 and 9,000 net migrants per year (see figure 4.3). During the period 2006–2011, the number of net migrants was exceptionally high, reaching 18,142 in 2011. In years 2012–2014, the number of net migrants dropped significantly and became negative, primarily due to labour oversupply in certain sectors of the economy resulting from the economic crisis. In years 2015–2019, net migration experienced a strong increase, reaching 8,797 in 2019. This increase was reversed in 2020, where net migration dropped to 4,493 as a result of the COVID-19 pandemic. In 2021, the net migration increased to 5,591, while in 2022, it experienced a strong increase reaching to 13,094.

Based on the observed values for 2022, it is projected that net migration will remain at high levels up to 2032, with an average of around 9,280 over the period 2023–2032.

► **Figure 4.3. Historical net migration flows, 1995–2022**



#### 4.1.4. Population

According to the above assumptions, the general population of Cyprus is projected to increase from its estimated level of 937,901 persons in 2022 to 1,060,572 in 2032. The starting point of 937,901 persons in 2022 takes into account the preliminary results of the 2021 population census.

Table 4.1 shows how the percentage distribution of population by three age groups (0–14, 15–64 and 65+) is developed throughout the projection period of 2023 to 2032, as well as the old-age dependency ratio, i.e., the ratio of the number of people aged 65 and over to those aged 15–64. This ratio, which provides a demographic measure of population ageing, is projected to increase continuously from 26 per cent in 2023 to 30 per cent in 2032. In other words, in 2032, it is expected that Cyprus will have almost three working-age people for every person aged 65 and over.

► **Table 4.1. Projection of the percentage distribution of population by age groups (0–14, 15–64 and 65+), 2023–2032 (percentages)**

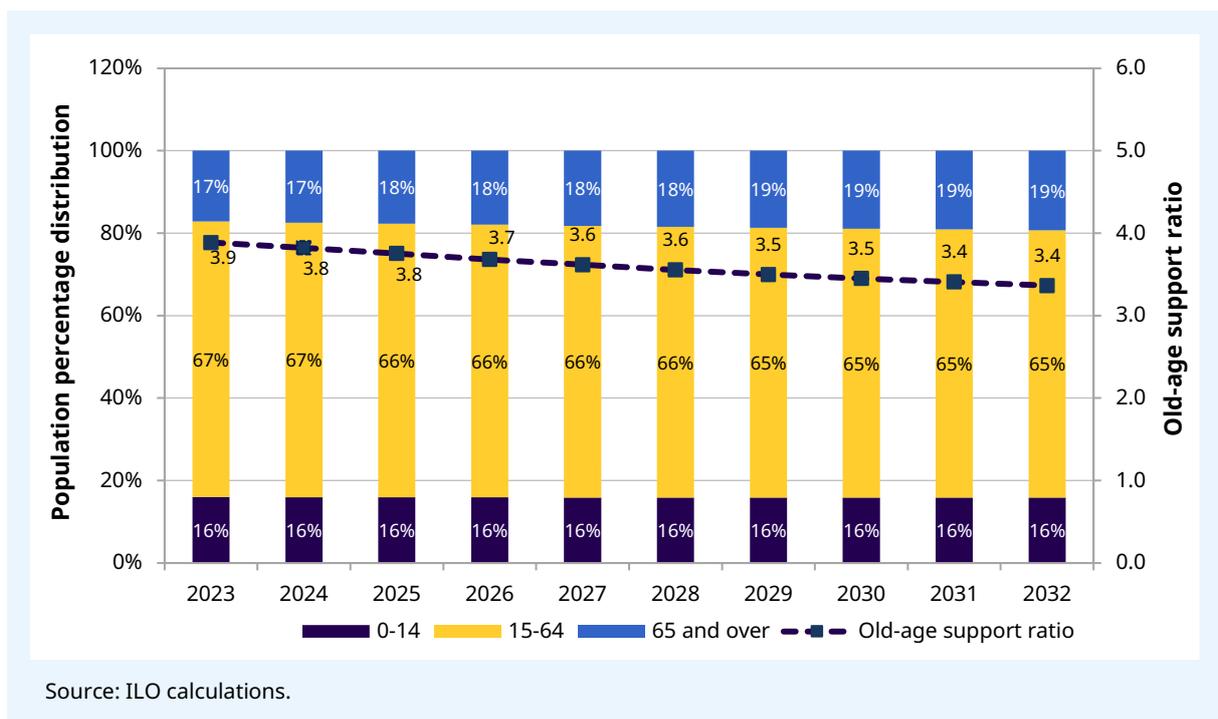
Year	Number of persons by age group				Old-age dependency ratio (%)
	0–14	15–64	65 and over	Total	
2023	16	67	17	100	26
2024	16	67	17	100	26
2025	16	66	18	100	27
2026	16	66	18	100	27
2027	16	66	18	100	28

Year	Number of persons by age group				Old-age dependency ratio (%)
	0–14	15–64	65 and over	Total	
2028	16	66	18	100	28
2029	16	65	19	100	29
2030	16	65	19	100	29
2031	16	65	19	100	29
2032	16	65	19	100	30

Figure 4.4 shows the projected percentage distribution of population by the age groups (0–14, 15–64 and 65+) and the old-age support ratio, which measures how many people there are of working age 15–64 relative to the number of working age 65 and over.

A decrease in the old-age support ratio directly affects the utilization rates as an increase in the aged population puts pressure for an increase in the number of claims.

► **Figure 4.4. Projected population percentage distribution and old-age support ratio, 2023–2032**



## 4.2. Economic and Labour market framework

The general economic developments and the evolution of the labour market directly influence the financial development of the GHS, affecting both GHS income and expenditure. The evolution of the gross domestic product, its primary factor income distribution, labour productivity, employment and unemployment, wages, inflation and interest rates have direct and indirect impacts on the projected revenue and expenditure of the GHS.

### 4.2.1. Economic growth

During the 1980s, the Cyprus economy grew at an average annual (real) rate of 6.3 per cent, while during the 1990s it grew at a much lower rate of 4.1 per cent. Over the period 2001–2008, real

GDP grew at an average rate of 4.2 per cent, whereas over the period 2009–2014, the economy contracted at an average rate of 1.9 per cent. Over the 5-year period 2015–2019, real GDP grew significantly at an average rate of 5.6 per cent while for 2020 economy contracted with a rate of 3.2 per cent as a result of COVID-19 pandemic. Finally, over 2021 and 2022, economy (real GDP) expanded significantly at a rate of 11.4 per cent and 7.4 per cent respectively.

The real GDP growth is expected to gradually decrease from 7.4 per cent in 2022 to 3.0 per cent in 2027, averaging to 3.0 per cent over the 5-year period 2023–2027. Thereafter, it is expected to continue decreasing from 2.7 per cent in 2028 to 2.0 per cent in 2031, averaging to 2.3 per cent over the period 2028–2031. In 2032, we expect GDP real growth rate to remain stable at a level of 2.0 per cent.

As shown in table 4.2, during the whole projection period the driving forces behind economic growth will equally be an increase of labour productivity and an additional employment.

► **Table 4.2. Annual growth of GDP, productivity and employment, 2023–2032**  
(percentages)

Year	Annual real GDP growth	Annual increase of productivity per worker	Annual employment growth (ages 15–74)
2023	2.6	1.1	1.5
2024	3.5	1.9	1.6
2025	3.1	2.0	1.1
2026	3.0	2.0	1.0
2027	3.0	2.0	1.0
2028	2.7	1.8	0.9
2029	2.3	1.4	0.9
2030	2.1	1.2	0.9
2031	2.0	1.1	0.9
2032	2.0	1.2	0.8

Source: Author's calculation. Year 2023 is based on National accounts data. Years 2024–2027 are based on Ministry of Finance's forecast.

#### 4.2.2. Labour force, employment and unemployment

In the long run, labour supply is basically determined by the development of the population and its structure, and by changes in the labour market behaviour of private households.

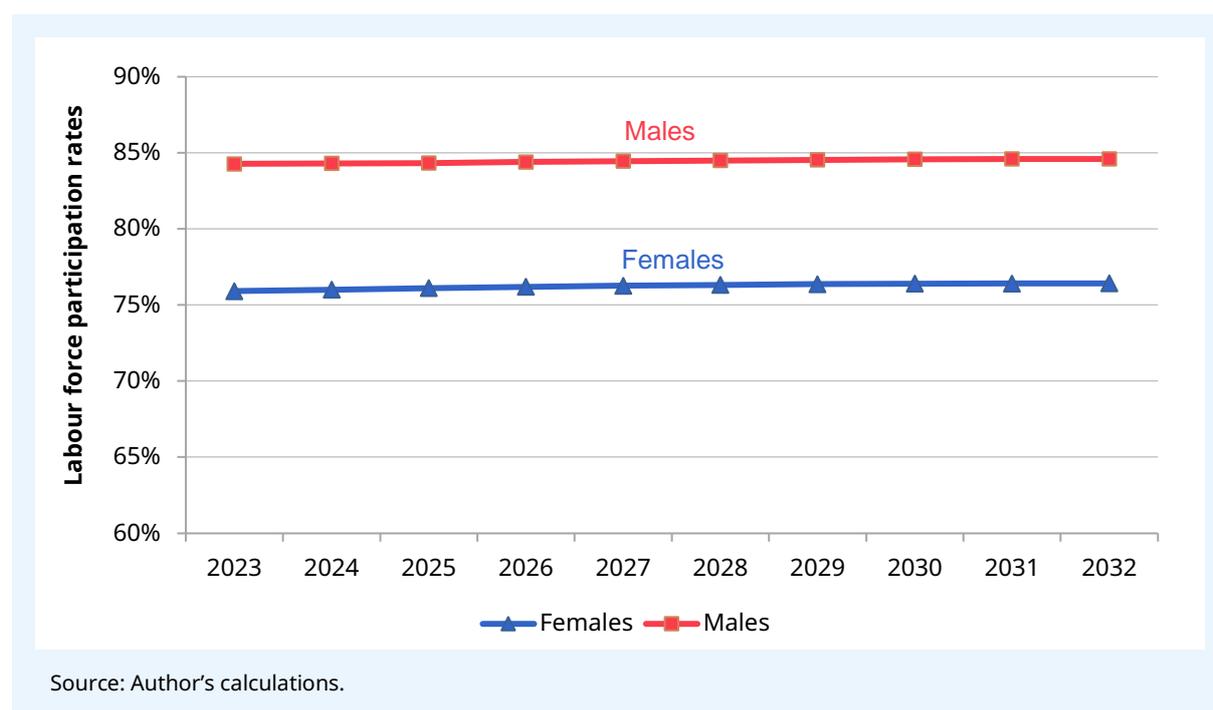
Over the period 2017–2022, the overall labour force participation rate for females for the age group 15 to 64 increased significantly by 5.3 percentage points, from 69.3 in 2017 to 74.6 in 2022. Over the same period, the female participation rate for the age group 55 to 64 also experienced a significant increase of 8.3 percentage points, from 48.9 in 2017 to 57.2 in 2022.

For the male population, over the period 2017–2022, the overall participation rate for the age group 15 to 64 also increased significantly by 5.4 percentage points, from 78.8 in 2017 to 84.2 in 2022. As well, the corresponding participation rate for the age group 55 to 64, over the same period, experienced a strong increase by 8.0 percentage points, from 71.6 in 2017 to 79.6 in 2022.

More recent data obtained from the Statistical Service of Cyprus indicates that female participation rates increased significantly from 2022 to 2023, from 74.6 per cent to 75.9 per cent while for the same period male participation rates increased marginally from 84.2 per cent to 84.3 per cent.

As shown in table 4.3 and figure 4.5, over the projection period the average labour force participation rate for males and females is assumed to moderately increase from its current level of 84.3 per cent and 75.9 per cent in 2023 to 84.6 per cent and 76.4 per cent in 2032 respectively. Increases in the above participation rates over the projection period are primarily driven by the needs of the continuously growing economy as well as the anticipated increase in the average exit age from the labour force, primarily due to the GSIS legal provision of the linkage of statutory pensionable age and life expectancy.

► **Figure 4.5. Projected labour force participation rates, 2023–2032**



► **Table 4.3. Assumptions of labour force participation, employment and unemployment rates, 2023–2032 (percentages)**

Assumption		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Labour force participation rate (ages 15–64)	Male	84.3	84.3	84.3	84.4	84.4	84.5	84.5	84.6	84.6	84.6
	Female	75.9	76.0	76.1	76.2	76.3	76.3	76.4	76.4	76.4	76.4
	Total	80.0	80.0	80.1	80.2	80.3	80.3	80.4	80.4	80.4	80.4
Employment rate (ages 15–64)		75.2	75.6	75.8	75.8	75.9	76.0	76.1	76.1	76.1	76.1
Unemployment rate (ages 15–64)		6.0	5.5	5.4	5.4	5.4	5.4	5.3	5.3	5.3	5.3

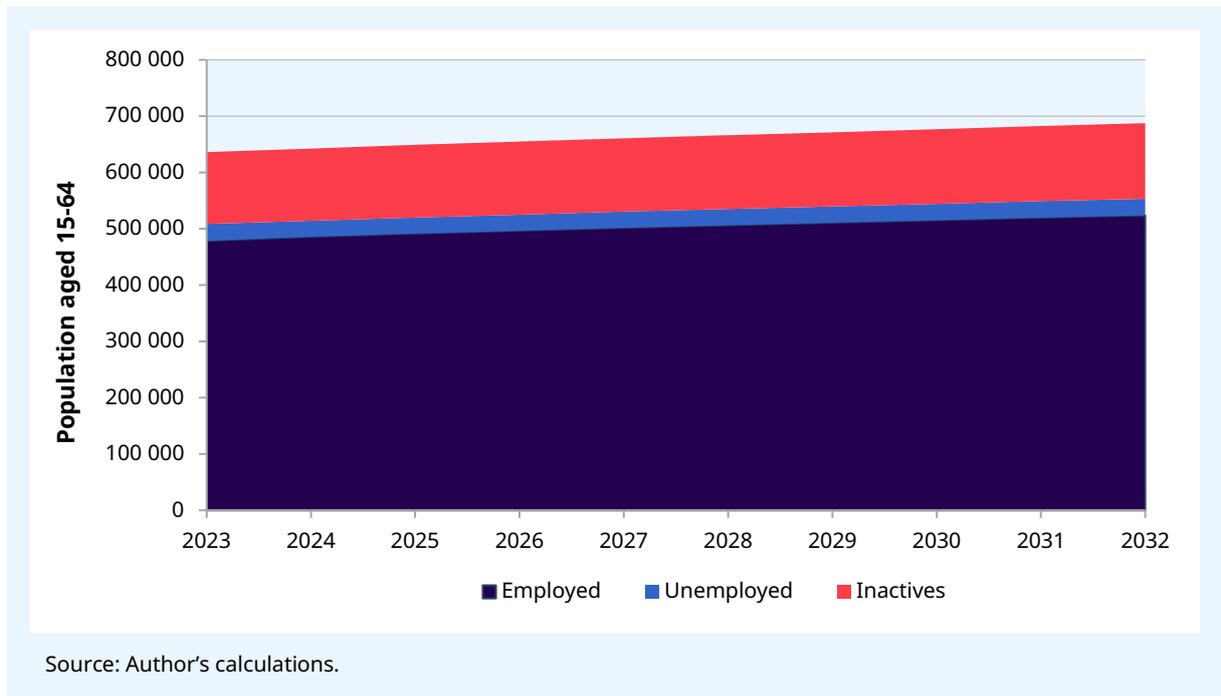
Once the labour force participation rates are determined on the basis of age group and sex, they are applied to the projected population to obtain the labour force. This projection reveals considerable growth of the labour force up to 2032.

The projected number of employed persons is then derived by applying the unemployment rates to the projected labour force. As shown in table 4.3, the unemployment rate for both males and females is anticipated to gradually fall from its current level of 6.0 per cent in 2023 to its lower limit of 5.3 per cent in 2029, and thereafter the number of employed persons will vary at the same rate as the labour force.

Table 4.3 also shows the development of the overall employment rate (the ratio of the number of employed persons aged 15–64 to the number of people aged 15–64), which is expected to increase from 75.2 per cent in 2023 to 76.1 per cent in 2029 and thereafter will remain stable.

Figure 4.6 shows the changes in the population aged 15 to 64 over the projection period 2023–2032 according to the labour force status: employed, unemployed and inactive persons.

► **Figure 4.6. Evolution of the distribution of population aged 15–64, by labour force status, 2023–2032**



### 4.2.3. Inflation, wages and interest rates

Price inflation, as measured by the consumer price index (CPI), tends to fluctuate from year to year. The desire of the European Central Bank to maintain inflation rates below, but close to 2 per cent, leads us to expect an ultimate, constant inflation rate of 2 per cent over the projection period. The average inflation rate for the euro area since 1999, when the euro currency was formally introduced, has been 1.81 per cent.

In Cyprus, the consumer price index has been 8.1 per cent in 2022. As shown in table 4.4, the annual price inflation is assumed to be 3.8 per cent in 2023 and 2.5 per cent in 2024 and thereafter to continue decreasing annually until it reaches its long-term rate of 2.0 per cent in 2026.

The real rate of increase in average wages in the long term is tied to increases in labour productivity. This assumption also takes into account the anticipated growth in the labour force in future. Given the current economic environment, a real wage growth of 1.5 per cent is assumed for 2023 and 1.2 per cent for 2024. Over the following eight years, the period 2025–2032, real wage growth is set to be averaged at 1.4 per cent.

Table 4.4 shows the expected evolution of nominal wage growth rates. For 2023, nominal wage growth is assumed to be 4.8 per cent, and thereafter, for the rest of the projection period, it is expected to be in the range of 3.1 to 3.6 per cent, averaging to 3.4 per cent.

► **Table 4.4. Assumptions of inflation rate, real and nominal increase of average wage, 2023–2032 (percentages)**

Year	Inflation rate	Annual real increase of average wage	Annual nominal increase of average wage
2023	3.8	1.5	4.8
2024	2.5	1.2	3.5
2025	2.2	1.3	3.5
2026	2.0	1.5	3.5
2027	2.0	1.6	3.6
2028	2.0	1.6	3.6
2029	2.0	1.4	3.4
2030	2.0	1.2	3.2
2031	2.0	1.1	3.1
2032	2.0	1.2	3.2

## ▶ 5. General Healthcare System: Experience and assumptions

This chapter presents the General Healthcare System (GHS) experience and assumptions made for the purpose of conducting the present actuarial valuation, and concern the GHS historical financial position, the GHS experience for contributors and beneficiaries, the historical claims cost and historical utilization of GHS services.

### 5.1. Financial experience

For the projection of the future GHS financial position, the starting point is the scheme’s financial position as of 31 December 2022.

Table 5.1 shows the GHS financial position of the GHS for the financial years 2021 and 2022.

▶ **Table 5.1. Financial statements, 2021–22 (Euros)**

	2021	2022
Contributions to GHS	1 186 666 198	1 353 310 345
Co-payments and contributions	45 269 867	48 030 881
Discounts from pharmaceutical companies	37 020 101	45 024 749
Other income items	2 712 214	2 738 924
Other income	57 814 051	33 658 084
<b>Total revenue</b>	<b>1 329 482 431</b>	<b>1 482 762 983</b>
Cost of services	-1 348 503 941	-1 398 072 929
Administrative expenses	-15 088 307	-18 017 342
<b>Total costs and expenses</b>	<b>-1 363 592 248</b>	<b>-1 416 090 271</b>
Surplus/(Deficit)	<b>-34 109 817</b>	<b>66 672 712</b>
Net financing income (expense)	-1 627 394	-956 183
Surplus/(Deficit) before taxation	<b>-35 737 211</b>	<b>65 716 529</b>
Taxation	-1 721	-90
Net Surplus/(Deficit) for the year	-35 738 932	65 716 439
<b>Cumulative Surplus/(Deficit) for the year</b>	<b>-35 738 932</b>	<b>65 716 439</b>

Table 5.2 presents a high-level comparison between the financial statement (FS) figures (contributions and cost of services) and the past experience data extracted from the HIO database (HIO data) and used for the conduct of the current actuarial valuation.

► **Table 5.2. Reconciliation of financial statements with the data received, 2021–22**

	2021			2022		
	FS (€)	HIO data (€)	Comparison (%)	FS (€)	HIO data (€)	Comparison (%)
Contributions to GHS	1 186 666 198	1 180 030 384	-0.6	1 353 310 345	1 347 540 125	-0.4
Cost of GHS services	1 348 503 941	1 346 313 941	-0.2	1 398 072 929	1 388 050 569	-0.7

Table 5.3 shows some key financial indicators regarding the GHS financial position. It follows that for the financial year 2022, there was a significant increase for both reserve ratio and administrative expense ratio over total expenditure, as well as the accumulated surplus (reserve) in absolute terms increased. This increase of the accumulated surplus (reserve) which resulted also to the increase of the reserve ratio in 2022, primarily is due to a significant increase of the income from contributions. The increased income from contributions for 2022 is due to the following two factors, i) the significant increase of GHS employed contributing population, primarily reflecting favourable demographics (high migration) and positive labour market developments (higher participation rates) and ii) the considerable increase of GHS employee contributory earnings, primarily reflecting positive evolution of wages. Indicatively, the GHS contributions were increased by 14 per cent and the accumulated surplus increased by 18 per cent. Administrative expense ratio was increased as the administrative expenses increased by 19 per cent from 2021 to 2022 while for the same period the total costs and expenses increased by 4 per cent.

► **Table 5.3. Financial Indicators, 2021–22**

	2021	2022
Accumulated surplus (reserve) (€)	370 037 183	435 753 622
Reserve ratio	0.27	0.31
Administrative expense ratio (%)	1.1	1.3

## 5.2. Coverage experience

The projection of the number of GHS active contributors and beneficiaries is based on the projection of the general population of the country.

The projection for the active contributors begins with the latest available statistical data on population, based on estimates from the Statistical Service of Cyprus as at 31 December 2022, to which the demographic assumptions presented in Chapter 4 on the future development of fertility, mortality and migration are applied. Assumptions on labour force participation rates, employment rates, rate of coverage of the employed population, and annual decrements by termination causes under the cohort method, are applied to finally obtain the demographic projections of active contributors' population. The projection of the active contributors' earnings, salaries or pensions, were based on the economic assumptions also presented in Chapter 4.

The projection of registered beneficiaries begins with the latest available data on registered beneficiaries by the HIO as at 31 December 2022, to which the demographic assumptions presented in Chapter 4 on the future development of fertility, mortality and migration are applied. Moreover, further estimates on the number of registered beneficiaries were provided by the HIO

as of 31 December 2023, resulting to an increased projected number of beneficiaries for 2023, primarily representing the impact of 2023 net migration.

Table 5.4 shows the development of GHS active contributors by category, namely employed and self-employed persons who are the GSIS contributors as well as, pensioners who are the beneficiaries of a GSIS or Social pension for the years 2021 and 2022.

► **Table 5.4. Active contributors to the GHS, 2021–22**

		Number of contributors	
		2021	2022
Employed persons	Male	253 315	277 461
	Female	231 051	246 829
Self-employed persons	Male	17 036	17 205
	Female	13 734	13 952
		Number of pensions	
		2021	2022
GSIS statutory pension		125 784	131 980
GSIS invalidity pension		3 932	3 783
GSIS widow's pension		32 687	33 902
GSIS disablement pension		796	774
GSIS orphans' benefit		1 041	1 005
Pension under SPS		16 132	16 244

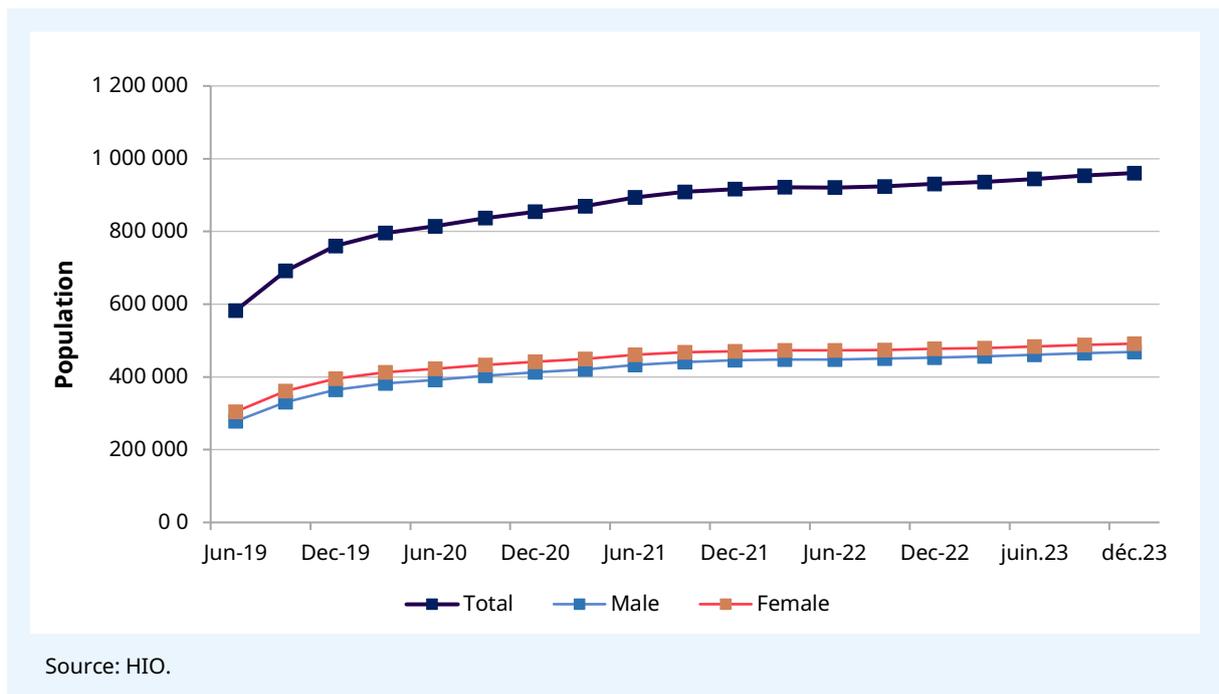
Table 5.5 and figure 5.1 show the number of registered beneficiaries, by sex, since the inception of the GHS, for selected months during the period from June 2019 to December 2023.

