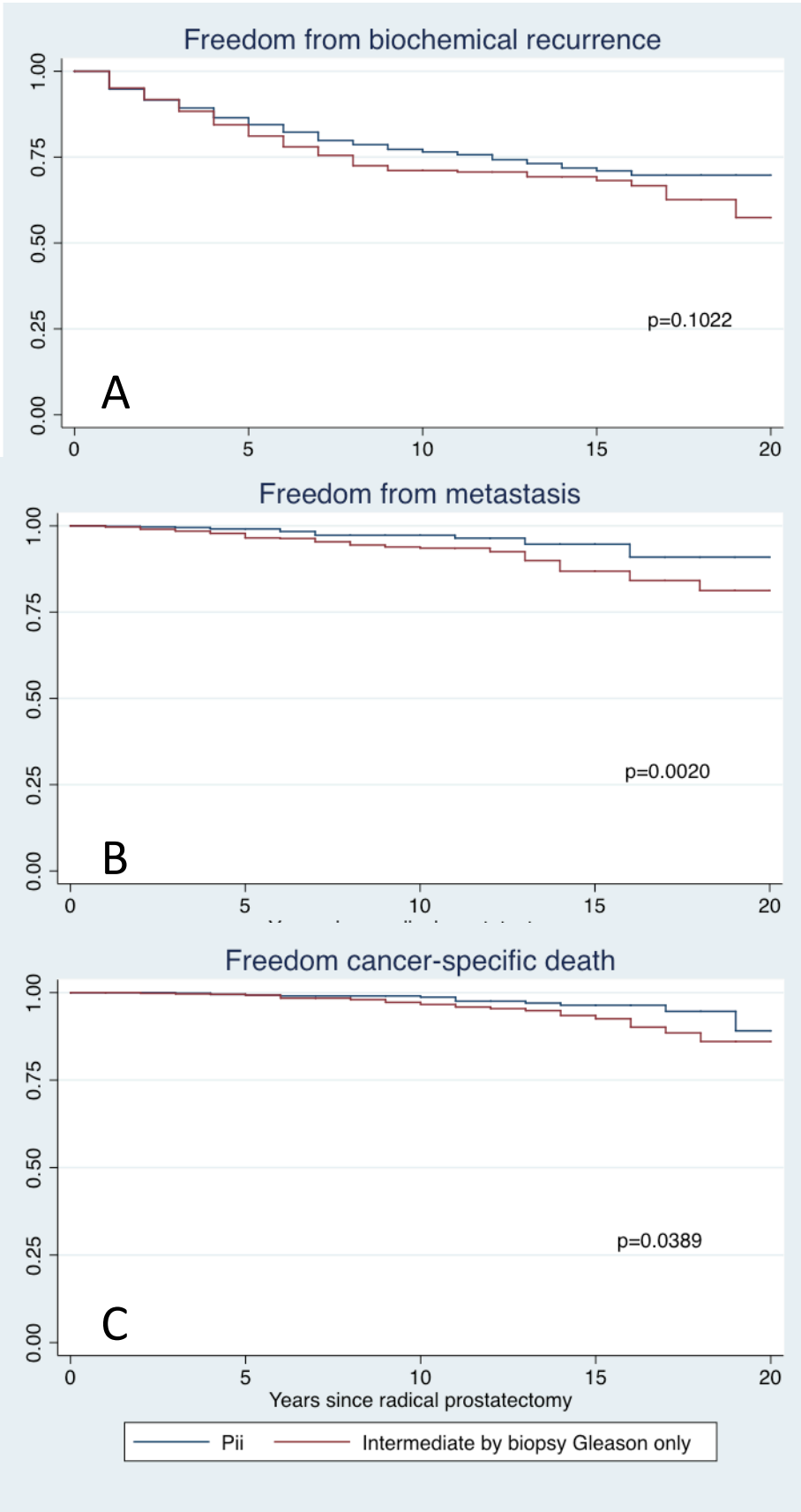


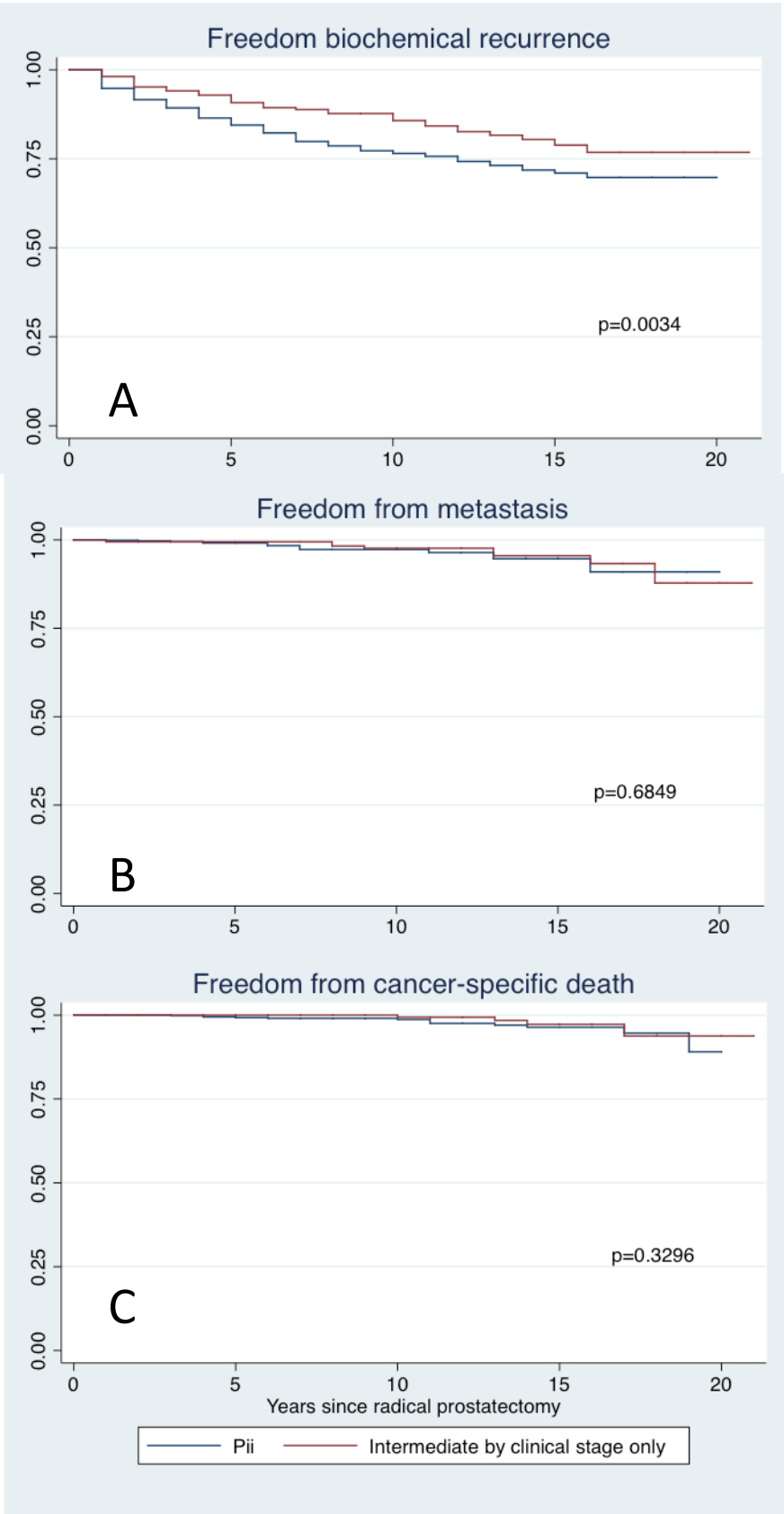
Supplemental Figure 1. Kaplan Meier curves comparing outcomes of Pii risk men to D'Amico intermediate risk men with biopsy Gleason score 7 as their only intermediate risk feature. (A) Biochemical recurrence free survival,  $p=0.1022$ . (B) Metastasis free survival,  $p=0.0020$ . (C) Cancer-specific survival,  $p=0.0389$ .



