



Does Distance From a Radiation Facility Impact Patient Decision-Making Regarding Treatment for Prostate Cancer?

Fady M. Ghali^{1,2}, Michael Laviolette², Maria O. Celaya^{3,4}, Judy R. Rees^{3,4}, Elias S Hyams¹

¹Section of Urology, Dartmouth Hitchcock Medical Center, ²New Hampshire Division of Public Health Services, Bureau of Public Health Statistics and Informatics, ³New Hampshire State Cancer Registry, ⁴Geisel School of Medicine at Dartmouth, Department of Epidemiology.



ABSTRACT

Introduction. Decision-making in the treatment of prostate cancer is complex and often involves subjective patient concerns. We have anecdotally observed that distance from a radiation facility may deter patients from seeking this therapy; this relationship was previously shown for early stage breast cancer patients in New Hampshire. We sought to determine whether a similar relationship is present for prostate cancer patients in the state.

Methods. Patients with clinically localized prostate cancer diagnosed 2004-2011 were identified from the NHSCR, and categorized by age, D'Amico risk category, year of treatment, marital status, and estimated travel time to the nearest radiation facility, both in-state and out-of-state. A multivariable logistic regression model was created to determine the relationship between distance to a facility and choice of initial treatment.

Results. 4,731 patients underwent treatment for prostate cancer during the study period, including 1,575 multi-trip (XRT) and 3,156 single trip (2,531 surgery and 625 brachytherapy). There were 1,580 low risk, 1,661 intermediate risk, and 1,490 high risk patients. In multivariable analysis, time to the nearest radiation facility was not significantly associated with treatment decisions. XRT was more likely to be selected by men in the intermediate risk category (Odds Ratio [OR] 1.95; 95% Confidence Interval [CI] 1.62, 2.34); high risk category (OR 2.87; 95 CI 2.38, 3.45); and in those diagnosed before 2006 (OR 1.19; 95% CI 1.02, 1.39). Older age, and being married or cohabiting were also associated with use of XRT.

Conclusion. Travel time to a radiation facility does not appear to discourage pursuit of XRT in the treatment of prostate cancer in New Hampshire. This does not imply that for certain patients travel time is not an important factor, however overall our findings are encouraging that travel time is not a systematic impediment to a multi-trip intervention. In winter months, travel time may have a greater impact on patient decision-making.

INTRODUCTION

- Decision-making regarding treatment for prostate cancer is complex and often involves subjective and objective patient concerns.
 - Objective concerns: risk category, age, health status
 - Subjective concerns: treatment side effects, logistical considerations
- Individualized concerns are particularly notable with prostate cancer treatment
 - Lack of a "gold standard"
 - Tradeoffs in risk and convenience are complex
- An important consideration is logistical ease or burden of therapy.
- Radiation treatment requires daily visits to a radiation treatment facility.
- New Hampshire is a rural state and patients may live more remotely.
- Hence, some patients may be deterred from XRT based on travel time and daily commute.

PURPOSE

- We evaluated the impact of travel time on treatment decisions for newly diagnosed prostate cancer in New Hampshire.

METHODS

- Data from the NHSCR were used for this study.
- We included clinically localized prostate cancer diagnosed in 2004-2011.
- Cases were categorized by age, D'Amico Risk, travel time to nearest radiation treatment facility
- Treatment was categorized by those requiring multiple trips (XRT and protons) and single trip (surgery or brachytherapy).
- Analysis was performed using SPSS and R.

RESULTS

Table 1. Patient characteristics at diagnosis, NH Prostate Cancers, 2004-2011.

	Multiple Trips		Single Trips		All Cases		Chi ²
	No.	%	No.	%	No.	%	
Age							0.000
<50	2	0.1	134	4.2	136	2.9	
50-65	424	26.9	2045	64.8	2469	52.2	
66-75	787	50.0	915	29.0	1702	36.0	
>75	362	23.0	62	2.0	424	9.0	
D'Amico Risk							0.000
Low	305	19.4	1275	40.4	1580	33.4	
Intermediate	606	38.5	1055	33.4	1661	35.1	
High	664	42.2	826	26.2	1490	31.5	
Residence*							0.000
Rural	786	50.0	1211	38.5	1997	42.3	
Urban	785	50.0	1936	61.5	2721	57.7	
Travel Time to Radiation (min)							0.000
<=30	1335	84.8	2809	89.0	4144	87.6	
>30	240	15.2	347	11.0	587	12.4	
Diagnosis Year							0.001
2004-2006	567	36.0	948	30.0	1515	32.0	
2007-2011	1008	64.0	2208	70.0	3216	68.0	
Marital Status**							0.001
Not Married*	336	21.3	534	16.9	870	18.4	
Married	1192	75.7	2540	80.5	3732	78.9	
Unknown	47	3.0	82	2.6	129	2.7	
Season at DX							0.008
Winter	421	26.7	714	22.6	1135	24.0	
Non-Winter	1154	73.3	2441	77.3	3595	76.0	
Unknown	0	0.0	1	0.0	1	0.0	

*Excludes cases where exact address is unknown (n=13).
**Not married includes single, divorced, separated, widowed.

