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Historical economic aspects of healthcare delivery and hospital performance in Athens

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Abstract

This paper examines the economic foundations of healthcare delivery and hospital performance in Athens through a long-term historical perspective. Drawing on a theoretical and historiographical methodology, it analyzes how dominant funding mechanisms, governance arrangements, and institutional actors shaped hospital operation, access to care, and performance constraints across successive historical periods. The study traces the evolution of healthcare provision from the Classical–Hellenistic era, where public works and taxation underpinned hygiene and care facilities, through the Byzantine period dominated by charity and religious endowments, and the Ottoman and early modern phases characterized by partial market organization and guild regulation. The analysis further explores the transformation brought about by nineteenth-century state-building, the postwar establishment of a national health system, and contemporary performance-oriented healthcare governance. By systematically linking funding sources—such as taxation, charity, religious institutions, market pricing, state budgets, insurance mechanisms, and performance metrics—to hospital operation and service scope, the paper offers a comparative framework for understanding shifts in access, resource allocation, and institutional constraints. The research contributes a conceptual synthesis that clarifies the economic logic underlying hospital performance in Athens and provides a structured basis for cross-period comparison without relying on empirical estimation or causal inference.

Keywords: Healthcare Economics, Hospital performance, Historical analysis, Athens, Taxation and charity, Health system governance, Funding mechanisms, Institutional change

1.Introduction

All periods of Athens' history offer abundant evidence of the key role that money has played in the delivery of health services. The fact that access to the services on offer has depended on economic considerations is equally clear; it is no surprise that hospitals, though never an essential component of a health system, suffer during downturns and his conspicuously present during times of economic growth. Nevertheless, these forces in action are rarely synthesized into a coherent discussion, as the wider historical point of reference tends to shift the spotlight elsewhere and preclude a focused investigation of these economic drivers. Such an assessment is in fact possible, and in doing so it becomes evident that, when hijacker behind the apparently altruistic motivations of the society's religious and civic institutions, the founding statutes of their hospital-like facilities fell short of providing uninterrupted or equitable access to their services. The economic foundations of healthcare delivery and hospital performance in Athens can be organized according to a simple framework that brings together six basic questions. Who pays for the healthcare system? Who provides it? Who supervises its operation? Where does the money go? How much does the economy foster or hinder access to healthcare services? What services are made available? The answers set out below are partly confounded by the almost complete absence of a provider-preference-need market mechanism. Even in modern economies this principle does not always hold, and when it does not — as has often been the case before our own epoch — hospital service supply often reflects the preferences of the providers and of those who pay the bills rather than those of the patients (Ilias Kyriopoulos et al., 2019; Maniadakis et al., 2008; Polyzos et al., 2008; Trakakis et al., 2021; Tsitsakis et al., 2014). Here this is especially true, for the economy rather provides at least two of the typical indicators of economic activity, namely, the external financing of activities and of public fire brigades. Indeed, the state pays the costs of several municipal health services directly through the allocation of tax revenue.

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2. Literature Review and Methodology: Early economic foundations of healthcare provision in ancient and medieval Athens

An economic foundation is discernible beneath the veil of piety that clothed healthcare delivery in ancient and medieval Athens. The contemporaneous evolution of religious and civic institutions occupying the healthcare sphere constitutes the central subject. Their respective activity systems suggest a division of labor that, while not formalized, is nevertheless clear: the former supplied hospitality to the mentally ill, the latter to the physically injured and ill, and the former were granted the choice of patrons and service recipients while the latter catered primarily to the poor. The operating budgets for both types of institutions proved critical in determining the services rendered. Indeed, although hospitals were founded at the behest of the state, their operations nevertheless remained, at least theoretically, under the control of the central government. Whether examination for a position in a general hospital was actually a prerequisite for appointment, whether practice in a hospital was actually a requirement for licensing of capitalistic practice of the trade, and whether the services were actually distributed without regard to ability to pay depended largely on the nature of the tax system. The alignments of funding sources for hospitals and the share of the annual production of hospital services of the capital area were also for the most part determined by institutional taxation (Challoumis, 2023a, 2024b). The response of the economy to the behavior of the hospital administrators in allowing the conditions of work to influence the rates had a part in shaping the equilibrium of services offered and demanded. The interactions of the producers of such services not merely with the patients but also with the family relatives and friends of the sick, as well as the role of hospitals as natural experiments, added a further dimension. The approaches, criticisms, and suggestions for improvements put forward from time to time by other concerned bodies and individuals regarding these hospitals are equally revealing of the state of the hospital services (Akdogan et al., 2025; Angelakis et al., 2020; Bonanno, 2021; Economou, 2010; Jam et al., 2025; Karamanou et al., 2019; Kyriazis, 2009; McCannon, 2017a).

2.1. Public and private funding streams for health services

State management of the provision of good health and public hygiene involved expenditure on the water supply, bathhouses, and preparation centres for treating diseased and wounded citizens. But public spending in these areas must be set against the collection of taxes on those in need of medical care, who often represented the poorest classes in society. Storage reservoirs and aqueducts, upgrading the quality of the water, remained priority areas for state investment. Of equal importance were the community bathhouses; the maintenance of these, often with an established percentage of the municipal budget allocated annually to their upkeep, implied the existence of water distribution networks and proper sanitation (Angelakis et al., 2020; Economou, 2010; Kyriazis, 2009; McCannon, 2017a). The Aqueduct of Phaleron, constructed in 335–322 BC at high cost, together with the vast bathhouse with rooms for approximately 1,000 bathers, was financed by a special fund created from a new tax on sales of sea water of the Salamis, which was also used for the expenses of the cult of Aphrodite present in the area of the construction. It is also possible to detect an implicit economic relationship in the formation of hospital-type institutions, such as the Katakuzina at the Kerameikos or a laudation for the lady Euphronike in Syntagma Square. Her dedication of a steering seal indicates the provision of the sites, but it is a special use–palinode for sick or wounded travellers in transit (Akdogan et al., 2025; Bonanno, 2021; Brenner, 2023; Karamagi et al., 2023; Lyttkens, 2010, 2011; McCannon, 2017a).

