

OCM_figurestable

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Figure 1: Sample exclusions used to move from a sample of 9,214 men in National Health and Nutrition Examination Survey (NHANES) 1999-2010 to the final training sample of 2,420 men used for model-building.

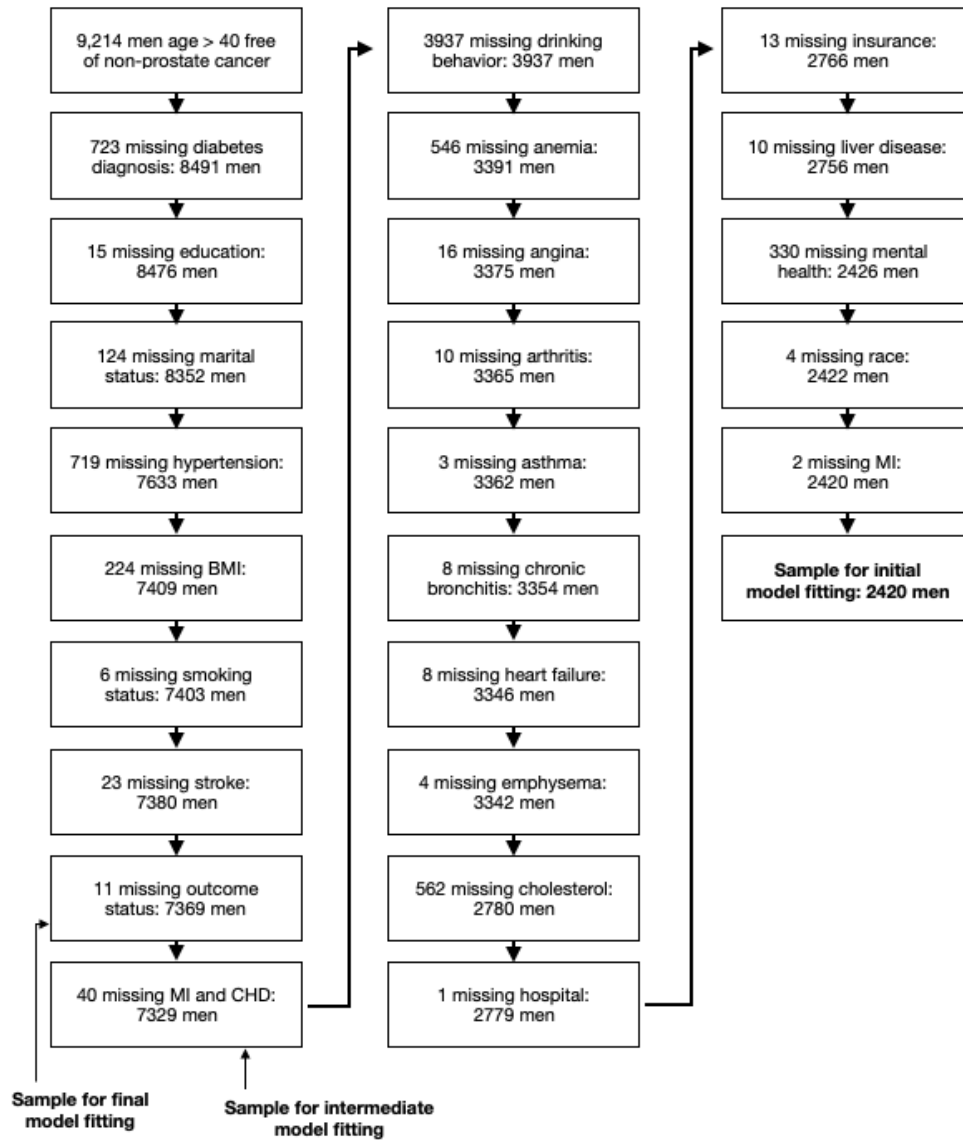


Figure 2: Sample exclusions used to move from a sample of 8,776 men in the Prostate, Lung, Colon, and Ovarian Cancer Screening Trial (PLCO) to the final validation sample of 8,220 men used for model-building.

