

Appendix

1 Explanation of how the models were back-transformed

We transformed the latent index estimates (i.e., $x_i\hat{\beta}_k$ from the model) to the predicted treatment probabilities ($\hat{\pi}_{i,j}$) based on the expression below:

$$\hat{\pi}_{i,j} = \frac{\exp(x_i\hat{\beta}_j)}{\sum_{k=1}^J \exp(x_i\hat{\beta}_k)}, \quad \forall j = 1, 2, \dots, J,$$

where,

- j and k index treatments and J (i.e., $J = 5$ in this study) is the size of the treatment choice set;
- x_i is patient i 's characteristics; β_k and β_j are treatment-specific coefficient vectors;
- $k = 1$ represents the reference treatment (i.e., 'observation');
- for the reference group, β_1 is $\mathbf{0}$ by standard normalization.

2 Explanation of p-value for trend

For each of the three study samples (low-risk disease, high risk of non-cancer mortality, and both low-risk disease and high risk of non-cancer mortality), we ran a nested shorter model without diagnosis year and a corresponding longer model with diagnosis year. We then conducted a likelihood ratio test as follows to obtain p-values for trend.

$$-2\log \left(\frac{\hat{L}_{without.Dx.Year}}{\hat{L}_{with.Dx.Year}} \right) \sim \chi^2(df = 20)$$

where,

- $\frac{\hat{L}_{without.Dx.Year}}{\hat{L}_{with.Dx.Year}}$ is the likelihood ratio between the shorter model (without diagnosis year) and the longer model (with diagnosis year);
- there are 5 treatment choices and 6 years, so the degree of freedom (df) of the chi-square test is 20 (i.e., $(5 - 1) \times (6 - 1) = 20$).

3 Detailed regression model outputs

It is difficult to interpret the marginal effect of an independent variable on treatment probabilities directly from a multinomial regression model's coefficient estimates. For this reason, we back-transformed the model estimates into predicted probabilities. For completeness, we present the detailed outputs from our multinomial logistic regression models below. We have 5 initial treatment categories in the analyses. Due to the concave likelihood functional form with logit transformation, all models converge.

3.1 Regression model outputs for patients with low-risk disease

Variable	Estimate	Standard Error	P Value	Significance
open radical prostatectomy:(intercept)	9.983E-01	2.974E-01	7.897E-04	**
EBRT:(intercept)	1.237E-01	4.339E-01	7.756E-01	
IMRT:(intercept)	-2.012E-01	1.905E-01	2.910E-01	
robotic prostatectomy:(intercept)	-1.006E+00	3.059E-01	1.010E-03	**
open radical prostatectomy:race.black	-2.889E-01	2.355E-01	2.199E-01	
EBRT:race.black	-9.621E-02	3.365E-01	7.749E-01	
IMRT:race.black	-4.530E-01	1.334E-01	6.820E-04	**
robotic prostatectomy:race.black	-7.569E-01	2.393E-01	1.563E-03	**
open radical prostatectomy:race.hispanic	3.808E-01	2.880E-01	1.861E-01	
EBRT:race.hispanic	7.132E-01	3.821E-01	6.193E-02	.
IMRT:race.hispanic	2.436E-01	1.690E-01	1.494E-01	
robotic prostatectomy:race.hispanic	5.045E-02	3.162E-01	8.732E-01	
open radical prostatectomy:race.other	2.203E-01	2.737E-01	4.209E-01	
EBRT:race.other	-6.953E-01	5.295E-01	1.892E-01	
IMRT:race.other	8.637E-02	1.620E-01	5.940E-01	
robotic prostatectomy:race.other	4.435E-01	2.555E-01	8.266E-02	.
open radical prostatectomy:race.white	1.034E-01	2.141E-01	6.291E-01	
EBRT:race.white	-1.014E-01	3.181E-01	7.498E-01	
IMRT:race.white	-1.705E-01	1.218E-01	1.615E-01	
robotic prostatectomy:race.white	8.653E-02	2.090E-01	6.789E-01	
open radical prostatectomy:socioeconomic class.medium	8.473E-02	8.279E-02	3.061E-01	
EBRT:socioeconomic class.medium	-3.545E-01	1.079E-01	1.014E-03	**
IMRT:socioeconomic class.medium	2.833E-01	5.063E-02	2.210E-08	**
robotic prostatectomy:socioeconomic class.medium	1.125E-01	9.039E-02	2.133E-01	
open radical prostatectomy:socioeconomic class.high	9.207E-02	8.081E-02	2.545E-01	
EBRT:socioeconomic class.high	-5.256E-01	1.152E-01	5.074E-06	**
IMRT:socioeconomic class.high	1.169E-01	5.285E-02	2.702E-02	*
robotic prostatectomy:socioeconomic class.high	5.907E-01	8.468E-02	3.058E-12	**
open radical prostatectomy:age.70-74	-8.863E-01	6.476E-02	0.000E+00	**
EBRT:age.70-74	6.152E-02	9.973E-02	5.374E-01	
IMRT:age.70-74	8.776E-02	4.576E-02	5.516E-02	.
robotic prostatectomy:age.70-74	-8.372E-01	6.397E-02	0.000E+00	**
open radical prostatectomy:age.75-79	-2.300E+00	1.223E-01	0.000E+00	**
EBRT:age.75-79	-2.058E-01	1.261E-01	1.027E-01	
IMRT:age.75-79	-1.430E-01	5.682E-02	1.185E-02	*
robotic prostatectomy:age.75-79	-2.564E+00	1.373E-01	0.000E+00	**
open radical prostatectomy:age.80+	-4.775E+00	4.212E-01	0.000E+00	**
EBRT:age.80+	-1.265E+00	1.858E-01	9.810E-12	**
IMRT:age.80+	-1.315E+00	7.911E-02	0.000E+00	**
robotic prostatectomy:age.80+	-5.425E+00	5.879E-01	0.000E+00	**
open radical prostatectomy:comorbidity.1	-2.184E-02	8.195E-02	7.899E-01	
EBRT:comorbidity.1	3.392E-01	1.051E-01	1.244E-03	**
IMRT:comorbidity.1	2.372E-01	4.890E-02	1.230E-06	**
robotic prostatectomy:comorbidity.1	-1.493E-01	8.356E-02	7.402E-02	.
open radical prostatectomy:comorbidity.2	-2.649E-01	1.638E-01	1.057E-01	
EBRT:comorbidity.2	3.054E-01	1.700E-01	7.245E-02	.
IMRT:comorbidity.2	3.061E-01	7.539E-02	4.886E-05	**
robotic prostatectomy:comorbidity.2	-4.128E-01	1.687E-01	1.440E-02	*
open radical prostatectomy:comorbidity.3+	-3.986E-01	2.149E-01	6.357E-02	.
EBRT:comorbidity.3+	7.126E-02	2.130E-01	7.380E-01	
IMRT:comorbidity.3+	7.645E-02	8.968E-02	3.939E-01	
robotic prostatectomy:comorbidity.3+	-1.105E+00	2.690E-01	3.985E-05	**
open radical prostatectomy:grade.well/mod.differentiated	-1.583E+00	1.158E-01	0.000E+00	**
EBRT:grade.well/mod.differentiated	-1.101E+00	1.811E-01	1.219E-09	**
IMRT:grade.well/mod.differentiated	-1.017E+00	7.686E-02	0.000E+00	**
robotic prostatectomy:grade.well/mod.differentiated	-1.275E+00	1.085E-01	0.000E+00	**
open radical prostatectomy:non-cancer mortality.high	-5.549E-01	1.325E-01	2.816E-05	**
EBRT:non-cancer mortality.high	-2.167E-01	1.619E-01	1.807E-01	
IMRT:non-cancer mortality.high	-1.693E-01	7.183E-02	1.840E-02	*
robotic prostatectomy:non-cancer mortality.high	-5.365E-01	1.398E-01	1.235E-04	**