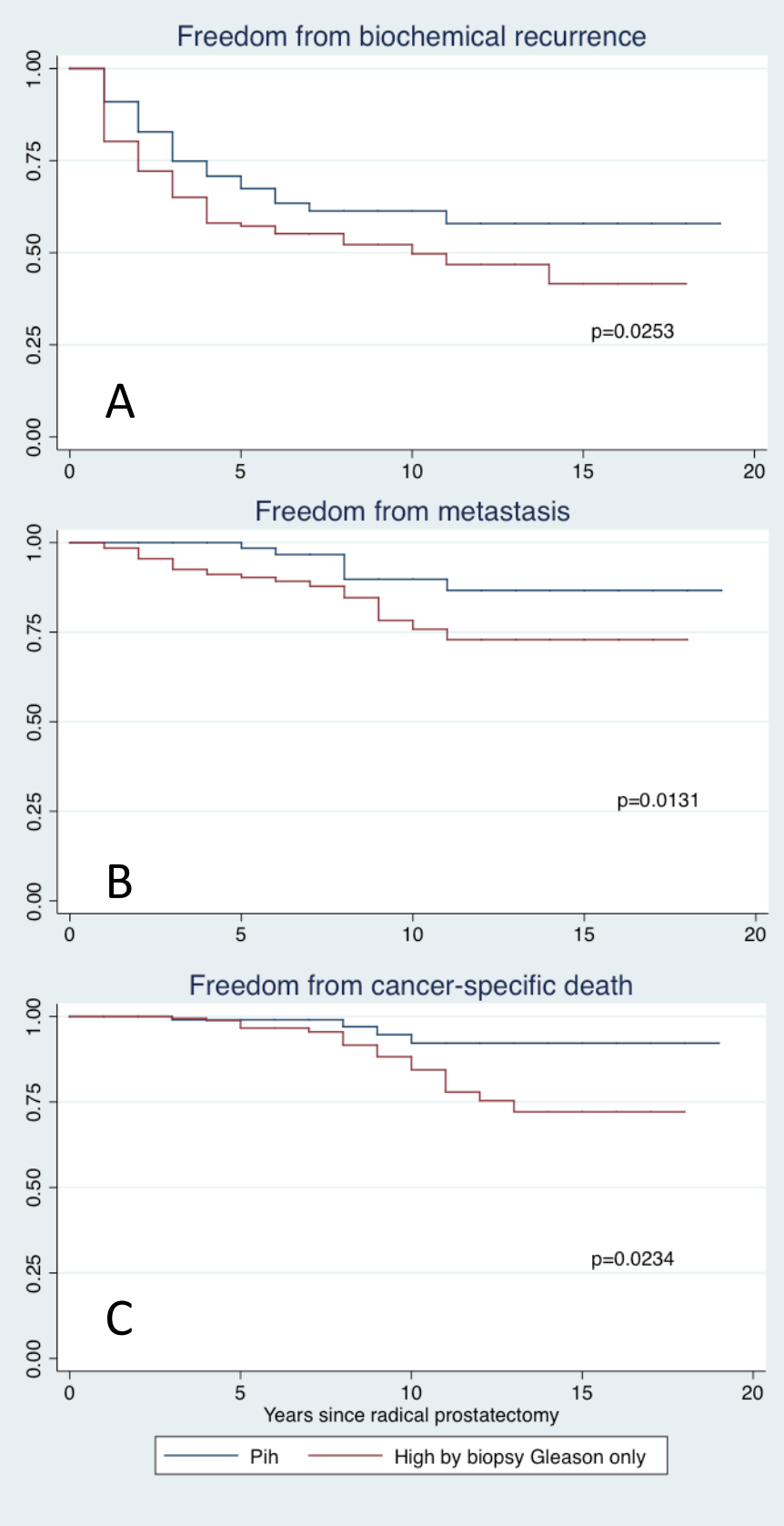
Supplemental Table 4. Univariate and multivariable hazard ratios predicting biochemical recurrence, metastasis, and prostate cancer-specific mortality for the 2005-2012 cohort

	UNIVARIATE			MULTIVARIABLE		
	H.R.	95% C.I.	<i>p</i>	H.R.	95% C.I.	<i>p</i>
<b>Biochemical recurrence</b>						
Risk category						
Low (referent)	1	--	--	1	--	--
Pii	1.97	0.85, 4.59	0.114	1.96	0.85, 4.57	0.117
Intermediate except Pii	5.10	3.74, 6.95	<0.001	5.35	3.91, 7.32	<0.001
Pih	5.56	1.36, 22.79	0.017	5.82	1.42, 23.93	0.015
High except Pih	16.21	11.63, 22.60	<0.001	16.75	11.98, 23.41	<0.001
Age	1.02	1.00, 1.03	0.086	1.00	0.98, 1.01	0.689
African American race	1.51	1.08, 2.09	0.015	1.43	1.03, 2.00	0.035
Year of surgery	0.92	0.86, 0.98	0.011	0.88	0.83, 0.95	<0.001
<b>Metastasis</b>						
Risk category						
Low (referent)	1	--	--	1	--	--
Pii	8.74	0.79, 96.48	0.077	8.86	0.80, 98.02	0.075
Intermediate except Pii	16.34	3.77, 70.74	<0.001	17.00	3.91, 73.96	<0.001
Pih	-	-	-	-	-	-
High except Pih	75.89	17.60, 327.14	<0.001	78.82	18.21, 341.20	<0.001
Age	1.01	0.97, 1.06	0.557	0.99	0.94, 1.04	0.599
African American race	0.99	0.30, 3.21	0.982	0.94	0.29, 3.10	0.918
Year of surgery	1.00	0.80, 1.25	0.986	0.95	0.76, 1.19	0.669
<b>Prostate cancer-specific mortality</b>						
Risk category						
Low (referent)	1	--	--	1	--	--
Pii	-	-	-	0.00	-	-
Intermediate except Pii	8.03	0.90, 71.91	0.063	8.16	0.90, 74.26	0.062
Pih	-	-	-	0.00	-	-
High except Pih	23.26	2.42, 223.68	0.006	25.51	2.63, 247.39	0.005
Age	1.03	0.92, 1.14	0.649	1.02	0.91, 1.13	0.785
African American race	1.80	0.22, 14.71	0.583	2.08	0.25, 17.63	0.500
Year of surgery	0.57	0.29, 1.11	0.101	0.53	0.27, 1.04	0.066

