International Labour Organization

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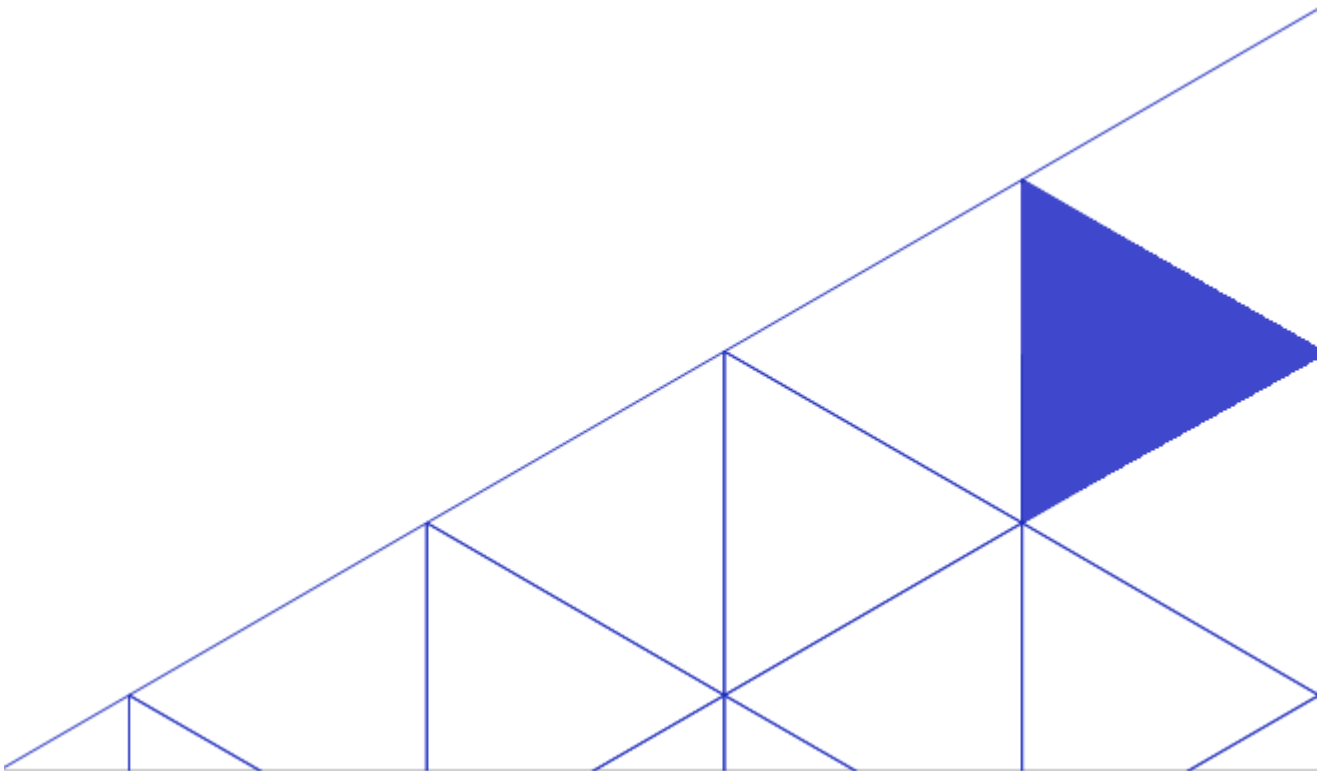
CYPRUS

Report to the Health Insurance Organization

Actuarial valuation of the General Healthcare System as of 31 December 2020, covering the period 2021–2030



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Foreword

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 2020 in compliance with relevant international actuarial standards, presents the financial results of the first actuarial valuation of the GHS since its inception in June 2019, covering the period from 2021 to 2030.

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Acknowledgements

The ILO designated the Actuarial Service Unit (ASU) of the Social Protection Department (SOCPRO) to oversee the conduct of the present actuarial valuation of the GHS Fund. Mr Costas Stavrakis, FIA, FCAA, senior social security actuary, undertook this work with the assistance of Mr Andreas Andreou, actuarial modelling expert. Mr André Picard, FSA, FCIA, the Head of SOC/ASU, supervised the project, provided technical inputs to the actuarial work and to the present actuarial valuation, as well as assumed overall technical responsibility. Ms Cristina Lloret, Actuary SAA, assisted with the technical backstopping of the actuarial calculations, reviewed the actuarial work, and provided inputs to the present actuarial valuation.

The ILO project team worked in close collaboration with Mr Angelos Tropis, the HIO project coordinator for the gathering of data and discussions on various aspects of the actuarial valuation. In addition to Mr Tropis, the ILO team is grateful to the HIO project team of the Finance Directorate as well as the various HIO subject-matter experts on the healthcare services covered under the GHS, who provided invaluable assistance throughout this project.

The ILO extends its gratitude to the Deputy Director General of the HIO, Mr Athos Tsinontides and the Director of the Finance Directorate, Mr Andreas Papaconstantinou, for their fruitful collaboration and contribution throughout the project.

▶ Executive summary

This report presents the results of the actuarial valuation of the GHS of the Republic of Cyprus as of 31 December 2020.

Projections have been made over a period of ten years, that is until 31 December 2030, as GHS provides short-term benefits highly influenced by recent epidemiological shocks, the introduction of new 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 2021–2030 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,[1] 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, 2021–2030 (in million of Euros)

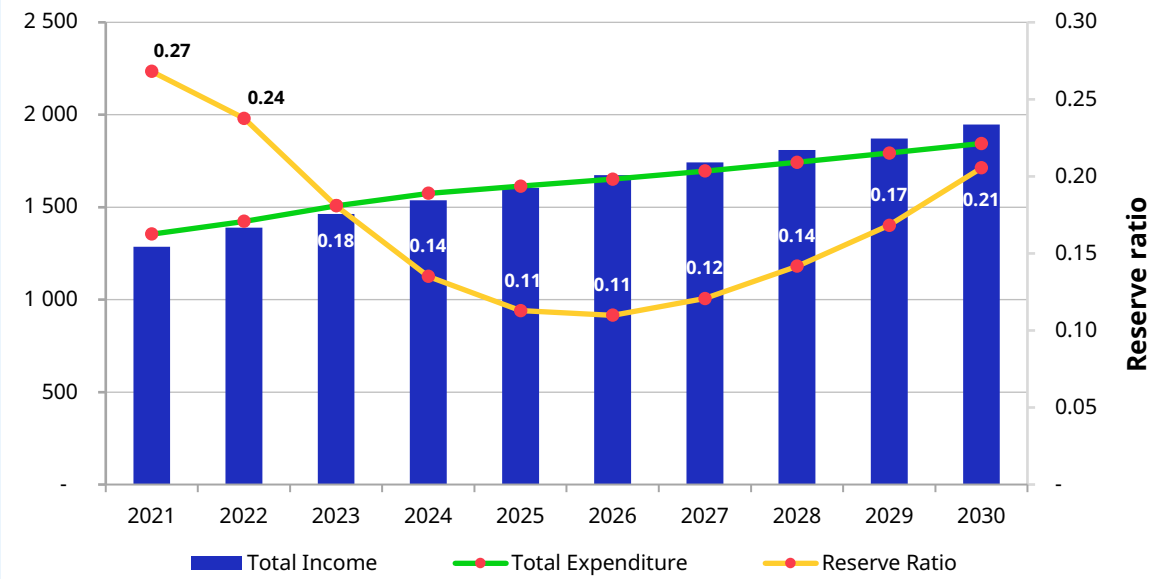
Year	2021[1]	2022	2023	2024	2025	2026	2027	2028	2029	2030
Reserve (start of year)	**406**	**364**	**339**	**273**	**213**	**182**	**182**	**205**	**248**	**303**
Total GHS income	1 287	1 389	1 463	1 537	1 605	1 674	1 743	1 810	1 872	1 947
Total GHS benefits expenditure	1 355	1 423	1 508	1 575	1 613	1 651	1 696	1 743	1 792	1 845
Total other income	42	28	0	0	0	0	0	0	0	0
Total administrative expenses	16	19	21	22	23	23	24	24	25	26
Surplus/Deficit	**–42**	**–25**	**–66**	**–60**	**–31**	**0**	**23**	**43**	**55**	**76**
Reserve (end of year)	**364**	**339**	**273**	**213**	**182**	**182**	**205**	**248**	**303**	**379**
Reserve ratio[2]	0.27	0.24	0.18	0.14	0.11	0.11	0.12	0.14	0.17	0.21
Administrative expense ratio[3] (%)	**1.2**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.3**	**1.3**	**1.3**

[1] The estimated financial figures for 2021 are derived from actual experience data. [2] 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. [3] 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.

[1] 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 2021–2030.

▶ **Figure ES.1. Total income, total expenditure and reserve ratio of the GHS, 2021–2030** (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 2021–2025, there is a downward trend in the reserve ratio and in fact, from year 2025 to 2027, the level of reserve is not sufficient to cover one-and-a-half months' expenditure, resulting to an increased financial sustainability risk, as faced by the GHS Fund. From 2027 onwards, the reserve ratio starts to increase and by 2029, it becomes sufficient to cover two 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 prolonged high inflationary pressures in the short term, resulting to lower GDP growth rates, higher nominal wage increases and higher unemployment rates in the short term; 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 ± 5 per cent; and
- increases or decreases in 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 2030, 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 2030:

- Higher reserve covering more than two 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 favourable cost evolution from the introduction of new/ innovative drugs and specialized laboratory tests, the assumption of decreases in utilization rates and the assumption of decrease in the Z items price by 5 per cent.
- Lower reserve reaching a level lower than two months' expenditure – namely the assumption of unfavourable medical inflation progressively growing to a higher-than-expected figure by 0.5 percentage points, the assumption of unfavourable cost evolution from the introduction of new/ innovative drugs and specialized laboratory tests, the assumption of increases in utilization rates and the assumption of increase in the Z items price by 5 per cent.

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

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

▶ 1. Introduction

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 an actuarial valuation of the GHS has to be conducted on an annual basis. This report presents the financial situation of the GHS as of 31 December 2020 and the financial results of an ILO actuarial assessment for measuring the financial sustainability of the GHS up to 2030. The present actuarial valuation represents the first 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. In addition, the COVID-19 pandemic, which appeared in March 2020 close to the implementation date of Phase II of the GHS, hide normal past trends of healthcare services utilization. Therefore, a number of sensitivity scenarios and tests are undertaken in Chapter 7 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 will facilitate 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 2020;
- assess the medium-term financial viability of the GHS until 2030, assuming the legislation remains unchanged, and make recommendations on its financing; and
- assess the sensitivity of the medium-term projected financial position of the GHS to changes in demographic and economic environments as well as 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 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 8 presents the conclusions and recommendations.
- Chapter 9 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 dieticians, speech therapists, occupational therapists) for outpatient care
1 October 2021	Midwives
1 January 2022	Palliative care
Expected to be implemented 1/1/2023	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)[2], 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. The payment of the contributions for the first phase started on 1 March 2019 and was fully implemented on 1 March 2020.

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.
5. Inpatient diagnosis related group (DRG) point system reimbursement: The point system reimbursement method is differentiated for DRG activities submitted for inpatient claims. One budget is maintained per hospital for all regular DRGs. Maximum number of points are determined by hospital. A Standard Base Rate is also determined for each hospital. Each hospital has its pre-agreed base rate and its pre-agreed number of points for which the pre-agreed base rate applies. If the hospital exceeds the pre-agreed number of points, the base rate is adjusted so that the global budget is not exceeded.

[2] Personal Contribution I will be paid in case a Beneficiary goes directly to an Outpatient specialist without a referral.

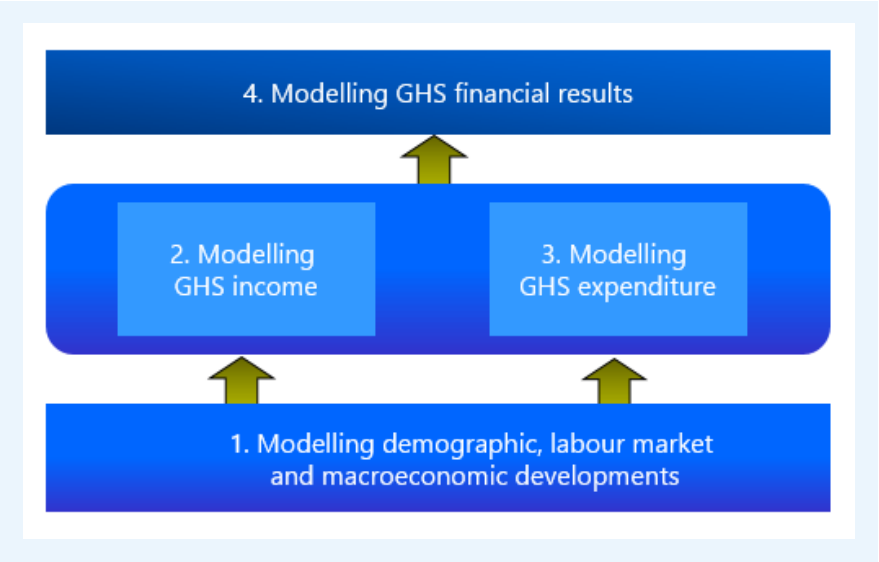
6. Fixed annual amount: A&E Department for public hospitals and ambulances of public hospitals.

▶ 3. Projection methodologies

The present actuarial valuation of the GHS involves cash-flow projections of its revenue and expenditures over a medium term, until 2030, 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 from pharmaceutical companies.

For each year in the projection period 2021–2030, 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.

$$\mathbf{CI_t = CR_t * Contributing\ Population_t * Assessment\ Base_t}$$

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	
Employed				
Salaried employees	2.65	2.90	4.70	**10.25**
Self-employed	4.00	–	4.70	**8.70**
Pensioners				
GSIS, GEPS, other	2.65	–	4.70	**7.35**
Other income				
Rent, interest, dividends, other	2.65	–	–	**2.65**

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

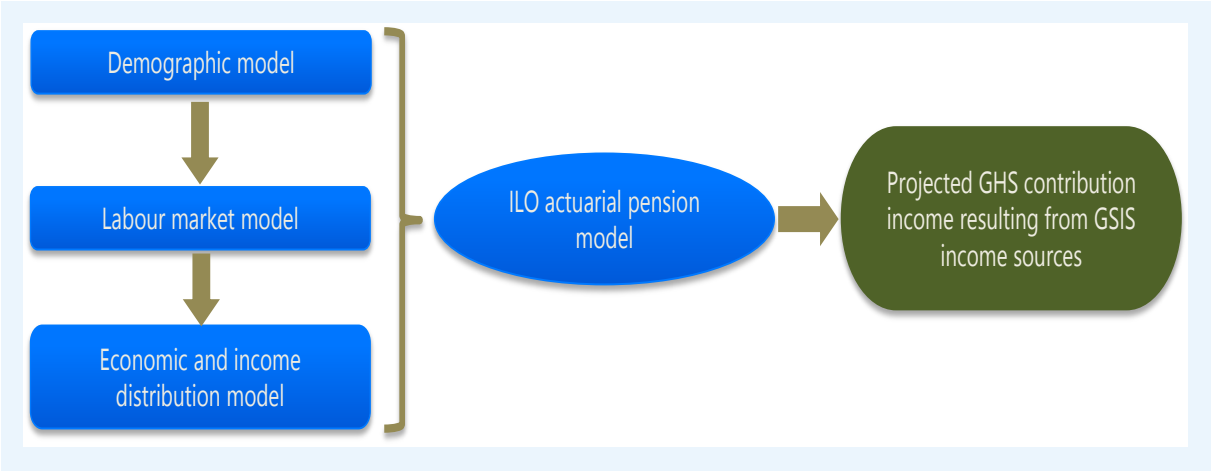
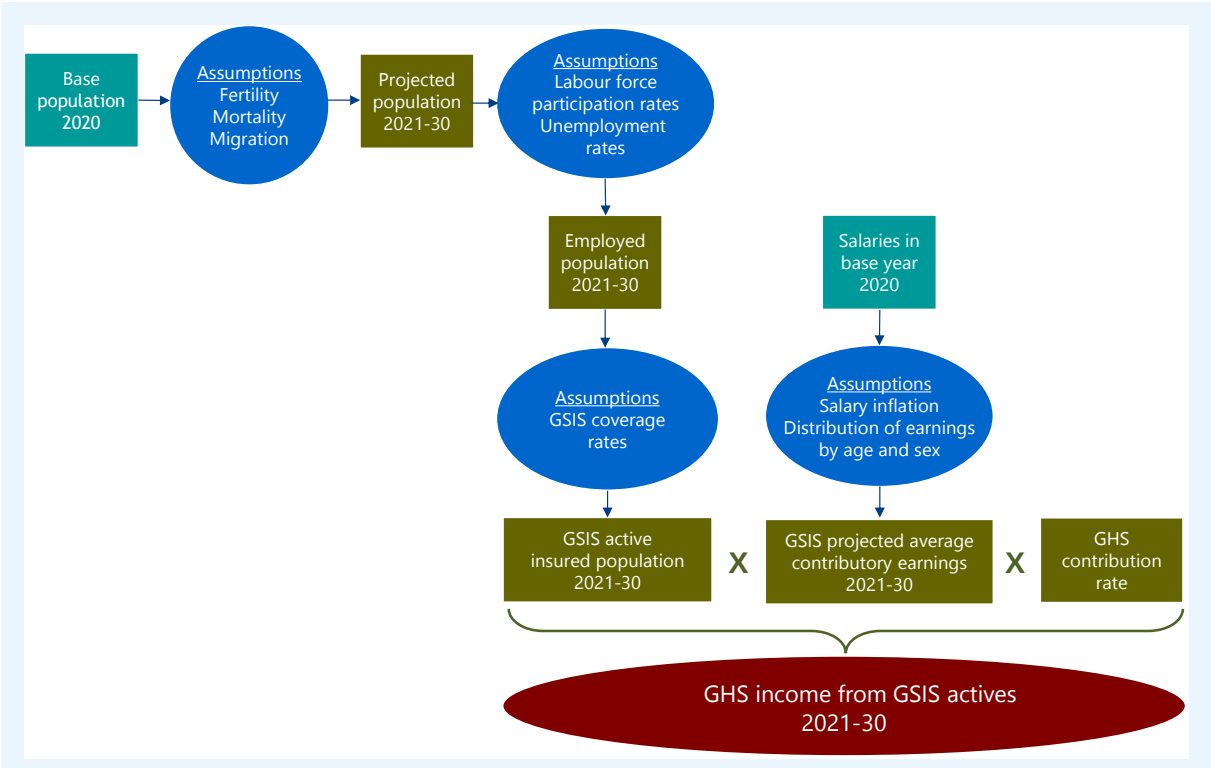


Figure 3.3 presents the methodology used for calculating the GHS income from the GSIS active insured population, while figure 3.4 presents the methodology used for calculating the GHS income from the GSIS pensioner population.

