

# Continued success of the rapid response radiotherapy program: a review of 2004–2008

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## Abstract

*Purpose* To update the clinical activity of the Rapid Response Radiotherapy Program (RRRP).

*Materials and methods* We conducted a retrospective review of our clinic database from January 2004 until July 2008. The number of patients referred to the RRRP, relevant demographic data, diagnosis and treatment dispositions were recorded. Time interval between referral to consultation and consultation to simulation were also calculated.

*Results* During the study period, 3,267 patients were seen in the RRRP. Forty-five percent (1,494) of the patients were new to the clinic. Of the 3,267 patients seen, 1,548 (47.4%) were female and 1,719 (52.6%) were male. The median age was 69.2 years (range, 22–101 years). The most common primary sites were lung (34.2%), breast (21.2%) and prostate (17.0%). The majority of patients were referred for palliative treatment of bone metastases (52.4%) or treatment for brain metastases (20.7%). Of the patients referred, 2,311 (70.5%) patients received palliative radiotherapy. The median duration from referral to consultation was 4 days. The majority (82.3%) of patients were simulated and treated within the first 7 days following consultation.

*Conclusion* The number of patients referred to the RRRP from January 2004–July 2008 remains comparable to our previous report (1996–2003). The overall median interval from referral to consultation for the analysed time period

was 4 days. Therefore, we are continuing to meet our goal of providing rapid access to palliative radiation treatment for symptomatic cancer patients. Further information relating to progression and advancements within the clinic aimed at improving our patients' quality of life are explored.

**Keywords** Palliative · Radiotherapy · Waiting time · Review

## Introduction

Radiation therapy (RT) is frequently employed with palliative intent to minimise tumour-related symptoms. Approximately 50% of cancer patients will receive palliative RT during the course of their disease [1].

In Ontario, there have been problems with the delivery of timely palliative radiotherapy to patients due to limitations in resources including personnel and radiation equipment [2]. Problems with lengthy waiting time for radiotherapy were not unique to Canada. In 1998, nearly one-third of radiotherapy departments in the UK were unable to meet radical radiotherapy guidelines of treating within 4 weeks. Patients in other Canadian provinces as well as Australia and New Zealand have faced similar dilemmas in waiting times for RT [3].

The Rapid Response Radiotherapy Program (RRRP) was initiated in 1996 with the goal of providing timely palliative RT within a week of referral and to decrease the number of clinic visits needed for patients [4, 5]. The RRRP multidisciplinary team consists of radiation oncologists, nurses, radiation therapists and research students. The program originally consisted of two half-day clinics per week but has since increased to five weekly clinics to meet the increase in referrals. The RRRP is structured to ensure a

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streamlined approach to both the referral process and delivery of radiation. To enable treatment planning to occur on the same day of consultation, all relevant information including imaging studies are made available before the patient arrives. The clinic is located in close proximity to the simulator and planning facilities. An interim consultation report is completed by the radiation oncologist providing details of treatment plan, its goals, anticipated side effects and recommendations which is then faxed to the referring physician immediately after radiotherapy consultation [4]. A published review of the current RRRP clinic within the Odette Cancer Centre (OCC) (formerly Toronto-Sunnybrook Regional Cancer Centre) evaluated the first 8-year period to determine whether the goals of the clinic were achieved [6]. This review spanned from 1996–2003. During this time, 38% of new cases were seen in consultation within 7 days of their referral to the RRRP and 50% within 7–15 days of referral [6].

This study updates the previous report on the RRRP for the time period of January 1, 2004 to July 31, 2008.

## Materials and methods

A prospective clinic database is continuously updated based on all patients seen in the RRRP. A “new case to RRRP” is defined as a patient who has not previously been seen in the clinic. Dates of referral to consult and consult to treatment, reason for referral, case disposition, treatment courses and patient demographics were recorded using our prospective research database. Duration between referral to consult and consult to treatment was calculated using both work days and weekend days. “Courses” instead of number of cases were used to calculate the treatments delivered. A course is defined as a series of treatments consisting of one total

