OCM_figurestables

Elizabeth Chase

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Figure 1: NHANES sample exclusions:

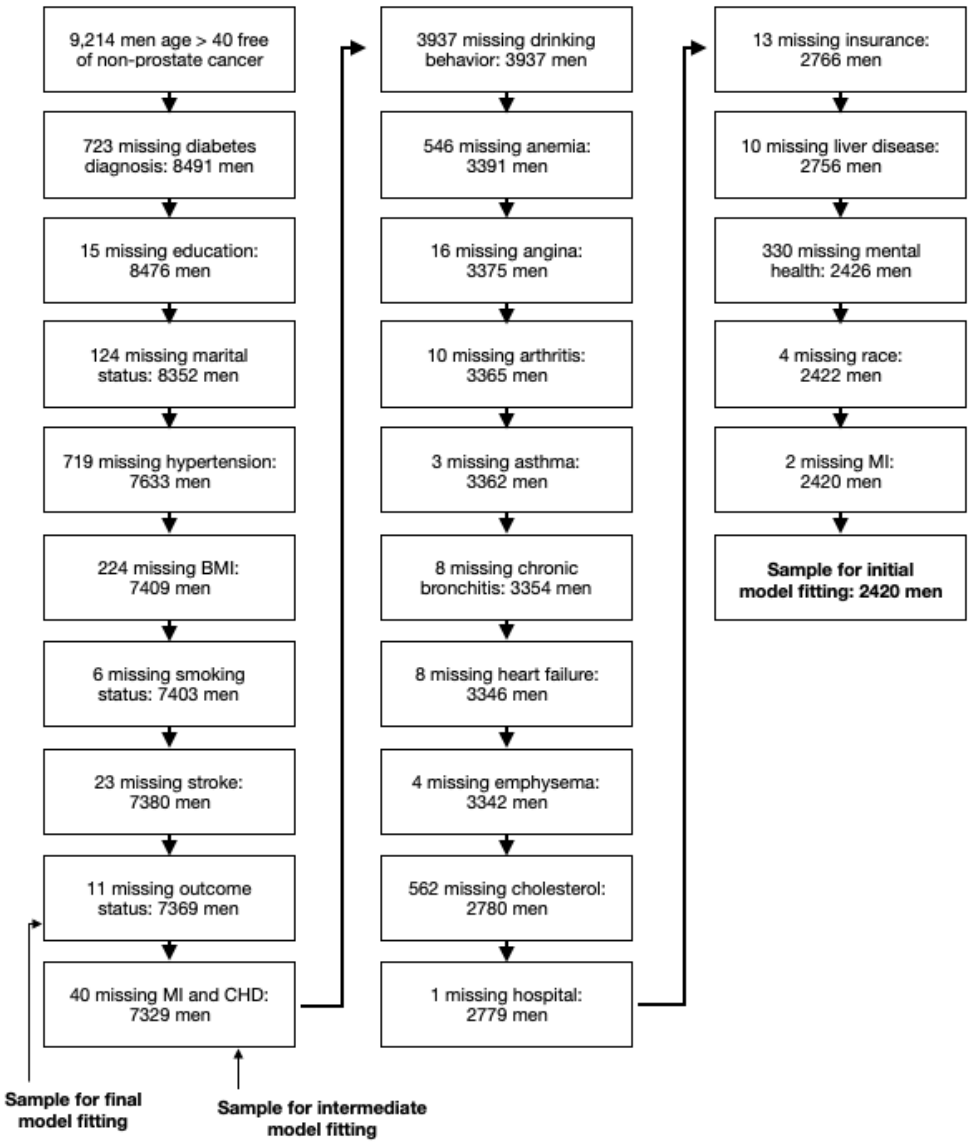


Figure 2: PLCO sample exclusions:

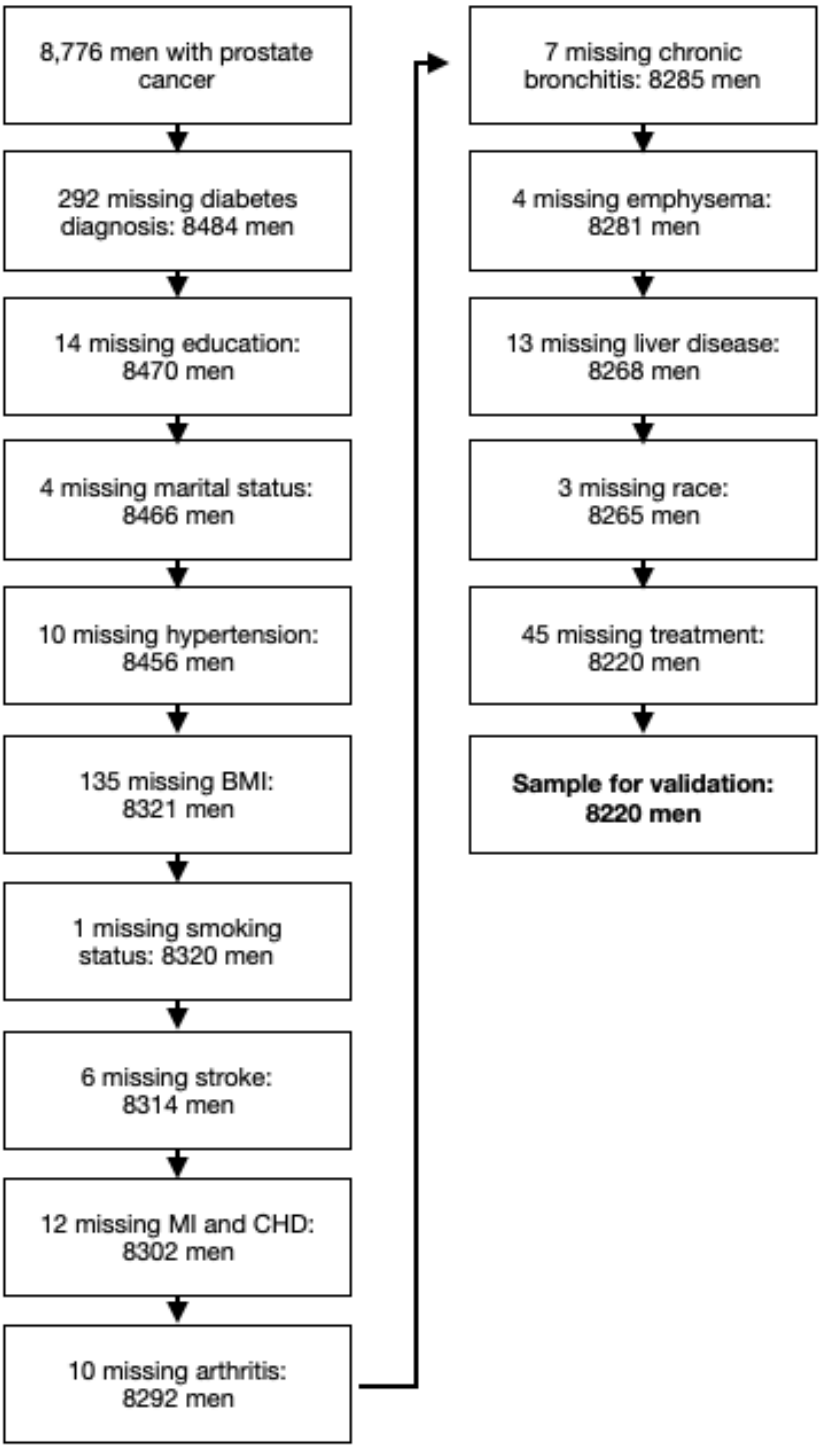


Table 1: Baseline characteristics of training and validation data:

	NHANES	PLCO	p	test
n	2420	8220		
Age (years) (mean (SD))	59.4 (12.1)	69.5 (5.9)	<0.001	
Race (%)			<0.001	
NHB	411 (17.0)	475 (5.8)		
NHW	1362 (56.3)	7312 (89.0)		
Other	647 (26.7)	433 (5.3)		
Education (%)			<0.001	
Less than 9th grade	305 (12.6)	90 (1.1)		
9th-11th grade	295 (12.2)	520 (6.3)		
HS graduate	591 (24.4)	1512 (18.4)		
Some college	607 (25.1)	2605 (31.7)		
College graduate	622 (25.7)	3493 (42.5)		
Marital status (%)			<0.001	
Married	1813 (74.9)	7055 (85.8)		
Separated	466 (19.3)	945 (11.5)		
Single	141 (5.8)	220 (2.7)		
Smoking status (%)			<0.001	
Never	905 (37.4)	3368 (41.0)		
Current	538 (22.2)	736 (9.0)		
Former	977 (40.4)	4116 (50.1)		
Arthritis = Yes (%)	813 (33.6)	2471 (30.1)	0.001	
Chronic bronchitis = Yes (%)	111 (4.6)	240 (2.9)	<0.001	
Diabetes = Yes (%)	453 (18.7)	527 (6.4)	<0.001	
Emphysema = Yes (%)	75 (3.1)	183 (2.2)	0.017	
Hypertension = Yes (%)	1169 (48.3)	2742 (33.4)	<0.001	
Previous heart attack, coronary heart disease = Yes (%)	281 (11.6)	979 (11.9)	0.716	
Liver disease = Yes (%)	113 (4.7)	314 (3.8)	0.070	
Previous stroke = Yes (%)	95 (3.9)	181 (2.2)	<0.001	
BMI category (%)			<0.001	
Underweight (BMI < 18.5)	21 (0.9)	21 (0.3)		
Normal weight (BMI 18.5-25)	506 (20.9)	2326 (28.3)		
Overweight (BMI 25-40)	1801 (74.4)	5809 (70.7)		
Obese (BMI 40+)	92 (3.8)	64 (0.8)		
Prostate cancer = Yes (%)	127 (5.2)	8220 (100.0)	<0.001	
Outcome = Deceased (%)	459 (19.0)	2415 (29.4)	<0.001	
Follow-up (months) (mean (SD))	103.7 (39.0)	127.8 (57.3)	<0.001	

Table 2: Model performance:

	C-Index			AUC		
Model	5 Years	10 Years	14 Years	5 Years	10 Years	14 Years
Cox Ages 55+	0.68	0.70	0.69	0.70	0.75	0.77
Cox Ages 40+	0.69	0.70	0.70	0.70	0.75	0.78
Random Forest	0.66	0.69	0.68	0.69	0.73	0.73

Figure 3: Forest plot of final Cox model:

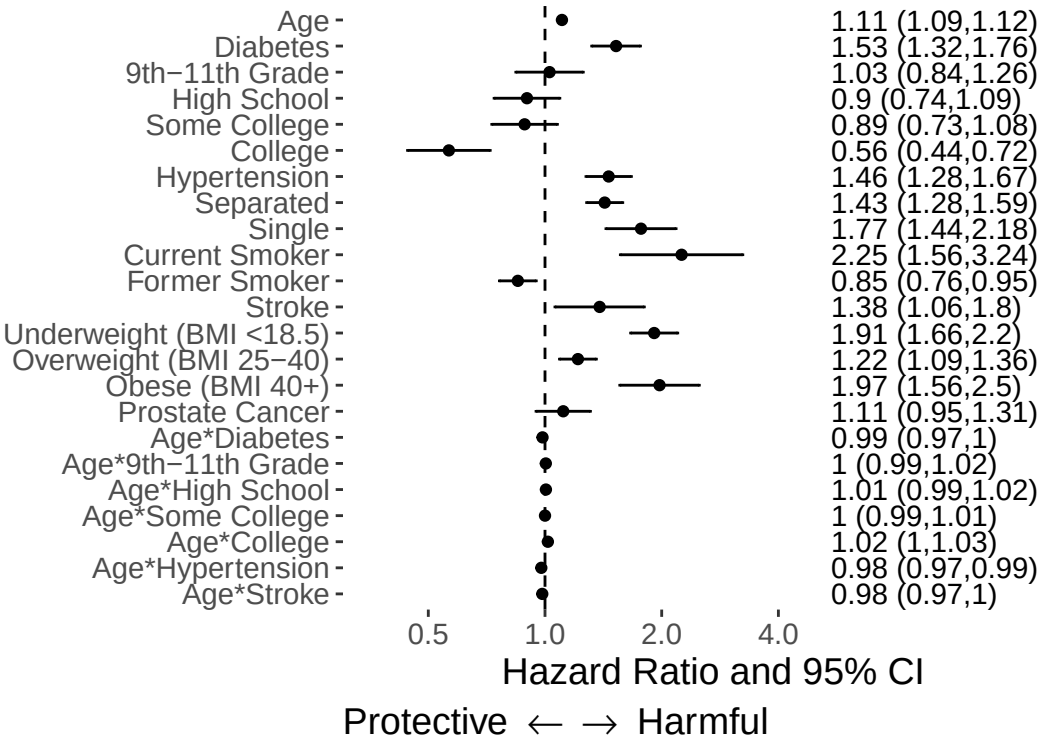
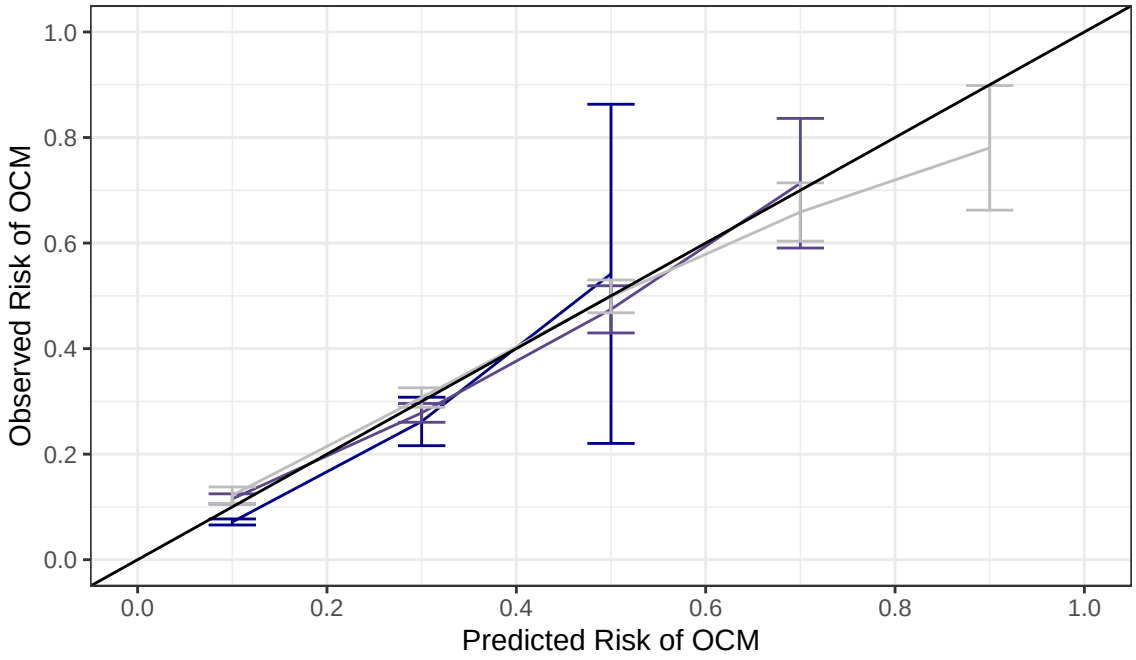


Table 3: Time-dependent AUC, C-index, by treatment:

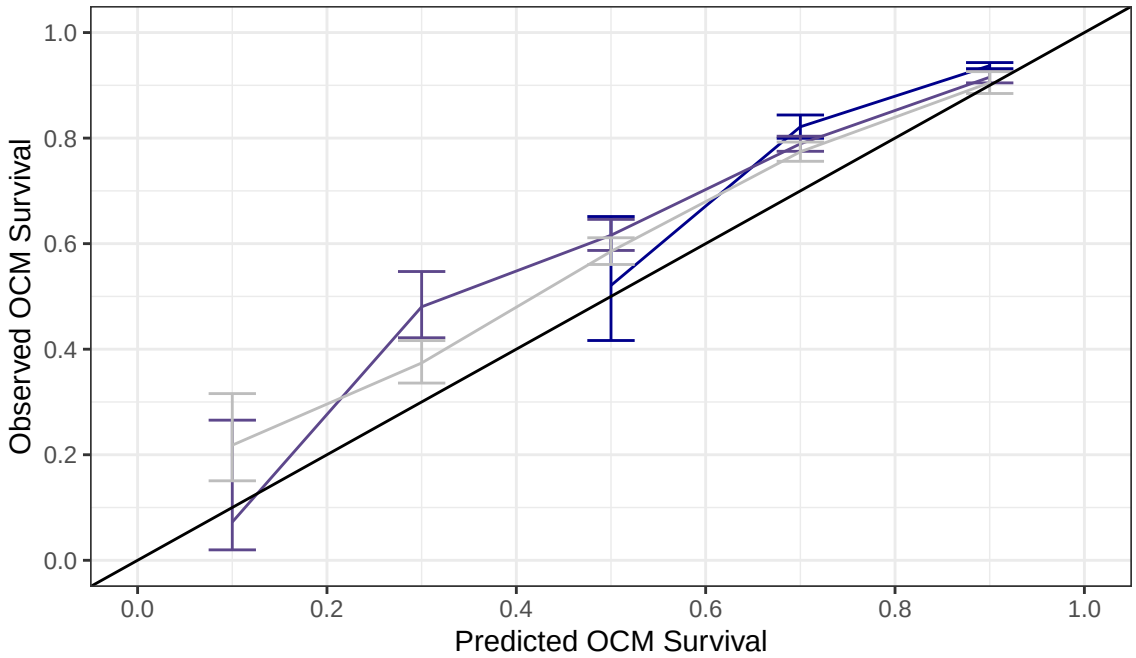
	C-Index			AUC		
Treatment	5 Years	10 Years	14 Years	5 Years	10 Years	14 Years
Prostatectomy	0.67	0.67	0.68	0.68	0.69	0.72
Radiation alone	0.64	0.66	0.66	0.65	0.71	0.74
Radiation + hormone	0.62	0.66	0.65	0.63	0.71	0.73

Figure 4: Calibration plot, Fine and Gray:



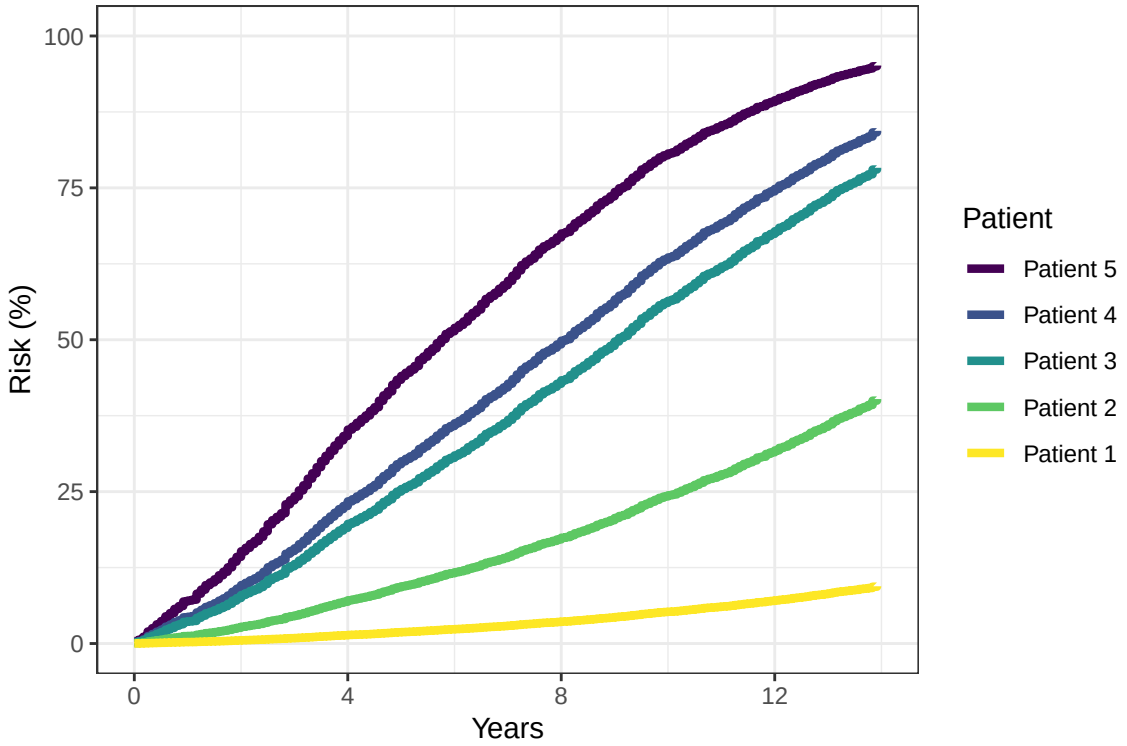
Black line: perfect calibration. Blue line: calibration at 5 years. Purple line: calibration at 10 years. Gray line: calibration at 14 years.

