Schweizerische Gesellschaft für Strahlenbiologie und Medizinische Physik
Société Suisse de Radiobiologie et de Physique Médicale
Società Svizzera di Radiobiologia e di Fisica Medica

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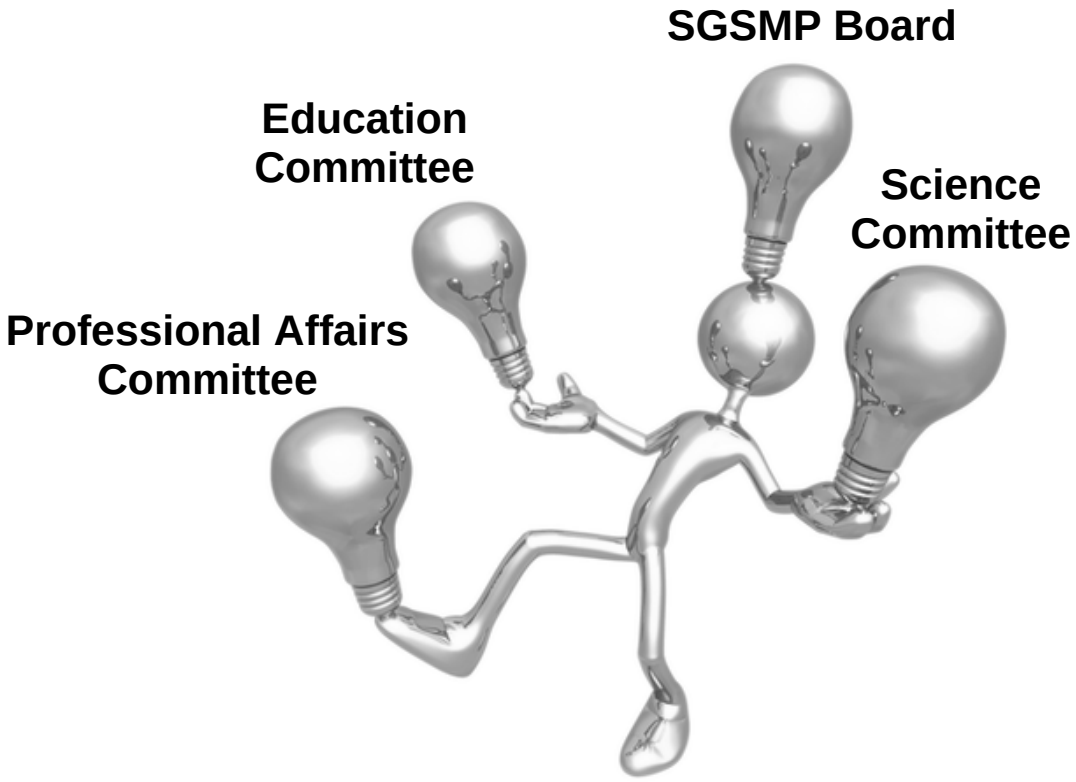

BULLETIN 2/2010

No. 72 October 2010

Online Bulletin: http://www.sgsmp.ch

BULLETIN 72

(October 2010)

Titelbild: SGSMP

Editorial

Dear colleagues,

Very few members (less than 40!) attended the general assemblies in June where big changes were made to the structure of the professional societies for medical physics in Switzerland. So it may come as a good surprise to find three new pages in the Bulletin with news from the professional affairs committee, education committee and the science committee. This is to share news about what the committees are working on, but also to make it easier for everyone to see who to contact with ideas/feedback/requests. The committees were formed at the end of August, so they haven't been working for very long. Expect more news from them in the next Bulletin which is due out at the end of January 2011.

We welcome your letters or emails with feedback about the contents of the Bulletin or ideas for future issues. The letters published in the Bulletin don't necessarily represent the point of view of the SSRMP (the board) or the editors – they are there to share news from Swiss centres or individual views about current issues of interest to everyone.

The next annual meeting, to be held at METAS in Wabern on 11-12th November is approaching fast. We hope to see you there.

Sunny greetings from,

Regina Müller and Shelley Bulling

Letter from the President

Dear colleagues, dear friends,

Done! During last general assemblies of SSRMP and SPAMP you decided to fuse the two societies into one. I'm convinced that this was a good decision and that the organization of our society will function better now. The two boards both supported the fusion and, on their behalf, I thank you for trusting us! We will do our best to show you that it is the right path to follow.

The SSRMP general assembly then elected the new board and the chairpersons of the three new permanent commissions. After the first board meeting, where the internal distribution of roles took place, the new board has the following structure: Stephan Klöck (vice-president), Peter Manser (chair scientific committee), Hans Roser (chair education committee), Frédéric Corminboeuf (chair professional affairs committee), Daniel Vetterli (secretary), Werner Roser (treasurer), Markus Notter (assessor) Jean-Yves Ray (assessor). The election of the new board meant that some former board members stepped down. I would like to thank them deeply for the work that they have done. They are, from the former SPAMP board, Léon André and Marco Malthaner, and from the former SSRMP board, Shelley Bulling, Angelika Pfaefflin, Luca Cozzi, Jean-François Germond, Marc Pachoud and Wolf Seelentag.
The board nominated the members of the permanent committees. Here is the result. Scientific committee: Shelley Bulling, Marc Pachoud, Stefan Scheib. Education committee: Regina Mueller, Angelika Pfaefflin, Frédéric Corminboeuf, Stephan Klöck, Raphaël Moeckli. Professional affairs committee: Stephan Klöck, Stefano Presilla, Jean-Yves Ray.
Finally, Marc Pachoud was nominated as the SSRMP webmaster to replace Wolf Seelentag who has maintained the SSRMP website for many years, perhaps even from it's very beginning, but for at least so many years that I can't remember how many! I would like to thank him for his important work.

Another hot topic that occupied the board quite a lot is the implementation of Article 74, concerning the role of medical physicists in radiology and nuclear medicine. Most of you probably heard rumours, read emails, etc… This is a good place to describe what happened and to give an update on the current situation. The implementation of this article (the transitional period ends at the end of 2011) obviously causes some problems. In July the BAG asked the management of all the hospitals concerned to present a concept for implementation, together with a time schedule, by the end of 2010. As a guideline, the BAG referred to our Report 20 on "Medical physicist staffing for nuclear medicine and dose-intensive X-ray procedures". There has been strong opposition to this from the Swiss Society of Radiology and the Swiss Society of Nuclear Medicine. Unfortunately, at an individual level, not every view offered has been marked by professional courtesy. It surprised and disappointed the members of the board how disparaging some of the personal comments expressed were about the profession of medical physics. After a lengthy discussion, the board decided not to react at all at this point because we haven't received an official statement as a society. Nevertheless, from informal discussions it is clear that all the professional bodies agree on the fact that there is a law and that it has to be implemented. There is also agreement that the wording of some of the individual statements was excessive. We also have to accept some criticism. Report 20 makes a statement about the number of additional medical physicists needed for the implementation of Art. 74, but doesn't say a lot about what the tasks of the additional physicists will be and what responsibilities they will assume. This opens the need for more medical physicists up for discussion. During the last SSRMP/BAG meeting (these meetings take

place twice a year), it was decided that a round-table will be organised by BAG with representatives from all of the societies involved. The board designated Frédéric Corminboeuf (chairman of the professional affairs committee) and Francis Verdun (chairman of the Article 74 working group that prepared Report 20) to represent us. The objective of BAG is to find an agreement between the societies and to issue a common recommendation. There is no doubt that our interests will be well defended by our representatives! Stay tuned for more on this topic in the next Bulletin…

Earlier this month I had the good fortune to be in Barcelona for the ESTRO congress. Not only was I happy to be in that amazing city, but also proud to see that there were physics contributions as oral talks from Aarau, Bellinzona, Lausanne, PSI and Zürich. Switzerland is present at the highest level in European medical physics and that is good news!

