InterACTIONS

CANADIAN MEDICAL
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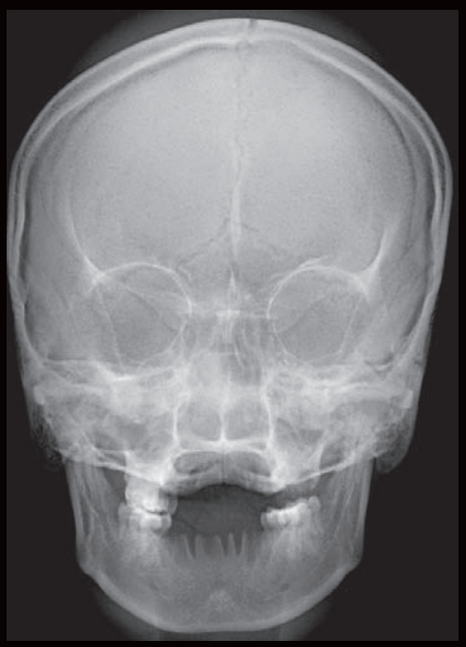
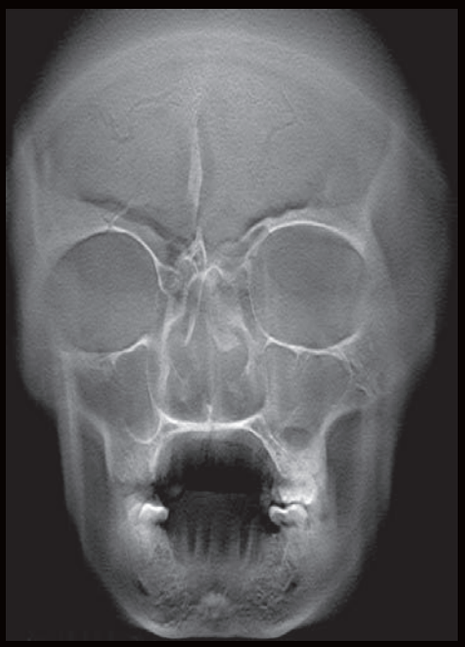
de PHYSIQUE MÉDICALE





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THE CANADIAN COLLEGE OF PHYSICISTS IN MEDICINE

LE COLLÈGE CANADIEN DES PHYSICIENS EN MÉDECINE

57 (3) juillet/July 2011

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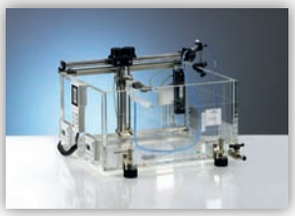

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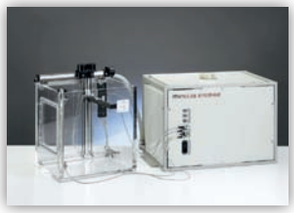

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InterACTIONS

Volume 57, Number 3 – juillet/July 2011

Contents

Cover Image

Clinical applications of digital tomosynthesis are being explored at the Children's Hospital in Winnipeg as part of collaboration between the Imaging Physics group and Pediatric Radiology. See the article by Dr. Ingleby on page 67. The cover image shows a plain radiograph of a skull phantom (left) juxtaposed next to a digital tomosynthesis slice of the same phantom showing the orbit floors in sharp focus.

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Boyd McCurdy
Parminder Basran

Please submit stories MS Word or ASCII text format. Images in Tiff format at 300 dpi resolution are preferred.

Message from the COMP President

Unlike last year, the timing is such that, as you are reading this message, the Annual Scientific Meeting (ASM) remains a future event rather than *fait accompli*. Consequently, although time is now getting short, there remains an opportunity to encourage you to consider attending the meeting. Being a joint meeting with the American Association of Physicists in Medicine (AAPM), the agenda is much more extensive than normally associated with our ASM. As on past occasions, the AAPM has been very receptive to our contributions to the organization of the meeting and gracious in accommodation of our requirements. The result is a truly joint meeting where, thanks to the efforts of the Conference Committee and the Local Arrangements Committee, I believe you will find COMP to have a clear presence and the meeting to have a Canadian feel. With respect to the former, there are a number of events targeted towards COMP members specifically. Please note in particular the Annual General Meetings (AGMs) of both COMP and the Canadian College of Physicists in Medicine and, if you are a member, plan on attending the relevant meeting(s). AGMs are critical and only effectual if a quorum is achieved. Although I know that many will be disappointed, the scheduling of events on August 3rd is quite tight so the COMP AGM will really need to start and, more importantly, end on time. So consider this an attempt to get an early start to the yearly herding of the physicists, which unfortunately has often proven to be much akin to the herding of cats. The parallel is such that, when gradually getting frustrated in the process of convincing you lot to get into the meeting room, one wonders if it would not have been more appropriate for Schrodinger to have constructed his seminal deliberations based upon physicists instead of cats. But I digress… perhaps more of a topic for the Awards Ceremony and the Banquet. (The latter will immediately follow the COMP AGM hence the main motivation for ensuring that the meeting finishes on time.) And speaking of awards, I am delighted to announce that this year's recipient of the Gold Medal is Jake Van Dyk. (There will be more on this later, but I could not resist letting the physicist out of the bag.) I for one am looking forward to this celebration of Jake's accomplishments and contributions.

Since my last message there has been a meeting of what is essentially the Editorial Board of the InterACTIONS. One of the more labour intensive tasks that people have undertaken for COMP is that of Editor of the newsletter. To date these individuals have single-handedly taken on the responsibility of soliciting content, pursuing timely submission of articles, and preparing the layout. While likely the least onerous, the last of these tasks is particularly time consuming so alternative approaches are being explored. In addition, the membership of the Editorial Board is being broadened and committee Chairs are being tasked with submitting articles on a more routine basis. All of this is being undertaken in recognition of the tremendous effort that our Editors invest to produce InterACTIONS with the objective of better supporting that effort. And, as we are on the topic, I would be particularly remiss if I failed to acknowledge the excellent job our current editor, Idris Elbakri, has been doing on our behalf. (I have particular appreciation because I suspect there is an outside chance that I am one of those that, on the extremely rare occasion, has not made

Dr. Peter McGhee

Idris' life any easier.) The upshot is that, while probably not terribly dramatic, you can anticipate seeing changes in future versions of the newsletter. If you have thoughts or suggestions as to ways to improve the newsletter, this would be an ideal time to bring them forward. Please do not hesitate to contact Tony Popescu, Councillor for Communications or me with any ideas or feedback that you may have.

While there continues to be many irons in the fire, there are a few highlights from recent activity that should be mentioned. The "Medical Imaging Team Day" initiative mentioned in previous messages was slated to take place in May. Unfortunately, as a result of our inexplicable inability to successfully argue for deferral of the federal election, the event was postponed instead. The current intent is to reschedule to the Fall. Two members of the Board, the Councillor for Professional Affairs and the Treasurer, are due for replacement at the upcoming AGM (just one of the myriad reasons for

continued on page 81

Message from the CCPM President

Another year of CCPM membership examinations has passed, with continuing strong interest in certification by both candidates and existing College members. The examination process is an impressive logistical exercise, orchestrated by Chief Examiner Robert Corns and executed by a team of medical physicists who volunteer their time and expertise. Here is a snapshot of the examination process.

2011 CCPM Membership Exam by the numbers:

MCCPM written exam:

Total number of individual questions in the banks, all parts, all sub-specialties:	663
Number of candidates doing written exam:	35
Number of cities hosting written exam:	14
Number of candidates passing written exam:	29
Caffeine consumed:	5600 mg (estimated)

MCCPM oral exam:

Number of candidates taking oral exam:	32
Number of examiners:	19
Number of examination rooms required:	7
Total number of individual questions answered:	480
Number of candidates examined in French:	2
Number of candidates certified in 2011:	27
Overall exam pass rate, written plus oral:	69%
Total number of volunteers involved in examination process:	about 40
Value of all this effort:	priceless

I find this process impressive for a variety of reasons. First of all, the number of medical physicists willing to volunteer their time to various aspects of the exam represents about 10% of College membership. We should be proud that so many people are prepared to step up to the plate to ensure that our profession has defined standards of competence and that physicists entering the profession have a respected qualification to mark their achievements.

The logistical challenge of executing the exam is significant – updating question banks, proofreading, assembling exam packages, lining up invigilators, ensuring candidates have correct information, distributing written exams to markers, informing candidates of results, recruiting oral examiners, devising questions, etc. All of this falls to the Chief Examiner Robert Corns, and the Deputy Chief Examiner Boyd McCurdy. These two individuals deserve enormous credit for ensuring that all of the exams are conducted accurately, fairly, and economically.

Most impressive are the candidates themselves. The MCCPM exam is by nature intensive, and requires serious preparation through study and clinical experience. Every year, several dozen capable young medical physicists subject themselves to what few would describe as a pleasant process, in order to earn a well-defined credential that earns them the enviable right to be considered a clinically competent medical physicist. While nervousness is an inevitable reality of the oral exam, most candidates distinguish themselves by displaying depth and breadth of knowledge through clear and cogent answers to difficult questions.

