Palliative Radiotherapy: Associations with age and nursing home residency for adults dying of cancer 2000-2005

G Johnston[1,2], J Gao[2], R Lavergne[1], D Rheaume[1,3], T Dummer[1,4], M MacIntyre[2]

1. Dalhousie University, 2. Cancer Care Nova Scotia, 3. Nova Scotia Cancer Centre, 4. IWK Health Centre

Background

Palliative radiotherapy (PRT) plays an important role in care for people dying of cancer. However, variations in the delivery of PRT associated with factors that are unrelated to patient needs have been observed.

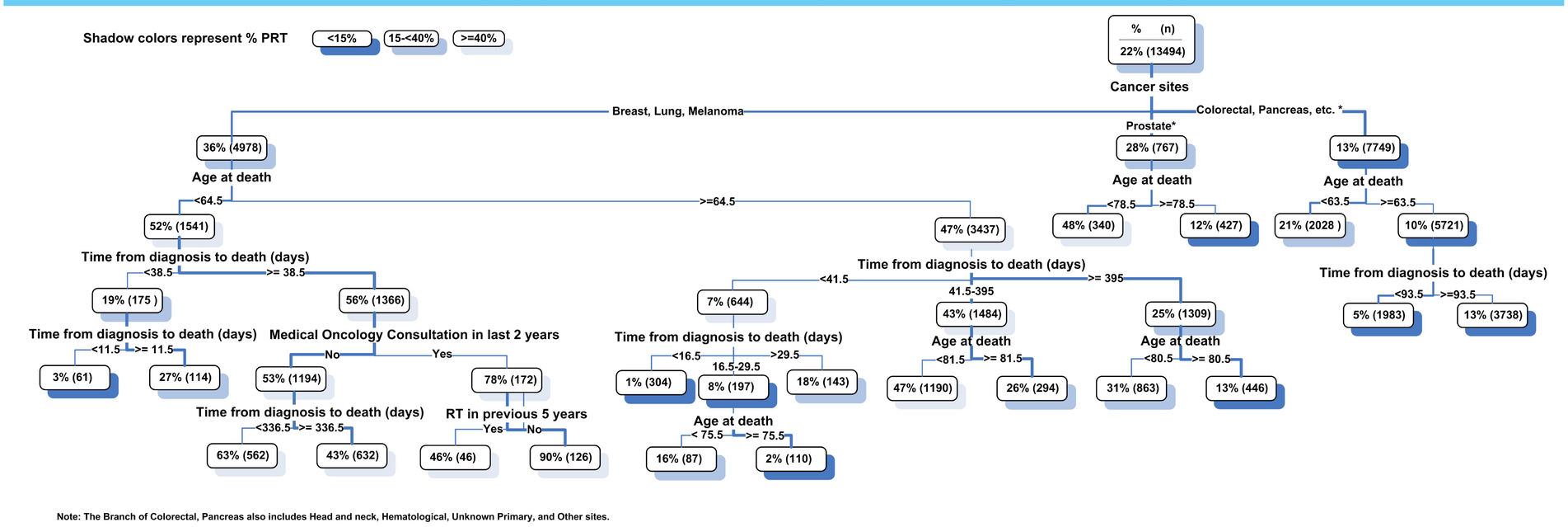
Johnston *et al*. (2001) published that receipt of PRT varied with age. This poster reports updated findings, adds nursing home residency, and includes Classification and Regression Tree (CART) results.

Reference: Johnston GM, Boyd CJ, Joseph P, MacIntyre M (2001). Variation in delivery of palliative radiotherapy to persons dying of cancer in Nova Scotia, 1994 to 1998. *Journal of Clinical Oncology 19(14)*: 3323-3332.

Purpose

To investigate the association between being a nursing home resident and the rate of palliative radiotherapy, incorporating age and other variables.

Classification and Regression Tree Analysis: Percentage (%) of Palliative Radiotherapy and Total Subjects in Node (n)



Note: The Branch of Colorectal, Pancreas also includes Head and neck, Hematological, Unknown Primary, and Other sites.

Method

Death certificate data for 13,494 adults aged 20 years and over who died of cancer between 2000 and 2005 in Nova Scotia, Canada were linked to cancer registry and centre data.