2.2. Roles of religious and civic institutions in hospital care

Evidence for religious institutions' participation in hospital care during the Byzantine and post-classical periods derives from the same body of texts as above, specifically the hospitals' founding statutes, archives, and other official records, complemented by donor epigraphy and legal documents. Historical questions concern the character of staff and the source of the charitable endowment, its extent relative to health-service provision, and the governing criteria for selecting among the poor the patients actually received. Hospitals established by churches,

monasteries, or charitable societies can all be expected to have had religious personnel and probably a chaplain, as a minimum. Hospitals run by the cities were unlikely to have had a priest among their staff, although the possibility should not be dismissed. Examining the monks of the above-mentioned depots, one is struck by the scant evidence for their role in hospital work: staffing seems to have been either exogenous or utterly insignificant. Clerical participation in hospital care is probably best seen as an obligation for all religious entities either engaged in hospital work or of sufficient standing to be expected to do so, their overall contribution determined jointly by the specific activity levels of each institution in hospitals and by the broader policy (Akdogan et al., 2025; Bonanno, 2021; Brenner, 2023; Karamagi et al., 2023; Lyttkens, 2010, 2011; McCannon, 2017a; Sabharwal, 2025).

2.3 Methodology

The synthesis relies on a historiographical approach, examining economic sustainability in healthcare provision over the ages. Sources stem primarily from the epigraphic corpus and narrative texts; individual hospitals function as an analytical unit, with other healthcare facilities included when data on their founding, operation, and resources are available. Limitations stem from discrepancies in the coverage of developments in the Byzantine and post-classical eras, and from the absence of references to the plot of contemporary drama in support of Athenian hospital work. Additional biases arise from the scarcity of data on care emerging from the marketplace, and from ethical constraints limiting the inclusion of evidence associated with prostitution (Bonati, 2020; Espinosa-González et al., 2020; Liaropoulos & Tragakes, 1998; Ravishankar et al., 2024). Despite these limitations, taxation, charity, and almsgiving emerge as underlying engines driving the work of hospitals. Ledgered revenue from these three modules created an economic climate permitting the establishment of institutions rendering services to the helpless and providing care for the seriously il; support networks of civic, local, and global stature contributed through gifts within the compass of charity and almsgiving; and the institutional frameworks of the church, its laws.

Economic foundations most relevant to access and service scope permit periodic classification into four main types: hospital services financed by the state—an occasional fiscal burden; those offered by religious endowments; and foundations supported by private donors, whose gifts constitute private endowment; and those services provided gratis by practitioners on an informal basis. For the classical and Hellenistic periods, the economic themes supporting hospital care are the fiscal management of publicly owned institutions, and taxation, charity, and almsgiving as engines of hospital work. For the Byzantine and post-classical eras, the themes are those same three elements of funding, together with congestion and uneven service levels as constraints on access to care.

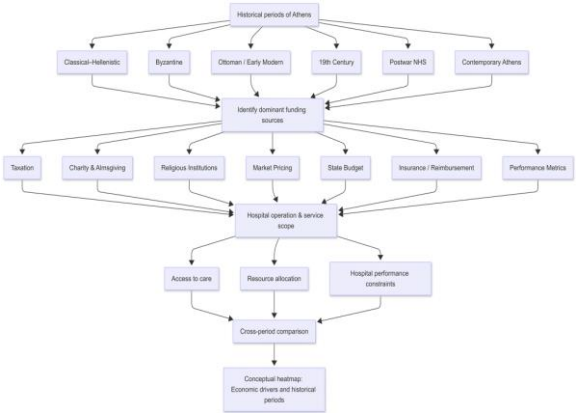

Figure 1: Methodology of historical economic aspects of healthcare system in Athens (Authors' scheme)

The flowchart summarizes the analytical structure of the paper by presenting, in a concise visual form, the sequence through which the economic foundations of healthcare delivery and hospital performance in Athens are examined across time. The point of departure is the distinction between major historical periods, ranging from the Classical–Hellenistic era to contemporary Athens. Each period is treated as a discrete institutional and economic configuration, shaped by prevailing political authority, fiscal capacity, and social organization. For each historical period, the analysis first identifies the dominant funding sources underpinning hospital activity. These include taxation, charity and almsgiving, religious institutions, market pricing, state budget allocations, insurance and reimbursement mechanisms, and—only in the most recent phases—formal performance metrics. The relative weight of these funding sources differs markedly across

periods and reflects broader economic structures rather than deliberate healthcare planning. This step establishes the financial and governance environment within which hospitals operated The identified funding sources are then linked to hospital operation and service scope. Funding arrangements condition the scale of services offered, the degree of specialization, staffing capacity, and the stability of hospital activity (Challoumis, 2019; Challoumis & Eriotis, 2024). Periods dominated by charity and religious endowments tend to exhibit limited and uneven service provision, while periods characterized by state financing and insurance mechanisms support broader access and more standardized hospital operations. Market pricing introduces additional constraints, particularly for poorer populations, by directly tying access to the ability to pay. From hospital operation, the analysis focuses on three closely related outcomes: access to care, resource allocation, and hospital performance constraints. Access to care reflects the extent to which services were available to different social groups; resource allocation captures how financial inputs were distributed across facilities and services; and performance constraints highlight limits imposed by funding instability, administrative capacity, or cost-containment policies. These outcomes are not treated as quantitative measures but as historically observable patterns derived from institutional records and narrative sources. The framework enables a cross-period comparison, allowing the paper to trace long-term shifts in the economic logic of healthcare delivery in Athens. This comparative step leads to the construction of the conceptual heatmap, which visually synthesizes how the importance of each economic driver changes across historical periods. The flowchart thus clarifies how the narrative and analytical components of the study are integrated, demonstrating that the heatmap is the result of a structured historical synthesis rather than an empirical or econometric exercise.

