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Vertical integration in health: An oasis or a mirage?

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Abstract

Around the world, countries strive to provide high-quality healthcare while also attempting to control the growth of healthcare spending. In recent decades, vertically integrated care models have been developed and implemented. In Portugal, vertical integration has been achieved through the establishment of local health units. Over 25 years after the founding of the first unit, and more than a decade since the creation of the most recent one, this model was rolled out nationwide in January 2024, promoting the integration of hospitals and primary care centers into a single institutional and management entity. This approach aims to deliver integrated healthcare, ensure continuity of care, strengthen community primary care services, and emphasize health promotion. The primary objectives of this study are to gain a deeper understanding of vertical healthcare integration, particularly in Portugal, and to evaluate the outcomes of this integration model. As an exploratory study, the methodology includes a review of the relevant literature and national legislation on the topic. The literature presents mixed, limited, inconsistent results, with no distinctly positive trend emerging. While the vertical integration model has the potential to realize the expected theoretical benefits, several factors and vulnerabilities must be considered; otherwise, it may transform a potential oasis into a fleeting opportunity mirage.

Keywords: Healthcare; Integrated care; Vertical integration; Health reforms; Local health unit; Portugal

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1. Introduction

Healthcare management, regardless of the context, is a complex task. Governments around the world have been confronted with the dichotomous task of balancing, on the one hand, the provision of quality healthcare and, on the other hand, the containment of rapidly increasing healthcare expenditures (Amado *et al.*, 2022; Ferreira *et al.*, 2018; Neiva *et al.*, 2023; Nunes and Ferreira, 2022; Wang *et al.*, 2024).

Health systems worldwide are inherently complex, subject to political cycles, regulatory barriers, bureaucratic idiosyncrasies, and numerous interdependencies among the public, private, and social sectors (Alonso and Andrews, 2022; Chen *et al.*,

2018; Goiana-da-Silva *et al.*, 2024; Heeringa *et al.*, 2020). On the other hand, they face numerous challenges, including:

- Increasing demand for healthcare services (Imison *et al.*, 2017; Jones *et al.*, 2018; Yu *et al.*, 2020);
- Rising life expectancy combined with low birth rates, leading to a growing aging population (Chen *et al.*, 2018; Cristea *et al.*, 2020; Cruz *et al.*, 2022; Lopreite and Mauro, 2017; Lopreite *et al.*, 2023; Rocks *et al.*, 2020; Tavares, 2022);
- Growing burden of chronic diseases (Busse and Stahl, 2014; Damaceno *et al.*, 2020; Fernandes *et al.*, 2019; Whitty *et al.*, 2020);
- Widening geographic dispersion of the population, far from healthcare providers (Neiva *et al.*, 2023);
- Mounting concerns about sustainability and efficiency (Asandului *et al.*, 2014; Nunes and Ferreira, 2018a; Nunes and Ferreira, 2018b; Nunes and Ferreira, 2022; Nunes, 2024);
- Persisting concerns regarding cost, quality, and performance (Caballer-Tarazona and Vivas-Consuelo, 2016; Comendeiro-Maaloe *et al.*, 2019; Machta *et al.*, 2019; Post *et al.*, 2017; Short and Ho, 2019; Whaley *et al.*, 2021);
- Escalating daily financial and service pressures (Baxter *et al.*, 2018; Curry *et al.*, 2013; Hildebrandt *et al.*, 2010; Imison *et al.*, 2017);
- Rising inflation (Nunes and Ferreira, 2022; Nunes, 2024);
- Experiencing continuous shortages of physical and human resources (Hogan *et al.*, 2019; Imison *et al.*, 2017; Jones *et al.*, 2018; Neiva *et al.*, 2023; Nunes and Ferreira, 2018b; Nunes and Ferreira, 2022; Yu *et al.*, 2020);
- Facing coordination gaps among various healthcare providers (Curry *et al.*, 2013; Falces *et al.*, 2011; Khatri *et al.*, 2023);
- Adapting to rapid health innovation and the emergence of new medicines and medical equipment (Ancarani *et al.*, 2016; Breyer *et al.*, 2022; Goiana-da-Silva *et al.*, 2024; Nunes, 2024); and
- Growing public expectations for receiving adequate healthcare (Cruz *et al.*, 2022; World Health Organization [WHO], 2018).

The fragmentation of healthcare constitutes another challenge. Healthcare is often provided episodically and through different care providers, without coordination and follow-up (Busse and Stahl, 2014; Falces *et al.*, 2011; Goiana-da-Silva *et al.*, 2024; Sidhu *et al.*, 2022). The lack of coordination among the various care-providing entities can lead to disjointed and inadequate care delivery and, consequently, to a negative impact on patient outcomes (Curry *et al.*, 2013; Damaceno *et al.*, 2020; Hildebrandt *et al.*, 2010; Jones *et al.*, 2018; Lopes *et al.*, 2017). By working in silos, health systems ultimately provide responses that fall short of the increasingly complex needs of populations, especially patients with comorbidities (Liljas *et al.*, 2019). The lack of continuity in providing healthcare tailored to patients' needs leads to the duplication of services, increased costs, and inefficiencies (Moloi *et al.*, 2023).

In many countries, health system fragmentation results from specialization, differentiation, segmentation, and/or decentralization of care, making efficient care management and comorbidities difficult (Rocks *et al.*, 2020; Valentijn *et al.*, 2013; Wang *et al.*, 2024; Whitty *et al.*, 2020). If healthcare services are not well-coordinated and equipped with adequate information systems, patients may experience delays or receive conflicting information from different healthcare providers. Fragmentation by specialization arises from the focus on specific diseases or conditions, leading to healthcare delivery in silos, where the lack of communication among various providers can compromise the continuity of care. Fragmentation by differentiation refers to dividing healthcare services into multiple categories or specialties, creating barriers between different types of care, and making it difficult for patients to navigate the system. Meanwhile, fragmentation by segmentation occurs when healthcare services are divided into distinct groups without interaction or communication, potentially leading to gaps in care. Fragmentation by decentralization, on the other hand, refers to the dispersion of healthcare services across various locations or healthcare organizations, resulting in inconsistencies in healthcare delivery.

As Goiana-da-Silva *et al.* (2024) highlight, many developed countries have health systems that have existed for more than 4 decades and are consequently misaligned with the population's needs and expectations, thus requiring restructuring and adaptation to this new reality. From this context, the integration of healthcare has emerged and spread as a trend in health reforms (Baxter *et al.*, 2018; Thaldorf and Liberman, 2007; Valentijn *et al.*, 2013; Yuan *et al.*, 2020), with the objectives of improving the efficiency and effectiveness of health systems, providing high-quality services, being cost-effective, improving population health outcomes, enhancing access to primary and hospital care, being more equitable, and ensuring a continuum of healthcare for patients (Goiana-da-Silva *et al.*, 2024; Liljas *et al.*, 2019; Moloi *et al.*, 2023).

Although currently in vogue, integrating care is not a new idea. The Declaration of Alma-Ata, in 1978, states that primary healthcare, in addition to being the entry point into national health systems, constitutes the first element of a continuous process of medical care (Damaceno *et al.*, 2020;

Nunes and Ferreira, 2018a; World Health Organization, 1978). According to Hernandez (2000), the concept of care integration gained momentum in the 1970s. It expanded in the 1980s through the horizontal integration of healthcare organizations to enhance competitiveness and service delivery, as well as improve the availability and accessibility of healthcare services. From the 1990s onward, the focus shifted to vertical integration, aiming to streamline services throughout the continuum of care, emphasizing the prevention of diseases and the promotion of health and healthy lifestyles. In Astana in 2019, the World Health Organization (WHO) reaffirmed its commitment to strengthening primary healthcare by making it accessible, safe, high-quality, comprehensive, continuous, integrated, and people-centered, improving individuals' physical and mental health (WHO, 2019).

In Portugal, health is a constitutional right (Constituição da República Portuguesa, de 10 de abril, de 1976 [Constitution of the Portuguese Republic, April 10, 1976]). To uphold this right, the National Health Service (NHS) was established, characterized by its universal coverage, responsiveness to all health needs, and tendency to be free of charge (Catarino *et al.*, 2024). Since its establishment in 1979, the NHS has been founded on the principles of integration and complementarity among primary healthcare, hospital care, long-term care, and palliative care (Catarino *et al.*, 2024; Ferreira and Nunes, 2018; Nunes and Ferreira, 2018a). According to Decreto-Lei nº 102 / 2023, de 7 de Novembro [Decree Law No. 102 / 2023, of November 7], the realization of this constitutional right requires policies for health promotion, prevention, and coordination across levels of care to meet the increased demand resulting from population aging and the prevalence of comorbidities, and to ensure a people-centered approach. The coordination across different levels of care, aligned with the 2030 Agenda, seeks to bring healthcare closer to communities, contributing to Sustainable Development Goal 3 (Good Health and Well-being) and equitable access to quality healthcare.

As highlighted by Lopreite and Mauro (2017) and Lopreite *et al.* (2023), a healthy population, even after the age of 65, has an impact on economic growth. Therefore, it is essential to develop public policies that improve access to healthcare services for the population—including the senior population. These can be achieved potentially through the advancement of technologies, the development of disease prevention programs, the promotion of healthy lifestyles, and active aging. In addition, it is necessary to improve the quality of primary healthcare to reduce the overall frailty of the population (Lopreite and Mauro, 2017). This is the central point of achieving actual and effective vertical integration of healthcare, as primary healthcare serves as the entry point to national health systems, from which referrals are made to the hospital services most appropriate for the specific conditions of each patient (Nunes and Ferreira, 2018a).

