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Original Article

Performance indicators for the management of a referenced hospital emergency service

Indicadores de desempenho de gestão de um serviço hospitalar de emergência referenciado

Indicadores de desempeño para la gestión de un servicio de urgencias hospitalario de referencia

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ABSTRACT

Objective: To analyze the management performance indicators of a referral emergency service in a capital city in southern Brazil. **Methodology:** A descriptive, retrospective, and quantitative study was conducted in a public university referral hospital. The data source consisted of patient visits to the Emergency Unit between January and December 2024, recorded in the Regulation System (REGULA+). The hospital performance indicators analyzed were: production (patient visits, number of discharges, hospital discharges, number of transfers, occupancy rate); productivity (bed turnover, average length of stay); and quality (dropout rate and mortality rate). Data were analyzed using descriptive statistics. The recommendations of Strengthening the reporting of observational studies in epidemiology were followed. **Results:** Over a one-year period, 8,818 patient visits were conducted, the unit presented an occupancy rate of 94.74%, with an average length of stay of 10 hours and 39 minutes. The dropout rate was 1.69% and the mortality rate was 1.19%. **Conclusion:** the unit is characterized by significant occupancy rates and length of stay, indicating high demand and complexity of patients, highlighting challenges for hospital management and the need to improve care processes.

DESCRIPTORS:
Emergency service hospital; Health Evaluation; Total Quality Management; Quality Indicators, Health Care.

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RESUMO

Objetivo: Analisar os indicadores de desempenho de gestão de um serviço de urgência e emergência referenciado de uma capital no sul do Brasil. **Metodologia:** Estudo descritivo, retrospectivo e quantitativo, em hospital público universitário de referência. A fonte de dados foi composta por atendimentos na Unidade de Urgência e Emergência entre janeiro e dezembro de 2024, registrados no Sistema de Regulação (REGULA+). Os indicadores de desempenho hospitalar analisados foram: de produção (atendimentos realizados, número de saídas, altas hospitalares, número de transferências, taxa de ocupação); produtividade (giro de leito, média de permanência); e qualidade (taxa de evasão e taxa de óbito). Os dados foram analisados por estatística descritiva. As recomendações do *Strengthening the reporting of observational studies in epidemiology* foram seguidas. **Resultados:** No período de um ano foram realizados 8.818 atendimentos, a unidade apresentou uma taxa de ocupação de 94,74%, com tempo médio de permanência de 10h39min. A taxa de evasão foi de 1,69% e de óbito 1,19%. **Conclusão:** A unidade caracteriza-se por taxa de ocupação e tempo de permanência expressivos, indicando elevada demanda e complexidade dos pacientes, destacando desafios para a gestão hospitalar e necessidade de aprimorar processos assistenciais.

DESCRITORES:

Serviço Hospitalar de Emergência; Avaliação em Saúde; Gestão da Qualidade Indicadores de Qualidade em Assistência à Saúde.

RESUMEN

Objetivo: Analizar los indicadores de desempeño de gestión de un servicio de urgencias de referencia en una capital del sur de Brasil. **Método:** Se realizó un estudio descriptivo, retrospectivo y cuantitativo en un hospital universitario público de referencia. La fuente de datos consistió en las visitas de pacientes a la Unidad de Urgencias entre enero y diciembre de 2024, registradas en el Sistema de Regulación (REGULA+). Los indicadores de desempeño hospitalario analizados fueron: producción (visitas de pacientes, número de altas, altas hospitalarias, número de traslados, tasa de ocupación); productividad (rotación de camas, duración media de la estancia); y calidad (tasa de abandono y tasa de mortalidad). Los datos se analizaron mediante estadística descriptiva. Se siguieron las recomendaciones de Fortalecimiento de la presentación de informes de estudios observacionales en epidemiología. **Resultados:** Durante un período de un año, se realizaron 8.818 visitas de pacientes, la unidad presentó una tasa de ocupación del 94,74%, con una duración media de la estancia de 10 horas y 39 minutos. La tasa de abandono fue del 1,69% y la tasa de mortalidad del 1,19%. **Conclusión:** La unidad se caracteriza por tasas de ocupación y estancias prolongadas significativas, lo que indica una alta demanda y complejidad de los pacientes, poniendo de manifiesto los retos para la gestión hospitalaria y la necesidad de mejorar los procesos asistenciales.

DESCRIPTORES:

Servicio de Urgencia en Hospital; Evaluación en Salud; Gestión de la Calidad Total; Indicadores de Calidad de la Atención de Salud.

