Supplemental Table 1. Pathologic staging by molecular subtype

Characteristic	HR+/HER2- (*n* = 314)	HR+/HER2+ (*n* = 122)	HR-/HER2+ (*n* = 39)	TNBC (*n* = 113)	Total (*n* = 588)
Pathologic stage group					
0	12 (3.8%)	32 (26.2%)	13 (33.3%)	31 (27.4%)	88 (15.0%)
1	114 (36.3%)	44 (36.1%)	8 (20.5%)	33 (29.2%)	199 (33.8%)
2	143 (45.5%)	34 (27.9%)	14 (35.9%)	41 (36.3%)	232 (39.5%)
3	45 (14.3%)	12 (9.8%)	4 (10.3%)	8 (7.1%)	69 (11.7%)
T classification					
pTis[a]	5 (1.6%)	13 (10.7%)	5 (12.8%)	4 (3.5%)	27 (4.6%)
pT0	12 (3.8%)	24 (19.7%)	12 (30.8%)	35 (31.0%)	83 (14.1%)
pT1	146 (46.5%)	47 (38.5%)	14 (35.9%)	42 (37.2%)	249 (42.3%)
pT2	118 (37.6%)	29 (23.8%)	7 (17.9%)	26 (23.0%)	180 (30.6%)
pT3	31 (9.9%)	9 (7.4%)	1 (2.6%)	6 (5.3%)	47 (8.0%)
pT4	2 (0.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.3%)
N classification					
pN0	169 (53.8%)	92 (75.4%)	29 (74.4%)	90 (79.6%)	380 (64.6%)
pN1	114 (36.3%)	24 (19.7%)	7 (17.9%)	17 (15.0%)	162 (27.6%)
pN2	19 (6.1%)	5 (4.1%)	2 (5.1%)	5 (4.4%)	31 (5.3%)
pN3	12 (3.8%)	1 (0.8%)	1 (2.6%)	1 (0.9%)	15 (2.6%)

HR: Hormone receptor; HER2: Human epidermal growth factor receptor 2; TNBC: Triple negative breast cancer

[a]: Pathologic complete response following neoadjuvant chemotherapy

Supplemental Table 2. Demographic and clinical characteristics by molecular subtype

