



**HAL**  
open science

## Evaluation of Fast-Track Implementation on Emergency Department: A Literature Review

Luis Valdiviezo Viera, Milena Reis, Sandra Chaves, Robisom Calado, Saulo Cabral Bourguignon, Sandro Lordelo

► **To cite this version:**

Luis Valdiviezo Viera, Milena Reis, Sandra Chaves, Robisom Calado, Saulo Cabral Bourguignon, et al.. Evaluation of Fast-Track Implementation on Emergency Department: A Literature Review. IFIP International Conference on Advances in Production Management Systems (APMS), Sep 2021, Nantes, France. pp.280-288, 10.1007/978-3-030-85902-2\_30 . hal-04117695

**HAL Id: hal-04117695**

**<https://inria.hal.science/hal-04117695>**

Submitted on 5 Jun 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License



This document is the original author manuscript of a paper submitted to an IFIP conference proceedings or other IFIP publication by Springer Nature. As such, there may be some differences in the official published version of the paper. Such differences, if any, are usually due to reformatting during preparation for publication or minor corrections made by the author(s) during final proofreading of the publication manuscript.

# Evaluation of Fast-Track Implementation on Emergency Department: A Literature Review

Luis Valdiviezo Viera<sup>1</sup>[0000-0002-9272-6065], Milena Reis<sup>2</sup>[0000-0003-1080-8735], Sandra Chaves<sup>1</sup>[00000-0002-2985-1410], Robisom Calado<sup>1</sup>[0000-0003-3349-0344], Saulo Bourguignon<sup>1</sup>[0000-0003-2098-8880] and Sandro Lordelo<sup>1</sup>[0000-0002-3046-395X]

<sup>1</sup> Federal Fluminense University, Niterói, RJ, Brazil  
luisvaldiviezo@id.uff.br

<sup>2</sup> Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil  
milenaestanislau@macae.ufrj.br

**Abstract.** The fast-track is an important strategy for the management and control of overcrowding, which is increasingly used in hospital emergency services. This review article aims to identify the main approaches and criteria for analyzing and deciding on the implementation of the fast-track strategy in the Emergency Department. The bibliographic review considered articles published in the Scopus and MedLine databases during the period 2010 and 2020. In general, the bibliographic research showed: the relative scarcity of scientific communication, regarding the implementation of fast-track strategies in hospital management systems; the diversity of the implantation purposes; the preference for modelling and simulation techniques; the difficulty of *ex-ante* and *ex-post* evaluation from a social perspective. The evaluation of the effectiveness of the implementation of fast-track strategies, when operational criteria are used, is based on quantitative models and techniques. In Brazil, the efficient management of Emergency Care Units, UPAs 24-hour, is essential because the UPAs are a fundamental part of the Brazilian health system.

**Keywords:** Fast Track, Emergency Department, Lean Healthcare, Assessment Methods.

## 1 Introduction

Overcrowding in hospitals is the result of a lower capacity to meet the demand for hospital services. The increase in demand for health services is a phenomenon observed in hospitals in different cities around the world [1-4].

The increase in demand is justified by the growth of population groups or by the expansion of the supply of services [5]. In Brazil, [6] consider that overcrowding is a performance problem in the organization of Brazilian hospitals.

In general, overcrowding management seeks improving operational, economic-financial and quality performance indices, etc. Consequently, efficient management of overcrowding benefits patients and their families, medical professionals, hospital staff and society.

The implementation of fast-track in hospital systems is conceived as a strategy for the control and reduction of overcrowding of emergency and emergency services [7]. Thus, the implementation of fast-track by the management of hospital systems has allowed improving the flow of patients, accelerating the fulfilment of the relevant activities. Consequently, how to evaluate the effectiveness or contribution of fast-track in reducing overcrowding in the areas of emergency care in hospitals? The bibliographic review of the present work has as main objective to identify the main practices in the evaluation of the implementation of the fast-track strategy in health services in hospital urgencies and emergencies.

