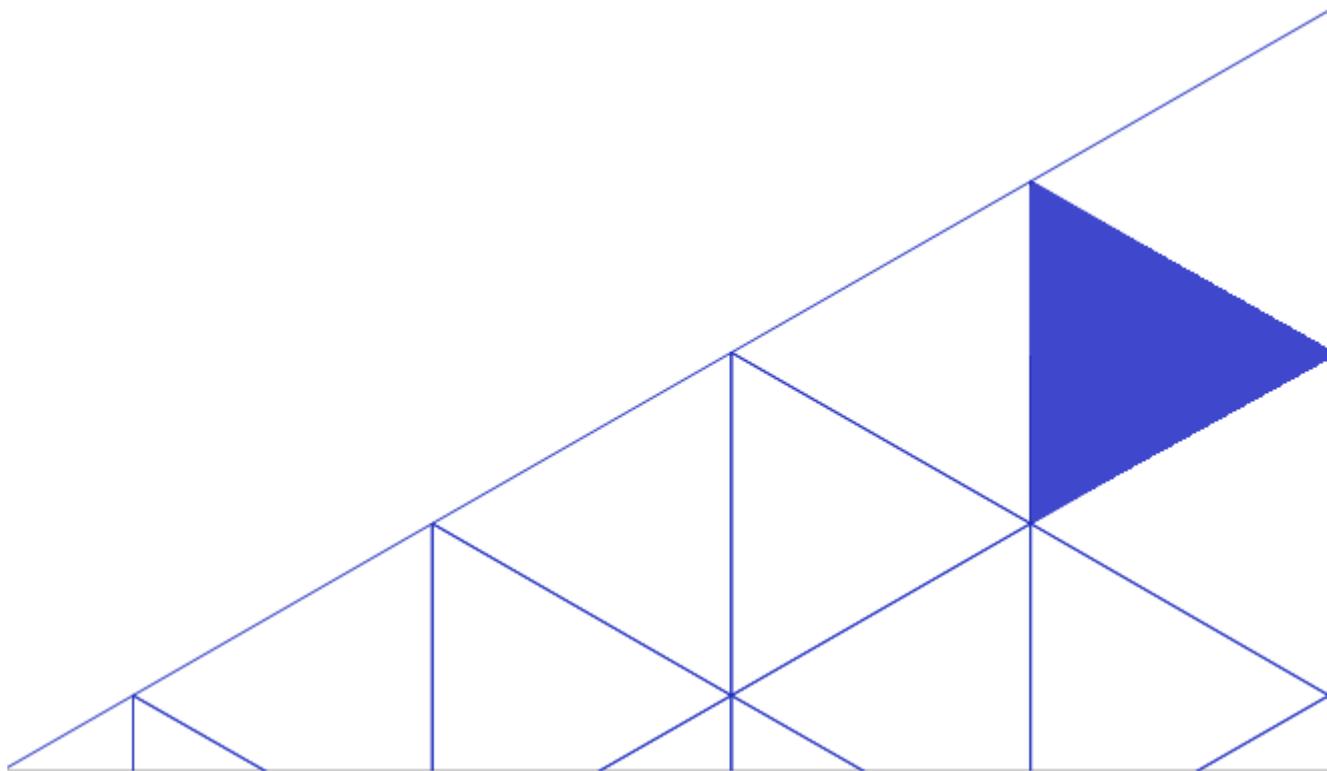




CYPRUS

# ► Second Report to the Health Insurance Organization

**Actuarial valuation of the General  
Healthcare System as of 31 December 2021,  
covering the period 2022–2031**





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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 2021 in compliance with relevant international actuarial standards, presents the financial results of the second actuarial valuation of the GHS since its inception in June 2019, covering the period from 2022 to 2031.

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## ► Executive summary

This report presents the results of the actuarial valuation of the GHS of the Republic of Cyprus as of 31 December 2021.

Projections have been made over a period of ten years, that is until 31 December 2031, 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 2022–2031 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, 2022–2031 (in million of Euros)**

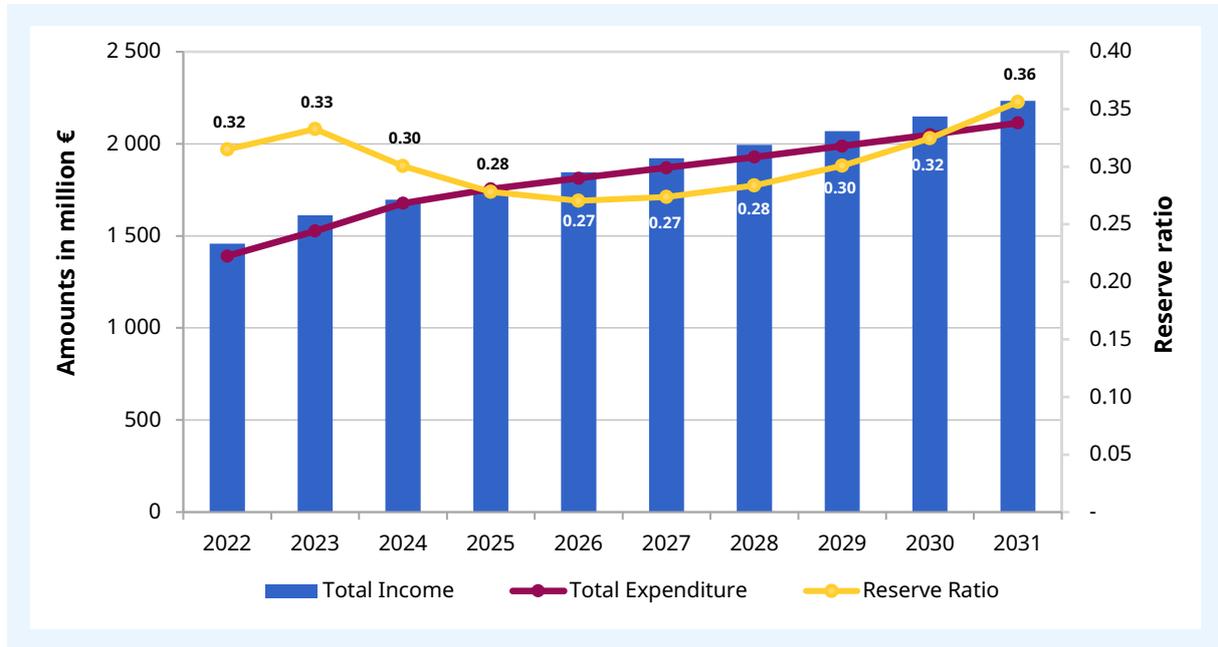
Year	2022 <sup>1</sup>	2023	2024	2025	2026	2027	2028	2029	2030	2031
<b>Reserve (start of year)</b>	<b>370</b>	<b>438</b>	<b>508</b>	<b>504</b>	<b>488</b>	<b>490</b>	<b>512</b>	<b>547</b>	<b>598</b>	<b>665</b>
Total GHS income	1 457	1 611	1 697	1 768	1 845	1 922	1 994	2 070	2 149	2 233
Total GHS benefits expenditure	1 391	1 527	1 677	1 755	1 813	1 870	1 928	1 988	2 050	2 113
Total other income	19	9	5	3	3	3	3	3	3	3
Total administrative expenses	17	23	29	32	33	33	34	34	35	35
<b>Surplus/Deficit</b>	<b>68</b>	<b>70</b>	<b>-4</b>	<b>-16</b>	<b>2</b>	<b>22</b>	<b>35</b>	<b>51</b>	<b>67</b>	<b>88</b>
<b>Reserve (end of year)</b>	<b>438</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>
Reserve ratio <sup>2</sup>	0.32	0.33	0.30	0.28	0.27	0.27	0.28	0.30	0.32	0.36
<b>Administrative expense ratio<sup>3</sup> (%)</b>	<b>1.2</b>	<b>1.5</b>	<b>1.7</b>	<b>1.8</b>	<b>1.8</b>	<b>1.7</b>	<b>1.7</b>	<b>1.7</b>	<b>1.6</b>	<b>1.6</b>
<b>Total GHS benefits expenditure/ Nominal GDP (%)</b>	<b>5.1</b>	<b>5.3</b>	<b>5.5</b>	<b>5.5</b>	<b>5.4</b>	<b>5.4</b>	<b>5.3</b>	<b>5.3</b>	<b>5.2</b>	<b>5.2</b>

<sup>1</sup> The estimated financial figures for 2022 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 per cent (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 2022–2031.

► **Figure ES.1. Total income, total expenditure and reserve ratio of the GHS, 2022–2031** (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 2023–2026, there is a downward trend in the reserve ratio since total GHS annual income alone is not sufficient to meet the GHS annual expenditure. From 2026 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 favourable economic conditions. By 2031, 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 as well as the activation of certain GHS institutional measures relating to its financial governance.

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 scenario of a slowdown in the economy compared to base scenario, resulting to lower net migration, lower GDP growth rates, higher inflation rate, higher nominal wage increases and lower labour-force participation rates from 2024 onwards; and
- activation of GHS institutional measures relating to its financial governance, which aim towards benefit cost containment, in accordance with the regulatory framework of the GHS.

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 four key GHS variables which are subject to a relatively high degree of uncertainty:

- cost from the introduction of new/innovative drugs and specialized laboratory tests;
- 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 2031, 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 2031:

- Higher reserve covering more than five months' expenditure – namely the scenario for implementation of cost control measures, 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 months' expenditure – namely the adverse scenario, the assumption of increases in utilization rates (that decreases the reserve ratio at a level of one and a half month's expenditure) and the assumption of increases in the inpatient 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 2021 and the financial results of an ILO actuarial assessment for measuring the financial sustainability of the GHS up to 2031. The present actuarial valuation represents the second 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 2021;
- assess the medium-term financial viability of the GHS until 2031, 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, changes in GHS-specific assumptions as well as to the activation of GHS institutional measures relating to its financial governance.

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 to the activation of GHS financial governance measures.
- 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

## 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 segment is allocated to the 12 months.

## 2.4. Source of funding

The GHS Fund revenues come from contributions, co-payments, personal contributions (contribution I)<sup>2</sup>, donations and legacies, 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 for each hospital for normal and for specialised cases, up to which no discount factors apply

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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.

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.

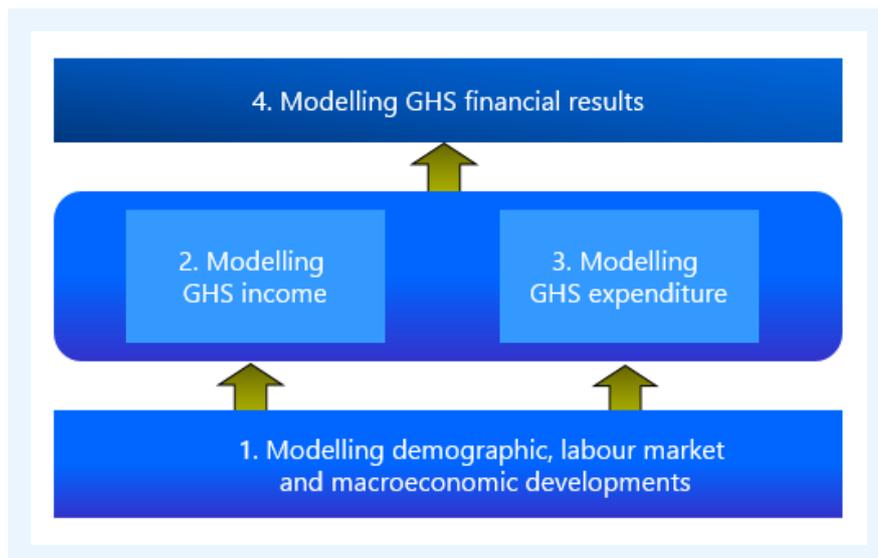
6. **Fixed annual amount:** A&E Department for public hospitals and ambulances of public hospitals.

## ► 3. Projection methodologies

The present actuarial valuation of the GHS involves cash-flow projections of its revenue and expenditures over a medium term, until 2031, 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 2022–2031, 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**

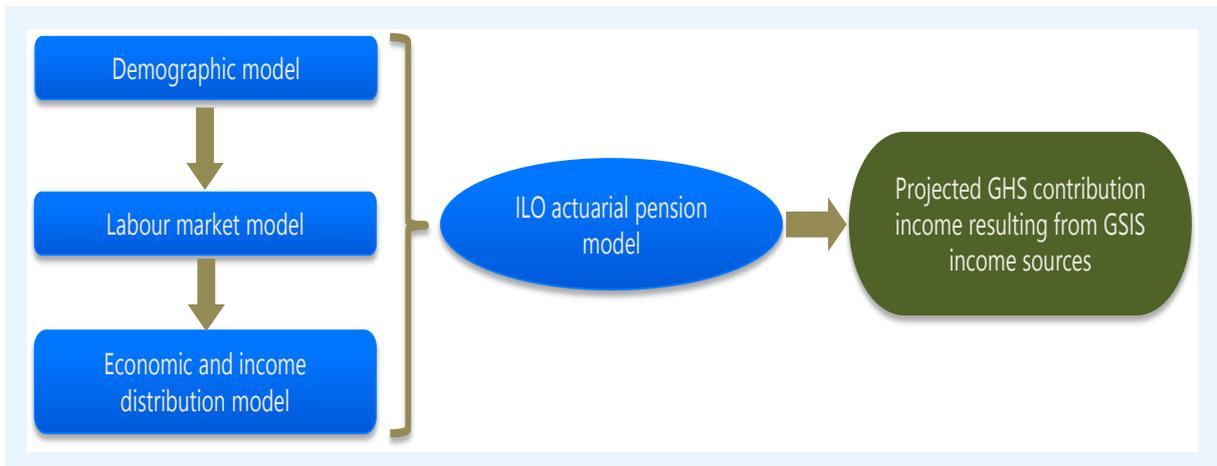
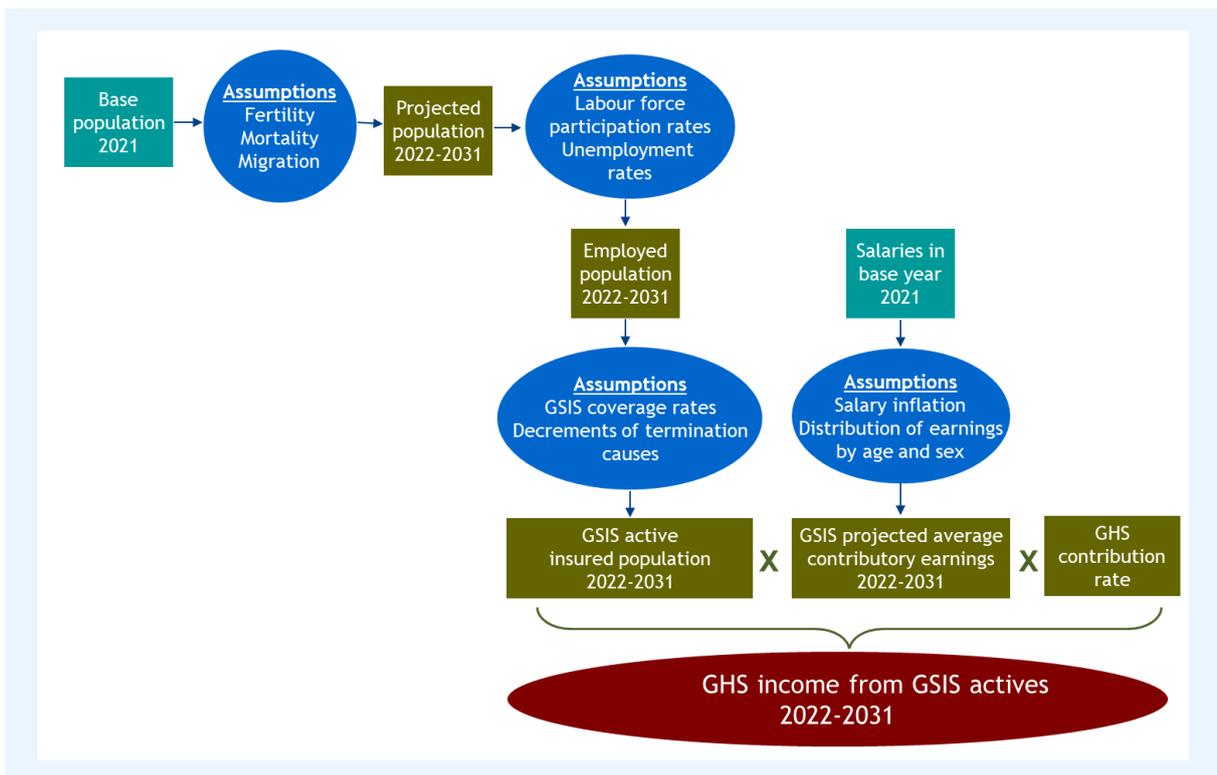


Figure 3.3 presents the methodology used for calculating the GHS income from the GSIS active insured population, while figure 3.4 presents the methodology used for calculating the GHS income from the GSIS pensioner population.

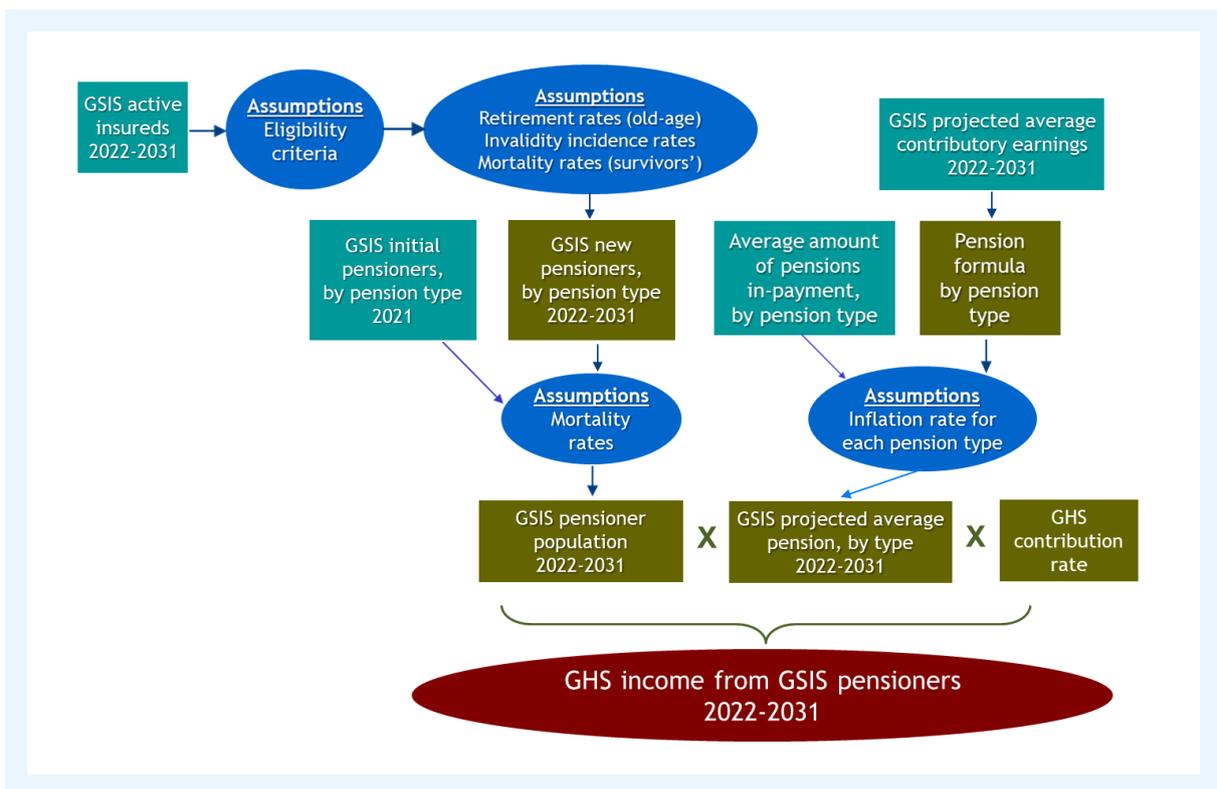
► **Figure 3.3. Methodology regarding GHS income from GSIS contributing population**



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 several decades 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 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.

