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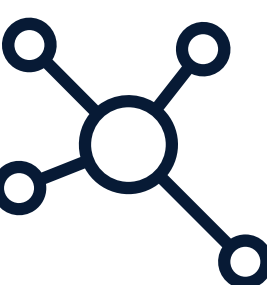
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## Objectives

Monitoring non-pharmacological health technologies requires more than assessing clinical effectiveness; it must also account for real-world durability and long-term impact on healthcare systems.

In this study, we utilized collected data from Brazil's Unified Health System (SUS) to evaluate the **longevity, survival outcomes, and device-related hospitalization costs** following **cardiac resynchronization therapy pacemaker (CRT-P)** implantation. This analysis offers insights into the real-world performance and economic burden of CRT-P within the Brazilian public health system.



## Methods

**Retrospective cohort study** based on medical claims and mortality data from the Brazilian Ministry of Health, paired through the VinculaSUS project.

All patients submitted to a **CRT-P implant in the public system SUS from 2008 to 2019** were eligible.

Using the patients' ID, multiple hospital claims were combined into complete hospitalizations and linked to mortality data.

**Overall survival (OS)** and **time to first device maintenance** (lead or generator replacements/repositioning) and **replacement** were analyzed by the Kaplan-Meier method.

**Device-related hospital expenses** included the first implant hospitalization and any maintenance or replacement following hospitalization, and values were adjusted for inflation until November 2024.



## Results

**A total of 3,709 patients were analyzed (Table 1).**

With 1,850 deaths, the **median OS** was 5.88 (95% confidence interval [CI] 5.56, 6.31) years. One-, five-, and ten-year mortality were 17.8%, 45.7%, and 60.3% (**Figure 1**).

Median **time to the first device-maintenance procedure** was 8.96 years (95%CI 7.97, not reached; 2,341 events; 1-year: 4.3%, 5-year: 16.4%, 10-year: 51.3%; **Figure 2**).

