Supplementary Materials (Online only)
Supplementary Table S1. Characteristics of male breast cancer patients by receipt of Oncotype DX Recurrence Score (RS) testing

	Primary Analysis			Sensitivity Analysis *		
	RS (N=848, %)	No RS (N=2,552, %)	P	RS (N=595, %)	No RS (N=1,073, %)	P
Age (years, Mean ± SD)	61.9 ± 10.4	64.9 ± 12.3	<0.001	61.5 ± 10.5	65.2 ± 11.6	<0.001
Year of Diagnosis			<0.001			0.12
2010	12.3	19.4		12.9	17.7	
2011	20.3	18.7		20.5	18.8	
2012	20.5	20.1		20.3	20.7	
2013	23.3	21.4		23.7	22.9	
2014	23.6	20.5		22.5	19.9	
Tumor Size (mm, Mean ± SD) #	19.7 ± 9.5	21.2 ± 17.0	0.02	19.2 ± 9.1	19.4 ± 17.9	0.81
Lymph Node Metastasis	19.0	36.2	<0.001	100.0	100.0	-
Positive Progesterone Receptor	92.7	92.8	0.27	92.8	93.7	0.56
Grade			0.02			0.03
I	20.5	21.8		23.2	26.0	
II	52.4	47.2		51.8	47.2	
III	21.1	22.3		19.5	17.9	
Unknown	6.0	8.7		5.5	8.9	
Ductal Histology	83.0	82.5	0.34	82.2	79.9	0.11
Lymph Vascular Invasion	18.2	22.7	<0.001	13.4	12.3	0.77
Comorbidity	19.9	22.3	0.17	20.7	21.4	0.76
Mastectomy	74.4	77.5	0.07	74.3	69.6	0.05
Chemotherapy	22.6	35.0	<0.001	19.7	22.1	0.24
Endocrine Therapy	86.0	67.4	<0.001	100.0	100.0	-
Radiation Therapy	32.1	33.5	0.10	28.9	33.8	0.07
Race			0.37			0.60
White	86.3	84.8		86.7	85.4	
Black	10.1	11.2		10.4	10.7	
Other	2.7	2.5		2.0	2.3	
Unknown	0.8	1.5		0.8	1.6	
Insurance			<0.001			0.002
No Insurance	2.0	2.1		1.8	1.4	
Private Insurance	52.0	42.6		51.8	42.4	
Government Insurance	44.7	53.8		45.2	54.7	
Unknown	1.3	1.6		1.2	1.5	
Residence [1]			0.60			0.20
Metro	83.3	83.7		81.2	81.9	
Urban	12.3	12.5		14.3	14.9	
Rural	1.3	1.4		1.5	1.7	
Unknown	3.2	2.4		3.0	1.5	
Annual Household Income [2]			0.38			0.57
<$30000	11.9	12.0		12.1	12.5	
$30000-$34999	16.6	19.0		17.6	20.0	
$35000-$45999	26.5	27.3		26.4	27.6	
≥$46000	43.9	40.4		42.5	38.5	
Unknown	1.1	1.3		1.3	1.4	
Education Attainment (percent of no high school graduation) [2]			0.01			0.09
≥29%	9.8	13.5		9.9	13.9	
20%-28.9%	20.8	22.6		21.3	22.7	
14%-19.9%	29.4	28.8		28.6	28.3	
<14%	38.9	33.7		38.7	33.6	
Unknown	1.2	1.3		1.5	1.4	

	Primary Analysis			Sensitivity Analysis *		
	RS (N=848, %)	No RS (N=2,552, %)	P	RS (N=595, %)	No RS (N=1,073, %)	P
Facility Type			0.25			0.97
Community	11.0	12.7		12.0	12.8	
Comprehensive Community	47.5	47.8		46.9	46.2	
Academic/Research Program	31.0	27.9		30.1	29.8	
Integrated Network	10.6	11.6		11.0	11.2	

* Only patients with negative lymph node and receipt of endocrine therapy was included.

Exact tumor size was not available for 5 patients with RS testing and 27 patients without RS testing in the primary analysis; while for 3 patients with RS testing and 9 patients without RS testing in the sensitivity analysis.

1. Residence was estimated by matching patients' Federal Information Processing Standards codes against US Department of Agriculture Economic Research Service records from 2003 or 2013, depending on the time of diagnosis.

2. Annual household income and educational attainment were estimated by matching patients' zip codes against American Community Survey data from 2000 or 2012, depending on the time of diagnosis.

