

## Geospatial disparities in 4-year survival in the African Breast Cancer-Disparities in Outcomes (ABC-DO) cohort

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**Background:** Breast cancer is the most commonly diagnosed cancer and the most frequent cause of cancer death globally. Though prognosis is good in high-income countries, there is an urgent need to improve survival in sub-Saharan Africa, where 3-year survival can fall below 50%. Within these settings, geospatial barriers contribute to delays in diagnosis, but their impact on survival is not well-understood. We examined geospatial disparities in 4-year survival in the African Breast Cancer-Disparities in Outcomes (ABC-DO) cohort.

**Methods:** Women with breast cancer were recruited from eight hospitals in Namibia, Nigeria, South Africa, Uganda, and Zambia between 2014 and 2017. Sociodemographic, diagnostic and treatment data were collected, and participants were actively followed-up every 3 months. We estimated crude and adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) for all-cause mortality in relation to three geospatial characteristics (rural vs. urban residence, straight-line distance between geocoded home and hospital addresses, and estimated travel times based on road types) using Cox proportional hazards and flexible parametric survival models.

**Results:** Among the 2101 women in this analysis, 44% lived in a rural area. Compared to urban residents, rural residents had a 24% (95% CI: 9, 40%) higher crude risk of mortality, but there was no difference after adjustment for site, age, stage at diagnosis, treatment, socioeconomic position, and HIV status. However, even in fully-adjusted models, both distance and travel time to the treatment hospital were significantly associated with a higher risk of mortality: 2% (95% CI: 0, 3%) per 50km, and 3% (95% CI: 1, 5%) per hour. Time-dependent HRs for rural vs. urban residence showed a clear peak around 1-year post-diagnosis, e.g. crude peak HR=1.45 (95% CI: 1.21, 1.74).

**Conclusions:** There are geospatial barriers to survival among breast cancer patients in sub-Saharan Africa. Further work should be done to identify and remove these barriers to improve survival in these settings.

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