Dr. David Wilkins

To those who work to make the exam process run as well as it does, the College is very grateful. To those who have successfully completed the membership exams this year, a hearty congratulations! To all College members, if you are attending the COMP/AAPM conference in Vancouver, please come to the Annual General Meeting of the CCPM to welcome our new members. The 2011 AGM will be held at 4:30-6 pm on Monday August 1, in the Mackenzie Ballroom, Concourse Level of the Fairmont Waterfront Hotel, which is across the street from the Vancouver Convention Centre. See you there!

Message from the Executive Director of COMP/CCPM

Bill C-4: Canada's New Not-for-Profit Corporations Act

The new Not-for-profit Corporations Act received royal assent on June 23, 2009. The regulations, forms and guidance are still being finalized by Corporations Canada but the act is expected to come into force in the fall of 2011. While very long and detailed, the new Act is more reflective of modern governance principles and standards (the old Act was written in 1917). It is also more flexible with respect to financial review provisions and the filing of bylaw changes. The new act also expands and clarifies the rights of members as well as the duties, powers, potential liabilities and standard of care for directors.

All not-for-profit organizations have a three year window to apply for a Certificate of Continuance (failure to do so will result in dissolution). This requires the preparation of each organization of articles of continuance which are similar to current Letters Patent. The articles of continuance must include information such as membership classes and voting rights and may include other governance details. COMP will also have to create new By-laws that are consistent with the new Act and articles of continuance and that deal with the governance mechanics. It is to COMP's advantage to let the larger associations (eg. the Canadian Medical Association, the Canadian Nurses' Association etc.) play a leadership role and complete the compliance requirements first as they will have the financial resources to cover the necessary legal fees. Groups like COMP and CCPM can then learn from the experience of these larger groups without as much financial investment. Even still, the Boards of COMP and CCPM are aware that the new legislation will require additional staff and volunteer time and plans are being developed to make the transition.

Canadian Content at the Joint AAPM/COMP Annual Scientific Meeting

COMP will have a booth located beside the Joint ASM registration desk at the Vancouver Convention Centre. Please drop by to say hello, pick up your tickets for the Banquet Cruise, find out more about COMP and CCPM events at the joint meeting and learn more about the 2012 Winter School that will be taking place at the Whistler Hilton.

COMP Committee meetings and the AGMs for both COMP and CCPM will be taking place at the COMP headquarters hotel, the Fairmont Waterfront which is across the street from the convention centre.

The COMP Awards ceremony will be taking place on August 3rd at 4:45pm at the Fairmont Waterfront. Please join us at this ceremony where will be presenting the Sylvia Fedoruk award and celebrating the distinguished career of the 2011 COMP Gold Medal winner, Jake Van Dyk.

The Awards Ceremony and COMP AGM will be followed by the COMP Banquet

Ms Nancy Barrett

which will be on a cruise of the Vancouver harbour where you will be treated to spectacular scenery, five-star cuisine and a front row seat for the Celebration of Lights Fireworks Competition. The boat will leave the dock at 7:30pm. Please note that the Banquet Cruise is a separate event and not included in the AAPM/COMP ASM registration package. Tickets must be purchased separately and in advance in order to participate. I would like to take this opportunity to thank the sponsors of the banquet cruise for their support.

For your convenience, a complete listing of COMP and CCPM events at the Joint AAPM/COMP ASM can be found in this issue of InterACTIONS and more information is available on the COMP website or the conference website: http://www.aapm.org/meetings/2011AM/.

As always, please feel free to contact me at nancy@medphys.ca or Gisele Kite at admin@medphys.ca at any time with your feedback and suggestions.

CNSC Feedback Forum
Air Activation on Ozone Production in Medical Linac Facilities

Jeff Sandeman

Senior Project Officer
Accelerators and Class II Facilities Division
Directorate of Nuclear Substance Regulation
Canadian Nuclear Safety Commission

Since the development of the very first medical linear accelerators, it has been recognized that some air activation will occur via (γ,n) interactions within the conical volume of air irradiated by the primary x-ray beam. The main activation products are ^{15}O and ^{13}N, both of which decay via β+ emission, with half life of 2 minutes and 10 minutes respectively. The minimum photon energy required for production of these isotopes is 15.7 MeV for ^{15}O and 10.5 MeV for ^{13}N.

Similarly, ozone (O_3) will be produced within the volume of air irradiated during electron treatments, due to the ionization and subsequent recombination of O_2.

Both activation products and ozone present potential hazards to staff. Activation products will add to the radiation dose incurred by persons entering the accelerator room following irradiation. High concentrations of ozone act as an asphyxiant. The primary means of mitigating the potential hazards is to prevent build-up of the concentration of these by-products by ensuring there is adequate ventilation in the room. However, this raises the question, "how much ventilation is enough?"

This article briefly reviews some of the existing published guidance for calculating the potential concentrations of ^{15}O, ^{13}N and O_3, as well as the methods for estimating the radiation doses which may result from air activation products. The results of an evaluation of the potential hazards using these methods will then be presented. The analysis covers a broad range of medical accelerator operating conditions and room ventilation rates, including zero ventilation.

Concentration and Dose Calculations for Activation Products

Probably the first analysis of the potential radiation doses incurred from air activation in medical linac facilities was published by Holloway & Cormack in 1980 (H&C1980). Subsequently, McGinley performed a similar analysis (Mc1984), using the methods he later included in his book *"Shielding Techniques for Radiation Oncology Facilities"* (Mc2002).

The fundamental approach used by both H&C and McGinley is the same. The concentrations of ^{15}O and ^{13}N within the air of the treatment room are calculated based on a series of assumptions relating to the clinical irradiation conditions. Standardized concentration-to-dose conversion factors are then used to derive both the equivalent dose to the skin (H_{skin}) from β+ emissions, and the whole body effective dose (E) from annihilation photons, that a Radiation Therapist might incur while working inside the treatment room between treatments. The doses from each post-irradiation entry into the room are then summed to derive annual doses.

However, within this framework, their approaches to analyzing the radiation dose to a therapist differ in terms of some of the basic assumptions made. For example, McGinley measured the production rates of ^{15}O and ^{13}N while H&C use theoretically derived values, which differ by roughly a factor of 2. H&C assume the activation products would only diffuse into one-tenth of the total room volume in the immediate vicinity of the beam/patient, while McGinley assumes it is uniformly distributed throughout the room. McGinley assumes the therapist enters the room immediately post-irradiation while H&C allow 20 seconds of post irradiation decay and ventilation prior to entering the room. H&C assume the therapist remains in the room for 3 minutes following each treatment while McGinley assumes 5 minutes. McGinley sums the dose contributions from residual activity remaining in the room from previous treatments, while H&C ignore this component. Different beam sizes and total path lengths are also used.

Ultimately, both H&C and McGinley conclude that radiation doses will be negligible, but there are three important limitations to that conclusion. These are:

- Both papers assume the same room volume (139 m^3) and ventilation rate (8 air changes per hour). Neither paper analyzes the impact of smaller room volumes or lower ventilation rates, which will increase the concentration of ^{15}O and ^{13}N and the resulting radiation doses.
- Both papers state that the limiting dose will be the skin dose from β+ emissions. This assumption is made because the

Maximum Permissible Concentrations (MPC), which are the concentrations at which a worker continuously occupying the area would receive a dose equal to the annual dose limit, were an order of magnitude lower for H_{skin} than for E. However, the MPCs were based upon the occupational dose limits at the time, which were 300 mSv and 50 mSv y^{-1} respectively. The H_{skin} limit has since been increased to 500 mSv, while limit for E has been reduced to 20 mSv y^{-1} (100 mSv averaged over 5 years). In addition, there was no consideration of ALARA, particularly with respect to E.

- Neither paper considered the potential impact of the inhalation dose.

O_3 Concentration Calculations

H&C also discuss the potential O_3 production from medical linacs. H&C indicates that for 8 air changes per hour, the maximum concentration would be 6.0×10^{-4} ppm, well below the threshold limit value of 0.1 ppm. H&C also indicate that even with no ventilation, the maximum attainable concentration would be 4.8×10^{-3} ppm, due to a "half value reduction" time of 35 minutes for O_3.

Chapter 7 of Mc2002 provides a method for calculating the concentration of O_3 inside a treatment room. McGinley concludes that "for normal clinical use of electron beams, a room ventilation rate of about three room change per hour is more than adequate", but does not include any calculations to support this conclusion.

Regulatory Implications

The work done by H&C and McGinley has had a regulatory impact. Typically, applicants for medical linac construction licences have been required to:

- assess the potential radiation doses from ^{13}N and ^{15}O;
- specify minimum ventilation requirements, and;
- verify adequate ventilation post-construction.

Due to the relatively limited use of electron beams, ventilation adequate to minimize doses from activation products have been assumed to be sufficient to prevent any significant build-up of O_3.

