

## Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

**eTable 1.** Selected Participant Characteristics by Baseline BMI

	Overall Cohort n (%)	Baseline BMI (kg/m <sup>2</sup> ) <sup>a</sup>					p value <sup>b</sup>
		18.5-24.99 301 (16)	25-29.99 528 (28)	30-34.99 503 (26)	35-39.99 322 (17)	≥40 237 (13)	
<b>Age at diagnosis, y</b>							
21-40	189 (10)	43 (14)	48 (9)	56 (11)	22 (7)	20 (8)	.008
41-60	1105 (58)	184 (61)	320 (61)	279 (56)	176 (55)	146 (62)	
61-75	597 (32)	74 (25)	160 (30)	168 (33)	124 (38)	71 (30)	
Mean±SD	54.46±10.75	52.18±11.23	54.46±10.63	54.64±10.95	56.02±10.36	54.89±10.05	
<b>Birthplace</b>							
United States	1580 (84)	229 (76)	431 (82)	420 (84)	280 (87)	220 (93)	<.001
Non US born	311 (16)	72 (24)	97 (18)	83 (16)	42 (13)	17 (7)	
<b>Education</b>							
≤High school graduate	728 (39)	103 (34)	185 (36)	199 (40)	133 (41)	108 (46)	<.001
Some college	589 (31)	79 (26)	171 (32)	167 (33)	101 (32)	71 (30)	
≥College	572 (30)	119 (40)	171 (32)	136 (27)	88 (27)	58 (24)	
<b>Marital status</b>							
Married/living as married	702 (37)	115 (38)	204 (39)	201 (40)	111 (34)	71 (30)	.009
Widow	187 (10)	22 (7)	45 (8)	45 (9)	44 (14)	31 (13)	
Divorced/separated	457 (24)	71 (24)	130 (25)	119 (24)	81 (25)	56 (24)	
Single/never married	542 (29)	92 (31)	148 (28)	137 (27)	86 (27)	79 (33)	
<b>Household income</b>							
<\$25,000	548 (29)	91 (30)	128 (24)	140 (28)	97 (30)	92 (39)	<.001
\$25,000-69,999	656 (35)	100 (33)	178 (34)	182 (36)	110 (34)	86 (36)	
≥\$70,000	554 (29)	95 (32)	188 (36)	137 (27)	90 (28)	44 (19)	
Unknown	133 (7)	15 (5)	34 (6)	44 (9)	25 (8)	15 (6)	
<b>Insurance status</b>							
Private	1056 (56)	166 (55)	313 (59)	277 (55)	173 (54)	127 (53)	.008
Medicaid/ Medicare	528 (28)	72 (24)	130 (25)	156 (31)	97 (30)	73 (31)	
Uninsured	197 (10)	42 (14)	45 (9)	43 (9)	37 (11)	30 (13)	
Other/Unknown	110 (6)	21 (7)	40 (7)	27 (5)	15 (5)	7 (3)	
<b>Menopausal status</b>							
Pre-menopausal	731 (39)	140 (47)	211 (40)	188 (37)	101 (31)	91 (38)	.003
Post-menopausal	1160 (61)	161 (53)	317 (60)	315 (63)	221 (69)	146 (62)	
<b>Smoking status (before diagnosis)</b>							
Never	1118 (59)	186 (62)	315 (60)	303 (60)	177 (55)	137 (58)	<.001
Former	464 (25)	47 (16)	125 (24)	129 (26)	95 (29)	68 (29)	
Current	308 (16)	68 (22)	88 (16)	70 (14)	50 (16)	32 (13)	