INTRODUCTION

Emergency and urgent care services are one of the main entry points to the Brazilian Unified Health System (UHS), playing a strategic role in the Emergency and Urgent Care Network (RUE). These services face increasing demand for highly complex care, reflecting the rise in external causes, urban violence, and traffic accidents, which remain among the leading causes of morbidity and mortality in the country. The complexity of the care profile and the overload of services impose continuous challenges on hospital management, especially in teaching institutions, where the patient flow is dynamic and requires quick, assertive, and safe responses[1-2].

Overcrowding in emergency services, understood as the situation in which the demand for care exceeds the installed capacity of physical, human, and organizational resources, is a global phenomenon that compromises the quality and safety of care, increases length of stay, and enhances the risk of adverse events. In the Brazilian context, part of this overload is associated with inadequate demand for care that could be resolved in Primary Health Care, insufficient hospital beds, and a lack of coordination between levels of care. This reality results in prolonged occupation of critical spaces, such as stretchers in corridors, delays in care for serious cases, and an increase in the hospital mortality rate[3-4].

In this scenario of overcrowding, the evaluation of health services is essential, since the results directly affect patient outcomes. Given this scenario, the systematic use of performance indicators, both quantitative and/or qualitative, has become an essential tool for monitoring and continuously improving health services. These indicators make it possible to assess the efficiency of processes, identify weaknesses in care, and support evidence-based management decisions[5]. Among the most used in hospital management are the occupancy rate, bed turnover, average length of stay, and replacement interval, which directly reflect the institution's performance[6].

Despite advances in evidence-based management, there are still significant knowledge gaps regarding the integrated analysis of management indicators, especially in tertiary-level and referral-based emergency and urgent care services. In the Brazilian context, the organization of the Emergency and Urgent Care Network (RUE) confers specificities to the care flow, since access to more complex hospital services generally occurs in a regulated manner, after users have passed through other points in the network, such as Emergency Care Units (UPA) and the Mobile Emergency Care Service (SAMU). This characteristic differentiates the national model from other health systems and can directly influence performance indicators by modifying the clinical profile of patients treated and care times. However, most existing studies focus on isolated analyses, without considering the interdependence between indicators and their implications for the quality and effectiveness of care[7]. A broader understanding of these data, considering the specificities of the care flow in the UHS, is fundamental to improving the planning and efficiency of hospital management.

In this context, conducting evaluative research and monitoring consolidated indicators of hospital management potentially contributes to the (re)structuring of management actions aimed at promoting the continuous improvement of care processes. In addition, it supports the planning of more effective public policies aligned with the real needs of the referenced emergency and urgent care services, contributing to the strengthening of healthcare in the public hospital setting.

OBJECTIVE

To analyze the management performance indicators of a referral-based emergency and urgent care service in a capital city in southern Brazil.

METHODOLOGY

Design

This descriptive, retrospective, and analytical study with a quantitative approach followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations[8] for its preparation.

Study site and period

The research was conducted at a public university hospital located in southern Brazil, characterized by 100% UHS (Brazilian Public Health System) tertiary-level care, and a reference center in the state of Paraná. It is a highly complex center that integrates care, teaching, and research, serving a wide range of medical and multidisciplinary specialties, including internal medicine, general and specialized surgery, cardiology, oncology, neurology, among others. The institution has inpatient units, adult and pediatric intensive care units, a surgical center, high-tech diagnostic and therapeutic support services, as well as a referenced Emergency and Urgent Care Unit. As a teaching hospital, the institution plays a strategic role in the training of human resources in health, articulating clinical practice with academic activities and contributing to the improvement of care provided to the population.

The urgent and emergency care unit (UUE) has a referral-based clinical care profile, meaning it does not receive walk-in patients; its services are provided through internal and external referrals, and it has 25 beds distributed among the red (n=3), orange (n=4), yellow (n=13), and blue (n=5) rooms.

Population or sample and period

The data source comprised all care provided at the UUE from January to December 2024. A full year timeframe was chosen to visualize all periods and possible seasonal changes. All records available in the hospital's Regulation System (REGULA+) database, electronically completed by healthcare professionals during care, were included.

The data were selected and collected in June 2025 by a single nurse and main investigator.

Data collection

The following information was extracted from the database: date and time of admission, origin of the referral, reason for admission, care status, conduct, date and time of discharge. Subsequently, the data were compiled using a structured spreadsheet in Microsoft Excel®, 2019.

The following variables were used: admission period; prior relationship with the hospital, assessment of the method of admission, and transfer sector. The method of admission variable was categorized according to the record in the institutional system, including direct referrals and regulated referrals. It is important to note that this classification depends on the record made by the professional at the time of care, and may be influenced by specific care protocols. In situations involving time-dependent

conditions, such as chest pain and stroke, care classified as direct referrals may be recorded as appropriate referrals, according to established institutional flows, which may affect the reliability of this variable and suggest possible underreporting.