► **Table 5.5. Registered beneficiaries in the GHS, 2019–2023**

Month	Male	Female	Total	Percentage increase (%)
Jun-19	277 796	304 546	582 342	–
Sep-19	330 778	361 128	691 906	19
Dec-19	364 711	395 619	760 330	10
Mar-20	382 557	413 075	795 632	5
Jun-20	392 278	422 221	814 499	2
Sep-20	403 674	433 206	836 880	3
Dec-20	412 692	441 858	854 550	2
Mar-21	420 428	449 404	869 832	2
Jun-21	433 153	460 730	893 883	3
Sep-21	440 956	467 912	908 868	2
Dec-21	445 866	470 779	916 645	1
Mar-22	448 169	473 518	921 687	1
Jun-22	447 927	472 835	920 762	0
Sep-22	450 081	474 011	924 092	0
Dec-22	453 409	477 466	930 875	1

Month	Male	Female	Total	Percentage increase (%)
Mar-23	456 465	479 586	936 051	1
Jun-23	460 719	483 750	944 469	1
Sep-23	465 361	488 520	953 881	1
Dec-23	468 940	491 560	960 500	1

► **Figure 5.1. Evolution of the number of registered beneficiaries, 2019–2023**



It follows from both table 5.5 and figure 5.1 that, for the first year of the GHS inception (June 2019 to June 2020) there was a significant increase in the number of registered beneficiaries, averaging to 10 per cent per quarter, while the increase for the 42-month period from June 2020 to December 2023 was on average only 1 per cent per quarter.

### 5.3. Claims experience and projection assumptions

As described in section 3.2, the projection of the GHS benefit expenditure, representing the claims cost for each healthcare service, is based on the projection of the number of registered beneficiaries, the projected utilization rates for each healthcare service and the projected average cost per claim, as adjusted by the projected medical inflation for each healthcare service. The projection of utilization rates is based on the available claims data and the observed trends concerning the usage of each healthcare service. The projection of the average cost for each healthcare service is based on the average points per claim and the average point value which is adjusted over time in line with projected medical inflation.

Moreover, with respect to healthcare services for which either utilization rates or average claim costs did not reach a stable level, additional claims data up to December 2023 were provided by the HIO. The above data was used to identify trends in utilization and claim costs for inpatients and outpatients.

### 5.3.1. Overview of past claims expenditure

Tables 5.6 to 5.9 show past claim experience for the years 2021–2023 for each main healthcare category, in terms of the number of claims, the average points per invoice, the total claims amount and the average amount per claim.

► **Table 5.6. Claims experience, inpatients, 2021–2023**

Year	Inpatient category	Number of claims	Total amount (€)	Average total amount per claim (€)
2021	DRGs	186 934	429 197 043	2 296
	Z-Drugs	104 711	40 220 541	384
	Z-Consumables	136 012	57 375 466	422
	Z-Procedures & fixed fee	163 913	59 199 062	361
2022	DRGs	212 518	442 622 946	2 083
	Z-Drugs	113 333	34 054 496	300
	Z-Consumables	167 315	71 361 163	427
	Z-Procedures & fixed fee	197 302	55 816 725	283
2023	DRGs	253 601	497 367 184	1 961
	Z-Drugs	134 081	42 371 705	316
	Z-Consumables	200 813	84 105 598	419
	Z-Procedures & fixed fee	237 634	60 882 665	256

► **Table 5.7. Claims experience, outpatients, 2021–2023**

Year	Outpatient category	Number of claims	Total amount (€)	Average total amount per claim (€)
2021	Allied health professionals	793 405	25 915 313	33
	Dentists	263 841	10 270 704	39
	Nurses and midwives	23 129	567 217	25
	Outpatient specialist doctors <sup>1</sup>	3 877 189	230 839 791	60
2022	Allied health professionals	1 104 051	35 346 589	32
	Dentists	279 071	10 877 473	39
	Nurses and midwives	51 678	1 379 330	27
	Outpatient specialist doctors <sup>1</sup>	3 933 859	232 840 210	59
2023	Allied health professionals	1 356 417	42 439 910	31
	Dentists	305 110	11 887 302	39
	Nurses and midwives	79 542	2 259 033	28
	Outpatient specialist doctors <sup>1</sup>	4 204 998	238 974 093	57

Note: <sup>1</sup> It includes outpatient activities undertaken by personal doctors, the total expenditure of those activities is limited up to around 2% in 2022 and 4% in 2023 of total outpatient expenditure.

► **Table 5.8. Claims experience, laboratories, 2021–2023**

Year	Laboratory test categories	Number of claims	Total amount (€)	Average points per invoice	Average total amount per claim (€)
2021	Biochemistry	908 376	27 507 063	38.6	30
	Haematology	783 226	4 774 208	7.8	6
	Immunology	814 009	18 897 023	29.6	23
	Microbiology	386 697	2 380 192	7.9	6
2022	Biochemistry	941 815	26 882 873	37.1	29
	Haematology	797 548	4 742 402	7.7	6
	Immunology	854 560	19 395 800	29.5	23
	Microbiology	398 088	2 407 321	7.9	6
2023	Biochemistry	989 897	25 937 287	34.0	26
	Haematology	816 740	4 847 642	7.7	6
	Immunology	887 976	20 464 564	30.0	23
	Microbiology	415 623	2 954 645	9.3	7

► **Table 5.9. Claims experience, pharmacies, 2021–2023**

Year	Number of claims	Total pharmaceuticals <sup>1</sup> amount (€)	Pharmacies' fees (€)	Overnight fees (€)	Average pharmaceuticals amount per claim (€)
2021	6 631 558	196 868 923	32 205 197	547 811	30
2022	7 382 662	216 814 135	32 112 393	549 999	29
2023	8 051 138	241 835 332	33 837 183	550 001	30

Note: <sup>1</sup> Pharmaceuticals represent pharmacies drugs, medical devices and consumables.

### 5.3.2. Analysis of inpatient past experience

Tables 5.10 and 5.11 show the observed trends in utilization rates and average cost per invoice for inpatient service categories, by sex, over the years 2021–2023.

► **Table 5.10. Inpatient utilization rates, by sex, 2021–2023 (percentages)**

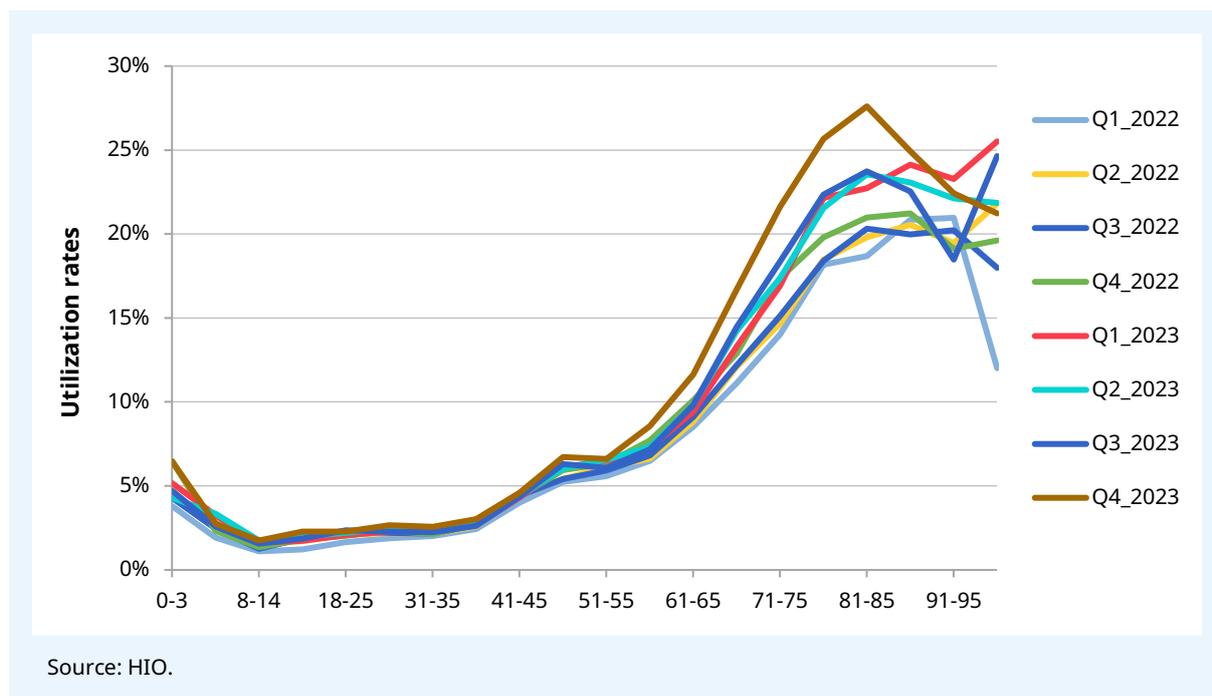
Inpatient category	Sex	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
DRGs	Male	2.8	2.9	2.9	2.9	2.8	2.9	3.0	3.2	3.3	3.3	3.3	3.7
	Female	2.8	2.9	2.9	3.0	2.9	3.2	3.1	3.4	3.5	3.5	3.5	3.9
Z-Drugs	Male	2.3	2.6	2.8	2.7	2.6	2.7	2.8	2.9	3.3	3.3	3.3	3.7
	Female	2.2	2.5	2.7	2.9	2.8	3.0	2.2	2.8	3.5	3.5	3.5	3.9
Z-Consumables	Male	2.7	2.7	2.8	2.8	2.8	3.0	3.0	3.2	3.3	3.3	3.3	3.7
	Female	2.7	2.8	2.6	2.9	2.9	3.2	3.1	3.4	3.5	3.5	3.5	3.9
Z-Procedures & fixed fee	Male	2.8	2.9	2.9	2.9	2.8	3.0	3.0	3.2	3.3	3.3	3.3	3.7
	Female	2.7	2.9	2.9	3.0	2.9	3.2	3.1	3.4	3.5	3.5	3.5	3.9

▶ **Table 5.11. Inpatient average cost per invoice, by sex, 2021–2023 (Euros)**

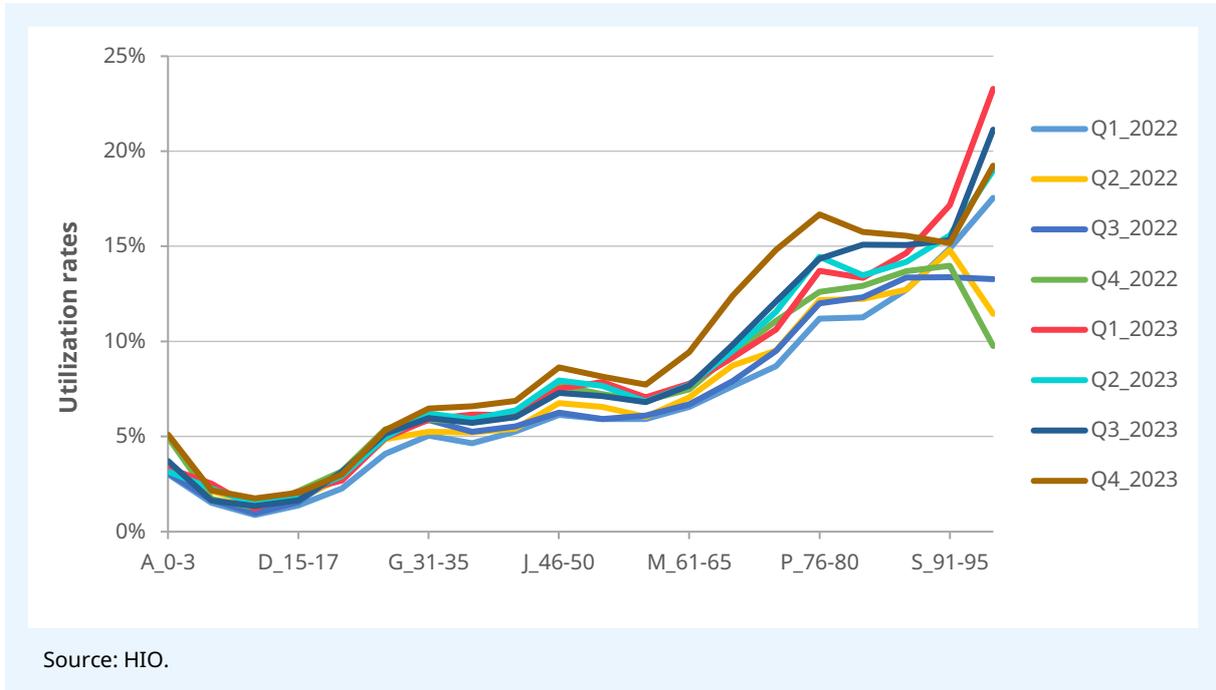
Inpatient category	Sex	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
DRGs	Male	3 647	3 620	3 416	3 478	3 698	3 085	3 223	3 250	3 306	4 398	4 544	3 565
	Female	3 279	3 596	3 099	3 013	2 745	4 185	2 937	2 778	2 748	3 262	3 614	2 811
Z-Drugs	Male	589	578	645	568	619	635	509	435	455	579	505	468
	Female	505	520	722	517	541	831	545	402	470	420	446	375
Z-Consumables	Male	634	871	690	703	946	800	832	687	835	880	844	863
	Female	838	770	523	755	626	897	680	703	836	865	744	795
Z-Procedures & fixed fee	Male	553	534	587	646	536	531	503	519	509	561	500	502
	Female	668	575	524	541	499	512	513	525	477	527	563	488

Figures 5.2 and 5.3 show the trend in inpatient utilization rates by age group and by quarter over the years 2022 and 2023 for males and females respectively.

▶ **Figure 5.2. Evolution of inpatient utilization rates, by age group, males, 2022–23**



► **Figure 5.3. Evolution of inpatient utilization rates, by age group, females, 2022–23**



It follows from table 5.10 and figures 5.2 and 5.3 above that the inpatient utilization rates remained relatively stable over the period from quarter 4 of 2022 to quarter 3 of 2023, while over the period from quarter 3 to quarter 4 of 2023 the overall utilization rates experienced an increase for both sexes and for the majority of the age groups. Moreover, as illustrated by table 5.11 above, the Z-items cost per invoice and the DRG cost per invoice are not yet stabilized, mainly due to the affiliation of new hospitals with the GHS and due to the varying underlying mix of inpatient services/ DRGs provided each quarter.

### 5.3.3. Analysis of outpatient past experience

Tables 5.12 and 5.13 show the observed trends in utilization rates and average cost per invoice for outpatient service categories, by sex, over the years from 2022 to 2023.

► **Table 5.12. Outpatient utilization rates, by category and by sex, 2022–23**  
(percentages)

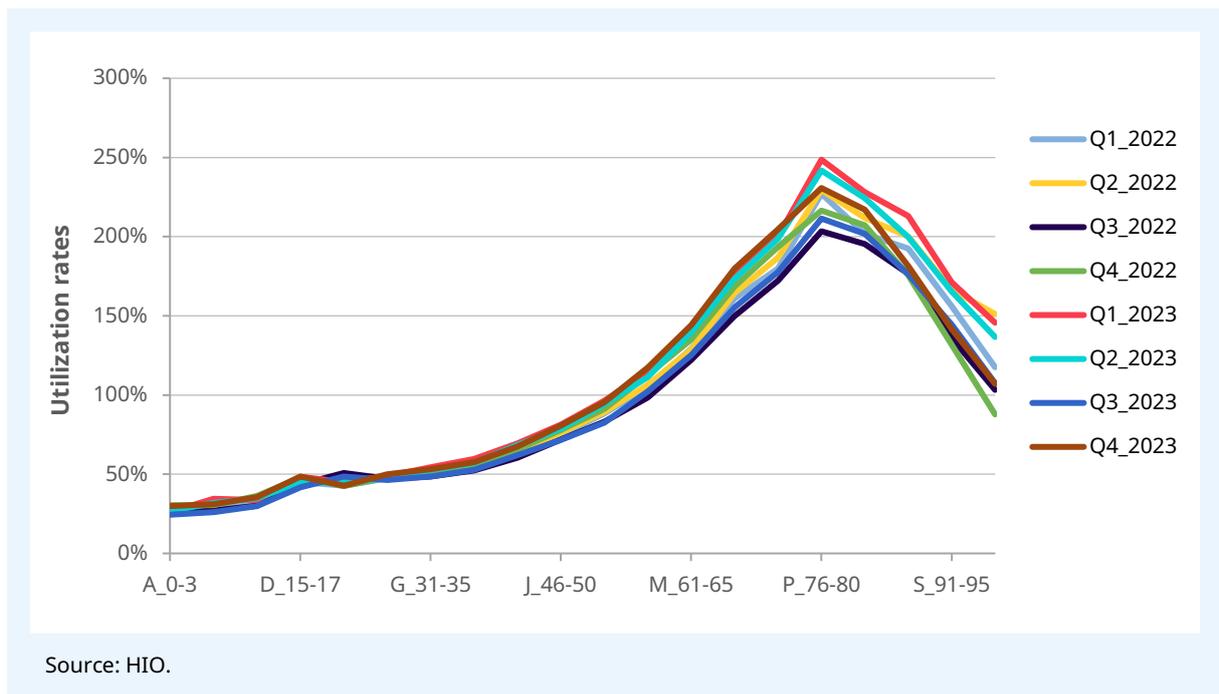
Outpatient category	Sex	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
Allied health professionals	Male	13.5	13.2	11.5	15.5	17.1	16.7	13.1	17.6
	Female	16.0	16.7	14.1	19.1	20.9	21.2	16.1	20.7
Dentists	Male	2.5	3.6	4.0	3.9	3.2	3.7	4.0	4.2
	Female	2.9	4.1	4.6	4.5	3.6	4.2	4.6	4.8
Nurses and midwives	Male	0.4	0.6	0.6	0.7	0.8	0.8	0.7	0.9
	Female	0.6	0.8	0.8	1.1	1.2	1.3	1.3	1.4
Personal and specialist doctors	Male	41.5	42.6	40.0	48.8	45.8	44.5	40.6	49.8
	Female	60.6	62.3	59.8	70.5	67.4	64.8	59.6	71.9

► **Table 5.13. Outpatient average cost per invoice, by category and by sex, 2022–23 (Euros)**

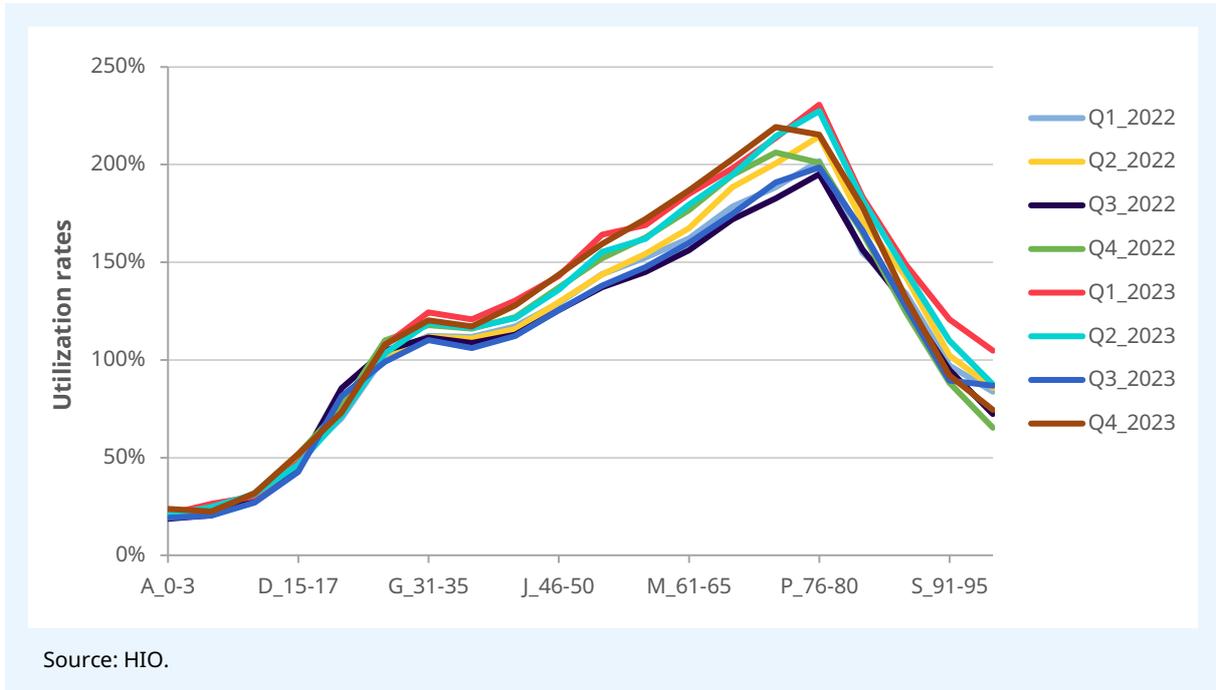
Outpatient category	Sex	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
Allied health professionals	Male	32	31	31	32	32	30	31	32
	Female	33	32	32	33	32	30	32	33
Dentists	Male	39	39	39	39	39	39	39	39
	Female	39	39	39	39	39	39	39	39
Nurses and midwives	Male	29	30	30	29	30	30	30	30
	Female	29	29	29	29	30	30	30	30
Personal and specialist doctors	Male	68	67	70	66	63	61	62	58
	Female	59	58	59	56	54	52	53	50

Figures 5.4 and 5.5 show the trend in outpatient utilization rates by age group and by quarter over the years 2022 and 2023 for males and females respectively.

► **Figure 5.4. Evolution of outpatient utilization rates, by age group, males, 2022–23**



► **Figure 5.5. Evolution of outpatient utilization rates, by age group, females, 2022–23**



It follows from table 5.12 and figures 5.4 and 5.5 above that the utilization rates for outpatient services over the period from quarter 4 of 2022 to quarter 4 of 2023 remained relatively stable for both sexes and for all age groups. Moreover, as illustrated by table 5.13 above, the average cost per invoice also remained relatively stable over the same period.

### 5.3.4. Analysis of laboratories' past experience

Tables 5.14 and 5.15 show the observed trends in utilization rates and average cost per invoice for various laboratory test categories over the years from 2022 to 2023.

► **Table 5.14. Laboratory utilization rates, by category, 2022–23 (percentages)**

Laboratory test categories	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
Biochemistry	24	26	25	27	28	26	24	26
Haematology	21	22	21	23	24	21	20	21
Immunology	22	24	22	24	26	23	22	23
Microbiology	10	11	11	11	11	11	10	11

► **Table 5.15. Laboratories, average cost per invoice, by category, 2022–23 (Euros)**

Laboratory test categories	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
Biochemistry	45	45	44	44	43	38	36	37
Haematology	9	9	9	9	9	9	9	9
Immunology	36	36	35	35	35	33	33	34
Microbiology	9	9	10	9	10	9	11	12

It follows from tables 5.14 and 5.15 above that over the period from quarter 1 of 2022 to quarter 4 of 2023, the overall utilization rates and average cost per invoice remained stable for haematology, immunology and microbiology. Over the same period, for Biochemistry, the utilization rates remained stable, whereas the average cost per invoice has been declining since quarter 1 of 2023.

### 5.3.5. Analysis of pharmacies’ past experience

Tables 5.16 and 5.17 show the observed trends in utilization rates and average cost per invoice for pharmacies over the years from 2022 to 2023.

► **Table 5.16. Pharmacy utilization rates, 2022–23 (percentages)**

	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
Overall rate	193	194	197	215	224	209	202	216

► **Table 5.17. Pharmaceuticals, weighted average cost per invoice, 2022–23 (Euros)**

	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
Overall rate	31	32	32	32	31	33	34	33

It follows from tables 5.16 and 5.17 above that over the period from quarter 3 of 2022 to quarter 1 of 2023 and in quarter 4 of 2023 the overall utilization rates were increased, while over the period from quarter 1 to quarter 3 of 2023 overall utilization rates were decreased. Despite the fluctuations in utilization rates, the weighted average cost per invoice remained relatively stable over the period quarter 1 of 2022 to quarter 4 of 2023.

### 5.3.6. Historical medical inflation and assumption

Table 5.18 shows the historical medical inflation rate by healthcare category over the 12-year period from 2012 to 2023.

► **Table 5.18. Historical medical inflation, by healthcare category, 2012–2023 (percentages)**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Medical products, appliances and equipment	0.4	-1.2	-0.2	-1.4	-0.3	0.0	-0.9	-2.2	0.1	1.2	1.3	2.7
Pharmaceutical products	0.0	-1.2	-0.1	-1.6	-0.4	0.1	-1.1	-2.4	-0.1	1.1	1.0	2.5
Outpatient services	0.7	-4.1	-3.0	0.8	1.5	0.9	0.7	0.8	0.8	0.6	0.5	1.0
Medical services	1.0	-4.9	-2.9	1.6	2.2	1.4	2.1	1.2	0.1	0.3	0.1	0.1
Dental services	0.2	-2.5	-2.8	-1.5	0.6	0.4	0.9	1.4	1.1	1.5	1.5	4.0
Paramedical services	0.5	-3.7	-3.3	0.9	1.0	0.5	-0.2	0.1	1.3	0.6	0.5	0.6
Hospital services	0.4	0.6	2.2	1.4	1.9	1.7	1.0	0.7	0.3	0.1	0.3	0.5
<b>Total health</b>	<b>0.6</b>	<b>-2.5</b>	<b>-1.3</b>	<b>0.4</b>	<b>1.1</b>	<b>0.8</b>	<b>-0.1</b>	<b>-0.3</b>	<b>0.5</b>	<b>0.7</b>	<b>0.8</b>	<b>1.5</b>

Note: Base year 2011.

Source: CyStat.

It follows from table 5.18 that overall the introduction of the GHS restrained the upward trend in medical inflation and could secure a stability in its future trends. Medical inflation increases observed in 2023, mainly for the categories “medical products, appliances and equipment” and “pharmaceutical products” reflect the unusually high inflationary pressure of recent years, especially in 2022.