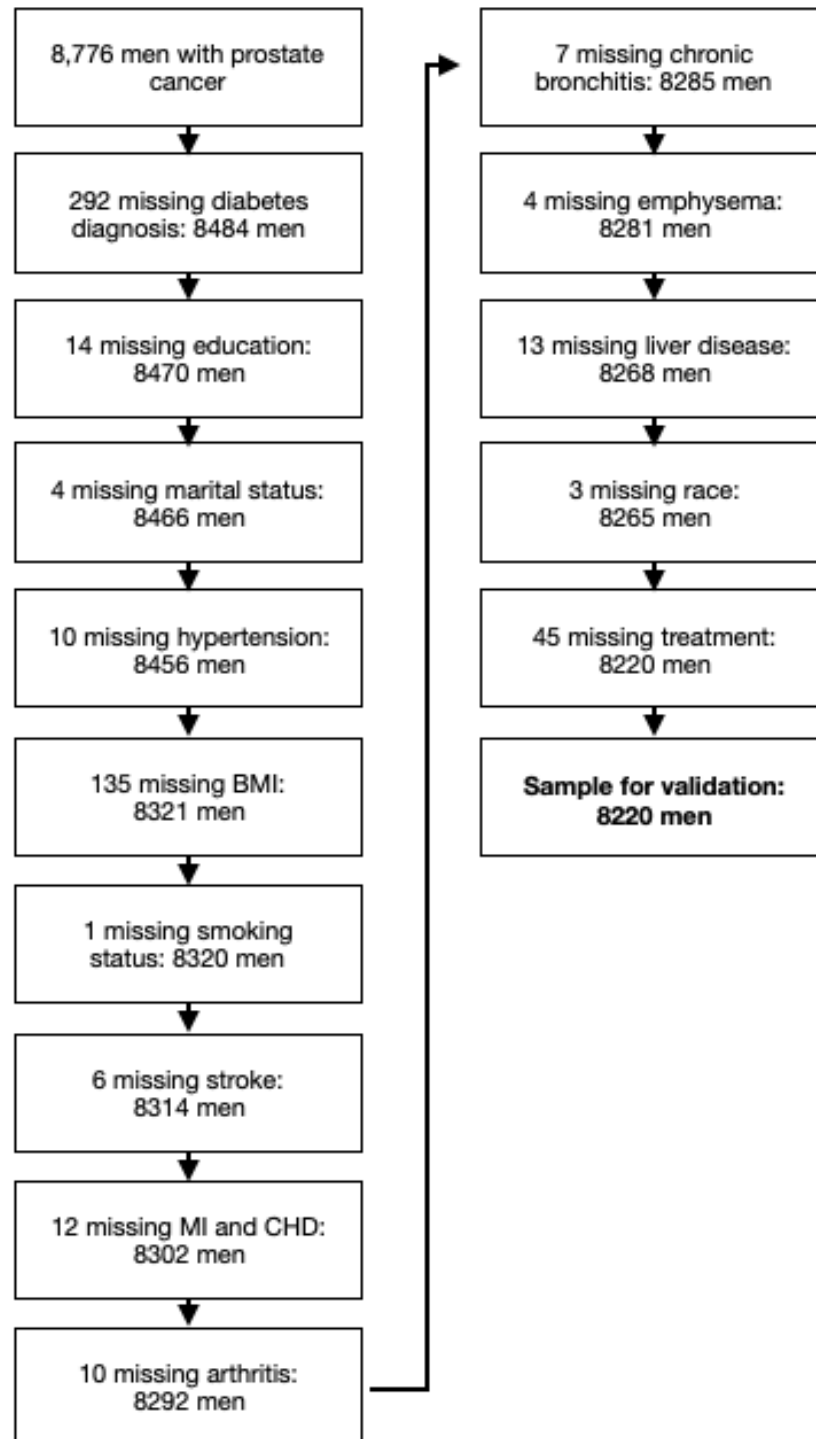


Table 1: Baseline characteristics of NHANES training and PLCO validation data.

	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: Externally validated time-dependent AUCs at 5, 10, and 14 years of our Cox model fit to men ages 55+, our Cox model fit to men older than 40, and a random forest fit to men older than 40. Based on this assessment, we selected our age >40 Cox model as our final OC mortality model. We also include the AUCs obtained from using the Social Security Administration (SSA) 2001 actuarial table’s life expectancy prediction and the National Vital Statistics System’s (NVSS) 2001 life expectancy. All time-dependent AUCs were obtained after fitting the models in NHANES and then validating them in our PLCO validation sample of 8,220 men.

