Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Protected Week Strategy and Hospital Flow Recovery in an Overcrowded Brazilian Public Hospital: A Quasi-Experimental Health Systems Evaluation

Raimundo Nonato Diniz Rodrigues Filho

nonatofilho@yahoo.com.br

Hospital Estadual Cairo Louzada https://orcid.org/0009-0005-7191-826X

Lidia Morais

Mi Camino

Dandara Oliveira

Hospital Estadual Cairo Louzada

Research Article

Keywords: Emergency Service, Hospital, Health Systems, Patient Flow, Health Policy, Hospital Administration, Overcrowding, Brazil

Posted Date: March 28th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9152090/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: The authors declare no competing interests.

Abstract

Objective:

To evaluate the operational effects of the “Protected Week” public policy on hospital inflow pressure and overcrowding indicators in a public hospital in Goiás, Brazil.

Methods:

This quasi-experimental policy evaluation analyzed routinely collected operational indicators from the Hospital Estadual de Aparecida de Goiânia Cairo Louzada (HEAPA), an 81-bed public hospital integrated into the regional emergency care network. Thirteen consecutive weeks of operational data were analyzed, including three cycles of the Protected Week intervention. Indicators included regulated admissions, emergency department visits, corridor patients, and patients awaiting intensive care unit (ICU) beds. Mean values were compared between protected and non-protected weeks, and relative percentage changes were calculated. Non-parametric Mann-Whitney tests and simple linear regression were applied to estimate the effect of protected weeks on operational indicators.

Results:

Protected weeks were associated with substantial reductions in hospital inflow pressure. Regulated admissions decreased from a mean of 249.6 to 67.3 per week (− 73%). Emergency department visits declined from 300.1 to 120.0 (− 60%). Indicators of hospital overcrowding also improved, with corridor patients decreasing from 23.5 to 16.6 (− 29.5%) and ICU bed pending requests decreasing from 2.49 to 1.60 (− 35.7%). Statistical analysis confirmed a significant reduction in regulated admissions ($p = 0.014$). Linear regression estimated an average reduction of 182 regulated admissions during protected weeks ($p = 0.001$; $R^2 = 0.63$).

Conclusions:

The Protected Week policy was associated with improvements in operational indicators of hospital flow and overcrowding. Rotational redistribution of emergency demand may represent an effective operational strategy to enhance resilience in regional public hospital networks.

Introduction

Hospital overcrowding is a persistent challenge affecting emergency care systems worldwide. When hospital demand exceeds available capacity, emergency departments experience congestion, delays in care delivery, prolonged waiting times, and increased risk of adverse outcomes for patients[1].

The imbalance between hospital demand and operational capacity is widely recognized as a central driver of emergency department overcrowding[2]. Several strategies have been proposed to mitigate this

problem, including expansion of hospital capacity, improvement of patient flow management, and system-wide coordination mechanisms[3].

In many public health systems, however, structural expansion of hospital capacity is limited by financial and logistical constraints. As a result, healthcare networks increasingly rely on organizational strategies aimed at redistributing demand and improving operational efficiency[4].

In Brazil, emergency care networks operate through centralized patient regulation systems that distribute hospital admissions across multiple institutions. Demand fluctuations may produce periods of excessive pressure on specific hospitals, resulting in overcrowding and reduced throughput.

To address this challenge, the Health Secretariat of the State of Goiás implemented a policy known as **Protected Week (Semana Protegida)**. During protected weeks, regulated referrals to a selected hospital are temporarily reduced and redistributed across other hospitals in the network.

This strategy aims to create a temporary window for hospitals under high pressure to reorganize internal flow, reduce overcrowding, and resolve accumulated operational backlog.

This study evaluates the operational effects of the Protected Week policy in a public hospital within the Goiás regional emergency care network.

Methods

Study design

This study used a quasi-experimental policy evaluation design based on repeated intervention cycles.

Because the intervention was implemented at predefined periods and random allocation was not possible, a quasi-experimental approach was considered appropriate to evaluate the operational effects of the policy.

Ethical approval

was waived because the study used anonymized operational management data collected for administrative purposes.

Study setting

The study was conducted at the **Hospital Estadual de Aparecida de Goiânia Cairo Louzada (HEAPA)**, a public hospital with approximately 81 beds integrated into the regional emergency care network coordinated by the Goiás State Health Secretariat.