Previous literature has addressed vertical integration from various perspectives, such as quality, access, efficiency, expenditures, and costs (Amado *et al.*, 2022; Post *et al.*, 2017; Machta *et al.*, 2019; Short and Ho, 2019). It has been related to patient-centered outcomes (Machta *et al.*, 2019), patients' chronic conditions (Chen *et al.*, 2018; Fernandes *et al.*, 2019), clinical practices (Falces *et al.*, 2011), payment reforms and organizational and market dynamics (Hogan *et al.*, 2019), continuity and coordination of care (Khatri *et al.*, 2023), readmissions (Fernandes *et al.*, 2019; Lopes *et al.*, 2017), and patient satisfaction (Nunes, 2024). The types of studies included systematic literature reviews (Amado *et al.*, 2022; Liljas *et al.*, 2019; Machta *et al.*, 2019; Rocks *et al.*, 2020; Wang *et al.*, 2024), meta-analyses (Rocks *et al.*, 2020; Wang *et al.*, 2024), exploratory analyses (Nunes, 2024), scoping reviews (Khatri *et al.*, 2023), protocol studies (Chen *et al.*, 2018), cross-comparative case studies (Sidhu *et al.*, 2022), and quantitative studies using various comparison methods and statistical analysis (Alonso and Andrews, 2022; Falces *et al.*, 2011; Lopes *et al.*, 2017; Short and Ho, 2019).

At the beginning of 2024, the Portuguese public health sector shifted from eight vertically integrated organizations and 31 horizontally integrated organizations to 39 vertically integrated organizations. This change occurred without studies proving the model's advantages and without, for example, legal, management, and information instruments to support a smooth transition between models, reflecting the skepticism mentioned in the literature. However, if the various needs and implementation challenges are adequately addressed, the advantages in the literature may become a reality.

The present study, based on the Portuguese case, fills a gap in studies addressing vertical integration. The gap centers on the dichotomy between the political decision to adopt the vertical integration model as the general model and the existing reality, where various needs and difficulties must be addressed for vertical healthcare integration to become a reality. While there may be political will to make changes to the structure of the NHS, these contrasts with the operational challenges faced by public health organizations—ranging from organizational limitations, sociocultural environment dynamics, and the uneven availability of information technologies across entities.

This review aims to contribute to a more thorough reflection on a model of healthcare integration—the vertical

integration model. It serves as a call for policymakers to carefully evaluate the subject and to meticulously plan every step to ensure that the model becomes a win-win solution for all stakeholders. The following exploratory analysis study employs a literature review to clarify the concepts of care integration, horizontal integration, and vertical integration. After explaining these concepts, the study identifies the advantages and disadvantages of vertical integration, with the latter in the form of critiques and skepticism toward the model. Next, it provides a brief distinction between horizontal and vertical integration. The following section portrays the development of vertical integration in Portugal across several phases—the first in 1999 and the most recent in 2024. The study then discusses the integration results, considering the literature. Finally, it presents the main conclusions and limitations of the study.

2. Concepts

2.1. Healthcare integration

The concept of integrated health services is not consensual (Rocks *et al.*, 2020; Wang *et al.*, 2024). It can assume various models, logics, and values depending on the context in which it develops (Goiana-da-Silva *et al.*, 2024; Rocks *et al.*, 2020; Yuan *et al.*, 2022).

The lack of a universally accepted definition hinders the implementation of effective strategies for the coordination and management of healthcare (Busse and Stahl, 2014), making it difficult to systematically understand, design, deliver, manage, and evaluate integrated care (Valentijn *et al.*, 2013). This may lead to inconsistencies in care delivery and user experiences (Khatri *et al.*, 2023); increased confusion and complexity in developing a holistic and cohesive approach (Kodner and Spreeuwenberg, 2002); diverse approaches and understandings of how to achieve integration, contributing to variable impacts of implementation (Moloi *et al.*, 2023); fragmented care, where users receive services from multiple providers without adequate coordination (Singer *et al.*, 2010); and, when combined with wide variation in integration models across geographic areas, challenges in ensuring reliability and replicability (Rocks *et al.*, 2020).

The plasticity of the concept is due to its breadth of meanings, encompassing continuity of care, coordination, integration, patient-centered care, continuous care, and cohesive, consistent care for the individual (Khatri *et al.*, 2023). For its part, the WHO identifies seven different uses of integration: A package of preventive and curative health interventions for a specific population group, multifunctional service delivery points, continuity of care over time, vertical integration across different service levels, integrated policy formulation and management, cross-sectional collaboration, and situations in which the insurance function and healthcare provision are handled by the same organization (World Health Organization, 2008).

Care integration refers to the organization, coordination, and combination of health services, aligning health services across various sectors (Baxter *et al.*, 2018; Chen *et al.*, 2018; Curry *et al.*, 2013; Falces *et al.*, 2011; Goiana-da-Silva *et al.*, 2024; Gröne and Garcia-Barbero, 2001). It is adapted to the needs of the user, based on a holistic vision (Busse and Stahl, 2014; Liljas *et al.*, 2019), involving a comprehensive approach that includes health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation, and palliative care according to the needs of the user throughout their life (Damaceno *et al.*, 2020; Lukey *et al.*, 2021; Yu *et al.*, 2020). Care integration involves bringing together organizations and professionals (Liljas *et al.*, 2019; Neiva *et al.*, 2023), as well as creating connectivity, alignment, and collaboration within and across healthcare providers (Rocks *et al.*, 2020; World Health Organization, 2016; Yuan *et al.*, 2022). It combines various forms of integration, including structural, functional, normative, processual, organizational, professional, and clinical (Singer *et al.*, 2010; Singer *et al.*, 2018; Thaldorf and Liberman, 2007).

The objectives of care integration include:

- Ensuring that healthcare is provided continuously over time at different levels of care, particularly for patients with significant chronic disease burdens (Baxter *et al.*, 2018; Damaceno *et al.*, 2020; World Health Organization, 2008);
- Improving the quality of care and outcomes (Liljas *et al.*, 2019; Neiva *et al.*, 2023; World Health Organization, 2016); enhancing user experience and increasing efficiency (Busse and Stahl, 2014; Curry *et al.*, 2013);
- Improving chronic disease management (Chen *et al.*, 2018);
- Preventing the fragmentation of care (Falces *et al.*, 2011);
- Ensuring the smooth functioning and improving the overall quality of the health system (Gröne and Garcia-Barbero, 2001; Lukey *et al.*, 2021);
- Assuring patient-centered care (Khatri *et al.*, 2023; Lukey *et al.*, 2021);
- Improving access to comprehensive, effective, and efficient healthcare, thus enabling users to receive multiple services during a single visit (Moloi *et al.*, 2023);
- Addressing rising healthcare expenditures (Rocks *et al.*, 2020);
- Improving quality of life (World Health Organization, 2016);

- Maximizing the value of services provided to the user (Singer *et al.*, 2010);
- Facilitating the smooth transfer of the user across services (Thaldorf and Liberman, 2007); and
- Ensuring a holistic approach to healthcare delivery (Valentijn *et al.*, 2013).

Amid the tangle of meanings and conceptions of care integration, the idea of a *continuum* emerges, one in which integrated health services not only address the numerous needs of populations but also provide more comprehensive, high-quality services throughout the life course across multidisciplinary teams (Lukey *et al.*, 2021; World Health Organization, 2018). It aims to deliver the proper healthcare at the right time (Khatri *et al.*, 2023), with the fundamental objectives of improving population health, enhancing the user experience, and curbing rising healthcare expenditures (Goiana-da-Silva *et al.*, 2024; Nunes, 2024; Rocks *et al.*, 2020).

As previously mentioned, care integration can follow either a horizontal or vertical model (Goiana-da-Silva *et al.*, 2024; Gröne and Garcia-Barbero, 2001; Hernandez, 2000; Liljas *et al.*, 2019; Nunes, 2024).

2.2. Horizontal integration

Horizontal integration involves consolidating services at the same level of care under the same management umbrella (Amado *et al.*, 2022; Chen *et al.*, 2018; Sarka and Pavla, 2016). The process involves merging entities operating at the same level of the healthcare delivery chain to form multi-institutional arrangements, aiming to expand reach, capacity, scope, and efficiency of service delivery (Amado *et al.*, 2022; Bainbridge *et al.*, 2014; Hernandez, 2000). In practice, it may involve cooperation among hospitals, clinics, and other healthcare entities that provide similar services (Goniewicz *et al.*, 2021; Yu *et al.*, 2020; Yuan *et al.*, 2022), often in arrangements without financial cohesion, where hospitals are managed as autonomous accounting entities or as subsidiaries of a parent company (Sarka and Pavla, 2016).

The reasons for choosing horizontal integration include:

- Enhancing competitiveness through increased market power, which allows hospitals to have a more substantial presence in the healthcare market (Hernandez, 2000; Sarka and Pavla, 2016);
- Increasing efficiency, which can lead to cost reductions and improved service delivery (Bainbridge *et al.*, 2014; Sarka and Pavla, 2016);
- Promoting professional collaboration and mutual support, which are both crucial for the provision of coordinated and effective care, especially for patients with comorbidities or diseases that limit daily life (Bainbridge *et al.*, 2014);
- Achieving economies of scale, as larger systems are better positioned to reach them, resulting in cost reductions through resource sharing, such as group purchasing and fixed cost distribution across a larger base (Hernandez, 2000); and
- Improving service delivery, as horizontal integration aims to increase capacity through the connection of multiple healthcare providers, ensuring patients receive comprehensive care across numerous organizational boundaries (Bainbridge *et al.*, 2014).

