

Supplementary Online Content

Dess RT, Hartman HE, Mahal BA, et al. Association of black race with prostate cancer–specific and other-cause mortality. *JAMA Oncol*. Published online May 23, 2019. doi:10.1001/jamaoncol.2019.0826

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

eTable 1. Randomized Clinical Trial Details

Trial	Years	Criteria	Treatment
RCT 92-02	1992-1995	Clinical stage T2c to T4 with no involved nodes in the common iliac or higher node chains, pretreatment prostate-specific antigen (PSA) < 150 ng/mL	Neoadjuvant (2 months) and concurrent androgen deprivation therapy (ADT) with radiation Randomized to receive no further treatment (STAD-RT) or to receive ADT for additional 2 years after the completion of RT (LTAD-RT).
RCT 94-08	1994-2001	Clinical stage T1b-T2b (AJCC 6 th Edition) and a PSA ≤ 20 ng/mL	Randomized to receive either radiotherapy plus short-term ADT (4 months) or radiotherapy alone
RCT 94-13	1995-1999	Clinically localized disease with high risk of lymph node involvement, or T2c-T4 tumors and Gleason ≥6, PSA < 100 ng/mL	Randomized to whole-pelvic vs. prostate-only radiation and also Randomized to combined neoadjuvant (2 months) + concurrent (2 months) ADT vs. adjuvant ADT (4 months)
RCT 99-10	2000-2004	T1b-4 (AJCC, 5 th edition) AND - Gleason 2-6, AND PSA >10 but ≤ 100 ng/mL - Gleason 7 AND PSA < 20 ng/mL or T1b-1c (AJCC, 5 th edition) AND - Gleason 8-10 AND PSA < 20 ng/mL	Randomized to either neoadjuvant (2 months) and concurrent ADT with radiation or prolonged neoadjuvant (7 months) followed by concurrent ADT with radiation

eTable 2. Exclusions and Missing Variables in the SEER, VA, and RCT Data Sets

Data set	Variable	Black			White			Overall		
		Missing	Cumulative Missing	Total Remaining	Missing	Cumulative Missing	Total Remaining	Missing	Cumulative Missing	Total Remaining
SEER				61012			283424			344436
	Survival time	289	289	60723	916	916	282508	1205	1205	343231
	Gleason	1623	1888	59124	7336	8140	275284	8959	10028	334408
	T-stage	523	2155	58857	2065	9229	274195	2588	11384	333052
	Yost Index	7	2160	58852	86	9285	274139	93	11445	332991
	PSA	7086	8172	52840	35474	39991	243433	42560	48163	296273
VA				1615			3029			4644
	T-stage	64	64	1551	311	311	2718	375	375	4269
	Gleason	50	102	1513	310	559	2470	360	661	3983
	Age	9	102	1513	0	559	2470	0	661	3983
	PSA	4	102	1513	49	568	2461	53	670	3974
	PSA >150 ng/mL	0	102	1513	1	569	2460	1	671	3973
RCT				1160			4851			6011
	T-stage	0	0	1160	0	0	4851	0	0	6011
	Gleason	28	28	1132	116	116	4735	144	144	5867
	n-stage	1	29	1131	1	117	4734	2	146	5865
	Zubrod	0	29	1131	0	117	4734	0	146	5865
	PSA	2	31	1129	9	126	4725	11	157	5854
	Age	0	31	1129	0	126	4725	0	157	5854

eTable 3. Description of Baseline Characteristics by Race (All Variables)

Variable n (%)	SEER Cohort		VA Cohort		RCT Cohort	
	White	Black	White	Black	White	Black
N	243433 (82)	52840 (18)	2459 (62)	1513 (38)	4725 (81)	1129 (19)
Follow up time Median (IQR)	76 (49, 105)	70 (45, 100)	98 (61, 145)	94 (55, 142)	105 (71, 132)	101 (60, 131)
Age Median (IQR)	65 (59, 71)	62 (56, 69)	64 (60, 68)	61 (56, 65)	71 (66, 74)	69 (64, 73)
Gleason Score						
<=6	115709 (48)	23304 (44)	1214 (49)	724 (48)	1926 (41)	494 (44)
7	95810 (39)	22515 (43)	896 (36)	600 (40)	1978 (42)	424 (38)
8	18440 (8)	4498 (9)	248 (10)	142 (9)	512 (11)	140 (12)
9-10	13474 (6)	2523 (5)	101 (4)	47 (3)	309 (7)	71 (6)
T-Stage						
T1/T2a	109467 (45)	28634 (54)	2040 (83)	1339 (89)	2306 (49)	619 (55)
T2b/c	108214 (45)	19878 (38)	398 (16)	171 (11)	1393 (30)	307 (27)
T3/T4	25752 (11)	4328 (8)	21 (1.0)	3 (0.2)	1026 (22)	203 (18)
N-Stage						
N0	237646 (98)	51727 (98)	2459 (100)	1513 (100)	2802 (59)	657 (58)
N1/N2	5787 (2)	1113 (2)	0	0	59	12
NX	0	0	0	0	(1) 1864 (39)	(1) 460 (41)
PSA ng/mL						
Median (IQR)	6.0 (4.5, 8.9)	6.6 (4.8, 10.8)	6.2 (4.6, 9.2)	7.0 (4.9, 10.7)	11.5 (7.2, 17.7)	13.7 (7.9, 22.2)
<10	194149 (80)	38086 (72)	2166 (75)	1417 (76)	1991 (42)	404 (36)
≥10 - <20	34055 (14)	9278 (18)	536 (19)	329 (18)	1599 (34)	347 (31)
≥20	15229 (6)	5476 (10)	198 (7)	115 (6)	1135 (24)	378 (34)
Risk Group						
Low	54305 (22)	11574 (22)	868 (35)	474 (31)	524 (11)	130 (12)
Intermediate	130387 (54)	27693 (52)	1134 (46)	750 (50)	2115 (45)	444 (39)
High	52954 (22)	12460 (24)	457 (19)	289 (19)	2027 (43)	543 (48)
Node Positive	5787 (2)	1113 (2)			59 (1)	12 (1)
Zubrod						
0					4391 (93)	975 (86)

1					334 (7)	154 (14)
Yost variable*	11302 (10722, 11600)	10971 (9898, 11432)				
Median (IQR)						
Q1 n (%)	43308 (18)	15564 (29)				
Q2 n (%)	45757 (19)	12359 (23)				
Q3 n (%)	48505 (20)	10920 (21)				
Q4 n (%)	51633 (21)	8234 (16)				
Q5 n (%)	54230 (22)	5763 (11)				
Insurance						
Insured	157220 (65)	32704 (62)				
Medicaid	3632 (1)	2745 (5)				
Uninsured	1656 (1)	1138 (2)				
Unknown	80925 (33)	16253 (31)				
RT	96166 (40)	23802 (45)	0 (0)	0 (0)	4725 (100)	1129 (100)
Surgery	101104 (42)	17379 (33)	2459 (100)	1513 (100)	0 (0)	0 (0)
No Surgery or RT	52092 (21)	12737 (24)				
Treatment arm**						
1					606 (13)	95 (8)
2					587 (12)	90 (8)
3					731 (15)	193 (17)
4					740 (16)	186 (16)
5					214 (5)	88 (8)
6					217 (5)	86 (8)
7					222 (5)	77 (7)
8					228 (5)	71 (6)
9					591 (13)	116 (10)
10					589 (12)	127 (11)

*Q1 = [8177, 10302), Q2 = [10302, 11045), Q3 = [11045, 11395), Q4 = [11395, 11619), Q5 = [11618, 11829]

**[1] "9202: Long-term Androgen Deprivation + RT"
 [2] "9202: Short-term Androgen Deprivation + RT"
 [3] "9408: Hormone + RT"
 [4] "9408: RT Alone"
 [5] "9413: PO RT + AHT"
 [6] "9413: PO RT + NHT"

[7] "9413: WP RT + AHT"

[8] "9413: WP RT + NHT"

[9] "9910: 28-week TAS RT+TAS"

[10] "9910: 8-week TAS RT+TAS"

eTable 4. Description of Baseline Characteristics by Race After Inverse Probability Weighting (All Variables)

Variable n (%)	SEER Cohort		VA Cohort		RCT Cohort	
	White	Black	White	Black	White	Black
N	243433 (82)	52840 (18)	2459 (62)	1513 (38)	4725 (81)	1129 (19)
Follow up time Median (IQR)	75	72	100	94	105	102
Age Mean (sd)	64.8 (8.9)	64.9 (8.9)	61.9 (6.0)	62.0 (6.2)	69.7 (6.5)	69.9 (6.5)
Gleason Score						
<=6	114236 (47)	25141 (48)	1203 (49)	751 (50)	1948 (41)	454 (40)
7	97155 (40)	20795 (39)	923 (38)	562 (37)	1945 (41)	482 (43)
8	18861 (8)	4046 (8)	241 (10)	142 (9)	527 (11)	129 (11)
9-10	13181 (5)	2858 (5)	92 (4)	58 (4)	305 (6)	64 (6)
T-Stage						
T1/T2a	113459 (47)	24665 (47)	2088 (85)	1282 (85)	2358 (50)	552 (49)
T2b/c	105243 (43)	22844 (43)	356 (14)	226 (15)	1374 (29)	344 (30)
T3/T4	24731 (10)	5331 (10)	15 (1)	5 (0)	993 (21)	233 (21)
N-Stage						
N0	237646 (98)	51727 (98)	2459 (100)	1513 (100)	2789 (59)	664 (59)
N1/N2	5705 (2)	1327 (3)	0	0	58 (1)	17 (2)
NX	0	0	0	0	1878 (40)	447 (40)
PSA ng/mL						
Median	6	6.4	6.4	6.6	11.7	12.4
Mean	9.0	9.2	8.9	8.9	18.6	18.9
<10	191622 (79)	40213 (76)	1880 (76)	1142 (75)	1941 (41)	451 (40)
≥10 - <20	34513 (14)	8792 (17)	420 (17)	278 (18)	1570 (33)	377 (33)
≥20	17298 (7)	3836 (7)	159 (6)	93 (6)	1214 (26)	301 (27)
Risk Group						
Low	54113 (22)	11935 (23)	831 (34)	513 (34)	526 (11)	123 (11)
Intermediate	129711 (53)	28022 (53)	1164 (47)	722 (48)	2066 (44)	502 (44)