Intervention

The intervention analyzed was the **Protected Week policy**, a regional operational strategy that temporarily reduces regulated emergency admissions directed to a specific hospital.

Three intervention cycles occurred during the observation period:

- • November 17–23
- • December 8–12
- • January 5–11

During these periods, emergency demand was redistributed across other hospitals in the network.

Data sources

Operational indicators were obtained from the hospital's internal management monitoring system.

Thirteen consecutive weeks of operational data were analyzed.

Outcomes

The following indicators were evaluated:

- • regulated admissions
- • emergency department visits
- • corridor patients
- • patients awaiting ICU beds

Statistical analysis

Mean values of operational indicators were compared between protected and non-protected weeks. Relative percentage changes were calculated.

Non-parametric Mann-Whitney tests were used to compare distributions between groups.

Additionally, linear regression models were applied to estimate the association between protected weeks and operational indicators.

Results

Thirteen weeks of operational data were analyzed, including three cycles of the Protected Week intervention.

Table 1
summarizes the comparison of operational indicators between protected and non-protected weeks.

Indicator	Non-protected weeks (mean)	Protected weeks (mean)	Absolute change	Relative change
Regulated admissions	249.6	67.3	−182.3	−73%
Emergency department visits	300.1	120.0	−180.1	−60%
Corridor patients	23.5	16.6	−6.9	−29.5%
Patients awaiting ICU beds	2.49	1.60	−0.89	−35.7%

Protected weeks were associated with substantial reductions in hospital inflow pressure. Mean regulated admissions decreased from **249.6 to 67.3 per week**, representing a **73% reduction**.

Emergency department visits declined from **300.1 to 120.0 per week**, corresponding to a **60% reduction**.

Indicators of hospital overcrowding also improved during protected weeks. The mean number of corridor patients decreased from **23.5 to 16.6**, representing a **29.5% reduction**.

Similarly, the mean number of patients awaiting ICU beds decreased from **2.49 to 1.60**, representing a **35.7% reduction**.

Statistical testing confirmed a significant reduction in regulated admissions during protected weeks. Mann-Whitney analysis demonstrated a significant difference between protected and non-protected weeks (**$p = 0.014$**).

Linear regression analysis estimated an average reduction of **182 regulated admissions per week** during protected periods (**$p = 0.001$; $R^2 = 0.63$**).

Reductions in corridor patients and ICU waiting indicators were observed but did not reach statistical significance.

Discussion

This study evaluated the operational effects of the Protected Week policy implemented in the Goiás regional emergency care network.

The results suggest that temporary redistribution of regulated emergency admissions may substantially reduce hospital inflow pressure and improve indicators associated with hospital overcrowding.

The most prominent operational effect observed was the reduction in regulated admissions during protected weeks. Because regulated referrals represent a major component of hospital inflow pressure

in the Brazilian public health system, reducing these referrals appears to be an effective mechanism for alleviating operational saturation.

Improvements were also observed in corridor patient indicators, which are widely recognized as markers of hospital congestion and disruption of patient flow[5].

The temporal pattern observed suggests a cyclic mechanism of operational saturation followed by recovery. During non-protected weeks, demand pressure accumulates and overcrowding increases. During protected weeks, reduced inflow pressure allows hospitals to reorganize internal flow and resolve accumulated operational backlog.

This dynamic suggests that hospitals within the regional network may function as **buffer institutions**, absorbing demand pressure during regular periods and recovering operational capacity during protected cycles.

Such strategies may increase the resilience of hospital networks by enabling temporary redistribution of demand without requiring structural expansion of hospital capacity[6].

Nevertheless, this study has limitations. The analysis was conducted in a single hospital and focused on operational indicators rather than clinical outcomes. Additionally, the observation period was relatively short.

Future studies involving multiple hospitals within the network could provide further insights into the systemic impact of this policy. These findings suggest that regional coordination policies targeting regulated admissions may represent a scalable strategy to mitigate emergency department overcrowding in resource-constrained health systems.

Conclusion

The Protected Week policy was associated with reductions in hospital inflow pressure and improvements in operational indicators of hospital overcrowding in a public hospital in Goiás.

These findings suggest that rotational redistribution of emergency demand may function as an effective strategy to support hospital flow recovery and improve operational resilience in regional public hospital networks.

Declarations

Descritores (DeCS)

Hospital Overcrowding
Emergency Medical Services
Health Policy

Health Systems
Hospitals
Brazil

Funding

No specific funding was received for this study.