Table 5.19 shows the medical inflation assumption by healthcare category over the period from 2025 to 2032. With respect to the years 2023 and 2024, medical inflation cost is included in the estimated expenditure figures, which are based on the actual/agreed reimbursement amounts.

► **Table 5.19. Medical inflation assumption, by category, 2025–2032 (percentages)**

Healthcare category	2025	2026	2027	2028	2029	2030	2031	2032
Personal doctors	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Outpatient specialist doctors	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Pharmacies	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2
Laboratories	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2
Inpatient DRGs	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2
Z-Consumables	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2
Z-Drugs	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2
Z-Procedures & fixed fee	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2
A&E departments and ambulances	1.8	1.7	1.8	1.9	1.9	1.8	1.8	1.8
Dentists	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Nurses and midwives	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Allied health professionals	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Rehabilitation and palliative care	1.8	1.7	1.8	1.9	1.9	1.8	1.8	1.8

### 5.3.7. Assumptions used for the projections

This section presents the main scheme-specific assumptions used for the projection of claims of various healthcare categories from 2023 and onwards. These assumptions relate to the variables of utilization rates and average cost per claim.

For the vast majority of GHS services, the utilization rates became stable by 2023, as indicated by the above past experience data analysis. Those utilization rates represent the basis for projecting future utilization levels until the end of the projection period.

Table 5.20 shows the assumption of inpatient DRGs' quarterly utilization rates by age group and sex over the years from 2023 to 2032.

► **Table 5.20. Inpatient DRGs, quarterly utilization rate assumption, by age group and sex, 2023–2032 (percentages)**

Age group	2023		2024		2025–2032	
	Male	Female	Male	Female	Male	Female
0–3	5.1	3.8	6.0	4.5	6.0	4.5

Age group	2023		2024		2025–2032	
	Male	Female	Male	Female	Male	Female
4–7	3.0	2.3	3.3	2.6	3.3	2.6
8–14	1.8	1.5	1.9	1.7	1.9	1.7
15–17	2.1	2.0	2.2	2.2	2.2	2.3
18–25	2.1	2.8	2.2	3.0	2.2	3.0
26–30	2.3	4.9	2.4	5.2	2.4	5.3
31–35	2.2	5.9	2.4	6.3	2.4	6.4
36–40	2.7	5.8	2.8	6.2	2.9	6.3
41–45	4.2	6.1	4.5	6.5	4.6	6.6
46–50	6.0	7.4	6.5	8.0	6.5	8.1
51–55	6.1	7.3	6.6	7.7	6.6	7.8
56–60	7.2	6.7	7.7	7.2	7.8	7.2
61–65	9.6	7.6	10.3	8.1	10.4	8.2
66–70	13.9	9.6	14.9	10.2	15.0	10.3
71–75	17.5	11.5	18.6	12.3	18.8	12.4
76–80	21.4	13.9	22.7	14.8	23.0	14.9
81–85	22.7	13.6	24.2	14.5	24.4	14.6
86–90	22.0	14.0	23.3	14.9	23.5	15.0
91–95	21.2	15.4	22.4	16.2	22.6	16.4
96–100	26.5	21.4	27.5	21.5	27.8	21.7

Tables 5.21 to 5.23 shows the assumption of inpatient Z items quarterly utilization rates by age group and sex for the years from 2023 to 2032.

► **Table 5.21. Inpatient Z consumables, quarterly utilization rate assumption, by age group and sex, 2023–2032 (percentages)**

Age group	2023		2024		2025–2032	
	Male	Female	Male	Female	Male	Female
0–3	2.2	0.8	2.3	0.8	2.3	0.8
4–7	1.5	0.8	1.6	0.8	1.6	0.8
8–14	1.3	0.8	1.4	0.9	1.4	0.9
15–17	1.3	0.8	1.4	0.8	1.4	0.8
18–25	1.6	2.3	1.7	2.4	1.7	2.4
26–30	1.7	4.1	1.8	4.4	1.8	4.4
31–35	1.7	5.0	1.8	5.3	1.8	5.3
36–40	1.9	4.8	2.0	5.0	2.1	5.1
41–45	2.8	4.4	3.0	4.6	3.0	4.7
46–50	4.3	5.4	4.6	5.7	4.6	5.8
51–55	4.4	5.7	4.7	6.1	4.8	6.1
56–60	6.2	5.5	6.6	5.8	6.6	5.9
61–65	9.1	5.6	9.7	5.9	9.8	6.0
66–70	13.4	8.4	14.2	8.9	14.3	9.0
71–75	16.3	9.9	17.3	10.4	17.5	10.5
76–80	19.6	12.3	20.7	13.1	20.9	13.2

Age group	2023		2024		2025–2032	
	Male	Female	Male	Female	Male	Female
81–85	19.6	11.4	20.7	12.1	20.9	12.2
86–90	17.0	10.7	17.9	11.3	18.1	11.4
91–95	13.3	10.5	14.1	11.1	14.2	11.3
96–100	7.6	5.9	8.0	6.2	8.1	6.3

► **Table 5.22. Inpatient Z drugs, quarterly utilization rate assumption, by age group and sex, 2023–2032 (percentages)**

Age group	2023		2024		2025–2032	
	Male	Female	Male	Female	Male	Female
0–3	3.1	1.9	3.3	2.0	3.3	2.0
4–7	1.1	1.1	1.1	1.1	1.1	1.2
8–14	1.1	0.7	1.1	0.7	1.1	0.7
15–17	0.7	0.6	0.7	0.6	0.7	0.6
18–25	0.5	0.9	0.6	0.9	0.6	0.9
26–30	0.8	1.5	0.8	1.6	0.8	1.6
31–35	0.6	4.7	0.7	5.0	0.7	5.0
36–40	0.8	2.1	0.9	2.3	0.9	2.3
41–45	2.3	3.5	2.4	3.7	2.4	3.8
46–50	3.4	3.9	3.6	4.1	3.6	4.1
51–55	3.5	4.2	3.7	4.4	3.7	4.5
56–60	4.0	3.8	4.2	4.0	4.3	4.0
61–65	6.2	4.3	6.5	4.5	6.6	4.6
66–70	8.1	5.9	8.6	6.3	8.7	6.3
71–75	12.4	7.4	13.1	7.8	13.2	7.9
76–80	12.2	7.1	12.9	7.5	13.1	7.6
81–85	11.7	8.0	12.4	8.4	12.5	8.5
86–90	8.6	4.9	9.1	5.2	9.2	5.3
91–95	3.9	0.7	4.1	0.7	4.1	0.7
96–100	0.7	1.1	0.7	1.2	0.7	1.2

► **Table 5.23. Inpatient Z procedures and fixed fee items, quarterly utilization rate assumption, by age group and sex, 2023–2032 (percentages)**

Age group	2023		2024		2025–2032	
	Male	Female	Male	Female	Male	Female
0–3	4.8	3.3	5.1	3.5	5.1	3.5
4–7	2.3	1.2	2.5	1.3	2.5	1.3
8–14	1.2	1.1	1.2	1.2	1.2	1.2
15–17	1.3	1.3	1.4	1.4	1.4	1.4
18–25	1.8	2.6	1.9	2.8	2.0	2.8
26–30	1.6	4.6	1.7	4.9	1.7	4.9
31–35	2.1	5.8	2.2	6.1	2.2	6.2
36–40	2.5	5.6	2.6	5.9	2.6	6.0

Age group	2023		2024		2025–2032	
	Male	Female	Male	Female	Male	Female
41–45	3.9	6.0	4.1	6.4	4.2	6.5
46–50	5.8	7.4	6.1	7.8	6.2	7.9
51–55	5.5	7.2	5.9	7.6	5.9	7.7
56–60	7.1	6.6	7.5	7.0	7.6	7.0
61–65	9.7	7.7	10.3	8.2	10.4	8.3
66–70	13.9	9.4	14.7	9.9	14.8	10.0
71–75	17.0	11.4	18.0	12.1	18.2	12.2
76–80	21.4	13.8	22.6	14.7	22.9	14.8
81–85	22.4	13.3	23.7	14.0	23.9	14.2
86–90	18.8	11.4	19.9	12.1	20.1	12.2
91–95	12.3	8.7	13.0	9.2	13.1	9.3
96–100	3.5	6.3	3.7	6.7	3.7	6.8

Table 5.24 shows the assumption of outpatient specialists' quarterly utilization rates by age group and sex for the years from 2023 to 2032.

► **Table 5.24. Outpatient specialists, quarterly utilization rate assumption, by age group and sex, 2023–2032 (percentages)**

Age group	2023		2024		2025		2026–2032	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	31.2	24.5	33.1	26.0	33.4	26.2	33.4	26.2
4–7	36.4	27.7	37.9	28.3	38.3	28.6	38.3	28.6
8–14	38.7	34.7	39.3	35.1	39.7	35.5	39.7	35.5
15–17	53.1	54.5	53.4	54.5	53.9	55.1	53.9	55.1
18–25	52.6	86.2	51.7	85.4	52.2	86.2	52.2	86.2
26–30	55.8	120.0	56.2	120.8	56.8	122.1	56.8	122.1
31–35	60.7	135.4	61.5	136.6	62.1	138.0	62.1	138.0
36–40	65.9	131.7	66.6	133.2	67.2	134.5	67.2	134.5
41–45	77.5	140.6	78.3	142.3	79.1	143.7	79.1	143.7
46–50	90.6	156.4	91.5	158.1	92.5	159.7	92.5	159.7
51–55	106.9	176.3	108.3	178.7	109.4	180.4	109.4	180.4
56–60	128.6	186.2	130.1	188.9	131.4	190.8	131.4	190.8
61–65	158.8	203.3	160.6	206.3	162.2	208.4	162.2	208.4
66–70	196.3	219.8	198.6	223.5	200.6	225.8	200.6	225.8
71–75	223.1	238.9	225.7	242.6	227.9	245.1	227.9	245.1
76–80	265.4	248.2	268.7	251.7	271.4	254.2	271.4	254.2
81–85	247.9	202.1	250.2	203.4	252.7	205.4	252.7	205.4
86–90	219.8	157.5	222.2	159.1	224.5	160.7	224.5	160.7
91–95	178.0	116.7	179.3	119.2	181.1	120.4	181.1	120.4
96–100	144.9	101.6	145.4	102.4	146.8	103.4	146.8	103.4

Table 5.25 shows the assumption of allied health professionals' quarterly utilization rates by age group and sex for the years from 2023 to 2032.

► **Table 5.25. Allied health professionals, quarterly utilization rate assumption, by age group and sex, 2023–2032 (percentages)**

Age group	2023		2024		2025		2026–2032	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	29.3	17.4	35.3	20.8	37.1	21.9	38.2	22.5
4–7	44.1	23.2	56.6	29.2	59.5	30.8	61.2	31.6
8–14	22.4	19.7	27.7	23.8	29.3	25.3	29.9	25.8
15–17	24.6	29.0	29.2	35.2	30.8	37.6	31.5	38.1
18–25	20.2	26.9	23.3	31.2	24.7	33.3	25.2	33.7
26–30	22.3	30.2	26.2	35.7	27.7	38.1	28.3	38.6
31–35	23.0	29.3	27.5	34.6	29.1	36.8	29.8	37.4
36–40	22.2	28.7	26.5	33.9	28.0	36.0	28.7	36.7
41–45	24.6	30.7	29.4	36.7	31.1	38.9	31.8	39.7
46–50	25.8	35.0	30.7	42.0	32.4	44.5	33.2	45.4
51–55	28.6	42.2	34.2	51.0	36.1	53.9	37.0	55.1
56–60	32.5	45.0	39.1	54.2	41.2	57.3	42.3	58.6
61–65	37.1	47.7	43.7	57.2	46.0	60.4	47.2	61.8
66–70	42.4	51.7	50.3	62.1	53.0	65.4	54.4	67.1
71–75	46.5	55.2	54.9	65.9	57.8	69.4	59.4	71.3
76–80	56.9	57.7	67.0	69.0	70.5	72.6	72.4	74.7
81–85	52.6	49.7	61.9	58.9	65.1	61.9	67.0	63.7
86–90	53.4	45.0	63.5	53.1	66.7	55.8	68.7	57.4
91–95	43.5	38.3	52.0	45.9	54.6	48.3	56.2	49.6
96–100	35.2	34.0	43.0	38.7	45.2	40.6	46.5	41.8

Table 5.26 shows the assumption of dentists' quarterly utilization rates by age group and sex for the years from 2023 to 2032.

► **Table 5.26. Dentists, quarterly utilization rate assumption, by age group and sex, 2023–2032 (percentages)**

Age group	2023		2024		2025		2026–2032	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	1.8	1.9	2.0	2.1	2.1	2.2	2.1	2.2
4–7	7.3	7.7	7.6	8.0	8.2	8.7	8.2	8.7
8–14	9.9	10.2	10.5	10.7	11.3	11.6	11.3	11.6
15–17	9.2	9.4	9.9	9.9	10.6	10.7	10.6	10.7
18–25	8.3	9.7	8.8	10.3	9.6	11.1	9.6	11.1
26–30	8.8	10.1	9.2	10.6	9.9	11.4	9.9	11.4
31–35	9.0	9.9	9.3	10.3	10.0	11.1	10.0	11.1
36–40	8.6	9.3	8.8	9.7	9.6	10.5	9.6	10.5
41–45	8.6	9.1	8.8	9.5	9.6	10.2	9.6	10.2
46–50	8.0	8.5	8.3	8.9	9.0	9.6	9.0	9.6

Age group	2023		2024		2025		2026–2032	
	Male	Female	Male	Female	Male	Female	Male	Female
51–55	7.8	8.6	8.1	9.0	8.8	9.7	8.8	9.7
56–60	7.6	8.5	7.8	8.8	8.4	9.5	8.4	9.5
61–65	7.1	8.2	7.4	8.5	7.9	9.2	7.9	9.2
66–70	7.0	8.0	7.2	8.3	7.8	9.0	7.8	9.0
71–75	6.3	7.0	6.5	7.2	7.1	7.8	7.1	7.8
76–80	6.0	6.2	6.1	6.3	6.6	6.8	6.6	6.8
81–85	4.6	4.2	4.7	4.3	5.1	4.7	5.1	4.7
86–90	3.9	3.0	3.9	3.2	4.2	3.5	4.2	3.5
91–95	3.4	2.0	3.4	2.1	3.7	2.3	3.7	2.3
96–100	2.1	1.4	2.4	1.3	2.5	1.4	2.5	1.4

Table 5.27 shows the assumption of nurses' and midwives' quarterly utilization rates by age group and sex for the years from 2023 to 2032.

► **Table 5.27. Nurses and midwives, quarterly utilization rate assumption, by age group and sex, 2023–2032 (percentages)**

Age group	2023		2024		2025		2026–2032	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0
4–7	0.2	0.0	0.2	0.1	0.2	0.1	0.2	0.1
8–14	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
15–17	0.3	0.2	0.3	0.3	0.4	0.3	0.4	0.3
18–25	0.3	0.4	0.3	0.5	0.4	0.5	0.4	0.5
26–30	0.5	1.5	0.6	1.9	0.7	2.1	0.7	2.1
31–35	0.6	2.2	0.7	2.6	0.8	2.9	0.8	2.9
36–40	0.8	1.2	1.0	1.4	1.2	1.6	1.2	1.6
41–45	1.0	0.7	1.2	0.9	1.3	1.0	1.3	1.0
46–50	1.0	0.8	1.2	1.1	1.4	1.2	1.4	1.2
51–55	1.2	1.2	1.6	1.5	1.7	1.7	1.7	1.7
56–60	1.7	1.5	2.1	1.9	2.3	2.1	2.3	2.1
61–65	1.8	2.3	2.4	3.0	2.6	3.3	2.6	3.3
66–70	2.6	2.5	3.3	3.2	3.7	3.6	3.7	3.6
71–75	3.5	3.9	4.7	5.0	5.2	5.5	5.2	5.5
76–80	5.7	7.1	7.5	9.1	8.3	10.0	8.3	10.0
81–85	8.7	15.3	11.4	19.8	12.5	21.8	12.5	21.8
86–90	16.0	25.6	21.0	33.7	23.1	37.1	23.1	37.1
91–95	27.9	35.9	37.2	47.4	40.9	52.1	40.9	52.1
96–100	39.6	62.8	50.3	84.2	55.3	92.6	55.3	92.6

Table 5.28 shows the assumption of laboratories' monthly utilization rates and average number of points per invoice, by test category over the projection period 2023–2032.

► **Table 5.28. Assumptions of laboratory monthly utilization rate and average number of points per invoice, by test category, 2023–2032**

Laboratory test category	2023		2024		2025–2032	
	Monthly utilization rate (%)	Average number of points per invoice	Monthly utilization rate (%)	Average number of points per invoice	Monthly utilization rate (%)	Average number of points per invoice
Biochemistry and immunology	16.2	32.0	16.6	32.0	16.6	32.0
Haematology and microbiology	10.9	8.5	11.1	9.2	11.1	9.2

Table 5.29 shows the assumptions of pharmacies' monthly utilization rates and pharmacist fee for the average number of packs dispensed, the pharmaceuticals average cost per invoice and the annual cost of the overnight pharmacist fee over the projection period 2023–2032.

► **Table 5.29. Pharmacies, monthly utilization rates and other projection assumptions, 2023–2032**

	2023	2024	2025	2026–2032
Monthly utilization rate (%)	71.0	72.0	72.0	72.0
Pharmacist fee – Average number of packs dispensed	2.5	2.5	2.5	2.5
Pharmaceuticals – Average cost per invoice (€)	30.0	32.3	33.2	34.0
Pharmacist fee per overnight – Annual cost (€)	550 000	550 000	550 000	550 000

Table 5.30 shows the personal doctors' annual capitation reimbursement rates which are projected to increase in line with the relevant medical inflation rate for the years 2025 onwards.

► **Table 5.30. Personal doctors' current capitation reimbursement annual rates (Euros)**

Age Group	Annual rates (€)		
	01/01/2022–31/05/2022	01/06/2022 - 31/12/2022	01/01/2023 - 31/12/2024
0–3	210	186	186
4–7	155	137	137
8–14	91	80	80
15–17	91	80	80
18–50	83	66	66
51–70	117	94	94
71+	145	116	116

Accident and emergency (A&E) departments of private hospitals follow the point system reimbursement method, while the A&E departments of public hospitals along with the ambulances are reimbursed based on an annual fixed guaranteed amount. These amounts are projected to increase in line with the relevant medical inflation rate for the years 2027 onwards.

Table 5.31 shows the assumptions of the quarterly utilization rates in A&E departments of private hospitals and the average number of points per invoice over the project period 2023–2032.

► **Table 5.31. A&E departments, private hospitals, assumptions of quarterly utilization rate and average number of points per invoice, 2023–2032**

	2023		2024		2025–2032	
	Quarterly utilization rate (%)	Average number of points per invoice	Quarterly utilization rate (%)	Average number of points per invoice	Quarterly utilization rate (%)	Average number of points per invoice
A&E departments, private hospitals	1.5	5.9	2.3	5.9	2.3	5.9

Table 5.32 shows the A&E departments of public hospitals and ambulances annual fixed cost. The amounts with respect to 2024, 2025 and 2026 have been agreed and thereafter, for the years 2027–2032, they are projected to increase in line with the relevant medical inflation rate.

► **Table 5.32. A&E departments of public hospitals, and ambulances, annual fixed cost (Euros)**

	2023	2024	2025	2026–2032
A&E department of public hospitals	18 000 000	23 346 992	25 004 628	25 504 721
Ambulances	13 200 000	16 821 105	17 157 527	17 500 678

Table 5.33 shows the assumption used for the GHS expenditure on rehabilitation and palliative care. From 2027 onwards these amounts are projected to increase in line with the relevant medical inflation rate.

► **Table 5.33. Rehabilitation and palliative care, assumption of annual cost, for the years 2023–2032 (Euros)**

	2023	2024	2025	2026	2027–2032
Palliative care in institutions	4 313 780	5 680 518	6 492 020	8 115 025	8 115 025
Rehabilitation in institutions	5 256 964	7 680 000	9 600 000	11 520 000	12 800 000

The following assumptions were made regarding additional healthcare services that are already covered under the GHS or will be introduced over the next few years:

- **Inpatient care:** Treatment of GHS beneficiaries abroad will reach €30 million in 2025 and is expected to be reduced to €28 million up to 2027. This cost is projected to grow in line with the relevant medical inflation from 2026 onwards.
- **Pharmaceuticals:** The cost of introducing the “on-going”<sup>3</sup> new or innovative drugs will increase from €45 million in 2022 to €89.4 million in 2026, while the “ad-hoc”<sup>4</sup> requests for new or innovative drugs estimated at €40 million in 2025 and will continue to increase, reaching €76 million in 2032, excluding medical inflation. These amounts are assumed to grow in line with the relevant medical inflation from 2027 onwards.

<sup>3</sup> “On-going” new or innovative drugs are the new/ innovative drugs already introduced to GHS or will be approved by the Drugs Committee in near future and then introduced to GHS.

<sup>4</sup> “Ad-hoc” requests for new or innovative drugs refer to the new/ innovative drugs currently covered by the Ministry of Health as special requests, but as of 1/1/2025 will be covered by GHS, as well as any subsequent special requests in future.

- **Services of General Economic Interest (ΥΓΟΣ):** The cost expected to be €37.3 million for 2024, increasing by 2 per cent for the years 2025 and 2026. This cost is assumed to grow in line with the relevant medical inflation from 2027 onwards.

## **5.4. Administrative expenditure projection assumption**

Administrative expenses were separated into four categories: staff expenses, operation expenses, development expenses and contingencies. Staff expenses were projected based on HIO strategic staffing plan and by applying the wage increase assumption presented in Chapter 4. Operation expenses, development expenses and contingencies were projected based on HIO operational and development plans and by applying the CPI assumption presented in Chapter 4.

## ► 6. General Healthcare System: Base scenario projection results

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The present actuarial valuation deals with the ability of the GHS to meet its future obligations at the time they fall due. This is done under an open-group approach, which takes into consideration all current and future contributors of the GHS, including their future contributions and benefits, to determine whether current reserve and future contributions will be sufficient to pay for all future GHS expenditures. Future contributions and benefit expenditures are calculated:

- according to the methodology covered in Chapter 3;
- according to the demographic and economic assumptions presented in Chapter 4; and
- using the scheme-specific assumptions presented in Chapter 5 as well as the basis of the GHS specific database presented in Annex 3.

The main purpose of the valuation is to find out whether the financing of the GHS is on course, and not to exactly forecast numerical values. Due to the nature of the assumptions, absolute figures include a degree of uncertainty. Therefore, results have to be interpreted carefully and future actuarial valuations should be undertaken on a regular basis to check the actual experience in the light of the assumptions made.

### 6.1. Demographic projections

#### 6.1.1. Projection of the GHS contributing population

The GHS contributing population consists of the employed population and the pensioner population. Table 6.1 shows the anticipated development of the GHS contributing persons by category over the projection period from 2023 to 2032. In particular, it shows the projection of the employed contributing population as well as the pensioner contributing population, which is represented by the number of pensions by type of pension, namely the GSIS pensions (statutory, invalidity, orphan's and widows) and the social pension.

The number of employed contributing population is directly linked to the assumed labour force participation rates applied to the working-age population. Hence, the demographic and labour market assumptions have a great impact on the expected number of future contributors. As shown in table 6.1, the number of GHS employed contributing persons is expected to increase continuously for the rest of the projection period due to the projected increase in the working-age population, mainly due to the projected positive net migration, and in the labour force. In particular, over the projection period, the number of employed contributing persons is expected to increase by 12.6 per cent, i.e., from 557,825 in 2023 to 628,054 in 2032.

The total number of GSIS pensions also increases during the projection period. In particular, the total number of GSIS pensions is expected to increase by 25.4 per cent, increasing from 179,527 in 2023 to 225,143 in 2032.

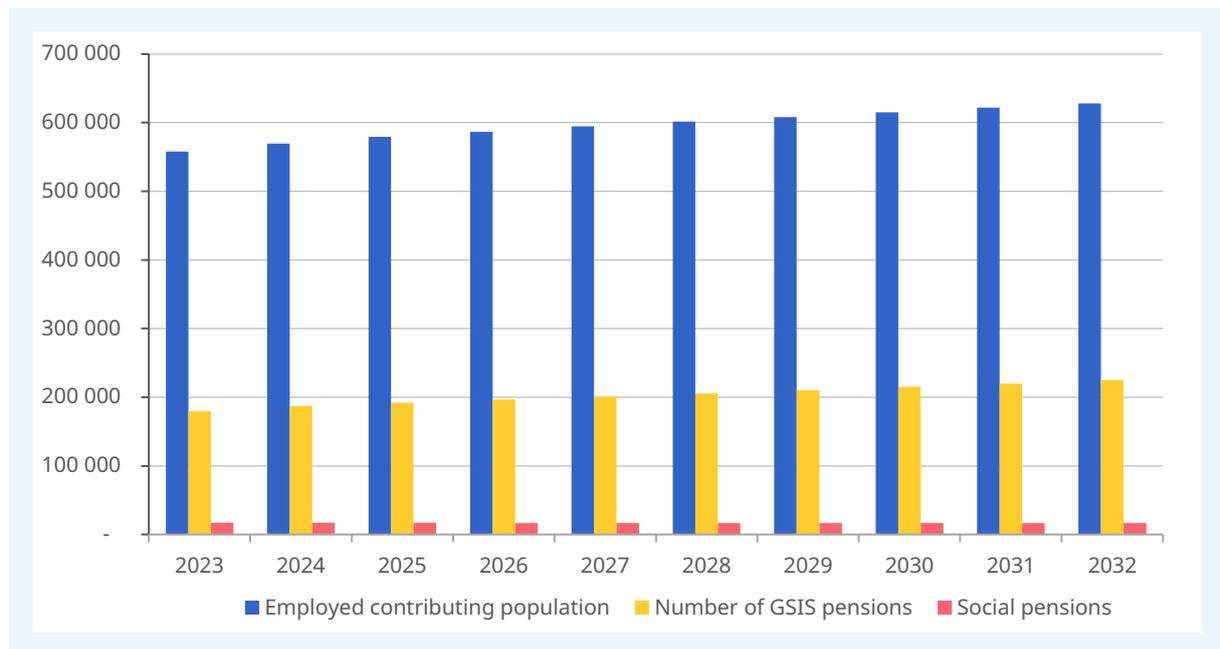
Furthermore, the number of social pensions is expected to decrease, by 2.7 per cent.