Supplementary Table S2. HRs (95% CI) for total mortality associated with the Recurrence Score categories among patients ≤ 50 years

	Deaths /Patients	CT (%)	ET (%)	Male Patients Hazard Ratio (95% CI)	Deaths /Patients	CT (%)	ET (%)	Female Patients Hazard Ratio (95% CI)
Continuous Scale								
Age-adjusted	4/129	33.3	90.7	0.98 (0.88 to 1.08)	289/28,320	32.4	92.1	1.04 (1.04 to 1.05)
Adjusted [1]	4/129	33.3	90.7	-	289/28,320	32.4	92.1	1.03 (1.02 to 1.04)
Fully-Adjusted [2]	4/129	33.3	90.7	-	289/28,320	32.4	92.1	1.03 (1.02 to 1.04)
Traditional Cutoffs [*]								
Age-adjusted								
Low risk	2/69	11.6	92.8	reference	89/16,844	12.3	92.8	reference
Intermediate risk	2/44	45.5	93.2	2.72 (0.36 to 20.48)	110/9,289	55.5	92.2	2.07 (1.57 to 2.74)
High risk	0/16	93.8	75.0	-	90/2,187	89.3	86.5	3.07 (2.76 to 3.41)
Adjusted [1]								
Low risk	2/69	11.6	92.8	reference	89/16,844	12.3	92.8	reference
Intermediate risk	2/44	45.5	93.2	-	110/9,289	55.5	92.2	1.89 (1.42 to 2.52)
High risk	0/16	93.8	75.0	-	90/2,187	89.3	86.5	4.65 (3.25 to 6.65)
Fully-Adjusted [2]								
Low risk	2/69	11.6	92.8	reference	89/16,844	12.3	92.8	reference
Intermediate risk	2/44	45.5	93.2	-	110/9,289	55.5	92.2	1.88 (1.39 to 2.56)
High risk	0/16	93.8	75.0	-	90/2,187	89.3	86.5	4.63 (3.11 to 6.90)
TAILORx Cutoffs [#]								
Age-adjusted								
Low risk	2/33	9.1	90.9	reference	27/5,543	8.5	92.6	reference
Intermediate risk	2/69	24.6	95.7	0.77 (0.10 to 5.91)	127/18,833	28.3	92.7	1.27 (0.84 to 1.93)
High risk	0/27	85.2	77.8	-	135/3,944	92.8	88.7	6.46 (4.27 to 9.79)
Adjusted [1]								
Low risk	2/33	9.1	90.9	reference	27/5,543	8.5	92.6	reference
Intermediate risk	2/69	24.6	95.7	-	127/18,833	28.3	92.7	1.20 (0.79 to 1.83)
High risk	0/27	85.2	77.8	-	135/3,944	92.8	88.7	4.43 (2.83 to 6.96)
Fully-Adjusted [2]								
Low risk	2/33	9.1	90.9	reference	27/5,543	8.5	92.6	reference
Intermediate risk	2/69	24.6	95.7	-	127/18,833	28.3	92.7	1.21 (0.79 to 1.85)
High risk	0/27	85.2	77.8	-	135/3,944	92.8	88.7	4.53 (2.78 to 7.37)

Abbreviations: CT: chemotherapy, ET: endocrine therapy.

[*] Traditional Cutoffs: low risk: Recurrence Score (RS) ≤17; intermediate risk: RS 18 to 30; high risk: RS ≥31.

[#] TAILORx Cutoffs: low risk: Recurrence Score (RS) ≤10; intermediate risk: RS 11 to 25; high risk: RS ≥ 26.

1. Adjusted for: age (continuous), race, grade, histology type, Progesterone Receptor status, tumor size, lymph nodal status, lymphovascular invasion, comorbidity, surgery, endocrine therapy, radiation therapy, education, income, insurance, year of diagnosis (strata).

2. Additionally adjusted for chemotherapy.

Supplementary Table S3. HRs (95% CI) for total mortality associated with the Recurrence Score categories among patients > 50 years