Conflict of Interest

The authors declare no conflicts of interest.

Author Contributions

Raimundo Nonato Diniz Rodrigues Filho: conceptualization, data analysis, manuscript drafting and interpretation of results.

Co-authors: data collection, methodological support and manuscript review.

References

1. Morley C, Unwin M, Peterson GM, Stankovich J Kinsman L
2. Emergency department crowding: a systematic review
3. ;13(9):e0203316.Hoot NR, PLoS One, Aronsky D (2018) Emergency department crowding. Ann Emerg Med. 2008
4. Institute of Medicine (2007) Hospital-Based Emergency Care: At the Breaking Point
5. Litvak E, Long MC (2000) Cost and quality under managed care. Am J Manag Care
6. Asplin BR et al (2003) A conceptual model of emergency department crowding. Ann Emerg Med
7. World Health Organization (2021) Strengthening health systems resilience. WHO
8. Pine JM et al (2006) The impact of ED crowding on care processes. Acad Emerg Med
9. Viccellio P (2001) Emergency department overcrowding. Acad Emerg Med
10. Litvak E, Bisognano M (2011) Improving hospital efficiency. Health Aff
11. Brasil (2013) Ministério da Saúde. Política Nacional de Atenção às Urgências

Figures

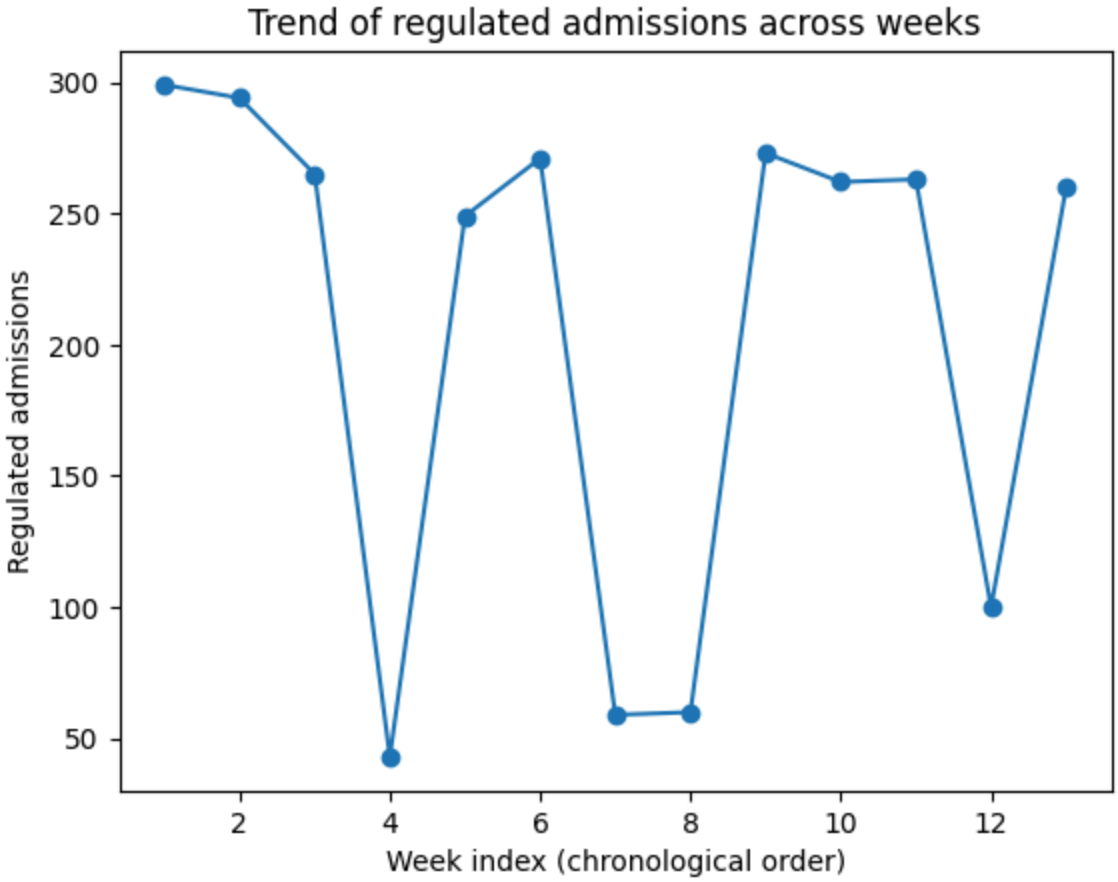


Figure 1

Weekly regulated admissions across the study period.