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Variable	Estimate	Standard Error	P Value	Significance
open radical prostatectomy:non-cancer mortality.intermediate	-1.079E-01	7.667E-02	1.593E-01	
EBRT:non-cancer mortality.intermediate	4.390E-02	1.133E-01	6.985E-01	
IMRT:non-cancer mortality.intermediate	-5.190E-02	5.070E-02	3.060E-01	
robotic prostatectomy:non-cancer mortality.intermediate	-1.430E-01	7.658E-02	6.181E-02	.
open radical prostatectomy:diagnosis.year.2005	-3.276E-01	8.642E-02	1.501E-04	**
EBRT:diagnosis.year.2005	-8.508E-01	1.006E-01	0.000E+00	**
IMRT:diagnosis.year.2005	1.175E-01	6.397E-02	6.623E-02	.
robotic prostatectomy:diagnosis.year.2005	1.820E-01	1.194E-01	1.274E-01	
open radical prostatectomy:diagnosis.year.2006	-7.290E-01	9.026E-02	6.661E-16	**
EBRT:diagnosis.year.2006	-1.586E+00	1.204E-01	0.000E+00	**
IMRT:diagnosis.year.2006	1.077E-01	6.256E-02	8.516E-02	.
robotic prostatectomy:diagnosis.year.2006	3.139E-01	1.137E-01	5.758E-03	**
open radical prostatectomy:diagnosis.year.2007	-8.325E-01	9.391E-02	0.000E+00	**
EBRT:diagnosis.year.2007	-2.114E+00	1.489E-01	0.000E+00	**
IMRT:diagnosis.year.2007	1.460E-01	6.251E-02	1.953E-02	*
robotic prostatectomy:diagnosis.year.2007	5.707E-01	1.103E-01	2.272E-07	**
open radical prostatectomy:diagnosis.year.2008	-1.092E+00	1.004E-01	0.000E+00	**
EBRT:diagnosis.year.2008	-3.072E+00	2.242E-01	0.000E+00	**
IMRT:diagnosis.year.2008	-1.865E-02	6.436E-02	7.720E-01	
robotic prostatectomy:diagnosis.year.2008	6.306E-01	1.101E-01	1.030E-08	**
open radical prostatectomy:diagnosis.year.2009	-1.597E+00	1.070E-01	0.000E+00	**
EBRT:diagnosis.year.2009	-3.061E+00	1.975E-01	0.000E+00	**
IMRT:diagnosis.year.2009	-2.623E-02	6.289E-02	6.766E-01	
robotic prostatectomy:diagnosis.year.2009	5.713E-01	1.083E-01	1.321E-07	**
open radical prostatectomy:registry.CT	-3.097E-01	2.304E-01	1.789E-01	
EBRT:registry.CT	-3.282E-02	3.149E-01	9.170E-01	
IMRT:registry.CT	8.163E-01	1.374E-01	2.816E-09	**
robotic prostatectomy:registry.CT	9.621E-01	2.176E-01	9.753E-06	**
open radical prostatectomy:registry.Detroit	-3.691E-02	2.080E-01	8.591E-01	
EBRT:registry.Detroit	7.861E-01	2.662E-01	3.142E-03	**
IMRT:registry.Detroit	1.183E+00	1.265E-01	0.000E+00	**
robotic prostatectomy:registry.Detroit	1.039E+00	1.980E-01	1.539E-07	**
open radical prostatectomy:registry.HI	2.353E-01	3.717E-01	5.267E-01	
EBRT:registry.HI	-1.694E+01	2.460E+03	9.945E-01	
IMRT:registry.HI	1.306E+00	2.016E-01	9.297E-11	**
robotic prostatectomy:registry.HI	1.357E+00	3.006E-01	6.337E-06	**
open radical prostatectomy:registry.IA	1.106E+00	1.974E-01	2.139E-08	**
EBRT:registry.IA	1.236E+00	2.781E-01	8.837E-06	**
IMRT:registry.IA	8.915E-01	1.407E-01	2.380E-10	**
robotic prostatectomy:registry.IA	8.800E-01	2.201E-01	6.408E-05	**
open radical prostatectomy:registry.NM	8.689E-01	2.129E-01	4.490E-05	**
EBRT:registry.NM	-4.647E-01	3.687E-01	2.075E-01	
IMRT:registry.NM	8.919E-01	1.501E-01	2.840E-09	**
robotic prostatectomy:registry.NM	3.553E-01	2.589E-01	1.699E-01	
open radical prostatectomy:registry.Seattle	5.914E-01	1.886E-01	1.710E-03	**
EBRT:registry.Seattle	4.198E-03	2.931E-01	9.886E-01	
IMRT:registry.Seattle	-2.116E-02	1.391E-01	8.791E-01	
robotic prostatectomy:registry.Seattle	5.036E-01	2.023E-01	1.278E-02	*
open radical prostatectomy:registry.UT	1.090E+00	1.995E-01	4.652E-08	**
EBRT:registry.UT	-6.045E-01	3.755E-01	1.074E-01	
IMRT:registry.UT	-1.237E+00	2.195E-01	1.751E-08	**
robotic prostatectomy:registry.UT	7.267E-01	2.272E-01	1.379E-03	**
open radical prostatectomy:registry.Atlanta	-2.668E-01	2.717E-01	3.262E-01	
EBRT:registry.Atlanta	1.208E-01	3.483E-01	7.288E-01	
IMRT:registry.Atlanta	1.536E+00	1.423E-01	0.000E+00	**
robotic prostatectomy:registry.Atlanta	-1.095E-02	2.833E-01	9.692E-01	
open radical prostatectomy:registry.SanJose	-2.170E-01	2.810E-01	4.400E-01	
EBRT:registry.SanJose	-2.370E-01	4.062E-01	5.595E-01	
IMRT:registry.SanJose	7.824E-01	1.545E-01	4.129E-07	**
robotic prostatectomy:registry.SanJose	2.271E-01	2.640E-01	3.897E-01	
open radical prostatectomy:registry.LosAngeles	1.071E+00	1.839E-01	5.667E-09	**
EBRT:registry.LosAngeles	-4.501E-01	3.053E-01	1.404E-01	

