The Radiation Therapy Physics Residency Program

Program Objectives

This program will provide the resident with clinical training in the four main areas of Medical Physics practice, namely Dosimetry, Treatment Planning, Stereotactic Radiosurgery and Brachytherapy. During this program, the resident will acquire clinical knowledge and practical experience to the extent that upon completion, will be able to operate independently under the guidance of a senior physicist. The development of decision-making skills and communication skills will be fostered.

Organizational Structure

The Radiation Therapy Physics Residency Program is a two year course run by the Department of Therapy Physics of the Division of Medical Physics, CancerCare Manitoba (CCMB). The Department of Therapy Physics is one of four departments within the Division of Medical Physics, CCMB. The other three departments within the Division include Medical Imaging, Radiation Protection and Medical Engineering. All four Department Heads, including the Head of Radiation Therapy Physics, report to the Director of Medical Physics. The Director is a senior manager of CCMB, reporting directly to the Head of the Radiation Oncology program. The Director of Medical Physics serves as the Director of the Radiation Therapy Physics Residency Program. All members of the Department of Therapy Physics, Medical Physicists and Physics Associates contribute to the Residency Program.

A Brief History of the Program

Established in 1997, the Program has two permanent positions. Residents take part in regular journal club presentations, receive a professional allowance and participate in oral examinations in four specialty areas; Dosimetry, Treatment Planning, Stereotactic Radiosurgery and Brachytherapy. The program received CAMPEP accreditation in 2008; as of January 2015, fifteen Medical Physicists have graduated from the program.

Program Content

The Residency Program at CCMB is two years in length and consists of four rotations; nine months in Dosimetry, nine months in Treatment Planning, four and a half months in Brachytherapy and one and a half months in Stereotactic Radiosurgery. To successfully complete a rotation, the Resident must demonstrate competency in performing specific tasks in each area of training. The Resident must also pass two or three oral exams in each rotation (two in the Brachytherapy rotation, three in both Dosimetry and Treatment Planning and one in Stereotactic Radiosurgery). Supplemental oral exams may be administered to the Resident, as required. Oral exams are approximately two hours in length and are administered by at least three staff physicists with clinical responsibilities in the areas of questioning. Immediately following the session, the examiners meet privately to evaluate the Resident’s performance. The results are summarized in a written report that also includes any corrective actions the Resident must take to remedy deficiencies.

Clinical competencies are acquired through one-on-one instruction from staff physicists. The learning process will begin with an orientation to a topic followed by detailed demonstration/instruction in which the Resident watches the staff member perform the clinical task. During the next phase, the Resident performs the task under close supervision of the staff member; extensive quizzing of the Resident will take place during this activity. Once the staff member believes the Resident has demonstrated competency in performing the task, they will sign off on the competency list. When two other staff physicists have also observed the Resident satisfactorily perform the task, they too will sign off on the competency list and the Resident will be considered to have successfully completed training in that particular area. Each rotation will also include reading assignments. Comprehension is assessed during the oral exams.

Residents are required to complete two program evaluation questionnaires per rotation, one at the midpoint of the rotation, the other at the end. This feedback will identify weaknesses in the program and allow solutions to be identified. The evaluation questionnaires were designed by making questions non-confrontational, to allow Residents to provide feedback without fear of reprisal.
All Residents entering the program are required to review and become familiar with anatomy using on-line teaching sites. Residents will participate in a Medical Physics journal club. The club runs from September through June, with Residents and graduate students presenting two journal papers per week, on a rotational basis. Residents will typically present approximately three times per year. The primary goal of this club is to provide residents and students an opportunity to hone their public speaking skills. It also gives Residents additional incentive to stay abreast of current literature. Residents are required to attend a monthly journal club run by the Radiation Oncology Resident Program at CCMB. One clinical radiation oncology paper is presented at each session by the oncology residents. Attendance gives the Medical Physics Residents opportunity to learn more about the diseases they will ultimately play a role in eradicating. Gaining such knowledge is essential to becoming a top quality medical physicist. The Radiation Oncology department at CCMB runs weekly treatment planning rounds at which the treatment strategies for select patients are discussed by oncologists, physicists and radiation therapists. Attendance at these rounds by the Medical Physics Resident is also mandatory. This forum provides the Resident with the opportunity to gain knowledge from the three primary groups responsible for Radiation Therapy in an interactive setting.

Salary and Benefits

The salary scale for Residents ranges from approximately $58,000 to $76,000, over six steps. The scale is adjusted yearly for cost of living, at the same rate as the Medical Physicist scales at CCMB. Residents are placed on the scale according to previous medical physics experience and whether they hold a PhD or MSc degree. Each Resident receives an additional $2,500 per year as a professional allowance to be used to purchase books or support conference travel. Residents are responsible for their food and lodging while in the program. Residents receive 4 weeks of vacation per year, plus thirteen days of stat/holidays. CCMB provides insurance to cover lawsuits that may be brought against the Resident, as a result of their work. Employment benefits received by the Resident include an employee pension, group life insurance, long term disability, Blue Cross dental and vision coverage and access to an employee assistance program. Additional health care insurance (Canada offers free health care to its citizens) is offered, as an option. Residents receive fifteen days per year to cover absences due to illness.

