Partnership for Health System Sustainability and Resilience

GREECE

Sustainability and Resilience in the Greek Health System

Kostas Athanasakis, Eleftheria Karampli, Giannis Agorastos and Ilias Kyriopoulos

November 2022

Authors

Kostas Athanasakis, Laboratory for Health Technology Assessment, Department of Public Health Policy, School of Public Health, University of West Attica

Eleftheria Karampli, Laboratory for Health Technology Assessment, Department of Public Health Policy, School of Public Health, University of West Attica

Giannis Agorastos, Laboratory for Health Technology Assessment, Department of Public Health Policy, School of Public Health, University of West Attica

Ilias Kyriopoulos, London School of Economics and Political Science

Acknowledgements

The authors thank Mrs Vasiliki Naoum MSc, for providing writing assistance during the initial preparation of portions of the text. We are also grateful to Mrs Panagiota Naoum MSc, Mr Nikolaos Nomikos MSc and Mr Konstantinos Zisis MSc, for their constructive comments.

The research team also thanks the members of the panel of experts who participated in the Delphi panel for the prioritisation of the policy proposals of this report and are listed below.

Contributors (in alphabetical order)

Spyros Apostolopoulos, General Manager, Attikon University Hospital

Dimitrios Boumpas, Professor, Medical School, NKUA, President of the Central Board of Health (KESY)

Elena Chouliara, Member of the Board and Former President, PhRMA Innovation Forum (PIF), Greece

Nikos Dedes, President, Greek Patients Association

Dimitrios Filippou, Assistant Professor, Medical School NKUA, President of the National Organisation for Medicines

Mary Geitona, Professor, Department of Social and Education Policy, University of Peloponnese

Michael Igoumenidis, Assistant Professor, Department of Nursing, University of Patras

Daphne Kaitelidou, Professor, Department of Nursing, NKUA, President of the Agency for Quality Assurance in Health

Chara Kani, Pharmacist, MSc, PhD, Head of the Department of Pharmaceutical Planning and Monitoring, Medicines Division, National Organization for Healthcare Services Provision (EOPYY)

Dimitrios Kontos, Chief of Staff, Minister's Office, Ministry of Health, Former President of the National Organization for Healthcare Services Provision (EOPYY)

Ioannis Kotsiopoulos, General Secretary of Health Services, Ministry of Health, Hellenic Republic

Christos Lionis, Professor, Director of the Clinic of Social and Family Medicine, Faculty of Medicine, University of Crete

Anargiros Mariolis, Director of Areopolis Health Centre, General Physician, President of the Hellenic Academy of General Practice/Family Medicine and Primary Health Care

Olympios Papadimitriou, President, Hellenic Association of Pharmaceutical Companies

Elpida Pavi, Professor, Dean of the School of Public Health, University of West Attica

Emmanouil Smyrnakis, Associate Professor of Primary Health Care and Medical Education, School of Medicine, Aristotle University of Thessaloniki

Kyriakos Souliotis, Professor, Department of Social and Education Policy, University of Peloponnese

Eleftherios Thireos, General Practitioner/Family Physician, Director of NHS – Vari Health Centre. Director, Quality Improvement of Health Services, National Agency for Quality Assurance in Health S.A. (AQAH S.A.). Secretary General, Athens Medical Society

Platon Tinios, Associate Professor, Department of Statistics and Insurance Science, University of Piraeus

Athanasios Vozikis, Professor, Department of Economics, University of Piraeus

---

This report was produced as part of the Partnership for Health System Sustainability and Resilience (PHSSR). The PHSSR is a collaboration between AstraZeneca, KPMG, the London School of Economics and Political Science (LSE), Royal Philips, the World Economic Forum, the Center for Asia-Pacific Resilience & Innovation (CAPRI) and the WHO Foundation, motivated by a shared commitment to strengthen health systems and improve population health. AstraZeneca, KPMG and Royal Philips fund the partnership.

This report was written on behalf of the PHSSR. The positions and arguments presented are the authors' own. They do not represent the views of the PHSSR partners listed above.

For further information on the PHSSR, including additional country reports, please visit www.phssr.org

This report was commissioned via LSE Consulting which was set up by The London School of Economics and Political Science to enable and facilitate the application of its academic expertise and intellectual resources.

LSE Enterprise Ltd, trading as LSE Consulting, is a wholly owned subsidiary of the London School of Economics and Political Science. The LSE trademark is used under licence from the London School of Economics and Political Science.

LSE Consulting
LSE Enterprise Ltd
London School of Economics and Political Science
Houghton Street, London, WC2A 2AE

(T) +44 (0)20 7106 1198
(E) consulting@lse.ac.uk
(W) lse.ac.uk/consultancy

Contents

Executive summary

After a 10-year odyssey – in a journey including one of the longest and deepest economic recessions in recorded economic history, which was followed by the COVID-19 pandemic – the economy and society in Greece have been profoundly transformed. The health system, one of the major societal structures in advanced economies, was no exception, and experienced financial stress, owing to the economic downturn and fiscal adjustment programmes, as well as structural stress that pushed the system to its limits during the pandemic. Therefore, the question arises as to whether the health system can continue to fulfil its mission and face the challenges of its future trajectory, in a sustainable and resilient manner.

The present report, as part of the Partnership for Health System Sustainability and Resilience (PHSSR), an international research collaboration aiming to improve global health by identifying issues and innovative solutions for strengthening health system resilience and sustainability worldwide (www.weforum.org/phssr/about), attempts to assess the Greek health system in the dimensions of sustainability and resilience, and propose a set of recommendations to strengthen both key areas.

Sustainability and resilience are complex concepts that lack universally accepted definitions and are determined by various aspects of how a health system is governed, organised and financed, and how services are provided. In this report, as in all PHSSR country reports, Sustainability relates to the health system's ability to maintain key functions, such as provision of services, financial protection, resource generation and responsiveness to population needs, by withstanding internal and external stresses (economic, social, epidemiological and environmental challenges). Resilience refers to a health system's ability to prevent, absorb, adapt and rebound from crises, and become even stronger, while minimising negative effects on population health, health services and the wider economy.

This rapid assessment of the Greek health system uses the PHSSR framework to evaluate the sustainability and resilience of the system across five core domains (governance; financing; workforce; medicines and technology; and service delivery) and two additional domains (population health and environmental sustainability). The report additionally includes two case studies that provide examples of policy implementations that could be used to guide actions that may positively affect the system's sustainability and resilience.

The report uses recent data derived from local or international databases, and analyses content from available publications, reports, working papers and legislation, among other sources, to identify the current status, as well as the potential threats and opportunities for the system's sustainability and resilience, under the PHSSR template.

Table 1 summarises the key findings regarding the sustainability and resilience of the Greek health system, following the review process.

Table 1: Sustainability and resilience – summary of findings by key domains

DOMAIN 1 GOVERNANCE		
Strengths	**Sustainability**	**Resilience**
	↑ The creation of the National Organization for the Provision of Health Services (EOPYY) has been a milestone reform. Future efforts should aim to strengthen its monopsonist power. ↑ Several strategic plans for health and specialised topics have been developed. A need exists to monitor their implementation. ↑ Reforms have been implemented and are planned to continue towards depoliticisation of public administration, modernisation of public administration and capacity building for public servants. ↑ Steps have been taken towards strengthening of prevention and PHC, which can provide a basis for a sustainable system. ↑ New legislation consolidates patients' voices. ↑ Notable steps have been taken towards ensuring the transparency of resource allocation. ↑ Health sector digitalisation has been a major reform. An opportunity exists to collect and analyse the data available through this process for policy evaluation and redesign.	↑ A series of risk preparedness and disaster management plans are available across different hazards, including pandemic threats. ↑ There was a successful response in the early stages of the pandemic. ↑ (Public) Health emerged as a priority during the pandemic, thus providing leverage for change for moving towards intersectoral and multisectoral approaches. ↑ Important knowledge created through the successful implementation of the vaccination programme and the COVID-19 registry should be capitalised upon; improvements are needed regarding the policy on data availability.
Weaknesses	**Sustainability**	**Resilience**
	↓ The system is highly centralised and is characterised by substantial administrative burden and legislative complexity. ↓ There are multiple institutions with overlapping activities in governance. ↓ Historically, the political cycle influence on policy planning has been an extensive phenomenon. (continued)	↓ The public health system was weakened due to the austerity policies implemented before the pandemic. ↓ There is a notable absense of a strong country-wide public health service. ↓ The weaknesses in the management of the second and subsequent COVID-19 pandemic waves suggest room for improvement.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 1	GOVERNANCE (continued)	
Weaknesses	**Sustainability (contuned)** ⇩ There is limited intersectoral cooperation despite various ministries' influence on the public health service. ⇩ There is limited follow-up regarding the implementation of plans or policies. ⇩ Public health is underfunded and has been an issue that was low in the political agenda . ⇩ There is no systematic process of stakeholder involvement in the decision-making processes. ⇩ There is no systematic process for the use of data on user satisfaction; according to available data, historically, there has been low public satisfaction with health care services and the health system. ⇩ There is a limited use of evidence-informed policy. ⇩ The process of policy formulation in the system is heavily driven by the supply side.	

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 2 FINANCING		
Strengths	**Sustainability** ↑ An opportunity for investments in public health policies is available through the Recovery and Resilience Facility and other sources. ↑ A general consensus exists towards maintaining part of the increase in public expenditure on health. In this direction, discussion of alternative sources of fund-pooling (e.g., consumption taxes) is slowly emerging. ↑ Reform of PHC providers' reimbursement is moving from an anachronistic FFS scheme towards reimbursement based on a capitation scheme. ↑ The DRG system for hospitals is being developed. Further acceleration of its implementation is needed. ↑ Steps are being taken to strengthen EOPYY's negotiating power.	**Resilience** ↑ During the economic crisis, a series of legislative efforts expanded population health coverage to those uninsured. ↑ Public expenditure on health swiftly increased in response to the pandemic. Emergency funding mechanisms were foreseen to respond to the increased needs of the health sector.
Weaknesses	**Sustainability** ↓ Historically, public expenditure on health has been low in Greece. The contribution of the state still remains low compared to other EU countries. ↓ High private expenditure on health, mostly out-of-pocket (OOP), contributes to inequalities, catastrophic expenditure, and marginalisation of population groups, as further aggravated during the economic crisis. ↓ Heavy spending on hospitals and pharmaceuticals deviates from that of EU peers. This distribution of financial resources also raises issues of efficiency. (continued)	**Resilience** ↓ Public expenditure on health was a major target of fiscal adjustment during the economic crisis.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 2	FINANCING (continued)	
Weaknesses	**Sustainability (continued)** ↓ Clawback and rebate policies are heavily relied upon. In the absence of other measures (e.g., demand regulation at the individual level) inverse incentives are created for providers, and sustainability is undermined. ↓ No systematic procedure exists for setting resource allocation priorities according to health needs and targets. ↓ Decreased labour force participation rates and high levels of unemployment exist. ↓ The FFS approach is relied upon for the reimbursement of most private sector providers of ambulatory care.	

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 3 WORKFORCE		
Strengths	**Sustainability**	**Resilience**
	↑ The availability of a Strategy on Human Resources for Health (HRH) as a result of a collaboration initiative between WHO and the MoH. ↑ A generational change is bound to occur in the system, particularly in ESY hospitals, where many physicians reach retirement age. Under carefully planned policies, this change could be used to staff the system with new specialties, that meet demand-side objectives.	↑ MoH showed a rapid response in staffing the ESY to meet excess demand due to COVID-19. A need exists to capitalise on this effort. ↑ Staff showed solidarity and support in the collective effort to mitigate the pandemic and provide care; this is a legacy that can be strengthened. ↑ The emergence of Public Health as priority can foster the development of a critical mass of public health scientists.
Weaknesses	**Sustainability**	**Resilience**
	↓ Availability of health care workforce specialties is suboptimal, compared with the production function of modern models of service provision. ↓ The geographical distribution of health care personnel, particularly physicians, is imbalanced. ↓ There is a 'silo approach' to care: task-shifting among different health care professions (as applicable) is very limited. Issues of efficiency and availability emerge. ↓ A national approach to workforce planning is lacking. ↓ Supply side led policies are used for investment in human resources in public hospitals and other infrastructures. ↓ Investment in the human capital of the system (e.g., continuing education or job satisfaction policies) is limited.	↓ Suspension of personnel recruitment due to economic adjustment measures has contributed to understaffing in the ESY. Hence, at the start of the pandemic, Greece already faced staff shortages in ESY public hospitals. ↓ Migration of health care professionals occurred during the economic crisis.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 4	MEDICINES AND TECHNOLOGIES	
Strengths	**Sustainability** ↑ In general, patient access to medicines remains high. ↑ Production and distribution of pharmaceuticals is among the most dynamic sectors in Greece. ↑ Introduction of a horizon-scanning process is to be undertaken by EOPYY. ↑ Steps have been taken to strengthen central planning and rationalisation of investments in biomedical equipment in ESY hospitals.	**Resilience** ↑ There is a strong legacy from the management of the pandemic, which was heavily based on the development of digital infrastructure. ↑ Digitalisation and investments in health information systems are stated as national priorities for the future. ↑ There was timely procurement of vaccines and therapeutics for COVID-19 through EU joint purchasing/procurement. ↑ There exists capacity for local production and distribution of pharmaceuticals during public health crises/emergencies.
Weaknesses	**Sustainability** ↓ Expenditure on pharmaceuticals is a considerable part of total health spending. Hospital pharmaceutical expenditure trends are also an important, though less explored, issue. ↓ Unilateral focus on harnessing expenditure through rebates and clawbacks undermines the sustainability of the system. ↓ The HTA system remains weak in terms of solid processes for decision making. The establishment of an HTA agency remains pending. HTA applies only to medicines, not to other health technologies. ↓ Systematic procedures for access to medical technologies such as biomarkers are lacking. ↓ Historically, BI systems and registries have had limited use and capacity (until recently).	**Resilience** ↓ Measures to decrease pharmaceutical expenditure during the economic crisis resulted in shifting the cost to patients and heavy reliance on clawback mechanisms.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 5	SERVICE DELIVERY	
Strengths	**Sustainability** ↑ Measures have been implemented to enhance the efficiency of the health system and strengthen primary health care. ↑ The new PHC reform (registration of citizens with a personal physician with a gate-keeping role) could substantially improve the sustainability of the system. ↑ The introduction of the National Agency of Quality Assurance in Health (ODIPY) is a promising step towards the provision of better services. Value-based policies should also be considered. ↑ Re-orientation of some ESY structures (hospitals) is starting to be discussed in the public dialogue. ↑ A national screening programme will be implemented.	**Resilience** ↑ A multitude of strategies were implemented to increase ICU capacity, taking into account military hospitals and private sector hospitals ↑ A development of alternative approaches to providing care, was observed during the pandemic e.g., tele-counselling network, mobile health units (KOMY).
Weaknesses	**Sustainability** ↓ Service delivery is heavily based on hospitals – a critical issue with implications for efficiency of spending and future disease burden. ↓ Out-of-pocket spending is the norm for primary health care (in some cases, for hospital care). ↓ Long term care is under-developed, posing a risk to the sustainability of the system, given the dynamics in demography and epidemiology. ↓ There is lack of care continuity and unbalanced service availability that is de-coupled to needs. ↓ High levels of unmet need are a longstanding problem in the country. This creates intense patient mobility to receive care. ↓ Spending on prevention and public health in general is low.	**Resilience** ↓ Overlapping activities of various governmental stakeholders could reduce the speed and efficiency of response to emergencies.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 6	POPULATION HEALTH	
Strengths	**Sustainability**	**Resilience**
	↑ Greece is among the countries with the highest participation rates in the National Immunisation Schedule for children. ↑ Current and projected investments on evidence generation (e.g., electronic patient records) can form the basis of data- and demand-driven policies. However, the investment must focus not only on data-generation but also on analytics. ↑ The role of communities in setting up customised policies for local populations can be strengthened.	↑ The shift in attention towards the importance of public health has increased governmental awareness regarding controlling risk factors for health.
Weaknesses	**Sustainability**	**Resilience**
	↓ Greece has above average life expectancy but a healthy life expectancy well below the average among OECD peers. ↓ Limited progress has been made in addressing risk factors in the past. Exposure to risk factors, such as smoking and obesity remains high. ↓ Obesity in children is a major threat. ↓ Cancer epidemiology data for Greece are based on estimates from comparable countries, mainly because of the absence of a National Cancer Registry that could provide local data. ↓ The prevalence of chronic illness is increasing. Multi-morbidity is an issue not adequately addressed. ↓ A focus on inequalities in national priority has not been discussed. The same applies for health literacy.	↓ The economic crisis exacerbated health inequalities. ↓ Food insecurity also increased during the years of the economic crisis. ↓ Post-COVID-19 morbidity is a threat, and its magnitude has not been assessed.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 7	ENVIRONMENTAL SUSTAINABILITY	
Strengths	**Sustainability**	**Resilience**
	↑ Currently, a substantial number of hospitals in Greece are shifting to renewable energy sources and implementing environmentally friendly actions. ↑ A double objective is identified: environmental sustainability and cost reduction (efficiency). ↑ Greece aligned with the EU Green Deal (to reduce greenhouse gas emissions by 56% (2050 vs 2005).	↑ Development of an action plan aiming to reduce the energy footprint of the health care units, in alignment with the National Energy and Climate Plan ↑ There are currently investments in more than 80 hospitals for energy upgrade activities (through EU or local funds). ↑ Investments in Environmental Sustainability also in PHC.
Weaknesses	**Sustainability**	**Resilience**
	↓ Greece does not systematically collect data on environmental costs and benefits of health system activities. Thus, no data are available on the environmental impact of health care units. ↓ Greece did not adequately progress in developing a national air pollution control programme, which would contain the reduction commitments for 2030 as set by the European Directive. ↓ Air pollution still affects citizens in the country's large cities.	↓ The environmental footprint of the health sector has been a neglected issue in health policy. ↓ Severe winter episodes of PM pollution are attributed to the shift from oil to wood or biomass for heating purposes due to high costs, thus posing a threat to environmental sustainability in view of the energy crisis.

Special attention was paid to eliciting recommendations in this report. To this end, the Country Team invited 20 experts, with relevant expertise and appropriate standing in the health sector, to participate in a Web-Delphi process aimed at assessing a set of policy proposals in two dimensions: (1) the potential effectiveness of each proposed recommendation for the strengthening of the sustainability and resilience of the system and (2) its feasibility, under the current status quo of the system.

In total, 55 policy proposals were assessed through a two-round Web-Delphi process performed via the Welphi platform. A 'two-thirds rule' was used, wherein consensus was defined as more than two-thirds (66.7%) of Delphi experts providing a rating of 7–9 in both dimensions (effectiveness and feasibility), as measured on a 1–9 scale (details of the methods are provided in the Annex of this report). After the completion of the Web-Delphi process, consensus was reached regarding 23 policy proposals. Those policy proposals were included as Domain Recommendations in the Greece PHSSR Country Report. Each domain also contains a section entitled 'Points for consideration', which includes the policy proposals for which consensus indicated high potential effectiveness regarding the health system's sustainability and/or resilience, but varying degrees of consensus or no consensus was reached regarding their feasibility. Hence, reforms will be required to enable their future implementation. Table 2 includes the key recommendations per domain.

Table 2: Recommendations across the seven domains

DOMAIN 1	GOVERNANCE
1A	To conduct a structured public dialogue, organised by the government and including all key stakeholders, for the evaluation of the response of the health system to the pandemic and the lessons that can be learned for the future. This evaluation must be documented in a written report.
1B	For each of the National Plans for health that is developed, the MoH should establish an independent ad hoc monitoring team that periodically assesses the progress in each plan on the basis of pre-agreed targets and indicators.
1C	To establish teams of analysts in the system who will officially undertake the task of analysing the collected system-level data, to be provided as inputs in the decision-making process for health policy formulation.
DOMAIN 2	**FINANCING**
2A	To introduce taxation levied on specific activities or goods that are deemed harmful to health ('sin taxes') as a means to improve the health system's financial base and as a public health measure that limits population exposure to risk factors for health.
2B	To develop payment by results schemes in primary health care.
2C	To establish a process for the periodic reassessment of the health benefits basket covered by EOPYY with the participation of stakeholders involved.

Table 2 (continued): Recommendations across the seven domains

DOMAIN 3	WORKFORCE
3A	To establish both annual and long-term planning processes for recruitment in health system structures, on the basis of health needs of the reference population.
3B	To prioritise the increase in the number of nurses employed in public hospitals with the goal of reaching the EU average.
3C	To implement policies for the measurement of job satisfaction among the ESY workforce, in a systematic manner.
3D	To introduce continuing education schemes, which will be obligatory for ESY health professionals.
3E	To institutionalise the periodic revision of undergraduate training programmes for health professionals, according to the developments in science and practice.
DOMAIN 4	**MEDICINES AND TECHNOLOGY**
4A	To develop a National Pharmaceutical Policy with the participation of all stakeholders.
4B	To establish a framework and a mechanism for analysing health technology utilisation and outcomes data and make the data available to the scientific community.
4C	To incentivise the local production of health technologies (e.g., medicines) through a dedicated sectoral/industrial policy with the aim of improving the international marketability of produced products and securing the response to emergencies or crises.
4D	To establish an independent and autonomous National Agency for Health Technology Assessment.
4E	To establish an assessment process for non-pharmaceutical health technologies (e.g., biomarkers, digital applications, etc.).
4F	To make all data on drug consumption from the e-prescription system publicly available. To initiate a gradual effort to systematically record therapeutic outcomes at the patient level, to link treatments to outcomes.
DOMAIN 5	**SERVICE DELIVERY**
5A	To define specific objectives and performance evaluation criteria for the implementation of population screening programmes.
5B	To establish indicators of accessibility and user satisfaction with health services, to monitor the progress in the undergoing reform in primary health care.

Table 2 (continued): Recommendations across the seven domains

DOMAIN 6	**POPULATION HEALTH**
6A	To implement health promotion and awareness programmes in schools and the family to support early recognition and management of obesity in children.
6B	To develop a national policy framework against health inequalities, which will foresee measurement of health inequalities based on indicators; specific objectives and actions; monitoring and evaluation of actions; and the publication of a periodic report on the implementation of the National Policy Framework against Health Inequalities.
DOMAIN 7	**ENVIRONMENTAL SUSTAINABILITY**
7A	To integrate actions that improve the energy efficiency of public hospitals in the set of performance indicators that are used to periodically evaluate the managers of public hospitals.
7B	To develop a policy to assess the future effects of climate change on the health system and prepare relevant actions.

An overarching theme stemming from this report is that the policy formulation in the Greek Health System overall was (and still is) heavily driven by the supply side.

Building a sustainable and resilient system for the future will require **a demand-driven rationale**, and **perspective and policy formulation** based on the current and projected health care needs of patients and the population in general.

1. DOMAIN 1
Governance

1.1 Governance for health system sustainability

1.1.1 Governance structure and leadership

Despite several efforts to delegate substantial power to regional authorities, the Greek health care system is predominantly a centralised system in terms of decision-making and health policy formulation. Key decision-making involves the Ministry of Health (MoH), which is responsible for policy design and implementation, planning and operation of the National Health Service (ESY), and the regulation and supervision of the private health sector.

The MoH supervises seven Regional Health Administrations (YPEs), which are responsible primarily for the implementation of national policies at the regional level, and the monitoring and auditing of public providers of health services within their jurisdictions. Their role also includes regular monitoring of private providers that are contracted with public insurers.

The National Organization for the Provision of Health Services (EOPYY), supervised by the MoH, is the main social health insurance fund. EOPYY was established in 2011 as a monopsony created through the consolidation of the health branches of various pre-existing compulsory social insurance funds. EOPYY aims to act as the sole public purchaser of health care services. However, its negotiating power remains limited by a lack of adequate funding, limited exploitation of available information on provider activities and oversight by the MoH [1–3]. In this sense, the creation of the EOPYY monopsony remains an incomplete reform, which in turn does not enable the system to make use of its full potential towards the sustainability of the public health service.

Various national organisations and institutions are also involved in the governance and regulation of the Greek health system, and typically operate under the supervision of the MoH (see Table 3).

The MoH requests guidance, strategic direction and support from several permanent or ad hoc advisory committees. The composition of these committees varies; they may consist of public administration executives, scientific experts, academics or professional groups representatives, among others. The Central Health Council (KESY) (established in 1982) and the Public Health Experts Committee (EEDY) have been the major advisory bodies of the MoH. During the COVID-19 pandemic. The National Vaccination Committee (NVC), the National Public Health Organization (EODY) and two additional ad hoc committees established at the start of the pandemic also recommended policy responses to COVID-19 and contributed to policy making.

Several ministries also influence decision-making in the health care sector or have responsibilities that affect the operation of the health system to varying degrees. Among the most important is the Ministry of Labour and Social Affairs, which supervises the National Social Security Fund (EFKA). EFKA collects all insurance contributions, including those for health, and subsequently transfers them to EOPYY. The Ministry of Labour and Social Affairs also formulates policy on social solidarity and social security (child protection, people with disabilities, etc.) and has taken responsibility for all issues related to Occupational Health and Safety (OHS) at the national level. Financing for health is also supported by general taxation; hence, revenue raising and subsequent budget allocation is the responsibility of the Ministry of Finance. The involvement of various ministries creates an overlap in decision-making and reduces accountability, thus inducing delays and inefficiencies. The simplification of legislation (both in terms of formulation as well as enacting the laws and decrees) and reduction of overlap can be a highly important step towards the efficient management and overall sustainability of the system.