On the advantages side associated with horizontal integration, the following can be listed:

- Expanding bargaining power and market expansion, enhancing a hospital's ability to negotiate better terms with suppliers and insurers (Sarka and Pavla, 2016);
- Sharing knowledge, making it easier for healthcare professionals to exchange opinions, develop joint care strategies, share learning, and foster collaborative practice (Bainbridge *et al.*, 2014);
- Achieving cost savings and economies of scale, reducing expenses, sharing resources, and eliminating inefficiencies for more efficient operations (Hernandez, 2000; Sarka and Pavla, 2016);
- Improving relationships with patients (Sarka and Pavla, 2016);
- Increasing efficiency by eliminating service duplication and combining resources and specialized knowledge to deliver services more effectively (Bainbridge *et al.*, 2014; Sarka and Pavla, 2016);
- Enhancing care coordination, improving coordination among providers to achieve better outcomes for patients (Bainbridge *et al.*, 2014);
- Accessing more advanced technological resources through collective purchasing and information exchange that improve technological capacity and reduce costs (Sarka and Pavla, 2016);
- Increasing access to healthcare (Hernandez, 2000); and
- Dispersing risk among the various organizations that are part of the integration (Sarka and Pavla, 2016).

On the disadvantages side, there is uncertainty about achieving the anticipated advantages associated with this integration model, along with the potential loss of organizational autonomy. Integration also presents challenges, as aligning different cultures and organizational systems can be time-consuming and complex. Bainbridge *et al.* (2014) argue that, without strong system-level governance, significant variability may arise in how different organizations operate, which can affect perceptions of integration. In addition, time constraints and workload issues may hinder healthcare providers' ability to fully engage in integrated care activities.

In summary, horizontal integration primarily aims to increase competitiveness and enhance service delivery by consolidating similar entities.

2.3. Vertical integration

Vertical integration involves the merger or the consolidation of different levels of healthcare delivery into a single organizational structure (Alonso and Andrews, 2022; Amado *et al.*, 2022; Fernandes *et al.*, 2019; Hogan *et al.*, 2018; Post *et al.*, 2021; Sidhu *et al.*, 2022). It represents a coordinated approach in which a multidisciplinary team provides care (Chen *et al.*, 2018), and also refers to the common ownership of the different stages of healthcare delivery (Harris *et al.*, 2024), including primary care, hospital care, and convalescent care, under a single organizational continuum (Haddad *et al.*, 2020; Hogan *et al.*, 2019; Levin *et al.*, 2023; World Health Organization, 2016).

In practical terms, vertical integration can be realized in various ways, including:

- Acquiring medical practices or post-acute care units by hospitals (Harris *et al.*, 2024; Post *et al.*, 2017; Upadhyay and Bhandari, 2024);
- Integrating subacute care facilities, outpatient services, or home healthcare agencies into hospital systems (Hogan *et al.*, 2018);
- Acquiring or managing medical clinics by hospitals or health systems (Levin *et al.*, 2023; Post *et al.*, 2021; Whaley *et al.*, 2021);
- Connecting hospitals with general clinics and community care providers (Liljas *et al.*, 2019; Yu *et al.*, 2020);
- Linking hospitals with primary healthcare providers (Lopes *et al.*, 2017; Nunes, 2024; Wang *et al.*, 2024); and
- Merging hospitals with insurers, pharmaceutical companies, or physicians (Thaldorf and Liberman, 2007).

According to proponents, vertical integration offers several advantages, including:

- Improving care coordination and simplifying payments among various providers (Whaley *et al.*, 2021);
- Reducing transaction costs and increasing administrative efficiency (Alonso and Andrews, 2022; Harris *et al.*, 2024; Thaldorf and Liberman, 2007);
- Promoting a continuum of care by aligning services that are typically delivered sequentially in the patient care process, from basic to specialized services (Amado *et al.*, 2022; Cruz *et al.*, 2022; Fernandes *et al.*, 2019; Heeringa *et al.*, 2020; Hogan *et al.*, 2018);
- Combining services across different sectors to improve patient outcomes (Gröne and Garcia-Barbero, 2001);
- Reducing care fragmentation and enhancing coordination, particularly for patients with complex or chronic conditions (Lopes *et al.*, 2017);
- Ensuring good access to healthcare services and establishing quality monitoring and improvement systems (Moloi *et al.*, 2023);
- Increasing efficiency and quality (Nunes, 2024; Upadhyay and Bhandari, 2024; Wang *et al.*, 2024);
- Creating a more cohesive healthcare delivery model (Short and Ho, 2019);
- Forming a patient-centered system that enables efficient resource allocation (Thaldorf and Liberman, 2007; Valentijn *et al.*, 2013);
- Ensuring that patients are treated at the appropriate levels of specialization (Valentijn *et al.*, 2013);
- Streamlining interactions among healthcare providers (Harris *et al.*, 2024; Yuan *et al.*, 2020); and
- Strengthening primary healthcare and establishing a hierarchical care delivery system (Yuan e*t al.*, 2022).

Vertical integration strategies can exist at the functional, normative, system, organizational, professional, clinical, and service levels (Valentijn *et al.*, 2013; Wang *et al.*, 2024). Functional integration encompasses back-office functions, such as financial and information management, strategic planning, and quality improvement (Ramsay *et al.*, 2009; Singer *et al.*, 2010; Valentijn *et al.*, 2013). Normative integration concerns organizational culture, where the mission, vision, values, and culture are shared among the organization, professionals, and individuals (Ramsay *et al.*, 2009; Valentijn *et al.*, 2013). Meanwhile, system integration refers to coherence in rules and policies adopted at all levels of the organization (Ramsay *et al.*, 2009), while organizational integration describes ownership, contractual agreements, and alliances established among healthcare institutions (Ramsay *et al.*, 2009; Singer *et al.*, 2010; Valentijn *et al.*, 2013). Professional integration addresses collaboration among healthcare professionals within and across institutions (Singer *et al.*, 2010; Valentijn *et al.*, 2013). On the other hand, clinical integration aims for the patient to have a single process within the organization and among healthcare professionals over time, maximizing the value of services provided to the patient (Ramsay *et al.*, 2009; Singer *et al.*, 2010; Valentijn *et al.*, 2013). Finally, service integration refers to the coordination of various clinical services provided to patients within the organization (Ramsay *et al.*, 2009).

Amado *et al.* (2022) stated that the vertical integration model of healthcare comprises two different components: Structural integration, which involves the necessary range

of healthcare services for the upward flow of patient care (from primary healthcare to hospital care and convalescent care); and functional integration, which involves the actual and effective coordination among this range of services. For example, structural integration aims for a continuous flow in healthcare provision within the same healthcare organization, beginning with a primary care consultation, followed by a specialty consultation, treatment, and convalescent care. In contrast, functional integration aims for information flows to be well-coordinated and directed, enabling patients to move smoothly and appropriately from one service to another at the right time.

In summary, vertical integration aims to consolidate various levels of care within the same organization structure, thereby providing a continuum of healthcare to patients—from primary care to post-acute care (Amado *et al.*, 2022; Goiana-da-Silva *et al.*, 2024; Nunes, 2024).

3. Advantages and disadvantages of vertical integration

The reasons for adopting the vertical integration model are varied and may be organizational, functional, political, or even strategic.

Previous studies have listed various reasons for pursuing the vertical integration model. These reasons can be grouped into 10 topics:

(i) Coordination, management, and continuity of care;
(ii) High-quality patient-centered care;
(iii) Multidisciplinarity and comorbidities;
(iv) Access and equity in care;
(v) Co-production in health, starting from primary healthcare;
(vi) Systemic performance;
(vii) Health promotion and disease prevention;
(viii) External pressures and sustainability;
(ix) Economic efficiency and value creation; and
(x) Accountability.

Table 1 presents the various advantages or reasons for pursuing the vertical integration model.

However, vertical integration is not immune to skepticism and criticism. In this regard, previous studies have highlighted a broad range of warnings that can be grouped into seven topics:

(i) Challenges in the coordination and management of integration;
(ii) Costs and resources;
(iii) Impacts on care and quality;
(iv) Equity and differential impact;
(v) Organizational and professional challenges;
(vi) Anticompetitive and market effects; and
(vii) Challenges in specific contexts.

Table 2 presents the systematization of the skepticism and criticisms of the vertical integration model.

When comparing the advantages with the criticisms of the model, several common topics stand out:

(i) Coordination, management, and continuity of care—the eternal tension between theory and practice: While in theory the model appears to be the solution, in practice, healthcare organizations are silos with disparate cultures, incentives, and metrics.
(ii) Patient-centered care and quality: Integration must be ethically and clinically oriented and centered on the patient, and not solely for economic reasons; otherwise, the patient becomes secondary.
(iii) Multidisciplinarity and comorbidities: Holistic treatment collides with the harsh reality of financing models and the compartmentalization of care; without system interoperability and actual incentives for collaboration, multidisciplinarity becomes an empty buzzword.
(iv) Access and equity: If the idiosyncrasies of each context are not considered, integration may fail or fall short of expectations.
(v) Economic efficiency and sustainability: The concentration of services within the same organization may neglect innovation and render the organization more bureaucratic and less agile.

In summary, vertical integration is only effective if it is pragmatic, centered on the actual needs of the patient, financed rationally, supplemented by appropriate technological and information systems, and supported by adequate policies.

