From the Editor:

by Peter Munro

If you look closely at the front cover you will notice a small but significant change – Interactions has now been registered with an International Standard Serial Number (ISSN). Indeed, COMP/CCPM has two ISSNs, one for the print version and one for the on-line version. In future, this may become important if the contents of the on-line version start to diverge from the print version. My hope is that improving the archival (and perhaps the citation) characteristics of Interactions might encourage COMP members who otherwise would not think of contributing, to submit contributions. My long term goal is to turn Interactions from an informal newsletter into an informative magazine that Canadian medical physicists can be proud to call their own. Equally importantly, I want Interactions to become (editorially at least) self-sustaining , so that the fate of Interactions does not depend so heavily on the efforts of one individual.

What are the implications of having an ISSN? We have to send two copies of each issue to the National Library of Canada. According to the letter that I received from the National Library :

> "Material received on legal deposit is preserved in the Library's permanent collection, where it is available for consultation and research, and most titles are also listed in Canadiana, the national bibliography."

So as well as the COMP/CCPM Office, a permanent archive of publications will be established in Ottawa.

One new feature in Interactions is a "New Products" section. COMP corporate members are eligible to submit descriptions of new products (for free) in this section. I think that this new feature will be of special importance, since there are few publications that publish descriptions of new radiation oncology or radiology products.

The COMP Communications Committee has been influenced by the brain drain south of the border. Two of the committee members – Lara Dyke and Shidong Tong – have left for greener pastures in the USA. While they continue to try and contribute to the activities of the committee, their departure places more responsibilities on those who remain. So some of the web site and e-mail list maintenance are being rethought. Despite this set-back, we continue to (slowly) add features to the COMP web site. For those of you who have not visited the site in a while it is probably worth re-visiting . A news feature is being added so that current events can be described in a more timely fashion. Anyone who has a news story can submit them to me for inclusion on the front page of the web site. And while it is not complete yet, James Mainprize (our technical expert) has made remarkable progress in developing an on-line, searchable, membership directory. Although it is not fully interactive yet, we hope to shorten the time between changes in the COMP membership directory (maintained at the COMP/CCPM Office) and updates of the on-line membership directory. This will make the on-line directory the first place to go when you find out – belately – that colleagues have moved.

One final item of interest. **My term as Interactions editor will finish after the April, 2000 issue.** So I am actively seeking a replacement. Unlike the current situation, the new editor will only be responsible for the publication of Interactions – I will continue to look after the web site. If you are up to a challenge this is your opportunity to become an important part of COMP/CCPM. You may be surprised at how enjoyable the experience becomes!

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InterACTIONS

CANADIAN MEDICAL PHYSICS NEWSLETTER
Le BULLETIN CANADIEN de PHYSIQUE MÉDICALE

COMP CCPM

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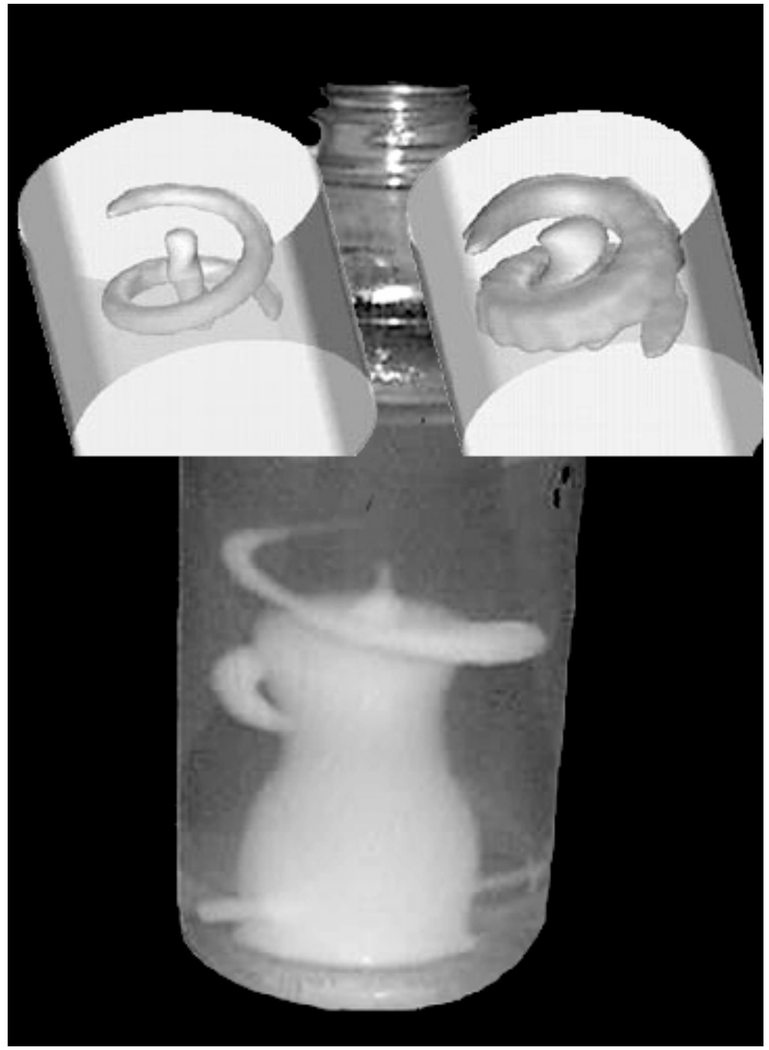
CANADIAN COLLEGE OF PHYSICISTS IN MEDICINE
LE COLLÈGE CANADIEN DES PHYSICIENS EN MEDECINE

45 (4) octobre/October 1999



Wheel of Dose

About our Cover

Wheel of Dose: A complex dose distribution delivered using a prototype Cobalt-60 tomotherapy device and measured using a poly-acrylamide gelatin (PAG) gel phantom. Gel dosimetry employs chemical solutions embedded in gel matrices (e.g., agarose, gelatin, ...) as a 3D dosimeters. Upon irradiation the optical and magnetic resonance properties of the solutions change and these changes can be measured by optical CT or MR imaging techniques. In addition, visual inspection permits qualitative evaluation of the dose distribution. In the future, gel dosimetry may become a standard technique for measuring the dose distributions delivered by conformal therapy and brachytherapy, as well as for quality assurance of treatment planning systems or individual treatment plans. Further research will be required to generate gel phantoms of the required accuracy, however. The two insets represent the 90% (left inset) and 75% (right inset) dose isosurfaces resulting when a particular 55 pencil beam irradiation is delivered by the Cobalt-60 tomotherapy device. [The dose distributions in the insets were calculated using the Theraplan Plus treatment planning system.] The photograph illustrates a post-irradiation blooming of the region of polymerization in the centre of the gel which confounds the PAG gel dosimetry and which is currently under investigation.

Figures courtesy of Dr. John Schreiner, Chief Physicist, Kingston Regional Cancer Centre and Associate Professor, Queen's University, Kingston

The Canadian Medical Physics Newsletter, which is a publication of the Canadian Organization of Medical Physicists (COMP) and the Canadian College of Physicists in Medicine (CCPM) is published four times per year on 1 Jan., 1 April, 1 July, and 1 Oct. The deadline for submissions is one month before the publication date. Enquiries, story ideas, article submissions, and advertising submissions can be made to:

P. Munro, London Regional Cancer Centre
790 Commissioners Road East
London, ON N6A 4L6
(519) 685-8600 x53317;
FAX (519) 685-8658
pmunro@lrcc.on.ca

Please submit stories in Publisher 98, Word 6.0, Word 97, or ASCII text format. Hardcopy submissions will be scanned to generate an electronic document for inclusion in the Newsletter.

Advertising Rates

	1/4 page	1/2 page	1 page	Addn. pages
Member	$75	$100	$125	$75
Corporate Member	$100	$125	$150	$100
Non Profit Organisation	$125	$175	$200	$125
Corporate Non-Member	$275	$275	$325	$200

Nuclear Medicine Medical Physicist Position

The Department of Nuclear Medicine and Magnetic Resonance at St. Joseph's Health Centre (DNMMR; www.stjosephs.london.on.ca), the Imaging Division of the Lawson Research Institute (LRI; lriweb.stjosephs.london.on.ca/imaging) Research Institute and the Department of Medical Biophysics at The University of Western Ontario, (www.uwo.ca/biophysics) London, Ontario has a Medical Physicist/Imaging Scientist Position available immediately.

The hospital Department of Nuclear Medicine and Magnetic Resonance is well equipped with two variable angle dual detector SPECT systems, RIA facilities, two bone mineral density x-ray units, and a 1.5T MRI/MRS system. The research institute imaging division is physically an extension of the hospital imaging department including a 1.89T MRI/MRS system, a 3.0T MRI/MRS system, and an imaging research computer network. The successful candidate will join six other Ph.D imaging scientists at the LRI who are part of a nationally recognized imaging research program with 19 Ph.Ds and over 40 graduate students in the Medical Biophysics Department. In the area of Nuclear Medicine service the successful candidate will be expected to implement and oversee a Nuclear Medicine quality assurance program, assist in Nuclear Medicine resident training and Nuclear Medicine technology training. As well, the successful candidate will be expected to develop an independent and collaborative research program in Single Photon Emission Computed Tomography. Teaching responsibilities will include lecture/seminar courses and graduate student supervision through an appointment in the Medical Biophysics Department.

The candidate must be a trained Nuclear Medicine Physicist with a postgraduate degree (Ph.D preferred) with Fellowship in the Canadian College of Physicists in Medicine or equivalent preferred. Applicant for the permanent full time position must have good evidence of research and/or development activity, with credentials and experience which would lead to an academic appointment in the Medical Biophysics Department. Experience in Nuclear Medicine SPECT systems including siting and quality assurance, and in SPECT research would be an asset.

In accordance with Canadian Immigration requirements, this advertisement is directed to Canadian Citizens and Permanent Residents of Canada. St. Joseph's Health Centre is committed to employment equity, welcomes diversity in the workplace and encourages applications from all qualified individuals including women, members of visible minorities, aboriginal persons, and persons with disabilities.

Please submit curriculum vitae and the names of three professional referees to:

Frank Prato, Ph.D, FCCPM, ABMP
Chair, Imaging Division, Lawson Research Institute
Department of Nuclear Medicine and Magnetic Resonance
St. Joseph's Health Centre
268 Grosvenor Street.
London, Ontario Canada N6A 4V2
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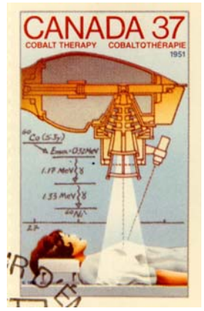
Inside this issue:



Cobalt-60: A Canadian Perspective Part 4: The M.D. Anderson ^{60}Co Teletherapy Unit"…….…….. **104**

Message from the COMP Chair:

As you know, next year our meeting will be incorporated into the World Congress on Medical Physics and Biomedical Engineering to be held in Chicago in July.

Like most organizations, even the massive machinery of COMP tends to slow down a bit in the summer. You will notice though that **somebody** was busy getting the directory up to date and out to all of you in August. Those "somebodies" were primarily Brighid McGarry and Curtis Caldwell, and I thank them for their work on what, to most of our members, is the most tangible evidence of our organization. We have also begun to convert the COMP database to Access (OK, Bill Gates, you win) in order to facilitate its maintenance and to, someday, provide for online changes.

With the arrival of September, activities pick up and we are already planning for the midyear meetings of COMP committees and the executive November 19 and 20 in Ottawa. We are also looking ahead to future conferences. As you know, next year our meeting will be incorporated into the World Congress on Medical Physics and Biomedical Engineering to be held in Chicago in July. For those of you who are more organized than I am, I draw your attention to the deadline for submission of papers which is January 14, 2000. More information is available on the conference website: wc2000.org. Even though there will not be a separate COMP program, there will be a designated COMP hotel (yes, the cheapest one) where we hope members can congregate. There will be the usual annual general meeting as well as a social function one evening. Gino Fallone is the COMP liason to the World Congress and he is working to ensure that we will maintain some identity in Chicago and not be absorbed totally into the great morass of medical physics. Looking ahead even farther to our 2001 meeting in Kelowna…there is some late breaking news as I write this message. COMP has been approached by CARO (the Canadian Association of Radiation Oncologists) about the possibility of a joint meeting. Emails are currently zinging around the country as to the format this might take and nothing is firm at the moment. However, your executive is strongly in favour of this idea, and optimistic that it will happen.

Some other recent news was communicated to you by email but I will mention it again here. The Atomic Energy Control Board is pursuing its initiative in quality assurance of radiation treatment. As part of that, members of the medical physics community are being invited to participate in the development of standards for different types of equipment and AECB will actually pay money for this important work. I should stress that this is not a COMP initiative *per se*, although COMP has been supportive of the concept. At a later date COMP may be invited to comment on the standards and even to approve them, but a mechanism for this remains to be worked out. Stay tuned for future developments.

Mike Patterson
Hamilton Regional Cancer Centre

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Fax: (519) 942-0288
e-mail: xicl@headwaters.com
Contact: Ms. Lois Brown, ACR
President

In Brief *(Continued from page 119)*

John Grant and Peter Munro

News from New York

St Vincents Cancer Center in Greenwich Village, New York will complete their Comprehensive Cancer Center with the opening of the Radiation Oncology Department in November 1999. Radiation Oncology will join the center, which opened earlier this summer, and which already houses the departments of medical and surgical oncology as well as radiology, and psycho-social services. The department will be equipped with 2 Varian EX accelerators with 120 leaf MLC, EDW and portal imaging. Additionally, there will be Varian EX2 simulator, a GE CT scanner, Somavision, and 2 CMS Focus treatment planning workstations. St Vincents Cancer Center is about to become a forerunner in the treatment of cancer using the latest technology in the NY metropolitan area.