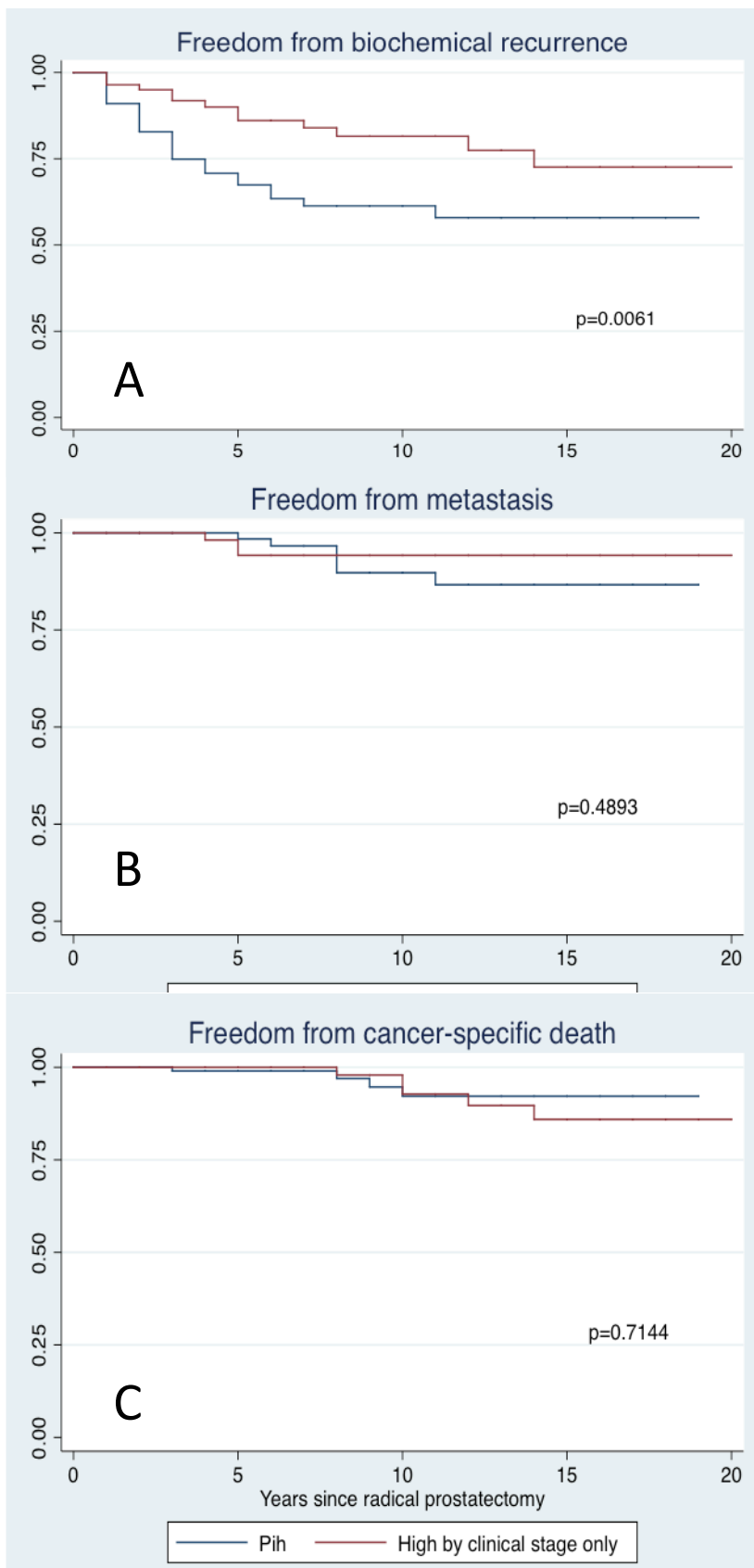
Supplemental Figure 2. Kaplan Meier curves comparing outcomes of Pii risk men to D'Amico intermediate risk men with clinical stage T2b as their only intermediate risk feature. (A) Biochemical recurrence free survival,  $p=0.0034$ . (B) Metastasis free survival,  $p=0.6849$ . (C) Cancer-specific survival,  $p=0.3296$ .