► **Table 6.1. Projection of GHS contributing population, by category, 2023–2032**

Year	Employed contributing population	Number of GSIS pensions					Total	Social pensions
		Statutory	Invalidity	Widows	Orphans			
2023	557 825	139 350	4 050	35 497	630	<b>179 527</b>	17 294	
2024	569 476	145 668	3 936	36 627	663	<b>186 894</b>	17 242	
2025	579 092	149 769	3 889	37 745	679	<b>192 082</b>	17 163	
2026	586 577	153 244	3 807	38 846	683	<b>196 580</b>	17 058	
2027	594 608	156 630	3 779	39 958	692	<b>201 059</b>	16 924	
2028	601 438	160 022	3 755	41 064	693	<b>205 534</b>	16 752	
2029	608 184	163 533	3 784	42 165	689	<b>210 171</b>	16 820	
2030	614 912	167 356	3 779	43 267	681	<b>215 083</b>	16 852	
2031	622 078	171 219	3 828	44 372	675	<b>220 094</b>	16 854	
2032	628 054	175 146	3 852	45 476	669	<b>225 143</b>	16 829	

Figure 6.1 shows the expected evolution of the number of GHS contributors by category over the projection period 2023–2032.

► **Figure 6.1. Projection of GHS contributing population by category, 2023–2032**



### 6.1.2. Projection of GHS registered beneficiaries

Table 6.2 shows the anticipated development of the number of GHS registered beneficiaries. This is directly linked to the demographic framework, namely the assumed fertility, mortality and net migration. As shown in table 6.2, the number of GHS registered beneficiaries is expected to increase continuously for the rest of the projection period mainly due to the projected increase in fertility and net migration. In particular, over the projection period, the number of registered beneficiaries is expected to increase by 10.2 per cent, i.e., from 960,500 in 2023 to 1,058,666 in 2032.

Table 6.2 presents the projection of year-end GHS registered beneficiary population for the period 2023 to 2032.

► **Table 6.2. Projection of year-end GHS registered beneficiaries, by sex, 2023–2032**

Year	Male	Female	Total
2023	468 941	491 559	<b>960 500</b>
2024	475 114	497 545	<b>972 659</b>
2025	481 068	503 386	<b>984 454</b>
2026	486 829	509 049	<b>995 878</b>
2027	492 392	514 574	<b>1 006 966</b>
2028	497 800	520 002	<b>1 017 802</b>
2029	503 063	525 280	<b>1 028 343</b>
2030	508 197	530 434	<b>1 038 631</b>
2031	513 253	535 508	<b>1 048 761</b>
2032	518 200	540 466	<b>1 058 666</b>

Table 6.3 shows the anticipated development in the number of GHS registered beneficiaries by age group at the end of each year.

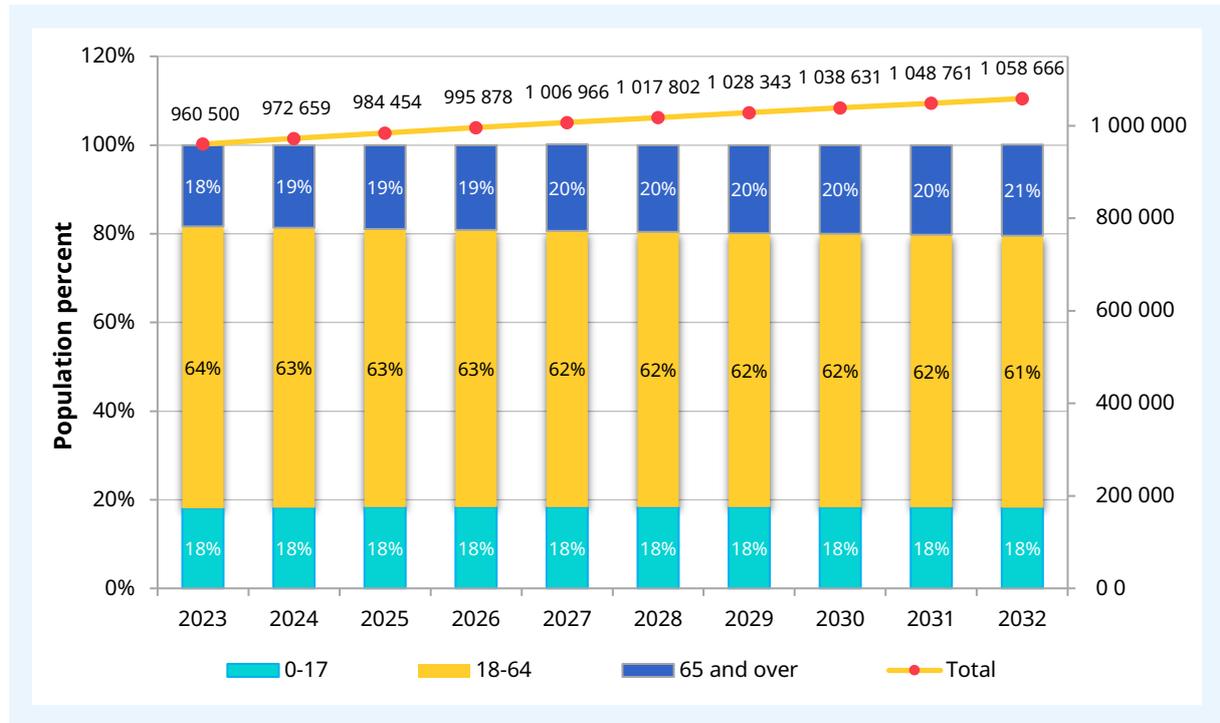
► **Table 6.3. Projection of year-end GHS registered beneficiaries, by age group, 2023–2032**

Year	0–17	18–64	65 and over	Total
2023	173 728	610 483	176 289	<b>960 500</b>
2024	177 136	614 329	181 194	<b>972 659</b>
2025	180 378	617 864	186 212	<b>984 454</b>
2026	183 023	622 494	190 361	<b>995 878</b>
2027	185 002	626 888	195 076	<b>1 006 966</b>
2028	186 737	631 476	199 589	<b>1 017 802</b>
2029	188 552	635 404	204 387	<b>1 028 343</b>
2030	189 735	640 981	207 915	<b>1 038 631</b>
2031	191 314	645 163	212 284	<b>1 048 761</b>
2032	192 636	649 785	216 245	<b>1 058 666</b>

The percentage of registered beneficiaries aged 18–64 over the total registered beneficiaries decreases from 63.6 per cent in 2023 to 61.4 per cent in 2032, while the percentage of registered beneficiaries aged 65 and above over the total registered beneficiaries increases from 18.4 per cent in 2023 to 20.4 per cent in 2032. It follows that the beneficiaries' age composition shows a small ageing effect over the projection period.

Figure 6.2 shows graphically the projection of year-end GHS registered beneficiaries and their percentage distribution by age group for 2023 to 2032.

► **Figure 6.2. Projection of year-end GHS registered beneficiaries, by age group, 2023–2032**



## 6.2. Financial projections

### 6.2.1. Projection of employee contributory earnings and other income sources

Table 6.4 shows the projection of the earnings of employees (salaried and self-employed) and the various other income sources which are subject to GHS contributions for the period 2023 to 2032.

► **Table 6.4. Projection of employee contributory earnings and other income sources, 2023–2032 (in million of Euros)**

Year	Employee contributory earnings	GSIS pension	Other pensions			Other income sources				
			GEPS	Semi-state pension schemes	Social pension	Cash deposits	Interest on cash deposits	Rents	Dividends	Other taxable income related to GHS
2023	12 726	1 828	416	83	92	27 347	87	565	1 380	362
2024	13 536	1 966	428	86	100	27 784	88	666	1 627	371
2025	14 168	2 120	433	87	106	29 378	96	681	1 663	379
2026	14 792	2 267	435	87	110	30 949	108	694	1 696	387
2027	15 484	2 396	436	87	114	32 515	119	708	1 730	395
2028	16 145	2 530	436	87	117	34 061	132	723	1 765	402
2029	16 815	2 670	436	87	121	35 541	145	737	1 800	411



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Other contribution income	63	73	75	76	78	80	82	84	86	92
Government as State	710	757	795	832	870	908	946	984	1 022	1 058
<b>Contribution income</b>	<b>1 534</b>	<b>1 641</b>	<b>1 719</b>	<b>1 796</b>	<b>1 878</b>	<b>1 957</b>	<b>2 037</b>	<b>2 117</b>	<b>2 196</b>	<b>2 276</b>

Note: "Other contribution income" includes interest on cash deposits, rents, dividends, and other taxable income related to GHS.

Table 6.7 shows the projection of other income for the period 2023 to 2032. Other income mainly concerns "state sponsorship and co-financed projects" and investment income, resulted mainly from interest paid on the reserve of the GHS.

► **Table 6.7. Projection of other income, 2023–2032 (in million of Euros)**

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Other income	6	16	12	12	9	9	9	9	10	11

### 6.2.3. Projection of benefits expenditure

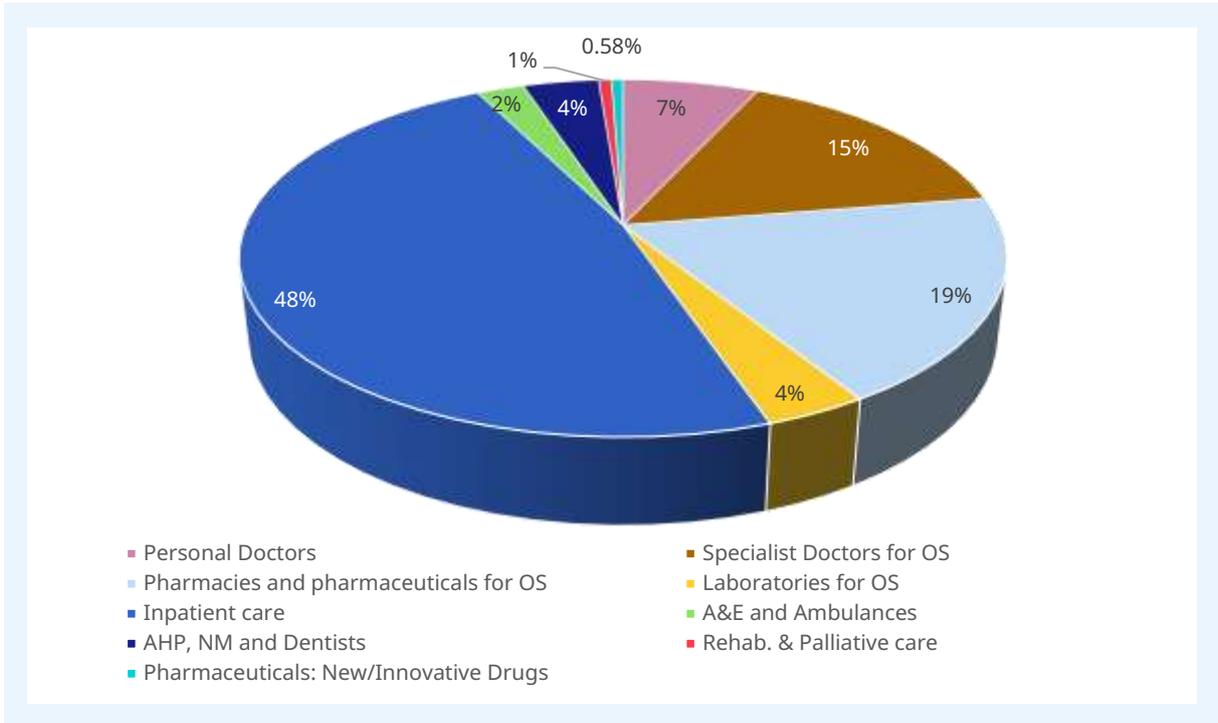
Table 6.8 shows the projection of benefits expenditure by healthcare category over the projection period of 2023 to 2032.

► **Table 6.8. Projection of GHS benefit expenditure, by healthcare category, 2023–2032 (in million of Euros)**

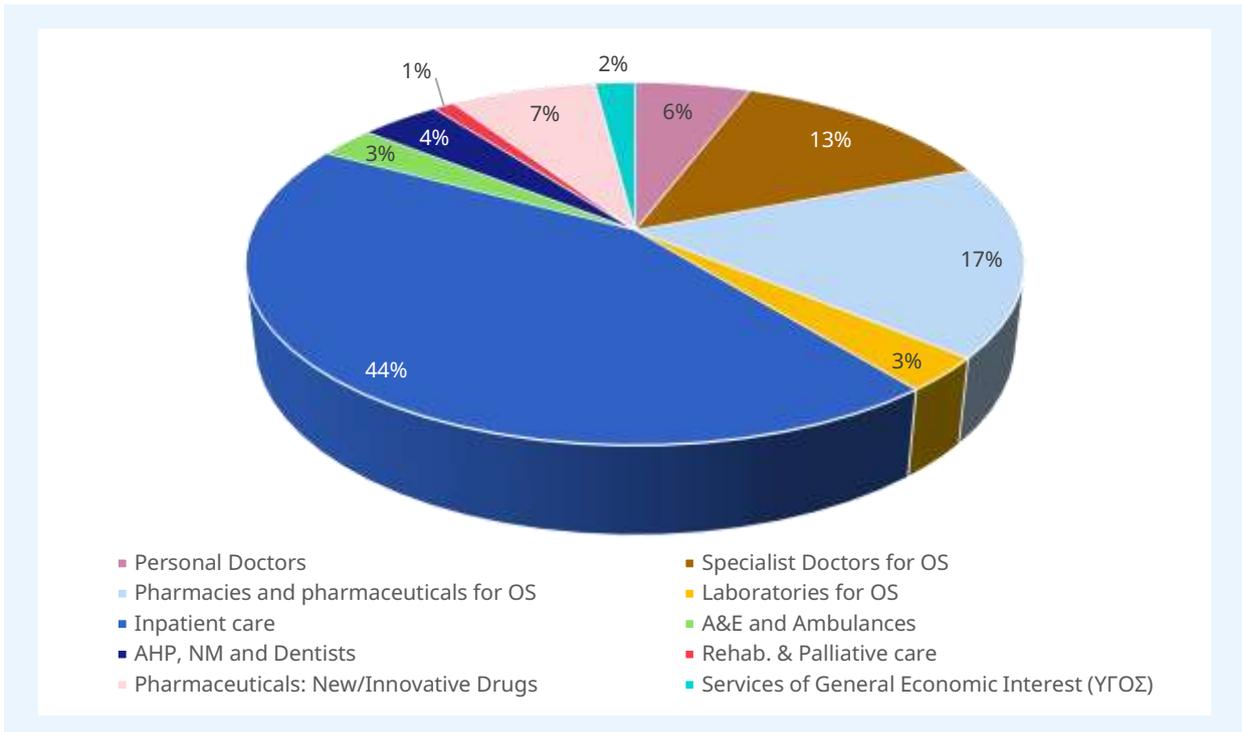
Healthcare category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Personal doctors	101	102	106	110	114	118	122	126	130	134
Outpatient specialist doctors	231	239	250	258	266	274	283	292	301	310
Pharmacies and pharmaceuticals for outpatient	276	305	318	329	339	349	360	371	383	395
Laboratories	54	56	57	59	61	63	64	66	68	70
Total Inpatient care	685	747	784	811	840	869	899	930	963	997
Treatment of GHS beneficiaries abroad	22	25	30	30	29	30	30	31	32	32
A&E and ambulances	35	50	53	55	56	57	58	59	60	62
AHP, NM and Dentists	56	67	73	77	79	82	84	86	89	91
Rehabilitation and palliative care	10	13	16	19	21	22	22	23	23	23
Pharmaceuticals: new/innovative drugs	9	40	115	135	144	152	161	169	178	187
Services of General Economic Interest (ΥΓΟΣ)	0	37	38	39	40	40	41	42	43	44
<b>Total GHS gross healthcare expenditure</b>	<b>1 479</b>	<b>1 681</b>	<b>1 840</b>	<b>1 922</b>	<b>1 989</b>	<b>2 056</b>	<b>2 124</b>	<b>2 195</b>	<b>2 270</b>	<b>2 345</b>

Figures 6.3 to 6.5 show the breakdown of GHS benefits expenditure by healthcare category in year 2023, 2027 and 2032 respectively.

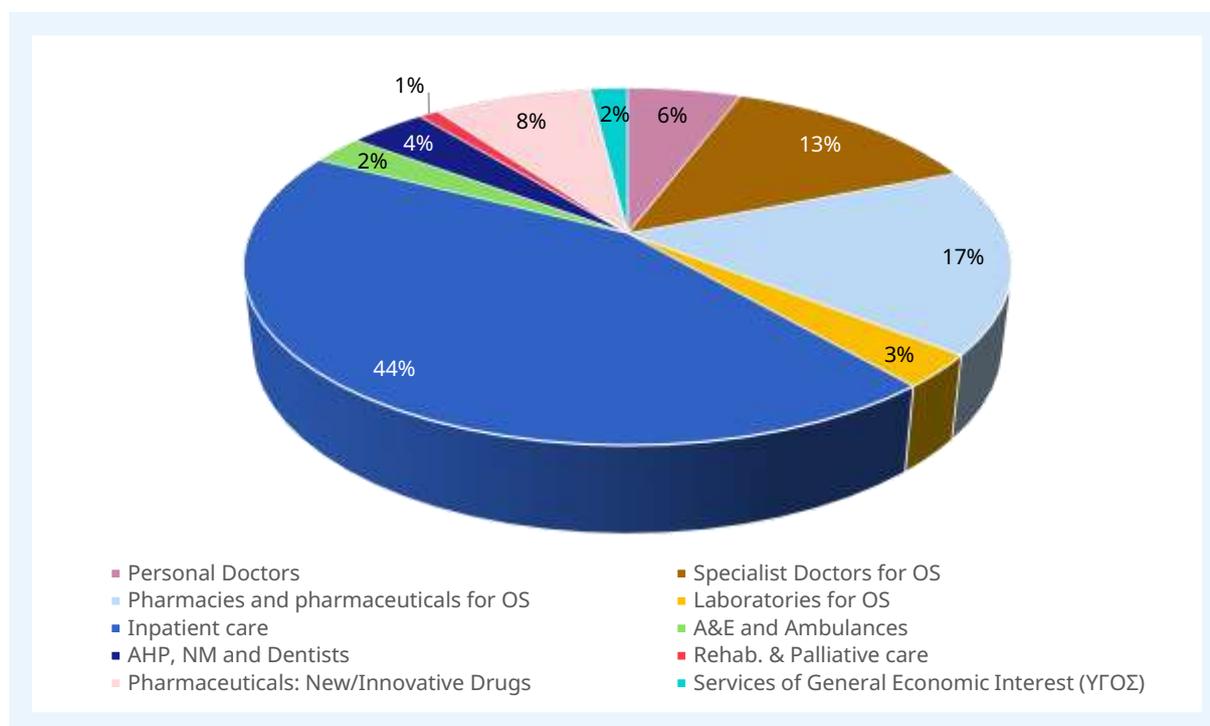
▶ **Figure 6.3. Breakdown of GHS benefits expenditure, by healthcare category, 2023 (percentages)**



▶ **Figure 6.4. Breakdown of GHS benefits expenditure, by healthcare category, 2027 (percentages)**



► **Figure 6.5. Breakdown of GHS benefits expenditure, by healthcare category, 2032 (percentages)**



It follows from figures 6.3 to 6.5 that over the period up to 2026, with the gradual introduction of new or innovative drugs, the annual expenditure of each healthcare category, other than new/ innovative drugs, as a percentage of the total GHS benefits expenditure, is projected to slightly decrease, whereas the proportion of new/ innovative drugs is projected to increase to 7 per cent. From 2027 onwards, the percentage distribution of the total GHS benefits expenditure by healthcare category is projected to be at a stable level.

Table 6.9 presents the projection of inpatient benefits expenditure by service type over the projection period from 2023 to 2032.

► **Table 6.9. Projection of inpatient benefits expenditure, by service type, 2023–2032 (in million of Euros)**

Inpatient projected expenditure	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Z-Consumables	84	93	97	101	105	108	112	116	120	125
Z-Drugs	42	51	54	55	57	59	62	64	66	68
Z-Procedures & fixed fee	61	65	70	72	75	78	80	83	86	89
DRGs	498	538	563	583	603	624	645	667	691	715
<b>Total Inpatient expenditure</b>	<b>685</b>	<b>747</b>	<b>784</b>	<b>811</b>	<b>840</b>	<b>869</b>	<b>899</b>	<b>930</b>	<b>963</b>	<b>997</b>

Table 6.10 presents the projection of benefits expenditure for pharmacies and pharmaceuticals, by service over the projection period from 2023 to 2032.

► **Table 6.10. Projection of benefits expenditure, pharmacies and pharmaceuticals, by service, 2023–2032** (in million of Euros)

Pharmacies and pharmaceuticals for outpatient: projected expenditure	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Pharmacist fees	34	35	36	37	38	39	41	42	44	45
Pharmacist fees per overnight	1	1	1	1	1	1	1	1	1	1
Pharmaceuticals: Drugs/medical devices/consumables	241	269	281	291	300	309	318	328	338	349
<b>Total expenditure</b>	<b>276</b>	<b>305</b>	<b>318</b>	<b>329</b>	<b>339</b>	<b>349</b>	<b>360</b>	<b>371</b>	<b>383</b>	<b>395</b>

Table 6.11 presents the projection of benefits expenditure for new or innovative drugs, by category, over the projection period from 2023 to 2032. As mentioned above, the categories of new/ innovative drugs refer to “On-going” and “Ad-hoc” requests.

► **Table 6.11. Projection of benefits expenditure, new or innovative drugs, by category, 2023–2032** (in million of Euros)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
“On-going” new/ innovative drugs	9	40	75	89	91	93	95	97	99	101
“Ad-hoc” requests for new/innovative drugs	0	0	40	46	53	59	66	72	79	86
<b>Total expenditure</b>	<b>9</b>	<b>40</b>	<b>115</b>	<b>135</b>	<b>144</b>	<b>152</b>	<b>161</b>	<b>169</b>	<b>178</b>	<b>187</b>

#### 6.2.4. Projection of administrative expenses

The actual cost of administrative expenses for the years 2022 and 2023 was 1.2 per cent and 1.4 per cent of total GHS income respectively. As mentioned above, the administrative expenses are currently covered by the GHS Fund and they are projected to increase over the next couple of years, reaching to 2.4 per cent in 2024 and to 2.5 per cent in 2025. For the rest of the projection period administrative expenses are projected to remain relatively stable in the range of 2.1 to 2.4 per cent.

Table 6.12 shows the projection of administrative expenses by category over the projection period from 2023 to 2032.

► **Table 6.12. Projection of administrative expenses, by category, 2023–2032**  
(in million of Euros)

Administrative projected expenditure	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Staff expenses	7	9	11	11	12	12	12	12	12	13
Operation expenses	15	24	25	25	26	26	27	28	28	29
Development expenses	1	10	10	10	10	10	10	10	10	10
Contingencies	0	0	0	0	0	0	0	0	0	0
<b>Total administrative expenses</b>	<b>23</b>	<b>43</b>	<b>46</b>	<b>46</b>	<b>48</b>	<b>48</b>	<b>49</b>	<b>50</b>	<b>50</b>	<b>52</b>
<b>Administrative expense ratio (%)</b>	<b>1.4</b>	<b>2.4</b>	<b>2.5</b>	<b>2.4</b>	<b>2.3</b>	<b>2.3</b>	<b>2.2</b>	<b>2.2</b>	<b>2.1</b>	<b>2.1</b>

### 6.2.5. Projection of reserve and reserve ratio

The projection of the revenue and expenditure components of the GHS and the evolution of the reserve of the GHS are presented in table 6.13.

Table 6.13 shows the projected financial situation of the GHS over the projection period from 2023 to 2032.

