

## INTRODUCTION

Cardiac implantable electronic devices (**CIED**) have a long history in the Brazilian Public Health System (SUS). Changes in the population profile, preferences, clinical practice, and the occurrence of external events, such as the **COVID-19 pandemic**, may affect its use.



Our objective was to analyze the impact of the pandemic on the CIED implantation trends in SUS.

## METHODS

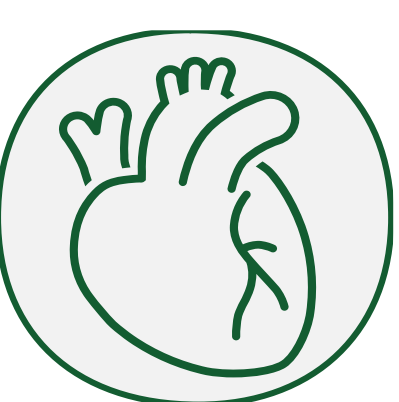
### Inclusion criteria



16 years Period  
2008 – 2023



Study Location  
Brazil



### Medical devices included

- permanent pacemaker [PM]
- implantable cardioverter-defibrillator [ICD]
- cardiac resynchronization therapy devices [CRT-Pacemaker or CRT-Defibrillator]

### RWE Outcomes Assessment

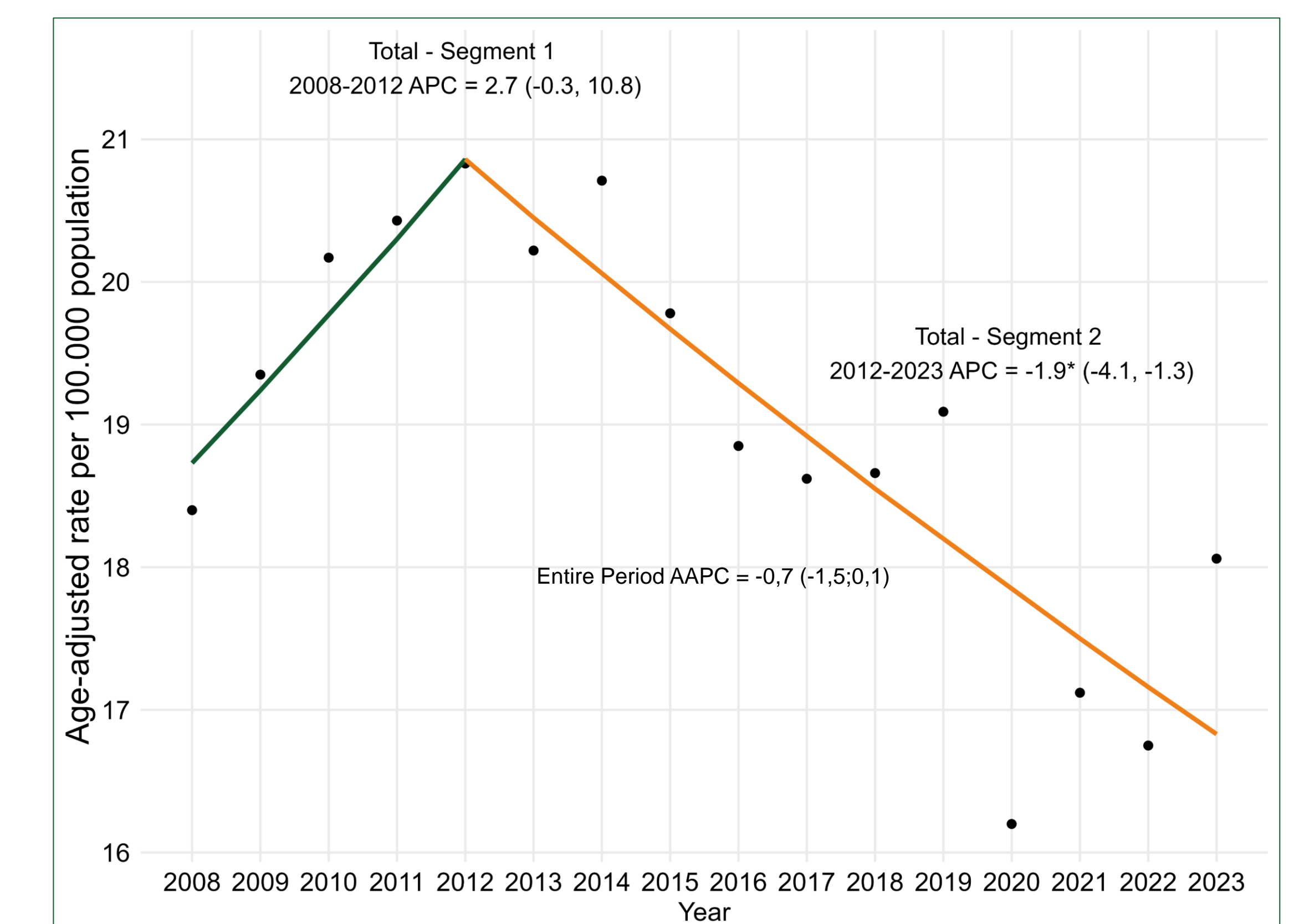
❖ Incidence rates (IR) per 100,000 population were adjusted to the European standard population. **Joinpoint regression**, using Poisson modeling, estimated change points and regression coefficients, with the optimal number of joinpoints determined by the weighted Bayesian Information Criterion, considering a maximum of two points and uncorrelated errors.

