Schweizerische Gesellschaft für Strahlenbiologie und Medizinische Physik
Société Suisse de Radiobiologie et de Physique Médicale
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Cover: Changes

Editorial

Dear colleagues

This last issue with Angelika at the helm has been slower coming than usual. Angelika has done a great job on the bulletin for six years – with passion – which represents many hours of work. Thank you Angelika!! Happily, she will still work closely with us for future Bulletins and we look forward to receiving her contributions. Please send your contributions too, because many people want to hear more in the Bulletin about what's happening in other Swiss centres.

There's lots of interesting news in this Bulletin, including the 2009 TLD intercomparison results, news from Lucerne about the shutdown of one of their linacs, and letters from the Presidents explaining the big changes proposed for the annual meeting on the 8th of June.
Most likely there will be only another Bulletin released in 2010.

We hope that you enjoy reading and we look forward to hearing from you soon. Anyone interested in joining our editorial team is very welcome!

Regina Müller and Shelley Bulling

Dear colleagues

During six years Regina Müller and I did the Bulletin. For me that editorial work was a very challenging experience. But you may know that I have changed jobs one year ago and I am not working in a radiation therapy department any longer. Instead I work as a teacher for MTRA HF and become certified adult educator soon (hopefully… have to pass an exam ☺). So my life has somehow changed which leads to rethink on many things, including our Bulletin. I am very glad that Shelley Bulling and Regina Müller will continue. And I got the feeling that I could become a better author if I do not have to worry about the organizational part too.

Discussions within our society convinced me to look for a new field of bringing in my points of view: Documentation, discussion, transparency and visibility of Medical Physics which is more than radiation therapy physics and is done also outside of a clinical environment – that means, if I got the chance I will contribute to our societies life in future.

Dear colleagues I am very glad that many of you have supported our Bulletin in the past and I hope you will do it as encouraged as before for the new team!

Angelika Pfäfflin, Münchenstein und Basel,
medphys.pfaefflin@bluewin.ch

Dear colleagues, dear friends

Thinking about what to write in this letter, I realized that even though not much time has passed since the last Bulletin, some important events for our society have happened.

First of all, there was the last annual meeting in Basel. The high quality of the presented talks was noticed by everyone. The talks on state-of-the-art topics in medical physics research gave a clear sign that medical physics in Switzerland is up to date. The entertainment events were also appreciated. I'd like to warmly thank the organizers for such a good annual meeting. The next annual meeting will take place in Wabern at METAS on the 11th and12th November 2010.

Secondly, during the Basel meeting you voted that medical physics in Switzerland should go back to being represented by one organization. This has meant that from January until now, the board has had a difficult job. Plenty of meetings took place, as well as joint meetings with the SPAMP, email exchanges and phone calls, to prepare for the next general assembly that will take place at Inselspital Bern on the 8th of June 2010. There is a good reason for all that. The June general assembly, along with the one of SPAMP, will have to decide about the future of our medical physics societies. The joint proposal of the SSRMP and SPAMP boards is to combine the two societies in order to have a more efficient one. On the 8th of June, you will have to decide if you accept (1) the dissolution of SPAMP and (2) the new SSRMP statutes. The major change to the SSRMP statutes is the creation of three specialized commissions chaired by members elected by the general assembly. These commissions are: professional (which will cover the present work of SPAMP), education (already existing) and scientific (which will deal with all the scientific aspects of the society, including the AMP which will remain). The chairpersons of these commissions will automatically become SSRMP board members. The remaining members of these commissions will be elected by the board. This proposal for the new structure was accepted by a large majority of the members of both boards. We believe that the communication problems that we've had in the past will be solved with this new structure. As president of SSRMP and on behalf of the large majority of the board, I advocate for these changes.

Thirdly, there is another less visible, but very important, change for our society - Angelika Pfaefflin will step down from the editorial board of your Bulletin. The edition that you're reading right now is the last one with Angelika as editor. Angelika did this important job very well for more than six years. This represents a huge amount of work and I deeply thank Angelika for that.

