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943 – Regional inequalities in breast cancer across Brazil: an ecological study with correlation analysis (2019–2024)

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Introduction: Breast cancer is the leading cause of cancer death among Brazilian women, yet access to screening and timely treatment varies sharply across the country's five macro-regions. This study examined whether lower mammographic coverage explains the paradox of lower apparent incidence but rising mortality in the North and Northeast.

Methods: Ecological study using Brazil's five macro-regions as analytical units (2019–2024). Data were drawn from verified primary sources: INCA Estimates 2023, INCA Breast Cancer Data and Figures 2025, SIA/SUS, the National Oncology Panel, and PNS 2019/IBGE. Spearman's correlation between mammographic coverage and age-adjusted mortality was calculated with 95% confidence intervals using bootstrap resampling (5,000 iterations). The 2019–2023 exposure–outcome gap reflects the biological interval between diagnosis and death under limited-access conditions.

Results: Brazil projected 73,610 new breast cancer cases per year for 2023–2025 (adjusted rate: 41.89/100,000 women), with regional incidence ranging from 27.73/100,000 in the North to 52.83/100,000 in the Southeast. More than 20,000 deaths were recorded in 2023 (12.58/100,000), representing 16.6% of all female cancer deaths. Mammographic coverage among women aged 50–69 varied regionally, ranging from 43.2% in the North to 65.2% in the Southeast, while 24.2% had never undergone any type of screening. A strong inverse correlation between screening coverage and mortality was found (Spearman's $\rho = -0.90$; 95%CI -0.99 to -0.41 ; $p = 0.037$). Only 47.8% of patients began treatment within 60 days.

Conclusion: Brazil shows a clear epidemiological divide. The South and Southeast exhibited higher incidence rates alongside greater access to healthcare infrastructure, while the North and Northeast present a lower apparent incidence, likely driven by underdetection, late diagnosis, and rising mortality. The strong screening–mortality correlation, compounded by regional under-registration and stage migration, demands organized screening programs with active patient recall and elimination of diagnosis-to-treatment delays.

Ethics: Public data.

Keywords: breast neoplasms; Epidemiology; health inequalities; mammography; ecological study.