► **Table 6.13. Projected financial situation of GHS, 2023–2032** (in million of Euros)

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Reserve (start of year)</b>	<b>436</b>	<b>591</b>	<b>647</b>	<b>634</b>	<b>620</b>	<b>622</b>	<b>639</b>	<b>671</b>	<b>715</b>	<b>766</b>
Total GHS income	1 651	1 764	1 861	1 942	2 030	2 112	2 196	2 280	2 361	2 445
Total GHS benefits expenditure	1 479	1 681	1 840	1 922	1 989	2 056	2 124	2 195	2 270	2 345
Total other income	6	16	12	12	9	9	9	9	10	11
Total administrative expenses	23	43	46	46	48	48	49	50	50	52
<b>Surplus/Deficit</b>	<b>155</b>	<b>56</b>	<b>-13</b>	<b>-14</b>	<b>2</b>	<b>17</b>	<b>32</b>	<b>44</b>	<b>51</b>	<b>59</b>
<b>Reserve (end of year)</b>	<b>591</b>	<b>647</b>	<b>634</b>	<b>620</b>	<b>622</b>	<b>639</b>	<b>671</b>	<b>715</b>	<b>766</b>	<b>825</b>
Reserve ratio	0.40	0.38	0.34	0.32	0.31	0.31	0.32	0.33	0.34	0.35
<b>Administrative expense ratio (%)</b>	<b>1.4</b>	<b>2.4</b>	<b>2.5</b>	<b>2.4</b>	<b>2.3</b>	<b>2.3</b>	<b>2.2</b>	<b>2.2</b>	<b>2.1</b>	<b>2.1</b>
<b>Total GHS benefits expenditure/ Nominal GDP (%)</b>	<b>4.7</b>	<b>5.0</b>	<b>5.2</b>	<b>5.2</b>	<b>5.1</b>	<b>5.0</b>	<b>5.0</b>	<b>4.9</b>	<b>4.9</b>	<b>4.9</b>

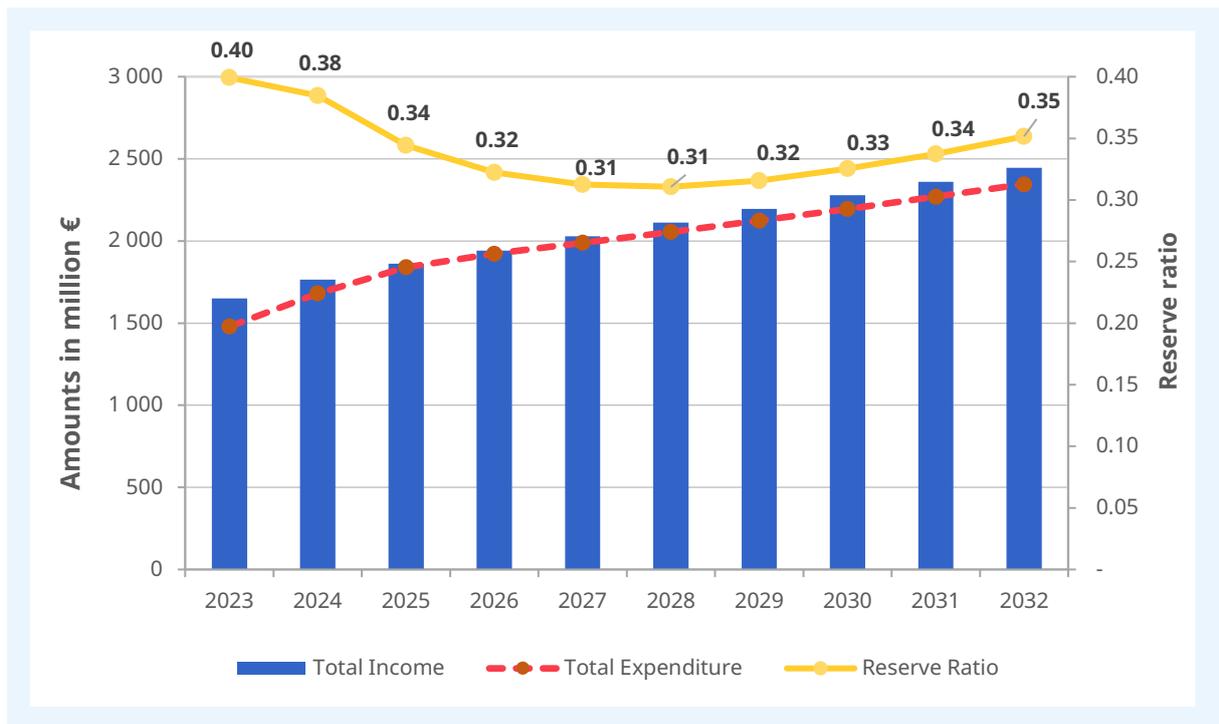
Following are the main points from table 6.13:

- The reserve ratio at the end of the projection period, i.e., in year 2032, is projected to be at an adequate level of 0.35, above four months' expenditure. It can thus be concluded that, considering the reserve, the existing schedule of the legislated contribution rates is sufficient to ensure the long-term sustainability of the GHS.
- From 2027 and onwards, total GHS income alone is sufficient to meet the GHS annual expenditure.

- For the years 2025 and 2026, the reserve will be needed in order to meet the total GHS expenditures.
- Over the period 2024–2027, there is a downward trend in the reserve and the reserve ratio. This is due to the fact that total GHS benefits expenditure is projected to grow at a faster rate than that of contributions, primarily due to the introduction of new and innovative drugs in inpatient and outpatient care, €115 million in 2025 and €135 million in 2026.
- From 2028 onwards, the reserve ratio starts to gradually increase from 0.31 in 2028 to 0.35 in 2032, primarily due the relative favourable economic conditions.
- From 2026 onwards, the ratio of the total GHS benefits expenditure over nominal GDP decreases with slow pace, from 5.2 in 2026 to 4.9 in 2030 and remains at the same level for the rest of the projection period, up to 2032.

Figure 6.6 shows graphically the evolution of the total income, total expenditure and the reserve ratio of the GHS for 2023–2032.

▶ **Figure 6.6. Total income, total expenditure and reserve ratio of the GHS, 2023–2032 (in million of Euros)**



It follows from figure 6.6 that contributions are almost sufficient to support the scheme’s expenditures for the whole projection period, thus ensuring the maintenance of a constantly positive reserve. Moreover, the GHS reserve is sufficient to cover three-and-a-half months’ expenditure over the whole projection period.

## ► 7. Reconciliation with the previous valuation

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### 7.1. Introduction

The results presented in this report were reconciled with those previously projected in the actuarial valuation as at 31 December 2021, to determine the effects of the changes that affect the projections. The indicators used for the reconciliation are the reserve and the reserve ratio, which are the GHS Fund accumulated surplus and the ratio of the level of reserve at the end of one year to the level of GHS expenditure for the same year, respectively.

The sources of difference of results observed at the two valuation dates, which are discussed below, are separated as:

- amendments in the GHS Law and other relevant laws;
- methodological improvements made to the projection model;
- GHS experience for the year 2022 affecting the starting data of the report as at 31 December 2022; and
- changes made to the key actuarial assumptions.

### 7.2. Amendments to the legislation

Over the period from the last actuarial valuation until the end of 2022, there has been one amendment to the legal provisions of the GHS. This amendment refers to the GHS Law N. 180(I) of 2022, which was enacted on 25 November 2022 and exempts the following emoluments from payment of contributions: i) the earnings of mariners who are not permanent residents of the Republic of Cyprus and ii) any lump sum or gratuity paid to employees in the public, broader public and private sector, by provident funds or pension schemes/funds. This amendment has no impact on the results between the two valuations.

### 7.3. Methodological improvements to the projection model

In principle, there were no methodological changes to the pension projection model used for the previous actuarial valuations.

### 7.4. Experience update, 2021–22

The projections made in the 2021 actuarial report were compared with the results published in the financial statements for the year 2022. Those results were adjusted so that they could be presented on the same basis as those of the present actuarial report, that is by assuming that expenditure amounts are disbursed as soon as they are encumbered, and contribution amounts are received as soon as they are due.

Table 7.1 shows the results of that comparison.

► **Table 7.1. Changes in GHS reserves, 2021–22** (in million of Euros)

	Actual	Expected	Difference	
	2022	2022	In million euros	Deviation (%)
<b>Reserves as at 31 December, 2021</b>	<b>370</b>	<b>370</b>	<b>0</b>	<b>0.0</b>
Plus contributions	1 353	1 349	4	0.3
Plus co-payments & contributions I	48	48	0	0.0
Discounts from pharmaceutical companies	45	45	0	0.0
Income from healthcare services to EU citizens	15	15	0	0.0
Other income & admin income	21	19	2	10.4
Minus healthcare expenditures	1 391	1 391	0	0.0
Other expenditure	7	0	7	-
Minus administration expenditures	19	17	2	11.5
Net financing income (expense)	0	0	0	0.0
<b>Reserves as at 31 December, 2022</b>	<b>436</b>	<b>438</b>	<b>-2</b>	<b>-0.5</b>

### 7.4.1. GHS Income

GHS income consists of contributions, copayments, contributions I, discounts from pharmaceutical companies, income from healthcare services to EU citizens and other income. The total GHS income collected in 2022 was €1,483 million, 0.4 per cent higher than projected in 2021 actuarial valuation. The difference mainly concerns the GHS contribution income which was projected to be €1,349 million in the 2021 actuarial valuation, €4 million lower than actual amount of €1,353 million in 2022.

### 7.4.2. GHS Expenditure

GHS expenditure consists of healthcare expenditure, administration expenditure, net financing income expense and other expenditure. The total GHS expenditure in 2022 was €1,417 million that is 0.6 per cent higher than anticipated. The difference primarily concerns the category of other expenditure, which mainly refers to excess GHS contribution refunds. That provision was not projected in the 2021 actuarial valuation, while an amount of €7 million incurred in 2022.

## 7.5. Changes in assumptions

Table 7.2 summarizes the key demographic and economic assumptions used in this report compared with those used in the 2021 actuarial valuation report. These assumptions concern:

- **Fertility rate:** In this report, the fertility rate is 1.38 children per woman in 2023, increasing gradually to 1.41 in 2031. These fertility rates are the same with those projected in 2021 valuation.
- **Life expectancy:** In this report, the life expectancies for both males and females are assumed to reach 81.9 and 85.8 years respectively in 2031. These life expectancies are the same with those projected in 2021 valuation.
- **Net migration:** In the 2021 actuarial valuation, net migration was projected to be 9,100 in 2023 gradually decreasing to 8,855 in 2031, with an average of 9,032 over the period 2023–

2031. In this valuation, net migration starts at a higher level, from 10,500 in 2023 and decreases to 8,800 up to 2031, with an average of 9,339 over the period 2023–2031.

- **Real GDP growth:** In this report, the assumed real GDP growth rate is 2.6 per cent in 2023 and decreases to 2.0 per cent in 2031, while in the 2021 actuarial valuation, the real GDP growth rate was 2.3 per cent in 2023 decreasing to 1.9 per cent in 2031.
- **Labour force participation rates:** The assumed overall male and female labour force participation rates starts at a much higher level in the present valuation compared to the 2021 actuarial valuation. In the 2021 actuarial valuation, the male labour force participation rate of 83.5 per cent in 2023 was projected to reach 83.9 per cent in 2031 and for females, it was 73.2 per cent in 2023, increasing to 74.3 per cent in 2031. In the present report, the male labour force participation rate of 84.3 per cent in 2023 is projected to reach 84.6 per cent in 2031 and for females, it is 75.9 per cent in 2023, increasing to 76.4 per cent in 2031.
- **Unemployment rate:** In this report, the unemployment rate is assumed to gradually decrease from 6 per cent in 2023 to 5.3 per cent in 2031, while in the 2021 actuarial valuation it was assumed to start at a higher level, 6.9 per cent in 2023, decreasing to 6.5 per cent in 2031.
- **Price inflation:** In this report, the price inflation is assumed to gradually decrease from 3.8 per cent in 2023 to 2 per cent in 2031, similarly with the 2021 actuarial valuation.
- **Real wage increase:** In this report, real wage increase is assumed to remain relatively stable up to 2027, starting from 1.5 per cent in 2023 and projected to be 1.6 per cent in 2027, decreasing thereafter to 1.1 in 2031. By contrast, in the previous report it was assumed to decrease from 1.5 per cent in 2023 to 0.9 per cent in 2027 and remain stable for the rest of the projection.

Some other GHS-specific assumptions, which are described in Annex 3, were slightly changed. In particular, the assumed invalidity incidence rates in the present valuation compared to the 2021 valuation for males are on average higher by a factor of 22 per cent while those for females are on average on the same level.

► **Table 7.2. Changes to key assumptions: 2022 versus 2021 actuarial valuations**

Assumption	Year	Actuarial report as at 31 December 2022		Actuarial report as at 31 December 2021	
		Males	Females	Males	Females
Total fertility rate	2023	1.38		1.38	
	2027	1.40		1.40	
	2031	1.41		1.41	
Life expectancy at birth	2023	80.5	84.4	80.5	84.4
	2027	81.3	85.3	81.3	85.3
	2031	81.9	85.8	81.9	85.8
Net migration	2023	10 500		9 100	
	2027	9 100		9 060	
	2031	8 800		8 855	
Real GDP growth rate (%)	2023	2.6		2.3	
	2027	3.0		2.0	
	2031	2.0		1.9	

Assumption	Year	Actuarial report as at 31 December 2022		Actuarial report as at 31 December 2021	
		Males	Females	Males	Females
Labour force participation rates (15–64) (%)	2023	84.3	75.9	83.5	73.2
	2027	84.4	76.3	83.7	73.7
	2031	84.6	76.4	83.9	74.3
Unemployment rate (15–64) (%)	2023	6.0		6.9	
	2027	5.4		6.6	
	2031	5.3		6.5	
Price inflation (%)	2023	3.8		3.8	
	2027	2.0		2.0	
	2031	2.0		2.0	
Real wage increase (%)	2023	1.5		1.5	
	2027	1.6		0.9	
	2031	1.1		0.9	
Real rate of return (%)	2023	-0.9		-0.9	
	2027	0.6		0.6	
	2031	0.2		0.2	

## 7.6. Reconciliation results

Tables 7.3 and 7.4 show the results of the reconciliation between the previous actuarial valuation and present valuation. Tables 7.3 and 7.4 show the effect of the various factors on the reserve and the reserve ratio respectively.

**Amendments:** There have been no amendments in the legislation since the last actuarial valuation so there is no impact on the results between the two valuations due to amendments in the Law.

**Experience update:** The experience update for the year 2022 had the effect of decreasing the reserve by €2 million all the years of the projection.

**Changes in assumptions:** The overall impact of changes to the projection assumptions had the effect of increasing both the reserve and the reserve ratio by €85 million and 0.07 per cent respectively in 2023, whereas for 2031 it had the effect of increasing the reserve by €15 million but decreasing the reserve ratio by 0.02 per cent which means that expenditure growth is higher than the reserve growth up to 2031. The detailed impact of these changes are as follows:

- Concerning demographic assumptions, the higher net migration projected over the period 2023–2027 in 2022 (present) actuarial valuation causes increases of both the reserve and the reserve ratio over the whole projection period.
- Concerning economic assumptions, the favourable assumptions of the 2022 (present) valuation primarily with regards to the higher male and female labour force participation rates, higher real wage increases and higher real GDP growth over the whole projection period causes noticeable increases of both the reserve and the reserve ratio over the period 2024–2031.
- Concerning scheme-specific assumptions, the less favourable assumptions in the 2022 (present) valuation regarding the higher projected utilization rates, the cost of the introduction of Services of General Economic Interest (ΥΓΟΣ) and the much higher ultimate

cost relating to the new or innovative drugs, lead to decreases in both the reserve and the reserve ratio over the period 2027–2031. In particular, over the period 2029–2031, there are considerable decreases in the reserve level of more than €100 million each year. On the contrary, the delay in the time expecting the cost of the introduction of new and innovative drugs in inpatient and outpatient care to incur, as well as the non-introduction of specialized laboratory tests due to lack of relevant legislation, lead to increases of both the reserve and the reserve ratio over the period 2023–2026.

► **Table 7.3. Reconciliation of the reserve between 2022 and 2021 actuarial valuations**

	2023	2024	2025	2026	2027	2028	2029	2030	2031
<b>As per actuarial report as at 31.12.2021</b>	<b>508</b>	<b>504</b>	<b>488</b>	<b>490</b>	<b>512</b>	<b>547</b>	<b>598</b>	<b>665</b>	<b>753</b>
I. Amendments	0	0	0	0	0	0	0	0	0
II. Experience update, 2021–22	-2	-2	-2	-2	-2	-2	-2	-2	-2
III. Improvements in methodology	0	0	0	0	0	0	0	0	0
IV. Changes in assumption									
Demographic	1	5	9	13	18	23	28	33	39
Economic	36	73	96	101	107	108	150	194	233
Scheme-specific	48	67	43	18	-13	-37	-103	-175	-257
<b>Subtotal</b>	<b>85</b>	<b>145</b>	<b>148</b>	<b>132</b>	<b>112</b>	<b>94</b>	<b>75</b>	<b>52</b>	<b>15</b>
<b>Total of I to IV</b>	<b>83</b>	<b>143</b>	<b>146</b>	<b>130</b>	<b>110</b>	<b>92</b>	<b>73</b>	<b>50</b>	<b>13</b>
<b>As per actuarial report as at 31.12.2022</b>	<b>591</b>	<b>647</b>	<b>634</b>	<b>620</b>	<b>622</b>	<b>639</b>	<b>671</b>	<b>715</b>	<b>766</b>

► **Table 7.4. Reconciliation of the reserve ratio between 2022 and 2021 actuarial valuations**

	2023	2024	2025	2026	2027	2028	2029	2030	2031
<b>As per actuarial report as at 31.12.2021</b>	<b>0.33</b>	<b>0.30</b>	<b>0.28</b>	<b>0.27</b>	<b>0.27</b>	<b>0.28</b>	<b>0.30</b>	<b>0.32</b>	<b>0.36</b>
I. Amendments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
II. Experience update, 2021–22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
III. Improvements in methodology	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IV. Changes in assumptions									
Demographic	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02
Economic	0.03	0.04	0.05	0.05	0.05	0.06	0.07	0.09	0.10
Scheme-specific	0.04	0.04	0.01	-0.01	-0.02	-0.04	-0.07	-0.10	-0.14
<b>Subtotal</b>	<b>0.07</b>	<b>0.08</b>	<b>0.06</b>	<b>0.05</b>	<b>0.04</b>	<b>0.03</b>	<b>0.02</b>	<b>0.01</b>	<b>-0.02</b>
<b>Total of I to IV</b>	<b>0.07</b>	<b>0.08</b>	<b>0.06</b>	<b>0.05</b>	<b>0.04</b>	<b>0.03</b>	<b>0.02</b>	<b>0.01</b>	<b>-0.02</b>
<b>As per actuarial report as at 31.12.2022</b>	<b>0.40</b>	<b>0.38</b>	<b>0.34</b>	<b>0.32</b>	<b>0.31</b>	<b>0.31</b>	<b>0.32</b>	<b>0.33</b>	<b>0.34</b>

## ► 8. Sensitivity scenarios and tests

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Since all projections have a degree of uncertainty, a variety of sensitivity scenarios and tests were carried out in order to measure the sensitivity of projected financial position of the GHS Fund to future changes in the demographic and economic environments as well as the activation of certain GHS institutional measures relating to its financial governance.

In order to examine the degree of sensitivity of projected results to changes in sensitivity scenario and test assumptions, two financial indicators are presented for each scenario/ test, the values of which are compared with those in the base scenario. These indicators are:

- the reserve amount at each year end; and
- the reserve ratio: the ratio of the level of reserve at the end of one year to the level of expenditures for the same year.

Two sensitivity scenarios were performed on the results of the actuarial valuation to examine their sensitivity to changes in the following set of assumptions or measures:

- economic adverse scenario, resulting to lower migration, lower GDP growth rates, lower nominal wage increases, lower employment growth rates and lower labour-force participation rates from 2025 onwards, when compared to base scenario; and
- introduction of new healthcare services which are not currently covered by the GHS legislation.

In addition, individual sensitivity tests were performed on the results of the actuarial valuation to assess their sensitivity to changes in the following four key GHS variables which are subject to a relatively high degree of uncertainty:

- cost from the introduction of new/innovative drugs;
- medical inflation: progressive growth to a higher or a lower level by 0.5 per cent over the projection period;
- Z items price: increase or decrease of  $\pm 5$  per cent;
- progressive increases or decreases in utilization rates by  $\pm 3$  per cent to  $\pm 5$  per cent; and
- increases or decreases of inpatient utilization rates of  $\pm 5$  per cent from 2026 onwards.

Two tests were conducted for each of the individual sensitivity test assumptions. The first evaluated the effect on the results of changes less favourable for the GHS than those used in the base scenario; the second evaluated the effect of more favourable changes. The variations in assumptions tested represent a difference considered to be significant with respect to the assumptions made in the base scenario without, however, being the upper and lower limits of a probable interval of change for each variable.

A less favourable change in an assumption (Test I) typically results in a lower reserve amount and reserve ratio. A more favourable change (Test II) has the opposite effect.

Tables 8.1 and 8.2 summarize the alternative assumptions used in the sensitivity scenarios and tests respectively. This is followed by a brief discussion of each sensitivity scenario and test as well as the impact that each sensitivity scenario and test has on projection results. Tables 8.3 and 8.4,

presented at the end of this chapter, show the values of the above two financial indicators for each sensitivity scenario and test.

► **Table 8.1. Sensitivity scenario assumptions (percentages)**

Assumption	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Base scenario</b>										
Net Migration	10 500	10 000	9 600	9 300	9 100	9 000	8 900	8 850	8 800	8 750
GDP growth (real)	2.6	3.5	3.1	3.0	3.0	2.7	2.3	2.1	2.0	2.0
Consumer Price Inflation	3.8	2.5	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Wage increase (nominal)	4.8	3.5	3.5	3.5	3.6	3.6	3.4	3.2	3.1	3.2
Labour force participation rates – Males	84.3	84.3	84.3	84.4	84.4	84.5	84.5	84.6	84.6	84.6
Labour force participation rates – Females	75.9	76.0	76.1	76.2	76.3	76.3	76.4	76.4	76.4	76.4
Employment growth (15–74)	1.5	1.6	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.8
Productivity growth (real)	1.1	1.9	2.0	2.0	2.0	1.8	1.4	1.2	1.1	1.2
Medical inflation	Increased in line with CPI increase									
<b>Economic adverse scenario</b>										
Net Migration	10 500	10 000	7 680	7 440	7 280	7 200	7 120	7 080	7 040	7 000
GDP growth (real)	2.6	3.5	2.4	2.1	1.9	1.8	1.7	1.6	1.5	1.5
Consumer Price Inflation	3.8	2.5	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Wage increase (nominal)	4.8	3.5	3.3	3.1	3.2	3.2	3.2	3.1	3.0	3.0
Labour force participation rates – Males	84.3	84.3	84.2	84.2	84.1	84.1	84.0	84.0	83.9	83.9
Labour force participation rates – Females	75.9	76.0	76.0	75.9	75.9	75.8	75.8	75.7	75.7	75.6
Employment growth (15–74)	1.5	1.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
Productivity growth (real)	1.1	1.9	1.8	1.5	1.3	1.3	1.2	1.1	0.9	1.0
Medical inflation	Increased in line with CPI increase									
<b>Scenario for introduction of new healthcare services</b>										
Specialised Laboratories tests	Introduction of specialised Laboratories tests from 2027 with an expenditure of €10 million increasing to €12 million in 2028.									
Rehabilitation services: New capacity	Introduction of new centres for Rehabilitation services and expansion of current centres, starting from 2026 with an additional expenditure of €3 million increasing to €10 million in 2029.									
Introduction of private hospitals Ambulances services	Introduction of private hospitals Ambulance services from 2026 with an expenditure of €1 million.									
Introduction of private occupational specialists	Introduction of private occupational specialists from 2026 with an expenditure of €13 million.									

► **Table 8.2. Sensitivity test assumptions (in million of Euros)**

Assumption	Test I (unfavourable)	Best estimate assumptions	Test II (favourable)
Introduction of:			
New/innovative drugs	"on-going" <sup>1</sup> new/innovative drugs: €98.3m by 2026	"on-going" <sup>1</sup> new/innovative drugs: €89.4m by 2026	"on-going" <sup>1</sup> new/innovative drugs: €80.5m by 2026
	"ad-hoc" <sup>2</sup> requests for new/innovative drugs: €44m in 2025 reaching €95m by 2032	"ad-hoc" <sup>2</sup> requests for new/innovative drugs: €40m in 2025 reaching €76m by 2032	"ad-hoc" <sup>2</sup> requests for new/innovative drugs: €36m in 2025 reaching €61m by 2032
Medical inflation	Progressive growth to a higher level by 0.5%	Base scenario	Progressive growth to a lower level by 0.5%
Z items price	+5% applied in 2025	Base scenario	-5% applied in 2025
Utilization rates	Progressive increase by 3 to 5% for all activities/services	Base scenario	Progressive decrease by 3 to 5% for all activities/services
Inpatient utilization rates	+5% applied from 2026 onwards	Base scenario	-5% applied from 2026 onwards
Notes: <sup>1</sup> On-going" new or innovative drugs are the new/innovative drugs already introduced to GHS or will be approved by the Drugs Committee in near future and then introduced to GHS. <sup>2</sup> "Ad-hoc" requests for new or innovative drugs refer to the new/innovative drugs currently covered by the Ministry of Health as special requests, but as of 1/1/2025 will be covered by GHS, as well as any subsequent special requests in future.			

## 8.1. Sensitivity scenarios

### 8.1.1. Economic adverse scenario

The present actuarial valuation is based on the prevailing economic conditions and expectations about Cyprus' economy, taking into account the relevant European Commission's forecasts along with the economic forecasts of the Ministry of Finance of Cyprus as of September 2024, on the measures of GDP growth, consumer price inflation, wage growth and unemployment rate, as presented in Chapter 4.

As shown in table 8.1, compared to base scenario, the economic adverse scenario is built on the assumption of a deterioration of the economy due to worsening of geopolitical tensions, which results to lower migration, lower GDP growth, lower nominal wage growth, lower employment growth and lower labour-force participation rates over the period 2025 to 2032.

This economic adverse scenario decreases both GHS contribution income and benefits expenditure.

The contribution income decreases primarily through:

- lower employee contributory earnings, driven by lower wages and lower employed contributing population due to decrease in employment growth rates; and
- lower pension income, driven by lower wage and price pension indexation.

On the other hand, the GHS benefits expenditure decreases mainly due to lower projected beneficiaries' population driven by lower net migration.

## 8.1.2. Scenario for introduction of new healthcare services

The present actuarial valuation results are based on current legal provisions of the GHS and a framework of healthcare services currently covered by the GHS, which drive the future evolution of GHS benefits expenditure. Under this sensitivity scenario, it is assumed that a number of potential new healthcare services that currently are not legally covered by the GHS, will be introduced. Those potential new healthcare services, which will drive the GHS benefits expenditure downwards, are as follows:

- The introduction of specialised laboratories tests from 2027 with an expenditure of €10 million increasing to €12 million in 2028.
- The introduction of new centres for rehabilitation services and expansion of current centres, starting from 2026 with an additional expenditure of €3 million increasing to €10 million in 2029.
- The introduction of private hospitals ambulance services from 2026 with an expenditure of €1 million.
- The introduction of private occupational specialists from 2026 with an expenditure of €13 million.

