

## Supplemental Online Content

Chen ZH, Yang KB, Zhang YZ, et al. Assessment of modifiable factors for the association of marital status with cancer-specific survival. *JAMA Netw Open*. 2021;4(5):e2111813.  
doi:10.1001/jamanetworkopen.2021.11813

**eFigure 1.** Evaluation of the Appropriateness of Weibull Distribution in AFT Models Assessing the Association Between Marital Status and Cancer-Specific Survival for the Following Cancer Sites: Breast, Lung, Prostate, Colorectum, Melanoma, Bladder, Kidney, Endometrium, and Pancreas

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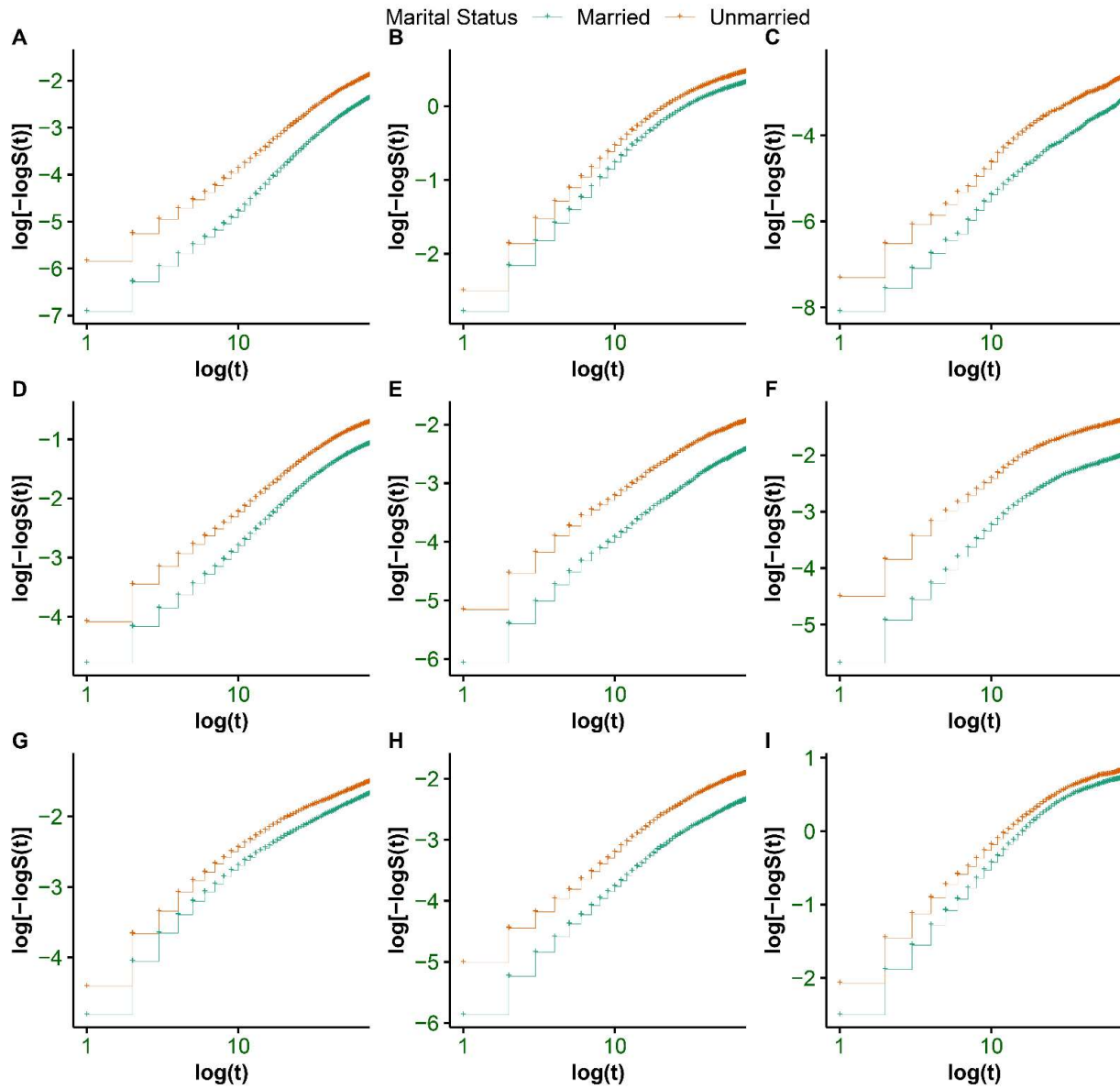
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This supplemental material has been provided by the authors to give readers additional information about their work.

**eFigure 1.** Evaluation of the Appropriateness of Weibull Distribution in AFT Models Assessing the Association Between Marital Status and Cancer-Specific Survival for the Following Cancer Sites: Breast, Lung, Prostate, Colorectum, Melanoma, Bladder, Kidney, Endometrium, and Pancreas



eTable 1. Patient Demographic and Clinical Characteristics by Marital Status and Cancer Site

Characteristics	Total Sample			Breast			Lung			Prostate		
	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>
	1067726	666180		259555	186601		146391	127669		287143	96782	
Age at diagnosis <sup>a</sup>	63.05 (11.74)	64.89 (13.79)	<0.001	58.25 (12.24)	63.16 (14.56)	<0.001	67.26 (10.28)	67.87 (11.43)	<0.001	65.46 (8.71)	65.14 (9.50)	<0.001
Race <sup>b</sup>			<0.001			<0.001			<0.001			<0.001
White	883655 (82.8)	509551 (76.5)		212617 (81.9)	140483 (75.3)		121240 (82.8)	99304 (77.8)		230879 (80.4)	67121 (69.4)	
Black	88389 (8.3)	112906 (16.9)		18009 (6.9)	31463 (16.9)		11267 (7.7)	21225 (16.6)		36093 (12.6)	24908 (25.7)	
Others <sup>c</sup>	87585 (8.2)	39835 (6.0)		27613 (10.6)	13714 (7.3)		13626 (9.3)	6917 (5.4)		16621 (5.8)	3580 (3.7)	
Unknown	8097 (0.8)	3888 (0.6)		1316 (0.5)	941 (0.5)		258 (0.2)	223 (0.2)		3550 (1.2)	1173 (1.2)	
Sex <sup>b</sup>			<0.001			<0.001			<0.001			<0.001
Female	478681 (44.8)	415698 (62.4)		257331 (99.1)	185593 (99.5)		56406 (38.5)	73394 (57.5)				
Male	589045 (55.2)	250482 (37.6)		2224 (0.9)	1008 (0.5)		89985 (61.5)	54275 (42.5)		287143 (100.0)	96782 (100.0)	
Grade <sup>b</sup>			<0.001			<0.001			<0.001			<0.001
Grade I	126551 (11.9)	80027 (12.0)		56790 (21.9)	38231 (20.5)		8312 (5.7)	6221 (4.9)		22102 (7.7)	7612 (7.9)	
Grade II	383913 (36.0)	228578 (34.3)		108196 (41.7)	76796 (41.2)		26540 (18.1)	21324 (16.7)		119954 (41.8)	37760 (39.0)	
Grade III	309987 (29.0)	178684 (26.8)		81178 (31.3)	60111 (32.2)		38553 (26.3)	32959 (25.8)		137400 (47.9)	47277 (48.8)	
Grade IV	35305 (3.3)	25483 (3.8)		1192 (0.5)	939 (0.5)		5083 (3.5)	4560 (3.6)		472 (0.2)	240 (0.2)	
Unknown	211970 (19.9)	153408 (23.0)		12199 (4.7)	10524 (5.6)		67903 (46.4)	62605 (49.0)		7215 (2.5)	3893 (4.0)	

eTable 1 cont.

Characteristics	Total Sample			Breast			Lung			Prostate		
	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>
	1067726	666180		259555	186601		146391	127669		287143	96782	
<b>Surgery<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>No</b>	317376 (29.7)	219538 (33.0)		11755 (4.5)	16310 (8.7)		107078 (73.1)	100184 (78.5)		149111 (51.9)	59887 (61.9)	
<b>Yes</b>	750350 (70.3)	446642 (67.0)		247800 (95.5)	170291 (91.3)		39313 (26.9)	27485 (21.5)		138032 (48.1)	36895 (38.1)	
<b>Radiation<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>No/Unknown</b>	711213 (66.6)	448228 (67.3)		117187 (45.1)	96243 (51.6)		79872 (54.6)	71315 (55.9)		187570 (65.3)	61289 (63.3)	
<b>Yes</b>	356513 (33.4)	217952 (32.7)		142368 (54.9)	90358 (48.4)		66519 (45.4)	56354 (44.1)		99573 (34.7)	35493 (36.7)	
<b>Chemotherapy<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>No/Unknown</b>	751265 (70.4)	456478 (68.5)		142721 (55.0)	114570 (61.4)		62616 (42.8)	65693 (51.5)		284576 (99.1)	95550 (98.7)	
<b>Yes</b>	316461 (29.6)	209702 (31.5)		116834 (45.0)	72031 (38.6)		83775 (57.2)	61976 (48.5)		2567 (0.9)	1232 (1.3)	
<b>Stage<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>Early</b>	760931 (71.3)	429026 (64.4)		222976 (85.9)	152277 (81.6)		42196 (28.8)	35925 (28.1)		242680 (84.5)	79180 (81.8)	
<b>Advanced</b>	306795 (28.7)	237154 (35.6)		36579 (14.1)	34324 (18.4)		104195 (71.2)	91744 (71.9)		44463 (15.5)	17602 (18.2)	
<b>Insurance<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>Insured</b>	960622 (90.0)	514788 (77.3)		235173 (90.6)	146260 (78.4)		128801 (88.0)	93827 (73.5)		261955 (91.2)	78997 (81.6)	
<b>Medicaid</b>	64888 (6.1)	116159 (17.4)		18208 (7.0)	34021 (18.2)		12855 (8.8)	27039 (21.2)		9962 (3.5)	10932 (11.3)	
<b>Uninsured</b>	17243 (1.6)	22719 (3.4)		3280 (1.3)	4151 (2.2)		3134 (2.1)	5139 (4.0)		3031 (1.1)	2844 (2.9)	
<b>Unknown</b>	24973 (2.3)	12514 (1.9)		2894 (1.1)	2169 (1.2)		1601 (1.1)	1664 (1.3)		12195 (4.2)	4009 (4.1)	

eTable 1 cont.