In Brazil, the Emergency Care Units, UPAs24-hour, are integrated into the Brazilian emergency care network, showing their strategic relevance by enabling the reduction of demand pressure in the emergency services of hospitals. The University Federal Fluminense, UFF, in partnership with the Ministry of Health of Brazil, developed the Project for Restructuring Implantation of Humanization in the Flow of Care of Patients at UPAS-24 hours. Brazil, with the implementation of the National Humanization Policy (PNH) promotes the humanization of health and integration of the hospital environment into the social environment [8-10].

## **2 Research Methodology and Data Collection**

A bibliographic review was developed based on the guidelines proposed by Villas [11], and along with the PRISMA 2020 flowchart for new systematic reviews. The steps covered by this study are detailed below.

### **2.1 Search Strategy**

The survey of bibliographic references of scientific literature was carried out on the CAPES Journal Portal, made available through the CAFE platform (Federal Academic Community) to researchers at Federal Fluminense University.

The bibliographic research was based on articles published in the last ten years found on Bases Scopus and MedLine. The parameters used in the bibliographic search were:

- Search period: LAST 10 years;
- Search material: ARTICLES;
- Language: ANY.

The CAFE Platform was accessed from April 9 to 11, 2020. The results generated are summarized in table 1. In the total results, shown in the table, articles common to the databases under consideration are excluded.

### **2.2 Selection of Articles**

The articles considered for the elaboration of a database correspond from search # 4 in table 1, which uses Fast-Track AND ED as search descriptor (ED refers to

Emergency Department). Then, potentially relevant articles have been identified as a result of excluding articles that:

- Were listed as removed from the database;
- Were published on an untrusted site identified by the antivirus;
- Had a link redirecting to other sources;
- Were not made available to their full extent;
- Reported a certification error while being downloaded.

**Table 1.** Results generated by platform CAFE

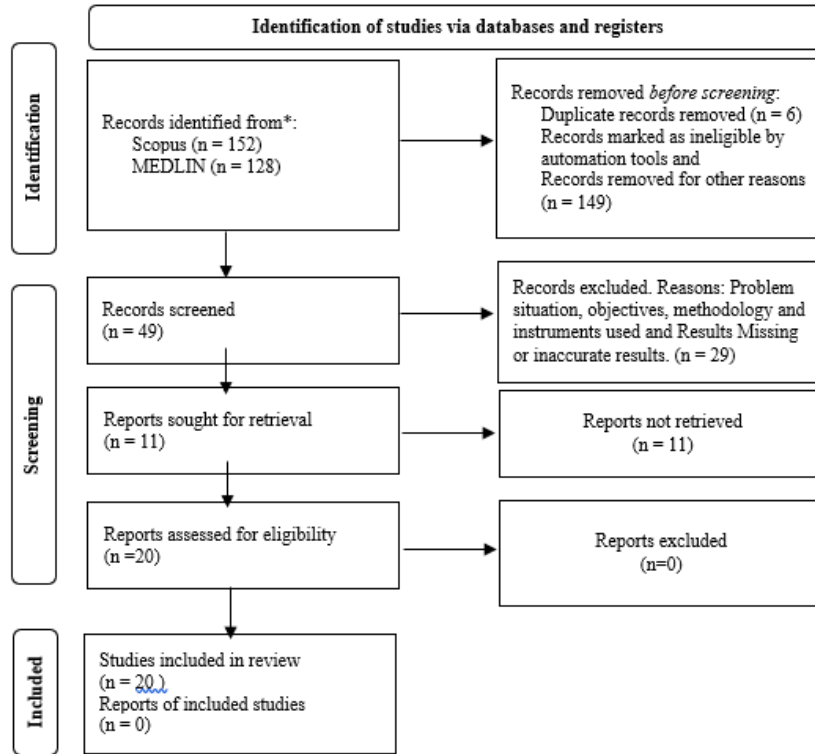
Search	Search descriptors	Data Base	Outcome
1	Fast Track	Total	2.760
		Scopus	1.304
		MedLine	780
2	Fast Track AND Hospital	Total	837
		Scopus	539
		MedLine	505
3	Fast Track AND Emergency Room	Total	42
		Scopus	39
		MedLine	
4	Fast Track AND ED	Total	204
		Scopus	152
		MedLine	72
5	Fast Track AND Lean-Healthcare	Total	10
		Scopus	8
		MedLine	7

### 2.3 Creating a Database

Potentially relevant articles were subjected to a selection criterion based on the relevance demonstrated by their abstracts. After analyzing the abstracts of articles, those who have not adequately meet at least one of this inclusion and/or exclusion selection criteria were excluded:

- Identification of used methodology and/or methods used: case study, experimental;
- Identification of use tools: documentary research, questionnaires, focus groups;
- Identification of data analysis techniques: statistical tests, regression analysis, descriptive statistics;
- Fast-track approach from a managerial perspective.