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 2022–2031, 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.

$$BE_t = \text{CovPop}_t * \text{Utilization rate}_t * \text{Average Unit Cost}_t$$

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;
- 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 (2022–2031) 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 sensible financial governance of the GHS, HIO should aim to maintain an adequate reserve ratio throughout the projection period 2022-2031, 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 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 2031, 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, to which the assumptions on the future development of fertility, mortality and migration are applied. For the year 2021, 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 2020, explicit data on the above variables were available.

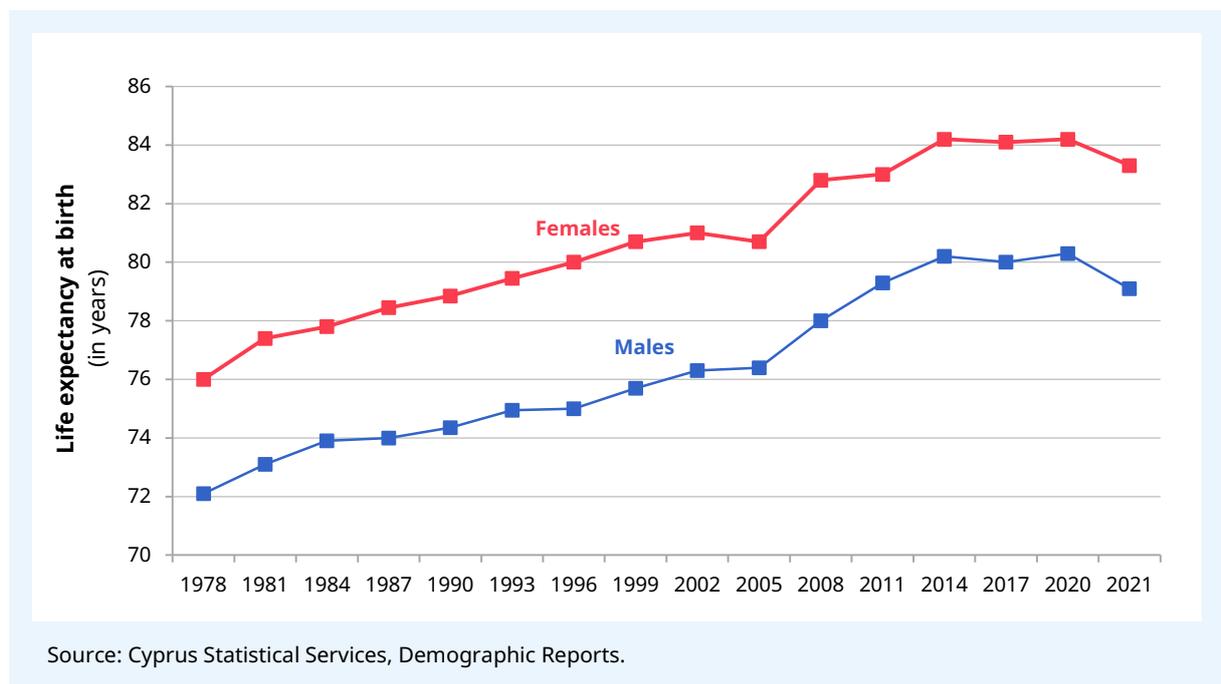
The current population structure strongly influences the results of projections for the coming years. The age distribution of the starting population shows an increasing ageing of the population in Cyprus, as is the case in many other developed countries.

### 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 9.7 per cent between 1978 and 2021, rising from 72.1 to 79.1 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, 1978–2021**

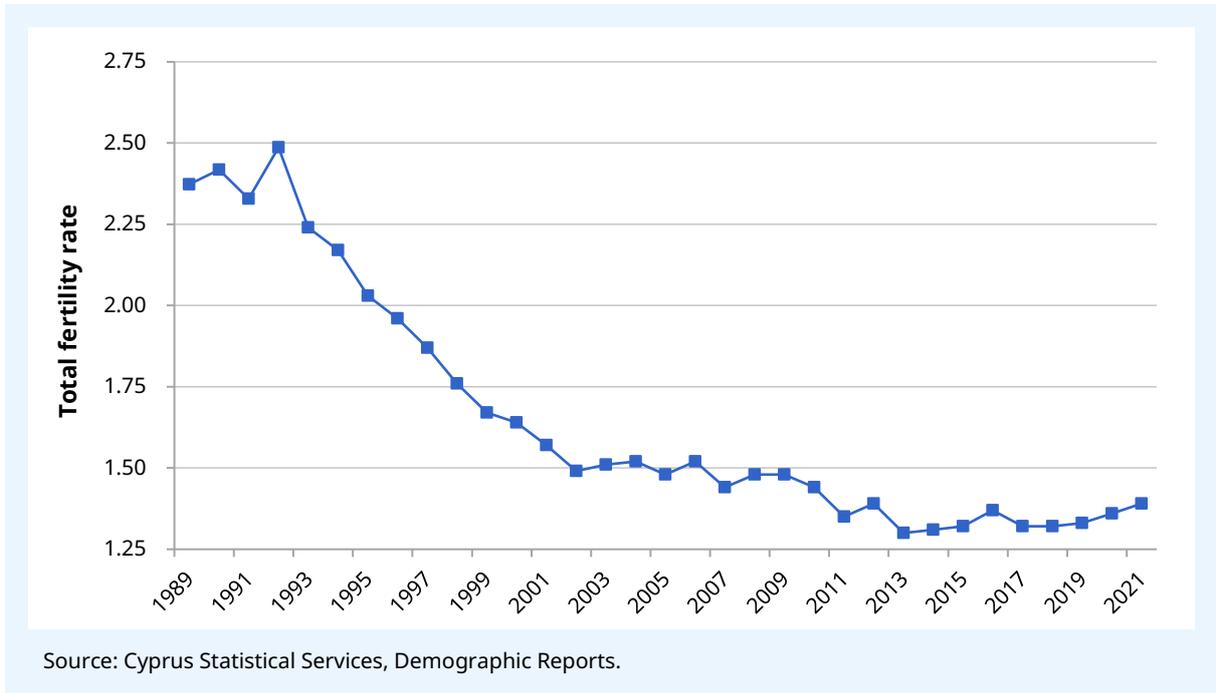


For the present valuation, mortality rates are in line with Eurostat’s mortality rates. For the determination of future mortality rates, it is assumed that mortality improvements continue in the future, but at a slower pace than in the past. In particular, it is assumed that the life expectancies at birth observed in 2021, which were 79.1 for males and 83.3 for females, are gradually increased to 81.9 for males and 85.8 for females in 2031. Finally, the gap between the life expectancy of men and women is expected to slightly decrease from 4.2 years in 2021 to 3.9 years in 2031. 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 and 2021 noted a slight increase of 0.03 per year. Figure 4.2 shows the historical total fertility rates for the period from 1989 to 2021.

► **Figure 4.2. Historical total fertility rates, 1989–2021**



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.

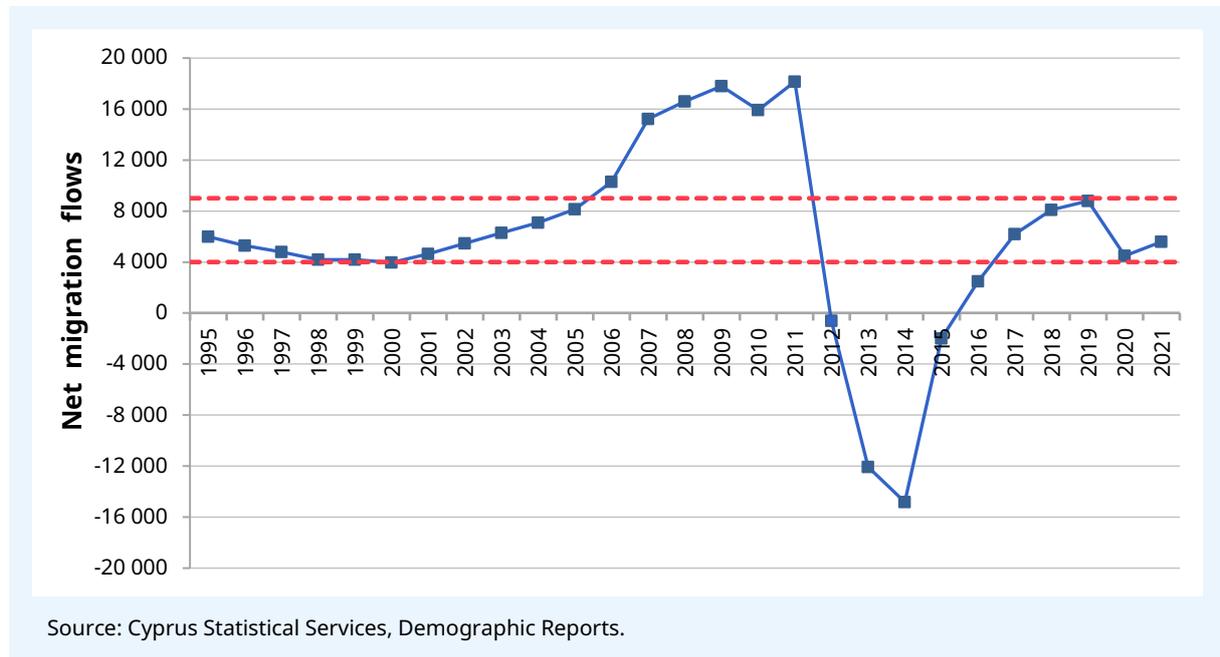
In the present valuation, the total fertility rate is estimated at 1.38 children per woman in 2022, increasing gradually to 1.41 in 2031.

### 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 estimation increased to 5,591.

Based on the observed values for 2022, it is projected that net migration will experience a strong increase over the period 2021–2025 and will remain at high levels up to 2031, with an average of around 9,000 over the period 2022–2031.

► **Figure 4.3. Historical net migration flows, 1995–2021**



#### 4.1.4. Population

According to the above assumptions, the general population of Cyprus is projected to increase from its estimated level of 925,914 persons in 2021 to 1,046,051 in 2031. The starting point was estimated to be 937,901 persons in 2022, taking into account the preliminary results of the 2021 census.

Table 4.1 shows the development of population for three age groups (0–14, 15–64 and 65+) throughout the projection period of 2022 to 2031, 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 25 per cent in 2022 to 29 per cent in 2031. In other words, in 2031, it is expected that Cyprus will have almost three working-age people for every person aged 65 and over.

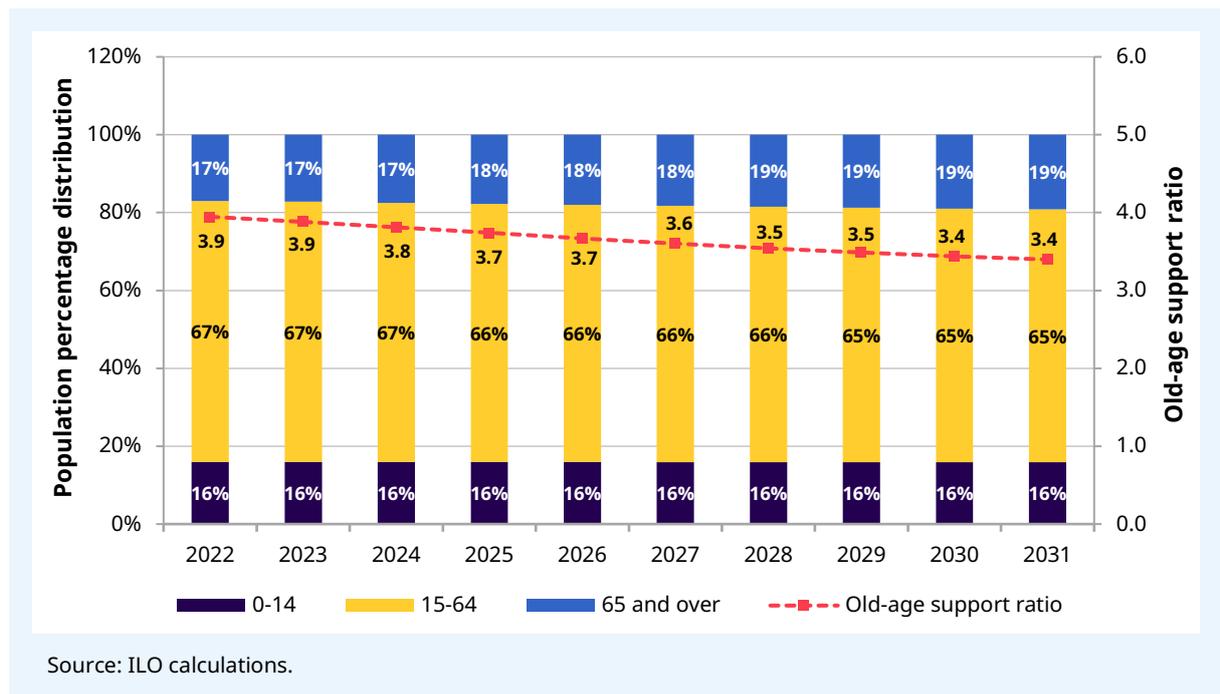
► **Table 4.1. Projection of the population of Cyprus, 2022–2031**

Year	Number of persons by age group				Old-age dependency ratio (%)
	0–14	15–64	65 and over	Total	
2022	149 624	628 899	159 378	937 901	25
2023	151 865	634 619	163 601	950 085	26
2024	153 747	640 501	168 117	962 365	26
2025	155 388	646 425	172 856	974 669	27
2026	157 251	651 943	177 743	986 937	27
2027	158 523	657 977	182 584	999 084	28
2028	160 458	663 325	187 306	1 011 089	28
2029	162 310	668 791	191 816	1 022 917	29
2030	164 152	674 367	196 029	1 034 548	29
2031	165 801	680 065	200 185	1 046 051	29

Figure 4.4 shows the projected percentage distribution of population into the three 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, 2022–2031**



## 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 5.4 per cent while for 2020 economy contracted with a rate of 4.4 per cent as a result of COVID-19 pandemic. Finally, in 2021, economy expanded at a rate of 6.6 per cent.

The real GDP growth is expected to gradually decrease from 5.6 per cent in 2022 to 2.3 per cent in 2025, averaging to 3.2 per cent over the 4-year period 2022–2025. Thereafter, it is expected to slightly decrease from 2.1 per cent in 2026 to 1.9 per cent in 2029, averaging to 2.0 per cent over

the period 2026–2029. Over the rest of the projection period, we expect GDP real growth rates to remain stable at a level of 1.9 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, 2021–2030**  
(percentages)

Year	Annual real GDP growth	Annual increase of productivity per worker	Annual employment growth (ages 15–64)
2022	5.6	2.8	3.2
2023	2.3	1.1	1.3
2024	2.7	1.6	1.1
2025	2.3	1.2	1.2
2026	2.1	1.0	1.1
2027	2.0	0.9	1.1
2028	2.0	1.0	1.0
2029	1.9	0.9	1.0
2030	1.9	0.9	1.0
2031	1.9	0.9	1.0

Source: Author's calculation. Years 2022–2024 were based on Spring 2023 economic 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.

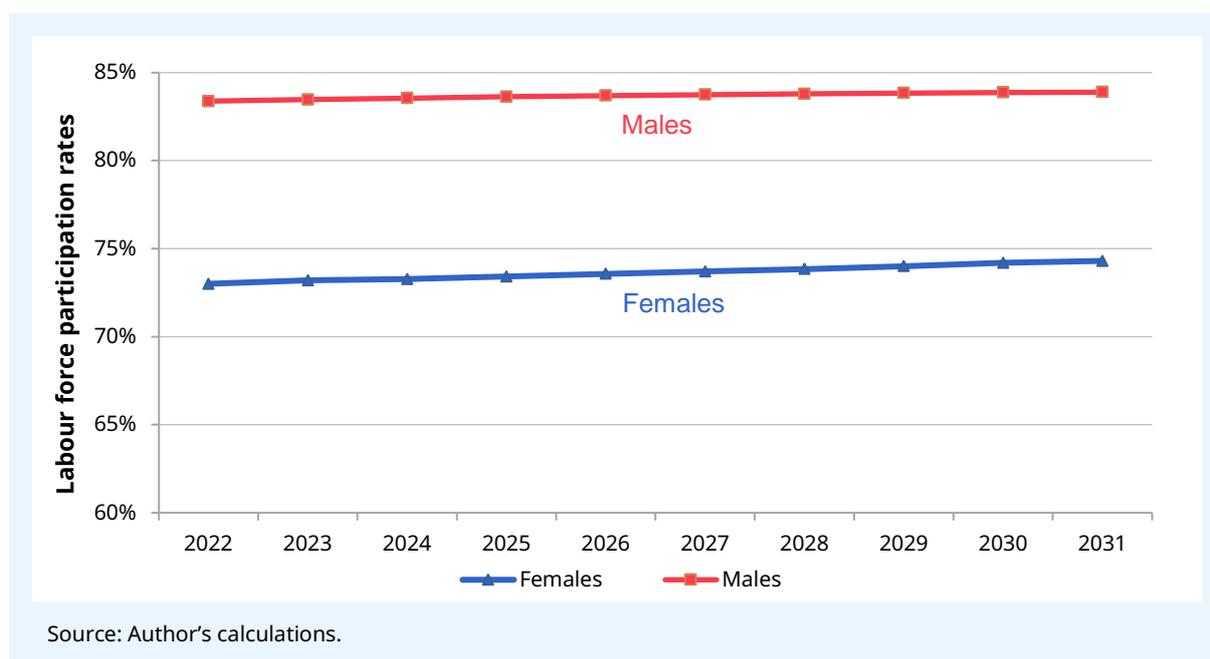
Over the period 2016–2021, the overall labour force participation rate for females for the age group 15 to 64 increased by 1.5 per cent. Over the same period, the female participation rate for the age group 55 to 64 experienced a significant increase of 7.4 per cent while in 2021 significantly increased by 2.9 per cent.

For the male population, over the period 2016–2021, the overall participation rate for the age group 15 to 64 increased significantly by 4.0 per cent, from 78.7 in 2016 to 82.7 in 2021. As well, the corresponding participation rate for the age group 55 to 64, over the same period, experienced a strong increase by 8.4 percent, from 70.5 in 2016 to 78.9 in 2021.

More recent data obtained from the Statistical Service of Cyprus indicates that female participation rates increased significantly from 2021 to 2022, from 71.0 per cent to 73.0 per cent while for the same period male participation rates increased from 82.7 per cent to 83.4 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 83.4 per cent and 73.0 per cent in 2022 to 83.9 per cent and 74.3 per cent in 2031 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 due to the recent GSIS reform measures.