In response, applicants have typically calculated doses from ^{13}N and ^{15}O based on a predetermined ventilation rate obtained from the building design specifications. Invariably, these doses are negligibly small and two questions frequently arise.

- "What is the minimum ventilation required?" and;
- "What happens at zero ventilation?" or "Do we have to stop operation if the ventilation fails?"

These two questions highlight the need for a thorough reanalysis of ^{15}O, ^{13}N and O_3 production in medical linac facilities.

Reanalysis of Doses from Air Activation

Doses from ^{15}O and ^{13}N were reanalyzed using the basic methods and production rates given by McGinley, for a broad range of ventilation rates and operating conditions. Inhalation doses were also incorporated directly into the dose calculations. Doses were derived using:

$$E = \left(\frac{D\,RA\rho_{air} f_N P_N \lambda}{D_{ref} F V}\right)\left(\frac{1-e^{-(\lambda+v/V)t}}{(\lambda+v/V)}\right)\left(B\,DC_{inh} + \frac{DL_E}{MPC_E}\right)\left(\frac{1-e^{-(\lambda+v/V)T}}{(\lambda+v/V)}\right)\left(\sum_{i=1}^{n}(n-i+1)e^{-(i-1)(\lambda+v/V)(t+T)}\right)$$

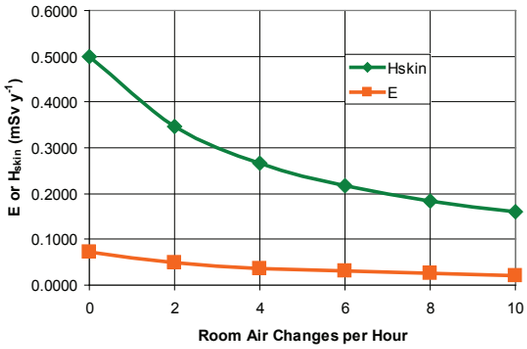
$$H_{skin} = \left(\frac{D\,RA\rho_{air} f_N P_N \lambda}{D_{ref} F V}\right)\left(\frac{1-e^{-(\lambda+v/V)t}}{(\lambda+v/V)}\right)\left(\frac{DL_{skin}}{MPC_{skin}}\right)\left(\frac{1-e^{-(\lambda+v/V)T}}{(\lambda+v/V)}\right)\left(\sum_{i=1}^{n}(n-i+1)e^{-(i-1)(\lambda+v/V)(t+T)}\right)$$

The five bracketed elements in each equation relate to the following components of the calculation:

- The first term represents the increase in the activity concentration (in Bq m^{-3}) of isotope *N* with decay constant λ, within a fraction *F* of the total room volume *V*, due to production of radioactive nuclei over the n^{th} irradiation period of duration *t*. The activation products are assumed to be confined to and uniformly distributed within the fractional volume *FV*. The term v/V gives the room ventilation rate in air changes per second. P_N is the production rate (from Mc2002) of nuclide *N* per unit mass of air irradiated (radioactive nuclei s^{-1} kg^{-1}) at a reference dose rate D_{ref} of 1 Gy min^{-1}. *D* is that actual treatment dose rate, *R* is the beam path length in air (m), *A* is the field size (m^2), ρ_{air} is the density of dry air at STP (1.205 kg m^{-3}) and f_N is the weight fraction of target atoms for producing isotope *N* in air (0.755 for N and 0.232 for O).
- The second term corrects the concentration for losses due decay and ventilation during the irradiation period *t*.
- The third term contains the conversion factors for converting the in-air concentration of radionuclide *N* to the radiation dose incurred over a post-irradiation exposure duration *T*. In the case of *E*, it includes an inhalation dose component $B\,DC_{inh}$ where *B* is the mean adult inhalation rate (0.925 m^3 h^{-1}) and DC_{inh} is the inhalation dose coefficient in Sv Bq^{-1} for isotope *N* calculated using LUDEP (NRPB2000). The remaining term $DL_{(E\ or\ skin)} / MPC_{(E\ or\ skin)}$ is the coefficient for external dose. *DL* is the dose limit and *MPC* is the corresponding maximum permissible concentration. *MPC* values were derived using the same method described by H&C, from the dose at the centre of a hemispherical cloud of uniformly distributed radioactive gas with a radius of 3 m.
- The fourth term corrects the concentration for losses due decay and ventilation during the exposure period *T*.
- The final term sums the doses incurred from all *n* irradiation and exposure cycles each day, corrected to include the additional contributions to each exposure due to the residual activation products remaining in the room from the previous *n* -1 irradiations.

The results of this analysis, for typical linac operating conditions, are shown in Figure 1.

FIGURE 1: Skin Dose (H_{skin}) and Effective Dose (E) from Air Activation for Various Ventillation Rates and Typical Operating Conditions
(30 kGy y^{-1} @ 18MV, 20x20 field, 3 m beam path
***D* = 5 Gy/min, *V* = 100 m^3, *F* = 0.25)**



As can be seen, under normal operating conditions, even with no ventilation, the annual equivalent dose to the skin due to ^{13}N and ^{15}O will be less than 0.5 mSv, while the annual effective dose will be less than 0.1 mSv. Note that this assumes that $F = 0.25$. Assuming that the ^{13}N and ^{15}O diffuse uniformly throughout the room reduces these doses by a factor of 4. Also note the use of a beam path of 3 m (rather than 1 m) since activation is not limited to the volume between the accelerator target and the patient, but will also occur within the beam volume on the exit side of the patient, albeit at a reduced rate.

Additional analysis shows that it is only under extreme and unrealistic operating conditions, such as those used by H&C (i.e., 100 kGy y^{-1} of operation all at 25 MV using a 40x40 field and $F = 0.1$) that significant doses are calculated. Even then, the maximum E derived assuming continuous operation with no ventilation for one year, is on the order 2.5 mSv y^{-1}, while the maximum H_{skin} is ≈ 20 mSv.

Reanalysis of O_3 Production

Again, a modified version of the methodology from Mc2002 was used. That is:

$$C_{O3,ppm} = (D_e P_{O3} f_o A\, RK)\left[\frac{(1 - e^{-(v/V)t})}{v}\right]$$

Where $C_{O3,ppm}$ is the concentration of O_3 in ppm, f_o is the fraction by weight of O_2 in air (0.232), P_{O3} is the production rate of O_3 by electron irradiation of air (≈3.75 x 10^{17} molecules J^{-1}), D_e is the electron beam dose rate in Gy min^{-1}, A is the field size in m^2, R is the electron beam path length in m, V is the room volume in m^3, v is the room ventilation rate in m^3 s^{-1}, t is the irradiation time in s, and K is a constant having a value of 8.85 x 10^{-22} molecules kg min s^{-1}.

While this appears very different from the formula given in Mc2002, it can be derived from that equation by noting that the electron beam current in air (I) can be estimated from the electron fluence rate required to produce the corresponding treatment dose rate in water/tissue. That is:

$$I = \frac{D_{water}\, \rho_{water} Ae}{S_{col,water}\,(1.6 \times 10^{-13}\ \mathrm{J\ MeV^{-1}})(60\ \mathrm{s\ min^{-1}})}$$

Where D_{water} is the electron beam dose rate (Gy min^{-1}), $S_{col,water}$ is the collision stopping power of electrons in water (≈ 1.9 MeV cm^{-1} from 2 to 25 MeV), ρ is the density of water (1 x 10^{-3} kg cm^3), A is the area (cm^2) of the beam, and e is the elementary electron charge (1.6 x 10^{-19} Coulombs). It is worth noting that for a maximum field size of 40 cm x 40 cm at isocentre and a dose rate of 5 Gy min^{-1}, this equates to an in-air electron beam current of only 70 nanoAmps, which is well below the beam currents of a few μA which are typically used for illustrative purposes when estimating O_3 levels.

Using this method, the following three observations can be made with respect to O_3 production assuming continuous operation using an electron beam with 40 cm x 40 cm field size and a dose rate of 5 Gy min^{-1}:

- For a 100 m^3 room with no ventilation (v=0), it would require 45 hours of to attain the O_3 TLV of 0.1 ppm;
- For an infinite irradiation time, a ventilation rate of just 0.027 air changes per hour is sufficient to limit the equilibrium concentration O_3 to 0.1 ppm, and;
- For an infinite irradiation time, a ventilation rate of 1 air change per hour limits the equilibrium concentration of O_3 to 0.0022 ppm, or about 1/450th of the TLV.

Conclusions

These findings indicate that, even if a medical linac were to be operated for a full year in a room with no ventilation whatsoever, the radiation doses resulting from ^{13}N and ^{15}O produced in the air inside the room would be negligible. Similarly, O_3 production is sufficiently low that there is no reasonable possibility of ever reaching the limiting concentration of 0.1 ppm.