Lara Dyke

Book Review – PACS *(Continued from page 102)*
operations. Any medical physicist, biomedical engineer or health professional involved in a PACS implementation effort, quality control and/or acquisition of digital imaging modalities will find in this book an excellent and complete reference.

NIH Grants *(Continued from page 100)*
not get funded because the ideas are stupid. Any decent idea or proposal will be funded. The success rate is about 30-40%.

Finally, if your grant is rejected, you are allowed 2 re-submissions. Check your application number to be sure it went to the correct study session. Each number has a significant meaning. Also clarify the summary statement in your rejection letter. It has a raw score and percentile rank for your topic. Call one of NIH's program officers or talk to your university program officer to discuss future options/improvements.

Good luck!

CADPLAN Vancouver *(Continued from page 103)*
The whole process was a little like attempting to decorate one room of your house and finding that the whole house needed extensive renovations!

In case you are wondering what we did with our spare time, during the last 12 months we also commissioned a new dual photon energy, 5 electron energy Varian linac and started a prostate brachytherapy implant program (currently implanting 4 patients/week).

PAC Report *(Continued from page 116)*
promoting medical physics in Canada. There are objectives to design promotional documents, which will be produced both in hard copy and on the Internet.

Update on World Congress 2000

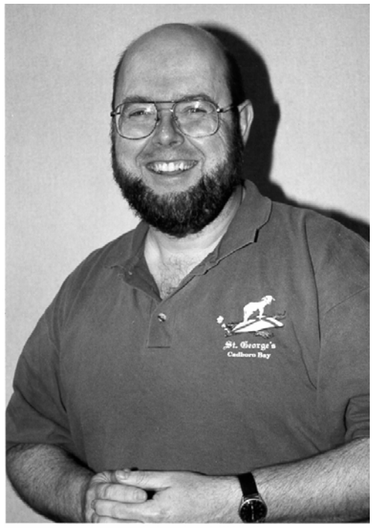
The following has been extracted from information sent to the International Advisory Committee for World Congress 2000.

(1) Detailed information, which is updated regularly, is available through the web at the Congress Home Page @ http://www.wc2000.org/
(2) Deadline for submission of abstracts is January 14, 2000
(3) Deadline for discounted registration fee is May 15, 2000
(4) Abstracts are to be submitted electronically through the web. Information about the process for submission and the web address will be available through the Congress home page.
(5) A maximum of 2 abstracts will be allowed for any author making presentation at the Congress.
(6) Authors will be informed of the acceptance (or rejection) of their paper(s) by April 3.
(7) Upon receipt of abstract acceptance, a fee **($50.00)** is expected from the presenter by **May 15**. If not received by then, **the paper will be withdrawn from the program and Congress records**.
(8) The ($50.00) paper fee (paid by May 15) will be deducted from the cost of registration fee when the first author (or presenter) registers for the Conference.

More information will be available in the January issue of Interactions. For more details contact Gino Fallone at gino.fallone@cancerboard.ab.ca

Message from the CCPM President:

When Peter Dunscombe handed the president's gavel on to me in Sherbrooke he muttered something about being out of Peter Munro's clutches. So, this is the first of twelve reports that you should get from me in the next three years. I would like to thank Peter Dunscombe for all the hard work that he did for the College in the last few years; particularly in documenting our functions and in establishing contacts



with other professional groups in Canada and beyond. I am happy to say that Peter is staying on the CCPM Board for a while yet, which should help make my transition to the role of president easier. I would also like to thank Gino Fallone for the work he did for the CCPM for many years, particularly as Chief Examiner. While Gino has stepped down from the Board, he will continue to serve the medical physics community through COMP. I also welcome Katharina Sixel to the Board.

A number of issues are presently at the forefront of College business and I will give you a brief review so you know where we are, and where we hope to be going in the next little while. One major effort on the College front has been the documentation of Policies and Procedures of the College and the CCPM Board. This work was initiated by Peter and he will continue to coordinate the work, although he has threatened to share the task with the rest of the Board. We hope to have a complete set of policies documented in a handbook within the next year. This will help orient new people coming onto the Board or other CCPM committees.

One of our active intergroup endeavors in the last while was an attempt to establish, with the CAMRT, a certification process for dosimetrists in Radiation Oncology. The discussions were difficult and were not resolved before the CAMRT withdrew from the process. The CCPM Board decided at the summer meeting, therefore, to develop some statement regarding the training and qualifications of radiation dosimetrists. It is our strong opinion that we must make such a statement, since Medical Physicists bear the responsibility for the accuracy of the dose prescribed to the target and of the calculated beam on time to deliver this dose. A draft document has been generated and is being circulated among some clinical therapy physics groups for input. If you have not received the document and would like to see it for comment, please give me a call. We hope to have a form ready at the mid year meeting late November that we will then distribute to clinics in Canada.

The College is also active in supporting the Conjoint Accreditation Services of the Canadian Medical Association. As you know, Dr. Andrew Rainbow has represented the CCPM at their General Assembly of Accreditation Sponsors for a number of years. Recently, Andrew was appointed as one of ten physician/scientist representatives on the CAS Program Accreditation Committee. Thus, the CCPM's representation to the CMA-CAS has increased. This enables us, in fact, to send one more representative to the annual General Assembly and Michael Evans has agreed to serve the College in that function. The CMA would like to have increased medical physics input into the Conjoint Accreditation Service and has asked that I solicit medical physics volunteers for site visits to training programs seeking accreditation in Canada. A couple of volunteers have come forward in Radiation Therapy and Nuclear Medicine. I would ask for more people (especially those who have been involved in training personnel in Diagnostic Radiology, Nuclear Medicine, Radiation Therapy, Magnetic Resonance Imaging and Ultrasound) to come forward to assist in the evaluation of sites that are training medical professionals. If you are willing to serve, please send me your name and I will make sure that it is forwarded to the Canadian Medical Association.

(Continued on page 119)

So as you can see the CCPM is alive and well. There are a number of other issues that are at the forefront (recertification is one example) but I want to keep some topics free for discussion in future issues of InterACTIONS

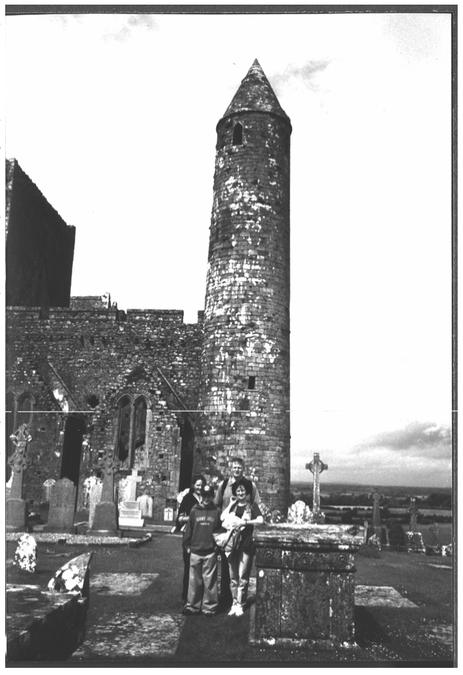
Guinness Anyone?

By Michael Evans

I recently returned from a trip to Ireland (July 1999) where I was able to visit the main radiotherapy center in Dublin, and the soon-to-be-under–construction clinic in Galway on the west coast of the country. The economy in Ireland is experiencing a massive economic boom, and by far the greatest evidence of this is in Dublin, the capital of the country. There is much rebuilding and modernization of the city's infrastructure, and this has also been the case with the clinic at St. Luke's Hospital in the south of the city. I had previously visited the radiotherapy clinic in 1985, and the change since then was almost overwhelming. The entire facility has more or less been rebuilt, and the medical physics department is now headed by Brendan McClean (ex of Edmonton). The clinic comprises 6 modern linear accelerators (a mix of Varian and Elekta) and a cobalt unit, a Leibinger stereotactic kit, a microSelectron HDR unit and a two room Selectron installation, a Gulmay Medical orthovoltage unit, two simulators and spiral CT, 5 Helax treatment planning stations as well as Plato and Leibinger treatment planning platforms. There is the usual assortment of physics measuring devices, and a well equipped machine-electronics shop and mold room. The total physicist complement is 11 in the department with 2 in nuclear medicine and one as physicist/engineer heading up the engineering group. There is also a physics technician, one resident and 4 dosimetrist positions (3 filled). The medical physics group is quite young, as most of the physics staff retired or moved away during the early 90's. This shortage of staff, along with the state of the aging equipment provoked a crisis in the radiotherapy service for the country (sounds a lot like Canada!) and a massive rebuilding of the radiotherapy service was undertaken. It appears that nothing gets attention like a crisis, and Brendan explained how the entire organizational structure of the clinic was modified to place medical physics in a more appropriate position so as to respond to the needs of the hospital.

Health services in Ireland are provided by a mix of public, and private schemes, and in Dublin city there are two other small free-standing clinics providing radiotherapy services. However the one at St-Luke's has the University affiliation and is beginning to produce Masters level medical physicists.

There is another radiotherapy center in the south of the country in Cork, however this means that for patients to the west and north of the country, radiotherapy services are in general less available. In an effort to solve this geographic problem, the government is in the final planning stages of a radiotherapy clinic at the Galway Regional Hospital, in the county of Galway. Galway is situated more or less directly opposite Dublin on the west coast of the country. It is about a 3.5 hour drive (driving in Ireland is a treat no one should miss), however as there is not a straight road in the entire country, this would not be an easy commute for most patients! In Galway, Wil van der Putten (ex of Winnipeg) is head of Medical Physics and Biomedical Engineering which currently has a staff of 6, including two graduate physicists. The group is mainly concerned with developing the bioengineering service, and are actively involved in the health board's Y2K projects. Wil is heading up the new radiotherapy project, and the facility will consist of two linacs, HDR brachy, ortho, sim and/or CT-sim and treatment planning. At the moment there are no radiotherapy physicists, and the group would seem to be looking for a few good physicists - Guinness anyone?



Michael Evans and Micheline Gosselin (McGill University) and family standing outside one of the oldest radiotherapy centers in Ireland! Notice the ancient stereotactic localization pin in the background.

I was very well received by my colleagues in both locations, and even managed to bore them with a couple of talks. The medical physicists in Ireland are certainly open to making professional contacts with physicists in Canada, and I would encourage anyone who might be in "the neighborhood" to take some time out and visit any of these centers. I was impressed with the progress made in the past decade with respect to staff and equipment, and enjoyed taking the opportunity to get to know some Irish physicists with a Canadian connection.

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Cumulative Table

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Volume 45 (2) avril/April 1999

DOSGEL'99

By Randall Miller
Nova Scotia Cancer Centre

The 1st International Workshop in Radiotherapy Gel Dosimetry was held on July 21-23 at the University of Kentucky in Lexington. The Scientific Organizing Committee, which had quite an international flair, is to be complimented on a job well done. The Local Organizing Committee led by Dr. Geoffrey S. Ibbott can take pride knowing the kind nature of good old southern hospitality was evident throughout the week. The aim of DOSGEL'99 was to bring together individuals with an interest in three-dimensional radiation dosimetry techniques. Hence, the program was a combination of basic science lectures and scientific presentations. In retrospect, this was a prudent approach as the approximately 60 attendees were not only individuals currently using the various gel techniques but those interested in establishing gel dosimetry at their own institutions as well.

Canada was well represented in regards to attendance, Invited Lectures and Poster Presentations.
The Canadian attendees represented cancer clinics from all across the country;
Chantal Audet and Michelle Hilts
British Columbia Cancer Agency

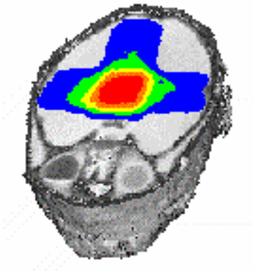
Kevin Jordan and Kenneth Chu
London Regional Cancer Center

John Schreiner and Greg Solomans
Kingston Regional Cancer Center

Ken Shortt
National Research Council of Canada

Randall Miller
Nova Scotia Cancer Center

Invited talks were given by both **John Schriener;** *Gel Dosimetry: Motivation and Historical Foundation* and **Chantal Audet;** *The NMR Relaxometry of Radiation Therapy Gel Dosimeters*. John gave a brief introduction into the challenges of employing gel-dosimetry for 3-dimensional



dosimetry. The development of the Fricke-gel dosimeter, Polymer-gel dosimeter and dose analysis techniques were discussed as well. It was argued that gel-dosimetry has a strong potential for providing the three dimensional dosimetry required for conformal radiotherapy. A very comprehensive list of references focusing on the early and pre 1984 developmental work was included in the conference proceedings. Chantal shared her pioneering work on determining the NMR relaxation properties of irradiated gels and establishing dose response models for NMR relaxation parameters. This discussion included both the ferrous sulfate-doped (Fricke) and polymer gels.

A poster competition was held, with the awards being determined by ballot of all attendees, for the 36 scientific presentations that were exhibited at the conference. Congratulations are in order for **Ken Chu** from the London Regional Cancer Center and **Michelle Hilts** representing the British Columbia Cancer Agency. First prize in the competition went to Ken Chu; *A Novel Fricke Dosimeter using PVA Cryogel*. ***K. C. Chu, K. J. Jordan, J. J. Battista, J. Van Dyk, B. K. Rutt*** This presentation reported on the application of a new tissue equivalent gel matrix based on polyvinyl alcohol (PVA) cryogel technology. Second prize in the poster competition went to Michelle Hilts; *Polymer Gel Dosimetry using X-ray Computed Tomography: Feasibility and Potential Application to Stereotactic Radiosurgery*. ***M. Hilts, C. Duzenli, J. Robar and C. Audet.*** This presentation was based on Michelle's Master's thesis work carried out at the Vancouver Cancer Center. In this work, the feasibility of CT PAG gel dosimetry and its application to stereosatatic radiosurgery (SRS) was investigated.