<b>Alcohol drinking (before diagnosis)</b>							
Non-drinker	1041 (55)	152 (50)	279 (53)	276 (55)	184 (57)	150 (63)	<i>.02</i>
>0-≤1 drinks/d	618 (33)	109 (36)	187 (35)	155 (31)	101 (32)	66 (28)	
>1 drink/day	69 (4)	11 (4)	21 (4)	23 (4)	7 (2)	7 (3)	
Unknown	163 (8)	29 (10)	41 (8)	49 (10)	30 (9)	14 (6)	
<b>Physical activity (before diagnosis, in METS-hours/week)</b>							
T1 (<11.7)	627 (33)	97 (32)	167 (32)	169 (34)	100 (31)	94 (40)	<i>.33</i>
T2 (11.8-37.9)	632 (34)	113 (38)	169 (32)	162 (32)	107 (33)	81 (34)	
T3 (≥38)	629 (33)	91 (30)	190 (36)	172 (34)	114 (36)	62 (26)	
<b>History of diabetes</b>							
No	1263 (67)	237 (79)	372 (70)	318 (63)	198 (61)	138 (58)	<i>&lt;.001</i>
Yes	424 (22)	22 (7)	105 (20)	125 (25)	100 (31)	72 (30)	
Unknown	204 (11)	42 (14)	51 (10)	60 (12)	24 (8)	27 (12)	
<b>History of hypertension</b>							
No	536 (28)	132 (44)	178 (34)	125 (25)	65 (20)	36 (15)	<i>&lt;.001</i>
Yes	1151 (61)	127 (42)	299 (57)	318 (63)	233 (72)	174 (73)	
Unknown	204 (11)	42 (14)	51 (10)	60 (12)	24 (7)	27 (11)	
<b>Percent body fat (%)</b>							
≤35%	316 (17)	215 (71)	76 (14)	17 (3)	5 (2)	3 (1)	<i>&lt;.001</i>
>35%	1451 (77)	66 (22)	427 (81)	453 (90)	288 (89)	217 (92)	
Missing	124 (6)	20 (7)	25 (5)	33 (7)	29 (9)	17 (7)	
<b>Fat mass index (kg/m<sup>2</sup>)</b>							
<9.5	365 (19)	272 (91)	88 (17)	3 (1)	2 (1)	0 (0)	<i>&lt;.001</i>
≥9.5	1401 (74)	10 (3)	414 (78)	467 (93)	290 (90)	220 (93)	
Missing	125 (7)	19 (6)	26 (5)	33 (6)	30 (9)	17 (7)	
<b>Waist circumference (cm)</b>							
≤88 cm	358 (19)	239 (79)	110 (21)	8 (2)	0 (0)	1 (1)	<i>&lt;.001</i>
>88 cm	1501 (79)	56 (19)	408 (77)	490 (97)	317 (98)	230 (97)	
Missing	32 (2)	6 (2)	10 (2)	5 (1)	5 (2)	6 (2)	
<b>Waist-to-hip ratio</b>							
≤0.85	568 (30)	159 (53)	184 (35)	117 (23)	68 (21)	40 (17)	<i>&lt;.001</i>
>0.85	1291 (68)	136 (45)	334 (63)	381 (76)	249 (77)	191 (81)	
Missing	32 (2)	6 (2)	10 (2)	5 (1)	5 (2)	6 (2)	

<sup>a</sup> Underweight women (BMI <18.5) were excluded (n=9)

<sup>b</sup> Based on Cochran-Mantel-Haenszel test (missing excluded)

**eTable 2.** Clinical Characteristics by Baseline BMI

	Overall Cohort n (%)	Baseline BMI (kg/m <sup>2</sup> ) <sup>a</sup> n (%)					p value <sup>b</sup>
		18.5-24.99 301 (16)	25-29.99 528 (28)	30-34.99 503 (26)	35-39.99 322 (17)	≥40 237 (13)	
<b>Stage</b>							
0	340 (18)	54 (18)	101 (19)	90 (18)	56 (17)	39 (16)	.13
I	678 (36)	106 (35)	209 (40)	177 (35)	111 (34)	75 (32)	
II	599 (32)	96 (32)	146 (28)	164 (33)	105 (33)	88 (37)	
III	196 (10)	34 (11)	44 (8)	51 (10)	39 (12)	28 (12)	
IV	46 (2)	8 (3)	18 (3)	10 (2)	6 (2)	4 (2)	
Missing	32 (2)	3 (1)	10 (2)	11 (2)	5 (2)	3 (1)	
<b>Grade</b>							
I-Well differentiated	219 (12)	16 (5)	78 (15)	59 (12)	40 (12)	26 (11)	.44
II-Moderately differentiated	724 (38)	123 (41)	198 (38)	193 (38)	122 (38)	88 (37)	
III-Poorly differentiated/undifferentiated	811 (43)	139 (46)	213 (40)	213 (42)	137 (43)	109 (46)	
Missing	137 (7)	23 (8)	39 (7)	38 (8)	23 (7)	14 (6)	
<b>ER status</b>							
ER Positive	1333 (70)	200 (66)	372 (71)	348 (69)	232 (72)	181 (76)	.03
ER Negative	506 (27)	93 (31)	140 (26)	136 (27)	83 (26)	54 (23)	
Missing	52 (3)	8 (3)	16 (3)	19 (4)	7 (2)	2 (1)	
<b>Tumor subtype</b>							
Luminal A	909 (48)	131 (43)	234 (44)	256 (51)	150 (46)	138 (58)	<.001
HER2 Positive	322 (17)	65 (22)	103 (20)	72 (14)	54 (17)	28 (12)	
Triple Negative	328 (17)	53 (18)	92 (17)	84 (17)	58 (18)	41 (17)	
Missing	332 (18)	52 (17)	99 (19)	91 (18)	60 (19)	30 (13)	
<b>TREATMENT INFORMATION</b>							
<b>Type of surgery</b>							
No surgery	63 (3)	13 (4)	19 (3)	15 (3)	12 (4)	4 (2)	.07
Lumpectomy	963 (51)	132 (44)	273 (52)	263 (52)	168 (52)	127 (53)	
Mastectomy	864 (46)	156 (52)	236 (45)	224 (45)	142 (44)	106 (45)	
<b>Chemotherapy</b>							
Yes	1028 (55)	175 (58)	279 (53)	267 (53)	173 (54)	134 (57)	.84
No	858 (45)	125 (42)	248 (47)	235 (47)	149 (46)	101 (43)	
<b>Radiation therapy</b>							
Yes	1276 (68)	194 (65)	365 (69)	328 (65)	223 (69)	166 (70)	.33
No	610 (32)	105 (35)	162 (31)	173 (35)	99 (31)	71 (30)	
<b>Endocrine therapy</b>							
Yes	1204 (64)	175 (59)	356 (68)	314 (63)	210 (65)	149 (63)	.69
No	679 (36)	122 (41)	170 (32)	188 (37)	112 (35)	87 (37)	