In the near future our annual congress will be held at METAS on the 11th and 12th of November. The scientific committee, chaired by Léon André, is finalizing the program. For sure, there will be interesting contributions from our Swiss centers and from invited speakers. The annual meeting is also the best place to meet colleagues and have fruitful discussions. Don't miss it!

I look forward to seeing you in Bern during the annual meeting and in the meantime, enjoy your Bulletin!

Meilleures salutations de Lausanne,

Raphaël Moeckli

Prolongation fee for the SSRMP certification in Medical Physics

Dear members of SSRMP,

As treasurer of our society, I was recently asked several times what will happen with the membership fees previously paid to SPAMP (Fr.100.-- p.a.), which were always deducted from the fee required every five years for the prolongation of the SSRMP certification (Fr. 500.--).

Here is the good news: no money will be lost. The new SSRMP board decided to continue with the deduction of the membership fees paid to SPAMP within the last 5 years before renewal. So if the renewal is due right now and the SPAMP membership fees had always been paid, then the prolongation of the SSRMP certification will be for free. If the renewal is due in two years, then Fr. 200.-- will have to be paid, because then only the SPAMP fees paid between 2008 and 2010 can be deducted.

At the latest, in five years time, everyone will have to pay the full prolongation fee of Fr. 500.--.

Werner Roser

Education committee news

The following members of the Committee for Education have been elected by either the annual general membership assembly (chair) or the board of SSRMP:

Hans W. Roser (chair)	Universitätsspital Basel	hroser@uhbs.ch
Frédéric Corminboeuf	Inselspital Bern	frederic.corminboeuf@insel.ch
Stephan Klöck	Universitätsspital Zürich	Stephan.Kloeck@usz.ch
Raphaël Moeckli	Institut de radiophysique, Lausanne	Raphael.Moeckli@chuv.ch
Regina Müller	Paul Scherrer Institut, Villigen	regina.mueller@psi.ch
Angelika Pfäfflin	Bildungszentrum Gesundheit Basel-Stadt	medphys.pfaefflin@bluewin.ch

The single most important task of the committee is no doubt dealing with the certification of medical physicists in Switzerland. That includes accepting new candidates, guide them through their education and professional training, organize the exams, issue certificates and looking after the certified medical physicist's continuing professional development.

But we definitely want to also look into other aspects relating to education in the field of medical physics. A few examples of more or less urgent things to be tackled by the committee are:

- Update rules and curriculum for certification relating to diagnostics radiology and nuclear medicine (including time spent in these fields)
- Entrance criteria for certification; state more precisely (physicists, engineers, University, Fachhochschule)
- International, mutual recognition of certifications
- Coordinate curriculum for certification with "Strahlenschutz-Ausbildungsverordnung" (in particular 3rd week of radiation protection course)
- Including "recommended reading" in curriculum for certification
- Medical Physics Master program in Switzerland

If you have questions or ideas for items to be added to the above list, you can always contact one of the members.

In behalf of the committee
Hans W. Roser

Professional affairs committee news

Chairperson:

Frédéric Corminboeuf, Inselspital Bern, frederic.corminboeuf@insel.ch, 031 632 35 40

The following members have been elected by the board:

Jean-Yves Ray, Hopitâl du Valais, jyves.ray@rsv-gnw.ch
Stephan Klöck, University Hospital Zürich, stephan.kloeck@usz.ch
Stefano Presilla, Clinica Luganese, stefano.presilla@clinicaluganses.ch

On behalf of SSRMP board, I want to congratulate them for their nomination.

The Professional Affairs Committee (PAC) will first continue to work on some open issues inherited from SPAMP.

1) Salary survey,
2) Publication of the results of the survey "Position of medical physicist in Switzerland"

Due to the reaction of our medical colleagues from radiology and nuclear medicine, BAG proposed to build a parity working group in order to find an acceptable compromise for each involved actor. PAC will certainly have to delegate someone to represent the interest of our profession.
In order to be well prepared it will be certainly necessarily to reactivate the WG "Art.74" to define more precisely the competences and responsibilities of the medical physicist working in nuclear medicine and dose intensive radiology in order to support our representative during the discussions with this group. It is clear for SSRMP board and the committee that to have fruitful works that our report 20 has to be the base for the coming discussion.

For any questions or suggestions, feel free to contact us.

On behalf of the committee
F. Corminboeuf, Inselspital Bern.

Science committee news

The members of the science committee are:

Peter Manser (chair)	Inselspital Bern	peter.manser@insel.ch
Marc Pachoud	CHUV, Lausanne	marc.pachoud@chuv.ch
Stefan Scheib	Varian, Wädenswil	stefan.scheib@varian.com
Shelley Bulling	Eaux-Vives Radio-oncologie, Geneva	sbulling@eaux-vives.com

The mission of the science committee is to promote scientific activity in the domains of medical physics, radiobiology, and related disciplines.

We have the specific tasks from SSRMP to:

- Organize an annual meeting
- Make research proposals, and
- Coordinate multidisciplinary collaboration with related disciplines

The main goal of the committee is to encourage the exchange of scientific ideas, so our first and most urgent task is to help the organizers and the scientific committee of the upcoming annual meeting at METAS to have a great meeting.

The more colleagues who can attend the annual meeting, the more opportunities there are for interesting discussions, and the more fun to be had - so please come to METAS in November and help make the next meeting a success.

