Characterizing the association between BMI and breast cancer risk by menopause status and age-time

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Introduction

High body mass index (BMI, kg/m^2) is associated with increased risk of breast cancer after menopause and decreased risk prior to menopause. How risk changes around the menopausal transition is unclear.

Aim

Describe patterns of BMI breast cancer HRs over age-time by menopause status.

Study population

- Prospective cohorts in the international Premenopausal Breast Cancer Collaborative Group with at least 100 female breast cancers diagnosed during follow-up before age 55
- This analysis includes 479,132 women from 15 studies including 11,358 who developed breast cancer before age 55 years.

Methods

- We used piecewise exponential additive mixed models with age as the primary time scale to estimate three BMI hazard ratios (HRs): constant, linear over age-time, or nonlinear (via splines).
- Person-time was divided into three menopausal groups: premenopause, natural menopause, or menopause due to interventional loss of ovarian function (surgery or chemotherapy).

We found little evidence of changing BMI breast cancer HRs over age-time during the period of transition to menopause up to age 55 years. Future work to estimate HR change after age 55 can address the expected positive association between higher BMI and breast cancer among postmenopausal women.

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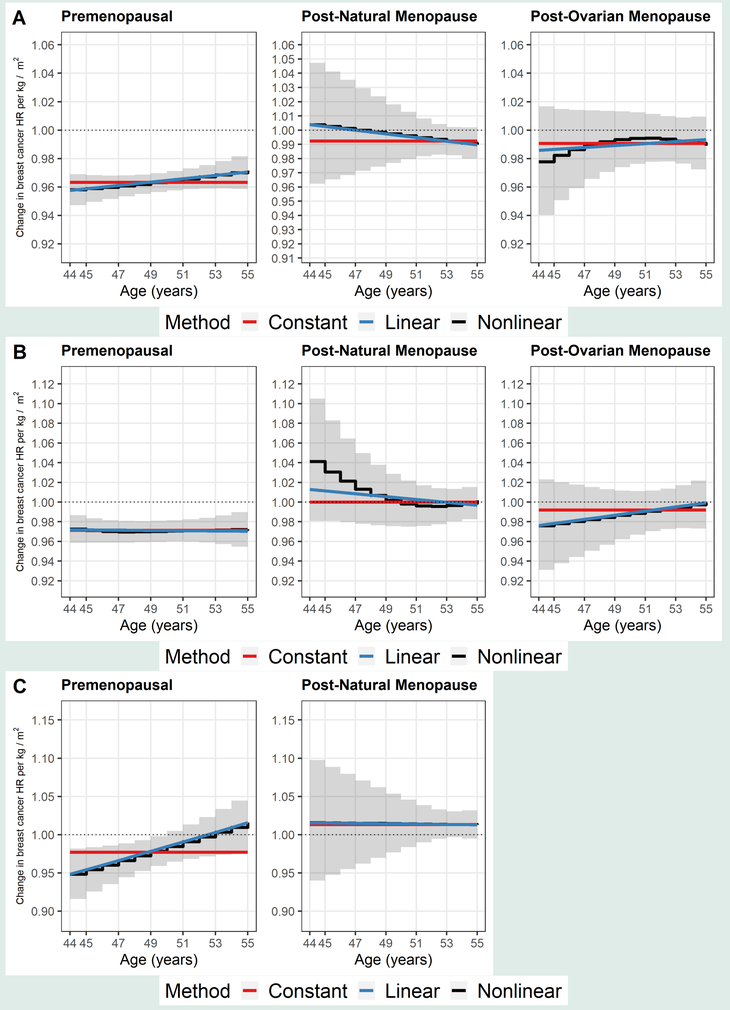
Results

Figure. Age-dependent BMI breast cancer HRs by menopause status



Panel A: Unadjusted BMI breast cancer HR; Panel B: Adjusted for BMI at age 18-24 years; Panel C: BMI breast cancer HR for women not reporting hormone replacement therapy at study entry (No data available for the post-ovarian menopause group).

Note: Post-Ovarian menopause corresponds to menopause due to interventional loss of ovarian function (surgery or chemotherapy).

HRs for the association between BMI and breast cancer did not change much across ages 45 to 55 years.

Table. Constant BMI HR by menopause group.

Group	BMI HR (95% CI)
Natural menopause	0.99 (0.98, 1.01)
Loss of ovarian function	0.99 (0.98, 1.00)
Premenopausal group	0.96 (0.96, 0.97)

Women who were premenopausal during that time had a BMI HR below one indicating a protective association. BMI HRs were close to null for women who experienced natural or surgical menopause.

Summary

- Inverse risk for the premenopausal group is consistent with prior evidence.
- We found little evidence of changing BMI breast cancer HRs over age-time for the postmenopausal groups before age 55.
- Future work can address expected positive association between higher BMI and breast cancer risk among postmenopausal women by estimating BMI HR change over age-time after 55 years.