► **Figure 4.5. Projected labour force participation rates, 2022–2031**



► **Table 4.3. Assumptions of labour force participation, employment and unemployment rates, 2022–2031 (percentages)**

Assumption		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Labour force participation rate (ages 15–64)	Male	83.4	83.5	83.5	83.6	83.7	83.7	83.8	83.8	83.9	83.9
	Female	73.0	73.2	73.3	73.4	73.6	73.7	73.8	74.0	74.2	74.3
	Total	78.1	78.2	78.3	78.4	78.5	78.6	78.7	78.8	78.9	79.0
Employment rate (ages 15–64)		72.5	72.8	72.9	73.1	73.3	73.4	73.5	73.7	73.8	73.9
Unemployment rate (ages 15–64)		7.1	6.9	6.8	6.7	6.6	6.6	6.6	6.5	6.5	6.5

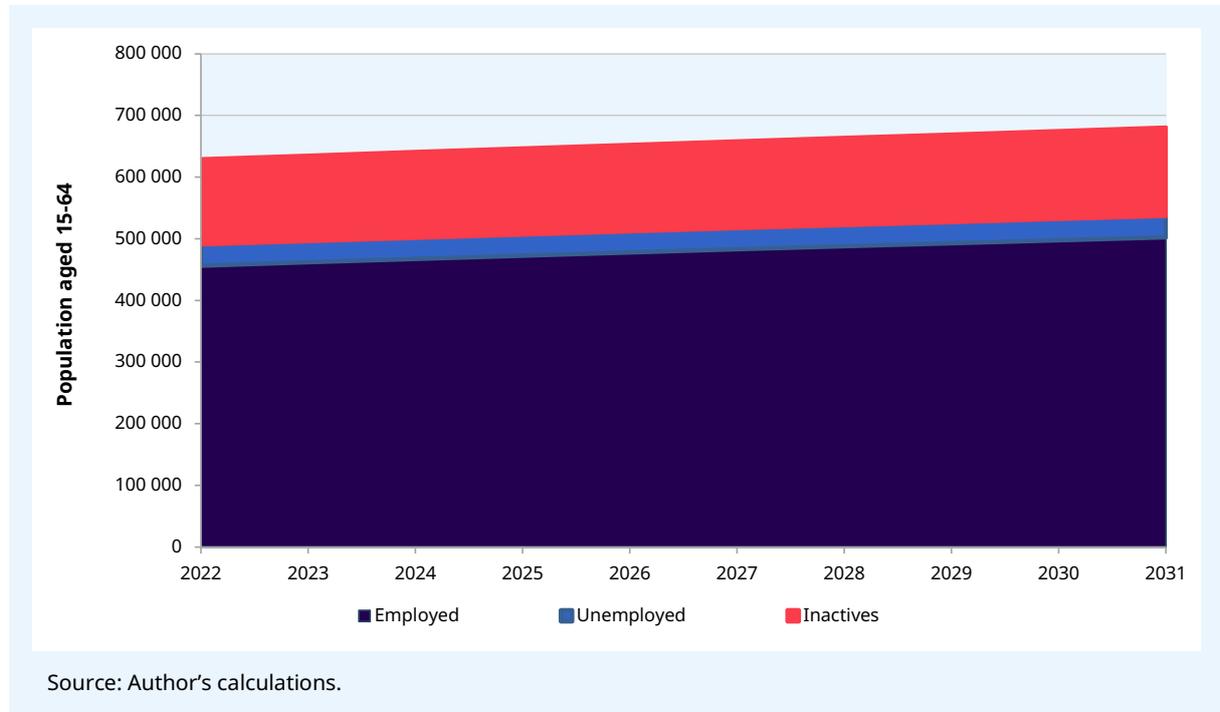
Once the labour force participation rates are determined on the basis of age group and sex, they are applied to the projected population to obtain the labour force. This projection reveals considerable growth of the labour force up to 2031.

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 7.1 per cent in 2022 to its lower limit of 6.5 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 72.5 per cent in 2022 to 73.9 per cent in 2031.

Figure 4.6 shows the changes in the population aged 15 to 64 over the projection period 2022–2031 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, 2022–2031**



### 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 a constant inflation rate of 2 per cent throughout 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 2.3 per cent in 2021. As shown in table 4.4, the annual price inflation is assumed to be 8.1 per cent in 2022 and 3.8 per cent in 2023 and thereafter to continue decreasing annually until it reaches its long-term rate of 2.0 per cent in 2027.

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 -0.2 per cent is assumed for 2022 and 1.5 per cent for 2023. Over the following eight years, the period 2024–2031, real wage growth is set to be averaged at 1.0 per cent.

Table 4.4 shows the expected evolution of nominal wage growth rates. In the short term, over the three-year period 2022–2024, nominal wage growth is assumed to be averaged at 4.5 per cent, and thereafter, for the rest of the projection period, it is expected to be in the range of 2.9 to 3.5 per cent, averaging to 3.1 per cent.

► **Table 4.4. Assumptions of inflation rate, real and nominal increase of average wage, 2022–2031 (percentages)**

Year	Inflation rate	Annual real increase of average wage	Annual nominal increase of average wage
2022	8.1	-0.2	5.2
2023	3.8	1.5	4.8
2024	2.5	1.2	3.5
2025	2.3	1.1	3.5
2026	2.2	1.0	3.2
2027	2.0	0.9	2.9
2028	2.0	1.0	3.0
2029	2.0	0.9	2.9
2030	2.0	0.9	2.9
2031	2.0	0.9	2.9

## ► 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 2021.

Table 5.1 shows the GHS financial position of the GHS for the financial years 2020 and 2021.

► **Table 5.1. Financial statements, 2020–21 (Euros)**

	2020	2021
Contributions to GHS	855 111 866	1 186 666 198
Co-payments and contributions	35 476 337	45 269 867
Discounts from pharmaceutical companies	35 145 924	37 020 101
Other income items	2 119 139	2 712 214
Other income	17 101 445	57 814 051
<b>Total revenue</b>	<b>944 954 711</b>	<b>1 329 482 431</b>
Cost of services	-769 822 649	-1 348 503 941
Administrative expenses	-12 749 458	-15 088 307
<b>Total costs and expenses</b>	<b>-782 572 107</b>	<b>-1 363 592 248</b>
Surplus/(Deficit)	<b>162 382 604</b>	<b>-34 109 817</b>
Net financing income (expense)	-959 923	-1 627 394
Surplus/(Deficit) before taxation	161 422 681	<b>-35 737 211</b>
Taxation	-	-1 721
Net Surplus/(Deficit) for the year	161 422 681	-35 738 932
<b>Cumulative Surplus/(Deficit) for the year</b>	<b>161 422 681</b>	<b>-35 738 932</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, 2020–21**

	2020			2021		
	FS (€)	HIO data (€)	Comparison (%)	FS (€)	HIO data (€)	Comparison (%)
Contributions to GHS	855 111 866	848 490 515	-0.8	1 186 666 198	1 180 030 384	-0.6
Cost of GHS services	769 822 649	766 218 377	-0.5	1 348 503 941	1 346 313 941	-0.2

Table 5.3 shows some key financial indicators regarding the GHS financial position. It follows that for the financial year 2021, there was a significant decrease for both reserve ratio and administrative expense ratio over total expenditure, as well as the accumulated surplus (reserve) in absolute terms decreased. This decrease is due to the fact that the full implementation of the GHS got in place in June 2020 (the second semester of 2020), so 2021 was the first year in which all GHS services provided to beneficiaries for a completed calendar year, and thus the cost of GHS services noted a significant increase of 75 per cent. The contributions were increased by 41 per cent while the accumulated surplus decreased by 9 per cent.

► **Table 5.3. Financial Indicators, 2020–21**

	2020	2021
Accumulated surplus (reserve) (€)	405 776 115	370 037 183
Reserve ratio	0.53	0.27
Administrative expense ratio (%)	1.6	1.1

## 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 2021, 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 2021, 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 2022, resulting to an increased projected number of beneficiaries for 2022, primarily representing the impact of 2022 net migration and the fact that a number of beneficiaries had not been registered in the GHS up to 31 December 2021.

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 2020 and 2021.

► **Table 5.4. Active contributors to the GHS, 2020–21**

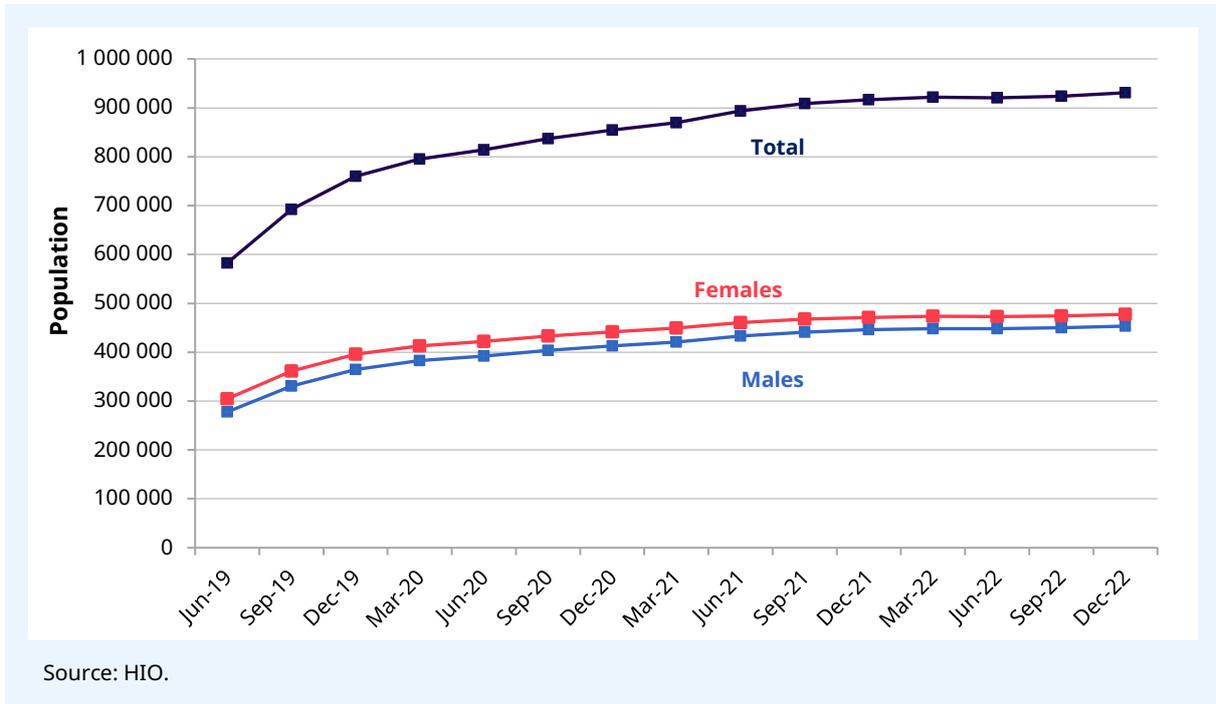
		Number of contributors	
		2020	2021
Employed persons	Male	242 910	253,315
	Female	220 166	231,051
Self-employed persons	Male	16 865	17,036
	Female	13 359	13,734
		Number of pensions	
		2020	2021
GSIS statutory pension		122 803	125,784
GSIS invalidity pension		4 202	3,932
GSIS widow's pension		31 639	32,687
GSIS disablement pension		836	796
GSIS orphans benefit		1 121	1,041
Pension under SPS		16 203	16,132

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 2022.

► **Table 5.5. Registered beneficiaries in the GHS, 2020–2022**

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

► **Figure 5.1. Evolution of the number of registered beneficiaries, 2019–2022**



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 30-month period from June 2020 to December 2022 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, 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 2022 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 2020 and 2021 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, 2020–21**

Year	Inpatient category	Number of claims	Total amount (€)	Average total amount per claim (€)
2020	DRGs	66 325	146 836 454	2 214
	Z-Drugs	20 901	3 842 654	184
	Z-Consumables	45 937	19 083 779	415
	Z-Procedures & fixed fee	13 693	11 073 328	809
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

► **Table 5.7. Claims experience, outpatients, 2020–21**

Year	Outpatient category	Number of claims	Total amount (€)	Average total amount per claim (€)
2020	Allied health professionals	9 590	321 295	34
	Dentists <sup>2</sup>	4 447	173 197	39
	Nurses and midwives	n/a		
	Outpatient specialist doctors <sup>1</sup>	3 378 016	228 679 172	68
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

Notes: <sup>1</sup> It includes outpatient activities undertaken by personal doctors, the total expenditure of those activities is limited up to around 2 per cent of total outpatient expenditure. <sup>2</sup> Figures represents only one month of data since dentists for preventive dental care was introduced from 1 December 2020.

► **Table 5.8. Claims experience, laboratories, 2020–21**

Year	Laboratory test categories	Number of claims	Total amount (€)	Average points per invoice	Average total amount per claim (€)
2020	Biochemistry	754 966	28 463 464	39.3	38
	Haematology	659 878	4 684 340	7.4	7
	Immunology	658 554	17 736 060	28.2	27
	Microbiology	328 450	2 367 598	7.6	7
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

► **Table 5.9. Claims experience, pharmacies, 2020–21**

Year	Number of claims	Total pharmaceuticals <sup>1</sup> amount (€)	Pharmacies' fees (€)	Overnight fees (€)	Average pharmaceuticals amount per claim (€)
2020	5 722 959	142 498 475	30 934 637	550 000	25
2021	6 631 558	196 868 923	32 205 197	547 811	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 and 2022.

► **Table 5.10. Inpatient utilization rates, by sex, 2021–22 (percentages)**

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

► **Table 5.11. Inpatient average cost per invoice, by sex, 2021–22 (Euros)**

Inpatient category	Sex	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
DRGs	Male	3 647	3 620	3 416	3 478	3 664	3 085	3 218	3 027
	Female	3 279	3 596	3 099	3 013	2 695	4 185	2 924	2 604
Z-Drugs	Male	589	578	645	568	618	635	511	366
	Female	505	520	722	517	540	831	545	347
Z-Consumables	Male	634	871	690	703	946	800	832	687
	Female	838	770	523	755	626	900	680	706
Z-Procedures & fixed fee	Male	553	534	587	646	536	531	503	449
	Female	668	575	524	541	499	512	513	486



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 2 of 2021 to quarter 3 of 2022, while over the period from quarter 3 of 2022 to quarter 4 of 2022 the overall utilization rates experienced a significant increase for both sexes and for all 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 mixture 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 2021 to 2022.

► **Table 5.12. Outpatient utilization rates, by category and by sex, 2021–22**  
(percentages)

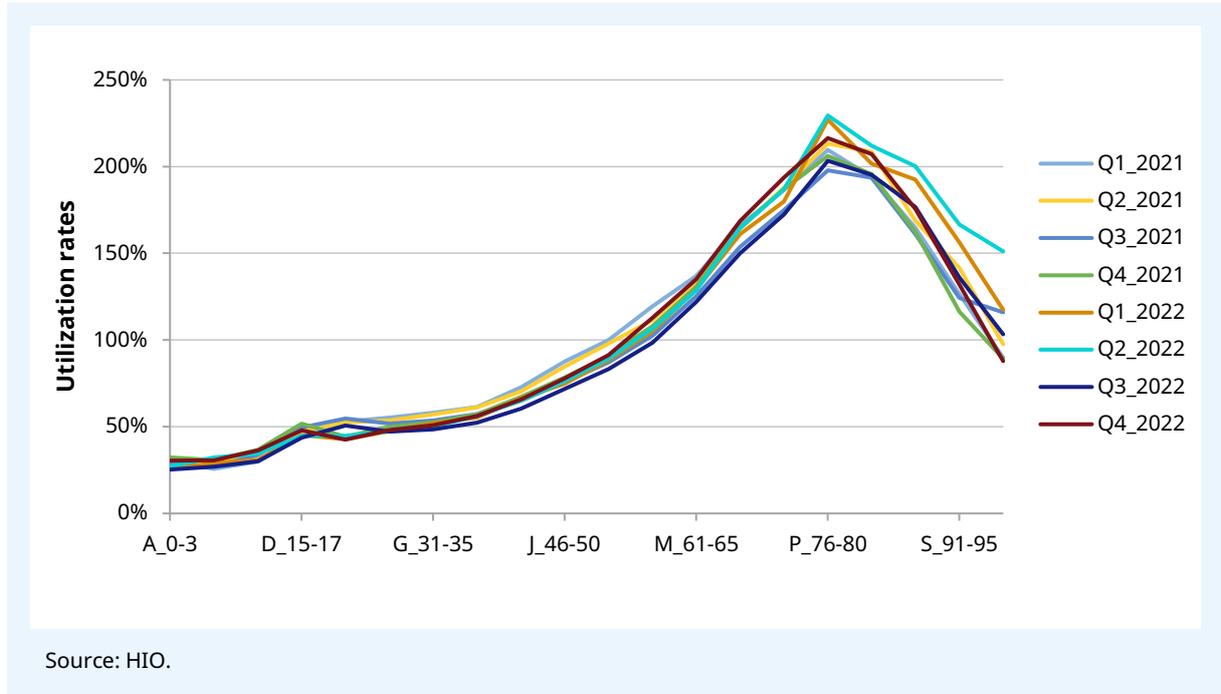
Outpatient category	Sex	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Allied health professionals	Male	7.0	9.5	9.6	13.2	13.5	13.2	11.5	15.5
	Female	9.4	12.4	11.7	15.8	16.0	16.7	14.1	19.1
Dentists	Male	2.5	4.1	3.8	3.2	2.5	3.6	4.0	3.9
	Female	3.1	4.8	4.4	3.6	2.9	4.1	4.6	4.5
Nurses and midwives	Male	0.2	0.2	0.3	0.4	0.4	0.6	0.6	0.7
	Female	0.3	0.4	0.4	0.5	0.6	0.8	0.8	1.1
Specialist doctors and Personal doctors	Male	42.5	42.1	39.2	41.4	39.4	40.3	37.8	40.9
	Female	62.9	61.6	57.5	60.8	58.5	60.0	57.5	62.0

► **Table 5.13. Outpatient average cost per invoice, by category and by sex, 2021–22 (Euros)**

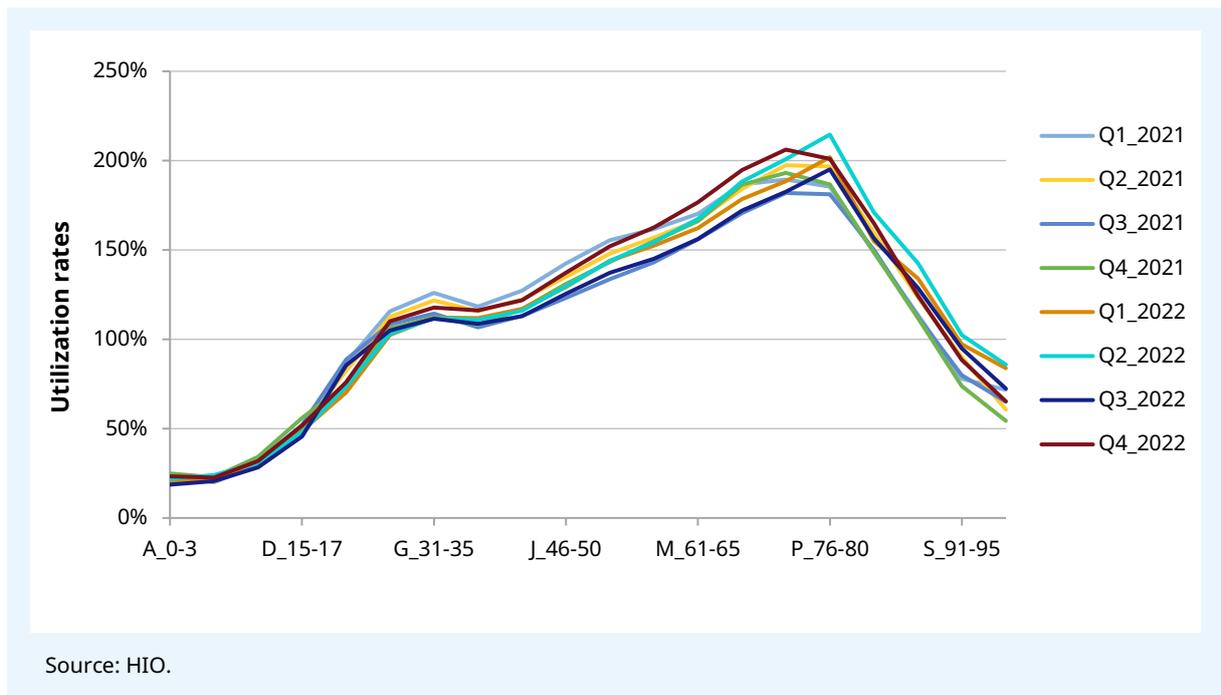
Outpatient category	Sex	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Allied health professionals	Male	33	33	34	33	32	31	31	32
	Female	33	33	34	33	33	32	32	33
Dentists	Male	39	39	39	39	39	39	39	39
	Female	39	39	39	39	39	39	39	39
Nurses and midwives	Male	28	27	28	29	29	30	30	29
	Female	27	27	26	27	29	29	29	29
Specialist doctors and Personal doctors	Male	67	67	67	66	68	67	70	66
	Female	60	59	59	59	59	58	59	56

Figures 5.4 and 5.5 show the trend in outpatient utilization rates by age group and by quarter over the years 2021 and 2022 for males and females respectively.

▶ **Figure 5.4. Evolution of outpatient utilization rates, by age group, males, 2021-22**



▶ **Figure 5.5. Evolution of outpatient utilization rates, by age group, females, 2021-22**



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 1 of 2021 to quarter 4 of 2022 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 2021 to 2022.