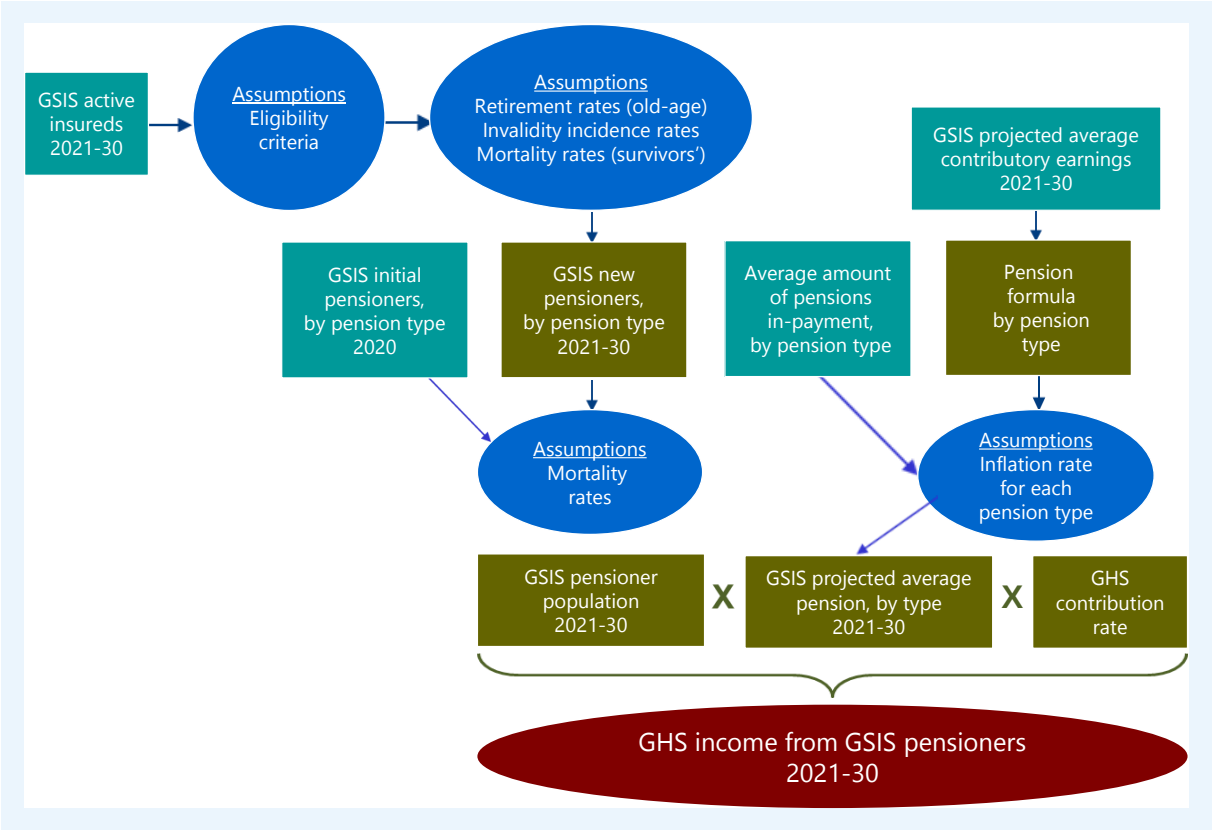
▶ Figure 3.3. Methodology regarding GHS income from GSIS contributing population



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 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 2021–2030, 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.

$$\mathbf{BE_t = CovPop_t * Utilization\ rate_t * Average\ Unit\ Cost_t}$$

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

Utilization rate$_t$ is the number of invoices per capita (1 in case of capitation reimbursement).

Average Unit Cost$_t$ 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 (2021–2030) 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 7). 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 between one month (8.3 per cent) and 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, in the short term, to maintain a reserve ratio of more than two months of annual healthcare expenditure (16.7 per cent), perhaps at a level between two-and-a-half months (20.8 per cent) and three months (25 per cent) of annual healthcare expenditure. Such a higher level is necessary, primarily to cover potential annual deficits which are anticipated to incur from the above introduction of new services/ providers.

Thereafter and towards the end of the projection period, i.e. 2030, when the GHS is expected to completely mature, lower target levels of reserve ratio might be justified, 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

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 2030, 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 regard to economic assumptions and Eurostat with regard 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 2020, to which the assumptions on the future development of fertility, mortality and migration are applied. For the year 2020, 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 2019, explicit data on the above variables were available.

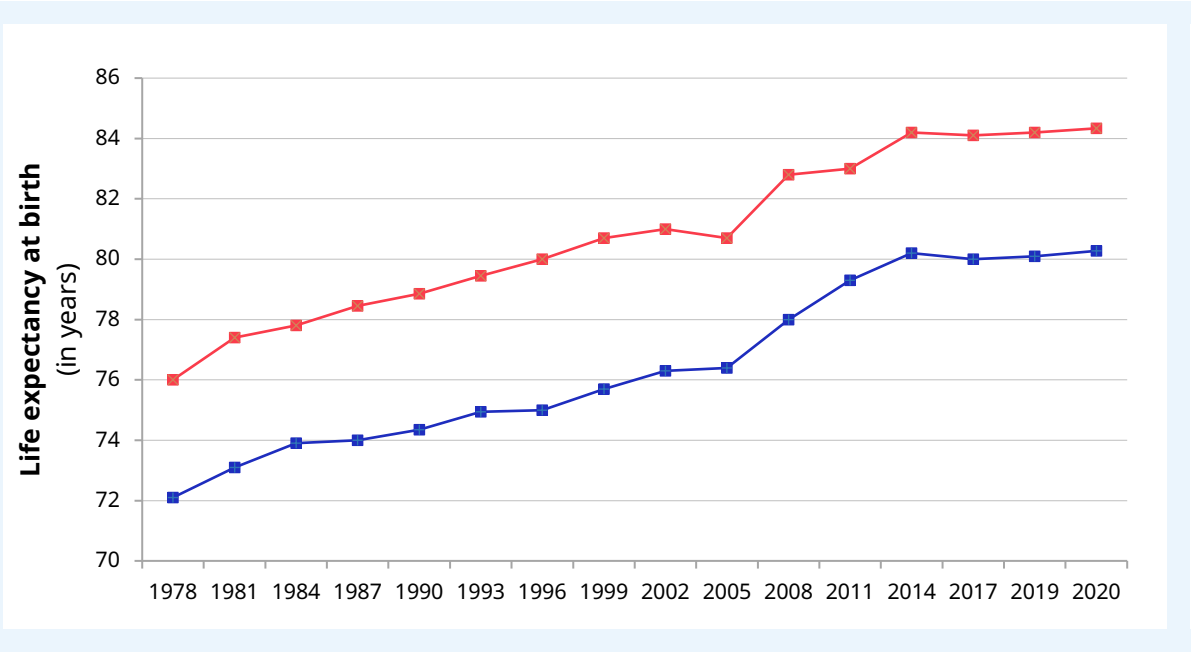
The current population structure strongly influences the results of projections for the coming years. The age distribution of the starting population shows an increasing ageing of the population in Cyprus, as is the case in many other developed countries.

4.1.1. Life expectancy

The other significant 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 11.3 per cent between 1978 and 2020, rising from 72.1 to 80.3 years. For females, life expectancy at birth increased from 76.0 to 84.3 years during the same period, representing an increase of 11 per cent. The increase in life expectancy has been particularly important since 2005 for both males and females.

▶ Figure 4.1. Historical life expectancies at birth, 1978–2020



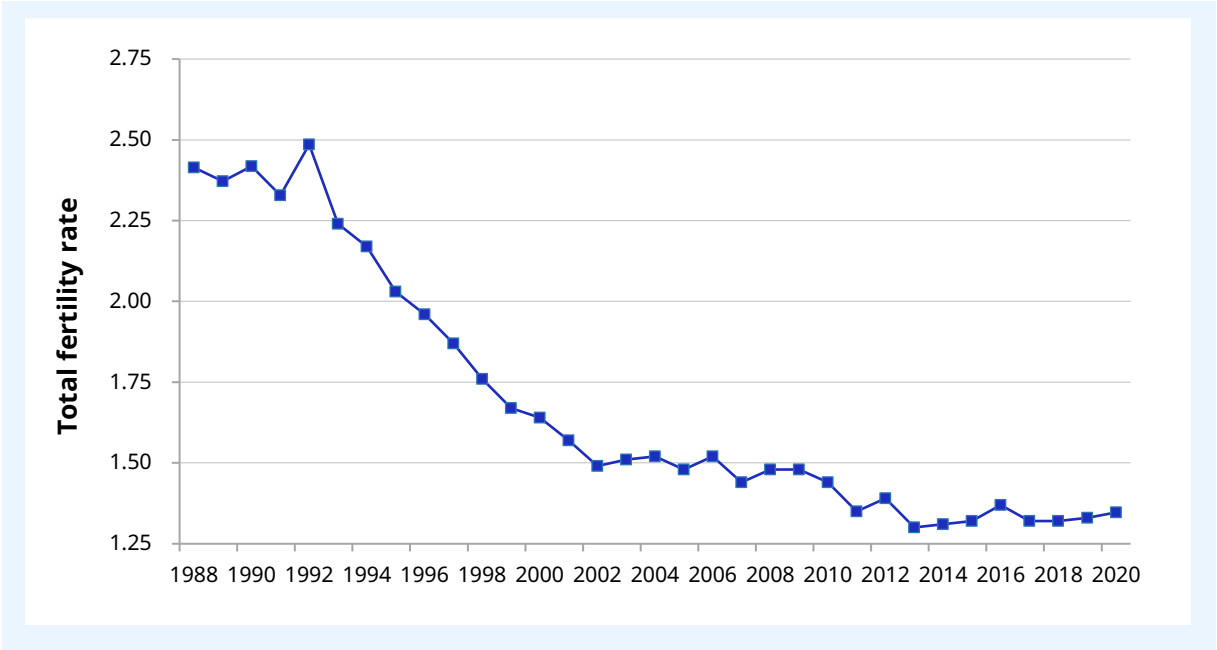
Source: Cyprus Statistical Services, Demographic Reports.

For the present valuation, mortality rates are determined with the methodology used for the development of United Nations life tables. For the determination of future mortality rates, it is assumed that mortality improvements continue in the future, but at a slower pace than most recently. In particular, it is assumed that the life expectancies at birth observed in 2020, which were 80.3 for males and 84.3 for females, are gradually increased to 82.1 for males and 85.9 for females in 2030. The overall expected rates of mortality improvement over the projection period for males and females correspond to 59 and 55 per cent respectively of the mortality improvement observed over the period 2005–20. Finally, the gap between the life expectancy of men and women is expected to slightly decrease from 4.1 years in 2020 to 3.8 years in 2030. Sample mortality rates can be found in Annex 3.

4.1.2. Fertility rate

The first 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 around to 1.33 since 2016. Figure 4.2 shows the historical total fertility rates for the period from 1989 to 2020.

▶ Figure 4.2. Historical total fertility rates, 1989–2020



Source: Cyprus Statistical Services, Demographic Reports.

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.

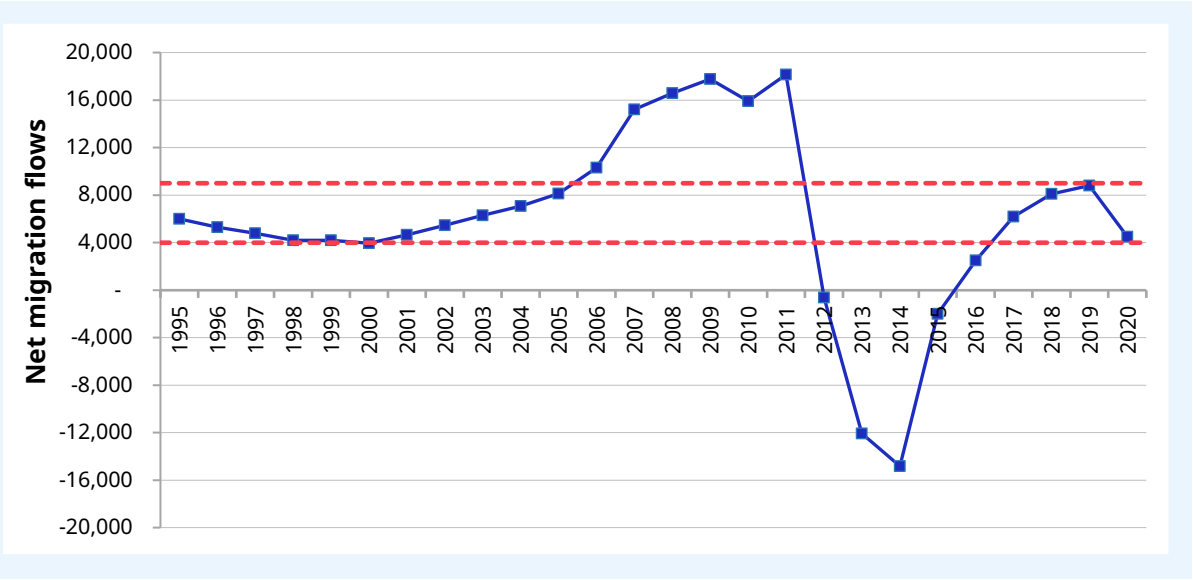
In the present valuation, the total fertility rate is estimated at 1.352 children per woman in 2021, increasing gradually to 1.392 in 2030.

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. Since 2014, net migration has been experiencing a strong increase, reaching 8,797 in 2019. In 2020, the net migration estimation was around 4,500.

It is projected that net migration will continue to increase over the period 2021–2030, but at a slower pace. In particular, net migration is projected to be 4,609 in 2021 and gradually increasing to around 5,600 net migrants per year in 2030.

▶ Figure 4.3. Historical net migration flows, 1995–2020



Source: Cyprus Statistical Services, Demographic Reports.

4.1.4. Population

According to the above assumptions, the general population of Cyprus is projected to increase from its observed level of 895,982 persons in 2020 to 1,001,667 in 2030. The starting point was estimated to be 922,258 persons in 2021 after 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 2021 to 2030, 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 2021 to 31 per cent in 2030. In other words, in 2030, it is expected that Cyprus will have almost three working-age people for every person aged 65 and over.

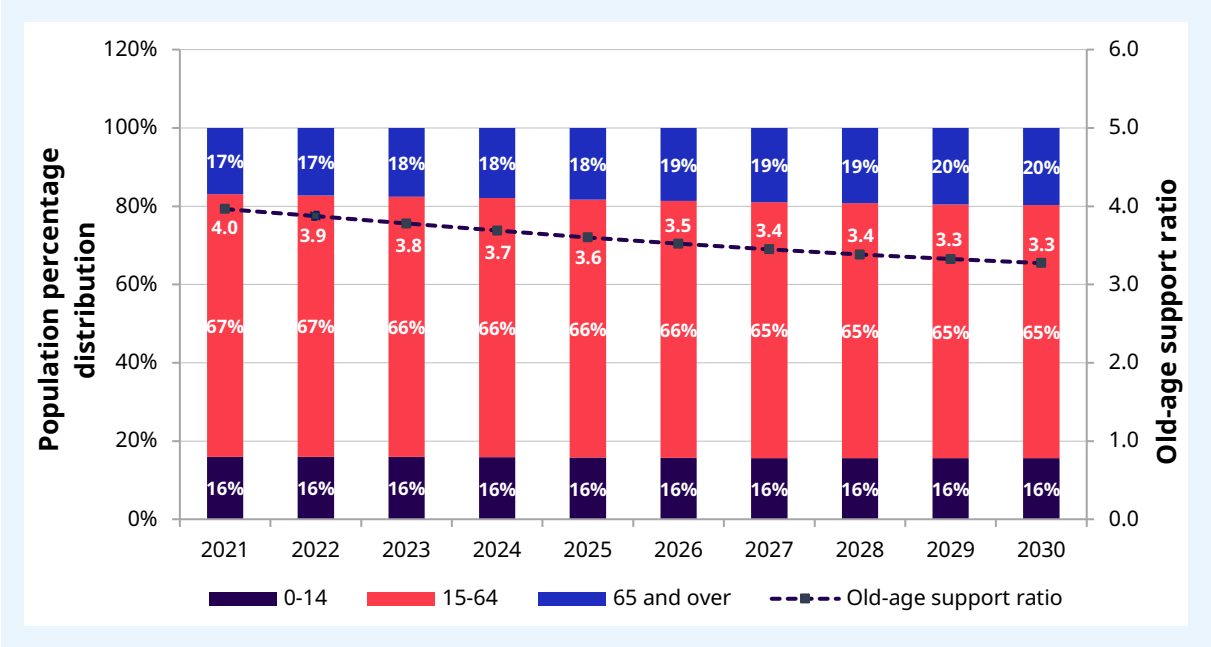
▶ Table 4.1. Projection of the population of Cyprus, 2021–2030

Year	Number of persons by age group				Old-age dependency ratio (%)
	0–14	15–64	65 and over	Total	
2021	147 524	618 703	156 031	922 258	25
2022	148 945	621 385	160 474	930 804	26
2023	149 912	624 386	165 195	939 493	26
2024	150 616	627 537	170 140	948 293	27
2025	151 145	630 862	175 170	957 177	28
2026	152 032	634 000	180 094	966 126	28
2027	152 508	637 720	184 877	975 105	29
2028	153 749	640 859	189 424	984 032	30
2029	154 978	644 173	193 736	992 887	30
2030	156 312	647 590	197 765	1 001 667	31

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, 2021–2030



Source: ILO calculations.

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. Finally, over the period 2015–2019, real GDP grew significantly at an average rate of 5.3 per cent while for 2020 the economy contracted with a rate of 5.2 per cent.

Real GDP growth is expected to gradually decrease from 5.5 per cent in 2021 to 2.8 per cent in 2023, averaging 3.8 per cent over the three-year period 2020–2023. Thereafter, it is expected to gradually decrease from 2.6 per cent in 2024 to 2.0 per cent in 2026, averaging 2.3 per cent over the period 2024–2026. Over the rest of the projection period, we expect GDP real growth rates to remain stable at a level of 2.0 per cent.

