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Performance Indicators in the Public Healthcare Sector: An Integrated KPI Framework for Hospital Pedro Hispano

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ABSTRACT: This study proposes an integrated Key Performance Indicator (KPI) framework for Hospital Pedro Hispano (HPH), a public hospital within the Local Health Unit of Matosinhos (ULSM), Portugal. Against a background of increasing pressure on the financial sustainability, accessibility, and quality of the Portuguese National Health Service, the study combines a literature-based performance measurement framework with the Balanced Scorecard and national health sector performance guidance. Thirty-three financial, operational, and service-quality indicators are specified in terms of calculation, data source, monitoring frequency, and target. The framework is illustrated with 2024 data reported by ULSM. The evidence shows a differentiated performance profile: surgical activity increased by 8%, average length of stay fell to 8.8 days, and bed occupancy was 79.7%; however, access to specialist consultations remained a major constraint, with 47,889 patients awaiting a first consultation and only 39.8% within the guaranteed maximum response time. Financial sustainability was also under pressure, with a net loss of EUR 45.1 million. The proposed framework demonstrates how a balanced set of KPIs can support strategic decision-making, accountability, continuous improvement, and public value creation in hospital management.

KEYWORDS: Performance Indicators; KPIs; Public Sector; Hospital Pedro Hispano; Balanced Scorecard; Hospital Management; National Health Service.

I. INTRODUCTION

Contemporary public-sector management is increasingly expected to go beyond legal and procedural compliance. Efficient allocation of scarce resources, effective achievement of socially relevant objectives, transparency, and accountability to citizens have become central requirements of modern public administration. Performance measurement systems are therefore increasingly important because they translate strategic objectives into operational measures and provide managers and governing bodies with evidence for decision-making.

These pressures are particularly visible in healthcare. Public hospitals operate under persistent budget constraints, demographic ageing, technological change, workforce pressures, and rising expectations regarding access and quality. In this context, financial performance cannot be assessed independently from operational efficiency and service quality. A hospital may improve production while simultaneously experiencing deteriorating access, rising costs, or quality risks. An integrated performance framework is therefore required.

This study develops an integrated KPI system for Hospital Pedro Hispano (HPH), part of the Local Health Unit of Matosinhos (ULSM), Portugal. The framework is structured around three complementary dimensions: financial performance, operational performance, and service quality. It is conceptually informed by the Balanced Scorecard (BSC) adapted to public organizations and by Portuguese health-sector performance and contracting practices. The proposed system is then illustrated with publicly reported 2024 data in order to assess its practical applicability and identify the areas of greatest management pressure.

The paper contributes in two ways. First, it operationalizes a multidimensional performance framework through a set of 33 indicators with explicit formulas, data sources, monitoring frequencies, and targets. Second, it demonstrates how the framework can be used to interpret the performance of a real public hospital, linking measurement to management action rather than treating KPIs as an end in themselves.

II. THEORETICAL BACKGROUND

A. Performance Measurement in the Public Sector

Performance assessment is a central element of the New Public Management tradition, which sought to introduce stronger results orientation, managerial accountability, and performance information into public administration. However, direct transplantation of private-sector performance logic to public organizations is problematic because public institutions pursue collective missions, serve multiple stakeholders, and do not have a single market-based measure equivalent to profit.

Performance indicators can nevertheless play a major governance role. They support planning, monitoring, accountability, and organizational learning. Their design must be balanced: excessive emphasis on easily measurable quantitative outputs can displace quality, while indicators linked to incentives may generate gaming, selective reporting, or other dysfunctional behaviour. In Portugal, public-sector performance management is framed by SIADAP, while health-sector organizations are additionally subject to contracting and monitoring arrangements established by the Central Administration of the Health System (ACSS).

B. The Balanced Scorecard as a Reference Framework

The Balanced Scorecard, originally developed by Kaplan and Norton, broadened performance assessment beyond financial measures by incorporating customer, internal-process, and learning-and-growth perspectives. In public and non-profit organizations, the model is normally adapted so that mission and public value occupy the highest level of the framework. Financial sustainability becomes an enabling condition rather than the ultimate objective.