► **Table 5.14. Laboratory utilization rates, by category, 2021–22 (percentages)**

Laboratory test categories	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Biochemistry	25	26	25	26	24	26	25	27
Haematology	22	23	22	22	21	22	21	23
Immunology	23	23	22	23	22	24	22	24
Microbiology	11	11	11	11	10	11	11	11

► **Table 5.15. Laboratories, average cost per invoice, by category, 2021–22 (Euros)**

Laboratory test categories	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Biochemistry	46	47	46	46	45	45	44	44
Haematology	9	9	9	9	9	9	9	9
Immunology	36	36	35	35	36	36	35	35
Microbiology	10	10	9	9	9	9	10	9

It follows from tables 5.14 and 5.15 above that over the period from quarter 1 of 2021 to quarter 4 of 2022, the overall utilization rates and average cost per invoice remained stable.

### 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 2021 to 2022.

► **Table 5.16. Pharmacy utilization rates, 2021–22 (percentages)**

	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Overall rate	184	183	181	194	193	194	197	215

► **Table 5.17. Pharmaceuticals, average cost per invoice, 2021–22 (Euros)**

	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Overall rate	31	32	34	31	31	32	32	32

It follows from tables 5.16 and 5.17 above that over the period from quarter 4 of 2021 to quarter 3 of 2022, the overall utilization rates and average cost per invoice remained stable, while for the quarter 4 of 2022 the utilization rate experienced a significant increase.

### 5.3.6. Historical medical inflation and assumption

Table 5.18 shows the historical medical inflation rate by healthcare category over the 10-year period from 2012 to 2022.

► **Table 5.18. Historical medical inflation, by healthcare category, 2012–2022** (percentages)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
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
Pharmaceutical products	0.0	-1.2	-0.1	-1.6	-0.4	0.1	-1.1	-2.4	-0.1	1.1	1.0
Outpatient services	0.7	-4.1	-3.0	0.8	1.5	0.9	0.7	0.8	0.8	0.6	0.5
Medical services	1.0	-4.9	-2.9	1.6	2.2	1.4	2.1	1.2	0.1	0.3	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
Paramedical services	0.5	-3.7	-3.3	0.9	1.0	0.5	-0.2	0.1	1.3	0.6	0.5
Hospital services	0.4	0.6	2.2	1.4	1.9	1.7	1.0	0.7	0.3	0.1	0.3
Total health	0.6	-2.5	-1.3	0.4	1.1	0.8	-0.1	-0.3	0.5	0.7	0.8

Note: Base year 2011.  
Source: CyStat.

It follows from table 5.18 that the introduction of the GHS restrained the upward trend in medical inflation and could secure a stability in its future trends.

Table 5.19 shows the medical inflation assumption by healthcare category over the period from 2024 to 2031. With respect to the years 2022 and 2023, 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, 2024–2031** (percentages)

Healthcare category	2024	2025	2026	2027	2028	2029	2030	2031
Personal doctors	2.5	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Outpatient specialist doctors	2.5	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Pharmacies	2.3	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Laboratories	2.3	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Inpatient DRGs	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2
Z-Consumables	2.3	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Z-Drugs	2.3	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Z-Procedures & fixed fee	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2
A&E departments and ambulances	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8
Dentists	2.5	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Nurses and midwives	2.5	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Allied health professionals	2.5	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Rehabilitation and palliative care	2.1	2.0	2.0	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 2022 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 2022, 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 2022 to 2031.

► **Table 5.20. Inpatient DRGs, quarterly utilization rate assumption, by age group and sex, 2022–2031 (percentages)**

Age group	2022		2023		2024-2031	
	Male	Female	Male	Female	Male	Female
0–3	4.7	3.6	5.4	4.4	5.6	4.6
4–7	2.4	1.9	2.5	2.0	2.6	2.1
8–14	1.4	1.2	1.5	1.3	1.6	1.4
15–17	1.7	1.7	1.9	2.0	2.0	2.1
18–25	1.9	2.8	2.1	3.2	2.2	3.4
26–30	2.1	4.7	2.4	5.6	2.5	5.8
31–35	2.0	5.3	2.3	6.2	2.4	6.5
36–40	2.5	5.0	2.9	6.0	3.0	6.2
41–45	4.1	5.4	4.7	6.4	4.9	6.7
46–50	5.3	6.5	6.2	7.7	6.4	8.1
51–55	5.7	6.2	6.7	7.2	7.0	7.5
56–60	6.6	6.0	7.7	7.1	8.0	7.4
61–65	8.8	6.7	10.4	7.7	10.9	8.1
66–70	11.6	8.1	13.9	9.5	14.5	9.9
71–75	14.7	9.3	17.8	11.0	18.6	11.5
76–80	17.9	11.4	21.2	13.2	22.1	13.8
81–85	19.0	11.6	22.4	13.2	23.4	13.8
86–90	19.8	12.6	22.8	14.2	23.8	14.9
91–95	20.1	14.1	22.2	15.7	23.2	16.4
96–100	18.0	14.1	18.1	15.1	18.9	15.8

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 2022 to 2031.

► **Table 5.21. Inpatient Z consumables, quarterly utilization rate assumption, by age group and sex, 2022–2031 (percentages)**

Age group	2022		2023		2024–2031	
	Male	Female	Male	Female	Male	Female
0–3	2.8	1.1	4.0	1.9	4.2	2.0
4–7	1.6	0.9	1.7	0.9	1.8	1.0
8–14	0.8	0.5	1.0	0.6	1.1	0.7
15–17	1.0	0.8	1.3	1.1	1.4	1.2
18–25	1.6	2.5	1.9	3.0	2.0	3.2
26–30	1.7	4.4	2.0	5.3	2.1	5.6
31–35	1.6	5.1	1.8	5.9	1.9	6.2
36–40	2.1	4.8	2.3	5.7	2.4	5.9
41–45	2.9	4.3	2.9	5.1	3.0	5.3
46–50	4.6	4.9	5.0	5.9	5.3	6.1
51–55	5.0	5.5	5.7	6.4	5.9	6.7
56–60	6.6	5.1	7.8	5.7	8.1	6.0
61–65	8.6	6.0	10.4	7.1	10.8	7.4
66–70	10.6	7.4	12.0	9.5	12.6	9.9
71–75	13.5	9.6	18.0	11.5	18.8	12.0
76–80	16.8	10.0	18.2	11.3	19.1	11.8
81–85	17.7	10.9	19.7	12.8	20.6	13.4
86–90	14.5	11.1	17.8	13.3	18.7	13.9
91–95	13.5	9.7	17.0	9.6	17.8	10.1
96–100	3.5	4.8	4.9	2.1	5.2	2.2

► **Table 5.22. Inpatient Z drugs, quarterly utilization rate assumption, by age group and sex, 2022–2031 (percentages)**

Age group	2022		2023		2024–2031	
	Male	Female	Male	Female	Male	Female
0–3	3.5	2.1	3.8	2.3	4.0	2.4
4–7	0.8	0.6	0.8	0.7	0.9	0.7
8–14	0.6	0.6	0.6	0.7	0.7	0.7
15–17	0.4	0.6	0.4	0.6	0.4	0.6
18–25	0.3	0.5	0.3	0.5	0.3	0.6
26–30	0.6	0.7	0.7	0.7	0.7	0.8
31–35	0.5	1.5	0.6	1.6	0.6	1.7
36–40	1.0	1.9	1.1	2.1	1.1	2.2
41–45	2.5	2.3	2.8	2.5	2.9	2.6
46–50	3.0	3.6	3.3	3.9	3.4	4.1
51–55	3.2	3.5	3.5	3.9	3.7	4.0
56–60	4.2	4.1	4.6	4.5	4.8	4.8

Age group	2022		2023		2024–2031	
	Male	Female	Male	Female	Male	Female
61–65	6.8	4.3	7.5	4.7	7.8	4.9
66–70	7.0	5.2	7.7	5.7	8.0	6.0
71–75	9.3	5.1	10.2	5.6	10.7	5.9
76–80	11.0	7.6	12.0	8.3	12.6	8.7
81–85	8.8	6.7	9.6	7.4	10.1	7.7
86–90	5.6	3.4	6.1	3.8	6.4	4.0
91–95	2.3	0.3	2.5	0.4	2.6	0.4
96–100	0.7	0.5	0.8	0.5	0.8	0.5

► **Table 5.23. Inpatient Z procedures and fixed fee items, quarterly utilization rate assumption, by age group and sex, 2022–2031 (percentages)**

Age group	2022		2023		2024–2031	
	Male	Female	Male	Female	Male	Female
0–3	4.5	3.3	4.9	3.6	5.2	3.7
4–7	1.3	1.1	1.5	1.2	1.5	1.3
8–14	1.1	1.0	1.2	1.1	1.3	1.1
15–17	1.0	1.1	1.1	1.3	1.2	1.3
18–25	1.5	2.5	1.7	2.8	1.8	2.9
26–30	1.5	4.5	1.6	4.9	1.7	5.2
31–35	1.6	4.9	1.8	5.4	1.8	5.6
36–40	2.3	4.8	2.5	5.3	2.6	5.6
41–45	3.6	5.1	4.0	5.6	4.2	5.8
46–50	4.9	6.3	5.4	6.9	5.6	7.2
51–55	5.1	5.8	5.6	6.4	5.9	6.7
56–60	6.1	5.6	6.7	6.1	7.0	6.4
61–65	8.7	6.0	9.6	6.6	10.1	6.9
66–70	10.9	7.6	12.0	8.4	12.5	8.8
71–75	13.9	8.9	15.3	9.8	16.0	10.3
76–80	17.5	10.9	19.2	12.0	20.1	12.6
81–85	17.5	11.3	19.3	12.4	20.2	13.0
86–90	15.9	9.1	17.5	10.0	18.3	10.5
91–95	11.5	8.2	12.6	9.0	13.2	9.4
96–100	5.3	5.8	5.9	6.4	6.1	6.7

Table 5.24 shows the assumption of outpatient specialists' quarterly utilization rates by age group and sex for the years from 2022 to 2031.

► **Table 5.24. Outpatient specialists, quarterly utilization rate assumption, by age group and sex, 2022–2031 (percentages)**

Age group	2022		2023		2024		2025–2031	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	28.4	22.0	29.7	22.9	30.3	23.3	30.6	23.6
4–7	31.8	23.9	30.9	23.6	31.6	24.1	31.9	24.3
8–14	34.6	31.6	35.8	32.2	36.5	32.8	36.8	33.2
15–17	47.8	51.3	48.4	52.7	49.4	53.7	49.9	54.2
18–25	48.3	81.9	48.1	83.6	49.1	85.3	49.6	86.1
26–30	51.0	112.2	51.5	114.9	52.5	117.2	53.0	118.3
31–35	54.1	120.9	54.4	124.0	55.5	126.5	56.0	127.8
36–40	59.3	120.2	60.1	123.2	61.3	125.7	61.9	126.9
41–45	69.5	126.2	71.0	128.9	72.5	131.4	73.2	132.8
46–50	81.4	141.1	83.7	145.0	85.4	147.9	86.3	149.4
51–55	95.6	156.8	97.5	161.0	99.5	164.2	100.5	165.8
56–60	114.9	167.0	118.7	171.9	121.0	175.3	122.2	177.1
61–65	140.2	180.7	144.2	185.6	147.1	189.3	148.6	191.2
66–70	175.3	199.7	180.6	205.6	184.2	209.7	186.0	211.8
71–75	199.5	211.5	205.4	217.3	209.5	221.7	211.6	223.9
76–80	238.5	220.7	240.8	222.8	245.7	227.3	248.1	229.5
81–85	221.5	175.3	226.2	178.9	230.7	182.5	233.0	184.3
86–90	201.7	143.3	199.9	143.9	203.9	146.8	205.9	148.3
91–95	159.9	102.5	157.4	102.5	160.5	104.5	162.1	105.6
96–100	127.0	82.5	128.1	80.7	130.6	82.3	131.9	83.1

Table 5.25 shows the assumption of allied health professionals' quarterly utilization rates by age group and sex for the years from 2022 to 2031.

► **Table 5.25. Allied health professionals, quarterly utilization rate assumption, by age group and sex, 2022–2031 (percentages)**

Age group	2022		2023		2024		2025–2031	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	26.9	16.5	33.5	20.6	36.3	22.4	36.3	22.4
4–7	44.1	23.3	58.0	30.2	62.8	32.7	62.8	32.7
8–14	21.3	17.3	27.0	22.4	29.0	24.0	29.0	24.0
15–17	25.0	27.2	31.1	34.4	33.5	36.7	33.5	36.7
18–25	21.5	24.1	24.7	27.4	26.7	29.3	26.7	29.3
26–30	25.1	27.6	30.0	32.7	32.4	35.0	32.4	35.0
31–35	24.3	26.4	29.3	31.9	31.6	34.2	31.6	34.2
36–40	24.0	26.9	28.7	32.6	31.0	35.0	31.0	35.0
41–45	25.6	29.6	31.0	36.0	33.5	38.8	33.5	38.8
46–50	26.9	34.3	32.7	42.5	35.4	45.8	35.4	45.8

Age group	2022		2023		2024		2025–2031	
	Male	Female	Male	Female	Male	Female	Male	Female
51–55	28.2	40.9	34.5	50.8	37.3	54.9	37.3	54.9
56–60	30.7	43.3	38.0	53.8	41.0	58.1	41.0	58.1
61–65	31.8	44.9	39.9	55.9	43.1	60.4	43.1	60.4
66–70	33.5	47.6	41.1	59.5	44.5	64.4	44.5	64.4
71–75	33.0	48.7	41.3	60.6	44.7	65.6	44.7	65.6
76–80	36.4	48.4	44.8	59.6	48.5	64.6	48.5	64.6
81–85	35.5	40.5	43.6	50.9	47.3	55.2	47.3	55.2
86–90	35.9	37.4	44.4	46.6	48.2	50.5	48.2	50.5
91–95	35.7	28.9	41.7	35.1	45.2	38.0	45.2	38.0
96–100	21.6	21.0	25.0	30.9	27.0	33.4	27.0	33.4

Table 5.26 shows the assumption of dentists' quarterly utilization rates by age group and sex for the years from 2022 to 2031.

► **Table 5.26. Dentists, quarterly utilization rate assumption, by age group and sex, 2022–2031 (percentages)**

Age group	2022		2023		2024		2025–2031	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	1.5	1.6	1.7	1.8	1.7	1.9	1.7	1.9
4–7	6.5	6.9	7.2	7.6	7.4	7.7	7.4	7.7
8–14	9.2	9.4	9.4	9.9	9.5	10.1	9.5	10.1
15–17	8.4	8.5	8.6	8.6	8.8	8.8	8.8	8.8
18–25	7.9	9.4	8.1	9.4	8.2	9.6	8.2	9.6
26–30	8.6	9.8	9.4	11.2	9.6	11.4	9.6	11.4
31–35	8.5	9.2	9.7	10.7	9.9	10.9	9.9	10.9
36–40	8.1	9.0	9.4	10.2	9.6	10.4	9.6	10.4
41–45	8.0	8.6	9.2	9.7	9.3	9.9	9.3	9.9
46–50	7.6	8.2	8.8	9.2	9.0	9.4	9.0	9.4
51–55	7.2	8.1	8.4	9.2	8.6	9.4	8.6	9.4
56–60	7.1	8.0	8.3	9.3	8.5	9.5	8.5	9.5
61–65	6.7	7.7	7.9	9.1	8.1	9.3	8.1	9.3
66–70	6.5	7.3	7.7	8.6	7.9	8.8	7.9	8.8
71–75	5.8	6.4	6.7	7.7	6.9	7.8	6.9	7.8
76–80	5.5	5.5	6.5	6.2	6.7	6.3	6.7	6.3
81–85	4.0	3.5	4.5	4.0	4.6	4.1	4.6	4.1
86–90	3.5	2.4	3.8	2.8	3.9	2.9	3.9	2.9
91–95	2.0	1.4	2.3	1.6	2.3	1.6	2.3	1.6
96–100	1.4	0.9	1.6	0.9	1.7	0.9	1.7	0.9

Table 5.27 shows the assumption of nurses' and midwives' quarterly utilization rates by age group and sex for the years from 2022 to 2031.

► **Table 5.27. Nurses and midwives, quarterly utilization rate assumption, by age group and sex, 2022–2031 (percentages)**

Age group	2022		2023		2024		2025–2031	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4–7	0.1	0.0	0.2	0.0	0.2	0.0	0.2	0.0
8–14	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1
15–17	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2
18–25	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
26–30	0.4	0.6	0.5	0.8	0.5	0.9	0.5	0.9
31–35	0.4	0.6	0.5	0.8	0.6	0.9	0.6	0.9
36–40	0.6	0.5	0.7	0.7	0.8	0.7	0.8	0.7
41–45	0.7	0.4	0.8	0.5	0.9	0.5	0.9	0.5
46–50	0.7	0.6	0.9	0.7	1.0	0.8	1.0	0.8
51–55	1.0	0.8	1.2	1.1	1.3	1.2	1.3	1.2
56–60	1.0	1.2	1.3	1.5	1.5	1.7	1.5	1.7
61–65	1.3	1.7	1.6	2.1	1.8	2.3	1.8	2.3
66–70	1.9	1.6	2.4	2.1	2.6	2.3	2.6	2.3
71–75	2.5	2.9	3.2	3.7	3.5	4.1	3.5	4.1
76–80	3.5	4.2	4.5	5.3	4.9	5.8	4.9	5.8
81–85	6.0	9.1	7.6	11.7	8.4	12.8	8.4	12.8
86–90	12.0	17.1	15.4	21.9	16.9	24.1	16.9	24.1
91–95	25.5	26.3	32.6	33.6	35.9	37.0	35.9	37.0
96–100	44.1	32.4	56.4	41.4	62.0	45.6	62.0	45.6

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 2022–2031.

► **Table 5.28. Assumptions of laboratory monthly utilization rate and average number of points per invoice, by test category, 2022–2031**

Laboratory test category	2022		2023		2024–2031	
	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	17	33.5	17	34.4	17	35.3
Haematology and microbiology	11	7.8	11	8.0	11	8.2

Table 5.29 shows the assumptions of pharmacies' monthly utilization rates and pharmacist fee for the average number of packs dispensed, the pharmaceuticals net average cost per invoice and the annual cost of the overnight pharmacist fee over the projection period 2022–2031.

► **Table 5.29. Pharmacies, monthly utilization rates and other projection assumptions, 2022–2031**

	2022	2023	2024	2025–2031
Monthly utilization rate (%)	67	69	69	69
Pharmacist fee – Average number of packs dispensed	2.6	2.6	2.6	2.6
Pharmaceuticals – Average cost per invoice (€)	29.0	29.0	30.1	30.9
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 2024 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 +
0–3	210	186
4–7	155	137
8–14	91	80
15–17	91	80
18–50	83	66
51–70	117	116
71+	145	145

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 2024 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 2022–2031.

► **Table 5.31. A&E departments, private hospitals, assumptions of quarterly utilization rate and average number of points per invoice, 2022–2031**

	2022		2023		2024–2031	
	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	0.83	6.1	0.88	6.4	0.75	6.4

Table 5.32 shows the A&E departments of public hospitals current annual fixed cost at A&E departments of public hospitals.

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

	A&E department of public hospitals	Ambulances
2022–2031 annual fixed cost	18 000 000	13 200 000

Table 5.33 shows the assumption used for the GHS expenditure on rehabilitation and palliative care. From 2025 onwards the 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 2022–2031 (Euros)**

	2022	2023	2024	2025–2031
Palliative care in institutions	2 800 000	5 348 240	6 112 274	7 640 343
Rehabilitation in institutions	–	6 630 000	9 360 000	11 700 000

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 €25 million in 2024 and will continue to grow for the rest of the projection period in line with the relevant medical inflation.
- **Laboratories:** The introduction of specialized laboratory tests will add a cost of €8 million in 2023 and it is estimated to increase up to €10.7 million in 2025; this will continue to grow for the rest of the projection period in line with the relevant medical inflation.
- **Pharmaceuticals:** The cost of introducing new or innovative drugs in inpatient and outpatient care will increase from €45 million in 2022 to €89.6 million in 2025 and will continue to grow for the rest of the projection period in line with the relevant medical inflation.
- **A&E departments of new or current affiliated private hospitals:** The cost of introducing new A&E departments will add a cost of €2.9 million in 2023 increasing to €10.5 million in 2025; this will continue to grow for the rest of the projection period in line with the relevant medical inflation.
- **Podiatrists:** The introduction of Podiatrists will add a cost of €2.1 million by 2024.