Bulletin editor is an important and time consuming task. Fortunately, Regina Mueller stays in the boat. And hopefully, we found a new Bulletin editor who accepted to join Regina. This is Shelley Bulling, actual board member, who will continue the work so that you will be able to read three Bulletin editions per year. Thank you Shelley for your commitment.

Last but not least, there is a side effect of the structure change of our society. Independent of the outcome of your vote on the 8th of June, two people will leave the board, and this is the end of an important era for our society. Wolf Seelentag and Jean-François Germond will step down from the board. They were the last medical physics pioneers of Switzerland still in the board.

Both of them have been president of SSRMP (by the way, I am the successor of both: Wolf because he was the first tieless president and Jean-François because he was the first French speaking president). Among the many roles that they have had, they have been representative of SSRMP in EFOMP (and even general secretary), member and president of working groups, member and president of Fachkommission, SSRMP webmaster, organizer of the annual congress, etc… Between them they have probably held all of the positions in our society. They have both contributed an enormous amount to SSRMP and I thank them very much and wish them well for their (soon but not yet) retirement.

I look forward seeing you in Bern on the 8th of June for this important day and in the meantime, enjoy your Bulletin!

Meilleures salutations de Lausanne,
Raphaël Moeckli

SSRMP Annual Scientific Meeting 2010

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

First Invitation and Call for Abstracts

Dear Colleagues and Friends
The SSRMP Annual Scientific Meeting 2010 will be held in Bern-Wabern at the Federal Office ofMetrology 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.
Abstracts should be submitted online. Please follow the corresponding guidelines on the SSRMP homepage. It is recommended to submit and present in English. The abstracts will be published in an abstract booklet provided at the meeting. The deadline for abstract submission is Monday, 6 September 2010.
There is no conference fee, but registration is mandatory. Details will follow in the Second Invitation.
We are looking forward to hearing from you.
On behalf of the organizing committee
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Varian Award for Radiation Oncology of the Swiss Society of Radiobiology and Medical Physics (SSRMP)

Deadline for submission: August 31st 2010 !

Award rules:

1. SSRMP can award during the annual general assembly up to three Varian prizes. The maximum amount for a single Varian prize is SFr. 3'000.-. Varian Medical Systems Inc. donate to SSRMP each year SFr. 3'000.- for the Varian prize.
2. The prizes are given to single persons or to groups, which have made an excellent work in radiobiology or in medical physics. Members of SSRMP or groups with at least one member of SSRMP are legitimate to attend with a manuscript or with a published or unpublished paper of special importance, special originality or special quality. The size of the work should not exceed the normal size of a paper. A thesis normally exceeds this size. The person, who enters a paper written by more than one author, should have contributed the major part to this paper. The consent of the co-authors must be documented.
3. The winner gets the prize amount, as well as a diploma with an appreciation.
4. The invitation for the Varian prize is published in the bulletin of SSRMP. Direct applications or recommendations of other persons can be sent to the President of SSRMP. The documents should be entered in four specimens not later than six month before the annual meeting.
5. A prize committee judges the entered works. It consists at least of three members of SSRMP and is elected or reelected for 2 years by the SSRMP board. At least one member of the prize committee should be member of the SSRMP board.
6. The prize committee constitutes itself. The decision of award together with the appreciation should be sent to the board for approval.
7. Varian Medical Systems Inc. is indebted to announce in written form each change of the prize amount or a termination of the contract to the president of SSRMP at least one year in advance.
8. This regulation was accepted by Varian Medical Systems Inc. (Switzerland) September 27th, 2006 and renewed by the annual assembly of SSRMP September 27th, 2007. It can be changed only with the approval of Varian Medical Systems by a decision of the annual assembly of SSRMP.