This adaptation is particularly relevant to hospitals. Financial discipline is essential to continuity of care, but it is not sufficient to represent organizational success. A meaningful hospital performance system must also capture capacity utilization, patient flow, access, safety, clinical outcomes, satisfaction, and workforce-related factors. Previous literature also emphasizes that successful implementation requires leadership commitment, reliable information systems, and a culture that uses performance information for learning rather than merely for compliance.

C. Specific Features of Portuguese Public Hospitals

Portuguese public hospitals operate within a regulated National Health Service (SNS) environment. Performance is influenced by annual contracting arrangements, production targets, quality objectives, and financing mechanisms. Hospital financing has historically incorporated Diagnosis-Related Group logic, linking part of funding to coded clinical activity. This creates incentives for technical efficiency but also requires safeguards against distortions such as inappropriate case selection or coding practices.

Hospital Pedro Hispano provides inpatient care, outpatient consultations, emergency services, day-hospital activity, and surgical services to the population of Matosinhos and surrounding areas. For the purposes of this study, HPH is analysed within ULSM because the 2024 public reporting used for empirical illustration is produced at Local Health Unit level. This institutional context reinforces the need to interpret hospital indicators within an integrated care model.

III. METHOD AND KPI FRAMEWORK

The study follows an applied case-study design. The first stage consisted of a review of performance measurement concepts in public administration and healthcare, with particular attention to the Balanced Scorecard and Portuguese health-sector performance guidance. In the second stage, a KPI framework was designed for HPH. Each indicator was defined by five elements: indicator name, calculation formula, data source, monitoring frequency, and target. In the third stage, publicly reported 2024 data were used to illustrate the framework and compare observed values with proposed targets where comparable data were available.

The resulting framework contains 33 KPIs distributed across three analytical dimensions. The financial dimension evaluates economic sustainability and resource efficiency. The operational dimension assesses capacity utilization, activity, patient flow, and response capability. The service-quality dimension includes patient safety, access and waiting times, satisfaction, clinical outcomes, and selected workforce indicators. Where the 2024 public report does not disclose a directly comparable value, the indicator is retained in the framework and marked as not disclosed.

A. Financial Dimension

The financial dimension assesses economic sustainability and the efficiency with which public resources are used. Profit maximization is not the objective of a public hospital; nevertheless, persistent financial imbalance can compromise service continuity, investment capacity, supplier relationships, and organizational resilience.

Table 1. Proposed financial performance indicators. N/D = not disclosed in the 2024 public report; *reported source values require harmonisation with the exact KPI definition before formal benchmarking.

Indicator	Calculation	Source	Frequency	Target	2024 value
Cost per DRG	Total costs / No. of DRGs	SONHO / Cost accounting	Quarterly	≤ SNS average	N/D
Budget execution rate	Executed expenditure / Budget appropriation × 100	SICC / Management report	Monthly	90%–100%	+27.0%*
Debt ratio	Total liabilities / Total assets	Balance sheet	Annual	< 60%	N/D
Average payment period	Supplier balance / (Purchases ÷ 360)	SICC	Monthly	≤ 30 days	Reduced by 38 days
Net income	Total revenue – Total costs	Income statement	Annual	≥ EUR 0	EUR −45.1m
Own-source revenue (%)	Own revenue / Total revenue × 100	Management report	Annual	≥ 15%	N/D
Cost per consultation	Outpatient costs / No. consultations	Cost accounting	Semi-annual	≤ ACSS benchmark	EUR 201.65
Budget deviation by service	Deviation / Budget allocation × 100	Cost accounting	Quarterly	< 5%	98% execution*

Cost per DRG is strategically relevant because it enables comparisons of productive efficiency across services and against system benchmarks. The average payment period is also important in the SNS context because delayed payments affect supplier relationships, procurement conditions, and institutional reputation. Financial KPIs should therefore be monitored alongside activity indicators rather than interpreted in isolation.