Characteristics	Total Sample			Breast			Lung			Prostate		
	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>
1067726	666180	259555		186601	146391		127669	287143		96782		
<b>Poverty<sup>a</sup></b>	32.02 (9.57)	33.00 (9.50)	<0.001	31.64 (9.39)	32.70 (9.33)	<0.001	32.97 (9.92)	33.60 (9.77)	<0.001	31.79 (9.53)	33.17 (9.53)	<0.001
<b>Education<sup>a</sup></b>	14.71 (6.20)	15.12 (6.10)	<0.001	14.54 (6.14)	15.01 (6.05)	<0.001	15.08 (6.35)	15.21 (6.20)	<0.001	14.60 (6.13)	15.20 (6.01)	<0.001
<b>Residence<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>Metropolitan</b>	939181 (88.0)	591974 (88.9)		232835 (89.7)	168658 (90.4)		123404 (84.3)	110042 (86.2)		255010 (88.8)	86575 (89.5)	
<b>Nonmetropolitan</b>	127647 (12.0)	73611 (11.0)		26467 (10.2)	17759 (9.5)		22817 (15.6)	17483 (13.7)		32045 (11.2)	10167 (10.5)	
<b>Unknown</b>	898 (0.1)	595 (0.1)		253 (0.1)	184 (0.1)		170 (0.1)	144 (0.1)		88 (0.0)	40 (0.0)	

eTable 1 cont.

Characteristics	Colorectum			Melanoma			Bladder			Kidney		
	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>
	135567	104409		67135	31666		31189	20564		57392	32936	
Age at diagnosis <sup>a</sup>	63.70 (12.82)	66.69 (14.91)	<0.001	59.68 (14.37)	58.03 (19.45)	<0.001	70.30 (11.02)	71.56 (13.10)	<0.001	61.10 (11.89)	60.54 (14.47)	<0.001
Race <sup>b</sup>			<0.001			<0.001			<0.001			<0.001
White	108889 (80.3)	78895 (75.6)		65035 (96.9)	30506 (96.3)		27826 (89.2)	17461 (84.9)		48239 (84.1)	25338 (76.9)	
Black	11268 (8.3)	17295 (16.6)		216 (0.3)	305 (1.0)		1383 (4.4)	2153 (10.5)		4624 (8.1)	5543 (16.8)	
Others <sup>c</sup>	14716 (10.9)	7793 (7.5)		609 (0.9)	363 (1.1)		1846 (5.9)	861 (4.2)		4058 (7.1)	1826 (5.5)	
Unknown	694 (0.5)	426 (0.4)		1275 (1.9)	492 (1.6)		134 (0.4)	89 (0.4)		471 (0.8)	229 (0.7)	
Sex <sup>b</sup>			<0.001			<0.001			<0.001			<0.001
Female	53558 (39.5)	60503 (57.9)		26003 (38.7)	16537 (52.2)		4890 (15.7)	7651 (37.2)		17506 (30.5)	15534 (47.2)	
Male	82009 (60.5)	43906 (42.1)		41132 (61.3)	15129 (47.8)		26299 (84.3)	12913 (62.8)		39886 (69.5)	17402 (52.8)	
Grade <sup>b</sup>			<0.001			<0.001			<0.001			<0.001
Grade I	12291 (9.1)	9002 (8.6)		108 (0.2)	37 (0.1)		986 (3.2)	655 (3.2)		5218 (9.1)	3037 (9.2)	
Grade II	86670 (63.9)	65058 (62.3)		170 (0.3)	81 (0.3)		2921 (9.4)	1885 (9.2)		22688 (39.5)	12572 (38.2)	
Grade III	19407 (14.3)	15809 (15.1)		293 (0.4)	162 (0.5)		6989 (22.4)	4734 (23.0)		13885 (24.2)	7440 (22.6)	
Grade IV	3171 (2.3)	2730 (2.6)		103 (0.2)	73 (0.2)		17519 (56.2)	11224 (54.6)		4960 (8.6)	2878 (8.7)	
Unknown	14028 (10.3)	11810 (11.3)		66461 (99.0)	31313 (98.9)		2774 (8.9)	2066 (10.0)		10641 (18.5)	7009 (21.3)	

eTable 1 cont.

Characteristics	Colorectum			Melanoma			Bladder			Kidney		
	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>
	135567	104409		67135	31666		31189	20564		57392	32936	
<b>Surgery<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>No</b>	14010 (10.3)	14956 (14.3)		3035 (4.5)	1905 (6.0)		1125 (3.6)	1132 (5.5)		4986 (8.7)	4141 (12.6)	
<b>Yes</b>	121557 (89.7)	89453 (85.7)		64100 (95.5)	29761 (94.0)		30064 (96.4)	19432 (94.5)		52406 (91.3)	28795 (87.4)	
<b>Radiation<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>No/Unknown</b>	114023 (84.1)	89232 (85.5)		65172 (97.1)	30417 (96.1)		28403 (91.1)	18109 (88.1)		54692 (95.3)	31247 (94.9)	
<b>Yes</b>	21544 (15.9)	15177 (14.5)		1963 (2.9)	1249 (3.9)		2786 (8.9)	2455 (11.9)		2700 (4.7)	1689 (5.1)	
<b>Chemotherapy<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>No/Unknown</b>	73477 (54.2)	62568 (59.9)		65513 (97.6)	30626 (96.7)		20094 (64.4)	13974 (68.0)		51284 (89.4)	29516 (89.6)	
<b>Yes</b>	62090 (45.8)	41841 (40.1)		1622 (2.4)	1040 (3.3)		11095 (35.6)	6590 (32.0)		6108 (10.6)	3420 (10.4)	
<b>Stage<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>Early</b>	74593 (55.0)	55235 (52.9)		59267 (88.3)	26438 (83.5)		24515 (78.6)	15274 (74.3)		40604 (70.7)	22940 (69.7)	
<b>Advanced</b>	60974 (45.0)	49174 (47.1)		7868 (11.7)	5228 (16.5)		6674 (21.4)	5290 (25.7)		16788 (29.3)	9996 (30.3)	
<b>Insurance<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>Insured</b>	119381 (88.1)	78474 (75.2)		60430 (90.0)	25927 (81.9)		28470 (91.3)	16365 (79.6)		51640 (90.0)	24320 (73.8)	
<b>Medicaid</b>	10967 (8.1)	19840 (19.0)		1442 (2.1)	2955 (9.3)		1776 (5.7)	3165 (15.4)		3996 (7.0)	6721 (20.4)	
<b>Uninsured</b>	3345 (2.5)	4614 (4.4)		965 (1.4)	1152 (3.6)		435 (1.4)	699 (3.4)		1140 (2.0)	1506 (4.6)	
<b>Unknown</b>	1874 (1.4)	1481 (1.4)		4298 (6.4)	1632 (5.2)		508 (1.6)	335 (1.6)		616 (1.1)	389 (1.2)	

eTable 1 cont.

Characteristics	Colorectum			Melanoma			Bladder			Kidney		
	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>
	135567	104409		67135	31666		31189	20564		57392	32936	
<b>Poverty<sup>a</sup></b>	32.67 (9.64)	33.31 (9.51)	<0.001	30.80 (9.17)	31.47 (9.01)	<0.001	31.98 (9.53)	32.70 (9.52)	<0.001	32.80 (9.69)	33.54 (9.48)	<0.001
<b>Education<sup>a</sup></b>	15.20 (6.33)	15.40 (6.17)	<0.001	13.85 (5.90)	14.38 (5.91)	<0.001	14.72 (6.22)	15.08 (6.16)	<0.001	15.14 (6.38)	15.41 (6.25)	<0.001
<b>Residence<sup>b</sup></b>			<0.001			<0.001			<0.001			<0.001
<b>Metropolitan</b>	117408 (86.6)	91984 (88.1)		59427 (88.5)	28367 (89.6)		27222 (87.3)	18088 (88.0)		50057 (87.2)	29148 (88.5)	
<b>Nonmetropolitan</b>	17930 (13.2)	12278 (11.8)		7694 (11.5)	3292 (10.4)		3952 (12.7)	2467 (12.0)		7274 (12.7)	3757 (11.4)	
<b>Unknown</b>	229 (0.2)	147 (0.1)		14 (0.0)	7 (0.0)		15 (0.0)	9 (0.0)		61 (0.1)	31 (0.1)	



eTable 1 cont.

