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Institute of Medical Science
University of Toronto

Consultants' Report on Proposed MHSc Program in Medical
Radiation Sciences

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Introduction:

This review considers the proposal for the creation of the Master of Health Science (MHSc) in Medical Radiation Sciences. The Institute of Medical Science with the clinical department of Radiation Oncology is proposing this new professional program, a 2 year full time program designed for Radiation Therapists who wish to expand their academic competence and contribution to the field. The program includes graduate level courses in the fundamental principles of the subject, clinical practica, and a research project to expand the clinical skills and knowledge translation.

A review of the proposed MHSc in Medical Radiation Sciences was conducted by Professors George T.Y. Chen and Angela Duxbury on May 15, 16, 2008 in Toronto. The review consisted of two major components – review of the documents provided, and interviews with key personnel. Those interviewed in the two day visit are listed in Appendix A.

The backgrounds of the consultants relevant to assessment of the program are:

Angela Duxbury. FCR.MSc. TDCR. is Professor of Therapy Radiography, Faculty of Health and Wellbeing and Subject Leader for Radiotherapy and Oncology at Sheffield Hallam University. Current responsibilities include the management of teams who deliver Radiotherapy and Oncology pre-and post registration programs in the UK.

George T.Y. Chen, Ph.D., is Professor of Radiation Oncology, Harvard Medical School and Head of Radiation Physics in the Department of Radiation Oncology at the Massachusetts General Hospital. Prior to his current appointment, he was Associate Director of the Graduate Program in Medical Physics at the University of Chicago for 15 years, and has been involved in teaching physics to Radiation Therapists for many years.

Documents submitted in support of this new program included:

- The Brief for the Standard Appraisal for the MHSc Program October 2007
- Curriculum Vitae of the Faculty
- Associated Program and Course Descriptors
- Report on Library Resources for the MHSc

In addition to extensive interviews of faculty, students and administrators associated with the program, a ½ hour visit was made to see the treatment and research facilities at the Princess Margaret Hospital, one of the primary sites for clinical training.

a. Rationale for the Professional Masters Degree:

Briefly, Clinical Radiation Oncology consists of key interdisciplinary components – radiation oncology as practiced by physicians specializing in this field, medical radiation physicists at the PhD and MSc level advancing the science and technology, Ph.D. radiation biologists, and radiation therapists. At the current time, the terminal degree in Radiation Therapy is the BSc. With the proposed program, Radiation Therapists will have the opportunity to advance their training, and extend their contribution to the many interdisciplinary aspects of the field.

There are a number of important benefits of this program in advanced clinical practice: 1) it provides a career path for personal and professional growth 2) optimizes the contributions of Radiation Therapists in the clinical domain 3) contributes to the scope of practice and improves care.

Radiation Therapists (RT's) in Ontario in the past decade have sought out advanced educational training programs to fulfill this need. A not uncommon route is through distance learning to the United Kingdom or Australia, where such programs are offered. With the proposed program, the advanced degree would be more accessible to Ontario RT's, with the expectation that this model could be extended throughout Canada.

A very important experiment to assess the feasibility of such a program has already been performed, and appears very successful. Supported by funding from the Ministry of Health and Long term Care, the Department has run a pilot program over the past two years to determine the feasibility of such a program. By recruiting students from the existing RT pool at Princess Margaret Hospital (PMH) and the Odette Cancer Centre (OCC), and mentoring them, these students have undertaken advanced practitioner training and done very well. As described by supervising clinical faculty, RT's have undertaken roles in case management of palliative cases, been trained to perform complex technical aspects of image segmentation (normal tissue and target contouring on image data) and in clinical research studies on treatment response. What is now needed is the formal master's level education to integrate the theory and practice as proposed by this program.

b. Competence of the Faculty

Interviews with teaching faculty included those specializing in 1) radiation oncology 2) radiobiology 3) medical physics and 4) radiation therapy. CVs of the faculty were included in the packet (438 pages!). A number of the faculty are recognized as world renowned scientists and clinicians. It was clear from the interviews that the teaching faculty are highly enthusiastic teachers and fully support the program's goals. Several of the faculty interviewed (radiation

oncologists and radiobiologists) have been working with RT's in the role of mentoring and training them to extend their skills and have clearly been impressed with their capabilities and the impact these practitioners have on service delivery. Overall, this is a very dedicated, enthusiastic group of faculty who are highly qualified to undertake the mentoring and supervision of students in the proposed program.