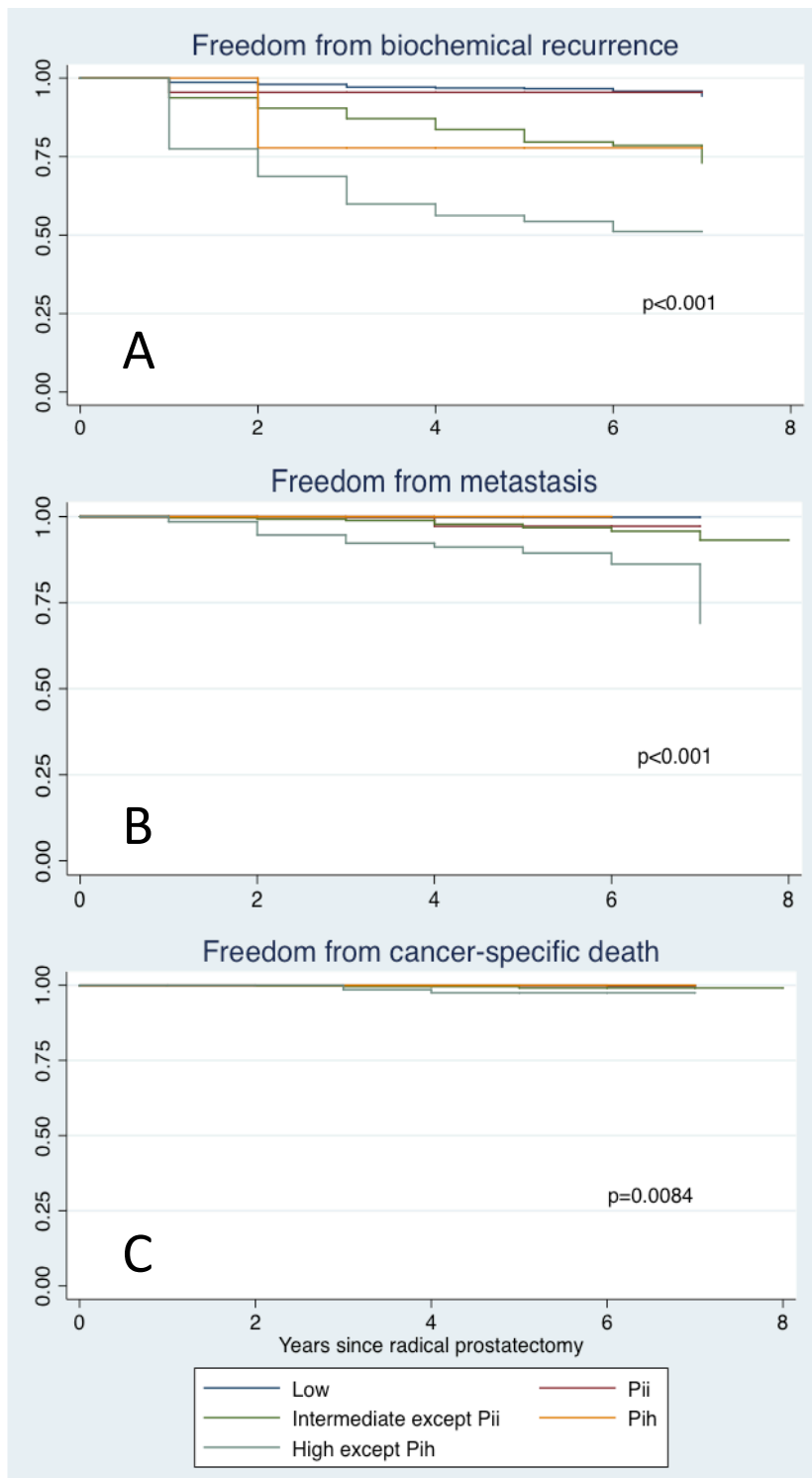
Supplemental Figure 3. Kaplan Meier curves comparing outcomes of Pih risk men to D'Amico high risk men with biopsy Gleason score 8-10 as their only high risk feature. (A) Biochemical recurrence free survival,  $p=0.0253$ . (B) Metastasis free survival,  $p=0.0131$ . (C) Cancer-specific survival,  $p=0.0234$ .