Characteristic	Endometrium			Pancreas		
	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>
	49528	42479		33826	23074	
Age at diagnosis <sup>a</sup>	60.47 (10.40)	62.72 (12.70)	<0.001	65.78 (10.97)	66.91 (12.95)	<0.001
Race <sup>b</sup>			<0.001			<0.001
White	41197 (83.2)	33210 (78.2)		27733 (82.0)	17233 (74.7)	
Black	2774 (5.6)	5836 (13.7)		2755 (8.1)	4178 (18.1)	
Others <sup>c</sup>	5235 (10.6)	3169 (7.5)		3261 (9.6)	1612 (7.0)	
Unknown	322 (0.7)	264 (0.6)		77 (0.2)	51 (0.2)	
Sex <sup>b</sup>			<0.001			<0.001
Female	49528 (100.0)	42479 (100.0)		13459 (39.8)	14007 (60.7)	
Male				20367 (60.2)	9067 (39.3)	
Grade <sup>b</sup>			<0.001			<0.001
Grade I	18481 (37.3)	13873 (32.7)		2263 (6.7)	1359 (5.9)	
Grade II	10976 (22.2)	9521 (22.4)		5798 (17.1)	3581 (15.5)	
Grade III	6877 (13.9)	6891 (16.2)		5405 (16.0)	3301 (14.3)	
Grade IV	2436 (4.9)	2621 (6.2)		369 (1.1)	218 (0.9)	
Unknown	10758 (21.7)	9573 (22.5)		19991 (59.1)	14615 (63.3)	

eTable 1 cont.

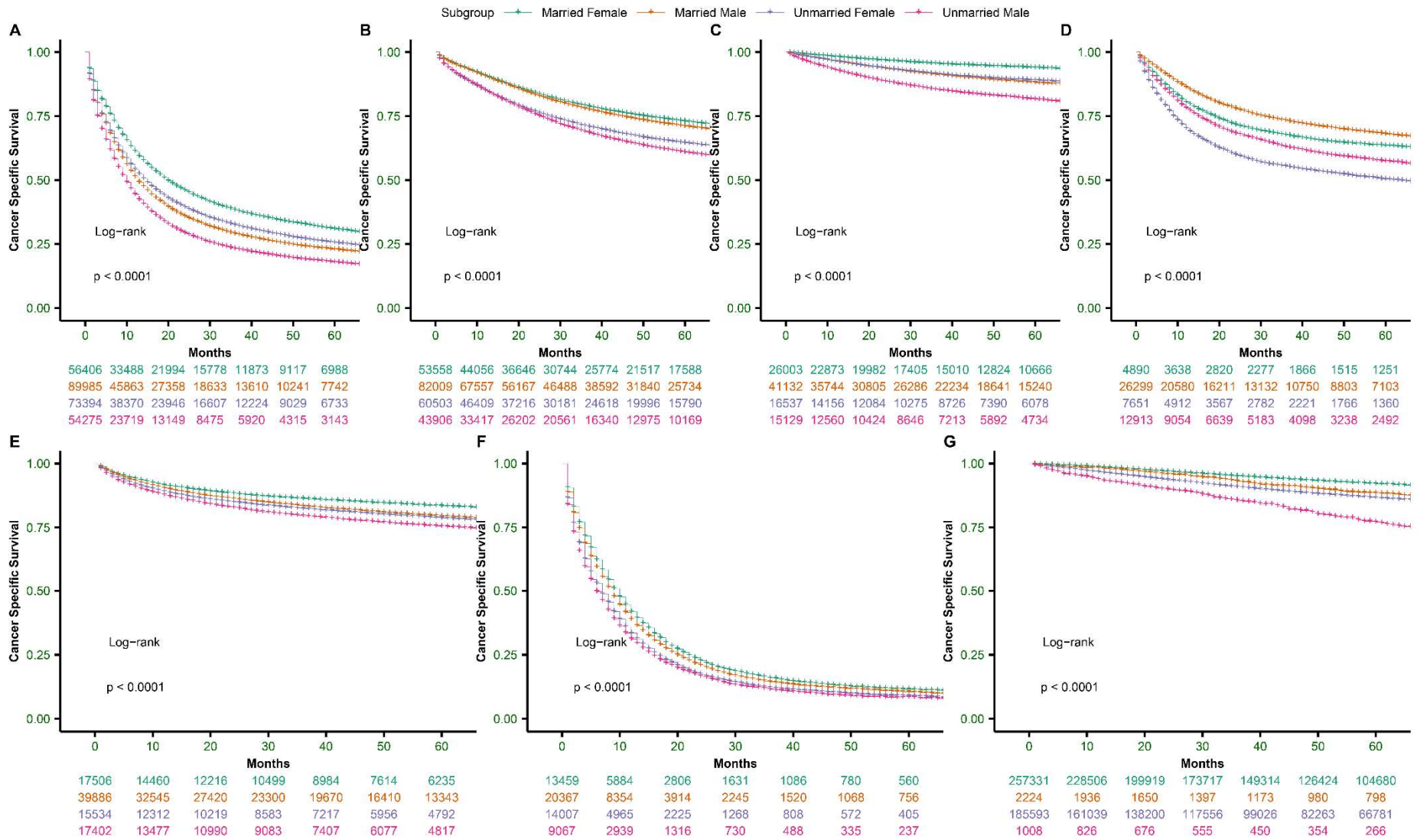
Characteristic	Endometrium			Pancreas		
	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>
	<b>49528</b>	<b>42479</b>		<b>33826</b>	<b>23074</b>	
<b>Surgery<sup>b</sup></b>			<0.001			<0.001
<b>No</b>	1729 (3.5)	3012 (7.1)		24547 (72.6)	18011 (78.1)	
<b>Yes</b>	47799 (96.5)	39467 (92.9)		9279 (27.4)	5063 (21.9)	
<b>Radiation<sup>b</sup></b>			<0.001			<0.001
<b>No/Unknown</b>	37063 (74.8)	31061 (73.1)		27231 (80.5)	19315 (83.7)	
<b>Yes</b>	12465 (25.2)	11418 (26.9)		6595 (19.5)	3759 (16.3)	
<b>Chemotherapy<sup>b</sup></b>			<0.001			<0.001
<b>No/Unknown</b>	40174 (81.1)	33713 (79.4)		10810 (32.0)	10268 (44.5)	
<b>Yes</b>	9354 (18.9)	8766 (20.6)		23016 (68.0)	12806 (55.5)	
<b>Stage<sup>b</sup></b>			<0.001			<0.001
<b>Early</b>	40991 (82.8)	32955 (77.6)		13109 (38.8)	8802 (38.1)	
<b>Advanced</b>	8537 (17.2)	9524 (22.4)		20717 (61.2)	14272 (61.9)	
<b>Insurance<sup>b</sup></b>			<0.001			<0.001
<b>Insured</b>	44571 (90.0)	33131 (78.0)		30201 (89.3)	17487 (75.8)	
<b>Medicaid</b>	3161 (6.4)	7142 (16.8)		2521 (7.5)	4344 (18.8)	
<b>Uninsured</b>	1194 (2.4)	1684 (4.0)		719 (2.1)	930 (4.0)	
<b>Unknown</b>	602 (1.2)	522 (1.2)		385 (1.1)	313 (1.4)	

eTable 1 cont.