The workshop was a good introduction to the various gel dosimeters. For example, the differences between Fricke and Polymer gels and the challenges faced, when dealing with either system, were discussed at length. A number of new gel dosimetry systems and measurement techniques were presented both in the scientific talks and poster sessions. With the advent of these developments, gel based 3-dimensional dosimetry for conformal therapy certainly deserves some consideration. However, one must appreciate the pitfalls and requirements of the different gel systems. Hence, it is not clear that gel dosimetry has been fully developed to the point that it can be readily utilized as a routine dosimetry tool in a clinic setting.

For those interested in obtaining more information on gel dosimetry, a copy of the conference proceedings can be obtained, for a nominal fee, from John Schreiner. There is also an Internet user group and information regarding the Gel Dosmetry Mailing List can be obtained from the following Internet site: http://mednet.qut.edu.au/gels/. The Second International Workshop for Gel Dosimetry (DOSGEL 2001) is slated for Stockholm, Sweden.

Tricks to Improve Success at Obtaining NIH Grants

By Ken Chu
London Regional Cancer Centre

At the last AAPM meeting in Nashville, I inadvertently attended a session by Paul Studler, the Review Administrator for NIH. I didn't know what he was going to talk about, but when I heard what he had to say I knew it was valuable. The following is a brief translation of my scribbled notes, so all the facts or details may not perfect, so don't quote me on anything, but the concepts are valid. He basically wanted to give some advice in improving your odds of getting NIH grants. Remember NIH has a budget of $15 billion US$, and 85% of this is for grants!

He said that all NIH grant submissions (40,000 per year) first go through him. He reads the cover page of each grant so that he knows which review committee (or study session) to forward the grant to. For example, if you are writing a grant on a new technique on detecting cancer tumours, clearly state that your grant is to go to Diagnostic Imaging rather than to the Cancer committee. To simplify Paul's job, make this cover page clear (in bullets, big fonts), so that it goes to the correct study session. The grant will fail if it goes to the incorrect study session. If you do not know which study session to apply to, ask your university program officer, or call him, or some else at NIH. If the person at NIH does not help you or is not very friendly, call NIH again and ask for someone else. NIH has over 16,000 employees, and some are friendlier and more helpful than others are.

Before sending the grant, proof read your grant. Let others (not your friends) at your university read it. You want an unbiased opinion. After sending the grant in, NEVER, NEVER send a letter asking him to substitute a page or two with a new revised page. It gets an automatic rejection. To Paul, you are admitting that the grant you submitted has obvious errors. If you do nothing, the study session members may miss the errors. If the errors are major, ask that the grant be withdrawn (you don't want to look stupid), and resubmit in the next round. Remember that he gets 2500 boxes delivered per day. They do not have time to search for individual grants.

Have a good abstract, easy to read and understand. Use bullets where possible. This determines if your grant will be read or not. Generally each member of your study session will separate all the grants into two piles: the top 50% and the worst 50%. When each member's top 50% pick is merged together with the others, this generally results in about 80 grants or so. These 80 are the ones they will read. All members will meet for 3 days and consider which of the 80 will receive funding. Later, all other grants will be quickly reviewed so that you will know why it was rejected (not it wasn't even considered reading at the first pass).

Two hints to success grant writing are 1) seeing what successful grants look like. First go to NIH's web page www.csr.nih.gov and click "search this site" for grants. All approved grants are public property and are on the web in the CRISP (Computer Retrieval of Information on Scientific Projects) page. See the type of research your competition is doing. Perhaps model your grant in the same fashion. 2) On the NIH web page, you can find the names of the people who will be in your study session/review committee. Write these names down. Go to the Pubmed web page and look up each member's publications. Since their work is probably relevant to your grant topic (if not you are in the wrong study session), be sure to reference some of their work. The last thing you want is to not get your grant because one member thought your literature search was poor.

The review criteria are significance, approach, innovation, investigators, and work environment.

A good grant discusses the future contingency plans if the research direction starts to fail. The work should be new and original. Similarly, the workload must be realistic for the time period. The research method is critical. It should have sufficient experimental details. Finally it should be at least 25 pages. It is aimed at a general audience. Not just physicists.

A bad grant lacks new ideas; lacks knowledge of the literature, and is uncertain of future directions. In addition, the aim is not very strong; it lacks acceptable scientific rationale; and the investigators lack experience in the essential work.

No longer required in NIH grants are detailed budgets. The new budget justification page is only 1 page. Most values entered are rounded up to the nearest $25,000 (my notes here were vague).

Some of the types of grants are:

RO1 grants (new applications) are hard to get. These are awarded to senior grant writers that ask for millions of dollars over long periods of time.

RO2 is a smaller development grant ($100,000/year for 2 year) that is easier to get

RO3 is smaller in grant size ($25,000 to $50,000/ year for 3 years) but easier to get

BECON is for bioengineering topics; this is a new source of funding for technology driven research. No biological advancement is required… sounds like its ideal for medical physicists. Topics like imaging, bioprocessing, biomechanics, drug delivery systems, tissue regeneration, etc are applicable. R24 grants must be less than $2 million per year.

SBIR/STTR are small business grants for companies that are 51% American owned. The funding can be used to rent university space, hire university professors as consultants without them leaving their university appointments. This last point is interesting. There are 3 phases to the grant. Phase 1 is $100,000/year. Phase 2 is $750,000/ year. And phase 3 is larger. Paul said most applications are terrible and do

(Continued on page 124)

New Products

Surveyor 2000E with Energy Compensated PGM

Bicron RMP now offers an updated version of its trusted Surveyor2000/PGM combination. The Surveyor2000E/ ECPGM includes a standard Bicron PGM, fitted with an Energy Compensation Shield. The shield ensures a flat gamma energy response when using the Surveyor2000E in dose rate mode. The Surveyor 2000E is also fitted with an internal GM and is compatible with other external GM probes which operate at 900V.

The Surveyor 2000E/ECPGM combination can often save the trouble of having to carry two instruments for survey work. It is available with either rem /cpm or Sievert/cps scales, with five ranges for dose rate and four for count rate.

Typical applications include: Monitoring surfaces for alpha or beta-gamma contamination. Monitoring for dose rate and contamination in nuclear medicine labs and other nuclear facilities. Checking for leakage from beam generators, such as X-ray machines. Verifying boundary dose rates. Monitoring packages for compliance with transport regulations. Monitoring sources for leakage and surface dose rate regulations.

The Surveyor 2000E with ECPGM meets or exceeds NRC Reg. Guide 10.8 and 10CFR35 requirements.

For information about this or any other Bicron, Nuclear Enterprises or Harshaw TLD instrument contact Hilferdine Scientific: (613) 591-5220 or via e-mail: hilferdine@sympatico.ca

New Products

GE Advantage Sim

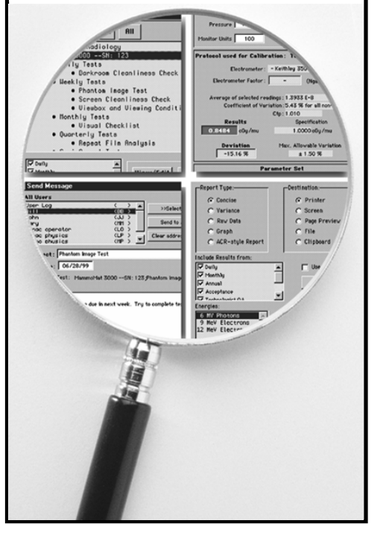
GE Medical Systems was pleased to announce the launch of its Advantage Sim 4.1 software at AAPM. Advantage Sim 4.1 builds on the productivity and visualisation features of Advantage Sim 4.0 while delivering many enhancements. Advantage Sim 4.1 is a DICOM RT compatible product - plans and structure outlines can be exported and imported in the DICOM RT Structure Set and plan formats. In addition, improvements have been delivered to allow free hand drawing in edit mode for blocks, the ability to print treatment parameters on a single sheet, provide direct links to mobile laser systems and permit simulation of variable leaf MLCs. Existing Advantage Sim 4.0 customers will receive their upgrade to Advantage Sim 4.1 in the next months. GE Advantage Sim 4.1 is the only CT Simulation offering that connects to any DICOM v.3 CT and or MR scanner(s) for departmental flexibility. Contact your local GE representative if you are interested in receiving more information on GE Medical Systems products for your department.

Argus QCIM v 3.5

Argus Software, developer of QC4 and QCWatch, arguably the most comprehensive, database driven equipment QA software available for radiation oncology and radiology departments, announces the release of QCIM version 3.5. This new version features updates to all Argus Software's existing modules, major enhancements to QC4 SIM and QCWatch R&F, new test templates for all existing modalities and is fully compliant with current MQSA regulations. All Argus Software QCIM tools are Y2K compliant and operate in both PC/Windows and Macintosh environments – either as stand alone applications or within most multi-user LAN and WAN environments.

QCIM version 3.5 is the culmination of a three-year, National Cancer Institute funded, Small Business Innovative Research grant for the development of Radiation Oncology Quality Assurance Management Software. Clinical affiliates on this project are Harvard University, Mallinckrodt Institute of Radiology and Stanford University.

For more information, please call (800) 422-7487 or visit the Argus Software web site at www.argusqa.com.



Graduate programs in Medical Physics at McGill University Re-Accredited

By Ervin B. Podgorsak

The M.Sc. and Ph.D. graduate programs in medical physics at McGill University in Montreal have been re-accredited by CAMPEP for a period of 5 years until April 2003. CAMPEP, the *"Commission on Accreditation of Medical Physics Education Programs"*, is sponsored by the American Association of Physicists in Medicine (AAPM), the American College of Medical Physics (ACMP), and the American College of Radiology (ACR). McGill received it initial accreditation for its graduate programs in medical physics in 1993, and is currently one of ten North American institutions with a CAMPEP accreditation.

The Medical Physics Unit (MPU) was founded in 1979 as an academic unit in McGill's Faculty of Medicine, with the primary objective to offer a graduate program leading to an M.Sc. degree in medical physics. The first director of the MPU was Montague Cohen, who was instrumental in establishing the graduate program in medical physics at McGill. During his 12 years as director of the MPU, Dr. Cohen succeeded in building the M.Sc. program in medical physics into a strong and reputable program which is well known and respected worldwide. In September 1991, Dr. Cohen was succeeded as director of the MPU by the current director, Ervin B. Podgorsak.

In 1979, six medical physicists with principal appointments in Radiation Oncology or Neurology-Neurosurgery departments at McGill received secondary appointments in the MPU. During the past 20 years, the number of MPU members grew to the current staff list of 15. The M.Sc. program in medical physics started as an applied program with students taking courses during the first three semesters of their study and working on a medical physics project during the fourth semester. No thesis was required and the degree conferred upon completion of course work and the project was labelled as M.Sc.(A) in medical physics, with (A) designating the applied nature of the program.

In 1987, the medical physics program was reorganized into the current pure M.Sc. program; nominally, a two year program in which students take 12 mandatory medical physics courses (28 credits) during the first two semesters and work on their M.Sc. theses (32 credits) during the second year under the supervision of an MPU faculty member. The prerequisites for admission to the M.Sc. program in medical physics are a B.Sc. degree in physics or related science with an undergraduate studies GPA of 3.00 or more. The current M.Sc. thesis program is structured such that, in addition to the basics of medical physics, the students receive some practical training through the mandatory laboratory work in radiation oncology, diagnostic radiology, and nuclear medicine and they also receive some research training through their thesis work. Upon completing the program, students are equipped with basic theoretical and practical knowledge of medical physics that enables them either to enter the job market in clinical physics at an M.Sc. level or to continue their studies toward a Ph.D. degree in medical physics. The continuation toward a Ph.D. degree is of course recommended only to students who excel during their M.Sc. studies.

The small size of the MPU and heavy clinical commitments of its staff allows only a relatively small effort toward a Ph.D. program in medical physics, and this in collaboration with the Physics department at McGill which has an excellent reputation in undergraduate and graduate physics teaching. The Ph.D. program in medical physics is open to students with M.Sc. degrees in medical physics from McGill or other institutions. The students register in the McGill Physics department but work on a medical physics project toward a Ph.D. degree under the supervision of an MPU staff member in one of the two hospital-based MPU divisions (clinical or imaging). To receive a Ph.D. degree in medical physics the student must fulfill all course requirements of the Physics department, pass the "*preliminary examination in physics*" given by the Physics department, and successfully defend a Ph.D. thesis on a medical physics subject.

To date, 92 students have graduated from McGill University with an M.Sc. degree in medical physics and 14 with a Ph.D. degree in medical physics. Of the 92 M.Sc. graduates, 41 were from Québec, 30 from the rest of Canada, 3 from the US, and 18 from other countries. Among the group of 92 M.Sc. graduates, a total of 68 currently hold positions in medical physics at various institutions around the world and 12 are continuing their studies toward a Ph.D. degree at McGill (4) or elsewhere. Of the 41 graduates originating from Québec, 14 are working as medical physicists in Quebec, another 8 in the US, and 4 in the rest of Canada. Seven of the 30 M.Sc. graduates from the rest of Canada are currently working as medical physicists in Quebec, as are 4 graduates who originated from outside of North America. All 14 Ph.D. graduates are employed in medical physics positions, 5 in Quebec, 4 in the US, and 5 in the rest of Canada.

Currently, 25 students are enrolled in the McGill medical physics graduate programs: 19 at various stages of the M.Sc. program and 6 in the Ph.D. program.

September 23, 1999

Book Review:

Practical Digital Imaging and PACS

by Nabil Adnani
Cross Cancer Institute

This book by Medical Physics Publishing is a compendium of 24 papers presented at the 1999 AAPM summer school. From the basics of digital imaging to a model RFP for PACS, this books discusses most if not all of the important issues related to digital imaging.