SSRMP Annual Scientific Meeting 2010

Federal Office of Metrology METAS, Bern-Wabern
11 and 12 November 2010

Dear Colleagues and Friends

The SSRMP Annual Scientific Meeting 2010 will be held in Bern-Wabern at the Federal Office of Metrology METAS. The special emphasis this year will be Dosimetry: general and fundamental aspects and specifically dosimetry in external beam radiation therapy, nuclear medicine, radiation protection and diagnostics. The program will, of course, also cover the usual topics of a SSRMP annual scientific meeting.
Members of the Program Committee are: Léon André (Chair), Sébastien Baechler, Peter Manser, Jean-Yves Ray, Hans Roser, Uwe Schneider, Damian Twerenbold and Daniel Vetterli

There is no conference fee, but registration is mandatory. A Conference Dinner will be held on the evening of Thursday 11 November at the Restaurant Rosengarten (CHF 60, transport from METAS to the Restaurant is organized

Online registration: http://www.sgsmp.ch/ann2010/ann2010.asp

S G S M P R e s e a r c h G r a n t R e p o r t

Kreuzkalibrierung von Positronen-Emissions-Tomographen für multizentrische Studien: Festkörper-Phantom und Transconvolution

T. Weitzel, F. Corminboeuf, B. Klaeser, T. Krause
Universitätsklinik für Nuklearmedizin, Inselsital, Bern
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Einleitung und Aufgabenstellung

Die Positronen-Emissions-Tomographie verbunden mit Computer-Tomographie (PET/CT) ist ein grundsätzlich quantitatives Verfahren, dass über die Bildgebung hinaus eine ortsauflösende Messung funktionaler physiologischer Parameter erlaubt. Im Kontext normierter Untersuchungsprotokolle dient vor allem der „standardized uptake value“ (SUV) als quantitatives Mass für die regionale Aufnahme des radioaktiv markierten Tracers und wird für Diagnostik und Therapiekontrolle verwendet. [1].
Messungen vor allem an kleineren Läsionen werden durch den Partial-Volumen-Effekt (PVE) behindert, der durch die räumliche Auflösung des Tomographen, insbesondere die räumliche Transferfunktion („point spread function“, PSF) bestimmt wird. Da unterschiedliche PET/CT Systeme und die unterschiedlichen Rekonstruktionsverfahren für die Bildgebung jeweils unterschiedliche PSF zeigen, werden die entsprechenden Messwerte geräteabhängig systematisch verfälscht. Multizentrische Studien aber auch der direkte Vergleiche älterer mit neueren Bildern des selben Patienten werden dadurch entsprechend erschwert. Eine numerische Korrektur des PVE ist in begrenztem Umfang möglich, löst aber nicht die Problematik der geräteabhängigen Variabilität der Messwerte.
Da eine vollständige numerische Korrektur des PVE ohnehin nicht möglich ist, zielen die hier vorgestellten Arbeiten zunächst auf einen numerischen Ausgleich der Variabilität unterschiedlicher PET/CT-Systeme um die Vergleichbarkeit der jeweiligen Messwerte zu gewährleisten. Geeignete Messungen am Phantom erlauben die Charakterisierung von Tomographen durch eine Bestimmung der jeweiligen räumlichen Transferfunktionen. In der Folge können durch numerische Operationen im Fourier-Raum gleichzeitig eine Verbesserung der quantitativen Bestimmung der Messwerte und ein Ausgleich der geräteabhängigen Variabilität erreicht werden.
Zur Unterstützung einer einfachen und genauen Bestimmung der räumlichen Transferfunktionen wurde ein geeignetes Festkörper-Phantom entwickelt [2] und hergestellt. Für den numerischen Ausgleich der Effekte unterschiedlicher räumlicher Transferfunktionen wurde ein geeignetes numerisches Verfahren entwickelt und unter dem Namen „Transconvolution“ vorgestellt [2].

Material and Methoden

Ein neuartiges Festkörper-Phantom wurde mit Hilfe von “rapid prototyping” Methoden entwickelt und konnte Dank der Unterstützung durch die SGSMP hergestellt werden. Das Phantom basiert auf einem Satz von 12 Kugeln mit Durchmessern von 2 mm bis 31 mm, welche mit einem mit ^{68}Germanium versetzten Polymer befüllt sind (Abb. 1). Die ursprüngliche Aktivitätskonzentration lieg mit 0,1 MBq/ml im Bereich typischer Aktivitätskonzentrationen der klinischen Routine.

Abbildung 1: Kugelsatz

Die Kugeln können vergleichbar zu einem Standard-Phantom angeordnet werden. Da eine grössere Anzahl Kugeln zur Verfügung steht und ein entsprechend grösserer Bereich an Durchmessern abgedeckt wird, erfolgt die Montage in diesem Fall in zwei konzentrischen Kreisen auf einer Plattform, die in der üblichen Anordnung im Inneren einer zylindrischen mit Wasser befüllbaren Plexiglas Form montiert werden kann (Abb. 2).

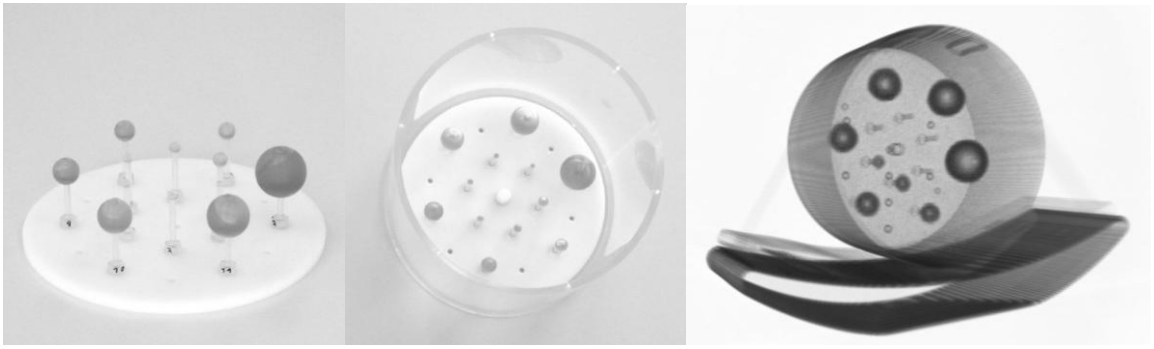


Abbildung 2:: konzentrische Anordnung der Kugeln, Montage in Zylinder, 3D Rekonstruktion PET/CT

Im Vergleich zu Phantomen, welche im Labor jeweils neu mit Aktivität befüllt werden müssen, ist das mit dem langlebigen ^{68}Ge befüllte Festkörper-Phantom unabhängig von der Anzahl der tatsächlich benutzen Kugeln sehr einfach handhabbar, vermindert die Belastung des Personals, liefert genau reproduzierbare Messwerte und kann in einfacher Weise transportiert werden.
Darüber hinaus können die Kugel einzeln gehandhabt und montiert werden (Abb. 3) um etwa bestimmte klinisch relevante Situationen nachzubilden.