Articles that adequately met the inclusion criteria started to constitute the database for this purpose in this study. This database consists of twenty articles. Figure 1 illustrates this process.



**Fig. 1.** Process of study and database establishment based on PRISMA 2020 flow diagram for systematic reviews

## 2.4 Database Analysis

The database created for this study was organized in a Microsoft Excel spreadsheet containing the following: Title; Authors; Geographic origin; Theoretical framework; Objectives; Problem situation; Participants; Methodology and Methods; Contribution; Strong points; Weak points.

The database analysis was carried out by considering the following aspects:

- Problem situation
- Objectives;
- Methodology, methods and instruments used;
- Results.

## 3 Analysis of the Results

The main objectives, stated by the analyzed authors with fast-track strategies are organized in table 2. Most authors propose to assess the implementation of fast-track in

DE, while others seek to compare the fast-track with other strategies. The “comparison” objectives refer to a specific form of evaluation, which is why the comparison objective was broken down into more specific categories such as costs, medical resources, revenues, satisfaction, productivity, etc. It is observed that the formulation of objectives related to the identification of factors and/or variables that influence the success of the fast-track implementation, seek to identify the most important factors and measure their degree of influence.

**Table 2.** Objectives formulated of analyzed articles

Objectives	Authors	Outcome
Evaluate the implementation of the fast-track ED.	[1], [2], [12], [13]	4
Analyze the length of stay	[1], [4], [14]	3
Analyze Service Quality Indicators	[1]	1
Analyze the Variability times.	[5]	1
Comparison of time reduction strategies.	[4], [7], [15]	3
Comparison of cost reduction strategies	[7], [16], [17]	3
Comparison of revenue growth strategies.	[18]	1
Comparison of resource use strategies.	[4], [19]	2
Comparison of satisfaction strategies	[18], [20], [21]	3
Comparison of strategies to increase productivity	[18], [22], [23]	3
Identify success factors or variables that influence the times.	[3], [24], [25]	3

Table 3 lists the main methodologies described by the authors that would make it possible to achieve the objectives, to explain how the scientific study was developed. The use of observational methodologies, called before and after, which ex-ante an ex-post evaluation, predominates. A prospective approach suggests an ex-ante evaluation. Both types of assessment used statistical techniques to identify the statistical relevance of differences in patient groups in fast-track care, or without fast-track care.

Another important technique used is mathematical modelling, where the behaviour of the flow of queues in urgent and emergency services in hospitals is modeled. The results generated by the simulation are statistically validated. Statistical analysis is the method widely used both to analyze and validate indicators of observed patient groups as to analyze and validate indicators generated by simulating the behaviour of the patient flow.

The information and data obtained through the application of questionnaires are also subjected to statistical methods of analysis to grant scientific support to the conclusions obtained. Statistical analysis is aided by a range of commercial software. Modelling and simulation is also favoured by the availability of high performance, friendly software.

**Table 3.** Methodologies used by the authors of the analyzed articles.

Methodologies	Authors	Outcome
Observational study: Before and after	[1]; [7], [12], [21]	4
Retrospective and prospective review	[18, [22]	2
Prospective study	[17]	1
Economic analysis	[7]	1
Statistical analysis	[3], [5], [13]	3
Top-down and Bottom-up approach	[24]	1
Cross-sectional study of questionnaire surveys	[20], [21], [25]	3
Mathematical modelling	[2], [4], [15], [19], [23]	4

Table 4 describes the main results and findings identified by the analyzed authors. There is a wide dispersion of these results. In general, the fast-track, as expected, allows for a reduction in waiting times, length of stay and the number of patients who have dropped out of care. However, it is important to emphasize certain constraints. Some articles show that the reduction of times is achieved through the greater use of resources or that the increase in customer satisfaction compensates for an increase in costs.