4. Differences between horizontal and vertical integration

The differences between horizontal and vertical integration models lie in their scope, structure, and objectives. In terms of scope, horizontal integration involves the consolidation of organizations or services at the same level of care, such as the merger of several hospitals or clinics, to streamline operations and reduce redundancy. In contrast, vertical integration involves the integration of services at different levels of care, such as the combination of primary care, specialty care, and convalescent care under the same organizational umbrella, to enhance coordination across the entire continuum of care and provide comprehensive services (Hernandez, 2000; Gröne and Garcia-Barbero, 2001; Sidhu *et al.*, 2022).

Regarding structure, horizontal integration may keep entities separate while maintaining shared objectives and resources. Despite having common asset ownership,

Table 1. Advantages of the vertical integration model

Topic	Advantages	Authors
Coordination, management, and continuity of care	Preventing the fragmentation of care and improving the management, coordination, and continuity of care provided	Amado *et al.* (2022); Curry *et al.* (2013); Damaceno *et al.* (2020); Falces *et al.* (2011); Levin *et al.* (2023); Lopes *et al.* (2017); Rocks *et al.* (2020); Valentijn *et al.* (2013); Yu *et al.* (2020); Yuan *et al.* (2020)
	Aligning governance, planning, and resources within the same organization to enhance coordination and administrative efficiency	Alonso & Andrews (2022); Curry *et al.* (2013); Goiana-da-Silva *et al.* (2024); Thaldorf & Liberman (2007)
	Creating conditions for better institutional management and collaboration among healthcare entities	Goiana-da-Silva *et al.* (2024)
	Improving communication and coordination between inpatient care and post-discharge care	Lopes *et al.* (2017)
	Determining political will to improve healthcare management, quality, and efficiency by reducing readmissions and enhancing continuity of care	Chen *et al.* (2018); Fernandes *et al.* (2019); Heeringa *et al.* (2020); Hogan *et al.* (2018); Upadhyay & Bhandari (2024)
High-quality patient-centered care	Improving patient satisfaction, experience, and care outcomes	Amado *et al.* (2022); Liljas *et al.* (2019); Singer *et al.* (2010); Valentijn *et al.* (2013); Wang *et al.* (2024); World Health Organization (2016)
	Concerning the levels of efficiency and quality of care provided	Amado *et al.* (2022); Cruz *et al.* (2022); Curry *et al.* (2013); Damaceno *et al.* (2020); Falces *et al.* (2011); Gröne & Garcia-Barbero (2001); Heeringa *et al.* (2020); Hogan *et al.* (2019); Levin *et al.* (2023); Machta *et al.* (2019); Nunes (2024); Wang *et al.* (2024); Yuan *et al.* (2022)
	Strengthening adherence to clinical guidelines and clinical practice indicators	Falces *et al.* (2011)
Multidisciplinarity and comorbidities	Addressing the needs of patients with comorbidities through a multidisciplinary approach	Alonso & Andrews (2022); Chen *et al.* (2018); Curry *et al.* (2013); Fernandes *et al.* (2019); Liljas *et al.* (2019); Rocks *et al.* (2020); Singer *et al.* (2010); Valentijn *et al.* (2013)
Access and equity in care	Increasing and improving access to healthcare services	Cruz *et al.* (2022); Haddad *et al.* (2020); Moloi *et al.* (2023); Nunes (2024); Sidhu *et al.* (2022); Wang *et al.* (2024); Yu *et al.* (2020)
Co-production in health, starting from primary healthcare	Prioritizing primary healthcare as a setting for health co-production	Damaceno *et al.* (2020); Yuan *et al.* (2020); Yuan *et al.* (2022)
Systemic performance	Enhancing health system performance by focusing on the interaction among various components, including functions, institutions, and professions	Gröne & Garcia-Barbero (2001)
Health promotion and disease prevention	Boosting and expanding disease prevention and the promotion of healthy lifestyles	Cruz *et al.* (2022)
External pressures and sustainability	Addressing external pressures, including economic, financial, political pressures, or those due to resource constraints	Cruz *et al.* (2022); Curry *et al.* (2013); Upadhyay & Bhandari (2024); Yu *et al.* (2020)
Economic efficiency and value creation	Delivering value-based care, responding to market and organizational factors, encouraging the formation of integrated organizations to effectively coordinate care, and benefiting financially from bundled payments and accountable care organizations	Haddad *et al.* (2020); Harris *et al.* (2024); Heeringa *et al.* (2020); Hogan *et al.* (2018); Hogan *et al.* (2019); Post *et al.* (2017); Post *et al.* (2021); Whaley *et al.* (2021)
	Minimizing costs and maximizing outcomes	Harris *et al.* (2024); Hogan *et al.* (2018); Hogan *et al.* (2019); Liljas *et al.* (2019); Rocks *et al.* (2020)
	Fostering economies of scale	Levin *et al.* (2023)
	Increasing market power and demand	Haddad *et al.* (2020); Harris *et al.* (2024); Heeringa *et al.* (2020); Hogan *et al.* (2018); Post *et al.* (2021); Short & Ho (2019); Sidhu *et al.* (2022); Thaldorf & Liberman (2007); Yu *et al.* (2020)
Accountability	Establishing shared accountability	Heeringa *et al.* (2020)

Table 2. Skepticism and criticisms of the vertical integration model

Topic	Skepticism and criticisms	Authors
Challenges in the coordination and management of integration	Difficulty in implementing functional integration	Amado *et al.* (2022); Nunes (2024)
	Management complexity due to the need for coordination across multiple levels and specializatins, potentially requiring significant resources and managerial effort	Heeringa *et al.* (2020); Valentijn *et al.* (2013)
	Risk of fragmentation if integration is poorly coordinated, with a focus on disease-specific interventions instead of holistic care	Valentijn *et al.* (2013)
	Risk of inefficiencies if strategic alignment is not achieved, potentially leading to a decline in quality	Nunes (2024)
	Potential conflicts across integrated entities with divergent objectives, such as between hospitals and insurers	Thaldorf & Liberman (2007)
Costs and resources	Opportunity costs of capital and resources required for implementation	Alonso & Andrews (2022); Hogan *et al.* (2018); Hogan *et al.* (2019)
	Potential for higher healthcare costs, reduced competition, and the fostering of monopolistic market conditions	Haddad *et al.* (2020); Harris *et al.* (2024); Levin *et al.* (2023); Post *et al.* (2021); Sidhu *et al.* (2022); Upadhyay & Bhandari (2024); Whaley *et al.* (2021); World Health Organization (2016)
	Increased hospital costs due to the administrative burden placed on physicians	Upadhyay & Bhandari (2024)
	Potential for unnecessary services that benefit partner hospitals, potentially increasing costs without improving patient outcomes	Machta *et al.* (2019)
Impacts on care and quality	Clinical integration and overall quality improvement are not guaranteed	Short & Ho (2019)
	Potential for lower-quality care and reduced patient adherence to treatments	Levin *et al.* (2023)
	Reduction in emergency episodes is not guaranteed	Cruz *et al.* (2022)
	Disruption of existing routines	Alonso & Andrews (2022)
	Perpetuation of inefficient organizational processes	Hogan *et al.* (2018)
Equity and differential impact	Negative impact on health equity, particularly among minorities, patients with comorbidities, and elderly patients	Haddad *et al.* (2020)
	Heterogeneous impact depending on institutions and patient groups	Lopes *et al.* (2017)
Organizational and professional challenges	Limitation of organizational flexibility by creating exit barriers if the organization opts to outsource services	Thaldorf & Liberman (2007)
	Lack of attractiveness for primary healthcare physicians and little effect on relationships between general practitioners and specialists	Sidhu *et al.* (2022)
	Lack of incentives to support development and coordination	Lopes *et al.* (2017)
Anticompetitive and market effects	Potential for anticompetitive pricing effects, as integrated entities can enter joint contracts with insurers	Machta *et al.* (2019); Post *et al.* (2017)
	Risk of focusing on organizational needs at the expense of patient-centered care	Singer *et al.* (2010)
Challenges in specific contexts	Implementation challenges in rural areas due to various limitations	Chen *et al.* (2018); Lopes *et al.* (2017)

governance remains separate. On the other hand, vertical integration often features a single unified structure. It may involve exclusive contracting relationships and shared governance structures (Heeringa *et al.*, 2020; Yu *et al.*, 2020). Meanwhile, regarding objectives, horizontal integration seeks, on the one hand, to expand service capacity to achieve cost savings through economies of scale and, on the other hand, to establish resource sharing at the same level to enhance efficiency. In addition, it aims to increase market share and reduce competition. In turn, vertical integration aims to ensure greater access and comprehensive coverage of care, streamlining service

delivery across the various stages of healthcare provision by creating a continuum of care at different levels (Gröne and Garcia-Barbero, 2001; Moloi *et al.*, 2023; Thaldorf and Liberman, 2007).

According to Valentijn *et al.* (2013), health system integration improves efficiency, enhances service quality, and increases both patient quality of life and satisfaction levels. It is embodied in a holistic approach focused on the actual needs of individuals, aiming to ensure continuity of care through a combination of structures, processes, and techniques. Each model has its focus: Horizontal integration is more holistic and person-centered, while vertical integration is more structured and disease-focused.

5. Vertical integration in Portugal

In Portugal, vertical integration has been achieved through the establishment of local health units (LHUs). More than 25 years after the first unit was established, and over a decade after the most recent one, this model was expanded nationwide in January 2024, encouraging the integration of hospitals and primary care centers into a single institutional and management framework.