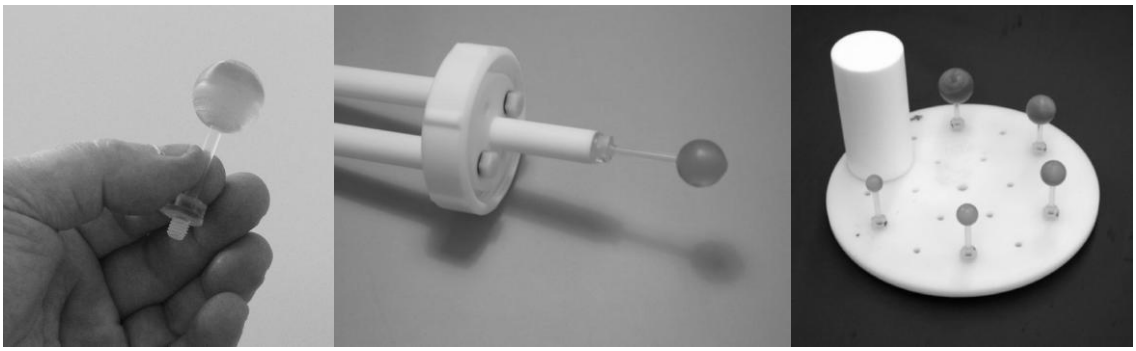


Abbildung 3: Handhabung einzelner Kugeln, „Ein-Kugel-Phantom“, alternative Anordnung der Kugeln

Weiter erlaubt das Phantom in einfacher Weise Messungen zur Bestimmung der räumlichen Variabilität der Transferfunktion für den jeweiligen Tomographen und eine Abschätzung des Einflusses von Rekonstruktions-Artefakten bei ungünstigen Aufnahmebedingungen, etwa in Anwesenheit von Absorbern, bei Messungen am Rand des Gesichtsfeldes des Tomographen oder bei unvollständiger Absorptionskorrektur (Abb. 4).

Im Unterschied zu konventionellen Verfahren unter Verwendung einer Punktquelle werden zur Bestimmung der räumlichen Transferfunktion die Messungen an den unterschiedlichen Kugeln und numerische Verfahren zur umgekehrten Entfaltung der Transferfunktion aus den Bilddaten anhand der bekannten Geometrie des abgebildeten Objekts i.e. der Kugeln verwendet.

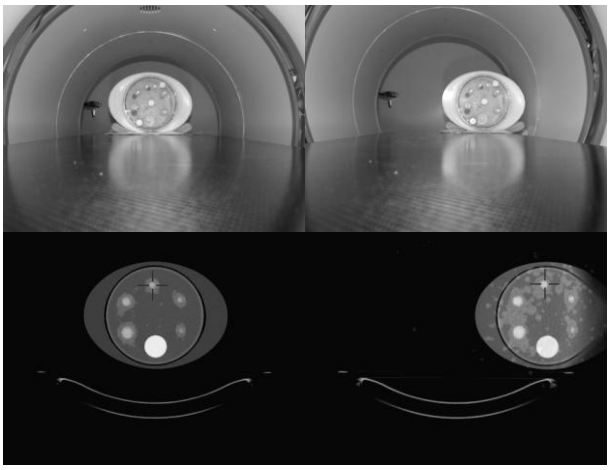


Abbildung 4.: Unterschiedliche Positionierung des Phantoms mit zusätzlichen Absorbern, Darstellung der PET/CT Bilder mit logarithmischer Intensitätsskala.

Für eine jeweils lokal als stationär angenommene räumliche Transferfunktion des Tomographen kann die Bildgebung mit dem Faltungsoperator $\otimes$ beschrieben werden als

$$obj \otimes psf_P \otimes psf_T = img \qquad (1)$$

Dabei steht das Objekt obj für die abzubildende 3 dimensionale Verteilung der Aktivitätskonzentration. Nach Faltung des Objektes mit der Transferfunktion psf_P, welche die bekannte Reichweite bzw. Reichweiten-Verteilung der Positronen repräsentiert, resultiert zunächst die räumliche Verteilung der Annihilationsereignisse und aus einer weiteren Faltung mit der eigentlichen Transferfunktion des Tomographen psf_T entsteht das 3 dimensionale Bild img.

Da psf_P und im Falle einer Phantom-Messung auch das Objekt obj genau bekannt sind, kann anhand der Gleichung

$$psf_T = img \otimes obj^{-1} \otimes psf_P{}^{-1} \qquad (2)$$

die jeweils lokale Transferfunktion psf_T des Tomographen mit Hilfe iterativer numerischer Verfahren bestimmt werden. Dieses Vorgehen hat Vorteile, da mehr Voxel zum Ergebnis beitragen als im Falle einer Punktquelle und die Messung selbst eher der klinischen Anwendung ähnelt.

Für zwei unterschiedliche Tomographen mit unterschiedlichen räumlichen Transferfunktionen psf_1 und psf_2 kann die Bildgebung beschrieben werden durch

$$obj \otimes psf_P \otimes psf_1 = img_1 \qquad (3a)$$

$$obj \otimes psf_P \otimes psf_2 = img_2 \qquad (3b)$$

wobei img_1 und img_2 für die beiden unterschiedlichen von den jeweiligen Tomographen erzeugten Bilder desselben Objektes stehen.

Aus den Gleichungen 3a und 3b folgt unmittelbar:

$$img_1 \otimes psf_1^{-1} \otimes psf_2 = img_2 \qquad (4)$$

Während die inverse Transferfunktion psf_1^{-1} divergiert kann der Term $psf_1^{-1} \otimes psf_2$ mit Hilfe numerischer Methoden zumindest näherungsweise bestimmt werden. Wir definieren nun die „transconvolution“ Funktion tf als

$$tf \equiv psf_1^{-1} \otimes psf_2 \qquad (5)$$

mit der resultierenden Bezieh

$$img_1 \otimes tf = img_2 \qquad (6)$$

Nach einmaliger Bestimmung der räumlichen Transferfunktionen der jeweiligen Tomographen anhand einfacher Messungen am Phantom und Berechnung der transconvolution Funktion ist es somit möglich ein durch den ersten Tomographen erzeugtes Bild img_1 jeweils so umzurechnen als wäre es als img_2 durch den zweiten Tomographen aufgenommen worden. Quantitative Werte, welche aus dem so erzeugten img_2 abgeleitet werden, sind dann direkt vergleichbar mit quantitativen Werten aus Messungen, welche direkt mit dem zweiten Tomographen durchgeführt wurden. Im Kontext einer multizentrischen Studie wird ein Tomograph als Standard gewählt werden und die Messungen der anderen Tomographen werden entsprechend auf diesen Ziel-Tomographen umgerechnet.
Selbstverständlich unterliegen die Berechnung den für Entfaltungsverfahren üblichen in der Regel durch das unvermeidliche Bildrauschen bestimmten Beschränkungen. Insbesondere sollte das räumliche Auflösungsvermögen des Ziel-Tomographen nicht wesentlich über dem Auflösungsvermögen der anderen Tomographen liegen.

Ergebnisse

Das Festkörper-Phantom hat alle Erwartungen erfüllt. Ausser der einfachen Handhabung und der ausserordentlich genauen Reproduzierbarkeit der Messungen machte sich im Vergleich zu konventionellen Phantomen vor allem positiv bemerkbar, dass das Phantom jederzeit verwendbar ist, ohne das irgendwelche Radionuklide zum jeweiligen genauen Zeitpunkt zur Verfügung gestellt werden müssten und ohne dass eine jeweils neue und exakte Befüllung vorgenommen werden müsste.
Neben Messungen zur Bestimmung der Stabilität der jeweiligen Transferfunktionen unter unterschiedlichen Bedingungen wurden vergleichende Phantom-Messungen an 6 unterschiedlichen PET/CT-Systemen vorgenommen.