High Node positive	53904 (22) 5705 (2)	11557 (22) 1327 (3)	464 (19) 0	278 (18) 0	2074 (44) 58 (1)	487 (43) 17 (2)
Zubrod 0 1					4332 (92) 393 (8)	1037 (92) 92 (8)
Yost variable Mean Median Q1 n (%) Q2 n (%) Q3 n (%) Q4 n (%) Q5 n (%)	10929.14 11229 49540 (20) 45886 (19) 47122 (19) 49517 (20) 51368 (21)	10900.64 11065 10237 (19) 12344 (23) 12305 (23) 10234 (19) 7721 (15)				
Insurance Insured Medicaid Uninsured Unknown	155861 (64) 5341 (2) 2321 (1) 79911 (33)	33671 (64) 1153 (2) 501 (1) 17515 (33)				
RT	98617 (41)	21307 (40)	0 (0)	0 (0)	4725 (100)	1129 (100)
Surgery	97288 (40)	21092 (40)	2459 (100)	1513 (100)	0 (0)	0 (0)
No RT or Surgery	53192 (22)	11752 (22)				
Treatment arm** 1 2 3 4 5 6 7 8 9 10					565 (12) 546 (12) 744 (16) 746 (16) 247 (5) 246 (5) 242 (5) 240 (5) 571 (12) 578 (12)	140 (12) 132 (12) 175 (15) 175 (16) 61 (5) 58 (5) 58 (5) 54 (5) 136 (12) 140 (12)

**[1] "9202: Long-term Androgen Deprivation + RT"

[2] "9202: Short-term Androgen Deprivation + RT"

[3] "9408: Hormone + RT"

[4] "9408: RT Alone"

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- [9] "9910: 28-week TAS RT+TAS"
- [10] "9910: 8-week TAS RT+TAS"

eTable 5. Inverse Probability Weighted 5- and 10-y estimates of Prostate Cancer–Specific Mortality, Other-Cause Mortality, and All-Cause Mortality

	SEER			VA			RCT		
	White	Black	Difference	White	Black	Difference	White	Black	Difference
5 year									
PCSM	0.019 (0.018, 0.020)	0.021 (0.019, 0.022)	0.002 (0, 0.003)	0.01 (0.006, 0.014)	0.005 (0.001, 0.009)	-0.005 (-0.011, 0.001)	0.036 (0.03, 0.041)	0.027 (0.016, 0.037)	-0.009 (-0.021, 0.003)
OCM	0.058 (0.057, 0.059)	0.077 (0.074, 0.080)	0.019 (0.016, 0.022)	0.211 (0.191, 0.23)	0.092 (0.075, 0.109)	0.021 (0.001, 0.041)	0.136 (0.126, 0.146)	0.174 (0.147, 0.199)	0.038 (0.01, 0.066)
ACM	0.077 (0.076, 0.078)	0.098 (0.095, 0.101)	0.021 (0.018, 0.024)	0.081 (0.07, 0.092)	0.097 (0.082, 0.113)	0.016 (-0.003, 0.035)	0.167 (0.156, 0.178)	0.198 (0.174, 0.221)	0.031 (0.005, 0.057)
10 year									
PCSM	0.047 (0.046, 0.048)	0.052 (0.049, 0.056)	0.005 (0.001, 0.009)	0.023 (0.016, 0.03)	0.017 (0.008, 0.026)	-0.006 (-0.018, 0.005)	0.099 (0.09, 0.108)	0.077 (0.058, 0.095)	-0.022 (-0.043, -0.001)
OCM	0.153 (0.151, 0.156)	0.192 (0.185, 0.198)	0.038 (0.032, 0.045)	0.211 (0.191, 0.23)	0.21 (0.182, 0.238)	-0.001 (-0.035, 0.034)	0.327 (0.313, 0.342)	0.357 (0.321, 0.391)	0.029 (-0.009, 0.067)
ACM	0.200 (0.198, 0.203)	0.244 (0.238, 0.250)	0.044 (0.037, 0.05)	0.234 (0.214, 0.254)	0.227 (0.201, 0.252)	-0.007 (-0.039, 0.026)	0.426 (0.411, 0.441)	0.434 (0.401, 0.465)	0.007 (-0.028, 0.042)

PCSM = prostate cancer-specific mortality

OCM = other-cause mortality

ACM = all-cause mortality

ACM: Kaplan-Meier survival estimates

PCSM/OCM: Andersen-Johansen estimates

eTable 6. Summary of Prostate Cancer–Specific Mortality, Other-Cause Mortality, and All-Cause Mortality Models

		SEER		VA		RCT	
		HR (95% CI)	p-value	HR (95% CI)	p-value	HR (95% CI)	p-value
PCSM (cause-specific)	Age-Weighted	1.35 (1.28, 1.42)	<0.001	0.89 (0.58, 1.36)	0.59	0.97 (0.80, 1.17)	0.73
	Age + Stage-Weighted	1.21 (1.15, 1.28)	<0.001	See Fully-weighted		0.96 (0.79, 1.17)	0.68
	Fully-weighted	1.12 (1.06, 1.18)	<0.001	0.86 (0.57, 1.32)	0.50	0.86 (0.70, 1.05)	0.14
PCSM (Fine and Gray)	Age-Weighted	1.30 (1.23, 1.37)	<0.001	0.88 (0.57, 1.34)	0.55	0.90 (0.74, 1.09)	0.27
	Age + Stage-Weighted	1.17 (1.11, 1.24)	<0.001	See Fully-weighted		0.89 (0.73, 1.08)	0.24
	Fully-Weighted	1.09 (1.04, 1.15)	<0.001	0.85 (0.56, 1.30)	0.46	0.81 (0.66, 0.99)	0.036
OCM (cause-specific)	Age-Weighted	1.55 (1.51, 1.59)	<0.001	1.09 (0.95, 1.24)	0.21	1.16 (1.05, 1.28)	0.005
	Age + Stage-Weighted	1.48 (1.44, 1.52)		See Fully-weighted		1.18 (1.06, 1.30)	0.002
	Fully-weighted	1.31 (1.27, 1.34)	<0.001	1.07 (0.93, 1.23)	0.29	1.16 (1.05, 1.28)	0.003
OCM (Fine and Gray)	Age-Weighted	1.54 (1.49, 1.58)	<0.001	1.09 (0.96, 1.24)	0.19	1.15 (1.04, 1.27)	0.008
	Age + Stage-Weighted	1.47 (1.43, 1.51)	<0.001	See Fully-weighted		1.16 (1.05, 1.28)	0.003
	Fully-Weighted	1.30 (1.27, 1.34)	<0.001	1.08 (0.95, 1.23)	0.26	1.17 (1.06, 1.29)	0.002
ACM	Age-Weighted	1.50 (1.47, 1.54)	<0.001	1.07 (0.94, 1.21)	0.30	1.11 (1.02, 1.22)	0.019
	Age + Stage-Weighted	1.43 (1.38, 1.45)	<0.001	See Fully-weighted		1.13 (1.03, 1.23)	0.009
	Fully-Weighted	1.26 (1.23, 1.29)	<0.001	1.05 (0.93, 1.19)	0.42	1.09 (1.00, 1.19)	0.057

