

RESEARCH ARTICLE

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THE HOSPITAL BED SQUEEZE: 42% MORE DISCHARGES WITH 7% FEWER BEDS, 2020–2025

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Abstract

Background: The pandemic changed hospital capacity and inpatient activity in Paraguay.
Objective: To describe recorded beds and discharges in the Ministry of Public Health and Social Welfare (MSPBS) network between 2020 and 2025.
Methods: We analysed annual aggregate administrative counts and population estimates, calculating endpoint percentage changes and discharges per recorded bed. An illustrative mean-stay scenario assumed 85% occupancy; actual occupancy and length of stay were unavailable.
Results: Recorded beds increased from 6,656 in 2020 to 7,573 in 2021 and decreased to 6,192 in 2025 (−7.0% versus 2020). Discharges increased from 203,377 to 288,672 (+41.9%), and discharges per bed from 30.6 to 46.6. The 2025 values were provisional. Service-level changes were affected by possible differences in facility coverage and classification.
Conclusions: The administrative indicators show diverging changes in recorded beds and discharges; they do not establish occupancy, efficiency or unmet need. Comparable facility-level data and observed bed-days are needed for planning.

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Introduction:-

The COVID-19 pandemic placed exceptional demands on health systems, while disrupting elective activity and changing the availability of inpatient beds. Recovery has been uneven across countries and clinical specialties [1,2]. Latin American health systems entered the pandemic with substantial differences in inpatient capacity; simple bed counts, however, are insufficient to characterise how services meet population needs [3]. Capacity planning increasingly emphasises patient flows, length of stay, occupied bed-days and the organisation of care rather than the stock of beds alone [4,5].In Paraguay, the Ministry of Public Health and Social Welfare (Ministerio de SaludPública y Bienestar Social; MSPBS) is a major provider of hospital services for people outside the contributory social insurance system [6]. Hospitals and beds were temporarily incorporated into its network during the pandemic. It is therefore important to distinguish the subsequent contraction of temporary capacity from changes in routinely available beds and the volume of inpatient care.This study aimed to describe annual changes in MSPBS hospital

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beds and discharges between 2020 and 2025, overall and by service, and to calculate descriptive indicators that may inform hospital-capacity planning.

Materials and Methods:-

Study design. A nationwide descriptive ecological study of six annual administrative observations (2020–2025), reported with reference to the RECORD guidance for routinely collected health data [7]. The unit of analysis was a service-year, rather than an individual patient.Data sources and setting. Annual MSPBS bed counts were grouped into maternity and gynaecology, neonatology, paediatrics, internal medicine, surgery, trauma and orthopaedics, intensive care and other services. Hospital discharges were drawn from the Hospital Discharge System (SEGHOSP) and supplied through the General Directorate of Strategic Health Information (DIGIES). Population and birth estimates were attributed to the National Institute of Statistics (INE), 2025 revision [8]. Bed counts for 2020–2022 included facilities integrated into the network during the COVID-19 emergency; the contribution of temporary facilities to each service category could not be separated. Bed counts for 2024–2025 and discharge counts for 2022–2025 were provisional as of 31 August 2026. The access route, extract dates and identifiers, bed-count reference dates, facility coverage and data-cleaning procedures remain to be confirmed from the source records.

Indicators. We calculated annual percentage change between endpoints as (2025 value − 2020 value) / 2020 value × 100; beds and discharges per 1,000 inhabitants; paediatric beds per 1,000 children younger than 15 years; intensive-care beds per 100,000 inhabitants; and discharges per recorded bed per year. We also calculated maternity and gynaecology discharges per estimated live birth, and neonatal discharges per 1,000 estimated births. These are broad ratios, not measures of delivery coverage or neonatal admissions per live birth. For illustration only, a scenario-based mean stay corresponding to 85% occupancy was calculated as 365 × 0.85 / (annual discharges / recorded beds) [9,10]. This calculation assumes a constant stock of available beds and approximately balanced annual patient flows, and ignores stays crossing the year boundary. It is not an observed length of stay, an occupancy estimate or a recommended target.