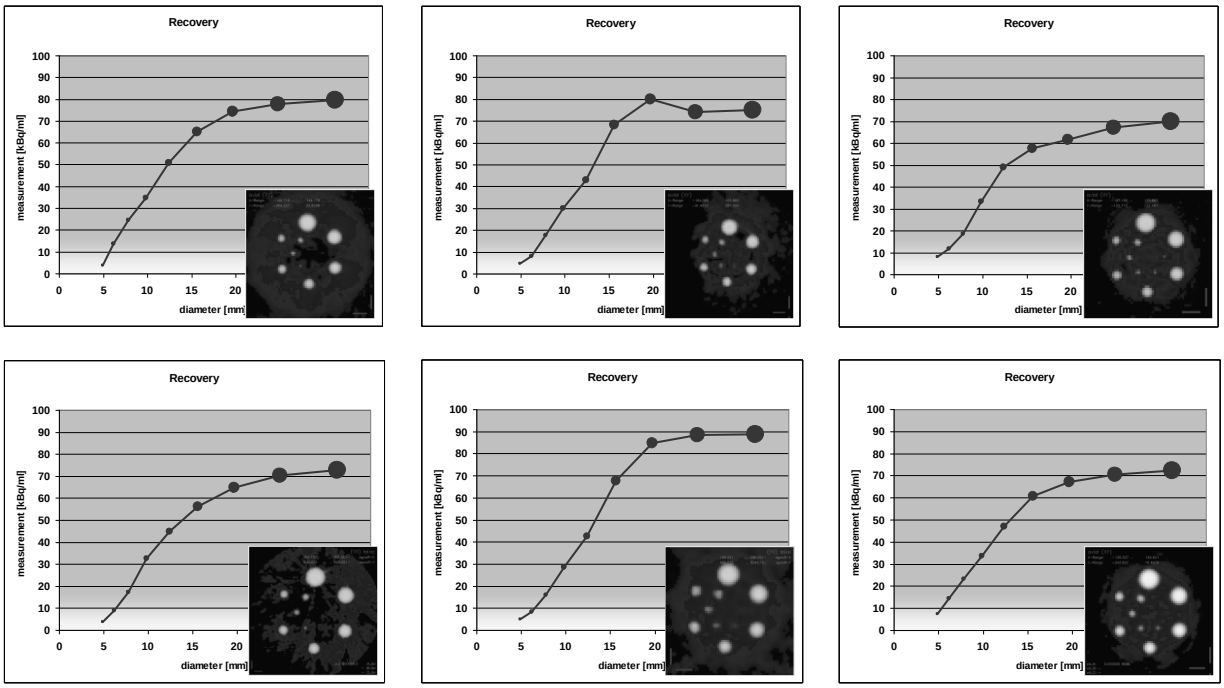


Abbildung 5: Recovery Kurven aus Phantom-Messungen an 6 unterschiedlichen PET/CT-Systemen von 3 unterschiedlichen Herstellern. Darstellung des PET jeweils mit logarithmischer Intensitätsskala.

Die anhand der Messungen bestimmten Recovery-Kurven (Abbildung 5) zeigen neben generell unterschiedlicher Kalibration und unterschiedlichen Verläufen der Kurven, welche den jeweiligen PVE charakterisieren, auch deutliche Hinweise auf entsprechende nicht Gauss-förmige räumliche Transferfunktionen. Ein direkter Vergleich der Recovery-Kurven

(Abbildung 6, links) zeigt die unterschiedlichen Messwerte, welche die verschiedenen Tomographen jeweils für das Voxel mit höchster Intensität für die jeweiligen Kugeln angeben.

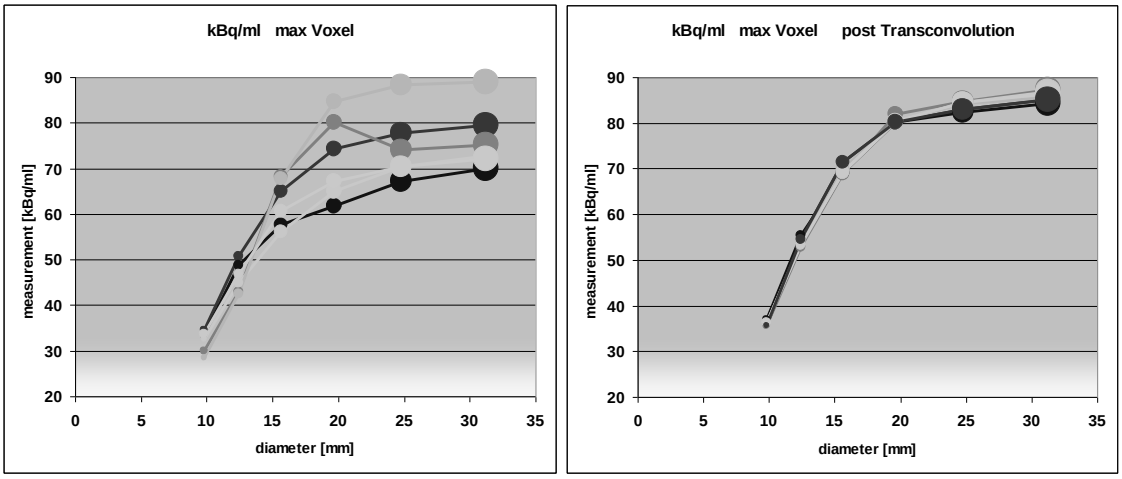


Abbildung 6: Recovery Kurven aus Phantom-Messungen an 6 unterschiedlichen PET/CT- links wie gemessen, rechts nach Anwendung des transconvolution Verfahrens..

Nach Anwendung des transconvolution Verfahrens zeigen die Recovery Kurven sehr gute Übereinstimmung und erlauben daher einen quantitativen Vergleich entsprechender Messungen.
Als Ziel-Tomograph wurde das System mit am ehesten Gauss-förmiger Transferfunktion gewählt.

Danksagung

Die Herstellung des Festkörper-Phantoms wurde durch die Schweizerische Gesellschaft für Strahlenbiologie und Medizinische Physik grosszügig unterstützt.
Wir bedanken uns bei den Kollegen in St. Gallen, Lausanne, Sion und Freiburg (D) für die freundliche Unterstützung der Vergleichsmessungen.

Literaturangaben

[1] R. Boellaard, Standards for PET image acquisition and quantitative data analysis. J Nucl Med. 2009;50(suppl):11S–20S
[2] T. Weitzel, F. Corminboeuf, T. Beyer, T. Krause, Towards quantitative PET/CT imaging in multi-centre trials, Eur J Nucl Med Mol Imaging (2009) 36 (Suppl 2):S158 –S193
[3] T. Weitzel, F.Corminboeuf, B. Klaeser, T. Krause, T. Beyer, Transconvolution and virtual PET: A new concept for quantification of PET in multi-centre trials, J Nucl Med. 2010; 51 (Supplement 2):115

Patient safety links

Patient safety has been in the spotlight at recent meetings.