	Deaths /Patients	CT (%)	ET (%)	Male Patients Hazard Ratio (95% CI)	Deaths /Patients	CT (%)	ET (%)	Female Patients Hazard Ratio (95% CI)
Continuous Scale								
Age-adjusted	37/719	20.7	85.1	1.02 (1.01 to 1.04)	2,238/82,578	20.3	93.3	1.03 (1.02 to 1.03)
Adjusted [1]	37/719	20.7	85.1	1.02 (1.00 to 1.05)	2,238/82,578	20.3	93.3	1.02 (1.01 to 1.02)
Fully-Adjusted [2]	37/719	20.7	85.1	1.02 (0.99 to 1.05)	2,238/82,578	20.3	93.3	1.02 (1.02 to 1.02)
Traditional Cutoffs [*]								
Age-adjusted								
Low risk	12/427	5.4	87.8	reference	1,609/49,091	4.7	93.7	reference
Intermediate risk	17/216	31.9	80.1	2.92 (1.39 to 6.11)	759/26,885	33.7	93.8	1.26 (1.15 to 1.38)
High risk	8/76	75.0	84.2	3.58 (1.46 to 8.77)	410/6,602	81.0	88.7	2.68 (2.39 to 3.00)
Adjusted [1]								
Low risk	12/427	5.4	87.8	reference	1,609/49,091	4.7	93.7	reference
Intermediate risk	17/216	31.9	80.1	1.94 (0.83 to 4.51)	759/26,885	33.7	93.8	1.21 (1.10 to 1.33)
High risk	8/76	75.0	84.2	1.40 (0.42 to 4.62)	410/6,602	81.0	88.7	1.98 (1.73 to 2.28)
Fully-Adjusted [2]								
Low risk	12/427	5.4	87.8	reference	1,609/49,091	4.7	93.7	reference
Intermediate risk	17/216	31.9	80.1	1.88 (0.78 to 4.53)	759/26,885	33.7	93.8	1.26 (1.14 to 1.39)
High risk	8/76	75.0	84.2	1.30 (0.35 to 4.86)	410/6,602	81.0	88.7	2.23 (1.91 to 2.61)
TAILORx Cutoffs [#]								
Age-adjusted								
Low risk	2/261	6.5	87.8	reference	462/20,386	3.3	93.0	reference
Intermediate risk	21/337	14.8	84.0	8.67 (2.03 to 36.98)	1,162/50,049	14.8	94.1	1.05 (0.94 to 1.17)
High risk	14/121	67.8	82.6	14.72 (3.34 to 64.76)	614/12,143	71.2	90.5	2.16 (1.92 to 2.44)
Adjusted [1]								
Low risk	2/261	6.5	87.8	reference	462/20,386	3.3	93.0	reference
Intermediate risk	21/337	14.8	84.0	1.21 (2.66 to 54.79)	1,162/50,049	14.8	94.1	1.06 (0.95 to 1.18)
High risk	14/121	67.8	82.6	9.05 (1.76 to 46.53)	614/12,143	71.2	90.5	1.71 (1.49 to 1.97)
Fully-Adjusted [2]								
Low risk	2/261	6.5	87.8	reference	462/20,386	3.3	93.0	reference
Intermediate risk	21/337	14.8	84.0	1.21 (2.65 to 54.74)	1,162/50,049	14.8	94.1	1.07 (0.96 to 1.20)
High risk	14/121	67.8	82.6	8.79 (1.58 to 48.84)	614/12,143	71.2	90.5	1.85 (1.59 to 2.16)

Abbreviations: CT: chemotherapy, ET: endocrine therapy.

[*] Traditional Cutoffs: low risk: Recurrence Score (RS) ≤17; intermediate risk: RS 18 to 30; high risk: RS ≥31.

[#] TAILORx Cutoffs: low risk: Recurrence Score (RS) ≤10; intermediate risk: RS 11 to 25; high risk: RS ≥26.

1. Adjusted for: age (continuous), race, grade, histology type, Progesterone Receptor status, tumor size, lymph nodal status, lymphovascular invasion, comorbidity, surgery, endocrine therapy, radiation therapy, education, income, insurance, year of diagnosis (strata).

2. Additionally adjusted for chemotherapy.

Supplementary Table S4. HRs (95% CI) for total mortality associated with chemotherapy status among intermediate-risk patients by age

	Deaths/Patients	ET (%)	Male Patients	Deaths/Patients	ET (%)	Female Patients
			Hazard Ratio (95% CI)			Hazard Ratio (95% CI)
Age ≤ 50 years						
RS 18-30						
No Chemotherapy	1/23	91.3	reference	44/4,023	90.4	reference
Chemotherapy	1/20	100.0	-	65/5,154	94.3	0.96 (0.64 to 1.44)
RS 11-25						
No Chemotherapy	1/50	96.0	reference	81/13,174	92.5	reference
Chemotherapy	1/17	100.0	-	44/5,325	94.2	0.97 (0.65 to 1.44)
Age > 50 years						
RS 18-30						
No Chemotherapy	10/141	84.4	reference	531/17,437	93.8	reference
Chemotherapy	7/69	75.4	1.72 (0.34 to 8.67)	217/9,063	94.4	0.82 (0.69 to 0.97)
RS 11-25						
No Chemotherapy	16/279	87.1	reference	994/41,728	94.3	reference
Chemotherapy	5/50	72.0	2.41 (0.55 to 10.51)	150/7,425	94.6	0.87 (0.73 to 1.04)

Abbreviations: ET: endocrine therapy; RS: Oncotype DX Breast Recurrence Score.
* Patients with unknown chemotherapy status were excluded from this analysis.
Adjusted for: age (continuous), race, grade, histology type, Progesterone Receptor status, tumor size, lymph nodal status, lymphovascular invasion, comorbidity, surgery, endocrine therapy, radiation therapy, education, income, insurance, year of diagnosis (strata).