Chapter 1 is an excellent overview of Picture Archiving and Communication Systems (PACS). The author explains how recent advances in networking technology has made PACS implementation very cost effective compared to what it was about a decade ago. General guidelines of PACS requirements such as image production, network infrastructure, image management, display, analysis and storage are also discussed. The second chapter is devoted to nuclear medicine imaging technology and its relation to image transfer and archiving. The physics of computed tomography is discussed in chapter 3. Basic concepts such as slice thickness, helical pitch and dose measurements are reviewed. The advantages of starting a PACS implementation with CT (or MR) instead of digital radiography are presented. DICOM specifications for a CT are also given. Magnetic resonance imaging (MRI) is the subject of chapter 4. Image acquisition is explained using the concepts of phase and frequency encoding, k-space and Fourier Transformation. The reader can also find some technical information on advanced imaging techniques used in MRI such as Echo Planar Imaging (EPI), Spiral Acquisition, Angiography, Functional Neuroimaging and Interventional MR. PACS issues related to MRI are mentioned briefly. Digital angiography and fluoroscopy systems and the challenges they pose to PACS implementation are reviewed in chapter 5. Film digitizers and laser printers, their technical specifications, quality control procedures and integration into a PACS system are given in details in chapter 6. An excellent overview of computer radiography physics and technology is given in chapter 7 followed by its corresponding quality control program in chapter 8. Chapter 9 describes the physics and technology of digital mammography, its integration into a PACS system as well as details about its quality control procedures. The detective quantum efficiency (DQE) as a means to determine image quality in x-ray digital imaging is explained in chapter 10. Because PACS implementation requires, among other things, a good knowledge of computer networking and communication, the reader will find in chapter 11 an excellent reference to all of the elements that play an important part in a networked radiological environment. Essential concepts of DICOM, some elements of the base standard, HIS/RIS interfacing issues and some useful internet addresses for DICOM workbenches can be found in chapter 12. Chapter 13 is a compilation of procedures used for DICOM networks diagnostic and acceptance testing. Some examples of application of acceptance testing freeware are also well documented. The reader will find the distinction made between DICOM conformance and DICOM compatibility particularly interesting. Two different models for DICOM purchasing are discussed. The HIS/RIS interface to PACS is the subject of chapter 14. The necessity of such interfacing in order to fully take advantage of an electronic environment in radiology is explained. Chapter 15 takes the reader to the future of image distribution: The web browser. Basic concepts and implementation issues of image compression and its relation to fast image transmission through a PACS network are reviewed in chapter 16. Teleradiology is described in chapter 17 as a PACS system without the archiving element or a Picture Communication System. The importance of the radiology workbench in improving the overall efficiency of a PACS system is presented in chapter 18. The effect of workstation environment (light, noise, motion, temperature & humidity, and space) and workstation ergonomics (radiologist position, hardware, software) are discussed. Since a PACS system relies entirely on high quality workstations for image display, the reader will find chapter 19 particularly useful for acceptance testing and quality control of PACS workstations. PACS economic issues are reviewed in chapter 20. Without a well thought of request for proposal, a PACS implementation effort may suffer some serious set backs. For this, the reader will find, in chapter 21, a model RFP for PACS extremely useful. A study of PACS implementation issues spanning through a period of over 10 years at the Medical University of South Carolina are the subject of chapter 22. The reader will appreciate the difficulties encountered and the adopted solutions from the initial CR PACS implementation, to a full blown PACS system serving six ultrasound scanners, seven nuclear medicine cameras, four CT scanners, three MRI scanners, three angiography units, five digital fluroscopy units, four film scanner, six CR units, two mobile fluoroscopy units and one stereotactic breast biopsy unit. Chapter 23 explains a prototypical storage model used in data management and archiving which is a crucial part of any PACS. The reader will get familiar with notions such as application layer, data management layer, file & filesystem layer, storage management and physical storage layer which together form a pyramid with the application layer at the top. Finally, Chapter 24 discusses the basics of ultrasound imaging.

In today's fast evolving communications and networking technology and because of the economic benefits associated with an electronic radiology environment, more and more institutions will realize that it is in their interest to become fully digital in their day-to-day

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CCPM President *(Continued from page 97)*

Drs. Peter Dunscombe and Brenda Clark had the opportunity this summer to visit with the Board of Directors of the Commission on Accreditation of Medical Physics Education Programs, CAMPEP, in Nashville. They presented the CCPM to CAMPEP and explored the function of CAMPEP in the accreditation of medical physics training programs. The interaction was good, and the College is now applying directly to be a sponsoring body of CAMPEP. This will present a Canadian perspective to the accreditation of training programs in North America and we are very excited that this possibility has come about.

So as you can see the CCPM is alive and well. There are a number of other issues that are at the forefront (recertification is one example) but I want to keep some topics free for discussion in future issues of InterACTIONS. I will close with an invitation to all of you to contact me if you have particular concerns about the future of the College. The changing of the guard always gives a good opportunity for reflection on what an organization is about. I have always believed the CCPM to be the arm of our profession which was established to ensure that Canadians receive the best health care we as medical physicists can offer or influence. I would not be surprised to hear there is more we could do, and I would welcome discussion of our future.

L. John Schreiner Kingston, ON

Canadian College of Physicists in Medicine
Examination Schedule 2000

Membership Examination:

Applications due:	21 January 2000
Examination date:	15 April 2000

Fellowship Examination:

Applications due:	28 April 2000
Examination date:	20, 21 or 22 July 2000 **(Chicago)**

Note: Fellowship applicants writing the membership examination should confirm their fellowship application and pay the fee within one week of receiving the membership examination results.

For further information, application kits, and membership examination study guides, contact the Registrar, Dr. Alistair Baillie, at:

Dr Alistair Baillie
The Registrar/ Le Registraire, CCPM
c/o Cancer Centre for the Southern Interior
399 Royal Avenue
Kelowna, BC, V1Y 5L3

In Brief *(Continued from page 118)*

their increased responsibilities make such contributions more difficult. So please bear with us as we try to maintain the activities of the Communications Committee with the reduced time of the members.

Peter Munro

New E-mail Convention

Cancer Care Ontario has established a new convention for e-mail addresses for all cancer centres in the province (except Princess Margaret Hospital). The convention is:
firstname.lastname@centrename.on.ca

Centrenames are:

krcc – Kingston	lrcc – London
wrcc – Windsor	hrcc – Hamilton
orcc – Ottawa	
tsrcc – Toronto-Sunnybrook	
nercc – NorthEastern (Sudbury)	
nwrcc – NorthWestern (Thunderbay)	

Peter Munro

Magnetic Resonance Meeting – ISMRM

The Eighth Scientific Meeting and Exhibition of the International Society for Magnetic Resonance in Medicine will take place 1-7 April 2000 at the Colorado Convention Center in Denver, Colorado, USA. The meeting will combine traditional and new elements of interest to both basic scientists and clinicians to provide a program to appeal to all attendees. For more information and a registration application contact: International Society for Magnetic Resonance in medicine, 2118 Milvia Street, Suite 201, Berkeley, CA 94704, USA, phone: (510) 841-1899; FAX (510) 841-2340; e-mail info@ismrm.org; web site http://www.ismrm.org.

Peter Munro

Maritime Physicists Meeting

Narayan Kulkarni in Saint John, New Brunswick organised a Maritime Canada Physicists meeting that was held on September 24-25. Physicists and dosimetrists from clinics at Saint John, Halifax, Moncton, Charlottetown and Sydney attended the meeting. Look for further details about this meeting in a future issue of Interactions.

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In Brief *(Continued from page 117)*

Gel Doimetry

The 1st International Workshop in Radiotherapy Gel Dosimetry (see http://mednet.qut.edu.au/gels/) was held on 21-23 July 1999 in Lexington, Kentucky. Gel dosimetry employs chemical solutions embedded in gel matrices (e.g., polyacrylamide, agar, gelatin, ...) as a 3D dosimeters. Upon irradiation the optical and magnetic resonance properties of the solutions change and these changes can be measured by optical CT or MR imaging techniques. In the future, gel dosimetry may become a standard technique in conformal therapy, brachy-therapy and for quality assurance of treatment planning systems.

COMP members are important players in the gel dosimetry community and two Canadians - Ken Chu and Chantal Audet - were co-winners of the best poster award at the Dose Gel workshop. Dr. Chu for his poster entitled "A novel fricke dosimeter using PVA cryogel" and Dr. Audet for her poster entitled "Polymer gel dosimetry using x-ray computed tomography: Feasiblity and potential application to stereotactic radiosurgery". Research excellence in gel dosimetry has been recognised quite frequently in Canada including the 1996 COMP poster award, the 1998 Sylvia Fedoruk award and one of the 1999 J.R. Cunningham Young Investigators' Symposium Awards. Surprisingly, this topic seems to evoke much less interest in the USA. At the annual meeting of the AAPM Dr. Chu had the "coveted" Thursday at 11:50 a.m. time slot (the last time slot of the conference) for his presentation.

Peter Munro

Trends

One of the current realities for Canadian medical physics organisations is the departure of physicists for the USA. The COMP Communications Committee has not been able to avoid this reality. In the past four months two members of the committee – Lara Dyke and Shidong Tong – have departed for greater opportunities in the USA. They continue to contribute to the workings of the committee – although

(Continued on page 119)

Canadian Standards for Quality Assurance in Radiation Therapy

By Peter O'Brien, FCCPM
Chair,Radiation Regulation Committee
peter.o'brien@tsrcc.on.ca

Although the quality of radiation therapy in Canada is high, there is not a written, formally agreed set of standards for quality assurance in radiation therapy. For several years there have been discussions between professional organizations involved in radiation therapy (including COMP) and the Atomic Energy Control Board (AECB) about this issue. The Group of Medical Advisors (GMA) to the AECB produced a report in 1998 (GMA-13, "Review of Quality Assurance in Radiation Therapy") which recommended a national program in quality assurance, to be introduced in several stages. The first stage of this program is the implementation of national standards for quality assurance. A small working group chaired by Peter O'Brien (Toronto) and including Dr. George Sandison (Calgary) was funded by the GMA to recommend a strategy for producing and implementing Canadian Standards for Quality Assurance. The report of this working group has now been accepted by the AECB and the process for standards production will begin under the auspices of the Advisory Committee on Radiation Protection (ACRP) which reports to the AECB.

The major thrust of the recommended strategy is to have standards *produced by radiation therapy professionals*; to have national professional organizations (COMP, CARO, CAMRT) play the major role in maintaining the standards and in auditing compliance with the standards.

In Ontario, the HARP Commission was established to monitor the use of ionizing radiation in health care with an emphasis on the protection of the patient. An advisory committee of the HARP Commission wrote guidelines for quality assurance in radiation therapy and a group of radiation therapy professionals audits compliance with the guidelines. It is hoped that the national process will build upon the process established in Ontario and in the end replace it.

It is important to recognize two important aspects of this issue. Firstly, we all recognize that quality assurance is an important part of a radiation therapy program and all facilities have quality assurance procedures in place. This effort should not increase the resources necessary for quality assurance. It will put some structure around an existing task and will give us a peer-created yardstick that we can use to help us with that task. Secondly, for public processes, especially those that are licenced, standards are an accepted part of the process for accountability. The regulations under the new Nuclear Safety and Control Act include a mandatory review of quality assurance programs for licenced facilities. Medical physicists should have a strong voice in the creation of the standards and compliance procedures necessary to satisfy that regulation.

I will keep the COMP/CCPM membership informed through the pages of *Interactions* as progress is made on the Canadian Standards for Quality Assurance in Radiation Therapy .

CADPLAN at Vancouver Cancer Centre

by Brenda Clark
BC Cancer Agency

The physicists at Vancouver Cancer Centre (VCC) have just completed beam commissioning of their new treatment planning system, CadPlan. Although each task appeared to be relatively straightforward, the whole procedure took 12 months to complete, considerably longer than we had originally anticipated. We recently summarised the activity, partly to justify the length of time taken and partly to satisfy ourselves that what we perceived to have been a very hard working year, was exactly that! We understand that many centres across Canada are doing or have done the same commissioning but hope that this general article may be of some interest.

The VCC has 7 linacs, only 2 of which are matched, giving us 10 open photon beams. They are manufactured by two different companies, a complication which has added greatly to the overhead involved. The 2 Elekta machines have 3 open beams between them, each with one associated motorised wedge. The 5 Varian machines have 7 open beams and 4 physical wedges giving 35 Varian beams for a grand total of 41 photon beams to be commissioned. (We have yet to consider electron beams!)

For each beam, the input data consisted of 50 profiles (10 field sizes each scanned at 5 depths) and 13 PDDs. Thus a total of 2,583 curves was used to fully characterise the open and wedged photon beams. Investigations of MLCs, asymmetric fields and Varian's enhanced dynamic wedges added considerably to this total. Although previous commissioning data existed for all linacs, the data sets had to be expanded to accommodate a wider scope of field sizes, large field sizes needed to be spliced and diagonals needed to be measured. Also, all data needed reformatting to allow compatibility with Cadplan. Needless to say, this involved a great deal of beam scanning. Our two older Varian linacs had to be completely recommissioned. Since VCC has a standing 6-8 week patient waiting list and operates standard 10 hour days, all these measurements had to be made after hours and week-ends, a task which stretched to many months.

With a full set of data in the appropriate format, the transfer into CadPlan and the configuration of the beam takes approximately 2 hours. Input data was verified by overlapping input and measured data, a very time consuming task as I'm sure you are all aware! (In hopes of facilitating this task in the future, one of our team is developing an algorithm to digitally compare curves.) CadPlan's algorithms were then checked by comparing CadPlan generated isodoses to measurement for a series of open and wedged rectangular fields. CadPlan allows input of relative dose factors (RDFs) for each open and wedged beam, a requirement we had to satisfy since we intend to transfer planning parameters, including MU calculations, directly to VARiS. The number of measurements was greatly reduced with the development of a fitting program using a representative subset of data. For example, to use a 12 x 12 matrix, the curve fitting technique reduced the number of values required from 144 to 25, reducing a 45 hour task to a mere 9 hours. After the data was successfully configured and verified, the ability of the algorithm to accurately compute central axis dose under various circumstances was assessed according to published guidelines (AAPM TG53). Closed loop checks covering a variety of clinical situations were completed for each beam and occasionally turned up a few surprises. We have found some minor discrepancies under the thin end of both physical and dynamic wedges. Our colleagues at CCSI in Kelowna have identified inadequacies in CadPlan's handling of the Elekta motorised wedge.