3. The classical and Hellenistic periods: fiscal management of health institutions

State expenditure on health-related services and public sanitation management reveals health priorities for Athens. The public funds came mostly from direct taxation on property holdings. The taxes on the richest served, as usual, to maintain the Senate (boule) and the principle of isogoria (equal speech)—a political privilege paid for by a restricted group and gained by the rest for nothing. The allocation of tax revenues to health services is difficult to trace, yet hospitals of varying forms and services gradually appeared in Athens, pointing to a systematic recognition of the importance of such institutions. Health services usually took the form of large public baths, aqueducts, lyceums, gymnasia, and, during the later stages of the city's existence, hospitals. The assignment of major burial expenditures to the offering of public baths to the Athenian population, also serves as an excellent proof of the importance given to hygiene by the authorities. Hospitals were founded by the state, by cities, and by individuals, while baths were mainly maintained by the city. Whatever the institution providing the service—bath, aqueduct, or hospital—the Athenian state sought to fulfil its obligation for oschlosis of the people (Alotaibi, 2021; Christova-Penkova, 2024; Giusti et al., 2024; Hanson et al., 2022; Kadarpeta et al., 2024; Mossialos et al., 2005; Onwujekwe et al., 2020).

3.1. State expenditure on public health and sanitation

The analysis of public health-related services, as most clearly mirrored by Athens' public accounts, offers some insight into the concerns that prevailed at the time regarding the risk of epidemics and the maintenance of hygiene in the city. Available data suggests that they were clearly secondary priorities, both in terms of overall fiscal outlays and in relation to the sources of taxation. Specifically, for the period after the Peace of Nikias very little progress was made in expenditure on baths, which had always been of primary importance in the prevention of contagious diseases. Special taxes on theatres and other entertainment aappear to have created a complementary source of revenue for the provision of at least basic public health facilities, but their relatively limited use suggests a rather low concern for public health at that time. The negligence given to the aqueducts also testified to the weakness of the state in liberalizing the supply of clean water. The meagre budgetary resources allocated to hospitals and the attention paid to the maintenance of prisons only reveals the limited public investment in care facilities during that period. Outlays on state-

sponsored hospitals seem to have been officially used to justify the creation of state hospitals for legitimate prisoners. Their permanent foundation was delayed by the destruction of the city but later reflected the critical situation of the new Byzantine metropolis. The sponsoring legislation was drafted in public assembly with explicit references to the "Kongou" hospital in Constantinople. The specified budget allocation was small, indicating that the original function was not essentially altered in subsequent centuries and that it was merely intended to satisfy the requirements of the state and the Orthodox Church rather than those of the needy (Christova-Penkova, 2024; Espinosa-González et al., 2020; Giusti et al., 2024; Kadarpeta et al., 2024; Kaitelidou et al., 2013; Mossialos et al., 2005; Onwujekwe et al., 2020; Ravishankar et al., 2024; Szigeti et al., 2019).

3.2. Hospital formation, governance, and resource allocation

The cumulative effect of taxation, charity, and almsgiving on hospital work is apparent in proportionally ledgered revenue notes, which also record patronage ties to Athens, the Monastery of Kyra, and the Russian Tsardom. Legal provisions on almsgiving, meanwhile, indicate the prevalence of donor funding based on conscience and fear of religious penalty. Nevertheless, available records expose both an overseer of hospital management and a more general model of industry governance. First, a series of untended craters along the Volos-Philippes road evidently provided torments to pilgrims and travelers alike but were protected from closure by provision in the charter of St. Theodore of Dionysus, which designated healing powers for the water therein. Second, analysis of the works of the Megarian synaxaristes reveals a plethora of miraculous cures and prophecies associated with the churches of St. Nicholas and St. Anna at Melboúki, the sanctuary of St. Longinus at Kolónos, and the shrine of St. John in the Anáfiotika area of the city. Supporting this attention to miraculous cure is the charter of the Monastery of Kyra, which maintained a hospitable guest house, supervised by probable nuns, for aerial pilgrims of the Middle Ages, thus functioning like the later hospital of Yenidje Vardar (Ilias Kyriopoulos et al., 2019; Maniadakis et al., 2008; Polyzos et al., 2008; Trakakis et al., 2021; Tsitsakis et al., 2014). The cumulative effect of taxation, charity, and almsgiving on hospital work is apparent in proportionally ledgered revenue notes, which also record patronage ties to Athens, the Monastery of Kyra, and the Russian Tsardom. Legal provisions on almsgiving, meanwhile, indicate the prevalence of donor funding based on conscience and fear of religious penalty. Nevertheless, available records expose both an overseer of hospital management and a more general model of industry governance. First, a series of untended craters along the Volos-Philippes road evidently provided torments to pilgrims and travelers alike but were protected from closure by provision in the charter of St. Theodore of Dionysus, which designated healing powers for the water therein. Second, analysis of the works of the Megarian synaxaristes reveals a plethora of miraculous cures and prophecies associated with the churches of St. Nicholas and St. Anna at Melboúki, the sanctuary of St. Longinus at Kolónos, and the shrine of St. John in the Anáfiotika area of the city. Supporting this attention to miraculous cure is the charter of the Monastery of Kyra, which maintained a hospitable guest house, supervised by probable nuns, for aerial pilgrims of the Middle Ages, thus functioning like the later hospital of Yenidje Vardar (Alotaibi, 2021; Grigorakis et al., 2016; Günther & Hahn, 2019a; Hanson et al., 2022; Kaitelidou et al., 2013; Tountas, 2009).