Other alternatives for managing overcrowding were considered and compared with the fast track, such as the Dynamic Priority Queue, DPQ, [19] and Inter-professional Teamwork [7]. The results obtained indicate that these alternative strategies to the fast-track proved to be effective in reducing the times and overcoming costs.

**Table 4.** Results obtained by the authors of the analyzed articles.

Results	Authors	Outcome
Increase in patients attended	[1], [12]	2
Reduced waiting time for low-risk patients	[1], [4], [12]	3
Reduction in waiting times for high-risk patients	[1]	1
Reduction in the number of patients who dropped out	[1], [12], [13], [14]	4
Reduction of the patient's length of stay	[2], [22]	2
Variation in treatment times	[5]	1
Shorter treatment time and wait time in alternative strategies to FT	[7], [19]	2
Lower costs in alternative strategies to FT	[7]	1
Lower costs per QALY in alternative strategies to FT	[7]	1
Additional medical staff to decrease FT strategy times	[12], [18], [21], [23]	4
Identification of the factors that influence waiting times in FT strategies	[3], [14]	2
Improving customer satisfaction with FT strategies	[20], [21]	2
Improving the productivity of ED resources	[15]	1

## 4 Conclusions

Overcrowding of hospital emergency services is currently a worldwide phenomenon. Public and private sector managers devote resources and efforts to mitigate the effects of overcrowding. The fast-track proved to be an effective management strategy in



reducing the patient's stay and, consequently, it would improve the performance of hospital services.

In the analysis of decisions to implement fast-track, the prevalence of the formulation of operational objectives, mainly related to the reduction of time, remained. On the other hand, economic and financial objectives, such as cost reduction; and quality objectives, such as patient and professional satisfaction, are less prevalent.

The main method of evaluating the decision to implement fast-track in hospital emergency services is statistical analysis. However, qualitative assessment methods are also used, through the application of questionnaires to users. These evaluation practices are of the *ex-post* type because they consider the results obtained by the normal operation of the fast-track, when evaluating the decision already executed. However, mathematical modelling allows for a prospective, or *ex-ante* type assessment, when assessing the implementation decision, with the results of the fast-track being generated or estimated and statistically validated.

In general, the use of mathematical models, simulation techniques, use of queues are the main methods and techniques for the analysis and evaluation of the decision to operationalize the fast-track. And, the evaluation of the effectiveness or benefits of implementing the fast-track predominates the use of models and techniques of univariate and multivariate statistical analysis. Other criteria used are the reduction of costs and the increase in revenues, the results of which are statistically valid.

**ACKNOWLEDGMENT:** The authors would like to thank the Brazilian Ministry of Health, Fluminense Federal University and Euclides da Cunha Foundation. This Research is part of a "Lean Project in UPAs 24h" that has been funded by the Brazilian Ministry of Health (TED 125/2019, number: 25000191682201908).

## References

1. Chrusciel, J. *et al.* Impact of the implementation of a fast-Track on emergency department length of stay and quality of care indicators in the Champagne-Ardenne region: A before-After study. *BMJ Open* **9**, 1–8 (2019).
2. Hajjarsaraei, H., Shirazi, B. & Rezaeian, J. Scenario-based analysis of fast track strategy optimization on emergency department using integrated safety simulation. *Saf. Sci.* **107**, 9–21 (2018).
3. Gill, S. D. *et al.* investigation of factors that predict length of stay Objective Methods Setting. **30**, 1–11 (2020).
4. Fitzgerald, K., Pelletier, L. & Reznick, M. A. A Queue-Based Monte Carlo Analysis to Support Decision Making for Implementation of an Emergency Department Fast Track. *J. Healthc. Eng.* **2017**, (2017).
5. McCarthy, M. L. *et al.* Provider variation in fast track treatment time. *Med. Care* **50**, 43–49 (2012).
6. Bittencourt, R. J. & Hortale, V. A. Intervenções para solucionar a superlotação nos serviços de emergência hospitalar: Uma revisão sistemática. *Cad. Saude Publica* **25**, 1439–1454 (2009).
7. Liu, J., Masiello, I., Ponzer, S. & Farrokhnia, N. Interprofessional teamwork versus fast track streaming in an emergency department—An observational cohort study of two