Table 3: Selected institutions/organisations supervised by the Ministry of Health

Organisation	Responsibilities
National Organization for Medicines (EOF)	Granting of marketing authorisation to medicinal products for human and veterinary use, and other related products (e.g., special diet foods and certain nutritional supplements, and medical aids); approval and monitoring of clinical trials; post-marketing surveillance; price setting of reimbursed medicines for human use
National Public Health Organization (EODY)	Monitoring of population health and its determinants; epidemiological surveillance and monitoring of the consequences of communicable diseases on public health; implementation of preventive measures; protecting the population against communicable disease threats; promoting actions aimed at improving health, and preventing chronic and non-communicable diseases
National Agency for Quality Assurance in Health (ODIPY)	Supporting quality assurance in public hospitals, development of the national quality assessment framework, and performing quality assessment of health services provided by the public sector and private providers contracted with social health insurance
National Centralised Health Procurement Authority (EKAPY)	Supervision of centralised procurement and distribution of products, materials and services for the public health care sector (including special status hospitals)
Greek DRGs Institute (KETEKNY SA)	Development and management of the system for measuring the cost of hospital medical procedures based on international DRGs
Institute of Child Health (IYP)	Research, educational and preventive activities relating to children
National Centre for Emergency Assistance (EKAB)	Provision of first aid and emergency care, transfers to hospitals, coordination between pre-hospital and hospital care during states of emergency and crises, and coordination of the public hospitals on call
Organisation Against Drugs (OKANA)	Planning, coordination and implementation of policies for combating drug addiction
Therapy Centre for Dependent Individuals (KETHEA)	Provisions to help people with addiction, including alcohol, gambling and Internet addiction

Sources: [4,5], websites of respective organisations.

Policy planning in Greece has historically been heavily bound to the political cycle. As a consequence, the public health system has undergone various changes in its structure and main directions through the years [6]. A change in government is also typically followed by radical changes in the leadership and governance structure of the public sector [7], in both mid- and high-level management. During the economic crisis, policy planning remained fairly stable, because the main goals and reforms foreseen in the Economic Adjustment Programmes (EAPs) were implemented irrespective of changes in government. The reform process is expected to continue to a certain extent as Greece's Recovery and Resilience Plan builds upon many structural reforms in

the health care sector that occurred in the context of the EAPs and the enhanced surveillance framework [8]. However, changes in the leadership and governance structure of the public sector remain a weakness of the Greek health system. Recent legislative changes aim to depoliticise public administration, including the health sector. A strict commitment to this mandate by the government could bring substantial efficiency gains and enhance consensus and continuity in health policy, planning and reforms for health system sustainability.

Health policy goals and priorities are usually described in the context of the National Plan for Public Health, whose current version covers the period 2021–2025. Nevertheless, a system for monitoring and evaluating the implementation of the National Plans was not established; in general, the previous National Plans for Public Health were only partially implemented. The current plan attempts to set specific, measurable targets and, among other provisions, incorporates five individual National Plans (on nutrition policy; smoking; prevention, timely diagnosis and palliative care for cancer; alcohol; and addictions) [9]. The establishment of a 'country-owned' plan with pre-defined goals and key performance indicators constitutes a step forward in the decision-making process for health in Greece that can increase the system's sustainability. A crucial step in this process is the enhancement of accountability in the progress in the implementation of the plan, i.e., the designation of a body/authority responsible for the monitoring of the reforms and policies in the long term, independently of the political cycle.

During the past decade, a shift in health policy planning towards the strengthening of prevention and primary care, as major steps that could contribute to the sustainability of the system, has been observed but has not yet fully materialised, because reforms remain ongoing. The Greek ESY, since its establishment, has been a hospital-centric system; therefore, this development may have highly positive effects on the system's sustainability (details provided in the respective case study).

Another weakness in the governance of the health system relates to the lack of consideration of health as a high priority issue in the political agenda or a 'cross-cutting' issue relevant to all policy areas, as reflected in the absence of a Health Impact Assessment (HIA) element in policies implemented in sectors outside the health system. As the economic crisis and the COVID-19 pandemic have revealed the importance of health and the health system, fertile ground exists to acknowledge the need for intersectoral and multisectoral approaches to address factors that influence health.

1.1.2 Multi-level governance and intersectoral coordination

As noted above, health system administration and governance are highly centralised. Several factors impede effective health system governance, including excessive public administration bureaucracy, fragmentation of mid-level responsibilities, legislative complexity and frequent changes in the organisational structure. During the past decades, many reforms have focused on the modernisation of public administration and capacity building for public servants [10], but have had limited success [11]. Furthermore, although the YPEs constitute a mechanism that has existed for more than two decades, and some changes have occurred during this period, their actual roles as policy making bodies remain highly limited. In contrast, they focus on administrative issues, and planning remains the responsibility of the MoH. This framework limits the roles of regional or local communities in health policy and public health, particularly at lower levels of organisation, wherein community involvement is crucial for efficient and tailored policies, according to the needs and preferences of the local populations. Earlier attempts to decentralise administration of the health system have failed, owing to inadequate financial and human resources of the YPEs, weak implementation of reforms as well as strong opposition of the reforms by interest groups, among other reasons [7, 12]. These factors must be addressed to support the ongoing attempt to transfer decision-making power to less centralised levels of administration, such as the YPEs. A window of opportunity has come with the current endeavours to digitalise the public administration system, which has positive spillover effects on health system management. Although efficiency gains are

expected to come through this reform, how these gains could be further exploited to decentralise the decision-making process and reduce overlapping activities in the top- and mid-level of management of the system remains unclear.

Despite the direct or indirect influence of different ministries on health policy, cooperation and coordination of activities with the MoH has been sparse. The main approach towards intersectoral coordination has been the establishment of Inter-Ministerial Committees, which have tended to have limited success. Positive steps to facilitate and strengthen formalised intersectoral planning and implementation have been taken during recent years, such as the establishment of the Governmental Council of Social Policy (2015) [4] as well as actions taken during the EAPs in the context of a wider reform of public administration, including strengthening the coordination and programming of the central administration. Regarding health policy-making, in the context of implementing the National Action Plan for Public Health, the establishment of an Inter-ministerial Public Health Council was foreseen, with the purpose of resolving multisectoral or intersectoral issues. Finally, the planning and implementation of the National Vaccination Programme against COVID-19 (Case Study 1) can be considered a best practice example regarding intersectoral cooperation and may serve as a useful and informative case study for setting up similar coordination mechanisms in the future.

1.1.3 Accountability, integrity and trust

Stakeholder involvement and consultation are achieved primarily through the participation of stakeholders in committees with an advisory or regulatory role with the MoH. The boards of directors of several major public organisations also include stakeholder representatives. Stakeholders may also be invited to provide feedback and input during the sessions of the Standing Committee on Social Affairs[1] of the Hellenic Parliament. Among health sector stakeholders, professional associations and unions have traditionally been highly influential in policy making in Greece, particularly those representing physicians [4]. In contrast, patient groups and associations have had a weak role in health system governance. An important development that enhanced the role of patients was the establishment of the Greek Patients Association (GPA) in May 2019 [13]. Furthermore, the role of patient associations in policy making has recently been further clarified and explained (May 2022). According to a recent law, the MoH can designate patient associations that will participate in statutory bodies for decision-making, health policy, planning and evaluation of health policy, organisation of public or private sector institutions, and patients' rights. This development signals progress towards shared decision-making and the sustainability of the system, and was welcomed by the GPA.

During the economic crisis, Greece implemented a variety of measures to improve transparency and accountability, and fight corruption. In 2019, the National Transparency Authority (NTA) was established. The NTA operates as an independent authority and is the main institution involved in the inspection of public administration and combating corruption [14]. Greece also prepared a National Anti-Corruption Plan (NACAP) which incorporates specific Action Plans for high-risk policy areas, including the health sector [15, 16]. In this framework, a series of measures were implemented to improve collection of data on the management and operation of the ESY health care units (through the Business Intelligence (BI) portal) and address corruption in purchasing and stock management (e.g., the centralisation of public procurement). The digitalisation of the health sector has also contributed to the aforementioned goals. Furthermore, legislation to empower patients was enacted into law in 2016 (Law 4368/2016), focusing on transparency regarding surgery waiting times and the protection of health services recipients' rights. The 2017 law on primary health care (PHC) reform included provisions for the accountability and social control of public PHC providers,

[1] Standing Committees elaborate on and examine bills or law proposals. Furthermore, they may exercise legislative work and parliamentary control and discuss issues within their competence

namely through a hearing process for social institutions and citizens to report problems in the operation or administration of the health care provider as well as through evaluation surveys on user satisfaction. The National Recovery and Resilience Plan (NRRP) for Greece includes specific actions such as further digitalisation of public administration, adoption of the National Anti-Corruption Action Plan for the period 2022–2025, and implementation of internal audits in public administration including hospitals and health units [8]. Regarding the transparency of decision-making at the national level, citizens can access administrative acts of all ministries, public institutions, regulatory authorities and local governments through an electronic platform. A process of electronic deliberation occurs for almost all pieces of draft legislation, which are posted on a platform before their submission to the Parliament. Since 2019, after a consultation is completed, a report with its results is produced, which also documents the reasons for the inclusion (or lack thereof) of the received comments. The above processes has contributed to increased transparency in decision-making.

Historically, satisfaction and trust in the Greek health system have not been measured or assessed on a regular basis, as part of a strategy for considering the general public views in the policy making process. Data on the public views on the health system and its performance are available primarily through surveys undertaken by academic institutions or independent think tanks. According to their findings, public satisfaction with health care services and the health system in Greece has been, and remains, low. Indicatively, in 2020, the percentage of the population satisfied with the availability of quality health care in the area where they live was 38% for Greece, a value substantially lower than the OECD average (71%); Greece had the second lowest percentage of satisfaction with the availability of quality health services among a total of 37 OECD countries [17]. The legislation for the reorganisation of PHC (Law 4486/2017) introduced user experience evaluation surveys for public PHC units and the subsequent submission of results to the YPEs and the MoH [10]. Because the survey covers user experiences with PHC services, extending the collection of data on other types of health services (public or private) is important.

Overall, the Greek Health System, since its inception, has been a system wherein policy formulation is heavily driven by the supply side. To build a sustainable and resilient system for the future, a demand-driven rationale, perspective and policy formulation is imperative.

1.1.4 Evaluation of programmes and policies

Similarly, one weakness of health system governance in Greece is the absence of an evaluative culture [18]. During the past decade, important steps have been taken to build infrastructure for data collection, which have increased the availability of data on health care utilisation, supply of health services and health expenditure. However, analysis of the produced data for the purpose of policy evaluation and redesign has been fairly limited, because as most (if not all) policies are implemented without an ex ante policy evaluation of the potential effects (e.g., through evaluation of pilot studies). Furthermore, data on clinical outcomes, quality of care or hospital performance data are not yet publicly available; this lack of availability is expected to change with the development of key performance indicators by the National Agency for Quality Assurance in Health (ODIPY) and the full operationalisation of the National Digital Health Record.

1.2 Governance for health system resilience

1.2.1 Preparedness

Greece has several risk preparedness and disaster management plans across different emergencies and hazards (e.g., for floods, earthquakes, forest fires, industrial accidents, and chemical and biological threats). The legal framework foresees a process of Annual National Planning of the Civil Protection Service, which consists of a general plan (the 'Xenokratis' plan) defining the types of

disasters, the means of civil protection, and the roles of central and local government. A basic framework is also provided for the development of hazard-specific plans by ministries, regional authorities and municipalities. The General Secretariat for Civil Protection (GSCP) is the coordinating body. Action Plans and General Plans prepared by the GSCP also cover prevention, preparedness and response to specific hazards. Greece has also ratified the updated International Health Regulations (IHR). A new law introduced in 2020 (Law 4662/20) has been aimed at upgrading the country's disaster risk management system, with the establishment of a single structure, the National Crisis and Hazard Management Mechanism (Nat-CHAMM) and the development of a 6-year National Hazard Mitigation Policy. To date, the regulatory acts of the new legislation have not been issued, and the previous legal framework still applies [9].

Apart from the aforementioned general plans, several action plans cover the response to outbreaks of specific infectious diseases. A pandemic preparedness plan (the 'Artemis' plan) was first released in 2005 (in response to the AH5N1 outbreak) and was substantially revised in 2009 in light of the influenza A (H1N1) pandemic. The plan is being revised and adapted to reflect changes in the epidemiological environment [3]. In 2014, after the West Africa Ebola outbreak, the MoH released the Action Plan for Ebola viral Haemorrhagic Fever (the 'Athena' plan). The MoH and the EODY also released a preparation and response plan to the COVID-19 pandemic in February 2020. In addition, the MoH publishes circulars relating to infectious disease control and the implementation of measures for the protection of public health in the event of emergency situations. Emergency operational frameworks/plans are in place, such as the 'Perseas' Plan (an emergency management plan for the hospital setting, which includes seven possible emergency situations) and the 'Sostratos' Plan (an operational plan for the evacuation of hospitals in the event of an earthquake). On the basis of these plans, training activities and field preparedness exercises are performed. Finally, the 'Philoktitis' plan is a classified plan that provides instructions and guidance for the management of chemical, biological, radiological and nuclear threats.

Overall, Greece has made substantial progress in the development of preparedness and management plans for pandemics, natural disasters and emergency situations in general. Future actions should focus on improving the cooperation and coordination of actors at the national and regional levels, strengthening the ability of local governments to respond to public health threats, planning for the regular assessment of preparedness and management plans, and organising joint training of all actors involved.

Epidemiological surveillance and monitoring of infectious and non-communicable diseases are several main activities of the EODY. Other activities include collection and provision of epidemiological data and provision of information to the public on the risk of serious health threats [19]. Other actors are also involved in epidemiological surveillance and cooperate with EODY (e.g., the Hellenic Pasteur Institute, Universities' laboratories). Surveillance is based primarily on three systems: the Mandatory Notification System for specific communicable diseases and relevant health issues, the Morbidity Monitoring System in Primary Health care (Sentinel, a network of physicians in private and public PHC units that voluntarily report selected diseases on a weekly basis) and laboratory surveillance (through specialised laboratories/reference centres and laboratory networks) [19]. Since May 2016, a system of epidemiological surveillance has been in place in reception centres hosting refugees from Asia, involving daily collection of epidemiological data for selected conditions. Given its participation in the relevant EU and international networks, EODY's surveillance is performed according to the rules and guidelines of the European Centre for Disease Prevention and Control (ECDC) and the WHO. Overall, the MoH and EODY have successfully responded to public health threats in the past. However, several areas for improvement in epidemiological surveillance have been identified regarding risk communication, sustainability of resources/funding and continuity of planning [20].

1.2.2 Response

To respond to the recent pandemic, the EODY received additional funding from national and European resources to enhance the infrastructure and capacity of the public health laboratories and recruit workforce [21, 22]. Emergency funding decisions may meet the needs of the current pandemic, but actions are necessary to ensure sustainability. The need to invest in public health policies and to strengthen public health institutions in Greece, including EODY, has been acknowledged since the first Action Plan for Public Health in 2008, and remains repeatedly emphasised by experts [23]. Indeed, public health has historically been neglected and underfunded in Greece. On average, OECD data show that expenditure on preventive care in Greece accounted for 1.2% of total current health expenditure or 0.1% of the gross domestic product (GDP) between 2003 and 2019. Nevertheless, the pandemic revealed the importance of public health, both at a global level and in Greece. Additional funds were directed to the health system to support the response to the pandemic, as reflected in the most recent OECD data (released on May, 2022), according to which expenditure on preventive care in Greece increased both in absolute terms and as a percentage of current expenditure on health (1.8%) in 2020.

Greece has continued to follow a centralised approach to health system governance during the pandemic. The emergency response was coordinated by the General Secretariat for Civil Protection [3]. The main actors involved in the health system response to the COVID-19 pandemic are the MoH, the EODY and the EKAB. The National Committee of Public Health Experts (EEDY), the Public Health Emergency Committee for Infectious Diseases and the Vaccinations Committee were the main advisory bodies shaping the response to the pandemic. Emergency legislation was also adopted to give the government special powers, e.g., to impose restrictions, release emergency funds, and restrict or cancel leaves of absence for the health care workforce. The centralised approach facilitated a rapid response during the crisis, coordination of measures, and effective procurement and distribution of resources such as personal protective equipment (PPE) [24] and, after their authorisation, vaccines. This success is likely to be attributable to the single power of authority that cross-cuts through overlapping responsibilities but also fosters (or forces) collaboration. The centralised approach was maintained throughout the pandemic response.

In view of outbreaks in other countries, Greece rapidly adopted an elimination strategy by imposing physical distancing requirements, travel restrictions, school closures and eventually a lockdown during the first wave of the pandemic. This strategy was successful in terms of enabling capacity building for the health system, particularly given its chronic deficiencies and constraints. As a response to the rising demand for health care due to the pandemic, Greece increased the physical infrastructure and health care workforce. For example, measures were taken to increase the number of intensive care units (ICU) beds and the health care workforce of the ESY, as well as to increase laboratory capacity [24]. Additional financial resources were directed towards the health system through the reallocation of the national budget, EU funding and private donations from companies and NGOs.

At the onset of the pandemic, emphasis was placed on the identification of cases, exhaustive contact tracing and imposition of quarantine to confirmed cases to prevent further transmission of the disease [3]. However, during the first wave, Greece lacked the capacity to scale up COVID-19 testing to a massive population-based approach. Testing strategies were intensified from May 2020 and included preparations for testing, which were available for all islands in anticipation of the touristic period. From April 2021, the MoH adopted a COVID-19 self-testing strategy using antigen tests, which targeted asymptomatic cases and complemented actions already in place, such as the as rapid mass testing of citizens in certain areas. Self-testing became mandatory for specific groups of the population (e.g., teachers and students)

The country also invested in information systems by developing digital registries to monitor stock and utilisation of PPE, as well as hospital and ICU capacity [25]. In addition, a registry for all COVID-19 cases was developed. In later stages of the pandemic response, the vaccination programme

against COVID-19 was managed through a dedicated web platform. More recently, a separate procedure via the e-prescription system was designed for prescribing and distributing the authorised per os pharmaceutical treatment for COVID-19.

The two expert committees involved in the response to the pandemic and EODY developed guidelines and protocols covering the entire spectrum of diagnosis and management of COVID-19 cases, as well as guidelines for the general public, travellers, health professionals, specific professional groups (e.g., those employed in education), workplaces and vulnerable groups. The guidelines and protocols are continually adjusted according to scientific developments. Protocols, standards and training programmes were also developed by the National Vaccinations Committee for the vaccine administration centres.

Information from available databases and expert advice from the relevant committees has been used in decision-making regarding the response to the pandemic, a choice that was made since the start of the pandemic. The influenza pandemic preparedness plan provided the basis for the risk communication strategy followed at the start of the pandemic [26]. During the first wave, the public was informed regarding the epidemiological situation in the country and the measures to combat the pandemic through various communication channels, including press conferences, press releases to the mass media, and the MoH and EODY websites. Decisions regarding regional lockdowns were made by the central government on the basis of epidemiological data; the criteria for imposing lockdowns, as well as loosening or lifting restrictions, were explicitly stated. Major stakeholders supported the strategy adopted, and messages for the general public were developed regarding the use of face masks (e.g., physicians' associations) and vaccination (e.g., the National Patients' Union). This aspect was crucial in building support and social capital, despite the spread of misinformation on COVID-19, and has produced a legacy of cooperation that must be maintained for re-deployment against potential future threats.

Most of the containment measures were maintained during the subsequent stages of the pandemic. However, the management of the pandemic became more challenging during the subsequent pandemic waves. The country experienced a resurgence in cases and an increase in deaths as it gradually lifted restrictions. Mitigation measures were reintroduced or relaxed according to epidemiological data. A variety of factors might have contributed to these developments, which were not unique to Greece, such as fatigue among the population as well as policy-makers, weaknesses in the crisis communication to the public and misinformation spread. The lack of an established, strong public health service can be considered an important factor, because the country has limited experience in implementing large-scale public health strategies. An objective, evidence-based evaluation of the overall response to the pandemic would substantially contribute to highlighting successes and failures and drawing lessons to prepare for the next public health threat.

1.2.3 Learning and adapting

The need for a timely response to emergency public health threats, and the surveillance and control of infectious diseases have been acknowledged in the strategic documents and action plans for Public Health prepared by the MoH in earlier years (National Action Plan for Public Health 2008–2012, National Strategic Plan for Public Health 2019–2022). The pandemic has emphasised the need to prepare for and effectively respond to public health crises. Consequently, strengthening the MoH and ESY readiness to effectively respond and manage emergency situations that constitute a threat to public health is a strategic goal of health policy. In this direction, the current National Action Plan for Public Health (2021–2025) includes actions for the development of mechanisms and the implementation of measures that aim to protect the population during the COVID-19 pandemic. The plan also includes actions to strengthen epidemiological surveillance, as part of broader action to improve the provision of public health services [9].

1.3 Recommendations

1.3.1 Domain recommendations

RECOMMENDATION 1
To conduct a structured public dialogue, organised by the government and including all key stakeholders, for the evaluation of the response of the health system to the pandemic and the lessons that can be learned for the future. This evaluation must be documented in a written report.

RECOMMENDATION 2
For each of the National Plans for health that is developed, the MoH should establish an independent ad hoc monitoring team that periodically assesses the progress in each plan on the basis of pre-agreed targets and indicators.

RECOMMENDATION 3
To establish teams of analysts in the system who will officially undertake the task of analysing the collected system-level data, to be provided as inputs in the decision-making process for health policy formulation.

1.3.2 Points for consideration

1. Transfer all public funding (i.e., both insurance based and tax based public resources on health) to EOPYY, in order for the organisation to operate as a true monopsony.

2 Provide for the mandatory publication of decisions, accompanied by the decision-making rationale, for decisions involving the allocation of funds exceeding a predefined expenditure threshold. The reporting should be based on a specified format with predefined domains and questions to be completed. This policy measure will improve transparency and accountability for health system governance.

3. Introduce a process of deliberation between the state and all relevant stakeholders during the law-making process to eliminate the element of 'surprise', and to base legislative initiatives on documentation and consensus.

4. Further decentralise the management of the ESY while in parallel strengthening the operational capacity of the Regional Health Administrations, thus limiting the role of the MoH in the strategic planning of the system.

5. Prioritise health in all policies while promoting intersectoral collaboration among ministries in wider public health issues.

6. Strengthen the individual decision-making process of health professionals regarding their therapeutic choices/practices, with a focus on the costs and effectiveness of alternative actions.

2. DOMAIN 2
Financing

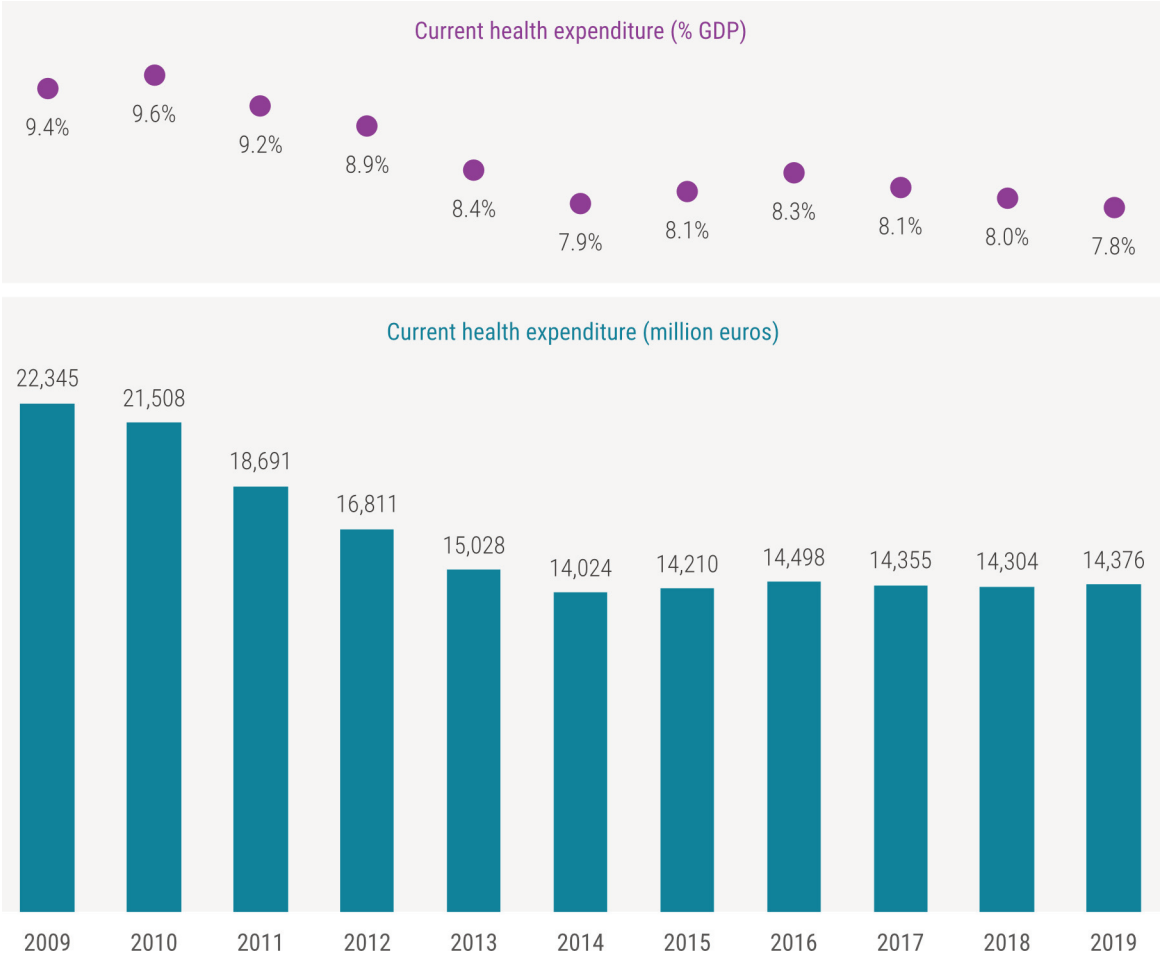
2.1 Financing for health system sustainability

2.1.1 Revenue generation

Although it was initially designed as a National Health Service model in 1983, the Greek health system largely relies on private funding. Despite various efforts and reforms, health expenditure in Greece has comprised approximately 60% from public sources and 40% from private funding in the past decades. Of note, a vast proportion of private expenditure (almost 90%) is out-of-pocket payments (OOP), in contrast to the mix of private expenditure in other European countries. This funding mix has led to concerns regarding the stability of the system and its financial protection mechanisms, particularly in periods of economic downturn, as documented in the years following the 2010 recession and onwards.