Characteristic	Endometrium			Pancreas		
	Married	Unmarried	<i>P</i>	Married	Unmarried	<i>P</i>
	<b>49528</b>	<b>42479</b>		<b>33826</b>	<b>23074</b>	
<b>Poverty<sup>a</sup></b>	31.65 (9.52)	32.34 (9.38)	<0.001	32.00 (9.52)	32.75 (9.51)	<0.001
<b>Education<sup>a</sup></b>	14.50 (6.19)	14.88 (6.07)	<0.001	14.72 (6.18)	14.95 (6.07)	<0.001
<b>Residence<sup>b</sup></b>			<0.001			<0.001
<b>Metropolitan</b>	43837 (88.5)	38337 (90.2)		29981 (88.6)	20775 (90.0)	
<b>Nonmetropolitan</b>	5658 (11.4)	4124 (9.7)		3810 (11.3)	2284 (9.9)	
<b>Unknown</b>	33 (0.1)	18 (0.0)		35 (0.1)	15 (0.1)	

<sup>a</sup>mean (SD); <sup>b</sup>N (%); <sup>c</sup>include American Indian, AK Native, Asian and Pacific Islander

eFigure 2. Survival Curves of Cancer-Specific Survival of Cancer of the Lung, Colorectum, Melanoma, Bladder, Kidney, Pancreas, and Breast by Marital Status and Sex



**eTable 2. Associations Between Cancer-Specific Survival and Marital Status (Married vs Unmarried), Stage at Diagnosis, and Treatment**

Risk factors	Total Sample		Breast		Lung		Prostate	
	TR <sup>e</sup> (95%CI)	P	TR <sup>e</sup> (95%CI)	P	TR <sup>e</sup> (95%CI)	P	TR <sup>e</sup> (95%CI)	P
<b>Stage<sup>a</sup></b>								
<b>Early</b>	Reference		Reference		Reference		Reference	
<b>Advanced</b>	0.051 (0.051, 0.052)	<0.001	0.125 (0.122, 0.128)	<0.001	0.158 (0.155, 0.161)	<0.001	0.139 (0.134, 0.144)	<0.001
<b>Surgery<sup>b</sup></b>								
<b>No</b>	Reference		Reference		Reference		Reference	
<b>Yes</b>	3.442 (3.417, 3.467)	<0.001	3.824 (3.729, 3.922)	<0.001	4.735 (4.638, 4.834)	<0.001	4.137 (3.979, 4.301)	<0.001
<b>Radiotherapy<sup>c</sup></b>								
<b>No</b>	Reference		Reference		Reference		Reference	
<b>Yes</b>	1.446 (1.436, 1.456)	<0.001	1.251 (1.226, 1.276)	0.015	1.277 (1.263, 1.291)	<0.001	1.587 (1.539, 1.635)	<0.001
<b>Chemotherapy<sup>d</sup></b>								
<b>No</b>	Reference		Reference		Reference		Reference	
<b>Yes</b>	0.727 (0.722, 0.733)	<0.001	0.973 (0.952, 0.995)	<0.001	1.837 (1.815, 1.86)	<0.001	0.418 (0.396, 0.441)	<0.001
	<b>Colorectum</b>		<b>Melanoma</b>		<b>Bladder</b>		<b>Kidney</b>	
	TR <sup>e</sup> (95%CI)	P	TR <sup>e</sup> (95%CI)	P	TR <sup>e</sup> (95%CI)	P	TR <sup>e</sup> (95%CI)	P
<b>Stage<sup>a</sup></b>	Reference		Reference		Reference		Reference	
<b>Early</b>	0.100 (0.097, 0.103)	<0.001	0.047 (0.044, 0.05)	<0.001	0.138 (0.131, 0.144)	<0.001	0.042 (0.039, 0.045)	<0.001
<b>Advanced</b>								
<b>Surgery<sup>b</sup></b>	Reference		Reference		Reference		Reference	
<b>No</b>	6.593 (6.447, 6.743)	<0.001	2.263 (2.128, 2.408)	<0.001	2.335 (2.16, 2.525)	<0.001	6.976 (6.606, 7.367)	<0.001
<b>Yes</b>								
<b>Radiotherapy<sup>c</sup></b>	Reference		Reference		Reference		Reference	
<b>No</b>	1.25 (1.22, 1.282)	<0.001	0.461 (0.432, 0.492)	<0.001	0.525 (0.497, 0.556)	<0.001	0.591 (0.563, 0.62)	<0.001
<b>Yes</b>								
<b>Chemotherapy<sup>d</sup></b>	Reference		Reference		Reference		Reference	
<b>No</b>	1.33 (1.302, 1.359)	<0.001	0.485 (0.454, 0.518)	<0.001	1.039 (0.994, 1.086)	0.094	0.662 (0.633, 0.692)	<0.001
<b>Yes</b>								

eTable 2 cont.

Risk factors	Endometrium		Pancreas	
	TR <sup>e</sup> (95%CI)	P	TR <sup>e</sup> (95%CI)	P
<b>Stage<sup>a</sup></b>				
<b>Early</b>	Reference		Reference	
<b>Advanced</b>	0.093 (0.088, 0.099)	<0.001	0.384 (0.375, 0.393)	<0.001
<b>Surgery<sup>b</sup></b>				
<b>No</b>	Reference		Reference	
<b>Yes</b>	6.582 (6.225, 6.959)	<0.001	3.156 (3.056, 3.259)	<0.001
<b>Radiotherapy<sup>c</sup></b>				
<b>No</b>	Reference		Reference	
<b>Yes</b>	1.323 (1.266, 1.383)	<0.001	1.152 (1.123, 1.182)	<0.001
<b>Chemotherapy<sup>d</sup></b>				
<b>No</b>	Reference		Reference	
<b>Yes</b>	0.954 (0.907, 1.003)	0.068	1.548 (1.516, 1.581)	<0.001

<sup>a</sup>After adjusted for age, race, marital status, sex, grade, residence, poverty level and educational level; <sup>b</sup>After adjusted for age, race, marital status, sex, grade, residence, poverty level, educational level, stage at diagnosis, radiotherapy, and chemotherapy; <sup>c</sup>After adjusted for age, race, marital status, sex, grade, residence, poverty level, educational level, stage at diagnosis, surgery, and chemotherapy; <sup>d</sup>After adjusted for age, race, marital status, sex, grade, residence, poverty level, educational level, stage at diagnosis, surgery, and radiotherapy; <sup>e</sup>Time ratio

**eTable 3. Associations Between Cancer-Specific Survival and Marital Status (Married vs Unmarried), Stage at Diagnosis, and Treatment by Cancer Site and Histological Subtype**

Cancer and Sex	CSS <sup>a</sup>		Diagnosed at an Advanced Stage		Receiving Surgery		Receiving Chemotherapy		Receiving RT <sup>f</sup>	
	TR <sup>b</sup> for Marriage (95% CI)	<i>P</i>	OR <sup>c</sup> for Marriage (95% CI)	<i>P</i>	OR <sup>d</sup> for Marriage (95% CI)	<i>P</i>	OR <sup>e</sup> for Marriage (95% CI)	<i>P</i>	OR <sup>g</sup> for Marriage (95% CI)	<i>P</i>
<b>Lung</b>										
<b>SCLC<sup>h</sup></b>	1.072(1.046, 1.099)	<0.001	1.019(0.945, 1.100)	0.621	1.374(1.197, 1.58)	<0.001	1.36(1.284, 1.441)	<0.001	1.127(1.076, 1.179)	<0.001
<b>NSCLC<sup>i</sup></b>	1.105(1.091, 1.118)	<0.001	1.003(0.983, 1.023)	0.774	1.437(1.397, 1.477)	<0.001	1.478(1.45, 1.507)	<0.001	1.046(1.027, 1.066)	<0.001
<b>Pancreas</b>										
<b>Adenocarcinoma</b>	1.088(1.067, 1.109)	<0.001	1.030(0.990, 1.072)	0.147	1.292(1.212, 1.379)	<0.001	1.615(1.551, 1.682)	<0.001	1.025(0.975, 1.079)	0.332
<b>pNET<sup>j</sup></b>	1.340(1.154, 1.556)	<0.001	0.884(0.738, 1.058)	0.180	1.253(0.984, 1.596)	0.067	1.078(0.878, 1.324)	0.472	1.111(0.804, 1.548)	0.529
<b>Breast</b>										
<b>Triple Negative</b>	1.090(1.023, 1.161)	0.008	0.819(0.762, 0.879)	<0.001	1.255(1.112, 1.416)	<0.001	1.117(1.026, 1.217)	0.011	1.072(1.01, 1.138)	0.023
<b>HER2 Enriched</b>	1.171(1.042, 1.316)	<0.001	0.779(0.708, 0.857)	<0.001	1.369(1.172, 1.599)	<0.001	0.986(0.87, 1.116)	0.821	1.029(0.939, 1.127)	0.544
<b>Luminal A</b>	1.110(1.065, 1.157)	<0.001	0.835(0.806, 0.865)	<0.001	1.298(1.214, 1.387)	<0.001	1.1(1.069, 1.131)	<0.001	1.052(1.025, 1.078)	<0.001
<b>Luminal B</b>	1.093(0.995, 1.201)	0.041	0.865(0.808, 0.926)	<0.001	1.447(1.293, 1.62)	<0.001	1.118(1.037, 1.204)	0.004	1.025(0.967, 1.086)	0.409

<sup>a</sup>Cancer-specific survival; <sup>b</sup>Time ratio, adjusted for patient demographics (age, race, sex, insurance status, residence, poverty level and educational level), stage, grade, receiving surgery, receiving chemotherapy and receiving radiation therapy; <sup>c</sup>Odds ratio, adjusted for patient demographics, and grade; <sup>d</sup>adjusted for patient demographics, stage, grade, receiving chemotherapy and receiving radiation therapy; <sup>e</sup>adjusted for patient demographics, stage, grade, receiving surgery and receiving radiation therapy; <sup>f</sup>adjusted for patient demographics, stage, grade, receiving surgery and receiving radiation therapy; <sup>g</sup>adjusted for patient demographics, stage, grade, receiving chemotherapy and receiving surgery; <sup>h</sup>SCLC, small cell lung cancer; <sup>i</sup>NSCLC, non-small cell lung cancer; <sup>j</sup>pNET, pancreatic neuroendocrine tumor.