Consequently, the Accelerators and Class II Facilities Division has concluded that requiring radiotherapy linac licence applicants to submit detailed analyses of ^{13}N, ^{15}O and O_3 production is no longer warranted. This applies only to medical electron accelerators. Analysis of the production of potentially hazardous gaseous by-products for other types of accelerator, such as cyclotron and research accelerators, is still required.

(H&C1980) *"Radioactive and Toxic Gas Production by a Medical Electron Linear Accelerator"*, A.F. Holloway and D.V. Cormack, Health Physics Vol 38(4), 1980

(Mc1984) *"Dose to Radiation Therapy Technologist from Air Activation"*, second edition, P.H. McGinley (Mc2002).

(Mc2002) *"Shielding Techniques for Radiation Oncology Facilities"*, second edition, P.H. McGinley (Mc2002).

(NRPB2000) *"LUDEP 2.0 – Personal Computer Program for Calculating Internal Doses Using the ICRP Publication 66 Respiratory Tract Model"*, Version 2.07, National Radiological Protection Board, 2000

Medical Physics Research in Pediatric Radiology in Manitoba

Harry Ingleby, PhD, MCCPM
CancerCare Manitoba
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Members of the Imaging Physics group of the division of Medical Physics of CancerCare Manitoba are collaborating with pediatric radiologists on several projects relating to dose measurement and optimization and clinical implementation of new imaging technologies. Two recent projects include an assessment of digital tomosynthesis for pediatric imaging, and dose monitoring in the neonatal intensive care unit.

Assessment of digital tomosynthesis

Tomosynthesis is an idea whose time has come. Digital tomosynthesis is a simple method for producing cross-sectional images using a slightly modified version of conventional digital x-ray equipment. The original concept of limited angle tomography was developed in the 1930s and the term "tomosynthesis" was coined in 1972.[1] However, tomosynthesis did not become popular until more recent developments in digital x-ray detectors provided the basis for a clinically effective imaging platform. Currently, tomosynthesis is being investigated for application in a wide range of imaging procedures, including chest, breast, head and extremities.

In a tomosynthesis image acquisition, the x-ray tube moves through a limited angle sweep, typically spanning 40° to 60°, while the detector remains stationary behind the patient, as shown in Figure 1. X-ray exposures are taken at a number of discrete points across the sweep. The images taken are processed by a reconstruction algorithm, generating a set of slice images in planes parallel to the detector. In these slice images, overlapping anatomy from preceding and subsequent slices is blurred out, providing depth information and detail free of clutter not possible with standard projection x-rays.

A GE Definium 8000 x-ray system with digital tomosynthesis capability is currently in use in the Children's Hospital. Research collaboration between pediatric radiologists lead by Dr. Martin Reed, Head of Pediatric Radiology, and the research group of Dr. Idris Elbakri at CancerCare Manitoba, has investigated the application of digital tomosynthesis to a number of pediatric imaging tasks.

Previous investigations included studying the efficacy of tomosynthesis for lumbar spine examinations, particularly for the diagnosis of spondylolysis, as well as for the cervical and thoracic spine and some facial bone examinations such as the evaluation of the temporomandibular joints (TMJ). Tomosynthesis is now the preferred examination method for lumbar spine and TMJ at the Children's Hospital. Figure 2 shows how tomosynthesis can enhance anatomical structures compared to plain radiography. For other anatomical sites, tomosynthesis provides a useful troubleshooting tool following standard radiography, with the potential to avoid follow-up computed tomography examinations in some cases, thus providing a significant reduction in patient dose. Current investigations include assessing tomosynthesis for pediatric sinusitis and detection of renal calculi.

Dose tracking in the neonatal intensive care unit

The neonatal intensive care unit (NICU) hospitalizes newborn babies with serious medical problems that demand close monitoring. Chest and abdominal x-rays are frequently required for diagnosis and monitoring of a variety of serious conditions in these neonates. Some NICU patients require a large number of diagnostic x-rays over the course of their stay in order to ensure appropriate care.

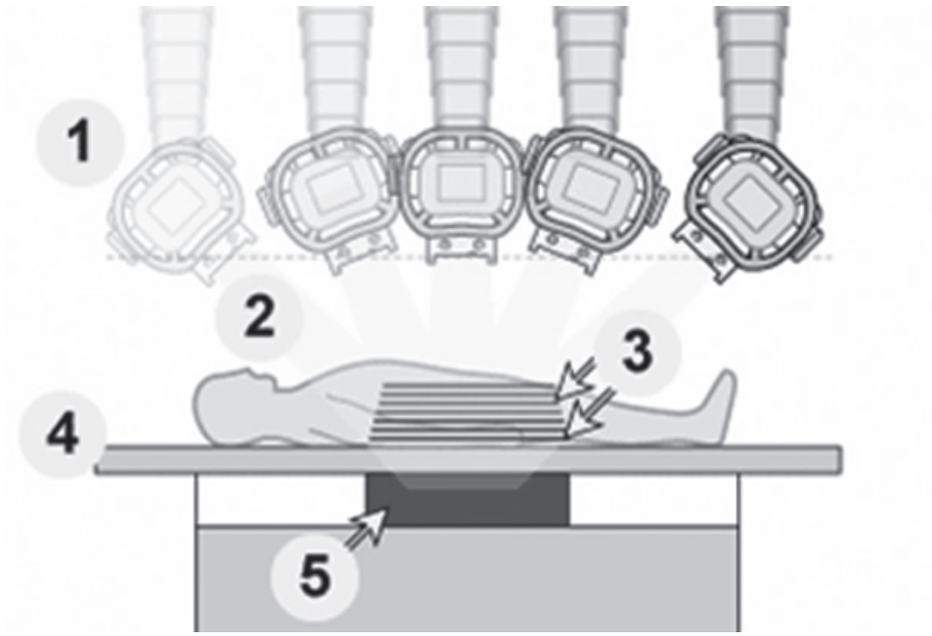

Figure 1: Tomosynthesis image acquisition (GE Healthcare, reprinted with permission)

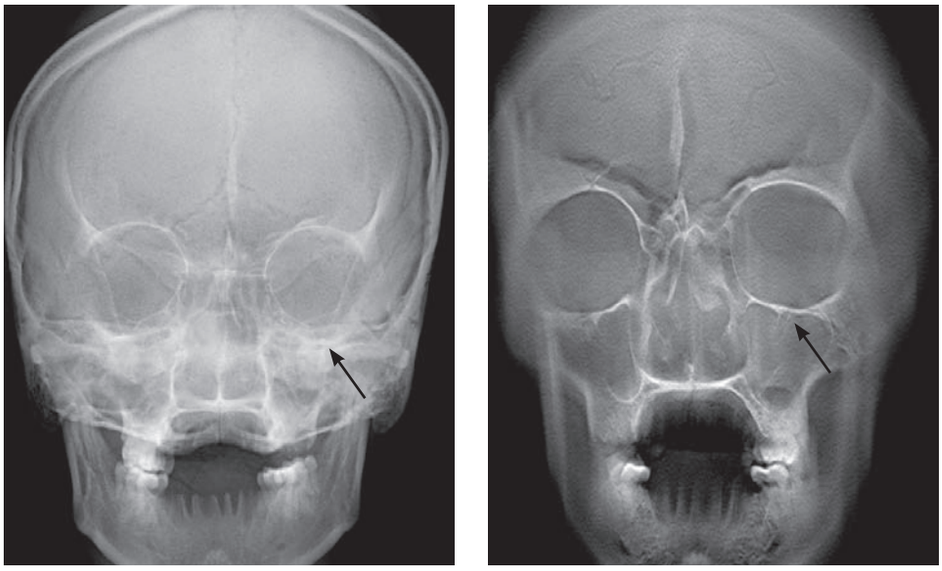

Figure 2: Left: skull phantom radiography. Right: tomosynthesis slice with orbit floors (arrows) brought into sharp focus.

Infants and children are at greater risk from ionizing radiation than adults due to the increased radiosensitivity of their cells and their longer life expectancy, both of which increase the likelihood of the development of radiation-induced cancers. It is thus particularly important to monitor and minimize the radiation dose to young patients from diagnostic x-ray examinations.

As a first step towards optimizing patient dose in the NICU, a collaborative project to develop a dose monitoring method was begun by Dr. Elbakri's research group in 2009 with research funding from the Manitoba Medical Services Foundation and the Manitoba Institute of Child Health. The goal of the project was to develop a simple method for estimating and recording patient dose resulting from each diagnostic x-ray procedure.

In the first stage of the project, the ability to accurately estimate patient effective dose from data routinely collected during NICU x-ray procedures was investigated. Patient data, x-ray image data and x-ray technique parameters were input into dose calculation software (PCXMC) and the resulting dose estimates were correlated with an x-ray exposure parameter (lgM) associated with each image by the computed radiography (CR) system. It was found that the dose estimates and the lgM value were only weakly correlated, so this approach did not provide the ability to accurately estimate patient dose.

In the next stage of the project, software dose estimates were compared with measured TLD doses obtained using a plastic phantom representing a newborn infant (Figure 3). The software dose estimates and measured TLD doses showed good agreement. This provided the necessary confidence that, given a more effective measure of patient x-ray exposure than the CR exposure parameter, patient dose could be reliably estimated using the software.