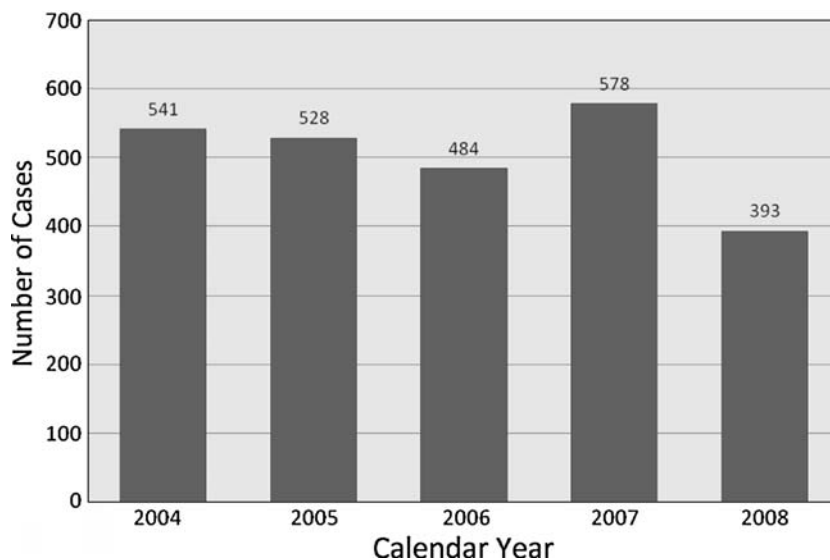
dose/fractionation; therefore, a patient being treated for two areas on the same day would be considered as one case with two courses of radiation treatment. Ethics approval was obtained from the hospital ethics board.

## Results

From January 1, 2004 to July 31, 2008, a total of 3,267 cases were referred to the RRRP for palliative RT consultation. Over 480 cases were seen annually during 2004 to 2007. The apparent 19% decrease in patients referred to the RRRP clinic in 2008 is the result of data collected ending on the last day of July (7 month period) of that year as opposed to the full 12 month period in previous years (Fig. 1).

There were 1,117 (34.2%) patients with lung cancer. The remaining patients (percentage of total in parentheses) had the following primary sites: breast 694 (21.2%), prostate 555 (17.0%), gastrointestinal 255 (7.8%), other primaries 448 (13.7%) and 198 (6.1%) primaries with unknown origin. There were 2,341 (71.7%) patients that came from their home, 811 (24.8%) from a hospital, 29 (0.9%) from a nursing home and the remaining 86 (2.6%) from another source. Seven hundred and thirty-four (22.5%) came by ambulance or healthcare transport system. There were 1,548 (47.4%) women and 1,719 (52.6%) men referred to the RRRP with a median age of 69.2 years (range 21–101). Of the 3,267 cases referred to the RRRP, 1,494 (45.7%) were new patients to the clinic, 1,030 (31.5%) were patients previously seen in the clinic but were currently being reviewed for a different reason and the remainder of the patients were followed-up for a previous treatment (22.7%). The median and mean of the Karnofsky performance status (KPS) and the palliative performance scale scores for

**Fig. 1** Number of new RRRP cases by calendar year. Data collected for the calendar year 2008 consists of cases referred to RRRP clinic between January 1 and July 31 inclusive



patients seen in the RRRP clinic were 60 (range 10–100) (Table 1).

Painful bone metastases accounted for 1,713 (52.4%) of all referrals. There were 675 (20.7%) patients referred for brain metastases. There were 67 (2.1%) referrals for spinal cord compression, nine (0.3%) for cauda equina syndrome, 26 (0.8%) for bone fracture, 80 (2.4%) for bleeding, 93 (2.8%) for dyspnea and 33 (1.0%) for symptoms of superior vena cava obstruction (Table 2).

Of the 3,267 cases seen in clinic, 2,311 (70.7%) received palliative RT. Twenty-one (0.6%) cases were referred to palliative care, 21 (0.6%) for radical treatment, 36 (1.1%) for surgery and 59 (1.8%) to orthopaedics or the Bone Metastases Clinic at OCC for multidisciplinary manage-

ment. Fifty-six (1.7%) declined treatment and seven (0.2%) were admitted to hospital directly from RRRP (Table 2).

A total of 2,560 courses of radiation treatment were prescribed with 1,520 (59.4%) courses for pain relief caused by bone metastases and 517 (20.2%) courses for brain metastases. For bone metastases, 8 Gy in one fraction accounted for 978 (64.4%) courses and 20 Gy in five fractions for 446 (29.3%) courses. For brain metastases, 20 Gy in five fractions accounted for 465 (90.0%) of the total number of courses given (Table 3).

