

Supplementary Table 1: SDHR and 95%CI for different functional forms of eCRF and their association with invasive breast cancer

Exposure	Unadjusted (N=17,840)	Minimally adjusted ¹ (N=17,840)	Fully adjusted ² (N=17,840)	Fully adjusted and restricted to 1 st protocol ² (N=15,147)
Tertiles				
0 to 33.3	Ref	Ref	Ref	Ref
≥33.3 to <66.6	1.13 (0.93, 1.39)	1.13 (0.92, 1.38)	1.11 (0.91, 1.36)	1.19 (0.95, 1.49)
≥66.6	0.85 (0.69, 1.06)	0.85 (0.68, 1.06)	0.84 (0.67, 1.04)	0.90 (0.71, 1.15)
≥66.6 th percentile Yes versus No	0.80 (0.66, 0.97)	0.80 (0.66, 0.96)	0.79 (0.65, 0.96)	0.82 (0.67, 1.01)
Quartiles				
0 to 25	Ref	Ref	Ref	Ref
≥25 to 50	0.99 (0.79, 1.26)	0.98 (0.78, 1.24)	0.98 (0.78, 1.24)	1.04 (0.80, 1.35)
≥50 to 75	1.00 (0.80, 1.27)	1.00 (0.79, 1.26)	0.99 (0.78, 1.25)	1.08 (0.83, 1.41)
≥75	0.75 (0.58, 0.96)	0.73 (0.57, 0.95)	0.72 (0.56, 0.93)	0.76 (0.57, 1.01)
≥75 th percentile Yes versus No	0.74 (0.60, 0.92)	0.74 (0.59, 0.92)	0.73 (0.59, 0.91)	0.73 (0.58, 0.92)
Three-category variable				
Low (<20 th percentile)	Ref	Ref	Ref	Ref
Moderate (20 th -<60 th percentile)	1.00 (0.80, 1.26)	0.99 (0.79, 1.24)	0.99 (0.79, 1.24)	1.07 (0.83, 1.38)
High (≥60 th percentile)	0.80 (0.63, 1.01)	0.79 (0.62, 1.00)	0.78 (0.61, 0.99)	0.87 (0.66, 1.14)
≥60 th percentile Yes versus No	0.80 (0.67, 0.96)	0.79 (0.66, 0.95)	0.79 (0.66, 0.94)	0.83 (0.68, 1.01)
VO ₂ peak (ml/kg/min) per 5 unit	0.86 (0.74, 1.02)	0.84 (0.72, 1.00)	0.85 (0.72, 1.00)	0.88 (0.74, 1.06)
16.8 ml/kg/min category	0.88 (0.65, 1.18)	0.86 (0.64, 1.17)	0.86 (0.64, 1.17)	0.87 (0.61, 1.24)
METs per 1-unit increase	0.90 (0.81, 1.01)	0.89 (0.79, 1.00)	0.89 (0.79, 1.00)	0.92 (0.81, 1.04)
METs per 5-unit increase	0.60 (0.34, 1.06)	0.58 (0.32, 1.04)	0.55 (0.31, 0.99)	0.65 (0.34, 1.21)
METs category ≥ 5 METs (Yes)	0.88 (0.69, 1.12)	0.86 (0.68, 1.11)	0.86 (0.67, 1.10)	0.90 (0.68, 1.20)
Natural Cubic Splines for 1 unit increase in VO₂peak				
Knot 1	Ref	Ref	Ref	Ref
Knot 2	0.99 (0.93, 1.05)	0.98 (0.93, 1.04)	0.98 (0.93, 1.04)	1.01 (0.94, 1.08)
Knot 3	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)	0.99 (0.98, 1.01)

