

Association between serum iron biomarkers and breast cancer incidence

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Introduction

Iron is a growth factor essential to life but potentially toxic. Extremely high iron is associated with increased risk of some cancers, but studies of breast cancer are sparse and inconsistent.

Aim

Assess breast cancer incidence in relation to three serum iron biomarkers: 1) iron, 2) ferritin, 3) transferrin saturation.

Study population

- 6,008 women (including 3,011 incident breast cancer cases) in the Sister Study
- Age 35-74 years at enrollment
 - Median follow-up 7.9 years
 - Iron biomarkers measured in serum collected at baseline

Methods

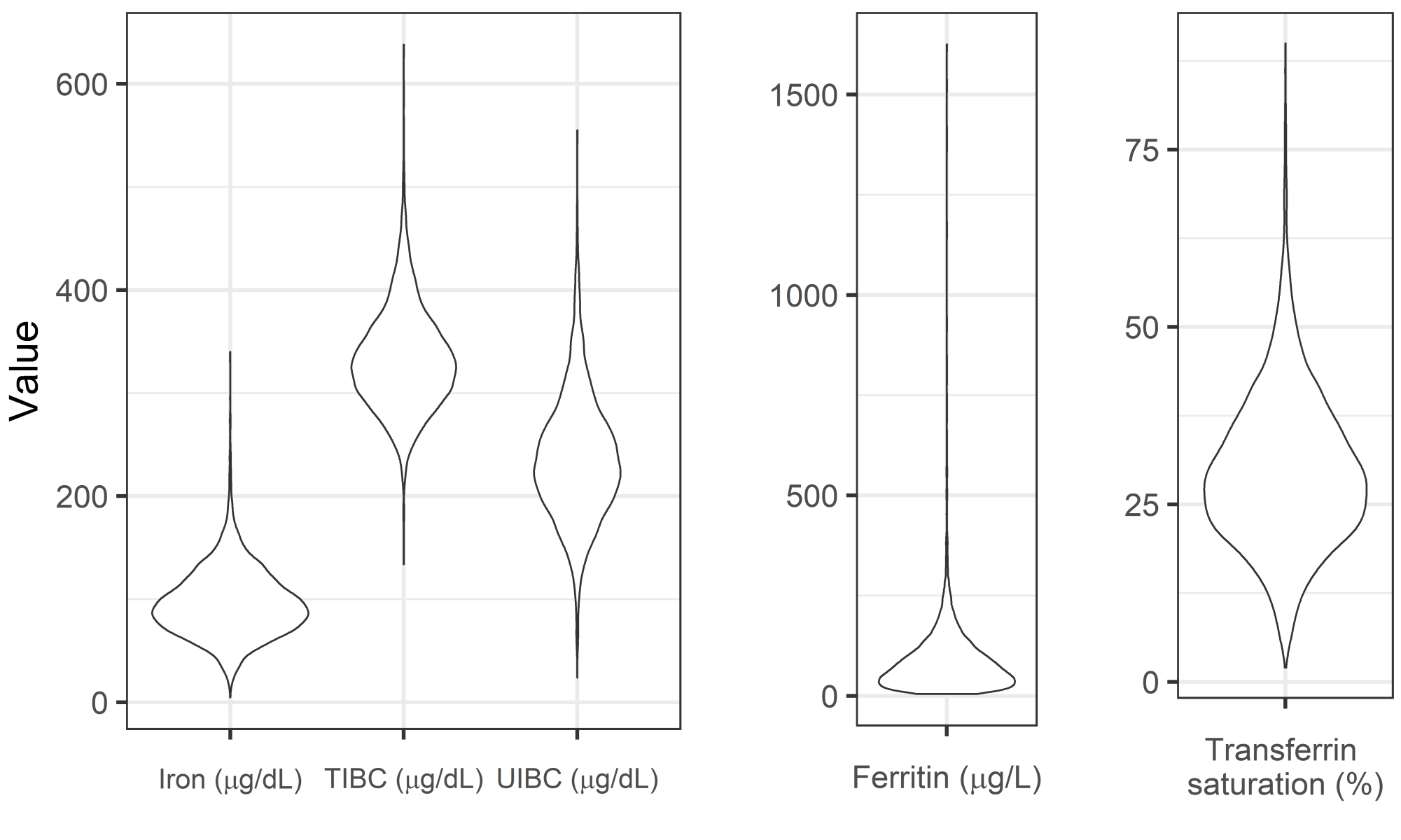
Model: Prentice-weighted Cox models used in case-cohort analyses to estimate breast cancer hazard ratios.