With all this activity around the beam data, we took the opportunity to standardise our terminology and data table format. VCCs linacs were purchased and commissioned sequentially over a 10 year period and we had acquired some inconsistencies within the clinic. In addition, all our treatment techniques had to be reviewed and optimised to make use of the new features offered by the new software.

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From left, back row: Brett Poffenbarger, Corey Zankowski, Alanah Bergman. Front: Chantal Audet, Paule Charland, Carrie-Lynne Swift. Other camera-shy team members: Cheryl Duzenli, Bob Harrison, William Kwa.

Cobalt-60: A Canadian Perspective Part 4: The M.D. Anderson ^{60}Co Teletherapy Unit

By Jack Cunningham with Peter Munro

Note: This is the last in a four part series describing the development of, and initial clinical experiences with, ^{60}Co sources for radiation therapy.

On the 22 February 1954 the first patient in the USA to receive ^{60}Co teletherapy irradiation was treated at the MD Anderson Hospital and Tumor Institute in Houston, Texas. Although an important event, the delay of several years from the events in London and Saskatoon reduced the historical importance of this treatment milestone. There were many reasons for the delay including USA military priorities, the Korean war, and the death of Leonard Grimmett - one of the driving forces behind the MD Anderson teletherapy unit.

LG Grimmett

Leonard George Grimmett was born in London, England in 1903. He graduated from Kings College, London and was a man of many talents.[1] He was a professional pianist, a book binder, a maker of jewellery and a calligrapher. His speciality in Medical Physics was machine design. He had designed one of the first teleradium units in England in the 1930's and had spent some time with Rolf Sievert at the Radiumhemmet in Stockholm on the teleradium unit there and had also worked on the teleradium unit at the Hamersmith Hospital in London. On the recommendation of Gilbert Fletcher, newly arrived at the M.D. Anderson Hospital, Grimmett was hired in February 1949 to establish a British-type medical physics department.[2]

Leonard George Grimmett

Beginnings

By 1949, ideas about the use of cobalt for radiotherapy were in the air.[3] It was being discussed in Canada by H.E. Johns of Saskatoon and A.J. Cipriani and W.B. Lewis of the Canadian Atomic Energy Project, in England by J.S. Mitchell, J.V. Dunworth and W.V. Mayneord, and in the U.S. by Marshall Brucer and others at The Oak Ridge Institute for Nuclear Studies (ORINS). ORINS invited universities and research centres throughout the country to submit designs for a cobalt-60 unit containing about 1,000 curies of cobalt. There were twelve designs proffered and Grimmett's submission was selected. His original design called for housing the cobalt in a container made of slabs of uranium but uranium was considered a priority war material and was not available. Hevimet, an alloy of tungsten, which Grimmett himself had helped to develop in England, was used instead. Fabrication of the unit took place in Milwaukee at the General Electric Company (X-Ray Division). Fletcher delivered a paper on the proposed use of the unit to the Fifth International Cancer Congress in 1950 and the unit was first displayed at a American Roentgen Ray Society meeting in Washington, DC in 1951.

Bob Shalek, a graduate student at the newly created Physics Department of the MD Anderson Hospital used a 2-curie cobalt source to conduct radiation protection measurements relevant to the Grimmett design. As a result of these experiments, some modifications were made in the design of the shutter mechanism, which, like the Saskatoon unit, was a source wheel design.

The ^{60}Co Sources and the Canadian NRX Reactor

Cobalt metal for three future ^{60}Co sources was placed in NRX between the fall of 1949 and June of 1950.[3] [There is actually some uncertainty in the exact date when the Texas wafers were placed in NRX. According to Houston and Fedoruk[6] all the ^{59}Co wafers were placed in the reactor at the same time, while according to Robison[3] the Texas wafers was placed in the reactor well after the smaller Canadian wafers.] After activation, one source was sent to Saskatoon for the treatment unit designed by Dr. H.E. Johns while another was sent to London, Ontario for the unit designed by a team from the commercial products division of Eldorado Mining and Smelting (1944) Ltd. The third source - destined for the rather different cobalt unit designed by Grimmett in conjunction with the General Electric Company (X-Ray Division), Milwaukee - was a completely different design from the Canadian versions. The Canadian sources were made up of a series of over twenty circular wafers, each 2.54 cm in diameter and 0.5 mm in thickness for a total volume of about 5 cm^3. The Texas source, curiously, seems to have been made up of four square wafers, each 2 x 2 x 0.25 cm for a total volume of 4 cm^3. There is an additional mystery concerning the Texas source. Some information suggests that it was originally intended to be shipped

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A VIRTUAL RADIATION MUSEUM - VRM

by John Cameron jrcamero@facstaff.wisc.edu

Science museums are an excellent way to educate young and old. Museum exhibits on radiation are rare. The Internet offers an opportunity to educate many people about radiation. I am trying to initiate an international Virtual Radiation Museum on the Internet. Visitors to the VRM can enter through any "door" of the museum and be able to visit many other museum "rooms" through links around the world. Explanations will be given in the major languages of the world. I am soliciting advice and ideas from members of COMP. I need advisors and especially ideas for "rooms" to add to the VRM. I am sure members of COMP will have some good ideas.

I hope that eventually the VRM will be part of a much larger Virtual Science Museum VSM. Some appropriate material is already on the Internet but I am sure much more can be made available. The VRM already has three advisors, Shinichi Wada of Niigata, Japan; Paul DeLuca, U. of Wisconsin-Madison and Cas Eubig at the Medical College of Georgia. Shinichi is working on a "room" demonstrating a large cloud chamber at the Niigata Science Museum. A video he sent me shows a wide variety of tracks. They will need to be labeled and described. He has built a simple cloud chamber which will be described and demonstrated in his room. Cas Eubig has a computer demo suitable for a "room". It shows a simulated GM counter and radioactive source that can be moved to demonstrate the change in the count rate with distance. Cas also has an excellent CD ROM for teaching the basics of nuclear physics used in nuclear medicine (available from Medical Physics Publishing). I'm sure some of the demos on his CD ROM can be included in his "rooms". Paul DeLuca, until recently chair of the Dept. of Medical Physics is now Assoc. Dean for Research at the UW Medical School has offered to provide a computer home for the UW entrance to the VRM.

In France they have a nation wide service available through MINITEL or the Internet that gives real time background dose rates (µGy/h) near each of their nuclear power plants as well as other locations in France, such as in the Alps and several locations in Paris. A separate part of the information service is a "magazine" that explains basic radiation physics (in French). We need to include this type of information for each country that has nuclear facilities.

My article "Are X-rays Safe?" (www.medinfo.ufl.edu/other/cameron/rads.html) will be one of the "rooms" of the VRM. Other radiation related sites on the Internet will be asked to be listed as "rooms" of the VRM.

By having museum rooms distributed all over the world the amount of work for any one person will be quite reasonable. I look forward to receiving ideas from members of COMP. Please contact me via e-mail jrcamero@facstaff.wisc.edu.

In Brief *(Continued from page 116)*

1990" and not "From 1990 to 1998" as is currently printed. We apologize for any inconvenience!

George Mawko

CCPM Harold E Johns Travel Award for 1999

The 1999 recipient of the CCPM Harold E Johns Travel Award is Mr. Craig Beckett from the Department of Physics, Allan Blair Cancer Centre, Regina, Saskatchewan. Mr. Beckett plans to augment his regular travel budget with the funds from the Harold E. Johns Travel Award to attend IRPA10 - The 10th International Congress of the International Radiation Protection Association, Harmonization of Radiation, Human Life and the Ecosystem. The Japan Health Physics Society hosts this conference in Hiroshima, Japan May 14-19, 2000. Major topics include: natural radiation exposure, health effects of ionizing radiation, dosimetry and instrumentation, radiation protection in the environment, waste management and decommissioning. radiation protection at workplaces, radiation protection for medical exposure, …. Further information about the conference can be obtained at http://www.convention.co.jp/irpa10/ .

Craig Beckett

Rebecca Fahrig wins AAPM YIS Award

Once again a Canadian has won a prestigious international award - in this case first place in the Young Investigators' Symposium held at the annual meeting of the AAPM in Nashville, TN. Dr. Fahrig's talk, entitled "In vitro and in vivo investigation of artifacts in 3D computed rotational angiography" described some of the studies performed during her Ph.D. She also placed first in the J.R. Cunningham Young Investigators' Symposium during the 1998 COMP annual meeting in London, Ont. Dr. Fahrig is now a post-doctoral fellow at Stanford University.

Peter Munro

(Continued on page 118)

In Brief

Changes at the COMP/CCMP Office

Brighid McGarry has taken up the duties of Executive Director as of 1 Aug. 1999. Lee Melnychuk has replaced Brighid in the Secretarial Assistant position. The mail address of the COMP/CCPM Office has changed to:

Post Office Box 39059
Edmonton, AB
T5B 4T8
Phone: (780) 479-1110
FAX: (780) 479-1110

Brighid's e-mail address remains bmcgarry@compusmart.ab.ca and Lee's e-mail address is comp@edmc.net.

Brighid McGarry

Publication of Safety Code 6

Health Canada has completed a revision to its radiofrequency exposure guidelines, commonly referred to as Safety Code 6 – *Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz (formerly Limits of Exposure to Radiofrequency Fields at Frequencies from 10 kHz – 300 GHz).* Safety Code 6 is currently in press and is expected to be published in the early fall of 1999. The electronic copy, in a pdf format, will be available on Health Canada's web site at http://www.hc-sc.gc.ca/rpb.

Robert P Bradley
Consumer and Clinical Radiation Hazards Division, Health Canada

Not Discontinued!

There were some inadvertent errors that crept into the August 1999 Membership Directory. The CCPM Harold E. Johns Travel Award is not discontinued as is suggested on page 41 of the Directory. Mr. Craig Beckett, Regina is the award recipient for 1999. In addition, the description of the CCPM Harold E. Johns Travel Award on page 37 should start with "Since

(Continued on page 117)

REPORT FROM THE COMP/ CCPM – PAC

By Peter Raaphorst
Chair, Professional Affairs Committee

The membership of the PAC in 1988-1999 consisted of G.P. Raaphorst, Chair, M. Patterson, J-P. Bissonnette, T. Li, L. Gerig, R. Hooper, J. Gallet, T. Lee and D. Wilkins. This was the last year for the present chair and D. Wilkins was nominated to be the new chair. This was voted on and approved at the AGM. The PAC was involved in a number of important projects and issues. Some have been accomplished and some are ongoing. The accomplishments are as follows:

1. The Generic physics job descriptions were completed.
2. The Role and Function statements for medical physicists in imaging and radiotherapy were revised.
3. The recommended hourly consulting rate for medical physicists was updated.
4. The first draft of the scope of practice statement which embodies also the role and function statements have been completed.

A number of other activities are ongoing. These are as follows:

1. D. Wilkins and J. Gallet are involved the promotion of medical physics and will be expanding their efforts in this area to create documentation and also collaborate with the communications committee.
2. Participation in the CAP meetings is continuing and P. Raaphorst and P. Johns continue to be the representatives of COMP and the PAC at the CAP meeting. The CAP also provided updated information to the PAC on their activities in regards to exclusion clauses in various provinces. They have been successful in protecting the scope of practice for natural scientists in Manitoba and are now working on the clauses in Saskatchewan. This activity is continuing.
3. R. Hooper is in the process of completing the 1998- 1999 salary survey and this should be available in the Fall publication of the Newsletter and on the website.
4. At the PAC meeting in Sherbrooke, there were representatives from the ACMP (P. Feller) and EFOMP (R. Nuesslin). P. Feller stated that an attempt had been made to try to combine the ABR and ABMP certification into one, however this had run into road blocks and for now has been put on the back burner. He also indicated that a journal entitled Journal of Applied Clinical Medical Physics is being produced as an electronic journal by the ACMP. For the first year this journal would be free and available to all. After this subscription, rates would be charged for the journal. More information can be obtained at www.acmp.org. R. Nuesslin brought the physics group up to date on the activities of EFOMP. EFOMP is the European Federation of Medical Physics and represents medical physics in many European countries. Each country has two representatives on the EFOMP board. R. Nuesslin indicated that much of the activity of EFOMP was in relationship to education and standards in medical physics. He also indicated a great interest to form a relationship with COMP. This is being further explored. For more information regarding EFOMP, they can be contacted at www.efomp.org.