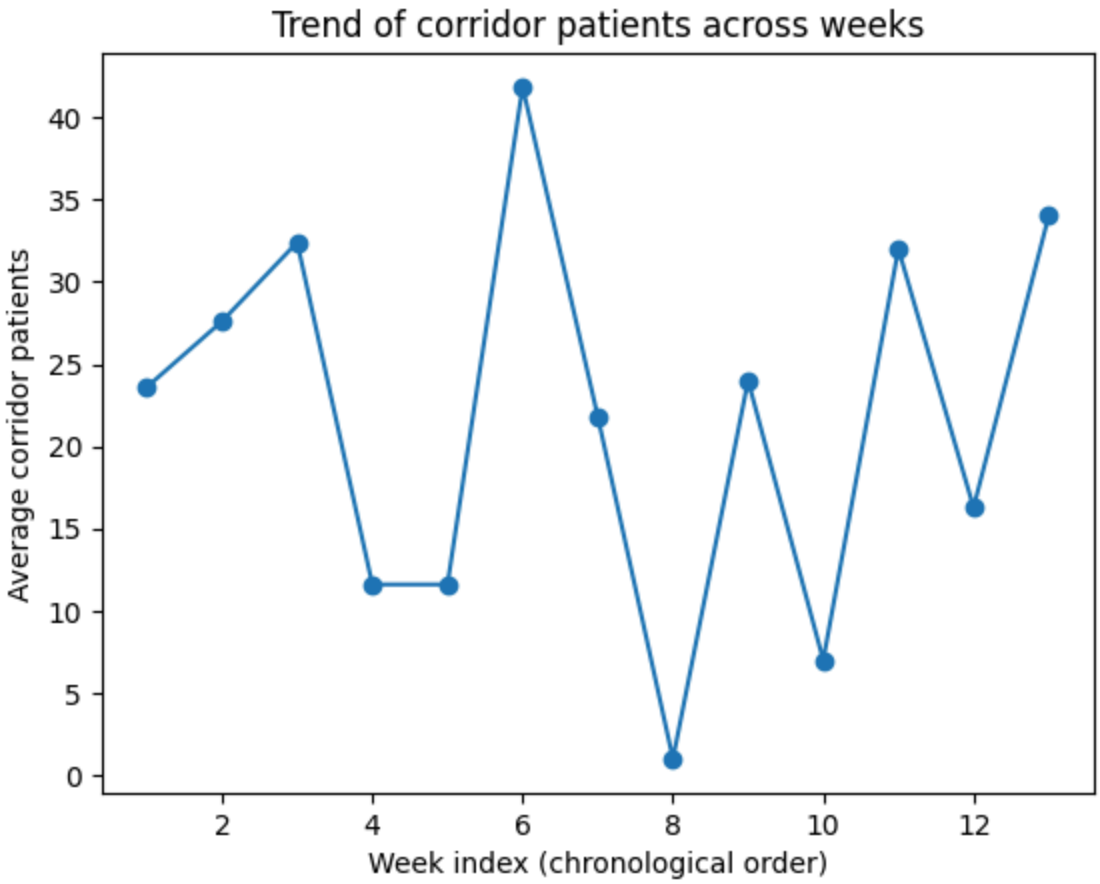


Figure 2

Temporal evolution of corridor patients during the study period.