❖ Annual percentage changes (APC) with 95% confidence interval (CI) were estimated for each segment, comparing average APC (AAPC) between the pre-COVID (2008-2019) and post-COVID (2020-2023) periods.

## RESULTS

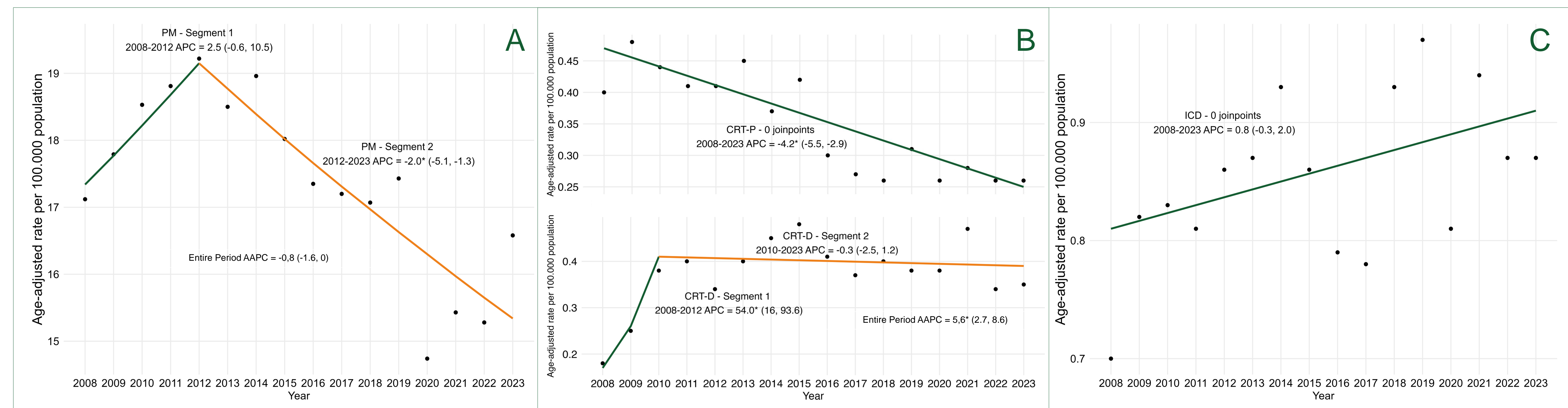
- ❖ During the period, 216,927 admissions for CIED implants were reimbursed by SUS. Overall annual IR oscillated from 18.4 to 20.8 implants per 100,000 population, with a significant decline identified after 2012 (APC 2008-2012 2.7, 95%CI -0.3, 10.8, 2012-2023 -1.9, 95%CI -4.1; -1.3 – Figure 1). Pacemakers and CRT-Ds also presented different trends before and after 2012.
- ❖ **No inflection point was detected with the pandemic start**, but the AAPC changed from -0.3 (95%CI -0.9; 0.8) to a significant decline of -1.9 (95%CI -4.0; -1.3) in the 2020-2023 period.
- ❖ CRT-Defibrillator implants presented positive AAPC pre-COVID, with stagnation post-COVID, while PM presented a significant decline post-COVID. CRT-P and ICD trends remained the same pre- and post-COVID.

**Figure 1:** Joinpoint regression graph for the joint analysis of all devices.



\*Statistical significant result

**Figure 2:** Joinpoint regressions graphs for pacemaker (A), CRT-P/CRT-D (B) and ICD (C)



\*Statistical significant result

## CONCLUSIONS

The **COVID pandemic** temporarily disrupted surgical procedures but **did not alter the general trend of CIED implantation in Brazil** (SUS). Implantation rates were already stagnant pre-pandemic and tended to decrease post-COVID, with no recovery observed across device types, highlighting long-term challenges in maintaining CIED access and utilization in the Brazilian Public Health System, urging a better understanding of the reasons.



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