## 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 General Healthcare System (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 2022 to 2031. 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, orphans 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 labour force. In particular, over the projection period, the number of employed contributing persons is expected to increase by 14.3 per cent, i.e., from 529,397 in 2022 to 605,090 in 2031.

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 23.7 per cent, increasing from 178,173 in 2022 to 220,372 in 2031.

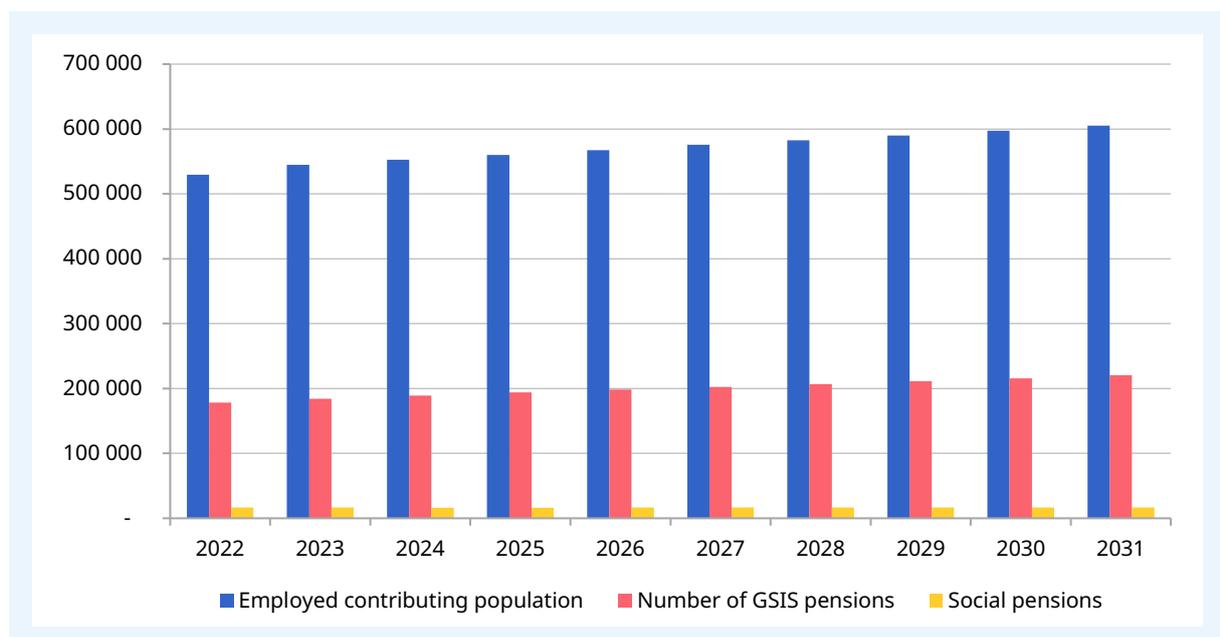
Furthermore, the number of social pensions is expected to increase marginally, only by 0.9 per cent.

► **Table 6.1. Projection of GHS contributing population, by category, 2022–2031**

Year	Employed contributing population	Number of GSIS pensions					Social pensions
		Statutory	Invalidity	Widows	Orphans	Total	
2022	529 397	137 341	4 504	35 564	764	<b>178 173</b>	16 309
2023	544 560	142 254	4 374	36 685	783	<b>184 096</b>	16 270
2024	552 458	146 376	4 253	37 800	770	<b>189 199</b>	16 214
2025	559 910	149 887	4 194	38 902	770	<b>193 753</b>	16 131
2026	567 503	153 187	4 127	39 990	763	<b>198 067</b>	16 278
2027	575 766	156 367	4 125	41 099	753	<b>202 344</b>	16 387
2028	582 776	159 525	4 113	42 210	724	<b>206 572</b>	16 458
2029	589 817	162 790	4 166	43 325	707	<b>210 988</b>	16 493
2030	597 158	166 327	4 196	44 443	689	<b>215 655</b>	16 490
2031	605 090	169 866	4 273	45 566	667	<b>220 372</b>	16 454

Figure 6.1 shows the expected evolution of the number of GHS contributors by category over the projection period 2022–2031.

► **Figure 6.1. Projection of GHS contributing population by category, 2022–2031**



### 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 10.3 per cent, i.e., from 930,875 in 2022 to 1,027,113 in 2031.

Table 6.2 presents the projection of year-end GHS registered beneficiary population and compares it with the general population for the period 2022 to 2031.

► **Table 6.2. Projection of year-end GHS registered beneficiaries, by sex, 2022–2031**

Year	Male	Female	Total	Total population	Coverage rate (%)
2022	453 409	477 466	930 875	937 901	99
2023	459 014	482 890	941 904	950 085	99
2024	464 629	488 391	953 020	962 365	99
2025	470 214	493 876	964 090	974 669	99
2026	475 747	499 316	975 063	986 937	99
2027	481 166	504 704	985 870	999 084	99
2028	486 472	510 025	996 497	1 011 089	99
2029	491 662	515 230	1 006 892	1 022 917	98
2030	496 748	520 319	1 017 067	1 034 548	98
2031	501 771	525 342	1 027 113	1 046 051	98

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

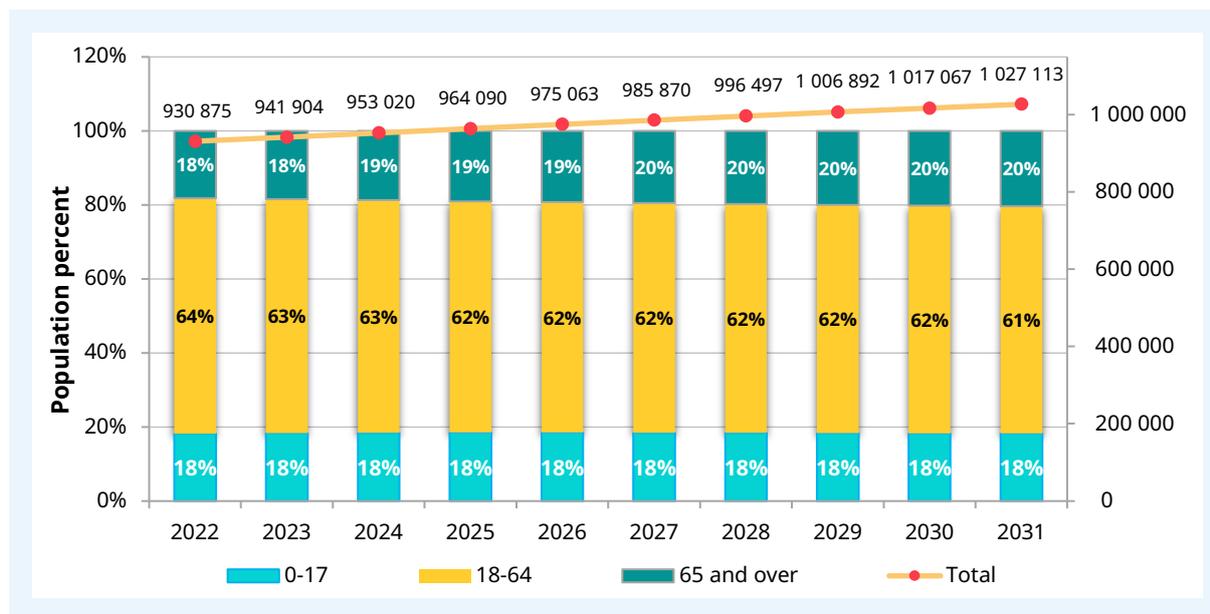
► **Table 6.3. Projection of year-end GHS registered beneficiaries, by age group, 2022–2031**

Year	0–17	18–64	65 and over	Total
2022	169 065	592 546	169 264	<b>930 875</b>
2023	172 597	595 563	173 744	<b>941 904</b>
2024	175 342	599 087	178 591	<b>953 020</b>
2025	178 041	602 433	183 616	<b>964 090</b>
2026	180 220	607 114	187 729	<b>975 063</b>
2027	181 835	611 645	192 390	<b>985 870</b>
2028	183 269	616 377	196 851	<b>996 497</b>
2029	184 910	620 347	201 635	<b>1 006 892</b>
2030	185 904	625 981	205 182	<b>1 017 067</b>
2031	187 346	630 223	209 544	<b>1 027 113</b>

The percentage of registered beneficiaries aged 18–64 over the total registered beneficiaries decreases from 63.7 per cent in 2022 to 61.4 per cent in 2031, while the percentage of registered beneficiaries aged 65 and above over the total registered beneficiaries increases from 18.2 per cent in 2022 to 20.4 per cent in 2031. Beneficiaries' age composition is relatively stable throughout the projection period, showing a small ageing effect.

Figure 6.2 shows graphically the projection of year-end GHS registered beneficiaries and their percentage distribution by age group for 2022 to 2031.

► **Figure 6.2. Projection of year-end GHS registered beneficiaries, by age group, 2022–2031**



## 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 2022 to 2031.

► **Table 6.4. Projection of employee contributory earnings and other income sources, 2022–2031 (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
2022	11 052	1 686	393	79	77	26 165	52	435	1 200	272
2023	12 357	1 791	398	80	78	27 245	54	452	1 246	282
2024	13 076	1 871	403	81	79	28 775	63	463	1 278	289
2025	13 625	2 014	409	82	80	30 190	72	474	1 307	296
2026	14 230	2 157	414	83	83	31 526	88	485	1 336	302
2027	14 849	2 282	418	84	86	32 800	105	494	1 362	308
2028	15 420	2 410	422	84	89	34 108	130	504	1 390	314
2029	16 024	2 538	425	85	91	35 451	156	514	1 417	321
2030	16 648	2 685	429	86	93	36 847	192	524	1 446	327
2031	17 319	2 826	431	86	96	38 299	230	535	1 475	334

## 6.2.2. Projection of GHS income

Table 6.5 shows the projection of GHS income by category over the projection period from 2022 to 2031.

► **Table 6.5. Projection of GHS income, by category, 2022–2031** (in million of Euros)

GHS income category	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Contributions (salaries, pensions)	667	741	783	816	854	891	926	962	1 001	1 041
Government as State	630	691	729	762	797	833	866	901	937	976
Other contribution income	52	54	55	57	59	60	62	64	66	68
<b>Contribution income</b>	<b>1 349</b>	<b>1 486</b>	<b>1 567</b>	<b>1 635</b>	<b>1 710</b>	<b>1 784</b>	<b>1 854</b>	<b>1,927</b>	<b>2 004</b>	<b>2 085</b>
Income from treatment of EU citizens	15	19	20	20	20	21	21	22	22	23
Co-payments	46	50	52	53	54	54	55	56	56	57
Contributions I	2	2	2	2	2	2	2	2	2	2
Discounts from pharmaceutical companies	45	45	47	48	49	50	51	52	53	54
Discounts/Claw-backs for Z-consumables	-	9	9	10	10	11	11	11	12	12
<b>Total GHS income</b>	<b>1 457</b>	<b>1 611</b>	<b>1 697</b>	<b>1 768</b>	<b>1 845</b>	<b>1 922</b>	<b>1 994</b>	<b>2 070</b>	<b>2 149</b>	<b>2 233</b>

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

Table 6.6 shows a further breakdown of GHS contribution income by income source for the period 2022 to 2031.

► **Table 6.6. Projection of GHS contribution income, by income source, 2022–2031** (in million of Euros)

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Salaried and government employees	580	649	687	716	747	780	810	842	874	910
Self-employed persons	24	27	28	29	31	32	33	34	36	37
GSIS pensions	45	47	50	53	57	60	64	67	71	75
Other pensions	18	18	18	18	19	19	19	19	20	19
Other contribution income	52	54	55	57	59	60	62	64	66	68
Government as State	630	691	729	762	797	833	866	901	937	976
<b>Contribution income</b>	<b>1 349</b>	<b>1 486</b>	<b>1 567</b>	<b>1 635</b>	<b>1 710</b>	<b>1 784</b>	<b>1 854</b>	<b>1 927</b>	<b>2 004</b>	<b>2 085</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 2022 to 2031. Other income for 2022, mainly concerns the Cyprus Government’s reimbursement to the GHS reflecting its expenditure for managing the COVID-19 pandemic and incidences. From 2023, other income mainly concerns “state sponsorship and co-financed projects”.

► **Table 6.7. Projection of other income, 2022–2031 (in million of Euros)**

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Other income	19	9	5	3	3	3	3	3	3	3

### 6.2.3. Projection of benefits expenditure

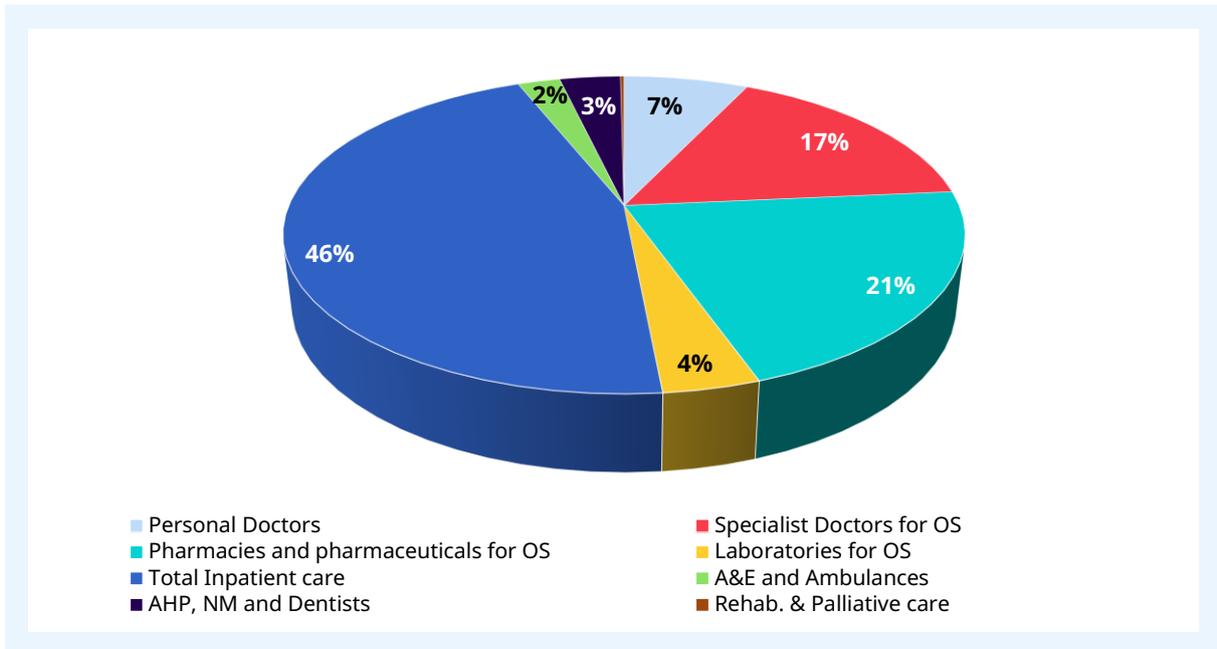
Table 6.8 shows the projection of benefits expenditure by healthcare category over the projection period of 2022 to 2031.

► **Table 6.8. Projection of GHS benefit expenditure, by healthcare category, 2022–2031 (in million of Euros)**

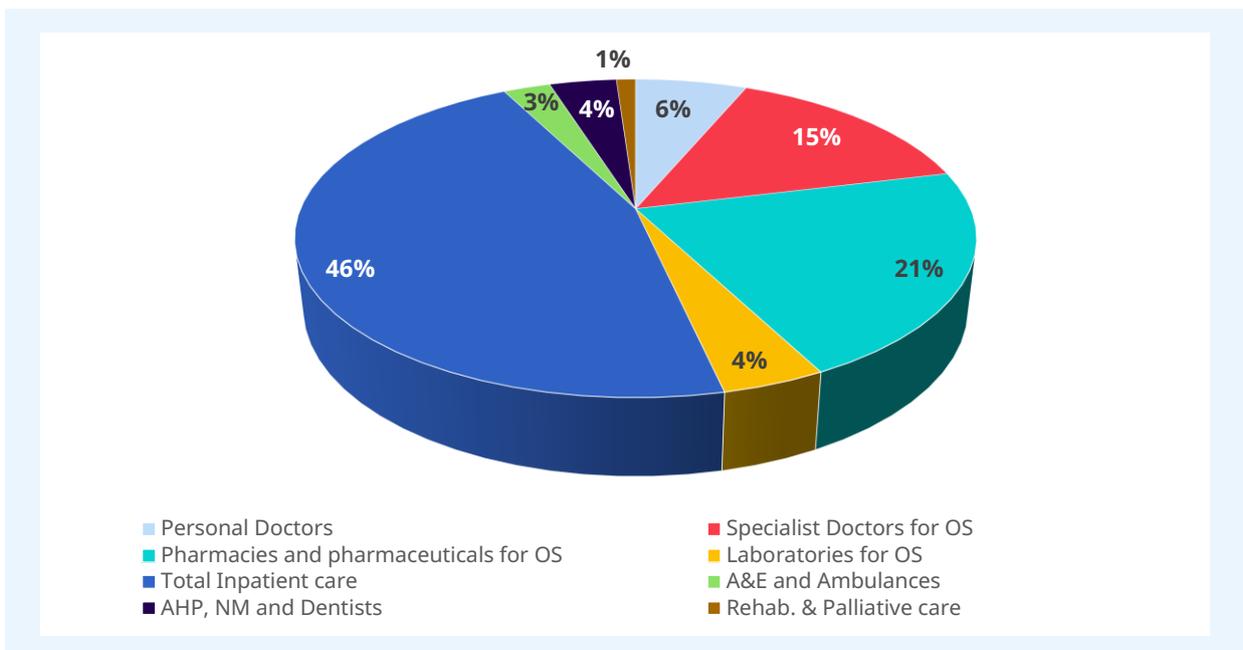
Healthcare category	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Personal doctors	98	103	107	111	115	118	122	126	130	134
Outpatient specialist doctors	230	235	249	261	269	278	287	296	305	314
Pharmacies and pharmaceuticals for outpatient	293	313	350	373	384	395	406	417	429	440
Laboratories	54	65	70	73	75	77	80	82	84	86
Total Inpatient care	604	681	751	778	807	835	863	892	924	956
Treatment of GHS beneficiaries abroad	28	22	25	26	26	27	27	28	28	29
A&E and ambulances	33	37	45	47	48	49	50	51	52	53
AHP, NM and Dentists	48	59	65	67	69	71	73	75	77	79
Rehabilitation and palliative care	3	12	15	19	20	20	20	21	21	22
<b>Total GHS gross healthcare expenditure</b>	<b>1 391</b>	<b>1 527</b>	<b>1 677</b>	<b>1 755</b>	<b>1 813</b>	<b>1 870</b>	<b>1 928</b>	<b>1 988</b>	<b>2 050</b>	<b>2 113</b>

Figures 6.3 to 6.5 show the breakdown of GHS benefits expenditure by healthcare category in year 2022, 2026 and 2031 respectively.