As shown in table 4.2, during the whole projection period the driving forces behind economic growth will be primarily an increase of labour productivity and to a lesser extent 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)
2021	5.5	4.3	1.2
2022	3.2	1.7	1.5
2023	2.8	1.4	1.4
2024	2.6	1.8	0.8
2025	2.3	1.4	0.8
2026	2.0	1.2	0.8
2027	2.0	1.2	0.8
2028	2.0	1.2	0.7
2029	2.0	1.2	0.8
2030	2.0	1.1	0.8

Source: Author's calculation. Years 2022 and 2023 were based on Spring 2022 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.

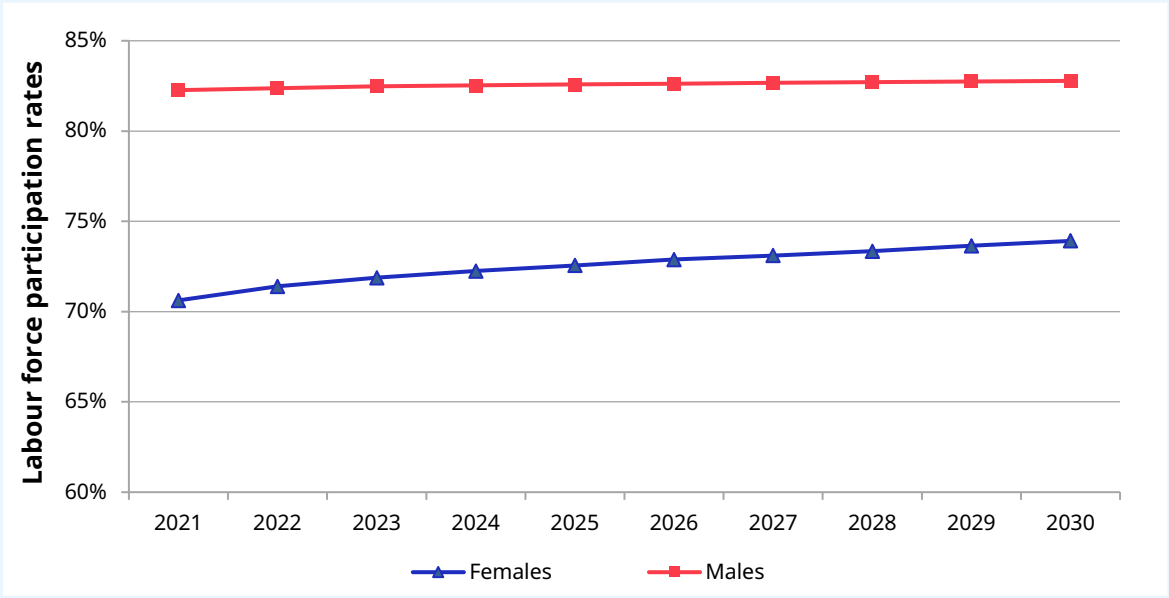
Over the period 2015–2019, the overall labour force participation rate for females for the age group 15 to 64 increased by 1.6 per cent, while in 2020 it decreased by 1.3 per cent. For the period 2015–2019 the participation rate for the age group 55 to 64 experienced a strong increase of 8.9 per cent while in 2020 it decreased by 1.9 per cent.

For the male population, over the period 2015–2020 the overall participation rate for the age group 15 to 64 increased by 3.5 per cent, from 78.8 in 2015 to 82.3 in 2020.

As shown in table 4.3 and figure 4.5, over the projection period the average labour force participation rate for males aged between 15 and 64 is assumed to moderately increase from its current level of 82.3 per cent in 2021 to 82.8 per cent in 2030. Changes in the male average participation rate result mainly from the anticipated increase in the average exit age from the labour force due to the recent GSIS reform measures, as well as changes in the structure of the active population over time (changing weight of different age groups in the total population), and thus reflect the general ageing process of the male Cypriot population.

For females, the average participation rate is assumed to grow quite significantly from its current level of 70.6 per cent in 2021 to 73.9 per cent in 2030. The increase is considerable for the period up to the year 2026, when the rate reaches a level of 72.9 per cent. Increases in the female participation rate 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, 2021–2030



Source: Author's calculations.

▶ Table 4.3. Assumptions of labour force participation, employment and unemployment rates, 2021–2030 (percentages)

Assumption		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Labour force participation rate (ages 15–64)	Male	82.3	82.4	82.5	82.5	82.6	82.6	82.7	82.7	82.8	82.8
	Female	70.6	71.4	71.9	72.3	72.6	72.9	73.1	73.3	73.6	73.9
	Total	76.3	76.8	77.1	77.3	77.5	77.7	77.8	78.0	78.1	78.3
Employment rate (ages 15–64)		70.5	71.2	71.9	72.1	72.3	72.5	72.7	72.9	73.1	73.2
Unemployment rate (ages 15–64)		7.6	7.2	6.7	6.7	6.7	6.6	6.6	6.6	6.5	6.5

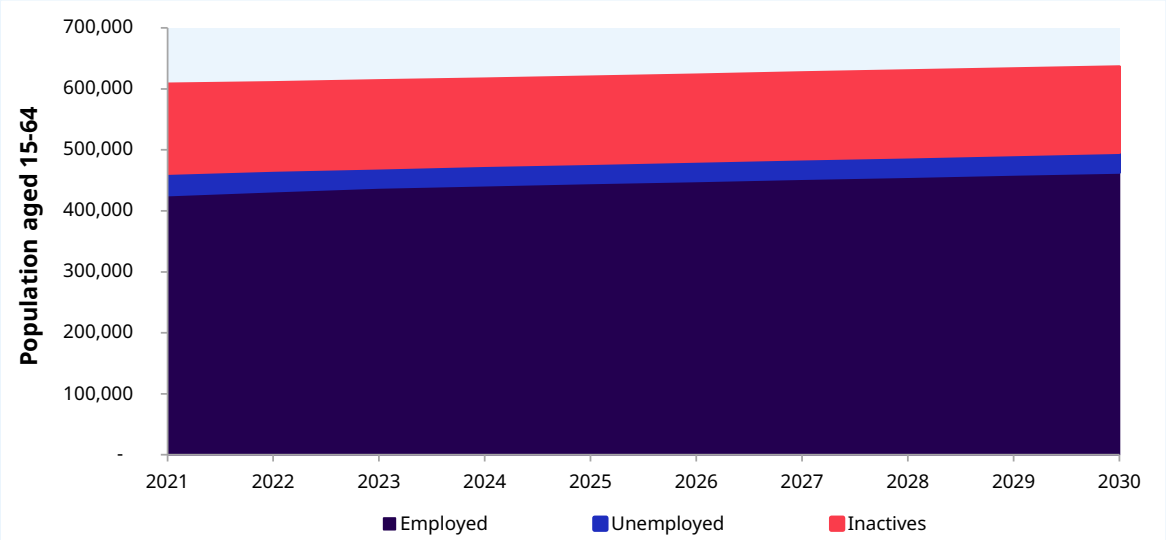
Once the labour force participation rates are determined on the basis of age group and sex, they are applied to the projected population to obtain the labour force. This projection reveals considerable growth of the labour force up to 2030.

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 7.6 per cent in 2021 to reach 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 70.5 per cent in 2021 to 73.2 per cent in 2030.

Figure 4.6 shows the changes in the population aged 15 to 64 over the projection period 2021–2030 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, 2021–2030



Source: Author's calculations.

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 2001, for the last 20 years, has been 1.63 per cent.

In Cyprus, the CPI decreased by –0.8 per cent in 2020. As shown in table 4.4, annual price inflation is assumed to be 2.3 per cent in 2021 and 6.5 per cent in 2022 and thereafter decreases until it reaches its long-term rate of 2 per cent in 2026.

The real rate of increase in average wages in the long term is tied to increases in labour productivity. This assumption also takes into account the anticipated growth in the labour force in future. Given the current economic environment, a real wage growth of 1.2 per cent is assumed for 2021 and –2.1 per cent for 2022. Over the following eight years, the period 2023–2030, real wage growth is set to be averaged at 0.9 per cent.

Table 4.4 shows the expected evolution of nominal wage growth rates. In the short term, over the three-year period 2021–2023, nominal wage growth is assumed to be averaged at 4.0 per cent, and thereafter, for the rest of the projection period, it is expected to be in the range of 3.2 to 3.8 per cent, averaging to 3.4 per cent.

▶ Table 4.4. Assumptions of inflation rate, real and nominal increase of average wage, 2021–2030 (percentages)

Year	Inflation rate	Annual real increase of average wage	Annual nominal increase of average wage
2021	2.3	1.2	3.5
2022	6.5	–2.1	4.4
2023	3.3	0.8	4.1
2024	2.5	1.3	3.8
2025	2.2	1.4	3.6
2026	2.0	1.3	3.3
2027	2.0	1.2	3.2
2028	2.0	1.3	3.3
2029	2.0	1.2	3.2
2030	2.0	1.2	3.2

▶ 5. General Healthcare System: Experience and assumptions

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

5.1. Financial experience

For the projection of the future GHS financial position, the starting point is the scheme's financial position as of 31 December 2020.

Table 5.1 shows the GHS financial position of the GHS for the financial years 2019 and 2020. As previously mentioned in the report, GHS inception was June 2019, so the financial results (contributions and expenditures) for 2019 presented below do not reflect a complete calendar year result.

▶ Table 5.1. Financial statements, 2019–20 (Euros)

	2019	2020
Contributions to GHS	454 787 925	855 111 866
Co-payments and contributions	16 434 314	35 476 337
Discounts from pharmaceutical companies	13 272 547	35 145 924
Other income items	4 059 789	2 119 139
Other income	395 061	17 101 445
Total revenue	**488 949 637**	**944 954 711**
Cost of services	–235 788 459	–769 822 649
Administrative expenses	–9 253 256	–12 749 458
Total costs and expenses	**–245 041 715**	**–782 572 107**
Surplus/(Deficit)	243 907 922	162 382 604
Net financing income (expense)	–39 475	–959 923
Surplus/(Deficit) before taxation	243 868 447	161 422 681
Taxation	–49	–
Net Surplus/(Deficit) for the year	243 868 398	161 422 681
Cumulative Surplus/(Deficit) for the year	**243 868 398**	**161 422 681**

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, 2019–20

	2019			2020		
	FS (€)	HIO data (€)	Comparison (%)	FS (€)	HIO data (€)	Comparison (%)
Contributions to GHS	454 787 925	450 528 934	–0.9	855 111 866	848 490 515	–0.8
Cost of GHS services	235 788 459	233 823 255	–0.8	769 822 649	766 218 377	–0.5

Table 5.3 shows some key financial indicators regarding the GHS financial position. It follows that for the financial year 2020, there was a significant decrease for both reserve ratio and administrative expense ratio over total expenditure, while the accumulated surplus (reserve) in absolute terms increased. This decrease is due to the full implementation of the GHS in 2020 and thus the cost of GHS services noted a significant increase of 91 per cent. The contributions and the accumulated surplus were increased by 88 per cent and 53 per cent accordingly.

▶ Table 5.3. Financial Indicators, 2019–20

	2019	2020
Accumulated surplus (reserve) (€)	244 353 434	405 776 115
Reserve ratio	1.04	0.53
Administrative expense ratio (%)	3.8	1.6

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 2020, 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 2020, 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 2021, resulting to an increased projected number of beneficiaries for 2021, primarily representing the fact that a significant number of beneficiaries had not been registered in the GHS up to 31 December 2020.

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 2019 and 2020.

▶ Table 5.4. Active contributors to the GHS, 2019–20

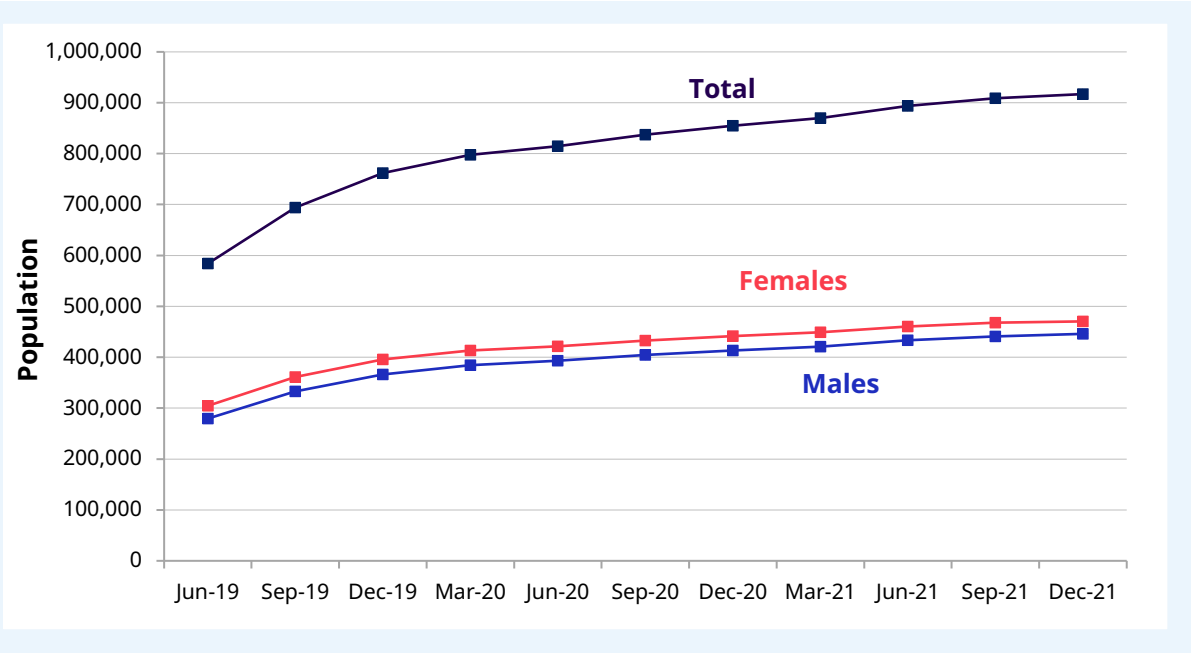
		Number of contributors	
		2019	2020
Employed persons	Male	252 750	242 910
	Female	232 981	220 166
Self-employed persons	Male	18 150	16 865
	Female	13 826	13 359
		Number of pensions	
		2019	2020
GSIS statutory pension		119 955	122 803
GSIS invalidity pension		4 492	4 202
GSIS widow's pension		30 675	31 639
GSIS disablement pension		859	836
GSIS orphans benefit		1 256	1 121
Pension under SPS		16 215	16 203

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 2020.

▶ Table 5.5. Registered beneficiaries in the GHS, 2019–2021

Month	Male	Female	Total	Percentage increase (%)
Jun–19	279 377	304 468	583 845	–
Sep–19	332 637	361 223	693 860	19
Dec–19	366 335	395 699	762 034	10
Mar–20	384 257	413 426	797 683	5
Jun–20	392 917	421 591	814 508	2
Sep–20	404 220	432 667	836 887	3
Dec–20	413 116	441 442	854 558	2
Mar–21	420 719	449 110	869 829	2
Jun–21	433 339	460 544	893 883	3
Sep–21	441 013	467 855	908 868	2
Dec–21	445 893	470 752	916 645	1

▶ **Figure 5.1. Evolution of the number of registered beneficiaries, 2019–2021**



Source: HIO.

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 18-month period from June 2020 to December 2021 was on average only 2 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 2021 were provided by the HIO. The above data was used to identify trends in utilization and claim costs for inpatients and outpatients, taking into account any abnormalities caused by the COVID-19 pandemic.

5.3.1 Overview of past claims expenditure

Tables 5.6 to 5.9 show past claim experience for the years 2019 and 2020 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

Inpatient category	Number of claims	Total amount (€)	Average total amount per claim (€)
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

▶ Table 5.7. Claims experience, outpatients, 2019–20

Year	Outpatient category	Number of claims	Total amount (€)	Average total amount per claim (€)
2019	Allied health professionals	N/A		
	Dentists			
	Nurses and midwives			
	Outpatient specialist doctors[1]	1 226 845	90 762 822	74
2020	Allied health professionals	9 590	321 295	34
	Dentists[2]	4 447	173 197	39
	Nurses and midwives	N/A		
	Outpatient specialist doctors	3 378 016	228 679 172	68

[1] 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. [2] Figures represents only one month of data since dentists for preventive dental care was introduced from 1 Dec 2020.

▶ Table 5.8. Claims experience, laboratories, 2019–20

Year	Laboratory test categories	Number of claims	Total amount (€)	Average points per invoice	Average total amount per claim (€)
2019	Biochemistry	351 778	16 047 653	42.8	46
	Haematology	317 329	2 421 833	7.3	8
	Immunology	313 090	11 438 040	34.5	37
	Microbiology	144 340	920 481	6.0	6
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

▶ Table 5.9. Claims experience, pharmacies, 2019–20

Year	Number of claims	Total pharmaceuticals[1] amount (€)	Pharmacies' fees (€)	Overnight fees (€)	Average pharmaceuticals amount per claim (€)
2019	2 069 630	51 425 605	17 383 118	400 000	25
2020	5 722 959	142 498 475	30 934 637	550 000	25

[1] 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 2020 and 2021.