The faculty as listed are a balance of the specific elements of radiation oncology. Of the 25 faculty with primary involvement in the program, 9 have backgrounds in radiography, radiation therapy, 10 are radiation oncologists, 3 are physicists, 1 is a radiation biologist, and an information management specialist and epidemiologist complete the list. It is our understanding that other clinicians or physicists will mentor students in the program based on the student's particular area of interest.

c. Admission standards and procedures: the quality of entering students, estimated enrolments

The primary requirements of admission to this program are 1) a B+ or higher grade point average in the undergraduate course of study in Medical Radiation Sciences and 2) 3 years of experience as a practicing radiation therapist. Initially, students are likely to be recruited from within the ranks of the RT's in the major programs within Ontario (PMH and OCC). There is abundant evidence that the current group of students entering the field is extremely strong. Many of them already have undergraduate degrees in the sciences and then continue in the Medical Radiation Sciences (MRS) School. During the last 8 years of graduates from the RT program, approximately 15% of the students have a GPA of A- or higher. There are approximately 100 students per class in the MRS program, so the rather small enrollment in this program should have a number of highly qualified students. Estimated enrollment by the program directors is 5 in the first year, 7 in the second for a total number of students at steady state of about 20 total.

Student Quality:

The reviewers met with one student in the MSc stream, a part time practicing RT at PMH. This student was a 'prototype' for the proposed MHSc program. She has a BS in the sciences, continued her education as an RT and received her degree in MRS at the IMS. Upon completion of her second B.S., this student decided to explore her interests in radiobiology, as well as work part time at PMH as an RT to improve her clinical skills. Under the supervision of Prof. Bristow, this student has begun a pilot study on biomarkers associated with inflammation of the prostate gland during radiation therapy. The ultimate goal will be to correlate such markers with treatment sequelae and outcome. She has found many opportunities to develop her presentation skills, and presented at the recent Assoc of Cancer Research in San Diego, winning one of 12 awards for student

research. She has also developed an interest in education of RT's. As an example candidate for the MHSc, this student is an impressive role model. The MHSc provides a career path to further the capabilities and responsibilities of RT's. When queried about her interests in becoming a radiobiologist (or physicist), she expressed her primary interest in remaining as an RT, but using her interdisciplinary knowledge to better understand and help care for patients.

In addition to the student interviewed in person, descriptions of the quality of students by clinicians who had students in the pilot program (described earlier) indicated that the student quality is exceptionally high.

Program and Course Curricula and innovative features

The program incorporates several multi professional courses that have been delivered by the faculty for a number of years and several new courses, incorporating clinical reasoning skills development, professional leadership and a student centered learning approach to clinical practice-the Clinical Internship courses. The new courses are designed around practice related scientific principles and allow students to apply their own unique body of knowledge and experience from an area/aspect of the work place of particular individual interest. The program facilitates consolidation of theory and principles of practice required to advance an individuals practice within the interdisciplinary team.

The program advisors and supervisors are world leaders in clinical care and radiation medicine research. The courses have been designed with an impressive, wide range of learning and teaching strategies and challenging assessment tools. The proposed interdisciplinary mentorship of students will foster new and better understanding of the complexities of the clinical context leading to greater clinical and research collaborations.

This interdisciplinary programme team effectively communicates a clear, shared vision for graduates from this program. Graduates will be able to effectively contribute to the advancement of the professional body of knowledge, create new ways of working in practice and make a contribution to employee, employer and patient satisfaction.

Throughout discussions with the program team, the consultants were convinced that the program would be administered by dedicated, experienced and capable program directors and that the University regulatory frameworks are understood and would be adhered to.

d, Adequacy of Student Support:

Intellectual Support: This aspect of student support is highly dependent upon the individual mentor, and the amount of time spent. Interviews with current faculty involved in working with RT's suggest that this support is outstanding; faculty

provide opportunities for exciting projects, and for students to present their work at national and international meetings.

Financial Support: Since these students have had 3 years of experience as RT's in the workforce, and may have families, returning for additional schooling may be an economic hardship. Part time employment serves two purposes, provide financial support as well as keeping up their clinical skills and changes in the technology. The consultants believe the provision for study in a part time mode is important for the success of this program. A part time, flexible mode is likely to positively impact on the numbers able to access the Program and therefore its financial viability.