Characteristic	HR+/HER2- (*n* = 314)	HR+/HER2+ (*n* = 122)	HR-/HER2+ (*n* = 39)	TNBC (*n* = 113)	Total (*n* = 588)
Age at diagnosis, years					
Median (IQR)	38 (35–40)	36 (33–39)	36 (34–40)	36 (33–39)	37 (34–39)
Follow-up time (OS), months					
Median (IQR)	71 (45–105)	75 (50–104)	75 (54–104)	72 (43–100)	73 (45–105)
Minimum	6	16	23	9	6
Maximum	139	135	132	148	148
Follow-up time (RFS), months					
Median (IQR)	70 (44–105)	72 (49–107)	75 (39–96)	72 (40–100)	71 (45–105)
Minimum	6	16	9	6	6
Maximum	139	135	132	148	148
BMI, kg/m^2					
Mean ± SD	28.5±7.3	28.6±7.3	26.9±6.5	29.2 (8.5)	28.6±7.5
Race					
Black	70 (22.3%)	36 (29.5%)	9 (23.1%)	38 (33.6%)	153 (26.0%)
White	216 (68.8%)	81 (66.4%)	23 (59.0%)	68 (60.2%)	388 (66.0%)
Other	28 (8.9%)	5 (4.1%)	7 (17.9%)	7 (6.2%)	47 (8.0%)
Surgical approach					
Lumpectomy	104 (33.1%)	44 (36.1%)	15 (38.5%)	45 (39.8%)	208 (35.4%)
Mastectomy	210 (66.9%)	78 (63.9%)	24 (61.5%)	68 (60.2%)	380 (64.6%)
Radiation therapy					
No	103 (32.8%)	44 (36.1%)	13 (33.3%)	39 (34.5%)	199 (33.8%)
Yes	211 (67.2%)	78 (63.9%)	26 (66.7%)	74 (65.5%)	389 (66.2%)
Chemotherapy					
No	99 (31.5%)	6 (4.9%)	2 (5.1%)	3 (2.7%)	110 (18.7%)
Yes	215 (68.5%)	116 (95.1%)	37 (94.9%)	110 (97.3%)	478 (81.3%)
Chemotherapy timing					
Neoadjuvant	117 (37.3%)	86 (70.5%)	27 (69.2%)	84 (74.3%)	314 (53.4%)
Adjuvant	98 (31.2%)	30 (24.6%)	10 (25.6%)	26 (23.0%)	164 (27.9%)
No chemotherapy	99 (31.5%)	6 (4.9%)	2 (5.1%)	3 (2.7%)	110 (18.7%)
Hormone therapy					
No	45 (14.3%)	19 (15.6%)	0 (0%)	0 (0%)	64 (10.9%)
Yes	269 (85.7%)	103 (84.4%)	0 (0%)	0 (0%)	372 (63.3%)
Not applicable	0 (0%)	0 (0%)	39 (100%)	113 (100%)	152 (25.9%)
Stage group					
I	140 (44.6%)	34 (27.9%)	9 (23.1%)	20 (17.7%)	203 (34.5%)
II	141 (44.9%)	63 (51.6%)	26 (66.7%)	79 (69.9%)	309 (52.6%)
III	33 (10.5%)	25 (20.5%)	4 (10.3%)	14 (12.4%)	76 (12.9%)
T classification					
cT0[a]	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)
cT1	137 (43.6%)	29 (23.8%)	10 (25.6%)	26 (23.0%)	202 (34.4%)
cT2	127 (40.4%)	66 (54.1%)	21 (53.8%)	65 (57.5%)	279 (47.4%)
cT3	48 (15.3%)	25 (20.5%)	8 (20.5%)	22 (19.5%)	103 (17.5%)
cT4	1 (0.3%)	2 (1.6%)	0 (0.0%)	0 (0.0%)	3 (0.5%)
N classification					
cN0	231 (73.6%)	76 (62.3%)	28 (71.8%)	77 (68.1%)	412 (70.1%)
cN1	72 (22.9%)	40 (32.8%)	10 (25.6%)	33 (29.2%)	155 (26.4%)
cN2	8 (2.5%)	3 (2.5%)	0 (0.0%)	1 (0.9%)	12 (2.0%)
cN3	3 (1.0%)	3 (2.5%)	1 (2.6%)	2 (1.8%)	9 (1.5%)
Grade					
1	47 (15.0%)	4 (3.3%)	0 (0.0%)	1 (0.9%)	52 (8.8%)
2	171 (54.5%)	55 (45.1%)	6 (15.4%)	11 (9.7%)	243 (41.3%)
3	92 (29.3%)	60 (49.2%)	31 (79.5%)	98 (86.7%)	281 (47.8%)
Unknown	4 (1.3%)	3 (2.5%)	2 (5.1%)	3 (2.7%)	12 (2.0%)
Lymphovascular invasion					
No	194 (61.8%)	82 (67.2%)	29 (74.4%)	80 (70.8%)	385 (65.5%)
Yes	89 (28.3%)	32 (26.2%)	8 (20.5%)	19 (16.8%)	148 (25.2%)
Indeterminate	31 (9.9%)	8 (6.6%)	2 (5.1%)	14 (12.4%)	55 (9.4%)
Extranodal extension					
No	270 (86.0%)	110 (90.2%)	38 (97.4%)	110 (97.3%)	528 (89.8%)
Yes	44 (14.0%)	12 (9.8%)	1 (2.6%)	3 (2.7%)	60 (10.2%)
Status					
Alive	281 (89.5%)	109 (89.3%)	33 (84.6%)	94 (83.2%)	517 (87.9%)
Deceased	33 (10.5%)	13 (10.7%)	6 (15.4%)	19 (16.8%)	71 (12.1%)
Recurrence					
No	273 (86.9%)	104 (85.2%)	28 (71.8%)	94 (83.2%)	499 (84.9%)
Yes	41 (13.1%)	18 (14.8%)	11 (28.2%)	19 (16.8%)	89 (15.1%)
Recurrence site					
Local	9 (22.0%)	3 (16.7%)	4 (36.4%)	4 (21.1%)	20 (22.5%)
Regional	1 (2.4%)	2 (11.1%)	0 (0.0%)	6 (31.6%)	9 (10.1%)
Distant	31 (75.6%)	13 (72.2%)	7 (63.6%)	9 (47.4%)	60 (67.4%)

BMI: Body mass index; HR: Hormone receptor; HER2: Human epidermal growth factor receptor 2; IQR: Interquartile range; OS: Overall survival; SD: Standard deviation; TNBC: Triple negative breast cancer; RFS: Recurrence-free survival; [a]: cT0N1

Supplemental Table 3. Multivariable recurrence-free survival analysis stratified by molecular subtype