▶ Table 5.10. Inpatient utilization rates, by sex, 2020–21 (percentages)

Inpatient category	Sex	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021[1]
DRGs	Male	1.1	2.2	2.2	2.4	2.6	2.7
	Female	1.3	2.2	2.4	2.6	2.7	2.8
Z-Drugs	Male	0.2	0.9	1.0	1.2	1.3	–
	Female	0.2	0.8	1.1	1.5	1.6	–
Z-Consumables	Male	0.7	1.4	1.4	1.4	1.7	–
	Female	1.1	1.5	1.6	1.6	1.8	–
Z-Procedures & fixed fee	Male	0.4	1.5	1.8	2.0	2.1	–
	Female	0.7	1.6	2.0	2.2	2.2	–

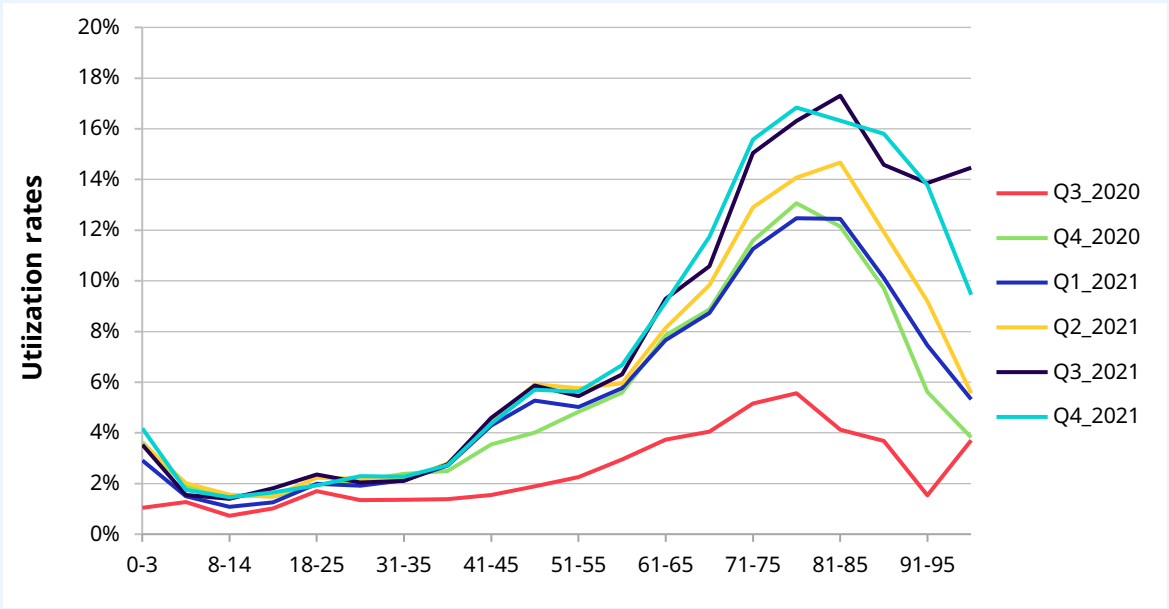
[1] With respect to quarter 4 of 2021, only DRGs data was collected, taking into account that z-items' utilization rates and average cost were relatively stable between quarter 2 and 3 of 2021.

▶ Table 5.11. Inpatient average cost per invoice, by sex, 2020–21 (Euros)

Inpatient category	Sex	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021
DRGs	Male	2 944	2 658	3 081	2 789	3 014	3 770
	Female	2 582	2 513	2 685	3 074	2 713	3 068
Z-Drugs	Male	752	626	625	597	522	–
	Female	567	487	518	535	522	–
Z-Consumables	Male	807	653	941	868	646	–
	Female	1 193	660	1 065	502	502	–
Z-Procedures & fixed fee	Male	428	616	639	617	562	–
	Female	520	682	724	608	520	–

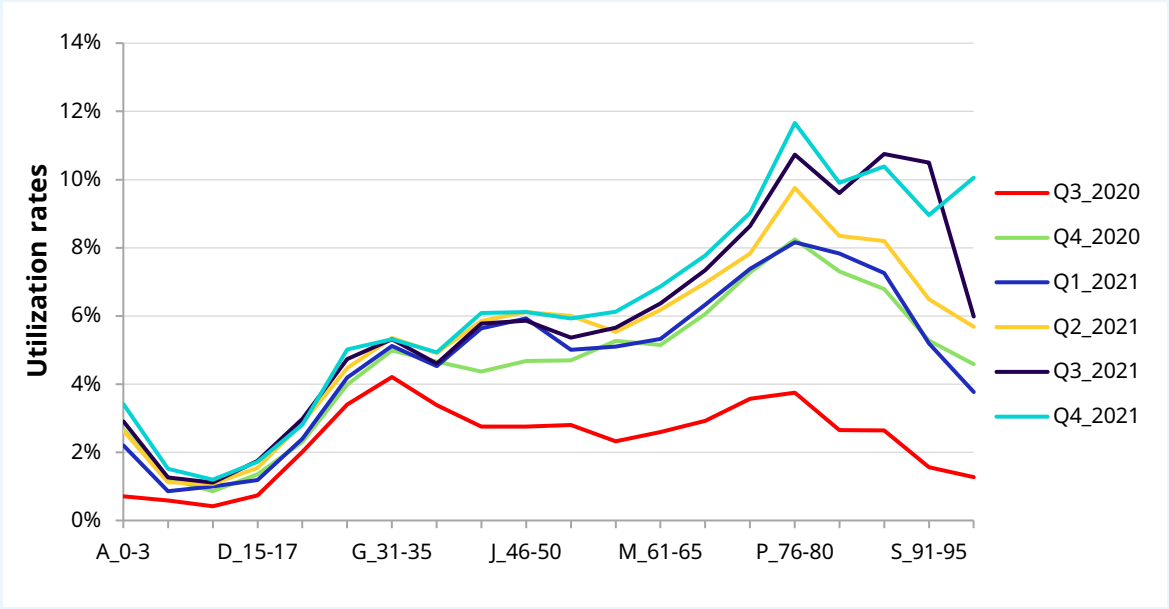
Figures 5.2 and 5.3 show the trend in inpatient utilization rates by age group and by quarter over the years 2020 and 2021 for males and females respectively.

▶ Figure 5.2. Evolution of inpatient utilization rates, by age group, males, 2020–21



Source: HIO.

▶ Figure 5.3. Evolution of inpatient utilization rates, by age group, females, 2020–21



Source: HIO.

It follows from table 5.10 and figures 5.2 and 5.3 above that the inpatient utilization rates experienced a significant increase over the period from June 2020 (inception month of inpatient services under the GHS) to June 2021, while over the period from quarter 3 of 2021 to quarter 4 of 2021 the overall utilization rates remained stable for both sexes and for all age groups. Moreover, as illustrated by table 5.11 above, the Z-items cost per invoice also remained stable between quarter 2 of 2021 and quarter 3 of 2021, while the DRG cost per invoice continued its increasing trend over the same period, mainly due to the affiliation of new hospitals with the GHS.

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 2019 to 2021.

▶ Table 5.12. Outpatient utilization rates, by category and by sex, 2019–2021 (percentages)

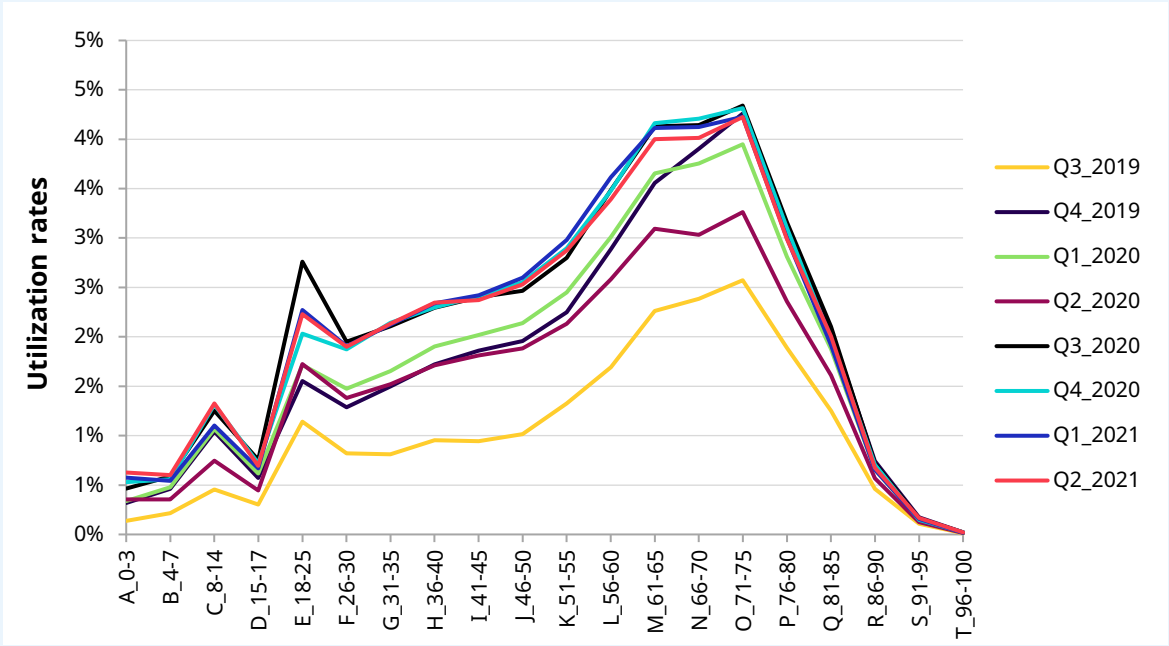
Outpatient category	Sex	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Allied health professionals	Male	N/A					0.5	6.9	9.4
	Female						0.6	9.4	12.3
Dentists	Male						0.2	2.5	4.1
	Female						0.3	3.0	4.8
Nurses and midwives	Male						0.0	0.2	0.2
	Female						0.0	0.3	0.4
Outpatient specialist doctors and Personal doctors	Male	20.8	35.2	35.7	30.7	42.1	41.4	41.4	41.1
	Female	31.4	53.1	54.7	45.7	64.9	62.8	62.2	60.9

▶ Table 5.13. Outpatient average cost per invoice, by category and by sex, 2019–2021 (Euros)

Outpatient category	Sex	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Allied health professionals	Male	N/A					34	34	34
	Female						34	34	34
Dentists	Male						37	37	38
	Female						38	37	38
Nurses and midwives	Male						–	29	28
	Female						–	28	27
Outpatient specialist doctors and Personal doctors	Male	95	84	84	81	69	67	72	64
	Female	93	81	76	74	62	62	60	59

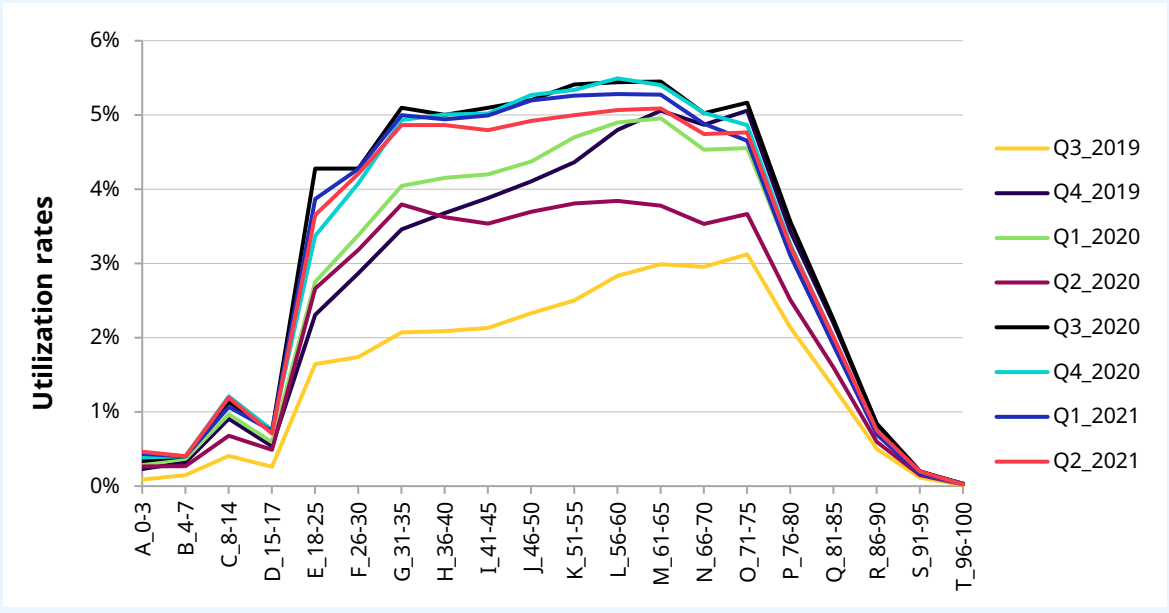
Figures 5.4 and 5.5 show the trend in outpatient utilization rates by age group and by quarter over the years 2019, 2020 and 2021 for males and females respectively.

▶ Figure 5.4. Evolution of outpatient utilization rates, by age group, males, 2019–2021



Source: HIO.

▶ Figure 5.5. Evolution of outpatient utilization rates, by age group, females, 2019–2021



Source: HIO.

It follows from table 5.12 and figures 5.4 and 5.5 above that the utilization rates for outpatient services experienced a significant increase over the period from June 2019 (inception month of personal doctors and specialist doctors for outpatient services under the GHS) to September 2020,

while over the period from quarter 4 of 2020 to quarter 2 of 2021 the overall utilization rates remained stable for both sexes and for all age groups. Moreover, as illustrated by table 5.13 above, the average cost per invoice also remained stable between quarter 4 of 2020 to quarter 2 of 2021.

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 2019 to 2021.

▶ Table 5.14. Laboratory utilization rates, by category, 2019–2021 (percentages)

Laboratory test categories	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Biochemistry	23	26	21	20	26	25	25	26
Haematology	20	23	19	17	23	21	22	23
Immunology	20	22	18	17	23	22	23	23
Microbiology	9	11	9	9	11	11	11	11

▶ Table 5.15. Laboratories, average cost per invoice, by category, 2019–2021 (Euros)

Laboratory test categories	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Biochemistry	53	52	47	53	48	47	46	46
Haematology	9	9	9	10	9	9	9	9
Immunology	45	39	34	38	34	35	36	36
Microbiology	7	8	9	11	9	9	10	10

It follows from tables 5.14 and 5.15 above that over the period from quarter 3 of 2020 to quarter 2 of 2021, 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 2019 to 2021.

▶ Table 5.16. Pharmacy utilization rates, 2019–2021 (percentages)

	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Overall rate	115	165	185	157	173	186	184	183

▶ Table 5.17. Pharmaceuticals, average cost per invoice, 2019–2021 (Euros)

	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Overall rate	28	26	27	26	24	28	32	32

It follows from tables 5.16 and 5.17 above that over the period from quarter 4 of 2020 to quarter 2 of 2021, the overall utilization rates and average cost per invoice remained stable.

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 2021.

▶ Table 5.18. Historical medical inflation, by healthcare category, 2012–2021 (percentages)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
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
Pharmaceutical products	0.0	–1.2	–0.1	–1.6	–0.4	0.1	–1.1	–2.4	–0.1	1.1
Outpatient services	0.7	–4.1	–3.0	0.8	1.5	0.9	0.7	0.8	0.8	0.6
Medical services	1.0	–4.9	–2.9	1.6	2.2	1.4	2.1	1.2	0.1	0.3
Dental services	0.2	–2.5	–2.8	–1.5	0.6	0.4	0.9	1.4	1.1	1.5
Paramedical services	0.5	–3.7	–3.3	0.9	1.0	0.5	–0.2	0.1	1.3	0.6
Hospital services	0.4	0.6	2.2	1.4	1.9	1.7	1.0	0.7	0.3	0.1
Total health	0.6	–2.5	–1.3	0.4	1.1	0.8	–0.1	–0.3	0.5	0.7

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 2023 to 2030. With respect to the years 2021 and 2022, 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, 2023–2030 (percentages)

Healthcare category	2023	2024	2025	2026	2027	2028	2029	2030
Personal doctors	2.1	2.0	1.8	1.6	1.6	1.8	2.0	2.0
Outpatient specialist doctors	2.1	2.0	1.8	1.6	1.6	1.8	2.0	2.0
Pharmacies	2.3	2.0	1.8	2.0	2.0	2.0	2.0	2.0
Laboratories	2.3	2.0	1.8	2.0	2.0	2.0	2.0	2.0
Inpatient DRGs	2.3	2.0	1.7	1.5	1.8	2.0	2.0	2.2
Z-Consumables	2.3	2.0	1.8	2.0	2.0	2.0	2.0	2.0
Z-Drugs	2.3	2.0	1.8	2.0	2.0	2.0	2.0	2.0
Z-Procedures & fixed fee	2.3	2.0	1.7	1.5	1.8	2.0	2.0	2.2
A&E departments and ambulances	2.1	1.9	1.6	1.2	1.2	1.2	1.2	1.2
Dentists	2.1	2.0	1.8	1.6	1.6	1.8	2.0	2.0
Nurses and midwives	2.1	2.0	1.8	1.6	1.6	1.8	2.0	2.0
Allied health professionals	2.1	2.0	1.8	1.6	1.6	1.8	2.0	2.0
Rehabilitation and palliative care	2.1	1.9	1.6	1.2	1.2	1.2	1.2	1.2

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 2021 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 2021, 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 2021 to 2030.

▶ Table 5.20. Inpatient DRGs, quarterly utilization rate assumption, by age group and sex, 2021–2030 (percentages)

Age group	2021		2022–2030	
	Male	Female	Male	Female
0–3	3.9	3.1	3.9	3.2
4–7	1.9	1.4	1.5	1.2
8–14	1.5	1.2	1.5	1.2
15–17	1.7	1.8	1.8	1.7
18–25	2.3	3.0	2.1	2.7
26–30	2.3	5.0	2.2	4.9
31–35	2.3	5.6	2.2	5.4
36–40	2.9	5.1	2.8	4.9
41–45	4.7	6.3	4.7	6.3
46–50	6.1	6.4	6.1	6.5
51–55	5.8	6.0	5.9	6.1
56–60	6.6	6.1	7.1	6.3
61–65	9.3	6.9	10.2	7.1
66–70	11.2	7.8	12.3	8.1
71–75	15.3	8.9	16.9	9.5
76–80	16.6	11.2	18.5	11.9
81–85	17.1	9.9	18.5	10.3
86–90	15.2	10.7	16.9	11.1
91–95	14.1	9.7	15.8	10.2
96–100	12.3	8.9	14.0	9.2

Table 5.21 shows the assumption of inpatient Z items quarterly utilization rates by age group and sex for the years from 2021 to 2030.

▶ Table 5.21. Inpatient Z items, quarterly utilization rate assumption, by age group and sex, 2021–2030 (percentages)

Age group	Z-Consumables		Z-Drugs		Z-Procedures & fixed fees	
	Male	Female	Male	Female	Male	Female
0–3	0.2	0.1	1.1	1.2	2.2	2.3
4–7	0.2	0.1	1.1	0.3	1.0	0.5
8–14	0.6	0.2	0.6	0.4	0.8	0.6
15–17	1.4	0.8	0.2	0.3	0.4	0.8
18–25	2.0	2.7	0.4	1.3	0.9	2.4
26–30	1.4	4.7	0.6	3.6	1.1	3.9
31–35	1.5	5.9	0.7	4.4	1.3	5.1
36–40	2.1	4.3	0.9	3.7	1.6	4.6
41–45	3.2	3.5	2.2	3.8	3.9	5.5
46–50	5.3	4.9	3.4	2.9	4.8	4.9
51–55	4.7	4.1	3.0	2.8	5.2	5.4
56–60	5.3	4.0	3.5	3.0	4.9	4.6
61–65	9.2	4.0	5.0	3.6	8.2	5.7
66–70	8.7	6.9	5.5	3.8	9.3	6.3
71–75	13.9	8.0	8.6	4.9	13.4	7.7
76–80	15.2	8.9	12.0	6.5	14.4	8.4
81–85	8.7	6.9	7.6	3.3	15.0	6.5
86–90	10.7	9.4	2.7	3.5	10.6	5.6
91–95	4.6	4.0	0.4	1.9	5.4	2.3
96–100	6.6	2.0	0.0	0.0	1.7	0.2

Table 5.22 shows the assumption of outpatient specialists' quarterly utilization rates by age group and sex for the years from 2021 to 2030.