4. The Byzantine and post-classical era: shifts in economic incentives for care

Taxation, charity, and almsgiving emerge from the discussions not only as excellent engines governing hospital work but also as the major suppliers of energy for accomplishing this work. The first form of financial monitoring was the general ledger of state income and expenditure. The sources of income were listed in the first part, while the first note on hospital activities appeared in the second one. Initiation to almsgiving, in the form of bequests to the poor, and practice of hospital care were encouraged by legal provisions. Both supplemented the limitation posed by lapse of fortune; they formed special networks in society for the gathering of special assistance and the flow of materials. Not only were the economy and the legislative framework indifferent, if not hostile, to medical care; economy also imposed a price on all sections of society which was weightier than the general tax. Emphasis was now placed on the law which bestowed a state of need on sections of society

(Challoumis, 2025b, 2025a). A politeia undertaken from the old pre-Classical world, in Christianity it now evolved an institutional foundation. The legal order devoted its special attention to the promotion of popular charity through the legal instrument of the Donation Act. Its sensitive attitude also gave birth to penal law, which defined the limits beyond which diminishment of the right to live through incest, paedophilia, and ostentatious consumption condemned the sinner to death. The economy – like the law – so conceived was a guiding agent of human behaviour. Poverty condemned sections of the population to a state of departure from a Christian conception of the world. They had to be looked after, cared for, sustained, and, if sickly, cured by a Christian society (Bates, 2025; Diamantis et al., 2020; Güemes & Cusumano, 2022; Karamanoli, 2015; Kourgiotis, 2025; Mavridoglou & Polyzos, 2022; Mengistie et al., 2025; Ragkou & Mader, 2025).

4.1. Taxation, charity, and almsgiving as engines of hospital work

A first approach into the economic foundations of hospital operation appears to render taxation, charity, and almsgiving into the engines driving hospitals. More directly, considerable quantities of hospital records, scores of other surviving documents referring to patrons, donors, and deeded commissions, and the regulation of almsgiving jointly publish the ledgered revenue of the work. After the introduction of the Kadi-Vizier court system in the early 17th century these data can be increased through the system of lay probates regulating domestic and foreign wealth holdings. They sing their own chant, as demonstrated in the analysis of Hospital revenue in this period. It is evident that taxes were properly dedicated to the work, at least under the capital-imperial administration (1458-1595), that a tradition of rich patronage and an innovative community of first-giver merchants generated a surplus of funds directed towards hospitals, at least until the end of the 17th century, and that the legal environment consecrated in meticulous detail the platonic third-way, allocating through Nomia to hospitals the largest share of capital destined for charitable foundations in Musyl-alawiga-Atina. It should also be emphasized that for every offering from the Turkish Budget in renovation and maintenance expenses, these capitular interventions were very rarely sufficient. Nevertheless, they appear to have ensured the functioning of the Gods "Houses of the Sick" in capital and important provincial centers, whose operations were threateningly fragile in the Byzantine period when they had briefly escaped taxation and were fully based on almsgiving. Balancing these remarks with the result of paying the same category for hospital prices should also indicate that the option to support the poor was not cancelled by the existence of Howard's and Gilbert's Testaments." The continue reading section reveals that the Kapicu supply and the subsequent home market prices offer to serious research potential on Medical Services simply waiting to be exploited (Alotaibi, 2021; Giusti et al., 2024; Grigorakis et al., 2016; Günther & Hahn, 2019a, 2019b; Hanson et al., 2022; Kaitelidou et al., 2013; Onwujekwe et al., 2020; Szigeti et al., 2019; Tountas, 2009; Yaroshovets, 2023).

4.2. Economic constraints and access to medical services

Taxation and charity, as recorded in hospital accounts, were the principal economic engines driving Byzantine hospital work. However, hospitals operating solely on these revenues were few. The price regime governing access to their medical services remains elusive, as do the practical effects of poverty. Although written sources suggest that services were largely stratified according to economic status, the role of poverty in regulating recourse to hospital services is rendered problematic by the absence of clear relations between the price of treatment and the poor's capacity to pay. Hospitals were always established near or within urban centres, offering direct services to the local population. In Athens, with its low urban density, the living conditions of the rural population may have been worse than those of urban society. Nevertheless, during the late Byzantine period, rural areas appear to lack even the most basic of hospitals, adequate to provide for the needs of the needy. Nevertheless, the continued existence of hospital services in the capital does not necessarily imply the poor's easy access to them. The missing ledger and patronage registers render impossible a thorough analysis of the economic factors enabling the lengthy existence of a hospital offering free medical care (Akdogan et al., 2025; Angelakis et al., 2020; Bonanno, 2021; Bonati,

2020; Brenner, 2023; Karamagi et al., 2023; Kyriazis, 2009; Liaropoulos & Tragakes, 1998; Lyttkens, 2010, 2011; McCannon, 2017a; Sabharwal, 2025). The apparent disjunction between wealth and recourse to medical services is confirmed by the data from the two Imperial Brown University archives, which consistently show that patients admitted to hospitals offering free treatment were usually poorer pilgrims and orphaned children. At the same time, however, the postponement of medical treatment possibly remains a reaction to the high cost of surgical intervention rather than a sign of wealth. The account ledgers of the Hospital of Saint John in Labouré suggest that pricing may also have been a limiting factor, as wealthier citizens seem to have used doctors residing in the vicinity of the Hospital and possibly operating on private terms (Bonati, 2020; Christova-Penkova, 2024; Espinosa-González et al., 2020; Kadarpeta et al., 2024; Liaropoulos & Tragakes, 1998; Mossialos et al., 2005; Ravishankar et al., 2024; Sabharwal, 2025).

5. Ottoman and early modern influences on Athens' healthcare economy

In early modern Athens, healthcare services were market-driven, transforming hospitals from centres of religious and philanthropic activity into state-sponsored healthcare where hospitals were established and maintained publicly but without a parallel provision of medical services. Professional guilds enforced regulation and charged patients for service. Yet, despite the emergence of these market structures and the impact of an abounding hospital network providing care, the quality of service remained, to a degree, subordinate to the building upkeep, governed by budgetary re-allocations driven by Ottoman responsiveness to external pressures. Medical supplies and the service of practitioners required, however, long-distance travel, and many of the capital's hospitals contracted out external provisioning often to the local neighbourhood at known tariffs. These distance factors and such factors as the matrimonial status of the patients conditioned the service demand and uptake, while the absence of female practitioners bore more adverse consequences for the hospital than for the private practitioner market, which catered mainly for prosperous Athenian households and economic aspects (Challoumis, 2023b, 2024d). It was particularly the poor, for whom Athens was, in any case, but a small stop on a bigger economic circuit travelling east and west, slowly heading for Sikyon, that suffered most from the price-cost structures governing the market supply. Although alms from the affluent for the hospitals remained a legally valid factor, the pressure to give increased with the Islamic teaching of almsgiving and the evolving structure of the Athenian economy built on army shares, transport trade, and shopkeeping (Alotaibi, 2021; Christova-Penkova, 2024; Espinosa-González et al., 2020; Giusti et al., 2024; Hanson et al., 2022; Kadarpeta et al., 2024; Mossialos et al., 2005; Onwujekwe et al., 2020; Ravishankar et al., 2024).