Figure 3: Anthropomorphic baby phantom manufactured by CIRS Inc.

This led to the final stage of the project, the installation of a dose-area product (DAP) meter on the portable x-ray unit used in the NICU. The DAP reading, which is a measurement of x-ray dose in air multiplied by the size of the radiation field, is read off from the meter and included with each x-ray image as an annotation. Together with patient data and the associated image, the DAP reading can be used with the dose estimation software to generate a usefully accurate estimate of patient dose for that procedure. This enables dose recording and tracking in the NICU, as dose measurements are now a part of the patient record. The next goal of this research is to use this data to help optimize NICU x-ray practices to minimize patient dose.

[1]J. T. Dobbins III, "Tomosynthesis imaging: At a translational crossroads," Med. Phys. **36** (6), 1956-1967 (2009).

AQuSI Workshop: Minimizing Errors, Maximizing Quality

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In April of this year I had the opportunity to attend an AQuSI workshop in Philadelphia, Pennsylvania. This workshop, entitled "Minimizing Errors, Maximizing Quality", aptly followed on the heels of the COMP winter school on Quality and Safety in Radiation Oncology (held in Tremblant in late January). The AQuSI workshop reiterated and expanded on the concepts learned at the winter school and most importantly provided practical hands-on sessions which allowed participants to develop skills in identifying and reducing risks in radiation medicine.

AQuSI is an international partnership of 4 individuals: Todd Pawlicki, Sasa Mutic, Peter Dunscombe and Derek Brown. The organization was formed in order to provide the radiation medicine community with practical training in error management and quality improvement. In order to achieve this goal, AQuSI offers multidisciplinary workshops and online learning courses to radiation medicine professionals (Radiation Oncologists, Administrators, Therapists, Dosimetrists, Physicists, Nurses, and Educators). Two workshops have been offered to date (Philadelphia, PA and La Jolla, CA) and a third workshop is planned for Seattle, WA this fall.

The Philadelphia workshop was attended by 13 registrants with representation from all members of the radiation medicine team: 1 Radiation Oncologist, 4 Radiation Therapists, 1 Radiation Therapy Quality Manager, 1 Software and Systems Developer (Varian), and 5 Medical Physicists. Registrants were also diverse in terms of geographic location: Ottawa (2), Philadelphia (5), Minnesota (1), Pennsylvania (outside Philadelphia) (2), Rhode Island (1), California (1), and Germany (1). The number and diversity of the attendees and the relaxed atmosphere resulted in many excellent discussions and debates. The course content and learning environment was a perfect mix! Of particular note was the attendance of a Radiation Therapy Quality Manager. I was pleased to discover that this position is beginning to take hold in radiation therapy. It is also worth noting that the recently released "Quality Assurance Guidance for Canadian Radiation Treatment Programs" (published by Canadian Partnership for Quality Radiotherapy) requires that a Quality Control Officer be designated within the radiation treatment program as having primary responsibility for the equipment quality control program. However the document does not go so far as to recommend a Quality Manager whose responsibilities would include ensuring that the program has the quality tools and training required to implement and maintain their quality system. Perhaps this is something to look forward to.

Eight sessions were offered at the Philadelphia workshop: Human Factors, Incident Learning, Preventive Measures, Root Cause Analysis, Failure Modes and Effects Analysis, Fault Tree Analysis, Process Control and Quality Management. Each session began with didactic instruction and was followed by one or more practical exercises. The exercises (hands-on sessions) were excellent and were certainly a highlight of the workshop. Participants used a number of quality tools (e.g. incident assessment, root cause analysis, process mapping, failure mode and effects analysis and process control) in order to assess clinically relevant scenarios both prospectively and retrospectively. For retrospective analyses, accident scenarios were taken from the IAEA training slides on Prevention of Accidental Exposure in Radiotherapy (Module 2.10: Accident update – some newer events) as well as the Ottawa Orthovoltage incident. For prospective analyses, participants were asked to create a process map of their emergency (on-call) treatment process. The process map was then used to determine high risk failure modes so that controls (process modifications or quality control checks) could be identified. This prospective risk analysis approach was particularly informative and it was interesting to see the variation (clinic to clinic) in the after hours treatment process complexity and associated risks / failure modes.

In conclusion, I highly recommend this workshop to anyone interested in learning about practical quality tools that can be used to minimize errors and improve safety in day to day clinical operations. I would also recommend the recently published textbook "Quality and Safety in Radiotherapy", editors: Todd Pawlicki, Peter Dunscombe, Arno Mundt and Pierre Scalliet. If you are interested in learning more about AQuSI please visit http://www.aqusi.org. The website includes a free online course (Introduction to Error Management) as well as details about past and upcoming workshops.

I congratulate the organizers and founding partners of AQuSI for their vision, drive and enthusiasm. This is a very important and timely effort and you are commended!

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COMP Awards Ceremony & Banquet Cruise
August 3, 2011

The COMP Awards Ceremony and Annual General Meeting will be taking place on Wednesday, August 3rd, at 4:45 pm, Fairmont Waterfront Hotel, Vancouver, BC. At this meeting, we will be awarding the Sylvia Fedoruk Prize and honouring Jake Van Dyk, the 2011 winner of the prestigious COMP Gold Medal.

The Awards Ceremony and AGM will be followed by the **COMP Banquet Cruise** of the beautiful Vancouver harbour where you will be treated to spectacular scenery, five-star cuisine and a front row seat for the Celebration of Lights Fireworks Competition (www.vancouverfireworks.ca). The boat will leave the dock at 7:30pm.

The Banquet Cruise is a separate event and not included in the AAPM/COMP ASM registration package. Tickets must be purchased separately and in advance in order to participate.

Space is limited. Don't delay! Reserve your tickets ($140) before July 22nd by visiting www.medphys.ca or calling Gisele Kite at (613) 599-3491.

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Meeting of the Canadian Radiation Protection Association – May 8-12, 2011

David Wilkins, PhD, FCCPM

The Ottawa Hospital
Ottawa, Ontario

The Canadian Radiation Protection Association held its annual scientific meeting in Ottawa in early May. Since Ottawa is lovely in the springtime, I decided to attend. The meeting coincided with the annual Tulip Festival, and also with a rare spell of sunny warm weather.

There was much at this meeting of interest to medical physicists. The president of the Canadian Nuclear Safety Commission, Dr. Michael Binder (himself a PhD physicist), presented an overview of CNSC activities and directions. In his presentation, he issued a challenge to users of radioactive materials in Canada to get more involved in the CNSC public hearings process. These hearings tend to be dominated by the voices of activists and NIMBYists who would prefer that the CNSC license nothing. Rarely heard are balancing voices from the medical or research sectors who benefit from the production and use of radioactive materials.

The President of the International Commission on Radiological Protection, Dr. Claire Cousins, gave an excellent presentation on the activities and challenges of the ICRP. They are trying to address the unfortunate fact that the vast majority of medical practitioners (including radiologists) have never heard of the ICRP, by increasing their presence at medical meetings and improving access to their publications. As a practicing vascular interventional radiologist, Dr. Cousins is acutely aware of the important issue of radiation dose to patients and staff from the increasing frequency and complexity of minimally invasive procedures using fluoroscopic guidance, and the need for the ICRP to provide guidance in this area.

The safe use of radiation in medicine received significant attention at the CRPA conference, with an assortment of presentations on this topic from representatives of a variety of organizations, such as: the CAR on measures to reduce patient doses in radiology; descriptions of patient exposure registry projects from Health Canada and Dalhousie University; a radiation therapy incident learning system from The Ottawa Hospital; measurements of dose in the maze of a Cyberknife installation; and air activation and ozone production from medical linear accelerators by the CNSC.

In the wake of the unfortunate incident at the Fukushima Daiichi nuclear power plant, there were sessions devoted to radiological emergency response in general, and the specific responses to the Japanese incident, both international and Canadian. Various federal government agencies described the expertise and resources that they are able to contribute to radiological emergencies, including meteorological modeling by Environment Canada, radiometric mapping by the

Nuclear Emergency Response Team from Natural Resources Canada, biological dosimetry by Health Canada, and response to radiological transport accidents by Transport Canada. In addition, the CNSC described the measures they have taken to ensure that the Canadian nuclear power industry is incorporating lessons learned from the Japanese experience.

Overall this was an excellent conference, with considerable content of interest to both clinical and academic medical physicists. I would urge COMP members to consider attending the CRPA conference in the future. Coincidentally, the CRPA conference is being held in Halifax next year (May 27-30), but unfortunately not at the same time as the COMP ASM (July 11-14). However, the thought of five weeks of vacation in Nova Scotia between the CRPA and COMP conferences is appealing…

Message from the Councillor for Professional Affairs

Well, this is the first and yet the last time you will read a message from me in InterACTIONS since my term as Councillor for Professional Affairs comes to an end at the COMP Annual General Meeting. I thought that before my term comes to a completion I would update the membership on the status of discussions surrounding Ontario Bill 68: *The Open for Business Act*. You may recall that back in the late summer of 2010, amendments to this omnibus bill included changes to the *Professional Engineers Act* which removed an important exemption clause.