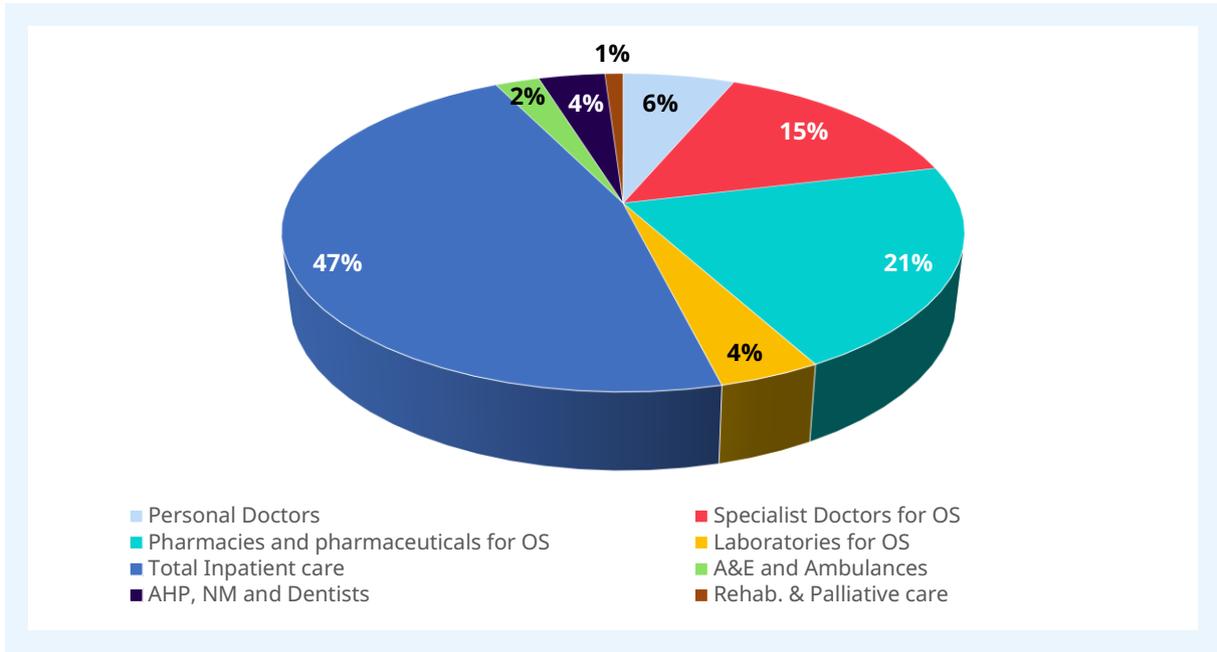
▶ **Figure 6.3. Breakdown of GHS benefits expenditure, by healthcare category, 2022 (percentages)**



▶ **Figure 6.4. Breakdown of GHS benefits expenditure, by healthcare category, 2026 (percentages)**



► **Figure 6.5. Breakdown of GHS benefits expenditure, by healthcare category, 2031 (percentages)**



It follows from figures 6.3 to 6.5 that the annual expenditure of each healthcare category in relation to the total GHS benefits expenditure 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 2022 to 2031.

► **Table 6.9. Projection of inpatient benefits expenditure, by service type, 2022–2031 (in million of Euros)**

Inpatient projected expenditure	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Z-Consumables	71	87	95	98	102	105	109	113	117	121
Z-Drugs	34	41	44	46	48	49	51	52	54	56
Z-Procedures & fixed fee	56	64	72	74	77	80	83	86	89	92
DRGs	443	489	540	560	580	601	620	641	664	687
<b>Total Inpatient expenditure</b>	<b>604</b>	<b>681</b>	<b>751</b>	<b>778</b>	<b>807</b>	<b>835</b>	<b>863</b>	<b>892</b>	<b>924</b>	<b>956</b>

Table 6.10 presents the projection of benefits expenditure for pharmacies and pharmaceuticals, by service over the projection period from 2022 to 2031.

► **Table 6.10. Projection of benefits expenditure, pharmacies and pharmaceuticals, by service, 2022–2031** (in million of Euros)

Pharmacies and pharmaceuticals for outpatient: projected expenditure	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Pharmacist fees	32	35	36	37	38	40	41	42	44	45
Pharmacist fees per overnight	1	1	1	1	1	1	1	1	1	1
Pharmaceuticals: Drugs/medical devices/consumables	215	224	236	245	253	261	269	277	285	293
Pharmaceuticals: new/innovative drugs	45	53	77	90	92	93	95	97	99	101
<b>Total expenditure</b>	<b>293</b>	<b>313</b>	<b>350</b>	<b>373</b>	<b>384</b>	<b>395</b>	<b>406</b>	<b>417</b>	<b>429</b>	<b>440</b>

#### 6.2.4. Projection of administrative expenses

The actual cost of administrative expenses for the years 2021 and 2022 was stable at 1.2 per cent of total GHS income. 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 1.5 per cent in 2023 and to 1,7 per cent in 2024. For the rest of the projection period administrative expenses are projected to remain relatively stable at around 1.7 per cent.

Table 6.11 shows the projection of administrative expenses by category over the projection period from 2022 to 2031.

► **Table 6.11. Projection of administrative expenses, by category, 2022–2031** (in million of Euros)

Administrative projected expenditure	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Staff expenses	5	6	7	9	9	9	9	9	9	9
Operation expenses	11	15	19	20	21	21	22	22	23	23
Development expenses	1	2	3	3	3	3	3	3	3	3
Contingencies	-	0	0	0	0	0	0	0	0	0
<b>Total administrative expenses</b>	<b>17</b>	<b>23</b>	<b>29</b>	<b>32</b>	<b>33</b>	<b>33</b>	<b>34</b>	<b>34</b>	<b>35</b>	<b>35</b>
<b>Administrative expense ratio (%)</b>	<b>1.2</b>	<b>1.5</b>	<b>1.7</b>	<b>1.8</b>	<b>1.8</b>	<b>1.7</b>	<b>1.7</b>	<b>1.7</b>	<b>1.6</b>	<b>1.6</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 6.12.

Table 6.12 shows the projected financial situation of the GHS over the projection period from 2022 to 2031.

► **Table 6.12. Projected financial situation of GHS, 2022–2031** (in million of Euros)

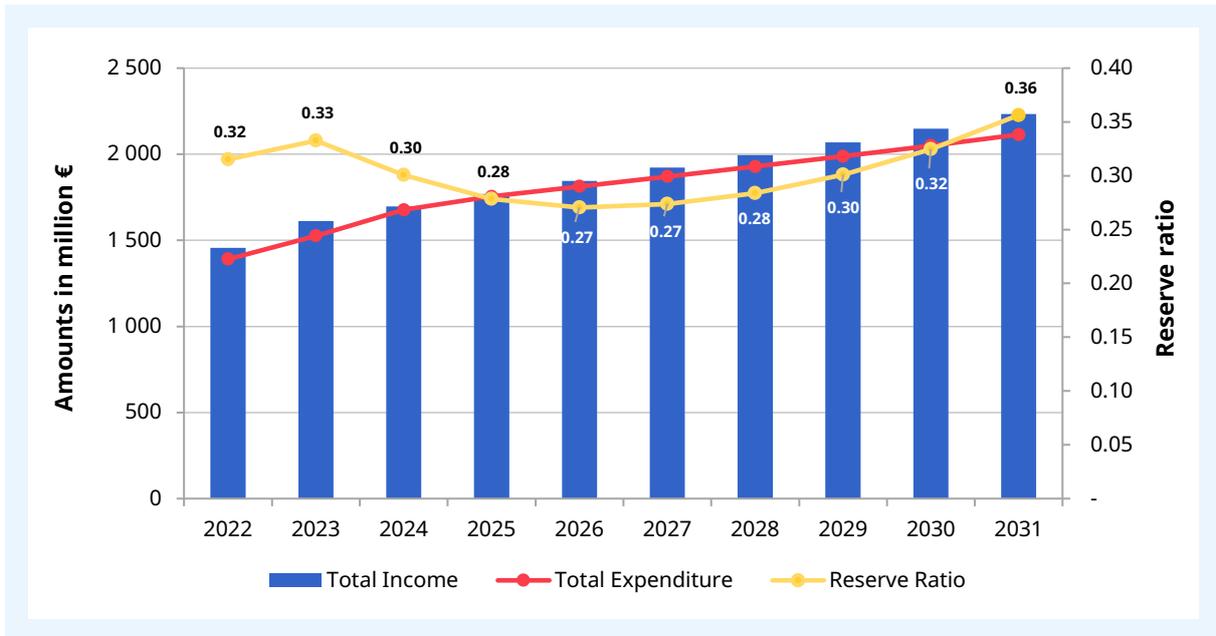
Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
<b>Reserve (start of year)</b>	<b>370</b>	<b>438</b>	<b>508</b>	<b>504</b>	<b>488</b>	<b>490</b>	<b>512</b>	<b>547</b>	<b>598</b>	<b>665</b>
Total GHS income	1 457	1 611	1 697	1 768	1 845	1 922	1 994	2 070	2 149	2 233
Total GHS benefits expenditure	1 391	1 527	1 677	1 755	1 813	1 870	1 928	1 988	2 050	2 113
Total other income	19	9	5	3	3	3	3	3	3	3
Total administrative expenses	17	23	29	32	33	33	34	34	35	35
<b>Surplus/Deficit</b>	<b>68</b>	<b>70</b>	<b>-4</b>	<b>-16</b>	<b>2</b>	<b>22</b>	<b>35</b>	<b>51</b>	<b>67</b>	<b>88</b>
<b>Reserve (end of year)</b>	<b>438</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>
Reserve ratio	0.32	0.33	0.30	0.28	0.27	0.27	0.28	0.30	0.32	0.36
<b>Administrative expense ratio (%)</b>	1.2	1.5	1.7	1.8	1.8	1.7	1.7	1.7	1.6	1.6
<b>Total GHS benefits expenditure/ Nominal GDP (%)</b>	5.1	5.3	5.5	5.5	5.4	5.4	5.3	5.3	5.2	5.2

Following are the main points from table 6.12:

- The reserve ratio at the end of the projection period, i.e., in year 2031, is projected to be at an adequate level of 0.36, above four months' expenditure. It can thus be concluded that, considering the reserve, the schedule of the legislated contribution rates is sufficient to ensure the long-term sustainability of the GHS.
- From 2026 and onwards, total GHS income alone is sufficient to meet the GHS annual expenditure.
- For the years 2024 and 2025, the reserve will be needed in order to meet the total GHS expenditures.
- Over the period 2023–2025, 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 (€89.6 million gradually up to 2025), the introduction of specialized laboratory tests (€10.7 million gradually up to 2025), the affiliation of new private hospitals by the end of 2023 (with an estimated cost of around 60 million by 2025) and the introduction of A&E departments of new or existing affiliated private hospitals (€10.5 million gradually up to 2025).
- From 2028 onwards, the reserve ratio starts to gradually increase from 0.28 in 2028 to 0.36 in 2031, primarily due the favourable economic conditions.
- From 2028 onwards, the ratio of the total GHS benefits expenditure over nominal GDP decreases with slow pace, from 5.4 in 2027 to 5.2 in 2031.

Figure 6.6 shows the total income, total expenditure and the reserve ratio of the GHS for 2022–2031.

► **Figure 6.6. Total income, total expenditure and reserve ratio of the GHS, 2022–2031** (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 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 2020, 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 2021 affecting the starting data of the report as at 31 December 2021; 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 earnings of mariners who are not permanent residents of the Republic of Cyprus. 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, 2020–21

The projections made in the 2020 actuarial report were compared with the results published in the financial statements for the year 2021. 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, 2020-2021** (in million of Euros)

	Actual	Expected	Difference	
	2021	2021	In million euros	Deviation (%)
<b>Reserves as at 31 December, 2020</b>	406	406	0	0.0
Plus contributions	1 187	1 189	-2	-0.2
Plus co-payments & contributions I	45	45	0	0.1
Discounts from pharmaceutical companies	37	37	0	0.0
Income from healthcare services to EU citizens	15	15	0	-2.1
Other income & admin income	46	42	4	9.2
Minus healthcare expenditures	1 346	1 355	-9	-0.7
Other expenditure	2	0	2	-
Minus administration expenditures	16	16	0	0.0
Net financing income (expense)	-2	0	-2	-
<b>Reserves as at 31 December, 2021</b>	<b>370</b>	<b>363</b>	<b>7</b>	<b>1.9</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 2021 was approximately €1,330 million, 0.1 per cent higher than projected in 2020 actuarial valuation.

### 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 2021 was approximately €1,362 million that is 0.6 per cent lower than anticipated. The difference mainly concerns the healthcare expenditure which projected to reach €1,355 million in 2020 actuarial valuation, €9 million higher than actual 2021 healthcare expenditure.

## 7.5. Changes in assumptions

Table 7.2 summarizes the demographic and economic changes made to the key assumptions used in this report compared with those used in the 2020 actuarial valuation report. These changes are as follows:

- The total fertility rate starts at a higher level than in the previous actuarial report, and by 2030 reaches at a higher level. In the 2020 actuarial valuation, the rate was increasing gradually from 1.36 in 2022 to 1.39 in 2030. In this report, the fertility rate is 1.38 children per woman in 2022, increasing gradually to 1.41 in 2030.
- In this report, the life expectancies for both males and females are assumed to reach 81.8 and 85.7 years respectively in 2030. These life expectancies are lower than those projected in the 2020 valuation, which were assumed to reach 82.1 years for males and 85.9 years for females in 2030.

- In the 2020 actuarial valuation, net migration was projected to be 4,727 in 2022 gradually increasing to 5,612 in 2030. In this valuation, net migration increases from 9,000 in 2022 to 9,100 in 2026 and decreases to 8,910 up to 2030, with an average of 9,048 over the period 2022–2030.
- In this report, the assumed real GDP growth rate is 5.6 per cent in 2022 and decreases to 1.9 per cent in 2030, while in the 2020 actuarial valuation, the real GDP growth rate was 3.2 per cent in 2022 decreasing to 2 per cent in 2030.
- The assumed overall male and female labour force participation rates starts at a much higher level in the present valuation compared to the 2020 actuarial valuation. In the 2020 actuarial valuation, the male labour force participation rate of 82.4 per cent in 2022 was projected to reach 82.8 per cent in 2030 and for females, it was 71.4 per cent in 2022, increasing to 73.9 per cent in 2030. In the present report, the male labour force participation rate of 83.4 per cent in 2022 is projected to reach 83.9 per cent in 2030 and for females, it is 73.0 per cent in 2022, increasing to 74.2 per cent in 2030.
- In this report, the unemployment rate is assumed to gradually decrease from 7.1 per cent in 2022 to 6.5 per cent in 2030, similarly with the 2020 actuarial valuation in which it was assumed to decrease from 7.2 per cent in 2022 to 6.5 per cent in 2030.
- In this report, the price inflation is assumed to gradually decrease from 8.1 per cent in 2022 to 2 per cent in 2030, similarly with the 2020 actuarial valuation in which it was assumed to decrease from 6.5 per cent in 2022 to 2 per cent in 2030.
- In this report, real wage increase is assumed to gradually increase from –0.2 per cent in 2022 to 1 per cent in 2026 and remain stable for the rest of the projection, whereas in the previous report it was assumed to increase from –2.1 per cent in 2022 to 1.3 per cent in 2026 and remain stable for the rest of the projection.

Some other GHS-specific assumptions, which are described in Annex 3, were also changed. In particular, the assumed invalidity incidence rates for males and females are lower in the present valuation compared to the 2020 valuation by a factor of 19 per cent and 26 per cent respectively.

► **Table 7.2. Changes to key assumptions: 2021 versus 2020 actuarial valuations**

Assumption	Year	Actuarial report as at 31 December 2021		Actuarial report as at 31 December 2020	
		Males	Females	Males	Females
Total fertility rate	2022	1.38		1.36	
	2026	1.39		1.37	
	2030	1.41		1.39	
Life expectancy at birth	2022	80.2	84.2	80.7	84.7
	2026	81.2	85.1	81.6	85.5
	2030	81.8	85.7	82.1	85.9
Net migration	2022	9 000		4 727	
	2026	9 100		5 180	
	2030	8 910		5 612	
Real GDP growth rate (%)	2022	5.6		3.2	
	2026	2.1		2.0	
	2030	1.9		2.0	

Assumption	Year	Actuarial report as at 31 December 2021		Actuarial report as at 31 December 2020	
		Males	Females	Males	Females
Labour force participation rates (15-64) (%)	2022	83.4	73.0	82.4	71.4
	2026	83.7	73.6	82.6	72.9
	2030	83.9	74.2	82.8	73.9
Unemployment rate (15–64) (%)	2022	7.1		7.2	
	2026	6.6		6.6	
	2030	6.5		6.5	
Price inflation (%)	2022	8.1		6.5	
	2026	2.2		2.0	
	2030	2.0		2.0	
Real wage increase (%)	2022	-0.2		-2.1	
	2026	1.0		1.3	
	2030	0.9		1.2	
Real rate of return (%)	2022	-4.8		-4.7	
	2026	0.5		0.1	
	2030	0.3		0.7	

## 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 on 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 2021 had the effect of increasing the reserve by €6 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 €93 million and 0,07 per cent respectively in 2021, and by €280 million and 0,11 per cent respectively in 2030:

- Concerning demographic assumptions, the significantly higher net migration projected over the whole projection period in 2021 (present) actuarial valuation causes significant increases of both the reserve and the reserve ratio over the period 2022- 2024 and much higher increases over the period 2025–2030.
- Concerning economic assumptions, the favourable assumptions of the 2021 (present) valuation primarily with regards to the higher male and female labour force participation rates over the whole projection period, higher nominal wage increases (due to higher inflation rate) and higher real GDP growth in the first years of the projection causes noticeable increases of both the reserve and the reserve ratio over the period 2023–2030.
- Concerning scheme-specific assumptions, the less favourable assumptions in the 2021 (present) valuation regarding the higher projected utilization rates, the higher cost of Inpatient care due to the affiliation of new private hospitals by the end of 2023 and the introduction of A&E departments of new or existing affiliated private hospitals causes

noticeable decreases of both the reserve and the reserve ratio over the period 2025–2030. On the contrary, the ultimate cost and the time expecting this cost to occur regarding the introduction of new and innovative drugs in inpatient and outpatient care and the introduction of specialized laboratory tests lead to increases of both the reserve and the reserve ratio over the period 2022–2024.

► **Table 7.3. Reconciliation of the reserve between 2021 and 2020 actuarial valuations**

	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>As per actuarial report as at 31.12.2020</b>	<b>339</b>	<b>273</b>	<b>213</b>	<b>182</b>	<b>182</b>	<b>205</b>	<b>248</b>	<b>303</b>	<b>379</b>
I. Amendments	0	0	0	0	0	0	0	0	0
II. Experience update, 2020–21	6	6	6	6	6	6	6	6	6
III. Improvements in methodology	0	0	0	0	0	0	0	0	0
IV. Changes in assumption									
Demographic	35	138	241	333	422	509	594	680	763
Economic	–8	10	29	53	82	118	154	191	228
Scheme-specific	66	81	15	–86	–202	–326	–455	–582	–711
<b>Subtotal</b>	<b>93</b>	<b>229</b>	<b>285</b>	<b>300</b>	<b>302</b>	<b>301</b>	<b>293</b>	<b>289</b>	<b>280</b>
<b>Total of I to IV</b>	<b>99</b>	<b>235</b>	<b>291</b>	<b>306</b>	<b>308</b>	<b>307</b>	<b>299</b>	<b>295</b>	<b>286</b>
<b>As per actuarial report as at 31.12.2021</b>	<b>438</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>

► **Table 7.4. Reconciliation of the reserve ratio between 2021 and 2020 actuarial valuations**

	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>As per actuarial report as at 31.12.2020</b>	<b>0.24</b>	<b>0.18</b>	<b>0.14</b>	<b>0.11</b>	<b>0.11</b>	<b>0.12</b>	<b>0.14</b>	<b>0.17</b>	<b>0.21</b>
I. Amendments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
II. Experience update, 2020–2021	0.01	0.00	0.00	0.01	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	0.03	0.09	0.14	0.19	0.23	0.27	0.31	0.34	0.37
Economic	–0.01	0.01	0.02	0.03	0.05	0.06	0.08	0.10	0.11
Scheme-specific	0.05	0.05	0.00	–0.06	–0.12	–0.18	–0.25	–0.31	–0.37
<b>Subtotal</b>	<b>0.07</b>	<b>0.15</b>	<b>0.16</b>	<b>0.16</b>	<b>0.16</b>	<b>0.15</b>	<b>0.14</b>	<b>0.13</b>	<b>0.11</b>
<b>Total of I to IV</b>	<b>0.08</b>	<b>0.15</b>	<b>0.16</b>	<b>0.17</b>	<b>0.16</b>	<b>0.15</b>	<b>0.14</b>	<b>0.13</b>	<b>0.11</b>
<b>As per actuarial report as at 31.12.2021</b>	<b>0.32</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>

## ► 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 scenario of a slowdown in the economy compared to base scenario, resulting to lower migration, lower GDP growth rates, higher inflation rate, higher nominal wage increases and lower labour-force participation rates from 2024 onwards; and
- activation of GHS institutional measures relating to its financial governance, which aim towards benefit cost containment, in accordance with the regulatory framework of the GHS.