PCSM = prostate cancer-specific mortality

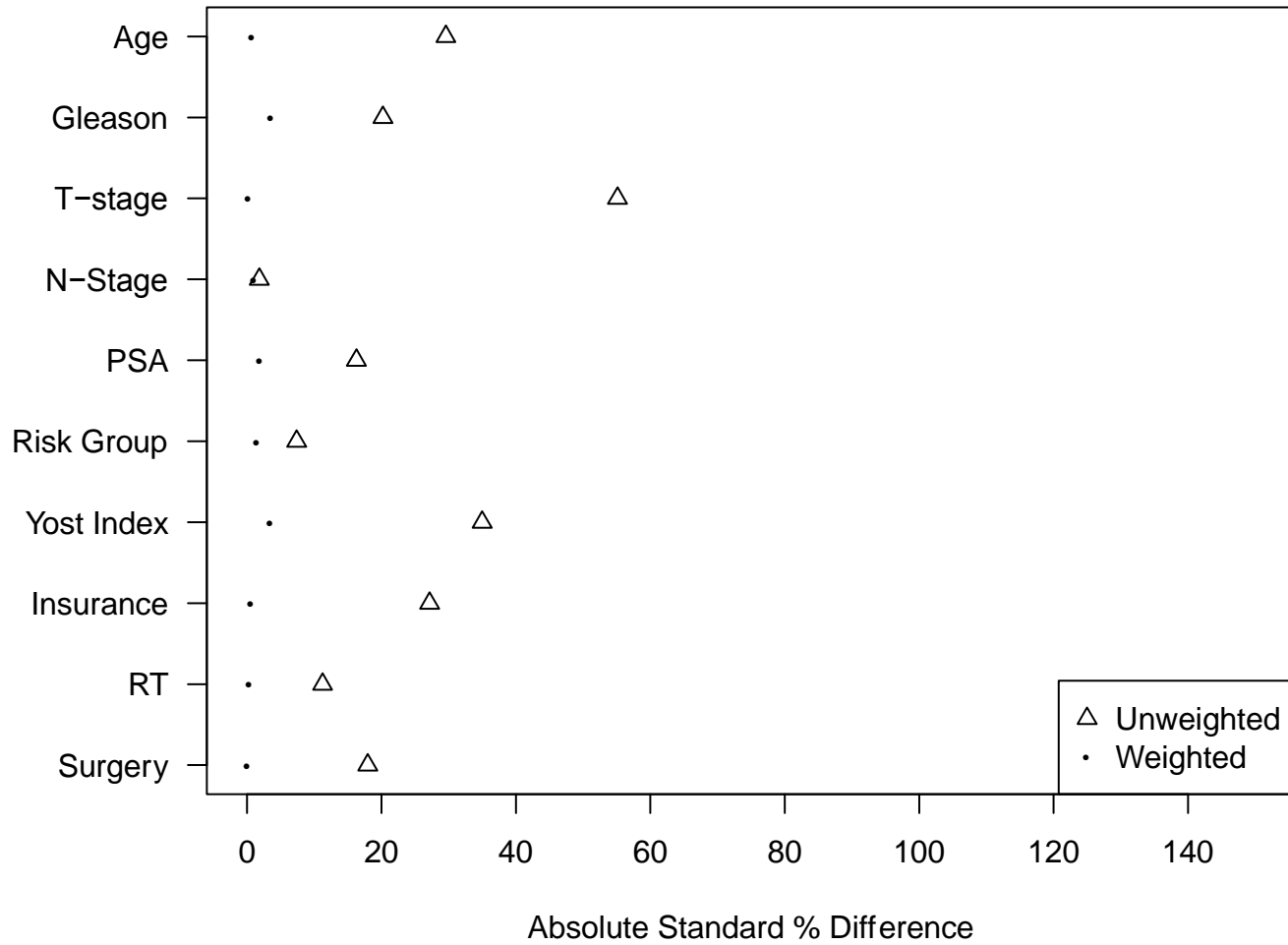
OCM = other-cause mortality

ACM = all-cause mortality

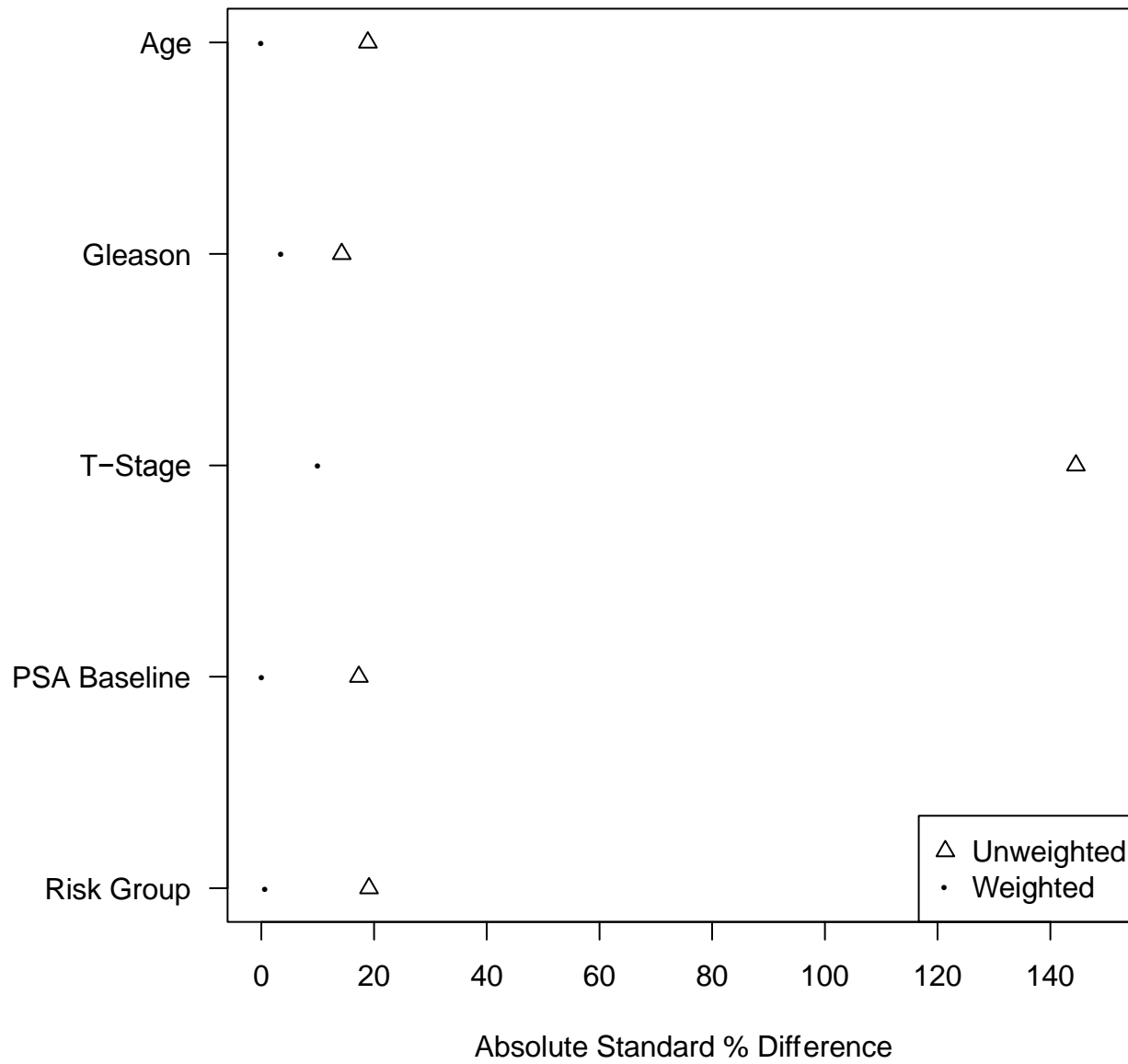
eFigure 1. Absolute Standard Percentage Differences in the Variables by Race Within the Weighted and Unweighted Data Sets for SEER (A), VA (B), and RCT (C) Cohorts