At ESTRO 29 in Barcelona there was a pre-teaching course on patient safety in radiation oncology, and at the AAPM annual meeting in Philadelphia in July there was a special patient safety symposium.

http://www.aapm.org/meetings/amos2/pdf/49-14600-67969-790.pdf

The AAPM and ASTRO have issued statements about what can be done to improve patient safety:

http://www.aapm.org/publicgeneral/StatementBeforeCongress.asp
http://cs.astro.org/blogs/astronews/pages/web-exclusive-astro-calls-on-congress-to-implement-patient-safety-plans.aspx

A recurring theme is the importance of learning from actual and potential adverse events by collecting and sharing data between institutions.

The IAEA and the NCI have patient safety initiatives and interesting articles on this subject. Some examples:

http://www.iaea.org/NewsCenter/Focus/RadiationProtection/index.html

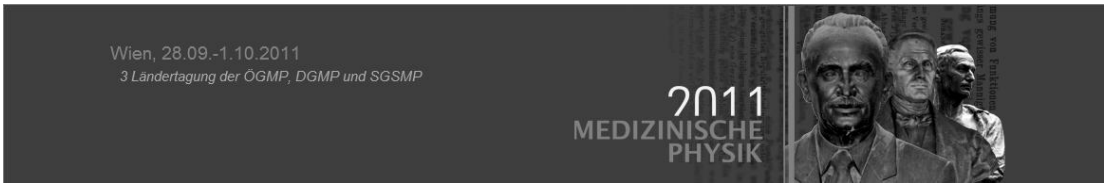
http://www.cancer.gov/aboutnci/ncicancerbulletin/archive/2010/012610/page8

Special travel grants for the 2011
three-countries meeting in Vienna

SGSMP members under the age of 35 and who will present a poster or a talk as first author at the three-countries meeting in Vienna will receive a travel grant of CHF 400.-

Applicants should contact directly SGSMP's treasurer

www.medphyswien2011.org



Response to linac shutdown in Lucerne

Comment on "One of three Linacs ordered shut down for five months" by Regina Seiler and Peter Thum (Lucerne), Bulletin 71, 1/2010, pp. 9-10

In their report about a recent authority-driven linac shutdown at the Cantonal Hospital Lucerne (KSL), the authors unintentionally highlight a severe crisis in the medical physics profession today. Why do they suggest a re-interpretation - or simply lowering - of the present accelerator ordinance related certified medical physicist personnel requirements? At first glance their argument appears reasonable; personnel fluctuations or sudden long-term absences, for whatever reasons, should not endanger radiation therapy treatments and patient throughput capacity. However, what this argument neglects is that medical physicists stand to lose the most from this strategy. In reaching a compromise with authorities such as the Federal Office of Public Health (BAG), clinical departments and hospital management make medical physicists pay the highest price. Asking that the KSL be allowed to run three linacs with only one certified medical physicist and two new trainees, for intermediate time periods in the order of half a year, is not reasonable, and in fact is not acceptable: It is acting against the interests of the medical physics profession, the goals of which include, (i) to be acknowledged as specialists in an interdisciplinary context by doing adequate work of a scientific nature; this means having the resources to do at least conceptual, and occasionally, research work, (ii) to be respected by physicians, technicians, authorities and manufacturers, and importantly (iii) to have an appropriate workload and regular working times. This last point requires adequate medical physicist staffing levels. In the context of a well organized medical department – as any radiotherapy department should be run – many factors need to be considered. In the old days, minimum personnel requirements would have been applied as they were intended, as a minimum, with some redundancy factored in. Today, minimum requirements are very often consciously misinterpreted as already having enough redundancy included, and are instead considered an absolute maximum. It is pure luck if this works over a period of years, but in the event that sudden personnel changes cannot be compensated for, then the clinical department executives and the hospital management must be held responsible! In particular, the hospital management, and not the physics group, should be held responsible if it becomes necessary to turn off machinery because there are not enough appropriately qualified certified personnel on the payroll! In the report from Lucerne, there is unfortunately no mention of the role of the hospital management in the crisis. Instead, the chief physicist and the head physician both argue that the legislation should be revised. Note that the BAG was actually offering a concession when accepting to turn off just one linac.

Lucerne also raised the issue with the BAG of whether or not daily or other regular quality assurance (QA) measurements require the possession of an SGSMP medical physics certificate. There are different requirement levels of QA. Some checks can and should be delegated to technicians. Other checks, however, require a lot of skill, planning, and experience in emergency or exceptional situations, sometimes even under normal conditions. The same is true for radiation treatment planning, which is regularly not a complex task, but often requires special expertise. These skills and expertise cannot be assumed to be sufficiently present in a new trainee. As practice shows, they are not necessarily even possessed after years spent working in radio-oncology, as a consequence of inadequate training. So, there is a very strong counter-argument to the suggestion that the number of expert physicists can be reduced in departments where there are physicists in training. In fact the opposite is true, a larger number of expert physicists are needed in order to properly

mentor and supervise colleagues in training. One needs to "admit" that the salaries for permanently vacant or cancelled positions cost the hospital management – nothing!

You may object that my viewpoint is naïve and doesn't reflect the reality of the job market, that times have changed and so on, and that too few medical physicists are being trained (in particular holding clinics responsible for not offering enough training positions), or that industry pays better, diverting young professionals away from a career in clinical radiation oncology physics. I contest that the real reasons for the shortage of medical physics are that the position of professional medical physicist is of limited attractiveness because it almost always remains a second-rank position. In addition, there is not usually an evolving hierarchy among more or less peers, and instead a role as "cat's paw" for the clinic's physicians. This, however, is the caricature of interdisciplinary work. Another crucial point is that the day to day work for a radiation oncology physicist nowadays typically requires too small an amount of creativity to be attractive to really good candidates.

Coming back to the Lucerne story, I would like to comment on the fact that the three linac patient workload was redistributed among the remaining two machines. This seems to be contrary to the BAG's intention, i.e. to limit the workload to at least a two-machine equivalent. In this sense I believe that Lucerne did not respect the BAG's concession.

The elderly among us might remember Jean de La Fontaine's famous fable "Le Singe et le Chat". It was the monkey who talked the cat into pulling its chestnuts out of the fire (by promising just half of them), and the naive/brave/stupid cat who eventually did so, however burning its paws so badly in doing so that the monkey could enjoy the well-done chestnuts alone, leaving the cat empty-handed.

U.-D. Braumann, Leipzig & Basel, formerly München

PS: What is the view of SGSMP about this issue? Any visible tendency to react? Surprisingly, BAG has no legal basis to intervene… And, once declared as "medical needs", any patient workloads seem to be justifiable. So, there is no way out.