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Variable	Estimate	Standard Error	P Value	Significance
IMRT:registry.LosAngeles	9.299E-01	1.293E-01	6.348E-13	**
robotic prostatectomy:registry.LosAngeles	1.604E+00	1.895E-01	0.000E+00	**
open radical prostatectomy:registry.ruralGA	-3.428E-01	7.685E-01	6.555E-01	
EBRT:registry.ruralGA	2.371E+00	4.365E-01	5.534E-08	**
IMRT:registry.ruralGA	1.559E+00	3.076E-01	4.014E-07	**
robotic prostatectomy:registry.ruralGA	-4.513E-01	1.045E+00	6.660E-01	
open radical prostatectomy:registry.greaterCA	6.237E-01	1.746E-01	3.551E-04	**
EBRT:registry.greaterCA	-8.554E-02	2.647E-01	7.466E-01	
IMRT:registry.greaterCA	6.091E-01	1.215E-01	5.376E-07	**
robotic prostatectomy:registry.greaterCA	1.012E+00	1.818E-01	2.639E-08	**
open radical prostatectomy:registry.KY	4.818E-01	2.010E-01	1.651E-02	*
EBRT:registry.KY	8.354E-01	2.768E-01	2.543E-03	**
IMRT:registry.KY	7.695E-01	1.351E-01	1.221E-08	**
robotic prostatectomy:registry.KY	1.337E+00	2.012E-01	3.067E-11	**
open radical prostatectomy:registry.LA	1.040E+00	1.979E-01	1.486E-07	**
EBRT:registry.LA	-2.323E-01	3.152E-01	4.611E-01	
IMRT:registry.LA	1.235E+00	1.343E-01	0.000E+00	**
robotic prostatectomy:registry.LA	1.082E+00	2.148E-01	4.695E-07	**
open radical prostatectomy:registry.NJ	-1.528E-01	2.015E-01	4.482E-01	
EBRT:registry.NJ	5.894E-01	2.735E-01	3.114E-02	*
IMRT:registry.NJ	1.650E+00	1.258E-01	0.000E+00	**
robotic prostatectomy:registry.NJ	1.056E+00	2.002E-01	1.354E-07	**

‘.’ represents $0.05 \leq p < 0.1$; ‘*’ represents $0.01 \leq p < 0.05$; ‘**’ represents $p < 0.01$.

