

# Evaluation indicators of urgency and emergency pre-hospital care services: Integrative review

Indicadores de avaliação dos serviços de atendimento pré-hospitalar de urgência e emergência: Revisão integrativa  
Indicadores de evaluación de los servicios de atención prehospitalaria de urgencia y emergencia: Revisión integrativa

## RESUMO

**Objetivo:** Analisar as evidências científicas disponíveis na literatura sobre indicadores que subsidiam a avaliação dos serviços de atendimento pré-hospitalar de urgência e emergência. **Método:** Revisão integrativa conduzida nas bases LILACS, CINAHL, SCOPUS, National Library of Medicine (via PubMed) e Web of Science. Utilizados estudos disponíveis na íntegra de domínio público ou privado, sem limite de idioma, não delimitando data de publicação. **Resultados:** Foram elencados quatro estudos para amostra final, os quais os indicadores de avaliação dos serviços de atendimento pré-hospitalar de urgência e emergência estavam relacionados à satisfação do paciente, os tempos despendidos durante o atendimento, o desenvolvimento de indicadores de qualidade (estrutura, processo e resultados) e os índices de avaliação dos serviços. **Conclusão:** Os achados contribuem no campo prático dos serviços de atendimento pré-hospitalar de urgência e emergência, com a finalidade de proporcionar uma reflexão entre os gestores e profissionais de saúde.

**DESCRITORES:** Serviços Médicos de Emergência; Assistência Pré-Hospitalar; Desvio de Ambulâncias; Indicadores de Gestão; Indicadores Básicos de Saúde.

## ABSTRACT

**Objective:** To analyze the scientific evidence available in the literature on indicators that support the evaluation of urgent and emergency pre-hospital care services. **Method:** Integrative review conducted in LILACS, CINAHL, SCOPUS, National Library of Medicine (via PubMed) and Web of Science databases. Studies available in full in the public or private domain were used, with no language limit, without delimiting the date of publication. **Results:** Four studies were listed for the final sample, in which the evaluation indicators of pre-hospital urgent and emergency care services were related to patient satisfaction, the time spent during care, the development of quality indicators (structure, process and results) and service evaluation indexes. **Conclusion:** The findings contribute to the practical field of urgent and emergency pre-hospital care services, with the aim of providing a reflection between managers and health professionals.

**DESCRIPTORS:** Emergency Medical Services; Prehospital Care; Ambulances; Management indicators; Health Status Indicators.

## RESUMEN

**Objetivo:** Analizar la evidencia científica disponible en la literatura sobre indicadores que apoyen la evaluación de los servicios de atención prehospitalaria de urgencia y emergencia. **Método:** Revisión integradora realizada en las bases de datos LILACS, CINAHL, SCOPUS, Biblioteca Nacional de Medicina (vía PubMed) y Web of Science. Se utilizaron estudios disponibles en su totalidad en el dominio público o privado, sin límite de idioma, sin delimitar la fecha de publicación. **Resultados:** Se listaron cuatro estudios para la muestra final, en los cuales los indicadores de evaluación de los servicios de atención prehospitalaria de urgencia y emergencia se relacionaron con la satisfacción del paciente, el tiempo dedicado a la atención, el desarrollo de indicadores de calidad (estructura, proceso y resultados) y índices de evaluación de servicios. **Conclusión:** Los hallazgos contribuyen al campo práctico de los servicios de atención prehospitalaria de urgencia y emergencia, con el objetivo de propiciar una reflexión entre gestores y profesionales de la salud.

**DESCRIPTORES:** Servicios Médicos de Urgencia; Atención Prehospitalaria; Desvío de Ambulancias; Indicadores de Gestión; Indicadores de Salud.

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**INTRODUCTION**

The evaluation of health services is essential, especially in pre-hospital care services, since their results impact the clinical outcome of patients, proving to be important for both the population and managers. Health services use indicators, quantitative and/or qualitative, as strategies for measuring and evaluating the performance and quality of the service offered<sup>(1)</sup>.

Pre-hospital service performance and quality are also evaluated according to management outcomes, which are non-clinical outcomes such as raw measures of care (eg service stakeholder satisfaction) or response time intervals<sup>(2)</sup>.