Between January 2004 and July 2008, 733 (49.1%) of new cases were seen in consultation within 4 days of referral and 1,229 (82.3%) were seen within the first week of referral. The median duration between referral to consultation was 4 days

**Table 1** Descriptive statistics for patients seen at the RRRP, January 2004–July 2008 inclusive ( $n=3,267$ )

	Cases <sup>a</sup>	Percent
Source of referral		
NP: new patients to RRRP	1,494	45.7
FU: previous patients followed-up in clinic	743	22.7
SPEC: previous patients reviewed in clinic for new reason	1,030	31.5
Total	3,267	
Age (years)		
Range	21–101	
Median	69.2	
Mean	67.9	
Gender		
Female	1,548	47.4
Male	1,719	52.6
Total	3,267	
Cases arrived via ambulance/healthcare transport <sup>b</sup>		
Yes	734	22.5
No	2,460	75.3
Unknown	73	2.2
Locations where cases arrived from		
Home	2,341	71.7
Hospital	811	24.8
Nursing Facility	29	0.9
Other	86	2.6
Primary cancer site		
Lung	1,117	34.2
Breast	694	21.2
Prostate	555	17.0
Gastrointestinal	255	7.8
Renal cell	174	5.3
Bladder	90	2.8
Unknown	198	6.1
Other	184	5.6
Karnofsky performance status		
Median	60	
Mean	60	
Range	10–100	
Palliative performance status		
Median	60	
Mean	60	
Range	10–100	

<sup>a</sup> NP + SPEC constitute new cases seen in RRRP; case is defined as a patient with one cancer diagnosis

<sup>b</sup> data not collected for 73 patients

**Table 2** Primary reasons for referral and primary case dispositions of cases seen in RRRP clinic

	Cases <sup>a</sup>	Percent
Primary reason for referral <sup>b</sup>		
Bone pain	1,713	52.4
Brain metastases	675	20.7
Mass	200	6.1
Assessed radiotherapy response	115	3.5
Dyspnea	93	2.8
Bleeding	80	2.4
Spinal cord compression	67	2.1
Assessed need for more treatment	39	1.2
SVCO Symptoms	33	1.0
Pathological fracture	26	0.8
Neuropathic pain	16	0.5
Other pain	29	0.9
Cauda equina syndrome	9	0.3
Other	172	5.3
Total	3,267	
Primary case dispositions <sup>c</sup>		
Prescribed palliative radiation	2,311	70.7
Referred to palliative care	21	0.6
Referred to radical treatment	21	0.6
Referred to surgery	36	1.1
Referred to BMC or orthopaedics	59	1.8
Further investigation required	257	7.9
Inappropriate referral	45	1.4
Patient asymptomatic	175	5.4
Patient declined treatment	56	1.7
Admitted	7	0.2
Other	279	8.5
Total	3,267	

<sup>a</sup> Case is defined as a patient with one cancer diagnosis

<sup>b</sup> Secondary reasons for referral may be given along with primary cited list

<sup>c</sup> Secondary case dispositions may be given along with primary cited list

(Table 4). For patients with metastatic bone pain, 1,244 (81.8%) were simulated on the same day as consultation, 221 (14.5%) within 1 to 6 days and 55 (3.7%) after 7 days from consultation (Table 5). For brain metastases, 357 (69.1%) patients were simulated the same day as consultation, 139 (26.9%) within 1 to 6 days and 21 (4.0%) after 7 days from consultation (Table 6). The majority of patients started treatment on the same day as simulation.

