Real-World Utilization–Informed, Route-Stratified Optimization of IVIG/SCIG Selection to Improve Infusion-Center Throughput

RWD94

Chair-Time, Capacity, and Cost Trade-Offs from the Provider Perspective

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Background

Human immunoglobulin is frequently used in autoimmune and neurologic conditions and is commonly administered in outpatient infusion centers, where chair-time is a critical operational resource. In these settings, administration time directly affects chair turnover, scheduling flexibility, and potential service capacity. Traditional economic assessments often emphasize costs and clinical outcomes, but operational metrics are also highly relevant from the provider perspective, particularly when reimbursement is structured as a fixed package per infusion.

Objectives

To assess the operational impact of usual human immunoglobulin administration strategies within intravenous (IVIG) and subcutaneous (SCIG) routes from the provider perspective, using real-world utilization data and a rule-based decision framework. The primary focus was total chair-time and potential operational capacity, with annual treatment costs and safety assessed as secondary descriptive outcomes.

Methods

A 12-month operational impact assessment with an economic component was conducted in a multispecialty outpatient infusion center with 8 infusion chairs, 6 operating days per week, and 75% average occupancy. For IVIG, real-world utilization data observed over 6 months were used to estimate baseline chair-time consumption and simulate substitution scenarios while keeping the total grams administered constant. For SCIG, the analysis reflected locally used administration strategies with different dose schedules, visit frequencies, and administration times.

The primary outcome was total chair-time, expressed as total hours used, annual hours released, and potential additional IV sessions per year. For capacity planning, released hours were converted into potential additional IV sessions using a 7-hour standard scheduling slot that included preparation, infusion, post-infusion observation, and operational buffers. Annual per-patient costs included drug acquisition, materials, and premedication, while safety was reported descriptively because product labels used heterogeneous reporting metrics.

Primary decision rule: Select the strategy with lower annual chair-time; interpret cost differences as secondary trade-offs.

Operational setting

The study reflects routine practice in a multispecialty outpatient infusion center with predominance of autoimmune and neurologic care. The center operated from 07:00 to 20:00, 6 days per week, with 8 infusion chairs and 75% average occupancy during the study period.

Results: IVIG

In the 6-month real-world baseline scenario, IVIG consumed 413.6 chair-hours. Replacing the baseline IVIG mix with the lower chair-time strategy reduced total chair-time to 332.7 hours over 6 months, corresponding to 161.8 hours released annually and approximately 23 additional IV sessions per year. A second IVIG scenario based on an intermediate administration time reduced chair-time to 361.8 hours over 6 months, equivalent to 103.6 hours released annually and about 15 potential additional IV sessions per year.

These findings suggest that differences in administration time across IVIG strategies may meaningfully affect infusion-center throughput even when the total grams administered remain constant.

Results: SCIG

Within SCIG, the lower-time strategy required 90 minutes per visit and consumed about 39 chair-hours annually. The alternative SCIG strategy required 240 minutes per visit and consumed about 48 chair-hours annually. This difference represents approximately 9 chair-hours released per year, indicating a smaller but operationally relevant impact when compared with IVIG in the subcutaneous route.

Results: Costs

Annual treatment costs varied across strategies. In IVIG, the baseline strategy had the lowest annual cost at BRL 126,420 per patient-year, whereas the lower chair-time and intermediate-time strategies were associated with annual costs of BRL 139,082 and BRL 143,790 per patient-year, respectively. Because IV reimbursement was assumed to be a fixed package per infusion, these cost differences did not alter the operational ranking and were interpreted as secondary trade-offs.

Costs are reported for transparency and contextualization and were not used as the primary decision criterion.

Results: Safety

Safety information was extracted exclusively from product labels. Because adverse events were reported using heterogeneous metrics, including rates per infusion, proportions of patients with events, and qualitative frequency categories, quantitative cross-product comparison was not considered appropriate. Therefore, safety was presented descriptively and was not incorporated as a quantitative decision criterion.

Sensitivity analyses

In IVIG, varying annual hours released by plus or minus 20% produced an estimated range of 129 to 194 hours released per year for the lower chair-time scenario, corresponding to approximately 18 to 28 potential additional IV sessions annually. For the intermediate scenario, the range was about 83 to 124 hours per year, corresponding to roughly 12 to 18 additional sessions. In SCIG, varying visit duration by plus or minus 20% resulted in estimated annual chair-time ranges of 31 to 47 hours for the lower-time strategy and 38 to 58 hours for the alternative strategy.

Interpretation

From the provider perspective, chair-time released under a fixed reimbursement model should be interpreted as potential operational capacity rather than immediate revenue gain. In the absence of documented unmet demand in the observed period, the operational benefit is better understood as improved scheduling flexibility, greater ability to absorb demand peaks, and better use of existing infrastructure and staff.