Therefore, the indicators of pre-hospital care services allow measuring the quality of the service and the identification of failures in its process. Thus, they subsidize actions to solve problems and subsequently improve the care that is provided. In this way, indicators are becoming important tools to guarantee the quality of health and the measurement of service performance. These components ensure that the information is both implemented and used properly and contributes to the reduction of subjectivity in the interpretation and application of these indicators<sup>(3)</sup>.

Pre-hospital care has been an intervention tactic that provides quick and early as-

sistance in the extra-hospital environment, with its own emergency service transport to guarantee life and minimize possible sequelae<sup>(4)</sup>.

Given this context, the quality of pre-hospital services has been a research area of extreme priority and relevance to achieve improvement in care. However, it has been a challenge to identify viable and valid indicators in pre-hospital services, as current publications are scarce<sup>(5)</sup>. It is noteworthy that a compilation of quality indicators, related to the evaluation of pre-hospital services, would facilitate the management of these services and the implementation of assertive strategies that seek to improve quality and safety in this work process<sup>(6)</sup>.

Considering the relevance of pre-hospital care services and the importance of health service evaluation indicators, the present study aims to analyze the scientific evidence available in the literature on indicators that support the evaluation of pre-hospital emergency care services and emergency.

**METHOD**

This is an integrative review of the literature, in which there is a union and synthesis of the results of studies referring to a certain theme. This method is carried out in an orderly and systematic way, with the purpose of guaranteeing a theoretical deepening<sup>(7)</sup>.

Data collection was carried out between December 2021 and February 2022, through virtual access to the databases using the Journal Portal of the Coordination for the Improvement of Higher Education Personnel (CAPES) via remote access via the Federated Academic Community (CAFe).

Five databases were used to search for articles: Latin American and Caribbean Literature in Health Sciences (LILACS), Cumulative Index to Nursing and Allied Health Literature (CINAHL), SCOPUS, National Library of Medicine (MEDLINE) (via PubMed) and Web of Science (WOS Inclusion criteria were: studies that were available in full in the public or private domain, with no language limit, without delimiting publication dates. All research that did not respond to the objective of this research, secondary studies, theses and dissertations, editorials, letters to the editor, case studies, integrative reviews and book chapters were excluded.

For all searches, the Boolean operators AND OR were used, as described in Table 1.

To construct the guiding question, the PICo strategy was used (Population, I: Phenomenon of interest and Co: Context)<sup>(8)</sup>. To formulate the guiding question of this study, the pre-hospital emergency care service was defined as population. The defined phenomenon of interest was the as-

assessment indicators of pre-hospital urgent and emergency care services. The context was represented by urgency and emergency network.. From this process, the following guiding question arose: What scientific evidence is available in the literature on indicators that support the evaluation of urgent and emergency pre-hospital care services?

From a previous reading of articles on the subject, the descriptors were selected following the recommendation of each base listed in this study. Thus, the Health Sciences Descriptors (DeCS) were used to search the LILACS: emergency medical services; pre-hospital care, ambulances; management indicators and basic health indicators.

For the formulation of the search strategy in the MEDLINE, WOS and SCOPUS database, the Medical Subject Headings (MeSH) descriptors were listed: emergency medical services; ambulances; health status indicators. As uncontrolled descriptor was used: prehospital care; management indicators and pre-hospital emergency care.

To meet the recommendations of the CINAHL database, the search strategy was formulated based on the descriptors of the CINAHL subject titles, namely: emergency medical services, prehospital care, ambulances, health status indicators. The following uncontrolled descriptors were used in this database: pre-hospital emergency care and management indicators.

The selected studies were classified according to the level of evidence: I) Evidence from syntheses of cohort or case-control studies; II) Evidence derived from a single cohort or case-control study; III) Evidence obtained from meta synthesis or synthesis of descriptive studies; IV) Evidence from descriptive or qualitative studies; V) Evidence from expert opinion <sup>(9)</sup>.

For analysis and inclusion of studies, two researchers individually read and selected the articles found in the search. For articles that had different evaluations, a third researcher was appointed to decide which one to choose. It should be noted that the bibliographic references of all articles selected in the sample were read to identify new studies, but articles from these sources were not added because they did not respond to

PICTURE 01: Search strategies according to the database, 2022.