Model	AUC		
	5 Years	10 Years	14 Years
Cox Ages 55+	0.70	0.75	0.77
Cox Ages >40	0.70	0.75	0.78
Random Forest >40	0.70	0.73	0.74
SSA	0.65	0.71	0.75
NVSS	0.65	0.71	0.75

Figure 3: Comparison of life expectancy predictions (truncated at 17 years) from our final OC mortality model and predictions from the SSA 2001 actuarial tables for 8,220 men in PLCO.

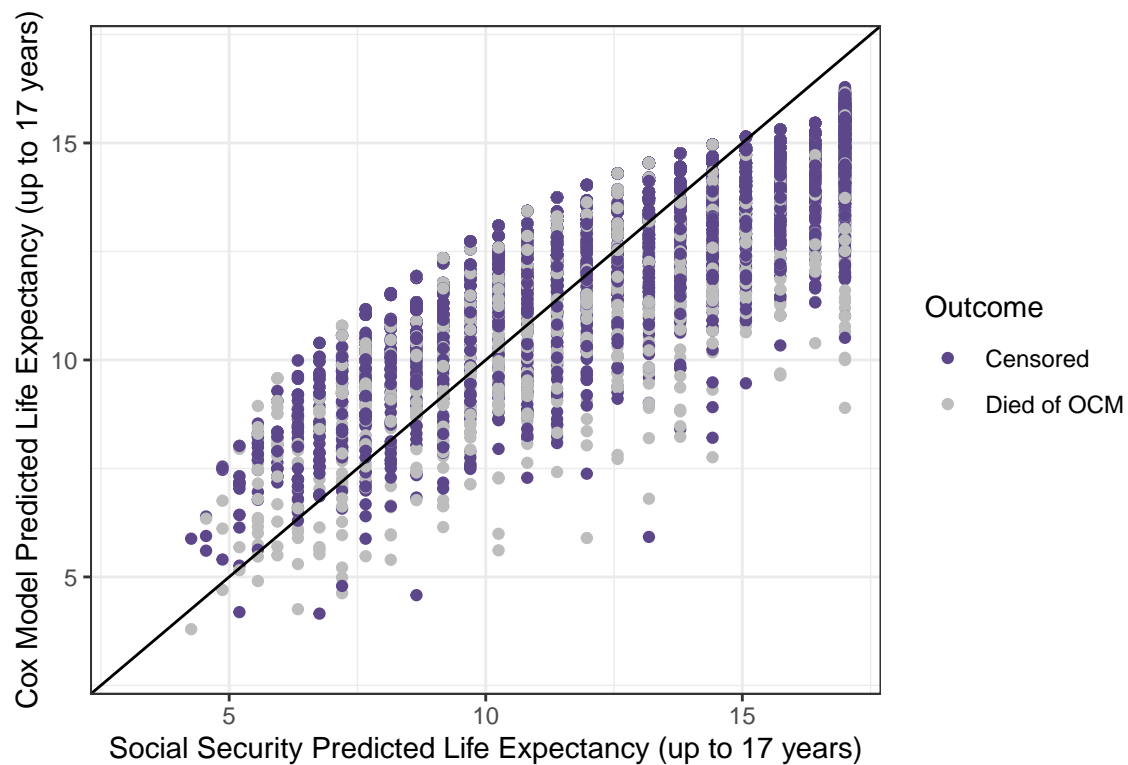


Table 3: Time-dependent AUC of our final OC mortality model in the three main treatment groups.

Treatment	AUC		
	5 Years	10 Years	14 Years
Prostatectomy	0.68	0.69	0.72
Radiation alone	0.65	0.71	0.74
Radiation + hormone	0.63	0.71	0.73

Figure 4: Calibration performance of our final OC mortality model in PLCO validation sample of 8,220 men with prostate cancer.