Statistical analysis and verification. Results are presented descriptively as counts, ratios and endpoint percentage changes. No significance tests or regression estimates are presented. The previous draft reported quasi-Poisson annual percentage changes, but the full annual service-level dataset, code and model specification were not available for validation; those estimates have therefore been removed. The 2020 and 2025 service counts in Table 1 were checked against their displayed totals, and endpoint percentages and ratios were recalculated from the displayed counts. This arithmetic check does not verify the administrative sources, completeness or classification of the underlying records.Ethical considerations. This study used aggregate administrative data without direct patient identifiers. Institutional ethics determination, including the responsible committee, decision and reference number, requires confirmation against the original documentation before submission.

Results:-

Annual recorded MSPBS bed counts increased from 6,656 in 2020 to 7,573 in 2021, then declined to 7,028 in 2022, 6,537 in 2023, 6,678 in 2024 and 6,192 in 2025. The 2025 figure was 7.0% below the 2020 count and 18.2% below the 2021 peak. Recorded beds per 1,000 population fell from 1.07 in 2020 to 0.96 in 2025. Bed counts for 2024 and 2025 were provisional.Discharges increased from 203,377 in 2020 to 288,672 in 2025 (41.9%), equivalent to 32.8 and 45.0 per 1,000 population, respectively. Annual discharges per recorded bed rose from 30.6 to 46.6 (Tables 1 and 2). Discharge figures for 2022–2025 were provisional.

Table 1. Recorded hospital beds and discharges by service, Paraguay, 2020 and 2025

Clinical service	Beds 2020	Beds 2025	Discharges 2020	Discharges 2025
Maternity and gynaecology	1,333	1,136	83,703	81,512
Neonatology	314	361	7,827	9,852
Paediatrics	796	874	19,545	41,570
Internal medicine	1,235	1,427	40,267	56,836
Surgery	440	602	22,962	45,400
Trauma and orthopaedics	159	230	5,920	13,030
Intensive care	423	542	2,381	5,723
Other services	1,956	1,020	20,772	34,749

Clinical service	Beds 2020	Beds 2025	Discharges 2020	Discharges 2025
Total	6,656	6,192	203,377	288,672

Source: MSPBS/DIGIES; SEGHOSP. The 2020 bed count includes facilities temporarily integrated during the pandemic; 2025 bed and discharge figures were provisional as of 31 August 2026. Category definitions and facility coverage require source confirmation.

Table 2. Discharges per recorded bed and scenario-based mean stay at an assumed 85% occupancy

Clinical service	Discharges/bed 2020	Discharges/bed 2025	Scenario mean stay, 2025 (days)
Maternity and gynaecology	62.8	71.8	4.3
Neonatology	24.9	27.3	11.4
Paediatrics	24.6	47.6	6.5
Internal medicine	32.6	39.8	7.8
Surgery	52.2	75.4	4.1
Trauma and orthopaedics	37.2	56.7	5.5
Intensive care	5.6	10.6	29.4
Other services	10.6	34.1	9.1
Total	30.6	46.6	6.7

Scenario calculated as 365 × 0.85 ÷ (2025 discharges / recorded beds), assuming a constant bed stock and approximately balanced patient flows. The 2025 inputs were provisional. This is not a measurement of actual occupancy or length of stay.

Discharges increased faster than recorded beds in several clinical services (Figure 1). The largest differences were in intensive care (discharges +140%, beds +28%), trauma and orthopaedics (+120% and +45%), paediatrics (+113% and +10%) and surgery (+98% and +37%). The heterogeneous "other services" category had approximately 48% fewer recorded beds. The available data do not distinguish withdrawal of temporary facilities from reclassification or changes in operational capacity.

