

**Breast cancer survivors:
A comprehensive examination of
multiple primary malignancies
comparing risk in younger and older
women over 20-years of follow-up**

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Background

- Breast cancer is the most frequently diagnosed cancer in women in USA
- Relative breast cancer survival rates are high in USA (>89% at five-years)
- Vast majority of women with breast cancer become long-term survivors at risk for developing subsequent malignancies

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Objective

- To examine incident multiple primary malignancies (MPM) in female breast cancer survivors over 20-years of follow-up

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Methods

- Included 110,440 women from 12 Surveillance, Epidemiology and End Results (SEER) registry sites diagnosed 1/1/1986 – 31/12/1994 with 1st primary malignant breast cancer
- Followed-up for MPM (SEER definition) or death until 31/12/2006

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Methods

- Analyses included:
 - age-specific descriptive characteristics
 - crude incidence rates
 - age-specific cumulative incidence rates
 - Cox proportional hazards regression models adjusted for socio-demographic characteristics, stage of 1st primary cancer, and risk for death as a competing outcome

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Results

- For all age groups breast cancer was the most common first incident MPM
- Time in months to first incident MPM decreased considerably with age from $100.09 \pm SD61.85$ in women <65 years to $50.92 \pm SD43.37$ in those 80+ years

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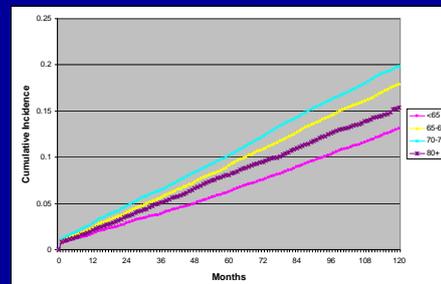
Results

- The risk of MPM varied by age but not by diagnosis year
- The crude 10-year MPM incidence rate was lower in younger survivors (11.7 per 10,000PY) and relatively constant across older age groups (16.7 per 10,000PY 65–69 years, 17.8 per 10,000PY 70-79 years, 16.4 per 10,000PY 80+ years)

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Results

Age-specific ten year cumulative incidence of first incident multiple primary malignancy (MPM) in a population of female breast cancer survivors (N=110,440), 1986-2006



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Results

Predictors of first incident multiple primary malignancy (MPM) adjusted for death as competing risk in a population of female breast cancer survivors (N=110,440) 1986-2006

Characteristic at Diagnosis	1 st MPM N (%)	HR _{adjusted} (95%CI)
Socio-Demographic		
Age[#]		
≤ 65 years	9,003 (20%)	1.0
65-69 years	4,034 (22%)	1.41 (1.34, 1.47)
70-79 years	5,666 (19%)	1.48 (1.42, 1.54)
80+ years	1721 (11%)	1.32 (1.25, 1.40)
Marital status[#]		
Not married	9,205 (17%)	1.0
Married	11,219 (20%)	0.92 (0.89, 0.95)
Education by zip code[#]		
More than 12 years	12,644 (19%)	1.0
12 years	5,282 (19%)	1.08 (1.04, 1.12)
Less than 12 years	2,498 (18%)	1.05 (0.99, 1.10)

CI, confidence interval; HR, hazard ratio; MPM, multiple primary malignancy
[#] Highest proportion education level by zip code based on 1990 census
[#] Chi-square test of independence statistically significant p <0.05

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Results

Predictors of first incident multiple primary malignancy (MPM) adjusted for death as competing risk in a population of female breast cancer survivors (N=110,440) 1986-2006

Characteristic at Diagnosis	1 st MPM N (%)	HR _{adjusted} (95%CI)
First Primary Breast Cancer		
Stage[#]		
Localized	12,916 (20%)	1.0
Regional	4,719 (17%)	0.95 (0.92, 0.99)
Distant	318 (7%)	1.05 (0.93, 1.18)
Unknown	2,471 (17%)	0.97 (0.92, 1.02)

CI, confidence interval; HR, hazard ratio; MPM, multiple primary malignancy
[#] Chi-square test of independence statistically significant p <0.05

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Conclusions

- These findings suggest there are age-related differences in risk of developing an MPM after a primary breast cancer diagnosis, with the highest risk in women age 70-79 years
- No other MPM risk factors were identified in this SEER population of breast cancer survivors

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