5.1. Market organization of medical services and guilds

During the Ottoman period, the organization of medical services in Athens conformed to a market system. The physician and pharmacist classes operated as licensed guilds defined by the şeriat. Licenses were distributed by the beylerbeyi, who also determined the number of physicians according to the population while engaging in price control. An apprenticeship system regulated entry into the guild. Medical services, including for the eye, fever, surgery, pharmacy, and midwifery, were provided for a price, according to fixed tariff scales set by the authorities and displayed in public view, although the poor received treatment free of charge. The quantity and quality of medical services remained inadequate. Auphuy, visiting Athens in 1778, expressed dissatisfaction with the local apothecary and the limited offers during a smallpox epidemic. The same complaint resurfaced in Hughes's observations from 1810 (Diamantis et al., 2020; Ilias Kyriopoulos et al., 2019; Maniadakis et al., 2008; Polyzos et al., 2008; Trakakis et al., 2021; Tsitsakis et al., 2014): "In these places there is no eye-doctor; the poor are thus condemned to navigate through towns and villages whose doors are always ajar for the Gipsies, to make a penny." Such lack of medical care reflected a wider spatial distribution of services in the city. Mégret, writing in 1842, claimed that the Hippocratic principle "curare miserum opportet" held true: "An incurable disease calls the cruel, but … either the distance or the poverty of the sick man renders him abandoned; and the few rich who die of fever are either nursed at home by their mother or at their

husband's house" (Boas, 2020; Grigorakis et al., 2016; Günther & Hahn, 2019a, 2019b; Jakovljevic et al., 2021; Kaitelidou et al., 2013; McCannon, 2017b; Szigeti et al., 2019; Tountas, 2009; Yaroshovets, 2023).

5.2. Public works, revenue streams, and hospital maintenance

Market organization guided the provision of medical services. Physicians belonged to a guild grouping all categories of medical workers, including surgeons, barbers, midwives, and herbalists (c and d). The guild authorized the founding of new practices, ratified apprenticeships, and determined fees; in principle at least, it entrusted members with fees for attendance and treatments and prohibited the exercise of any other profession. This intricate licensing and supervision system may have had some regulatory effect, but it did not prevent practitioners from charging excessive fees, especially when treating poor customers or patients in tumbling health. Practitioners were present in the main cities of the conquered lands, where public baths had already been built; the interior of the land was serviced by itinerant practitioners, calling their services from one place to another. The conditions of the profession were those of a regular employment contract, with a regular daily wage. The appointed public physician was expected to reside in the major city of the area. He was licensed to sell medicine, treatment, and aids, so long that the fees were not disproportionate and responding to the condition of the patient. The public physician was assisted by an apothecary and sometimes also by a helper, 'somebody to carry the pot'. The municipal budget covered all necessary expenses to pay the practicing physician and help him in the treatment and surgery and to provide the necessary medical instruments and medicines (Grigorakis et al., 2016; Günther & Hahn, 2019a, 2019b; Hanson et al., 2022; Kaitelidou et al., 2013; Szigeti et al., 2019; Tountas, 2009; Yaroshovets, 2023).

6. 19th and early 20th centuries: modernization, public funding, and hospital performance

The political landscape of Greece shifted significantly in the 19th century, as the country emerged as an independent state in southern Balkan Peninsula and positioned itself as an ally of the Great Powers. Following the outbreak of the Greek War of Independence in 1821, the Philhellenic Organistion took on an important role by galvanizing support and financial contributions from Greece and abroad. It also coordinated actions by Allied countries that ultimately led to the establishment of a modern Greek state and the election of the first king in 1833. An incipient state-building process was put into motion, along with a social agenda focusing on the preservation of Greek identity through education and religion. Within this framework, the church became shortly thereafter an integral part of the organizational and administrative structure of the new state and the tax system was also set up, albeit with slow progress. The health budget was quickly and continuously prioritized, primarily in the central city of Athens. The first steps for the establishment of a modern hospital were made during the 1830s, primarily through the efforts of foreign residents and, especially, of the Englishman Thomas M. T. P. Griffiths. The first hosptials were commissioned to facilitate the accommodation of the military – either Greek or foreign – and the work of the Hellenic Red Cross during the Balkan Wars of 1912-1913 played a very important part in the early development of the new state, which had limited financial resources. At the same time, however, cooperation with charitable institutions was stepped up. The early alignment of the countries that composed the newly founded temple of St. Sophia in the form of a central city directly contributed to the creation of many new institutions dedicated to the care of Athenian and foreign citizens. Their performance and specialization gradually became evident and the consequences clearly discernible through the maintenance of statistical records (Becker, 2020; Boas, 2020; "Impact of Direct Health Facility Funding on Service Delivery in Primary Healthcare Facilities in Plateau State," 2025; Jakovljevic et al., 2021; Kachula et al., 2023; I Kyriopoulos et al., 2025; McCannon, 2017b; Tridimas, 2020; Ungar-Sargon, 2025).