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 and specialized laboratory tests;
- 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 2025 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	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
<b>Base scenario</b>										
Net Migration	9 000	9 100	9 150	9 130	9 100	9 060	9 015	8 965	8 910	8 855
GDP growth (real)	5.6	2.3	2.7	2.3	2.1	2.0	2.0	1.9	1.9	1.9
Consumer Price Inflation	8.1	3.8	2.5	2.3	2.2	2.0	2.0	2.0	2.0	2.0
Wage increase (nominal)	5.2	4.8	3.5	3.5	3.2	2.9	3.0	2.9	2.9	2.9
Labour force participation rates – Males	83.4	83.5	83.5	83.6	83.7	83.7	83.8	83.8	83.9	83.9
Labour force participation rates – Females	73.0	73.2	73.3	73.4	73.6	73.7	73.8	74.0	74.2	74.3
Employment growth (15–74)	2.8	1.2	1.1	1.1	1.1	1.1	0.9	1.0	1.0	1.0
Productivity growth (real)	2.8	1.1	1.6	1.2	1.0	0.9	1.0	0.9	0.9	0.9
<b>Economic scenario</b>										
Net Migration	9 000	9 100	8 600	6 600	5 600	5 600	5 600	5 600	5 600	5 600
GDP growth (real)	5.6	2.7	2.1	1.9	1.7	1.5	1.5	1.5	1.5	1.5
Consumer Price Inflation	8.1	3.8	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2
Wage increase (nominal)	5.2	4.8	3.5	3.5	3.2	3.2	3.4	3.3	3.3	3.3
Labour force participation rates – Males	83.4	83.5	83.0	82.5	82.5	82.5	82.5	82.5	82.5	82.5
Labour force participation rates – Females	73.0	73.2	72.7	72.2	72.2	72.2	72.2	72.2	72.2	72.2
Employment growth (15–74)	2.8	1.2	0.3	-0.0	0.5	0.5	0.4	0.4	0.4	0.5
Productivity growth (real)	2.8	1.5	1.8	1.9	1.2	1.0	1.1	1.1	1.0	1.0
Medical inflation	Increased in line with CPI increase									
<b>Scenario for implementation of cost control measures</b>										
Outpatient specialist doctors' utilization rates	-1% from 2024 to 2031									
Treatment of GHS beneficiaries abroad	€22.5m by 2024 and then increased by medical inflation									
Inpatient care: DRGs point value	-1% applied in 2025									
Inpatient care: Day care – DRGs point value	-3% applied in 2026									
Dentists, nurses and midwives, allied health professionals point value	-1% applied in 2025									

► **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	€107.5m by 2025	€89.6m by 2025	€80m by 2025
Specialized laboratories tests	€12.8m by 2025	€10.7m by 2025	€8.5m by 2025
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 2024	Base scenario	-5% applied in 2024
Utilization rates	Progressive increase by 3 to 5 per cent for all activities/services	Base scenario	Progressive decrease by 3 to 5 per cent for all activities/services
Inpatient utilization rates	5% applied from 2025 onwards	Base scenario	-5% applied from 2025 onwards

## 8.1. Sensitivity scenarios

### 8.1.1. Economic scenario

The present actuarial valuation is based on the prevailing economic conditions and expectations about Cyprus' economy as of May 2023, taking into account the relevant EU Commission's Economic Forecast 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 scenario is built on the assumption of an economic slowdown, which results to lower migration, lower GDP growth, higher inflation, higher nominal wage growth and lower labour-force participation rates over the period 2024 to 2031.

This economic scenario increases both GHS contribution income and benefits expenditure.

The contribution income increases primarily through:

- higher employee contributory earnings, driven by higher wages which in turn are fuelled by higher CPI; and
- higher pension income, driven by wage and price pension indexation.

GHS contribution income is partially offset by lower employee contributory earnings, driven by lower levels of employment due to an increase in unemployment rates.

On the other hand, the upward pressure to GHS benefits expenditure is mainly driven by higher medical inflation, fuelled by higher prices.

### 8.1.2. Implementation of cost control measures

The present actuarial valuation results are based on current legal provisions of the GHS and a framework of scheme-specific assumptions, such as utilisations rates and average claim costs, which drive the future evolution of GHS benefits expenditure. The above assumptions were constructed by analysing past experience and trends, as well as taking into account likely future trends of each GHS healthcare service. Under this sensitivity scenario, a number of cost control measures are assumed to be implemented in the short-term, through activation of certain GHS

institutional measures relating to its financial governance. Those cost control measures, which drive the GHS benefits expenditure downwards, are as follows:

- The introduction of key performance indicators for PDs, including their referral performance, results in a reduction of 1 per cent of outpatient specialists' utilization rates, applied from 2024 onwards.
- The introduction of specific eligibility criteria and the set-up of an effective committee for examining the specific conditions for treatment abroad, results in a reduction of the expenditure of treatment of GHS beneficiaries abroad by €2.5 million.
- The introduction of corrective measures regarding hospitals' base rate, results in a decrease of 1 per cent in DRGs point value, applied from 2025 onwards.
- The introduction of day-care treatment facilities, results in a decrease of 3 per cent in DRGs point value, applied from 2026 onwards.
- The introduction of corrective measures regarding AP, NM and dentists' reimbursement, results in a decrease of 1 per cent in their budgets, applied from 2025 onwards.

## 8.2. Sensitivity tests

### 8.2.1. Introduction of new/innovative drugs and specialized laboratory tests

Due to the uncertainty regarding the determination of the assumption related to the ultimate cost of introducing new or innovative drugs as well as specialized laboratory tests, 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 the introduction of new/ innovative drugs will reach €89.6 million by 2025 and the cost of introducing specialized laboratory tests will reach €10.7 million by 2025.

In Test I (unfavourable), the cost from the introduction of new/ innovative drugs and specialized laboratory tests is higher than that assumed under the base scenario, primarily due to a higher volume of those drugs and laboratory tests driven by changing patients' needs, a higher price of those drugs and laboratory tests, or lower discounts gained from pharmaceutical providers. In Test II (favourable), the cost of new/ innovative drugs and specialized laboratory tests is lower than that assumed under the base scenario, primarily due to a lower volume or price of those drugs/ laboratory tests, or higher discounts gained from pharmaceutical providers.

In Test I (unfavourable), the assumed cost from the introduction of new/ innovative drugs will reach €107.5 million by 2025 and the cost of introducing specialized laboratory tests will reach €12.8 million by 2025. By contrast, in Test II (favourable), the assumed cost of new/ innovative drugs will reach €80 million by 2025 and the cost of introducing specialized laboratory tests will reach €8.5 million by 2025.

### 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 2030, 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 2030 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 2024. By contrast, in Test II (favourable), the assumed Z items prices decreased by 5 per cent in 2024.

### **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 2026 or 2028 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 2026 or 2028 respectively. Increases in utilization rates also includes an increase of the cost for public hospitals A&E and Ambulances by €10m and €5m 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 2025 onwards. By contrast, Test II (favourable), assumes a decrease of 5 per cent in utilization rates from 2025 onwards. Increases/decreases in Inpatient utilization rates also include increase/decrease of the estimated cost for the new affiliated private hospitals by  $\pm 20$  per cent.

## 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 2022 to 2031.

### 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 2022–2031.

As described in section 8.1.1, the economic scenario assumes a slowdown in the economy compared to base scenario and this increases both GHS income and expenditure. As it is illustrated by table 8.3, such a scenario increases the GHS benefits expenditure more than the GHS income, and thus causes a reduction in the reserve of up to 50 per cent in 2031 when compared to the base scenario. Nevertheless, at the end of the projection period, i.e., 2031, the available amount of reserve remains sufficient to cover two months' expenditure.

Under the sensitivity scenario of implementing cost control measures, the projected financial position of the GHS, as measured by the level of reserve and the reserve ratio, improves significantly 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., 2031, is by 25 per cent higher than that of the base scenario. Additionally, the reserve ratio indicates that the reserve is enough to cover at least three-and-a-half months of GHS expenditure throughout the projection period and by 2028 could cover more than four months' expenditure, reaching to cover 5 months' expenditure in 2031. This sensitivity scenario shows that by adopting even small corrective measures, the HIO could restrain the expenditure of the GHS and increase GHS reserve to a level that would create conditions for further development of the GHS and provide security and confidence that even in an adverse event the GHS will have the proper reserve amount.

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

Scenario/Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
<b>Reserve amount at year end (in million of Euros)</b>										
Base scenario	438	508	504	488	490	512	547	598	665	753
Economic scenario	438	508	501	468	437	412	392	379	373	379
Scenario for implementation of cost control measures	438	508	509	504	534	585	650	732	831	952
<b>Reserve ratio (percentages)</b>										
Base scenario	0.32	0.33	0.30	0.28	0.27	0.27	0.28	0.30	0.32	0.36
Economic scenario	0.32	0.33	0.30	0.27	0.24	0.22	0.20	0.19	0.18	0.18
Scenario for implementation of cost control measures	0.32	0.33	0.30	0.29	0.30	0.32	0.34	0.37	0.41	0.46

### 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 eight individual sensitivity tests, representing one favourable and one

unfavourable test with respect to each of four 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 and specialized laboratory tests. 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 2026, a minimum of €433 million compared to €490 million under the base scenario; at the end of the projection period, a 22 per cent lower level compared to that of the base scenario; and over the years from 2026 to 2029 the level of reserve is reduced below three 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 2025, a minimum of €502 million compared to €488 million under the base scenario; at the end of the projection period, a 12 per cent higher level compared to that of the base scenario, covering more than four-and-a-half months' expenditure.

The above results show that the GHS is very 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 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 €590 million in 2031 compared to €753 million under base scenario, representing a decrease of 22 per cent, while the reserve by 2031 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 €914 million in 2031, representing a decrease of 21 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 €662 million in 2031, compared to €753 million under the base scenario, representing a decrease of 12 per cent, while the reserve by 2031 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 €844 million in 2031, 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 €8 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 €264 million in 2031, compared to €753 million under the base scenario, representing a decrease of 65 per cent, while from 2030 the reserve is not sufficient to cover one-and-a-half months' expenditure. On the other hand, a decrease in the utilization rates results in an increase of the reserve to €962 million in 2031, representing an increase of 28 per cent compared to the base scenario, while at the end of the projection period the reserve is sufficient to cover more than five 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 €417 million in 2031, compared to €753 million under the base scenario, representing a decrease of 45 per cent, while from 2027 the reserve is sufficient to cover up to two months' expenditure. On the other hand, a decrease in the utilization rates results in an increase of the reserve to €1,089 million in 2031, representing an increase of 45 per cent compared to the base scenario, while at the end of the projection period the reserve is sufficient to cover more than six 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	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
<b>Reserve amount at year end (in million of Euros)</b>										
Base scenario	438	508	504	488	490	512	547	598	665	753
Introduction of new/ innovative drugs and specialized laboratories tests (higher expenditure)	438	508	487	451	433	433	447	476	521	586
Introduction of new/ innovative drugs and specialized laboratories tests (lower expenditure)	438	508	506	502	516	550	598	661	741	842
Medical inflation: progressive increase of +0.5%	438	508	503	483	477	485	500	523	552	590
Medical inflation: progressive decrease of -0.5%	438	508	506	494	503	539	594	673	778	914
Z items price: +5%	438	508	494	468	459	470	493	532	587	662
Z items price: -5%	438	508	514	509	522	555	601	664	744	844
Increase in utilization rates	438	508	478	423	372	330	292	267	257	264
Decrease in utilization rates	438	508	515	520	545	591	657	740	840	962
Increase in Inpatient utilization rates	438	508	491	434	393	370	359	363	381	417
Decrease in Inpatient utilization rates	438	508	517	543	588	654	735	834	950	1,089
<b>Reserve ratio (%)</b>										
Base scenario	0.32	0.33	0.30	0.28	0.27	0.27	0.28	0.30	0.32	0.36
Introduction of new/ innovative drugs and specialized laboratories tests (higher expenditure)	0.32	0.33	0.29	0.25	0.24	0.23	0.23	0.24	0.25	0.27

Sensitivity/Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Introduction of new/innovative drugs and specialized laboratories tests (lower expenditure)	0.32	0.33	0.30	0.29	0.29	0.30	0.31	0.33	0.36	0.40
Medical inflation: progressive increase of +0.5%	0.32	0.33	0.30	0.27	0.26	0.26	0.26	0.26	0.26	0.27
Medical inflation: progressive decrease of -0.5%	0.32	0.33	0.30	0.28	0.28	0.29	0.31	0.34	0.39	0.44
Z items price: +5%	0.32	0.33	0.29	0.27	0.25	0.25	0.25	0.27	0.28	0.31
Z items price: -5%	0.32	0.33	0.31	0.29	0.29	0.30	0.31	0.34	0.37	0.40
Increase in utilization rates	0.32	0.33	0.28	0.24	0.20	0.17	0.15	0.13	0.12	0.12
Decrease in utilization rates	0.32	0.33	0.31	0.30	0.30	0.32	0.35	0.38	0.42	0.46
Increase in Inpatient utilization rates	0.32	0.33	0.29	0.24	0.21	0.19	0.18	0.18	0.18	0.19
Decrease in Inpatient utilization rates	0.32	0.33	0.31	0.32	0.33	0.36	0.39	0.43	0.48	0.53

## ► 9. Conclusions and recommendations

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The financial projections indicate that the GHS Fund is financially sustainable over the period 2022–2031 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 2023 to 2025, a downward trend is observed in the reserve ratio. This is primarily due to four facts. The introduction of new and innovative drugs in inpatient provisions and outpatient services care, with an expenditure gradually increasing up to €89.6 million in 2025, the introduction from 2023 of specialized laboratories tests, with an expenditure gradually increasing up to €10.7 million in 2025, the affiliation of new private hospitals by the end of 2023 with an estimated cost of around 60 million by 2025 and the introduction of A&E departments of new or existing affiliated private hospitals with an expenditure gradually increasing up to €10.5 million in 2025. The reserve ratio indicates that the accumulated reserve can cover more than three month's expenditure throughout the projection period.

Over the period 2028–2031, an upward trend in the reserve ratio is observed, primarily due to the favourable economic conditions which cause income to grow at a faster rate than expenditure. In year 2031, the reserve ratio is projected to attain a level to cover more than four months' 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 implementation of cost control measures, aiming towards the enhancement of financial governance of the GHS;
- the gradual introduction of new /innovative drugs, based on a thorough assessment for value added; and
- the constrain of overutilization of services/activities, especially 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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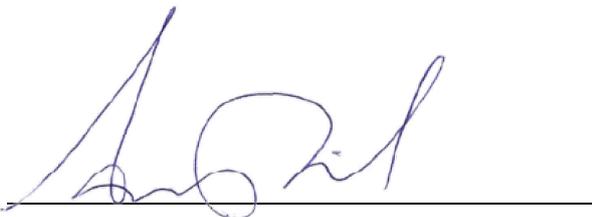
This Report was prepared as requested under the provisions of Part II, Article 4(2)(e), of The General Healthcare System Law of 2001 (N.89(I)/2001). In our opinion:

- 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.

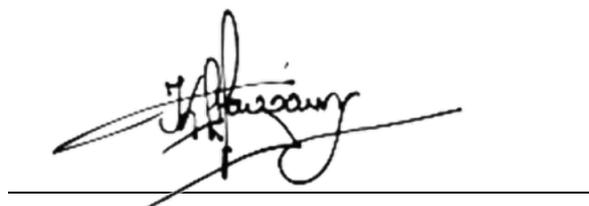
Based on the results of this valuation, we hereby certify that, under the current GHS provisions, the GHS is financially sustainable over the period covered by the projections in this Report. The above projections assume no policy change in terms of adding new GHS healthcare services other than those 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 are 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.

1 February 2024



**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 2017 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 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 exactly the same healthcare services covered by GHS. The 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

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 to certain healthcare services. These are: outpatient specialists, laboratories, pharmacies, nurses, midwives and allied health professionals and hospitals for inpatient services. In case a beneficiary visits directly an outpatient specialist without a referral from their personal doctor, a personal contribution is paid, as explained in section A1.5.

GHS beneficiaries can directly access personal doctors, dentists for preventive dental care, ambulances and accident and emergency services without referral and without paying any personal contribution. For accident and emergency services a co-payment applies. 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, can also access without 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 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 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	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 salaries of employees which are employed by the Republic of Cyprus, pensions provided by the Government (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 salaries of employees other than those who are employed by the Republic of Cyprus, insured 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 insured 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 case that the physical person is not a tax resident of Cyprus, he/she will pay contributions only for the income, earnings and pensions that derive from the Republic of Cyprus, excluding dividends and interest.

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

Wherever applicable, the beneficiaries, upon receiving healthcare services, pay directly to the providers for the services they receive:

#### Co-payment

The objective of the co-payment is to encourage responsible behaviour by patients and healthcare providers and to prevent abuse of the 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

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 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 family doctor visits (additional co-payment applies of €0–€15 per visit only if the beneficiary exceeds the specified annual number of visits for their age group), ambulances, inpatient care and dentists for preventive dental care.

Additional co-payment of €0 to €25 also 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, referral is needed to access to certain healthcare services. These are: outpatient specialists, laboratories, pharmacies, nurses, midwives and allied health professionals and hospitals for inpatient services. In case 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.

In addition, personal doctors, dentists for preventive dental care, ambulances and accidents and emergencies services can also be directly accessed without 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 and no annual cap applies on personal contribution. Personal Contribution I is paid directly by the beneficiary to the healthcare provider and constitutes part of the healthcare provider's fee.

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 pharmaceutical product that the beneficiary chose. 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, as follows:

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 doctor out-of-hour service
  - e. Personal doctor 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 for private hospitals
  - f. Allied 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 based on 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 indicators, such as the KPIs.
5. **Inpatient 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, and gatekeeping has been designed as the backbone of the GHS. Most private doctors working outside hospitals have joined the GHS.

There are two categories of personal doctors (PD), 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, based on the number of beneficiaries registered on the PD's catalogue. Since June 2022, in addition to capitation fee, KPIs reimbursement method has been introduced for PDs. The capitation fee amount per beneficiary that is paid to PDs is based on the age of each registered beneficiary. The PD fee per month is calculated by multiplying the number of days each beneficiary is registered to personal doctor list during that month, with the respective daily rate which corresponds to the age group of the beneficiary. Personal doctors for children are paid a fixed fee amount of €250 for the new born visit.

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

Age group	01/01/2022–31/05/2022		01/06/2022 +	
	Annual rates	Daily rates	Annual rates	Daily rates
0–3	210	0.57	186	0.51
4–7	155	0.42	137	0.38
8–14	91	0.24	80	0.22
15–17	91	0.24	80	0.22
18–50	83	0.22	66	0.18
51–70	117	0.32	116	0.32
71+	145	0.39	145	0.40

From 1 June 2019 to 31 March 2021, the PD for adults were paid €5 for each beneficiary who registered in their list and for whom PD completed the Beneficiary Profile Questionnaire in the GHS IT system.

An adjustment of per capita remuneration of an overall average reduction of 10 per cent was applied to all PDs because of the impact of the coronavirus 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 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 specialties 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 in order to not exceed the global budget of the specific specialty. The HIO has the right to transfer budget amounts between specialties, i.e., from the surplus of one specialty the HIO covers 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, performed outside the context of inpatient care, are reimbursed by fee-for-service based on the laboratory tests catalogue and the point system method. A point value is defined for a certain monthly volume of points per laboratory. Once the laboratory exceeds the defined volume of points, a lower point value is applied in order to ensure that the global budget for the laboratories category is not exceeded.

Currently, only some specialized laboratory tests are covered. Full coverage of specialised tests is planned to start once legislation on this subject is finalized by the MoH. Some of the costs of specialized laboratory tests are currently covered by the State Health Services Organization (SHSO) 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 on the pharmaceutical companies based on the actual levels of drug consumption. In addition, managed entry agreements between HIO and pharmaceutical companies are implemented for the introduction of new/innovative drugs.

For new drugs or for the revision of protocols concerning existing drugs to include their use in more cases, it is estimated that the cost of outpatient drugs and Z drugs will be gradually included in the next few years (partly in 2022 and mainly 2024–25).