Limitations

This was a single-center assessment, and local practices such as infusion titration, monitoring, pharmacy logistics, staffing, and scheduling buffers may differ across centers. The number of infusions in the observational period was estimated from aggregate product volume converted into equivalent 30 g administrations rather than directly extracted from patient-level administration records. In addition, the SCIG analysis compared usual regimens with different dosing schedules, so findings should be interpreted as comparisons of operational burden rather than evidence of pharmacologic or clinical equivalence.

Conclusions

Usual human immunoglobulin administration strategies associated with shorter chair-time may reduce infusion-room utilization and expand potential operational capacity, particularly within the intravenous route. Differences across presentations in administration-related parameters (e.g., infusion-rate limits and total chair-time) are directly linked to operational efficiency (chair turnover/throughput) and help clarify pharmacoeconomic trade-offs between cost and capacity. Operational metrics such as chair-time can therefore complement conventional clinical and cost assessments, supporting more practical, real-world decision-making for infusion-center management.

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Ethics: The study used aggregated, non-identifiable service data only; no patient-level data were accessed.

Abbreviations: IVIG, intravenous immunoglobulin; SCIG, subcutaneous immunoglobulin; MCDA, multicriteria decision analysis.

References:

- Drummond MF, et al. *Methods for the Economic Evaluation of Health Care Programmes.* 4th ed.
- Husereau D, et al. CHEERS 2022. *Value in Health.*
- Garrison LP Jr, et al. Using real-world data for coverage and payment decisions. *Value in Health.*
- Neumann PJ, et al. Cost-Effectiveness in Health and Medicine. 2ª ed. Oxford: Oxford University Press; 2016.
- Imunoglobulina humana (package inserts): Flebogamma®, Gamunex®, Privigen®, Kiovig®, Hizentra®, HyQvia®.

Table 1: Model inputs by route and administration strategy

Route	Strategy	Dose per administration	Administrations/ year	Chair-time per administration	Drug cost (BRL/g)	Annual cost per patient (BRL)
IV	Human immunoglobulin IV 5–10%	30 g	12	420 min	350.00	126,420
IV	Human immunoglobulin IV 10% (intermediate time)	30 g	12	300–390 min	386.34–398.25	139,082 – 143,790
SC	Human immunoglobulin SC 20%	20 g	26	90 min	389.36	Not shown in aggregated table
SC	Human immunoglobulin SC 10% + hyaluronidase	30 g	12	240 min	398.25	Not shown in aggregated table

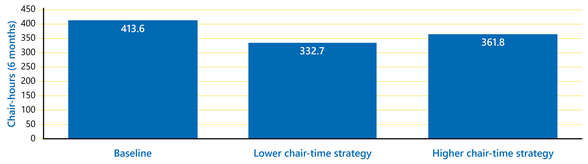
Table note: Costs are reported in 2025 Brazilian reais. SC annual costs varied according to dose and frequency and were described separately in the manuscript.

Table 2: Operational outcomes: chair-time and potential capacity

Route	Scenario	Chair-time, 6 months	Difference vs baseline	Hours released/ year	Potential additional sessions/year
IV	Baseline real-world mix	413.6 h	—	—	—
IV	Lower chair-time strategy	332.7 h	-80.9 h	161.8 h	23
IV	Intermediate-time strategy	361.8 h	-51.8 h	103.6 h	15
SC	Lower chair-time strategy	—	—	39 h/year used	—
SC	Higher chair-time strategy	—	—	48 h/year used	—

Table note: Additional IV sessions were estimated assuming a 7-hour standard scheduling slot. For SCIG, results are presented as annual chair-hours used.

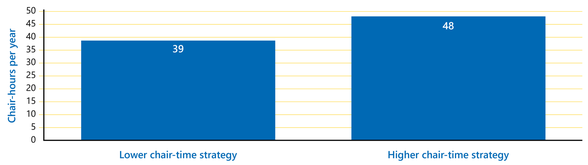
Figure 1: IVIG Chair-Time Consumption Over 6 Months



Substituting the baseline IVIG mix with strategies associated with shorter administration time reduced total 6-month chair-time from 413.6 hours to 332.7 hours or 361.8 hours, depending on the scenario.

- Annual capacity gain: **161.8 h/year** and **23 additional IV sessions/year** in the lower chair-time scenario.
- Annual capacity gain: **103.6 h/year** and **15 additional IV sessions/year** in the intermediate scenario.

Figure 2: SCIG Annual Chair-Time Consumption



The lower-time SCIG strategy consumed approximately 39 chair-hours annually versus 48 chair-hours for the alternative strategy, corresponding to a difference of about 9 hours per year.

- **413.6 h** baseline IVIG chair-time over 6 months.
- **161.8 h/year** potentially released with the lower chair-time IVIG strategy.
- **23 sessions/year** additional IV capacity under the 7-hour scheduling assumption.