## 8.2. Sensitivity tests

### 8.2.1. Introduction of new/innovative drugs

Due to the uncertainty regarding the determination of the assumption related to the ultimate cost of introducing both “on-going” and “ad-hoc” requests for new or innovative drugs, it is necessary to test the sensitivity of GHS projected financial position to changes in this assumption. The base scenario assumes that the cost from introducing the “on-going” new or innovative drugs will increase from €45 million in 2022 to €89.4 million in 2026, while the “ad-hoc” requests for new or innovative drugs estimated at €40 million in 2025 and will continue to increase, reaching €76 million in 2032, excluding medical inflation.

In Test I (unfavourable), the cost from the introduction of both “on-going” and “ad-hoc” requests for new/ innovative drugs is higher than that assumed under the base scenario, primarily due to a higher volume of those drugs, a higher price of those drugs, or lower discounts gained from pharmaceutical providers. In Test II (favourable), the cost of both “on-going” and “ad-hoc” requests for new/ innovative drugs is lower than that assumed under the base scenario, primarily due to a lower volume or price of those drugs, or higher discounts gained from pharmaceutical providers.

In Test I (unfavourable), the assumed cost from the introduction of the “on-going” new or innovative drugs will reach €98.3 million in 2026 and the “ad-hoc” requests for new or innovative drugs will be €44 million in 2025 reaching €95 million in 2032, excluding medical inflation. By contrast, in Test II (favourable), the assumed cost of the “on-going” new or innovative drugs will reach €80.5 million in 2026 and the “ad-hoc” requests for new or innovative drugs will be €36 million in 2025 reaching €61 million in 2032, excluding medical inflation.

### 8.2.2. Medical inflation

Based on the analysis of historical data and of likely future trends in medical inflation, the base scenario uses an assumption on the evolution of medical inflation for each healthcare service, as presented in table 5.19 of Chapter 5.

A possible increase in the consumer price inflation or the cost of healthcare services (Test I) could drive medical inflation at higher levels. By contrast, a possible decrease in the consumer price inflation or the cost of healthcare services (Test II) has the opposite effect.

In Test I (unfavourable), the assumed medical inflation evolves at a higher rate than that assumed under the base scenario, progressively reaching to a higher level by 0.5 per cent by 2031, and thus putting an upward pressure to GHS benefits expenditure. By contrast, in Test II (favourable), the assumed medical inflation evolves at a lower rate, progressively reaching to a lower level by 0.5 per cent by 2031, and thus putting a downward pressure to GHS benefits expenditure.

### 8.2.3. Z items prices

Based on the analysis of historical data and of likely future trends in Z items prices, the base scenario uses an assumption of Z items prices, as presented in Chapter 5.

A possible increase in the prices of Z items or gaining lower discounts for Z items (Test I) could result in an increase in Z items expenditure. A possible decrease in the prices of Z items or gaining higher discounts for Z items (Test II) has the opposite effect.

In Test I (unfavourable), the assumed Z items prices increased by 5 per cent in 2025. By contrast, in Test II (favourable), the assumed Z items prices decreased by 5 per cent in 2025.

### 8.2.4. Increases or decreases in utilization rates

Based on the analysis of historical data and of likely future trends in utilization rates, the base scenario uses an assumption of utilization rates by age group and sex for each healthcare service, as presented in Chapter 5.

A possible increase in the morbidity rates or an increased demand in specialties/ services (Test I) could result in an increase of utilization rates in those specialties, thus driving the GHS benefits expenditure at higher levels. A possible downward change in the morbidity rates or a decreased demand in specialties/services (Test II) has the opposite effect.

Test I (unfavourable) assumes a progressive increase of 3 to 5 per cent in all utilization rates depending on the activity/service up to 2027 or 2029 respectively. By contrast, Test II (favourable), assumes a progressive decrease of 3 to 5 per cent in all utilization rates depending on the activity/service up to 2027 or 2029 respectively.

### 8.2.5. Increases or decreases in Inpatient utilization rates

Based on the analysis of historical data and of likely future trends in Inpatient utilization rates, the base scenario uses an assumption of utilization rates by age group and sex for each Inpatient healthcare service, as presented in Chapter 5.

Due to the uncertainty of the results as the inpatient utilization rates are not yet stabilized and due to the affiliation of the new private hospitals, a possible increase in the morbidity rates or an increased demand in inpatient specialties/ services (Test I) could result in an increase of utilization rates, thus driving the GHS benefits expenditure at higher levels. A possible downward change in the morbidity rates or a decreased demand in inpatient specialties/ services (Test II) has the opposite effect.

Test I (unfavourable) assumes a 5 per cent increase in inpatient utilization rates from 2026 onwards. By contrast, Test II (favourable), assumes a decrease of 5 per cent in utilization rates from 2026 onwards.

## 8.3. Test results

The following sub-sections present the results of each sensitivity scenario and test compared to base scenario. For each sensitivity scenario and test, the values of the financial indicators of reserve amount and reserve ratio, are presented and compared with the respective figures under the base scenario over the projection period from 2023 to 2032.

### 8.3.1. Sensitivity scenarios results

Table 8.3 shows the financial situation of the GHS under the base scenario compared to the two sensitivity scenarios described in sub-sections 8.1.1 and 8.1.2 over the period 2023–2032.

As described in section 8.1.1, the economic adverse scenario assumes a deterioration of the economy compared to base scenario and this decreases both GHS income and expenditure. As it is illustrated by table 8.3, such a scenario decreases the GHS income more than the GHS benefits expenditure, and thus causes a reduction in the reserve of up to 54 per cent in 2032, when compared to the base scenario. Nevertheless, at the end of the projection period, i.e., 2032, the available amount of reserve remains sufficient to cover almost two months' expenditure.

Under the sensitivity scenario for the introduction of new healthcare services, the projected financial position of the GHS, as measured by the level of reserve and the reserve ratio, deteriorate when compared to the base scenario results. It follows from table 8.3 that the level of reserve at the end of the projection period, i.e., 2032, is by 31 per cent lower than that of the base scenario. Additionally, the reserve ratio indicates that the reserve is enough to cover at least two-and-a-half months of GHS expenditure throughout the projection period. This sensitivity scenario shows that even by introducing some new healthcare services under GHS, the GHS reserve will be maintained at an adequate level.

► **Table 8.3. Results of sensitivity scenarios**

Scenario/Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Reserve amount at year end (in million of Euros)</b>										
Base scenario	591	647	634	620	622	639	671	715	766	825
Economic adverse scenario	591	647	627	593	558	525	491	458	422	383
Scenario for introduction of new healthcare services	591	647	634	602	573	553	545	548	556	571
<b>Reserve ratio (percentages)</b>										
Base scenario	0.40	0.38	0.34	0.32	0.31	0.31	0.32	0.33	0.34	0.35
Economic adverse scenario	0.40	0.38	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.17
Scenario for introduction of new healthcare services	0.40	0.38	0.34	0.31	0.28	0.26	0.25	0.25	0.24	0.24

### 8.3.2. Sensitivity tests results

Table 8.4 shows the projected financial situation of the GHS under the base scenario compared to that of each of the ten individual sensitivity tests, representing one favourable and one unfavourable test with respect to each of five GHS variables tested. Details of the above sensitivity tests are described in sub-sections 8.2.1 to 8.2.4.

The first variable tested is the cost of introducing new/ innovative drugs. Under Test I (unfavourable), a cost of the above products higher than that assumed under the base scenario, results in reduced levels of reserve: in 2028, a minimum of €591 million compared to €639 million under the base scenario; at the end of the projection period, a 19 per cent lower level compared to that of the base scenario; and over the years from 2028 to 2032 the level of reserve is gradually reduced slightly below three-and-a-half months' expenditure. On the other hand, under Test II (favourable), a cost of the above products lower than that assumed under the base scenario, results in increased levels of reserve: in 2026, a minimum of €633 million compared to €620 million under the base scenario; at the end of the projection period, a 18 per cent higher level compared to that of the base scenario, covering five months' expenditure.

The above results show that the GHS is sensitive to these decreases or increases, and that the HIO will have to carefully examine the relevant catalogue of drugs and introduce them in a manner so as not to disturb the scheme's financial sustainability. Moreover, the results show that if the HIO handles the negotiations in a manner that could gain as many discounts as possible from the pharmaceutical companies, this could lead to a higher reserve than that calculated under the base scenario.

The second variable tested is the medical inflation. An assumed medical inflation which progressively leads to a higher level by 0.5 per cent than that of base scenario, results in a reduction of the reserve to €631 million in 2032 compared to €825 million under base scenario, representing a decrease of 24 per cent, while the reserve by 2032 is sufficient to cover three months' expenditure. On the other hand, an assumed medical inflation which progressively leads to a lower level by 0.5 per cent than that of base scenario, results in an increase of the reserve to €1,019 million in 2032, representing an increase of 24 per cent compared to base scenario, while at the end of the projection period the reserve is sufficient to cover more than five months' expenditure. The above tests indicate that the GHS financial sustainability is very sensitive to fluctuations in medical inflation.

The third variable tested is the Z items price. An increase in the Z items price by 5 per cent results in a reduction of the reserve to €726 million in 2032, compared to €825 million under the base scenario, representing a decrease of 12 per cent, while the reserve by 2032 is not sufficient to cover four months' expenditure as in base scenario. On the other hand, a decrease in the Z items price by 5 per cent results in an increase of the reserve to €927 million in 2032, representing an increase of 12 per cent compared to the base scenario, while at the end of the projection period the reserve is sufficient to cover four-and-a-half months' expenditure. The above tests indicate that the GHS financial sustainability is sensitive to fluctuations in the Z items price, and the savings or the expenses could be on average €10 million or more per year.

The fourth variable which was tested is the utilization rates. An increase in the utilization rates results in a reduction of the reserve to €391 million in 2032, compared to €825 million under the base scenario, representing a decrease of 53 per cent. Additionally, in 2032 the reserve is sufficient to cover slightly below two months' expenditure. On the other hand, a decrease in the utilization rates results in an increase of the reserve to €1,069 million in 2032, representing an increase of 30 per cent compared to the base scenario, while at the end of the projection period the reserve is sufficient to cover five-and-a-half months' expenditure. The above results indicate that the reserve is very sensitive to changes in the utilization rates.

The fifth variable which was tested is the inpatient utilization rates. An increase in the inpatient utilization rates results in a reduction of the reserve to €557 million in 2032, compared to €825 million under the base scenario, representing a decrease of 33 per cent, while from 2029 the reserve is sufficient to cover only two-and-a-half months' expenditure. On the other hand, a

decrease in the utilization rates results in an increase of the reserve to €1,096 million in 2032, representing an increase of 33 per cent compared to the base scenario, while at the end of the projection period the reserve is sufficient to cover more than five-and-a-half months' expenditure. The above results indicate that the reserve is very sensitive to changes in the utilization rates.

► **Table 8.4. Results of sensitivity tests**

Sensitivity/Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Reserve amount at year end (in million of Euros)</b>										
Base scenario	591	647	634	620	622	639	671	715	766	825
Introduction of new/innovative drugs (higher expenditure)	591	647	634	606	592	591	601	619	640	666
Introduction of new/innovative drugs (lower expenditure)	591	647	634	633	651	685	737	805	882	971
Medical inflation: progressive increase of +0.5%	591	647	632	615	608	610	618	628	631	631
Medical inflation: progressive decrease of -0.5%	591	647	635	625	636	668	724	803	900	1 019
Z items price: +5%	591	647	623	598	588	594	613	644	681	726
Z items price: -5%	591	647	645	641	655	685	730	787	852	927
Increase in utilization rates	591	647	621	580	541	503	466	437	411	391
Decrease in utilization rates	591	647	646	655	683	728	796	878	968	1 069
Increase in Inpatient utilization rates	591	647	619	573	543	525	521	528	539	557
Decrease in Inpatient utilization rates	591	647	649	666	701	753	821	904	994	1 096
<b>Reserve ratio (%)</b>										
Base scenario	0.40	0.38	0.34	0.32	0.31	0.31	0.32	0.33	0.34	0.35
Introduction of new/innovative drugs (higher expenditure)	0.40	0.38	0.34	0.31	0.30	0.28	0.28	0.28	0.28	0.28
Introduction of new/innovative drugs (lower expenditure)	0.40	0.38	0.34	0.33	0.33	0.34	0.35	0.37	0.39	0.42
Medical inflation: progressive increase of +0.5%	0.40	0.38	0.34	0.32	0.30	0.29	0.29	0.28	0.27	0.26
Medical inflation: progressive decrease of -0.5%	0.40	0.38	0.35	0.33	0.32	0.33	0.34	0.37	0.40	0.45
Z items price: +5%	0.40	0.38	0.34	0.31	0.29	0.29	0.29	0.29	0.30	0.31
Z items price: -5%	0.40	0.38	0.35	0.34	0.33	0.34	0.35	0.36	0.38	0.40

Sensitivity/Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Increase in utilization rates	0.40	0.38	0.34	0.30	0.27	0.24	0.21	0.19	0.18	0.16
Decrease in utilization rates	0.40	0.38	0.35	0.34	0.35	0.36	0.38	0.41	0.43	0.46
Increase in Inpatient utilization rates	0.40	0.38	0.33	0.29	0.27	0.25	0.24	0.24	0.23	0.23
Decrease in Inpatient utilization rates	0.40	0.38	0.36	0.35	0.36	0.37	0.39	0.42	0.45	0.48

## ► 9. Conclusions and recommendations

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The financial projections indicate that the GHS Fund is financially sustainable over the period 2023–2032 under the legislated schedule of contribution rates. Over the projection period there is a small ageing effect which does not materially alter the projected financial position of the GHS. Therefore, considering the reserve, contribution rates are assessed to be appropriate to sustain the scheme financially in the short and medium term, and thus ensuring the maintenance of a constantly positive reserve.

The projected reserve ratio remains positive throughout the projection period, indicating the sufficiency of the annual income and the accumulated reserve to cover the annual expenditures. However, from year 2024 to 2027, a downward trend is observed in the reserve ratio. This is primarily due to the introduction of new and innovative drugs in inpatient provisions and outpatient services care, with an expenditure gradually increasing to €115 million in 2025 and reaching up to €144 million in 2027.

Over the period 2029–2032, an upward trend in the reserve ratio is observed, primarily due to the relative favourable economic conditions which cause income to grow at a faster rate than expenditure. By year 2032, the reserve ratio is projected to attain a level to cover more than four months' expenditure. Throughout the projection period 2023–2032, the reserve ratio indicates that the accumulated reserve can cover more than three-and-a-half month's expenditure.

Given the recent implementation of the HIO, the short historical series of data available to obtain stability in key GHS variables as well as the high degree of uncertainty associated with the projected financial results of the present actuarial valuation, as illustrated by sensitivity analyses, it is essential that the financial position of the GHS Fund is monitored closely and on a regular basis, so that, where necessary, corrective measures are taken in a timely manner.

In particular, the following endogenous measures, as illustrated by sensitivity analysis, would have greater financial impact than others and could reduce the risk that reserve would not be enough to face unexpected expenditures that could disrupt the financial sustainability of the GHS Fund:

- the gradual introduction of new /innovative drugs, based on a thorough assessment for value added; and
- the constrain of overutilization of services/activities, especially with regards to the inpatient services.

Given the uncertainty of results, in the context of a sound financial governance of the GHS, it is recommended that the HIO makes the necessary provisions for maintaining an adequate reserve ratio, taking into account the desired level of reserve of its Board of Directors, necessary to safeguard the GHS against potential future financial risks associated with events of sudden adverse economic and morbidity developments.

The main role of the reserve, as in all social security health insurance schemes providing short term benefits, is to cover potential annual deficits in cases where the annual cash flow balance is temporarily reversed, i.e., the annual expenditure is higher than revenues, primarily due to events of sudden adverse economic and morbidity developments. Therefore, in the short-term, it is reasonable and appropriate for the HIO to maintain a higher reserve ratio than the benchmark level of two months (16.7 per cent) of annual healthcare expenditure, which is typically held by

mature, well-established social security healthcare programmes, primarily to cover potential annual deficits. Those deficits are anticipated to incur since the GHS is at its early stages of maturity and over the next few years new services and new providers are expected to be introduced.

## ► 10. Actuarial opinion

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This Report was prepared as requested under the provisions of Part II, Article 4(2)(e), of The General Healthcare System Law of 2001 (N.89(I)/2001). In our opinion:

- a. the data upon which the report is based are sufficient and reliable;
- b. the assumptions used for the report are reasonable and appropriate both in the aggregate and individually; and
- c. the methodology employed is appropriate and consistent with accepted actuarial practice.

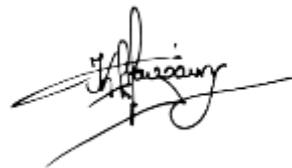
Based on the results of this valuation, we hereby certify that, under the current GHS provisions, the GHS is financially sustainable over the period covered by the projections in this Report. The above projections assume no policy change in terms of adding new GHS healthcare services other than those which had been anticipated to be introduced at the time of writing this report. This means that the initial reserve plus future projected income of GHS is sufficient to support projected GHS benefits and administrative expenses over the projection period, when considering the applicable financing rules and the projected future demographic and economic environment in which GHS will operate.

This report has been prepared and our opinions provided in accordance with internationally accepted actuarial practice as provided by the International Standard of Actuarial Practice 2: Financial Analysis of Social Security Programs.

10 February, 2025



**André Picard FSA, FCIA**



**Costas Stavrakis FIA, FCAA**



## ► Annex 1. Design features of the GHS

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### A1.1. Brief history

The Health Insurance Organization (HIO) was established by virtue of the Law No. 89(I) 2001 as a legal entity governed by public law for the implementation of the General Healthcare System (GHS) in the Republic of Cyprus. HIO implemented the first phase of the new GHS in June 2019, which unified a previously fragmented system, as well the second phase of the new GHS in June 2020. Under the new system, some responsibilities of the Ministry of Health shifted to the HIO, which serves as the single purchaser of services from both public and private providers.

The HIO is governed by a Board of Directors in which the Government, the employers, the employees and the patients are represented. In accordance with the General Healthcare System Laws of 2001 to 2022 the Organization is the executive authority for the implementation of the GHS. The Law stipulates the philosophy, system-architecture and main features of the GHS.

### A1.2. Covered population

Under the previous system, in 2019, only around 80 per cent of the population were technically considered to be covered free of charge. The GHS aims to provide universal health coverage for all legal residents as described in the following paragraph. For the first time, migrants will have the same healthcare coverage as all Cypriots and EU citizens, reducing or even eliminating the disadvantages of the previous system, in which people were dependent on private health insurance.

Therefore, the GHS covers the following categories of beneficiaries:

- Citizens of the Republic of Cyprus who have their ordinary residence in the areas controlled by the Government of the Republic of Cyprus.
- European Union Citizens who have their ordinary residence and either work or have acquired the right of permanent residence in the Republic of Cyprus.
- Third-country Citizens who have their ordinary residence in the Republic of Cyprus and have acquired legally either the right of permanent residence or the right to equal treatment in the sectors of social insurance, according to the provisions of the Cyprus National Law.
- Other categories (such as refugees) under certain conditions.
- Persons who are family members of the first two points or persons who are family members of the third point and who have also acquired legally the right of permanent residence.

Family members are the spouse of the beneficiary and the children under the age of 21, or over the age of 21 who are dependent on them or their spouse, as determined by Regulations.

### A1.3. Healthcare services under the General Healthcare System

All beneficiaries have access to the same healthcare services covered by the GHS. The healthcare services covered are described in table A1.1.

► **Table A1.1. Healthcare services covered by the GHS, by implementation date**

Date implemented	Healthcare service
1 June 2019	Personal doctors for adults and children
	Specialist doctors for outpatient care
	Pharmacies and pharmaceuticals for outpatient care
	Laboratories for outpatient care
1 June 2020	Inpatient care
1 September 2020	Accident and emergency care and ambulance services
1 December 2020	Dentists for preventive dental care
	Nurses and allied health professionals: physiotherapists, clinical psychologists, clinical dieticians, speech therapists, occupational therapists for outpatient care
1 October 2021	Midwives
1 January 2022	Palliative care
1 January 2023	Institutional rehabilitation services
1 November 2023	Allied health professionals: podologists for outpatient care

As a general principle, the GHS covers only prescribed pharmaceuticals and vaccines. The HIO reimburses fully the cheapest pharmaceutical based on its active-ingredient-group or/and its therapeutic-class-group. Pharmaceuticals not covered by GHS are non-prescribed drugs and lifestyle drugs.

Under the GHS, referral is needed to access certain healthcare services. These are: outpatient specialists, laboratories, pharmacies, nurses, allied health professionals and hospitals for inpatient services. In case where a beneficiary visits directly an outpatient specialist without a referral from his/her personal doctor, a personal contribution is paid, as explained in section A1.5.

GHS beneficiaries can directly access personal doctors, outpatient specialists for chronic/serious illness (cancer, thalassemia etc.) care, dentists for preventive dental care, midwives, ambulances and accident and emergency services without a referral and without paying any personal contribution. For accident and emergency services a co-payment applies. Moreover, a female beneficiary who has attained the age of 15 and visits an outpatient specialist in gynaecology/obstetrics, and a beneficiary who is serving his compulsory military service and visits an outpatient specialist having a referral by a military doctor, can access these healthcare services without a referral. However, they need to pay the co-payment amount as indicated in table A1.3 for visiting an outpatient specialist.

### A1.4. Financing approach

For the implementation of the GHS, a Healthcare Insurance Fund (GHS Fund) has been established for the purpose of gathering the relevant contributions, and from which all payments to providers of healthcare services are made. The GHS Fund is administered by the HIO.

The HIO sets an individual global budget for each segment of healthcare following consultations with the respective representatives of the healthcare providers. The total global budget corresponds to the annual expenditure for healthcare services covered by the GHS. In any given

financial year, the actual expenditure for any segment of healthcare within the framework of the GHS cannot exceed the predetermined global budget, irrespective of the volume of services provided. This practice aims at containing the cost and ensure the sustainability of the scheme. The annual global budget of each healthcare segment is allocated to the 12 months of the year.

## A1.5. Source of funding

The GHS Fund revenues come from contributions, co-payments, personal contributions (contribution I), donations and legacies, income from assets of the HIO, investment income (interest paid on the GHS Fund accumulated surplus) and any other income accrued from the activities of the HIO.

### A1.5.1. Contributions

The main GHS source of financing is contributions. The payment of the contributions for the first phase started on 1 March 2019 and was full implemented on 1 March 2020.

The categories of contributors are:

- Employees;
- Employers;
- State;
- Self-employed;
- Pensioners;
- Income-earners;
- Government officials;
- Persons responsible for the payment of remuneration to government officials.

The contribution rates for each category of contributors set by the General Healthcare System (Amending) Law of 2017 are shown in table A1.2.

► **Table A1.2. Contribution rates for each category of contributors during the first phase and full implementation phase (percentages)**

Category	First phase (1 March 2019 – 28 February 2020)	Full implementation (as of 1 March 2020)
Employees (public and private sector)	1.70	2.65
Pensioners	1.70	2.65
Income earners (e.g. rent, interest, dividends)	1.70	2.65
Government officials	1.70	2.65
Self-employed	2.55	4.00
Employers (including the State as an employer)	1.85	2.90
Government/ State	1.65	4.70

There is a maximum annual income per physical person of €180,000 on which contributions are payable.

The Treasury oversees the collection of contributions from the salaries of employees which are employed by the Republic of Cyprus, pensions provided by the Government/ State (excluding Social Pension) and earnings of government officials. The Social Insurance Services (which covers

other branches of social security as pensions, maternity, sickness, etc.) oversees the collection of contributions from the salaries of employees other than those who are employed by the Republic of Cyprus, insurable earnings of the self-employed and pensions provided by the Social Insurance Fund and Social Pension. Finally, the Tax Department oversees the collection of contributions from earnings over the insurable earnings of the self-employed, pensions from Cyprus other than those paid by the Treasury or the Social Insurance Services, pensions from abroad, earnings of officials other than government officials and other income (e.g. rent, interest, dividends).

In the case where a physical person is not a tax resident of Cyprus, he/she will pay contributions only for the income, earnings and pensions which are derived from the Republic of Cyprus, excluding dividends and interest.

### A1.5.2. Co-payments and Personal Contribution I and II

Where applicable, upon receiving a healthcare service, the beneficiary pays directly to the provider of the healthcare service the relevant co-payment and/or Personal Contribution I and II.

#### Co-payment

The objective of the co-payment is to encourage responsible behaviour by patients and healthcare providers and to prevent abuse of the healthcare services offered. The healthcare services for which a co-payment is paid by the beneficiary and the amounts of the co-payments are set out in table A1.3. The co-payment is paid directly to the healthcare provider and constitutes part of the provider's fee.

► **Table A1.3. Co-payments applied by healthcare service providers**

Healthcare service	Applied	Co-payment amount (€)
Drugs	Per product	1.00
Medical devices/consumables	Per product	1.00
Vaccines	Per product	0.00
Laboratory tests (up to 10 lab tests per lab order)	Per test/test panel	1.00
Outpatient specialists (except radiology, pathological anatomy, cytology)	Per visit	6.00
Radiology	Per test	10.00
Pathological anatomy, cytology	n/a	0.00
Personal doctors	Per visit	0.00
Allied health professionals (occupational therapists, clinical dieticians, clinical psychologists, speech therapists, physiotherapists)	Per visit	10.00
Nurses and midwives	Per visit	6.00
Accident and emergency departments	Per visit (on triage activity)	10.00
Dentists	n/a	0
Inpatient services	n/a	0
Ambulance services	n/a	0
Palliative care and Institutional rehabilitation services	n/a	0

A maximum annual amount of co-payments is set for each beneficiary in order to protect vulnerable groups (e.g. low-income persons and/or persons with increased needs in medical care)

and to safeguard unhindered access of the population to the necessary healthcare services. The maximum annual amounts for co-payments are shown in table A1.4.