3.2 Regression model outputs for patients with a high risk of non-cancer mortality

Variable	Estimate	Standard Error	P Value	Significance
open radical prostatectomy:(intercept)	1.091E+00	4.572E-01	1.708E-02	*
EBRT:(intercept)	2.352E+00	2.857E-01	2.220E-16	**
IMRT:(intercept)	1.490E+00	1.749E-01	0.000E+00	**
robotic prostatectomy:(intercept)	-1.898E-01	4.123E-01	6.452E-01	
open radical prostatectomy:race.black	-2.682E-02	3.877E-01	9.449E-01	
EBRT:race.black	-4.684E-01	2.324E-01	4.391E-02	*
IMRT:race.black	-5.526E-01	1.288E-01	1.798E-05	**
robotic prostatectomy:race.black	-8.095E-01	3.070E-01	8.378E-03	**
open radical prostatectomy:race.hispanic	6.389E-01	4.677E-01	1.719E-01	
EBRT:race.hispanic	5.512E-01	2.842E-01	5.242E-02	.
IMRT:race.hispanic	6.314E-02	1.681E-01	7.072E-01	
robotic prostatectomy:race.hispanic	-4.464E-02	4.110E-01	9.135E-01	
open radical prostatectomy:race.other	5.120E-01	4.442E-01	2.491E-01	
EBRT:race.other	-6.637E-01	3.487E-01	5.701E-02	.
IMRT:race.other	3.967E-02	1.674E-01	8.127E-01	
robotic prostatectomy:race.other	5.812E-02	3.597E-01	8.716E-01	
open radical prostatectomy:race.white	3.668E-01	3.662E-01	3.165E-01	
EBRT:race.white	-2.302E-01	2.133E-01	2.804E-01	
IMRT:race.white	-2.045E-01	1.171E-01	8.059E-02	.
robotic prostatectomy:race.white	-2.877E-01	2.731E-01	2.921E-01	
open radical prostatectomy:disease risk.low	-8.489E-01	1.497E-01	1.434E-08	**
EBRT:disease risk.low	-1.655E+00	1.097E-01	0.000E+00	**
IMRT:disease risk.low	-1.311E+00	5.963E-02	0.000E+00	**
robotic prostatectomy:disease risk.low	-8.746E-01	1.648E-01	1.118E-07	**
open radical prostatectomy:disease risk.intermediate	-1.705E-01	1.001E-01	8.842E-02	.
EBRT:disease risk.intermediate	-8.317E-01	7.167E-02	0.000E+00	**
IMRT:disease risk.intermediate	-6.157E-01	4.567E-02	0.000E+00	**
robotic prostatectomy:disease risk.intermediate	1.699E-01	1.098E-01	1.219E-01	
open radical prostatectomy:socioeconomic class.medium	-9.277E-02	1.218E-01	4.461E-01	
EBRT:socioeconomic class.medium	-8.783E-02	8.835E-02	3.201E-01	