B. Operational Dimension

Operational performance reflects the hospital's capacity to transform available resources into timely healthcare activity. Capacity utilization, length of stay, patient turnover, emergency activity, outpatient consultations, and surgical production are particularly important because they reveal both efficiency and bottlenecks in patient flow.

Table 2. Proposed operational performance indicators. *The 24.6% figure is reported in the source material and should be verified against the numerator and denominator used for the proposed KPI.

Indicator	Calculation	Source	Frequency	Target	2024 value
Bed occupancy rate	Inpatient days / (Beds × 365) × 100	SONHO	Monthly	80%–85%	79.7%
Average length of stay	Total inpatient days / Discharges	SONHO	Monthly	≤ SNS DRG average	8.8 days
Bed turnover index	Discharges / Average no. beds	SONHO	Quarterly	≥ 40	≈ 45
30-day readmission rate	30-day readmissions / Total × 100	SONHO	Monthly	< 10%	N/D
Emergency episodes	Count of emergency episodes	SONHO	Monthly	Downward trend	−1.2%
Emergency abandonment rate	Patients leaving before observation / Triaged patients × 100	ALERT / SONHO	Monthly	< 3%	N/D

Outpatient consultations	Total consultations	SONHO	Monthly	≥ ACSS target	347,536
First-consultation rate	First consultations / Total consultations × 100	SONHO	Quarterly	≥ 30%	24.6%*
Missed appointment rate	Missed consultations / Scheduled consultations × 100	SONHO	Monthly	< 10%	N/D
Surgical activity	Number of surgeries	SONHO / Operating room	Monthly	≥ contracted target	+8.0%
Surgical cancellation rate	Cancelled / Scheduled surgeries × 100	Operating room	Monthly	< 5%	N/D
Operating-room utilization	Surgical minutes / Available capacity × 100	Operating room	Monthly	≥ 75%	N/D
Day-hospital activity	No. of day-hospital sessions	SONHO	Monthly	≥ contracted target	+27% sessions

Average length of stay should be interpreted together with bed occupancy and readmissions. A shorter stay can indicate improved efficiency, but excessively rapid discharge may increase readmission risk. Similarly, high operating-room utilization can signal efficiency, while excessively high utilization may reduce flexibility for urgent cases and increase cancellation risk. The framework therefore favours joint interpretation of related indicators.

C. Service Quality Dimension

Service quality is the most mission-critical and multidimensional component of the framework. It includes patient safety, access, waiting times, satisfaction, clinical outcomes, and workforce factors that indirectly influence continuity and quality of care.

Table 3. Patient safety and access indicators. TMRG = Guaranteed Maximum Response Time; N/D = not disclosed.

Indicator	Calculation	Source	Frequency	Target	2024 value
Healthcare-associated infection rate	Patients with HAI / Inpatients × 100	HAI registry / DGS	Quarterly	< 5%	N/D
Acquired pressure ulcer rate	Acquired cases / Admissions × 100	Clinical records	Quarterly	< 1%	N/D
Falls with harm	Falls with harm / Patient-days × 1,000	Incident reporting	Monthly	< 0.5‰	N/D
Reported medication errors	Medication errors / Administrations × 1,000	Reporting system	Monthly	Downward trend	N/D
Standardized hospital mortality (HSMR)	Observed deaths / Expected deaths × 100	IASIST / DGS	Semi-annual	< 100	N/D
Safe-surgery checklist rate	Complete checklists / Surgeries × 100	Operating room	Monthly	≥ 99%	N/D
Patients within TMRG – consultation	Patients seen within TMRG / Waiting list × 100	SIGLIC / ACSS	Monthly	≥ 85%	39.8%
Patients within TMRG – surgery	Surgeries within TMRG / Surgical waiting list × 100	SIGIC / ACSS	Monthly	≥ 80%	96.2%*

Emergency triage waiting time	Total time to triage / Patients	ALERT / SAP	Monthly	< 15 min	N/D
Door-to-doctor time	Total door-to-doctor time / Episodes	ALERT	Monthly	≤ 60 min	N/D
Surgical waiting list	Patients registered in SIGIC	SIGIC	Monthly	Downward trend	6,102

Table 4. Satisfaction and organizational quality indicators.