Figure 5: Calibration plot, cause-specific:



Black line: perfect calibration. Blue line: calibration at 5 years. Purple line: calibration at 10 years. Gray line: calibration at 14 years.

Figure 6: Sample incidence curves. We consider 5 different patients, with the characteristics:



Patient 1 (lowest risk): age 58, hypertensive, college graduate, married, former smoker, BMI 25-40

Patient 2 (low risk): age 70, no comorbidities, 9th-11th grade education, married, former smoker, BMI 18.5-25

Patient 3 (moderate risk): age 80, hypertensive, high school graduate, separated, former smoker, BMI 25-40

Patient 4 (high risk): age 82, no comorbidities, 9th-11th grade education, separated, never smoker, BMI 25-40

Patient 5 (highest risk): age 80, no comorbidities, high school graduate, married, former smoker, BMI < 18.5

Figure 7: Treatment concordance with OCM predictions:

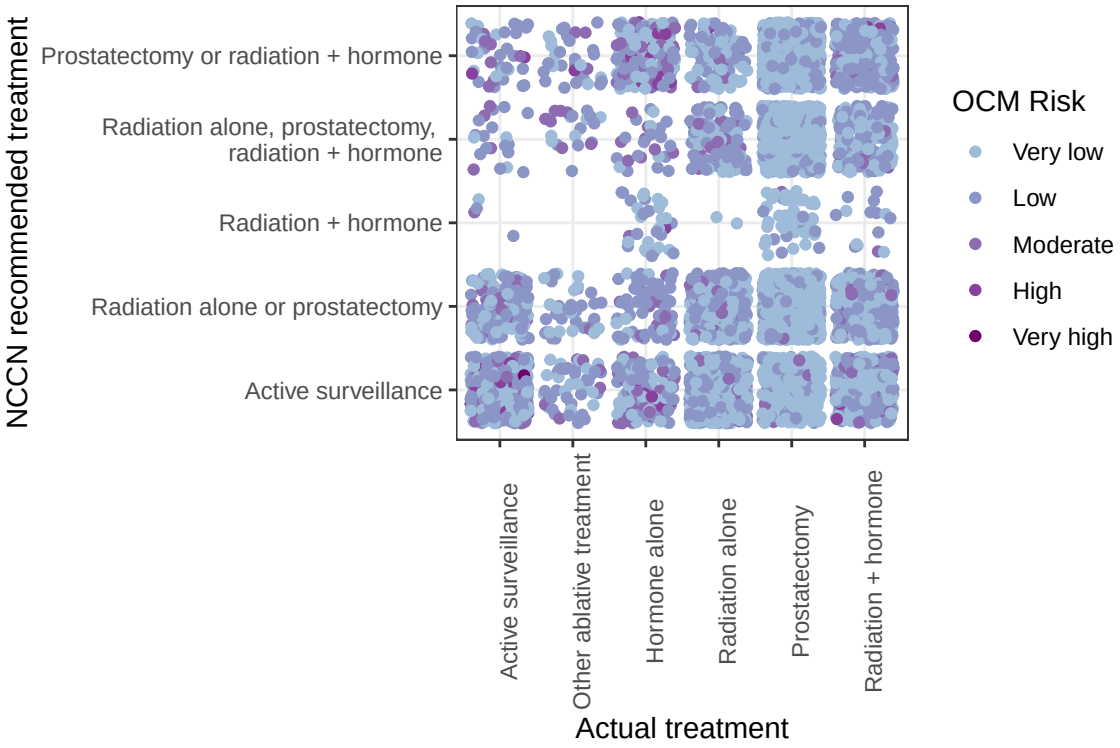


Table 4: Descriptions of life expectancy (grouped by risk of OCM at 10 years):

	Very low	Low	Moderate	High	Very high	p	test
n	4336	2644	536	72	8		
Age (years) (mean (SD))	65.9 (4.2)	73.2 (3.7)	78.0 (4.0)	80.8 (3.8)	82.4 (3.7)	<0.001	
Race (%)						<0.001	
NHB	214 (4.9)	166 (6.3)	48 (9.0)	11 (15.3)	1 (12.5)		
NHW	3927 (90.6)	2321 (87.8)	444 (82.8)	52 (72.2)	7 (87.5)		
Other	195 (4.5)	157 (5.9)	44 (8.2)	9 (12.5)	0 (0.0)		
Education (%)						<0.001	
9th-11th grade	138 (3.2)	244 (9.2)	82 (15.3)	17 (23.6)	2 (25.0)		
College graduate	2259 (52.1)	825 (31.2)	136 (25.4)	19 (26.4)	0 (0.0)		