**eTable 4. Mediation Analyses of Direct and Indirect Effects of Marital Status on Cancer-Specific Survival Mediated by Stage at Diagnosis and Treatment and Receiving Radiation Therapy**

Mediators	Total Sample		Breast		Lung		Prostate	
	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>
<b>Stage</b>								
TE <sup>a</sup>	0.387 (0.378,0.396)	<0.001	0.275 (0.253,0.296)	<0.001	0.177 (0.163,0.191)	<0.001	0.451 (0.421,0.48)	<0.001
NIE <sup>b</sup>	0.065 (0.063,0.067)	<0.001	0.028 (0.026,0.03)	<0.001	-0.002 (-0.01,0.006)	<0.001	0.013 (0.011,0.015)	<0.001
NDE <sup>c</sup>	0.322 (0.313,0.331)	<0.001	0.247 (0.226,0.268)	<0.001	0.179 (0.167,0.191)	<0.001	0.437 (0.408,0.467)	<0.001
PM <sup>d</sup>	0.196 (0.195,0.197)	<0.001	0.114 (0.112,0.116)	<0.001	-0.013 (-0.015, -0.01)	<0.001	0.036 (0.034,0.038)	<0.001
<b>Surgery</b>								
TE	0.341 (0.335,0.348)	<0.001	0.191 (0.171,0.21)	<0.001	0.19 (0.177,0.203)	<0.001	0.474 (0.446,0.503)	<0.001
NIE	0.034 (0.033,0.036)	<0.001	0.005 (0.004,0.006)	<0.001	0.095 (0.087,0.102)	<0.001	0.161 (0.153,0.168)	<0.001
NDE	0.307 (0.301,0.314)	<0.001	0.186 (0.166,0.205)	<0.001	0.096 (0.084,0.107)	<0.001	0.314 (0.286,0.341)	<0.001
PM	0.117 (0.116,0.117)	<0.001	0.029 (0.027,0.03)	<0.001	0.522 (0.519,0.524)	<0.001	0.393 (0.39,0.396)	<0.001
<b>Radiotherapy</b>								
TE	0.318 (0.312,0.325)	<0.001	0.194 (0.175,0.214)	<0.001	0.099 (0.088,0.11)	<0.001	0.333 (0.305,0.361)	<0.001
NIE	0.011 (0.01,0.012)	<0.001	0.009 (0.008,0.01)	<0.001	0.004 (0.002,0.005)	<0.001	0.019 (0.017,0.021)	<0.001
NDE	0.307 (0.301,0.314)	<0.001	0.186 (0.166,0.205)	<0.001	0.096 (0.084,0.107)	<0.001	0.314 (0.286,0.341)	<0.001
PM	0.04 (0.04,0.041)	<0.001	0.05 (0.048,0.051)	<0.001	0.037 (0.036,0.038)	<0.001	0.067 (0.065,0.069)	<0.001
<b>Chemotherapy</b>								
TE	0.298 (0.292,0.305)	<0.001	0.185 (0.165,0.204)	<0.001	0.149 (0.138,0.161)	<0.001	0.313 (0.286,0.341)	<0.001
NIE	-0.009 (-0.009,-0.008)	<0.001	-0.001 (-0.002,0)	0.016	0.054 (0.051,0.057)	<0.001	0 (0,0)	0.051
NDE	0.307 (0.301,0.314)	<0.001	0.186 (0.166,0.205)	<0.001	0.096 (0.084,0.107)	<0.001	0.314 (0.286,0.341)	<0.001
PM	-0.034 (-0.035,-0.034)	<0.001	-0.006 (-0.008,-0.004)	<0.001	0.377 (0.376,0.379)	<0.001	0 (-0.002,0.002)	0.707



eTable 4 cont.

Mediators	Colorectum		Melanoma		Bladder		Kidney	
	Effect size (95%CI)	P	Effect size (95%CI)	P	Effect size (95%CI)	P	Effect size (95%CI)	P
<b>Stage</b>								
<b>TE<sup>a</sup></b>	0.351 (0.329,0.372)	<0.001	0.386 (0.336,0.437)	<0.001	0.442 (0.398,0.486)	<0.001	0.248 (0.204,0.292)	<0.001
<b>NIE<sup>b</sup></b>	0.033 (0.026,0.04)	<0.001	0.039 (0.034,0.044)	<0.001	0.029 (0.02,0.037)	<0.001	0.019 (0.01,0.027)	<0.001
<b>NDE<sup>c</sup></b>	0.318 (0.298,0.338)	<0.001	0.347 (0.297,0.397)	<0.001	0.413 (0.37,0.456)	<0.001	0.229 (0.186,0.273)	<0.001
<b>PM<sup>d</sup></b>	0.109 (0.107,0.112)	<0.001	0.12 (0.117,0.124)	<0.001	0.079 (0.075,0.082)	<0.001	0.085 (0.081,0.09)	<0.001
<b>Surgery</b>								
<b>TE</b>	0.244 (0.226,0.263)	<0.001	0.338 (0.29,0.385)	<0.001	0.389 (0.347,0.432)	<0.001	0.159 (0.122,0.197)	<0.001
<b>NIE</b>	0.02 (0.018,0.021)	<0.001	0 (0,0.001)	0.269	0.003 (0.002,0.005)	<0.001	0.011 (0.01,0.013)	<0.001
<b>NDE</b>	0.225 (0.207,0.243)	<0.001	0.337 (0.29,0.385)	<0.001	0.386 (0.344,0.429)	<0.001	0.148 (0.111,0.185)	<0.001
<b>PM</b>	0.09 (0.088,0.091)	<0.001	0.001 (-0.002,0.005)	0.387	0.009 (0.007,0.012)	<0.001	0.076 (0.072,0.079)	<0.001
<b>Radiotherapy</b>								
<b>TE</b>	0.223 (0.205,0.242)	<0.001	0.338 (0.29,0.385)	<0.001	0.395 (0.353,0.437)	<0.001	0.148 (0.111,0.185)	<0.001
<b>NIE</b>	-0.002 (-0.002,-0.001)	0.004	0 (0,0.001)	0.12	0.009 (0.006,0.011)	<0.001	0 (0,0)	<0.001
<b>NDE</b>	0.225 (0.207,0.243)	<0.001	0.337 (0.29,0.385)	<0.001	0.386 (0.344,0.429)	<0.001	0.148 (0.111,0.185)	<0.001
<b>PM</b>	-0.008 (-0.009,-0.006)	<0.001	0.001 (-0.002,0.004)	0.474	0.026 (0.024,0.029)	<0.001	0 (-0.004,0.003)	<0.001
<b>Chemotherapy</b>								
<b>TE</b>	0.245 (0.227,0.264)	<0.001	0.337 (0.29,0.385)	<0.001	0.388 (0.345,0.43)	<0.001	0.146 (0.108,0.183)	<0.001
<b>NIE</b>	0.021 (0.018,0.023)	<0.001	0 (0,0)	0.309	0.002 (0,0.003)	0.102	-0.002 (-0.003,-0.002)	<0.001
<b>NDE</b>	0.225 (0.207,0.243)	<0.001	0.337 (0.29,0.385)	<0.001	0.386 (0.344,0.429)	<0.001	0.148 (0.111,0.185)	<0.001
<b>PM</b>	0.094 (0.092,0.095)	<0.001	-0.001 (-0.004,0.003)	0.762	0.005 (0.002,0.008)	0.001	-0.015 (-0.019,-0.012)	<0.001

eTable 4 cont.

Mediators	Endometrium		Pancreas	
	Effect size (95%CI)	P	Effect size (95%CI)	P
<b>Stage</b>				
<b>TE<sup>a</sup></b>	0.274 (0.226,0.322)	<0.001	0.166 (0.143,0.189)	<0.001
<b>NIE<sup>b</sup></b>	0.031 (0.026,0.037)	<0.001	-0.006 (-0.015,0.004)	<0.001
<b>NDE<sup>c</sup></b>	0.243 (0.195,0.29)	<0.001	0.172 (0.15,0.193)	<0.001
<b>PM<sup>d</sup></b>	0.129 (0.125,0.133)	<0.001	-0.037 (-0.04,-0.033)	<0.001
<b>Surgery</b>				
<b>TE</b>	0.173 (0.13,0.217)	<0.001	0.153 (0.131,0.176)	<0.001
<b>NIE</b>	0.014 (0.012,0.016)	<0.001	0.042 (0.032,0.052)	<0.001
<b>NDE</b>	0.16 (0.116,0.203)	<0.001	0.111 (0.091,0.131)	<0.001
<b>PM</b>	0.086 (0.082,0.09)	<0.001	0.289 (0.286,0.293)	<0.001
<b>Radiotherapy</b>				
<b>TE</b>	0.16 (0.116,0.203)	<0.001	0.112 (0.091,0.132)	<0.001
<b>NIE</b>	0 (-0.002,0.002)	<0.001	0 (0,0.001)	0.392
<b>NDE</b>	0.16 (0.116,0.203)	<0.001	0.111 (0.091,0.131)	<0.001
<b>PM</b>	-0.001 (-0.005,0.003)	<0.001	0.004 (0.002,0.006)	<0.001
<b>Chemotherapy</b>				
<b>TE</b>	0.159 (0.115,0.203)	<0.001	0.153 (0.132,0.173)	<0.001
<b>NIE</b>	-0.001 (-0.001,0)	0.076	0.041 (0.037,0.045)	<0.001
<b>NDE</b>	0.16 (0.116,0.203)	<0.001	0.111 (0.091,0.131)	<0.001
<b>PM</b>	-0.004 (-0.008,0)	0.059	0.286 (0.284,0.289)	<0.001