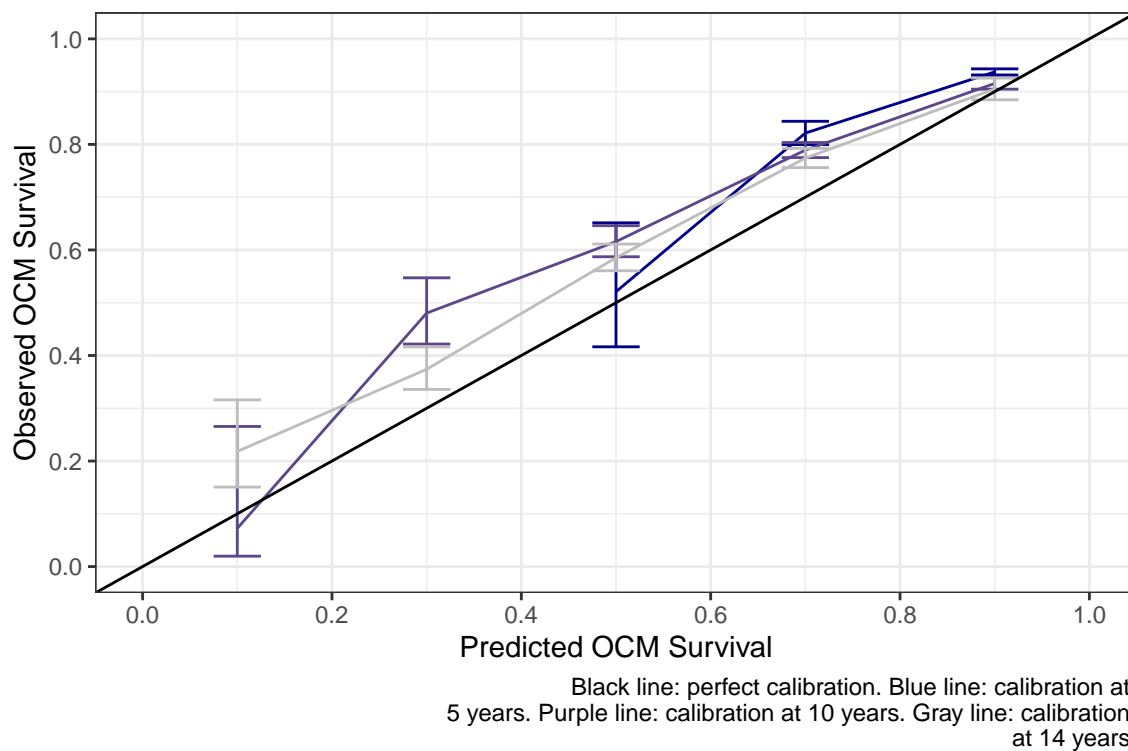


Figure 5: Forest plot of predictors for final OC mortality prediction model fit in NHANES training data. The model also includes interactions between age and diabetes, education, hypertension, and stroke.