Total current health expenditure in Greece has been decreasing, both in absolute terms and as a proportion of the GDP, during the past 10 years (Figure 1). In 2009, current health expenditure amounted to 22.3 billion euros (9.41% of the GDP), whereas in 2019 it was substantially reduced to 14.4 billion euros (7.84% of the GDP). The reduction observed from 2010 onwards is largely attributable to the contraction of the Greek economy due to the economic crisis, and the subsequent measures and reforms implemented as part of the Economic Adjustment Programmes [18].

Figure 1: Current health expenditure in million euros and as a share of the GDP (2009–2019)

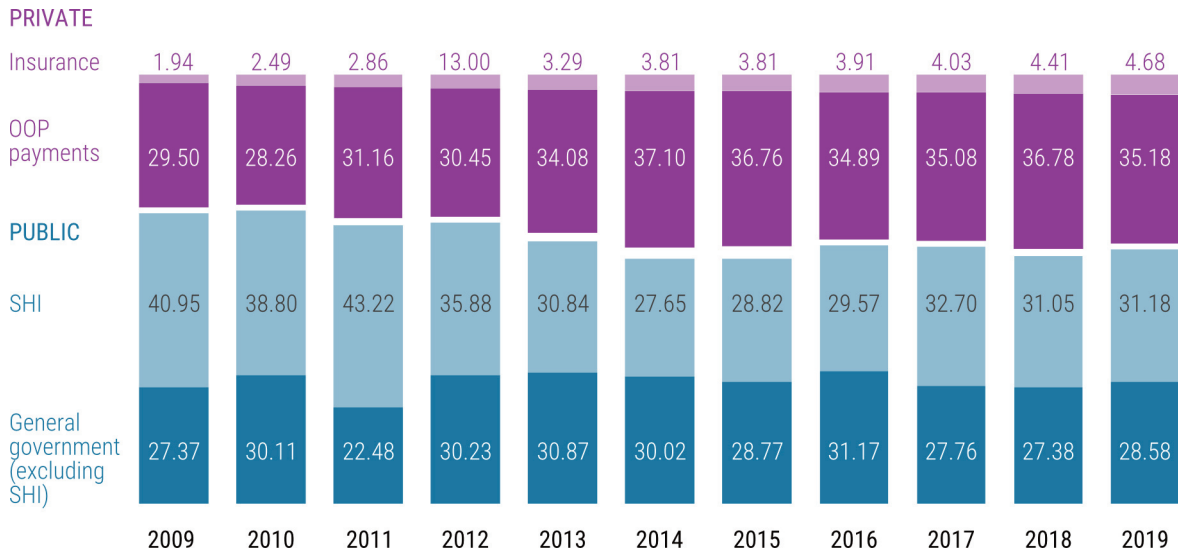


Source: Hellenic Statistical Authority.

Public expenditure as a percentage of total current health expenditure has been declining while the burden of health expenditure has been shifting to households, predominantly in the form of OOP (Figure 2). Specifically, the first EAP introduced a ceiling for public health expenditure set at 6% of the country's GDP – a requirement considered to undermine health system's sustainability. Notably, in 2019, public health expenditure in Greece corresponded to 4.7% of the GDP, compared with a European average of 8.0% (for 23 countries for which data were available) [27]. Public expenditure on health rapidly increased in response to the pandemic, as discussed in more detail later in this chapter. Currently, the general consensus supports maintaining part of this expenditure increase, as corroborated by sustainable financing of the health system having been included as a policy goal in the National Strategy for Health [9]. In this direction, discussion of alternative sources of fund-pooling (e.g., consumption taxes) is slowly emerging.

OOP, a sizeable part of health expenditures, mainly comprise co-payments for pharmaceuticals and direct payments for services that are either not covered by SHI, or arise from patient preferences (for example the choice of the treating physician).

Figure 2: Current health expenditure by source of funding, expressed as percentages of total health expenditure (2009–2019)



Source: Hellenic Statistical Authority.

Public health expenditure is sourced primarily from the governmental budget generated through taxation and SHI contributions. Financing from government schemes is primarily directed towards inpatient and outpatient care (68.0% and 23.7% of total expenditure, respectively) whereas financing from SHI schemes is directed towards medical goods (49.9%) and inpatient care (25.3%) (OECD data).

According to Eurostat data on general government expenditure by function (COFOG), in 2019, health corresponded to 12.0% of general government expenditure (10,536 million euros, or 5.7% of the GDP), well below the EU-27 average (15.1% of total general government expenditure, or 8.0% of the GDP). The governmental budget for health is funded mainly by direct and indirect taxes. The indirect taxation portion introduces a degree of regressivity in this section of revenue generation. The level of annual funding for health is based primarily on a historical basis (i.e., the allocations for previous

years) [4] with no input from demand-side factors, such as the trends in disease burden or needs Overall, a systematic procedure for setting resource allocation priorities according to health needs and targets has not been developed, thus leading to persistent socioeconomic disparities and unmet needs [4].

The other half of public spending on health is financed from SHI (mainly EOPYY). EOPYY funds are predominantly financed by compulsory health contributions from employees, employers and pensioners. In many cases, contributions are complemented by other sources such as pharmaceutical rebates or clawbacks, as well as annual subsidies from the State budget, when arrears to the monopsony's providers emerge [4].

With respect to overall (public and private) funding allocation in the system, most resources are primarily allocated to in-patient care, pharmaceuticals and out-patient care, all of which substantially decreased in nominal terms over the past decade. Funds allocated to long-term care, in contrast, have increased since 2009 (Table 4) but still represent a very low proportion of spending in Greece compared with European countries. The smallest proportion of funds is allocated to preventive care. The allocation of a larger share of financial resources to in-patient and pharmaceutical care, compared with that in other EU countries, suggests a quite different 'production function' of health in Greece vs its European peers, and prompts questions regarding spending efficiency.

Table 4: Health care funding by health care function, as a percentage share of current health expenditure (2009–2019)

Year	In-patient care	Out-patient care	Long-term care	Pharmaceuticals	Preventive care	Administration	Other
2009	42.58	25.57	0.52	29.48	0.32	1.30	0.23
2010	42.82	23.84	0.65	30.84	0.34	1.30	0.22
2011	39.00	25.21	0.69	33.11	0.37	1.44	0.16
2012	45.27	20.76	0.94	31.18	0.22	1.50	0.12
2013	44.60	23.32	0.68	29.26	0.30	1.59	0.24
2014	44.72	22.70	0.60	29.30	0.44	2.04	0.20
2015	44.33	21.98	1.12	30.43	0.39	1.56	0.19
2016	44.42	20.46	1.22	31.62	0.30	1.60	0.38
2017	42.57	21.82	1.76	31.07	0.30	1.57	0.91
2018	44.29	21.28	2.27	29.56	0.29	1.64	0.66
2019	44.54	22.69	1.56	28.85	0.18	1.66	0.52

Source: Hellenic Statistical Authority (2019).

Population demographic characteristics, such as labour force participation, are substantial indicators of financial development within a country. Across Europe, the active population is steadily declining as a result of the aging of the population, the decreasing number of active people and the decreasing employment rate [28]. Greece is among the leaders in this trend. Life expectancy at birth in Greece has increased during the past decade, from 80.4 years in 2009 to 81.2 years in 2019 (Figure 3), with a reduction of 0.5 years in 2020. This decline may be at least partially attributable to the COVID-19 pandemic. Simultaneously, the proportion of people over 65 years of age substantially increased to 22.26% of the total population in 2020, whereas the average country unemployment rate increased from 9.6% in 2009 to 16.3% in 2020, albeit with a small declining trend, according to the most recent provisional estimates. These demographic changes have led to a decrease in the labour force participation rate. Further reductions in labour force participation rate could undermine future financial and overall system sustainability.

Figure 3: Key demographic indicators (2009–2019)

Sources: Hellenic Statistical Authority; Eurostat.

2.1.2 Coverage and resource allocation

Entitlement to access to health services provision (insurance coverage and reimbursement) in Greece was historically linked to employment status. After the onset of the 2010 crisis and the subsequent rise in unemployment levels, a substantial proportion of the population (approximately 21%) lost insurance coverage [29]. Legislative initiatives were introduced (for example Law 4368/2016), particularly focused on the growing number of uninsured citizens, migrants and other vulnerable groups. According to these provisions, access to public health care services was granted for the uninsured population. The corresponding expenditures are covered by EOPYY, usually by additional cash flows from the general budget. After these measures, Greece has formally provided universal population coverage for publicly funded services since 2016. Refugees have had access to the same level of services as the rest of the population since 2016 [30]. Although these measures have reduced the gap in population health coverage, barriers in access to health care still exist. Asylum seekers and those stranded at the EU borders do not have access to health care and thus have faced barriers to access to health care during the pandemic [31]. An effort has been made to reverse this lack of access, by securing vaccinations for all people living in the country regardless of their immigration status.

In terms of the depth of coverage, public expenditure has focused primarily on hospital care (provided either by public or private providers), diagnostics (mostly administered through private providers) and pharmaceuticals and, to a lesser degree, outpatient care. Major omissions in public sector funding have been observed in the fields of long-term care, palliative care and physical rehabilitation, where funding is very low; hence, these services are typically covered by private spending and/or voluntary organisations [4]. Greece also has among the lowest percentages of public spending on prevention in the EU.

In contrast, private expenditure is mainly directed towards hospital care, pharmaceuticals (particularly following the change in patient co-payments for pharmaceuticals and their subsequent increase during 2011–2014), dental care and outpatient care [27]. Long-term care needs usually burden patients' families in the form of informal care. As noted above, private expenditure is predominantly in the form of OOP. According to a relevant study, 16.9% of households experienced catastrophic health expenditure in 2016 (defined as OOP exceeding 10% of household total consumption or income) [32]. More recent data have estimated that the proportion of households experiencing catastrophic expenditure (defined as OOP exceeding 40% of total household spending net of subsistence needs) increased between 2010 and 2019, from 7.0% to 8.9%, respectively [30, 33].

2.1.3 Paying providers

Ambulatory care is provided mainly by public PHC facilities and outpatient hospital departments, and private sector providers (physicians in private practices, laboratories, diagnostic centres, private sector hospital outpatient departments and other health care professionals).

Private sector providers are reimbursed by EOPYY through contracting. Diagnostic tests and examinations are reimbursed on a fee-for-service (FFS) basis, according to the corresponding price list. Physiotherapists, speech therapists and occupational therapists in the private sector, as well as physicians in private practice, are reimbursed on an FFS basis according to the published legislated fees. After the most recent PHC reform (May 2022), physicians contracted with EOPYY (primarily General Practitioners and Internists in the case of adults and paediatricians for children) can opt to participate in the gate-keeping system as personal doctors, whereas the reimbursement system for their services is based on capitation. The reform also foresees financial incentives for the participation of physicians in prevention and health promotion activities; the incentive system is expected to be further specified in forthcoming secondary legislation. Other specialised physicians contracted with EOPYY will continue to be reimbursed on an FFS basis. The reform in PHC providers' reimbursement is a major improvement that can contribute to health system sustainability.

Health care professionals employed by public PHC providers are salaried employees. In an effort to incentivise participation in the gate-keeping system, the recently introduced law on reforming PHC has introduced a mixed method for the remuneration of physicians who are employed in public PHC units and will participate as personal physicians in the gate-keeping system. They will receive an additional capitation-based payment, whereas those employed in remote or underserved areas will also receive a bonus payment.

Regarding inpatient care, private and public hospitals are reimbursed through a Diagnosis-Related-Groups (DRG)-based system (the KEN-DRGs). The replacement of a retrospective, per-diem reimbursement system with a DRG-based system was one of the reforms initiated by the EAP. However, because the timeframe for its implementation foreseen in the EAP was very short (1 year), in the first stage of the system's development (2011), a DRG list (KEN-DRGs) was produced from cost data from a sample of public hospitals (via activity-based costing) and 'imported' cost weights [34]. Of note, the KEN-DRG system covers only the non-personnel related cost of services (approximately 50% of total cost of care), and the remainder is financed from the General Budget for the public providers (because hospital workers are civil servants and are salaried by the Central Authority of Payments). This framework decouples hospital activity from personnel reimbursement, thus resulting in efficiency issues. The system is currently undergoing refinement to transition to a full DRG system (the Gr-DRGs). To date, it has been implemented by all hospitals of one Health Region (the 7th Health Region of Crete) and is currently being rolled out in more hospitals across the country. The shift towards DRG-based reimbursement of in-patient care is a major reform that must be further accelerated.

During the economic crisis, various measures were taken regarding contracting and reimbursement of private sector providers. Initially, a ceiling on expenditure for pharmaceuticals was introduced. Spending above the specified ceiling resulted in the activation of a clawback mechanism and the collection of the excess amount from pharmaceutical companies. The clawback mechanism was further applied to expenditure for other health care services and products purchased by EOPYY from contracted private providers. The clawback mechanism has been introduced as a short-term cost-containment measure and was envisaged to be replaced by structural changes. Currently, it has been extended to 2025 and is linked to real GDP growth. The level of the clawback has continually been rising at an alarming rate, probably because the unilateral focus on budget ceiling policies, such as clawbacks, cannot be an effective measure for controlling expenditure if it is not accompanied by demand-side policies at the patient level (for example strict application of clinical protocols and prescribing guidelines). A re-evaluation of spending levels (budget caps) according to current and anticipated demand, technology innovation and emerging clinical practices is necessary.

EOPYY can negotiate the reimbursement price of services and products covered by its benefits basket. However, in the past, financial liquidity problems and limited administrative capacity have contributed to limited negotiating power. Currently, the role of EOPYY as a single payer is envisaged through negotiations with providers and, for that purpose, the quality of provided services/products has recently been added as a criterion for the determination of reimbursed prices and rebates during the negotiation process with providers (Law 4931/2022).

2.2 Financing for health system resilience

Large-scale unforeseen events and shocks can pose a major threat to population health, health system resilience and economic performance, owing to their disruptive nature. In Greece, several sources are available for funding the response to such shocks and urgent needs. At the national level, funds for emergencies may be derived from the Public Investment Programme, which finances the country's development policy through projects funded by public sources. Sources may also come from European Programme funds. In addition, owing to the unpredictable expenses related to the COVID-19 pandemic, an additional special financial reserve for COVID-19 was foreseen in the governmental budget, aiming to address the increased health care needs of the pandemic [35].

The outbreak of COVID-19 has led to increased health care needs and hence health expenditures. To address the increased needs for the health care workforce, purchase of medical supplies and PPE, and diagnostic testing and examinations, the Greek MoH received supplementary financial support. Additional funds for the health care sector were financed through grants or loans from international partners and donations from the private sector (both cash and in-kind donations) [36].

Overall, the MoH total supplementary budget allocation for the increased health care needs of the pandemic in 2020 amounted to 786 million euros. Approximately 640 million euros was directed to the COVID-19 response, including sources from European programmes [3]. Additional sources allocated to emergency medical staff and medical equipment and intensive care units amounted to 85 million euros and 60 million euros, respectively [30]. Finally, until June 2020, additional funding of 128 million euros was derived from cash and in-kind donations [3].

Regarding the funds derived from European Union programmes, Greece absorbed 2.7 billion euros until October 2020, as loans under favourable terms, from the Support to Mitigate Unemployment Risks in an Emergency (SURE) programme to combat the consequences of the pandemic [27]. In addition, 32 billion euros (19.5 billion euros as grants and 12.5 billion euros as loans) from the Recovery Fund was agreed to be absorbed over a 6-year period for the system's response to the crisis caused by the pandemic. The European Central Bank also provided 1.9 trillion euros in the Pandemic Emergency Purchase Programme (PEPP), which also included Greek bonds [27].

The new Strategic Action Plan for Public Health [9] includes a pillar for the protection of the population against health emergencies, which aims to develop mechanisms and implement measures to protect the population during such emergencies. All programmes under this pillar have been proposed to be implemented with funding from the regular budget. An additional pillar aims to ensure constant funding for the provision of high-quality public health services. To achieve this objective, funding is expected to derive from national sources, co-financed National Strategic Reference Framework (NSRF) 2021–2027 sources, Recovery Fund sources, European sources and Public Investment Programme sources [9].

2.3 Recommendations

2.3.1 Domain recommendations

RECOMMENDATION 1

To introduce taxation levied on specific activities or goods that are deemed harmful to health ('sin taxes') as a means to improve the health system's financial base and as a public health measure that limits population exposure to risk factors for health.

RECOMMENDATION 2

To develop payment by results schemes in primary health care.

RECOMMENDATION 3

To establish a process for the periodic reassessment of the health benefits basket covered by EOPYY with the participation of stakeholders involved.

2.3.2 Points for consideration

1. Establish a process for prioritising investments/resource allocation in the health care sector, on the basis of a specific set of pre-defined criteria (for example, a process based on the principles of Multiple Criteria Decision Analysis) and incorporation of societal preferences for resource allocation.

2. Establish a process for forecasting future changes in health needs and demand for health care services, with the aim of supporting the future allocation of resources.

3. Facilitate public-private partnerships for the development of complementary insurance schemes. The proposed action is aimed at incorporating direct OOP into insurance schemes that will meet the preferences of health service users currently covered by OOP.

4. Develop alternative patient co-payment schemes, on the basis of health needs as well as income capacity.

5. Develop a national map or report of the current status of heath needs of the population.

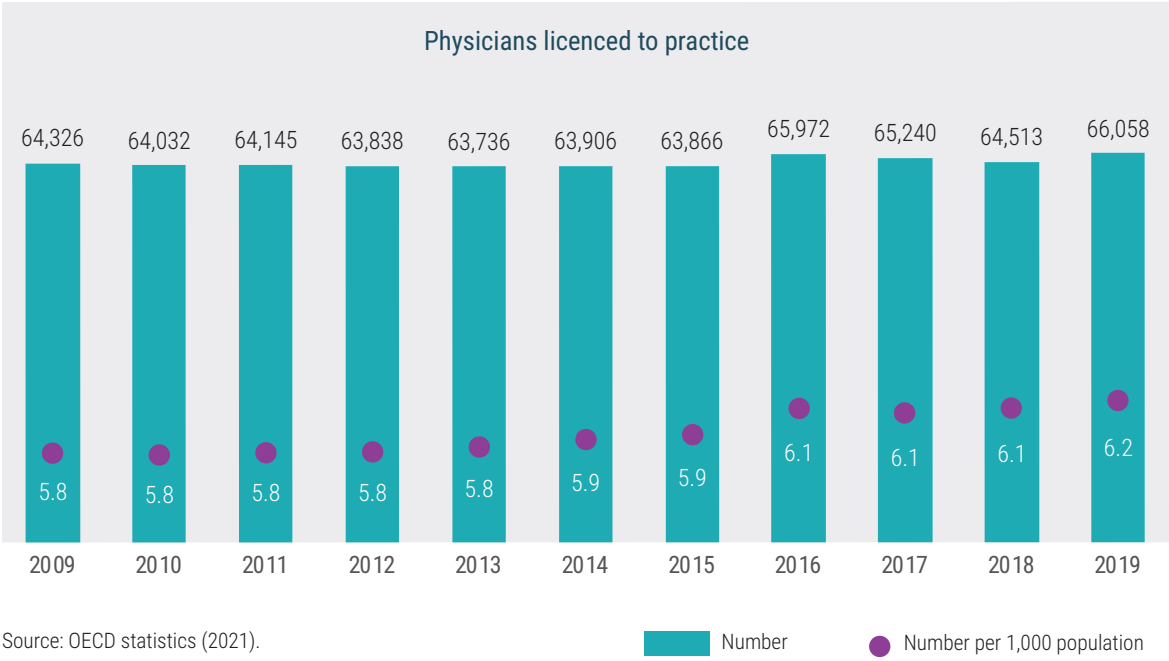
6. Introduce shared responsibility among all stakeholders involved in creating or maintaining capped health care budgets.

3. DOMAIN 3
Workforce

3.1 Workforce for health system sustainability

Over the past decades, Greece has had an expanded health care workforce, mainly in the fields of (specialist) physicians, dentists and pharmacists, but has faced substantial shortages in core health care employees, such as nurses. As shown in Figure 4, the numbers of physicians licenced to practice, pharmacists, midwives and physiotherapists have increased since 2009, whereas the numbers of practicing nurses, caring personnel and dentists has decreased. Greece consistently reports a higher density of physicians than the OECD average, with increasing trends in absolute numbers. In 2019, Greece had 6.2 physicians per 1,000 population, whereas the OECD average was 3.6 per 1,000 population. Of note, in 2019, approximately 82% of physicians were specialists, whereas only 6% were general practitioners, and 2% were other generalists (the remaining percentage is reported as 'undefined') [17]. The share of general practitioners in Greece is substantially lower than the OECD average of 23% of all physicians [17]. Greece also has more pharmacists that the OECD average, at 106 pharmacists per 100,000 population in 2019, whereas the respective OECD average was 86 per 100,000 population [17]. In contrast, Greece has consistently substantially fewer practicing nurses than the OECD average: in 2019, Greece had only 3.4 practicing nurses per 1,000 population, whereas the OECD average was 8.8 per 1,000 population [17]. This trend among nurses has persisted through the years, despite the increase in supply of university programmes providing training in nursing, thus probably indicating low incentives to pursue the profession. Collectively, the above findings suggest an imbalance and substantial differences in the availability of health care workforce specialties in Greece compared with other countries.

Figure 4: Health care workforce data (2009–2019)



Source: OECD statistics (2021).

Figure 4 (continued): Health care workforce data (2009–2019)

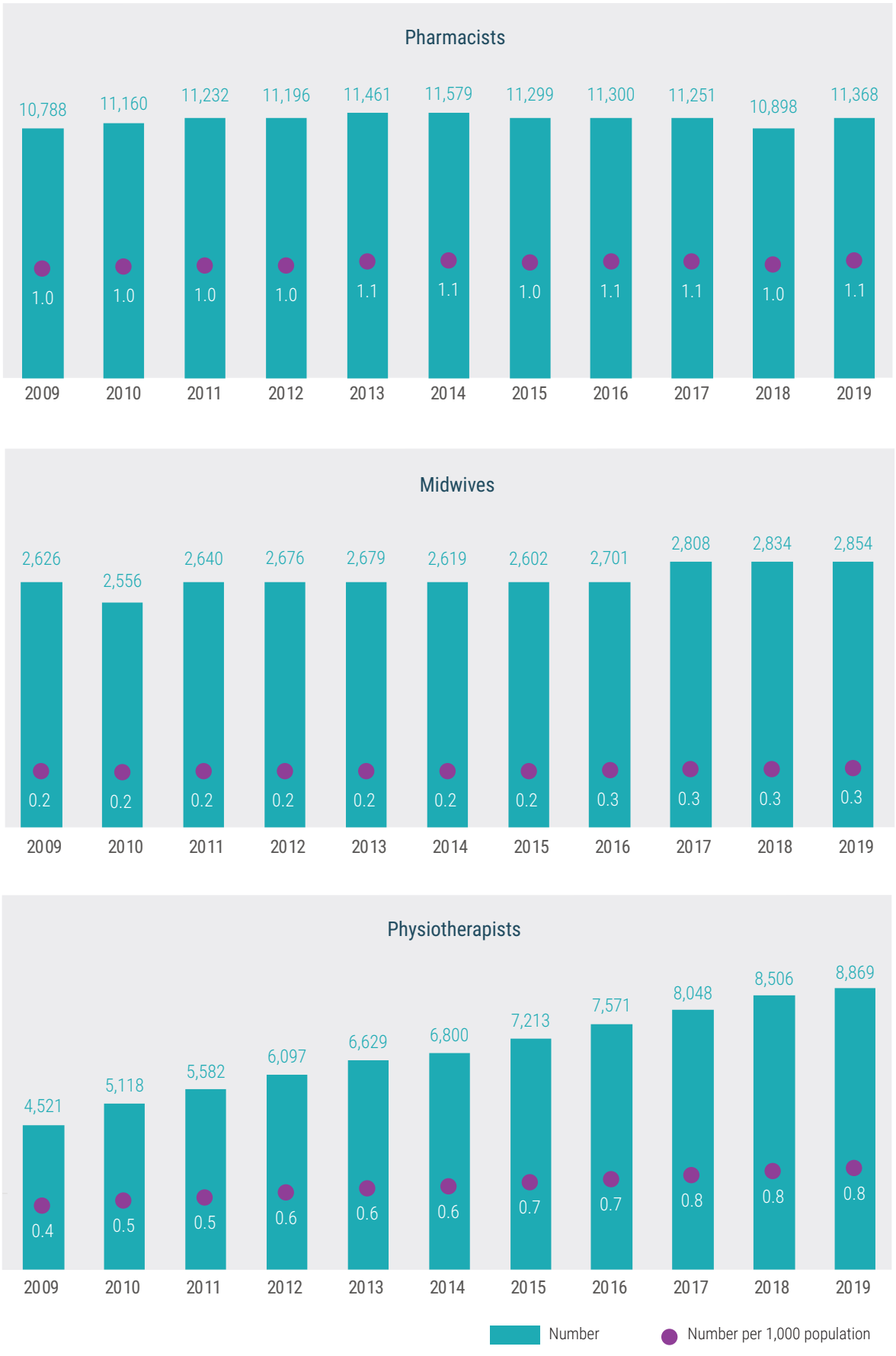
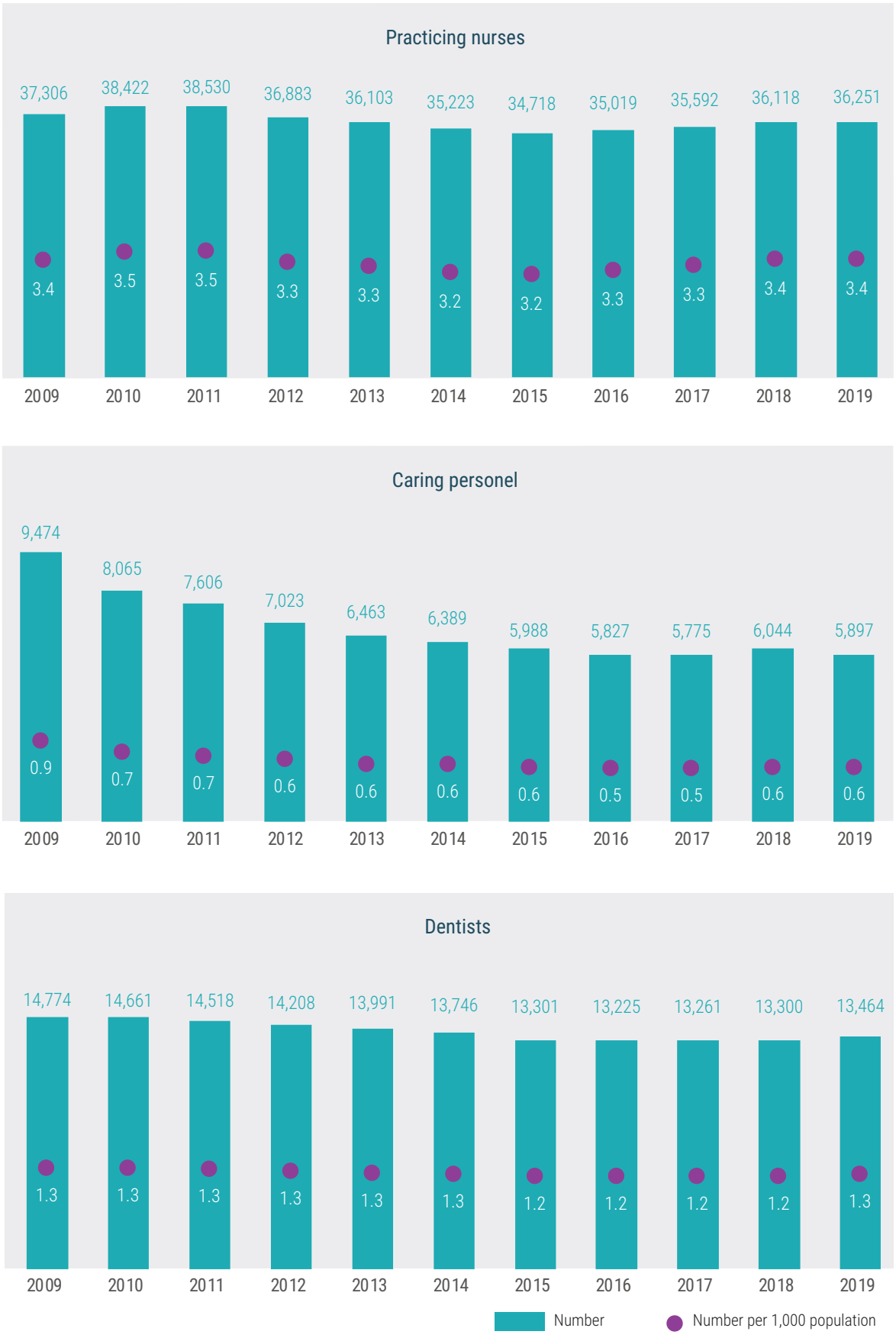