<sup>a</sup> Underweight women (BMI <18.5) were excluded (n=9)

<sup>b</sup> Based on Cochran-Mantel-Haenszel test (missing excluded)

**eTable 3.** Associations of Body Size, Body Fat Distribution, and Body Composition With Breast Cancer–Specific Mortality by Estrogen Receptor Status Among Black Breast Cancer Survivors

	ER Positive			ER Negative			<i>p</i> for interaction
	n (%)	Deaths due to breast cancer	HR <sup>a</sup> (95% CI)	n (%)	Deaths due to breast cancer	HR (95% CI)	
<b>Baseline BMI (kg/m<sup>2</sup>)</b>							
Normal (18.5-24.9)	200 (15)	16	Ref	93 (18)	12	Ref	.54
Overweight (25.0-29.9)	372 (28)	21	0.83 (0.41-1.66)	140 (28)	18	0.97 (0.44-2.10)	
Obese I (30.0-34.9)	347 (26)	28	1.23 (0.66-2.27)	136 (27)	18	1.09 (0.51-2.31)	
Obese II/III (≥35.0)	413 (31)	31	1.12 (0.60-2.08)	137 (27)	28	1.51 (0.73-3.09)	
<i>p</i> for trend			0.12			0.11	
Per 5 units	1332	96	1.08 (0.89-1.32)	506	76	1.17 (0.93-1.47)	.54
<b>Waist circumference (cm)</b>							
Q1 (<90.6)	309 (24)	23	Ref	139 (28)	16	Ref	.34
Q2 (90.6-100.1)	328 (25)	11	0.47 (0.22-1.04)	116 (23)	15	0.99 (0.48-2.05)	
Q3 (100.2-110.9)	334 (25)	25	1.15 (0.62-2.13)	123 (25)	15	0.88 (0.41-1.88)	
Q4 (>110.9)	343 (26)	32	1.42 (0.78-2.60)	117 (24)	28	1.65 (0.85-3.21)	
<i>p</i> for trend			0.18			0.20	
Per 10 cm	1314	91	1.21 (0.97-1.50)	495	74	1.18 (0.94-1.49)	.83
<b>Waist-to-hip ratio</b>							
Q1 (0.65-0.84)	331 (25)	17	Ref	120 (24)	11	Ref	.35
Q2 (0.85-0.89)	319 (24)	18	1.02 (0.50-2.10)	130 (26)	21	1.53 (0.73-3.23)	
Q3 (0.90-0.95)	330 (25)	26	1.55 (0.77-3.15)	126 (26)	19	1.16 (0.52-2.58)	
Q4 (>0.95)	334 (26)	30	1.53 (0.78-2.99)	119 (24)	23	1.62 (0.77-3.41)	
<i>p</i> for trend			<b>0.03</b>			<b>0.02</b>	
Per 0.1 unit	1314	91	1.18 (0.96-1.45)	495	74	1.12 (0.89-1.41)	.64
<b>Percent body fat (%)</b>							
Q1 (<37.1)	293 (23)	21	Ref	132 (28)	14	Ref	.64
Q2 (37.1-41.9)	311 (25)	21	1.31 (0.67-2.54)	114 (24)	17	1.18 (0.56-2.52)	
Q3 (42.0-46.5)	322 (26)	18	1.12 (0.57-2.21)	115 (24)	15	1.11 (0.48-2.54)	
Q4 (>46.5)	321 (26)	28	1.70 (0.95-3.06)	116 (24)	23	2.04 (1.03-4.05)	
<i>p</i> for trend			0.16			0.16	
Per 5 units	1247	88	1.16 (0.96-1.41)	477	69	1.25 (0.99-1.57)	.66
<b>Fat Mass Index (kg/m<sup>2</sup>)</b>							
Q1 (<9.9)	294 (24)	20	Ref	129 (27)	13	Ref	.48
Q2 (9.9-12.8)	314 (25)	22	1.34 (0.69-2.62)	119 (25)	19	1.13 (0.52-2.47)	
Q3 (12.9-16.5)	316 (25)	19	1.20 (0.62-2.32)	113 (24)	16	1.47 (0.67-3.22)	
Q4 (>16.5)	323 (26)	28	1.70 (0.91-3.20)	115 (24)	21	1.66 (0.80-3.45)	
<i>p</i> for trend			<b>0.03</b>			<b>0.04</b>	
Per 5 units	1247	89	1.17 (0.96-1.42)	476	69	1.20 (0.96-1.50)	.59

