

# Risk factors for breast cancer subtypes among Black women undergoing screening mammography

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## BACKGROUND

Molecular breast cancer subtypes are defined by expression of estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor 2 (HER2)  
 ER/PR+Her2- is the most common subtype  
 Triple negative breast cancer (TNBC) subtype has poorer prognosis and limited treatment options  
 Black women are twice as likely to be diagnosed with TNBC than non-Hispanic White women  
 Breast density has been shown to increase breast cancer risk in Black women relative to other races, but the influence of breast density on breast cancer among Black women has not been studied  
 Assessing this relationship can inform risk-stratified screening approaches and improve risk prediction models for Black women

### Aim

The purpose of this study is to assess the associations of breast density and known breast cancer risk factor with ER/PR+HER2- and TNBC subtypes among a cohort of Black women

## METHODS

### Study population

Black women who underwent screening mammography at the University of Pennsylvania between 2010-2015

### Eligible women

- >40 years
- no prior breast cancer
- no breast implants
- no known *BRCA1/2* variants

### Breast cancer risk factors

- breast density
  - Extremely/ heterogeneously dense vs.
  - Scattered/almost entirely fatty (non-dense)
- age at screening, family history of breast cancer, BMI, age at menarche and age at first live birth

### Cox proportional hazard model:

Separate models for invasive breast cancer (IBC) subtypes:  
 ER/PR+Her2-  
 TNBC

### Follow up time

6 months post screening date → until event date of IBC subtype diagnosis  
 If no event, censored at :

- date of death
- date diagnosed with DCIS or another subtype of IBC
- December 31, 2018 if alive and cancer free

## Results

**Total Sample, N=24,812**  
**Follow up (Years): 5.81 (0.6-8.3)**  
**Breast Density : Dense 6,787 (27.4%)**  
**Age at Screening (Years)**  
**Mean (range)**  
**56.24 (40.0-84.0)**

## Conclusions

We observed an increased risk for denser breasts in both molecular subtypes  
 Stronger association of dense breasts for TNBC than ER/PR+Her2- breast cancer  
 Older age was associated with an increased risk for both subtypes  
 Prior biopsy was associated with an increased risk in women with ER/PR+Her2- breast cancer, but not TNBC  
 Older age at menarche and younger age at first birth were associated with a decreased risk of ER/PR+Her2-  
 For TNBC subtype, a family history of breast cancer in first degree relatives and an obese BMI were associated with an increased risk

These results highlight the importance of assessing risk factors for tumor subtypes in Black women.

Risk factors for ER/PR+Her2- & TNBC among Black women, can vary according to molecular subtype, and potentially differ with previously reported factors from studies primarily conducted in non-Hispanic White women

## Results: Risk factors for breast cancer subtypes among 24,812 Black women undergoing screening mammography

	ER/PR+HER2- N=218			Triple Negative N=59		
	HR	95% CI	p-value	HR	95% CI	p-value
<b>Breast Density (Reference Non-dense)</b>						
<b>Dense</b>	1.79	1.32-2.43	<0.001	2.59	1.46-4.61	0.001
<b>Age continuous</b>	1.05	1.03-1.06	<0.001	1.03	1.00-1.05	0.045
<b>Prior Biopsy (Reference None)</b>						
<b>1+</b>	1.46	1.07-1.98	0.016	1.07	0.56-2.04	0.83
<b>Age at Menarche</b>						
<b>&lt;12</b>						
<b>12-13y</b>	0.95	0.67-1.35	0.783	2.67	0.97-7.36	0.058
<b>14+</b>	0.62	0.38-0.99	0.044	2.70	0.95-7.69	0.063
<b>Age first birth (Reference Nulliparous)</b>						
<b>&lt;20</b>	0.67	0.46-0.97	0.035	1.27	0.52-3.06	0.599
<b>20-24</b>	0.69	0.46-1.03	0.066	0.95	0.35-2.53	0.914
<b>25-29</b>	0.75	0.47-1.20	0.235	2.22	0.89-5.55	0.087
<b>30+</b>	0.83	0.46-1.52	0.548	1.45	0.41-5.08	0.564
<b>Family History* (Reference No family history)</b>						
<b>1+</b>	1.32	0.94-1.86	0.110	1.89	1.03-3.45	0.039
<b>BMI (Ref &lt;25 kg/m<sup>2</sup>)</b>						
<b>25-29</b>	1.27	0.79-2.05	0.328	2.46	0.91-6.67	0.077
<b>30+</b>	1.37	0.87-2.16	0.177	2.78	1.01-7.65	0.048
<b>*Number of first degree relatives with breast cancer</b>						