6.1. State-building and health budget priorities

The period from state independence to the Great Depression saw the establishment of a modern national health system that guaranteed medical care to an ever-growing section of the population. During

this transitional phase, the economic logic of health-care provision shifted from market-oriented to quasi-socialist, driven by public funding through compulsory insurance contributions and state taxation. Hospitals became compulsory insurance providers. The debt-servicing burden of the state limited the acceptability of any tax increase, while the low levels of medical insurance contributions made private hospital care for all but the wealthy very difficult. Waiting lists and waiting times for poor patients continued to expand. In the second postwar decade, response dumping practices led to fallacies in the private medical care market, and control procedures were put in place. The foundations laid for the construction of a national health-care system began to yield results During the period under consideration, Athens assumed the role of a national health centre. Health expenditure grew significantly faster than national income, and hospitals were at the forefront of demand for state funds. To meet the needs of a modern city, hospitals were expanded, and new ones built. Reforms introduced in the years following the end of the dictatorship of July 1967 shaped both the performance of the health-care system and the manner in which health care was financed (Alotaibi, 2021; Grigorakis et al., 2016; Günther & Hahn, 2019a, 2019b; Hanson et al., 2022; Jakovljevic et al., 2021; Kaitelidou et al., 2013; McCannon, 2017b; Onwujekwe et al., 2020; Szigeti et al., 2019; Tountas, 2009; Yaroshovets, 2023). Despite the tight budgetary policy followed by the government and the introduction of price controls, funding growth was sufficient to guarantee better-quality services.

6.2. Hospital accreditation, reporting, and outcome measures

The establishment of formal standards for hospital accreditation, the recording of health outcomes, and the publication of results in comparative form represent new public administration approaches during the modern period. These measures were instituted not by persistent demand from domestic society, but were accomplished with determination by the bureaucracies and governments of the time. Such features are generally implemented later in a nation's developmental sequence and tend to benefit later-developing nations, or regions within them. In this specific instance, their development in Athens occurred in the second half of the twentieth century. These historical trends coincide with external shocks such as world wars, revolutions, financial crises, and reform movements in nation-states, with their attendant repercussions at the local level. As a result of the evolution of a national health system, Athens became home to hospitals funded through different sources, as well as a diverse combination of public and private factors. These hospitals also faced the economic necessity of remaining efficient in order to operate successfully within their prescribed cost limits, despite the economic responsibilities external to the organizations themselves. For the first time, therefore, the Athenian hospitals operated under "realistic" profitability—expressed in the accounting statements of cost centers supervised by the ministry of health (Becker, 2020; Boas, 2020; Günther & Hahn, 2019b; "Impact of Direct Health Facility Funding on Service Delivery in Primary Healthcare Facilities in Plateau State," 2025; Jakovljevic et al., 2021; Kachula et al., 2023; Kaitelidou et al., 2013; I Kyriopoulos et al., 2025; McCannon, 2017b; Szigeti et al., 2019; Tridimas, 2020; Ungar-Sargon, 2025; Yaroshovets, 2023). The hospitals' efficiency during this period is examined through the sub-indicators of no. of beds occupied within certified capacity, no. of patients discharged in the year, no. of births, no. of surgical operations—distinguished between in-patient and out-patient, and average length of stay.

7. Postwar to late 20th century: economic reform, reimbursement models, and efficiency

The evolution of hospital performance in Athens during the postwar period formed part of a wider national health system trend. In many countries, government spending on health increased due to rising demand and expanding fiscal capacity, enabling the introduction of publicly funded medical care services. Section 7.1 discusses how these developments eventually led to the establishment of a national health system in Greece by the late 1980s, while also outlining the associated funding structure. Problems linked to the implementation of such a system are examined in section 7.2, which reviews hospital performance in the late 1990s. Although per capita government health spending in Greece remained low relative to Western European levels throughout the postwar period, a series of external influences and domestic events hastened the

establishment of a national health system in the late 1980s. National expenditure on health as a percentage of gross domestic product rose sharply during the 1980s, before stagnating over the next decade. Public funding increased considerably, although it remained below 70% during the whole period. The subsequent introduction of a shunt funded primarily by employers and employees permitted the conclusion of the National Health System for all Greeks in 1983. The most positive index of this rapid expansion was the introduction of the symbolic motto of the foundation: "The citizen can now go to the doctor without having to pay" (Bergh & Lyttkens, 2014; Carmichael, 1997; Kamble, 2024; Kidd, 2025; Michaleas et al., 2024; Pappa & Niakas, 2006; Rentoumis et al., 2010; Siskou et al., 2008; Taheri et al., 2025). The endorsement of this principle, however, coincided with the serious crisis of the National Health System, which was the inevitable consequence of an unmanaged expansion both of private insurance companies and of co-payments for the supply of health services.

7.1. National health systems, funding mechanisms, and Athens-based hospitals

The emergence of national health systems promoting access to effective health services without financial hardship transformed Athens' geometry of health care delivery, alongside hospitals evolving into the prime care providers. A broad array of hospitals performed various tasks and, with that, served different funding sources. Public hospitals offering most services were reimbursed by the health-insurance fund. The Democritus Foundation supplemented private and church hospitals through direct financing and grants. The monasteries covered urban services mainly through income from land and property as well as endowment revenues. Finally, Geneva's Office of Foreign Affairs supported Koraes's hospital in maintaining a contractual framework for French-speaking settlers. Public regulations, particularly health-insurance legislation, acted as powerful cost-containment tools and conditioned access to services through a cooperation-pricing scheme. While formal demand constantly increased, real demand fluctuated and frequently became negative, registering long average wait times. The supply of medical services outside Athens was hardly disrupted: although district hospitals remained scarcely used and many patients had no access to health services close to home, the waiting list for those hospitals providing surgical interventions was substantially longer than the available surgery slots (Bhat, 2023; Burke, 2010; Demertzis & Stratoudaki, 2020; Diamantopoulos et al., 2025; Farantos & Koutsoukis, 2023; Kawakami et al., 2025; Kondilis & Benos, 2023; Radu et al., 2021; Rhodes, 2013; "The Commercial Mentality in the Low Countries in the 15th Century," 2025). Further analysis of these patterns is needed to disentangle the medical and economic determinants behind the differences in formal and real demand for hospital services in Athens and in the neighbourhood.