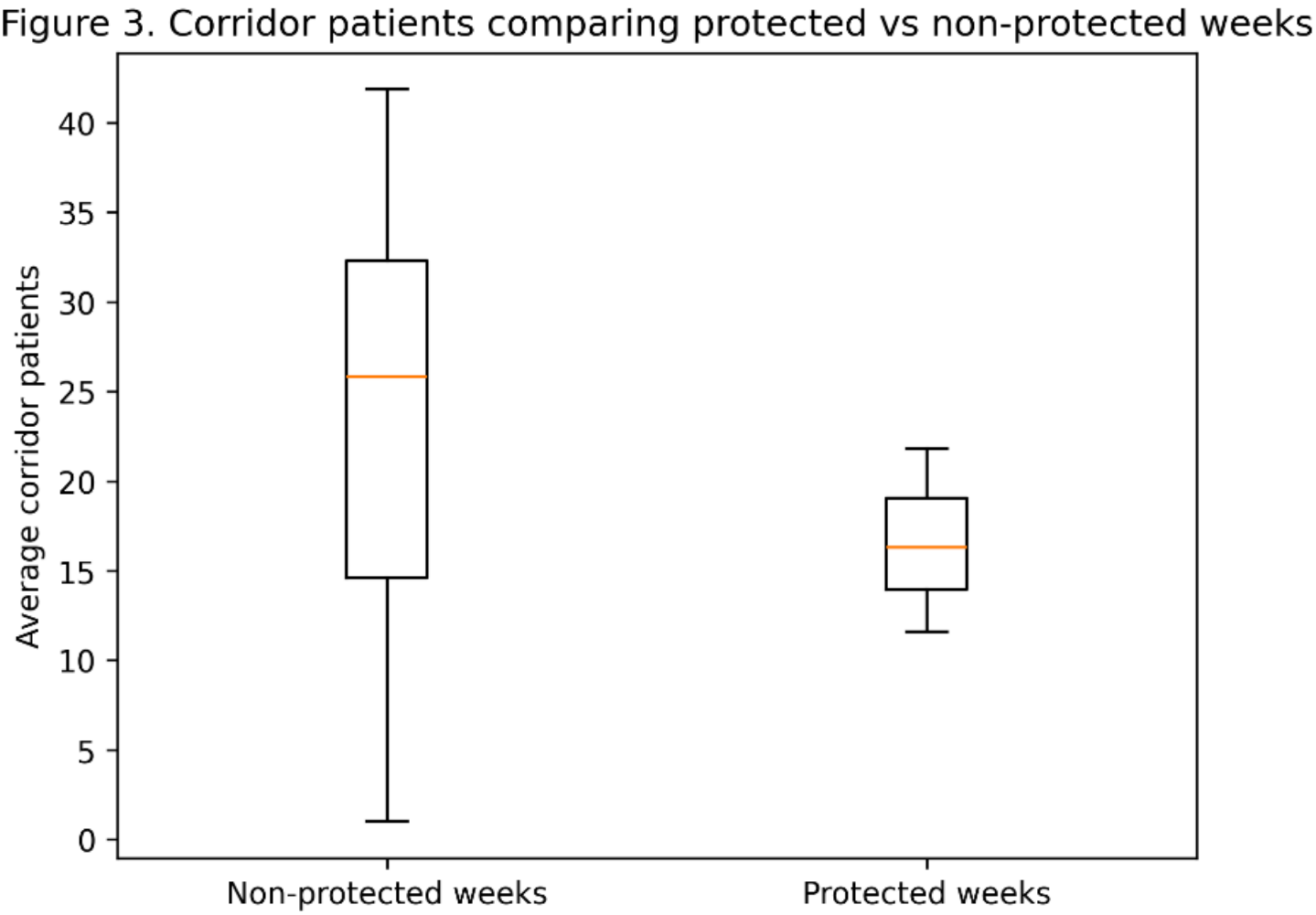


Figure 3

Comparison of corridor patients between protected and non-protected weeks.

Figure 4. Conceptual model of the Protected Week policy and hospital flow recovery mechanism

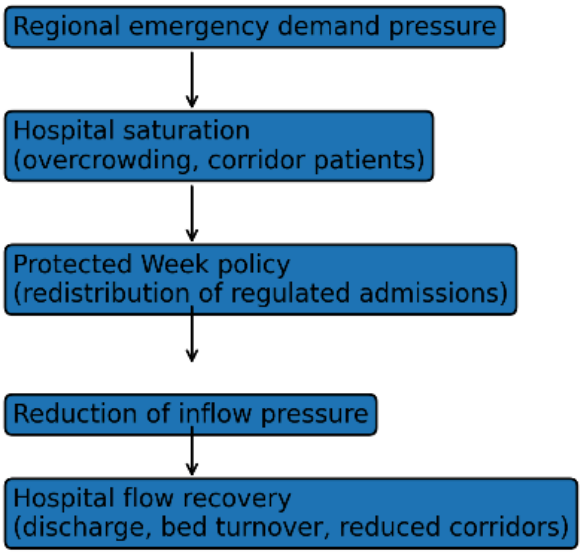


Figure 4

Conceptual framework of the Protected Week policy and hospital flow recovery mechanism.