The LHUs are public corporate entities endowed with administrative, financial, and patrimonial autonomy (*Decreto-Lei nº 102 / 2023, de 7 de novembro* [Decree Law No. 102 / 2023, of November 7]; *Decreto-Lei nº 133 / 2013, de 3 de outubro* [Decree Law No. 133 / 2013, of October 3]; *Decreto-Lei nº 18 / 2017, de 10 de fevereiro* [Decree Law No. 18 / 2017, of February 10]), with the competence to ensure the integrated provision of primary and hospital healthcare (*Decreto-Lei 52 / 2022, de 4 de agosto* [Decree Law No. 52 / 2022, August 4]). Thus, they correspond to a process of vertical integration, in which entities providing different levels of care are merged into a single, responsible entity. The LHUs result from the merger of hospital units with groups of health centers, which are responsible for ensuring the provision of primary healthcare (Nunes, 2021). According to Nunes (2020, 2021), this model was developed to provide integrated and continuous care to users within a given region, ensuring high-quality services and facilitating referral pathways, communication, and access to consultations and diagnostic tests.

In Portugal, healthcare integration under the vertical model occurred in three phases: The initial phase in 1999, a second wave between 2007 and 2012, and the most recent expansion in 2024. Table 3 presents, in chronological order, the establishment of the 39 LHUs in Portugal, along with the respective constitutional governments, political parties, and legal statutes.

The first LHU in Portugal was established in 1999 by the XIII Constitutional Government. The government aimed to integrate, within a single public entity, the various services and institutions of the NHS that provided healthcare to the population, in this case, within the municipality of Matosinhos. The first eight LHUs were created to both improve the provision of healthcare, responding to increasingly demanding populations seeking greater access to high-quality healthcare (*Decreto-Lei nº 207 / 1999, de 9 de junho* [Decree Law No. 207 / 1999, of June 9]), and to optimize the supply of health services in regions with specific challenges. These challenges included aging population dispersed across a vast territorial area (*Decreto-Lei nº 67 / 2011, de 2 de junho* [Decree Law No. 67 / 2011, June 2]), significant public health problems, limited response capacity within the health services, and the need to involve professionals, users, and the community to develop more effective, efficient, and sustainable ways of providing healthcare (*Decreto-Lei nº 238 / 2012, de 31 de outubro* [Decree Law No. 238 / 2012, of October 31]).

In Portugal, the vertical integration model encompasses two approaches. The first is structural integration, which

Table 3. Establishment of local health units in Portugal

Local health unit	Year	Constitutional government	Party	Legal diploma
Matosinhos	1999	XIII	Socialist Party	*Decreto-Lei nº 207/99, de 9 de junho* [Decree Law No. 207/99, June 9]
Norte Alentejano	2007	XVII	Socialist Party	*Decreto-Lei nº 50-B/2007, de 28 de fevereiro* [Decree Law No. 50-B/2007, February 28]
Alto Minho	2008	XVII	Socialist Party	*Decreto-Lei nº 183/2008, de 4 de setembro* [Decree Law No. 183/2008, of September 4]
Baixo Alentejo				
Guarda				
Castelo Branco	2009	XVIII	Socialist Party	*Decreto-Lei nº 318/2009, de 2 de novembro* [Decree Law No. 318/2009, of November 2]
Nordeste	2011	XVIII	Socialist Party	*Decreto-Lei nº 67/2011, de 2 de junho* [Decree Law No. 67/2011, of June 2]
Litoral Alentejano	2012	XIX	Social Democratic Party	*Decreto-Lei nº 238/2012, de 31 de outubro* [Decree Law No. 238/2012, of October 31]
Remaining 31	2023	XXIII	Socialist Party	*Decreto-Lei nº 102/2023, de 6 de setembro* [Decree Law No. 102/2023, of September 6]

unifies infrastructures and services within a vertical supply chain (as in the case of the first eight LHUs). The second is functional integration, which seeks effective coordination among services to improve health outcomes, strengthen institutional autonomy, and focus on patient centrality, as with the new proposed model. The functional approach aims to optimize management, training, and research within LHUs, although it may present greater challenges than structural integration. It is worth noting that the first LHU incorporated only structural integration, which, on its own, did not lead to significant health improvements (Amado *et al.*, 2022; Nunes, 2024).

The 31 LHUs established under *Decreto-Lei nº 102 / 2023, de 7 de novembro* [Decree Law No. 102 / 2023, November 7] are, directly and indirectly, based on the same rationale as the earlier units. However, they also incorporate the following approaches: Alignment with the 2030 Agenda for Sustainable Development, particularly regarding the topics of "Proximity Health" and "Quality Health"; alignment with the Health Basic Law (*Lei nº 95 / 2019, de 4 de setembro* [Law No. 95 / 2019, September 4]), especially Number 2 of Base 20; and alignment with the Statutes of the NHS (*Decreto-Lei nº 52 / 2022, de 4 de agosto* [Decree Law No. 52 / 2022, August 4]), especially Article 5. The latter two legal references focus on person-centered care, the provision of proper care at the right time, the promotion of primary healthcare as the gateway to the NHS, and the operation of care delivery in proximity through integrated care and coordinated responses. Figure 1 shows the geographical distribution of the first eight LHUs, established between 1999 and 2012, while the remaining 31 LHUs were established in 2024 to expand coverage to the rest of the territory.

Tables 4-6 present various indicators related to the 39 LHUs. Table 4 shows demographic data, Table 5 outlines dependency indicators, and Table 6 indicates the number of family doctors in each LHU and compares it with the weighted units (WUs) to determine the shortfall of family doctors in each unit.

The analysis of all these indicators reveals asymmetries at various levels, including:

- Population density: The São José LHU records the highest value, with 6,023.59 inhabitants/km^2, in contrast to the Baixo Alentejo LHU, which reports only 13.45 inhabitants/km^2. With a national population density of 115.4 inhabitants/km^2, access issues may arise, including high patient inflow rates and long waiting times.
- Coverage areas of LHUs: While that of São José LHU is limited to 42.26 km^2, the Baixo Alentejo LHU covers 8,542.72 km^2. This may lead to access issues, including long distances and travel times to healthcare providers, as well as limited availability of transportation.
- Number of patients per family doctor: In the Trás-os-Montes e Alto Douro LHU, there is one family doctor for every 1,470 patients, while in the Estuário do Tejo LHU, the ratio is one for every 3,315 patients. This may lead to access issues, such as increasing the interval between visits to the family doctor.
- Aging index: The Castelo Branco LHU has the highest value (514.07), while the Estuário do Tejo LHU has the lowest (136.8). This may lead to a greater demand for healthcare in the Castelo Branco LHU due to the higher prevalence of multimorbidity.
- Elderly dependency: The Guarda LHU has an elderly dependency rate of almost 60%, 30% higher than the Tâmega e Sousa LHU. These LHUs demonstrate the same difference in the total dependency index. There may be more constraints in the demand for healthcare and a greater need to develop health campaigns focused on the elderly in the Guarda LHU,

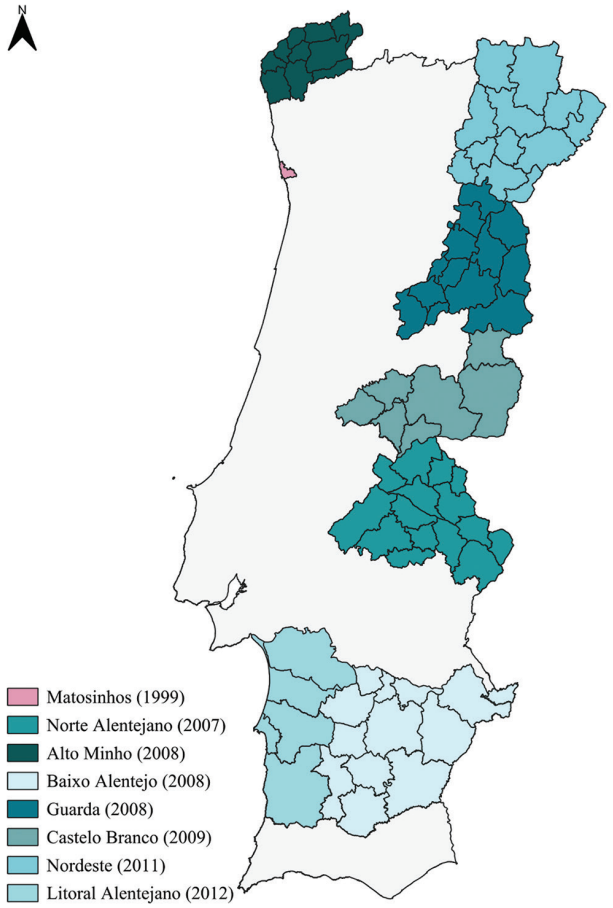

Figure 1. The first eight local health units in Portugal that were established between 1999 and 2012