7.2. Performance indicators, productivity, and governance reforms

Performance indicators, productivity, and governance reforms outlining the major elements of hospital performance in the years since 1945. Their identification draws on the work of notable scholars and practitioners, while the results of institutional analyses add depth. Accumulated findings are summarized here in two clusters: performance measures and factors related to hospital output and efficiency. A national health system was established during the earliest postwar years. Following the construction of a first generation of general hospitals, a second wave of hospitals was built through national health insurance funds and under the supervision of the SIADAP organization. By 1970, the National Health System covered the costs of treatment in public hospitals for about 70% of patients (Bates, 2025; Güemes & Cusumano, 2022; Jamshidi, 2025; Karamanoli, 2015; Karayiannis & Hatzis, 2010; Kourgiotis, 2025; Matczak, 2025; Mengistie et al., 2025; Ragkou & Mader, 2025; Subramani et al., 2025; Trotman-Dickenson, 1996). The growth in patient numbers in the ongoing postwar years, the rapid increase in the number of hospitals within Athens, the public system's offer for free care, and the system's admission policy strongly influenced the functioning of Athenean hospitals.

8. Contemporary Athens: economic pressures, hospital performance, and policy responses

Funding dynamics, cost containment, and access to medical care in Athens are increasingly constrained

and complex. The payer mix has shifted as insurance coverage has become more universal, but prices for services are tightly controlled to contain costs, leading to longer wait times. Public hospitals are the largest providers of hospital care in the city and nation but have much lower capital spending than private facilities, including unaccredited clinics. Waiting times at these facilities are thus considerably higher, although patients still tend to express higher satisfaction rates than in other parts of the country. Quality of care appears to be directly correlated with budgetary factors. Performance measures routinely occupy the top tier of international efficiency ratings and document a relative increase in the efficiency of Athens-based hospitals over the last decade, especially when viewed from the perspective of health outcomes. Systematic institutional benchmarking has also provided reliable information on case mix, complication rates, and survival data. Individual organizational outcomes by service, especially mortality rates, are thus becoming part of the contemporary policy-making process.

The economic history of Athens' hospitals over the past four decades has been marked by a shift in the nature of funding and the increase of cost containment. Initially reliant on taxation, insurance contributions were incorporated to create a quasi-national health insurance model, although cost containment measures placed price control over quality. Initiatives to replace private expenses with insurance and ease access through service price reductions have yet to yield results. Since 2010, the centre-right and left-of-centre governments have pursued similar policies; higher taxes, pay cuts, and structural reforms—still sought—have redirected health expenditure from hospital to ambulatory care. Hospitals continue to attract share of the population that cannot cope with lengthy waiting times or afford out-of-pocket expenses for faster or better quality of care. Hospital performance in Athens has been analysed using measures of quality of care, efficiency, and outcomes. Satisfaction levels are generally high, but the comparison of patients' evaluation of the service received with throughput per doctor suggests a trade-off. During the 1990s, substantial investments in new technology and infrastructures contributed to a significant decrease in mortality of inpatients, while the number of discharges and, more importantly, of operations performed per 100,000 residents exhibited an increasing trend. The introduction of an outcome-based performance assessment system highlighted a contrast between the increasing hospitals' share of health care expenditure and their proportionalised estimated mortality rates, as well as the relatively low production of operations of major complexity (Bates, 2025; Diamantis et al., 2020; Güemes & Cusumano, 2022; Jamshidi, 2025; Karamanoli, 2015; Kourgiotis, 2025; Ilias Kyriopoulos et al., 2019; Maniadakis et al., 2008; Mavridoglou & Polyzos, 2022; Mengistie et al., 2025; Polyzos et al., 2008; Ragkou & Mader, 2025; Trakakis et al., 2021; Tsitsakis et al., 2014).

9. Results and Discussion

The analysis clarifies how the economic parameters of healthcare delivery and hospital performance in Athens have changed over time. The investigations synthesize the economic drivers of healthcare delivery and hospital performance in Athens across periods, identifying central actors, funding streams, governance forms, and performance metrics.

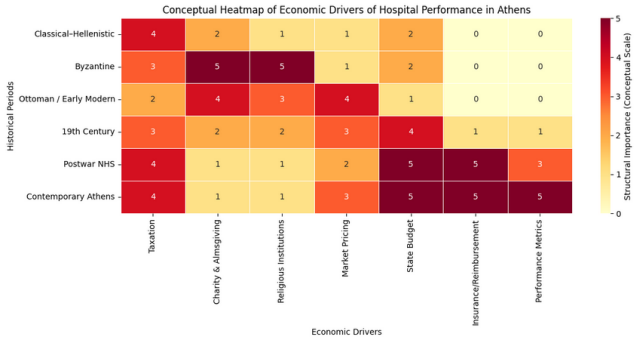

Figure 2: Conceptual heatmap of economic drivers of hospital performance in athens (authors' scheme, see appendix i)

Figure 2 provides a synthetic visualization of how the economic drivers of hospital performance in Athens have evolved across distinct historical periods. Its purpose is not to measure hospital activity quantitatively, but to condense the historiographical analysis into a structured comparative framework, highlighting shifts in the dominant financial and institutional mechanisms that shaped healthcare delivery over time. The color intensity reflects the relative structural importance of each driver within a given period, as inferred from historical sources and