Figure 1a

SEER Race Differences



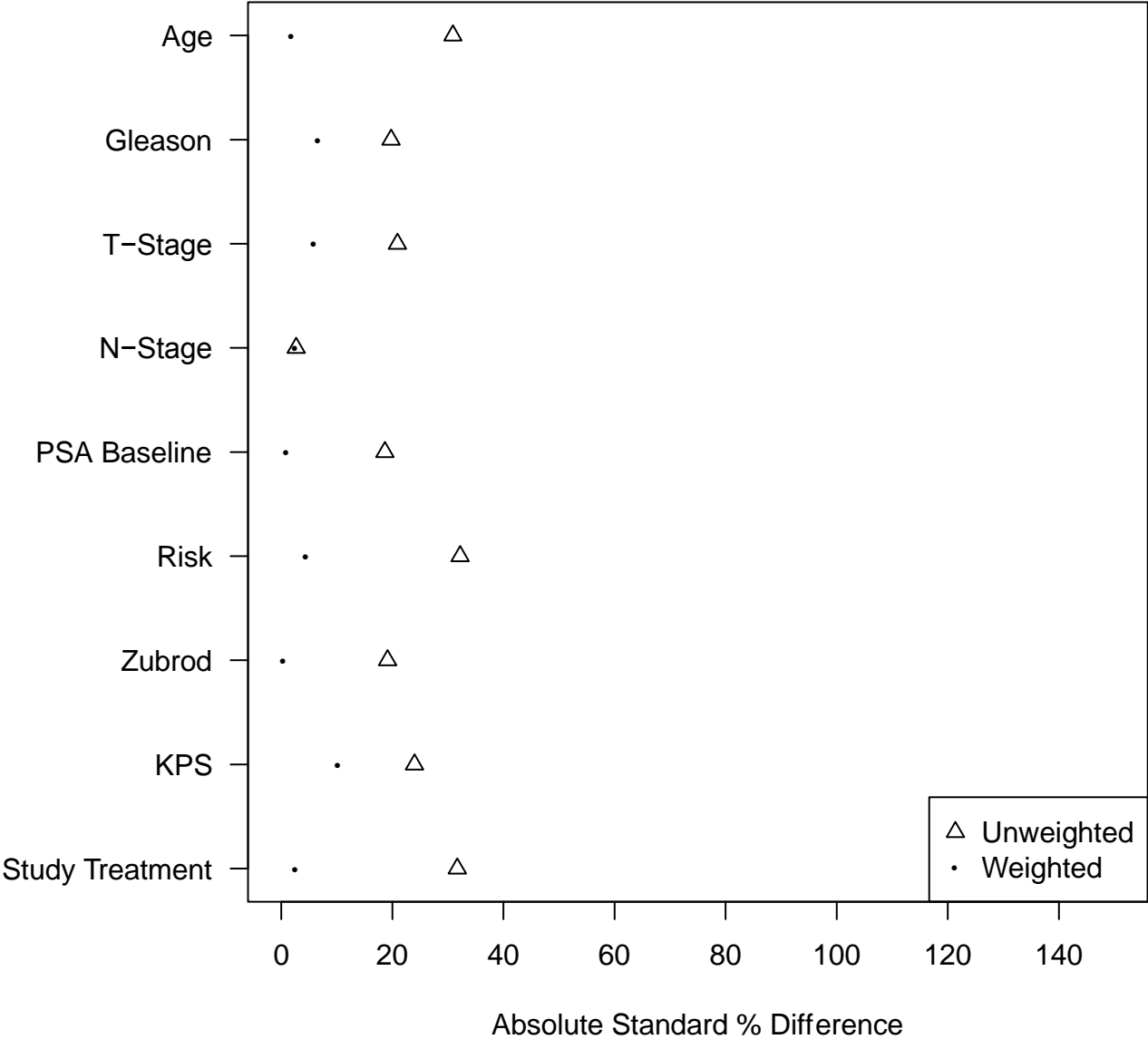
VA Race Differences



eFigure 1b

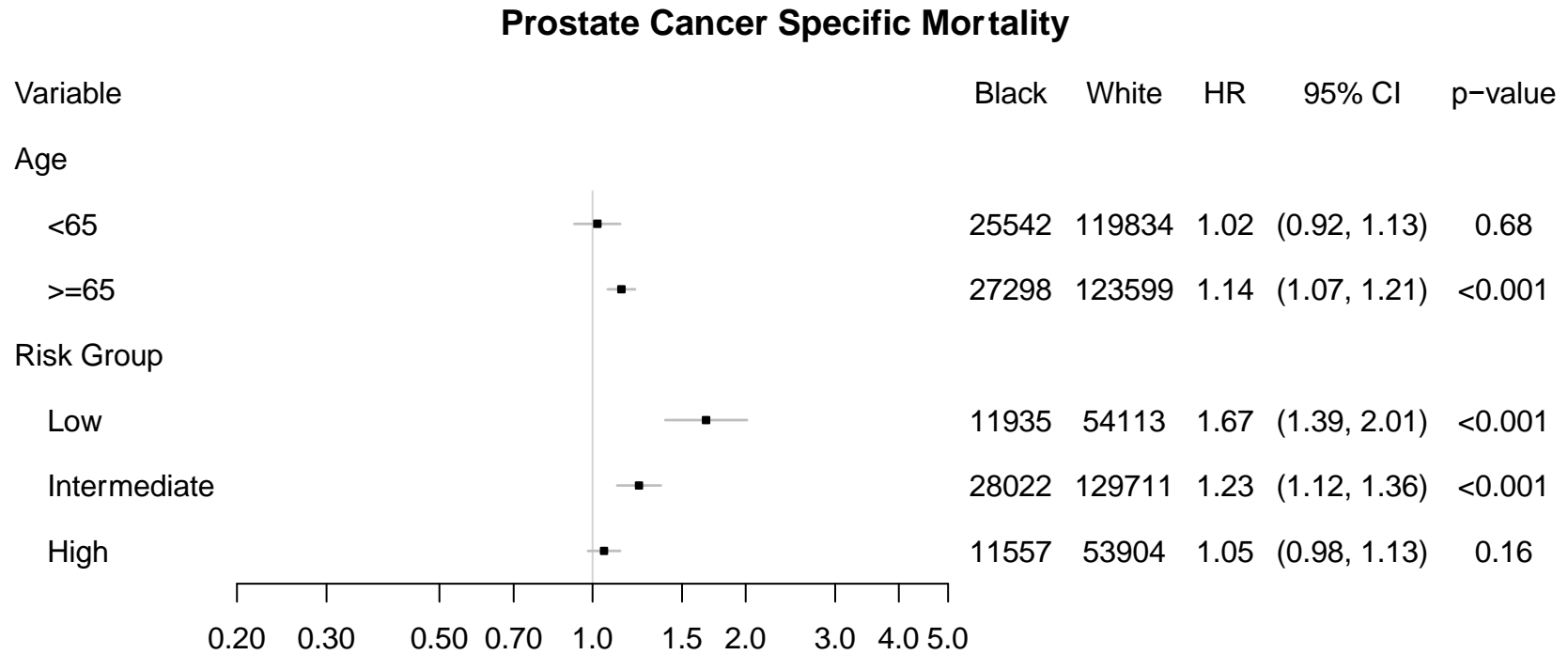
eFigure 1c

RCT Race Differences



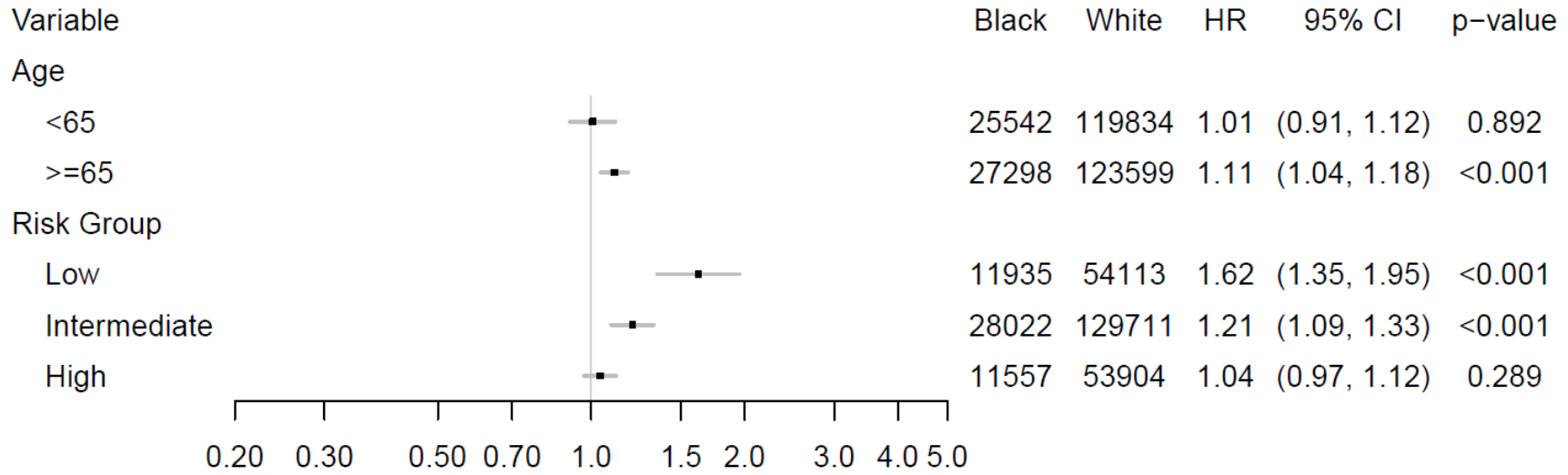
eFigure 2. Subgroup Forest Plots of Hazard of Prostate Cancer Specific Mortality for SEER Cohort (A), SEER Cohort With Fine-Gray Competing Risks (B), VA Cohort (C), VA Cohort With Fine-Gray Competing Risks (D), RCT Cohort (E), and RCT Cohort With Fine-Gray Competing Risks (F)

eFigure 2a:



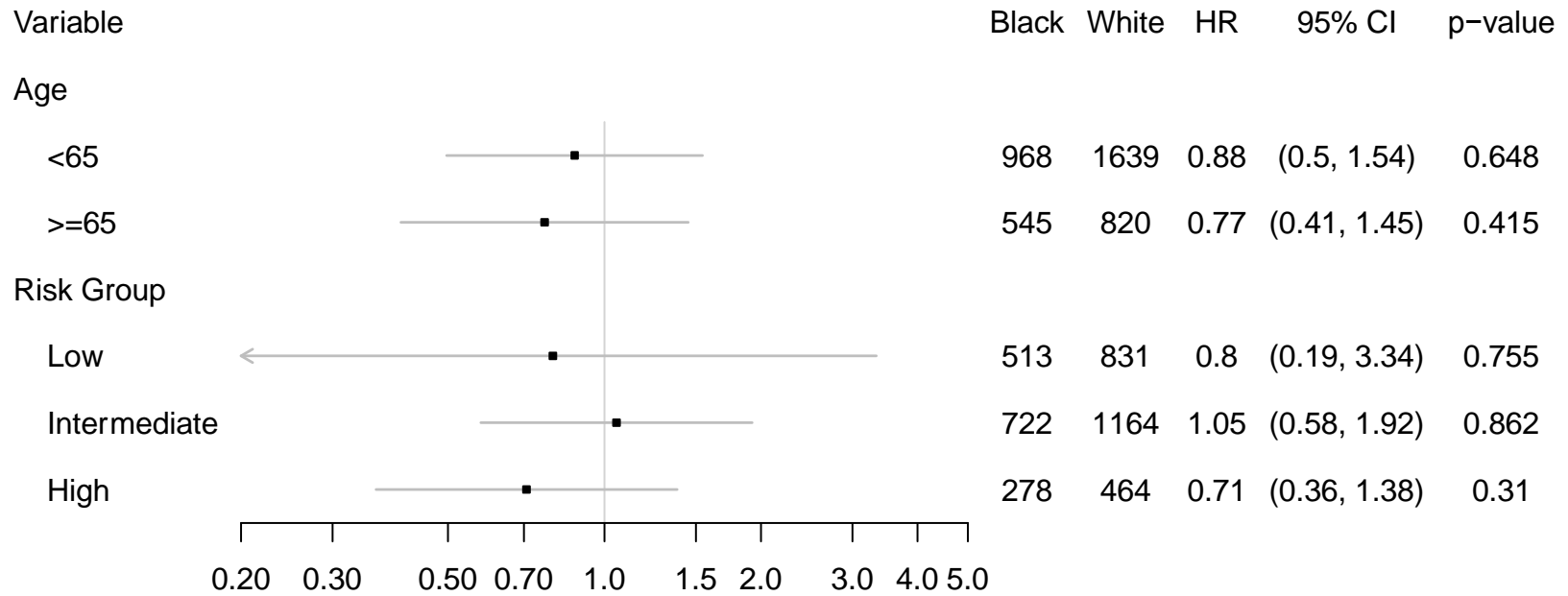
eFigure 2b:

Prostate Cancer Specific Mortality Fine and Gray Subdistribution Hazard (95% CI)



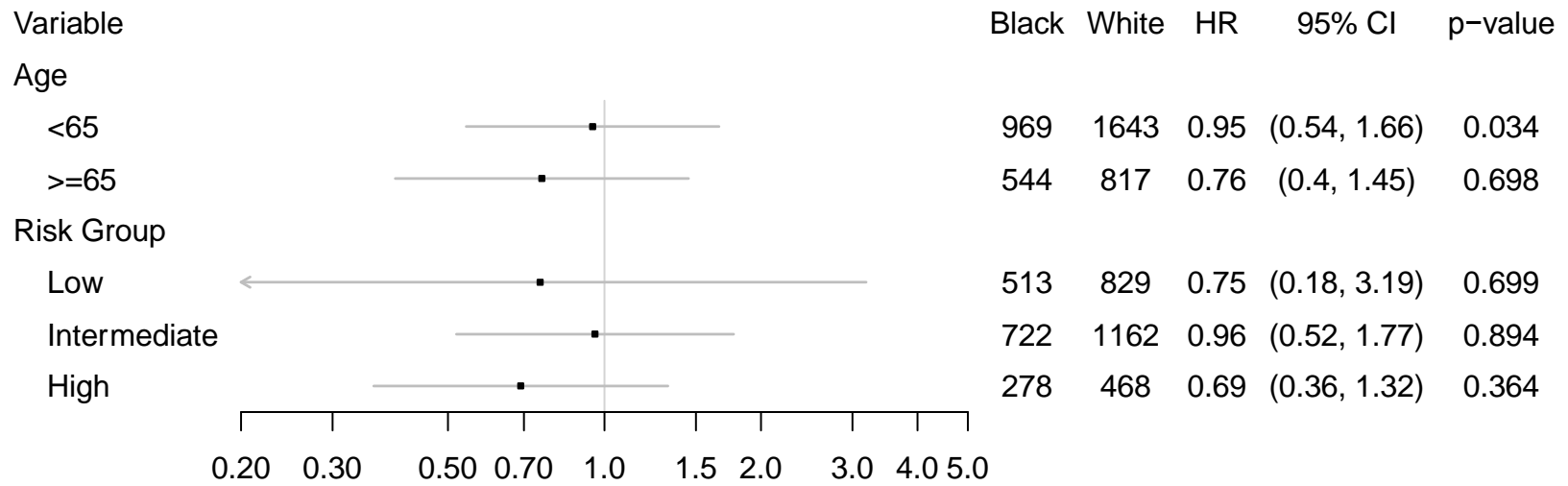
eFigure 2c:

Prostate Cancer Specific Mortality



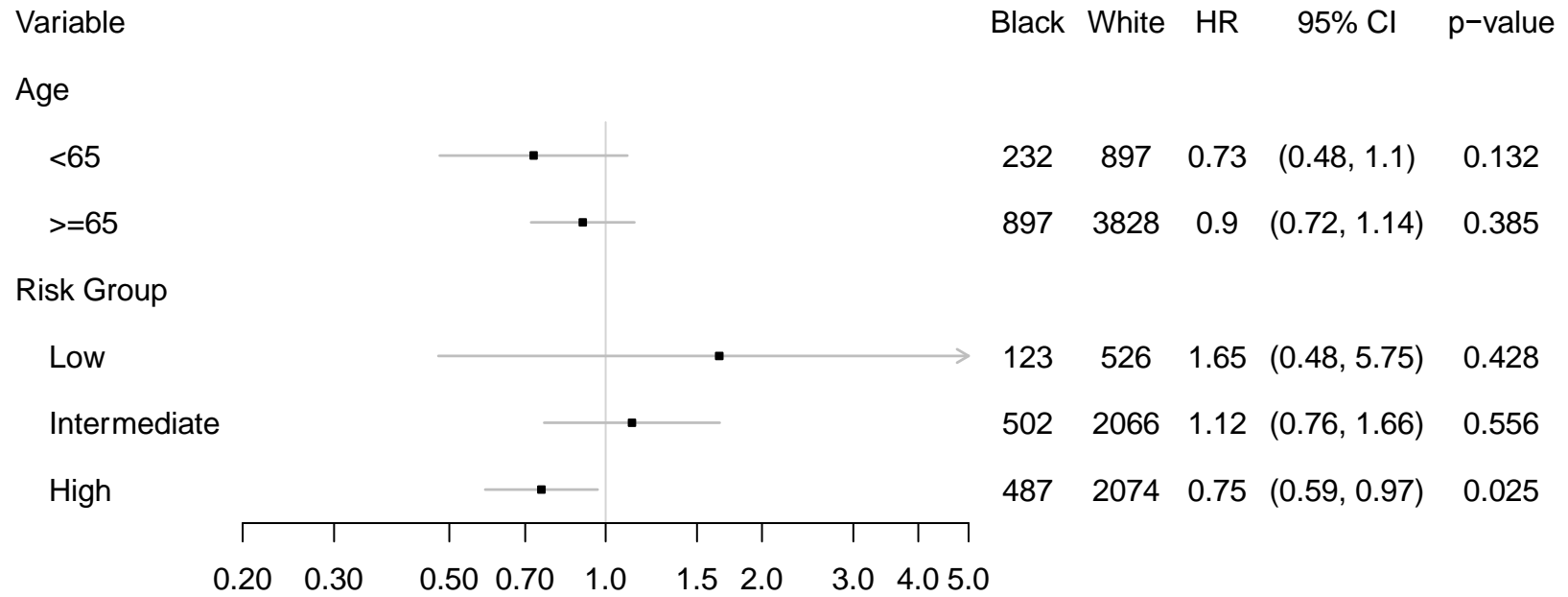
eFigure 2d:

Prostate Cancer Specific Mortality Fine and Gray Subdistribution Hazard (95% CI)



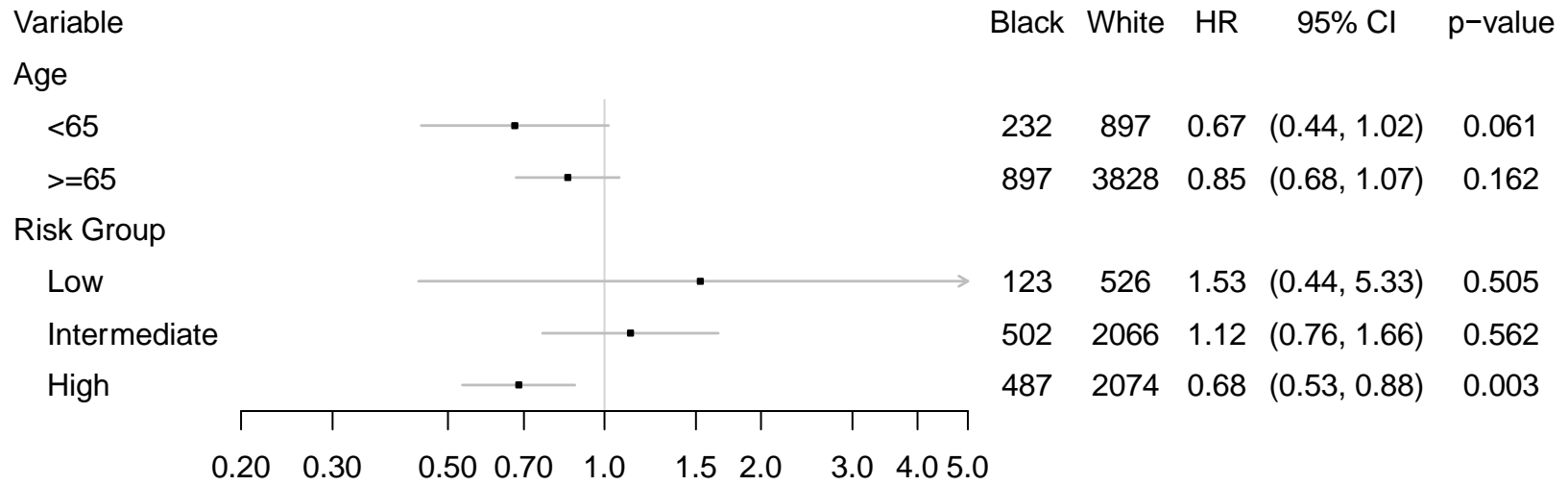
eFigure 2e:

Prostate Cancer Specific Mortality

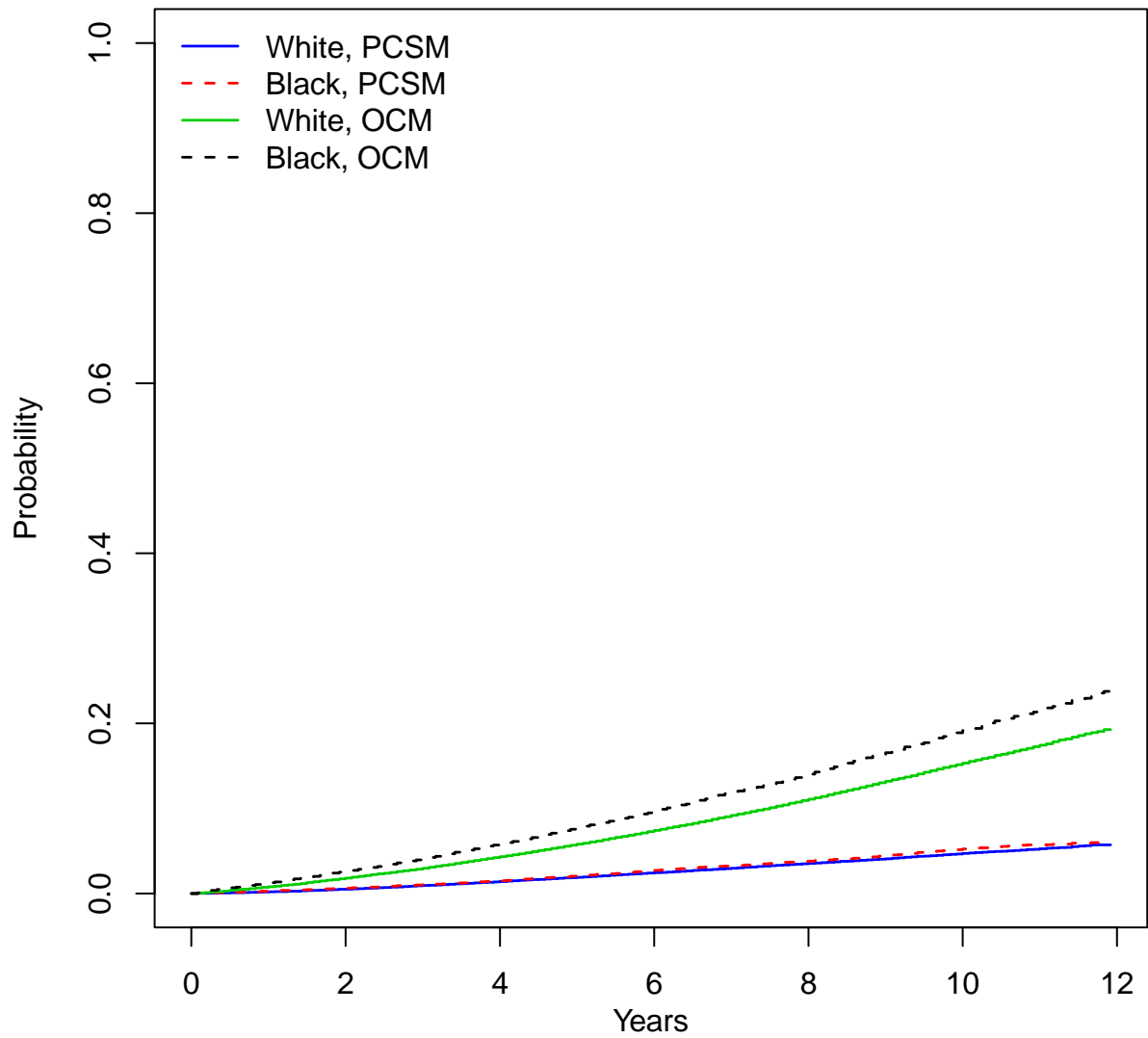


eFigure 2f:

Prostate Cancer Specific Mortality Fine and Gray Subdistribution Hazard (95% CI)