▶ Table 5.22. Outpatient specialists, quarterly utilization rate assumption, by age group and sex, 2021–2030 (percentages)

Age group	2021		2022–2030	
	Male	Female	Male	Female
0–3	28	22	28	22
4–7	26	20	27	20
8–14	34	33	33	33
15–17	47	53	48	52
18–25	51	89	52	89
26–30	53	118	53	119
31–35	57	127	56	127
36–40	60	120	60	121
41–45	69	128	70	128
46–50	85	143	86	143
51–55	99	156	99	155
56–60	116	166	117	165
61–65	136	172	136	172

Age group	2021		2022–2030	
	Male	Female	Male	Female
66–70	161	185	161	185
71–75	193	202	193	201
76–80	210	192	209	191
81–85	193	151	193	151
86–90	150	109	149	109
91–95	107	69	109	70
96–100	80	56	79	55

Table 5.23 shows the assumption of allied health professionals' quarterly utilization rates by age group and sex for the years from 2021 to 2030.

▶ Table 5.23. Allied health professionals, quarterly utilization rate assumption, by age group and sex, 2021–2030 (percentages)

Age group	2021		2022		2023		2024–2030	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	10.3	9.0	12.5	9.6	14.4	11.1	15.1	11.6
4–7	9.3	5.6	12.7	7.5	14.5	8.5	15.2	8.9
8–14	10.9	10.1	12.2	10.8	13.5	12.0	14.2	12.6
15–17	15.4	17.1	15.8	17.4	17.8	19.0	18.7	20.0
18–25	13.6	15.6	13.3	15.6	14.9	17.2	15.6	18.1
26–30	15.5	17.6	15.4	17.7	17.4	19.7	18.2	20.7
31–35	16.4	17.2	16.0	16.7	18.1	18.7	19.1	19.6
36–40	16.8	18.5	16.0	17.5	18.1	19.7	19.0	20.7
41–45	18.7	21.5	17.3	20.2	19.6	22.8	20.6	23.9
46–50	20.7	27.1	18.5	25.0	21.0	28.3	22.1	29.7
51–55	21.6	31.9	19.5	29.2	22.1	33.1	23.3	34.7
56–60	22.8	32.7	21.0	29.4	23.9	33.4	25.1	35.0
61–65	23.0	33.7	21.3	30.7	24.2	35.0	25.4	36.7
66–70	22.8	34.7	20.9	31.7	23.9	36.1	25.1	38.0
71–75	23.7	35.0	22.7	32.7	25.9	37.3	27.2	39.2
76–80	21.6	30.9	21.3	30.5	24.4	34.9	25.6	36.7
81–85	20.9	22.7	21.5	24.4	24.7	28.0	25.9	29.4
86–90	13.7	15.0	14.1	15.7	16.2	18.0	17.0	18.9
91–95	8.9	8.6	10.8	9.6	12.4	11.0	13.0	11.6
96–100	17.2	9.2	22.0	12.0	25.1	13.8	26.4	14.5

Table 5.24 shows the assumption of dentists' quarterly utilization rates by age group and sex for the years from 2021 to 2030.

▶ Table 5.24. Dentists, quarterly utilization rate assumption, by age group and sex, 2021–2030 (percentages)

Age group	2021		2022		2023		2024–2030	
	Male	Female	Male	Female	Male	Female	Male	Female
0–3	1.1	1.1	1.6	1.5	1.7	1.6	1.7	1.6
4–7	5.6	5.8	7.6	8.1	8.0	8.5	8.0	8.5
8–14	8.1	8.2	10.4	10.2	10.9	10.7	10.9	10.7
15–17	7.7	8.5	9.6	10.8	10.1	11.3	10.1	11.3
18–25	7.9	10.1	9.8	12.1	10.3	12.7	10.3	12.7
26–30	9.2	11.1	11.5	13.5	12.1	14.2	12.1	14.2
31–35	8.9	10.0	11.2	12.5	11.8	13.1	11.8	13.1
36–40	8.2	9.2	10.3	11.3	10.8	11.9	10.8	11.9
41–45	7.8	8.5	9.9	10.6	10.4	11.1	10.4	11.1
46–50	7.6	8.3	9.6	10.1	10.0	10.6	10.0	10.6
51–55	7.5	8.3	9.5	10.5	10.0	11.1	10.0	11.1
56–60	7.0	8.1	8.9	10.3	9.4	10.8	9.4	10.8
61–65	6.5	7.6	8.2	9.6	8.6	10.1	8.6	10.1
66–70	6.1	6.8	7.8	8.8	8.2	9.2	8.2	9.2
71–75	5.7	6.3	7.4	8.2	7.8	8.6	7.8	8.6
76–80	4.7	4.8	6.0	6.0	6.3	6.3	6.3	6.3
81–85	3.6	2.9	4.8	3.8	5.0	4.0	5.0	4.0
86–90	2.5	1.7	3.2	2.3	3.4	2.4	3.4	2.4
91–95	1.5	0.9	1.8	1.1	1.9	1.2	1.9	1.2
96–100	1.2	0.3	1.0	0.5	1.0	0.5	1.0	0.5

Table 5.25 shows the assumption of nurses' and midwives' quarterly utilization rates by age group and sex for the years from 2021 to 2030.

▶ Table 5.25. Nurses and midwives, quarterly utilization rate assumption, by age group and sex, 2021–2030 (percentages)

Age group	2021		2022		2023		2024–2030	
	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8–14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15–17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18–25	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0
26–30	0.1	0.0	0.1	0.0	0.2	0.0	0.2	0.0
31–35	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0
36–40	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
41–45	0.1	0.0	0.1	0.0	0.1	0.1	0.2	0.1
46–50	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
51–55	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.3
56–60	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.4
61–65	0.7	0.6	0.9	0.7	1.0	0.8	1.1	0.9
66–70	0.5	0.7	0.6	0.8	0.7	0.9	0.8	1.0

Age group	2021		2022		2023		2024–2030	
	Male	Female	Male	Female	Male	Female	Male	Female
71–75	1.3	1.5	1.5	1.8	1.8	2.1	1.9	2.3
76–80	1.9	2.7	2.3	3.2	2.7	3.7	2.9	4.1
81–85	4.7	5.9	5.6	7.0	6.4	8.1	7.1	8.9
86–90	8.0	10.3	9.6	12.4	11.1	14.2	12.2	15.7
91–95	12.3	14.4	14.8	17.3	17.0	19.9	18.7	21.9
96–100	14.6	24.1	17.5	29.0	20.1	33.3	22.1	36.6

Table 5.26 shows the assumption of laboratories' monthly utilization rates and average number of points per invoice, by test category.

▶ Table 5.26. Assumptions of laboratory monthly utilization rate and average number of points per invoice, by test category, 2021–2030

Laboratory test category	2021–22		2023–2030	
	Monthly utilization rate (%)	Average number of points per invoice	Monthly utilization rate (%)	Average number of points per invoice
Biochemistry and immunology	16	34.2	16	34.2
Haematology and microbiology	11	7.9	11	10.3

Table 5.27 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 2021–2030.

▶ Table 5.27. Pharmacies, monthly utilization rates and other projection assumptions, 2021–2030

	Monthly utilization rate (%)	Pharmacist fee – Average number of packs dispensed	Pharmaceuticals – Average cost per invoice (€)	Pharmacist fee per overnight – Annual cost (€)
2021–2030	61	2.78	30.7	550 000

Table 5.28 shows the personal doctors' current annual capitation reimbursement rates which are projected to increase in line with the relevant medical inflation rate for the years 2022 onwards.

▶ Table 5.28. Personal doctors' current capitation reimbursement annual rates (Euros)

Age group	Annual rates
0–3	210
4–7	155
8–14	91
15–17	91
18–50	83
51–70	117
71+	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 2022 onwards.

Table 5.29 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 2021–2030.

▶ Table 5.29. A&E departments, private hospitals, assumptions of quarterly utilization rate and average number of points per invoice, 2021–2030

	2021		2022–2030	
	Quarterly utilization rate (%)	Average number of points per invoice	Quarterly utilization rate (%)	Average number of points per invoice
A&E departments, private hospitals	0.40	8.1	0.51	8.1

Table 5.30 shows the A&E departments of public hospitals current annual fixed cost at A&E departments of public hospitals.

▶ Table 5.30. A&E departments, public hospitals, and ambulances, assumed annual fixed cost (Euros)

	A&E department of public hospitals	Ambulances
2021–2030 annual fixed cost	18 000 000	13 200 000

Table 5.31 shows the assumption used for the GHS expenditure on rehabilitation and palliative care. From 2024 onwards the amounts are projected to increase in line with the relevant medical inflation rate for the years 2022 onwards.

▶ Table 5.31. Rehabilitation and palliative care, assumption of annual cost, for the years 2022–2030 (Euros)

	2022	2023	2024–2030
Palliative care in institutions	2 000 000	4 000 000	6 000 000
Rehabilitation in institutions	2 000 000	4 000 000	6 000 000

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.
- Inpatient care: The provision of additional care, primarily covering urgent cases on an ad-hoc basis, from providers in Cyprus who in 2021 were not affiliated with the GHS and incurred a total expenditure of approximately €18 million. That expenditure will be gradually eliminated in the short-term, as the GHS capacity for the provision of inpatient healthcare services is expected to increase, in terms of the introduction of new services in line with advances in medical technology and the affiliation of new hospitals with the GHS. The cost of the above anticipated increased capacity is assumed to be gradually absorbed by the main expenditure category of inpatient care over the short term.

- Laboratories: The introduction of specialized laboratory tests will add a cost of €12.45 million in 2023; 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 will increase from €55 million in 2021 to €95 million in 2024 and will continue to grow for the rest of the projection period in line with the relevant medical inflation.

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

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 2021 to 2030. 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 and labour force. In particular, over the projection period, the number of employed contributing persons is expected to increase by 12.6 per cent, i.e., from 493,686 in 2021 to 556,009 in 2030.

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 20.7 per cent, increasing from 170,384 in 2021 to 205,737 in 2030.

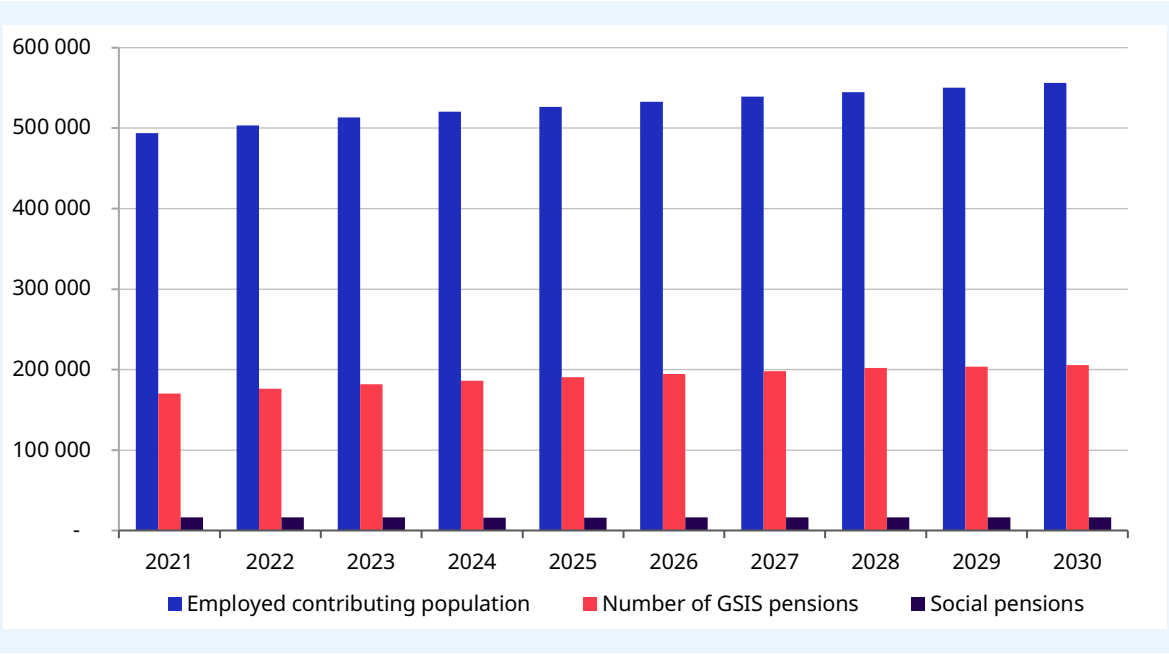
Furthermore, the number of social pensions is expected to increase marginally, only by 1 per cent.

▶ Table 6.1. Projection of GHS contributing population, by category, 2021–2030

Year	Employed contributing population	Number of GSIS pensions					Social pensions
		Statutory	Invalidity	Widows	Orphans	Total	
2021	493 686	131 634	4 641	33 395	715	**170 385**	16 334
2022	503 520	137 598	4 508	33 566	732	**176 404**	16 309
2023	513 089	142 775	4 383	33 810	735	**181 703**	16 270
2024	520 525	147 155	4 263	34 133	706	**186 257**	16 214
2025	526 468	150 992	4 200	34 527	692	**190 411**	16 131
2026	532 557	154 588	4 124	34 971	671	**194 354**	16 278
2027	538 963	157 970	4 108	35 465	648	**198 191**	16 387
2028	544 771	161 248	4 078	35 997	608	**201 931**	16 458
2029	550 144	162 425	4 109	36 573	581	**203 688**	16 493
2030	556 009	163 887	4 113	37 182	556	**205 738**	16 490

Figure 6.1 shows the expected evolution of the number of GHS contributors by category over the projection period 2021–2030.

▶ Figure 6.1. Projection of GHS contributing population by category, 2021–2030



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 6.9 per cent, i.e., from 916,645 in 2021 to 980,072 in 2030.

Table 6.2 presents the projection of year-end GHS registered beneficiary population and compares it with the general population for the period 2021 to 2030.

▶ Table 6.2. Projection of year-end GHS registered beneficiaries, by sex, 2021–2030

Year	Male	Female	Total	Total population	Coverage rate (%)
2021	445 893	470 752	916 645	922 258	99
2022	449 623	474 141	923 764	930 804	99
2023	453 357	477 608	930 965	939 493	99
2024	457 072	481 081	938 153	948 293	99
2025	460 772	484 537	945 309	957 177	99
2026	464 451	487 977	952 428	966 126	99
2027	468 109	491 389	959 498	975 105	98
2028	471 712	494 744	966 456	984 032	98
2029	475 262	498 042	973 304	992 887	98
2030	478 776	501 297	980 073	1 001 667	98

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

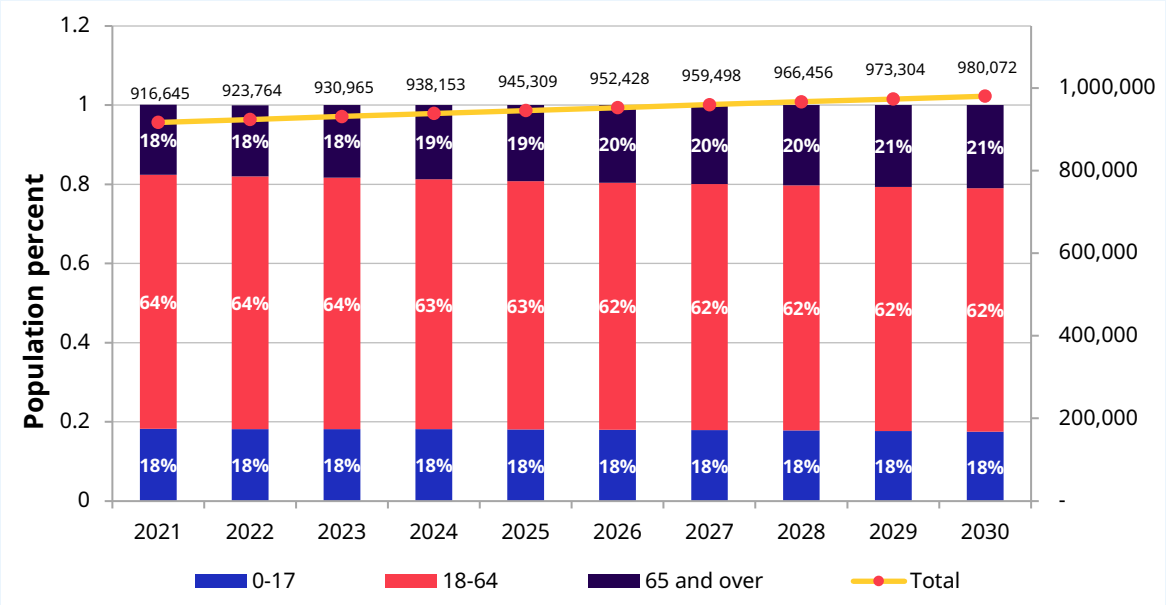
▶ Table 6.3. Projection of year-end GHS registered beneficiaries, by age group, 2021–2030

Year	0–17	18–64	65 and over	Total
2021	166 311	588 384	161 950	**916 645**
2022	167 788	589 804	166 172	**923 764**
2023	168 876	591 403	170 686	**930 965**
2024	169 755	592 212	176 186	**938 153**
2025	170 549	592 746	182 014	**945 309**
2026	171 225	594 294	186 909	**952 428**
2027	171 418	596 115	191 965	**959 498**
2028	171 378	598 297	196 780	**966 456**
2029	171 385	600 389	201 530	**973 304**
2030	171 312	602 847	205 914	**980 073**

The percentage of registered beneficiaries aged 18–64 over the total registered beneficiaries decreases from 64 per cent in 2021 to 62 per cent in 2030, while the percentage of registered beneficiaries aged 65 and above over the total registered beneficiaries increases from 18 per cent in 2021 to 21 per cent in 2030. 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 2021 to 2030.

▶ **Figure 6.2. Projection of year-end GHS registered beneficiaries, by age group, 2021–2030**



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 2021 to 2030.