institutional arrangements rather than from statistical observation. In the Classical–Hellenistic period, taxation appears as the most significant economic driver, reflecting the central role of the polis in financing public goods such as baths, aqueducts, and early care facilities. Charity and religious institutions play only a secondary role, while market pricing and formal performance metrics are largely absent. Healthcare provision during this period was embedded in broader public infrastructure and civic obligation rather than in specialized hospital systems, which explains the low intensity assigned to insurance mechanisms and accountability indicators. During the Byzantine era, the heatmap shows a clear shift toward charity and religious institutions as the dominant engines of hospital activity. Monasteries, churches, and religious endowments assumed responsibility for funding, staffing, and governing hospitals, while taxation continued to play a supporting role. Market pricing remained marginal, and the absence of formal performance assessment reflects the charitable and spiritual orientation of care. Hospital access and service scope were therefore conditioned primarily by almsgiving and donor patronage rather than by state planning or economic efficiency. The Ottoman and early modern period introduces a more balanced configuration. Charity and religious influence remain important, but market pricing gains prominence, reflecting the organization of medical services through guilds, fixed tariffs, and licensed practitioners. State budget involvement is relatively weak, and hospitals operate under constrained and fragmented funding streams. This mixed structure illustrates a partial commodification of healthcare, where access increasingly depends on the ability to pay, even as almsgiving continues to support the poor. In the 19th century, coinciding with Greek state-building, the heatmap indicates a growing importance of state budget allocation alongside taxation. While market pricing remains relevant, public investment in hospitals and health infrastructure becomes more systematic. Insurance mechanisms and performance metrics begin to emerge, albeit weakly, signaling the transition from charitable or market-based care toward a modern, administratively organized health system. The postwar period and the establishment of the National Health System (NHS) mark a decisive transformation. State budget allocation and insurance-based reimbursement become the dominant drivers of hospital performance, while charity and religious institutions recede to the margins. Performance metrics gain noticeable importance, reflecting the introduction of accreditation, reporting, and efficiency indicators. Hospitals increasingly operate under budget constraints and administrative oversight, aligning healthcare provision with broader public policy objectives. In contemporary Athens, the heatmap depicts a mature system characterized by strong state financing, universal insurance coverage, and high reliance on performance metrics. Market pricing reappears in a complementary role, particularly through private providers and co-payments, but it is no longer the primary determinant of access. The configuration illustrates a healthcare economy driven by cost containment, accountability, and outcome-based assessment, encapsulating the long-term evolution from civic obligation and charity to a regulated, performance-oriented public health system (Akdogan et al., 2025; Angelakis et al., 2020; Bonanno, 2021; Bonati, 2020; Espinosa-González et al., 2020; Karamagi et al., 2023; Karayiannis & Hatzis, 2010; Ilias Kyriopoulos et al., 2019; Lyttkens, 2011; Maniadakis et al., 2008; Matczak, 2025; Mengistie et al., 2025; Polyzos et al., 2008; Ravishankar et al., 2024; Trakakis et al., 2021; Tsitsakis et al., 2014). The economic foundations of illness treatment before the classical era are characterized in terms of public and private funding, the contributions of temples and the polis, and donor patronage; the implications for service access and scope are discussed. The roles of religious and civic institutions in hospital care are examined so as to reveal the governance, staffing, charitable endowments, and service selection criteria deducible from surviving evidence. Hospitals in Athens from the beginning of the Byzantine era onwards were productively managed (Challoumis, 2024a, 2024c). Taxation, charity, and almsgiving are recognized as the key economic levers driving hospital work, while ledgered revenue, patterns of patronage, and the enabling legal framework are specified. The resulting framework sheds light on economic constraints and citizens' access to medical services. These now encompass price regimes, service deserts, urban-rural disparities, and poverty effects. Subsequent inquiry shows that the market organization of medical services and the accompanying guild structure responded to low demand and fostered the bourgeois position of

medical practitioners. The effect of public works on the revenue streams underwriting hospital maintenance is also evaluated.

10. Conclusion

The economic drivers of healthcare delivery and hospital performance in Athens can be synthesized across periods, identifying central actors, funding streams, governance forms, and performance metrics. The early economic foundations consisted of public and private funding, with religious associates securing donations, whether from temples, the city, or other benefactors. Such generosity may have favoured the free provision of services, albeit with possible limitations on access or the scope of care offered. Examining religious and civic institutions' roles in hospital care reveals how an analysis of founding laws can arrive at conclusions about the governance, staffing, charitable endowments, and service-selection criteria of those hospitals. The methodology is theoretical in nature, establishing a historiographic approach to the economic aspects of healthcare delivery and hospital performance in Athens. Processed evidence is derived from diverse sources, with the analysis unit the economic growth stage of each period. Limitations and biases arise in data availability, representativity, and levels of analytical depth. State expenditure on public health and sanitation in the classical and Hellenistic periods reflects budgetary priorities, tax sources, and allocation structures, especially for baths, aqueducts, and care facilities. The formation, governance, and resource allocation of hospitals are addressed with reference to founding statutes, staffing regimes, material provisioning, and revenue streams.

Appendix I

Python code:

```
# Constantinos Challoumis 2025 ©® All Rights Reserved
import seaborn as sns
import matplotlib.pyplot as plt
import pandas as pd

# Conceptual data based on historiographical analysis
data = pd.DataFrame(
    [
        [4, 2, 1, 1, 2, 0, 0],  # Classical–Hellenistic
        [3, 5, 5, 1, 2, 0, 0],  # Byzantine
        [2, 4, 3, 4, 1, 0, 0],  # Ottoman / Early Modern
        [3, 2, 2, 3, 4, 1, 1],  # 19th Century
        [4, 1, 1, 2, 5, 5, 3],  # Postwar NHS
        [4, 1, 1, 3, 5, 5, 5],  # Contemporary
    ],
    columns=[
        "Taxation",
        "Charity & Almsgiving",
        "Religious Institutions",
        "Market Pricing",
        "State Budget",
        "Insurance/Reimbursement",
        "Performance Metrics"
    ],
    index=[
        "Classical–Hellenistic",
        "Byzantine",
        "Ottoman / Early Modern",
        "19th Century",
        "Postwar NHS",
        "Contemporary Athens"
    ]
)

plt.figure(figsize=(12, 6))
sns.heatmap(
    data,
    annot=True,
    cmap="YlOrRd",
    linewidths=0.5,
    cbar_kws={"label": "Structural Importance (Conceptual Scale)"}
)

plt.title("Conceptual Heatmap of Economic Drivers of Hospital Performance in Athens")
plt.xlabel("Economic Drivers")
plt.ylabel("Historical Periods")
plt.tight_layout()
plt.show()
```

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