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Variable	Estimate	Standard Error	P Value	Significance
IMRT:socioeconomic class.medium	1.935E-01	5.241E-02	2.227E-04	**
robotic prostatectomy:socioeconomic class.medium	2.496E-01	1.412E-01	7.707E-02	.
open radical prostatectomy:socioeconomic class.high	2.444E-01	1.126E-01	3.005E-02	*
EBRT:socioeconomic class.high	-1.985E-01	9.093E-02	2.908E-02	*
IMRT:socioeconomic class.high	2.755E-01	5.272E-02	1.744E-07	**
robotic prostatectomy:socioeconomic class.high	8.387E-01	1.247E-01	1.719E-11	**
open radical prostatectomy:age.70-74	-1.331E+00	1.238E-01	0.000E+00	**
EBRT:age.70-74	-2.054E-01	1.338E-01	1.247E-01	
IMRT:age.70-74	-1.092E-01	8.569E-02	2.023E-01	
robotic prostatectomy:age.70-74	-1.139E+00	1.342E-01	0.000E+00	**
open radical prostatectomy:age.75-79	-2.766E+00	1.347E-01	0.000E+00	**
EBRT:age.75-79	-7.621E-01	1.315E-01	6.886E-09	**
IMRT:age.75-79	-5.205E-01	8.293E-02	3.459E-10	**
robotic prostatectomy:age.75-79	-2.708E+00	1.465E-01	0.000E+00	**
open radical prostatectomy:age.80+	-5.550E+00	2.361E-01	0.000E+00	**
EBRT:age.80+	-1.771E+00	1.378E-01	0.000E+00	**
IMRT:age.80+	-1.573E+00	8.548E-02	0.000E+00	**
robotic prostatectomy:age.80+	-5.348E+00	2.332E-01	0.000E+00	**
open radical prostatectomy:comorbidity.1	-5.103E-02	1.121E-01	6.491E-01	
EBRT:comorbidity.1	3.574E-01	7.836E-02	5.080E-06	**
IMRT:comorbidity.1	1.711E-01	4.558E-02	1.739E-04	**
robotic prostatectomy:comorbidity.1	-1.054E-01	1.210E-01	3.837E-01	
open radical prostatectomy:comorbidity.2	-2.684E-01	1.238E-01	3.015E-02	*
EBRT:comorbidity.2	1.508E-01	9.498E-02	1.123E-01	
IMRT:comorbidity.2	1.570E-02	5.491E-02	7.749E-01	
robotic prostatectomy:comorbidity.2	-6.068E-01	1.369E-01	9.357E-06	**
open radical prostatectomy:comorbidity.3+	-8.701E-01	1.505E-01	7.398E-09	**
EBRT:comorbidity.3+	-5.726E-02	1.083E-01	5.971E-01	
IMRT:comorbidity.3+	-1.395E-01	6.052E-02	2.114E-02	*
robotic prostatectomy:comorbidity.3+	-1.264E+00	1.660E-01	2.576E-14	**
open radical prostatectomy:grade.well/mod.differentiated	-1.219E+00	1.273E-01	0.000E+00	**
EBRT:grade.well/mod.differentiated	-9.381E-01	8.955E-02	0.000E+00	**
IMRT:grade.well/mod.differentiated	-7.931E-01	5.040E-02	0.000E+00	**
robotic prostatectomy:grade.well/mod.differentiated	-1.145E+00	1.350E-01	0.000E+00	**
open radical prostatectomy:diagnosis.year.2005	-3.148E-01	1.330E-01	1.794E-02	*
EBRT:diagnosis.year.2005	-5.941E-01	8.400E-02	1.516E-12	**
IMRT:diagnosis.year.2005	1.398E-01	6.508E-02	3.175E-02	*
robotic prostatectomy:diagnosis.year.2005	3.013E-01	2.050E-01	1.415E-01	
open radical prostatectomy:diagnosis.year.2006	-6.533E-01	1.369E-01	1.815E-06	**
EBRT:diagnosis.year.2006	-1.205E+00	9.306E-02	0.000E+00	**
IMRT:diagnosis.year.2006	2.539E-01	6.315E-02	5.805E-05	**
robotic prostatectomy:diagnosis.year.2006	6.180E-01	1.893E-01	1.093E-03	**
open radical prostatectomy:diagnosis.year.2007	-4.549E-01	1.335E-01	6.553E-04	**
EBRT:diagnosis.year.2007	-1.659E+00	1.066E-01	0.000E+00	**
IMRT:diagnosis.year.2007	3.950E-01	6.310E-02	3.855E-10	**
robotic prostatectomy:diagnosis.year.2007	9.441E-01	1.836E-01	2.731E-07	**
open radical prostatectomy:diagnosis.year.2008	-7.788E-01	1.440E-01	6.399E-08	**
EBRT:diagnosis.year.2008	-2.364E+00	1.354E-01	0.000E+00	**
IMRT:diagnosis.year.2008	2.512E-01	6.447E-02	9.793E-05	**
robotic prostatectomy:diagnosis.year.2008	1.009E+00	1.833E-01	3.681E-08	**
open radical prostatectomy:diagnosis.year.2009	-6.559E-01	1.429E-01	4.426E-06	**
EBRT:diagnosis.year.2009	-2.411E+00	1.468E-01	0.000E+00	**
IMRT:diagnosis.year.2009	4.108E-01	6.574E-02	4.131E-10	**
robotic prostatectomy:diagnosis.year.2009	1.291E+00	1.812E-01	1.022E-12	**
open radical prostatectomy:registry.CT	-5.522E-01	3.316E-01	9.589E-02	.
EBRT:registry.CT	-5.571E-01	1.834E-01	2.380E-03	**
IMRT:registry.CT	4.990E-01	1.147E-01	1.349E-05	**
robotic prostatectomy:registry.CT	-2.987E-02	3.163E-01	9.248E-01	
open radical prostatectomy:registry.Detroit	-1.700E-01	2.693E-01	5.280E-01	
EBRT:registry.Detroit	-4.912E-01	1.618E-01	2.394E-03	**
IMRT:registry.Detroit	5.357E-01	1.032E-01	2.103E-07	**
robotic prostatectomy:registry.Detroit	4.022E-01	2.575E-01	1.183E-01	