Currently, the *Professional Engineers Act* states that: the "practice of professional engineering" means any act of planning, designing, composing, evaluating, advising, reporting, directing or supervising that requires the application of engineering principles and concerns the safeguarding of life, health, property, economic interests, the public welfare or the environment, or the managing of any such act; ("exercice de la profession d'ingénieur"). The previous act included the exemption clause "but does not include practicing as a natural scientist" at the end of this definition.

A number of natural science organizations believed that there was insufficient consultation regarding removal of this clause. The natural science community raised the issue with government after third reading of the amending Bill had commenced. The Government of Ontario asked Professional Engineers Ontario (PEO) to work with the natural scientists to see if a regulatory solution to address the concerns of the natural scientists could be developed. On October 25, 2010 the *Professional Engineers Act* received Royal Assent. The government's amending Bill did not include the recommended exemption clause.

A Joint Engineering and Natural Science Task Force (JENSTF) was subsequently struck with a mandate to achieve the intent of the exemption clause. COMP was invited to participate and so a representative (J.E. Hayward) was identified to participate as a member of this task force and act as a liaison to the process. Although the JENSTF was unable to develop the wording for an exemption through a Regulation in the *Professional Engineers Act*, an Overlapping Practices Committee was established that will assist PEO in determining whether a natural scientist is practicing professional engineering on a case-by-case basis. This committee is comprised of members of the engineering and natural science communities. (J.E. Hayward is a member of this committee.) In addition, the JENSTF recommended that PEO work with the natural science community and Engineers Canada to establish a task force with a broader mandate to consider when it is in the public interest to require a person practising natural science to hold a license. (To in part maintain continuity, J.E. Hayward has volunteered to be a member of this task force.)

In addition, during recent meetings with the Ontario Attorney General's office, it was agreed that PEO would issue a public statement, via their literature, website, etc., that is to read as follows (draft version):

"PEO clarifies that it does not have jurisdiction over the practice of Natural Science. Where there is any concern as to whether a person is practicing engineering in addition to natural science, the Overlapping Practices Committee would deal with the case."

For those that would like more information, please refer to van Driel and Allen, JENSTF Final Report, which was recently added to the COMP website. (It should be noted that elements of this message have in fact been taken directly from this report.) In addition, because the topic is complex and has many nuances, the intent is to include future articles in InterACTIONS to stimulate discussion and assist with the consolidation of a position by COMP with regard to these events. While it is recognized that this particular situation pertains strictly to Ontario, the ultimate resolution can clearly have national implications.

Joseph E. Hayward

So, you can see that, although I will no longer chair the Professional Affairs Committee, I will still be actively representing our organization on a professional level. I would like to take this opportunity to thank the members of the COMP Executive and the Professional Affairs Committee for their help and support during my tenure as Councillor. I would like to encourage all of our members to take some time to consider volunteering to serve on one of COMP's various committees. It is a rewarding learning experience and you get to wear a much cooler badge at the ASM.

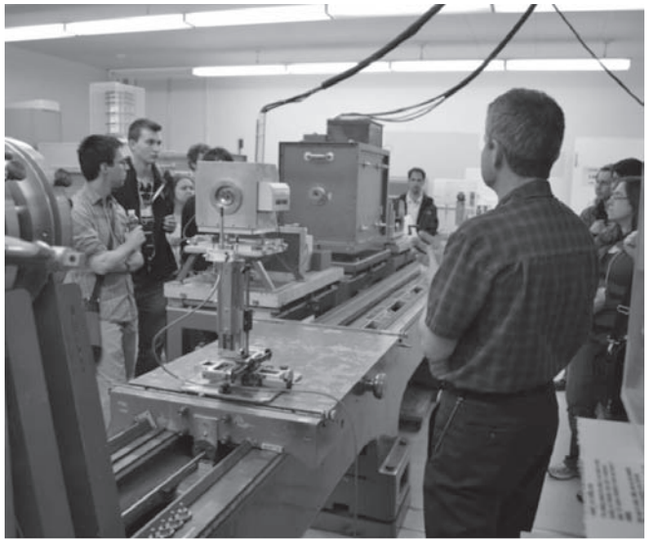
NRC Workshop Redux

Malcolm McEwen, PhD
Institute for National Measurements Standards
National Research Council, Ottawa, Ontario

Over-popularity is not something that physicists usually have to deal with but Dr. Claudiu Cojocaru of the Ionizing Radiation Standards Group at the National Research Council is not complaining. He has just finished organizing a second 1-day workshop for Canadian medical physicists on "Primary Standards, Calibration Services and Research Capabilities" after the first one (held as part of 2010 COMP ASM) was oversubscribed. Twenty Masters and PhD students from Ottawa, Kingston and Montreal signed up for the May 2011 edition. The workshop had originally been scheduled for February of this year but the infamous Canadian winter intervened. Not that the weather in May in Ottawa is always predictable, but the day dawned bright and warm and both the students and coffee arrived on time!

The course attendees hear about the latest developments in electron beam dosimetry from NRC scientist Claudiu Cojocaru.

The aim of this second workshop was to introduce medical physics students to the activities and staff of the IRS group at INMS. "By interacting with the medical physicists of tomorrow we ensure continued engagement between the standards lab and the user community. And perhaps attract the next generation of metrologists!" says Group Leader Dr. Carl Ross.



NRC scientist John McCaffrey describes the operation of the X-ray laboratory.

"The work of IRS is often perceived by medical physicists in cancer centres as simply, 'Calibration Services and Monte Carlo', so we wanted to show the full range of what goes on here" continues Dr. Cojocaru. Presentations therefore covered all the activities of the IRS group, including both the expected – maintenance of primary standards for cancer therapy – and the new – linear accelerator-based production of radioisotopes for nuclear medicine imaging.

A full tour of the IRS facilities followed the lectures and these highlighted the wide range of facilities operated by the group. "Visitors often don't realize the capabilities of the group until they see it for themselves", enthuses Dr. Cojocaru. "What we have here is unique in Canada and, possibly, the world. We may have the solution to a student's measurement or calculation problem – a project that could well result in improved techniques being implemented in clinic."

The success of these two workshops is very encouraging and the Ionizing Radiation Standards group is looking at the best option to continue their interactions with the medical physics community. Stay tuned for news of further workshops!

Message from the Communications Committee

Tony Popescu, PhD, MCCPM
COMP Councillor for Communications

I would like to start by bringing into focus a topic already mentioned last year at the COMP AGM in Ottawa and invite all COMP members to give it some thought. One of the long-standing tasks on our committee's agenda has been to generate a 'COMP List of Experts'.

What do we exactly mean by that and why do we need it? The need for this list (or one of the main reasons to have it) arises from the COMP External Communications Policy and Procedure, adopted at the last COMP mid-year Board meeting in November 2010. (The full text of this policy is given below.) The policy, which refers to communications with the media and with other organizations, identifies the COMP President as the official spokesperson of our organization. In this capacity, he/she may need expert advice in responding to specific questions or enquires. Therefore, we need to put together a list of people who, on one hand, are experts in a specific subfield and, on the other hand (and perhaps more importantly), are willing to be contacted by the COMP President to provide support as needed. I hope our members will appreciate the fact that this cannot be achieved without volunteer participation in this process.

If you would like to contribute, please contact our Executive Director, Nancy Barrett, or the COMP President, Dr. Peter McGhee, identifying yourself as an expert in a specific area or aspect of medical physics, who could be contacted for the purpose described above. At this early stage, we will not list specific subfields or required credentials, to keep the process as open as possible.

We would also like to receive feedback from COMP members on a few other topics (some of which have been mentioned in previous AGM reports) and I invite you to write to the Editor, Dr. Idris Elbakri, or to me, or bring your ideas forward at the upcoming AGM in Vancouver. Don't forget that we are still waiting to receive from you proposals for topics that will help us launch a Canadian version of a medical physics "point-counterpoint" feature. So far, we have only received an ingenious suggestion from Frederic Tessier of NRC that would help avoid too much similarity with the well-known Medical Physics journal feature. He suggested to call the column "The cross-section", with the first viewpoint being called "The Incident Angle" and the second one being called "The Scattering Angle", which would tie in nicely with the title of the newsletter. Half of the people to whom I've mentioned this thought it was a cool idea, while the other half thought it was nerdy. (As a physicist, I proudly take both terms as compliments, by the way.) What do you think? And, more generally speaking, is there even a scope for such a feature? Is there anything controversial in our professional lives that should be discussed openly, or should it all be settled behind closed doors? We could even start by having a point-counterpoint debate on *this* topic. Last, but not least, we would like you to tell us what you expect from InterACTIONS and whether you have proposals on how to make it even better.