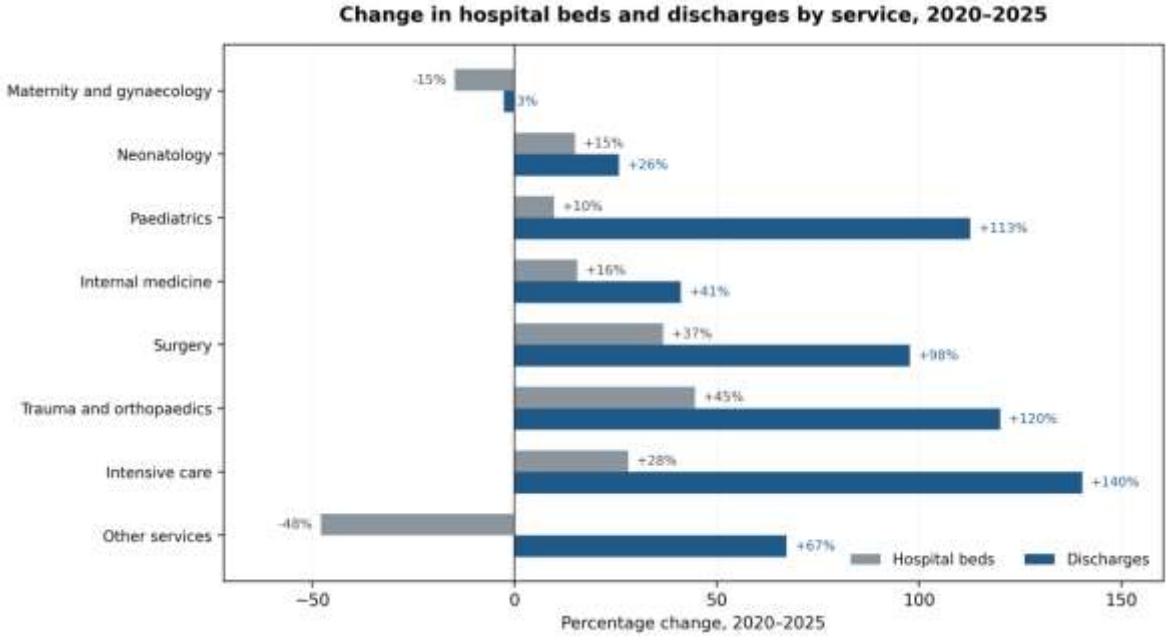


Figure 1. Percentage change in recorded beds and discharges by service, 2020–2025.

Source: MSPBS/DIGIES and SEGHOSP; percentage changes calculated from the displayed 2020 and 2025 counts. The 2025 figures were provisional. "Other services" and the facility mix may not be comparable between years.
Maternity and gynaecology beds fell by 14.8%, while discharges declined by 2.6%; estimated national births decreased from 109,451 to 98,388 (10.1%). Maternity discharges per estimated birth ranged from 0.69 to 0.83

during the study period. Neonatal discharges per 1,000 estimated births rose from 71.5 to 100.1. Paediatric beds increased from 0.48 to 0.54 per 1,000 children younger than 15, and intensive-care beds increased from 6.8 to 8.4 per 100,000 inhabitants, after reaching 10.3 in 2021.At the observed 2025 discharge-to-bed ratio, the hypothetical mean length of stay corresponding to 85% occupancy was 6.7 days overall, 4.1 days in surgery, 4.3 days in maternity and gynaecology, 5.5 days in trauma and orthopaedics, and 6.5 days in paediatrics (Table 2). These estimates cannot establish actual occupancy or whether capacity was adequate.

Discussion:-

Between 2020 and 2025, the MSPBS network recorded approximately 42% more hospital discharges with 7% fewer beds than at the beginning of the period. The turnover ratio increased from roughly 31 to 47 discharges per bed per year. This divergence is a useful signal for capacity assessment, but it should not be interpreted as proof of overcrowding or greater efficiency: both conclusions require observed occupied bed-days, actual length of stay, case mix and information on bed availability.The increase in inpatient activity may partly reflect recovery of scheduled care deferred during the early pandemic [1,2]. Deferral of elective operations can create a backlog; subsequent rescheduling could increase surgical discharges above their 2020 level. However, the data do not distinguish elective from emergency procedures, quantify a backlog, or include a pre-pandemic baseline. The 98% increase in surgical discharges is therefore compatible with recovery but does not establish its contribution. Changes in coverage, coding, referrals and service configuration may also have contributed.

Intensive-care discharges increased by 140%, compared with a 28% rise in recorded beds. At 10.6 discharges per intensive-care bed in 2025, the illustrative mean stay corresponding to 85% occupancy was approximately 29.4 days. The assumptions underlying this scenario and the comparability of ICU discharge and bed counts have not been verified. Occupied bed-days, staffed-bed availability and case severity were not measured; the ratio cannot establish a shortage or the actual duration of ICU treatment.Maternity-bed numbers declined alongside estimated national births, while recorded maternity discharges were comparatively stable. The divergence may indicate changes in the share of births attended by MSPBS services or hospital transfer patterns, rather than a straightforward improvement in productivity. Any proposal to redeploy maternity capacity should first examine local obstetric access, emergency readiness and geographical distribution, not merely national bed-to-discharge ratios.