Continued on next page

Variable	Estimate	Standard Error	P Value	Significance
open radical prostatectomy:registry.HI	2.731E-01	7.732E-01	7.240E-01	
EBRT:registry.HI	-6.512E-01	3.764E-01	8.364E-02	.
IMRT:registry.HI	1.084E+00	1.877E-01	7.669E-09	**
robotic prostatectomy:registry.HI	9.115E-01	5.851E-01	1.192E-01	
open radical prostatectomy:registry.IA	6.609E-01	2.680E-01	1.367E-02	*
EBRT:registry.IA	6.858E-02	1.727E-01	6.912E-01	
IMRT:registry.IA	1.929E-01	1.167E-01	9.844E-02	.
robotic prostatectomy:registry.IA	1.172E-01	2.878E-01	6.838E-01	
open radical prostatectomy:registry.NM	4.726E-01	2.981E-01	1.129E-01	
EBRT:registry.NM	-1.643E+00	2.735E-01	1.892E-09	**
IMRT:registry.NM	2.425E-02	1.344E-01	8.568E-01	
robotic prostatectomy:registry.NM	-1.701E-01	3.587E-01	6.355E-01	
open radical prostatectomy:registry.Seattle	5.108E-01	2.521E-01	4.276E-02	*
EBRT:registry.Seattle	-7.115E-01	1.706E-01	3.040E-05	**
IMRT:registry.Seattle	-2.551E-01	1.083E-01	1.851E-02	*
robotic prostatectomy:registry.Seattle	-9.704E-02	2.619E-01	7.110E-01	
open radical prostatectomy:registry.UT	1.266E+00	2.555E-01	7.286E-07	**
EBRT:registry.UT	-8.297E-02	1.755E-01	6.364E-01	
IMRT:registry.UT	-1.210E+00	1.429E-01	0.000E+00	**
robotic prostatectomy:registry.UT	-3.453E-01	3.094E-01	2.644E-01	
open radical prostatectomy:registry.Atlanta	-6.804E-01	3.474E-01	5.016E-02	.
EBRT:registry.Atlanta	-4.402E-01	2.067E-01	3.316E-02	*
IMRT:registry.Atlanta	5.407E-01	1.236E-01	1.224E-05	**
robotic prostatectomy:registry.Atlanta	-7.544E-01	3.684E-01	4.060E-02	*
open radical prostatectomy:registry.SanJose	-1.096E+00	6.346E-01	8.412E-02	.
EBRT:registry.SanJose	-2.681E-01	2.598E-01	3.021E-01	
IMRT:registry.SanJose	4.559E-01	1.473E-01	1.964E-03	**
robotic prostatectomy:registry.SanJose	-2.303E-01	4.549E-01	6.126E-01	
open radical prostatectomy:registry.LosAngeles	9.620E-01	2.494E-01	1.149E-04	**
EBRT:registry.LosAngeles	-1.009E+00	1.804E-01	2.245E-08	**
IMRT:registry.LosAngeles	3.999E-01	1.049E-01	1.371E-04	**
robotic prostatectomy:registry.LosAngeles	1.486E+00	2.387E-01	4.722E-10	**
open radical prostatectomy:registry.ruralGA	-3.491E-01	6.123E-01	5.686E-01	
EBRT:registry.ruralGA	4.292E-01	3.944E-01	2.765E-01	
IMRT:registry.ruralGA	5.672E-01	2.881E-01	4.900E-02	*
robotic prostatectomy:registry.ruralGA	1.966E-01	6.174E-01	7.502E-01	
open radical prostatectomy:registry.greaterCA	4.783E-01	2.532E-01	5.886E-02	.
EBRT:registry.greaterCA	-7.243E-01	1.569E-01	3.920E-06	**
IMRT:registry.greaterCA	8.416E-02	1.005E-01	4.026E-01	
robotic prostatectomy:registry.greaterCA	8.307E-01	2.457E-01	7.220E-04	**
open radical prostatectomy:registry.KY	-7.108E-02	3.279E-01	8.284E-01	
EBRT:registry.KY	1.364E-02	1.793E-01	9.394E-01	
IMRT:registry.KY	9.099E-02	1.211E-01	4.524E-01	
robotic prostatectomy:registry.KY	7.267E-01	3.070E-01	1.791E-02	*
open radical prostatectomy:registry.LA	3.238E-01	2.976E-01	2.767E-01	
EBRT:registry.LA	-5.924E-01	1.916E-01	1.985E-03	**
IMRT:registry.LA	5.952E-01	1.168E-01	3.465E-07	**
robotic prostatectomy:registry.LA	-2.741E-02	3.496E-01	9.375E-01	
open radical prostatectomy:registry.NJ	-6.474E-01	3.505E-01	6.473E-02	.
EBRT:registry.NJ	-4.445E-01	1.757E-01	1.143E-02	*
IMRT:registry.NJ	1.084E+00	1.084E-01	0.000E+00	**
robotic prostatectomy:registry.NJ	2.276E-01	3.093E-01	4.618E-01	

‘.’ represents $0.05 \leq p < 0.1$; ‘*’ represents $0.01 \leq p < 0.05$; ‘**’ represents $p < 0.01$.