▶ **Table 6.4. Projection of employee contributory earnings and other income sources, 2021–2030** (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
2021	9 701	1 671	390	78	77	24 847	51	356	900	197
2022	10 608	1 687	393	79	77	26 078	78	379	958	210
2023	11 230	1 776	398	80	78	27 291	82	392	990	217
2024	11 830	1 889	403	81	79	28 560	100	402	1 014	222
2025	12 377	2 015	409	82	80	29 801	119	411	1 037	227
2026	12 927	2 142	414	83	83	31 005	124	419	1 058	232
2027	13 483	2 261	418	84	86	32 258	145	427	1 079	237
2028	14 021	2 381	422	84	89	33 561	151	436	1 100	241
2029	14 576	2 409	425	85	91	34 917	175	444	1 122	246
2030	15 165	2 563	429	86	93	36 328	218	453	1 145	251

6.2.2. Projection of GHS income

Table 6.5 shows the projection of GHS income by category over the projection period from 2021 to 2030.

▶ Table 6.5. Projection of GHS income, by category, 2021–2030 (in million of Euros)

GHS income category	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Contributions (salaries, pensions)	589	639	676	712	745	779	813	845	877	913
Government as State	560	604	637	671	703	735	767	799	826	862
Other contribution income	40	43	45	46	48	49	50	51	53	55
Contribution income	**1 189**	**1 286**	**1 358**	**1 429**	**1 496**	**1 563**	**1 630**	**1 695**	**1 756**	**1 830**
Income from treatment of EU citizens	15	16	16	16	16	17	17	18	18	18
Co-payments	44	48	49	51	51	51	53	53	53	53
Contributions I	2	2	2	2	2	2	2	2	2	2
Discounts from pharmaceutical companies	37	37	38	39	40	41	41	42	43	44
Total GHS income	**1 287**	**1 389**	**1 463**	**1 537**	**1 605**	**1 674**	**1 743**	**1 810**	**1 872**	**1 947**

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 2021 to 2030.

▶ Table 6.6. Projection of GHS contribution income, by income source, 2021–2030 (in million of Euros)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Salaried and government employees	510	557	590	622	650	679	708	736	766	796
Self-employed persons	21	23	24	25	27	28	29	30	31	33
GSIS pensions	44	45	47	50	53	57	60	63	64	68
Other pensions	14	14	15	15	15	15	16	16	16	16
Other contribution income	40	43	45	46	48	49	50	51	53	55
Government as State	560	604	637	671	703	735	767	799	826	862
Contribution income	**1 189**	**1 286**	**1 358**	**1 429**	**1 496**	**1 563**	**1 630**	**1 695**	**1 756**	**1 830**

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 2021 to 2030. Other income mainly concerns the Cyprus Government's reimbursement to the GHS reflecting its expenditure for managing the COVID-19 pandemic and incidences.

▶ **Table 6.7. Projection of other income, 2021–2030** (in million of Euros)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Other income	42	28	0	0	0	0	0	0	0	0

6.2.3. Projection of benefits expenditure

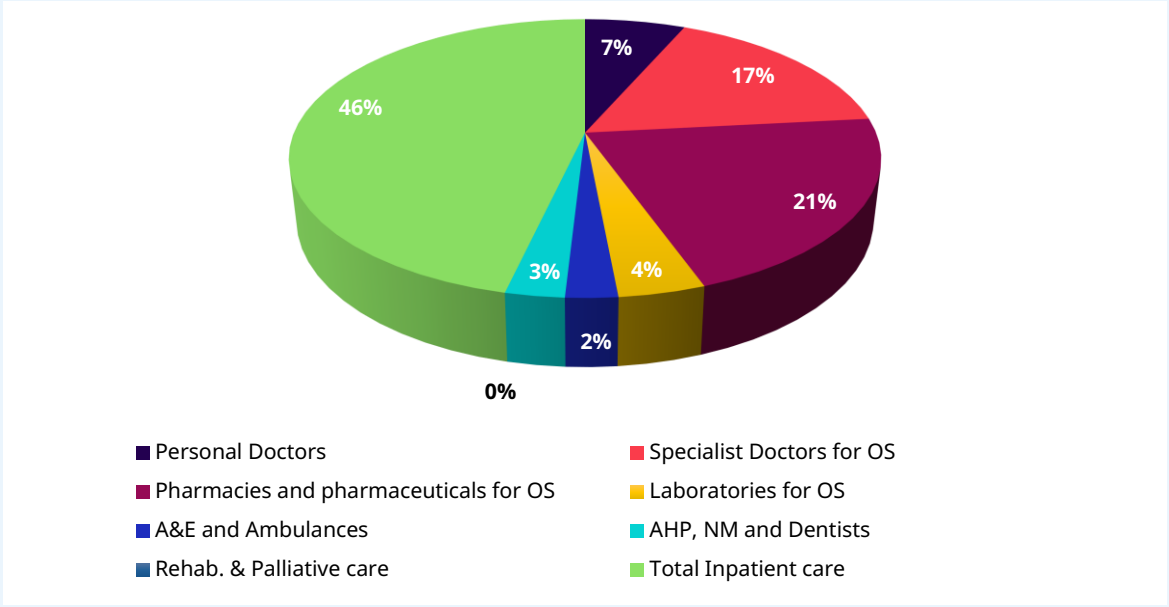
Table 6.8 shows the projection of benefits expenditure by healthcare category over the projection period of 2021 to 2030.

▶ **Table 6.8. Projection of GHS benefit expenditure, by healthcare category, 2021–2030** (in million of Euros)

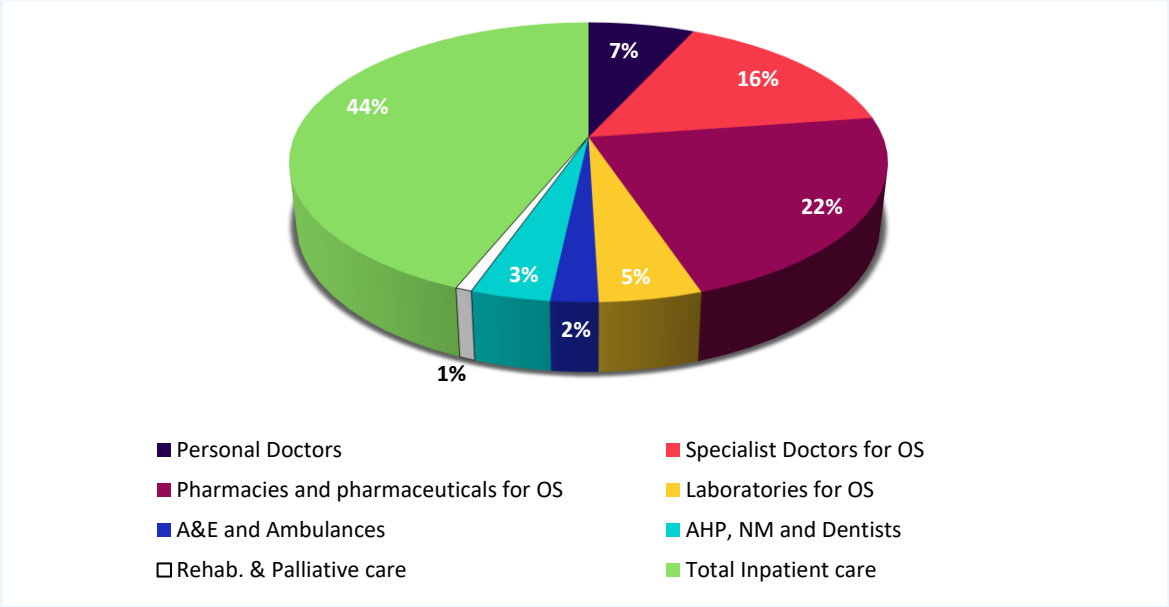
Healthcare category	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Personal doctors	89	100	104	107	109	112	115	118	121	125
Outpatient specialist doctors	227	234	241	249	256	263	270	277	285	293
Pharmacies and pharmaceuticals for outpatient	287	306	323	350	358	367	376	385	395	405
Laboratories	54	56	72	74	76	78	80	81	83	86
Total Inpatient care	609	623	649	666	683	698	720	743	766	792
Treatment of GHS beneficiaries abroad	20	20	23	25	25	26	26	27	27	28
A&E and ambulances	32	33	34	35	35	35	36	36	37	37
AHP, NM and Dentists	37	47	54	57	59	60	61	63	65	66
Rehabilitation and palliative care	–	4	8	12	12	12	12	13	13	13
Total GHS gross healthcare expenditure	**1 355**	**1 423**	**1 508**	**1 575**	**1 613**	**1 651**	**1 696**	**1 743**	**1 792**	**1 845**

Figures 6.3 to 6.5 show the breakdown of GHS benefits expenditure by healthcare category in year 2021, 2025 and 2030 respectively.

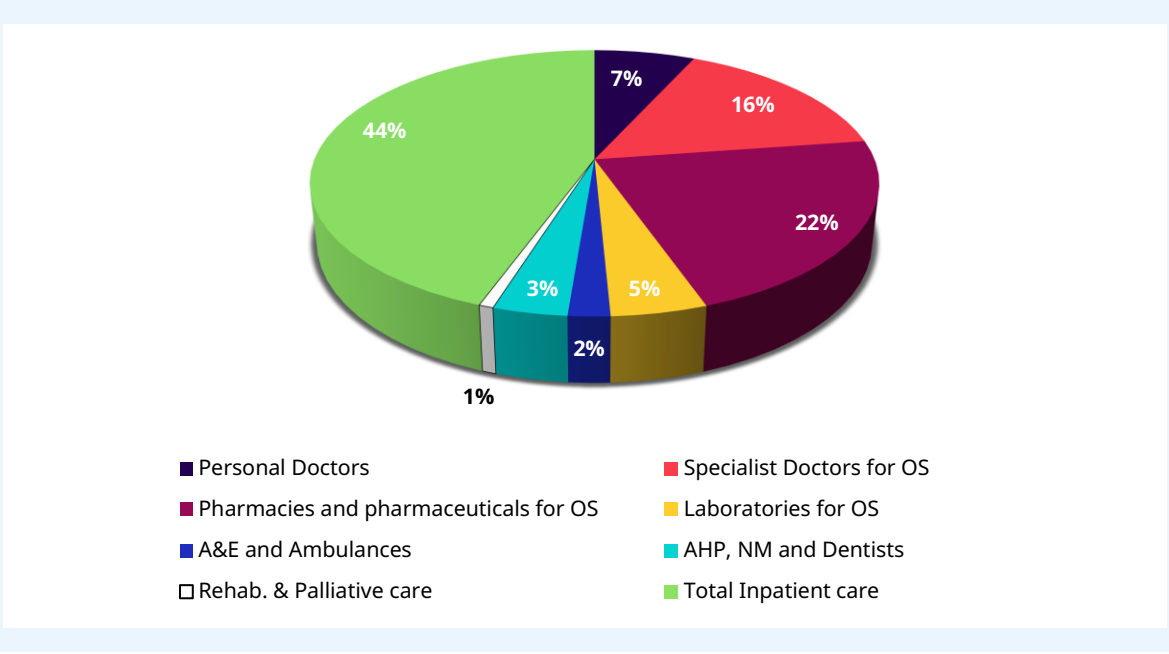
▶ Figure 6.3. Breakdown of GHS benefits expenditure, by healthcare category, 2021 (percentages)



▶ Figure 6.4. Breakdown of GHS benefits expenditure, by healthcare category, 2025 (percentages)



▶ Figure 6.5. Breakdown of GHS benefits expenditure, by healthcare category, 2030 (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 2021 to 2030.

▶ Table 6.9. Projection of inpatient benefits expenditure, by service type, 2021–2030 (in million of Euros)

Inpatient projected expenditure	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Z-Consumables	59	57	59	61	63	65	67	69	71	74
Z-Drugs	41	42	44	45	47	48	50	51	53	54
Z-Procedures & fixed fee	58	60	69	72	73	76	78	81	83	86
DRGs	433	450	466	481	496	509	525	542	559	578
Additional inpatient care[1]	18	14	11	7	4	–	–	–	–	–
Total expenditure	**609**	**623**	**649**	**666**	**683**	**698**	**720**	**743**	**766**	**792**

[1] It refers to the cost of care, primarily related to urgent cases, provided, on an ad-hoc basis, by hospitals in Cyprus which in 2021 were not affiliated with the GHS. This cost will be gradually eliminated in the short-term, as the GHS capacity for the provision of inpatient healthcare services is expected to increase.

Table 6.10 presents the projection of benefits expenditure for pharmacies and pharmaceuticals, by service over the projection period from 2021 to 2030.

▶ Table 6.10. Projection of benefits expenditure, pharmacies and pharmaceuticals, by service, 2021–2030 (in million of Euros)

Pharmacies and pharmaceuticals for outpatient: projected expenditure	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Pharmacist fees	32	33	34	35	36	37	38	39	40	42
Pharmacist fees per overnight	1	1	1	1	1	1	1	1	1	1
Pharmaceuticals: Drugs/medical devices/ consumables	199	207	213	219	224	230	236	242	249	255
Pharmaceuticals: new/innovative drugs	55	65	75	95	97	99	101	103	105	107
Total expenditure	**287**	**306**	**323**	**350**	**358**	**367**	**376**	**385**	**395**	**405**

6.2.4. Projection of administrative expenses

The actual cost of administrative expenses for the years 2020 and 2021 was relatively stable at 1.2 to 1.4 per cent of total GHS income. As mentioned above, the administrative expenses are currently covered by the GHS Fund and are projected to be stable at around 1.4 per cent of total GHS income.

Table 6.118 shows the projection of administrative expenses by category over the projection period from 2021 to 2030.

▶ Table 6.11. Projection of administrative expenses, by category, 2021–2030 (in million of Euros)

Administrative projected expenditure	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Staff expenses	6	7	7	7	7	7	8	8	8	9
Operation expenses	8	11	13	14	15	15	15	15	16	16
Development expenses	2	1	1	1	1	1	1	1	1	1
Contingencies	–	0	0	0	0	0	0	0	0	0
Total administrative expenses	**16**	**19**	**21**	**22**	**23**	**23**	**24**	**24**	**25**	**26**
Administrative expense ratio (%)	**1.2**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.3**	**1.3**	**1.3**

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 2021 to 2030.

▶ Table 6.12. Projected financial situation of GHS, 2021–2030 (in million of Euros)

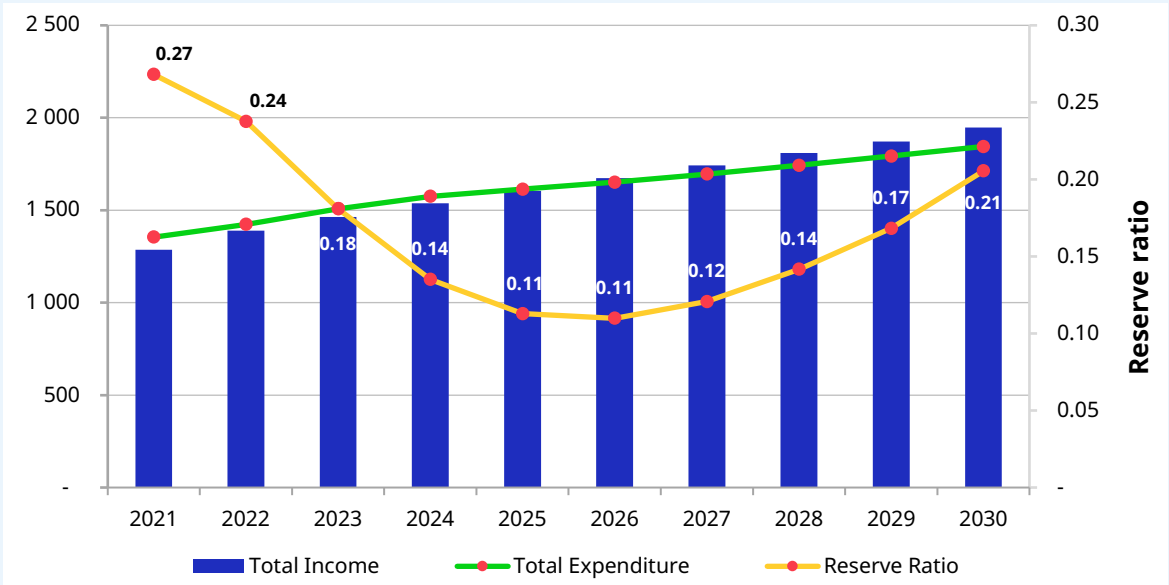
Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Reserve (start of year)	**406**	**364**	**339**	**273**	**213**	**182**	**182**	**205**	**248**	**303**
Total GHS income	1 287	1 389	1 463	1 537	1 605	1 674	1 743	1 810	1 872	1 947
Total GHS benefits expenditure	1 355	1 423	1 508	1 575	1 613	1 651	1 696	1 743	1 792	1 845
Total other income	42	28	0	0	0	0	0	0	0	0
Total administrative expenses	16	19	21	22	23	23	24	24	25	26
Surplus/Deficit	**–42**	**–25**	**–66**	**–60**	**–31**	**0**	**23**	**43**	**55**	**76**
Reserve (end of year)	**364**	**339**	**273**	**213**	**182**	**182**	**205**	**248**	**303**	**379**
Reserve ratio	0.27	0.24	0.18	0.14	0.11	0.11	0.12	0.14	0.17	0.21
Administrative expense ratio (%)	**1.2**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.3**	**1.3**	**1.3**

Following are the main points from table 6.12:

- The reserve ratio at the end of the projection period, i.e., in year 2030, is projected to be at an adequate level of 0.21, above two 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 period 2021–2025, the reserve will be needed in order to meet the total GHS expenditures.
- Over the period 2021–2025, 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 (€95 million gradually up to 2024) and of specialized laboratory tests (€12.45 million, in 2023).
- From 2027 onwards, the reserve ratio starts to gradually increase from 0.12 in 2027 to 0.21 in 2030, primarily due the favourable economic conditions.

Figure 6.6 shows the total income, total expenditure and the reserve ratio of the GHS for 2021–2030.

▶ Figure 6.6. Total income, total expenditure and reserve ratio of the GHS, 2021–2030 (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 ratio by 2029, is sufficient to cover two months' expenditure.

▶ 7. 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 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 prolonged high inflationary pressures in the short term, resulting to lower GDP growth rates, higher nominal wage increases and higher unemployment rates in the short term; 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 ± 5 per cent; and
- increases or decreases in utilization rates.

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 7.1 and 7.2 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 7.3 and 7.4, presented at the end of this chapter, show the values of the above two financial indicators for each sensitivity scenario and test.