Other items on the PAC agenda are the issues of credentials for foreign medical physicists seeking employment in Canada and also medical physics retention in Canada. Another item which is further being evaluated is the teleradiology document. In this document there is very little mention of medical physics support. The PAC will be dealing with response to this type of omission. In the next year, the PAC will put an enlarged effort into the activity of

(Continued on page 124)

to England for a unit to be built for the Royal Cancer Hospital (now the Royal Marsden Hospital) under W.V. Mayneord.[4] Other, probably more reliable, information says that it was designed by Grimmett directly for the Texas cobalt unit. One certainty is that when the sources were removed from the reactor in the summer of 1951 the Canadian sources had an activity of about 1,000 curies while the Texas source had an activity of only 650 curies. This was less than it should have had as judged by volume, and was likely due to the self-shielding by the thicker wafers. It was decided the Texas source should be replaced in the reactor for further irradiation but this was delayed slightly by the needs of the Korean War. Later studies by Marshall Brucer, demonstrated that a circular source, similar to the Canadian designs, was the optimal configuration for a ^{60}Co source.[3]

The NRX reactor in Chalk River was key to the development of the source for the MD Anderson ^{60}Co teletherapy unit. It was necessary to get the co-operation of the US Atomic Energy Commission to obtain a ^{60}Co source. This proved difficult because Dr. Warren Shields, the director of the Division of Biology and Medicine of the US Atomic Energy Commission (a position similar to Dr. Cipriani's in Canada), did not believe that 1000 curie ^{60}Co sources were feasible, due to US Navy difficulties in shielding much smaller (100 curie) sources. Furthermore, American reactors had been preempted for plutonium weapons production. The Oak Ridge reactor – the only reactor available in the USA for activation of medical isotopes – could only generate ^{60}Co with a specific activity of

Grimmett demonstrates a mock-up of his cobalt unit for (left) Marshall Brucer, Gilbert Fletcher and R.L. Clark.

2 Ci/g. At a meeting on 13 February 1950 in Washington, DC, Dr Brucer – the research chair for the Medical Division of ORINS - decided that the ^{60}Co for the Texas source would come from Chalk River, rather than be activated in the Oak Ridge reactor. After reaching this decision, Dr. Brucer had the unenviable task of explaining to the US Atomic Energy Commission why ORINS wanted to import radioactive isotopes from Canada. At one point Dr Brucer found himself in the ironic position of having to swear that he would not disclose any secrets about Canadian made ^{60}Co to Canada![3]

Setbacks

On May 27 1951, only a few days before completion of the ^{60}Co teletherapy unit in Milwaukee, Dr. Grimmett died from a heart attack.[3] He was only 49 years old. This was a severe blow to the project. Since the Chalk River source was not yet ready, the machine was sent to the Oak Ridge Institute for fourteen months of testing including some animal experimentation using an available 200 curie source loaned from the Chicago Tumor Institute.

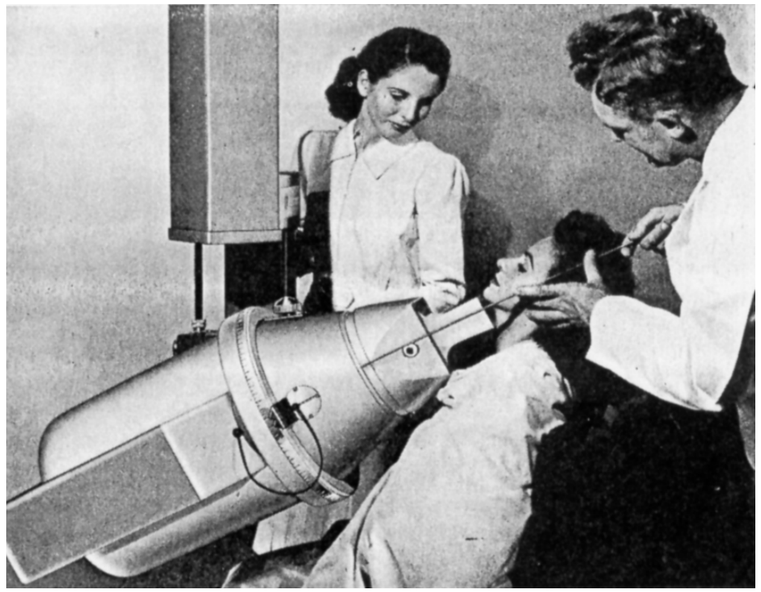
The ^{60}Co source was finally removed from the Chalk River reactor in July 1952 with an activity of 876 curies, still well short of the intended ac-

(Continued on page 106)

Event	Saskatoon Saskatchewan	London Ontario	Houston Texas
Source Delivered	30 July, 1951	16 October, 1951	July, 1952
Source Installed	17 August, 1951	23 October, 1951	September, 1953
First Patient Treated	8 November, 1951	27 October, 1951	22 February, 1954

Table 1: Chronology of important events for the first three ^{60}Co sources activated in the NRX reactor.

tivity of 1,000 curies. It was shipped to Oak Ridge for loading into the unit and further tests and measurements. Partly due to construction delays of the MD Anderson Hospital caused by the Korean War, it was not until September 1953 that the teletherapy unit, with the source in place, was transferred to the hospital. The unit did not have a continuously variable collimator and cones and attachments had to be made in the physics shop. The unit operated at an SSD of 50 cm and produced an output of just over 70 Roentgens/min. The original source was replaced at Thanksgiving, 1955 with a 2000 curie source and the treatment unit remained in active clinical use until the end of 1963. Important events for all three cobalt units are given in Table 1.



The ^{60}Co teletherapy unit as it appeared at the meeting of the American Roentgen Ray Society in Washington DC in 1951. The head of the unit was only 13-1/2 inches in diameter by 3 feet long.

Conclusions

The MD Anderson ^{60}Co treatment unit turned out to be a commercial failure. Initially viewed by General Electric Company as an exciting commercial product, the delays in clinical introduction of the Texas unit gave Atomic Energy of Canada the opportunity to dominate the market for ^{60}Co treatment units. Furthermore, there appeared to be a bias in the USA against ^{60}Co. Often referred to in early US publications as a poor man's radium,[5] the marketing department of General Electric predicted that demand would only be about one unit per year. Little did they realise that by 1986 over 2400 units would be in clinical operation.[3]

Despite its lack of commercial success, the first US ^{60}Co teletherapy unit had a profound influence on radiation therapy. Dr. Gilbert Fletcher of the MD Anderson Hospital, along with Canadian physicians such as Dr. T.A. Watson, Dr. Walter Rider, Dr. Raymond Bush, and Dr. Vera Peters, made tremendous contributions to the treatment of malignant disease. As Canadians, we have much to be proud of the development of ^{60}Co teletherapy – one of the most successful and practical anti-cancer therapies ever developed.

References

1. Information supplied by: W.F.Hansen, Director, Radiological Physics Center. The University of Texas, M.D. Anderson Cancer Center, 1515 Holcombe Blvd., Houston, Texas. 77030

2. *The First Twenty Years of The University of Texas M.D. Anderson Hospital and Tumor Institute.* (Houston, Texas, The University of Texas M.D. Anderson Hospital and Tumor Institute, 1964)

3. R.F.Robison, "The race for megavoltage. X-rays versus telegamma." Acta Oncol. **34**:1055-1074 (1995).

4. M.D.Schulz, "The supervoltage story. Janeway Lecture, 1974." Am.J.Roentgenol.Radium.Ther.Nucl.Med. **124**:541-559 (1975).

5. L.M.Miller and J.Monahan, "Cobalt 60 - "Poor Man's Radium"." Reader's Digest (Canadian Edition) **61**:43-46 (1952).

6. C. Stuart Houston and Sylvia Fedoruk "Saskatchewan's role in radiotherapy research." Can. Med. Assoc. J., **132**: 854 (1985)

forts.

7.4 Report of the Awards Committee
Schreiner reported that the idea of awarding travel assistance monies to those selected for the YIS (i.e., to support their registration) was working well. He thanked the judges and noted that we had a good YIS this year. Arsenault will take over as Chair of the committee. There will be no Canadian YIS at the 2000 meeting, but students should be encouraged to enter the World Congress YIS.

8. Report of the CCPM

Schreiner reported that the CCPM has welcomed 8 new members and 5 new Fellows this year. Dunscombe has stepped down as President (Schreiner replacing). Dunscombe will continue on the Board for 2 more years. Fallone is leaving the Board to take up his duties with the COMP (he is COMP Chair-elect). Lee will replace Fallone as Chief Examiner. Clark is the new VP of the CCPM and Sixel has joined as a new Member of the Board. The CCPM Board and the COMP Executive are working well together. Thanks for this are due to Dunscombe, Johns and Patterson.

9. Greetings from the ACMP

Feller explained that the ACMP represents clinical medical physicists in the US. From 15-20 May, 2000, the ACMP will be meeting at the Chateau Whistler. COMP members are invited to participate in this meeting and symposium. Feller was pleased to report that the Journal of Applied Clinical Medical Physics was now accepting submissions. This is a new, internet-only, journal. Its first issue will be January 2000. Peter Almond is the Editor-in-Chief. The journal will focus on articles which "affect or improve patient care".

10. Greetings from the EFOMP

Nuesslin thanked Johns and Patterson for inviting him to participate in the meeting. He explained that the EFOMP (European Federation of Organizations in Medical Physics) was composed of 32 national member organizations, each representing a European country or state. EFOMP represents 5000 medical physicists. It puts on a Congress every 2 years. This year, the Congress is meeting in Patras, Greece. EFOMP is primarily interested in the professional education, training and scientific efforts of medical physicists. They would be interested in more liaison with non-European medical physics bodies such as the COMP. This could be pursued at the Patrice meeting, if a COMP representative is going (it was noted that Connors is attending that meeting). To find out more about the EFOMP, go to www.efomp.org. EFOMP's journal is "physica medica" Nuesslin congratulated the COMP on our meeting, especially on the YIS.

Patterson thanked Nuesslin and stated that the COMP looks forward to further interactions with the EFOMP. **Action:** Patterson to consider approaching a COMP member regarding representing the COMP at the Patras, Greece meeting.

11. Conference reports

11.1 Chicago 2000
Fallone reported that there would be a designated hotel for Canadians at the World Congress. We will try to pick one of the less expensive hotels. There will be some student rooms available at $85 (US)/night. For more information on the Congress, visit www.wc2000.org. 14 January 2000 is the deadline for receipt of abstracts. The Congress will be on from 23 to 28 July 2000. COMP will have committee meetings and an AGM at the Congress. There should also be a Canadian social event.

11.2 Kelowna, 2001
Baillie reported that plans are progressing and the COMP will meet at Okanagan University College from 9 to 14 July 1999.

11.3 Montreal (AAPM) 2002
Patterson reported that the AAPM is meeting in Montreal in 2002. It is logical for the COMP to try to meet in Montreal at that time as well. Patterson moved that the COMP meet with the AAPM in Montreal in 2002. Bissonnette seconded the motion. Carried.

Action: Patterson to contact the AAPM regarding meeting with them in 2002.

12. Other Business

12.1 Quorum Issue
Cottrell raised the issue of a quorum required at the AGM. He asked that the Executive consider the issue, as it seems difficult to meet the 20% of Full Members quorum. Kulkarni mentioned that, if we followed Robert's Rules we could still send the minutes out in the absence of a quorum.

Action: Patterson to bring the matter to the Executive.

12.2 Moment of Silence in Memory of Dr. HE Johns
Podgorsak proposed a moment of silence in memory of the passing of Dr. HE Johns. Patterson agreed and a moment of silence was observed.

13. Motion to adjourn

Fenster. Seconded: Connors. Carried.

on a trial basis for one year in 1998. The DMBP met at the Fredricton CAP meeting. Two days of "DMBP" related papers were presented and were well received. David Chettle, the Chair of the DMBP, has related to Patterson that the one year trial was considered to be successful and a recommendation had been made to the CAP Executive to reinstate the DMBP permanently. It has been suggested that the COMP join the CAP and the Canadian Biophysical Society in a joint meeting at Brock University in St. Catharines, Ontario in 2003. Chettle is interested in cooperative efforts between the DMBP and the COMP.

The DMBP has been brought back by the actions of only a small number of people. Only 11 individuals were involved in the vote to recommend re-instatement of the DMBP. One of the reasons it has been brought back is that they do not think the COMP can fulfil their needs for a scientific home, including the need to attract undergraduate physicists into medical and biological physics.

Patterson also reported on the new "P.Phys." designation. The CAP now has a method of certifying individuals as "Professional Physicists." This designation is intended to aid those physicists who must now compete with engineers (i.e., P.Eng.) for positions. One of the current requirements is that one be a member of the CAP. In addition, one must pay the CAP $50/year to maintain certification. Patterson is to request that a CAP member write an article regarding the new certification procedure for publication in the COMP newsletter. Patterson will approach the CAP about the possibility of their accepting membership in the COMP (instead of the CAP) as one of the requirements for certification.

6. Treasurer's Report:

Evans' report on COMP's financial details for 1998 has already been published in the July 1999 issue of *Interactions*. Mr. Randall Miller looked through the books on short notice (i.e., at the June 1999 conference). He did not find anything significantly out of order. Shortt moved that Miller's audit be accepted. Second by Mawko. Motion Carried. Evans moved that the 1998 Financial Report be accepted. This was seconded by Clark. Carried.

Evans reported on the 1999 Financial statement. Shortt asked about the amount of "Executive Director" time being paid for. Patterson replied that one full day per week was being paid for.

Evans presented the following proposed budget for 2000:

Revenue:	
Membership:	$31 000.
Corporate:	$10 000.
Interest:	$ 4 000.
Total:	*$45 000.*
Expenditures:	
Executive Director:	$17 000.
Mid-year Meeting:	$16 000.
Communications Committee:	$ 3 000.
Secretarial:	$6 500.
Chair/President's discretionary:	$3 000.
Directory and Publications:	$3 500.
Office	$1 000.
Member services:	$1 000.
CMA	$1 500.
CRISM, IOMP	$1 500.
Newsletter:	$1 500.
Total:	*$55 500.*
One-time expenditures:	
CAMPEP:	$7 500.
Brochure/Poster:	$4 000.
CRISM Symposium	$1 000.
Total:	*$12 500.*

Result: $23 000. Deficit expected.