DATA BASE	SET OF TERMS
LILACS	(serviços médicos de emergência) OR (assistência pré-hospitalar de emergência) [Palavras] and (indicadores de gestão) OR (indicadores básicos de saúde) [Palavras]
MEDLINE/PUBMED	((emergency medical services) OR (pre-hospital emergency care)) AND ((prehospital care) OR (ambulances))) AND ((management indicators) OR (health status indicators))
CINAHL	((emergency medical services OR pre-hospital emergency care) AND (prehospital care OR ambulances) AND (management indicators OR health status indicators)))
WEB OF SCIENCE	((emergency medical services OR pre-hospital emergency care) AND (prehospital care OR ambulances) AND (management indicators OR health status indicators)))
SCOPUS	(TITLE-ABS-KEY ("emergency medical services") OR TITLE-ABS-KEY ("pre-hospitalemergency care") AND TITLE-ABS-KEY ("prehospital care") OR TITLE-ABS-KEY ("ambulances") AND TITLE-ABS-KEY ("management indicators") OR TITLE-ABS-KEY ("health status indicators"))

Source: Survey data, 2022.

the objectives of this review. After this step, a structured table was prepared to standardize the organization of data, with the following items: article title, year of publication, journal name, objective, study method and indicators used to evaluate pre-hospital care services of urgency and emergency. A descriptive analysis of the included studies was carried out, highlighting the indicators that support the evaluation of urgent and emergency pre-hospital care services.

In order to facilitate the visualization of the methodological route of the selection of studies, a flowchart was built, shown in picture 1.

This study does not require the approval of a research ethics committee as it presents results from published studies. However, it is noteworthy that the authors maintained ethics by referencing all the studies used.

## RESULTS

Initially, 1,806 studies were identified after the initial reading of titles and abstracts, 38 were selected for full reading. Of these,

26 were excluded for not reporting on indicators, eight were excluded for not dealing with urgent and emergency pre-hospital care services. Therefore, the final sample consisted of four scientific articles..

The results of this review identified that all selected articles were published in English in international journals regarding the place where the studies were developed: Sweden (A1), Iran (A2, A4), Norway (A3). Regarding the design of the studies, two were cohort studies (A1, A2), one quantitative (A3) and one quantitative-qualitative (A4).

Chart 2 presents the characteristics of the articles selected for this review, year of publication, location, database, level of evidence, study objective, research design, main results and evaluation indicators of pre-hospital emergency care services and emergency.

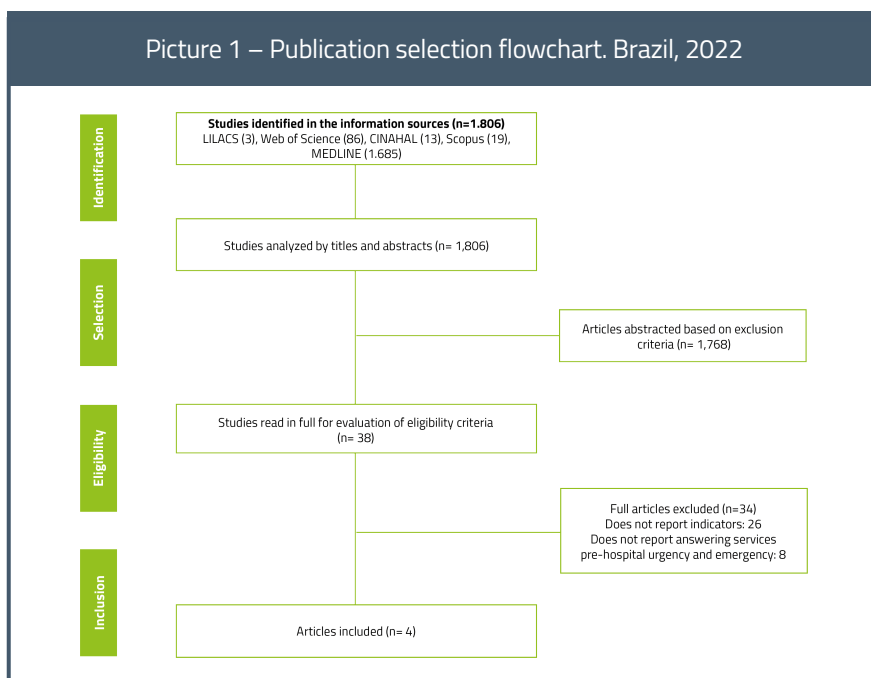
## DISCUSSION

In view of the findings of the survey carried out, a limited production regarding the

central theme of the study was noted. Thus, even without defining the data collection period, only four articles were identified that discussed issues related to the evaluation indicators of urgent and emergency pre-hospital care services. The studies found were developed in Europe and Asia. Given this, it is important to consider that economic development, access to health, operating conditions of emergency medical services can influence the service provided (10).