Characteristic	HR+/HER2- (*n* = 314)			HR+/HER2+ (*n* = 122)			HR-/HER2+ (*n* = 39)			TNBC (*n* = 113)		
	Hazard ratio (95% CI)	Hazard ratio *p*-value	Overall *p*-value	Hazard ratio (95% CI)	Hazard ratio *p*-value	Overall *p*-value	Hazard ratio (95% CI)	Hazard ratio *p*-value	Overall *p*-value	Hazard ratio (95% CI)	Hazard ratio *p*-value	Overall *p*-value
Age at diagnosis, 1-yr increase	0.93 (0.87–0.99)	**0.04**	**0.04**	0.92 (0.83–1.02)	0.11	0.11	1.40 (1.02–1.92)	**0.04**	**0.04**	0.93 (0.82–1.04)	0.20	0.20
BMI, kg/m^2												
<25	ref		0.30	ref		0.96	ref		**0.04**	ref		0.47
≥25	1.41 (0.73–2.69)	0.30		0.97 (0.35–2.72)	0.96		8.45 (1.14–62.76)	**0.04**		0.68 (0.24–1.93)	0.47	
Race												
White	ref		**0.01**	ref		0.48	ref		0.16	ref		0.07
Black	0.88 (0.42–1.85)	0.74		1.84 (0.60–5.60)	0.29		0.37 (0.05–3.00)	0.35		3.36 (1.16–9.71)	**0.03**	
Other	3.27 (1.44–7.40)	**0.005**		0.45 (0.02–9.95)	0.61		0.01 (0.00–1.23)	0.06		2.38 (0.50–11.36)	0.28	
Type of surgery												
Mastectomy	ref		0.85	ref		0.87	ref		**0.047**	ref		0.85
Lumpectomy	0.93 (0.45–1.92)	0.85		1.13 (0.26–5.01)	0.87		9.06 (1.03–80.02)	**0.047**		0.89 (0.27–2.90)	0.85	
Radiation therapy												
Yes	ref		0.28	ref		0.39	ref		0.89	ref		0.96
No	1.47 (0.73–2.94)	0.28		1.90 (0.44–8.19)	0.39		0.83 (0.06–11.74)	0.89		1.03 (0.28–3.79)	0.96	
Chemotherapy												
No	ref		0.71	ref		0.79	ref		**0.04**	ref		0.36
Yes	0.86 (0.38–1.91)	0.71		0.75 (0.10–6.01)	0.79		0.00 (0.00–0.66)	**0.04**		0.37 (0.05–3.06)	0.36	
Hormone therapy												
No	ref		0.51	ref		0.25	NA	NA	NA	NA	NA	NA
Yes	0.76 (0.34–1.71)	0.51		0.47 (0.13–1.70)	0.25		NA	NA		NA	NA	
Stage group												
I	ref		0.11	ref		0.89	ref		**0.03**	ref		0.80
II	2.02 (0.97–4.21)	0.06		1.10 (0.30–4.09)	0.88		11.24 (0.46–277)	0.14		0.69 (0.20–2.40)	0.55	
III	2.71 (0.97–7.62)	0.06		1.40 (0.30–6.43)	0.67		125.94 (2.84–5583)	**0.01**		0.90 (0.18–4.49)	0.89	
LVSI												
No	ref		**0.02**	ref		0.13	ref		0.25	ref		0.36
Yes	2.41 (1.32–4.43)	**0.01**		2.76 (0.91–8.33)	0.07		0.12 (0.01–1.68)	0.12		2.38 (0.71–7.93)	0.16	
Indeterminate	2.06 (0.75–5.63)	0.16		0.77 (0.10–5.77)	0.79		0.11 (0.00–8.69)	0.32		0.95 (0.21–4.38)	0.95	
ENE												
No	ref		0.06	ref		0.20	ref		0.95	ref		0.97
Yes	1.99 (0.97–4.08)	0.06		2.62 (0.61–11.29)	0.20		1.12 (0.05–26.49)	0.95		1.04 (0.11–9.79)	0.97	

BMI: Body mass index; ENE: Extranodal extension; HR: Hormone receptor; HER2: Human epidermal growth factor receptor 2; CI: Confidence interval; LVSI: Lymphovascular space invasion; NA: Not applicable. Bold indicates $p<0.05$. For categorical variables with more than two categories, the hazard ratio *p*-value assesses the statistical significance of the comparison between a specific category and the reference category, while the overall *p*-value assesses whether there is a difference across all categories combined. For continuous or binary variables, the hazard ratio *p*-value and overall *p*-value are identical because there is only one comparison