Supplementary Table S5. HRs (95% CI) for total mortality associated with Recurrence Score categories (sensitivity analysis)

	Deaths/Patients	CT (%)	Male Patients Hazard Ratio (95% CI)	Deaths/Patients	CT (%)	Female Patients Hazard Ratio (95% CI)
Continuous Scale						
Age-adjusted	22/595	19.7	1.02 (1.00 to 1.05)	1,647/85,386	20.8	1.03 (1.03 to 1.03)
Adjusted [1]	22/595	19.7	1.02 (0.98 to 1.06)	1,647/85,386	20.8	1.02 (1.02 to 1.03)
Fully-Adjusted [2]	22/595	19.7	1.02 (0.98 to 1.06)	1,647/85,386	20.8	1.02 (1.02 to 1.03)
Traditional Cutoffs *						
Age-adjusted						
Low risk	9/355	4.2	reference	771/50,644	3.6	reference
Intermediate risk	12/181	29.8	2.58 (1.08 to 6.15)	545/28,102	36.7	1.21 (1.08 to 1.35)
High risk	1/59	81.4	0.69 (0.08 to 5.28)	331/6,640	85.0	2.97 (2.61 to 3.38)
Adjusted [1]						
Low risk	9/355	4.2	reference	771/50,644	3.6	reference
Intermediate risk	12/181	29.8	1.72 (0.63 to 4.72)	545/28,102	36.7	1.15 (1.03 to 1.29)
High risk	1/59	81.4	0.34 (0.03 to 3.03)	331/6,640	85.0	2.21 (1.89 to 2.59)
Fully-Adjusted [2]						
Low risk	9/355	4.2	reference	771/50,644	3.6	reference
Intermediate risk	12/181	29.8	1.47 (0.51 to 4.21)	545/28,102	36.7	1.20 (1.07 to 1.35)
High risk	1/59	81.4	0.18 (0.02 to 2.06)	331/6,640	85.0	2.48 (2.07 to 2.99)
TAILORx Cutoffs #						
Age-adjusted						
Low risk	2/204	4.4	reference	323/19,857	1.8	reference
Intermediate risk	15/295	13.2	5.31 (1.21 to 23.27)	842/53,237	15.3	1.02 (0.89 to 1.16)
High risk	5/96	71.9	5.05 (0.98 to 26.06)	482/12,292	75.5	2.30 (1.99 to 2.64)
Adjusted [1]						
Low risk	2/204	4.4	reference	323/19,857	1.8	reference
Intermediate risk	15/295	13.2	5.44 (1.20 to 24.58)	842/53,237	15.3	1.02 (0.89 to 1.16)
High risk	5/96	71.9	4.69 (0.79 to 27.76)	482/12,292	75.5	1.79 (1.53 to 2.11)
Fully-Adjusted [2]						
Low risk	2/204	4.4	reference	323/19,857	1.8	reference
Intermediate risk	15/295	13.2	5.21 (1.14 to 23.74)	842/53,237	15.3	1.03 (0.90 to 1.17)
High risk	5/96	71.9	3.93 (0.59 to 26.10)	482/12,292	75.5	1.93 (1.61 to 2.30)

Sensitivity analysis: Only patients with negative lymph node and receipt of endocrine therapy was included.

Ten female patients who died within 30 days after surgery were excluded from this analysis.

Abbreviations: CT: chemotherapy, ET: endocrine therapy.

* Traditional Cutoffs: low risk: Recurrence Score (RS) ≤17; intermediate risk: RS 18 to 30; high risk: RS ≥31. Based on the fully adjusted model, *P* value for interaction between RS and sex was 0.007.

TAILORx Cutoffs: low risk: Recurrence Score (RS) ≤10; intermediate risk: RS 11 to 25; high risk: RS ≥26. Based on the fully adjusted model, *P* value for interaction between RS and sex was 0.02.

1. Adjusted for: age (continuous), race, grade, histology type, Progesterone Receptor status, tumor size, lymph nodal status, lymphovascular invasion, comorbidity, surgery, endocrine therapy, radiation therapy, education, income, insurance, year of diagnosis (strata).

2. Additionally adjusted for chemotherapy.