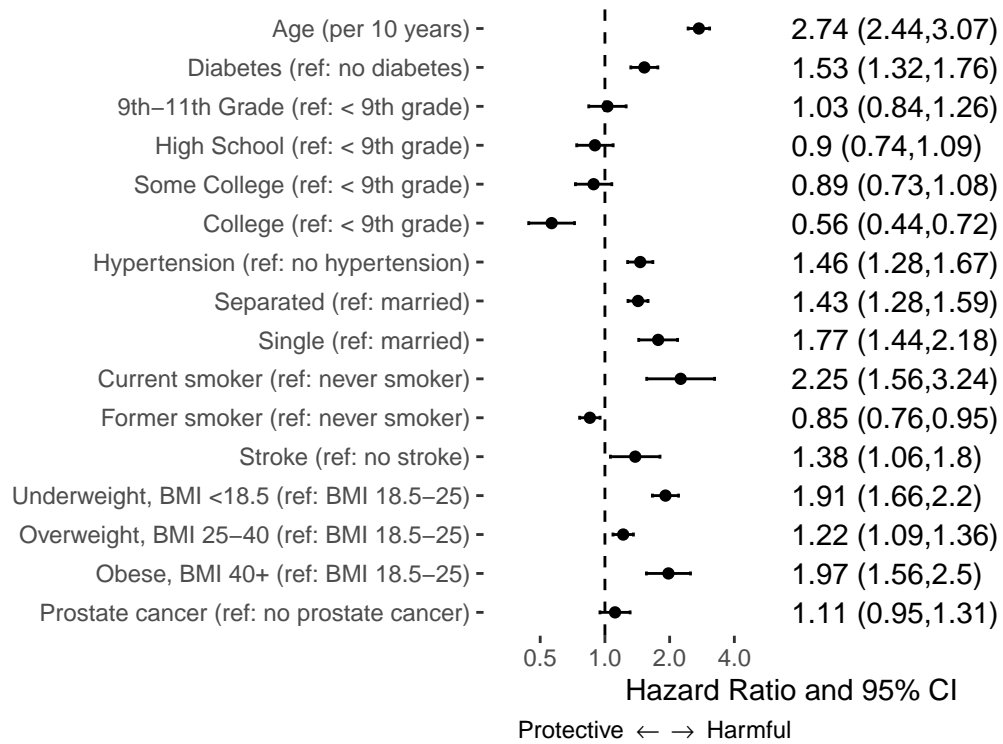
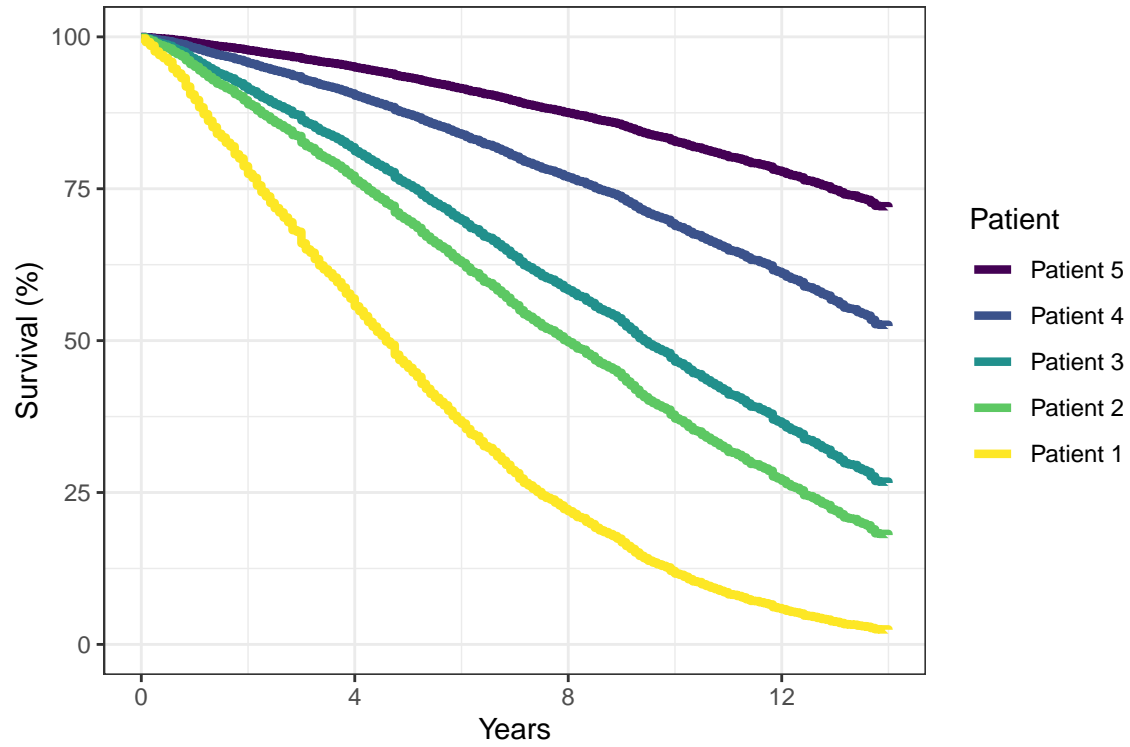


Figure 6: Sample incidence curves predicted using our OC mortality model for 5 different patients taken from our PLCO validation sample.



Patient 1 (very high risk): age 85, no comorbidities, some college, married, current smoker, BMI 25-40

Patient 2 (high risk): age 82, hypertensive, college graduate, married, former smoker, BMI 18.5-25

Patient 3 (moderate risk): age 71, hypertensive, high school graduate, married, current smoker, BMI 18.5-25

Patient 4 (low risk): age 66, no comorbidities, college graduate, separated, current smoker, BMI 18.5-25

Patient 5 (very low risk): age 62, hypertensive, some college, married, former smoker, BMI 25-40

Table 4: Characteristics of 7,596 men in PLCO, grouped by years of life remaining up to 17 years.