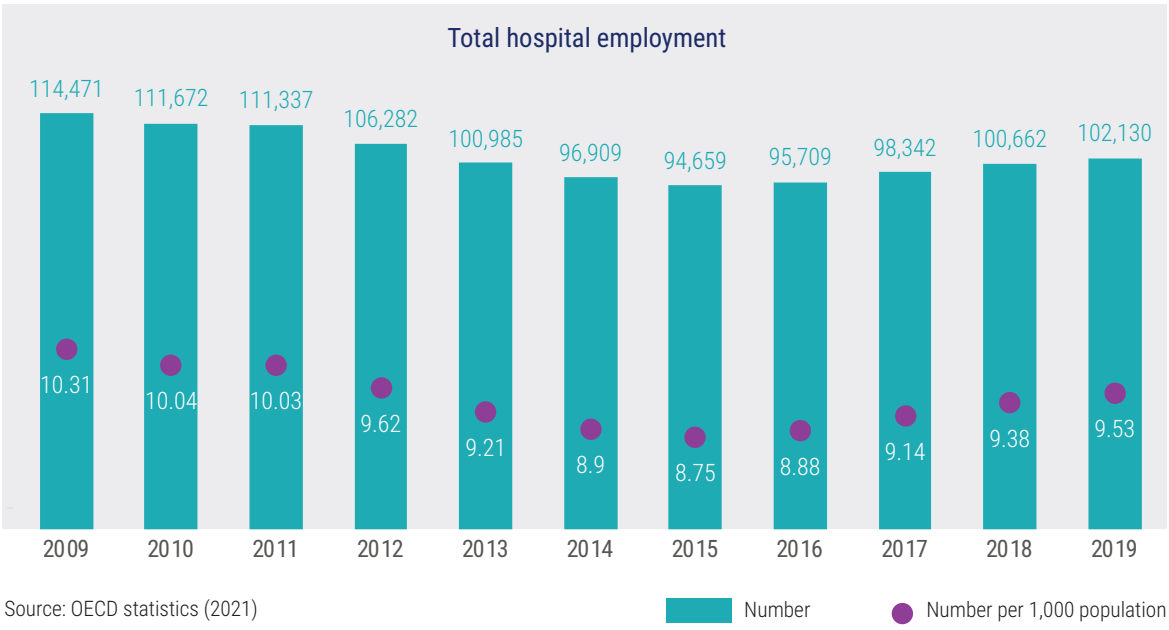
Figure 4 (continued): Health care workforce data (2009–2019)



Apart from the imbalances among specialties, substantial geographical differences exist in the distribution of the health workforce. In particular, concentrations of physicians are higher in large urban centres than rural or less urban areas. Indicatively, the Athens region is currently one of the most densely populated areas worldwide, in terms of the number of practicing physicians per 1,000 population [17]. The number of physicians who can practice in publicly funded health care facilities is determined by the MoH, although the MoH does not regulate the distribution of physicians practicing in the private sector across the country [12]. Planning of human resources for physicians is associated with the number of entrants in medical schools, which is determined by the Ministry of Education. Nonetheless, the annual number of entrants is not associated with population or health system needs. In this context, a national approach to long-term workforce planning is not currently in place, and the only implemented measure to manage human resources has been the stabilisation of the number of new entrants in medical schools annually since the mid-2000s [12]. However, the physician population is further expanded by those who study abroad and return to practice in Greece. Imbalances are also observed between specialties and the ratio of medical and nursing staff.

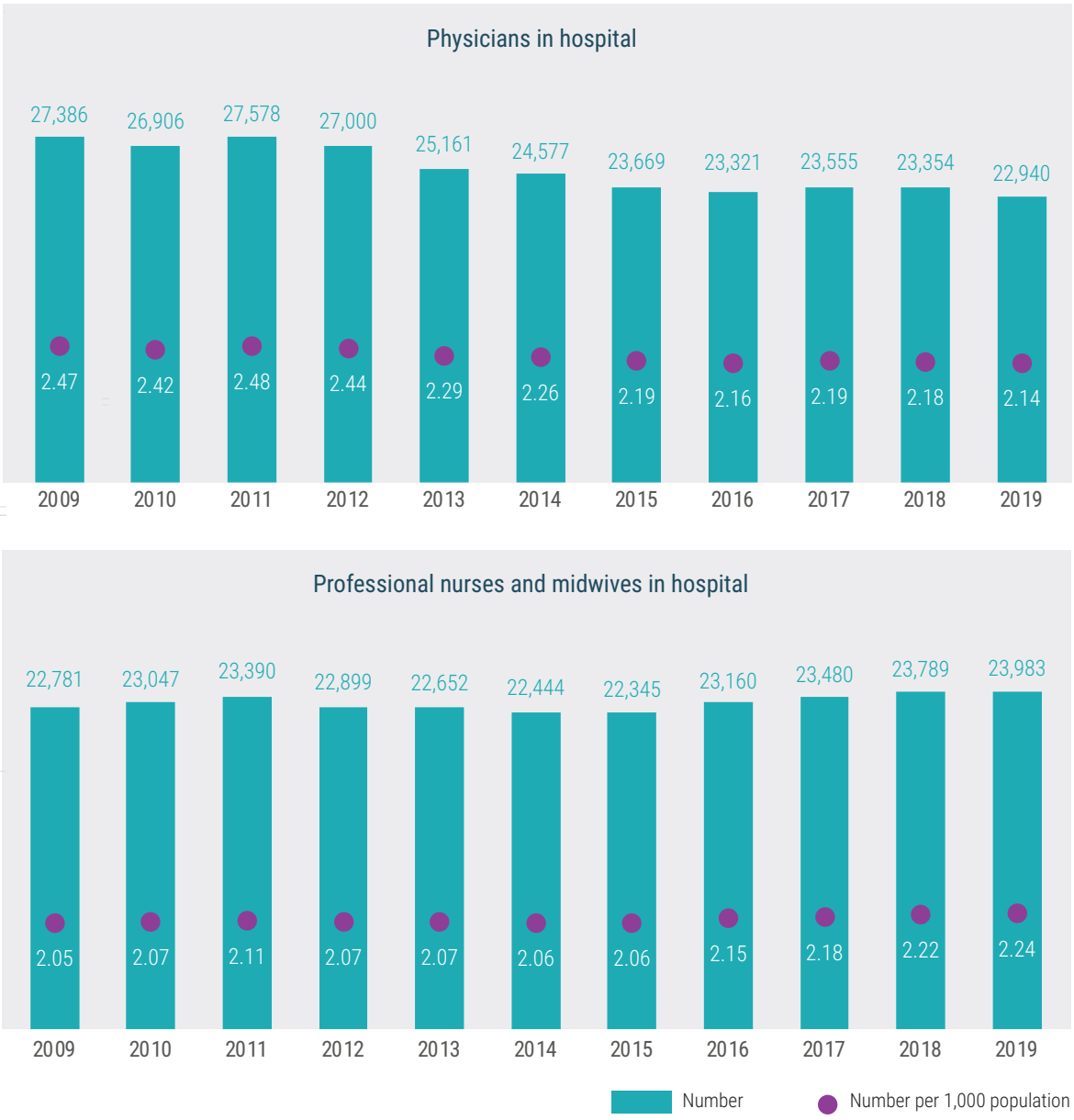
Regarding hospital employment, previously published studies have reported understaffing in public hospitals, mainly among nursing personnel [37, 38]. In 2018, the ratio of the number of nurses employed compared with the planned positions, as reported in the organisation charts of each of the public hospitals of the National Health System, varied from 80% in the Health Region of Macedonia to 68.20% in the Health Region of Attica, with a country average of 69% [38]. Overall, a declining trend in total hospital employment was observed in Greece between 2009 and 2015, as well as in the number of hospital physicians and hospital professional nurses and midwives (Figure 5). This trend is largely attributable to the suspension of hospital personnel recruitment in the public sector, owing to the need for fiscal adjustment during the economic crisis. An increasing trend in hospital employment has been observed from 2016 onwards, with the exception of physicians employed in hospitals.

Figure 5: Hospital employment (2009–2019)



Source: OECD statistics (2021)

Figure 5 (continued): Hospital employment (2009–2019)



An important element in terms of practicing in the health care sector is the 'silo' approach of care; i.e., health care professions, at least in principle and legislation, have specific boundaries/limits on their approach to care, although in real life, those boundaries may be less clear. In this sense, for example, certain pharmaceuticals or laboratory exams may be prescribed by specific specialties, most services to the patient are by law to be administered only by physicians, etc. In 2014, legislation to allow nurses to perform a specific list of services directly on patients was met with fierce resistance and was finally withdrawn. This framework does not allow for 'task shifting' that could improve the availability of services, foster collaboration and increase the efficiency of spending.

The consequences of the financial crisis and its overall effects on the health care sector have contributed to the migration of health care professionals [39]. According to the Medical Association of Athens, 12,226 physicians had migrated from Attica alone between 2009 and 2020, whereas more than 18,000 Greek physicians have migrated since the onset of the financial crisis. During

2019, the Medical Association of Athens issued 1,097 certificates to physicians who intended to migrate, of whom 749 were specialists [40]. High unemployment, salary reductions, shrinking of the private sector and poor work satisfaction are among the main reasons for the high outflow rates of health care professionals [39].

Greece had not developed a national approach to workforce planning or a monitoring mechanism for the inflow and outflow of health professionals; therefore, policies for investment in human resources in public hospitals and other infrastructures were supply led, whereas governance and administrative capacity to implement HRH policies at the central and regional level is limited [39]. In addition, investment in human capital (e.g., through continual education or job satisfaction policies) has been limited. In 2018, as part of the Strengthening Capacity for Universal Coverage (SCUC) collaboration initiative between the WHO and the MoH, a Strategy on HRH was prepared. The strategy consists of objectives and recommended policy actions including health care workforce monitoring and planning, recruitment, equitable distribution, continuing professional development and retention of health workers [39]. As many physicians reach the age of retirement, particularly in the ESY hospitals, an opportunity arises to staff the public health care system with new specialties that meet demand-side objectives.

No systematic method is used for assessing job satisfaction among personnel employed in the public health service. Available data suggest that health care professionals (both physicians and nurses) working in public health care facilities in Greece are generally satisfied with the nature of their job, and their relationships with their colleagues and their supervisors and management. Nonetheless, they are not satisfied with the current remuneration scheme and their income [41–45].

The monthly salaries of physicians working in the National Health System depend primarily on their salary scale (based on their number of years of work experience and education) and their position. Allowances are made according to position, education and other factors. The monthly salary of all other health care workers of the National Health System is defined according to Law 4778/2021. Owing to cuts in salaries of workers employed in the public sector, the average annual gross income of salaried specialists has substantially decreased between 2009 and 2019, from 57,564.56 euros to 39,007.92 euros. Hospital nurses also saw a decrease in their annual gross income during the same period, from 28,846.80 euros to 20,285.00 euros (Table 5) (data are available for salaried specialists and nurses employed in public hospitals). Both salaried physicians' and hospital nurses' annual wages in 2019 were higher than the average annual wage, which was 17,195 euros.

Table 5: Annual gross income of specialists and hospital nurses (2009, 2014, 2019)

Salaried health care personnel employed in public hospitals		2009	2014	2019
Specialists	Gross income (Euros)	57,564.56	43,153.92	39,007.92
	Gross income (Euros, 2015 prices)	55,408.94	43,027.17	39,090.88
Hospital nurses	Gross income (Euros)	28,846.80	22,932.00	20,285.00
	Gross income (Euros, 2015 prices)	27,766.57	22,864.64	20,328.14

Source: OECD statistics (2022).

3.2 Workforce for health system resilience

Greece entered the COVID-19 pandemic with staff shortages in ESY public hospitals, mainly in nursing personnel. At the very beginning of the pandemic in Greece, several mechanisms were activated to respond to the increased health care and health workforce needs. According to legislation, in cases of emergencies and in cases requiring prompt prevention or response to public health threats, local authorities may recruit additional short-term contract staff. In addition, orders of personal services may be issued in cases of emergencies such as war and hazards to public health, according to the decision of the Prime Minister [46].

Thus, after confirmation of the first case of COVID-19, several actions were taken, including revocation and suspension of regular leaves for health staff, recruitment of short-term contract staff members (medical, paramedical, nursing, managerial and other staff), calls for volunteers (doctors, nurses, paramedics, retirees, medical students, administrative assistants, technicians and others) [3], as well as the requisition of services of private physicians based in regions with increased health care needs, to reinforce the ESY. In addition, in hospitals where most medical wards became COVID-19 units, most health care personnel were allocated to COVID-19 clinics, and staff from other hospitals were transferred to those with increased needs [47].

Protocols are in place for the management of patients and the safety of health care professionals and are regularly revised. During the pandemic, educational meetings, electronic distribution of updated information and guidelines formed the basis of training, and practice sessions on the proper use of protective measures and equipment were held [47]. To provide psychological support to in-hospital patients with COVID-19 and their families, health care workers as well as the general public, the MoH implemented the programme Nobody Alone in the Pandemic [48], providing psychosocial support and empowerment services, as well as psychotherapy services. Tablets and smartphones have been made available to hospitals to ensure access to those services. The *Nobody Alone in the Pandemic* programme operated in collaboration with a hotline, which provided 24/7 specialised support services to the general public [48]. Additionally, a psychological support system from experienced professionals has been aimed at supporting health care staff affected by fear and exhaustion [47].

Vaccination against COVID-19 was mandatory for staff working in private, public or municipal health care structures, and care units for older people and individuals with disability (Law 4778/2021). Hence, physicians, nurses, administrators and other staff who had not been vaccinated against, or had recently recovered from, COVID-19 were suspended from their duties until they received at least one dose of the vaccine. After implementation of the law, more than 5,000 workers in the health care sector (approximately 5.8% of total staff) were suspended [49]. Of those working in hospital settings, approximately 2.1% of physicians, 6.8% of nurses and 7.3% of administrative staff were suspended from their duties [49]. Following a recent decision of the Greek Council of State, the top administrative court, the remaining unvaccinated healthcare workers (approximately 2,000) are expected to return to work under strict monitoring protocols that will include regular rapid testing.

Overall, the MoH responded swiftly and staffed the ESY to meet excess demand due to the COVID-19 pandemic; capitalising on the experience gained is currently important to improve responses to future public health crises. We highlight that the health care personnel showed solidarity and support in the collective effort to mitigate the pandemic and provide care. This legacy could also be strengthened and considered in the planning of future HRH policies.

Furthermore, the emergence of public health as a priority can foster the development of a critical mass of public health scientists and professionals. Administratively, this development could take the form of an organised public health service, with focal points in all regions/localities in Greece.

3.3 Recommendations

3.3.1 Domain recommendations

RECOMMENDATION 1
To establish both annual and long-term planning processes for recruitment in health system structures on the basis of health needs of the reference population.

RECOMMENDATION 2
To prioritise the increase in the number of nurses employed in public hospitals with the goal of reaching the EU average.

RECOMMENDATION 3
To implement policies for the measurement of job satisfaction among the ESY workforce, in a systematic manner.

RECOMMENDATION 4
To introduce continuing education schemes, which will be obligatory for ESY health professionals.

RECOMMENDATION 5
To institutionalise the periodic revision of undergraduate training programmes for health professionals, according to the developments in science and practice.

3.3.2 Points for consideration

1. Introduce financial rewards as a motive for ESY health staff or structures that excel in terms of productivity (and/or efficiency, in the case of structures).

2. Further extend task shifting between health professionals, e.g., by enabling pharmacists to provide health advice in a systematic manner, or allowing nurses to perform specific procedures (both in-hospital and on an outpatient basis).

3. Implement a system for ESY personnel performance assessment that will incorporate goal-setting, specified key performance indicators and corresponding salary scales.

4. DOMAIN 4

Medicines and technology

4.1 Medicines and technology for health system sustainability

4.1.1 Adoption of health technologies

The pharmaceutical industry (including both the production and distribution of pharmaceuticals) is among the most dynamic industrial sectors in Greece. Indicatively, its gross added value was 1.2 billion euros in 2019, representing 6.6% of the total manufacturing sector [27]. Approximately 106 national and multinational pharmaceutical companies operate in Greece, including a strong generic medicines industry. More than 23,000 people were working in the pharmaceutical sector in 2019 (representing approximately 0.4% of all people employed). Despite the notable presence of the pharmaceutical industry in the sectors of production and distribution, it has performed well below the EU average in terms of research and development (R&D) activity. Indicatively, between 2002 and 2020, 3,114 clinical studies were conducted in Greece (including all stages and phases), of which 1,800 had been completed, whereas the EU-28 average was 6,568. In addition, R&D for pharmaceuticals accounted for 7% (76 million euros) of total expenditure on R&D (2019 data), a value lower than that in other countries with similar population sizes [27]. R&D expenditure relative to the GDP has also been historically in Greece. R&D expenditure as a percentage of the GDP was lower than the EU average in 2020 (1.51% of the GDP vs the EU-27 average of 2.31%). However, an increasing trend has been observed during the past decade [50]. Most R&D expenditure was in the business enterprise sector.

Regarding the formal introduction (including pricing and reimbursement) of new medications to the market, Greece has seen some delays with respect to the major pharmaceutical markets in the EU, particularly during the financial crisis. According to Waiting to Access Innovative Therapies (W.A.I.T.) indicator data, of the 152 medicines approved by European Medicines Agency (EMA) during 2016–2019, 53% were available (reimbursed by social insurance) in Greece in 2020, compared with an EU average of 49% [51]. This performance indicated a slight improvement over 2010–2014, when major delays in the introduction of new medications were observed. The average time to availability (number of days between central marketing authorisation of a medicine and the date of availability to patients) for the period 2016–2019 was estimated at 447 days for Greece (again indicating an improvement over 2010–2014), whereas in other European countries, the indicator ranges from 120 days (Germany) to 883 days (Romania), with an average of approximately 504 days among 24 European Union countries [51].

Nevertheless, these delays have resulted in extensive use of the Electronic Drug Pre-approval System (SIP). In this case, a request may be submitted to the SIP by consulting physicians for the per case reimbursement of medicines that: (1) are not currently included in the list of reimbursed medicinal products and will be used to treat a life-threatening or debilitating disease, (2) are high-cost medicines that require pre-authorisation, (3) are intended for off-label use, (4) are intended for compassionate use and require temporary personal authorisation for early access to the treatment from the National Organisation for Medicines (EOF) and (5) may not be available in the country (for example because of temporary shortages or a lack of interest by the Marketing Authorisation Holder (MAH) in obtaining a formal reimbursement approval) but have received EMA authorisation and are available in other EU countries. For medicines used in the hospital setting, a special procurement process exists, whereby the medicine is imported via the IFET, a subsidiary of the EOF [52].

Pharmaceutical products cannot be marketed in Greece without a marketing authorisation from the EOF or the EU centralised authorisation procedure. The EOF is obliged to grant marketing authorisation within 210 days from the submission of a complete application (Joint Ministerial Decision Δ.ΥΓ3α/Γ.Π. 32221). Nonetheless, delays exceeding 2 years have been reported in the past [53]. After marking authorisation is granted, all pharmaceuticals for human use undergo an assessment procedure and a price negotiation procedure.

The Committee for the Evaluation and Reimbursement of Medicinal Products for Human Use (Evaluation Committee) evaluates all medicinal products and issues recommendations to the MoH regarding their inclusion or exclusion in the list of the reimbursed medicinal products (also known as the 'positive list'). The assessment is based on the criteria of clinical benefit, comparison with the available alternative options, degree of reliability of the clinical data, cost/effectiveness ratio and budget impact. In actual terms, the evaluation is based primarily on clinical criteria, whereas the use and the guidelines for health economics evidence are unclearly defined, mainly because of the absence of a concise set of guidelines for how health technology assessment should be performed. Consequently, an official cost-effectiveness threshold has not been yet defined, and other elements of adoption (or non-adoption) – such as spillover social and general economic effects, or the effects of potential non-adoption on patients – are not formally appraised.

After positive evaluation, medicinal products undergo a negotiation procedure before they can be officially added to the positive list. The Committee for the Negotiation of Medicinal Products' Price (Negotiation Committee) negotiates the price or discounts of medicinal products and informs the Evaluation Committee regarding budget impact. The final decision on the inclusion, non-inclusion or exclusion of a medicinal product from the positive list is issued by the MoH, and the applicant MAH is notified within an exclusive timeframe of 180 days from the submission of the application (Law 4512/2018). Nonetheless, substantial delays have been reported [54]. The decision can specify special conditions for reimbursement (i.e., the drug can be reimbursed for a subgroup of patients or only when specific treatments have been administered beforehand). All medicinal products that are under patent protection and have been included in the positive list are re-evaluated every 3 years to determine whether they will continue to be reimbursed. Some categories of medicinal products may be exempted from the negotiation and/or assessment procedures. Generic medicinal products; new medicinal products containing known constituents not hitherto used in combination for therapeutic purposes; or medicinal products that have changed their container, packaging, brand name or form, and do not have positive effects on the SHI budget, do not undergo assessment (Law 4675/2020). Biosimilar medicinal products and vaccines undergo a shortened evaluation process of 1 month from the application of the MAH [55]. Those categories may also be exempt from the negotiation procedure on the basis of certain criteria regarding their price or budget impact (Law 4675/2020).

Currently, no official decision-making process exists regarding to the course of de-adoption of obsolete medicines or technologies. These can be excluded from the benefits package (reimbursed services) of the SHI under its periodic changes, but formalisation is lacking. Market forces tend to make older drugs non-available (not imported in the market), sometimes because of low incentives (low prices) or strategy decisions by the MAH. For patients in need of a medication that has become non-available on the market, the IFET process described above (i.e., individual patient level imports) is in place. In contrast, regarding emerging technologies, a horizon-scanning process has recently (May 2022) been introduced and will be undertaken by EOPYY with the purpose of identifying new and emerging pharmaceutical technologies that are expected to enter the Greek pharmaceutical market.

The government has introduced a series of measures to reduce pharmaceutical expenditure following the implementation of the EAPs. Among those, price cuts, rebates, budget ceilings (and subsequent clawbacks) were put in place. In a specific effort to address the long-standing problem of low generic medicinal product penetration and to increase the uptake of generic and biosimilar medicinal products, INN prescribing (i.e., prescriptions based on active substance instead of brands) has been mandatory for reimbursed medicinal products since 2012. When receiving prescriptions for reimbursed medicinal products, pharmacists are obligated to offer the product with the lowest retail price (often generic). In cases in which patients choose the product with the lowest price, they pay only the legislated co-payment fees (0%, 10% or 25% coinsurance level depending on the underlying disease). In cases in which patients select a product with a higher retail price than the reimbursement price, they also pay the difference in prices. Despite those measures, according to the most recently available data for 2019, generic medicinal products represented 30% of the total

pharmaceutical market in volume, far below the European average (53%) [17]. However, the share of generic medicinal products in volume has increased since 2012 (18.5%) [27].

