Predictors of Breast Cancer Screening Variability Among National Breast and Cervical Cancer Early Detection Program Awardees: Provider Shortages and Nurse Practitioner Autonomy

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Background/Objective

- The National Breast and Cervical Cancer Early Detection Program (NBCCEDP) provides breast and cervical cancer screening to eligible women with incomes ≤250% of the federal poverty level who are uninsured or underinsured
- The portion of eligible women screened for breast cancer varies considerably among NBCCEDP awardees
- Screening variability among awardees may be influenced by awardee- and/or state-level factors

Objective: Identify awardee- and state-level factors that influence variability in percentage of eligible women screened for breast cancer among NBCCEDP awardees, focusing on Primary Care-Health Professional Shortage Areas (PC-HPSA) and Nurse Practitioner (NP) scope of practice

Methods

We assessed the effect of awardee- and state-level factors on the % of eligible women screened for breast cancer among 50 NBCCEDP state awardees and D.C. during July 2022- June 2024

- **Awardee-level factors (4)**: total funding, number of provider sites, provider site reductions, and funding reductions
- **State-level factors (9)**: women ages 40-64, % women eligible for NBCCEDP, % up to date with mammograms, % urban population, number of Federally Qualified Health Centers (FQHCs), number of Community Health Centers (CHCs), reduction in mammography sites, % population living in PC-HPSA, and NP autonomy
- **Outcome**: % of eligible women screened for breast cancer
- **Analysis:** Two multilevel models; Partial and Marginal R^2 calculations
  - Base model with all 13 factors. Interaction model with 13 factors and an interaction term assessing interaction effects of NP autonomy and PC-HPSA on study outcome.
  - Partial R^2 calculated to determine individual contributions of predictors on variability in study outcome among NBCCEDP awardees. Marginal R^2 calculated to determine combined contribution of all predictors in base model and interaction model on study outcome, separately.

Results

- NBCCEDP awardees in states with a larger PC-HPSA population screened a high percentage of eligible women
- NBCCEDP awardees in states with NP autonomy screened a high percentage of eligible women
- NBCCEDP awardees with both a larger PC-HPSA population and NP autonomy screened an even higher percentage of eligible women
- Base model explained 52% of the variability in the percentage of eligible women screened for breast cancer (marginal $R^2 = 0.52$) and the interaction model explained approximately 60% (marginal $R^2 = 0.59$).

9.6%
Average % of eligible women screened for breast cancer

0.5%–78.0%
Range of % eligible women screened from breast cancer among NBCCEDP awardees

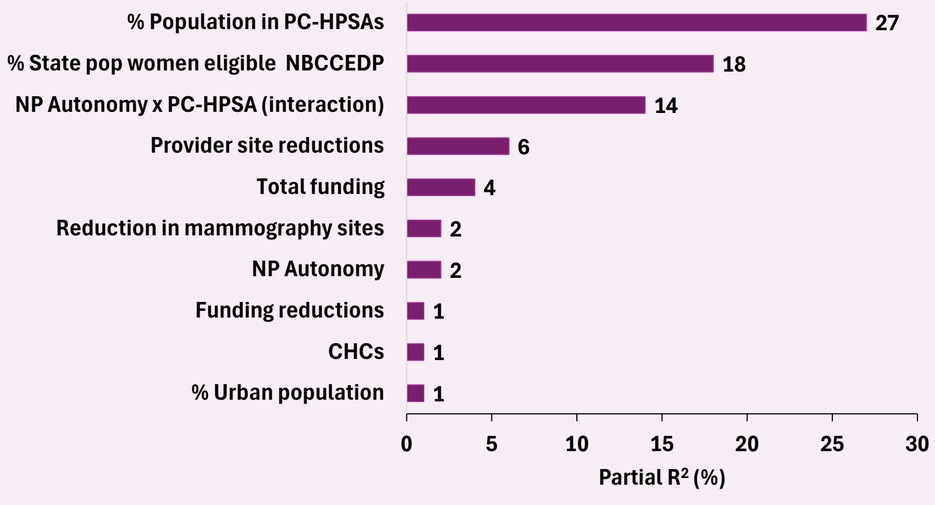
Higher % in PC-HPSAs
Larger PC-HPSA population associated with higher screening

Full NP Autonomy
Associated with higher screening

Significant Interaction
PC-HPSA × NP autonomy increased screening (β = 0.46; *P* = .02)

59%
Variability explained by the interaction model (Marginal R^2)

Individual Contribution of Awardee and State Level Predictors to Variability in Screening Among NBCCEDP Awardees



This figure only includes factors with observed partial effects; all partial R^2 values > 0%

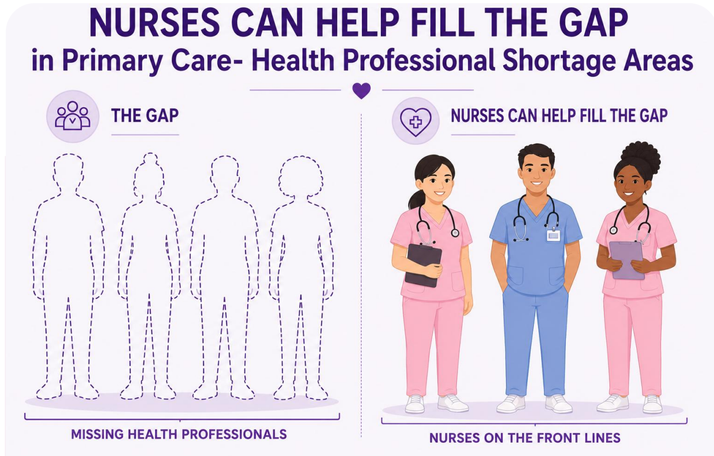
Conclusion

PC-HPSAs have a large low-income population which aligns with the NBCCEDP's low-income criterion

- Awardees can increase the percentage of eligible women screened by targeting providers in PC-HPSAs to recruit eligible women and offering patient navigation services to help connect women to available clinical services

When NPs have autonomy, they fill gaps in care and improve access, particularly in areas with larger provider shortage populations

- Awardees can increase the percentage of eligible women screened by encouraging their clinical partners to work with NPs, especially in places where NPs have full autonomy and where there are large PC-HPSA populations



References and Acknowledgments

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