Thus, it is important to establish strategies for constant improvement of the quality of health services, with performance indicators (structure, process and result) that allow evaluating the functions that may influence health outcomes, even more in terms of refers to urgent and emergency pre-hospital care services, where any failure can significantly impact an individual's life (11).

Picture 1 – Publication selection flowchart. Brazil, 2022



Source: Survey data, 2022.

Table 2- Description of articles selected for integrative review. Brazil, 2022.

ID/ year/ location/ database/ NE	Purpose of the study	Research design	Main results	Evaluation Indicators
A1 2011 Sweden MEDLINE I	Assessment indicators Measuring patient satisfaction with healthcare in ambulance services in Skane Region, southern Sweden.	Prospective clinical cohort study with consecutive inclusion. Conducted with 128 patients who arrived by ambulance for emergency.	The average service time of informants in the ambulance was 31 minutes (r = 12–75). Most answers (93.1%) presented the most positive answer option in each position of the question.	Patient satisfaction, which was measured using the instrument: Consumer Emergency Care Satisfaction Scale © (CECSS).
A2 2002 Iran MEDLINE I	To evaluate the existing prehospital trauma care system in Tehran, Iran.	Cross-sectional cohort study.	The averages of the “interval from start to scene arrival” and “interval from scene arrival to scene exit” were 10 and 18 minutes, respectively (median: 10 minutes, range from 0 to 55 minutes for the first; and median: 15 minutes, range from 1 to 165 minutes for second time range). The mean “dispatch-start-to-hospital-arrival interval” was 45 minutes (median: 42 minutes, range: 5–170 minutes).	Time intervals of each dispatch, which was measured in the following times: 1) difference between the dispatch start time and the arrival time at the location, (T1); 2) difference between the time of arrival at the location and the time of departure from the location (T2); 3) the difference between the time of departure from the site and the time of arrival at the hospital (T3); 4) difference between the time of arrival at the hospital and the time of departure (T4); and, finally, 5) difference between the beginning of the dispatch and the arrival at the hospital (T5).
A3 2017 Norway WEB OF SCIENCE IV	Develop a set of quality indicators for international P-EMS to enable quality improvement initiatives.	Quantitative study using the nominal group technique with specialists to develop quality indicators for emergency services.	Consensus on 15 response-specific and 11 system-specific quality indicators.	Indicators allocated to one of the six quality dimensions defined by the Institute of Medicine: safety; efficiency; efficiency; patient-centeredness; equity and punctuality, with all dimensions covered by the structure, process, and outcome indicators.
A4 2018 Iran WEB OF SCIENCE IV	Compile performance evaluation indicators for pre-hospital emergency centers in 2017.	Qualitative-quantitative study referring to the evaluation indices of pre-hospital emergency centers.	Identified 9 items in the facilities and physical space area, 10 items in the communication area, 10 items in the ambulance area, 8 items in the human resources area, 9 items in the regulations and protocols area, 3 items in the equipment storage area in the center and 3 items in the training area.	Listed seven factors effective in improving the quality of care: building and physical facilities owning the land of the Emergency Center; communication system; ambulance; human Resources; regulations and protocols; storage of equipment in the centers; training at the centers.

Source: Survey data, 2022.

To evaluate the health service, one of the strategies is the patient's opinion as a form of evaluation that can provide the creation of new management strategies in the pre-hospital urgent and emergency care service to strengthen the quality of care.

o find out the indicators that reflect on a successful and quality service, the patient observes: type of service given by the team, interpersonal relationship, technical skill, availability of materials and service time, among others, as these aspects are essential for quality of the service offered<sup>(6)</sup>.