Overall, pharmaceutical spending has been an issue of longstanding debate in Greece, particularly following the fiscal adjustment period. Pharmaceutical spending was considered an area of high inefficiency and, as early as the first EAP, a ceiling on public spending on outpatient pharmaceuticals was set to approximately 1% of the GDP. This measure, which remains in place, has created increasing sums of rebates and clawbacks as well as increased patient contributions [56].

The total retail pharmaceutical spending as a percentage of the GDP in Greece remains among the highest in the OECD and is increasing. Apart from the outpatient expenditure, substantial pressures arise in the in-hospital sector, whose allocated budget for medicines is exceeded by the actual need by almost 100% (i.e., 50% of total expenditure for in-hospital pharmaceuticals is to be returned by the MAHs as rebates or clawbacks). The underlying forces driving outpatient pharmaceutical expenditure in Greece can probably be traced to the product mix [57] rather than volumes (which are close to the EU average) or the evolution of medicines' prices. Greece has a high percentage of on-patent and off-patent medicine use, and a persistently low penetration of generic medicinal products. Therefore, policies that influence prescribing behaviour and manage the diffusion of new pharmaceuticals must be strengthened; furthermore, the unilateral focus on harnessing expenditure through rebates and clawbacks undermines the sustainability of the system. In this direction, the results of laboratory tests must be available and imported into the electronic prescribing system so that therapeutic choices are supported by evidence and to enable prescribing audits.

The HTA system remains weak regarding processes for decision-making; hence, HTA institutionalisation, through the establishment of a dedicated HTA agency, is also a necessity. Regarding pharmaceutical use, re-evaluation of the role of hospitals as a dispensing channel for pharmaceuticals may pose new grounds for restarting discussions regarding the general setting of in-hospital pharmaceutical spending, in not only Greece but also probably other European countries.

The current HTA process does not include medical devices. The lack of a formalised process for biomedical technologies (apart from pharmaceuticals) creates substantial uncertainty for providers of biomedical tests and for pharmaceutical companies (regarding market entry of the tests and patient access to drugs for which a companion diagnostic is a pre-requisite for administration) as well as for patients (regarding access to testing and sometimes treatment). In some cases, this situation can be highly problematic, e.g., for biomarker tests used to guide highly specialised therapies. To promote market access for their targeted medicines, some pharmaceutical companies agree to finance access to biomarker testing. Given that this arrangement can negatively affect the effectiveness of treatments and the efficiency of spending, a robust and timely process must be established for the reimbursement of such technologies. Of note, a Committee for the Negotiation of Medical Devices' Fees and Prices does exist, operating within EOPYY; however, it is not involved in the assessment of new technologies. Instead, it only negotiates the prices of technologies that either already exist in the market or are imported through ad hoc decisions, such as ministerial decrees, i.e., the non-formalised and non-systematic process described above.

Regarding new biomedical equipment, investments made by private sector health care providers on equipment using ionising and non-ionising radiation[2] are assessed by a special committee of the MoH. The committee issues an opinion regarding the investment's feasibility to the respective decision-making body. The criteria considered relate to the applicants' adequacy in terms of infrastructure and (specialised) personnel; the equipment's quality; and the biomedical equipment available in the respective geographical area. A population coverage criterion is also in place;

[2] Equipment used for diagnostic and invasive radiology, mammography, computed tomography, magnetic resonance imaging, nuclear medicine, positron and computed tomography (PET-CT), radiotherapy, stereotactic radiosurgery, bone densitometers and orthopantographs.

specifically, the criterion sets a maximum equipment/population ratio for each type of system, taking into consideration the available equipment in both private and public sector facilities. The population size considered varies depending on the type of equipment. Certain exceptions from the population coverage criterion apply, e.g., for areas where access to the respective services may be hindered by geographical or supply side characteristics, (2) for private clinics that operate complete pathology and surgical departments and (3) for 'new technology and state-of-the-art' equipment (up to a maximum number per population unit and type of equipment). In the third case, the equipment must comply with the specifications foreseen in the law (pertaining to types of CT, MRI and PET CT systems). Although private providers are requested to send utilisation data for this type of equipment to the MoH and respective authorities, these data are not publicly available; therefore, evaluating the effectiveness of the biomedical equipment regulation is difficult.

Decisions for investments in biomedical equipment by ESY hospitals are overseen by the MoH. Funding is available from various sources (the Public Investment Programme and European Structural Funds), whereas large donations of biomedical equipment have also been made by non-profit institutions. The MoH oversees the progress in investments in biomedical equipment in all ESY hospitals, in an effort to strengthen central planning [58]. The MoH plans to develop an information system for the collection of data, aiming to present the current status and the monitoring and management in terms of future needs for biomedical equipment in ESY hospitals. A roadmap and a strategy are foreseen to also consider the use of new tools (e.g., leasing and public-private partnerships) to meet the needs of ESY hospitals.

These advances can be regarded as a positive step towards improving sustainability by supporting the allocation of biomedical equipment according to population needs. Recording and monitoring of biomedical equipment in the private sector could further strengthen the MoH supervisory role of the health system as a whole, given the strong presence of the private sector of diagnostic services.

4.1.2 Digital health

Digital health has been a national priority during recent years in Greece. Substantial progress has been made towards the integration of digital health in everyday medical practice and health service management. The electronic prescription system, established in 2010, implemented the electronic registration of prescriptions and medical test/examination referrals. This system is used by all physicians contracted with EOPYY and pharmacists, and is scheduled to be implemented in the hospital setting.

The Individual Electronic Health Record (AIFI) was first established in 2014 and was aimed at implementing e-health in primary care to ensure continuity, coordination and efficiency in the provision of health care. AIFI is first activated by citizens' family physicians or any physicians specialised in general medicine, internal medicine or paediatrics. Subsequently, physicians, dentists and other health care professionals who are certified and authorised to use the Electronic Prescribing System register citizens' medical information in their AIFI. Health care professionals have access to their patients' medical histories through their electronic files.

Recently, MyHealth, a new application through which citizens are provided with easy and safe access to their electronic prescriptions, has been released. This application is considered a prototype of the Electronic Health File and will be updated with new features over time, such as medical certificates and diagnostics [59]. All citizens can easily download the application to their electronic devices free of charge.

A number of patient registries have also been developed (e.g. for patients with hepatitis C, diabetes, cystic fibrosis) or are under development (such as the registry of patients with HIV infection). Depending on the disease, the registries aim to support a range of activities including epidemiological surveillance, health policy planning and implementation, recording and monitoring of healthcare resource utilisation, enabling of electronic prescribing of treatments, assessment of

treatment outcomes etc. The National Plan for Public Health also foresees the further expansion and strengthening of the operation of the National Cancer Registry; the transition to a fully operational Cancer Registry will be an important step in the effort to combat cancer in Greece.

4.2 Medicines and technology for health system resilience

A National Registry of COVID-19 Patients was created in response to the COVID-19 pandemic. The registry was launched in May 2020, with the purpose of collecting epidemiologic data on COVID-19, such as incidents, deaths, number of positive polymerase chain reaction and rapid tests, hospital admissions and admissions to ICUs, patient medical records and demographic data. Treating physicians are required to register every patient diagnosed with COVID-19. The registry is aimed at facilitating evidence-based decision-making and improving the coordination of health care services. It has also provided the opportunity to provide telemedicine to patients with COVID-19 who were isolated at home. In addition, the registry has facilitated resource allocation, planning of future needs, formulation of hospital treatment protocols and monitoring of the status of health care facilities. The registry is also connected to the electronic prescription system [60].

Greece secured access to vaccines and therapeutics for COVID-19 authorised in Europe as well as to medical supplies and equipment through the EU joint purchasing and procurement procedures [61]. Further collaboration in joint procurement among EU member states could strengthen the health system's sustainability and resilience. The vaccine delivery and distribution process are considered successful, and no shortages have been reported. The rollout of the Greek vaccination programme against COVID-19 is an example of successful implementation of a vaccination strategy that also capitalised on the potential of digital technologies (see related Case Study 1).

Vaccination against COVID-19 was initially performed only in facilities in the public sector. In July 2021, private practitioners, diagnostic centres and private clinics were invited to participate in the vaccination campaign by performing vaccinations in their practices and/or at homes with the Johnson & Johnson and Pfizer vaccines under a specific contractual agreement. In December 2021, a call was addressed to non-profit organisations to participate in the vaccination campaign, with the purpose of addressing the vaccination needs of vulnerable social groups (e.g., people experiencing homelessness, substance users and migrant populations). Participating organisations can provide vaccinations at their premises or mobile units [62]. The National Vaccination Committee in cooperation with the EODY developed educational material and guidelines targeted at vaccination centre personnel and private practitioners providing vaccination with the Johnson & Johnson vaccine in ambulatory settings [63].

In conclusion, a strong legacy has arisen from the management of the pandemic, which was heavily based on the development of digital infrastructure. Digitalisation and investments in health information systems have been stated as a national priority for the future – a development expected to support health system sustainability and resilience. In addition, planning for future public health crises should consider the capacity for local production and distribution of pharmaceuticals that could ameliorate issues regarding the availability of pharmaceuticals in times of crises/emergencies, with careful planning.

4.3 Recommendations

4.3.1 Domain recommendations

RECOMMENDATION 1
To develop a National Pharmaceutical Policy with the participation of all stakeholders.

RECOMMENDATION 2
To establish a framework and a mechanism for analysing health technology utilisation and outcomes data and make the data available to the scientific community.

RECOMMENDATION 3
To incentivise the local production of health technologies (e.g., medicines) through a dedicated sectoral/industrial policy with the aim of improving the international marketability of produced products and securing the response to emergencies or crises.

RECOMMENDATION 4
To establish an independent and autonomous National Agency for Health Technology Assessment.

RECOMMENDATION 5
To establish an assessment process for non-pharmaceutical health technologies (e.g., biomarkers, digital applications, etc.).

RECOMMENDATION 6
To make all aggregated data on drug consumption from the e-prescription system publicly available. To initiate a gradual effort to systematically record therapeutic outcomes at the patient level, to link treatments to outcomes.

4.3.2 Points for consideration

1. Inclusion of digital apps in EOPYY's benefits basket to facilitate patient access.

2. Develop payment-by-results schemes for health technologies.

3. Develop a comprehensive Medicines and Technology database. The database will contain the full clinical and economic characteristics of included medicines/technologies, and will be interconnected with the EMA and other national and European organisations and agencies for online, real-time updating.

5. DOMAIN 5
Service delivery

5.1 Service delivery for sustainability

5.1.1 Efficiency measures

The Greek health system heavily relies on the hospital sector for the provision of health care. Hospitals account for 44% of total health expenditure, representing one of the highest rates among OECD countries, whose average corresponding expenditure has been estimated to be 28% [17]. In contrast to the general trend in Europe, the share of expenditure for inpatient care in Greece has increased during the past decade, mainly at the expense of outpatient care [64]. This fact poses a substantial threat to the sustainability of the system, given that the over-reliance on hospital care and the channelling of demand towards hospitals, substantially reduces the role of outpatient care and in turn leads to inefficiencies in spending and service delivery. The service delivery efficiency is affected through a mechanism of 'inverse substitution', whereby less severe cases tend to be managed in emergency departments, instead of primary or outpatient services.

In acknowledgment of this situation, several policies have been implemented in the country, mainly from 2010 onwards, either with national 'ownership', i.e., initiated as part of the local policy dialogue, or mandated as a part of the EAP. These policies have focused mainly on reducing waste, enhancing health system efficiency, and strengthening PHC. The most important reforms in this context refer to the following [2,10,12]:

- Public hospital accounting (introduction of a double-entry accounting system, regular publication of audited balance sheets, revision of pricing and costing mechanisms, use of uniform coding system for medical supplies)
- Public hospital restructuring
- Implementation of a Diagnosis Related Groups (DRG) system for the reimbursement of inpatient care
- Reforms in PHC (see 5.1.4)

In addition, ongoing efforts are in place to enhance the capabilities of the existing BI system to allow for provision of real-time information on a series of operational indicators for the public hospitals. To improve the hospital management and increase efficiency, the management team of each hospital is periodically evaluated on the basis of a set of performance indicators (financial management, operational efficiency, quality and patient safety and crisis management). Underperforming can lead to managerial changes after the evaluation process. Finally, a new law (4865/2021) was recently implemented regarding the procurement processes in public hospitals, aiming to improve the efficiency of spending through centralised tenders or procurement. In this respect, an organisation, the Authority for Centralised Procurement (EKAPY) was established, and a 40% share of centralised procurement in total hospital expenditure (approximately 320 million euros) is expected to be met in 2022 [65].

The 30-day all cause readmission rate among patients with heart failure, discharged alive with a length of stay <30 days in Greece has been reported to be 6.7% in a multinational study (ASCEND-AF)[66]. The time series of readmission rates is not available. However, the readmission rate for certain diseases is planned to be included in the hospital performance indicators developed by the National Agency for Quality Assurance in Health (ODIPY). The average length of stay in hospitals across Greece in 2019 was 6.9 days [17].

Despite longstanding efforts, progress in reforms to increase efficiency remains slow regarding the PHC reform and the full-scale introduction of the DRG system. Another risk to the sustainability of the system, given the demography and epidemiology dynamics, is the underdevelopment of long-term care. To address this gap in service provision, re-orientation of some of the ESY structures (hospitals) is starting to be discussed in the public dialogue. Another notable omission is that no comprehensive system for systematically recording (and reporting in the public domain)

performance indicators exists in secondary and tertiary care. Therefore, comparison between hospitals and clinics on a consistent basis is almost impossible, thus potentially leading to substantial efficiency loss due to the inability to benchmark relative performance and define best practices.

5.1.2 Digitalisation for health service delivery

The digital transformation of health is among the key reforms of the National Recovery and Resilience Plan (NRRP) in the health sector. Digitisation is considered a substantial step in ensuring the sustainability of Greece's health care and long-term care systems. In detail, the objective of digitisation includes the following [8]:

- Full operationalisation of the National Digital Health Record
- Development of a Cancer Treatment Information System including patient registries
- Further development of telemedicine (including telemedicine station, infrastructure and tools)
- Enhancement of hospital digital readiness through the introduction and utilisation of digital tools and systems, including the electronic medical record, the medical equipment inventory, the implementation of the DRG system, the e-prescription for inpatients, the adoption of therapeutic protocols in the clinical practice, the development of an e-appointment system, and the digital upgrade of the National Centre for Emergency Care (EKAB) and the EOF
- Digital upgrade of EOPYY through the development of an integration information system for the effective management of data and resources

5.1.3 Quality

During past years, the MoH, in collaboration with medical associations, has developed and disseminated clinical guidelines and treatment protocols aimed at strengthening disease management and thus improving the quality of care [67]. The adoption of clinical guidelines contributes to the improvement of the processes and the outcomes of care, reduces the use of unnecessary interventions and saves costs [68]. However, one challenge faced by the system relates to how health care professionals are trained to apply the clinical guidelines in routine practice [10].

In 2020, Greece established the National Agency for Quality Assurance in Health (ODIPY) to monitor quality of care across the health system. According to its mandate, ODIPY makes suggestions to the MoH, for sanctions when health care providers do not comply with the set quality standards. No financial incentives are in place for meeting quality standards in primary and secondary care, but, according to its mandate, ODIPY is responsible for making suggestions to the MoH regarding bonuses for health care providers with an exceptional level of service. The introduction of ODIPY is a promising step towards the provision of better services. To this end, value-based policies should also be considered in the future.

In the same direction, WHO/Europe and the Hellenic Republic of Greece established the WHO European Centre of Excellence for Quality in Care and Patient Safety in Athens in April 2021. The Centre aims to support the efforts of member states to build safe, qualitative, effective and resilient health systems at the core of post-COVID-19 strategies [69].

5.1.4 The role of primary care

The role of PHC in Greece is less institutionalised than that in other European health systems [30]. Primary health care services are provided mainly by private practitioners, usually on an OOP basis, whereas the role of the public sector is limited to (1) the operation of 305 ESY primary health centres and their health surgeries, as well as 127 local health units (TOMY) [70], (2) the remuneration of several private practicing physicians for the provision of a limited number of visits – approximately

200 visits per physician per month – to patients covered by SHI in Greece (EOPYY) on a first come, first served basis. All physicians either contracted or certified by EOPYY can prescribe medications or exams to people residing in the country (regardless of insurance eligibility status) [30].

The reform of the PHC system was a major component of the EAPs and remains an important strategic goal. The first PHC reform occurred in 2014, with the establishment of a National Primary Care Network and the transfer of responsibility for primary care provision to the YPEs. The 2017 reform in primary care aimed to establish a first contact point, through decentralised local primary units staffed by multidisciplinary teams, with a gatekeeping system in place, but the reform was partially implemented. Several challenges arose in PHC reform; specifically, the establishment of a National Primary Care Network (PEDY) was delayed because of a lack of funding, human resources, and administrative weaknesses [10]. The reform that followed with the establishment of the local primary network projected the rollout of 239 TOMY within 2 years, but only 127 of them are operating to date. This delay may be attributed to unavailability of GPs and/or insufficient incentives [71]. The full rollout of the network is planned to be completed by June 2023 [65].

As previously described, a new law regarding the reorganisation of the PHC system was enacted in May 2022. According to its provisions, all citizens are required to select and register with a personal physician who will have a gate-keeping role in the health system. The personal physicians will guide all registered citizens under their responsibility (as many as 2,000 registered) through the ESY, and refer patients to specialised physicians or to secondary and tertiary health care services. The law provides freedom of choice of a personal physician, who can be from a health centre, a TOMY or a primary health care unit of the ESY, or a private practitioner contracted with EOPYY. A capitation model will be followed for the reimbursement of personal physicians, and the exact amount will be determined through upcoming ministerial decisions. The law foresees the introduction of a financial incentives/disincentives scheme to facilitate population registration and gate-keeping, whose details are expected to be set in secondary legislation. The details of provider remuneration are also planned to be included in secondary legislation, given the ongoing negotiations regarding the contractual arrangements for general practitioners [65].

A radical change in the role of primary health care remains a policy priority of utmost importance for the sustainability of the health care system in Greece. Health expenditure on outpatient care represented 23% of total health expenditure for 2019, whereas inpatient care is the dominant expenditure category in Greece, with 44% of total health expenditure for the same year [17]. Furthermore, public spending accounts for 61% of total health spending on outpatient medical care, a percentage well below the EU average for this type of service (75%) [30]. This situation is probably indicative of the absence of a first point of contact for health needs, which are addressed at the hospital level, thereby burdening ESY hospitals and undermining the sustainability of public health care system delivery.

5.1.5 Coordination of care and new care models

One structural inefficiency of the Greek health system is the lack of coordination and integration of services among primary, secondary and social care [11]. These factors contribute to a lack of continuity of care, which is also intensified by unbalanced service availability that is de-coupled from needs.

Despite the need for refocusing care away from the hospital and towards the community, a country-wide strategy to promote new care models is lacking. Moreover, the weak coordination results in problems with access, continuity of care and comprehensiveness of services [10]. New models of providing long-term care (e.g., outside facilities, at the place of residence) could also overcome the issue of the absence of long-term care facilities.

The ongoing PHC reform aims to address these long-standing problems by establishing a gate-keeping and referral system, which is also expected to decongest outpatient departments of public hospitals. Furthermore, the development of information technology systems (e.g., e-prescribing, e-referral and personal health records) constitutes a critical step towards better coordination of care. The Recovery and Resilience Plan for Greece foresees further steps towards digital transformation of the health system; these include, for example, the Cancer Treatment Information System, which aims to cover the entire cancer care pathway, thus facilitating integration of care for cancer patients.

5.1.6 Distribution of, and access to, service provision

As a result of the historical focus on the supply side of the health care system, in terms of service deployment, Greece has not developed an evidence-based procedure for setting priorities in resource allocation on the basis of health needs. Therefore, substantial geographical disparities exist in the allocation of health care workforce (physicians, nurses and dentists) among geographical regions, as noted in Chapter 3, as well as the availability of hospital beds and medical equipment (in both the public and private sector), because most resources (e.g., advanced diagnostic imaging equipment) are located in metropolitan areas [12, 72]. For example, the highest density of physicians in Greece is in the region of Attica, with 8.14 physicians per 100,000 population, whereas Central Greece and the North Aegean regions have the lowest proportions for the same indicator (3.12 and 3.2 physicians per 100,000 population, respectively) [17]. The existence of these differences results in patients seeking health care services in regions outside their region of residence, particularly in large cities such as Athens and Thessaloniki [73]. One indicative example is the geographical misdistribution in oncology care across the country, thereby leading to inequalities in access to health care services [74, 75] which may have implications for inequalities in outcomes. Relevant studies have shown that location affects the effectiveness of health care services, because remote units appear to be more inefficient, owing to uneven distribution of health resources [73]. Recent findings for Greece have also shown that unmet medical needs and barriers to health care access are identified mainly in individuals with lower socioeconomic status and have negative effects on health outcomes (particularly in depression, NCDs and poor subjective health) [76].

Unmet need is a long-standing problem in the Greek health care system. Before the outbreak of the COVID-19 pandemic, Greece had the second highest share of the population (8.1%) reporting unmet medical needs due to cost, travel or waiting times among EU countries, second to only Estonia [30]. In 2019, Greece was by far the country with the widest disparity in unmet needs across income groups in the EU. Specifically, 18.1% of people in the lowest income quintile reported unmet medical needs (due to costs, distance of travel or waiting times), whereas the respective share was 0.9% for counterparts in the highest quintile. Notably, in Greece, cost was the main factor in unmet needs in 7.5% of respondents, as compared with the EU average of 0.9% [30]. Finally, given the unequal geographic distribution of system resources and the lack of care continuity, patients from sparsely populated areas often seek care in other regions, mainly in urban centres, and therefore undergo a substantial burden in terms of travel costs and productivity costs, among other factors[75, 77].

5.1.7 Focus on prevention and chronic diseases

Greece has not historically invested in and designed comprehensive preventive policies, and does not focus on health promotion but instead focuses on the treatment of problems after they arise. The lack of preventive policies poses a substantial threat to the sustainability of the system, which becomes increasingly less able to bend the curve of the epidemiological transition. In addition, the gap between Greece and the OECD average in healthy life expectancy at 65, for both men (8.1 years compared with 9.7 years) and women (7.7 years compared with 9.8 years) is indicative of the burden of chronic diseases [17].

However, the new National Action Plan for Public Health 2021–2025 constitutes an important initiative aimed at addressing risk factors in population health, management of diseases with a high

burden of morbidity (e.g., cancer), protection and improvement of population health. It contains clear, measurable and time-bound goals that must be met in the coming years [9]. The implementation of antitobacco legislation in 2019 was also a critical step in this direction [30].

Greece dedicates only 1.4% of total health expenditure to preventive care, a percentage among the lowest in the EU (average 2.9%). Notably, in the context of the National Recovery and Resilience Plan, 254 million euros will be earmarked for the funding of the National Public Health Prevention Strategy. This allocation includes national screening programmes and the improvement of palliative care for cancer patients [30].

5.2 Service delivery for health system resilience

5.2.1 Maintaining services in a crisis

The COVID-19 pandemic caused substantial disruptions to the delivery of health services. A retrospective analysis of utilisation rates of public health care services during the first 9 months of the pandemic in Greece (26 February 2020 – 30 November 2020) demonstrated declines of 17.3%, 23.1% and 24.8% for hospital admissions, hospital surgical procedures and primary care visits, respectively, with respect to the average utilisation rates in the previous period (2017–2019) [78].

During the pandemic, the Greek MoH almost doubled the capacity of ICU beds (from 557 in 2019 to 1,105 in 2022) [79]. The need for this increase was also enforced by Greece's having 5.3 ICU beds per 100,000 population before the pandemic – a number well below the EU average (12.9 ICU beds per 100,000 population) [33]. According to the most recent update (February 2022), 205 and 35 ICU beds were contributed by private clinics and military hospitals, respectively [79]. Greece has also introduced public-private partnerships, which have enabled purchasing of ICU services from the private sector to meet the increasing needs due to COVID-19 hospitalisations. Moreover, in November 2020 the Greek Government requisitioned two private clinics in Thessaloniki, after their refusal to contribute to the public health system with 200 beds for the treatment of patients with COVID-19 [24].

During the first wave of the pandemic, Greece used only one-third of the available ICU beds, but in the second wave, occupancy rates increased dramatically and, in some regions, even surpassed 100%.

The occupancy rate of curative care beds in Greece before the pandemic (2018) was 58.2%, a percentage below the EU average of 73.5% for the same year [33]. Hospital beds have been unevenly distributed across the country's regions and are highly concentrated in urban areas and large cities. Of note, a three-fold difference exists between the number of hospital beds in metropolitan Attica and rural central Greece [12].

In the first wave of the pandemic crisis, to strengthen the primary care sector in the management of COVID-19 cases, an Action Plan was announced by the MoH on 3 April 2020. The main objectives of this plan were [80] as follows:

1. The operation of designated COVID-19 health centres on a 24-hour basis, exclusively for the screening and management of patients with COVID-19 not requiring hospital referral
2. The transformation of certain health centres to 24-hour health centres dedicated to providing care for patients without COVID-19 with chronic diseases, management of emergencies and communication with registered patients self-isolating in their homes

In parallel, since April 2020, the Greek MoH introduced a tele-counselling network for patients with COVID-19, which was provided through the primary care health centres. The aim of this network was the provision of counselling and support to patients, particularly vulnerable patients, via daily phone checks. The telehealth network focuses on self-isolated patients, patients with mild cases of COVID-

19 and patients after discharge [80]. Moreover, in the spring of 2020, an electronic registry for monitoring patients diagnosed with COVID-19 was put in place for ensuring continuity of care [30].