PRT was defined as having a palliative intent code for radiotherapy provided with less than 10 fractions in the last nine months of life. Nursing home residents were identified by place of residence or death at time of death. Other predictor variables in the analysis were age, sex, cancer site as cause of death, time from cancer diagnoses to death, previous radiotherapy in last five years, and medical oncology consultation in the two years before death.

Logistic regression (LR) findings are presented as odds ratios (OR) with 95% confidence intervals (CI) and were based on the same data as the CART analysis. CART is a private sector data mining tool for identifying niche markets, which has also been used in research to model clinical decision-making and to predict health outcomes. CART results are presented as a tree-diagram.

Discussion

CART uses recursive partitioning to repeatedly split a study population into smaller and smaller homogenous subgroups based on the distribution of the outcome variable. Optimal split points are selected to maximize the homogeneity within sub-populations. There is no pre-defined hypothesis.

A CART strength is the incorporation of data-driven variable interactions, i.e., CART makes use of what the data themselves are saying. On the other hand, adjusted LR analyses has a strength in controlling for confounding (which CART does also), but in LR the interaction terms are typically omitted because they are often difficult to interpret and based on *a priori* hypotheses rather than being data-derived.

Results

The overall PRT rate was 22% for the study subjects. PRT rates varied by sub-population.

Lower PRT rates were observed for nursing home residents (11.1%), persons 80 years and older (10.2%), females (21.2%), and those surviving only a month or two after cancer diagnoses (5.6%). PRT rates varied by cancer site.

Univariate odds ratios (OR) show findings similar to those in the bar graphs. PRT rates are higher for those who received a medical oncology consultation (OR=10.03; CI: 8.06, 12.48) and prior radiotherapy (OR=1.76; CI: 1.59, 1.94). Overall, comparable results were observed in the adjusted odds ratios which take covariance amongst the variables into account, except the effect of previous radiotherapy and medical oncology decreased in significance.

Adjusted ORs for age were only slightly lower than univariate ORs. Controlling for nursing home residence did not, therefore, explain the inverse association between PRT rate and age.

The CART findings show that cancer site was the first variable to separate the study subjects by PRT rates. Those dying of breast, lung and melanoma cancer had higher rates (36%), than prostate (28%), and colorectal, pancreas and others (13%).

The 129 persons who had a medical oncology consultation in the last two years of life had a PRT rate of 67% and are not reported on the CART diagram for the cancer sites marked with an asterisk (*) since their numbers were small and PRT rate high.

After cancer site, and medical oncology consultation, age was the next most important variable for partitioning PRT rates. Decreasing PRT rates with increasing age were seen with cut points just over 75 years (78.5) for prostate, and approximately 65 years (63.5, 64.5) for other cancers.

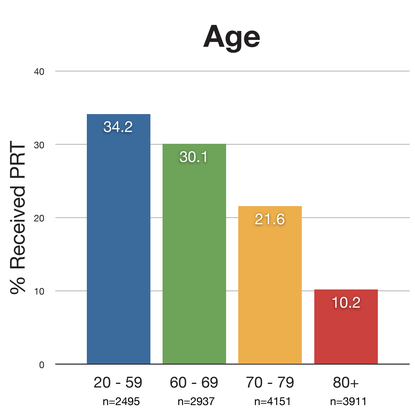
Time from cancer diagnosis to death then was the primary predictor of rates of PRT with patterns that were more detailed but not inconsistent with LR findings. Thereafter, age and cancer services again were partitioning factors.

Being a nursing home resident did not appear in this CART. Interactions among cancer cause of death, age, time from diagnosis to death, and having a medical oncology consultation were stronger factors than nursing home residence in partitioning the study subjects on the basis of PRT rates. However, other CART analyses not reported on this poster, showed that nursing home residency appeared when medical oncology was omitted.