Natural Cubic Splines for 5 unit increase in VO ₂ peak				
Knot 1	Ref	Ref	Ref	Ref
Knot 2	0.94 (0.70, 1.25)	0.92 (0.68, 1.23)	0.91 (0.68, 1.22)	1.03 (0.73, 1.44)
Knot 3	0.92 (0.71, 1.18)	0.93 (0.72, 1.20)	0.92 (0.71, 1.19)	0.86 (0.65, 1.14)
Natural Cubic Splines for 1 unit increase in METs				
Knot 1	Ref	Ref	Ref	Ref
Knot 2	0.95 (0.78, 1.17)	0.94 (0.77, 1.16)	0.94 (0.76, 1.15)	1.02 (0.80, 1.29)
Knot 3	0.96 (0.85, 1.09)	0.96 (0.85, 1.09)	0.96 (0.85, 1.09)	0.93 (0.81, 1.07)
Natural Cubic Splines for 5 unit increase in METs				
Knot 1	Ref	Ref	Ref	Ref
Knot 2	0.79 (0.29, 2.20)	0.74 (0.26, 2.08)	0.73 (0.26, 2.03)	1.10 (0.34, 3.57)
Knot 3	0.35 (0.02, 7.83)	0.40 (0.02, 9.05)	0.37 (0.02, 8.57)	0.16 (0.00, 5.12)

Abbreviations: METs, metabolic equivalent tasks

Bolded values have a p-value less than 0.05.

Fine and Gray regression analysis with other cancer, and all-cause mortality treated as competing risks was used to produce SDHRs.

Age was used as a timescale to anchor findings to a clinically meaningful timepoint instead of arbitrary time point (i.e., time since CRF assessment).

¹Estimates adjusted for ethnicity (white, Black, other), smoke status (never, current, previous), alcohol use frequency (never, special occasions only, one to three times a month, once or twice a week, three or four times a week, daily), and physical activity (categorized as $\leq 50^{\text{th}}$ percentile versus $> 50^{\text{th}}$ percentile of MET minutes per week)

²Estimates are adjusted for all variables in the minimally adjusted model and education (secondary, post-secondary, missing), family history of breast cancer, age at menarche ($<$ or ≥ 13 years of age), number of live births (nulliparous, one, two, three or more children), and protocol (1, 2, 3) if relevant.

Supplementary Table 2: SDHR (95% CI) for the relationship between eCRF and breast cancer risk setting index to 6 months, 1 year and 2 years after CRF assessment

Exposure	Unadjusted	Minimally adjusted ¹	Fully adjusted ²	Adjusted & restricted to protocol 1 ²
	Excluding events within the first 6 months			
High eCRF (Yes versus No)	0.83 (0.65, 1.05)	0.82 (0.65, 1.04)	0.82 (0.64, 1.04)	0.83 (0.64, 1.07)
	Excluding event within the first year			
High eCRF (Yes versus No)	0.86 (0.68, 1.09)	0.85 (0.68, 1.08)	0.84 (0.66, 1.07)	0.85 (0.66, 1.10)
	Excluding events within the first 2 years			
High eCRF (Yes versus No)	0.82 (0.64, 1.05)	0.81 (0.63, 1.05)	0.84 (0.62, 1.04)	0.81 (0.62, 1.07)

*Statistically Significant (P<0.05)

Fine and Gray regression analysis with other cancer, and all-cause mortality treated as competing risks was used to produce SDHRs. Age was used as a timescale to anchor findings to a clinically meaningful timepoint instead of arbitrary time point (i.e., time since CRF assessment).

¹Estimates adjusted for ethnicity (white, Black, other), smoke status (never, current, previous), alcohol use frequency (never, special occasions only, one to three times a month, once or twice a week, three or four times a week, daily), and physical activity (categorized as $\leq 50^{\text{th}}$ percentile versus $> 50^{\text{th}}$ percentile of MET minutes per week)

²Estimates are adjusted for all variables in the minimally adjusted model and education (secondary, post-secondary, missing), family history of breast cancer, age at menarche ($<$ or ≥ 13 years of age), number of live births (nulliparous, one, two, three or more children), and protocol (1, 2, 3) if relevant.