Exposure: Iron biomarkers were analyzed both as categorical (quartiles) and continuous variables.

- Transferrin Saturation = $\frac{Iron}{Iron+UIBC} \cdot 100$, UIBC=unsaturated iron-binding capacity

Results

Serum iron distributions



In the largest, most comprehensive, U.S. study to date, we found little evidence to support an association between elevated serum iron biomarkers and breast cancer incidence.

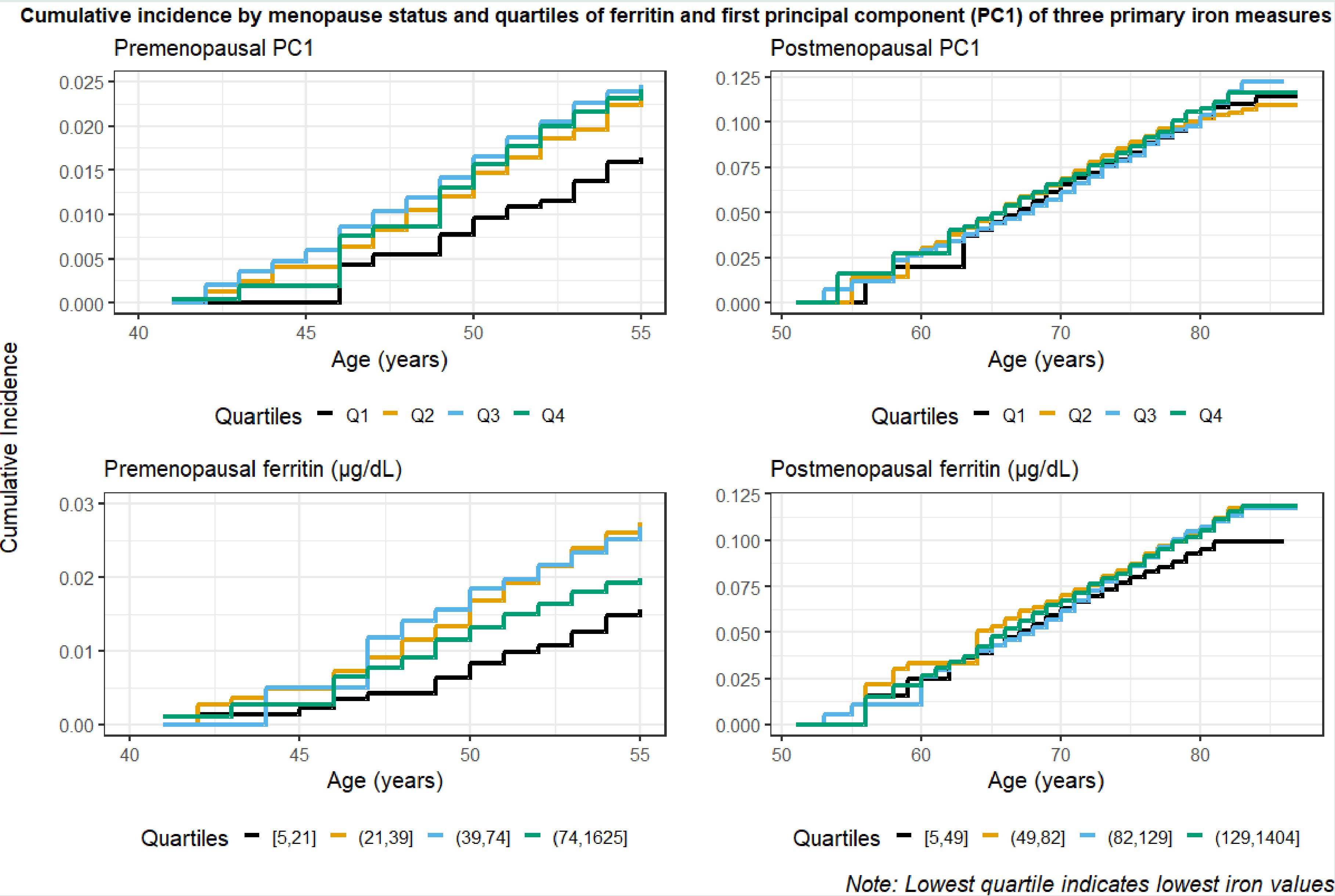
Results, cont...