COMP External Communications Policy and Procedure

Purpose:

As COMP is the voice of medical physicists in Canada, it is important that the information issued externally by the organization is accurate, consistent, timely and serves the best interests of the profession.

Policy:

COMP regularly communicates with its membership and with adjacent communities. From time to time, COMP publishes consensus statements and reports that are made available via its website and its quarterly newsletter, InterACTIONS. COMP manages its external communications in an open and pragmatic way and strives to be responsive to the legitimate interests of its stakeholders as well as the media. The COMP President is the designated official public spokesperson of the organization. The President may request that another member of the Board, the Executive

Director or subject matter expert perform this function, if circumstances warrant.

Procedure:
The following is the established process for handling requests for information:

A) Requests for information will be made to the Executive Director of COMP.

B) When possible, the Executive Director will request that specific questions be outlined in writing.

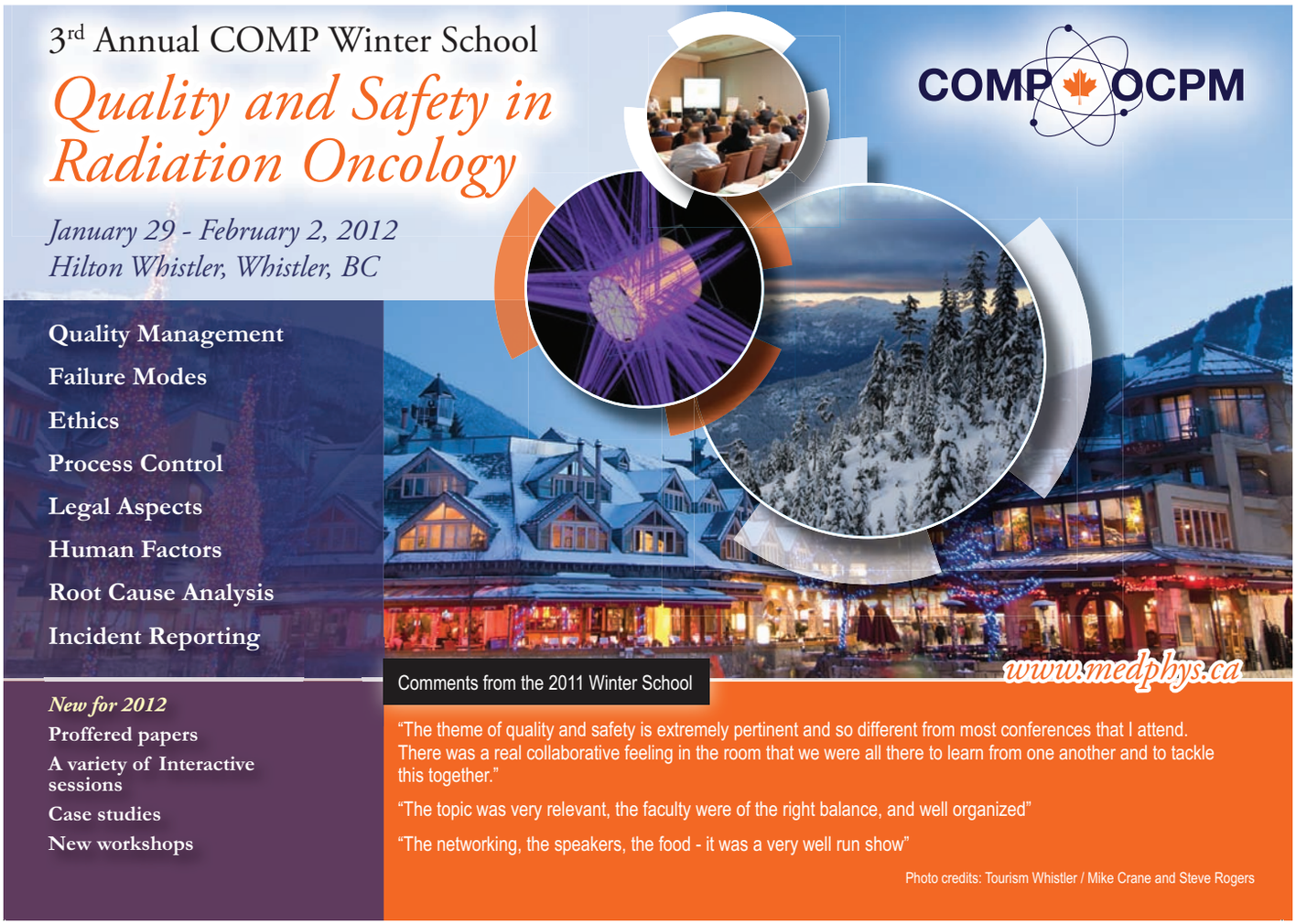
C) The Executive Director will contact the COMP President with the request. The COMP President and Executive Director will discuss the request to determine the benefits/risks of responding and the appropriate timing for a response. The President will then deal with the request as follows:

For routine requests, the COMP President will respond directly to the request.

For complex or controversial issues, the COMP President will discuss the request with the Board via email or teleconference and a position will be developed by consensus. The President will clearly indicate to Board members when COMP must respond to the request so that the Board can discuss the issue in a timely manner. If necessary, the Board will consult with subject matter experts in the medical physics community.

The Board position will then be communicated by the COMP President.

Next
Inter*ACTIONS*
deadline is September 1, 2011. Submit your articles on time.



COMP AND CCPM EVENTS AT THE JOINT AAPM/COMP MEETING

July 31 – August 4, 2011, Vancouver, B.C.

DATE	TIME	EVENT	LOCATION	ROOM
Sunday July 31st	9:30 – 11:00 am	Joint AAPM/COMP Student Meeting	Vancouver Convention Centre	Room 110
	11:00 – 12:00 pm	COMP Student Meeting	Vancouver Covention Centre	Room 110
	4:00 – 6:00 pm	J.R. Cameron – J.R. Cunningham Young Investigators Symposium	Vancouver Convention Centre	Ballroom A
Monday August 1st	2:00 – 3:50 pm	CCPM Symposium – Practical Medical Physics Track: The Inverse Problem in Medical Physics Training – Defining the Objectives and Finding the Solutions	Vancouver Convention Centre	Room 301
	4:30 – 6:00 pm	CCPM AGM	Fairmont Waterfront Hotel	Mackenzie Room
Wednesday August 3rd	4:45 – 5:30 pm	COMP Awards Ceremony Gold Medal Recipient – Jake Van Dyk Sylvia Fedoruk Award Presentation	Fairmont Waterfront Hotel	Waterfront Ballroom
	5:30 – 6:30 pm	COMP AGM	Fairmont Waterfront Hotel	Waterfront Ballroom
	7:30 pm	Sunset Banquet Cruise (tickets required)	Westin Bayshore & Marina	10-15 min walk from Hotel

New COMP Members

Please welcome the following new members who have joined COMP since our last issue:

Last Name	First Name	Institute	Member Type
Aldarwish	Huda	Laurentian University	Student
Cojocaru	Claudiu	National Research Council	Full
D'Souza	Malgorzata		Associate
Fiege	Jason	University of Manitoba	Associate
Garcia	Lourdes Maria	Cancer Centre of Southeastern Ontario	Full
Hill	Melanie	Sunnybrook Research Institute	Student
Jensen	Nikolaj	University of Western Ontario	Student
Johnston	Holly	University of Victoria	Student
Liu	Derek	Cross Cancer Institute	Student
Maraghechi	Borna	Laurentian University	Student
Mercure	Stéphane	Centre Hospitalier Universitaire de Sherbrooke	Full
Patrick	John	Lawson Health Research Institute	Student
Pham	Yen Thu	BC Cancer Agency – Vancouver Island Centre	Full
Roussin	Étienne	Hôpital Maisonneuve-Rosemont	Full
Tam	Cindy	BC Cancer Agency – Vancouver	Student
Thakur	Yogesh	Vancouver General Hospital	Full
Thompson	Manuela	McMaster University	Student
Van Uytven	Eric	CancerCare Manitoba	Associate
Wong	Felix Hau Chun	Juravinski Cancer Centre	Full
Wu	Gang	Sunnybrook Research Institute	Student
Xhaferllari	Ilma	London Regional Cancer Program	Student
Zakariaee	Roja	University of British Columbia	Student
Congratulations to past student members who are now full members:			
Baldwin	Lesley	Cross Cancer Institute	
Fraser	Danielle	The Ottawa Hospital	
Meyer	Tyler	Tom Baker Cancer Centre	
Olding	Timothy	Cancer Centre of Southeastern Ontario	
Pater	Piotr	Hôpital Maisonneuve-Rosemont	

Letter to the Editor

I was interested to read the article in the April 2011 InterACTIONS on the activities of the Canadian Partnership for Quality Radiotherapy. CPQR's overall guidance document *Quality Assurance for Canadian Radiotherapy Treatment Programs* is now available on their website. The quality assurance guidelines in this document will help to ensure continued high levels of patient care in our radiotherapy centres.

