Cost Analysis of Lupus Nephritis in the Brazilian Unified Health System: A Real-World Study (2023)

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BACKGROUND & OBJECTIVE

Background

- **Context:** Lupus Nephritis (LN) presents a significant clinical and economic burden[1] within the Brazilian Unified Health System (SUS), with expenditures driven largely by severe disease progression rather than pharmacological therapies.
- **Study Scope:** An estimation of the direct costs of managing adult LN patients (≥18 years) and an evaluation of regional cost disparities from the perspective of the SUS, for the year 2023

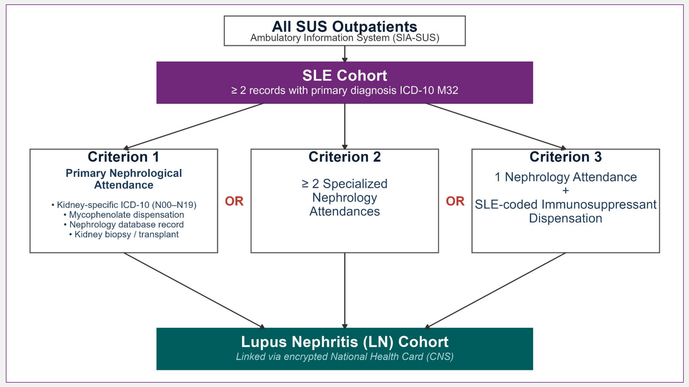
Objective

- **Economic Impact:** Estimate the total costs of managing LN to identify the primary cost drivers the SUS network.
- **Expenditure Analysis:** Compare the economic burden of severe clinical procedures, particularly dialysis, against the costs of standard immunosuppressive treatments.
- **Regional Disparities:** Evaluate the variations in Average cost per patient across geographic regions to highlight imbalances in healthcare access, specialized services, and diagnostic resources.

METHODS

- **Study Design:** Retrospective, observational cost-of-illness study.
- **Data Source:** Outpatient Information System of the SUS (SIA-SUS/DATASUS)[2] and Health Price Panel of Ministry of Health[3].
- **Population:** Adult patients (≥18 years) with Lupus Nephritis (LN) identified nationwide in 2023.
- **Inclusion Criteria**: As LN does not have a specific ICD-10 code, patients required a documented diagnosis of Systemic Lupus Erythematosus (SLE) (ICD-10: M32) linked via a National Health Card identifier to at least one of the following:
  - Renal Procedures: documented dialysis, nephrology care, or specific renal interventions.
  - Treatment: use of specific immunosuppressive therapy.
  - At least two consultations with a nephrologist.

Figure 1. Inclusion Criteria and Patient Selection Flow Diagram



RESULTS

Overall Results

In 2023, **15,580 patients with Lupus Nephritis were identified** as being treated in the Unified Health System (SUS). Of this total, **1,503 patients (approximately 9.6%) underwent dialysis** treatment during the same period (Table 1).

Table 1. Total and Mean Treatment Costs per Patient by Modality (USD)*

Treatment Modality	Number of APACs	Number of Distinct Patients	Total Cost (USD)	Average Cost/Patient (USD)
Azathioprine	11,653	2,076	129,627.08	62.44
Renal Biopsy	103	97	1,124.27	11.59
Cyclophosphamide	109	23	862.26	37.49
Cyclosporine	2,325	374	125,798.10	336.36
Dialysis	14,197	1,503	6,865,655.68	4,567.97
Mycophenolate	41,993	7,777	2,579,823.55	331.72
Other Pharmacological Treatments	19,603	2,603	1,695,708.17	651.44
Rituximab	504	154	326,196.38	2,118.16
Tacrolimus	3,867	577	219,527.95	380.46
Other Treatments	108,722	11,831	6,005,834.25	507.64
Total	**94,354**	**15,580****	**16,254,449.52**	**1,043.29**

Table 2. Mean Annual Costs per Patient (USD)*: Dialysis vs. Non-Dialysis by Geographic Region

Region	Non-Dialysis Patients	Average Cost (USD)*	Dialysis Patients	Average Cost (USD)*	Cost Multiplier
Southeast	7,281	635.56	624	6,026.57	9.5x
Northeast	3,603	417.70	435	5,920.68	14.2x
Central-West	1,123	487.45	153	5,321.92	10.9x
South	1,383	523.80	152	5,084.25	9.7x
North	687	323.66	139	5,069.20	15.7x
Brazil	14,077	541.78	1,503	5,740.36	10.6x

- **Cost Multiplier:** Progression to dialysis increases the Average cost per patient by 9x to 16x across all Brazilian regions.
- **Highest Absolute Cost:** The Southeast bears the highest Average cost per dialysis patient (US$ 6,026.57).
- **Highest Relative Jump:** The North and Northeast experience the sharpest relative cost increases (up to 15.7x higher than their baseline care).
- **The Bottom Line:** Delaying or preventing dialysis is not just a clinical necessity, but the primary cost-containment strategy for the SUS.

Figure 2: Mean Annual Costs per Patient (USD)*: Dialysis vs. Non-Dialysis

Legend: * Values reported in Brazilian reais (BRL) were converted to United States dollars (USD) using the 2023 annual average exchange rate provided by the Brazilian Federal Revenue Service. ** The number of distinct patients is lower than the sum of observations, as individual patients may undergo more than one treatment modality.

CONCLUSION

- **Primary Cost Driver:** End-stage renal disease, drives the economic burden of LN. Dialysis consumes 57.5% of total expenditures while serving only 9.7% of the patient cohort.
- **Economic Impact:** Progression to dialysis increases the Average per-patient cost by more than 10-fold nationally (from USD 541.78 to USD 5.740.36).
- **Regional Disparities:** Resource-constrained areas bear the greatest financial shock, with per-patient costs surging 15.7x in the North upon dialysis initiation.
- **Policy Implications:** Strategic investments in early screening, timely biopsies, and optimal pharmacological management are critical cost-containment and renal preservation strategies for the SUS.

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DISCLOSURES