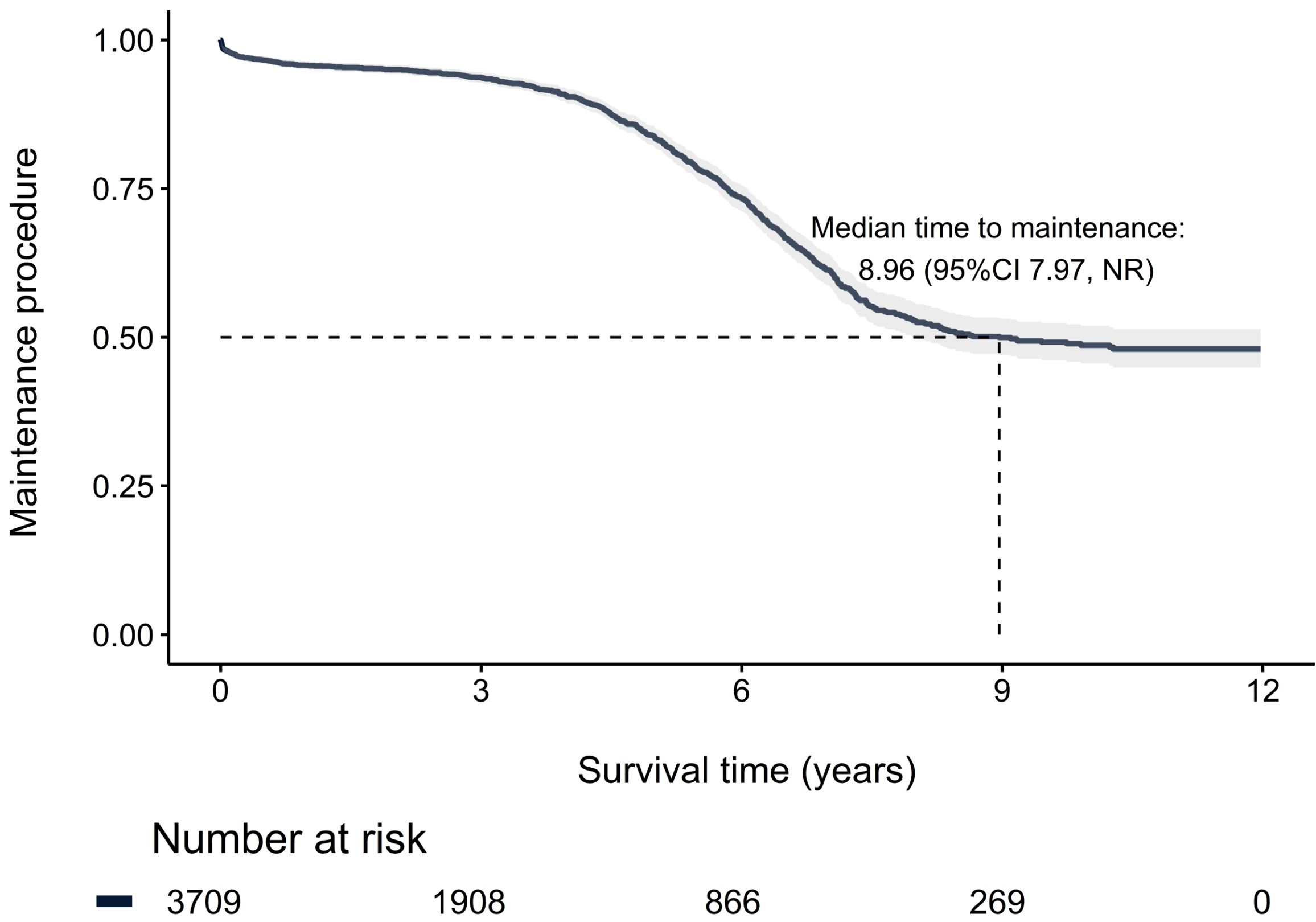
167 patients were submitted to a new device implantation, with cumulative probability of 2.8% in 1 year, 5.1% in 5, and 7% in 10 years. Median **time to replacement** was not reached (**Figure 3**).

Total **device-related expenses** mean  $\pm$  standard deviation were R\$ 27,856.67  $\pm$  13,436.36 (**R\$ 53,406.97  $\pm$  26,156.43 adjusted for inflation**).

**Table 1.** Patients' characteristics

Characteristic	CRT-P N = 3,709
Age	
Mean (SD)	60.9 (13.2)
Median (IQR)	62 (53 to 70)
0-1	13 (0.4)
2-19	12 (0.3)
20-39	168 (4.6)
40-59	1,382 (37.6)
60-79	1,935 (52.6)
80+	168 (4.6)
Males, n (%)	2,227 (60.0)
Race/color, n (%)	
White	1,583 (42.7)
Brown	950 (25.6)
Black	157 (4.2)
Asian	12 (0.3)
Native	3 (0.1)
Not informed	1004 (27.1)
Diagnosis, n (%)	
Chagas Disease	14 (0.4)
Arrhythmias	307 (8.3)
Atrial Fibrillation	21 (0.6)
Congenital diseases	8 (0.2)
Heart Failure	2,188 (59.0)
Ischemic Heart Diseases	59 (1.6)
Other Cardiac Diseases	1,346 (36.3)
CRT implantation technique, n (%)	
Thoracotomy	794 (21.4)
Transvenous	2915 (78.6)