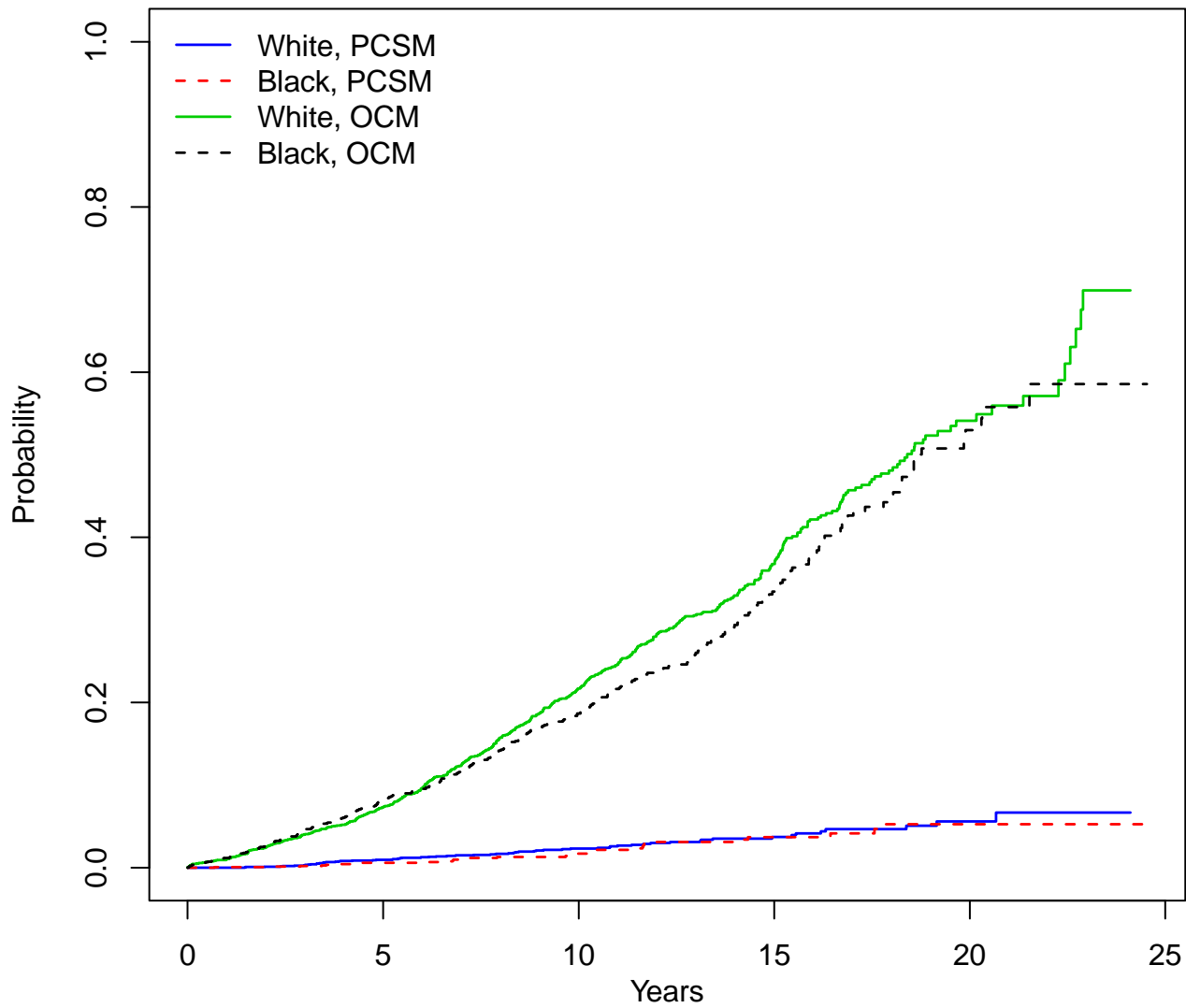
eFigure 3. Cumulative Incidence of Prostate Cancer–Specific Mortality and Other-Cause Mortality for the Unadjusted and Unweighted SEER (A), VA (B), and RCT (C) Cohorts
eFigure 3a:



Number at risk

White	243433	233652	184624	129009	77496	31171
Black	52840	49692	37657	25298	14732	5817

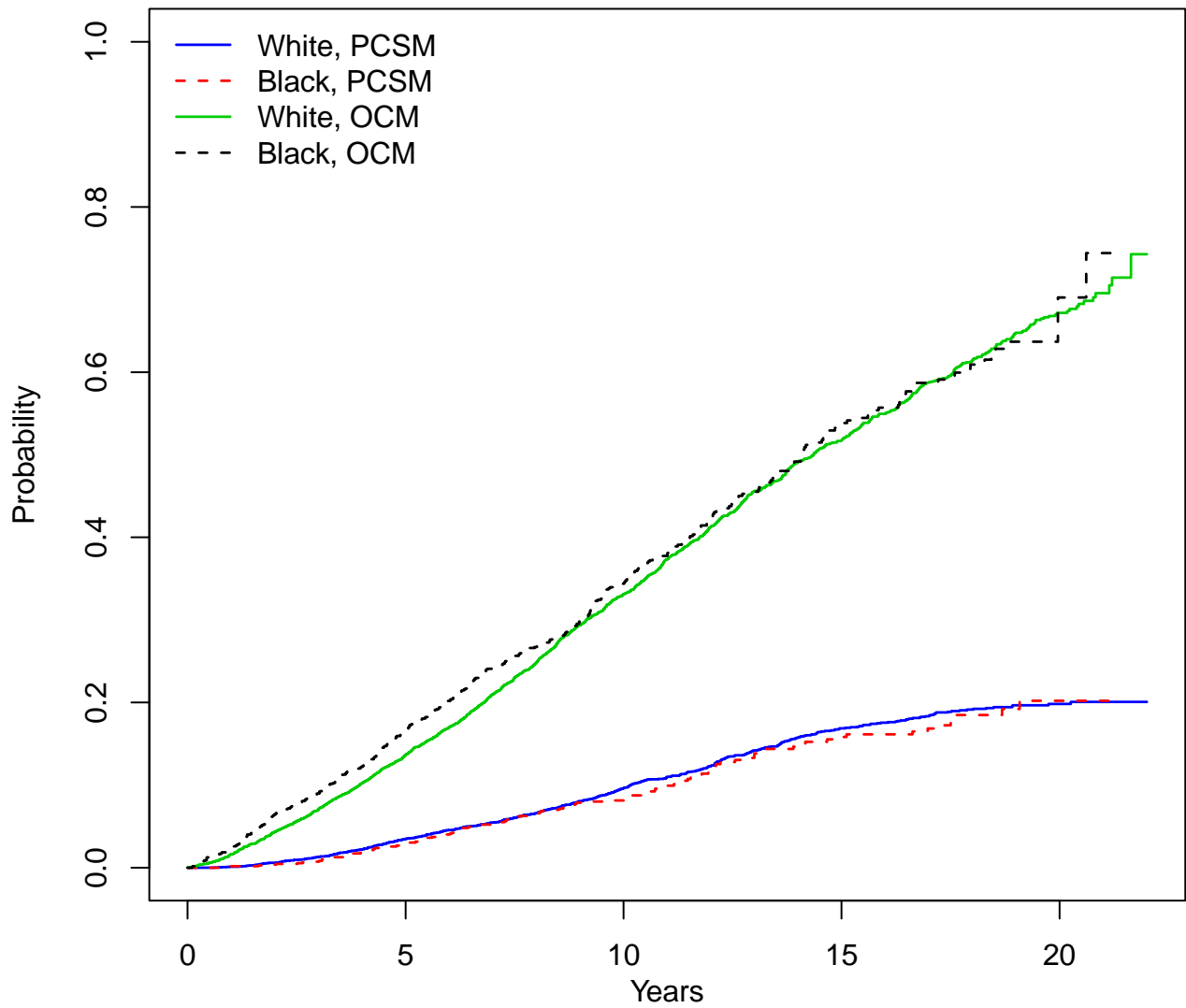
eFigure 3b: VA cohort



Number at risk

White	2458	1858	933	294	52
Black	1513	1080	554	183	35

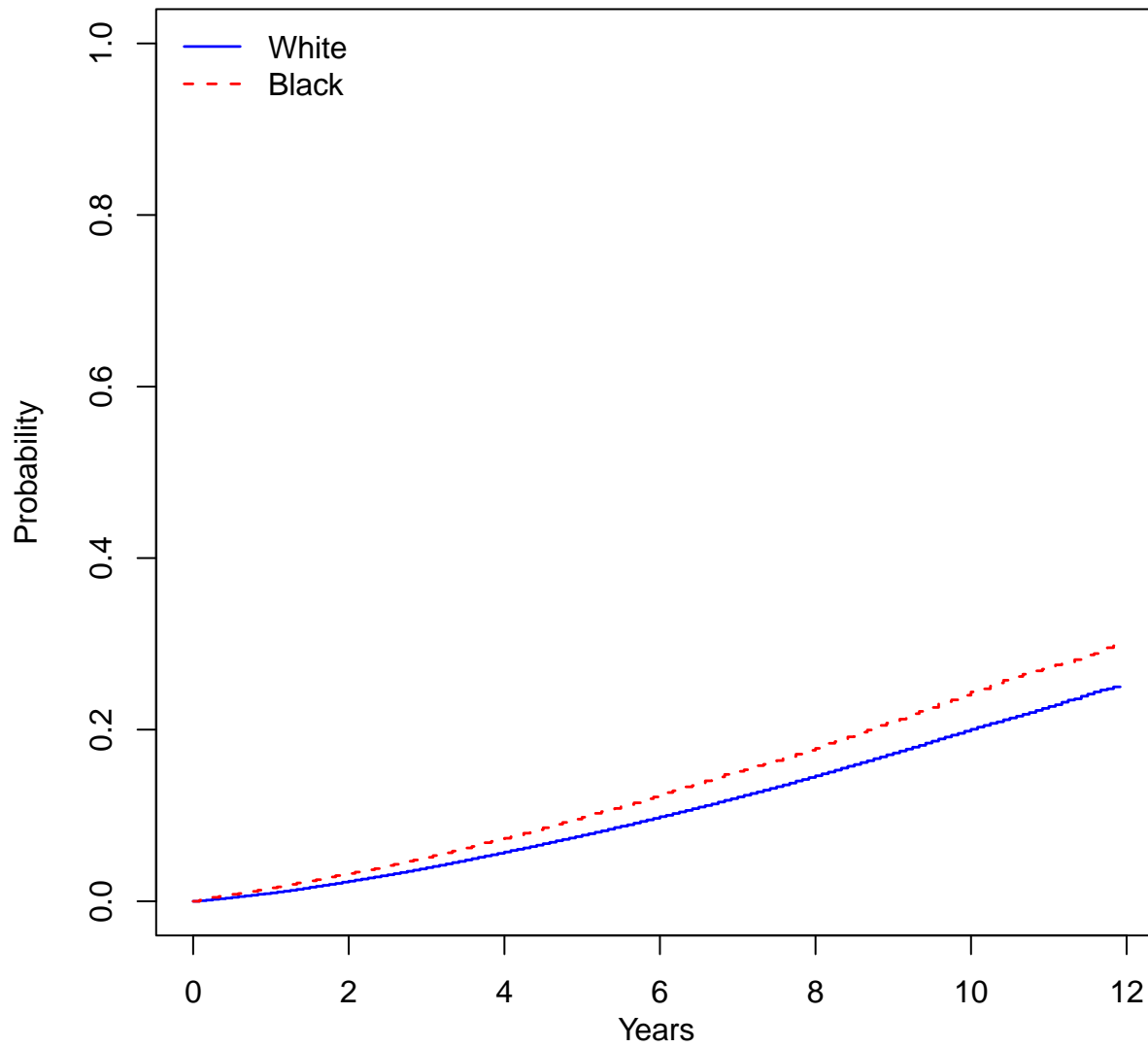
eFigure 3c:



Number at risk

White	4724	3789	1675	475	65
Black	1129	852	384	100	2

eFigure 4. Cumulative Incidence of All-Cause Mortality for the Inverse Probability Weighted SEER (A), VA (B), and RCT (C) Cohorts

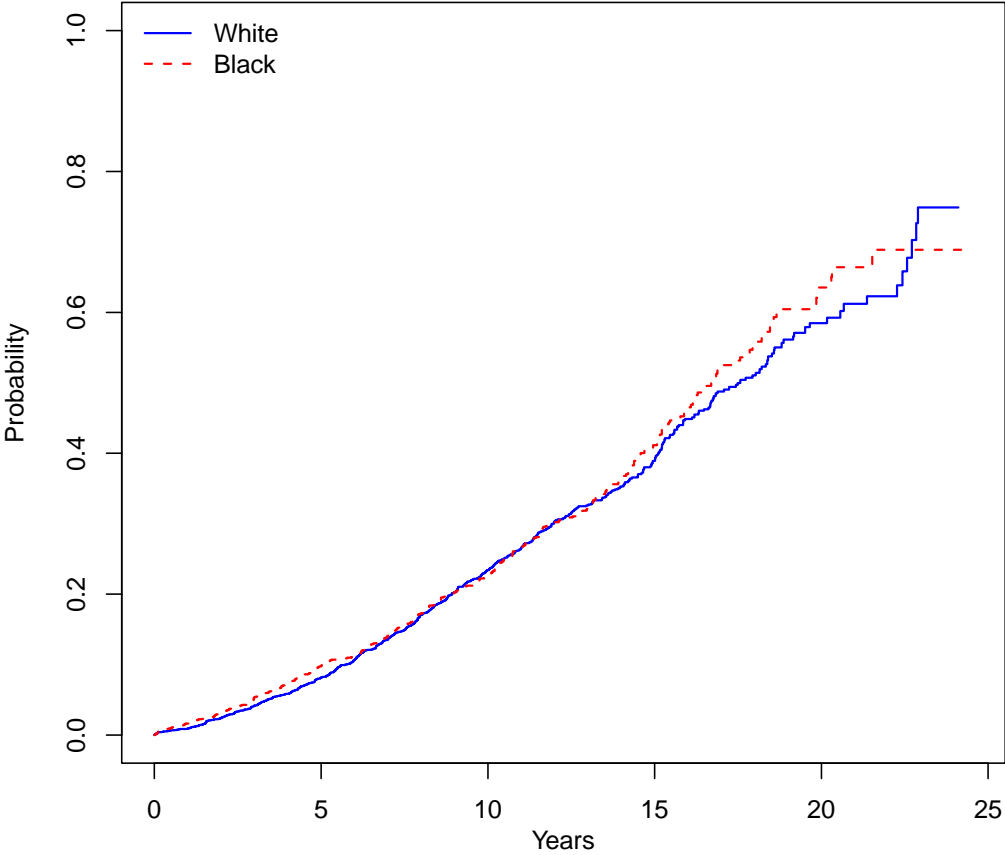


Number at risk

White	243433	233421	183665	127983	76675	30739
Black	52840	49887	38549	26311	15547	6310

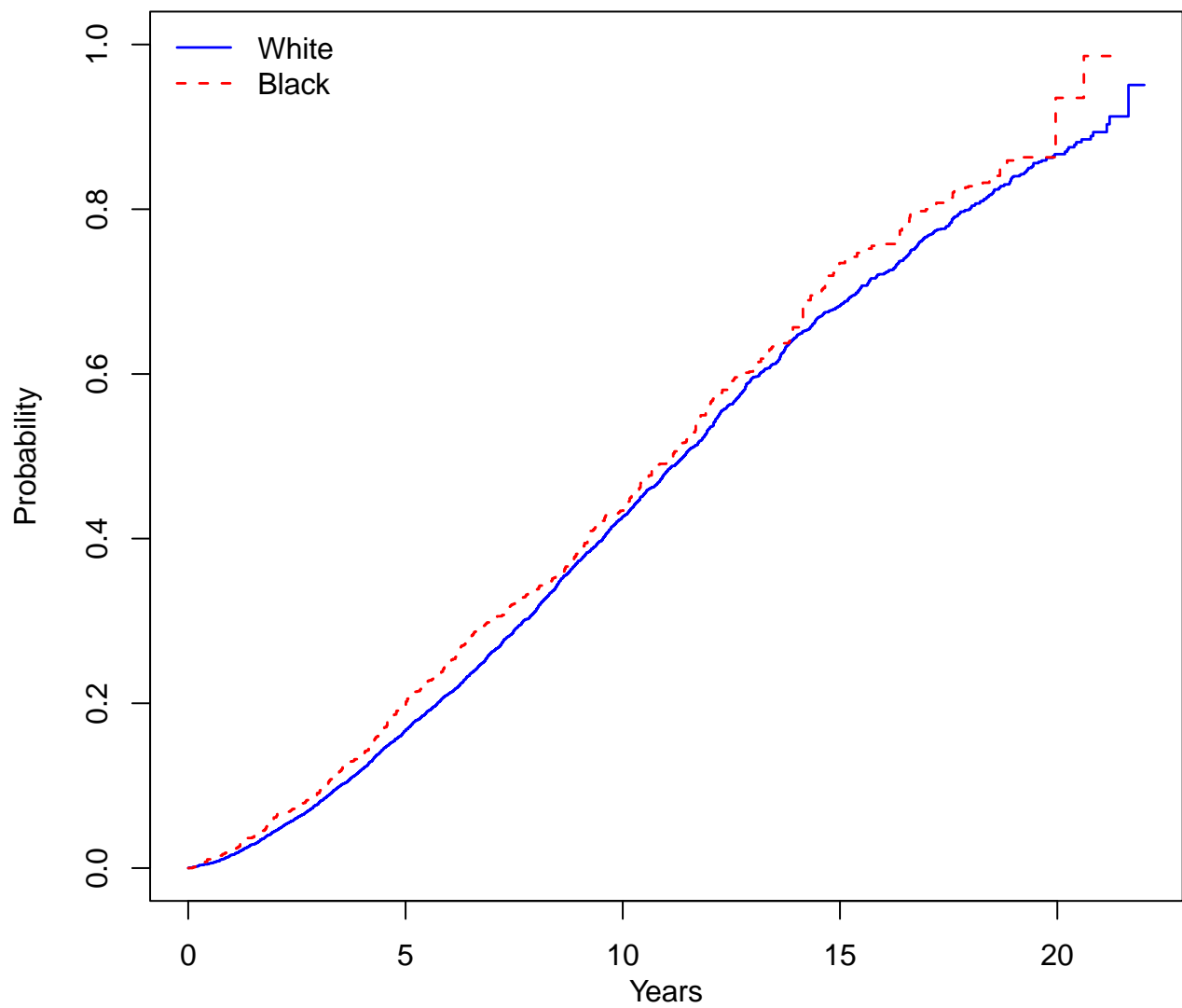
eFigure 4a:

eFigure 4b:



Number at risk	
White	2459
Black	1513
	1863
	1074
	550
	301
	186
	52
	33

eFigure 4c:

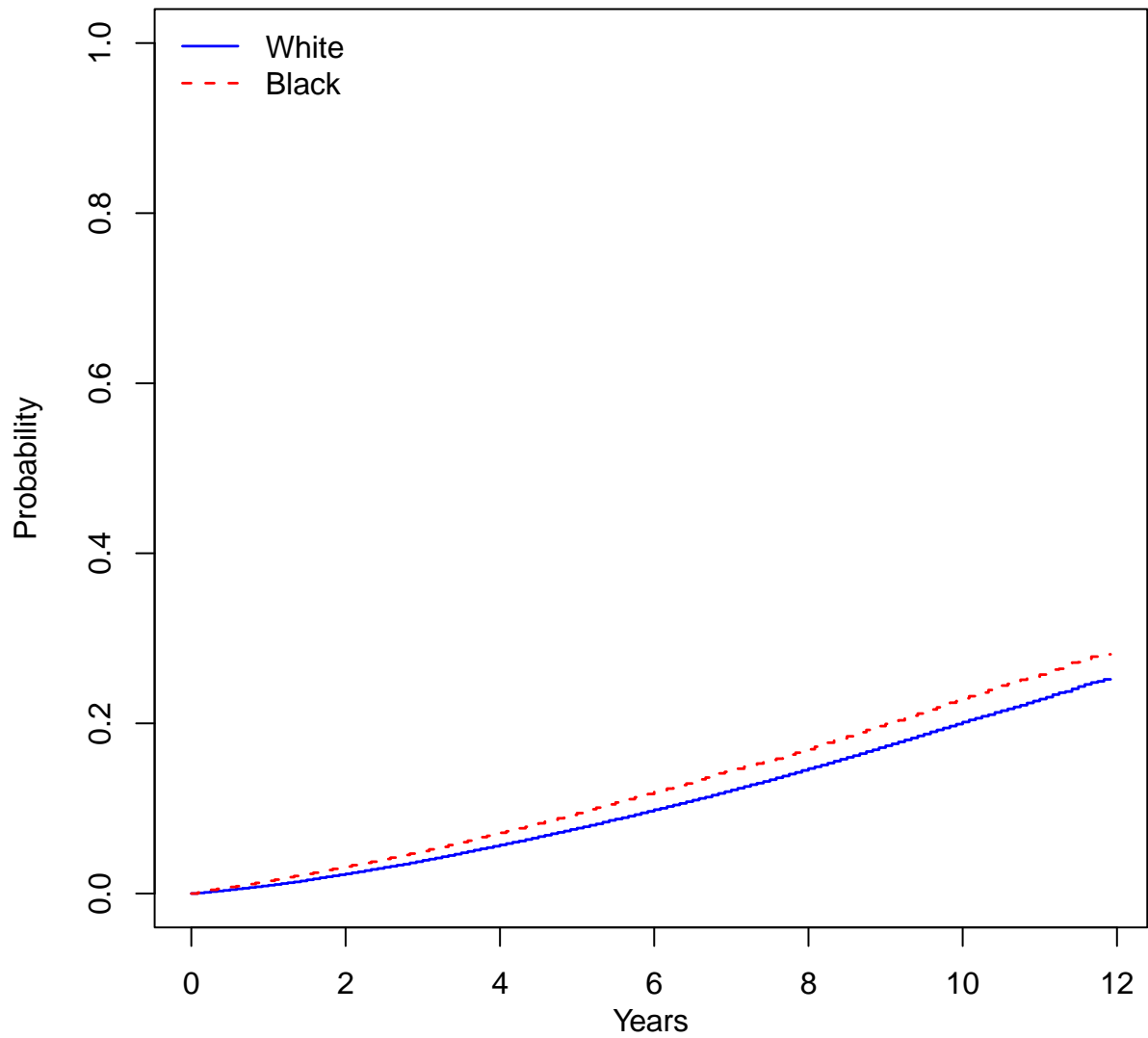


Number at risk

White	4724	3783	1681	484	63
Black	1129	851	383	92	3

eFigure 5. Cumulative Incidence of All-Cause Mortality for the Unadjusted SEER (A), VA (B), and RCT (C) Cohorts

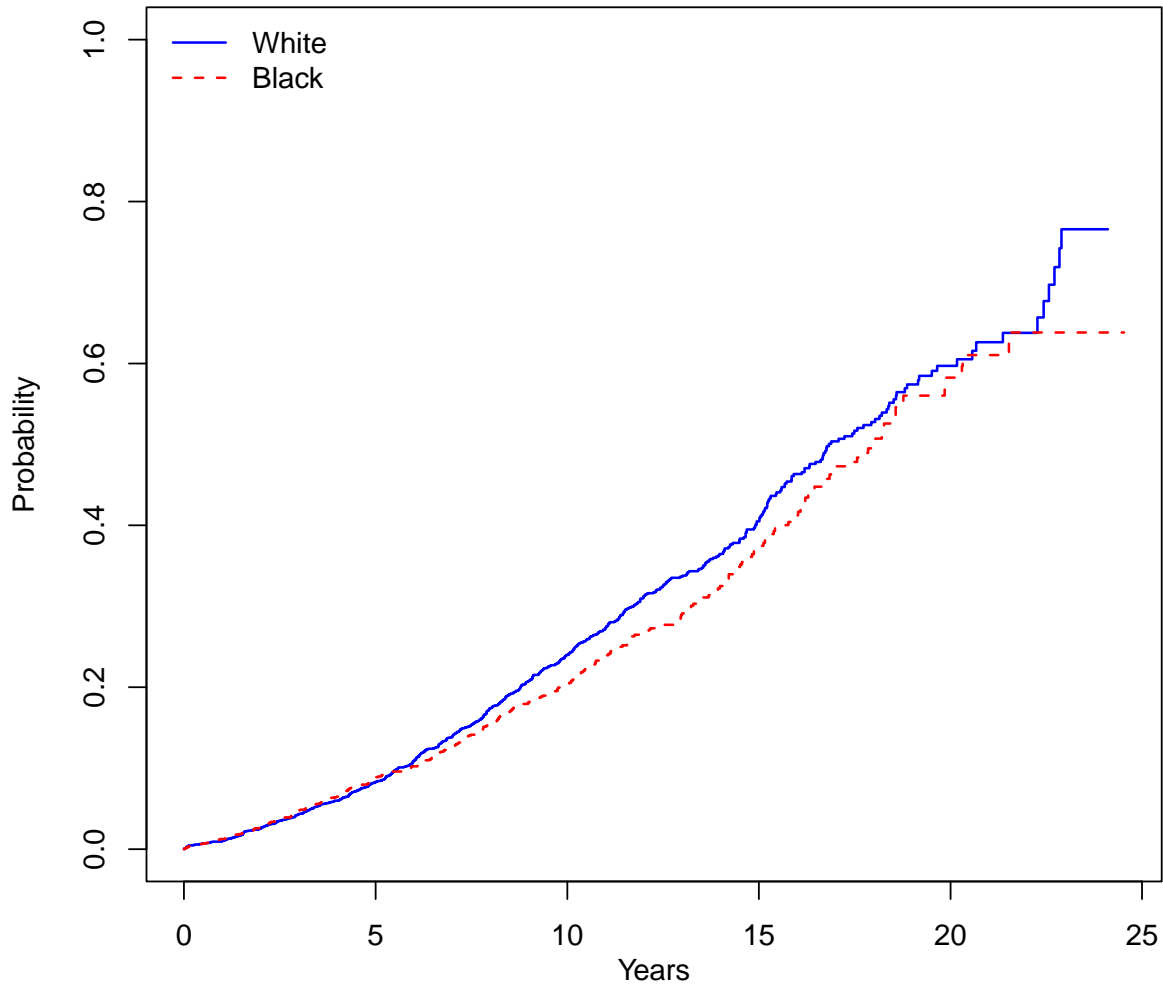
eFigure 5a:



Number at risk

White	243433	233652	184624	129009	77496	31171
Black	52840	49692	37657	25298	14732	5817

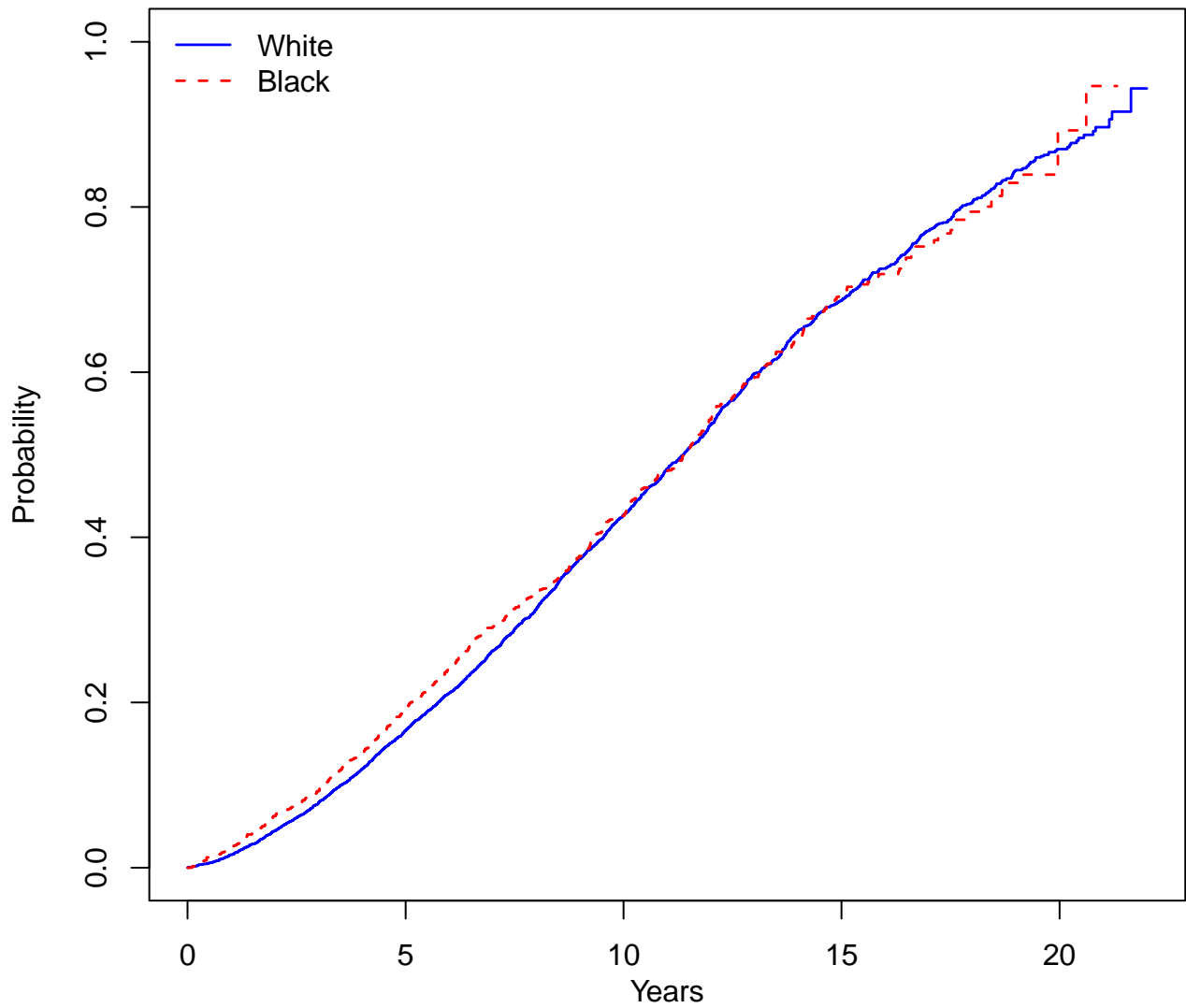
eFigure 5b:



Number at risk

White	2458	1858	933	294	52
Black	1513	1080	554	183	35

eFigure 5c:



Number at risk

White	4724	3789	1675	475	65
Black	1129	852	384	100	2