To examine the relationship between geographic patient characteristics and needle biopsy receipt, controlling for observed patient residence and facility, facility type, and diagnosis, year of diagnosis, distance between patient and unobserved patient needle biopsy receipt, controlling for observed equipment, or reduced financial capacity.

We conducted mixed effects logistic regression to assess the effect of metropolitan status and facility region factors on needle biopsy receipt: 7.5% lower (OR = 0.93, CI = 0.91-0.94, p<0.01) for non-metropolitan patients compared to metro patients.

We also found significant geographic disparities between the regions of the facility where the patient received their diagnosis, shown in Figure 1.

Compared to patients from facilities in the West South Central region, Mid Atlantic patients had decreased odds of needle biopsy utilization by 19% (p=0.02).

Patients from East North Central, East South Central, and Pacific facilities had increased odds of undergoing needle biopsy by 20% (p=0.04), 40% (p<0.01), and 37% (p<0.01). Adjusted model results showed that non-metropolitan patients had lower odds of needle biopsy receipt: 7.5% lower (OR = 0.93, CI = 0.91-0.94, p<0.01) for non-metropolitan patients compared to metro patients.

We used the US National Cancer Database, a surveillance database of cancer cases diagnosed at Commission on Cancer-accredited facilities, to examine female patients diagnosed with breast cancer between 2004 and 2015.

Covariates included: race/ethnicity, insurance coverage, age, Charlson-Deyo score, stage at diagnosis, year of diagnosis, distance between patient residence and facility, facility type, and annual average breast cancer case volume.

We conducted mixed effects logistic regression to assess the effect of metropolitan status and geographic region of the diagnosing facility on needle biopsy receipt, controlling for observed and unobserved patient- and facility-level factors.

BACKGROUND AND PURPOSE

- Breast cancer incidence and mortality have declined over the past 20 years.1
- These improvements can be explained, in part, by adherence to breast cancer diagnosis and treatment quality standards endorsed by the National Quality Forum (NQF).1,2
- NQF recommends needle biopsy for breast cancer diagnosis, which helps determine cancer characteristics to guide treatment.1,3
- Socio-demographic disparities have been found in needle biopsy receipt, but few studies have explored geographic disparities in needle biopsy receipt.4,5

METHODS

- We used the US National Cancer Database, a surveillance database of cancer cases diagnosed at Commission on Cancer-accredited facilities, to examine female patients diagnosed with breast cancer between 2004 and 2015.
- Covariates included: race/ethnicity, insurance coverage, age, Charlson-Deyo score, stage at diagnosis, year of diagnosis, distance between patient residence and facility, facility type, and annual average breast cancer case volume.
- We conducted mixed effects logistic regression to assess the effect of metropolitan status and geographic region of the diagnosing facility on needle biopsy receipt, controlling for observed and unobserved patient- and facility-level factors.

RESULTS

- In our cohort of 1.3 million patients, 78.7% received needle biopsy for breast cancer diagnosis. Panel 1 shows the distribution of patients' facilities across regions and patient metropolitan status.
- Adjusted model results showed that non-metropolitan patients had lower odds of needle biopsy receipt: 7.5% lower (OR = 0.93, CI = 0.91-0.94, p<0.01) for non-metropolitan patients compared to metro patients.
- We also found significant geographic disparities between the regions of the facility where the patient received their diagnosis, shown in Figure 1.
- Compared to patients from facilities in the West South Central region, Mid Atlantic patients had decreased odds of needle biopsy utilization by 19% (p=0.02).
- Patients from East North Central, East South Central, and Pacific facilities had increased odds of undergoing needle biopsy by 20% (p=0.04), 40% (p<0.01), and 37% (p<0.01).

DISCUSSION

- Possible inequities in facility resources may explain geographic deviations from the NQF-recommended utilization of needle biopsy for breast cancer diagnosis.
- Inequities in facility resources could include shortage of personnel or equipment, or reduced financial capacity.
- Geographic factors need to be explored as predictors of utilization of evidence-based diagnostic testing and cancer treatment.
- Addressing care inequities may help improve breast cancer treatment outcomes in underserved patient populations, such as women residing in non-metropolitan areas.

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Figure 1: Model Results

Key Findings
- Non-metropolitan breast cancer patients have lower odds of needle biopsy receipt.
- Regional variation in receipt of needle biopsy was identified even after adjustment.