Breast cancer risk associated with increasing levels of iron-related biomarkers

	Quartile of iron-related biomarker				Linear trend over quartiles ^c
Biomarkers	Quartile 1	Quartile 2	Quartile 3	Quartile 4	
Iron (μg/dL)					
Median	63	85	103	133	
Ranges	[5,74]	(74,93]	(93,115]	(115,340]	
Unadjusted	ref	1.15 (0.99, 1.33)	1.08 (0.93, 1.25)	1.14 (0.98, 1.32)	1.03 (0.99, 1.08)
Adjusted ^a	ref	1.07 (0.91, 1.26)	1.08 (0.92, 1.27)	1.06 (0.90, 1.25)	1.02 (0.97, 1.07)
Ferritin^b (μg/dL)					
Median	22	50	88	157	
Ranges	[5,36.25]	(36.25,67]	(67,113]	(113,1625]	
Unadjusted	ref	1.05 (0.90, 1.21)	1.09 (0.93, 1.26)	1.06 (0.91, 1.23)	1.02 (0.97, 1.07)
Adjusted ^a	ref	0.99 (0.84, 1.17)	1.05 (0.89, 1.24)	1.03 (0.87, 1.23)	1.02 (0.96, 1.07)
Transferrin saturation (%)					
Median	19	26	33	42	
Ranges	[2,22]	(22,29]	(29,36]	(36,90]	
Unadjusted	ref	1.01 (0.88, 1.17)	1.10 (0.95, 1.28)	1.02 (0.88, 1.19)	1.02 (0.97, 1.06)
Adjusted ^a	ref	0.92 (0.78, 1.07)	1.06 (0.89, 1.25)	0.94 (0.80, 1.12)	1.00 (0.95, 1.05)
First principal component^d					
Median	-1.5	-0.3	0.5	1.5	
Ranges	[-9.9,-0.799]	(-0.799,0.147]	(0.147,0.976]	(0.976,5.12]	
Unadjusted	ref	1.18 (1.02, 1.37)	1.11 (0.95, 1.28)	1.11 (0.96, 1.29)	1.03 (0.98, 1.07)
Adjusted ^a	ref	1.12 (0.95, 1.32)	1.04 (0.88, 1.23)	1.06 (0.90, 1.25)	1.01 (0.96, 1.06)

^a Adjusted for baseline smoking, alcohol, education, HRT, age at menarche, age at first birth, oral contraceptive use, menopause status, BMI, and a product term between the last two variables.
^blog transformed
^c Iron covariate in quartile units
^d The first principal component explains 72% of the variance and represents loadings of 0.63, 0.40, and 0.66 for the iron, ferritin and transferrin saturation measures, respectively.

Little evidence of association between elevated iron stores and breast cancer risk.



- Results unchanged when excluding first two person-years or including first four person-years.
- In case-only analyses no evidence of association between higher iron levels and specific subtypes or stages.
- Post-hoc analyses suggest very low iron may be protective for breast cancer risk.

Discussion

- We did not find strong evidence of an association between increasing iron and breast cancer incidence.
- Findings are similar to another U.S. cohort but contrast with studies from other countries.
- The potentially reduced risk with very low levels of ferritin merits further study.



Take a picture to download the digital poster.

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