Facilities

CCMB operates eight linear accelerators, all manufactured by Varian. One of these units is located in a satellite clinic in Brandon, Manitoba, which is a two hour drive west of Winnipeg. Energies available on these treatment units are 6, 10 and 18MV. Electron beams with energies of 6, 9, 12, 15 and 18 MeV are available on three of the units, one of which is located in the Brandon facility (electrons on the other units have been decommissioned). Five of the dual energy Varian units are responsible for IMRT delivery. Most of these treatments are administered using a VMAT technique; all head and neck, prostate and prostate bed, CNS, anal canal and most breast treatments are delivered using IMRT techniques. SBRT programs are available for treating lung, liver and spine lesions. Total Body Irradiation (TBI) and Total Skin Irradiation (TSI) are delivered on two of the 6 & 18 MV units (high energy photons are used for TBI, low energy electrons for TSI). All linacs have electronic portal imaging, multileaf collimators and virtual wedge capabilities while five have OBI.

Treatment planning imaging is performed on two wide bore Computed Tomography (CT) scanners, one of which is housed in the Brandon facility. An in-room contrast injector is available as needed. All dosimetrically planned patients and many palliative patients are imaged with the CT’s. Some patients are imaged using a PET/CT scanner located in the adjoining hospital (the PET/CT scanner has been fitted with a flat couch top and room lasers for use in radiation therapy applications). Magnetic Resonance Imaging (MRI) scanners also are available in the adjoining hospital.

External beam planning is performed using the Eclipse planning system. CCMB has twelve full workstations and a large number of licenses allowing for remote access. Two of the workstations are reserved for physicist plan checking and training. An image fusion package is available on all workstations.
CCMB delivers Brachytherapy treatments to all sites other than prostate, using High Dose Rate (HDR) techniques. The treatment unit is manufactured by Nucletron (V2) and planning is performed using the Plato system. Disease sites treated using this unit include cervix, vaginal vault, esophagus and lung. Many sites have been treated using interstitial techniques including breast, base of tongue and extremity sarcomas. Prostate Brachytherapy treatments are administered using low dose rate permanent I-125 seeds.

A full surgical suite (complete with x-ray and anesthesia equipment) within the CCMB facility has been dedicated to the program. Pretreatment imaging is carried out using a B-K ultrasound unit. Planning is performed using the Varian Variseed system. Skin lesions are often treated at CCMB using a superficial/orthovoltage x-ray unit. Radiation Therapy Physics is also heavily involved in a Stereotactic Radiosurgery program. Treatments are administered using an Elekta Perfection Gamma Knife housed in the hospital adjoining CCMB.

CCMB operates a fully equipped electronics lab that is staffed by eight certified electronics technologists. The organization also maintains a fully equipped machine shop consisting of five certified machinists. Equipment found in the shop includes CNC mill machines, lathes, drill presses and other assorted power tools. Design software and welding facilities are also available. Both the electronics and machine shops are departments within the Division of Medical Physics at CCMB. Residents have access to these departments for equipment repair, as well as for design and fabrication of clinical/research devices.

Radiation Therapy Residents also have access to the expertise and equipment of the Imaging Department (five Medical Physicists, one Resident and one Research Associate) and the Radiation Protection Department (one Medical Physicist, two Health Physicists and five Radiation Protection Officers). These two departments are housed within the Division of Medical Physics at CCMB.

Besides a small library maintained within the Division of Medical Physics, Residents have access to the Neil John Maclean library, located in the Health Science Centre complex. Between these two sites, they have access to an extensive collection of radiation oncology and medical physics journals and books. Each Resident in the program receives a small one-person cubicle office that includes a work desk, storage space, a telephone and a computer with access to the CCMB network, as well as the internet. Residents receive personal dosimeters and pagers when they arrive. Administrative support and office supplies are available, as well.

About the City of Winnipeg

Located in the heart of Canada at the junction of the Red and Assiniboine rivers, Winnipeg has over 750,000 people from over 40 different countries, speaking over 100 languages. This extremely diverse city is home to the Royal Winnipeg Ballet and the Winnipeg Symphony Orchestra. It hosts over 100 cultural festivals, each year. The first national museum outside of the national capital region, the Canadian Museum of Human Rights, opened its doors in fall 2014. Several professional sports franchises call Winnipeg home: the Winnipeg Jets (NHL hockey), the Winnipeg Blue Bombers (CFL football) and the Winnipeg Goldeyes (baseball). Winnipeg is the only Canadian city to have hosted the Pan-American Games twice (1967 and 1999). Winnipeg is located near the geographic center of North America, is just 100 km from the US border and is easily accessible by road, air and railway. The surrounding area includes forests, marsh landscapes and various lakes and rivers including Lake Winnipeg, the third largest lake in Canada and 13th in the world. It offers one of the lowest average housing prices of all of the major cities in Canada.
Admissions

Candidates who have successfully completed a Medical Physics graduate program, either at the MSc or PhD level, will be considered for a residency position. Individuals possessing an MSc or PhD in a non-medical stream of physics or engineering will also be considered. However, should such a candidate be successful in securing a position, their program would be modified to rectify any weaknesses (in particular, the Resident would be required to complete the appropriate medical physics courses offered by the Medical Physics graduate program, University of Manitoba). Individuals interested in applying to the residency program are required to submit:

1) A current CV
2) An official transcript pertaining to undergraduate and graduate degree programs
3) Three letters of reference

To:
Director, Therapy Physics Residency Program
Division of Medical Physics
CancerCare Manitoba
675 McDermot Ave.
Winnipeg, Manitoba
Canada R3E 0V9

All applicants will receive notification of receipt. Candidates will be short-listed based on basic physics and medical physics background, academic performance in undergraduate and graduate degree programs, references and research achievements. This review process will involve all members of the General Committee. Short-listed candidates will then be brought to CCMB (all expenses paid) for a one-day, in-person interview. Interview day will consist of a tour of the facility, multiple meetings with individuals both within and outside of Medical Physics, a one-hour presentation by the candidate and a formal interview. Once an individual has accepted the Residency position, all other applicants will be informed the position is no longer open.