

APPENDIX

Supplementary Table 1. Univariable analysis for development of secondary bladder and rectal cancer after primary treatment for prostate cancer				
	Fine-Gray subdistribution hazard ratio (95% CI)	p	Cause-specific hazard ratio (95% CI)	p
Secondary bladder cancer				
Treatment (reference: surgery)				
Radiotherapy	2.25 (2.11, 2.41)	<0.001	2.62 (2.45, 2.80)	<0.001
Age (per 1 year increase)	1.007 (1.005, 1.008)	<0.001	1.007 (1.006, 1.007)	<0.001
Year of diagnosis (per 1 year increase)	0.95 (0.94, 0.96)	<0.001	0.964 (0.95, 0.97)	<0.001
Race (reference group: white)				
Black	0.59 (0.53, 0.65)	<0.001	0.60 (0.54, 0.67)	<0.001
Other	0.62 (0.52, 0.73)	<0.001	0.62 (0.52, 0.74)	<0.001
Marital status (reference group: married)				
Unmarried	0.89 (0.82, 0.96)	0.005	0.94 (0.87, 1.03)	0.17
Secondary rectal cancer				
Treatment (reference: surgery)				
Radiation	2.12 (1.87, 2.41)	<0.001	2.46 (2.17, 2.80)	<0.001
Age (per 1 year increase)	1.006 (1.004, 1.007)	<0.001	1.006 (1.005, 1.007)	<0.001
Year of diagnosis (per 1 year increase)	0.92 (0.91, 0.94)	<0.001	0.93 (0.92, 0.95)	<0.001
Race (reference group: white)				
Black	1.10 (0.93, 1.31)	0.25	1.13 (0.95, 1.33)	0.17
Other	1.28 (1.00, 1.63)	0.05	1.28 (1.00, 1.64)	0.05
Marital status (reference group: married)				
Unmarried	0.96 (0.82, 1.12)	0.62	1.02 (0.87, 1.19)	0.79

Supplementary Table 2. Patient characteristics of primary and secondary bladder cancers			
	Primary bladder cancer n=202 822	Bladder cancer post-RP n=2270	Bladder cancer post-radiation n=4841
Age (mean±SD)	70.8±13.2	70.3±7.4	76.4±7.7
Year at diagnosis (mean±SD)	2008.2±4.9	2010.0±4.2	2009.5±4.4
Race			
White	182,534 (90.9)	2058 (90.7)	4198 (86.8)
Black	9803 (4.9)	161 (7.1)	452 (9.3)
Other	8385 (4.2)	50 (2.2)	189 (3.9)
Marital status			
Married	133 241 (70.8)	1720 (82.9)	3284 (74.1)
Not married	55 009 (29.2)	355 (17.1)	1148 (25.9)
Bladder cancer tumor stage			
0	106 721 (55.4)	1456 (66.2)	2928 (63.4)
1	45 551 (23.5)	431 (19.6)	923 (20.0)
2	20 628 (10.7)	157 (7.1)	285 (8.33)
3	8720 (4.5)	64 (2.9)	186 (4.0)
4	11 066 (5.7)	91 (4.1)	198 (4.3)

Supplementary Table 3. Univariable analysis for bladder cancer and rectal cancer specific survival				
	Fine-Gray subdistribution HR (95% CI)	p	Cause-specific hazard model HR (95% CI)	p
Bladder cancer-specific survival				
Primary vs. secondary bladder cancer (reference group: primary bladder cancer)				
Secondary bladder cancer after surgery	0.53 (0.46, 0.61)	<0.001	0.50 (0.43, 0.58)	<0.001
Secondary bladder cancer after RT	0.85 (0.79, 0.92)	<0.001	0.90 (0.83, 0.97)	0.008
Age (per 1 year increase)	1.006 (1.005, 1.007)	<0.001	1.007 (1.006, 1.007)	<0.001
Year of diagnosis (per 1 year increase)	0.997 (0.995, 0.999)	0.01	1.006 (1.003, 1.008)	<0.001
Race (reference group: white)				
Black	1.37 (1.31, 1.43)	<0.001	1.41 (1.35, 1.48)	<0.001
Other	0.97 (0.92, 1.03)	0.37	0.96 (0.91, 1.02)	0.15
Marital status (reference group: married)				
Unmarried	1.42 (1.39, 1.45)	<0.001	1.53 (1.50, 1.57)	<0.001
Bladder cancer stage (reference group: stage 0)				
1	2.97 (2.86, 3.08)	<0.001	3.12 (3.01, 3.24)	<0.001
2	9.08 (8.77, 9.41)	<0.001	10.9 (10.5, 11.3)	<0.001
3	11.3 (10.8, 11.8)	<0.001	13.3 (12.8, 13.9)	<0.001
4	24.6 (23.6, 25.5)	<0.001	37.2 (35.8, 38.6)	<0.001
Rectal cancer-specific survival				
Primary vs. secondary rectal cancer (reference group: primary rectal cancer)				
Secondary rectal cancer after surgery	0.66 (0.52, 0.84)	<0.001	0.62 (0.49, 0.79)	0.0001
Secondary rectal cancer after RT	1.08 (0.94, 1.25)	0.26	1.22 (1.06, 1.41)	0.005
Age (per 1 year increase)	1.005 (1.004, 1.006)	<0.001	1.007 (1.007, 1.007)	<0.001
Year of diagnosis (per 1 year increase)	1.004 (1.001, 1.008)	0.02	1.013 (1.009, 1.016)	<0.001
Race (reference group: white)				
Black	1.14 (1.08, 1.20)	<0.001	1.20 (1.14, 1.26)	<0.001
Other	1.00 (0.95, 1.06)	0.92	0.96 (0.91, 1.02)	0.20
Marital status (reference group: married)				

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Unmarried	1.46 (1.41, 1.51)	<0.001	1.64 (1.59, 1.70)	<0.001
Rectal cancer stage (reference group: stage 0)				
1	2.91 (2.51, 3.38)	<0.001	2.96 (3.55, 3.43)	<0.001
2	6.43 (5.56, 7.43)	<0.001	6.99 (6.04, 8.08)	<0.001
3	7.63 (6.60, 8.81)	<0.001	8.56 (7.41, 9.89)	<0.001
4	19.9 (17.3, 23.0)	<0.001	40.2 (34.8, 46.4)	<0.001

Supplementary Table 4. Patient characteristics of primary and secondary rectal cancers			
	Primary rectal cancer n=107 964	Rectal cancer post-RP n=713	Rectal cancer post-radiation n=1335
Age (mean±SD)	63.5±14.6	68.3±7.7	74.9±81
Year at diagnosis (mean±SD)	2008±4.9	2009.2±4.3	2009.1±4.5
Race			
White	86,145 (80.7)	568 (79.7)	1039 (77.8)
Black	10,278 (9.6)	100 (14.0)	215 (16.1)
Other	10,358 (9.7)	45 (6.3)	81 (6.1)
Marital status			
Married	66,920 (66.5)	526 (77.8)	896 (71.4)
Not married	33,762 (33.5)	150 (22.2)	358 (28.6)
Rectal cancer tumor stage			
0	8635 (9.1)	57 (9.0)	90 (7.5)
1	25 269 (26.7)	208 (33.0)	386 (32.1)
2	21 437 (22.7)	150 (23.8)	311 (25.9)
3	21 938 (23.2)	158 (25.1)	225 (18.7)
4	17 244 (18.3)	57 (9.1)	189 (15.7)