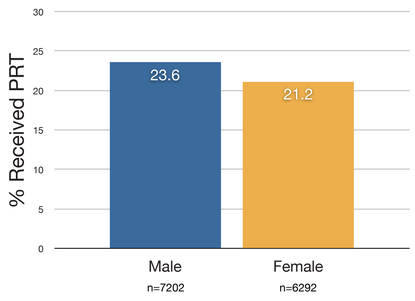
Table 1: PRT Logistic Regression Findings

	Variable	Univariate OR (95% CI)	Adjusted OR (95% CI)
Cancer Site (vs. lung)	Melanoma	1.10(0.82,1.48)	0.98(0.71,1.35)
	Breast	0.78(0.67,0.90)	0.76(0.64,0.91)
	Prostate	0.64(0.54,0.76)	0.83(0.68,1.01)
	Other	0.38(0.34,0.43)	0.35(0.31,0.40)
	Head and Neck	0.38(0.28,0.51)	0.29(0.21,0.40)
	Unknown Primary	0.21(0.17,0.27)	0.30(0.23,0.38)
	Hematological	0.19(0.16,0.24)	0.19(0.16,0.24)
	Colorectal	0.18(0.16,0.22)	0.18(0.15,0.21)
	Pancreas	0.03(0.02,0.05)	0.03(0.02,0.06)
Medical Oncology Consultation	Y vs. N	10.03 (8.06,12.48)	4.75 (3.76,6.02)
Previous RT	Y vs. N	1.76(1.59,1.94)	1.02(0.91,1.15)
Sex	M vs. F	1.14(1.06,1.24)	1.16(1.05,1.29)
Time (vs. 26+)	0-<1.5 months	0.20(0.17,0.25)	0.20(0.16,0.25)
	1.5 months-<26 months	1.34(1.22,1.47)	1.19(1.06,1.33)
Age (vs. 80+)	20-59	4.58(4.01,5.23)	3.89(3.36,4.51)
	60-69	3.78(3.32,4.31)	3.07(2.66,3.54)
	70-79	2.42(2.13,2.75)	2.08(1.81,2.38)
Place of Residence	Nursing Home vs. Other	0.41(0.33,0.50)	0.54(0.43,0.67)

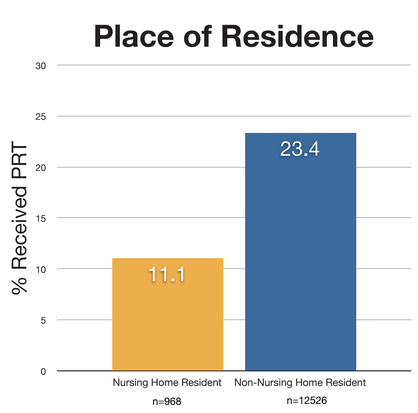
Age



Sex



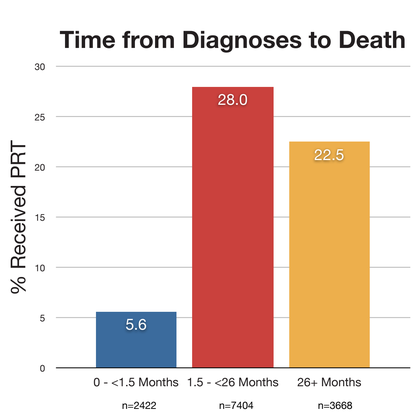
Place of Residence



Location of Study

Radiotherapy was provided in the Halifax and Cape Breton cancer centres.

Time from Diagnoses to Death



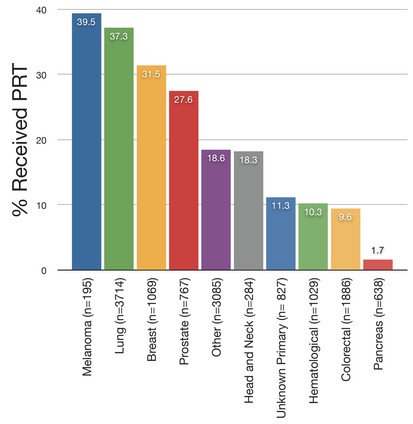
Conclusion

Nursing home residents were less likely to receive PRT.

To understand PRT rates for nursing home residents, correlations with previous radiotherapy and medical oncology consultation appear relevant.

The association between increasing age and decreasing rates of PRT were only marginally explained by the low PRT rate for nursing home residents.

Cause of Death



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Cancer Care Nova Scotia

CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

NELS | Network for End of Life Studies
ICE | Interdisciplinary Capacity Enhancement