Reply from Lucerne

I'm glad to be given the opportunity to further expand on the points I was trying to make in the last bulletin since it seems that the author of the letter in response has misunderstood them. **Never did we suggest that the number of expert physicists can or should be reduced!** No one in Lucerne (neither physician, nor hospital management, nor physicist) ever argued that way.
We tried to show the practical implications of Art. 19^1 when the *temporary* situation does arise that not enough certified medical physicists are available. It is my firm belief that such a situation may arise for almost any institute for various reasons. This is therefore not about Lucerne, it's about raising awareness *what Art. 19 implies on a practical level.*
The particular situation in Lucerne wasn't created by choice and unlike what is suggested, hospital management had nothing to do with the fact that two trainees were hired and one position left open until the ideal person came along. Lucerne actually had enough positions with adequate funding available, but no certified candidates to fill them with. The people we hired were the most suitable ones with the greatest potential, both with theoretical background

in medical physics. High-caliber trainees are better than no one and they *can* – under supervision – perform some of the tasks (but not all, and I'm sure we all agree on that). Since the situation did arise we needed to cope with it and we were committed to providing the same high-quality service for our patients even with limited resources. Contrary to what might have been the original intention, Art. 19 did not help our cause.

Financial considerations were not what made us decide to put the workload of three linacs onto two. Our primary concern has been the service to the patients as the closest alternatives are an hour away. It was stipulated that the workload should have been reduced to a "two-machine equivalent". What is a "two-machine equivalent"? Some other sites are treating just as many patients with two linacs as we did during this limited time and to my knowledge that is not against the law. Normally, the workload on Lucerne's three linacs is such that goal iii) in the author's letter is fulfilled which shows respect by those responsible for the quality of life of all professionals.

One should also consider the fact that the *total* number of medical physicists in Switzerland is not enough. If those surplus patients are too much for Lucerne to handle why should they be manageable by another site that might have barely enough staff for their own patients? It wasn't the intention of neither our original letter nor this response to elaborate on the required number of staff. It is a complex issue and goes beyond the number of linacs or patients. It depends upon the kind of treatments that are offered, the way processes are streamlined, the kind of equipment at hand and even the people involved themselves (more or less experienced, some are willing to put in more effort than others, some work more efficiently than others etc.).

I agree wholeheartedly with the author that the medical physicists' tasks go well beyond QA and that QA in itself is multifaceted with various levels of responsibility. QA was mentioned in our article because it is the only reason BAG provided (besides the article itself, which is reason enough, whether it makes sense or not). According to BAG treating patients on that particular linac was unsafe because Lucerne didn't employ enough certified medical physicists to guarantee that linac's reliability. I do think that the need for an adequate number of medical physicists is mostly uncontested throughout the radiotherapy community, but I maintain that I find it questionable whether it can simply be linked by law to the number of accelerators. I therefore will not retract from my wish for this article to be revised. (Note: I do not have the solution where and how such an adequate number of medical physicists should be mandated. I can only state what I do not consider to be a solution.)

It is important to learn from the past and from the experiences of "the elderly". It is also important that we move on towards creating and maintaining a healthy work environment where all professionals respect and support each other. It is a sad reality that some departments have not reached this yet, but it is very wrong to assume that none have.

Regina Seiler

B R A N D N E W ! – B R A N D N E W !

The new IGRT QA recommendation is out.
Soon it will be possible to download it from http://www.sgsmp.ch/recrep-m.htm#rec. Paper copies will be printed in the next few days and can be obtained by sending an email to Werner Roser at werner.roser@psi.ch or collected from the welcome desk at our annual meeting in Wabern in November.

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Schweizerische Gesellschaft für Strahlenbiologie und Medizinische Physik
Société Suisse de Radiobiologie et de Physique Médicale
Società Svizzera di Radiobiologia e di Fisica Medica
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Quality assurance of gantry-mounted image-guided radiotherapy systems

Recommendations No. 16

ISBN 3 908 125 48 0 **September 2010**

CALENDAR 2010 / 2011

09.-12.11.2010	IAEA International Symposium on Standards, Applications and Quality Assurance in Medical Radiation Dosimetry
A-Vienna	*INFO: pub.iaea.org/MTCD/meetings/Announcements.asp?ConfID=38093*
11.-12.11.2010	SGSMP Annual Meeting
Wabern BE	*INFO: /sgsmp.ch/ann-10-e.htm*
19.-20.11.2010	27. Jahrestagung der ÖGRO
A-Krems	INFO: *www.oegro2010.at/cms/website.php*
03.-04.12.2010	„Lebkuchenkongress“, 40. Fortbildungskongress für ärztliches Assistenzpersonal,
D-Nürnberg	*INFO: apps.drg.de/data/VMTB/lebkuchen-2010.htm*l

13.-15.01.2011	MR 2011 - 14th International MRI Symposium
D-Garmisch	*INFO: www.mr2011.org*
20.-22.01.2011	ORAMED 2011, International Workshop on Optimization of Radiation Protection of Medical Staff
E-Barcelona	*INFO: www.upc.edu/inte/oramed*
	Winterschule Pichl
14.-18.03.2011	Physik in der Nuklearmedizin
21.-22.03. 2011	Methodische und statistische Aspekte medizinischer Studien
23.-25.03.2011	Monte Carlo Methoden in der Strahlentherapie
A-Pichl	*INFO: sgsmp.ch/sgsmp-d.htm*
13.-16.04.2011	NuklearMedizin 2011, Gemeinsame Jahrestagung der Deutschen, Österreichischen und Schweizerischen Gesellschaften für Nuklearmedizin
A-Bregenz	*INFO: www.nuklearmedizin2011.eu/*
09.-10.05.2011	European Commission Project: Guidelines on Medical Physics Expert (MPE)
E-Seville	*INFO:portal.ucm.es/web/medical-physics-expert-project/*
29.9.-01.10.2011	Dreiländertagung Medizinische Physik, DGMP, ÖGMP; SGSMP
A-Wien	*INFO: www.medphyswien2011.org*

– From the newspaper –

Anmerkung der Redaktion: Hier finden sich interessante Artikel, die an anderer Stelle bereits erschienen sind.

The EMF Directive and MRI: an update

In April 2008, following a lengthy campaign by the European MRI community, the European Parliament and Council agreed to delay the deadline for implementation of the Physical Agents (EMF) Directive by four years. This delay, which came into force only a matter of days before the original transposition deadline, was agreed explicitly to allow time for a solution to be found to the problems posed by the Directive for MRI in clinical practice and research.
Since the delay was agreed, MRI community representatives have been working closely with European Commission officials to find a lasting solution. Lobbying has been maintained as well, including early contact with the new European Parliament elected in June 2009 and a forthcoming meeting with the recently appointed Commissioner for Employment and Social Affairs.

More details can be found on the Alliance for MRI website at:
www.alliance-for-mri.org

Source:
ESMRMB Newsletter, European Multidisciplinarity, Vol. 9, June 2010,
www.esmrmb.org/html/img/pool/ESMRMB_2010_NL_Vol9_June_web_FINAL.pdf

BOSTON RADIOLOGIST SAYS CLOSER ATTENTION COULD REDUCE DOSE

Outdated CT protocols called widespread in imaging units

The scanner could be brand new, but there a good chance it's operating with old protocols imported from a previous unit and not optimized for best imaging at the reduced dose levels possible today, a researcher suggests.
Outdated CT protocols are a widespread problem, according to Dr. Aaron Sodickson, assistant director of the emergency radiology at Brigham and Womens Hospital in Boston, Massachusetts. […]
"All of these general strategies are fairly well-known, but they nedd to be more universally adopted in day-to-day practice. Sites need to spend some time updating and improving their protocols." […]
"Protocol optimization ideally requires a strong collaborative effort between CT manufacturers, radiologist, technologists, and medical physicists," Sodickson said.

