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Utilization of radiotherapy

Do radiation oncology outreach clinics affect the use of radiotherapy?

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ABSTRACT

Background and purpose: The scope and effect of radiation oncology (RO) outreach activities within centralized radiotherapy (RT) systems is poorly defined. The purpose of this study was to describe the outreach activities of Ontario's regional cancer centres, and to explore the relationship between radiation oncology (RO) outreach clinics and rates of radiotherapy (RT) utilization at hospitals without RT on site (HWOS-RT).

Materials and methods: Ontario RO centres' outreach activities were identified by semi-structured interview. A multivariate analysis determined the association between on-site RT facilities, or presence of RO clinic at HWOS-RT, and RT utilization within one year of diagnosis (RT_{1Y}), for all patients diagnosed with cancer in Ontario in 2011–2012.

Results: RO outreach varied widely by region. Of the largest 58 diagnosing hospitals, 14 had RT on-site, 19 had no RT but RO outreach clinic(s) and 25 had no RT or RO clinic. RT was used more frequently for patients diagnosed at hospitals with on-site RT compared to those at HWOS-RT (RT_{1Y} = 35% vs. 29%, RR = 1.32 [95% CI 1.27–1.38]). For HWOS-RT, RT was used more frequently if there was an RO clinic (RT_{1Y} = 31% vs. 29%, RR = 1.06 [95% CI 1.02–1.10]).

Conclusions: RO outreach clinics were associated with a small but significant increase in RT utilization. There is opportunity to improve access to RT by optimizing the effectiveness of RO outreach.

In the early 1990s, the Canadian province of Ontario experienced long waiting times for radiotherapy (RT), which threatened the effectiveness of its overall programme of cancer control [1–3]. Since that crisis, the province has invested heavily in expanding the capacity of its RT programme to meet demand, and ongoing audit shows that are no waiting lists for RT at any Ontario treatment centre today [4]. In spite of this remarkable achievement, the rate of utilization of RT still varies widely across the province [5,6], and the overall provincial rate remains low in comparison to published estimates of the appropriate rate [6,7]. Although some new RT centres have recently opened, the RT system remains centralized [6] and many large Ontario hospitals do not have their own radiation oncology (RO) department. Rates of RT utilization are higher among patients diagnosed at hospitals where RT facilities are located, and where radiation oncologists (ROs) routinely work along with surgeons and other doctors involved in cancer care [6,7]. It has been hypothesized that the much lower rates of utilization observed elsewhere are due to a lower level of awareness of the indications for RT among doctors who provide care for cancer patients at hospitals without an on-site radiation oncology department [8,9].

When medical services are centralized, active programmes of outreach may be necessary to promote equitable access to care [10]. Outreach activities have been defined by the World Health Organization as "any type of health service that mobilizes health workers to provide services to the population, or to other health workers, away from where they usually work and live" [10]. In the context of radiation oncology, potential outreach activities include: ROs' attendance at hospitals without RT facilities; remote RO consultation by audiovisual link; participation in multidisciplinary case conferences (MCCs); and participation in educational initiatives targeted to other doctors, or to patients. It is known that many Ontario RO centres engage in some such outreach activities, but the province does not have a standard approach to outreach, and the nature, extent and effectiveness of these activities is unknown.

The objectives of this study were, first, to describe and compare the outreach activities currently undertaken by Ontario's regional RO centres, and secondly, to explore the relationship between RO outreach clinics and rates of RT utilization.

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Materials and methods

Context: the Ontario cancer system

Ontario has a population of 14 million people and a land area of 918,000 km^2 [11]. All RT in Ontario is provided by a network of 14 RO centres located at large general hospitals. The provincial RT programme is coordinated by Cancer Care Ontario (CCO), the provincial government agency responsible for cancer services. The entire cost of RT for residents of Ontario is covered by the provincial government. There is no parallel private system for RT in Ontario [12].

Describing outreach activities: survey methods

Between January and April 2015, we conducted a semi-structured interview with the head of RO (13), or with the ROs responsible for outreach activities (1), at each of Ontario's 14 RO centres. Respondents were asked to describe all the current RO outreach activities of their centre and to provide the dates when each of those activities was initiated. Respondents were also asked about the management of their outreach programme, and about any plans for future expansion of outreach activities. Finally, respondents were asked to identify barriers to RO outreach activities. The questionnaire template for the interview is shown in eSupplement 1. The initial interviews were all carried out either in person or by telephone by one of the authors (P.-Y.M.). Supplementary information was obtained by follow-up email, if necessary.