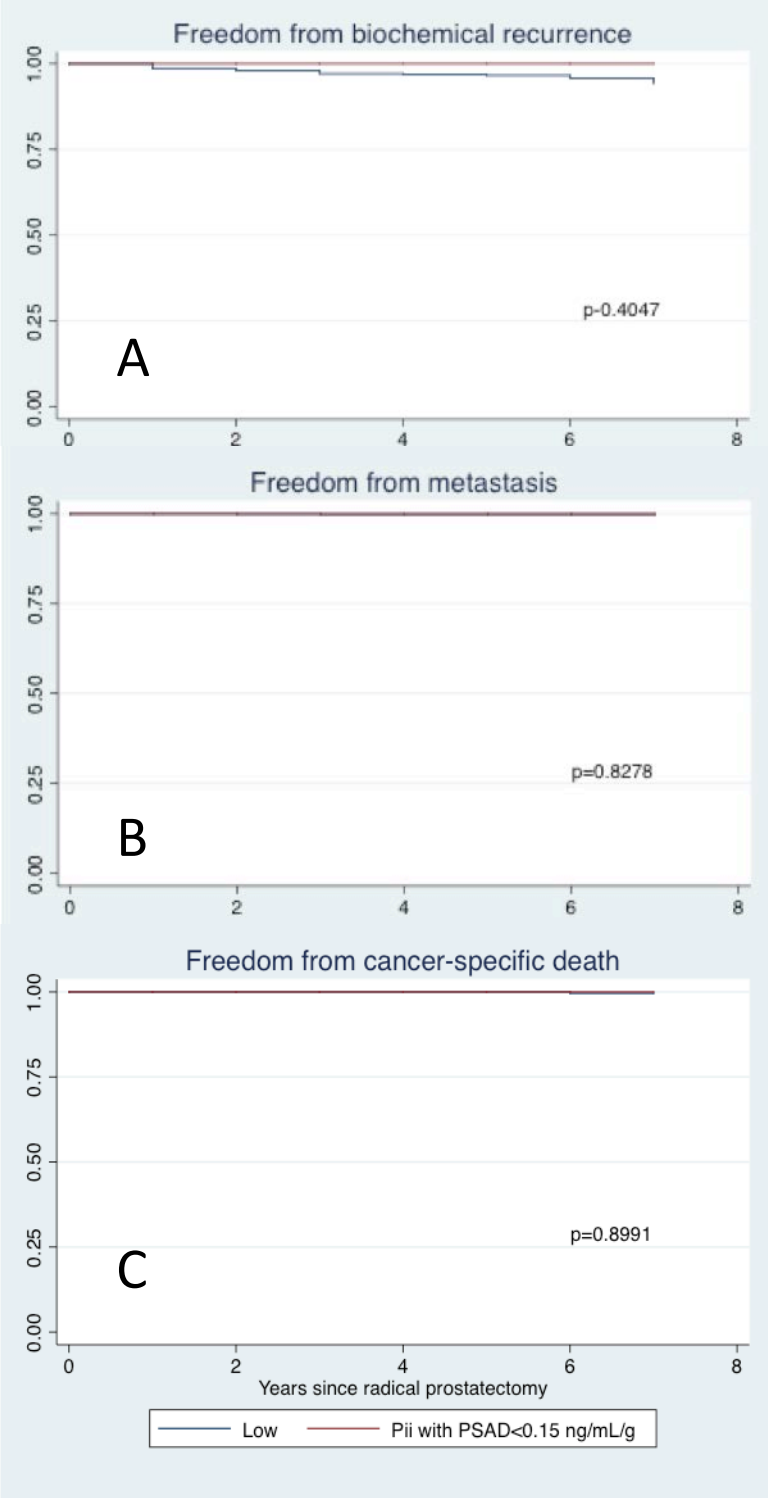
Supplemental Figure 4. Kaplan Meier curves comparing outcomes of Pih risk men to D'Amico high risk men with clinical stage  $\geq T2c$  as their only high risk feature. (A) Biochemical recurrence free survival,  $p=0.0061$ . (B) Metastasis free survival,  $p=0.4893$ . (C) Cancer-specific survival,  $p=0.7144$ .



Supplemental Figure 5. Cancer-specific outcomes stratified by risk category for the 2005-2012 cohort. (A) Biochemical recurrence free survival,  $p < 0.001$  for all comparisons. (B) Metastasis free survival,  $< 0.001$  for all comparisons. (C) Cancer-specific survival,  $p = 0.008$  for all comparisons.



Supplemental Figure 6. Kaplan Meier curves comparing PSA-incongruent men from the 2005-2012 cohort having PSA density <0.15 ng/mL/g (Pii: n=46, Pih: n=0) to D'Amico low risk men. (A) Biochemical recurrence free survival, p=0.4047. (B) Metastasis free survival, p=0.8278. (C) Cancer-specific survival, p=0.8991.



Supplemental Table 1. Among the cohort of Pii or Pih men, stratified by PSAD <0.15 ng/mL/g or PSAD ≥0.15 ng/mL/g, univariate and multivariable hazard ratios predicting biochemical recurrence, metastasis, and prostate cancer-specific mortality.