**Figure 2.** Time to first device-maintenance

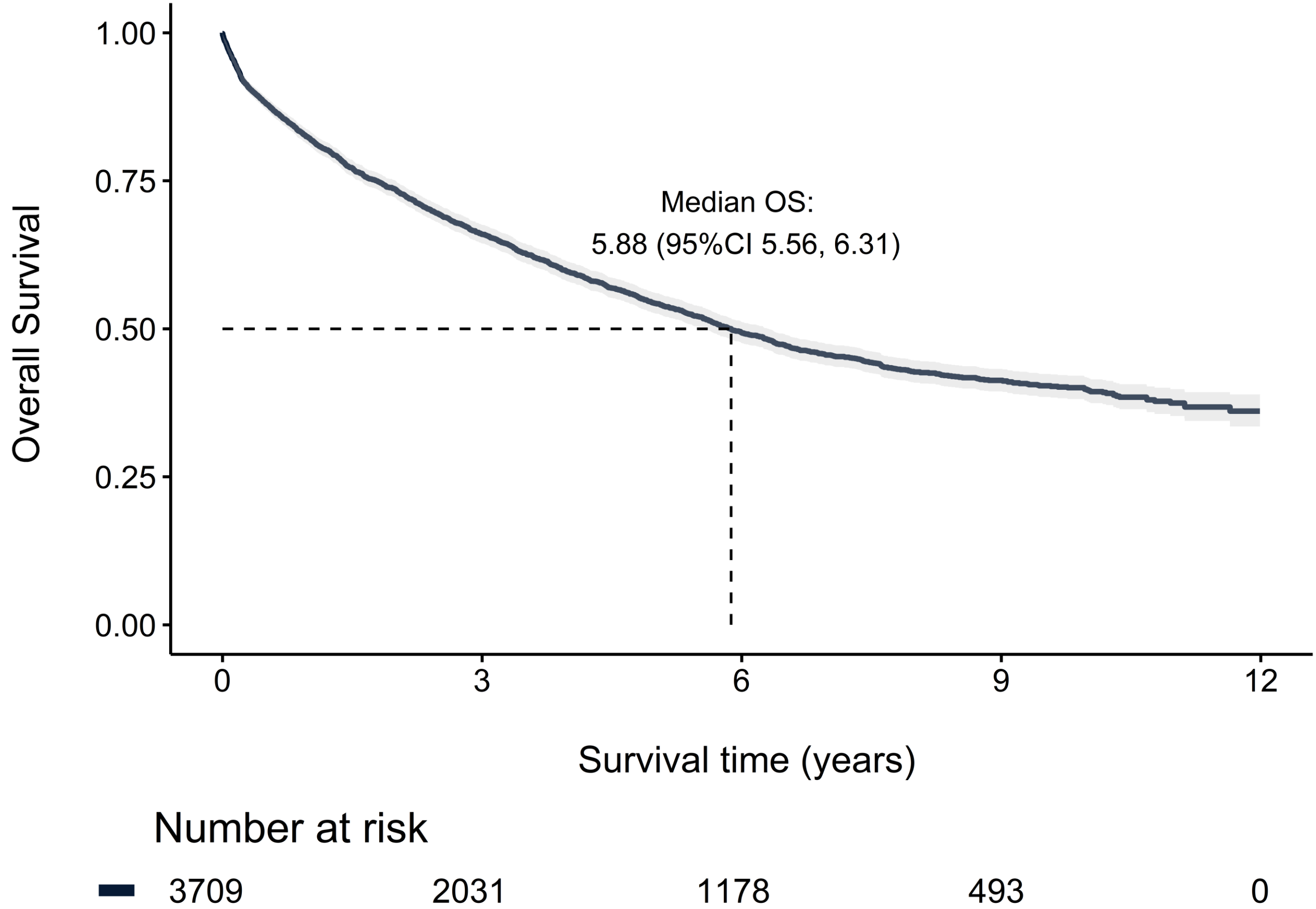


## Conclusions

Based on 12 years of linked SUS data, CRT-P short- and long-term mortality rates in Brazil are comparable to those reported internationally, indicating consistent clinical outcomes. Device maintenance and replacement occurred largely within expected longevity, reflecting proper use and system efficiency. These findings **support the continued adoption of CRT-P in the SUS and inform policy planning with real-world evidence**.

Further research exploring **regional disparities** and factors associated with early replacement or complications are important. And there is also missing data on **patient-reported outcomes** and quality of life to complement survival metrics.

**Figure 1.** Overall Survival



**Figure 3.** Time to first replacement

