Racial/ethnic Differences in Risk of Subsequent Invasive Breast Cancer Among Women Diagnosed with Invasive Breast Cancer and Ductal and Lobular Breast Carcinoma *in situ* in New Jersey, 1992-2012

Karen S. Pawlish[1], Xiaoling Niu[1], Antoinette M. Stroup[2]
[1]New Jersey Department of Health, Trenton, NJ
[2]Rutgers School of Public Health and Rutgers Cancer Institute of New Jersey, New Brunswick, NJ

Abstract

Women diagnosed with breast cancer and breast carcinoma *in situ* are at increased risk for subsequent primary breast cancer, and this risk may vary by race and ethnicity. The risk of developing subsequent invasive breast cancer by race and ethnicity, age group, and histologic subtype was examined in a cohort of 136,671 New Jersey women diagnosed with invasive breast cancer and breast carcinoma *in situ* from 1992 to 2012, using data from the NJ State Cancer Registry. Standardized incidence ratios (SIR) for invasive breast cancer and 95% confidence intervals (CI) were calculated using the MP-SIR session of SEER*Stat. Compared to the NJ female population, risk of subsequent breast cancer was significantly elevated in the four racial/ethnic groups included in the analysis [whites: SIR=1.40, 95% CI 1.36-1.45; African Americans (AA): SIR=2.48, 95% CI 2.28-2.69; Asian/Pacific Islanders (API): SIR=2.26, 95% CI 1.85-2.73; Hispanics: SIR=2.10, 95% CI 1.86-2.37]. The risk for subsequent breast cancer was significantly elevated during the first 5 years, 5-10 years, and 10+ years after diagnosis of the index cancer. The risk for subsequent breast cancer was highest among the youngest women diagnosed with the initial cancer before age 40, in particular among younger AA and Hispanic women (SIR= 8.88, 95% CI=7.01-11.10; SIR=6.54, 95% CI=4.68-8.91, respectively). The risk for subsequent invasive breast cancer was significantly higher among women initially diagnosed with lobular carcinoma *in situ* (LCIS) (SIRs 2.96, 4.74, 4.48, 4.57 in whites, AA, API and Hispanics, respectively). Risk for contralateral breast cancer was higher than that for ipsilateral breast cancer. Our findings support the importance of continued surveillance of breast cancer patients, especially AA women, women diagnosed at younger ages, and LCIS patients. The risk of subsequent breast cancer continued to be elevated more than ten years after diagnosis.

Objectives

Evaluate risk of subsequent breast cancer in a cohort of NJ women diagnosed with breast cancer

- by race and ethnicity
- by age group
- by histologic subtype and other clinical factors

Methods

- **Data Source**: New Jersey State Cancer Registry (NJSCR)
- **Cohort**: NJ women diagnosed with invasive breast cancer or carcinoma *in situ* as a 1st primary malignancy during 1992-2012
- **Exclusions**:
  - diagnosed with cancer prior to index breast cancer
  - diagnosed at autopsy or by death certificate only
  - < 2 months of follow-up time
  - other/unknown race.
- N = 136,671 women after exclusions (112,374 invasive breast cancer, 19,653 ductal carcinoma *in situ*, and 4,644 lobular carcinoma *in situ*)
- **Statistical analysis**: Standardized incidence ratios (SIRs) and 95% confidence intervals

SIR = Observed/ expected

- **Observed**: Number of subsequent invasive primary breast cancers
  - Diagnosed > 2 months after index breast cancer and before December 31, 2012
  - All 2nd and later (3rd, etc.) breast cancers were included
  - NJSCR follows SEER rules for classifying multiple primary cancers

Methods (2)

Person years at risk (PYR):

- Calculated for each woman starting from 2 months after dx of index breast cancer and ending at the earliest of: date of death, last known follow-up, or 12/31/2012
- Stratified by age at initial dx (5 year groups), race (or ethnicity), calendar year

Expected:

- NJ female age-, race- (or ethnicity-), & calendar year-specific breast cancer incidence rates were multiplied by strata-specific PYR and then summed.

All analyses were conducted using the MP-SIR session of SEER*Stat software versions 8.1.5 and 8.2.1.

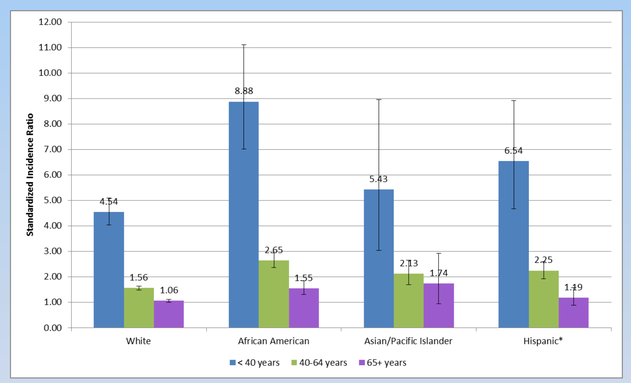
Results

The risk for subsequent invasive breast cancer was significantly elevated in all 4 racial/ethnic groups of women initially dx with invasive breast cancer.