Schreiner explained that CAMPEP has been approached regarding the accreditation of Radiotherapy Physics Residency programs in Canada. The CCPM approached CAMPEP and is exploring the possibility of being one of CAMPEPs co-sponsoring bodies. It may be appropriate for the COMP, not the CCPM to be the co-sponsoring body, but this is not relevant in the information gathering phase. Shortt asked what the COMP would expect to get back from CAMPEP for its $7500. Schreiner explained that the CCPM was asked to accredit Radiotherapy Physics Residency programs in Ontario. Since CAMPEP already existed as a recognized program accrediting body, it made sense to approach CAMPEP. If we (either the CCPM or the COMP) became tied into CAMPEP, we could make use of their expertise in the area and still have influence. Patterson stressed that, by becoming involved with CAMPEP, we would have a Canadian input into North American standards. Patterson explained that, by approving the $7500, the Membership would be giving the Executive the ability to act, if further meetings with CAMPEP made it clear that getting involved with CAMPEP was in the best interests of the COMP.

Rogers asked why so much money was needed for the mid-year meeting (i.e., how many people are involved?). Patterson and Evans explained that approximately 35 people are involved, and the figure includes both COMP and CCPM expenses (pooling CCPM and COMP expenses has helped eliminate haggling over small sums at Exec and Board meetings).

Evans moved that Miller be appointed as auditor for 1999. Second by Fenster. Carried.

Evans: move to accept 2000 budget. Second by Dunscombe. Carried.

7. Committee Reports

7.1 Report of the Professional Affairs Committee

Raaphorst's report is printed elsewhere in this issue of *Interactions.*

7.2 Report of the Communications Committee

Munro's report has already been printed in the July 1999 issue of *Interactions.*

Patterson thanked Munro for all his hard work. The communications committee has made impressive progress, both in the Newsletter and the Website.

7.3 Report of the Radiation Regulations Committee

O'Brien's report has already been published in the July 1999 issue of *Interactions*. Patterson thanked O'Brien for his ef-

EFOMP Congress

By Sherry Connors
Cross Cancer Institute

The European Federation of Medical Physics held their tri-annual (once every 3 years) congress in Patras, Greece from August 31 - September 4, 1999. The federation fosters and co-ordinates Medical Physics activities in Europe. It plays a vital role for those countries that may not have a national organization, or a very large active organization. Some of you may remember that the EFOMP president, Dr. Fridtjof Nusslin, attended our June meeting in Sherbrooke and extended a warm invitation to develop a liaison between our two organizations. It was my honour to represent COMP at this congress.

Patras is located on the northern tip of the Greek Peloponese and is accessed from Athens airport by a 3 hour bus ride. The conference was held at the University of Patras, which has a large and active academic program in medical physics. The opening night session was delightful, featuring many entertaining speakers. Canada was well represented by Jack Cunningham who spoke of the career of Harold Johns. B. Proimos, a notable Greek Medical Physicist, gave a thoroughly enjoyable talk, speaking of his early experiences with radiation exposure. It was black humor at its very best.

Refresher-type talks by well recognized international speakers were given each morning. The usual mix of radiotherapy and imaging talks, with some non-ionizing radiation presentations made up the bulk of the scientific sessions. There were 3 sessions in parallel, often with a poster session making up the third session. A modest exhibitor's area, similar to a COMP meeting, ensured that physicists could investigate the latest products.

Our Greek hosts went out of their way to entertain us with magnificent social events every night usually until 1 am in the morning, in accordance with local customs. Many of us had trouble keeping up with these very late evenings and all day sessions from 8 am - 6pm.

Interested members may access the EFOMP website at : http://www.efomp.org/index.html

WANTED: Editor for Interactions

The COMP Communications Committee is looking for a person to become responsible for the publication of Interactions. Web site management and the co-ordination of the Communications Committee (also the job of the current editor) will become a separate task performed by the Chair of the Communications Committee. COMP can offer the same conditions that Canadian medical physicists have long been accustomed – low salary, long hours, no benefits, lots of complaints, and limited praise. There's no life like it!

The position becomes available on 2 April, 2000.

If interested in this challenge please contact the Chair of the COMP Communications Committee at:

peter.munro@lrcc.on.ca

1998 Professional Survey

By Richard Hooper
For the Professional Affairs Committee

The format and data collection procedure for the 1998 COMP Professional Survey was similar to that used for the 1997 survey. Approximately 245 questionnaires were mailed out to all COMP full members currently residing in Canada, and 148 surveys were returned to the COMP Secretariat. All survey responses were handled in the strictest confidence so as to ensure the anonymity of respondents. Responses are summarized by geographic area and degree/certification in tables 1 and 2 below. Three surveys were incomplete and were excluded from further analysis.

Salaries

A summary of the salary data for Medical Physicists working in Canada is provided in table 3 below. Full statistics are provided for groups with at least 11 respondents. Only average and median results are provided for groups of 5 to 10 respondents. Data for groups of fewer than 5 could jeopardize confidentiality and thus are not listed.

A comparison of average and median salaries for 1997 and 1998 is provided in table 4. Only groups with at least 11 respondents in both years are included in this table. Figure 1 depicts percentile ranges of primary income in 1996, 1997 and 1998 for all Medical Physicists working in Canada, and also for subgroups by degree and certification.

Individuals were asked to specify by what percentage their salaries increased or decreased between 1997 and 1998. Of the respondents who had at least three years experience in medical physics and had not changed jobs in the past two years, 2% reported that their salary decreased, 31% reported that their income did not change, and 67% reported that their income increased. For all these individuals the average increase was 5.1% and the median increase 2.2%. For the 67% who reported an increase in income the average increase was 7.8% and the median increase 5.0%.

The regular hours of work specified in employment contracts for full-time employees was, on average, 37.2 hours per week.

Benefits

The average annual vacation allotment was 22 days per year.

Some employers allocate each of their physicists an annual personal travel and/or professional expense allowance, while other employers reimburse these expenses on an ad-hoc basis. Of all the respondents who listed themselves as full-time employees, 75% reported receiving an allowance or reimbursement of at least $100, 69% reported receiving reimbursement of at least $1,000, 15% reported receiving no allowance or reimbursement, and 10% did not answer the question. For those receiving at least $1,000 the average allocation was $2,748 and the median allocation $2,000.

Other benefits data is summarized in table 5.

Additional information regarding salaries or benefits, such as a detailed summary for a particular geographical region, is available upon request provided the data can be reported without jeopardizing confidentiality. Requests for further information or comments regarding the survey should be directed to Richard Hooper (rick.hooper@cancerboard.ab.ca).

REGION	Number of Responses
British Columbia (BC)	14
Alberta(AB)	9
Saskatchewan (SK)	8
Manitoba (MB)	11
Ontario (ON)	71
Quebec (PQ)	24
New Brunswick (NB)	4
Nova Scotia (NS) and Prince Edward Island (PE)	6
Newfoundland (NF)	1
Total	148

Table 1: 1998 Professional Survey responses by geographical region.

	Certification				
Degree	None	CCPM(M)	CCPM(F)	Other	Total
Bachelors	2	0	3	0	5
Masters	20	13	11	4	48
Doctorate	38	17	34	6	95
Total	60	30	48	10	148

Table 2: 1998 Professional Survey responses by degree and certification.

The nominee was Stephen Pistorius of Winnipeg, and the nominators were Roger Palser and Jeff Bews. For the position of Councillor for Professional Affairs, two nominations were received. Peter O'Brien was nominated by Katharina Sixel and Kathy Mah. David Wilkins was nominated by Peter Raaphorst and Lee Gerig. However on April 21 Peter O'Brien contacted me stating that he was withdrawing due to time commitments which had arisen in the period since he had agreed to stand. The election was conducted by mail ballot, with closing date June 4. Curtis Caldwell and I have independently tallied the results. This fulfills the requirements of Article X of the Bylaws.

The results are:

Treasurer: *67 votes for Stephen Pistorius*
Councillor for Professional Affairs:
65 votes for David Wilkins
1 vote for Ervin Podgorsak as a write-in candidate

Stephen Pistorius is thus declared elected to the position of Treasurer, and David Wilkins to Councillor for Professional Affairs. As per Article IV.B.7, David Wilkins takes office today at the close of the 1999 AGM, and Stephen Pistorius on next January 1. Congratulations to you both and thank you for your commitment to this organization.

Michael Patterson thanked both Raaphorst and Evans for their service to the COMP.

5. COMP Chair's Report:

5.1 **Sherbrooke 1999**

Patterson began by reporting on the 1999 conference. There were 258 registrants this year and 28 exhibitors. There has been a good level of corporate sponsorship, which can be credited to the work of Claude Foucart and Paul Johns. While the conference will not lose money, the exact amount of the surplus will not be known for some months.

Patterson asked the membership for input on continuing the speaker exchange program with the CAP. If it were eliminated, six more COMP members could give platform presentations. There is also the issue of the revived DMBP, which could be seen as being in competition with the COMP for members. Rogers and others commented that they like the CAP talk and would like to see it continue. It appeared to be the desire of the membership to continue the speaker exchange.

Patterson asked for input relating to the format of the meeting, i.e., 2.5 days with no parallel sessions. This year there was also a late brachytherapy session and a late mammography session. The days started early as well. Is there a need for parallel sessions? Connors spoke against parallel sessions. This would decrease circulation among the posters and exhibitors and we need to maintain reasonable circulation in these areas. Should we extend to Saturday afternoon or start earlier? Fenster was opposed to extending the meeting. He expressed view that special interest work-shops should be put on during the day preceding the actual conference, so that those interested could attend, but the actual conference would not be lengthened and would not have excessively long days. Johns stated that the exhibitors would like to staff their booths for fewer hours and do not like staffing booths on Saturday. Extending the conference is difficult, as 35 members are already involved in Executive and Committee meetings on the day preceding the conference. Dunscombe felt there should be more posters and fewer talks, as posters are more effective at communicating the ideas. This would shorten the conference.

5.2 Executive Director COMP/CCPM

Patterson reported on the hiring of an Executive Director to serve the interests of both the COMP and the CCPM. At last year's AGM, the membership agreed to pursue hiring an Executive Director. The search committee was composed of Johns, Patterson and Schreiner. Three worthy candidates were identified and all were interviewed on 30 May 1999. The position has been offered to, and the offer accepted by, Brighid McGarry, who has been acting as the COMP Secretariat. McGarry will hire a secretarial assistant. McGarry has agreed to a 13 month contract. Initially, she will take over corporate liaison, will support meetings (scientific and business), will work on Policies and Procedures for the CCPM.

5.3 TG51

At the last AGM, it was agreed to strike a committee to study TG51. A report is to be submitted to the COMP by the committee. Podgorsak chairs the committee. Committee members include Rogers, Mason, Olivares, Miller, Ross and Rawlinson. The committee met in Sherbrooke for the first time and expect to report to the COMP Executive at the mid-year meeting in November 1999.

5.4 CRISM

Patterson reported that this organization is one year old. It plans to sponsor a symposium on breast cancer diagnosis and treatment at the upcoming CAR/CAMRT meeting in 2000. Funding is needed from the member organizations, including the COMP. In 2004, CRISM plans to hold a joint conference in Vancouver. The COMP Executive has decided to explore this, but will remain uncommitted until after a specific proposal has taken shape. The Membership will have a chance to vote on the COMP's participation in two years.

5.5 CSNM

Patterson reported that the COMP is one of the founding members of the Canadian Society of Nuclear Medicine. The first annual general meeting was held in Banff, Alberta in March, 1999. Caldwell attended the Board meeting there as COMP's representative. The COMP has an opportunity to add a second member to the Board, as we have been invited to appoint a physicist as Chair of one of the CSNM's standing committees (i.e., the Technical Standards Committee). Caldwell invited any COMP members interested in Nuclear Medicine to join the CSNM. Annual fees are $40 for physicists.

5.6 CAP

Kirkby Medal

Patterson reported that this was an award open to members of the CAP or the COMP who have made significant professional contributions to physics or medical physics in Canada. It is given every two years. Nominations will be sought this summer. The nomination procedure will be placed on the COMP/CCPM web site (**Action**: Patterson)

DMBP

Patterson reported that this Division had been reconstituted

Minutes of the COMP Annual General Meeting
18 June 1999 Sherbrooke, Quebec

Chair: Michael Patterson
Secretary: Curtis Caldwell

The meeting, scheduled to being at 16:00, was delayed to 16:36, by the need to achieve a quorum (20% of Full Members = 58 Full Members). 60 Full Members were ultimately in attendance, as were two Student Members and two distinguished guests (Paul Feller and Fridtjof Nuesslin)

1. Adoption of the agenda.

Rogers moved that the agenda be adopted; Shortt seconded the motion; carried.

2. Minutes of last AGM

Shortt moved that the minutes be accepted as presented. Connors seconded. Carried.

3. Proposed By-law changes

Patterson reported that two by-law changes had been proposed and published in the Newsletter as follows:

During the November 1998 meeting of the COMP Executive, motions were passed to propose two amendments to the COMP by-laws relating to the "Eligibility and Rights as Full Members" and the "Eligibility and Rights of Associate Members". The intent of the amendments is to (1) define the eligibility requirements more clearly and (2) to make clear the intended use of the "Associate Member" category (we currently have only one such member).

(1) Proposed amendment relating to "Eligibility and Rights as Full Members"

Currently, By-Law Number One, Article III, under "ELIGIBILITY AND RIGHTS AS FULL MEMBERS" reads:

Are Eligible:

A) *Those who have graduated from an accreditated University, who also subscribe to the specific objectives of the COMP and are practicising medical physicists as determined by a review of their membership application.*

B) *Those who are Members or Fellows of the Canadian College of Physicists in Medicine (CCPM).*

It is proposed that the above text be replaced by:

Are Eligible:

A) (i) Those who have graduated with a Master's degree or Doctorate in medical physics, a physical science or engineering from an accredited University (in exceptional cases, other qualifications will be considered),and (ii) who also subscribe to the specific objectives of the COMP, and (iii) are practicing medical physicists as determined by a review of their membership application by the Executive.

B) Those who are Members or Fellows of the Canadian College of Physicists in Medicine.