Indicator	Calculation	Source	Frequency	Target	2024 value
Patient satisfaction index	Mean satisfaction score (1–5)	Annual survey	Annual	≥ 4.0	Different scale reported
Survey response rate	Completed / Distributed surveys × 100	Quality service	Annual	≥ 30%	N/D
Complaints per 1,000 episodes	Complaints / Episodes × 1,000	Complaints book / ERS	Semi-annual	< 2‰	N/D
Complaints resolved within 30 days	Resolved within 30 days / Total × 100	Management system	Semi-annual	≥ 90%	N/D
Training plan completion	Completed / Planned training actions × 100	HR / Training	Annual	≥ 85%	N/D
Absenteeism rate	Absence hours / Contractual hours × 100	HR system	Monthly	< 5%	N/D

IV. APPLICATION TO 2024 PERFORMANCE DATA

A. Inpatient Activity and Capacity

In 2024, HPH reported a bed occupancy rate of 79.7%, down from 82.4% in 2023. Average length of stay, excluding the nursery, was 8.8 days, a 3.8% reduction from 9.1 days in 2023. Inpatient DRG activity reached 16,236 cases, including 11,319 medical and 4,917 surgical DRGs, representing an increase of 3.6% (+563) compared with the previous year. These results suggest improved inpatient flow, although bed occupancy remained slightly below the proposed 80%–85% reference interval.

The interpretation of occupancy should remain contextual. Lower occupancy can provide operational resilience, but underutilization may also signal inefficient capacity use. Conversely, occupancy rates close to or above full capacity can increase delays, reduce flexibility, and intensify pressure on clinical teams. The KPI framework therefore recommends simultaneous monitoring of occupancy, length of stay, bed turnover, readmissions, and delayed discharges.

B. Emergency Care, Access and Surgery

Emergency activity declined slightly in 2024, with a 1.2% reduction compared with the previous year. The source report associates part of this trend with the implementation of the 'Call First, Save Lives' initiative from November 2024, intended to redirect low-urgency patients toward primary care. The share of green, blue, or white triage priorities was 29.6%, with 2,126 fewer patients in these categories than in 2023.

Surgical performance improved markedly. The number of patients undergoing surgery increased by 8% (+1,412 patients). Conventional operating-room activity increased by 5.4%, while ambulatory surgery grew by 8.7%. The surgical waiting list fell to 6,102 patients at year-end, 992 fewer than in 2023, with a median waiting time of 2.6 months. However, 810 surgeries were cancelled because of strike action and 170 because of insufficient inpatient capacity, illustrating why production indicators should be complemented by cancellation and capacity-utilization measures.

C. Outpatient Access

Outpatient medical consultations increased by 3% in 2024, corresponding to 10,017 additional consultations. Despite this growth, access to first specialist consultations remained the most significant pressure point. At 31 December 2024, 47,889 patients were awaiting a first specialist consultation, 9,574 more than one year earlier. Median waiting time reached 162 days, and only 39.8% of patients on the waiting list were within the Guaranteed Maximum Response Time (TMRG).

This result is particularly important because it shows that higher activity does not necessarily imply better access. A hospital can increase the number of consultations while the waiting list continues to grow if demand expands more rapidly than available capacity. For management purposes, activity volumes should therefore be assessed together with waiting-list size, waiting-time distribution, first-consultation share, and TMRG compliance.

D. Financial Sustainability and Institutional Quality

ULSM closed 2024 with a net loss of EUR 45.1 million and negative EBITDA of approximately EUR 41 million. Total revenue reached EUR 213 million, an increase of 15.9% compared with 2023, while expenditure grew by 28% (+EUR 56.5 million). The source material attributes a substantial part of the increase to personnel expenditure and external supplies and services. The estimated Global Performance Index under the 2024 programme contract was 71.7%.