Table 4. The demographic characterization of local health units

Local health unit	Municipalities	Parishes	Area (km²)	Resident population	Population density (per km²)	Registered users	Family doctors	User per family doctor
Alentejo Central	14	69	7,393.49	152,444	20.62	164,698	95	1,734
Algarve	16	67	4,996.77	467,343	93.53	529,642	250	2,119
Almada Seixal	2	9	165.46	343,745	2,077.51	369,886	183	2,021
Alto Alentejo	15	69	6,084.35	104,923	17.24	109,532	55	1,991
Alto Ave	6	111	1,079.75	268,834	248.98	288,137	156	1,847
Alto Minho	10	208	2,218.85	231,266	104.23	250,335	160	1,565
Amadora Sintra	2	17	343.01	557,060	1,624.03	548,825	230	2,386
Arco Ribeirinho	4	16	568.63	219,425	385.88	235,156	90	2,613
Arrábida	3	12	891.17	244,732	274.62	243,392	95	2,562
Baixo Alentejo	13	62	8,542.72	114,863	13.45	120,694	71	1,700
Baixo Mondego	3	35	873.07	100,783	115.44	108,807	66	1,649
Barcelos Esposende	2	70	474.31	151,884	320.22	161,678	91	1,777
Braga	6	138	1,122.57	298,451	265.86	324,590	184	1,764
Castelo Branco	7	69	5 061.37	95,520	18.87	100,781	54	1,866
Coimbra	21	152	4,168.02	365,275	87.64	407,394	232	1,756
Cova da Beira	3	48	1,374.56	79,163	57.59	84,323	45	1,874
Entre Douro e Vouga	6	62	1,009.06	322,360	319.47	332,419	187	1,778
Estuário do Tejo	5	32	1,484.41	247,093	166.46	238,670	72	3,315
Gaia/Espinho	2	19	189.52	334,867	1,766.92	351,620	201	1,749
Guarda	13	232	5,328.54	137,743	25.85	140,319	85	1,651
Lezíria	9	57	3,490.93	184,731	52.92	200,084	98	2,042
Lisboa Ocidental	3	13	166.26	450,751	2,711.12	481,026	266	1,808
Litoral Alentejano	5	31	5,309.4	96,442	18.16	102,185	53	1,928
Loures Odivelas	3	14	193.6	342,980	1,771.59	233,626	102	2,290
Matosinhos	1	4	62.42	172,557	2,764.45	176,994	104	1,702
Médio Ave	3	53	410.15	239,791	584.64	242,862	141	1,722
Médio Tejo	11	70	2,480.91	169,274	68.23	180,931	85	2,129
Nordeste	12	226	6,598.54	122,804	18.61	126,005	80	1,575
Oeste	8	58	1,347.39	235,231	174.58	248,908	79	3,151
Póvoa do Varzim e Vila do Conde	2	28	231.24	145,080	627.40	157,755	87	1,813
Região de Aveiro	10	69	1,545.16	312,450	202.21	338,013	204	1,657
Região de Leiria	8	77	2,650.84	371,940	140.31	401,625	181	2,219
Santa Maria	2	19	326.64	319,429	977.92	348,712	147	2,372
Santo António	2	11	155.04	297,530	1,919.05	350,441	197	1,779
São João	3	17	176.38	328,176	1,860.62	348,067	195	1,785
São José	2	12	42.26	254,557	6,023.59	430,624	222	1,940
Tâmega e Sousa	11	180	1,807.21	475,348	263.03	483,654	279	1,734
Trás-os-Montes e Alto Douro	21	290	5500.4	246,287	44.78	261,579	178	1,470
Vise Dão-Lafões	14	156	3,237.74	252,777	78.07	275,623	159	1,733

Sources: National Health Service. Available at: https://bicsp.min-saude.pt/pt/biufs/1/815/10039/1130973/O%20QUE%20OFERECEMOS/User%20Guide%202023%20USF%20Cedofeita.pdf (Last accessed: January 5, 2025); Primary Health Care Identity Card. Available at: https://www.spms.min-saude.pt/2020/07/bi-csp-bilhete-de-identidade-dos-cuidados-de-saude-primarios/(Last accessed: January 5, 2025); Database, Statistics Portugal. https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_destaques&DESTAQUESdest_boui=728526363&DESTAQUESmodo=2 (Last accessed: January 5, 2025).

Table 5. The demographic dependency indices of local health units

Local health unit	Aging index	Total dependency (%)	Youth dependency (%)	Elderly dependency (%)
Alentejo Central	253.98	62.35	19.73	42.62
Algarve	236.97	59.34	21.19	38.15
Almada Seixal	160.25	58.51	22.42	36.09
Alto Alentejo	321.86	68.19	19.65	48.53
Alto Ave	192.09	51.05	17.98	33.07
Alto Minho	246.90	63.59	17.99	45.60
Amadora Sintra	138.74	54.06	22.08	31.99
Arco Ribeirinho	141.66	57.72	22.48	35.24
Arrábida	148.30	57.45	21.86	35.60
Baixo Alentejo	249.02	66.03	21.08	44.94
Baixo Mondego	264.62	65.95	17.92	48.03
Barcelos Esposende	151.92	48.93	17.82	31.11
Braga	206.64	50.34	18.94	31.40
Castelo Branco	514.07	73.96	18.41	55.55
Coimbra	328.51	63.45	18.18	45.27
Cova da Beira	304.09	68.59	17.15	51.44
Entre Douro e Vouga	195.76	55.64	17.79	37.86
Estuário do Tejo	136.80	54.59	21.67	32.91
Gaia/Espinho	216.48	54.48	18.53	35.95
Guarda	445.09	76.49	16.74	59.75
Lezíria	233.01	63.05	20.29	42.76
Lisboa Ocidental	168.89	59.63	22.19	37.44
Litoral Alentejano	225.80	61.31	19.08	42.23
Loures Odivelas	283.40	56.84	23.10	33.75
Matosinhos	182.59	56.65	19.19	37.45
Médio Ave	179.97	53.11	17.55	35.57
Médio Tejo	300.68	67.67	19.23	48.44
Nordeste	446.32	75.85	16.43	59.42
Oeste	201.00	60.49	19.98	40.51
Póvoa do Varzim e Vila do Conde	151.43	51.33	19.05	32.28
Região de Aveiro	200.46	59.07	19.84	39.24
Região de Leiria	201.96	58.85	19.02	39.79
Santa Maria	144.64	57.63	22.87	34.76
Santo António	194.92	54.47	18.74	35.73
São João	181.47	53.29	18.66	34.63
São José	164.46	54.91	21.10	33.82
Tâmega e Sousa	162.70	47.40	17.69	29.71
Trás-os-Montes e Alto Douro	330.69	67.08	16.39	50.69
Vise Dão-Lafões	300.62	64.14	18.31	45.83

Sources: National Health Service. Available at: https://bicsp.min-saude.pt/pt/biufs/1/815/10039/1130973/O%20QUE%20OFERECEMOS/User%20Guide%202023%20USF%20Cedofeita.pdf (Last accessed: January 5, 2025); Primary Health Care Identity Card. Available at: https://www.spms.min-saude.pt/2020/07/bi-csp-bilhete-de-identidade-dos-cuidados-de-saude-primarios/(Last accessed: January 5, 2025); Database, Statistics Portugal. https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_destaques&DESTAQUESdest_boui=728526363&DESTAQUESmodo=2 (Last accessed: January 5, 2025).

Table 6. Demographic data for family doctors across local health units

Local health unit	WU[a]	Family doctors	WU per family doctors	WUs over 1,917 WU	WUs over 2,100 WU	Differential existing versus required (1,917 WU)	Differential existing versus required (2,100 WU)
Alentejo Central	223,758.00	95	2,355	117	107	−22	−12
Algarve	702,528.50	250	2,810	366	335	−116	−85
Almada Seixal	486,740.50	183	2,660	254	232	−71	−49
Alto Alentejo	152,533.00	55	2,773	80	73	−25	−18
Alto Ave	373,407.50	156	2,394	195	178	−39	−22
Alto Minho	344,541.00	160	2,153	180	164	−20	−4
Amadora Sintra	708,421.00	230	3,080	370	337	−140	−107
Arco Ribeirinho	308,163.50	90	3,424	161	147	−71	−57
Arrábida	319,266.50	95	3,361	167	152	−72	−57
Baixo Alentejo	165,215.50	71	2,327	86	79	−15	−8
Baixo Mondego	150,995.00	66	2,288	79	72	−13	−6
Barcelos Esposende	297,689.00	91	3,271	155	142	−64	−51
Braga	417,428.00	184	2,269	218	199	−34	−15
Castelo Branco	144,111.00	54	2,669	75	69	−21	−15
Coimbra	560,134.00	232	2,414	292	267	−60	−35
Cova da Beira	118,601.50	45	2,636	62	56	−17	−11
Entre Douro e Vouga	441,041.00	187	2,359	230	210	−43	−23
Estuário do Tejo	308,709.50	72	4,288	161	147	−89	−75
Gaia/Espinho	462,132.00	201	2,299	241	220	−40	−19
Guarda	203,819.50	85	2,398	106	97	−21	−12
Lezíria	271,722.00	98	2,773	142	129	−44	−31
Lisboa Ocidental	637,856.50	266	2,398	333	304	−67	−38
Litoral Alentejano	138,464.00	53	2,613	72	66	−19	−13
Loures Odivelas	303,759.50	102	2,978	158	145	−56	−43
Matosinhos	234,070.00	104	2,251	122	111	−18	−7
Médio Ave	318,677.50	141	2,260	166	152	−25	−11
Médio Tejo	251,475.00	85	2,959	131	120	−46	−35
Nordeste	182,732.50	80	2,284	95	87	−15	−7
Oeste	334,284.00	79	4,231	174	159	−95	−80
Póvoa do Varzim e Vila do Conde	203,586.50	87	2,340	106	97	−19	−10
Região de Aveiro	451,637.50	204	2,214	236	215	−32	−11
Região de Leiria	538,856.50	181	2,977	281	257	−100	−76
Santa Maria	457,119.00	147	3,110	238	218	−91	−71
Santo António	460,560.00	197	2,338	240	219	−43	−22
São João	455,184.50	195	2,334	237	217	−42	−22
São José	562,534.50	222	2,534	293	268	−71	−46
Tâmega e Sousa	615,930.00	279	2,208	321	293	−42	−14
Trás-os-Montes e Alto Douro	366,892.00	178	2,061	191	175	−13	3
Vise Dão-Lafões	379,431.00	159	2,386	198	181	−39	−22

Note: [a]Data from the primary health care identity card, National Health Service. Available at: https://bicsp.min-saude.pt/pt/Paginas/default.aspx (Last accessed: January 5, 2025).
Abbreviation: WU: Weighted unit.

while focuses are needed on the needs of the young population in the Tâmega e Sousa LHU.