Given this perspective, the service provided by the team stands out. It is relevant that the team does not diminish the user's request, but pays attention to the individual's demand, as making an inadequate judgment can endanger the lives of those who wait for the service<sup>(12)</sup>.

A study carried out in Florianópolis, with a qualitative method and which aimed to understand patient care in an emergency situation, from the mobile pre-hospital service to the hospital emergency service showed that professionals seek to offer fast and quality care. However, with the resources available regarding the environment and the structure of the place of occurrence, even with different actions during the pre-hospital care, the teams interact with each other during the occurrences and seek, when necessary, help from each other for the care<sup>(13)</sup>.

Another point in the patient's assessment is the interpersonal relationship between team members in which effective communication has been an indispensable aspect for the development of group work, with negative results when absent or positive when present<sup>(14)</sup>. The weariness of everyday life, work overload, lack of human and material resources, and disunity are examples of a set of weaknesses that permeate interpersonal relationships.<sup>(15)</sup>

A study carried out in Spain, with the objective of analyzing the perception of the nursing team about the conditions that generate absenteeism and their implications for assistance in urgent and emergency units, highlights that good communication between health professionals allows safe

and effective assistance to the patient. Thus, the standardization of communication during the patient transfer process from one service to another can maximize the clinical safety of this user<sup>(16)</sup>. In addition, adequate communication between the service and the patient enables better care, providing the creation of a bond between them.<sup>(14)</sup>

Considering that urgencies and emergencies in pre-hospital care are intense, there are still difficulties in providing and improving the service due to the great demand for these occurrences, weak infrastructure and few professionals.<sup>(13)</sup> Thus, the management of these calls must be carried out by health professionals with knowledge, attitudes and skills, such as quick decision making, management and leadership in crisis situations<sup>(17)</sup>.

In this circumstance, the role of the nurse becomes very present, since the theoretical and practical knowledge that these professionals accumulate over the years are of great importance for a quick and safe action<sup>(18)</sup>.

In addition, the response time in pre-hospital care in urgent and emergency situations has still been a challenge among managers in charge of structuring, organizing, and qualifying the mobile service, since the time spent on care is an indicator related to service quality. Thus, any failure in response time can lead to permanent sequelae or death in patients, especially in time-dependent conditions<sup>(19-20)</sup>.

Well-organized and distributed pre-hospital care systems provide positive and relevant results in addressing emergencies, especially in time-sensitive conditions. However, these results may vary, according to the conditions of organization, coverage and distribution of resources<sup>(21)</sup>.

Factors that influence the longer response time may be directly related to the population that often initiates the rescue on its own even before triggering the emergency service. In addition, the lack of resources of the emergency services stands out, such as the lack of qualified professionals and the number of trained professionals leading to an overload of work, the lack of equipped ambulances, difficulties related to the in-

frastructure of the roads and congestion, lack of good maps and cooperation of drivers of vehicles that, on several occasions, do not give accessibility to ambulances to follow the route<sup>(22)</sup>.

In addition, pre-hospital care plays the role of saving lives. Thus, the adequate performance in the different parts of the service system results in the quick and timely implementation of the mobile service in the place where the patient is, consequently preventing death and/or serious sequelae, since the pre-care services hospital are responsible for bridging the gap between the health needs of people outside the hospital environment<sup>(23)</sup>.

However, assessing the quality of care, especially in dynamic pre-hospital care (ambulance), has still been a major challenge to understand and improve the quality of urgent and emergency care<sup>(24)</sup>.

As a limitation of the study, the number of studies on the subject is still limited. It should be noted that there were no studies carried out in Latin America, based on the search strategy used. However, the findings of this study allow health professionals to reflect on the quality indicators of pre-hospital urgent and de urgency emergency care services.

## CONCLUSION

The scientific evidence about the evaluation indicators of urgent and emergency pre-hospital care services was focused on patient satisfaction, the various times spent during care, the development of quality indicators (structure, process, and results) and the indexes evaluation of urgent and emergency pre-hospital care services. The findings contribute to the practical field of pre-hospital urgent and emergency care services, with the aim of providing a reflection between managers and health professionals.

Furthermore, the study's findings reinforce the importance of further research on the evaluation indicators of pre-hospital urgent and emergency care services, especially in different global and local contexts.

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