<sup>a</sup>Total effect; <sup>b</sup>Natural indirect effect; <sup>c</sup>Natural direct effect; <sup>d</sup>Proportion mediated

**eTable 5. Mediation Analyses of Direct and Indirect Effects of Marital Status on Cancer-Specific Survival Mediated by Stage at Diagnosis and Treatment by**

**Histological Subtype**

Mediators	Lung				Pancreas			
	NSCLC <sup>e</sup>		SCLC <sup>f</sup>		Adenocarcinoma		pNET <sup>g</sup>	
	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>
<b>Stage</b>								
<b>TE<sup>a</sup></b>	0.191 (0.175,0.207)	<0.001	0.107 (0.078,0.135)	<0.001	0.156 (0.133,0.178)	<0.001	0.359 (0.189,0.53)	<0.001
<b>NIE<sup>b</sup></b>	-0.001 (-0.01,0.007)	0.774	-0.003 (-0.014,0.009)	0.621	-0.007 (-0.016,0.002)	0.147	0.052 (-0.024,0.127)	0.183
<b>NDE<sup>c</sup></b>	0.193 (0.179,0.206)	<0.001	0.11 (0.083,0.136)	<0.001	0.163 (0.142,0.183)	<0.001	0.308 (0.155,0.461)	<0.001
<b>PM<sup>d</sup></b>	-0.007 (-0.01,-0.004)	<0.001	-0.029 (-0.033,-0.024)	<0.001	-0.048 (-0.051,-0.044)	<0.001	0.166 (0.14,0.192)	<0.001
<b>Surgery</b>								
<b>TE</b>	0.208 (0.193,0.222)	<0.001	0.077 (0.052,0.102)	<0.001	0.118 (0.096,0.139)	<0.001	0.351 (0.189,0.514)	<0.001
<b>NIE</b>	0.108 (0.1,0.116)	<0.001	0.007 (0.002,0.012)	0.004	0.034 (0.025,0.042)	<0.001	0.059 (-0.005,0.122)	0.073
<b>NDE</b>	0.1 (0.087,0.112)	<0.001	0.07 (0.045,0.094)	<0.001	0.084 (0.064,0.103)	<0.001	0.293 (0.143,0.442)	<0.001
<b>PM</b>	0.546 (0.543,0.549)	<0.001	0.096 (0.093,0.099)	<0.001	0.299 (0.296,0.302)	<0.001	0.192 (0.169,0.214)	<0.001
<b>Radiotherapy</b>								
<b>TE</b>	0.102 (0.089,0.114)	<0.001	0.086 (0.06,0.111)	<0.001	0.084 (0.065,0.104)	<0.001	0.292 (0.143,0.441)	<0.001
<b>NIE</b>	0.002 (0.001,0.003)	<0.001	0.016 (0.01,0.022)	<0.001	0.001 (-0.001,0.002)	0.330	-0.001 (-0.003,0.002)	0.666
<b>NDE</b>	0.1 (0.087,0.112)	<0.001	0.07 (0.045,0.094)	<0.001	0.084 (0.064,0.103)	<0.001	0.293 (0.143,0.442)	<0.001
<b>PM</b>	0.02 (0.019,0.022)	<0.001	0.19 (0.187,0.193)	<0.001	0.007 (0.005,0.009)	0.036	-0.002 (-0.014,0.009))	0.669
<b>Chemotherapy</b>								
<b>TE</b>	0.159 (0.146,0.171)	<0.001	0.094 (0.069,0.119)	<0.001	0.139 (0.119,0.159)	<0.001	0.291 (0.141,0.44)	<0.001
<b>NIE</b>	0.059 (0.056,0.062)	<0.001	0.024 (0.019,0.029)	<0.001	0.055 (0.05,0.06)	<0.001	-0.002 (-0.007,0.003)	0.496
<b>NDE</b>	0.1 (0.087,0.112)	<0.001	0.07 (0.045,0.094)	<0.001	0.084 (0.064,0.103)	<0.001	0.293 (0.143,0.442)	<0.001
<b>PM</b>	0.391 (0.389,0.392)	<0.001	0.265 (0.262,0.268)	<0.001	0.411 (0.409,0.413)	<0.001	-0.007 (-0.018,0.004)	0.219

<sup>a</sup>Total effect; <sup>b</sup>Natural indirect effect; <sup>c</sup>Natural direct effect; <sup>d</sup>Proportion mediated; <sup>e</sup>NSCLC, non-small cell lung cancer; <sup>f</sup>SCLC, small cell lung cancer; <sup>g</sup>pNET, pancreatic neuroendocrine tumor.

eTable 5 cont.

Mediators	Breast							
	Triple Negative		HER2 Enriched		Luminal A		Luminal B	
	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>
<b>Stage</b>								
<b>TE<sup>a</sup></b>	0.163 (0.094,0.231)	<0.001	0.272 (0.145,0.399)	0.002	0.181 (0.136,0.225)	<0.001	0.232 (0.132,0.333)	<0.001
<b>NIE<sup>b</sup></b>	0.032 (0.02,0.044)	<0.001	0.054 (0.032,0.075)	<0.001	0.018 (0.014,0.022)	<0.001	0.025 (0.013,0.036)	<0.001
<b>NDE<sup>c</sup></b>	0.131 (0.063,0.198)	<0.001	0.219 (0.094,0.344)	0.008	0.163 (0.118,0.207)	<0.001	0.208 (0.108,0.307)	<0.001
<b>PM<sup>d</sup></b>	0.21 (0.202,0.217)	<0.001	0.219 (0.207,0.231)	<0.001	0.108 (0.103,0.112)	<0.001	0.117 (0.108,0.126)	<0.001
<b>Surgery</b>								
<b>TE</b>	0.091 (0.028,0.155)	<0.001	0.169 (0.052,0.286)	0.004	0.107 (0.066,0.148)	<0.001	0.098 (0.004,0.193)	0.040
<b>NIE</b>	0.005 (0.002,0.008)	<0.001	0.012 (0.003,0.02)	0.007	0.003 (0.002,0.003)	<0.001	0.009 (0.006,0.012)	<0.001
<b>NDE</b>	0.086 (0.022,0.149)	0.007	0.158 (0.041,0.274)	0.008	0.104 (0.063,0.146)	<0.001	0.089 (-0.005,0.183)	0.063
<b>PM</b>	0.06 (0.053,0.066)	<0.001	0.074 (0.063,0.085)	<0.001	0.026 (0.022,0.03)	<0.001	0.1 (0.09,0.109)	0.136
<b>Radiotherapy</b>								
<b>TE</b>	0.089 (0.025,0.152)	0.006	0.157 (0.04,0.274)	0.008	0.106 (0.064,0.147)	<0.001	0.09 (-0.004,0.184)	0.061
<b>NIE</b>	0.003 (0,0.006)	0.039	-0.001 (-0.002,0.001)	0.592	0.001 (0,0.002)	0.003	0.001 (-0.001,0.002)	0.437
<b>NDE</b>	0.086 (0.022,0.149)	<0.001	0.158 (0.041,0.274)	0.008	0.104 (0.063,0.146)	<0.001	0.089 (-0.005,0.183)	0.063
<b>PM</b>	0.033 (0.027,0.04)	0.008	-0.003 (-0.014,0.007)	0.529	0.012 (0.007,0.016)	0.745	0.008 (-0.002,0.018)	0.101
<b>Chemotherapy</b>								
<b>TE</b>	0.087 (0.023,0.15)	0.007	0.157 (0.04,0.274)	0.009	0.103 (0.061,0.144)	<0.001	0.096 (0.001,0.19)	0.047
<b>NIE</b>	0.001 (0,0.002)	0.177	-0.001 (-0.006,0.005)	0.822	-0.002 (-0.003,-0.001)	0.002	0.007 (0.002,0.011)	0.005
<b>NDE</b>	0.086 (0.022,0.149)	0.008	0.158 (0.041,0.274)	0.008	0.104 (0.063,0.146)	<0.001	0.089 (-0.005,0.183)	0.063
<b>PM</b>	0.01 (0.003,0.016)	0.003	-0.004 (-0.015,0.007)	0.449	-0.019 (-0.023,-0.015)	<0.001	0.072 (0.062,0.081)	<0.001

**eTable 6. Mediation Analyses of Direct and Indirect Effects of Marital Status on Cancer-Specific Survival Mediated by Stage at Diagnosis and Treatment by Sex**