3.3 Regression model outputs for patients with low-risk disease and a high risk of non-cancer mortality

Variable	Estimate	Standard Error	P Value	Significance
open radical prostatectomy:(intercept)	1.643E+00	8.393E-01	5.032E-02	.
EBRT:(intercept)	1.172E+00	7.382E-01	1.124E-01	
IMRT:(intercept)	-4.617E-02	3.525E-01	8.958E-01	
robotic prostatectomy:(intercept)	-2.823E+00	1.294E+00	2.918E-02	*
open radical prostatectomy:race.black	-4.888E-01	6.347E-01	4.412E-01	
EBRT:race.black	-1.718E-01	5.439E-01	7.522E-01	
IMRT:race.black	1.943E-02	2.417E-01	9.359E-01	
robotic prostatectomy:race.black	-1.515E-01	6.669E-01	8.203E-01	
open radical prostatectomy:race.hispanic	7.398E-01	7.234E-01	3.065E-01	
EBRT:race.hispanic	2.645E-01	6.628E-01	6.898E-01	
IMRT:race.hispanic	3.236E-01	3.011E-01	2.825E-01	
robotic prostatectomy:race.hispanic	9.085E-01	8.629E-01	2.924E-01	
open radical prostatectomy:race.other	1.703E-01	7.799E-01	8.272E-01	
EBRT:race.other	-1.772E+01	3.648E+03	9.961E-01	
IMRT:race.other	3.671E-01	3.034E-01	2.262E-01	
robotic prostatectomy:race.other	5.595E-01	7.575E-01	4.601E-01	
open radical prostatectomy:race.white	2.698E-02	5.657E-01	9.620E-01	
EBRT:race.white	-2.311E-01	5.041E-01	6.467E-01	
IMRT:race.white	8.850E-02	2.240E-01	6.928E-01	
robotic prostatectomy:race.white	1.340E-01	6.036E-01	8.243E-01	
open radical prostatectomy:socioeconomic class.medium	-3.243E-01	2.387E-01	1.743E-01	
EBRT:socioeconomic class.medium	-6.034E-02	1.899E-01	7.507E-01	
IMRT:socioeconomic class.medium	2.685E-01	8.747E-02	2.145E-03	**
robotic prostatectomy:socioeconomic class.medium	5.075E-01	2.896E-01	7.969E-02	.
open radical prostatectomy:socioeconomic class.high	8.138E-02	2.047E-01	6.910E-01	
EBRT:socioeconomic class.high	-5.183E-01	2.080E-01	1.271E-02	*
IMRT:socioeconomic class.high	1.207E-01	8.931E-02	1.765E-01	
robotic prostatectomy:socioeconomic class.high	8.169E-01	2.487E-01	1.022E-03	**
open radical prostatectomy:age.70-74	-1.679E+00	2.203E-01	2.531E-14	**
EBRT:age.70-74	1.349E-01	2.582E-01	6.013E-01	
IMRT:age.70-74	-1.402E-01	1.224E-01	2.521E-01	
robotic prostatectomy:age.70-74	-1.101E+00	2.422E-01	5.479E-06	**
open radical prostatectomy:age.75-79	-2.818E+00	2.443E-01	0.000E+00	**
EBRT:age.75-79	-5.325E-01	2.600E-01	4.053E-02	*
IMRT:age.75-79	-4.983E-01	1.198E-01	3.185E-05	**
robotic prostatectomy:age.75-79	-2.997E+00	2.967E-01	0.000E+00	**
open radical prostatectomy:age.80+	-5.264E+00	4.617E-01	0.000E+00	**
EBRT:age.80+	-1.593E+00	2.877E-01	3.049E-08	**
IMRT:age.80+	-1.685E+00	1.292E-01	0.000E+00	**
robotic prostatectomy:age.80+	-5.802E+00	6.468E-01	0.000E+00	**
open radical prostatectomy:comorbidity.1	-1.586E-01	2.261E-01	4.829E-01	
EBRT:comorbidity.1	1.229E-01	1.848E-01	5.060E-01	
IMRT:comorbidity.1	1.210E-01	8.060E-02	1.333E-01	
robotic prostatectomy:comorbidity.1	-1.528E-01	2.543E-01	5.480E-01	
open radical prostatectomy:comorbidity.2	-3.832E-01	2.455E-01	1.185E-01	
EBRT:comorbidity.2	1.120E-01	2.066E-01	5.876E-01	
IMRT:comorbidity.2	1.659E-01	9.197E-02	7.128E-02	.
robotic prostatectomy:comorbidity.2	-7.567E-01	2.783E-01	6.541E-03	**
open radical prostatectomy:comorbidity.3+	-7.812E-01	2.882E-01	6.721E-03	**
EBRT:comorbidity.3+	-9.744E-02	2.391E-01	6.836E-01	
IMRT:comorbidity.3+	-7.834E-02	1.017E-01	4.410E-01	
robotic prostatectomy:comorbidity.3+	-1.362E+00	3.433E-01	7.275E-05	**
open radical prostatectomy:grade.well/mod.differentiated	-1.835E+00	2.926E-01	3.578E-10	**
EBRT:grade.well/mod.differentiated	-1.517E+00	2.940E-01	2.473E-07	**
IMRT:grade.well/mod.differentiated	-1.304E+00	1.239E-01	0.000E+00	**
robotic prostatectomy:grade.well/mod.differentiated	-1.522E+00	3.095E-01	8.751E-07	**
open radical prostatectomy:diagnosis.year.2005	-5.590E-03	2.455E-01	9.818E-01	
EBRT:diagnosis.year.2005	-8.099E-01	1.723E-01	2.600E-06	**
IMRT:diagnosis.year.2005	2.014E-01	1.127E-01	7.384E-02	.