During the COVID-19 pandemic, the MoH also worked closely with municipalities in increasing the provision of the Help at Home services. Help at Home is a social protection programme aimed at providing organised and systematic care to older people, people with disabilities and low-income families. The provided services include counselling and psychological support, nursing care, family assistance and home delivery of basic goods (e.g., medicines and food) [80].

In April 2020, EODY deployed the first mobile health units (consisting of physicians and nurses), which were responsible for on-site assessment, evaluation and provision of medical and nursing care for patients without access to health centres and hospitals, owing to chronic health conditions [81].

5.2.2 Coordination of care during a crisis

Primary care played an important role in the detection and management of COVID-19 cases, but the pandemic crisis highlighted the absence of a fully developed primary care system in Greece [10, 80]. Moreover, during the pandemic crisis, the traditional boundaries separating the public and the private sector were withdrawn [24]; i.e., interconnection and cooperation between sectors was used to handle the excess demand. Building upon this practice could increase the resilience of the system.

5.2.3 Learning and adaptation

Owing to the territorial makeup of the country (with many islands and remote regions), to ensure access to health care services in remote and underserved areas, Greece had established a telemedicine programme before the onset of the pandemic, although it was not very successful [30, 71].

The spread of COVID-19 led to extended use of novel care delivery methods (e.g., remote consultations), as demonstrated by approximately 38% of the Greek population reporting having an online or telephone medical consultation during the first 12 months of the pandemic. This proportion is almost equal to the EU average of 39% [30]. The expansion of the telemedicine network will be financed by the RRF.

5.3 Recommendations

5.3.1 Domain recommendations

RECOMMENDATION 1
To define specific objectives and performance evaluation criteria for the implementation of population screening programmes.

RECOMMENDATION 2
To establish indicators of accessibility and user satisfaction with health services, to monitor the progress in the undergoing reform in primary health care.

5.3.2 Points for consideration

1. Change the scope of service provision for selected public hospitals, to provide services other than secondary care, depending on the reference population needs.

2. Organise the provision of hospital services in the form of a network of providers (reference hospital–regional points-of-care) to support care continuity and contain inter- and intra- regional mobility for patients seeking care.

3. Establish, finance and reimburse long-term care services provided by multi-disciplinary teams of health professionals at the patient's place of residence, instead of the hospital setting.

4. Introduce long-term planning for the development of health services (structures as well as types of service provision), on the basis of forecasted demand for health care services.

5. Digitally interconnect PHC, public health, social care, mental care, hospital care and post-hospitalisation care structures. This policy measure is aimed at strengthening the continuity of care provided to users of health services.

6. Develop systems to monitor and audit health services providers, both financially and in terms of the quality of service provision.

6. DOMAIN 6

Population health

6.1 Population health and health promotion

The health status of the population in Greece has historically been among the best in the WHO European Region. The life expectancy at birth in Greece in 2020 was 81.2 years (83.7 years for women and 78.6 years for men), approximately half a year above the EU average (80.6 years). The outbreak of the COVID-19 pandemic and the resultant deaths temporarily decreased life expectancy by 6 months (from 81.7 in 2019 to 81.2 in 2020). In a broader context, we can identify two distinct trends in the life expectancy in Greece from 2000 onwards. More specifically, between 2000 and 2009, life expectancy in Greece, as well as in other EU countries, increased by approximately 2 years (from 78.6 years in 2000 to 80.4 years in 2009), whereas during the next decade, the increase in life expectancy slowed substantially to 1 year (from 80.7 years in 2010 to 81.7 years in 2019), an effect attributable to limited progress in reducing ischaemic heart disease and lung cancer, as well as to increased mortality due to diabetes among older people [30].

However, life expectancy indicators tend to report only one side of the story. A key indicator for the demand of health services and the sustainability of the system is healthy life expectancy, usually measured as years lived in good health at the age of 65. In Greece, women and men are expected to have 7.7 and 8.1 such years at the age of 65, compared with an EU average of 10.4 and 10.2, respectively, in contrast to the above-average estimates of life expectancy [82]. Coupled with a growing share of the population aged over 65 (22.30% in 2020), serious concerns have been raised regarding the future sustainability of the health system, and calls for policy reform have been made [30].

In contrast, the country appears to perform well in the case of perinatal health. The infant mortality rate in Greece in 2019 was 3.7 deaths/1,000 live births, which is below the OECD average for the same year, at 4.2 deaths/1,000 live births, thereby continuing a decreasing trend recorded throughout the past decades – with the exception of the economic crisis of 2010, when an increase was observed, as the average rate of 3.1 per 1,000 live births in 2007–2009 reversed to 3.9 in 2015–2017 and reached its highest rate for the decade in 2016 (4.2 deaths/1,000 live births), probably as a result of the external shock to the economy and the subsequent repercussions to the health system [17, 83]. Regarding child health, Greece also has some of the highest participation rates in basic vaccines among its EU peers. In 2018, 99% of 1-year-olds were vaccinated for diphtheria, tetanus and pertussis, exceeding the OECD average (95.06%). In addition, for children of the same age, the vaccination rates for measles (97%) and hepatitis B (96%) were high [17]. Given the roles of vaccines in the creation of equal opportunities in future health and the amelioration of inequalities, further investment in, and strengthening of attitudes towards, vaccines is crucial element for the sustainability of the system.

Risk factors, both behavioural and environmental, are key drivers of mortality [30]. In 2019, approximately 40% of all deaths in Greece were attributable to behavioural risk factors. Tobacco smoking (including direct and second-hand smoking) represented 22% of all deaths in the country in 2019, and was followed by dietary risks (including low fruit and vegetable intake, and high sugar and salt consumption) which accounted for 15% of all deaths. In addition, air pollution (referring to fine particulate matter, PM2.5) and ozone exposure were estimated to account for 5% of all deaths in 2019. Furthermore, 3% of all deaths were related to alcohol consumption, whereas 2% were attributed to low physical activity [30].

The prevalence of smoking among the population in Greece, despite declining during the past two decades, remains among the highest in Europe. Almost one in four (24,9%) Greek people 15 years of age or older are daily smokers, and in Greece, as in other countries, males (31.3%) are most likely to be smokers than females (19%) [17, 33].

Malnutrition in Greece is manifested by a divergence from the Mediterranean diet pattern. In 2019, only approximately half the population (49.2%) 15 years of age or older ate fruit every day, and 53.4% reported daily consumption of vegetables or salads [84]. In contrast, food insecurity increased

during the years of the economic crisis, and the share of households unable to afford a meal with meat, chicken, fish (or vegetarian equivalent) every other day nearly doubled from 2008 (approximately 7%) to 2016 (more than 14%) [85]. According to recent data, in 2020, 6.1% of the total population still experienced moderate and/or severe levels of food insecurity [86].

Obesity is a major risk factor and a public health concern for Greece, particularly because of its incidence among adolescents. In 2019, approximately one in six adults (16%) self-reported being obese – a percentage almost equal to the EU average. However, more than one in five (22%) 15-year-olds self-reported being overweight or obese in 2018, a percentage higher than that in most EU countries. The problem is much more evident for boys: 31% of 15-year-old boys self-reported being overweight, as compared with 13% of girls at the same age [17, 30]. The burden of obesity is a major threat to the sustainability of the system, and its consequences affect individuals, society, and the economy. The level of insufficient physical activity among adults in Greece was recorded as 40.6% of the population, well above the OECD average (34.7%). The rates of physical activity are substantial lower among adolescents: only 21% of 11-year-olds and 13% of 15-year-olds reported engaging in moderate to vigorous physical activity on a daily basis [17]. Overweight, particularly in early years of life, may have effects over a person's lifetime, through leading to conditions including deterioration of health and well-being, emotional and mental health problems, and poor educational performance [87]. According to published estimates, 9% of current health expenditure is attributable to obesity, and projections indicate that the national GDP will decrease by 3% during the period 2020–2050 because of the economic repercussions of obesity[88]. These alarming signals indicate a need for immediate policy actions.

The alcohol consumption rates have decreased during the past years: the overall consumption per capita among adults in 2019 was 6.3 litres per person, as compared with 8.3 litres per person in 2009. Greece has reported a rate of drunkenness among 15-year-olds of 19.5%, with higher rates among boys (22%) than girls (17%) [17].

Low birthweight infants represented 9.4% of total live births in Greece in 2019 [33]. Low birthweight is associated with a greater risk of poor health or death, requires longer periods of hospitalisation after birth and predisposes infants to the development of substantial disabilities later in life [17]. Recent studies have also highlighted the negative association between newborn health and economic conditions in Greece. Relevant findings have demonstrated that the effects of the economic crisis on birth outcomes are more severe among infants in families with low-socioeconomic status [89, 90].

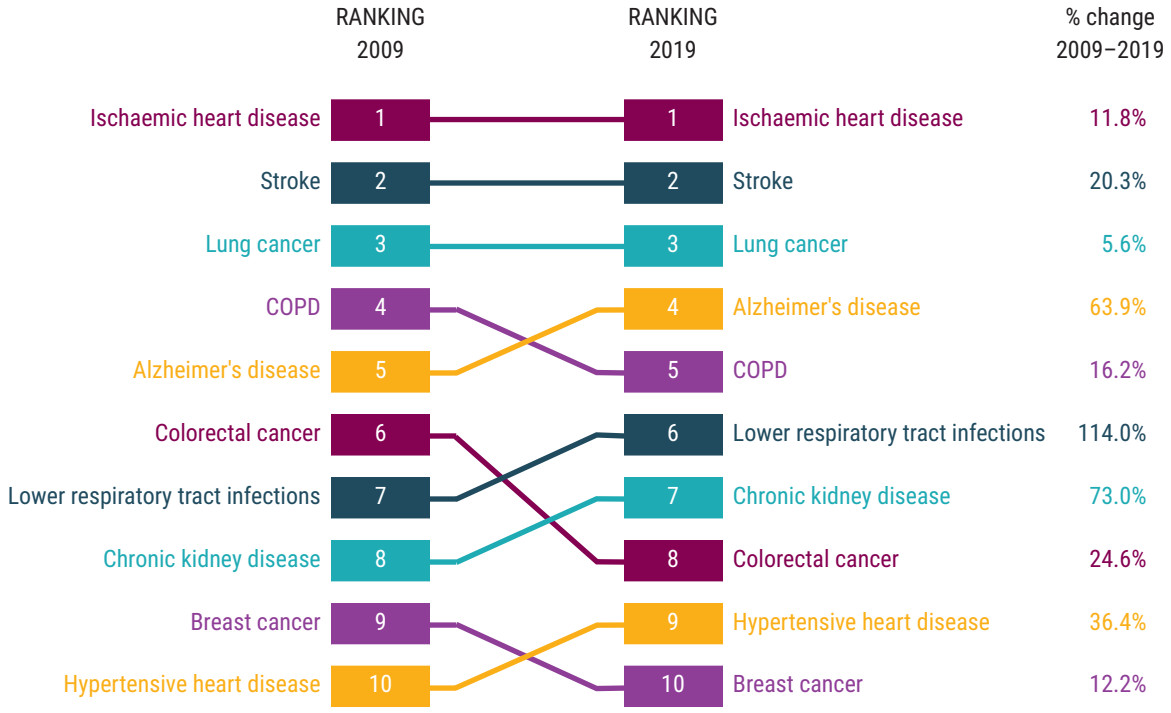
In 2020, the estimated cancer incidence in Greece was 265 cases per 100,000 population. The leading cancer among men is lung cancer (19%), which is closely followed by prostate (18%), bladder (14%) and colorectal (13%) cancers. Among women, the most frequent cancer is breast cancer (29%), which is followed by colorectal (12%), lung and uterine cancers (both at 8%) [17]. Typically, cancer epidemiology data for Greece are based on country estimates rather than actual data, mainly because of the absence of a National Cancer Registry. This aspect has been recognised as an obstacle to the development of national evidence-based cancer policies that could improve the sustainability of the system. Ongoing efforts are aimed at addressing this omission, as part of the National Recovery and Resilience Plan through the implementation of a Cancer Treatment Information System (including therapeutic protocols for chemotherapy) along with the establishment of a National Cancer Registry [8].

Regarding other major chronic diseases, the population older than 15 years of age with diabetes in Greece in 2019 has been reported to be 8.0% (48.5% men and 51.5% women) [84], and approximately 1 in 5 (19.6%) people in the Greek population older than 15 years of age reported having hypertension (high blood pressure) (45.0% men and 55.0% women) [84]. Estimates indicate an increasing trend in the prevalence of chronic diseases as well as multi-morbidity. Given that the emergence of chronic illness is heavily influenced by behavioural background, opportunities for 'reducing the future burden of chronic illness do arise – but the establishment and application of

specific policies for mitigating the effects of social and behavioural determinants on health are immensely important.

Regarding mortality, ischaemic heart disease and stroke have been the two leading causes of death in Greece over the past 10 years. In the same period, lung cancer remained the most frequent cause of death due to cancer [30]. Main changes that have been identified, as presented in Figure 6, include increasing mortality due to lower respiratory infections as well as to Alzheimer disease.

Figure 6: Top 10 causes of deaths in 2009 and 2019, and percentage change 2009–2019 (all ages combined)



Source: [91].

The situation has changed since the outbreak of the pandemic. In 2020, COVID-19 caused 4,838 deaths in the country (approximately 3.7% of total deaths) [92], a figure that more than tripled in 2021 (15,952 deaths) [93, 94]. The issue of excess mortality due to COVID-19 remains a key concern alongside the future burden to the system from 'long COVID' syndromes whose magnitude has not been assessed. Translating the public dialogue into concise action, i.e., specific policies for addressing this future burden, will be imperative for the sustainability of the system.

Greece lacks official reports on inequalities. According to research findings, the economic crisis that the country has faced since 2009 has exacerbated health inequalities: individuals reporting poor self-related health have been mostly older people, unemployed people, pensioners, housewives and people with chronic disease [95]. Furthermore, a degree of the influence of socioeconomic factors in health in Greece has been reported by Charonis et al.[96], who have demonstrated that age, existence of chronic disease, size of social network and socioeconomic status affect self-related health in Greece. To date, a focus on inequalities as a national priority has not been discussed. The presence of health inequalities should be further documented, and the evidence generated through electronic systems should be used to develop policies.

In Greece, no national health literacy strategy and policy is in place. There are, however, projects that aim to support health education and literacy among minority ethnic communities, and individuals from low socioeconomic backgrounds and/or low education levels. One recent programme in this direction is the REACH project, which aims to combat discrimination against Romani people, through the development of an inclusive PHC environment, and to support Romani having equal access to health services. Relevant actions of the REACH project include the empowerment of Romani women and an increase in health literacy among communities, with a focus on women, their families and youth [97]. Another programme implemented in past years is the iHEAL project, which aims to improve digital health literacy among older (50+) EU citizens regarding non-communicable disease prevention and medication adherence [98]. In addition, eLILY is another international initiative in which Greece participates, which started in 2018 and focuses on the provision of a blended training programme (class sessions and e-learning courses) for carers of frail older people and people with dementia [99]. Academia has also contributed to the same goal: the Hellenic Mediterranean University developed a toolkit focusing on health care professionals to help them identify and improve health literacy among older people [100].

Greece has health programmes and policies integrated into the school environment, in the form of enrolment requirements as well measures to decrease inequalities. The National Vaccination Committee has set a yearly National Immunisation Schedule for children, which includes the vaccines required by the State for school enrolment [101].

The Greek Ministry of Labour and Social Affairs, in collaboration with the Ministry of Education and Religious Affairs, since 2017 has organised a programme for the provision of free meals for schools, focusing on education units with high numbers of students from low-income households or belonging to vulnerable social groups. The budget of the school meals programme for the period 2021–2022 is 90.1 million euros, and the beneficiaries are 224,300 students from 1,621 schools [102]. Since 2012, a non-profit organisation (Prolepsis Institute) funded probably by the Stavros Niarchos Foundation, has implemented a programme for food aid and promotion of health nutrition. To date, 16,644,000 meals have been provided to 112,700 students in 728 schools across Greece [103].

In 2021, schools in Greece, after a pilot phase, started sexual education programmes as part of a study course in Skills Labs [104]. Physical activity for health is an independent module in the curriculum in both primary and secondary schools in Greece. The physical education requirements constitute three mandatory hours per week in primary schools and two mandatory hours per week in secondary schools [105].

Overall, the shift of attention towards the importance of public health has raised governmental awareness regarding controlling risk factors for health, thus providing a substantial opportunity to improve health system sustainability and resilience. Current and projected investments in evidence generation (e.g., electronic patient records) can form a basis for data- and demand-driven policies that can positively influence health indicators. The investment, however, must not focus on only data generation but also must consider analytics to provide better-quality input to policy formulation. In addition, new policy options, such as behavioural approaches, that have emerged in the international scientific dialogue can provide a fertile ground for future policies in Greece. In this context, the role of communities in setting up policies tailored to local populations can be strengthened.

6.2 Recommendations

6.2.1 Domain recommendations

RECOMMENDATION 1
To implement health promotion and awareness programmes in schools and the family to support early recognition and management of obesity in children.

RECOMMENDATION 2
To develop a national policy framework against health inequalities which will foresee measurement of health inequalities based on indicators; specific objectives and actions; monitoring and evaluation of actions; and the publication of a periodic report on the implementation of the National Policy Framework against Health Inequalities.

6.2.2 Points for consideration

1. Broaden the scope of health policy to include all social determinants of health (e.g., by systematically accounting for the potential implications of, or social determinants in, the templates for decisions made by the MoH).

2. Establish a National Health Indicators Framework to monitor the health of the population (at national and regional levels) and support health policy decision-making.

3. Establish a mechanism enabling the submission of proposals by civil society regarding programmes and actions in public health.

4. Integrate practices from behavioural science into health policy-making.

7. DOMAIN 7

Environmental sustainability

7.1 Environmental sustainability and resilience

Health systems are crucial for sustaining and improving health and the quality of life of the population; however, their environmental footprint may have negative consequences for human health [106]. Health systems have a considerable environmental impact, because large amounts of energy and resources are consumed in the provision of health services. In parallel, the health sector produces substantial emissions and waste, either directly or indirectly [107].

Greece does not systematically collect data on the environmental costs and benefits of health system activities. Thus, no data are available on the environmental impact of health care units [108]. The MoH routinely collects only cost data, in terms of energy requirements for public hospitals, on a monthly basis via the online platform BI-Health. Recent data have indicated that the annual expenditure on energy consumption for Greek public hospitals exceeds 4%, and in some cases even 7%, of the total annual budget [109].

In the context of the National Action Plan for Public Health, the MoH has developed an action plan aimed at reducing the energy footprint of the health care units by 38% until 2030. This goal is in alignment with the National Energy and Climate Plan (NECP), which provides a detailed roadmap regarding the attainment of specific energy and climate objectives during the decade 2020–2030 [110]. According to the NECP, the availability of financial instruments and the development of tax incentives for the installation of Renewable Energy Source systems in energy consumption sectors are deemed as crucial steps towards the goal of energy efficiency improvement. Therefore, incentives are planned to be introduced towards achieving sustainable development [110].

Currently, a substantial number of hospitals in Greece are shifting to renewable energy sources and implementing environmentally friendly actions (e.g., solar panels, water heating, upgrading to energy-efficient lamps and infrastructure upgrades). These initiatives serve a dual role in the health system by both contributing to energy savings and decreasing costs [108]. One important step towards the reduction of the energy consumption of public hospitals in Greece was the inclusion of 14 hospitals (cost 45.6 million euros) in an energy upgrade plan funded by the National Strategic Reference Framework in 2019 [111]. In the same context, another recently announced initiative is the energy upgrade of 68 hospitals (cost 260 million euros) funded by the National Strategic Reference Framework, which is expected to be concluded by 2023 [112].

Moreover, the National Recovery and Resilience Plan includes, among its targets for the primary health care sector, the renovation of at least 156 health centres (50% of the total), in terms of public infrastructure and medical equipment to improve energy efficiency. Regarding the public hospital units, the plan introduces extensive interventions for renovation, and upgrading the facilities and supply of new medical equipment in 80 hospitals across the country [8].

According to a recent environmental policy report, the Greek health system's carbon footprint represents 3.7% of the national footprint. The emissions per capita account for 0.38 tCO2e/capita, thus placing Greece among the countries with higher-than-average emissions. The report also presents the composition of the national health care's climate footprint as follows [113]:

- Emissions emanating directly from health care facilities and health care owned vehicles (14%)
- Indirect emissions from purchased energy sources such as electricity, steam, cooling and heating (24%)
- Emissions derived from the health care supply chain through the production, transport and disposal of goods and services, such as pharmaceuticals and other chemicals; food and agricultural products; medical devices; hospital equipment; and instruments (62%)

Greece is aligned with the EU objectives on climate neutrality by 2050, as described in the European Green Deal. Through the National Energy and Climate Plan, an ambitious goal has been set to decrease greenhouse gas emissions by 56% (with respect to 2005 national data) by the year 2030 [8, 110].

The legal framework (Law 4042/2012 and subsequent Joint Ministerial Decision 146163/08-05-2012) for the waste management of health care units in Greece constitutes implementation of the European Directive 2008/98/EC on the protection of the environment through criminal law. In addition, a National Plan focused on the Management of Dangerous Wastes from Health Care Units was developed by the Ministry of Environment, Energy and Climate Change [114]. In the same direction, but with a broader scope, the Ministerial Council Act 49/15-12-2015 approved a National Action Plan for the Management of Wastes. This plan was updated recently with the Ministerial Council Act 39/31-08-2020, to address the needs and challenges of the current decade in the field of waste management.

Health care units, which are subject to environmental licensing, are obliged to develop an Internal Regulation for Waste Management. This regulation reflects how each health care unit manages its waste and contains the following sections:

- Description of the health care unit
- Duties and responsibilities of all stakeholders involved in waste management
- Quantities of waste generated per category, and description of the methods of waste separation, collection, packaging, transport, temporary storage, and management
- Employee training programme
- Health and safety measures for the management of infectious waste
- Provision for the implementation of environmental management systems (for health care units with >100 beds)
- Description of the relevant registries required within health care units

The air management policy of Greece is based on the 2013 Clean Air Programme for Europe. The country, however, has not yet developed a national air pollution control programme containing the reduction commitments for 2020 and 2030, as set by the European Directive. Greece instead implemented a transitional national plan, which allowed more time for power plants to comply with the Industrial Emissions Directive (2010/75/EU) [115].

The Greek population, particularly in large cities such as Athens and Thessaloniki, is severely affected by air pollution. Notably, these two cities are among the top 20% most polluted metropolitan areas among OECD countries. The topography of Attica, a basin surrounded by mountains and the sea, also contributes to atmospheric inversion and high concentrations of pollutants. In addition, natural sources, such as Saharan dust air transfers, play critical roles in the ambient air pollution, particularly in Southern Greece [116]. Another concerning fact is that Greece has among the highest rates of mortality (premature deaths) attributable to outdoor air pollution: 556 premature deaths per million inhabitants were reported for 2017, a number substantially higher than the OECD average of 326 in the same year [115]. Notably, the (almost 10-year) financial crisis of 2010 led to decreased concentrations of the main air pollutants, owing to lower economic and transport activity, scrapping of old vehicles and increased use of natural gas. However, in the same period, severe winter episodes of PM pollution were recorded and are attributed to the shift from the use of oil to wood or biomass for heating purposes, because of high costs [117–119].

Greece's exceeding EU air quality standards for PM10 and NO2 led the European Commission to open infringement procedures against Greece for failure to comply with limits that are set by the air quality standards and to establish adequate air quality monitoring systems in Thessaloniki [115].

Greece developed a National Strategy for Adaptation to Climate Change in April 2016, which, after a consultation phase, was formally endorsed by the Greek Parliament in August 2016. The strategy outlines the objectives, principles and priorities for climate adaptation and constitutes the national policy document on building resilience against climate change impacts. Additionally, it elaborates on sectoral adaptation policies including both the public and private sectors [120].

7.2 Recommendations

7.2.1 Domain recommendations

RECOMMENDATION 1
To integrate actions that improve the energy efficiency of public hospitals in the set of performance indicators that are used to periodically evaluate the managers of public hospitals.

RECOMMENDATION 2
To develop a policy to assess the future effects of climate change on the health system and prepare relevant actions.

7.2.2 Points for consideration

1. Introduce elements/criteria for environmental policy in all decisions regarding health sector investments.

2. Systematise data collection on the environmental footprint of health units, and develop corresponding indicators. Establish targets and monitor the degree to which health units meet the specified targets.

3. Develop policies at the local level for environmental sustainability. Regional Health Administrations should be responsible for initiating the process.

4. Introduce behavioural science elements in the service provision of primary health care, with a focus on improving public attitudes towards environmental risks to health.

8. CASE STUDY 1

Vaccination strategy ‘Operation Freedom’

Context

After the approval of the first vaccines against COVID-19 by the EMA, Greece developed a country-wide vaccination strategy as a response to the pandemic. The national operation plan prepared to achieve vaccination coverage of the population for COVID-19 was heavily based on the digital transformation of service delivery in the country.

Goal

Promote vaccine uptake and increase the vaccination coverage of the population in Greece against COVID-19, to protect health and resume the socioeconomic activity of the country. Full vaccination of most of the population was expected to contribute to minimising deaths, severe disease and overall disease burden, and reducing the risk of new variants.

Relevant domain

Domain 4 – Medicines and Technology

Case and analysis

In Greece, the national vaccination plan against COVID-19 was first published on 19 November 2020 under the title 'National Plan of Vaccination Coverage for COVID-19' [121]. This plan provided brief information on the joint purchasing of vaccines and their distribution, the numbers of vaccination centres that would be developed across the country and the prioritisation of the population during the vaccination phases (first the health professionals, following the vulnerable groups and then the general population).