Mediators	Total Sample				Lung				Colorectum			
	Female		Male		Female		Male		Female		Male	
	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>
<b>Stage</b>												
<b>TE<sup>a</sup></b>	0.261 (0.248,0.274)	<0.001	0.372 (0.358,0.386)	<0.001	0.129 (0.107,0.15)	<0.001	0.21 (0.19,0.229)	<0.001	0.261 (0.231,0.291)	<0.001	0.405 (0.377,0.434)	<0.001
<b>NIE<sup>b</sup></b>	0.048 (0.045,0.051)	<0.001	0.07 (0.064,0.075)	<0.001	-0.01 (-0.022,0.002)	0.001	-0.001 (- 0.012,0.01)	<0.001	0.061 (0.05,0.072)	<0.001	0.035 (0.025,0.044)	<0.001
<b>NDE<sup>c</sup></b>	0.213 (0.201,0.226)	<0.001	0.302 (0.29,0.315)	<0.001	0.139 (0.121,0.157)	<0.001	0.211 (0.195,0.227)	<0.001	0.2 (0.172,0.228)	<0.001	0.371 (0.343,0.398)	<0.001
<b>PM<sup>d</sup></b>	0.203 (0.202,0.204)	<0.001	0.217 (0.215,0.219)	<0.001	-0.084 (-0.089, - 0.08)	<0.001	-0.006 (-0.01,-0.002)	<0.001	0.257 (0.253,0.261)	<0.001	0.103 (0.099,0.106)	<0.001
<b>Surgery</b>												
<b>TE</b>	0.203 (0.194,0.213)	<0.001	0.308 (0.297,0.318)	<0.001	0.161 (0.141,0.182)	<0.001	0.211 (0.194,0.229)	<0.001	0.21 (0.182,0.239)	<0.001	0.278 (0.254,0.303)	<0.001
<b>NIE</b>	0.021 (0.019,0.022)	<0.001	0.073 (0.069,0.077)	<0.001	0.085 (0.073,0.097)	<0.001	0.096 (0.088,0.105)	<0.001	0.01 (0.008,0.013)	<0.001	0.029 (0.026,0.032)	<0.001
<b>NDE</b>	0.183 (0.173,0.192)	<0.001	0.235 (0.225,0.244)	<0.001	0.076 (0.059,0.093)	<0.001	0.115 (0.1,0.13)	<0.001	0.2 (0.172,0.228)	<0.001	0.249 (0.225,0.274)	<0.001
<b>PM</b>	0.111 (0.11,0.112)	<0.001	0.266 (0.264,0.267)	<0.001	0.547 (0.544,0.551)	<0.001	0.483 (0.48,0.485)	<0.001	0.054 (0.051,0.056)	<0.001	0.117 (0.115,0.119)	<0.001

eTable 6 cont.

Mediators	Total Sample				Lung				Colorectum			
	Female		Male		Female		Male		Female		Male	
	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>
<b>Radiotherapy</b>												
<b>TE</b>	0.193 (0.184,0.203)	<0.001	0.233 (0.223,0.242)	<0.001	0.079 (0.062,0.096)	<0.001	0.119 (0.103,0.134)	<0.001	0.199 (0.171,0.227)	<0.001	0.247 (0.223,0.272)	<0.001
<b>NIE</b>	0.01 (0.01,0.011)	<0.001	-0.002 (- 0.003,-0.002)	<0.001	0.003 (0.001,0.004)	<0.001	0.004 (0.002,0.005)	<0.001	-0.001 (-0.002,0)	<0.001	-0.002 (-0.003,- 0.001)	<0.001
<b>NDE</b>	0.183 (0.173,0.192)	<0.001	0.235 (0.225,0.244)	<0.001	0.076 (0.059,0.093)	<0.001	0.115 (0.1,0.13)	<0.001	0.2 (0.172,0.228)	<0.001	0.249 (0.225,0.274)	<0.001
<b>PM</b>	0.059 (0.058,0.06)	<0.001	-0.01 (-0.011,- 0.009)	<0.001	0.038 (0.037,0.04)	<0.001	0.033 (0.032,0.035)	<0.001	-0.006 (-0.008,- 0.003)	<0.001	-0.01 (-0.012,- 0.008)	<0.001
<b>Chemotherapy</b>												
<b>TE</b>	0.192 (0.182,0.201)	<0.001	0.25 (0.24,0.26)	<0.001	0.117 (0.1,0.134)	<0.001	0.178 (0.163,0.194)	<0.001	0.219 (0.191,0.248)	<0.001	0.269 (0.245,0.294)	<0.001
<b>NIE</b>	0.009 (0.008,0.01)	<0.001	0.015 (0.014,0.016)	<0.001	0.041 (0.037,0.045)	<0.001	0.063 (0.059,0.067)	<0.001	0.019 (0.016,0.022)	<0.001	0.02 (0.017,0.023)	<0.001
<b>NDE</b>	0.183 (0.173,0.192)	<0.001	0.235 (0.225,0.244)	<0.001	0.076 (0.059,0.093)	<0.001	0.115 (0.1,0.13)	<0.001	0.2 (0.172,0.228)	<0.001	0.249 (0.225,0.274)	<0.001
<b>PM</b>	0.051 (0.05,0.052)	<0.001	0.068 (0.067,0.068)	<0.001	0.363 (0.361,0.365)	<0.001	0.375 (0.373,0.377)	<0.001	0.096 (0.093,0.099)	<0.001	0.083 (0.081,0.086)	<0.001

eTable 6 cont.

Mediators	Melanoma				Bladder				Kidney			
	Female		Male		Female		Male		Female		Male	
	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>
<b>Stage</b>												
<b>TE<sup>a</sup></b>	0.313 (0.224,0.402)	<0.001	0.409 (0.347,0.471)	<0.001	0.373 (0.281,0.464)	<0.001	0.469 (0.419,0.518)	<0.001	0.117 (0.042,0.192 )	<0.001	0.294 (0.24,0.349)	<0.001
<b>NIE<sup>b</sup></b>	0.023 (0.017,0.029)	<0.001	0.05 (0.042,0.057)	<0.001	0.009 (-0.009,0.028)	0.281	0.038 (0.029,0.048)	<0.001	0.006 (- 0.005,0.018)	<0.001	0.025 (0.013,0.036)	0.115
<b>NDE<sup>c</sup></b>	0.29 (0.201,0.379)	<0.001	0.359 (0.298,0.421)	<0.001	0.363 (0.274,0.453)	<0.001	0.431 (0.382,0.479)		0.111 (0.036,0.185 )	<0.001	0.27 (0.216,0.323)	<0.001
<b>PM<sup>d</sup></b>	0.084 (0.077,0.091)	<0.001	0.144 (0.139,0.149)	<0.001	0.03 (0.022,0.039)	<0.001	0.1 (0.096,0.105)	<0.001	0.057 (0.049,0.065 )	<0.001	0.095 (0.09,0.101)	<0.001
<b>Surgery</b>												
<b>TE</b>	0.299 (0.215,0.383)	<0.001	0.35 (0.292,0.408)	<0.001	0.341 (0.253,0.429)	<0.001	0.405 (0.358,0.453)	<0.001	0.173 (0.13,0.217)	<0.001	0.177 (0.13,0.224)	<0.001
<b>NIE</b>	0 (-0.001,0.001)	0.604	0.001 (0,0.002)	0.103	0.003 (-0.001,0.006)	0.147	0.003 (0.001,0.005)	<0.001	0.014 (0.012,0.016 )	<0.001	0.014 (0.012,0.017)	<0.001
<b>NDE</b>	0.299 (0.215,0.383)	<0.001	0.349 (0.291,0.407)	<0.001	0.338 (0.25,0.426)	<0.001	0.402 (0.354,0.45)	<0.001	0.16 (0.116,0.203 )	<0.001	0.162 (0.116,0.209)	<0.001
<b>PM</b>	-0.001 (-0.007,0.005)	0.736	0.003 (-0.001,0.007)	0.136	0.009 (0.003,0.016)	0.003	0.009 (0.006,0.012)	<0.001	0.086 (0.082,0.09)	<0.001	0.088 (0.084,0.093)	<0.001

eTable 6 cont.