## Discussion

The goal of palliative radiation is to provide symptomatic relief using a short treatment schedule to minimise treatment-related side-effects and visits to the cancer centre [4]. Dividing up the consultation, simulation, planning and treatment into multiple visits for terminally ill cancer patients places a greater burden on the patients and their families and increases the likelihood of aggravating existing

**Table 3** Details of treatment courses for patients seen at RRRP Clinic

	Courses <sup>a</sup>	Percent
Referred with and received treatment for		
Metastatic bone pain	1,520	59.4
Symptoms of brain metastases	517	20.2
Other	523	20.4
Total	2,560	
Treatment regimes for pain due to bone metastases		
800 cGy in one fraction	978	64.4
2,000 cGy in five fractions	446	29.3
3,000 cGy in ten fractions	32	2.1
Other	64	4.2
Total	1,520	
Treatment regimes for brain metastases		
2,000 cGy in five fractions	465	90.0
2,000 cGy in ten fractions	18	3.5
3,000 cGy in ten fractions	16	3.0
Other	18	3.5
Total	517	

<sup>a</sup> Course is defined as a series of treatments all related to one total dose/fractionation

symptoms. The longer the treatment duration, the less likely the patient is willing to travel [7].

According to the Manpower and Standards of Care in Radiation Oncology Committee September 2000, waiting times for initiation of radiotherapy treatment should not exceed ten working days [8]. The RRRP was a pilot program in Ontario developed in 1996 with the intent to improve quality of life and to relieve suffering experienced by terminally ill cancer patients by providing timely palliative radiotherapy. The OCC launched the RRRP to allow quick access for radiation treatment with resources specifically allocated for patients with palliative needs [2, 4]. Medical oncologists and palliative care physicians provide the majority of referrals to the clinic [9].

For the initial 8 years, the median interval from referral to consultation was 8 days [6]. For the time period of January

**Table 4** Annual number and percentage of new patients seen within 7 days of referral to RRRP

Year	Total cases	Referral to consult				
		0–4 days	Percent	0–7 days	Percent	Median (days)
2004	357	107	30.0	257	72.0	5
2005	341	130	38.1	264	77.4	5
2006	266	165	62.0	233	87.6	3
2007	322	190	59.0	282	87.6	3
2008 <sup>a</sup>	208	141	67.8	193	92.8	2
Overall	1,494	733	49.1	1,229	82.3	4

<sup>a</sup> Data collected for the calendar year 2008 consists of cases referred to RRRP clinic between January 1 and July 31 inclusive

**Table 5** Interval consult to simulation for patients with metastatic bone pain annually

Year	Total cases	Consult to simulation					
		Same day (day 0)	Percent	1–6 days	Percent	7 or more days	Percent
2004	361	294	81.4	49	13.6	18	5.0
2005	284	249	87.7	28	9.9	7	2.4
2006	242	209	86.4	28	11.6	5	2.0
2007	348	281	80.7	50	14.4	17	4.9
2008 <sup>a</sup>	285	211	74.0	66	23.2	8	2.8
Overall	1,520	1,244	81.8	221	14.5	55	3.7

<sup>a</sup>Data collected for the calendar year 2008 consists of cases referred to RRRP clinic between January 1 and July 31 inclusive

2004 to July 2008, the overall median interval from referral to consultation has decreased to 4 days. When the RRRP was initiated at the OCC, over 200 patients were seen annually from 1996 to 1998. The number of cases jumped to 447 in 1999 and approximately 550 cases were seen in the RRRP during the years 2000, 2001 and 2002. The clinic observed a 13% drop in the number of cases reviewed in 2003 which was attributed in part to the impact of severe acute respiratory syndrome on access to facilities within health care centres [6]. For the years 2004 to 2007, the number of cases has remained comparable to the 1996–2003 reporting periods. The decrease in the number of patients seen in the clinic during the calendar year 2008 (393 cases) is attributed to the time period from which the data was extracted (January to July). The current time period analysed has shown that 81.8% of patients receiving RT for painful bone metastases and 69.1% of patients receiving RT for brain metastases are simulated on the same day of consultation, while 4% or less wait for a period of 7 days or longer. Nearly all patients were simulated on the same day of consultation, with the majority starting treatment on the same day as simulation. While the clinic is usually able to offer patients the option of starting treatment on the same day as consultation, the patient may request to delay the start of treatment. Reasons may include not wanting to wait at the centre for RT later in the afternoon or needing to arrange drivers to bring them for treatments.

The RRRP has served as a template for other rapid radiotherapy clinics. Members from Princess Margaret Hospital's Palliative Radiation Oncology Program in Toronto, Juravinski Cancer Centre in Hamilton, Ontario and the Tom Baker Cancer Centre in Calgary, Alberta have toured and used the RRRP as a reference centre when establishing their own clinics. Similar programs with the intent of delivering rapid access to palliative radiotherapy have been implemented at other Canadian cancer centres [6] and in Brisbane, Australia [9].