	< 10	10+	p	test
n	870	6726		
Age (years) (mean (SD))	77.7 (4.1)	68.4 (5.2)	<0.001	
Race (%)			<0.001	
NHB	86 (9.9)	354 (5.3)		
NHW	712 (81.8)	6039 (89.8)		
Other	72 (8.3)	333 (5.0)		
Education (%)			<0.001	
9th-11th grade	140 (16.1)	343 (5.1)		
College graduate	222 (25.5)	3017 (44.9)		
HS graduate	218 (25.1)	1174 (17.5)		
Less than 9th grade	26 (3.0)	59 (0.9)		
Some college	264 (30.3)	2133 (31.7)		
Marital status (%)			<0.001	
Married	585 (67.2)	5925 (88.1)		
Separated	212 (24.4)	662 (9.8)		
Single	73 (8.4)	139 (2.1)		
Smoking status (%)			<0.001	
Current	176 (20.2)	503 (7.5)		
Former	473 (54.4)	3350 (49.8)		
Never	221 (25.4)	2873 (42.7)		
Diabetes = Yes (%)	116 (13.3)	361 (5.4)	<0.001	
Hypertension = Yes (%)	373 (42.9)	2167 (32.2)	<0.001	
Previous stroke = Yes (%)	80 (9.2)	92 (1.4)	<0.001	
BMI category (%)			<0.001	
Underweight (BMI < 18.5)	7 (0.8)	13 (0.2)		
Normal weight (BMI 18.5-25)	365 (42.0)	1782 (26.5)		
Overweight (BMI 25-40)	479 (55.1)	4890 (72.7)		
Obese (BMI 40+)	19 (2.2)	41 (0.6)		
N Stage (%)			0.001	
N0	722 (83.0)	5856 (87.1)		
N1	8 (0.9)	87 (1.3)		
N2	0 (0.0)	11 (0.2)		
NX	140 (16.1)	772 (11.5)		

Table 4, cont: Characteristics of 7,596 men in PLCO, grouped by years of life remaining up to 17 years.

	< 10	10+	p	test
n	870	6726		
T Stage (%)			<0.001	
T0	0 (0.0)	1 (0.0)		
T1-T2a	659 (75.7)	3761 (55.9)		
T2b-T2c	174 (20.0)	2220 (33.0)		
T3a-T4	36 (4.1)	741 (11.0)		
TX	1 (0.1)	3 (0.0)		
Gleason (%)			<0.001	
<= 6	391 (44.9)	3777 (56.2)		
7	296 (34.0)	2191 (32.6)		
8	100 (11.5)	436 (6.5)		
9	67 (7.7)	290 (4.3)		
10	16 (1.8)	32 (0.5)		
PSA at diagnosis (mean (SD))	20.8 (79.1)	11.2 (69.9)	0.001	
Prostate cancer risk group (%)			0.001	
Low	204 (23.4)	1840 (27.4)		
Intermediate	210 (24.1)	1538 (22.9)		
High	210 (24.1)	1261 (18.7)		
Regional	8 (0.9)	98 (1.5)		
NA	238 (27.4)	1989 (29.6)		
primary_tx (%)			<0.001	
Active surveillance	199 (22.9)	666 (9.9)		
Other ablative treatment	35 (4.0)	132 (2.0)		
Hormone alone	197 (22.6)	351 (5.2)		
Radiation alone	170 (19.5)	1446 (21.5)		
Prostatectomy	39 (4.5)	2805 (41.7)		
Radiation + hormone	230 (26.4)	1326 (19.7)		
Outcome (%)			<0.001	
Alive	385 (44.3)	4592 (68.3)		
Died of OC	426 (49.0)	1755 (26.1)		
Died of PC	59 (6.8)	379 (5.6)		

Figure 7: Proportion of patients receiving definitive treatment (prostatectomy, radiation, or radiation + hormone therapy) grouped by OC mortality prediction and prostate cancer risk group in sample of 6,881 men from PLCO.