Source: DIAGNOSTIC IMAGING EUROPE, August/September 2010
Diagnosticimaging.com

Two more hospitals report CT scan radiation overdoses

Los Angeles Times

County-USC and Bakersfield Memorial said the manufacturer, Toshiba, provided the protocol they followed.

Two California hospitals where patients were exposed to excessive levels of radiation during CT scans had programmed their scanners according to the manufacturer's specifications, officials at both hospitals said.

Los Angeles County-USC Medical Center and Bakersfield Memorial Hospital are the latest additions to a list of California hospitals where overdoses occurred during CT brain perfusion scans. In both cases, the scanner in question was made by Toshiba.

"We called Toshiba to give us the protocol," said Dr. Stephanie Hall, the chief medical officer at County-USC, where two patients received overdoses shortly after the hospital began doing the scans last fall. "We used that one."

In Bakersfield, 16 patients received excess radiation "although the dosage guidelines provided by Toshiba were strictly followed," the hospital president, Jon Van Boening, said in a prepared statement.

Toshiba issued a statement Monday saying it "cannot comment on specific cases" because of an investigation underway by the U.S. Food and Drug Administration. "We continue to work with all of our customers to educate them on the dose reduction technologies that we provide on our CT systems," it added.

In any case, the hospitals are unlikely to be absolved of responsibility. L.A. County health officials who investigated the County-USC overdoses concluded that the technologists were not paying attention to dose levels during the scans, according to a state "notice of violation." "Reference dose information is included on the computer monitor screen, but the technologists had not been trained to observe or track the reference doses indicated," the filing said.

The Times reported last year that over an 18-month period, more than 260 patients at Cedars-Sinai Medical Center received up to eight times the normal radiation from a General Electric scanner.

Cedars-Sinai officials cited confusion over setting the computerized instructions that control the radiation dose and scan quality. The overdoses began after the hospital had reprogrammed its machine. GE has held that nothing was wrong with the scanner.

At least 44 more overdoses were then discovered at Glendale Adventist Medical Center, which also used a GE scanner, and at Providence St. Joseph Medical Center in Burbank, which uses a Toshiba model.

Patients at Huntsville Hospital in Alabama were also exposed to excessive radiation — from a GE scanner.

All of the overdoses involved only brain perfusion scans — which are used to quickly diagnose strokes by examining blood flow in the brain — and not the dozens of other types of CT scans.

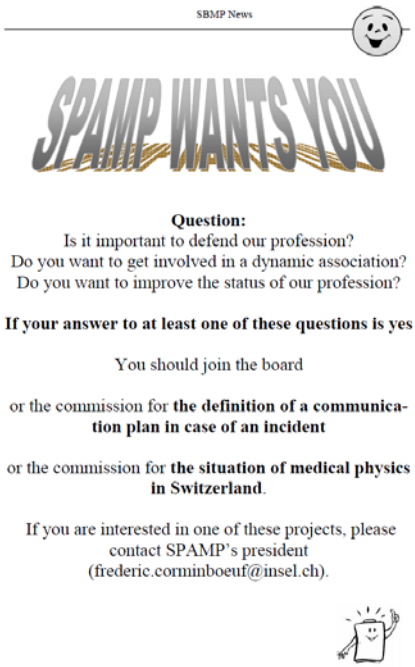
The discovery of the problem last year caused the FDA to issue an alert to hospitals nationwide to check the settings on their scanners. The agency also imposed new safety controls on medical imaging devices and called for the development of more precise dosing standards.

Experts believe that the problem occurred at more hospitals than those that have been identified. An FDA spokesman said Monday that the agency hopes to complete an investigation into the overdoses in the next few months.

Source: Los Angels Times, 30 August 2010

NOTICE BOARD

Survey on the position of medical physics in Switzerland


SBMP News

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Is it important to defend our profession?
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If your answer to at least one of these questions is yes

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or the commission for **the definition of a communication plan in case of an incident**

or the commission for **the situation of medical physics in Switzerland**.

If you are interested in one of these projects, please contact SPAMP's president (frederic.corminboeuf@insel.ch).

Do you remember that advertisement in our Bulletin 64, December 2007? That was the starting point of the work of some people to find out how medical physics is seen nowadays by medical physicists.
You also know that meanwhile spamp does not exist anymore.
So you may be interested in the current status of the survey which has taken place last year between October and December 2009. At least I am. So that is why I started to put your answers together. By the way about 63 medical physicists answered: Thank you!
You may know that the survey was mentioned in various presidents' reports to you during the last year. But what happened? Yeah, you are right: Just nothing.
Together with this report I will transfer the summary to the president of ssrmp.
Meanwhile I will thank the following people for their work for that survey – in alphabetical order: Léon André, Stephan Kloeck, Regina Müller and an anonymous person that did the translation of the questionnaire.

I am very curious how this story will continue ☺

Angelika Pfäfflin, Basel & Münchenstein

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Pattern Recognition 41 (2008) 543–554

PATTERN RECOGNITION
THE JOURNAL OF THE PATTERN RECOGNITION SOCIETY
www.elsevier.com/locate/pr

An easy measure of compactness for 2D and 3D shapes

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Received 6 July 2005; received in revised form 9 April 2007; accepted 29 June 2007

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Das Institut für Radio-Onkologie sucht eine(n)

Medizinphysiker(in)

Das Luzerner Kantonsspital zählt zu den drei grössten nicht universitären Krankenhäusern der Schweiz. Das Versorgungsgebiet der Radio-Onkologie umfasst alle Kantone der Zentralschweiz. Das modern ausgerüstete Institut behandelt pro Jahr rund 1'300 Patienten.

Es stehen drei Linearbeschleuniger im Einsatz, wovon zwei mit OBI und RapidArc®-Funktionalität versehen sind. Ein konventionelles Röntgentherapiegerät sowie eine HDR-Brachytherapie-Einheit ergänzen das Behandlungsangebot. Für die Planung stehen der institutseigene Onko-CT, ein Simulator sowie die Planungssoftware Eclipse® zur Verfügung. Die Arbeitsstationen sind mit dem Radio-Onkologie-Informationssystem Aria® vernetzt.

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Ihre schriftliche Bewerbung senden Sie bitte unter Angabe der Kennziffer 53581 an das Luzerner Kantonsspital, Personalabteilung, CH-6000 Luzern 16.

I M P R E S S U M

Herausgeber:	Schweizerische Gesellschaft für Strahlenbiologie und Medizinische Physik (SGSMP/SSRPM/SSRFM)	
Druck:	Druckerei PSI	
Redaktion:	Shelley Bulling Eaux-Vives Centre de Radio-Oncologie 26 Rue Maunoir 1207 Genève 022 319 77 30 sbulling@eaux-vives.com	Regina Müller Paul Scherrer Institut Schule für Strahlenschutz 5232 Villigen PSI Tel. 056 310 2480 regina.mueller@psi.ch
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