Measuring RT utilization

The Ontario Cancer Registry (OCR) provided information about all new cases of cancer diagnosed in the province between January 2011 and December 2012 (see eSupplement 2 which further describes the OCR). RT utilization was described by the percentage of incident cases of cancer that received RT at least once within one year of diagnosis (RT_{1Y}) [5]. RT utilization was measured at the level of the "diagnosing hospital", which was defined as the first general hospital attended by the patient within 30 days before or after the date of diagnosis. RT rates at individual hospitals were standardized to the distribution of age and primary cancer site observed in the overall cancer population.

Exploring the association between RO outreach and RT utilization

Based on our survey results, all hospitals were classified based on whether they had RT facilities or RO outreach clinics operating in 2011 and 2012. Four categories of hospital were distinguished: (a) single-site hospitals with RT on-site; (b) multi-site hospitals with RT at one site only; (c) hospitals without RT on-site (HWOS-RT), but which had at least one RO outreach clinic operating throughout the study period; and (d) HWOS-RT with no RO outreach clinic. Hospitals were also subclassified by case volume. Those that diagnosed 250 or more cases of cancer/year were arbitrarily classified as "large", and those that diagnosed <250 cases/year were classified a "small" hospitals.

Modified Poisson regression was used explore the association between availability of RT facilities or RO consultation at the diagnosing hospital and rate of RT utilization (RT_{1Y}), after controlling for factors known to be associated with the use of RT [6,7], including: primary site, age, prevailing waiting time for RT, distance from the patient's residence to the nearest RT facility, and community-level household income.

Results

Outreach activities of Ontario's RO centres

All 14 RO centres in Ontario provided information about their outreach activities. Responsibility for RO outreach was generally the responsibility of the head of RO, with only one centre assigning responsibility for outreach to other ROs. Outreach activities had a dedicated budget in half of the centres, with the others having to obtain funds from the general operating budget of the centre. Most centres had plans to increase their current outreach activities, but many cited lack of financial support (7/14), lack of ROs' clinical time (7/14), and lack of space for outreach clinics at other hospitals (7/14), as barriers to increasing outreach clinics.

Table 1 shows that all RO centres engaged in outreach, but the scope of their outreach activities varied widely. All RO centres reported involvement in continuing medical education and 13/14

Table 1
Summary of the outreach activities of 14 Ontario RO centers.

Centre	A	B	C	D	E	F	G	H	I	J	K	L	M	N
# of full-time equivalent ROs	8.6	6.1	5	8.2	6	11.6	25.4	18	3	16	26.8	6	4.5	35.6
Educational programmes about the uses for RT for non-oncologists (Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participation in regional disease site groups with staff of hospitals without RT (Yes/No)	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
# tumour boards involving staff of hospitals without RT	1	2	1	2	3	3	2	3	3	9	3	2	3	6
# hospitals without RT where the Centre operates outreach clinic(s)	1	0	0	4	1	1	2	0	0	4	6	1	0	2
# outreach clinic consultations/year	90*	–	–	707	195	356	270	–	–	1675	2345*	125*	–	195
# outreach clinic follow-up visits/year	0	–	–	nk**	nk**	389	200*	–	–	nk**	nk**	nk**	–	5
# hospitals without RT where the Centre provides inpatient consultations	1	1	0	4	3	1	2	0	0	7	0	1	3	4
# consultations/year	10*	2*	–	50*	10*	10*	30*	–	–	40*	–	10*	5*	30*
Remote patient encounters (Yes/No)	No	No	Yes	No	No	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes
# consults/year	0	0	150*	0	0	0	7	0	75*	35*	0	125*	100*	35*
# follow-up/year	–	–	75	–	–	–	7	100	0	0	–	3500	0	0
Percentage of RO's working hours devoted consultations at hospitals without RT***	5%	0%	12%	30%	11%	11%	6%	0%	8%	30%	35%	6%	8%	3%
Operate off-site linac (Yes/No)****	No	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No	No

* Denotes estimates.
** Number not known.
*** Includes remote consultations.
**** Only after 2011.