HS graduate	654 (15.1)	580 (21.9)	136 (25.4)	20 (27.8)	2 (25.0)		
Less than 9th grade	28 (0.6)	41 (1.6)	10 (1.9)	4 (5.6)	2 (25.0)		
Some college	1257 (29.0)	954 (36.1)	172 (32.1)	12 (16.7)	2 (25.0)		
Marital status (%)						<0.001	
Married	3922 (90.5)	2191 (82.9)	364 (67.9)	31 (43.1)	2 (25.0)		
Separated	342 (7.9)	367 (13.9)	130 (24.3)	31 (43.1)	4 (50.0)		
Single	72 (1.7)	86 (3.3)	42 (7.8)	10 (13.9)	2 (25.0)		
Smoking status (%)						<0.001	
Current	256 (5.9)	284 (10.7)	111 (20.7)	24 (33.3)	4 (50.0)		
Former	1981 (45.7)	1506 (57.0)	298 (55.6)	34 (47.2)	4 (50.0)		
Never	2099 (48.4)	854 (32.3)	127 (23.7)	14 (19.4)	0 (0.0)		
Diabetes = Yes (%)	163 (3.8)	237 (9.0)	69 (12.9)	8 (11.1)	0 (0.0)	<0.001	
Hypertension = Yes (%)	1187 (27.4)	1103 (41.7)	222 (41.4)	26 (36.1)	2 (25.0)	<0.001	
Previous stroke = Yes (%)	17 (0.4)	94 (3.6)	46 (8.6)	14 (19.4)	1 (12.5)	<0.001	
BMI category (%)						<0.001	
Underweight (BMI < 18.5)	5 (0.1)	10 (0.4)	1 (0.2)	2 (2.8)	2 (25.0)		
Normal weight (BMI 18.5-25)	1073 (24.7)	801 (30.3)	230 (42.9)	41 (56.9)	2 (25.0)		
Overweight (BMI 25-40)	3236 (74.6)	1812 (68.5)	290 (54.1)	27 (37.5)	4 (50.0)		
Obese (BMI 40+)	22 (0.5)	21 (0.8)	15 (2.8)	2 (2.8)	0 (0.0)		
N Stage (%)						<0.001	
N0	3832 (88.4)	2246 (84.9)	438 (81.7)	56 (77.8)	6 (75.0)		
N1	56 (1.3)	33 (1.2)	4 (0.7)	1 (1.4)	1 (12.5)		
N2	9 (0.2)	2 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)		
NX	439 (10.1)	363 (13.7)	94 (17.5)	15 (20.8)	1 (12.5)		