A helpful approach taken in this document is to specify a total of 46 Key Quality Indicators that can be used to assess the Quality Assurance Program in each institution. Many of these indicators are assessed on a 0 *or* 1 scale. The facility either meets the full requirements and receives a "1" or, if it falls short in some way, the rating is "0". Other parameters are rated on a 0 to 100% scale.

The purpose of my letter is not to critique what I think is an excellent document, but rather to suggest a topic for a medical physics sponsored seminar, especially one that is attended by a cross-section of staff, including physicists, therapists, radiation oncologists and management staff. (Sometimes it is difficult to find topics that can hold the attention and involve individuals from different areas.) For a recent seminar on Quality Assurance, I pasted the 46 Key Indicators from the CPQR document into an Excel worksheet and, rather than using a rating 0 or 1, or 0 to 100%, I allowed a rating of 0 to 10 for each indicator. I then briefly discussed each indicator in turn and asked for opinions as to how well the clinic met the indicator on the 0 to 10 scale. Not everyone would have an opinion on each indicator but, in our case, there were always several people with an assessment from their perspective as to how well we were meeting the requirement. The brief discussion on each topic sometimes showed that different areas had different opinions. However, the discussion was useful, especially to the managers and supervisors present, and showed areas where improvements in communication or procedures would be beneficial. As each opinion on the 0 to 10 scale was expressed, I entered the value in a column next to the indicator on the worksheet and a running average converted to a 0 to 1 decimal fraction was continually displayed. Those unhappy with the average could speak up and give their assessment.

We were able to cover the 46 indicators in an hour and ended up with an average value for each indicator and an overall average. Certainly the accuracy was not as great as would be determined by a review panel taking several days to carefully examine the documents relating to each indicator. However, if a staff member thought there was no procedure or document relating to some indicator and gave a low rating, then that is useful information to know. From that individual's point of view, we may as well not have had that procedure or document.

We had the advantage of having 20 or so individuals in one room participating in the discussion. It might not work as well for a larger group. However, those present found the discussion very useful and we have a baseline opinion as to where we rate with respect to the key quality indicators.

The CPQR document is at http://www.partnershipagainstcancer.ca/wp-content/uploads/Quality-Assurance-Guidance-for-Canadian-Radiaition-Treatment-Programs.pdf. Please contact me at jandrew@ihis.org if you would like a copy of the assessment sheet (without our ratings).

My congratulations to our COMP members on the CPQR committee, Jean-Pierre Bissonnette, Peter Dunscombe and Jason Schella, as well as the members from CARO, CAMRT, and CPAC, for their excellent work.

John Andrew

PEI Cancer Treatment Centre

Message from the COMP President

continued from page 61

you to be in attendance) and nominations are actively being sought. Progress continues to be made by the Canadian Partnership for Quality Radiotherapy (CPQR). The *Quality Assurance Guidance for Canadian Radiation Treatment Centres* document is now available and undergoing a formal broader community review process; now is the time for you to have a look and provide your feedback. Thanks to the efforts of Jean Pierre Bissonnette, Councillor for Quality Assurance and Radiation Safety, and the volunteers who have agreed to take on the task, the first of the new equipment specific *Technical Quality Control* documents will also be available soon. COMP is currently in the process of becoming a member of the Union for International Cancer Control (UICC), which holds a World Cancer Congress every two years. The Congress represents a unique and ideal platform for the international cancer control community to meet, discuss, share, learn and connect in order to find solutions to reduce the impact of cancer on communities around the world. The next Congress will take place August 27-30, 2012, in Montréal, and COMP has representation on the Canada-Wide Advisory Committee that is supporting the organizing committee. Finally, development of a new Strategic Plan for COMP is being undertaken this year, with the main planning session scheduled for the end of November. As the process rolls out, which will include surveys, invitations for feedback, and opportunities for more direct engagement, please take the time to contribute your thoughts. Your participation is essential to ensuring that the new Strategic Plan guides the evolution of COMP to best fulfil your needs.

Hope to see you in Vancouver.

Message from the Editor

Idris Elbakri, PhD, MCCPM
CancerCare Manitoba

We have some good discussions about InterACTIONS at the level of the Communications Committee with input from the COMP board. The outcomes of these discussions will be some changes to the content and production process of InterACTIONS that will be gradually introduced over the coming issues. One feature already implemented is regular contributions from COMP councillors (see articles by Tony Popescu and Joseph Hayward). We can look forward to more regular updates from COMP leaders to the membership through the pages of InterACTIONS.

We are also experimenting with a different production process that alleviates much of the burden of graphic design and layout from the editor and allows the editor more time to focus on soliciting and editing newsletter content. To facilitate this new process and ensure its success, I have come up with some guidelines for contributors to InterACTIONS to follow:

1. Use Times New Roman with a font size of 12.
2. Submit articles as word documents.
3. Append tables at the end of the document.
4. Send figures as separate files.
5. Do not pre-format the layout of your article.
6. Respect the deadlines for submission! The deadlines for submission are December 1 for the January issue, March 1 for the April issue, June 1 for the July issue and September 1 for the October issue.
7. Consider an appropriate length for your article. One page of InterACTIONS is about 700 words. Generally, two pages is a reasonable length for an article (this is not a requirement. Just something to keep in mind when preparing your submission).
8. Items about "extra-curricular activities" of Canadian medical physicists are welcome and encouraged, subject to the discretion of the Editor and the Editorial Board.

I hope you find these guidelines helpful. If you have any questions about InterACTIONS please feel free to contact me.

This issue will come out before the AAPM/COMP joint meeting in Vancouver. I need someone out there to write a report about their experience of the conference. Anyone? Please?

Happy summer!

Dates to Remember

2011 Joint AAPM/COMP Meeting
July 31 - August 4, 2011
Vancouver, BC

AAPM 2011 Summer School
August 4 – 9, 2011
Simon Fraser University

COMP 2012 Winter School
January 29-February 2, 2012
Whistler BC

2012 COMP/CCPM Annual Scientific Meeting
July 11-14th, 2012
Halifax, NS

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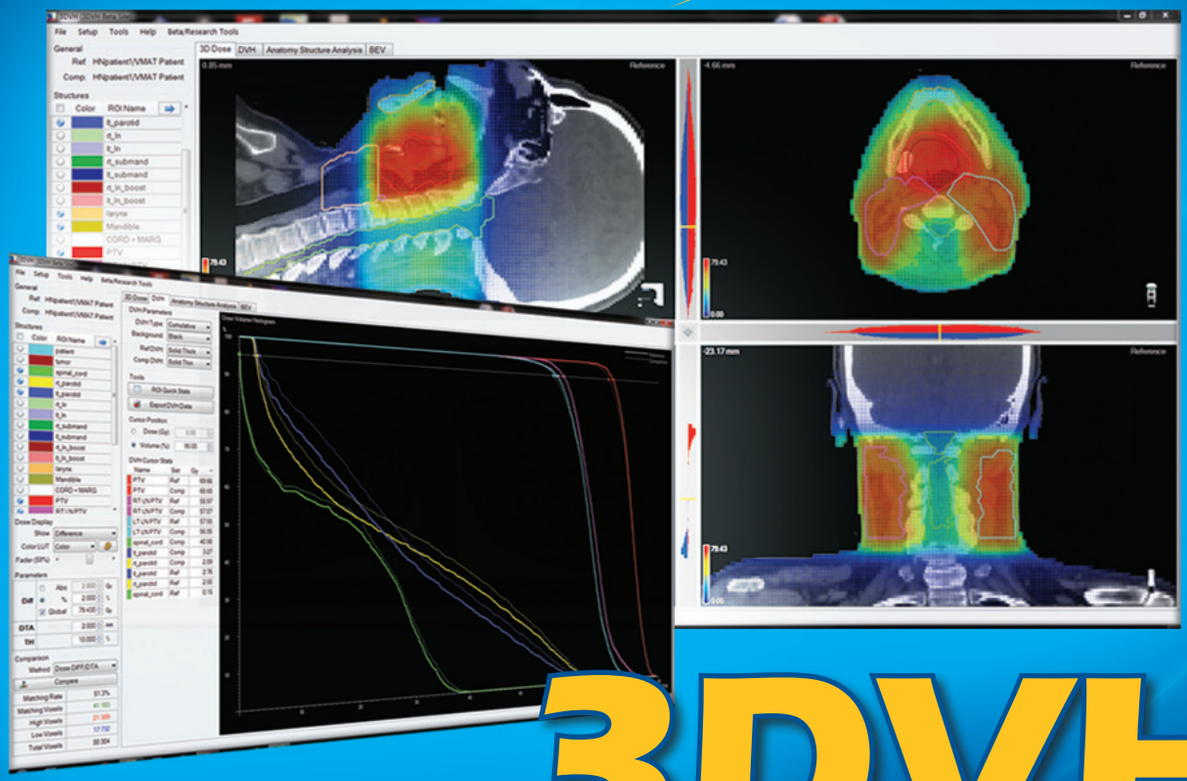

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