- Transfer of competencies to municipalities in the health sector: Each LHU shares primary healthcare management with its respective municipality. The LHU oversees medical equipment and healthcare professionals, while the municipality handles all logistical aspects, non-medical equipment, and professionals within the operational assistants' careers. The complexity of each LHU's institutional relationships varies based on the number of municipalities it covers.
- Municipalities covered: While the Matosinhos LHU covers only one municipality, the Coimbra LHU and the Trás-os-Montes e Alto Douro LHU each cover 21 municipalities. Each municipality has specific needs and unique characteristics based on its context. The contexts of the Coimbra LHU are diverse, as they encompass municipalities that range from coastal areas to mountainous regions, including urban and rural settings.

Taking into consideration Number 5 of Article 278 in *Decreto-Lei nº 75-B/2020, de 31 de dezembro* [Decree Law No. 75-B/2020, of December 31], *Decreto-Lei nº 73 / 2017, de 21 de junho* [Decree Law No. 73 / 2017, of June 21], and *Recomendação nº 02, de 25 de agosto de 2017* [Recommendation No. 2, of August 25, 2017] from the National Coordination for the Reform of the NHS in the area of Primary HealthCare, the needs for general and family doctors in each LHU were calculated. Two values were determined, as there are two baseline values for WU: The legal acts refer to 1,917 WU, while Recommendation Number 02, of August 25, 2017, refers to 2,100 WU. For comparison purposes, the number of WUs per existing general and family medicine doctor was calculated for each of the 39 LHUs:

- If the minimum number of WU is 1,917, all LHUs have a shortage of clinical professionals, with shortages ranging from 13 in the Baixo Mondego and Trás-os-Montes e Alto Douro LHUs to 140 professionals in the Amadora Sintra LHU.
- If the minimum number of WU is 2,100, only the Trás-os-Montes e Alto Douro LHU can provide sufficient family doctors to all its users. All other LHUs have a shortage of professionals, with the worst case being the Amadora Sintra LHU, lacking 107 professionals.

Notably, two additional aspects must be considered. First, in Portugal, most LHUs do not have all medical specialties, requiring them to refer patients to other LHUs that provide the necessary specialty. In other words, certain LHUs serve not only their own patients but also those referred from other LHUs. Second, the number of primary care units per LHU varies, ranging from 10 in the Cova da Beira LHU to 67 in the Coimbra LHU. Table 7 presents the number of primary care centers per LHU.

Based on all aspects, three points must be taken into consideration. First, ensuring efficient and effective coordination across the various phases of care (consultation in primary healthcare, specialist consultations, treatment, and convalescence) is essential to prevent bottlenecks due to excessive demand for particular services. Such inefficiencies can result in long waiting times and information loss during the referral process, potentially delaying the provision of healthcare and, ultimately, endangering patients' lives. Second, the number of primary care units in each ULS, when assessed together with its coverage area, population density, and shortage of health professionals, may require adjustments in the distribution of these units, either through merging units into one or reorganizing the network of units by moving units from one location to another.

It is also necessary to consider the change in the financing model for LHUs. Until 2024, the financing model for hospitals—whether under the horizontal or vertical integration model—was primarily based on production. However, with the expansion of the vertical integration model to all NHS hospitals, the financing model transitioned to a capitation-based model. This new approach adjusts funding according to risk profiles calculated based on the characteristics of the population in the reference area (*Decreto-Lei nº 102 / 2023, de 7 de novembro* [Decree Law No. 102 / 2023, November 7]).

The decision to expand LHUs in Portugal was based on the objective of ensuring that beneficiaries of the NHS have access to care that aligns with their actual needs, regardless of their geographical location (*Decreto-Lei nº 102 / 2023, de 7 de novembro* [Decree Law No. 102 / 2023, November 7]). However, if all relevant aspects are not adequately considered, vertical integration may inadvertently exacerbate disparities in healthcare across regions, particularly due to a lack of professionals or inadequate responses to patient needs.

6. Results of vertical integration

The concept of integration, particularly vertical integration, is not new; however, few studies have systematically assessed its effects (Alonso and Andrews, 2022; Chen *et al.*, 2018; Wang *et al.*, 2024). The existing literature does not point to a clear trend. Instead, it presents widely divergent evidence (Rocks *et al.*, 2020), with results that are often mixed and limited (Amado *et al.*, 2022; Cruz *et al.*, 2022; Yuan *et al.*, 2022), uncertain (Baxter *et al.*, 2018; Upadhyay and Bhandari, 2024), or even contradictory

Table 7. Primary healthcare units by local health units in Portugal

Local health unit	Number of primary healthcare units
Alentejo Central	35
Algarve	55
Almada Seixal	26
Alto Alentejo	31
Alto Ave	33
Alto Minho	35
Amadora Sintra	43
Arco Ribeirinho	21
Arrábida	26
Baixo Alentejo	22
Baixo Mondego	15
Barcelos Esposende	20
Braga	40
Castelo Branco	16
Coimbra	67
Cova da Beira	10
Entre Douro e Vouga	44
Estuário do Tejo	23
Gaia/Espinho	38
Guarda	26
Lezíria	27
Lisboa Ocidental	41
Litoral Alentejano	11
Loures Odivelas	18
Matosinhos	18
Médio Ave	30
Médio Tejo	27
Nordeste	25
Oeste	26
Póvoa do Varzim e Vila do Conde	16
Região de Aveiro	46
Região de Leiria	44
Santa Maria	22
Santo António	36
São João	38
São José	30
Tâmega e Sousa	61
Trás-os-Montes e Alto Douro	53
Viseu Dão-Lafões	37

Sources: Unidades de Saúde Familiares Associação Nacional [National Association of Family Health Units]. *O Momento Atual da Reforma dos Cuidados de Saúde Primários em Portugal 2023/2024: ULS Alentejo Central* [National Association of Family Health Units. The Current State of Primary Health Care Reform in Portugal 2023/2024: Alentejo Central Local Health Unit]. Available at: https://app.box.com/s/kd79d5fdgaljgjl8r78igb8e22z3j9fh (Last accessed: January 5, 2025).

(Wang *et al.*, 2024). Table 8 presents the impacts (positive, negative, and not significant) reported in the literature.

On the one hand, literature demonstrated improvements in:

- Administrative efficiency (Alonso and Andrews, 2022; Wang *et al.*, 2024),
- User experience (Alonso and Andrews, 2022; Baxter *et al.*, 2018; Busse and Stahl, 2014),
- Quality of care provided (Baxter *et al.*, 2018; Yuan *et al.*, 2022),
- Access to healthcare (Baxter *et al.*, 2018),
- Specific health indicators (Busse and Stahl, 2014),
- Reduction in planned hospitalizations (Busse and Stahl, 2014; Cruz *et al.*, 2022; Yu *et al.*, 2020),
- Reduction in hospitalization duration (Upadhyay and Bhandari, 2024),
- Response capacity (Cruz *et al.*, 2022),
- Diagnostics and treatment processes (Curry *et al.*, 2013; Falces *et al.*, 2011),
- Management of the most severe disease cases (Falces *et al.*, 2011),
- Overall readmissions (Lopes *et al.*, 2017),
- Professional satisfaction (Falces *et al.*, 2011),
- Quality (Machta *et al.*, 2019; Short and Ho, 2019; Wang *et al.*, 2024),
- Communication and coordination between primary and specialty care professionals (Falces *et al.*, 2011),
- Access to surgical care for low-income populations (Haddad *et al.*, 2020),
- Costs and expenditures (Rocks *et al.*, 2020; Yu *et al.*, 2020),
- Outcomes (Rocks *et al.*, 2020; Wang *et al.*, 2024),
- Effectiveness in intervention groups (Rocks *et al.*, 2020), and
- Management of patient flow (Sidhu *et al.*, 2022).