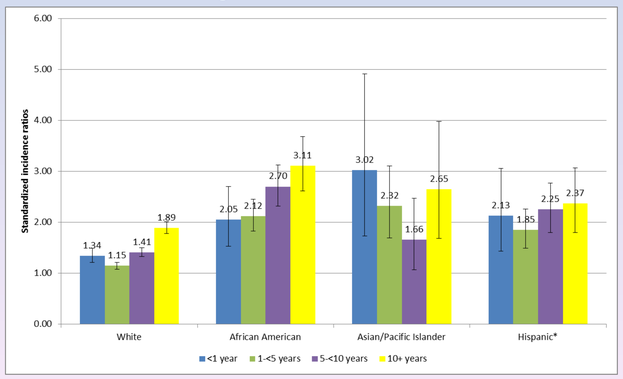
Race/ Ethnicity	Persons	Mean Follow-up	Observed	SIR	95% CI
White	96,201	7.6 years	3,712	1.40	1.36-1.45
AA	12,139	6.5 years	555	2.48	2.28-2.69
API	3,918	6.5 years	108	2.26	1.85-2.73
Hispanic*	8,050	6.8 years	268	2.10	1.86-2.37

*Hispanics may be of any race; therefore, the categories of race and ethnicity are not mutually exclusive.
Observed= number of subsequent breast cancers diagnosed, SIR = standardized incidence ratio, CI= confidence interval, AA = African American, API = Asian or Pacific Islander.

Risk of subsequent invasive breast cancer after breast cancer diagnosis by age at dx of index breast cancer and race/ethnicity in NJ women, 1992-2012



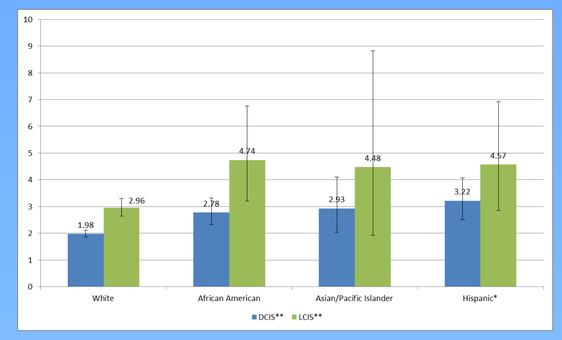
Risk of subsequent invasive breast cancer by time since index invasive breast cancer diagnosis in NJ women, 1992-2012



The vertical lines indicate 95% confidence intervals.
*Hispanics may be of any race; therefore, the categories of race and ethnicity are not mutually exclusive.

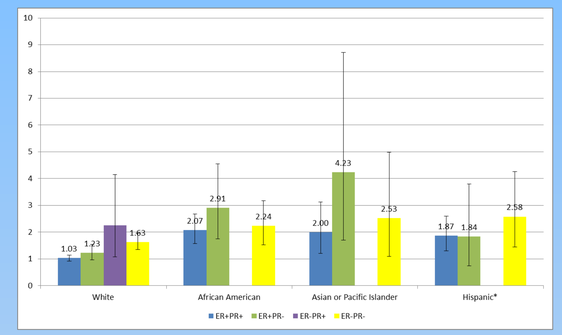
Results (2)

Risk of subsequent invasive breast cancer after diagnosis of DCIS** or LCIS** in New Jersey women by race/ethnicity, 1992-2012



The vertical lines indicate 95% confidence intervals.
*Hispanics may be of any race; therefore, the categories of race and ethnicity are not mutually exclusive.
**Ductal carcinoma *in situ* (DCIS) includes histology codes 8201, 8230, 8401, 8500-8507, 8523. Lobular carcinoma *in situ* (LCIS) includes histology codes 8520-8521, 8524.

Risk of subsequent invasive breast cancer after dx of breast cancer by race/ethnicity and tumor receptor status of index breast cancer in NJ women, 2004-2012



ER = estrogen receptor, PR = progesterone receptor. Results were not presented for AA, API and Hispanic women initially diagnosed with ER-PR+ breast cancer due to small numbers. Patients with index breast cancer of unknown ER or PR status were excluded.

Limitations

- Medical surveillance bias
- Possible misclassification of separate primary cancer vs. recurrence of original cancer
- Patients who move out-of-state
  ⇒ under-ascertainment of subsequent cases
- Misclassification of race or ethnicity

Strengths

- Population based cancer registry with high-quality data
- Diverse population of New Jersey
- Large numbers to do sub-analyses
- High rates of microscopic confirmation of cases (98.8%)

Conclusions

- Our findings support the importance of continued surveillance of breast cancer patients, especially African American women and women diagnosed at younger ages.
- Risk of subsequent breast cancer continued to be elevated more than 10 years after diagnosis of the first breast cancer.

Acknowledgments

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