The referral adequacy variable was defined based on institutional regulatory criteria, considering the compatibility between the patient's clinical profile and the care complexity of the destination unit. However, this classification may vary according to clinical judgment and professional records, and should be interpreted with caution.

The indicators analyzed were: production (care provided, number of discharges, hospital discharges, number of transfers, occupancy rate); productivity (bed turnover, average length of stay); and quality (dropout rate and death rate)[9,10]. Chart 1 shows the variables and indicators.

Chart 1. Variables and indicators verified. Curitiba, PR, 2025

Variables and indicators	**Calculation**
Operational beds available	(total number of beds - inactive beds)
Bed turnover	(total number of discharges, deaths, and transfers in a given period) / (Number of beds available in the same period)
Occupancy rate	(number of hospitalized patients) / (total bed capacity) x 100
Average length of stay	Σ (length of stay per patient) / total number of patients seen
Number of exits	(Discharges + Transfers + Deaths + Escapes)
Waiting time for medical treatment	(Time of course of action determination – Time of patient admission to the unit)
Number of patients per period	(number of patients admitted between 7:00 AM and 7:00 PM) and (number of patients admitted between 7:00 PM and 7:00 AM)
Dropout rate	(total number of patients discharged without medical clearance) / (total number of patients admitted) x 100
Death rate	(total number of deaths of hospitalized patients) / (total number of discharges) x 100
Services provided	total number of patients admitted for care within a 24-hour period

Data analysis

Continuous variables were analyzed using descriptive statistics through the Power BI Desktop program, presented as simple and absolute frequencies, means, and standard deviations. All measurements and calculations were performed in DAX (Data Analysis Expressions). The Chi-square goodness-of-fit test was performed to verify possible differences between the groups of categorical variables. Significance was set at 5%. The test was performed using SPSS version 25.

Ethical aspects

The research was approved by the Ethics and Research Committee of the Complex Clinical Hospital of the Federal University of Paraná, through CAAE N. 87167425.4.0000.0096 and approval opinion N. 7.509.759, in accordance with Resolution N. 466/2012 of the National Health Council.

RESULTS

There were 8,818 consultations were carried out, predominantly involving females (n=4,582; 51.96%). The average age of the patients was 56.69 years (median= 56.80 years, standard deviation= 3.79). It was observed that 6,086 (69.02%) consultations were carried out during the daytime, and 7,632 (86.55%) had not been seen at the hospital previously. There was a statistically significant difference between all observed categories (p<0.001), as shown in Table 1.

Table 1. Profile of services provided by the emergency department. Curitiba, PR, 2025

Variables		n	%	c^2(df)	p-valor
Period of admission	07h to 19h	6,086	69.0	1,275.72(1)	p<0.001
	19h to 07h	2,732	31.0		
Previous care in the hospital maintaining bond	No	7,632	86.6	4,712.06(1)	p<0.001
	Yes	1,186	13.4		
Evaluation of the way of entry	Inadequate hospital assessment	33	0.4	31,380.35(5)	p<0.001
	Proper routing	7,650	86.8		
	Inadequate referral of the outpatient clinic	49	0.6		
	Direct search	687	7.8		
	Inadequate protocol	217	2.5		
	Zero vacancy inadequate	182	2.1		
Transfer sector	Obstetric Clinic	2	0.0		
	Emergency	17	0.2		
	Infirmary	4,425	50.2	12,405.04(4)	p<0.001
	Single room	52	0.6		
	Intensive care unit	1,382	15.7		

Caption: M – mean; SD – standard deviation; χ^2: Chi-square statistic; df: degrees of freedom.

Among the main healthcare indicators evaluated at the Emergency Unit during the period, the occupancy rate stands out due to its high level of 94.74% (n=8,669), highlighting the high demand for care and the near-full utilization of installed capacity, with 24 out of 25 available beds being used daily. On the other hand, the dropout and death rates remained low, as shown in Table 2.