▶ Table 7.1. Sensitivity scenario assumptions (percentages)

Assumption	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Base scenario										
GDP growth (real)	5.5	3.2	2.8	2.6	2.3	2.0	2.0	2.0	2.0	2.0
Consumer price inflation	2.3	6.5	3.3	2.5	2.2	2.0	2.0	2.0	2.0	2.0
Wage increase (nominal)	3.5	4.4	4.1	3.8	3.6	3.3	3.2	3.3	3.2	3.2
Unemployment rate 15–64	7.6	7.2	6.7	6.7	6.7	6.6	6.6	6.6	6.5	6.5
Economic scenario										
GDP growth (real)	5.5	3.0	2.1	2.5	2.2	2.0	2.0	2.0	2.0	2.0
Consumer price inflation	2.3	7.0	3.5	2.8	2.5	2.2	2.0	2.0	2.0	2.0
Wage increase (nominal)	3.5	4.8	4.2	4.0	3.9	3.5	3.2	3.3	3.2	3.2
Unemployment rate 15–64	7.6	7.3	6.9	6.9	6.9	6.8	6.8	6.8	6.7	6.7
Medical inflation	Increased in line with CPI increase									
Scenario for implementation of cost control measures										
Outpatient specialist doctors' utilization rates	–1% from 2023 to 2030									
Additional inpatient care	€0 from 2022 and onwards									
Treatment of GHS beneficiaries abroad	€22.5m by 2023 and then increased by medical inflation									
Inpatient care: DRGs point value	–1% applied in 2024									
Inpatient care: Day care – DRGs point value	–3% applied in 2026									
Dentists, nurses and midwives, allied health professionals point value	–1% applied in 2024									

▶ Table 7.2. Sensitivity test assumptions (in million of Euros)

Assumption	Test I (unfavourable)	Best estimate assumptions	Test II (favourable)
Introduction of:			
New/innovative drugs	€110m by 2025	€95m by 2024	€80m by 2024
Specialized laboratories tests	€14.95m by 2024	€12.45m by 2023	€9.95m by 2023
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 2023	Base scenario	–5% applied in 2023
Utilization rates	Increase of 3%-5% in specific activities	Base scenario	Decrease of 3%–5% in specific activities

7.1. Sensitivity scenarios

7.1.1. Economic scenario

The present actuarial valuation is based on the prevailing economic conditions and expectations about Cyprus' economy as of July 2022, 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 7.1, compared to base scenario, the economic scenario is built on the assumption of a prolonged higher inflation over the short-term (2022–2026), which results to lower GDP growth, higher nominal wage growth and higher unemployment rates. Over the medium term (2027–2030), the macroeconomic figures of the economic scenario (GDP growth, CPI and wage growth) return to their base scenario's values, while its unemployment figures remain slightly above those of the base scenario.

A scenario of prolonged higher inflation increases GHS contribution income, 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.

In addition, such a scenario puts an upward pressure to GHS benefits expenditure, mainly driven by higher medical inflation, fuelled by higher prices.

7.1.2. 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 2023 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 2024 onwards.
- The introduction of day-care treatment facilities, results in a decrease of 3 per cent in DRGs point value, applied from 2024 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 2024 onwards.

7.2. Sensitivity tests

7.2.1. 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 €95 million by 2024 and the cost of introducing specialized laboratory tests will reach €12.45 million by 2023.

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 €110 million by 2025 and the cost of introducing specialized laboratory tests will reach €14.95 million by 2024. By contrast, in Test II (favourable), the assumed cost of new/ innovative drugs will reach €80 million by 2024 and the cost of introducing specialized laboratory tests will reach €9.95 million by 2023.

7.2.2. 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.

7.2.3. 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 2023. By contrast, in Test II (favourable), the assumed Z items prices decreased by 5 per cent in 2023.

7.2.4. 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 specific 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 specific specialities/services (Test II) has the opposite effect.

Test I (unfavourable) assumes an increase of 3 to 5 per cent in utilization rates for specific activities/services from 2023 onwards. By contrast, Test II (favourable), assumes a decrease of 3 to 5 per cent in utilization rates for specific activities/services from 2023 onwards.

7.3. 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 2021 to 2030.

7.3.1. Sensitivity scenarios results

Table 7.3 shows the financial situation of the GHS under the base scenario compared to the two sensitivity scenarios described in sub-sections 7.1.1 and 7.1.2 over the period 2021–2030.

As described in section 7.1.1, the economic scenario of a prolonged higher inflation over the short-term increases both GHS income and expenditure. As it is illustrated by table 7.3, such a scenario increases the GHS benefits expenditure more than the GHS income, and thus causes a reduction in the reserve of up to 10 per cent in 2026 when compared to the base scenario. Nevertheless, at the end of the projection period, i.e., 2030, 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 7.3 that the level of reserve at the end of the projection period, i.e., 2030, is 1.5 times greater than that of the base scenario. Additionally, the reserve ratio indicates that the reserve is enough to cover at least one-and-a-half months of GHS expenditure throughout the projection period and by 2029 could cover more than three months' expenditure. 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 7.3. Results of sensitivity scenarios

Scenario/Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Reserve amount at year end (in million of Euros)										
Base scenario	364	339	273	213	182	182	205	248	303	379
Economic scenario	364	339	272	207	170	164	186	228	282	358
Scenario for implementation of cost control measures	364	354	300	256	239	263	311	381	462	567
Reserve ratio (percentages)										
Base scenario	0.27	0.24	0.18	0.14	0.11	0.11	0.12	0.14	0.17	0.21
Economic scenario	0.27	0.24	0.18	0.13	0.10	0.10	0.11	0.13	0.16	0.19
Scenario for implementation of cost control measures	0.27	0.25	0.20	0.16	0.15	0.16	0.19	0.22	0.26	0.31

7.3.2. Sensitivity tests results

Table 7.4 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 7.2.1 to 7.2.4.

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 €143 million compared to €182 million under the base scenario; at the end of the projection period, a 30 per cent lower level compared to that of the base scenario; and over the years from 2025 to 2029 the level is not sufficient to cover one-and-a-half months' expenditure. On the other hand, under Test II (favourable), a cost of the above products lower than that assumed under the base scenario, results in increased levels of reserve: in 2025, a minimum of €220 million compared to €182 million under the base scenario; at the end of the projection period, a 35 per cent higher level compared to that of the base scenario, covering more than three 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 €225 million in 2030 compared to €379 million under base scenario, representing a decrease of 41 per cent, while from 2025 to 2030 the reserve is not sufficient to cover one-and-a-half 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 €531 million in 2030, representing a decrease of 40 per cent compared to base scenario, while at the end of the projection period the reserve is sufficient to cover more than three 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 €302 million in 2030, compared to €379 million under the base scenario, representing a decrease of 20 per cent, while from 2024 to 2028 the reserve is not sufficient to cover one-and-a-half months' expenditure. On the other hand, a decrease in the Z items price by 5 per cent results in an increase of the reserve to €456 million in 2030, representing an increase of 20 per cent compared to the base scenario, while at the end of the projection period the reserve is sufficient to cover three 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 for specific services. An increase in the utilization rates results in a reduction of the reserve to €291 million in 2030, compared to €379 million under the base scenario, representing a decrease of 23 per cent, while from 2024 to 2028 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 €468 million in 2030, representing an increase of 23 per cent compared to the base scenario, while at the end of the projection period the reserve is sufficient to cover three months' expenditure. The above results indicate that the reserve is sensitive to changes in the utilization rates.

▶ Table 7.4. Results of sensitivity tests

Sensitivity/Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Reserve amount at year end (in million of Euros)										
Base scenario	364	339	273	213	182	182	205	248	303	379
Introduction of new/ innovative drugs and specialized laboratories tests (higher expenditure)	364	339	273	210	162	143	148	172	207	264
Introduction of new/ innovative drugs and specialized laboratories tests (lower expenditure)	364	339	275	233	220	238	280	342	416	512
Medical inflation: progressive increase of +0.5%	364	339	272	208	170	157	161	177	195	225
Medical inflation: progressive decrease of –0.5%	364	339	274	217	194	206	248	319	409	531
Z items price: +5%	364	339	264	195	155	145	159	192	236	302
Z items price: –5%	364	339	282	230	209	218	251	304	369	456
Increase in utilization rates	364	339	264	194	153	141	153	184	227	291
Decrease in utilization rates	364	339	282	231	211	222	257	312	379	468
Reserve ratio (percentages)										
Base scenario	0.27	0.24	0.18	0.14	0.11	0.11	0.12	0.14	0.17	0.21
Introduction of new/ innovative drugs and specialized laboratories tests (higher expenditure)	0.27	0.24	0.18	0.13	0.10	0.09	0.09	0.10	0.11	0.14
Introduction of new/ innovative drugs and specialized laboratories tests (lower expenditure)	0.27	0.24	0.18	0.15	0.14	0.15	0.17	0.20	0.23	0.28
Medical inflation: progressive increase of +0.5%	0.27	0.24	0.18	0.13	0.11	0.09	0.09	0.10	0.11	0.12
Medical inflation: progressive decrease of –0.5%	0.27	0.24	0.18	0.14	0.12	0.13	0.15	0.19	0.23	0.30
Z items price: +5%	0.27	0.24	0.17	0.12	0.10	0.09	0.09	0.11	0.13	0.16
Z items price: –5%	0.27	0.24	0.19	0.15	0.13	0.13	0.15	0.17	0.21	0.25
Increase in utilization rates	0.27	0.24	0.17	0.12	0.09	0.08	0.09	0.10	0.13	0.16
Decrease in utilization rates	0.27	0.24	0.19	0.15	0.13	0.14	0.15	0.18	0.21	0.26

▶ 8. Conclusions and recommendations

The financial projections indicate that the GHS Fund is financially sustainable over the period 2021–2030 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 2021 to 2025, a downward trend is observed in the reserve ratio. This is primarily due to two facts. The first is the introduction of new and innovative drugs in inpatient provisions and outpatient services care, with an expenditure gradually increasing up to €95 million in 2024.The second is the introduction in 2023 of specialized laboratories tests, with an expenditure of €12.45 million. The reserve ratio indicates that the accumulated reserve can cover more than one month's expenditure throughout the projection period. From year 2025 to 2027, however, the reserve is not sufficient to cover up to one-and-a-half month's expenditure.

Over the period 2027–30, 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 2029, the reserve ratio is projected to attain a level to cover more than two 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; and
- the gradual introduction of new /innovative drugs, based on a thorough assessment for value added.

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, the target level of which might be set at around 16.7 per cent (two months) by 2030, the end of the projection period when the GHS is expected to completely mature. The above target level should take into account the HIO Board of Directors' desired level of reserve, necessary to safeguard the GHS against potential future financial risks.

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, a higher level of reserve ratio is reasonable and appropriate, primarily to cover potential annual deficits

which 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.

▶ 9. Actuarial opinion

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.

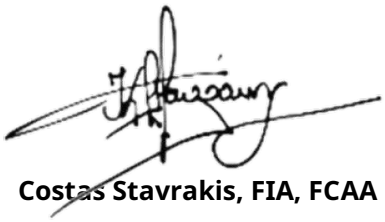
Based on the results of this valuation, we hereby certify that, under the current GHS provisions, the GHS is financially sustainable over the period covered by the projections in this Report. The above projections assume no policy change in terms of adding new GHS healthcare services other than those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

According to the International Standard of Actuarial Practice 1, the actuary should consider any subsequent event that has the potential of materially changing the results of the actuarial services if the event had been reflected in the work and disclose such an event in any report. It is our opinion that, while the COVID-19 crisis may impact considerably the results and outcomes for the years 2020 and some subsequent years, the situation will not change the conclusion of this report.

1 November 2022

Andre Picard, FSA, FCIA



Costas Stavrakis, FIA, FCAA

▶ Annex 1. Design features of the GHS

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. Cyprus implemented the first phase of the new GHS in June 2019, which unified a previously fragmented system. 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
Expected to be implemented 1/1/2023	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.

All diagnostic and therapeutic services provided as part of the COVID-19 response within the new system are provided free of charge. This also applies to undocumented migrants living in Cyprus, who are now legally entitled to healthcare and treatment of infectious diseases.

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 2019)	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, 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, 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.
5. **Inpatient DRG point system reimbursement:** The point system reimbursement method is differentiated for DRG activities submitted for inpatient claims. The points for DRG activities are calculated during Claim Submission as the Effective Cost Weight returned by the DRG Grouper multiplied by the Factor maintained in Fee Schedules. One Budget is maintained per hospital for all regular DRGs. Maximum number of points are agreed with

each hospital. A Standard Base Rate is also agreed with each hospital. Each hospital has its pre-agreed base rate and its pre-agreed number of points for which the pre-agreed base rate applies. If the hospital exceeds the pre-agreed number of points, the base rate is adjusted so that the global budget is not exceeded.

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. 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	Annual rates	Daily rates
0–3	210	0.57
4–7	155	0.42
8–14	91	0.24
15–17	91	0.24
18–50	83	0.22
51–70	117	0.32
71+	145	0.39

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 specialities together have an additional total budgeted amount, namely the 'equalization fund'. In cases where the total number of points per specialty exceeds the pre-defined limit, the point value is adjusted in order to not exceed the global budget of the specific specialty. The HIO has the right to transfer budget amounts between specialities, 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 is planned to start from 2023 once legislation on this subject is finalized. Reimbursement methods will be decided as they are implemented. Some of the costs of specialized laboratory tests are also covered by the organization managing the public hospitals (SHSO). The cost will be passed to the HIO once the system is fully 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 2023–24).

Inpatient services

For hospitals registered with the GHS, the point system reimbursement method is differentiated for DRG activities submitted in inpatient claims. The points are calculated during claim submission as the effective cost weight returned by the DRG grouper multiplied by the factor maintained in fee schedules.

One budget is maintained per hospital for all regular DRGs. Each hospital monitors the number of points for all birth-related DRG activities separately from all other DRG activities claimed. The maximum number of points is defined by hospital for birth DRGs and for other DRGs. A standard base rate is also defined for each hospital. Each hospital has its pre-agreed base rate and its pre-agreed number of points for which the pre-agreed base rate applies. If the hospital exceeds the pre-agreed number of points, the base rate is adjusted so that the global budget is not exceeded.

The Z catalogue items concern high-cost consumables and medical devices, high-cost pharmaceutical products and high-cost procedures under inpatient services. They all have fixed prices for the services defined in Z catalogues and they are reimbursed on the fee-for-service method.

Finally, in the initial years of GHS implementation and 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.

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

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 incidence and the point system method. The SHSO (the organization managing the public hospitals) is reimbursed based on a guaranteed monthly 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

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:[3]

- 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.

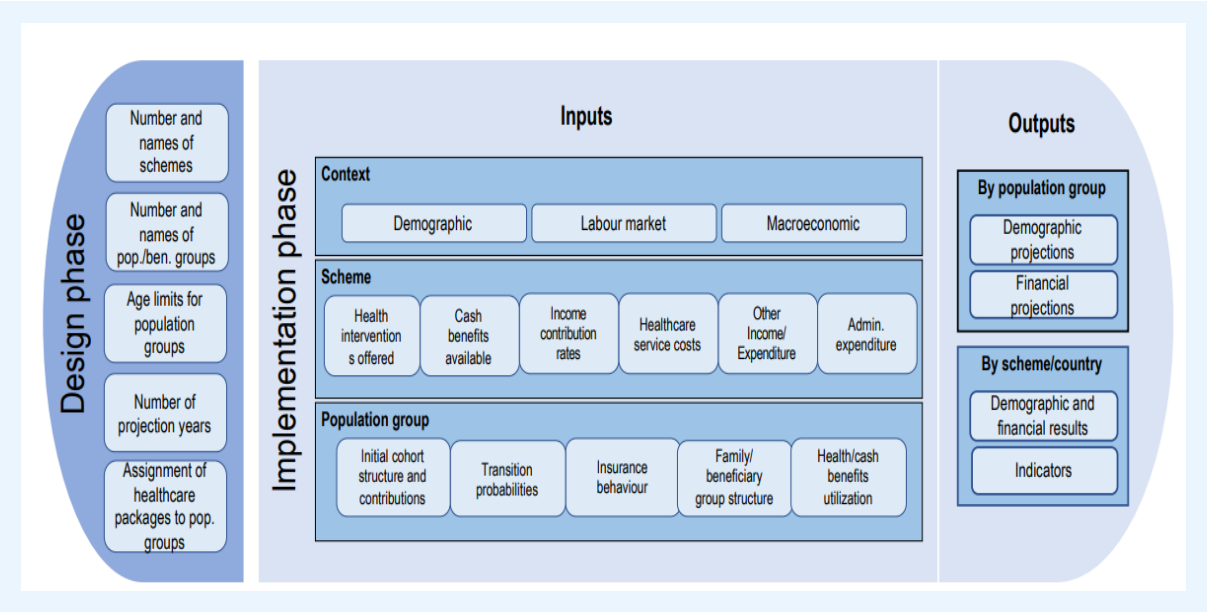
[3] ILO. 2020. Towards Universal Health Coverage: Social Health Protection Principles. Social Protection Spotlight Brief. Available at: https://www.ilo.org/secsoc/information-resources/publications-and-tools/Brochures/WCMS_740724/lang--en/index.htm.

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 belonging to each scheme and the age limits of each population group within the scheme is 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 beneficiary 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 situation in which the scheme functions;
- the scheme's characteristics: eligibility conditions, services and benefits available (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 beneficiary 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, rates of participation in economic activity 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 they are calculated. Scheme characteristics are also governed by a set of rules that determine who pays contributions (if applicable), the period during which they do so, 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 have different rules and cover specific populations in relation to 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 user 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 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 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 financial projections at the population group level. These contain average values of 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 aid in 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 included in the model (i.e., scheme rules, populations covered, and others).