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Variable	Estimate	Standard Error	P Value	Significance
robotic prostatectomy:diagnosis.year.2005	5.548E-01	4.265E-01	1.933E-01	
open radical prostatectomy:diagnosis.year.2006	-5.876E-01	2.679E-01	2.826E-02	*
EBRT:diagnosis.year.2006	-1.709E+00	2.206E-01	9.326E-15	**
IMRT:diagnosis.year.2006	3.282E-01	1.086E-01	2.515E-03	**
robotic prostatectomy:diagnosis.year.2006	4.581E-01	4.196E-01	2.750E-01	
open radical prostatectomy:diagnosis.year.2007	-3.457E-01	2.597E-01	1.831E-01	
EBRT:diagnosis.year.2007	-2.592E+00	3.244E-01	1.332E-15	**
IMRT:diagnosis.year.2007	3.665E-01	1.097E-01	8.368E-04	**
robotic prostatectomy:diagnosis.year.2007	1.232E+00	3.820E-01	1.254E-03	**
open radical prostatectomy:diagnosis.year.2008	-9.035E-01	2.949E-01	2.186E-03	**
EBRT:diagnosis.year.2008	-3.108E+00	3.969E-01	4.885E-15	**
IMRT:diagnosis.year.2008	6.374E-02	1.136E-01	5.746E-01	
robotic prostatectomy:diagnosis.year.2008	1.246E+00	3.836E-01	1.165E-03	**
open radical prostatectomy:diagnosis.year.2009	-1.011E+00	2.850E-01	3.910E-04	**
EBRT:diagnosis.year.2009	-2.868E+00	3.156E-01	0.000E+00	**
IMRT:diagnosis.year.2009	1.714E-01	1.103E-01	1.203E-01	
robotic prostatectomy:diagnosis.year.2009	1.039E+00	3.860E-01	7.121E-03	**
open radical prostatectomy:registry.CT	-2.259E+00	1.129E+00	4.546E-02	*
EBRT:registry.CT	-6.353E-01	5.249E-01	2.261E-01	
IMRT:registry.CT	7.488E-01	2.349E-01	1.437E-03	**
robotic prostatectomy:registry.CT	1.462E+00	1.126E+00	1.942E-01	
open radical prostatectomy:registry.Detroit	-4.799E-01	5.571E-01	3.889E-01	
EBRT:registry.Detroit	-6.254E-02	4.578E-01	8.913E-01	
IMRT:registry.Detroit	9.976E-01	2.135E-01	2.991E-06	**
robotic prostatectomy:registry.Detroit	2.157E+00	1.051E+00	4.004E-02	*
open radical prostatectomy:registry.HI	-1.575E+01	5.611E+03	9.978E-01	
EBRT:registry.HI	-1.694E+01	5.257E+03	9.974E-01	
IMRT:registry.HI	2.301E+00	3.758E-01	9.226E-10	**
robotic prostatectomy:registry.HI	4.650E+00	1.324E+00	4.430E-04	**
open radical prostatectomy:registry.IA	2.873E-01	5.595E-01	6.076E-01	
EBRT:registry.IA	6.726E-01	4.702E-01	1.526E-01	
IMRT:registry.IA	5.150E-01	2.413E-01	3.278E-02	*
robotic prostatectomy:registry.IA	1.560E+00	1.104E+00	1.576E-01	
open radical prostatectomy:registry.NM	3.951E-01	5.987E-01	5.093E-01	
EBRT:registry.NM	-1.020E+00	6.381E-01	1.101E-01	
IMRT:registry.NM	8.989E-01	2.566E-01	4.590E-04	**
robotic prostatectomy:registry.NM	2.312E+00	1.106E+00	3.652E-02	*
open radical prostatectomy:registry.Seattle	1.863E-01	5.327E-01	7.265E-01	
EBRT:registry.Seattle	-8.929E-02	4.737E-01	8.505E-01	
IMRT:registry.Seattle	-5.601E-02	2.349E-01	8.115E-01	
robotic prostatectomy:registry.Seattle	1.577E+00	1.066E+00	1.392E-01	
open radical prostatectomy:registry.UT	1.056E+00	5.211E-01	4.273E-02	*
EBRT:registry.UT	-1.369E+00	6.218E-01	2.771E-02	*
IMRT:registry.UT	-1.419E+00	3.418E-01	3.314E-05	**
robotic prostatectomy:registry.UT	1.821E+00	1.076E+00	9.051E-02	.
open radical prostatectomy:registry.Atlanta	-8.150E-01	7.720E-01	2.911E-01	
EBRT:registry.Atlanta	-5.678E-01	6.050E-01	3.480E-01	
IMRT:registry.Atlanta	1.371E+00	2.410E-01	1.278E-08	**
robotic prostatectomy:registry.Atlanta	9.396E-01	1.251E+00	4.527E-01	
open radical prostatectomy:registry.SanJose	-1.749E+01	3.824E+03	9.964E-01	
EBRT:registry.SanJose	-5.231E-01	8.384E-01	5.327E-01	
IMRT:registry.SanJose	1.211E+00	2.748E-01	1.046E-05	**
robotic prostatectomy:registry.SanJose	1.096E+00	1.446E+00	4.483E-01	
open radical prostatectomy:registry.LosAngeles	6.197E-01	5.170E-01	2.307E-01	
EBRT:registry.LosAngeles	-7.252E-01	4.992E-01	1.463E-01	
IMRT:registry.LosAngeles	9.797E-01	2.174E-01	6.578E-06	**
robotic prostatectomy:registry.LosAngeles	3.273E+00	1.036E+00	1.574E-03	**
open radical prostatectomy:registry.ruralGA	-1.854E+01	5.615E+03	9.974E-01	
EBRT:registry.ruralGA	1.356E+00	6.675E-01	4.225E-02	*
IMRT:registry.ruralGA	1.150E+00	4.157E-01	5.694E-03	**
robotic prostatectomy:registry.ruralGA	-1.579E+01	5.679E+03	9.978E-01	
open radical prostatectomy:registry.greaterCA	6.353E-01	5.169E-01	2.190E-01	

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Variable	Estimate	Standard Error	P Value	Significance
EBRT:registry.greaterCA	-2.787E-01	4.575E-01	5.424E-01	
IMRT:registry.greaterCA	6.054E-01	2.148E-01	4.820E-03	**
robotic prostatectomy:registry.greaterCA	2.175E+00	1.055E+00	3.920E-02	*
open radical prostatectomy:registry.KY	4.966E-03	6.241E-01	9.937E-01	
EBRT:registry.KY	2.770E-01	4.891E-01	5.712E-01	
IMRT:registry.KY	5.397E-01	2.420E-01	2.574E-02	*
robotic prostatectomy:registry.KY	2.521E+00	1.110E+00	2.307E-02	*
open radical prostatectomy:registry.LA	4.326E-01	5.924E-01	4.652E-01	
EBRT:registry.LA	-2.022E-01	5.194E-01	6.971E-01	
IMRT:registry.LA	1.151E+00	2.336E-01	8.298E-07	**
robotic prostatectomy:registry.LA	1.937E+00	1.133E+00	8.737E-02	.
open radical prostatectomy:registry.NJ	-8.329E-01	7.168E-01	2.452E-01	
EBRT:registry.NJ	-3.598E-01	4.863E-01	4.594E-01	
IMRT:registry.NJ	1.488E+00	2.207E-01	1.533E-11	**
robotic prostatectomy:registry.NJ	1.642E+00	1.124E+00	1.439E-01	

‘.’ represents $0.05 \leq p < 0.1$; ‘*’ represents $0.01 \leq p < 0.05$; ‘**’ represents $p < 0.01$.