► **Table A1.4. Annual co-payments cap by beneficiary category**

Beneficiary category	Annual co-payment cap
General population	150
Beneficiaries under 21 years old	75
Low-income pensioners	75
Recipients of the Guaranteed Minimum Income	75
Specific groups of beneficiaries are exempted from co-payments according to the relevant GHS legislation	0

Co-payments do not apply for personal doctor visits (additional co-payment applies, of €0 to €15 per visit, only in the case where the beneficiary exceeds the specified annual number of personal doctor visits defined for their age group), ambulances, inpatient care and dentists for preventive dental care.

Additionally, a co-payment of €0 to €25 applies for out-of-hour visits to personal doctors and outpatient specialists. In cases where the additional co-payment applies, no other co-payment or PC I is payable by the beneficiary.

### Personal Contribution I and II

Under the GHS, a referral is needed to access certain healthcare services. These are: outpatient specialists, laboratories, pharmacies, nurses, midwives and allied health professionals and hospitals for inpatient services. In case where a beneficiary visits directly an outpatient specialist without a referral from their personal doctor, the Personal Contribution I of €25 per visit will be paid. The two exceptions for which this Personal Contribution I is not applied are:

- a female beneficiary who has attained the age of 15 and visits an outpatient specialist in gynaecology/ obstetrics; and
- a beneficiary who is serving his compulsory military service in the National Guard of the Republic and holds a referral by a military doctor referring him to an outpatient specialist.

Moreover, personal doctors, outpatient specialists for chronic/serious illness (cancer, thalassemia etc.) care, dentists for preventive dental care, midwives, ambulances and accidents and emergencies services can also be directly accessed without a referral and without paying a Personal Contribution I. For accident and emergency services a co-payment applies.

Once a personal contribution is due, then no co-payment is deemed due. Personal Contribution I is paid directly by the beneficiary to the healthcare provider and constitutes part of the healthcare provider's fee. No annual cap applies on personal contribution I.

As a general principle, the GHS covers only prescribed pharmaceuticals and vaccines. The HIO reimburses fully the cheapest pharmaceutical based on its active-ingredient-group or/and its therapeutic-class-group. In this case the beneficiary pays only the co-payment amount of €1 per drug. In cases where beneficiaries choose a more expensive pharmaceutical product than the one reimbursed fully by the GHS, they pay a Personal Contribution II which is equal to the difference between the price of the pharmaceutical product covered by the GHS and the price of the chosen pharmaceutical product. Personal Contribution II is paid in addition to the co-payment or the Personal Contribution I.

## A1.6. Reimbursement methods

The HIO reimburses providers through various reimbursement methods; these are:

- 1. Price list (fixed fee):** Reimbursement is calculated based on the list price of each item for the specific date. Price list catalogues exist for:
  - a. Drugs
  - b. Medical equipment/ Consumables
  - c. Drugs for vaccinations
  - d. Personal doctors out-of-hour service
  - e. Personal doctors firstborn visit
  - f. Specific inpatient care services (Catalogue Z)
  - g. Specific outpatient specialists' activities/ items
  - h. Personal doctors for children for the escort of a child by ambulance
- 2. Point system:** Reimbursement is calculated based on the number of points of each activity in a group, the total claimed number of points per group and the group budget of each month. Point values are calculated monthly, based on the monthly budget and the total number of points for the specific month. The HIO can define minimum or maximum amounts for point values. Claims reimbursements are based on the calculated point value of the specific group. The point system applies for:
  - a. Laboratory tests
  - b. Outpatient specialists (OS)
  - c. Special group of OS (diagnostic radiology, pathological anatomy, cytology, nuclear doctors)
  - d. Personal doctors Tier 2 & 3 services (excluding services under the price list reimbursement method)
  - e. Accident and emergency (A&E) activities from private hospitals
  - f. Allied health professionals activities
  - g. Inpatient activities
  - h. Dentist activities
  - i. Nurse activities
  - j. Midwife activities
  - k. Pharmacist fee (both for the dispensing of drugs and for out-of-hours services)
- 3. Capitation reimbursement:** Reimbursement is not claim-based. It concerns the personal doctors and the services they offer to beneficiaries registered in their list. It is calculated based on the number of days each beneficiary is registered to a personal doctor list according to a daily rate corresponding to the age group of the beneficiary.
- 4. Performance reimbursement:** Implemented in 2022 and aiming at improving quality of services. The reimbursement amount for each provider is calculated based on various key performance indicators (KPIs).
- 5. Inpatient diagnosis related group (DRG) point system reimbursement:** Inpatient services are reimbursed per case based on a DRG reimbursement method. The DRG cases are separated into normal, specialised and births. The Standard Base Rates (point value) which apply for each hospital for normal and specialised cases, are determined based on the score

of each hospital on specific qualitative criteria. The Standard Base Rates for specialised cases are higher than the Standard Base Rates for normal cases. The Base Rate for all birth cases is fixed and it is the same for all hospitals. A pre-agreed number of points is defined for each hospital for normal and for specialised cases, up to which no discount factors apply on each hospital's respective Standard Base Rates. In case a hospital exceeds its pre-agreed number of points, discount factors apply in order not to exceed the global budget.

**6. Fixed annual amount:** A&E Department for public hospitals and ambulances of public hospitals.

### Personal doctors

About one quarter of doctors in Cyprus report that they provide general practice services, although this might not be their specialization, while gatekeeping has been designed as the backbone of the GHS. Most of the private doctors working outside hospitals have joined the GHS.

There are two personal doctors (PD) categories, the PD for adults (over 15 years old) and the PD for children (under 18 years old). PDs are reimbursed for the provision of healthcare services, mainly by capitation fee, and based on the number of beneficiaries registered on their PD's catalogue. Since June 2022, in addition to the capitation fee, KPIs reimbursement method has been introduced for PDs. The capitation fee amount that is paid to a PD per beneficiary is based on the age group of each registered beneficiary. The PDs monthly fee is calculated by multiplying the number of days which each beneficiary is registered to personal doctor list during that month, according to a daily rate corresponding to the age group of the beneficiary. Personal doctors for children are paid a fixed fee amount of €250 for the newborn visit.

► **Table A1.5. Age groups and capitation rates (Euros)**

Age group	01/01/2022 – 31/05/2022		01/06/2022 – 31/12/2022		01/01/2023 +	
	Annual rates	Daily rates	Annual rates	Daily rates	Annual rates	Daily rates
0-3	210	0.57	186	0.51	186	0.51
4-7	155	0.42	137	0.38	137	0.38
8-14	91	0.24	80	0.22	80	0.22
15-17	91	0.24	80	0.22	80	0.22
18-50	83	0.22	66	0.18	66	0.18
51-70	117	0.32	94	0.26	94	0.26
71+	145	0.39	116	0.32	116	0.32

An adjustment in the per capita remuneration, average reduction of 10 per cent, was applied to all PDs due to the COVID-19 impact on the economy and consequently on the GHS Fund. This adjustment was in place from May 2020 to February 2022.

### Outpatient services

Outpatient specialists (OS) are reimbursed on a fee-for-service method, based on the activity list of each specialty and the point system method. Under the point system method, the healthcare services are reimbursed based on the number of points of the specific medical activity and the point value for the specific month.

Separate budgets and point values are applied for most outpatient specialties. Each specialty currently has an additional margin on its basic budgeted amount. That margin stands at 15 per cent in 2022. All specialities together have an additional total budgeted amount, namely the

‘equalization fund’. In cases where the total number of points per specialty exceeds the pre-defined limit, the point value is adjusted so the corresponding specialty expenditure to do not exceed the global budget set for the specific specialty. The HIO has the right to transfer budget amounts between specialities, i.e., from the surplus of one specialty the HIO has the right to cover the additional costs of another specialty provided that the total global budget for all OS specialties is not exceeded.

Fixed fee reimbursement is applied for specific consumables and facility fees for certain specialties.

### **Laboratory services**

Laboratory services are performed outside the context of inpatient care. They are reimbursed by fee-for-service based on the laboratory tests catalogue and the point system method. A point value is pre-defined for a certain monthly volume of points per laboratory. Once the laboratory exceeds the pre-defined volume of points, an adjusted lower point value is applied in order to ensure that the global budget for the laboratories category is not exceeded.

Currently, only few specialized laboratory tests are covered. Full coverage of the specialised tests is planned to start once the relevant legislation is finalized by the MoH. A part of the costs of specialized laboratory tests are currently covered by the State Health Services Organization (SHSO - the organization managing the public hospitals) and their cost is expected to be passed to the HIO once full coverage of specialised tests is implemented.

### **Pharmacists, pharmaceuticals, consumables, and medical devices**

The following categories can be differentiated under this section:

- pharmacist fee reimbursed through the point system method as per the activity catalogue;
- pharmacist fee for out-of-hours services reimbursed through the point system method;
- pharmaceutical drugs/medical devices/consumables, reimbursed through a price list reimbursement based on a fixed fee per drug/medical device/consumable; and
- new/innovative drugs reimbursed based on a fixed fee per drug.

Discounts and clawbacks are applied to pharmaceutical companies based on the actual levels of drugs consumption. In addition, managed entry agreements between HIO and pharmaceutical companies are implemented for the introduction of new/innovative drugs.

The cost of outpatient drugs and inpatient Z drugs, regarding new/innovative drugs or the revision of protocols concerning the use of existing drugs in more cases, will be gradually included in the next few years (partly in 2024 and mainly 2025–26).

### **Inpatient services**

For private or public hospitals affiliated with the GHS, inpatient services are reimbursed per case based on a diagnosis-related-group (DRG) reimbursement method. As from 1 September 2023, the inpatient DRG cases are separated into normal, specialised and births. The Standard Base Rates (point value) which apply for each hospital for normal and specialised cases, are determined based on the score of each hospital on specific qualitative criteria. The Standard Base Rates for specialised cases are higher than the Standard Base Rates for normal cases. The Base Rate for all birth cases is fixed and it is the same for all hospitals. A pre-agreed number of points is defined for each hospital for normal and for specialised cases, up to which no discount factors apply on

each hospital's respective Standard Base Rates. In case a hospital exceeds its pre-agreed number of points, discount factors apply in order the specific hospital to do not exceed the global budget.

It is noted that DRG points for normal or specialised cases which arise after a referral from an A&E department, are not subject to discount factors if these A&E visits are up to a maximum percentage of the total A&E visits.

The Z-catalogue items concern high-cost consumables and medical devices, high-cost pharmaceutical products and high-cost procedures under inpatient services, which are reimbursed over and above DRG reimbursement. They all have fixed prices for the services defined in Z-catalogues and they are reimbursed based on a fee-for-service method. Depending on the actual volume of specific Z-catalogue procedures, discount factors apply in order not to exceed the global budget.

Global budgets are defined separately for DRGs, Z-catalogue procedures, Z-catalogue drugs and Z-catalogue consumables.

Finally, until the HIO is able to manage internally the inpatient care treatment of GHS beneficiaries abroad, the relevant cost is reimbursed to the Ministry of Health as an annual lump sum expenditure.

### **Accident and emergency services and ambulances**

Currently, a different reimbursement method is applied for private and public hospitals for accident and emergency (A&E) services. Private hospitals are reimbursed per case based on the fee-for-service method and the point system method. The SHSO (the organization managing the public hospitals) is reimbursed based on a guaranteed annual amount.

Private hospital A&E departments are reimbursed on a point system method. If the hospital's A&E department exceeds the pre-agreed number of points, its point value is adjusted so that the global budget is not exceeded. Emergency services in private hospitals are reimbursed similarly to inpatient services.

The SHSO is the unique provider for ambulance services under the HIO and is reimbursed for ambulance services based on a guaranteed monthly amount.

### **Dentist, nurses and midwives and allied health professionals**

Dentists are reimbursed on a point system method based on the number of points of the specific medical activity and the point value for the specific month. Nurses, midwives and allied health professionals are reimbursed on the fee-for service-method based on the activity list as per the activity catalogue and the point system method.

Separate budgets and point values are applied for dentists, nurses, midwives and allied health professionals. Furthermore, nurses budget and point value differentiate between general nurses and nurses for psychiatric nursing. Differentiation of the budget and the point value is also made for the different specialities of allied health professionals, specifically: physiotherapists, occupational therapists, speech therapists, clinical dieticians and clinical psychologists. Each category of allied health professionals currently has an additional margin on its basic budgeted amount. That margin stands at 10 or 15 per cent in 2022.

## ► Annex 2. The ILO/HEALTH modelling framework

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### A2.1. Objective of the ILO/HEALTH modelling framework

Building on decades of policy and analytical work to support countries in the extension of their social protection systems, the ILO has created a modelling framework, along with a set of quantitative tools, to support the long-term planning and sustainability of social health protection schemes and programmes. This framework supports the development of institutional capacities to produce a strong evidence-based process of policy reform. The tools should be used as part of a policy process aimed at ensuring that the human right to access healthcare becomes a reality for all. As the world works to achieve the 2030 Agenda for Sustainable Development, there is an urgent need to ensure that the targets of the Sustainable Development Goals (SDG) will be met and sustained over time. To this end, the ILO strives to support those efforts, especially with a view to achieving and sustaining SDG Target 1.3 on universal social protection and Target 3.8 on universal health coverage.

### A2.2. Scope of the ILO/HEALTH modelling framework

The ILO/HEALTH modelling framework targets the establishment of appropriate models that can be used to estimate and project the future financial impact of the introduction of and/or parametric changes to social protection schemes and programmes covering healthcare. These schemes or programmes should aim to provide effective access to healthcare services without hardship. The ILO International standards envisage the provision of medical care – both preventative and curative – by defining a basic set of goods and services that should be provided with a view to maintaining, restoring or improving health and the ability to work and attend to personal needs.

In line with ILO standards and principles, the ILO/HEALTH modelling framework is adapted to the variety of systems that exist to finance these schemes and programmes. It can be adapted to both tax-financed programmes and schemes funded by contributions, in accordance with the recognition by ILO standards that several approaches exist to ensure effective access to healthcare as long as they respect key principles:<sup>5</sup>

- The modelling framework is adapted to the diversity of arrangements that can exist for the financing, purchasing and provision of healthcare. The recourse to social health insurance, a national health service or a combination of these schemes is possible in line with ILO Medical Care Recommendation, 1944 (No. 69).
- It can be used for both contributory and non-contributory short-term cash benefits to guarantee income security during sickness.

The ILO/HEALTH modelling framework is the result of conceptual, methodological and technical development over several decades of experience of the ILO worldwide. It implies the establishment of actuarial models that combine components of economic, demographic and financial modelling specific to healthcare schemes, and it can be used to support quantitative work in both social health insurance schemes and national healthcare services.

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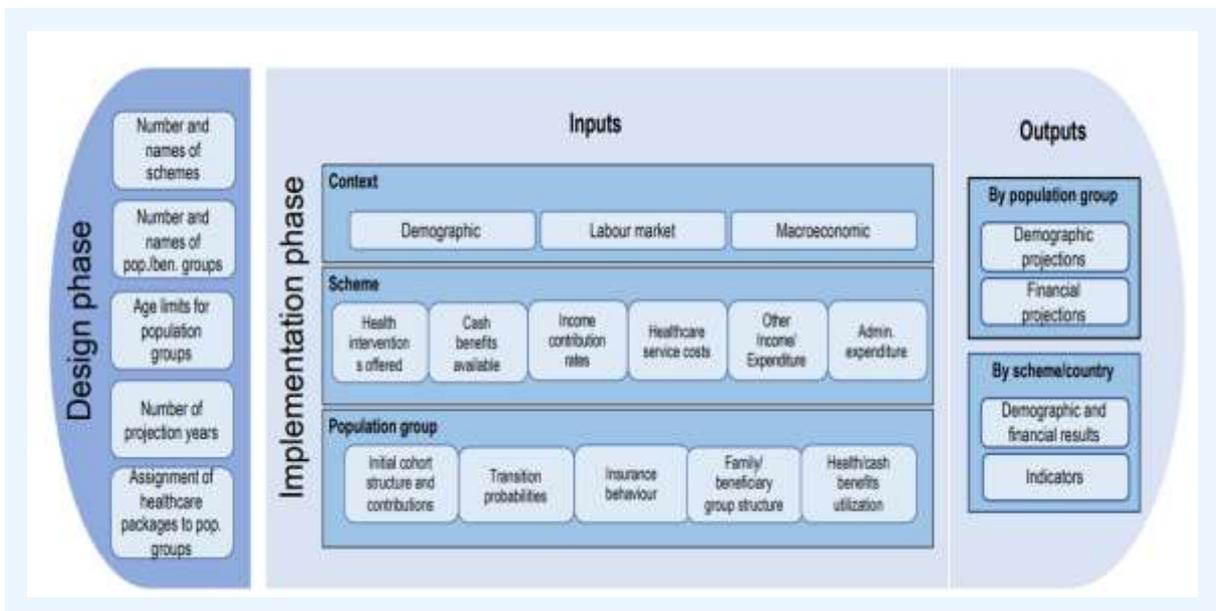
<sup>5</sup> ILO. 2020. Towards Universal Health Coverage: Social Health Protection Principles. Social Protection Spotlight Brief. Available at: [https://www.ilo.org/secsoc/information-resources/publications-and-tools/Brochures/WCMS\\_740724/lang-en/index.htm](https://www.ilo.org/secsoc/information-resources/publications-and-tools/Brochures/WCMS_740724/lang-en/index.htm).

The formulation of quantitative models for healthcare schemes comprises a complex and interrelated set of elements. These include the macroeconomic framework, the labour market, the different population groups covered, the rules of financing and access to healthcare services, the supply and demand for healthcare services, rules for the allocation of financial resources to healthcare service providers and their linkage to payment methods, and the institutional arrangements for linking the flow of economic resources to the demand for healthcare services.

### A2.3. The building blocks of the modelling framework

The ILO/HEALTH modelling framework is constructed on a basic set of building blocks. Understanding these building blocks is crucial to modelling and obtaining the desired results (see figure A2.1).

► **Figure A2.1. Overview of the modelling framework (building blocks)**



Modelling work is done in **two phases**:

- The first phase is the design phase, where the establishment of parameters is done. First there is the need to discuss and analyse the critical aspects of setting up a particular actuarial model. To this end, defining the schemes that are going to be modelled, the population groups that belong to each scheme and the age limits of each population group within the scheme are necessary. For the formulation of more than one scheme, at least one group of active contributors (in the case of contributory schemes) is required. Every scheme also has a set of beneficiaries' groups: contributors, pensioners (when this option applies) and protected dependent family members. The projection period and the method of calculation of results can be in nominal or real terms. A critical stage in the design phase is the configuration of the healthcare services and their linkage to the relevant population groups.
- The second phase is the **implementation phase**. Once a model is set with the appropriate parameters, the creation of base scenario and sensitivities analysis follow.

### A2.3.1. Inputs

The following data help to simulate the demographic and financial dynamics of the population groups, as shown in figure A2.1:

- **context:** the national demographic, labour market and macroeconomic framework in which the scheme functions;
- **the scheme's characteristics:** eligibility conditions, services and available benefits (their costs and calculation formula), contribution rates, income and administrative expenditures; and
- **population group characteristics:** initial contributions, structure and transition probabilities (including those of inactive contributors and all beneficiaries' groups) and key information on the healthcare and cash benefit demand.

The **context** is a set of national-level variables and parameters. These include projections of the national population by sex, economic activity participation rates by sex, and a set of basic parameters for the macroeconomic framework, including GDP growth rate, inflation rate, salary growth rate and interest rate.

**Scheme data:** On the beneficiary end, the scheme rules determine who has access to the scheme's benefits, how much these benefits cost and how these benefits are calculated. Scheme characteristics are also governed by a set of rules that determine the contributors (if applicable), the period during which they contribute, and the proportion of earnings paid as contributions. Regarding health schemes and institutional rules, one or more schemes can exist and be functioning at the national or sectoral level. Thus, there can be national single-scheme models and multi-scheme models.

Typically, a scheme can consist of different rules and cover specific populations other than those used for other healthcare schemes. At the modelling level, specific healthcare schemes are associated with certain population groups, eligibility criteria for access to healthcare services, differentiated healthcare services, one or more payment methods, and a specific definition of costs or fees (reimbursement fees to healthcare providers, considering co-payments and specific frequencies of use of healthcare services).

For **population groups**, data inputs are the initial composition of the different groups; their different transition probabilities (probabilities of moving between populations groups within the scheme or from other schemes); their dependency situation and their economic situation (their relevant cash flows) from the scheme's perspective (salaries or income, including pensioners' income when applicable); and their interaction with benefit providers in the form of utilization or demand curves.

The ILO/HEALTH modelling framework places emphasis on the following characteristics of population groups: (i) their initial composition and their expected transition over time; (ii) their insurance status (the probability that the group will achieve the minimum contribution period to become insured) and the extension of their insurance status to their family dependent groups; and (iii) their demand for benefits or healthcare services as well as cash benefits when available.

### A2.3.2. Outputs

Modelling work under the ILO/HEALTH framework provides for the creation of an extensive set of reports for different uses and needs in terms of analysis and policy design. There are two main groups of outputs: outputs at population group level (demographic and financial projections), and scheme or country-level outputs.

**Demographic projections** should interact with other inputs to estimate the financial projections at the population group level. These contain average salaries, new benefits, total benefits and estimates of the main cash flows associated with each demographic group. **Financial projections** at each demographic group level should then be combined with other inputs in order to produce financial reports and demographic and financial indicators at the **scheme and country levels**.

The outputs include demographic and financial flows projected in absolute values, such as directly contributing populations, eligible populations, scheme revenues and expenses, and actuarial technical reserve levels, among others.

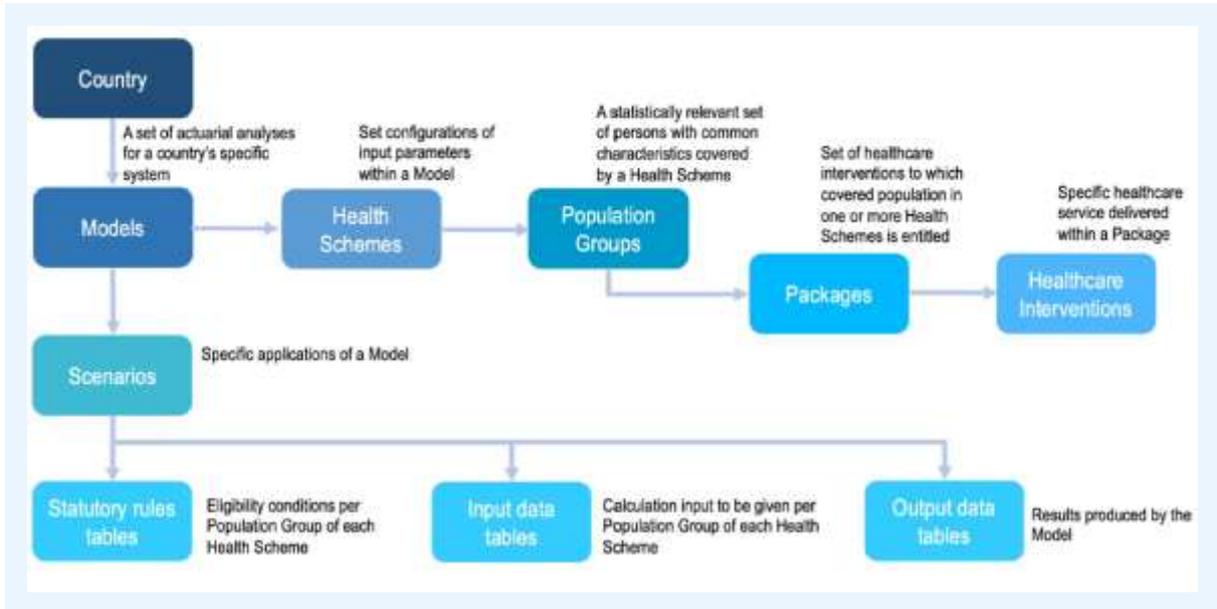
These indicators can be used both to support model calibration and consistency testing and to support results analysis and reporting. The outputs include a set of indicators useful for performing a step-by-step consistency test.

## A2.4. Basic concepts used by the ILO/HEALTH modelling framework: An introduction

Modelling work under the ILO/HEALTH modelling framework requires a firm grasp of some basic concepts. Since definitions of these concepts may vary from one country to another, definitions according to the ILO/HEALTH modelling framework are provided below:

- **Model:** A model is a quantitative formulation specific to a country's social health protection system. It includes general definitions (i.e., model description, projection period, and others) and specific definitions for each of the healthcare schemes and programmes that would be used (i.e., scheme rules, populations covered, and others).
- **Scenario:** A scenario is a specific formulation of a model under a certain set of parameters. Each scenario differs from all others in terms of parameters which define statutory rules, population biometrics, specific statutory rules, and others. Under a model, several scenarios can be used so that a variety of conditions are reflected.
- **Base scenario** (status quo scenario): It is good practice to formulate a "base scenario", assuming current conditions with no changes or reforms in parameters and the most plausible developments in demographic and financial terms. A base scenario is essentially a scenario reflecting the status quo, with no changes to legislation (statutory rules), coverage, level of benefits, salaries or other variables. Once the base scenario has been established and calibrated, any *alternative scenarios* can be established which can serve to compare the results of certain simulations, typically policy scenarios, with those reflected in the base scenario.
- **Population group:** Each healthcare scheme may cover one or more population group. Scenarios can be created and linked to the extension of a scheme or programme to one or more uncovered population group. The ability to define more than one population group in a specific model, depends on the limitations of the specific data available, which are needed to be feed into the model for each one of these population groups separately.
- **Healthcare packages:** Healthcare packages are the sets of healthcare interventions/services to which protected/covered persons under one or more healthcare schemes are entitled. Each scheme and its respective population are linked to specific healthcare packages. Several healthcare schemes in the same country may have one or more healthcare packages in common, while others may not. Each healthcare service has an associated payment method. Hence, in the case that a given protected/covered population group is entitled to a range of healthcare interventions/services that have different provider payment methods, one payment method must be created for each service.