Support for this program was also highly apparent from Departmental Leadership, who during reviewer discussions enthusiastically supported the program.

e. On-campus and off-campus library resources

The consultants met with the Deputy Librarian of the Medical Sciences Library, the Director of Science Information and the Subject Specialist Librarian. The consultants were provided with a written description of the collection and other library resources at the UT. UT's Medical Library is rated in the top five in North America (ref., Deputy Librarian); among peers are Harvard, Yale, and Stanford. The consultants inquired about the availability of journals specific to the specialty of Radiation Oncology (e.g. Medical Physics, Physics in Medicine and Biology, Radiotherapy and Oncology, International Journal of Radiation Oncology, Biology, and Physics (etc)). By in large, these specialty journals are available. Both PMH and OCC have specialist library facilities, and staff and students have access to the larger hospital's wide libraries. This includes on line access to relevant medical journals. Overall, the on and off campus library resources are excellent.

f. Office Space / Laboratory.

The visit was limited to a walk through of the PMH. The clinical facilities for practicum training are outstanding; the Department has the latest equipment in imaging and treatment. There is a Radiological Learning Lab where students can have hands on labs in image processing and treatment planning. Given the world class stature of the UT Department of Radiation Oncology, it is expected laboratories in radiobiology and other areas of interest to the students would be more than adequate.

Recommendations of the Consultants:

This is an outstanding program, from the standpoint of clinical and advanced training for a MHS professional degree in Medical Radiation Sciences. The facilities and faculty are excellent. The pool of potential students is highly qualified. The faculty and administration are highly committed to the formation of the program and are driven to make it succeed. It is expected that the classes in the first few years to be small, as the program becomes established and known. There may be a small class size with diverse interests. However this is not seen as a serious impediment to the success of the program.

The consultants highly recommend the program be approved.

To ensure that the program is viable and accessible, particularly for those students who have financial commitments and who may need to remain employed part time, the consultants recommend that the program is also offered in a part-time, flexible mode of study. It is highly likely that these practitioners are already contributing to unique practice and service delivery and the full time program may not be an option, particularly where allowing access to the programme could negatively impact on service delivery and patient care.

Acknowledgements

The visitors would like to thank Nicole Harnett and Pamela Catton for ensuring that the Visitors were made to feel welcomed to the University and for making seamless arrangements for meetings and tours. We would like to thank the University for their Hospitality.

Appendix A

Meetings held on Thursday, May 15 2008

Senior Administration-IMS, UTDRO

Ori Rotstein, Director IMS

Brad Wouters, Senior Administration-IMS, UTDRO

Karen Davis, graduate Coordinator, IMS

Pamela Catton, Vice Chair, UTDRO

Jean-Pierre Bissonnette, Physics Coordinator, UTDRO

Program Administration-IMS, UTDRO

Karen Davis, Program Administrator

Josie Chapman-Smith, Program Administrator

Pamela Catton, Program Administrator

Jeremy Kwan, Program Administrator

Nicole Harnett, Program Administrator

IMS Instructors

Rob Bristow, IMS Instructor

Richard Hill, IMS Instructor

Faculty –Didactic

Jean-Philippe Pignol, IMS Instructor

Alex Vitkin, IMS Instructor

Related Programs-Undergraduate MRS

Pamela Catton, Vice Chair, UTDRO

Cathryne Palmer Undergraduate MRS Tutor

Fiona Cherryman Undergraduate MRS Tutor

Shun Wong, OCC Departmental Manager

Richard Tsang, PMH Departmental Manager

Meetings held on Friday, May 16 2008

Faculty-Courses under development

Joyce Nyhof-Young, Course Director

Amanda Bolderston, Course Director

Ruth Barker, Course Director

Nicole Harnett, Course Director

Pamela Catton, Course Director

Faculty of Medicine Senior Administration

Andrea Sass-Kortsak, Vice-Dean, Graduate Affairs

Faculty-Clinical and mentors of advanced RT's

Robert Dinniwell

Rebecca Wong

John Waldron

Current student on MSc stream

Eva Christiansen

Chief Librarian

Joan Leishman, Director, Sciences Libraries and Deputy Chief Librarian

Sandra Langlands, Director of Science Information

Gail Nichol, Subject specialist Librarian.

Dean of SGS

Susan Pfeiffer, Dean, School of Graduate Studies

Elizabeth Cowper, Vice –Dean, School of Graduate Studies