- strategies for enhancing the throughput of orthopedic patients presenting limb injuries or back pain. *PLoS One* **14**, 1–17 (2019).
8. Souza, L. A. de P. & Mendes, V. L. F. O conceito de humanização na Política Nacional de Humanização (PNH). *Interface Commun. Heal. Educ.* **13**, 681–688 (2009).
  9. Nunes, L. C. Implantação da política nacional de humanização (pnh): conquistas e desafios para a assistência em saúde. 2–7 (2018).
  10. Brasil. Política Nacional de Humanização. 368 (2013).
  11. Villas, M. V., Macedo-Soares, T. D. L. van A. de & Russo, G. M. Bibliographical research method for business administration studies: a model based on scientific journal ranking. *BAR - Brazilian Adm. Rev.* **5**, 139–159 (2008).
  12. Saidi, K. *et al.* Effets de la création d'un circuit court au sein d'un service d'urgence adulte. *Ann. Fr. Med. d'Urgence* **5**, 283–289 (2015).
  13. Gardner, R. M., Friedman, N. A., Carlson, M., Bradham, T. S. & Barrett, T. W. Impact of revised triage to improve throughput in an ED with limited traditional fast track population. *Am. J. Emerg. Med.* **36**, 124–127 (2018).
  14. Copeland, J. & Gray, A. A daytime fast track improves throughput in a single physician coverage emergency department. *Can. J. Emerg. Med.* **17**, 648–655 (2015).
  15. Kaushal, A. *et al.* Evaluation of fast track strategies using agent-based simulation modeling to reduce waiting time in a hospital emergency department. *Socioecon. Plann. Sci.* **50**, 18–31 (2015).
  16. Wijnen, B. F. M. *et al.* Cost-effectiveness of an integrated 'fast track' rehabilitation service for multi-trauma patients: A non-randomized clinical trial in the Netherlands. *PLoS One* **14**, 1–18 (2019).
  17. Reurings, J. C. *et al.* A prospective cohort study to investigate cost-minimisation, of Traditional open, open fAst track recovery and laParoscopic fAst track multimodal management, for surgical patients with colon carcinomas (TAPAS study). *BMC Surg.* **10**, (2010).
  18. Jeanmonod, R., DelCollo, J., Jeanmonod, D., Dombchewsky, O. & Reiter, M. Comparison of resident and mid-level provider productivity and patient satisfaction in an emergency department fast track. *Emerg. Med. J.* **30**, e12 (2013).
  19. Ferrand, Y. B., Magazine, M. J., Rao, U. S. & Glass, T. F. Managing responsiveness in the emergency department: Comparing dynamic priority queue with fast track. *J. Oper. Manag.* **58–59**, 15–26 (2018).
  20. Hwang, C. E., Lipman, G. S. & Kane, M. Effect of an emergency department fast track on press-ganey patient satisfaction scores. *West. J. Emerg. Med.* **16**, 34–38 (2015).
  21. Lutze, M., Ross, M., Chu, M., Green, T. & Dinh, M. Patient perceptions of emergency department fast track: A prospective pilot study comparing two models of care. *Australas. Emerg. Nurs. J.* **17**, 112–118 (2014).
  22. Kosy, J. D., Blackshaw, R., Swart, M., Fordyce, A. & Lofthouse, R. A. Fractured neck of femur patient care improved by simulated fasttrack system. *J. Orthop. Traumatol.* **14**, 165–170 (2013).
  23. La, J. & Jewkes, E. M. Defining an optimal ED fast track strategy using simulation. *J. Enterp. Inf. Manag.* **26**, 109–118 (2013).
  24. Basta, Y. L. *et al.* Organizing and implementing a multidisciplinary fast track oncology clinic. *Int. J. Qual. Heal. Care* **29**, 966–971 (2017).
  25. Dinh, M. M., Enright, N., Walker, A., Parameswaran, A. & Chu, M. Determinants of patient satisfaction in an Australian emergency department fast-track setting. *Emerg. Med. J.* **30**, 824–827 (2013).