	UNIVARIATE			MULTIVARIABLE		
	H.R.	95% C.I.	<i>p</i>	H.R.	95% C.I.	<i>p</i>
<b>Biochemical recurrence</b>						
Risk category						
Low (referent)	1	--	--	1	--	--
Pii, PSAD <0.15 ng/mL/g	0.89	0.44, 1.80	0.752	0.76	0.38, 1.53	0.439
Pii, PSAD ≥0.15 ng/mL/g	3.44	2.79, 4.22	<0.001	3.01	2.43, 3.72	<0.001
Pih, PSAD <0.15 ng/mL/g	13.63	1.91, 97.16	0.009	7.48	1.04, 53.75	0.046
Pih, PSAD ≥0.15 ng/mL/g	6.13	4.31, 8.71	<0.001	4.84	3.38, 6.94	<0.001
Age	1.03	1.02, 1.04	<0.001	1.03	1.02, 1.04	<0.001
African American race	2.40	1.85, 3.12	<0.001	2.23	1.71, 2.90	<0.001
Year of surgery	0.93	0.92, 0.95	<0.001	0.96	0.94, 0.98	<0.001
<b>Metastasis</b>						
Risk category						
Low (referent)	1	--	--	1	--	--
Pii, PSAD <0.15 ng/mL/g	0.78	0.11, 5.69	0.809	0.56	0.08, 4.11	0.570
Pii, PSAD ≥0.15 ng/mL/g	3.42	1.97, 5.94	<0.001	2.72	1.54, 4.79	0.001
Pih, PSAD <0.15 ng/mL/g	0.00	--	1.00	0.00	--	--
Pih, PSAD ≥0.15 ng/mL/g	6.30	2.68, 14.83	<0.001	4.68	1.95, 11.22	0.001
Age	1.08	1.03, 1.12	<0.001	1.07	1.03, 1.11	0.001
African American race	2.14	0.92, 4.96	0.076	1.88	0.81, 4.39	0.143
Year of surgery	0.88	0.82, 0.95	0.001	0.92	0.85, 0.99	0.024
<b>Prostate cancer-specific mortality</b>						
Risk category						
Low (referent)	1	--	--	1	--	--
Pii, PSAD <0.15 ng/mL/g	0.00	--	1.00	0.00	--	--
Pii, PSAD ≥0.15 ng/mL/g	4.38	2.20, 8.73	<0.001	3.84	1.89, 7.81	<0.001
Pih, PSAD <0.15 ng/mL/g	0.00	--	1.00	0.00	--	--
Pih, PSAD ≥0.15 ng/mL/g	7.61	2.62, 22.13	<0.001	6.32	2.12, 18.81	0.001
Age	1.08	1.02, 1.14	0.005	1.08	1.02, 1.14	0.007
African American race	2.04	0.63, 6.64	0.237	1.70	0.52, 5.55	0.383
Year of surgery	0.90	0.81, 1.00	0.055	0.96	0.86, 1.07	0.443



Supplemental Table 2. Pre-operative characteristics and pathologic findings of 2005-2012 cohort stratified by risk category

	Low	Pii	Intermediate except Pii	Pih	High except Pih	<i>p</i>
N	4095 (56.3%)	255 (3.51%)	2344 (32.3%)	32 (0.4%)	542 (7.5%)	--
Age (years), mean (range)	57.5 (35-77)	59.0 (40-72)	59.6 (34-76)	59.3 (45-73)	60.1 (38-76)	<0.001
Race						0.001
African American	426 (10.4%)	39 (15.3%)	308 (13.1%)	5 (15.6%)	77 (14.2%)	
Caucasian/Other	3669 (89.6%)	216 (84.7%)	2036 (86.9%)	27 (84.4%)	465 (85.8%)	
Year of surgery, median (IQR)	2008 (2006, 2010)	2008 (2006, 2010)	2009 (2007, 2011)	2009 (2008, 2011)	2009 (2007, 2011)	<0.001
Follow-up (years)						0.022
Mean	2.8	2.6	2.6	2.8	2.8	
Median	2.0	2.0	2.0	2.0	2.0	
PSA (ng/mL), median (IQR)	4.6 (3.5, 5.9)	12.3 (10.8, 14.7)	5.1 (4.2, 7.1)	24.8 (21.4, 31.2)	6.1 (4.3, 10.6)	<0.001
PSA Density (ng/mL/g), median (IQR)	0.09 (0.07, 0.12)	0.22 (0.16, 0.29)	0.11 (0.08, 0.16)	0.56 (0.31, 0.69)	0.13 (0.09, 0.22)	<0.001
Prostate weight (g), median (IQR)	47.6 (39.4, 58.8)	54.8 (44.4, 78.2)	45.4 (37.6, 55.0)	51.4 (37.7, 85.8)	47.9 (39.0, 58.7)	<0.001
Biopsy Gleason Score						<0.001
≤6	4095 (100.0%)	255 (100.0%)	98/2343 (4.2%)	32 (100.0%)	18 (3.3%)	
7 (3+4)	0 (0.0%)	0 (0.0%)	1606 (68.5%)	0 (0.0%)	58 (10.7%)	
7 (4+3)	0 (0.0%)	0 (0.0%)	639 (27.3%)	0 (0.0%)	34 (6.3%)	
8-10	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	432 (79.7%)	
Clinical Stage						<0.001
T1c	3580/4095 (87.4%)	235/255 (92.2%)	1538/2344 (65.6%)	31/32 (96.9%) 1 (3.1%)	265/542 (48.9%)	
T2a	515 (12.6%)	20 (7.8%)	503 (21.5%)	0 (0.0%)	109 (20.2%)	
T2b	0 (0.0%)	0 (0.0%)	303 (12.9%)	0 (0.0%)	82 (15.1%)	
T2c	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	61 (11.3%)	
T3a	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	24 (4.4%)	
T3b	0 (0.0%)	0 (0.0%)	0 (0.0%)		1 (0.1%)	
Pathologic Gleason score						<0.001
≤6	3025/4094 (73.9%)	148/255 (58.0%)	438/2344 (18.7%)	13/32 (40.6%)	25/541 (4.6%)	