At the same time, institutional quality indicators show evidence of management-system maturity. ULSM maintained ISO 9001:2015 certification and NP 4552:2022 certification relating to humanization of care. Day-hospital sessions increased by 27% and the number of day-hospital patients by 16.8%, reflecting growth in ambulatory and oncology-related activity. These results reinforce the need for a balanced interpretation: financial pressure coexists with activity growth and quality initiatives.

V. DISCUSSION AND MANAGEMENT IMPLICATIONS

The 2024 application demonstrates the value of an integrated KPI approach. HPH presents a differentiated performance profile rather than a uniformly positive or negative one. Surgical production and inpatient efficiency improved, while specialist outpatient access deteriorated and financial sustainability remained under substantial pressure. A single aggregate performance measure would obscure these differences.

A first implementation challenge concerns data quality and interoperability. The usefulness of KPIs depends on consistent definitions, reliable coding, timely extraction, and integration across clinical, administrative, and financial systems such as SONHO, ALERT, and cost-accounting platforms. Before a dashboard is used for incentives or external benchmarking, each KPI should have an approved technical specification defining the numerator, denominator, exclusions, data owner, update frequency, and validation rules.

A second challenge concerns the number and complexity of indicators. Thirty-three KPIs provide broad coverage, but not all indicators require equal managerial attention at all times. A practical implementation should distinguish a smaller executive dashboard of critical indicators from a more detailed operational scorecard. Based on the 2024 evidence, the executive level should prioritize specialist-access indicators, financial balance, operating-room capacity and cancellations, average length of stay, bed occupancy, and selected patient-safety measures.

A third challenge is the potential for dysfunctional behaviour. When performance measures are strongly linked to targets or incentives, organizations may focus on what is measured rather than on the underlying public-service objective. Examples include premature discharge to reduce length of stay, patient selection to improve efficiency ratios, or under-reporting of adverse events. Balanced indicator sets, independent data validation, and a learning-oriented governance culture are necessary safeguards.

From a management perspective, the proposed framework supports the creation of an institutional performance dashboard with automatic updates and role-based access for the Board and clinical/service managers. The dashboard should be embedded in a four-stage management cycle: planning, execution, monitoring, and review. Variances should trigger investigation and action plans rather than merely retrospective reporting.

The access results deserve particular attention. The 47,889-patient waiting list for first specialist consultations and 39.8% TMRG compliance indicate a structural mismatch between demand and available response capacity. Management action should therefore combine capacity analysis, referral-pathway review, specialty-level segmentation, demand management, digital/non-presential consultation where clinically appropriate, and coordination with primary care. Importantly, these interventions should be evaluated not only by volume produced but also by their effect on waiting times and equity of access.

VI. CONCLUSION

This study developed an integrated performance measurement framework for Hospital Pedro Hispano comprising 33 financial, operational, and service-quality KPIs. By specifying formulas, sources, frequencies, and targets, the framework converts broad strategic objectives into measurable management information and demonstrates how the Balanced Scorecard logic can be adapted to a public hospital context.

The application to 2024 data identifies clear strengths and pressures. Inpatient efficiency improved, with an average length of stay of 8.8 days and bed occupancy of 79.7%. Surgical activity increased by 8%, and the surgical waiting list fell by 992 patients. In

contrast, access to first specialist consultations deteriorated, with 47,889 patients waiting, a median waiting time of 162 days, and only 39.8% within TMRG. Financial sustainability also remained problematic, with a reported net loss of EUR 45.1 million.

The principal implication is that hospital performance cannot be managed through isolated financial or activity measures. Integrated monitoring is required to reveal trade-offs between cost, production, access, quality, and patient outcomes. The proposed framework is therefore best understood not as a static reporting tool but as an infrastructure for strategic dialogue, accountability, and continuous improvement.

Future work should validate the KPI definitions with hospital data owners, test the framework longitudinally, compare results with peer institutions, and assess the statistical relationships between financial, operational, and quality indicators. Such extensions would strengthen the framework's value for benchmarking and evidence-based public healthcare management.

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