A total of 4731 patients underwent XRT, surgery, or brachytherapy as initial treatment for localized prostate cancer during 2004-2011.

Table 2. Multivariate analysis of factors predicting multi- vs. single-trips travel for treatment in 4,731 New Hampshire men with clinically localized prostate cancer in 2004-2011.

Covariate	P value	Odds Ratio	95% CI	
			Lower	Upper
Age at diagnosis	< 0.001	1.17	1.16	1.18
Diagnosis after 2006	0.024	0.84	0.72	0.98
Intermediate risk	< 0.001	1.95	1.62	2.34
High risk	< 0.001	2.87	2.38	3.45
Single, separated, divorced, or widowed	0.006	0.73	0.59	0.91
Diagnosis during winter (December, January or February)	0.788	NA	NA	NA
Travel time to nearest facility	0.916	NA	NA	NA
Diagnosis during winter x Travel time	0.024	NA	NA	NA

Figure 3. Probability of making multiple trips for treatment by diagnosis year.

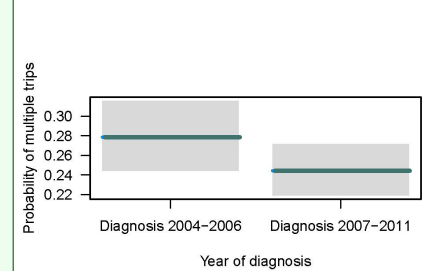


Figure 1. Age at diagnosis for clinically localized prostate cancer, NH 2004-2011.

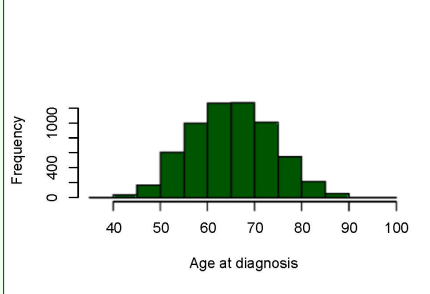


Figure 2. Travel time (min) to nearest radiation treatment facility.

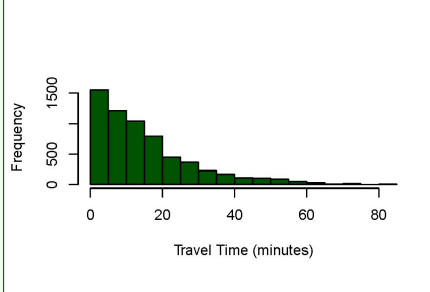


Figure 4. Probability of low-, intermediate-, or high-risk prostate patients making multiple trips for initial treatment..

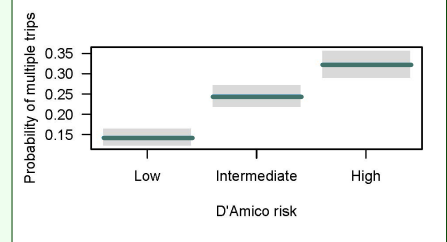
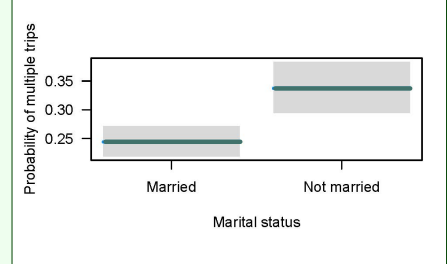


Figure 5. Probability of married and unmarried prostate patients making multiple trips for initial treatment.



DISCUSSION

- Our study found that travel time to nearest radiation treatment facility was not significantly associated with prostate treatment decisions.
- Higher risk categories were associated with a greater probability of choosing multiple trip radiation options
- Older age and being married or cohabiting were associated with multiple trip radiation options.
- Diagnosis after 2006 was associated with a greater likelihood of using treatments completed in a single trip, largely surgery.
- Multiple trip treatments were more likely during winter months among those living further from a radiation facility. This counterintuitive result is difficult to interpret and may be due to chance.

CONCLUSION

- Travel time to a radiation center did not independently affect decisions regarding XRT vs. alternative therapies for treatment of localized prostate cancer in the state of New Hampshire.
- Overall these findings are encouraging in that there are no significant travel barriers to access to all treatment options for prostate cancer in this rural state.

ACKNOWLEDGEMENTS

We acknowledge the Centers for Disease Control (CDC) and Prevention's National Program of Cancer Registries for its support of NHSCR. Development of this project was supported in part by cooperative agreement U58/DP003930 awarded to the NH Department of Health and Human Services (NH DHHS), Division of Public Health Services, Bureau of Disease Control and Health Statistics, Health Statistics and Data Management Section. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the CDC or NH DHHS.

Calculation of travel time was performed by Heather Carlos, Manager Spatial Analyst, at the Norris Cotton Cancer Center's GeoSpatial Resource, which is part of the Biostatistics Shared Resource.