### Progression and advancements in the RRRP

The RRRP along with the Division of Orthopaedics at Sunnybrook and Women's College Health Science Centre initiated the Bone Metastases Clinic (BMC) at the Odette Cancer Centre in January 1999. The clinic is staffed by radiation oncologists, medical oncologists, orthopaedic surgeons, radiation therapists, pain specialists and a nurse coordinator. The BMC provides a multidisciplinary approach to the care of cancer patients with bone metastases allowing patients to see multiple health care professionals in a single visit. The Prostate Bone Metastases Clinic operates jointly with the BMC specializing in treating patients with prostate primary tumours and readily accepts quick referrals for patients who need treatment with

**Table 6** Interval consult to simulation for patients with brain metastases annually

Year	Total cases	Consult to simulation					
		Same day (day 0)	Percent	1–6 days	Percent	7 or more days	Percent
2004	118	77	65.3	33	28.0	8	6.7
2005	115	86	74.8	25	21.7	4	3.5
2006	82	68	82.9	12	14.6	2	2.5
2007	122	76	62.3	41	33.6	5	4.1
2008 <sup>a</sup>	80	50	62.5	28	35.0	2	2.5
Overall	517	357	69.1	139	26.9	21	4.0

<sup>a</sup>Data collected for the calendar year 2008 consists of cases referred to RRRP clinic between January 1 and July 31 inclusive



bisphosphonates or other treatment planning. Patients referred to the RRRP often require referrals to interventional radiologists, orthopaedic consults or require more advanced treatment planning. The strong communication between the RRRP and the bi-weekly BMC/Prostate-BMC allow patients to promptly be referred to the clinic and consulted by many specialists thereby reducing the wait periods from months to weeks [10].

The Rapid Response Radiotherapy Program continues to provide ample research opportunities and the number of studies conducted and research students employed has increased over the past 4 years. The RRRP has been the base for a 2-year pilot project for a clinical specialist radiation therapist specializing in palliative care and radiation therapy. The success of this project has resulted in another five clinical radiation therapy specialist roles entering the first phase of the pilot project in November 2008. Collaboration with other specialties continues to increase with the addition of medical physics clinical trials and access to specialised radiation therapies including tomotherapy and stereotactic radiosurgery that are made available to our palliative patients when required.

While the clinic provides rapid access to consultation, simulation, planning, and treatment for each patient, the RRRP also provides quick and easy access for referring physicians to send their patients to the clinic without the need to schedule an appointment with an individual radiation oncologist. In some cases, a patient may be seen by their medical oncologist or family physician, be sent to our clinic later that same morning and has finished treatment by the late afternoon, thereby demonstrating the true potential of rapid response the RRRP clinic has to offer. Most patients are treated the same day as seen in consultation unless the patient requests a delay or unless the patient's chemotherapy schedule dictates a later radiation treatment start date. This quick access to consultation and delivery of radiation and easier referral access to other speciality clinics aim to improve the quality of life by reducing unnecessary pain or reducing fracture risk.

Most recently, the RRRP-BMC clinics were recognised with the Cancer Care Ontario and the Cancer Quality Council of Ontario's 2008 Quality Team Award for excellence within in the field of cancer care.

## Conclusion

From January 2004 to July 2008, the Rapid Response Radiotherapy Program has continued to provide timely care through the shortening of wait times. The overall median from referral to consultation has decreased since the last clinic review from 8 days to 4 days despite an increase in the number of referrals. The structure of the clinic has

streamlined radiation referral, registration and delivery of treatment and continues to provide prompt access to palliative radiation therapy with minimal intrusion on the schedules of terminally ill cancer patients. Nearly all patients are treated on the same day of simulation and with 69% of patients beginning their radiation therapy on the same day as consultation, many patients only need to come to the clinic for a single visit. This innovative program has decreased the wait time between referral to consult while continuing to provide timely palliative radiotherapy for symptomatic terminal cancer patients. While the RRRP has been acknowledged by the medical community for its service with the palliative population, the clinic continues to re-evaluate itself and examine and explore ways to improve our patients' quality of life.

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