On 23 December 2020, the Greek MoH published the 'National Vaccination Operational Plan against COVID-19' (known as 'Operation Freedom') [121]. This operational plan describes the principles on which the vaccination strategy is based, the types of vaccines expected to become available in each phase of the Vaccination Plan, the gradual deployment of vaccination centres throughout Greece, and the entire process from delivery and storage, to distribution and storage in the vaccination centres. The National Plan provided an overview of the areas in which preparatory action would occur to facilitate smooth implementation of the Vaccination Plan, e.g., operational planning, ensuring adequate staffing of vaccination centres and training activities for those involved in the process; management of the distribution chain; development of the necessary information systems and apps; IS security; pharmacovigilance procedures; legal support; and organisation and coordination of vaccination centres and communication activities. Owing to the complexity of the operation, and to ensure the optimal use of resources, a dedicated algorithm for accurate real-time monitoring of the stock was created. Moreover, an electronic platform was developed, which covered every step of the process from the delivery of the vaccines until vaccine administration.

The National Vaccination Committee was responsible for the prioritisation of the vaccination groups. The eligible groups per phase of implementation, which were also included in Operation Freedom, are described in Table 7 [122].

Table 7: Eligible groups for vaccination per phase of the National Plan of Vaccination Coverage for COVID-19

	Eligible groups
Phase 1	• Health care personnel and personnel working in social services • Residents and personnel in nursing homes • Residents, personnel and patients in facilities providing care for patients with chronic illness and rehabilitative centres • Priority staff involved in critical functions of the government
Phase 2	• People older than 70 years of age (regardless of medical history), prioritised as follows: People > 85 years of age People >80 years of age People >75 years of age People >70 years of age • Patients with underlying conditions placing them at high risk of COVID-19 illness, irrespective of age • Priority staff for critical functions of the State • People 60–69 years of age (regardless of medical history) • Patients 18–59 years of age with underlying conditions placing them at high risk of COVID-19 illness, irrespective of age
Phase 3	People 18 years and older without underlying conditions

The pillars on which the vaccination plan was based were as follows [123]:

Transparency, in terms of keeping citizens informed of all aspects of the Operation to build and maintain public trust

Speed, achieved through, e.g., a well-developed network for the timely delivery, storage and distribution of the vaccines, taking into account their special requirements (e.g., expiration dates, availability of ultra-cold chain)

Quality, procedures for keeping track, constantly monitoring and ensuring that the vaccines met the set quality standards

Accessibility of the vaccine to all residents across the country

The overview and rollout of Operation Freedom was centralised; the Implementation Team comprised [123]:

The Minister of Health
The Deputy Minister of Health
The Minister of State
The Minister of Digital Governance
The Deputy Minister of Climate Change and Civil Protection
The Secretary General for Coordination

The responsibility for project management of the overall operation was assigned to the General Secretary of Primary Health Care. Furthermore, the Greek Armed Forces provided support and ensured the safe and timely distribution of vaccines, as well as the efficient flow of all stages of the supply chain.

For the delivery and storage of vaccines under specific conditions, five storage sites were deployed across Greece (Athens, Thessaloniki, Ioannina, Karditsa and Crete). Meeting high-quality standards of shipment and maintenance was of utmost importance; therefore, the safety conditions for the storage of vaccines were monitored and reviewed 24 hours a day, 7 days per week. Moreover, the delivery of vaccines from the storage sites to the vaccination centres was accompanied by the police for safety reasons, and live tracking of the dedicated shipments was made available with a GPS system. Thus, the Operation Centre (located on the premises of the Ministry of Climate Change and Civil Protection) was able to monitor the exact times of delivery for every shipment of vaccines across the country [123].

To ensure a smooth vaccination process, financial and human resources were made available to the vaccination centres. Specifically, all vaccination sites were equipped with storage equipment (refrigerators), consumables and tablets, and personnel were trained in the procedures of vaccine storage, vaccine administration and use of the tablets. Notably, the training included 20 sessions, in which more than 15,000 people involved in Operation Freedom participated. The digitalisation of Operation Freedom allowed the Operation Centre to monitor the stock and storage conditions at all vaccination centres across Greece in real time. Vaccination centres were also supported by a designated helpdesk and by a committee for quality control, to which any issue related to quality could be reported [123].

People eligible for vaccination were able to book vaccination appointments either directly through the electronic platform, via either pharmacies or a Citizen Service Centre (KEP). During the early phases of the Campaign, those enrolled in the e-prescription system received an SMS on their mobile phones with a suggested pre-booked, modifiable appointment. Eligibility for vaccination was based on social security number; therefore, a provision was made for citizens who did not have a social security number, enabling them to apply for one at a Citizen Service Centre or directly through the Vaccination Platform.

All vaccines were available free of charge at the point of care for all eligible people. Vaccination became mandatory for staff working in all private, public or municipal health care structures at all levels of care, and in care units for older people and individuals with disability in July 2021. Until recently, vaccination was voluntary for the general population; however, in December 2021, vaccination was made mandatory for residents older than 60 years of age.

The first vaccination in Greece occurred on 27 December 2020 for frontline health and social care personnel. The National Vaccination Campaign for the general population began on 11 January 2021, when the electronic platform dedicated to the Vaccination Platform was launched, thus providing access to appointment scheduling for people above 85 years of age.

On 17 May 2021, the MoH initiated an operation called 'Blue Freedom', aimed at providing full vaccination of all residents over 18 years of age on 19 islands with the single-dose Johnson & Johnson vaccine. This initiative, beyond providing clear health benefits, would allow islands to attract tourists, because they would be considered 'COVID-free' travel destinations, thereby boosting the local economies.

Moreover, on 5 July 2021, vaccinations with mobile units for the immunisation coverage of rural areas were made available, and on 20 July 2021 vaccinations in homes were launched by mobile units of the Health Centres. Finally, private-practice physicians were allowed to participate in the vaccination campaign as of 25 July 2021.

Vaccinations with a third dose (by prioritisation) started on 14 September 2021; and since 7 April 2022, the platform has been open for a fourth dose (or second vaccine booster) in prioritised groups.

The vaccination capacity of the country on 8 October 2021 was 687 vaccination sites (226 in hospitals, 452 in primary health care and nine mega-vaccination centres), and 1,500 vaccination centres (480 in hospitals, 860 in primary health care and 160 in the mega-vaccination centres). The number of daily doses that could be administered with this capacity was 75,000, which, if needed, could be increased to 136,000 within 48 hours [123].

According to the ECDC data, on 14 May 2022, the cumulative uptake of full vaccination (primary course) was 73.9% in the total population of Greece and 83.9% in adults over 18 years of age. The percentages in EU/EAA countries were 75.4% and 85.9%, respectively. The total number of vaccine doses administered in Greece was 20,957,465 [124].

Key findings/recommendations

Operation Freedom is a project of unprecedented scale and complexity for the Greek health care sector, with special logistic, technical and organisational requirements. The key for the successful establishment of a country-wide vaccination strategy was the digitalisation of all stages of the Operation. This process required the development of information systems and applications, which facilitated the monitoring and support of the Operation at every stage. The uncertainties related to the vaccination programme (e.g., the exact number of available vaccines, particularly in the initial stages), highlighted the importance of having real-time data on vaccinations country-wide, to allow for redesign, adaptation and modification of the plan as necessary.

The fine-tuning of Operation freedom may guide future reforms in the health care field. The experience gained through the development of the vaccination operating plan for COVID-19, heavily based on digital tools and solutions, may have 'externalities' in other parts of the health system (e.g., establishment of a national registry for non-COVID-19 vaccines). Achievements, good practices, lessons learned and transferable elements, could be capitalised upon in the scope of the quality and efficiency improvement of the system. In order to increase the potential outcomes of such initiatives, data analysis and data-driven policies (for example the set-up of managed entry or risk-sharing agreements for emerging health technologies) must follow each process of data collection. For this purpose, the sharing of gathered data, under, or course the conditions of anonymity and personal data protection, with the scientific community and other relevant stakeholders, is of high priority. And the pandemic period showed that if there is a political wil to motivate change, significant steps can be made towards the digitalization of processes in the healthcare system.

The successful implementation of the National Vaccination Campaign changed the paradigm for communication between the public administration and citizens, by placing citizens at the centre of the interaction. In this light, it may serve as a prototype for the development of other services such as those foreseen in the National Screening Programme.

Additionally, the Operation demonstrated the benefits of cooperation beyond the traditional boundaries (by involving the public sector, the private sector and NGOs) and across policy fields. Of note, 11 ministries (Ministry of Health, Ministry of Digital Governance, Ministry of Climate Change and Civil Protection, Ministry of Citizen Protection, Ministry of Education and Religious Affairs, Ministry of Tourism, Ministry of Culture and Sport, Ministry of Maritime Affairs and Insular Policy, Ministry of Migration and Asylum, Ministry of Interior and Ministry of Foreign Affairs) contributed during the planning and rollout of the project.

The digital transformation of service delivery is a necessity for the Greek health care system, and the National Recovery and Resilience Plan – Greece 2.0 provides a unique opportunity to move in this direction [8].

Limitations

Challenges that the Government faced in the planning and management of Operation Freedom were as follows [123]:

- Limited time for developing the plan and coordinating all involved actors
- Special requirements regarding the delivery, storage and distribution of the vaccines
- Limited availability of vaccines, owing to high demand (in the first phase of the Operation)
- Handling of surplus vaccine doses
- Access and vaccinations performed in rural areas and islands
- Lack of prior experience in organising a vaccination plan of that scale

Those challenges were, without doubt, major issues that were considered during the operation and influenced its design and outcomes. Nevertheless, because such challenges are usually context specific, the outcomes and learnings of the case study may not be directly applicable or generalisable to all health care systems.

9. CASE STUDY 2

Spyros Doxiadis Programme for Improving Population Health

Establishment of a national population screening programme

Context

Greece has previously lacked a coherent public health strategy. Interventions implemented in this area were mainly information campaigns regarding the dangers of substance use, tobacco use and alcohol consumption, which lacked the characteristics of a holistic approach [30]. Among the most notable omissions in this sector was the absence of a National Screening Programme for key diseases, such as breast, cervical and colorectal cancers, thus placing the country among the last in Europe lacking the above policy.

To address this deficiency and to strengthen a key pillar of the sustainability and the resilience of the system, Greece is currently implementing substantial reforms in the field of public health. These reforms were planned before the onset of the COVID-19 pandemic, but were probably accelerated by, and gained ground and public support after, the emergence of the pandemic and the inevitable focus on public health, as a priority in the national agenda.

Consequently, a series of policy reforms were proposed and have been included in the context of the National Plan of Public Health for the period 2021–2025. Among these reforms, the establishment of a National Prevention Programme (called the Spyros Doxiadis Programme) is among the most substantial.

Goal

The goal of the Spyros Doxiadis Programme is the protection and promotion of population health, management of diseases with a high burden of morbidity, and addressing behavioural and environmental risk factors. The development of a comprehensive system for prevention was also aimed at increasing the quality of life of the population and relieving the hospital system in the long term. The health interventions and actions included in the Spyros Doxiadis Programme focus on vulnerable groups in the population, such as students, preschool age children, women and people living below the poverty line. One of the most notable, and currently implemented, provisions of the Programme has been the establishment of a series of Population Screening Programmes, namely the Screening Programmes for Breast Cancer, Cervical Cancer and Colorectal Cancer. The establishment of the Programmes, particularly in operational settings, considered and crystallised the learnings from, and experience in, the rollout of the vaccination strategy against COVID-19 (Case Study 1), which was digitally based and thus provides an example of how the system can build on its 'organisational memory' to promote sustainability and resilience.

Relevant domains

Domain 1 – Governance

Domain 5 – Service Delivery

Domain 6 – Population Health

Case and analysis

The MoH is responsible for the implementation of the Spyros Doxiadis Programme, and the services provided are free of charge for the population. The Programme comprises designated National Programmes focusing on specific population groups and risk factors. According to its provisions, the Programme includes public health interventions and actions focusing on meeting the following four strategic goals [9]:

1. Primary prevention

Specifically in this field (budget 381.2 million euros), the national programmes being developed are:

- National Programme for the Promotion of Physical Exercise and Healthy Eating
- National Alcohol Programme
- National Vaccination Programme

Further interventions are also included in the domain of primary prevention. These focus on :

- Prevention of psychosocial problems in children
- Prevention of dental conditions

2. Secondary prevention

In the strategic target of secondary prevention (budget 150.7 million euros), the national programmes being developed are:

- Screening Programme for the early detection of highly prevalent diseases
- National Systematic Prenatal Programme and Perinatal Control

3. Tertiary prevention

Regarding tertiary prevention (budget 50.9 million euros), the national plan being developed is:

- National programme of psychosocial integration and rehabilitation for people with serious psycho-social problems

Moreover, interventions at the tertiary level of prevention refer to the development of a National Strategy and legal framework for Cancer Palliative Care.

4. Functional modernisation of the public health system, to enhance the technical and managerial capacity of the system (budget 75,8 million euros).

The spectrum of reforms being planned in this direction are summarised as follows:

- Functional reorganisation of the Population Health Monitoring System
- Efficiency and effectiveness of public health services
- Building health emergency response capacity
- Improving the effectiveness of environmental health mechanisms
- Provision of quality and evidence-based public health services
- Digital transformation of public health services
- Communication activities

The role of the digitalisation of the system in the effective implementation of the reforms designed in Public Health is deemed critical [125]. Thus, the MoH, in collaboration with the Ministry of Digital Governance, has aimed at capitalising on the experience aggregated and using transferable elements in other tools and solutions within the health sector. An indicative example is the e-prescription system, which was extensively used by citizens during the COVID-19 pandemic, which will be used to send personalised messages to people, depending on their age, sex, geographical area and state of health concerning critical preventive diagnostic tests for cancer, cardiovascular diseases and immunisations (e.g., flu vaccinations, children's vaccinations according to the National Vaccination Programme, etc.) [126]. Therefore, the National Recovery and Resilience Plan – Greece 2.0 has budgeted 254 million euros for the implementation of the National Prevention Spyros Doxiadis Programme [8].

As a first step towards the implementation of the Programme, the MoH introduced a general population screening programme for three cancers (breast cancer, cervical cancer and rectal cancer) and two other disease areas (cardiovascular disease and abdominal aortic aneurysm). The first screening programme, which has started in recent months, focuses on breast cancer (the so-called Fofi Genimmata Programme) [127]. At the time of writing, more than 40,000 digital mammographies have been performed free of charge through the Fofi Genimmata Programme. A total of 17,605 women had benign findings, whereas for 5,104 women, further screening was negative and no findings were determined. Moreover, 2,411 women had early detection of findings, owing to the screening programme, and most did not require mastectomy or chemotherapy.

Key findings/recommendations

The establishment and successful implementation of the Spyros Doxiadis Programme can deliver substantial public health benefits for individuals, their families and society. It can lead to a reduction in the incidence, mortality and severity of disease through early detection and provision of effective treatment. In parallel, it can increase informed choice [128]. Moreover, as noted above, the provisions of the Programme, particularly in the case of the National Population Screening policies, utilise the accumulated experience during the pandemic and contribute to the building of a body of knowledge in the system, in terms, among other things, of reaching out to the population (i.e. communicating information, inviting people -on an individual basis- to participate to the screening programme etc.), on the basis of proactive policies. These benefits are essential to ensuring the resilience and sustainability of the country's health care system.

However, despite the clear positive aspects particularly associated with the introduction of the Screening Programme, specific steps must be taken to prevent the Programme from being simplified to an 'exams for free' approach and to ensure that it is run as an efficient population screening programme. To this end, the future development of the system must be based on international best practices, wherein screening programmes do not comprise single tests but a pathway that must involve the following steps [128, 129]:

1. Identification the population eligible for screening
2. Invitation and provision of information
3. Testing
4. Referral of patients with positive screening results and reporting of negative screening results
5. Diagnosis
6. Intervention, treatment and follow-up
7. Reporting of outcomes

Notably, a comprehensive screening programme extends from planning, designing and implementing, to monitoring and evaluating the programme. Therefore, using a data-driven approach based on the data generated in the process is considered key for the success of the programme. Moreover, the development of screening programmes should also consider behavioural policies and country-specific characteristics (e.g., context, capacity and resources).

The digitalisation of the system also enables the effective implementation of public health interventions. The establishment of patient registries and the use of data analytics are critical for ensuring that decision-making processes are based on available scientific evidence. This approach, combined with digital tools and solutions, must be used as a basis for the addition of screening programmes for other diseases as well, exceeding the traditional areas of population screening and incorporating novel domains. Among those areas, and considering the availability of efficient treatment strategies we could distinguish:

(a) Screening for chronic kidney disease, a condition that poses a heavy toll to the total disease burden in Greece as well as a significant economic cost. Albeit it is accompanied by a growing incidence rate, chronic kidney disease is usually diagnosed at a late stage, where medical interventions are, usually, of low efficacy. An early diagnosis programme could have a significant impact on the sustainability of the system, by bending the cost curve and reducing future morbidity.

(b) Screening selected groups of persons for lung-cancer, given that smoking constitutes one of the major risk factors for health in Greece, following decades of high prevalence of smokers in the general population. International efforts focus on early diagnosis of lung cancer on the basis of strategies such as low-dose computed tomography screening, for persons with a considerable history of smoking.

Key concerns in this approach include the caution at defining the at-risk populations and the diagnostic performance of the test – nevertheless, and taking into account the considerable (and potentially avoidable, up to a degree) disease burden that is associated with lung cancer in Greece, such activities could positively impact the sustainability of the system, from a future perspective.

10. References

[1] Petmesidou M. Challenges to Healthcare Reform in Crisis-Hit Greece. e-cadernos CES. 2019;(31):19–42.

[2] Kalavrezou N, Jin H. Healthcare Reform in Greece: Progress and Reform Priorities [Internet]. IMF Working Papers. International Monetary Fund; 2021 Jul [cited 2022 Feb 25]. Available from: www.elibrary.imf.org/view/journals/001/2021/189/article-A001-en.xml

[3] European Observatory on Health Systems and Policies. COVID-19 Health System Response Monitor – Greece [Internet]. 2021 [cited 2022 Apr 12]. Available from: https://eurohealthobservatory.who.int/monitors/hsrm/hsrm-countries/hsrm/greece/overview

[4] European Observatory on Health Systems and Policies. Health Systems and Policy Monitor (HSPM) – Health Systems in Transition (HiT) profile: Greece [Internet]. 2021 [cited 2022 Mar 1]. Available from: https://eurohealthobservatory.who.int/monitors/health-systems-monitor/countries-hspm/hspm/greece-2017/overview

[5] Ministry of Health. Supervised institutions and legal entities (in Greek) [Internet]. 2022 [cited 2022 Mar 14]. Available from: www.moh.gov.gr/articles/ministry/organogramma/129-foreis

[6] Paparrigopoulou P. Public law in the health sector (in Greek). 2nd ed. Athens: Nomiki Bibliothiki; 2017.

[7] Kyriopoulos I, Mossialos E. Greece. In: Immergut EM, Anderson KM, Devitt C, Popic T (eds). Health Politics in Europe: A Handbook. Oxford, UK: Oxford University Press; 2021.

[8] Hellenic Republic. Greece 2.0: National Recovery and Resilience Plan [Internet]. 2021. Available from: https://greece20.gov.gr/wp-content/uploads/2021/07/NRRP_Greece_2_0_English.pdf

[9] Ministry of Health. National Plan for Public Health 2021–2025 (in Greek). Athens; 2021.

[10] Economou C, Panteli D. Monitoring and documenting systemic and health effects of health reforms in Greece [Internet]. Copenhagen: WHO; 2019 [cited 2020 Jan 22]. Available from: www.euro.who.int/en/countries/greece/publications/monitoring-and-documenting-systemic-and-health-effects-of-health-reforms-in-greece-2019

[11] Tountas Y, Kyriopoulos J, Lionis C, Nektarios M, Souliotis K, Yfantopoulos J, et al. The new NHS: the rebuilding of the National Health System (in Greek). [Internet]. Athens; 2020 [cited 2022 Mar 29]. Available from: www.dianeosis.org/wp-content/uploads/2020/09/greek_health_system_v17092020.pdf

[12] Economou C, Kaitelidou D, Karanikolos M, Maresso A. Greece: Health System Review. [Internet]. Vol. 19, Health systems in transition. 2017 Sep [cited 2019 Apr 3]. Available from: www.ncbi.nlm.nih.gov/pubmed/29972131

[13] Greek Patients Association. Who we are [Internet]. 2020 [cited 2022 Mar 22]. Available from: https://greekpatient.gr/en/poioi-eimaste

[14] NTA. National Transparency Authority – Home [Internet]. 2022 [cited 2022 Mar 29]. Available from: https://aead.gr/en

[15] European Commission. Compliance Report ESM Stability Support Programme for Greece Fourth Review [Internet]. 2018 [cited 2022 Mar 29]. Available from: https://ec.europa.eu/info/sites/default/files/economy-finance/compliance_report_4r_2018.06.20.docx.pdf

[16] NAP. Implementation of the National Anti-Corruption Action Plan (NACAP) 2018–2021 January – June 2021 [Internet]. 2021. Available from: https://aead.gr/images/manuals/esskd/NACAP_S1_2021.pdf

[17] OECD. Health at a Glance 2021: OECD Indicators [Internet]. Paris; 2021. Available from: www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2021_ae3016b9-en

[18] Economou C. Greece's healthcare system and the crisis: a case study in the struggle for a capable welfare state. An Inst Hig Med Trop (Lisb). 2018;17(Suplemento No1):7–21.

[19] National Public Health Organization (EODY). National Public Health Organization [Internet]. 2021 [cited 2022 Mar 22]. Available from: https://eody.gov.gr/en/npho

[20] Tsiodras S. HCDCP in the management of health threats [Internet]. Athens; 2018 [cited 2022 Apr 20]. Available from: https://eody.gov.gr/wp-content/uploads/2019/01/Sotirios_Tsiodras_HCDCP.pdf

[21] National Public Health Organization (EODY). Programmes/Collaborations (in Greek) [Internet]. 2021 [cited 2022 Apr 20]. Available from: https://eody.gov.gr/programmata/programmata-synergasies

[22] National Public Health Organization (EODY). Significant enhancement of EODY public health laboratories through ECDC funding (in Greek) [Internet]. Athens; 2021. Available from: https://eody.gov.gr/simantiki-enischysi-ton-ergastirion-toy-eody-me-chrimatodotisi-toy-ecdc

[23] Bodossaki Foundation. Action Plan for Public Health in the 21st century (in Greek) [Internet]. Athens; 2022. Available from: www.bodossaki.gr/draseis-toy-idrymatos/gia-to-21/schedia-drasis/schedio-drasis-dimosia-ygeia

[24] Waitzberg R, Hernández-Quevedo C, Bernal-Delgado E, Estupiñán-Romero F, Angulo-Pueyo E, Theodorou M, et al. Early health system responses to the COVID-19 pandemic in Mediterranean countries: A tale of successes and challenges. Health Policy (New York) [Internet]. 2021; Available from: www.sciencedirect.com/science/article/pii/S0168851021002554

[25] Sagan A, Webb E, Mckee M, Greer SL, Karanikolos M, Williams GA, et al. Health systems resilience during lessons for building back better [Internet]. In: Sagan A, Webb E, Azzopardi-Muscat N, Mata I de la, McKee M, Figueras J (eds). World Health Organization; 2021 [cited 2022 Apr 17]. Available from: https://eurohealthobservatory.who.int/publications/i/health-systems-resilience-during-covid-19-lessons-for-building-back-better

[26] Psomiadi M, Platis C, Gogosis K, Intas G, Prezerakos P. A proposal for the creation of a Greek national team for crisis communication management (in Greek). Archives of Hellenic Medicine [Internet]. 2021;38(5):683–91. Available from: http://mednet.gr/archives/2021-5/pdf/683.pdf

[27] IOBE, SfEE. The Pharmaceutical Market in Greece: Facts & Figures 2020 [Internet]. Athens; 2021. Available from: www.sfee.gr/wp-content/uploads/2021/07/F-F-2020-ENG.pdf

[28] Soava G, Mehedintu A, Sterpu M, Raduteanu M. Impact of Employed Labor Force, Investment, and Remittances on Economic Growth in EU Countries. Sustainability. 2020 Dec 4;12(23):10141.

[29] OECD/European Union. Health at a Glance: Europe 2014 [Internet]. Paris; 2014. Available from: https://doi.org/10.1787/health_glance_eur-2014-en

[30] OECD/European Observatory on Health Systems and Policies. Greece: Country Health Profile 2021 [Internet]. Paris: OECD Publishing; 2021 [cited 2022 Jun 12]. (State of Health in the EU). Available from: www.oecd-ilibrary.org/social-issues-migration-health/greece-country-health-profile-2021_4ab8ea73-en

[31] European Public Health Alliance. Access to health is a luxury for stranded refugees in Greece [Internet]. European Public Health Alliance. 2020 [cited 2022 Jan 18]. Available from: https://epha.org/access-to-health-is-a-luxury-for-stranded-refugees-in-greece

[32] World Health Organization and International Bank for Reconstruction and Development / The World Bank. Global monitoring report on financial protection in health 2019 [Internet]. Geneva; 2020. Available from: www.who.int/publications/i/item/9789240003958

[33] OECD/European Union. Health at a Glance: Europe 2020: State of Health in the EU Cycle [Internet]. Paris; 2020. Available from: www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-europe-2020_82129230-en

[34] Polyzos N, Karanikas H, Thireos E, Kastanioti C, Kontodimopoulos N. Reforming reimbursement of public hospitals in Greece during the economic crisis: Implementation of a DRG system. Health Policy (New York). 2013 Jan 1;109(1):14–22.

[35] Ministry of Finance. The increase in Health expenditures, as reflected in the Introductory Budgetary Report (in Greek) [Internet]. 2020 [cited 2022 Feb 2]. Available from: www.minfin.gr/-/e-auxese-ton-dapanon-ygeias-opos-apotyponetai-sten-eisegetike-ekthese-tou-proupologismou-2021

[36] Thomson S, García-Ramírez JA, Akkazieva B, Habicht T, Cylus J, Evetovits T. How resilient is health financing policy in Europe to economic shocks? Evidence from the first year of the COVID-19 pandemic and the 2008 global financial crisis. Health Policy (New York). 2022 Jan;126(1):7–15.