(2) Proposed amendment relating to "Eligibility and Rights of Associate Members"

Currently, By-Law Number One, Article III, under "ELIGIBILITY AND RIGHTS OF ASSOCIATE MEMBERS" reads (in part):

Those who are not eligible as Full members but are engaged in a field of endeavor related to Medical Physics.

It is proposed that the above text be replaced by:

Physical scientists or engineers not eligible as Full members may apply as Associate Members.

Patterson explained that these changes were needed in order to clarify what a "practising medical physicist" was, in order to provide guidance for those considering applications for membership in the COMP. Some applicants would likely be placed in the (currently unused) "Associate member" category.

Rogers was not in agreement with the amendments. He asked "Why have a second-class citizen in this small organization?" There was significant concern about the amendments among the Members. It was generally, though not universally, agreed that the COMP did not wish to be in the position of having to grant membership to Radiotherapy Technologists, should they apply. Shortt and Podgorsak both indicated a need for inclusiveness in the COMP. Alan Cottrell asked that the Executive re-visit the issue at the next Executive meeting.

Patterson moved that By-law change 1 (see above text) be approved by the membership. Second by Johns. Carried.

Connors moved that By-law change 2 (see above text) be approved by the membership. Second by Clark. Carried.

Note: From the discussion, it was the desire of the membership that the issue of how these new membership criteria are to be applied be re-considered at the Executive level and clarified for the benefit of the Membership.

4. Report on elections:

Johns supplied a typed report, as follows:

The Nominating Committee this year consisted of Curtis Caldwell (COMP Secretary) and myself. For the 1999 election two vacancies on the COMP Executive were to be filled: Treasurer and Councillor for Professional Affairs. A Call for Nominations was sent via the canada-l e-mail burster 21 December 1998 and published in the January 1999 Newsletter. The closing date was 1 March 1999.

For the position of Treasurer, one nomination was received.

	Number	Ave Yrs Exper	PRIMARY INCOME Average Income	PRIMARY INCOME Percentiles 20th	PRIMARY INCOME Percentiles Median	PRIMARY INCOME Percentiles 80th	TOTAL INCOME Average Income	TOTAL INCOME Percentiles 20th	TOTAL INCOME Percentiles Median	TOTAL INCOME Percentiles 80th
OVERALL (Canada)	145	12.3	69.6	52.5	70.0	85.0	71.8	54.0	70.5	86.9
PROVINCE										
BC + AB + SK + MB	42	12.2	73.9	56.8	74.5	87.2	75.3	56.8	77.4	90.5
ON	70	13.7	71.4	55.0	70.2	88.5	74.4	57.3	70.8	93.0
PQ	23	10.6	59.9	47.6	60.0	73.9	61.3	50.3	60.0	73.9
NB + NS + PE + NF	10	7.2	61.6		64.4		63.0		67.5	
EMPLOYER										
General Hospital	41	11.3	62.9	48.7	60.0	74.2	66.2	49.7	61.0	77.2
Cancer Institute	76	12.8	73.2	56.7	70.5	87.0	74.2	57.0	70.5	87.6
University or Government	19	12.2	68.2	47.9	71.1	83.7	70.8	47.9	75.0	88.5
FUNCTIONS (>= 50%)										
Clinical Service	77	9.7	64.6	52.9	63.0	75.0	65.7	53.1	64.0	76.2
Teaching + R&D	36	11.8	69.6	52.5	70.6	86.2	74.0	54.6	73.5	90.3
Administration	22	20.4	88.8	74.8	90.5	101.4	90.4	74.8	94.8	105.1
SPECIALTIES (>= 50%)										
RT	96	10.9	71.0	54.4	69.5	86.2	72.1	56.7	70.0	86.7
DR + NM + MR	32	13.1	67.3	53.6	69.5	80.5	72.3	53.6	71.6	90.1
RP	9	19.5	59.9		50.0		64.4		65.0	
YEARS EXPERIENCE										
< 5	33	2.5	47.5	40.0	48.0	54.8	48.8	40.0	49.0	59.7
5 - 9.9	34	6.8	63.6	57.2	62.5	70.0	64.1	57.8	62.5	70.0
10 - 14.9	24	11.4	78.8	68.6	75.0	88.3	81.6	71.4	76.5	90.7
15 - 19.9	17	16.5	81.0	74.7	80.0	86.9	83.3	74.7	80.0	87.4
20 - 24.9	19	21.2	79.4	60.9	85.0	94.8	86.8	65.3	85.0	105.4
25+	18	28.8	88.2	73.1	84.0	111.4	88.8	73.1	84.0	111.9
DEGREE/ CERTIFICATION										
Bachelors/all	4									
Masters/all	47	12.8	64.0	48.9	60.0	75.0	65.3	49.9	63.0	75.0
Masters/no cert.	19	7.6	51.9	44.0	49.0	65.6	54.6	44.0	50.0	69.8
Masters/CCPM(M)	13	10.0	63.2	52.1	60.0	74.7	63.2	52.1	60.0	74.7
Masters/CCPM(F)	11	22.5	83.9	68.6	75.0	112.6	84.5	68.6	75.0	114.0
Masters/CCPM(M or F)	24	15.7	72.7	58.3	71.5	82.7	72.9	58.3	71.5	82.7
Masters/other cert.	4									
Doctorate/all	94	11.7	72.7	57.2	71.8	88.6	75.3	58.4	73.6	93.6
Doctorate/no cert.	38	9.5	64.8	47.2	64.2	81.9	67.8	47.2	64.6	84.8
Doctorate/CCPM(M)	17	7.6	65.9	59.8	64.0	70.3	66.7	59.8	64.0	72.8
Doctorate/CCPM(F)	34	16.8	85.0	73.2	84.2	98.1	88.1	73.2	86.0	102.8
Doctorate/CCPM(M or F)	51	13.7	78.7	64.0	76.0	92.8	80.9	64.0	79.0	98.1
Doctorate/other cert.	5	7.7	72.6		64.6		75.0		64.6	
DEGREE/YEARS EXPER.										
Masters/< 10	21	4.2	49.8	45.4	50.0	58.3	51.3	45.4	51.5	59.3
Masters/10+	26	19.8	75.4	65.0	73.5	81.0	76.7	69.8	74.0	81.0
Doctorate/< 5	19	2.6	49.2	40.0	48.9	60.0	49.9	40.0	49.0	60.5
Doctorate/5 - 9.9	26	6.7	65.9	59.3	64.6	72.7	66.2	59.3	64.6	73.1
Doctorate/10 - 19.9	29	13.4	82.3	72.3	80.0	93.0	85.8	75.0	82.0	93.6
Doctorate/20+	20	24.4	90.1	82.8	91.0	99.9	96.0	84.1	98.1	108.0

Table 3: Salary data for Medical Physicists working in Canada. Salaries are in thousands of dollars. In order to ensure confidentiality, data are not listed for subgroups of less than 5, and only average and median values are reported for groups of 5 to 10 respondents.

	PRIMARY INCOME				CHANGE IN PRIMARY INCOME	
	1997		1998		(% of 1997 Income)	
	Average	Median	Average	Median	Average	Median
OVERALL (Canada)	66.5	65.0	69.6	70.0	4.7%	7.7%
PROVINCE						
BC + AB + SK + MB	68.1	67.0	73.9	74.5	8.5%	11.2%
ON	68.4	67.5	71.4	70.2	4.4%	4.0%
PQ	57.1	58.5	59.9	60.0	4.9%	2.6%
EMPLOYER						
General Hospital	63.2	60.0	62.9	60.0	-0.5%	0.0%
Cancer Institute	68.4	67.9	73.2	70.5	7.0%	3.8%
University or Government	66.1	65.0	68.2	71.1	3.2%	9.4%
FUNCTIONS (>= 50%)						
Clinical Service	62.6	60.0	64.6	63.0	3.2%	5.0%
Teaching + R&D	65.0	64.2	69.6	70.6	7.1%	10.0%
Administration	82.5	82.0	88.8	90.5	7.6%	10.4%
SPECIALTIES (>= 50%)						
RT	65.9	65.0	71.0	69.5	7.7%	6.9%
DR + NM + MR	67.3	67.0	67.3	69.5	0.0%	3.7%
YEARS EXPERIENCE						
< 5	48.7	48.1	47.5	48.0	-2.5%	-0.2%
5 - 9.9	62.3	60.0	63.6	62.5	2.1%	4.2%
10 - 14.9	75.4	78.0	78.8	75.0	4.5%	-3.8%
15 - 19.9	82.9	81.4	81.0	80.0	-2.3%	-1.7%
20 - 24.9	82.8	84.5	79.4	85.0	-4.1%	0.6%
25+	76.7	74.1	88.2	84.0	15.0%	13.4%
DEGREE/CERTIFICATION						
Masters/all	61.0	60.0	64.0	60.0	4.9%	0.0%
Masters/no cert.	49.2	46.5	51.9	49.0	5.5%	5.4%
Masters/CCPM(M or F)	69.1	68.5	72.7	71.5	5.2%	4.4%
Doctorate/all	69.9	68.0	72.7	71.8	4.0%	5.6%
Doctorate/no cert.	61.2	60.0	64.8	64.2	5.9%	7.0%
Doctorate/CCPM(M or F)	76.6	77.6	78.7	76.0	2.7%	-2.1%
DEGREE/YEARS EXPER.						
Masters/< 10	51.4	48.6	49.8	50.0	-3.1%	2.9%
Masters/10+	71.0	70.0	75.4	73.5	6.2%	5.0%
Doctorate/< 5	51.1	53.9	49.2	48.9	-3.7%	-9.3%
Doctorate/5 - 9.9	65.1	65.0	65.9	64.6	1.2%	-0.6%
Doctorate/10 - 19.9	84.2	83.4	82.3	80.0	-2.3%	-4.1%
Doctorate/20+	84.9	86.0	90.1	91.0	6.1%	5.8%

Table 4: Comparison of average and median values for primary income in 1997 and 1998. Income values are in thousands of dollars, and change in income is specified as percentage of primary income in 1997. Only groups with at least 11 respondents in both years are included in this table.

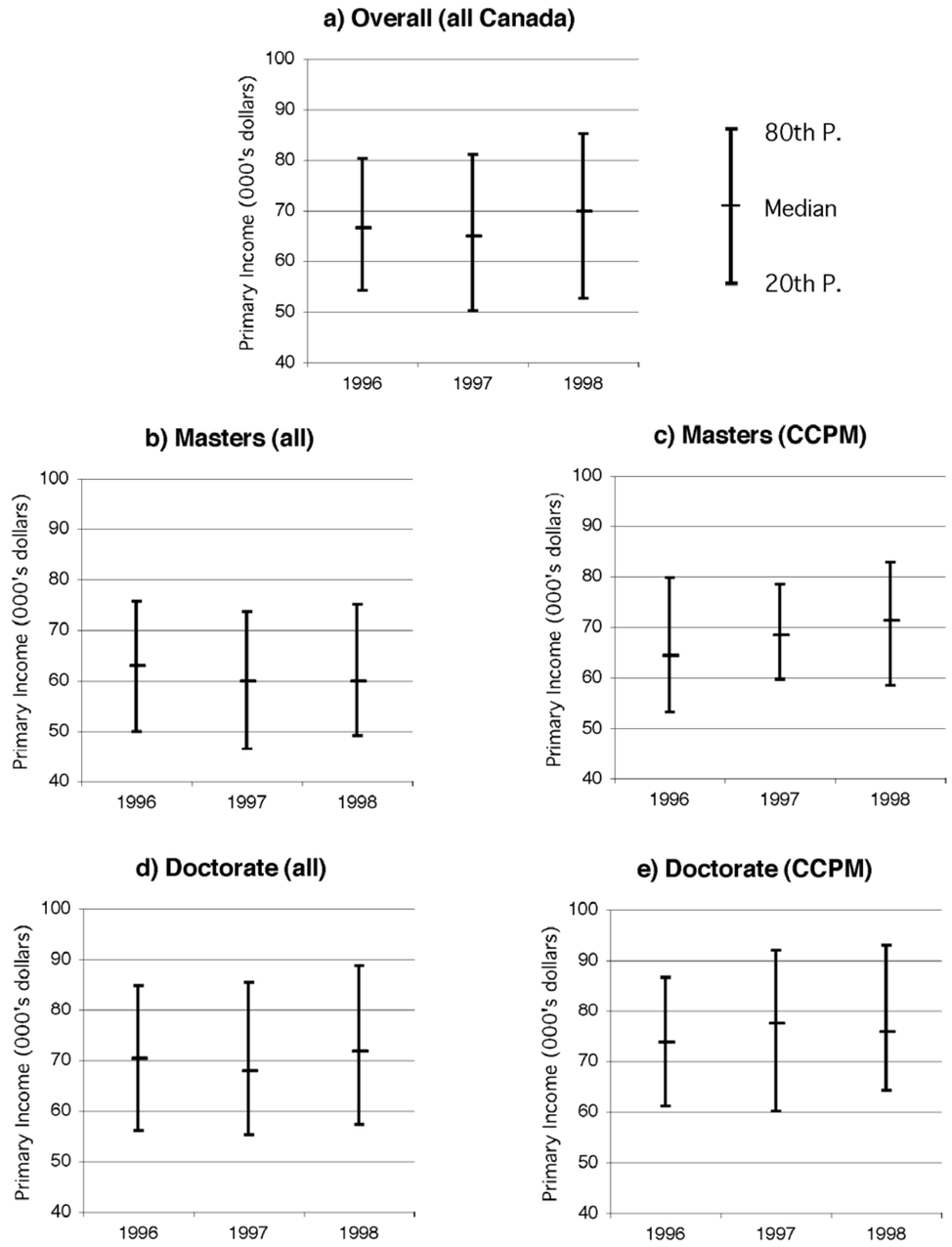


Figure 1: Percentile ranges of primary income in 1996, 1997 and 1998 for all Medical Physicists living in Canada, and for subgroups by degree and certification. CCPM designation includes both members and fellows.