Table 4 cont.: Descriptions of life expectancy (grouped by risk of OCM at 10 years):

	Very low	Low	Moderate	High	Very high	p	test
n	4336	2644	536	72	8		
T Stage (%)						<0.001	
T0	1 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)		
T1-T2a	2129 (49.1)	1836 (69.4)	399 (74.4)	49 (68.1)	7 (87.5)		
T2b-T2c	1652 (38.1)	610 (23.1)	111 (20.7)	20 (27.8)	1 (12.5)		
T3a-T4	551 (12.7)	198 (7.5)	25 (4.7)	3 (4.2)	0 (0.0)		
TX	3 (0.1)	0 (0.0)	1 (0.2)	0 (0.0)	0 (0.0)		
Gleason (%)						<0.001	
<= 6	2536 (58.5)	1368 (51.7)	237 (44.2)	24 (33.3)	3 (37.5)		
7	1379 (31.8)	896 (33.9)	188 (35.1)	22 (30.6)	2 (25.0)		
8	235 (5.4)	227 (8.6)	64 (11.9)	8 (11.1)	2 (25.0)		
9	167 (3.9)	138 (5.2)	41 (7.6)	11 (15.3)	0 (0.0)		
10	19 (0.4)	15 (0.6)	6 (1.1)	7 (9.7)	1 (12.5)		
PSA at diagnosis (mean (SD))	10.5 (80.2)	13.2 (49.1)	19.0 (77.5)	39.8 (106.7)	7.2 (2.4)	<0.001	
Prostate cancer risk group (%)						<0.001	
Low	1158 (26.7)	758 (28.7)	118 (22.0)	8 (11.1)	2 (25.0)		
Favorable intermediate	1149 (26.5)	645 (24.4)	136 (25.4)	12 (16.7)	2 (25.0)		
Unfavorable intermediate	734 (16.9)	316 (12.0)	61 (11.4)	7 (9.7)	0 (0.0)		
High/very high	790 (18.2)	527 (19.9)	123 (22.9)	29 (40.3)	2 (25.0)		
Regional	65 (1.5)	35 (1.3)	4 (0.7)	1 (1.4)	1 (12.5)		
NA	440 (10.1)	363 (13.7)	94 (17.5)	15 (20.8)	1 (12.5)		
Primary treatment (%)						<0.001	
Active surveillance	304 (7.0)	424 (16.0)	112 (20.9)	19 (26.4)	6 (75.0)		
Other ablative treatment	49 (1.1)	94 (3.6)	22 (4.1)	2 (2.8)	0 (0.0)		
Hormone alone	143 (3.3)	250 (9.5)	122 (22.8)	31 (43.1)	2 (25.0)		
Radiation alone	817 (18.8)	681 (25.8)	109 (20.3)	9 (12.5)	0 (0.0)		
Prostatectomy	2318 (53.5)	504 (19.1)	22 (4.1)	0 (0.0)	0 (0.0)		
Radiation + hormone	705 (16.3)	691 (26.1)	149 (27.8)	11 (15.3)	0 (0.0)		
Treatment concordance with NCCN recs (%)						<0.001	
Not aggressive enough	255 (5.9)	376 (14.2)	119 (22.2)	22 (30.6)	1 (12.5)		
Concordant	2497 (57.6)	1188 (44.9)	175 (32.6)	19 (26.4)	4 (50.0)		
Too aggressive	1144 (26.4)	717 (27.1)	148 (27.6)	16 (22.2)	0 (0.0)		
NA	440 (10.1)	363 (13.7)	94 (17.5)	15 (20.8)	3 (37.5)		
Outcome (%)						<0.001	
Alive	3214 (74.1)	1507 (57.0)	237 (44.2)	17 (23.6)	2 (25.0)		
Died of OC	900 (20.8)	965 (36.5)	264 (49.3)	48 (66.7)	4 (50.0)		
Died of PC	222 (5.1)	172 (6.5)	35 (6.5)	7 (9.7)	2 (25.0)		