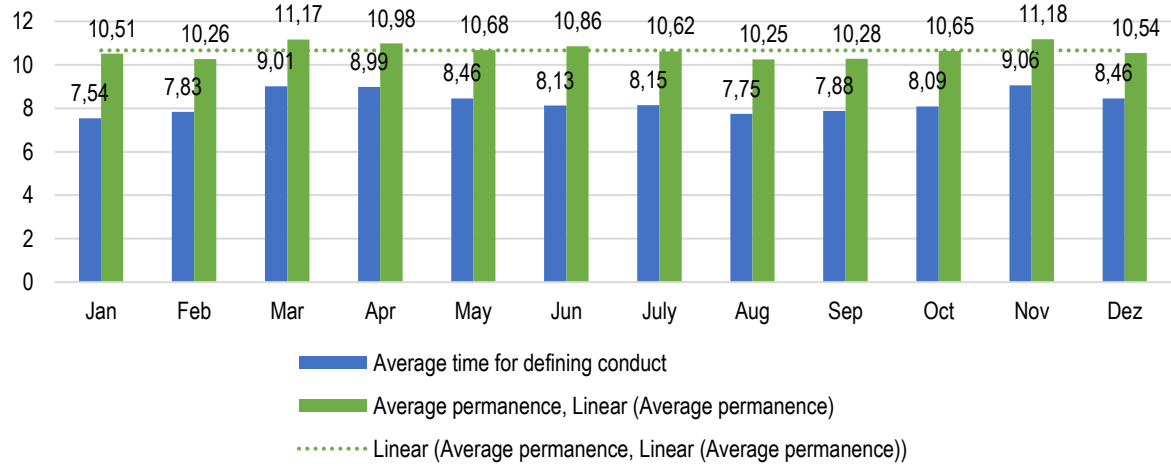
Table 2. Distribution of care indicators for the emergency and urgent care unit. Curitiba, PR, 2025

Type of indicator	Indicators	n	M±SD	%
Production	Services provided	8,818	24.09±5.33	100
	n. of exits	8,818	24.09±5.33	100
	n. of hospital discharges	4,025	11.00±3.65	45.64
	n. of transfers	4,539	12.40±3.45	51.47
	Occupancy rate	8,669	23.69±1.26	94.74
Productivity	Bed turnover	0,96		-
Quality	Attrition rate	149	0.41	1.69
	Death rate	105	0.29	1.19

Caption: M - daily average; n. - number of services provided; DP - standard deviation.

The average monthly time (in hours) for defining conduct and length of stay was 8h16m and 10h39m, respectively. Figure 1 shows that the average monthly time in hours for defining conduct and length of stay remained stable throughout the months. Calculating the ΔT (delta time) between the definition of conduct and the length of stay, a time of 2h23m is observed.

Figure 1. Average monthly time for determining treatment and length of stay in the emergency unit. Curitiba, PR, 2025



DISCUSSION

Measuring the quality of health services is an ongoing challenge for managers, especially in complex hospital sectors where care demand is unpredictable. Management tools prove effective in evaluating care, its results and weaknesses, which allows for the direction of improvements. For the service diagnosis to be accurate, it is essential to ensure the quality and reliability of the data. In this

context, performance indicators play a fundamental role by allowing objective and comparable measurements, even though they are systematically underutilized, especially in emergency and urgent care services[11].

Considering the variables presented in this research, there is a predominance of care provided during the daytime, possibly due to the greater availability of diagnostic, specialized and therapeutic support resources during this shift, which favors the speed of care and the resolution of cases. This result can be justified, firstly, by the fact that the UUE is a referral unit, that is, its largest entry is regulated by the internal regulation centers and the municipal bed management center, and, secondly, by being a direct open door of the Mobile Emergency Care Service (SAMU) for cases of chest pain, which are more frequent during the daytime[12].

Similar findings were described in national studies[11,13-14] that associated the higher concentration of daytime care with the expanded offer of clinical support and the operational dynamics of the institutions. It is worth highlighting that the variable form of entry, especially the direct search item, can be influenced by how professionals classify these services. In situations involving specific protocols, such as chest pain and stroke, direct search may be recorded as appropriate referral, which tends to compromise the reliability of the data. Therefore, it is believed that it may be an underreported data point.

Most patients did not have a prior connection with the hospital, highlighting the unit's role as a metropolitan, regional and national reference center for high complexity care, receiving cases from other services. This profile reinforces the importance of the public university hospital in Paraná, with infrastructure and technology geared towards high complexity care, as an institution supporting the UHS, requiring efficient management of regulation flows and bed occupancy[15].

Furthermore, the high proportion of referrals classified as appropriate stands out, indicating consistency between the regulatory criteria and the established care profile. However, the presence of inappropriate referrals, even in smaller quantities, negatively impacts the unit's operational dynamics, since the indiscriminate referral of patients to emergency services can contribute to overcrowding, patient dissatisfaction, delays in the administration of critical therapy, increased risk of adverse events and consequently increased mortality, especially among the elderly[16]. These data reinforce the need for continuous training of professionals involved in regulatory processes and effective communication between levels of care.