On the other hand, literature also reported that significant improvements were not observed in:

- Some health indicators (Alonso and Andrews, 2022; Liljas *et al.*, 2019; Machta *et al.*, 2019),
- Healthcare costs and prices (Amado *et al.*, 2022; Baxter *et al.*, 2018; Harris *et al.*, 2024; Machta *et al.*, 2019; Post *et al.*, 2017),
- Technical efficiency (Amado *et al.*, 2022),
- The increase of hospitalizations (Busse and Stahl, 2014; Curry *et al.*, 2013; Upadhyay and Bhandari, 2024; Yuan *et al.*, 2022),
- Economic gains (Cruz *et al.*, 2022),
- The average length of hospitalization duration (Cruz *et al.*, 2022),
- The number of emergency episodes (Cruz *et al.*, 2022),
- Overall health outcomes (Curry *et al.*, 2013; Liljas *et al.*, 2019),

Table 8. Impacts of vertical integration reported in the existing literature

Authors	Methodology	Positive impacts	Negative impacts	Not significant or unclear changes
Alonso & Andrews (2022)	• Quasi-experiment quantitative analysis • DiD	• Reduction in late discharges • Organizational efficiency • Patient experience	-	• Premature mortality rates
Amado *et al.* (2022)	• Mixed • Systematic review • DEA • DiD	-	• Costs of care • Prices of care	• Quality of care • Technical efficiency
Cruz *et al.* (2022)	• Exploratory and quantitative study	• Responsiveness (doctors and nurses)	-	• Health gains • Economic gains
Curry *et al.* (2013)	• Mixed qualitative and quantitative analysis	• Strategic vision • Governance structures • In-care processes (diabetes and dementia)	-	• Engagement of clinicians • Emergency admissions
Falces *et al.* (2011)	• Observational, cross-sectional study	• Chronic treatment (ischemic heart disease, heart failure, and atrial fibrillation) • Control of severe cases by cardiologists • Satisfaction of family doctors • Communication among professionals	-	• Use of resources
Fernandes *et al.* (2019)	• Quantitative analysis • DiD • Cox regression	• Reduction in readmission rates (Individuals with more chronic conditions presented a lesser risk of readmission)	-	-
Haddad *et al.* (2020)	• Quantitative analysis • Chi-square analysis • Analysis of Variance	• Integrated practices demonstrated increased Medicaid acceptance • Improvement in surgical access for low-income patients	-	-
Harris *et al.* (2024)	• Systematic review	-	• Costs (in hospital–physician integration)	• Cost • Quality • Health service utilization (all three in hospital–physician integration and hospital–post-acute care integration)
Lopes *et al.* (2017)	• Quantitative analysis • DiD	• Overall reduction in readmission rates • Communication • Coordination • Positive evolution in some clinical conditions	-	• Readmission rate without impact in two hospitals.
Machta *et al.* (2019)	• Systematic review	• Quality (often measured as optimal care for specific conditions)	-	• Spending • Utilization • Prices
Post *et al.* (2017)	• Systematic review	• Accessibility to health services	• Costs	• Prices • Quality (care coordination and readmission rates) • Mortality
Sidhu *et al.* (2022)	• Qualitative, cross-comparative case study	• Health system costs • Stabilization in financial risks for primary care practices	-	-
Upadhyay & Bhandari (2024)	• Quantitative study • Linear regressions	• Reduction in hospitalization duration	• Increment in the number of hospitalizations	• Little or no impact on a broad set of metrics capturing hospital output

(Cont'd...)

Table 8. ***(Continued)***

Authors	Methodology	Positive impacts	Negative impacts	Not significant or unclear changes
Wang *et al.* (2024)	• Systematic review • Meta-analysis	• Efficiency • Quality of care • Patient outcomes (significant reduction in blood pressure and improvement in adherence to treatment in patients with hypertension and diabetes)	-	-
Whaley *et al.* (2021)	• Quantitative study • DiD	• Number of diagnostic imaging tests and laboratory tests	• Costs	-
Yu *et al.* (2020)	• Retrospective synthetic matched controlled database study	• Reduction in unplanned hospitalizations • Reduction in readmissions • Savings from the reductions in unplanned care	-	• Number of emergencies
Yuan *et al.* (2022)	• Longitudinal-design DiD	• Quality of care (hypertension and diabetes)	• Increment in admissions	-

Abbreviations: DEA: Data envelopment analysis; DiD: Difference-in-differences.

- Quality (Harris *et al.*, 2024; Levin *et al.*, 2023; Post *et al.*, 2017; Yuan *et al.*, 2022),
- The use of health services (Harris *et al.*, 2024; Machta *et al.*, 2019),
- Patient satisfaction (Liljas *et al.*, 2019; Short and Ho, 2019), and
- Readmission and emergency visits (Post *et al.*, 2017).

Since the results do not show a clear trend and some aspects demonstrate positive and negative outcomes, the success of integration largely depends on several factors. The literature identified several key success factors for implementation:

- Good collaborative practices and the adoption of a shared vision, overcoming the inherent tensions of the health system (Curry *et al.*, 2013);
- Alignment and coordination challenges, such as the level of autonomy and the complexity of managing integrated services (Busse and Stahl, 2014; Nunes, 2024);
- Resistance to change (Rocks *et al.*, 2020);
- Alignment with user needs (Singer *et al.*, 2010);
- The influence of local idiosyncrasies and implementation processes (Fernandes *et al.*, 2019; Lopes *et al.*, 2017; Yuan *et al.*, 2022); and
- Participation of health professionals in the implementation process (Lopes *et al.*, 2017).

In summary, vertical integration in the health sector is a strategy with the potential to strengthen patient-centered care while contributing to health systems' efficiency and effectiveness. Compared to disease-specific or population-specific interventions, integration tends to improve outcomes and the quality of care. However, it is essential to maintain careful oversight to prevent inefficiencies, especially if there is no precise strategic alignment (Goiana-da-Silva *et al.*, 2022).

In the Portuguese case, the vertical integration model was implemented in phases, with the latest phase facing significant challenges. Specifically, the decree establishing the most recent LHUs was dated November 7, 2023, and came into effect on January 1, 2024. However, the Portuguese Prime Minister submitted his resignation on the same day the decree was published, and his term ended on April 2, 2024. The governing party did not remain in office. During this transitional period, the government was limited to managing public affairs (*Constituição da República Portuguesa de 10 de abril de 1976* [Constitution of the Portuguese Republic, April 10, 1976]). As a result, the implementation of the new integration model remained, and continues to remain, unfinished. The last 31 LHUs transitioned from a horizontal to a vertical integration model through a decree-law, without addressing all the differences between the two models. This highlights the need for changes not only in the legal field but also at the organizational level.

Vertical integration can improve the Portuguese NHS, provided that, on the one hand, public policy is made more comprehensive and in-depth, and, on the other hand, healthcare organizations undertake organizational changes. These include achieving true vertical integration of services; establishing more flexible management mechanisms; adopting a financing model suited to vertical integration; implementing a unified patient record system; standardizing information systems across healthcare organizations; creating mechanisms for the recruitment and retention of healthcare professionals, especially in the most underserved regions; ensuring effective clinical governance within healthcare organizations; fostering an organizational culture consistent with the objectives and mission of the vertical integration model; strengthening

patient follow-up in primary healthcare; and promoting greater health literacy in the population.

As Nunes (2024) concluded, vertical integration, in the form of LHUs, constitutes a promising opportunity in the reform of the NHS. This model facilitates the integration of health services, aligns the various entities under a single strategy, promotes collaboration across sectors in a spirit of complementarity, and focuses on the centrality and continuity of person-centered care. However, the same author warns of the system's vulnerabilities, as listed in the strengths, weaknesses, opportunities, and threats analysis of the LHU model.

7. Conclusion

The key idea underlying the implementation of the vertical integration model is its potential to become an effective model, yet the outcome is not guaranteed. Theoretically, the purported advantages of the vertical integration model are appealing, but they lack practical validation.

Before policymakers decide to adopt a healthcare integration model, they must equip themselves with credible information regarding the advantages and disadvantages of each model, the barriers or difficulties of implementation and operation, and the type and amount of resources required for proper implementation. Without an adequately designed and carefully planned integration, reforms risk remaining symbolic rather than functional.

Vertical integration brings together various types of healthcare within the same organization, most notably primary healthcare and hospital care. Since primary healthcare serves as the entry point for patients into the NHS, it requires particular attention from policymakers and organizations. Therefore, public policy and vertically integrated organizations must prioritize primary healthcare to enhance and ensure a longer and higher-quality life. As highlighted by Lopreite and Mauro (2017) and Lopreite *et al.* (2023), public policy should establish reform plans that, on the one hand, support the elderly in achieving the optimal level of life and health and, on the other hand, intervene early with young people through primary and preventive services. In other words, stakeholders should promote disease prevention, healthy lifestyles, and active aging.

However, the existing literature does not present results that are entirely consistent with the theoretical advantages. Instead, the results are often mixed, limited, and contradictory. The main reported advantages include improved system efficiency and effectiveness, reduced costs, improved coordination across levels of healthcare, increased health outcomes for populations, enhanced information flows, increased flexibility in service delivery, focused continuum of healthcare, and improved access at various levels of care.

On the side of disadvantages, the following are listed: Unpredictability in long-term sustainability, inadequacy of infrastructures, misalignment of installed information systems, growing healthcare needs, demographic pressures, negative public perceptions of health services, and misalignment of organizational culture.

In Portugal, the decision to expand the LHU model nationwide is extremely risky, in every sense of the term, for two main reasons. First, there is no solid scientific basis proving the alleged advantages of the model. Second, as Goiana-da-Silva *et al.* (2024) warn, some factors must be well-orchestrated to improve healthcare delivery and patient outcomes. These factors include the scope of integration, the structure of financial incentives, the degree of decision-making, the design of governance structures, and the development of care pathways for specific disease contexts. If not properly structured, organized, financed, monitored, and evaluated, the LHU model in Portugal could quickly turn from a potential oasis into a fleeting mirage.

The present study, as with all research, has limitations. First, the literature review was limited to articles in English, Portuguese, and Spanish, potentially omitting relevant articles in other languages. Second, as it is an exploratory investigation to evaluate the challenges that may underlie the vertical integration model, the study may lack a standardized methodological rigor. Finally, there is a lack of data on the current state of vertical integration implementation in Portugal, hindering the ability to assess the status of each new LHU and to identify the difficulties in implementation or operation.

For future research, it would be interesting to evaluate the vertical integration policy in the short/medium term, with the aim of verifying whether the results meet the expected objectives. Furthermore, it would be interesting to identify the primary flaws in implementation, whether from a structural, administrative, or clinical integration perspective.

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