Mediators	Melanoma				Bladder				Kidney			
	Female		Male		Female		Male		Female		Male	
	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>
<b>Radiotherapy</b>												
<b>TE</b>	0.299 (0.215,0.383)	<0.001	0.349 (0.291,0.408)	<0.001	0.347 (0.259,0.435)	<0.001	0.411 (0.363,0.459)	<0.001	0.16 (0.116,0.203)	<0.001	0.162 (0.116,0.209)	<0.001
<b>NIE</b>	0 (-0.002,0.002)	0.81	0 (0,0.001)	0.296	0.009 (0.004,0.014)	<0.001	0.009 (0.006,0.011)	<0.001	0 (-0.002,0.002)	<0.001	0 (0,0)	0.487
<b>NDE</b>	0.299 (0.215,0.383)	<0.001	0.349 (0.291,0.407)	<0.001	0.338 (0.25,0.426)	<0.001	0.402 (0.354,0.45)	<0.001	0.16 (0.116,0.203)	<0.001	0.162 (0.116,0.209)	<0.001
<b>PM</b>	0.001 (-0.005,0.007)	0.745	0.001 (-0.003,0.005)	0.528	0.031 (0.024,0.037)	<0.001	0.026 (0.023,0.029)	<0.001	-0.001 (-0.005,0.003)	<0.001	-0.001 (-0.005,0.003)	0.695
<b>Chemotherapy</b>												
<b>TE</b>	0.299 (0.215,0.383)	<0.001	0.349 (0.291,0.407)	<0.001	0.343 (0.255,0.431)	<0.001	0.403 (0.355,0.451)	<0.001	0.159 (0.115,0.203)	<0.001	0.16 (0.113,0.206)	<0.001
<b>NIE</b>	0 (-0.001,0)	0.7135	0 (0,0)	0.657	0.005 (0,0.01)	0.047	0.001 (-0.001,0.003)	0.412	-0.001 (-0.001,0)	0.076	-0.003 (-0.003,-0.002)	<0.001
<b>NDE</b>	0.299 (0.215,0.383)	<0.001	0.349 (0.291,0.407)	<0.001	0.338 (0.25,0.426)	<0.001	0.402 (0.354,0.45)	<0.001	0.16 (0.116,0.203)	<0.001	0.162 (0.116,0.209)	<0.001
<b>PM</b>	-0.001 (-0.007,0.005)	0.699	0 (-0.004,0.004)	0.88	0.017 (0.01,0.023)	<0.001	0.002 (-0.001,0.005)	0.139	-0.004 (-0.008,0)	0.059	-0.018 (-0.022,-0.014)	<0.001



eTable 6 cont.

Mediators	Pancreas				Breast			
	Female		Male		Female		Male	
	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>
<b>Stage</b>								
<b>TE<sup>a</sup></b>	0.106 (0.074,0.138)	<0.001	0.213 (0.179,0.247)	<0.001	0.271 (0.25,0.293)	<0.001	0.546 (0.344,0.748)	0.003
<b>NIE<sup>b</sup></b>	-0.012 (- 0.025,0)	<0.001	-0.002 (- 0.016,0.012)	<0.001	0.028 (0.026,0.03)	<0.001	0.032 (0,0.064)	0.277
<b>NDE<sup>c</sup></b>	0.119 (0.089,0.148)	<0.001	0.215 (0.184,0.246)	<0.001	0.244 (0.223,0.265)	<0.001	0.514 (0.314,0.713)	0.005
<b>PM<sup>d</sup></b>	-0.123 (-0.128, -0.118)	<0.001	-0.011 (- 0.016,-0.006)	<0.001	0.115 (0.113,0.117)	<0.001	0.076 (0.061,0.09)	<0.001
<b>Surgery</b>								
<b>TE</b>	0.109 (0.078,0.141)	<0.001	0.188 (0.156,0.221)	<0.001	0.103 (0.07,0.135)	<0.001	0.567 (0.175,0.959)	0.005
<b>NIE</b>	0.035 (0.021,0.049)	<0.001	0.042 (0.029,0.056)	<0.001	0.004 (0.003,0.005)	<0.001	0 (- 0.006,0.007)	0.899
<b>NDE</b>	0.074 (0.046,0.102)	<0.001	0.146 (0.116,0.175)	<0.001	0.098 (0.066,0.131)	<0.001	0.567 (0.175,0.958)	0.005
<b>PM</b>	0.331 (0.326,0.336)	<0.001	0.242 (0.238,0.247)	<0.001	0.042 (0.038,0.045)	<0.001	0.001 (- 0.017,0.019)	0.914

eTable 6 cont.

Mediators	Pancreas				Breast			
	Female		Male		Female		Male	
	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>	Effect size (95%CI)	<i>P</i>
<b>Radiotherapy</b>								
<b>TE</b>	0.074 (0.046,0.102)	<0.001	0.147 (0.117,0.176)	<0.001	0.1 (0.067,0.132)	<0.001	0.567 (0.175,0.958)	0.005
<b>NIE</b>	0 (-0.001,0.001)	0.71	0.001 (0,0.002)	0.109	0.001 (0.001,0.002)	0.06731 2613	0 (- 0.001,0.001)	0.995
<b>NDE</b>	0.074 (0.046,0.102)	<0.001	0.146 (0.116,0.175)	<0.001	0.098 (0.066,0.131)	<0.001	0.567 (0.175,0.958)	0.005
<b>PM</b>	-0.003 (-0.006,0)	0.036	0.008 (0.005,0.011)	<0.001	0.014 (0.011,0.018)	<0.001	0 (- 0.018,0.018)	0.999
<b>Chemotherapy</b>								
<b>TE</b>	0.112 (0.083,0.14)	<0.001	0.191 (0.161,0.22)	<0.001	0.098 (0.065,0.13)	<0.001	0.576 (0.183,0.969)	0.004
<b>NIE</b>	0.037 (0.032,0.043)	<0.001	0.045 (0.039,0.051)	<0.001	-0.001 (- 0.002,0)	<0.001	0.009 (- 0.026,0.045)	0.604
<b>NDE</b>	0.074 (0.046,0.102)	<0.001	0.146 (0.116,0.175)	<0.001	0.098 (0.066,0.131)	<0.001	0.567 (0.175,0.958)	0.005
<b>PM</b>	0.345 (0.342,0.348)	<0.001	0.252 (0.249,0.256)	<0.001	-0.009 (- 0.013,-0.006)	<0.001	0.021 (0,0.043)	0.054

<sup>a</sup>Total effect; <sup>b</sup>Natural indirect effect; <sup>c</sup>Natural direct effect; <sup>d</sup>Proportion mediated

**eTable 7. Demographic and Clinical Characteristics of Individuals Included and Excluded**

<b>Characteristics</b>	<b>Included 1733906 (81.3)</b>	<b>Excluded 397632 (18.7)</b>	<b><i>P</i></b>
<b>Age at diagnosis<sup>a</sup></b>	63.76 (12.60)	67.79 (14.90)	<0.001
<b>Race<sup>b</sup></b>			<0.001
<b>White</b>	1393206 (80.4)	304445 (76.6)	
<b>Black</b>	201295 (11.6)	42183 (10.6)	
<b>Other<sup>c</sup></b>	127420 (7.3)	23254 (5.8)	
<b>Unknown</b>	11985 (0.7)	27750 (7.0)	
<b>Sex<sup>b</sup></b>			<0.001
<b>Female</b>	894379 (51.6)	163721 (41.2)	
<b>Male</b>	839527 (48.4)	233911 (58.8)	
<b>Grade<sup>b</sup></b>			<0.001
<b>Grade I</b>	206578 (11.9)	34179 (8.6)	
<b>Grade II</b>	612491 (35.3)	92795 (23.3)	
<b>Grade III</b>	488671 (28.2)	67334 (16.9)	
<b>Grade IV</b>	60788 (3.5)	7827 (2.0)	
<b>Unknown</b>	365378 (21.1)	195497 (49.2)	
<b>Surgery<sup>b</sup></b>			<0.001
<b>No</b>	536914 (31.0)	182464 (45.9)	
<b>Yes</b>	1196992 (69.0)	154303 (38.8)	
<b>Unknown</b>	0 (0.0)	60865 (15.3)	
<b>Radiation<sup>b</sup></b>			<0.001
<b>No/ Unknown</b>	1159441 (66.9)	341790 (86.0)	
<b>Yes</b>	574465 (33.1)	55842 (14.0)	
<b>Chemotherapy<sup>b</sup></b>			<0.001
<b>No/ Unknown</b>	1207743 (69.7)	350252 (88.1)	
<b>Yes</b>	526163 (30.3)	47380 (11.9)	

eTable 7 cont.

<b>Characteristics</b>	<b>Included 1733906 (81.3)</b>	<b>Excluded 397632 (18.7)</b>	<b><i>P</i></b>
<b>Stage<sup>b</sup></b>			<0.001
<b>Early</b>	1189957 (68.6)	193049 (48.5)	
<b>Advanced</b>	543949 (31.4)	48769 (12.3)	
<b>Unknown</b>	0 (0.0)	155814 (39.2)	
<b>Insurance<sup>b</sup></b>			<0.001
<b>Insured</b>	1475410 (85.1)	199736 (50.2)	
<b>Medicaid</b>	181047 (10.4)	27051 (6.8)	
<b>Uninsured</b>	39962 (2.3)	6337 (1.6)	
<b>Unknown</b>	37487 (2.2)	164508 (41.4)	
<b>Poverty<sup>a</sup></b>	32.40 (9.55)	32.47 (9.62)	<0.001
<b>Education<sup>a</sup></b>	14.87 (6.17)	14.76 (6.15)	<0.001
<b>Residence<sup>b</sup></b>			<0.001
<b>Metropolitan</b>	1531155 (88.3)	350231 (88.1)	
<b>Nonmetropolitan</b>	201258 (11.6)	46226 (11.6)	
<b>Unknown</b>	1493 (0.1)	1175 (0.3)	

<sup>a</sup>Mean (SD); <sup>b</sup>N (%) includes American Indian, Alaska Native, and Asian/Pacific Islander