[37] Sakellaropoulos T, Economou C, Georgousi E, Thomas D, Kyriazis S, Philiopoulou M. Structural and qualitative characteristics of human resources in the health sector in Greece (in Greek). Athens: ADEDY: Koinoniko Polykentro; 2012.

[38] Tziallas D, Gkoytzias E, Konstantinidou EX, Dimakopoulos G, Anagnostopoulos F. Quantitative and Qualitative Assessment of Nurse Staffing Indicators across NHS Public Hospitals in Greece (in Greek). Hellenic Journal of Nursing. 2018;57(4):420–49.

[39] Kaitelidou D, Economou C, Siskou O, Konstantakopoulou O, Galanis P, Myloneros T, et al. Human Resources for Health in Greece: Current status and the way forward. Social Cohesion and Development. 2018;13(2):107–24.

[40] Mpouloutza P. Greek doctors' "bleeding" continues (in Greek). Kathimerini [Internet]. 2019; Available from: www.kathimerini.gr/society/1058039/exakoloythei-i-aimorragia-ton-ellinon-giatron

[41] Moisoglou I, Meimeti E, Avramidou E, Galanis P, Ntavoni G, Dimitrios Z. Job Satisfaction in Primary Health Care in Athens, Greece: A Pilot Study. Int J Caring Sci. 2021;14(1):166–73.

[42] Roditis K, Samara E, Louis K. A survey to assess job satisfaction among junior doctors in Greece. Scientific Chronicles. 2019;24(1):72–96.

[43] Karakolias S, Kastanioti C, Theodorou M, Polyzos N. Primary Care Doctors' Assessment of and Preferences on Their Remuneration. INQUIRY: The Journal of Health Care Organization, Provision, and Financing. 2017 Jan 1;54:1–8.

[44] Kontogeorgou I, Varounis C, Vasilopoulos G, Kelesi M, Fasoi G, Stavropoulou A. Job satisfaction among intensive care unit and emergency department nurses in Greece. Perioperative Nursing. 2017;6(3):158–70.

[45] Konstantopoulou E, Naoum V, Skiathitis G, Apostolakis I. Investigation of business satisfaction of medical and nursing staff of the Naval Hospital of Athens. Intenational Journal of Caring Sciences. 2016;9(3):1098–105.

[46] General Secretariat for Public Protection. Circular on the Action plan for the mitigation of hazards from flood (in Greek) [Internet]. 2019. Available from: www.civilprotection.gr/sites/default/gscp_uploads/sxedio_drasewn_plimiron_2019.pdf_2.pdf

[47] Bamias G, Lagou S, Gizis M, Karampekos G, Kyriakoulis KG, Pontas C, et al. The Greek Response to COVID-19: A True Success Story from an IBD Perspective. Inflamm Bowel Dis. 2020 Jul 17;26(8):1144–48.

[48] Ministry of Health. Press conference of the Deputy Minister of Health Zoe Rapti and the President of the ARGO Federation Menelaos Theodoroulakis (in Greek) [Internet]. 2021. Available from: www.moh.gov.gr/articles/ministry/grafeio-typoy/press-releases/8750-synenteyksh-typoy-yfypoyrgoy-ygeias-zwhs-rapth-kai-proedroy-omospondias-argw-menelaoy-theodwroylakh

[49] Ministry of Health. Briefing of accredited authors by the Deputy Minister of Health Mina Gagas, the Professor of Pediatric Infectious Diseases Vana Papaevangelou and the Assistant Professor of Epidemiology Gkikas Magiorkinis (in Greek) [Internet]. 2021. Available from: www.moh.gov.gr/articles/ministry/grafeio-typoy/press-releases/9261-enhmerwsh-diapisteymenwn-syntaktwn-apo-thn-anaplhrwtria-ypoyrgo-ygeias-mina-gkagka-thn-kathhghtria-paidiatrikhs-loimwksiologias-bana-papaeyaggeloy-kai-ton-epikoyro-kathhghth-epidhm

[50] Eurostat. Research and development expenditure, by sectors of performance [online dataset]. [Internet]. 2022. Available from: https://ec.europa.eu/eurostat/databrowser/view/TSC00001/default/table?lang=en&category=scitech.rd.rd_e

[51] IQVIA. EFPIA Patients W.A.I.T. Indicator 2019 Survey [Internet]. 2020 [cited 2022 Feb 3]. Available from: www.efpia.eu/media/554526/patients-wait-indicator-2019.pdf

[52] Institute of Pharmaceutical Research & Technology (IFET). Medicines [Internet]. Available from: www.ifet.gr/170/en

[53] Hellenic Federation of Enterprises (SEV). Enterpreneurship without Barriers. New Approach to Creating a Favorable Business Environment. Special Report on the approval procedures for the marketing of medicinal products: a) Licensing Procedure, b) Pricing Procedure (in Greek) [Internet]. Athens; 2011. Available from: www.sev.org.gr/Uploads/pdf/DRAGS_LICENCING_PRICING.pdf

[54] Papadimitriou O. HTA implementation in Greece: A 3 years' experience from the industry perspective [Internet]. In: HTA Conference [Internet]. 2021. Available from: https://events.boussias.com/files/_boussias_conferences_content/presentations/hta_conference/2021/Papadimitriou_HTA_Conference2021.pdf

[55] Angelis A. Evaluating the Benefits of New Drugs in Health Technology Assessment Using Multiple Criteria Decision Analysis: A Case Study on Metastatic Prostate Cancer With the Dental and Pharmaceuticals Benefits Agency (TLV) in Sweden. MDM Policy Pract. 2018 Jul 15;3(2):238146831879621.

[56] Gouvalas A, Igoumenidis M, Theodorou M, Athanasakis K. Cost-Sharing Rates Increase During Deep Recession: Preliminary Data From Greece. Int J Health Policy Manag. 2016 May 28;5(12):687–92.

[57] Lambrelli D, O'Donnell O. The impotence of price controls: Failed attempts to constrain pharmaceutical expenditures in Greece. Health Policy (New York) [Internet]. 2011 Jul [cited 2019 Mar 22];101(2):162–71. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0168851010002575

[58] Ministry of Health. Action Plan for 2022 [Internet]. 2021 [cited 2022 May 31]. Available from: https://government.gov.gr/wp-content/uploads/2021/12/yp_ygeias_2022.pdf

[59] Ministry of Health. Press release. MyHealth application was presented to the Prime Minister. Citizens gain access to their data in electronic prescription (in Greek) [Internet]. 2021. Available from: www.moh.gov.gr/articles/ministry/grafeio-typoy/press-releases/9157-paroysiasthke-ston-prwthypoyrgo-h-efarmogh-myhealth-ndash-oi-polites-apoktoyn-prosbash-sta-dedomena-toys-sthn-hlektronikh-syntagografhsh

[60] WHO Regional Office for Europe. Greece: National digital registry of COVID-19 patients [Internet]. 2021 [cited 2022 May 31]. (Digital Health Country Vignettes series). Available from: www.euro.who.int/__data/assets/pdf_file/0009/509742/Greece-vignette-eng.pdf

[61] European Commission. Ensuring the availability of supplies and equipment [Internet]. 2022 [cited 2022 Feb 6]. Available from: https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/public-health/ensuring-availability-supplies-and-equipment_en#stockpiling-and-distributing-supplies-and-equipment

[62] Ministry of Health. Vaccination against COVID-19 (In Greek) [Internet]. 2022 [cited 2022 Feb 6]. Available from: www.moh.gov.gr/articles/health/emboliasmoi-covid-19

[63] Ministry of Health. Educational Material on COVID-19 vaccinations (In Greek) [Internet]. 2021 [cited 2022 Feb 6]. Available from: www.moh.gov.gr/articles/health/dieythynsh-dhmosias-ygieinhs/emboliasmoi/ekpaideytiko-yliko-gia-emboliasmoys-covid19

[64] OECD. Health at a Glance 2013: OECD Indicators [Internet]. Paris; 2013. Available from: https://doi.org/10.1787/health_glance-2013-en

[65] Directorate-General for Economic and Financial Affairs (European Commission). Enchanced Surveillance Report. Greece, May 2022 [Internet]. Luxembourg; 2022. (Institutional Paper). Report No.: 178. Available from: https://ec.europa.eu/info/system/files/economy-finance/ip178_en.pdf

[66] Eapen ZJ, Reed SD, Li Y, Kociol RD, Armstrong PW, Starling RC, et al. Do countries or hospitals with longer hospital stays for acute heart failure have lower readmission rates? Findings from ASCEND-HF. Circ Heart Fail. 2013;6(4):727–32.

[67] OECD/European Observatory on Health Systems and Policies. Greece: Country Health Profile 2019. OECD; 2019 Nov. (State of Health in the EU).

[68] OECD. Tackling Wasteful Spending on Health [Internet]. Paris; 2017. Available from: https://doi.org/10.1787/9789264266414-en

[69] WHO Regional Office for Europe. WHO Office on Quality of Care and Patient Safety (Athens, Greece) [Internet]. 2022 [cited 2022 Mar 4]. Available from: www.who.int/europe/teams/office-on-quality-of-care-patient-safety/about-us

[70] Hellenic Statistical Authority. Census of Health Centres and Units providing Primary Health care services: Year 2019 (in Greek) [Press release]. 2020.

[71] Myloneros T, Sakellariou D. The effectiveness of primary health care reforms in Greece towards achieving universal health coverage: a scoping review. BMC Health Serv Res. 2021;21(1):1–13.

[72] Ziomas D, Konstantinidou D, Capella A. ESPN Thematic Report on Inequalities in access to healthcare. 2018;(June).

[73] Economou C. Barriers and facilitating factors in access to health services in Greece [Internet]. Copenhagen; 2015. Available from: www.who.int/publications/m/item/barriers-and-facilitating-factors-in-access-to-health-services-in-greece

[74] Souliotis, K, Athanasakis, K., Golna, C., Kyriopoulos J. Regional distribution of oncology specific infrastructure for the care of cancer patients in Greece (in Greek). Archives of Hellenic Medicine. 2009;26(6):808–17.

[75] Athanasakis K, Souliotis K, Kyriopoulos EJ, Loukidou E, Kritikou P, Kyriopoulos J. Inequalities in access to cancer treatment: an analysis of cross-regional patient mobility in Greece. Supportive Care in Cancer [Internet]. 2012;20(3):455–60. Available from: https://doi.org/10.1007/s00520-011-1093-0

[76] Chantzaras AE, Yfantopoulos JN. Income-related health inequalities among the migrant and native-born populations in Greece during the economic crisis: a decomposition analysis. Eur J Public Health [Internet]. 2018 Dec 1;28(suppl_5):24–31. Available from: https://doi.org/10.1093/eurpub/cky203

[77] Kyriopoulos II, Zavras D, Skroumpelos A, Mylona K, Athanasakis K, Kyriopoulos J. Barriers in access to healthcare services for chronic patients in times of austerity: an empirical approach in Greece. Int J Equity Health [Internet]. 2014;13(1):54. Available from: https://doi.org/10.1186/1475-9276-13-54

[78] Kondilis E, Tarantilis F, Benos A. Essential public healthcare services utilization and excess non-COVID-19 mortality in Greece. Public Health [Internet]. 2021;198:85–8. Available from: www.sciencedirect.com/science/article/pii/S0033350621002596

[79] Ministry of Health. ICUs: Reality in figures (in Greek) [press release] [Internet]. 2022. Available from: www.moh.gov.gr/articles/ministry/grafeio-typoy/press-releases/10130-meth-h-pragmatikothta-se-arithmoys

[80] European Observatory on Health Systems and Policies. COVID-19 Health System Response Monitor (HSRM): Greece [Internet]. 2021 [cited 2022 Mar 4]. Available from: https://eurohealthobservatory.who.int/monitors/hsrm/hsrm-countries/hsrm/greece

[81] Prouskas C. Governmental response to the COVID-19 pandemic in Long-Term Care residences for older people: preparedness, responses and challenges for the future: Greece, MC COVID-19 working paper 07/2021. 2021. http://dx.doi.org/10.20350/digitalCSIC/13695

[82] Eurostat. Healthy life years by sex (from 2004 onwards) [online dataset] [Internet]. 2021. Available from: https://ec.europa.eu/eurostat/databrowser/view/HLTH_HLYE__custom_2474877/default/table?lang=en

[83] OECD/European Union. Health at a Glance: Europe 2018: State of Health in the EU Cycle. OECD Publishing, Paris/European Union, Brussels; 2018.

[84] Hellenic Statistical Authority. Health Survey: 2019 [Press release]. 2020.

[85] Backes S, Gkiougki J, Kay S, Konstantinidis C, Mattheisen E, Sakali C, et al. Democracy Not For Sale. The Struggle for Food Sovereignty in the Age of Austerity in Greece [Internet]. Amsterdam, Heidelberg, Athens/Thessaloniki: Transnational Institute; FIAN International; Agroecopolis; 2018. Available from: www.tni.org/files/publication-downloads/tni_democracy-not_for-sale-en.pdf

[86] Hellenic Statistical Authority. FOOD SECURITY: 2020 Survey on Income and Living Conditions (Income reference period 2019) [Press release]. 2021.

[87] OECD. The Heavy Burden of Obesity: The Economics of Prevention [Internet]. Paris; 2019. (OECD Health Policy Studies). Available from: https://doi.org/10.1787/67450d67-en

[88] Manios Y, Moschonis G, Androutsos O, Mavrogianni C, Malakou E. Obesity and related cardiometabolic diseases: Causes - Consequences - Solutions (in Greek) [Internet]. Athens; 2022. Available from: www.dianeosis.org/wp-content/uploads/2022/02/obesity_final11022022.pdf

[89] Kyriopoulos I, Nikoloski Z, Mossialos E. Does economic recession impact newborn health? Evidence from Greece. Soc Sci Med [Internet]. 2019;237:112451. Available from: www.sciencedirect.com/science/article/pii/S0277953619304459

[90] Zilidis C, Hadjichristodoulou C. Economic Crisis Impact and Social Determinants of Perinatal Outcomes and Infant Mortality in Greece. Vol. 17, International Journal of Environmental Research and Public Health. 2020.

[91] Institute of Health Metrics and Evaluation. Top 10 causes of total number of deaths in 2019 and percent change 2009–2019, all ages combined [online dataset] [Internet]. 2020. Available from: www.healthdata.org/greece

[92] National Public Health Organization (EODY). Daily epidemiological report for COVID-19, 31/12/2020. 2020.

[93] National Public Health Organization (EODY). Daily epidemiological report for COVID-19, 31/12/2021. 2021.

[94] Hellenic Statistical Authority. Weekly Death Statistics: Period 1st to 52nd week, 2021 [Press release]. 2022.

[95] Zavras D, Tsiantou V, Pavi E, Mylona K, Kyriopoulos J. Impact of economic crisis and other demographic and socio-economic factors on self-rated health in Greece. Eur J Public Health [Internet]. 2013 Apr 1;23(2):206–10. Available from: https://doi.org/10.1093/eurpub/cks143

[96] Charonis A, Kyriopoulos II, Spanakis M, Zavras D, Athanasakis K, Pavi E, et al. Subjective social status, social network and health disparities: empirical evidence from Greece. Int J Equity Health [Internet]. 2017;16(1):40. Available from: https://doi.org/10.1186/s12939-017-0533-y

[97] REACH. Roma women's Empowerment and fighting discrimination in ACcess to Health [Internet]. [cited 2022 Feb 8]. Available from: https://romahealth.eu

[98] iHEAL. IHEAL Project, Up-skilling elders in Digital Health Literacy to prevent marginalization and exclusion [Internet]. 2019 [cited 2022 Feb 8]. Available from: https://iheal.eu

[99] eLILY. ehealth Literacy Learning skills among carers of older people and people with Dementia [Internet]. 2022 [cited 2022 Feb 8]. Available from: https://elily.eu

[100] Hellenic Mediterranean University. Health Literacy webpage (in Greek) [Internet]. [cited 2022 Feb 9]. Available from: https://healthliteracy.hmu.gr

[101] Ministry of Health. National Immunisation Schedule for Children & Adolescents 2020, Δ1α/Γ.Π.οικ.34701/04-06-2020 (in Greek). 2020.

[102] Ministry of Labour and Social Affairs. The budget for the programme "School Meals" which starts in October accounts 90.118.000 euros (in Greek) [Press release]. 2021.

[103] Partners in Prolepsis: Institute of Preventive Medicine Environmental and Occupational Health. DIATROFI: OUR ACTIVITY IN FIGURES [Internet]. 2022 [cited 2022 Feb 10]. Available from: http://diatrofi.prolepsis.gr/en

[104] Institute of Educational Policy (IEP). Sexual Education (in Greek) [Internet]. [cited 2022 Feb 10]. Available from: http://iep.edu.gr/el/sex-education

[105] World Health Organization. Greece Physical Activity: Factsheet 2018 [Internet]. 2018. Available from: www.who.int/europe/publications/m/item/greece---physical-activity-factsheet-(2018)

[106] Lenzen M, Malik A, Li M, Fry J, Weisz H, Pichler PP, et al. The environmental footprint of health care: a global assessment. Lancet Planet Health. 2020;4(7):e271–9.

[107] WHO Regional Office for Europe. Environmentally sustainable health systems: a strategic document [Internet]. Copenhagen; 2017. Available from: https://apps.who.int/iris/bitstream/handle/10665/340375/WHO-EURO-2017-2241-41996-57723-eng.pdf?sequence=3&isAllowed=y

[108] Sepetis A. Sustainable Health Care Management in the Greek Health Care Sector. Open J Soc Sci. 2019;07(12):386–402.

[109] Zaza PN, Sepetis A, Bagos PG. Prediction and Optimization of the Cost of Energy Resources in Greek Public Hospitals. Vol. 15, Energies. 2022.

[110] Ministry of the Environment and Energy. National Energy and Climate Plan. Athens; 2019.

[111] Ministry of Economy and Development. Declaration by the Minister of Economy regarding the funding for the energy upgrade of hospitals (in Greek) [press release]. [Internet]. 2019. Available from: www.mindev.gov.gr/δήλωση-υπ-οικονομίας-για-χρηματοδότη

[112] Ministry of Development and Investments. Press conference with A.Georgiadis, T.Plevris and M.Gaga in the Ministry of Development with subject "National Strategic Reference Framework (ESPA)-Public Hospitals (in Greek) [Internet]. 2022. Available from: www.mindev.gov.gr/παρουσία-α-γεωργιάδη-θ-πλεύρη-και-μ-γκ

[113] Karliner J, Slotterback S, Boyd R, Ashby B, Steele K. Health Care's Climate Footprint - How the Health Sector Contributes to the Global Climate Crisis and Opportunities for Action - Green Paper Number One in the Climate-Smart Health Care Series. Health Care Without Harm. 2019;(September).

[114] Ministry of Environment and Energy. National Plan focused on the Management of Dangerous Wastes from Health Care (in Greek). 2012.

[115] OECD. OECD Environmental Performance Reviews: Greece 2020 [Internet]. Paris; 2020. (OECD Environmental Performance Reviews). Available from: https://doi.org/10.1787/cec20289-en

[116] Trianti SM, Samoli E, Rodopoulou S, Katsouyanni K, Papiris SA, Karakatsani A. Desert dust outbreaks and respiratory morbidity in Athens, Greece. Environ Health. 2017;16(1):1–9.

[117] Athanasopoulou E, Speyer O, Brunner D, Vogel H, Vogel B, Mihalopoulos N, et al. Changes in domestic heating fuel use in Greece: Effects on atmospheric chemistry and radiation. Atmos Chem Phys. 2017;17(17):10597–618.

[118] Zervas E, Vatikiotis L, Gareiou Z, Manika S, Herrero-Martin R. Assessment of the Greek national plan of energy and climate change—Critical remarks. Sustainability (Switzerland). 2021;13(23):1–18.

[119] Anastasaki M, Tsiligianni I, Sifaki-Pistolla D, Chatzea VE, Karelis A, Bertsias A, et al. Household air pollution and respiratory health in rural crete, Greece: A cross-sectional fresh air study. Atmosphere (Basel). 2021;12(11):1–13.

[120] Ministry of Environment and Energy. National Strategy for Adaptation to Climate Change (in Greek). 2016.

[121] European Union Agency for Fundamental Rights. Coronavirus Pandemic in the EU – Fundamental Rights Implications: Vaccine Rollout And Equality of Access in the EU. Luxembourg; 2021 May.

[122] Ministry of Health. National Operational Vaccination Plan against COVID-19 ("Operation Freedom") (in Greek). 2020.

[123] Themistokleous M. National Operation Vaccination Plan against COVID-19. Presentation in the 23rd Forum for Health Economics and Policy (in Greek) [video] [Internet]. 2021. Available from: www.youtube.com/watch?v=eosgxAIdM0c

[124] European Centre for Disease Prevention and Control. COVID-19 Vaccine Tracker [Internet]. 2022 [cited 2022 Feb 6]. Available from: https://vaccinetracker.ecdc.europa.eu/public/extensions/COVID-19/vaccine-tracker.html#national-ref-tab

[125] WHO Regional Office for Europe. Towards a Roadmap for the Digitalization of National Health Systems in Europe [Internet] [Internet]. Copenhagen (Denmark); 2018. Available from: www.euro.who.int/__data/assets/pdf_file/0008/380897/DoHS-meeting-report-eng.pdf

[126] Tsimtsiou Z, Fragkoulis E, Koupidis S, Theodorakis P. Greece: Introducing paperless, remote ePRESCRIPTION – a game-changer for primary care services [Internet]. 2021. Available from: www.who.int/greece/publications/m/item/greece-introducing-paperless-remote-eprescription-a-game-changer-for-primary-care-services-(2021)

[127] eKathimerini. Breast cancer screnning program to be named after Gennimata, PM announces [Internet]. 2021. Available from: www.ekathimerini.com/news/1170718/breast-cancer-screening-program-to-be-named-in-honor-of-gennimata-mitsotakis-announces

[128] World Health Organization. Regional Office for Europe. Screening programmes: a short guide. Increase effectiveness, maximize benefits and minimize harm. [Internet]. Copenhagen; 2020. Available from: https://apps.who.int/iris/handle/10665/330829

[129] Sagan A, McDaid D, Rajan S, Farrington J, Mckee M. Screening: When is it appropriate and how can we get it right? [Internet]. Copenhagen (Denmark); 2020. (Policy Brief). Report No.: 35. Available from: https://apps.who.int/iris/handle/10665/330810

APPENDIX A

Delphi Panel Method

The Delphi technique provides a structure for collecting expert opinion and knowledge on important topics through an anonymous, iterative multistage process [1,2]. Since its conception in the 1950s, it has been applied in numerous fields, including healthcare; in parallel, various modifications of the original technique have emerged.

In the present study, the Country Team invited 20 experts with relevant expertise and appropriate standing in the health sector to participate in a Delphi process aimed at assessing a set of policy proposals. Eligible participants were sent an invitation letter via e-mail, inviting them to participate in the Delphi panel and providing all relevant information on the PHSSR project, the research team and what was expected from them if they agreed to participate. All 20 invited experts agreed to participate. Participating experts included high level executives from the Ministry of Health, social insurance and regulatory bodies; experts on public health, health policy, and health systems originating from academia; executives holding managerial positions in public hospitals and primary care units; and executives from the health technology industry and patient organisations.

Web-Delphi was selected as the most suitable mode for conducting the Delphi panel, to facilitate the experts' participation during different periods of time at their own pace, and to limit drop-out rates between rounds. To this end, the Welphi platform was used (www.welphi.com/en/Home.html).

At the beginning of the first round, each participant received an invitation e-mail via the Welphi platform, which contained all the information required for accessing the online questionnaire. Participants could log on to the platform and provide their responses at a time that was convenient to them, but within a specific timeframe. Completion of the questionnaire was anonymous, and each participant's responses were not visible to other participants. In addition, the administrator of the survey (a member of the research team) could not identify participants, because the Welphi platform generated a code for each participant.

Apart from the invitation via the Welphi platform, participants also received an e-mail from the team leader containing a short description of the Domains in the PHSSR Framework as well as the definitions of sustainability and resilience, to provide context for the items included in the questionnaire. Participants were also reminded of these definitions on the welcome screen of the Welphi online survey.

The questionnaire consisted of a set of 46 policy proposals prepared by the study team. Policy proposals were grouped and presented by Domain. Participants were asked to rate the policy proposals in two dimensions: (1) their effectiveness in improving the sustainability and/or resilience of the Greek health system, and (2) their feasibility under the current status quo. Participants were asked to rate each policy proposal on a scale of 1–9 (1, lowest; 9, highest). Participants were also given the opportunity to provide comments supporting their answers and to suggest their own proposals in an open question.

In the present study, consensus was defined as more than two-thirds (66.7%) of Delphi experts providing a rating of 7–9 in both dimensions (effectiveness and feasibility). All policy proposals were rated in both rounds.

The first round took place between 4 and 10 July 2022, and the second round occurred between 22 and 31 July 2022. The response rate was 100% for the first round and 90% for the second round.

In the first round, consensus was reached for 14 policy proposals. The second-round questionnaire consisted of all the original questions plus nine additional questions provided by participants. In the beginning of the second round, participants could see the previous round's results as percentage rates for each response, as well as participants' anonymous comments. They could also see their answers from the first round and revise or maintain them. After completion of the second round, consensus was reached on 23 policy proposals (listed as recommendations in each Domain of this report), whereas partial consensus (consensus in terms of the potential effectiveness for each

proposal but not their feasibility under the current status quo of the system) was achieved for a series of policy proposals, which are listed as points for consideration in each Domain of this report.

References

[1] Adler M, Ziglio E. Gazing into the oracle. The delphi method and its application to social policy and public health. London: Jessica Kingsley Publishers. 1996.

[2] von der Gracht H.A. Consensus measurement in Delphi studies. review and implications for future quality assurance. Technol. Forecast. Soc. Change. 2012;79(8):1525–1536. doi: 10.1016/j.techfore.2012.04.013.