The 2025 MSPBS figure of 0.96 recorded beds per 1,000 inhabitants excludes the Social Security Institute, other public providers and the private sector and is not directly comparable with all-sector national estimates [3]. Hospital capacity planning requires flow as well as stock measures [4,5]. A systematic scoping review identified admission rates, length of stay, occupancy and demographic change among common inputs to hospital bed planning, with model choice depending on context and data availability [5]. Simulation work suggests high occupancy may reduce flexibility for emergency admissions, but 85% is an illustrative assumption rather than a universal threshold [9].
For Paraguay, actionable improvements would include publishing staffed and operational beds separately from temporarily designated beds, recording occupied bed-days and median as well as mean length of stay, identifying inter-service transfers, and assessing differences across facilities and departments. Such monitoring would support capacity planning consistent with national health-policy priorities [12].

Case mix also matters for interpreting discharge counts: similar volumes can involve different diagnoses, pathways and resource requirements [13]. For example, kidney replacement therapy in intensive care can require substantial resources; evidence from a multicentre registry describes variation in patient characteristics and treatment delivery [14]. These studies offer context for selecting additional planning indicators, not an explanation for the national trends observed here.Local clinical studies from the Regional Hospital of Concepción provide examples of this heterogeneity. Reports on patients receiving urgent haemodialysis and on mortality among haemodialysis patients [15,16] illustrate the need to record renal-support requirements and case severity. They do not measure national bed demand and cannot establish causes of the aggregate changes.

Similarly, local studies of paediatric dengue and newborns of mothers living with HIV [17,18] illustrate distinct clinical populations that may require different resources. They are not representative estimates of national case mix and do not explain the observed national changes.Finally, capacity planning has an equity dimension that aggregate national indicators cannot resolve. A qualitative study involving five women receiving long-term haemodialysis in rural Paraguay described financial dependence, family support needs and difficulties associated with access to care [19]. Although chronic outpatient dialysis differs from hospital inpatient care, those experiences reinforce why any future assessment of hospital-bed redistribution should include geographical accessibility, referral arrangements and

patient burden. The present dataset provides no department-level information and cannot determine whether access has become more or less equitable.

Study Limitations:-

First, occupied bed-days, actual patient-level lengths of stay, staffing and quality measures were unavailable; occupancy, efficiency and unmet need could not be estimated. Second, the inclusion of facilities integrated during 2020–2022 and possible changes in classification and coverage limit comparability; the relative contributions of withdrawal, reclassification and operational change cannot be separated. Third, 2024–2025 bed data and 2022–2025 discharge data were provisional as of 31 August 2026. Fourth, discharges are events, not unique patients, and their treatment of transfers requires confirmation. Fifth, facility- and department-level data were unavailable.

Conclusion:-

Recorded administrative data indicate that MSPBS discharges increased between 2020 and 2025 while the reported bed count declined relative to 2020. These changes do not establish changes in actual occupancy, care efficiency, overcrowding or unmet need, and their interpretation is limited by provisional data and changing network composition. Future research should verify comparable facility-level series and include operational and staffed beds, occupied bed-days, length of stay, case mix, transfers and geographic access to inform service-level planning.

Declarations:-

Ethics approval and consent to participate: This study involved a secondary analysis of aggregated administrative data without direct patient identifiers. The study was reviewed by Comité de Ética de la Investigacion de la Universidad Nacional de Concepcion, which granted an exemption from full ethical review on October 12, 2026 under reference number 018/2026. The informed consent requirement was waived by the same committee.
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Author contributions: Raúl Milciades Desvars González was responsible for the conceptualization, methodology, data analysis, interpretation of the findings, and drafting and critical revision of the manuscript. The author approved the final version and accepts responsibility for all aspects of the work.
Data availability: The data used in this study were obtained from the Ministry of Public Health and Social Welfare of Paraguay, through the General Directorate of Strategic Health Information (DIGIES), and from the National Institute of Statistics (INE). The administrative datasets are available from the author upon reasonable request, subject to applicable institutional procedures and restrictions. Population and birth estimates are available from https://www.ine.gov.py/microdatos/.

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