7 (3+4)	860 (21.0%)	68 (26.7%)	1129 (48.2%)	10 (18.7%)	101 (18.7%)	
7 (4+3)	137 (3.3%)	27 (10.6%)	604 (25.8%)	4 (12.5%)	129 (23.8%)	
8-10	72 (1.8%)	12 (4.7%)	173 (7.4%)	5 (15.6%)	286 (52.9%)	
Pathologic stage						<0.001
T2	3492/4085 (85.5%)	187/255 (73.3%)	1365/2336 (58.4%)	16/32 (50.0%)	217/542 (40.0%)	
T3a	555 (13.6%)	59 (23.1%)	771 (33.0%)	15 (46.9%)	202 (37.3%)	
T3b	31 (0.8%)	8 (3.1%)	147 (6.3%)	1 (3.1%)	72 (13.3%)	
N1	7 (0.2%)	1 (0.4%)	53 (2.3%)	0 (0.0%)	51 (9.4%)	
Positive margins	445/4080 (10.9%)	48/254 (18.9%)	398/2339 (17.0%)	12/31 (38.7%)	145/540 (26.9%)	<0.001
Upgrade (pGS ≥7)	1069/4094 (26.1%)	107/255 (42.0%)	215/2344 (9.2%)	19/32 (59.4%)	85/541 (15.7%)	<0.001
Upstage (PS ≥pT3a)	593/4085 (14.5%)	68/255 (26.7%)	971/2336 (41.6%)	16/32 (50.0%)	310/542 (57.2%)	<0.001

Supplemental Table 3a. Risk of positive surgical margins, upgrading (pathologic Gleason sum  $\geq 7$ ), and upstaging (pathologic stage  $\geq$ pT3a) at RP compared to those classified as D'Amico low risk for the 2005-2012 cohort.

	OR	95% CI	<i>p</i>
Positive margins			
Low	1	--	--
Pii	1.90	1.37 – 2.65	<0.001
Intermediate except Pii	1.67	1.45 – 1.94	<0.001
Pih	5.16	2.49 – 10.70	<0.001
High except Pih	3.00	2.42 – 3.72	<0.001
Upgrade			
Low	1	--	--
Pii	2.05	1.58 – 2.65	<0.001
Intermediate except Pii	0.29	0.24 – 0.34	<0.001
Pih	4.14	2.04 – 8.40	<0.001
High except Pih	0.53	0.41 – 0.67	<0.001
Upstage			
Low	1	--	--
Pii	2.14	1.60 – 2.86	<0.001
Intermediate except Pii	4.19	3.72 – 4.72	<0.001
Pih	5.89	2.93 – 11.84	<0.001
High except Pih	7.87	6.50 – 9.53	<0.001

Supplemental Table 3b. Among the cohort of Pii or Pih men from 2005-2012, stratified by PSAD <0.15 ng/mL/g or PSA  $\geq$ 0.15 ng/mL/g, risk of positive surgical margins, upgrading (pathologic Gleason sum  $\geq 7$ ), and upstaging (pathologic stage  $\geq$ pT3a) at RP compared to those classified as D'Amico low risk.

	OR	95% CI	<i>p</i>
Positive margins			
Low	1	--	--
Pii, PSAD <0.15 ng/mL/g	0.57	0.18 – 1.84	0.348
Pii, PSAD $\geq$ 0.15 ng/mL/g	2.33	1.62 – 3.36	<0.001
Pih, PSAD <0.15 ng/mL/g	-	-	-
Pih, PSAD $\geq$ 0.15 ng/mL/g	3.87	1.74 – 8.60	0.001
Upgrade			
Low	1	--	--
Pii, PSAD <0.15 ng/mL/g	1.11	0.58 – 2.13	0.742
Pii, PSAD $\geq$ 0.15 ng/mL/g	2.56	1.90 – 3.46	<0.001
Pih, PSAD <0.15 ng/mL/g	-	-	-
Pih, PSAD $\geq$ 0.15 ng/mL/g	4.01	1.91 – 8.42	<0.001
Upstage			

Low	1	--	--
Pii, PSAD <0.15 ng/mL/g	0.41	0.13 – 1.33	0.137
Pii, PSAD ≥0.15 ng/mL/g	2.92	2.12 – 4.03	<0.001
Pih, PSAD <0.15 ng/mL/g	-	-	-
Pih, PSAD ≥0.15 ng/mL/g	5.50	2.64 – 11.45	<0.001

- indicates inadequate number of events to generation odds ratios