<sup>a</sup>Hazard ratios (HR) and 95% confidence intervals (CI) from Fine and Gray's subdistribution hazard model adjusted for age, income, smoking, tumor stage, and type of surgery.

**eTable 4.** Precision Analyses: Estimated Half-width of 95% CIs for Main Results

	All-cause mortality		Breast cancer-specific mortality	
	HR <sup>a</sup> (95% CI)	half-width of 95% CI	HR <sup>a</sup> (95% CI)	half-width of 95% CI
Baseline BMI (kg/m <sup>2</sup> )				
Normal (18.5-24.9)	Ref	Ref	Ref	Ref
Overweight (25.0-29.9)	0.94 (0.64-1.37)	0.365	0.93 (0.57-1.53)	0.480
Obese I (30.0-34.9)	1.17 (0.80-1.67)	0.435	1.27 (0.80-2.03)	0.615
Obese II/III (≥35.0)	1.26 (0.89-1.79)	0.450	1.33 (0.84-2.10)	0.630
Per 5 units	1.11 (1.02-1.20)	0.090	1.11 (1.00-1.23)	0.115
Waist-to-hip ratio				
Q1 (0.65-0.84)	Ref	Ref	Ref	Ref
Q2 (0.85-0.89)	1.07 (0.73-1.58)	0.425	1.25 (0.75-2.07)	0.660
Q3 (0.90-0.95)	1.37 (0.94-2.00)	0.530	1.47 (0.88-2.46)	0.790
Q4 (>0.95)	1.61 (1.12-2.33)	0.605	1.68 (1.04-2.71)	0.835
Per 0.1 unit	1.29 (1.11-1.50)	0.195	1.19 (0.99-1.44)	0.225
Percent body fat (%)				
Q1 (<37.1)	Ref	Ref	Ref	Ref
Q2 (37.1-41.9)	1.14 (0.79-1.65)	0.430	1.29 (0.80-2.08)	0.640
Q3 (42.0-46.5)	1.08 (0.75-1.56)	0.405	1.12 (0.68-1.85)	0.585
Q4 (>46.5)	1.53 (1.09-2.15)	0.530	1.81 (1.17-2.80)	0.815
Per 5 units	1.10 (1.01-1.20)	0.095	1.13 (1.00-1.28)	0.140
Fat mass index (kg/m <sup>2</sup> )				
Q1 (<9.9)	Ref	Ref	Ref	Ref
Q2 (9.9-12.8)	1.22 (0.85-1.75)	0.450	1.27 (0.79-2.03)	0.620
Q3 (12.9-16.5)	1.22 (0.85-1.77)	0.460	1.28 (0.79-2.09)	0.650
Q4 (>16.5)	1.57 (1.11-2.22)	0.555	1.74 (1.10-2.75)	0.825
Per 5 units	1.18 (1.05-1.33)	0.140	1.20 (1.02-1.41)	0.195

<sup>a</sup>The HRs and 95% CIs are presented in Table 1.