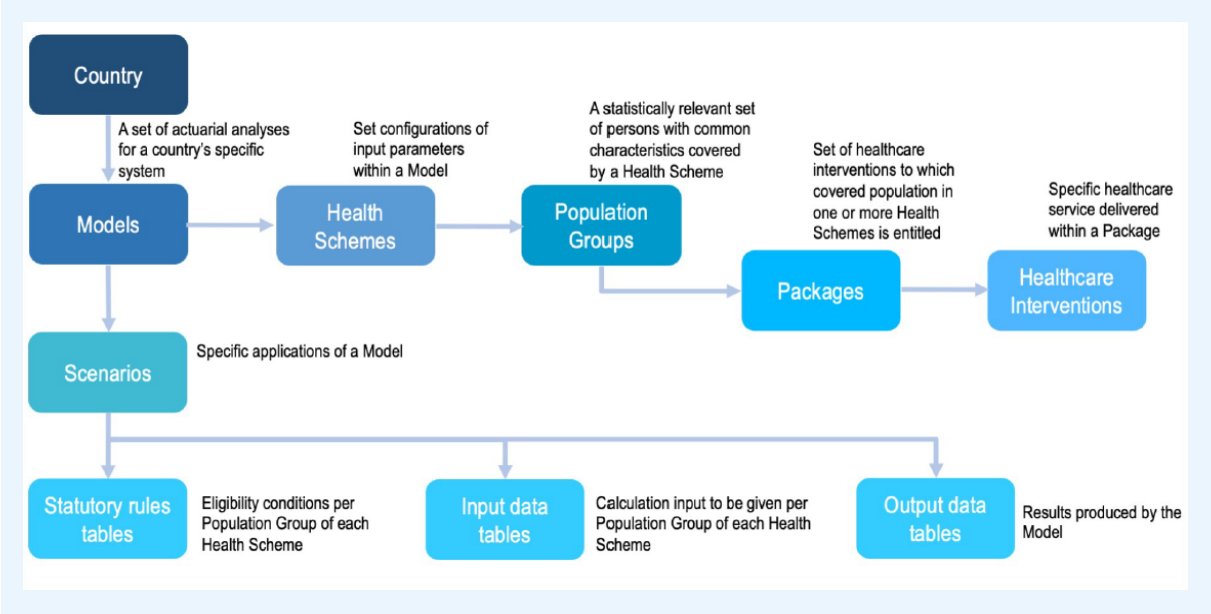
Scenario; A scenario is a specific formulation of a model under a certain set of parameters. Each scenario differs from all others in terms of parameters that define statutory rules, population biometrics, specific statutory rules, and others. Under a model, several scenarios can be used so that a variety 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 and which 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 groups. Scenarios can be created and related to the extension of a scheme or programme to one or more uncovered population groups. To define more than one population group in a specific model is limited by the availability of specific data to feed the model for each of these population groups separately.

Healthcare packages: Healthcare packages are the sets of healthcare interventions/services to which protected 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 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

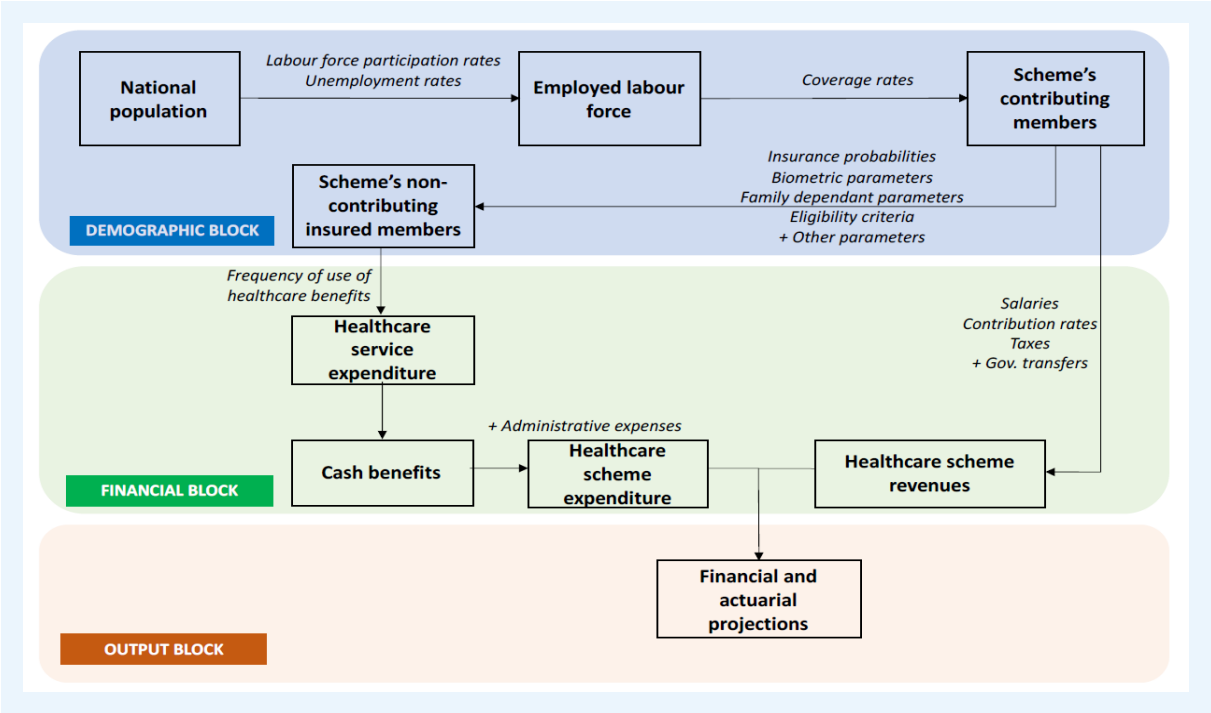


As shown in figure A2.2, the definitions of the different schemes, their associated populations and conditions for entitlement to certain benefits are critical elements when designing a new actuarial model for country application. Ideally, this work should be carried out by a multidisciplinary team, with an emphasis on the final objectives of the policy analysis. The design features and parameters of each scheme must be known and described accurately for the actuary to carry out the analytical work. The same is true 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 logic 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 to project the employed labour force. Hypotheses on the future behaviour of these parameters should consider the main factors affecting their evolution: 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, among others.
3. **Scheme's contributing members:** Based on the employed labour force, the coverage rates of each scheme are applied to obtain a projection of the scheme's active contributors. Usually, this refers to the active members paying contributions. Hypotheses on future trends in coverage rates are constructed based on expert judgement. International experience is always a useful reference when formulating these hypotheses.
4. **Scheme's non-contributing insured members:** The contributor's own contributions are not the only means to achieve healthcare protection. By forming the protected 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 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 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 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 in combination with the expected trends in 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 populations covered (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 and 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 493,711 active insured persons having contributed in 2020. Out of these persons, 305,455 had annual earnings over €9,566 (in 2020) 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 2020, the GSIS covers another 330,569 persons who have contributed to the GSIS in the past, but not in 2020; 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, 2020

Age group	Basic only			Basic and supplementary		
	Male	Female	Total	Male	Female	Total
15–19	3 086	2 861	**5 947**	154	127	**281**
20–24	13 681	11 978	**25 659**	5 591	4 004	**9 595**
25–29	15 230	13 800	**29 030**	18 396	15 490	**33 886**
30–34	12 088	13 466	**25 554**	25 071	19 369	**44 440**
35–39	10 000	12 760	**22 760**	26 870	20 986	**47 856**
40–44	8 251	11 941	**20 192**	24 274	19 803	**44 077**
45–49	6 467	11 104	**17 571**	20 514	16 991	**37 505**
50–54	6 071	9 925	**15 996**	19 254	14 912	**34 166**
55–59	5 663	7 031	**12 694**	17 815	12 111	**29 926**
60–64	5 071	4 725	**9 796**	13 599	8 575	**22 174**
65–68	1 799	1 258	**3 057**	1 029	520	**1 549**
Total	**87 407**	**100 849**	**188 256**	**172 567**	**132 888**	**305 455**

▶ Table A3.2. Inactive insured persons, 2020

Age group	Basic only[1]			Basic and supplementary[2]		
	Male	Female	Total	Male	Female	Total
16–19	210	150	**360**	4	1	**5**
20–24	2 974	2 562	**5 536**	487	337	**824**
25–29	6 260	5 885	**12 145**	2 435	2 014	**4 449**
30–34	11 417	12 359	**23 776**	7 162	5 805	**12 967**
35–39	13 112	17 033	**30 145**	11 970	8 221	**20 191**
40–44	11 430	18 935	**30 365**	13 586	8 505	**22 091**
45–49	9 660	20 934	**30 594**	12 968	8 843	**21 811**
50–54	8 033	19 565	**27 598**	12 767	9 498	**22 265**
55–59	5 067	13 990	**19 057**	10 917	10 107	**21 024**
60–64	4 799	11 165	**15 964**	10 617	10 158	**20 775**
65+	4 012	7 005	**11 017**	3 585	3 443	**7 028**
Total	**76 974**	**129 583**	**206 557**	**86 498**	**66 932**	**153 430**

Notes: [1] Persons with at least one insurance point in the basic part of the GSIS are included. [2] 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 2020, one insurance point is equivalent to annual earnings of €9,566. The first insurance point is credited to the basic part of the GSIS, and annual earnings in excess of €9,566 and up to €57,396 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, 2020[4]

Age group	Basic only		Basic and supplementary	
	Male	Female	Male	Female
16–19	2 833	3 060	13 896	11 579
20–24	4 326	4 370	14 354	13 360
25–29	4 837	4 914	17 097	16 293
30–34	5 001	4 966	20 631	18 930
35–39	5 068	5 081	23 367	22 179
40–44	5 107	5 049	26 296	25 719
45–49	4 978	4 984	28 254	26 615
50–54	5 149	4 982	27 987	25 467
55–59	5 055	4 922	27 332	25 258
60–64	4 942	4 873	26 897	25 373
65–68	3 892	3 975	22 682	21 127
Total	**4 841**	**4 878**	**24 225**	**22 719**

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

[4] 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 854,558 registered beneficiaries in December 2020, while in December 2019 the registered beneficiaries were 762,034. This increase is mainly due to the fact that the GHS inception was in June 2019 and a significant percentage of the eligible population registered during the year 2020.

▶ Table A3.4. Registered beneficiaries, 2020

Age group	December 2019			December 2020		
	Male	Female	Total	Male	Female	Total
0–3	16 321	15 460	**31 781**	18 303	17 254	**35 557**
4–7	16 867	15 558	**32 425**	18 731	17 155	**35 886**
8–14	27 294	25 938	**53 232**	31 354	29 752	**61 106**
15–17	11 137	10 606	**21 743**	12 436	11 914	**24 350**
18–25	33 269	32 961	**66 230**	37 529	37 010	**74 539**
26–30	25 383	27 022	**52 405**	30 282	31 431	**61 713**
31–35	26 447	29 109	**55 556**	31 825	34 182	**66 006**
36–40	27 968	31 059	**59 027**	32 961	35 997	**68 958**
41–45	25 386	29 590	**54 977**	29 460	34 015	**63 476**
46–50	22 407	27 840	**50 247**	25 647	31 516	**57 163**
51–55	22 215	26 143	**48 358**	25 275	29 286	**54 561**
56–60	23 505	25 633	**49 138**	25 912	27 733	**53 646**
61–65	24 095	25 267	**49 362**	25 742	26 679	**52 422**
66–70	20 982	21 907	**42 889**	21 991	22 852	**44 844**
71–75	17 190	18 448	**35 637**	18 863	20 195	**39 059**
76–80	11 518	13 333	**24 852**	12 350	14 371	**26 722**
81–85	8 585	10 766	**19 352**	8 879	11 277	**20 156**
86–90	4 040	6 019	**10 059**	3 975	5 975	**9 950**
91–95	1 421	2 453	**3 874**	1 346	2 338	**3 684**
96–100	279	518	**797**	231	454	**685**
101+	25	68	**93**	23	54	**77**

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		
	2020	2025	2030	2020	2025	2030
0	0.00224	0.00184	0.00157	0.00135	0.00113	0.00098
5	0.00010	0.00008	0.00006	0.00017	0.00013	0.00010
10	0.00015	0.00012	0.00010	0.00015	0.00012	0.00010
15	0.00029	0.00025	0.00022	0.00015	0.00012	0.00011
20	0.00046	0.00039	0.00036	0.00015	0.00013	0.00012
25	0.00042	0.00038	0.00036	0.00018	0.00016	0.00015
30	0.00045	0.00040	0.00039	0.00022	0.00020	0.00019
35	0.00069	0.00064	0.00061	0.00032	0.00029	0.00027
40	0.00103	0.00094	0.00090	0.00049	0.00044	0.00042
45	0.00156	0.00141	0.00134	0.00080	0.00073	0.00069
50	0.00249	0.00223	0.00208	0.00130	0.00118	0.00112
55	0.00377	0.00334	0.00307	0.00210	0.00189	0.00176
60	0.00647	0.00568	0.00517	0.00329	0.00292	0.00268
65	0.01011	0.00889	0.00812	0.00516	0.00455	0.00416
70	0.01754	0.01541	0.01407	0.00860	0.00754	0.00688
75	0.02892	0.02547	0.02333	0.01596	0.01396	0.01268
80	0.05083	0.04510	0.04158	0.03327	0.02913	0.02649
85	0.09807	0.08813	0.08230	0.07427	0.06571	0.06042
90	0.17811	0.16248	0.15401	0.16122	0.14444	0.13447
95	0.32170	0.29723	0.28537	0.32861	0.29828	0.28134
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 2018, 2019 and 2020 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	0.00008	0.00009
27	0.00017	0.00010
32	0.00019	0.00012
37	0.00038	0.00022
42	0.00048	0.00046
47	0.00089	0.00087
52	0.00163	0.00149
57	0.00316	0.00261
62	0.00585	0.00370

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	16	2 188	35	2 488	5 686	11 919	3 076	9 108
65–69	524	1 711	729	2 000	20 011	11 875	13 938	8 758
70–74	1 119	2 522	1 385	2 978	17 712	12 466	11 894	8 440
75–79	1 205	3 568	1 867	4 138	11 488	11 502	7 969	7 406
80–84	1 264	3 736	1 773	4 505	8 337	10 476	5 320	6 755
85–89	703	4 173	1 678	4 626	3 715	9 156	1 457	6 939
90–94	256	4 538	590	4 692	1 337	7 992	376	6 304
95+	51	4 498	99	4 620	247	7 397	70	6 099
Total	**5 138**	**3 328**	**8 156**	**3 969**	**68 533**	**11 559**	**44 100**	**8 125**

▶ 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	4	4 722	–	–	15	5 235	1	4 601
30–34	2	5 047	2	–	44	7 341	19	6 020
35–39	3	3 206	2	4 082	103	7 317	39	5 927
40–44	5	4 621	2	4 645	171	7 940	103	7 041
45–49	5	3 977	3	4 713	261	8 246	176	6 698
50–54	8	4 660	10	3 177	483	8 257	273	6 441
55–59	12	3 880	16	3 499	816	8 647	484	5 927
60–63	12	2 949	30	3 010	820	8 678	438	6 253
Total	**51**	**3 938**	**65**	**3 225**	**2 713**	**8 413**	**1 533**	**6 275**

▶ 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	–	–	1	6 220	–	–	7	5 940
30–34	1	6 631	3	6 479	5	7 448	46	8 876
35–39	–	–	1	6 997	4	9 575	107	9 471
40–44	–	–	4	4 349	14	11 357	238	9 856
45–49	1	6 997	14	3 544	15	10 479	425	8 919
50–54	1	6 220	19	3 491	31	8 883	703	9 045
55–59	1	4 665	26	3 473	60	7 410	1 093	8 640
60–64	4	4 665	96	3 419	86	7 416	1 911	8 519
65–69	1	4 665	232	3 942	112	6 940	2 706	8 247
70–74	14	4 665	583	4 028	134	6 492	3 932	8 136
75–79	25	4 517	844	4 237	131	6 270	4 493	7 660
80–84	33	4 712	1 262	4 296	140	6 008	5 339	7 071
85–89	37	4 687	1 046	4 482	99	5 843	3 763	6 666
90–94	12	4 710	663	4 772	25	5 621	1 714	6 415
95+	2	4 665	278	4 994	3	4 665	302	6 285
Total	**132**	**4 703**	**5 072**	**4 355**	**859**	**6 743**	**26 779**	**7 623**

▶ 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	5	1 829	9	1 779	–	–	1	4 958
5–9	34	1 829	35	1 829	1	7 936	1	4 406
10–14	83	1 809	95	1 789	4	5 529	4	4 745
15–19	117	1 773	113	1 757	9	5 849	10	6 172
20–24	91	1 795	67	1 814	7	6 579	4	5 514
25–29	5	1 829	5	1 829	–	–	–	–
30–34	5	1 829	4	1 829	1	–	–	–
35–39	5	1 829	2	1 829	–	–	2	4 877
40–44	2	1 829	3	1 829	4	4 955	3	4 286
45–49	6	2 744	3	3 049	5	4 527	8	4 619
50–54	1	3 659	5	3 659	12	3 971	13	4 043
55–59	6	3 354	7	3 659	13	4 041	26	4 008
60–64	17	3 443	13	3 659	20	4 079	36	4 040
65–69	18	3 659	27	3 659	13	3 949	26	3 892
70+	27	3 659	123	3 659	8	3 799	17	3 937
Total	**422**	**2 101**	**511**	**2 437**	**97**	**4 481**	**151**	**4 252**

A3.5. Other assumptions

A3.5.1. Credited pension benefits

Taking into account the GSIS recent experience and trends over the period 2017–2020, as well as the development of the fertility rate, female labour force participation rates, education levels and other factors, including legal requirements, assumptions were made with regard to the eligible credits to be awarded to future pensioners in respect of the following periods:

- compulsory service in the national guard for male insured persons;
- childhood – granted to female pensioners;
- study;
- unemployment; and
- incapacity for work.

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

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

A3.5.3. GHS scheme-specific parameters

Laboratory and inpatient costs are directly linked to the agreed volumes specified for each year. The HIO reimburses laboratories and hospitals with an agreed rate for the agreed volumes and for services/activities performed over agreed volumes with a reduced rate. For the projection of laboratory and inpatient costs it has been assumed that the 2020, 2021 and 2022 agreed volumes for the affiliated laboratories and hospitals will increase in line with the development of the population of beneficiaries. This assumption was made in order to match the future agreed volumes for laboratories and hospitals with the future needs for laboratory tests and inpatient treatment of the continually growing population of beneficiaries. In addition, an assumption of a 12 per cent increase in 2023 was made regarding the inpatient Z-procedures. This increase is related to the expected coverage of specific treatments such as robotic prostatectomy and proton therapy. The above scheme specific assumptions are presented in table A3.12.

▶ Table A3.12. GHS scheme specific assumptions

Assumption	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Laboratories, agreed volumes	12 500	12 500	12 625	12 751	12 879	13 008	13 138	13 269	13 402	13 536
Number of affiliated laboratories	153	153	155	156	158	159	161	162	164	166
DRGs, agreed volumes	92 216	92 216	93 138	94 070	95 011	95 961	96 920	97 889	98 868	99 857
Z-Procedures & fixed fee: growth due to new methodologies (%)	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0