► **Figure A2.2. Overview of the relationships between models, scenarios, schemes and population groups**

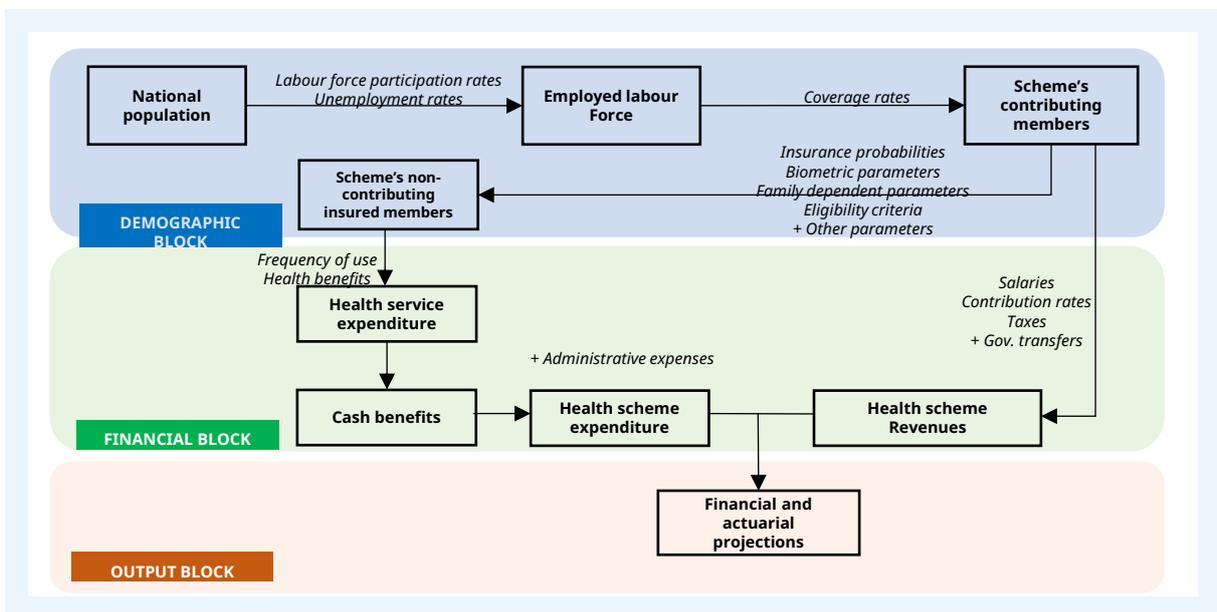


As shown in figure A2.2, the definitions of the different schemes, their associated populations and conditions for entitlement to certain benefits are critical elements when designing a new actuarial model to be applicable for a country. Ideally, this work should be carried out by a multidisciplinary team, with emphasis on the final objectives of the policy analysis. The design features and parameters of each scheme must be known and described accurately to the actuary in order to carry out the analytical work. The same stands for the formulation of scenarios to simulate parametric changes.

## A2.5. General flow of the calculation

Figure A2.3 presents an overview of the steps involved in preparing annual projections.

► **Figure A2.3. Overview of the calculation flow (a simplified flow)**



In general terms, the rationale of the projection flow can be described as part of three blocks: demographic block (inputs), financial block (inputs) and projections (outputs). Since the architecture and related financial flows are more complex for contributory schemes, proper actuarial tools are adapted to this complexity across the three blocks.

### Block 1: Demographic block

The demographic block is composed of the estimation of the general population and scheme-specific populations:

- 1. General population:** To ensure the overall consistency of the population projections, a safe starting point is to have a general population projection distributed by age and sex. This projection can be obtained from official national sources. In the absence of official national projections, the UN World Population Prospect database is a reliable source of these projections. The WPP database can be used to get country-specific decrements and population projections using appropriate demographic assumptions.
- 2. Employed labour force:** The hypothetical and projected labour force participation rates and unemployment rates are applied to the population in order to project the employed labour force. Assumptions on the future behaviour/trends of these parameters should consider the main factors affecting their evolution such as: change in female labour force participation rates; urbanization trends; size of the agricultural, services and manufacturing sectors; coverage of the education system; coverage of health insurance systems; and current and expected trends in levels of labour informality.
- 3. Scheme's contributing members:** Based on the employed labour force, the coverage rates of each scheme are applied to obtain the scheme's projected active contributors. Usually, this refers to the active members that pays contributions. Assumptions on the future trends of coverage rates are constructed based on expert judgement. International experience is always a useful reference when formulating these assumptions.
- 4. Scheme's non-contributing insured members:** The contributions are not the only means to achieve healthcare protection. By forming the protected/covered population based on the whole set of individuals with rights to access healthcare services (beneficiaries), the modelling framework also considers the extension of protection to non-contributing family members.

### Block 2: Financial block

The financial block requires that the calculations are performed under the demographic block. Using certain assumptions, this block estimates:

- 5. Contribution revenues:** Contribution revenues are derived from the information on salaries and the demographic projection of contributors (i.e., average contributions amount of the demographic groups). Salaries are weighted by age and sex. Salaries are estimated based on the interaction of previous surviving contributing groups and the new entries. Pensions calculation is also crucial in Cyprus, as the pensioners are considered to be contributors to the GHS. Pensions are derived from the information on current pensions, projection of future pensioners (existing and new) and the projected pension amounts. Government transfers and income-earners are also incorporated into the healthcare scheme contribution revenue.
- 6. Healthcare scheme expenditure:** Expenditures are derived from the information on the population with the right to healthcare services and depends on the payment method of

these services: the frequency and the costs of their use, the per capita cost of their financing, or the budget allocated to their payment.

- 7. Cash benefits:** These are estimated in the same way as health benefits. These estimates use information on the frequency of use and their calculation formulas established in legislation.

### Block 3: Projections

By combining the steps above, this block enables users to:

- 8. Project administrative expenditures:** They are projected based on the information of current and historical expenditure combined with the expected trends of factors which reflect wages and price inflation rates.
- 9. Calculate actuarial/financial results and indicators.** The results that are generated display a wide range of output variables and indicators, including demographic, financial and actuarial context. These include projections of the covered populations (directly insured and dependent family members) by population group, age and sex; healthcare expenditures by age and sex; revenues from members' contributions, by age and sex; financial flows of income and expenditure; financial results of operations; and actuarial, coverage, revenue and expenditure indicators.

#### A2.5.1. Output reports for financial and actuarial projections

This category of outputs comprises a variety of reports that provide details on the intermediate and final calculations performed. In general, they contain the following:

- Demographic projections: by age, sex, population group and healthcare scheme, including details for active and inactive contributors and beneficiary populations.
- Detailed financial projections: These include projected flows of insurable earnings, income and expenditures, and projected healthcare service expenditures (by type of expenditure). Where applicable, these projections are disaggregated by age, sex and population group.
- Financial and demographic indicators: Indicators reports are useful in order to review the resulting values and to assess if the model formulation is performing well according to the expected logical results for the scheme under evaluation. They also allow for a more detailed overview of the future development of the different coverage schemes.

## ► Annex 3. Scheme-specific data and assumptions

### A3.1. Introduction

In addition to the demographic and economic assumptions presented in Chapter 4 of this report, the projection of the future GSIS income and expenditure development of the GHS requires a database specific to both the GSIS and GHS (characteristics of insured persons and pensions in payment and registered beneficiaries) and some particular actuarial assumptions. For the present valuation, for income projection purposes, projections have been performed separately for insured persons with basic insurance only and those with basic and supplementary insurance. In addition, basic data and assumptions have been divided according to the age and sex of insured persons. For the projection of the future expenditure development, GHS-registered beneficiaries and scheme-specific data were adopted and projected based on particular actuarial assumptions.

### A3.2. Data and assumptions on the insured and covered population

#### A3.2.1. Number of insured persons

Data on the insured population were obtained from the statistics and information systems department of the Social Insurance Services. The database presents a population of 555,830 active insured persons having contributed in 2022. Out of these persons, 374,526 had annual earnings over € 10,008 (in 2022) and have thus been credited with both basic and supplementary insurance points. The distribution of these populations by age and sex is presented in table A3.1.

In addition to the persons who have contributed in 2022, the GSIS covers another 361,900 persons who have contributed to the GSIS in the past, but not in 2022; these were taken into account. This population was projected for the needs of future pensions estimations. Their characteristics are presented in table A3.2. These persons still have the status of insured persons and may re-enter into the GSIS active insured population at some point in the future.

► **Table A3.1. Active insured persons, 2022**

Age group	Basic only			Basic and supplementary		
	Male	Female	Total	Male	Female	Total
15–19	5 366	5 387	<b>10 753</b>	312	298	<b>610</b>
20–24	16 295	13 181	<b>29 476</b>	8 530	5 935	<b>14 465</b>
25–29	16 931	13 000	<b>29 931</b>	23 022	19 028	<b>42 050</b>
30–34	12 702	11 867	<b>24 569</b>	30 581	24 038	<b>54 619</b>
35–39	9 747	11 043	<b>20 790</b>	31 458	25 617	<b>57 075</b>
40–44	7 443	10 356	<b>17 799</b>	29 219	24 918	<b>54 137</b>
45–49	5 274	8 932	<b>14 206</b>	23 726	21 300	<b>45 026</b>
50–54	4 572	8 054	<b>12 626</b>	21 723	19 277	<b>41 000</b>
55–59	4 214	5 695	<b>9 909</b>	20 146	15 572	<b>35 718</b>
60–64	4 056	3 978	<b>8 034</b>	16 363	11 338	<b>27 701</b>
65–68	1 842	1 369	<b>3 211</b>	1 332	793	<b>2 125</b>
<b>Total</b>	<b>88 442</b>	<b>92 862</b>	<b>181 304</b>	<b>206 412</b>	<b>168 114</b>	<b>374 526</b>

► **Table A3.2. Inactive insured persons, 2022**

Age group	Basic only <sup>1</sup>			Basic and supplementary <sup>2</sup>		
	Male	Female	Total	Male	Female	Total
16–19	66	40	<b>106</b>	2	4	<b>6</b>
20–24	2 184	1 795	<b>3 979</b>	492	245	<b>737</b>
25–29	6 304	5 144	<b>11 448</b>	2 675	1 853	<b>4 528</b>
30–34	10 086	10 312	<b>20 398</b>	6 451	4 669	<b>11 120</b>
35–39	13 624	16 377	<b>30 001</b>	11 538	7 894	<b>19 432</b>
40–44	13 071	18 972	<b>32 043</b>	14 504	8 485	<b>22 989</b>
45–49	9 689	19 106	<b>28 795</b>	13 325	8 174	<b>21 499</b>
50–54	10 088	22 908	<b>32 996</b>	13 790	9 495	<b>23 285</b>
55–59	6 044	15 705	<b>21 749</b>	11 714	9 780	<b>21 494</b>
60–64	4 178	11 904	<b>16 082</b>	10 621	10 441	<b>21 062</b>
65+	3 230	7 109	<b>10 339</b>	3 940	3 872	<b>7 812</b>
<b>Total</b>	<b>78 564</b>	<b>129 372</b>	<b>207 936</b>	<b>89 052</b>	<b>64 912</b>	<b>153 964</b>

Notes: <sup>1</sup> Persons with at least one insurance point in the basic part of the GSIS are included. <sup>2</sup> Persons with at least one insurance point in the supplementary part of the GSIS are included.

### A3.2.2. Insurable earnings

Credits under the GSIS are computed in terms of points. For the year 2022, one insurance point is equivalent to annual earnings of € 10,008. The first insurance point is credited to the basic part of the GSIS, and annual earnings in excess of € 10,008 and up to € 58,080 are converted into insurance points in the supplementary part. Table A3.3 presents average annual insurable earnings of active contributors by insurance level (basic only/basic and supplementary) and for specific age groups.

► **Table A3.3. Average annual insurable earnings of active contributors, 2022<sup>6</sup>**

Age group	Basic only		Basic and supplementary	
	Male	Female	Male	Female
16–19	3 641	4 024	13 928	12 009
20–24	4 753	4 734	15 445	14 337
25–29	5 106	5 069	18 649	17 869
30–34	5 192	5 210	22 708	20 657
35–39	5 387	5 391	25 446	22 805
40–44	5 478	5 529	27 664	25 892
45–49	5 623	5 569	29 976	27 036
50–54	5 559	5 628	30 094	26 144
55–59	5 760	5 696	28 743	25 186
60–64	5 524	5 620	28 439	25 368
65–68	4 175	4 420	22 570	23 022
<b>Total</b>	<b>5 206</b>	<b>5 303</b>	<b>25 847</b>	<b>23 462</b>

In order to reflect the dispersion of earnings and, consequently, the distribution of earnings for active contributors by insurance level (basic only/basic and supplementary), a coefficient of

<sup>6</sup> New entries, re-entries and terminations are not included.

variation has been applied to average earnings by age group and for each year of projection. In addition, the average earnings of the insured population have been separated into three sub-groups: the lowest 30 per cent, a medium range of 40 per cent and the highest 30 per cent.

### A3.2.3. Number of registered beneficiaries

Data on the registered beneficiaries (table A3.4) were obtained from the information systems department of the HIO. The database presents a population of 930,875 registered beneficiaries in December 2022 and 960,500 in December 2023. This increase is mainly due to fertility and net migration.

► **Table A3.4. Registered beneficiaries, 2022–23**

Age group	December 2022			December 2023		
	Male	Female	Total	Male	Female	Total
0–3	19 296	18 225	<b>37 521</b>	19 913	18 676	<b>38 589</b>
4–7	19 828	18 405	<b>38 233</b>	20 237	19 158	<b>39 395</b>
8–14	34 151	32 285	<b>66 436</b>	35 081	32 968	<b>68 049</b>
15–17	13 839	13 036	<b>26 875</b>	14 290	13 405	<b>27 695</b>
18–25	39 897	39 165	<b>79 062</b>	40 696	39 916	<b>80 612</b>
26–30	33 851	34 241	<b>68 092</b>	34 592	34 622	<b>69 214</b>
31–35	36 516	37 232	<b>73 748</b>	38 749	38 765	<b>77 514</b>
36–40	37 324	39 233	<b>76 557</b>	38 856	40 364	<b>79 220</b>
41–45	33 599	37 358	<b>70 957</b>	35 758	39 035	<b>74 793</b>
46–50	28 304	33 821	<b>62 125</b>	29 415	34 592	<b>64 007</b>
51–55	27 243	31 613	<b>58 856</b>	27 842	32 748	<b>60 590</b>
56–60	27 896	29 674	<b>57 570</b>	28 063	29 995	<b>58 058</b>
61–65	27 532	28 433	<b>55 965</b>	28 215	29 383	<b>57 598</b>
66–70	23 518	24 482	<b>48 000</b>	24 414	25 403	<b>49 817</b>
71–75	20 561	22 165	<b>42 726</b>	20 778	22 319	<b>43 097</b>
76–80	14 937	17 066	<b>32 003</b>	16 720	18 927	<b>35 647</b>
81–85	9 202	11 694	<b>20 896</b>	9 233	11 689	<b>20 922</b>
86–90	4 394	6 591	<b>10 985</b>	4 548	6 768	<b>11 316</b>
91–95	1 298	2 272	<b>3 570</b>	1 317	2 364	<b>3 681</b>
96–100	215	436	<b>651</b>	216	431	<b>647</b>
101+	8	39	<b>47</b>	8	31	<b>39</b>

## A3.3. Demographic assumptions related to contributors and beneficiaries

### A3.3.1. Mortality of insured persons and registered beneficiaries

Mortality rates for the insured population and the registered beneficiaries have been assumed equal to the mortality rates of the general population. Sample mortality rates are presented in table A3.5. This mortality pattern is also used to project survivors' benefits payable on the death of insured persons or pensioners. Mortality rates are assumed to decline continuously during the projection period.

For invalidity pensioners, in the absence of statistics on the experience under the GSIS mortality rates have been set so as to reflect the level of the Swiss EVK Table. Mortality rates for males and females were fixed, at age 20, at 25 times the mortality rate applicable to active insured persons and this ratio was linearly reduced to one at age 60.

► **Table A3.5. Sample mortality rates applied to the insured population**

Age	Male			Female		
	2022	2027	2032	2022	2027	2032
0	0.00483	0.00453	0.00371	0.00302	0.00232	0.00195
5	0.00012	0.00012	0.00010	0.00009	0.00010	0.00008
10	0.00010	0.00013	0.00011	0.00009	0.00010	0.00009
15	0.00018	0.00020	0.00018	0.00012	0.00012	0.00011
20	0.00035	0.00032	0.00029	0.00013	0.00013	0.00012
25	0.00045	0.00037	0.00035	0.00013	0.00013	0.00012
30	0.00048	0.00045	0.00042	0.00020	0.00018	0.00017
35	0.00065	0.00061	0.00059	0.00031	0.00030	0.00028
40	0.00095	0.00081	0.00078	0.00051	0.00046	0.00043
45	0.00152	0.00122	0.00116	0.00087	0.00065	0.00061
50	0.00242	0.00195	0.00182	0.00139	0.00103	0.00097
55	0.00386	0.00316	0.00291	0.00213	0.00177	0.00165
60	0.00668	0.00561	0.00510	0.00335	0.00288	0.00264
65	0.01051	0.00907	0.00826	0.00508	0.00433	0.00396
70	0.01755	0.01552	0.01411	0.00866	0.00727	0.00661
75	0.02914	0.02608	0.02378	0.01640	0.01381	0.01250
80	0.05307	0.04782	0.04384	0.03514	0.03031	0.02739
85	0.10213	0.09137	0.08495	0.08138	0.07144	0.06518
90	0.18768	0.17428	0.16427	0.17202	0.15300	0.14153
95	0.27205	0.27107	0.26056	0.27492	0.25769	0.24355
100	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

### A3.3.2. Invalidity incidence

Rates of entry into invalidity have been calculated from the past experience of the GSIS. Recent data for the years 2020, 2021 and 2022 were obtained. Invalidity incidence rates are kept constant for the whole projection period. The rates are presented in table A3.6.

► **Table A3.6. Rates of entry into invalidity**

Age	Male	Female
22	0.00007	0.00009
27	0.00010	0.00006
32	0.00014	0.00011
37	0.00038	0.00021
42	0.00055	0.00042
47	0.00075	0.00086
52	0.00116	0.00126
57	0.00331	0.00183
62	0.00591	0.00407

### A3.3.3. Retirement

The actuarially assumed retirement rates used in the pension model are consistent with the economic framework, as described in Chapter 4. In particular, projected retirement rates evolve in line with labour force exit ages, which are expected to increase over the projection period due to the recent (2012) GSIS reform. Those labour force exit ages drive the anticipated increase in labour force participation rates. Consistency checks are performed to produce an appropriate retirement pattern, which is consistent with the one observed recently under the GSIS.

In particular, retirement rates are in principle applied from age 63 to 65 in the initial years as per recent retirement experience under the GSIS. These retirement rates gradually shift to higher ages, in line with the Social Insurance Law which provides for a periodic increase of the normal retirement age in the future.

### A3.3.4. Family structure

Information on the family structure of insured persons is necessary for the projection of survivors' benefits. In the case of the GSIS, these data are also used to project the dependants' supplement paid in the basic part of the GSIS pension. Assumptions have to be established on the probability of being married at death, the age difference between spouses, the average number of children possibly eligible to an orphan's benefit and the average age of orphans.

Data on the percentage of married persons were obtained from tables of the 2011 Population Census. The age differential between spouses was calculated from data of the Demographic Reports of the Cyprus Statistical Services. The average number of children has been assumed equal to 0.1, considering the stringent eligibility conditions for this benefit and the observed number of orphans' benefits in payment. The average age of orphans has been set with regard to age of the mother at first birth and with some margin for conservatism at older ages. These assumptions are presented in tables A3.7 and A3.8.

► **Table A3.7. Assumptions on the family structure, for male insured persons**

Age	Probability of being married at death	Average age of the spouse	Average age of orphans
17	0.01	17	1
22	0.05	20	1
27	0.28	24	2
32	0.58	29	4
37	0.73	34	7
42	0.79	39	10
47	0.84	44	13
52	0.87	49	16
57	0.90	54	17
62	0.91	59	18
67	0.90	64	19
72	0.89	69	20
77	0.84	74	20
82	0.74	80	20
87	0.61	85	20

► **Table A3.8. Assumptions on the family structure, for female insured persons**

Age	Probability of being married at death	Average age of the spouse	Average age of orphans
17	0.01	17	1
22	0.14	24	1
27	0.47	30	3
32	0.69	35	5
37	0.76	40	8
42	0.77	45	11
47	0.80	50	14
52	0.80	55	16
57	0.80	60	17
62	0.78	65	18
67	0.73	70	19
72	0.64	75	20
77	0.49	80	20
82	0.32	84	20
87	0.18	89	20

### A3.4. Pensions in payment

Statutory, invalidity, widows' and orphans' pensions in payment are shown in tables A3.9 to A3.12.

► **Table A3.9. Statutory pensions** (amounts in Euros where applicable)

Age group	Basic only				Basic and supplementary			
	Male		Female		Male		Female	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
60–64	6	1 794	23	3 628	5 241	12 689	3 008	9 710
65–69	329	1 584	542	2 025	20 494	12 204	14 686	9 267
70–74	935	2 122	1 086	2 469	17 708	12 688	12 307	8 945
75–79	1 278	3 373	1 834	4 023	14 166	12 494	9 863	8 233
80–84	1 077	3 639	1 554	4 636	7 948	11 295	5 688	7 215
85–89	776	4 337	1 587	4 872	4 263	10 189	2 193	7 196
90–94	283	4 463	701	4 905	1 350	8 841	498	7 039
95+	69	4 928	125	4 822	283	7 942	78	6 478
<b>Total</b>	<b>4 753</b>	<b>3 306</b>	<b>7 452</b>	<b>4 055</b>	<b>71 453</b>	<b>12 115</b>	<b>48 321</b>	<b>8 638</b>

► **Table A3.10. Invalidity pensions** (amounts in Euros where applicable)

Age group	Basic only				Basic and supplementary			
	Male		Female		Male		Female	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
20–24	-	-	-	-	-	-	-	-
25–29	2	4 030	-	-	9	5 751	1	4 848
30–34	5	5 272	-	-	33	7 353	9	6 356
35–39	3	4 269	3	2 993	80	7 683	36	6 546
40–44	4	2 272	4	4 465	159	7 859	89	7 130
45–49	8	4 800	-	-	225	8 390	164	7 439
50–54	5	4 690	8	3 528	430	8 363	241	6 761
55–59	11	4 535	13	3 942	686	8 903	405	6 403
60–63	9	3 327	15	3 244	707	8 865	418	6 341
<b>Total</b>	<b>47</b>	<b>4 213</b>	<b>43</b>	<b>3 604</b>	<b>2 329</b>	<b>8 595</b>	<b>1 363</b>	<b>6 622</b>

► **Table A3.11. Widows'/widowers' pensions** (amounts in Euros where applicable)

Age group	Basic only				Basic and supplementary			
	Male		Female		Male		Female	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
25–29	-	-	4	1 936	-	-	5	8 098
30–34	3	1 936	5	3 795	6	7 340	33	8 630
35–39	8	2 572	6	4 260	7	10 743	97	9 227
40–44	4	1 936	5	2 869	25	10 097	214	9 965
45–49	7	3 583	9	3 642	31	10 332	399	9 545
50–54	3	5 132	23	3 850	63	8 414	765	9 138
55–59	5	4 086	26	3 695	91	7 240	1 106	8 845
60–64	17	3 908	84	3 402	165	7 077	1 929	8 763
65–69	26	3 922	189	3 787	202	7 170	2 750	8 636
70–74	28	3 935	467	4 163	208	6 876	3 855	8 571
75–79	56	4 499	874	4 248	294	6 846	5 163	8 302
80–84	60	4 823	1 100	4 475	240	6 661	5 061	7 628
85–89	71	4 903	1 041	4 553	160	6 166	4 134	7 192
90–94	35	4 915	626	4 791	55	6 586	1 868	6 859
95+	5	4 938	277	5 179	9	5 606	406	6 689
<b>Total</b>	<b>332</b>	<b>4 420</b>	<b>4 737</b>	<b>4 442</b>	<b>1 557</b>	<b>7 027</b>	<b>27 785</b>	<b>8 075</b>

► **Table A3.12. Orphans' pensions** (amounts in Euros where applicable)

Age group	Basic only				Basic and supplementary			
	Male		Female		Male		Female	
	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension	Number	Average annual pension
0–4	2	1 936	4	1 937	–	–	–	–
5–9	25	1 937	32	1 906	1	8 203	1	5 188
10–14	85	1 936	92	1 896	3	6 051	4	5 113
15–19	96	1 903	89	1 906	10	5 293	8	5 281
20–24	70	1 896	48	1 993	5	6 439	5	7 487
25–29	–	–	–	–	–	–	–	–
30–34	–	–	–	–	–	–	–	–
35–39	–	–	–	–	–	–	–	–
40–44	–	–	–	–	–	–	–	–
45–49	–	–	–	–	–	–	–	–
50–54	–	–	–	–	–	–	–	–
55–59	–	–	–	–	–	–	–	–
60–64	–	–	–	–	–	–	–	–
65–69	–	–	–	–	–	–	–	–
70+	–	–	–	–	–	–	–	–
<b>Total</b>	<b>278</b>	<b>1 915</b>	<b>265</b>	<b>1 919</b>	<b>19</b>	<b>5 868</b>	<b>18</b>	<b>5 851</b>

## A3.5. Other assumptions

### A3.5.1. Credited pension benefits

Taking into account the GSIS recent experience and trends over the period 2018–2022, as well as the development of the fertility rate, female labour force participation rates, education levels and other factors, including legal requirements, assumptions were made with regard to the eligible credits to be awarded to future pensioners in respect of the following periods:

- compulsory service in the national guard for male insured persons;
- childhood (maternity/paternity and parental leave) – granted to both male and female pensioners;
- study;
- unemployment; and
- incapacity for work.

### A3.5.2. Indexing of GHS parameters and pensions in payment

It has been assumed that the basic insurable earnings and the minimum pension are indexed annually in line with the wage growth assumption. In addition, pensions in payment are assumed to be indexed in the future in line with the wage index in the basic insurance and with the consumer price index in the supplementary insurance.

