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Title: Determinates of patient choice for breast cancer surgery in Tuscany: quality and equity implications

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Background:

Equity and quality in healthcare are key goals embraced by universal healthcare systems, however inequalities in access and unwarranted variations in quality of care are well documented in the Italian healthcare system.

In the last three years, national quality standards have been applied at hospital level for selected clinical procedures (i.e. deliveries, oncological surgery, vascular surgery, etc.) for which there is evidence of an inverse relation between volumes and clinical outcomes. Specifically for breast cancer, the Italian NHS indicates a minimum number of breast surgeries per year (> 150) for the identification of breast cancer units (Decree Law 70/2015). However, high dispersion of surgical interventions across hospitals still exists (less than 70% of providers from 12 Regions evaluated by the Inter-Regional Performance Evaluation System are above the threshold) highlighting the need to understand the determinants behind cancer patients' choice for hospital for breast surgery, including socio-demographic characteristics, distance and provider performance indicators.

Objectives: This contribution aims to provide evidence on the determinants of breast-cancer patient choice regarding hospital services, focusing on the trade-offs and relationships between distance and hospital performance for breast cancer treatments in different patient groups. Specifically, we are interested in analysing how SES, using education as a proxy, affect the access to high (low) performing providers in Tuscany region.

Methodology: We ran a retrospective analysis using the administrative data on hospital admission of about 3,100 women undergoing breast cancer surgery in Tuscany for 2016 to understand patient choice. The administrative data were integrated into a GIS environment, in order to visualize the geographical distribution of the hospitals performing such interventions. We apply mixed logit regression to investigate patients' choice of breast-cancer surgery provider (hospital). By merging the information on hospital performance characteristics and patient demographics, we modelled patient choice between alternative hospitals services as a mutually exclusive choice. We focused on the effect of travel time, hospital performance indicators (hospital yearly volume of breast cancer surgical interventions, quality of surgical procedures considering the ratio of breast-conserving surgery on overall breast cancer surgery and waiting time for surgery after clinical evaluation). The analysis include interactions with patient age, comorbidity level (Charlson Comorbidity Index) and education level (I-IV level from elementary to university degree).

Main expected results: Preliminary results reveal that the breast cancer patients preferred hospitals nearby and with shorter waiting times (p=0.000). A significant preference heterogeneity among women was found for both the distance travelled and the waiting time. In addition, the coefficient for volume is statistically significant: providers with a low number of surgical procedures (less than 50 per year) are selected to a lesser extent (p=0.000). After the inclusion of patient sociodemographic characteristics, we observe differences in patient mobility (travel time) depending on age (older people are less prone to travel) and education level

where high educated women are willing to travel further to receive the surgical treatment. Longer waiting times for surgery negative influence the choice to select a hospital for younger women ($p=0.000$), and low-educated women ($p=0.009$). Women that are more educated select high performing hospitals (>50 interventions per year and breast-conserving surgery performed on a regular basis). Comorbidity level has no significant effect in explaining choice of hospital, revealing that clinical severity is not a main driver in hospital selection for breast cancer.

These preliminary results reveal that age and socioeconomic status have a significant effect in choice of hospital providers by breast cancer patients. Older and lower educated women appear to receive low quality care for surgical breast cancer treatments in Tuscany. The socioeconomic disaggregation of statistical data (vertical equity) highlights the existence of inequalities in access to high performing hospitals in Tuscany. These findings could be used to optimize the allocation of resources toward regional breast cancer units that meet quality and efficacy standards to increase the efficiency and responsiveness of breast cancer care towards low educated and older women. From policy point of view, equity goals should be included in the management strategies aimed at achieving quality through evidence-based interventions.