### Inpatient services

For 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 not to 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 up to a maximum percentage of the 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 MoH 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 based on the fee-for-service method per case 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 and 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. For nurses, there are further point values and budget differentiations between general nurses and nurses for psychiatric nursing. Budget and point values differentiation are also made for 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 budget 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>3</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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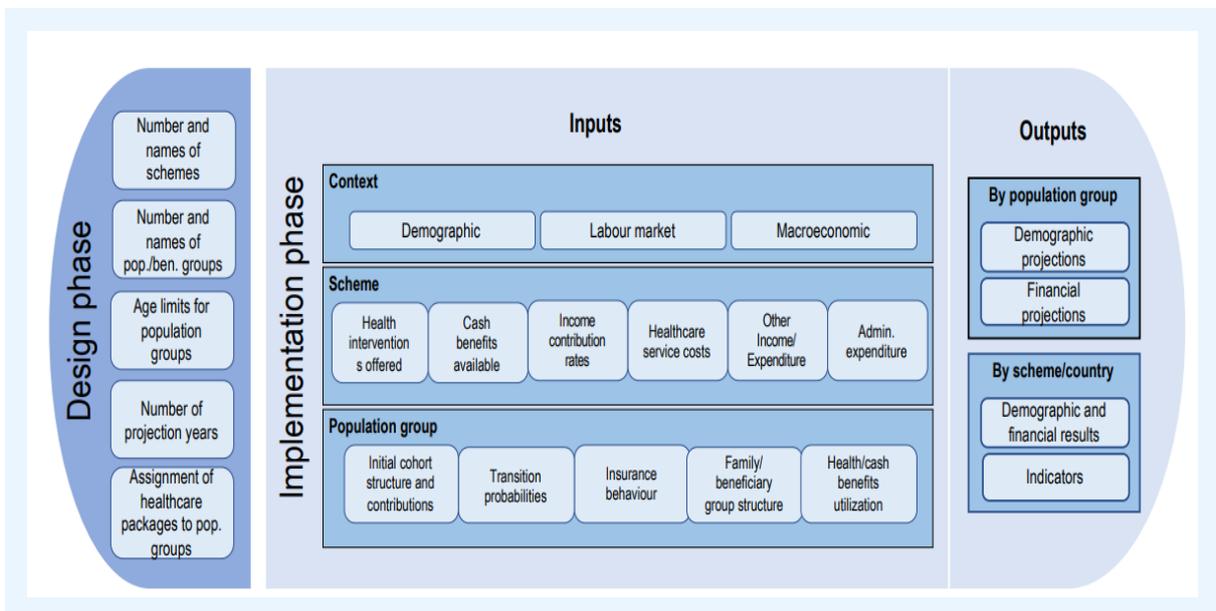
<sup>3</sup> ILO. 2020. Towards Universal Health Coverage: Social Health Protection Principles. Social Protection Spotlight Brief. Available at: [https://www.ilo.org/secsoc/information-resources/publications-and-tools/Brochures/WCMS\\_740724/lang--en/index.htm](https://www.ilo.org/secsoc/information-resources/publications-and-tools/Brochures/WCMS_740724/lang--en/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, 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 they 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 the 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.

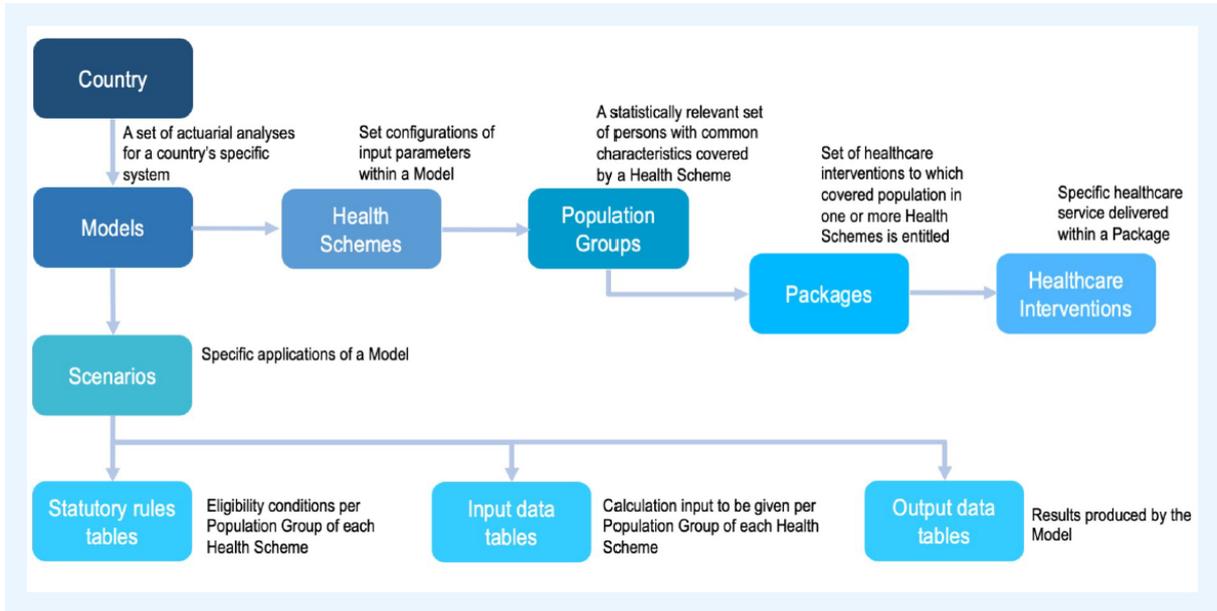
These indicators can be used both to support model calibration and consistency testing and to support results analysis and reporting. The outputs include a set of indicators useful for performing a step-by-step consistency test.

## 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 that 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**

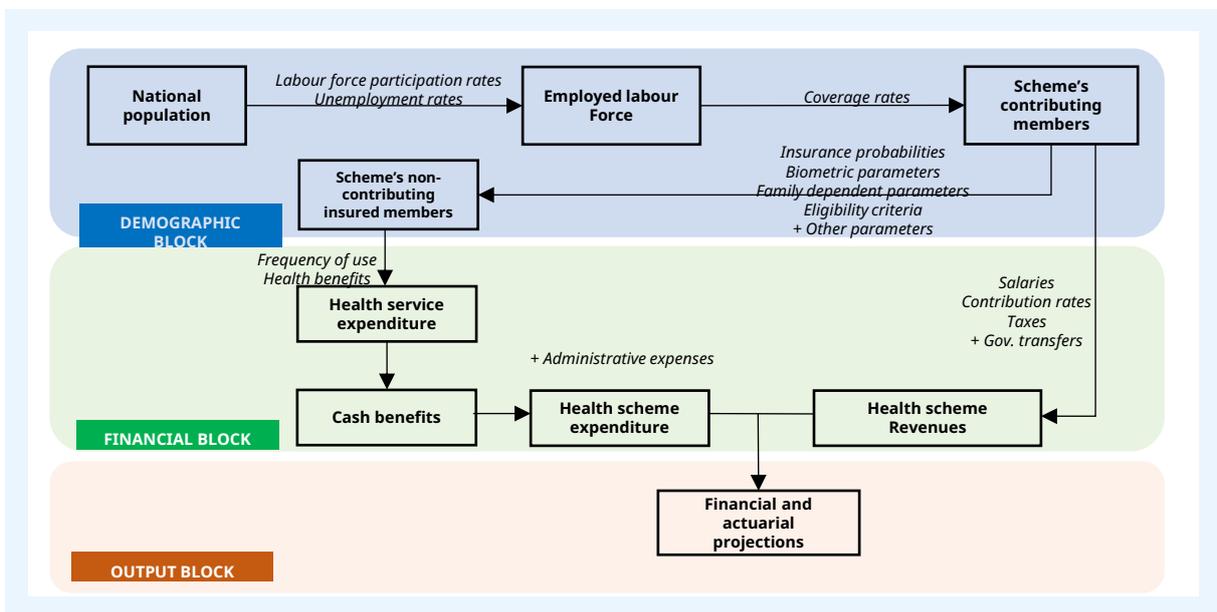


As shown in figure A2.2, the definitions of the different schemes, their associated populations and conditions for entitlement to certain benefits are critical elements when designing a new actuarial model to be applicable for a country. Ideally, this work should be carried out by a multidisciplinary 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 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 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.
- 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. It also allows for a more detailed overview of the future development of the different coverage schemes, among other parameters.

## ► 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 515,510 active insured persons having contributed in 2021. Out of these persons, 336,452 had annual earnings over €9,682 (in 2021) 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 2021, the GSIS covers another 361,681 persons who have contributed to the GSIS in the past, but not in 2021; 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, 2021**

Age group	Basic only			Basic and supplementary		
	Male	Female	Total	Male	Female	Total
15–19	4 125	4 249	<b>8 374</b>	178	154	<b>332</b>
20–24	14 166	12 577	<b>26 743</b>	7 028	5 025	<b>12 053</b>
25–29	14 513	12 671	<b>27 184</b>	20 827	17 398	<b>38 225</b>
30–34	11 080	12 131	<b>23 211</b>	27 264	21 245	<b>48 509</b>
35–39	8 990	11 801	<b>20 791</b>	29 113	23 198	<b>52 311</b>
40–44	7 262	11 261	<b>18 523</b>	26 529	21 819	<b>48 348</b>
45–49	5 561	10 378	<b>15 939</b>	22 220	18 850	<b>41 070</b>
50–54	5 093	9 380	<b>14 473</b>	20 314	16 455	<b>36 769</b>
55–59	4 935	6 796	<b>11 731</b>	19 056	13 613	<b>32 669</b>
60–64	4 529	4 611	<b>9 140</b>	14 907	9 396	<b>24 303</b>
65–68	1 678	1 271	<b>2 949</b>	1 166	697	<b>1 863</b>
<b>Total</b>	<b>81 932</b>	<b>97 126</b>	<b>179 058</b>	<b>188 602</b>	<b>147 850</b>	<b>336 452</b>

► **Table A3.2. Inactive insured persons, 2021**

Age group	Basic only <sup>1</sup>			Basic and supplementary <sup>2</sup>		
	Male	Female	Total	Male	Female	Total
16–19	120	51	<b>171</b>	3	–	<b>3</b>
20–24	2 496	1 941	<b>4 437</b>	481	295	<b>776</b>
25–29	6 201	5 413	<b>11 614</b>	2 465	1 863	<b>4 328</b>
30–34	10 780	11 174	<b>21 954</b>	6 708	5 106	<b>11 814</b>
35–39	13 499	16 847	<b>30 346</b>	11 805	8 044	<b>19 849</b>
40–44	12 319	18 864	<b>31 183</b>	14 099	8 396	<b>22 495</b>
45–49	10 256	20 879	<b>31 135</b>	13 285	8 540	<b>21 825</b>
50–54	8 574	20 424	<b>28 998</b>	13 267	9 300	<b>22 567</b>
55–59	5 529	14 948	<b>20 477</b>	11 237	9 901	<b>21 138</b>
60–64	4 718	11 508	<b>16 226</b>	10 828	10 462	<b>21 290</b>
65+	4 068	7 345	<b>11 413</b>	4 013	3 629	<b>7 642</b>
<b>Total</b>	<b>78 560</b>	<b>129 394</b>	<b>207 954</b>	<b>88 191</b>	<b>65 536</b>	<b>153 727</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 2021, one insurance point is equivalent to annual earnings of €9,682. The first insurance point is credited to the basic part of the GSIS, and annual earnings in excess of € 9,682 and up to € 57,408 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, 2021<sup>4</sup>**

Age group	Basic only		Basic and supplementary	
	Male	Female	Male	Female
16–19	3 253	3 743	13 481	12 272
20–24	4 821	4 806	15 063	13 880
25–29	5 219	5 215	17 875	17 167
30–34	5 256	5 241	21 714	19 832
35–39	5 416	5 359	24 348	22 580
40–44	5 403	5 449	27 083	25 915
45–49	5 417	5 481	29 102	26 989
50–54	5 469	5 489	29 148	26 075
55–59	5 487	5 484	28 269	25 451
60–64	5 247	5 422	27 867	25 846
65–68	4 073	4 156	22 817	22 784
<b>Total</b>	<b>5 206</b>	<b>5 291</b>	<b>25 100</b>	<b>23 204</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>4</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 916,645 registered beneficiaries in December 2021 and 930,875 in December 2022. This increase is mainly due to fertility and net migration.

► **Table A3.4. Registered beneficiaries, 2021-22**

Age group	December 2021			December 2022		
	Male	Female	Total	Male	Female	Total
0–3	19 123	18 028	<b>37 151</b>	19 296	18 225	<b>37 521</b>
4–7	19 694	17 983	<b>37 677</b>	19 828	18 405	<b>38 233</b>
8–14	33 134	31 530	<b>64 664</b>	34 151	32 285	<b>66 436</b>
15–17	13 541	12 887	<b>26 428</b>	13 839	13 036	<b>26 875</b>
18–25	40 305	39 680	<b>79 985</b>	39 897	39 165	<b>79 062</b>
26–30	33 851	34 289	<b>68 140</b>	33 851	34 241	<b>68 092</b>
31–35	36 087	37 374	<b>73 461</b>	36 516	37 232	<b>73 748</b>
36–40	36 489	38 855	<b>75 344</b>	37 324	39 233	<b>76 557</b>
41–45	32 501	36 702	<b>69 203</b>	33 599	37 358	<b>70 957</b>
46–50	27 807	33 494	<b>61 301</b>	28 304	33 821	<b>62 125</b>
51–55	27 453	31 312	<b>58 765</b>	27 243	31 613	<b>58 856</b>
56–60	27 607	29 180	<b>56 787</b>	27 896	29 674	<b>57 570</b>
61–65	27 114	27 894	<b>55 008</b>	27 532	28 433	<b>55 965</b>
66–70	22 905	23 706	<b>46 611</b>	23 518	24 482	<b>48 000</b>
71–75	20 346	21 879	<b>42 225</b>	20 561	22 165	<b>42 726</b>
76–80	13 294	15 521	<b>28 815</b>	14 937	17 066	<b>32 003</b>
81–85	9 252	11 763	<b>21 015</b>	9 202	11 694	<b>20 896</b>
86–90	3 925	5 993	<b>9 918</b>	4 394	6 591	<b>10 985</b>
91–95	1 232	2 264	<b>3 496</b>	1 298	2 272	<b>3 570</b>
96–100	192	404	<b>596</b>	215	436	<b>651</b>
101+	14	41	<b>55</b>	8	39	<b>47</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 and the registered population 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		
	2021	2026	2031	2021	2026	2031
0	0.00488	0.00470	0.00385	0.00305	0.00242	0.00201
5	0.00012	0.00012	0.00010	0.00009	0.00011	0.00008
10	0.00010	0.00013	0.00011	0.00009	0.00012	0.00009
15	0.00018	0.00021	0.00019	0.00012	0.00013	0.00011
20	0.00035	0.00032	0.00030	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	0.00066	0.00061	0.00059	0.00031	0.00031	0.00028
40	0.00096	0.00082	0.00079	0.00052	0.00047	0.00044
45	0.00154	0.00124	0.00117	0.00088	0.00065	0.00062
50	0.00244	0.00198	0.00184	0.00140	0.00105	0.00098
55	0.00390	0.00321	0.00295	0.00215	0.00180	0.00166
60	0.00675	0.00570	0.00518	0.00338	0.00296	0.00268
65	0.01062	0.00922	0.00839	0.00513	0.00445	0.00402
70	0.01773	0.01578	0.01435	0.00875	0.00747	0.00672
75	0.02943	0.02652	0.02417	0.01656	0.01422	0.01273
80	0.05360	0.04856	0.04452	0.03549	0.03118	0.02789
85	0.10315	0.09253	0.08602	0.08219	0.07337	0.06624
90	0.18956	0.17599	0.16588	0.17374	0.15671	0.14344
95	0.27477	0.27266	0.26209	0.27767	0.26280	0.24579
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 2019, 2020 and 2021 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	0.00005	0.00004
27	0.00010	0.00006
32	0.00011	0.00010
37	0.00025	0.00023
42	0.00031	0.00051
47	0.00063	0.00093
52	0.00132	0.00143
57	0.00273	0.00204
62	0.00477	0.00273

### 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 mainly 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 table A3.7.

► **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

### A3.4. Pensions in payment

Statutory, invalidity, widows' and orphans' pensions in payment are shown in tables A3.8 to A3.11.

► **Table A3.8. 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	10	2 153	21	3 135	4 113	12 266	2 265	9 443
65–69	381	1 700	565	2 051	19 685	12 027	13 640	9 041
70–74	1 021	2 369	1 233	2 747	17 790	12 684	12 131	8 794
75–79	1 240	3 533	1 876	4 208	12 628	12 080	8 781	7 850
80–84	1 208	3 774	1 636	4 632	8 233	10 942	5 572	7 058
85–89	780	4 362	1 723	4 838	4 087	9 782	1 870	7 134
90–94	291	4 637	643	4 875	1 385	8 416	438	6 810
95+	64	4 633	129	4 797	274	7 745	71	6 296
<b>Total</b>	<b>4 995</b>	<b>3 419</b>	<b>7 826</b>	<b>4 111</b>	<b>68 195</b>	<b>11 866</b>	<b>44 768</b>	<b>8 408</b>

► **Table A3.9. 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	3 982	–	–	10	5 368	1	4 789
30–34	4	5 401	1	2 114	42	7 041	9	6 784
35–39	5	4 072	3	3 472	83	7 730	40	6 287
40–44	2	3 042	3	4 865	162	8 118	92	6 933
45–49	7	4 857	2	4 675	230	8 208	163	7 143
50–54	6	4 674	10	3 500	440	8 323	244	6 695
55–59	13	4 224	14	3 573	738	8 825	437	6 125
60–63	12	2 978	23	3 503	721	8 879	411	6 405
<b>Total</b>	<b>51</b>	<b>4 092</b>	<b>56</b>	<b>3 608</b>	<b>2 426</b>	<b>8 562</b>	<b>1 397</b>	<b>6 487</b>

► **Table A3.10. 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	7 004
30–34	-	-	3	6 776	2	8 119	39	8 788
35–39	1	6 935	2	6 912	5	10 192	93	9 424
40–44	-	-	3	4 438	16	10 937	225	9 873
45–49	2	5 692	10	4 006	18	10 252	394	9 117
50–54	3	5 421	20	3 560	41	8 956	721	9 128
55–59	1	4 879	18	3 313	67	7 647	1 052	8 866
60–64	5	4 462	84	3 563	98	7 472	1 809	8 732
65–69	6	3 801	193	4 063	153	7 342	2 662	8 540
70–74	13	4 239	520	4 170	158	6 934	3 802	8 421
75–79	31	4 777	802	4 363	192	6 671	4 602	8 041
80–84	35	4 823	1 165	4 471	168	6 435	5 076	7 419
85–89	46	4 891	1 074	4 620	123	5 929	3 994	7 038
90–94	23	4 906	667	4 870	36	5 986	1 813	6 708
95+	1	4 879	299	5 174	5	4 879	384	6 557
<b>Total</b>	<b>167</b>	<b>4 786</b>	<b>4 860</b>	<b>4 513</b>	<b>1 082</b>	<b>7 013</b>	<b>26 670</b>	<b>7 910</b>

► **Table A3.11. 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	4	1 913	7	1 845	-	-	1	5 126
5–9	31	1 913	30	1 913	1	6 678	1	4 760
10–14	78	1 891	95	1 886	4	5 601	4	5 144
15–19	90	1 892	88	1 865	10	5 919	8	5 741
20–24	73	1 837	52	1 919	7	7 000	4	6 938
25–29	4	1 913	5	1 913	-	-	-	-
30–34	2	1 913	3	1 913	1	3 838	1	6 844
35–39	6	1 913	2	1 913	-	-	2	5 044
40–44	4	1 913	2	1 913	2	5 709	3	4 454
45–49	5	2 678	3	2 551	5	4 527	3	5 799
50–54	1	3 826	6	3 826	7	4 338	10	4 140
55–59	5	3 826	4	3 826	15	4 230	25	4 196
60–64	12	3 348	12	3 826	17	4 262	34	4 215
65–69	19	3 826	23	3 826	13	4 171	25	4 073
70+	28	3 826	113	3 826	10	3 953	20	4 122
<b>Total</b>	<b>362</b>	<b>2 226</b>	<b>445</b>	<b>2 581</b>	<b>92</b>	<b>4 730</b>	<b>141</b>	<b>4 438</b>