Regarding outcomes, most transfers occurred to wards, followed by the Intensive Care Unit. This circumstance indicates a predominance of cases requiring medium-complexity hospitalization, which are absorbed by the wards. Sectors with lower transfer percentages, such as single rooms (isolation) and the obstetrics center, demonstrate a low need for specific relocation, consistent with the clinical profile of patients and the nature of the UUE. Among the main indicators of hospital performance, the occupancy

rate, average length of stay, and bed turnover stand out, reflecting the efficiency of the use of available resources. Theoretically, shorter length of stay is related, among other factors, to improved patient flow and greater bed availability, contributing to increasing the bed turnover rate and optimizing care capacity[17-19]. In this research, bed turnover fell short of the average rate of the National Association of Private Hospitals (NAPH) in 2024 of 5.94, and of a public university hospital in 2022 of 4.06[20]. Taking into account the particularities of each hospital sector and the differences in care models and financing of health services, it can be inferred that this discrepancy can be attributed mainly to the prolonged stay of patients in the unit and the difficulties of internal and external regulation for reallocation to backup beds.

Prolonged stays in the emergency department, possibly associated with overcrowding, lead to significant, often negative and exhausting, consequences for patient care and management, such as increased waiting times, work overload, decreased quality of care, and difficulty in the actual management of beds. Furthermore, the time it takes to determine a course of action is crucial for the effectiveness and outcome of patient care in the emergency department.

In the United Kingdom, to ensure the proper functioning of emergency services, a maximum patient stay in emergency units has been set at four hours; this goal is the responsibility of referral hospitals[21]. In the United States of America, in turn, the Society of Critical Care Medicine recommends that critically ill patients be transferred from the emergency room to the intensive care unit within a maximum of six hours. There is evidence that when this time is exceeded, there are worse outcomes for the patients referred[22]. Considering the interval between the definition of conduct and the effective transfer of the patient presented in this research, operational obstacles in regulation and bed availability are observed, reinforcing the importance of real-time monitoring of these indicators[20].

On the other hand, the high transfer rate, followed by medical discharge, associated with low percentages of elopement and death, suggests the effectiveness of care practices and the problem-solving capacity of the multidisciplinary team, resulting in the effectiveness of the care provided and favorable outcomes, aspects also described in observational studies carried out in recent emergency services[23-24]. These results demonstrate good care coordination and appropriate clinical management, although challenges related to flow management and optimization of length of stay persist.

The description of the indicators shows that the operational efficiency of the unit depends directly on the articulation between the care processes of the medical and multidisciplinary team, both in the emergency unit and in the support, regulation and bed management units. Investing in continuous monitoring, systematic analysis of indicators and integration between levels of care is essential to reduce overcrowding, improve institutional performance and strengthen the quality of care in emergency services.

Study Limitations

This study presents limitations inherent to its descriptive and retrospective design, conducted in a single public university referral hospital, which may restrict the generalization of the findings to other healthcare settings with different structural and organizational profiles. The use of secondary data from the institutional system (REGULA+) may be subject to inconsistencies, underreporting, or incomplete records, as it is a system filled out by the professionals who provide patient care, influencing the accuracy of some of the variables analyzed.

Contributions for the Nursing Area, Health or Public Policy

The study contributes by systematically highlighting the integrated behavior of care and management indicators in a referenced emergency and urgent care service, strengthening the culture of continuous monitoring based on evidence. For nursing, the findings support the planning of team sizing, the organization of the work process, and the improvement of bed management strategies, considering the high occupancy rate and length of stay identified. The strategic role of the nurse in managing the care flow, improving record-keeping, and coordinating with internal regulatory centers is reinforced. For public policy, the findings indicate the need for structural investments in the Emergency and Urgent Care Network, expansion of backup beds, and strengthening of Primary Health Care, as strategies to mitigate overcrowding and improve hospital care within the context of the UHS.

CONCLUSION

It is concluded that the referenced emergency and urgent care unit presents a scenario of high occupancy rate and length of stay, which indicates high demand for care and the complexity of the profile of patients served. On the other hand, it presents a median bed turnover rate, low dropout rate and death rate. These findings indicate important challenges for hospital management, highlighting the need to improve care processes. The analysis of performance indicators reinforces that the systematic use of management tools is fundamental to evaluate the quality of care, identify operational weaknesses and support decision-making in hospital emergency and urgent care services.

Continuous, systematic and real-time monitoring of these indicators represents an essential strategy to optimize processes, anticipate demands, adjust care flows and improve the efficiency of resource allocation. This practice contributes to maintaining the quality and safety of the patient, in addition to strengthening the response capacity of the teams in the face of variations in care demand, promoting greater efficiency of processes and excellence in the care provided.

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