Léon André, Bern
President of the Prize Committee

Dear SPAMP members,

This is certainly my last message in the Bulletin as SPAMP's president. As mentioned by Raphaël, the June extraordinary general assembly will have to decide about the future of our medical physics societies. The joint proposal of both boards is to combine the two societies in order to have a more efficient one. As president of SPAMP and on behalf of the large majority of the board, I also advocate for these changes. These important changes to the structure of our societies should be seen as an evolution and not as a backwards step as SPAMP's aims will be taken over by the specialized commission "professional issues".

During my presidency, we tried with the board to promote our association first by the medical physics community. We were quite successful in 2007 we had 60 members and today 81 members. Despite these increase, it was always very difficult for the board to find members ready to work in working groups or in the board.

We introduced medical physicists in radiology and nuclear medicine. To realize this task, we used the partial revision of the radioprotection ordinance by means of the article 74. The next step is now for medical physicists to work in these domains and to prove that we can bring some improvements.

On the other hand we tried to organize regularly the salary survey and we were less successful due to a lack of response. But in the future we will certainly continue with this survey because it is an important tool for the community and for every medical physicist.

We have also initiated a survey about the position of the medical physics in Switzerland. Until now we have not yet results but we will certainly continue to work on this issue.

I was always aware that professional issues are not the main interest of our community. But we have also to take care that we will certainly live some changes in the near future (Art. 74 of radioprotection ordinance, revision of the radioprotection law…) and we have to prepare us to face them.

I want also to take the opportunity to thank all my colleagues of the board for all the accomplished work and for the fruitful collaboration during all these years.

I look forward seeing you in Bern on the 8th of June for this important day.

Gruss aus Bern,
Frédéric Corminboeuf

Results of the TLD intercomparison 2009

Since the last year's TLD intercomparison was quite comprehensive, the aim of this year's intercomparison was to check just the absolute dose calibration under standard conditions, as described in [1]. All institutions addressed participated in the dosimetry intercomparison. Altogether 24 institutions with 50 machines and 95 beams were evaluated. Due to technical evaluation problems in St.Gallen, the results of two institutions are not included in this evaluation. Further measurements are in process.

The ratios of the measured to the stated doses at the dose calibration point, D_m/D_s, are shown in Table 1:

Energy	number of beams	mean	st.dev
6X	48	1.000	1.1%
15X	15	0.998	1.2%
18X	20	1.004	1.3%
others	12	0.999	0.6%
all	95	1.000	1.2%

Table 1: D_m/D_s *values for measurements in the dose calibration point.*

The mean of D_m/D_s of all beams is 1.000, the standard deviation amounts to 1.2%. The maximum value is 1.038 (deviation caused by setup problems) and the minimum value is 0.975. The distribution of the D_m/D_s values is shown in diagram 1:

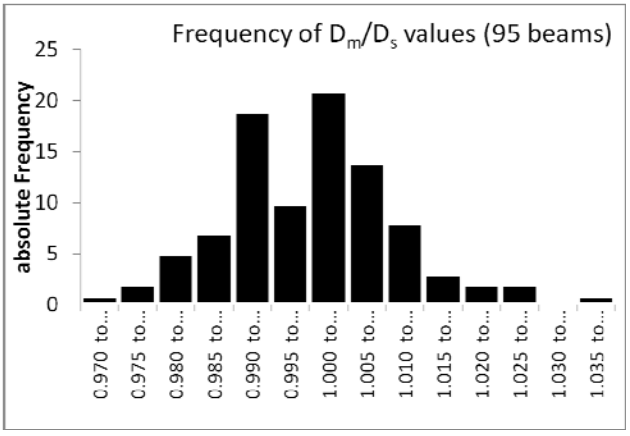

Diagram 1: Histogram of 95 D_m/D_s values: 67.4% of all measurements are within ±1.0%, and 91.6% are within ±2.0%. All measurements except one are within 3.0%.

For the interpretation of individual results, a difference of less than 3% between the stated and measured dose is to be considered optimal, a difference of 3…5 % is to be considered within tolerance. All reference field measurements except one fulfilled the first criterion, and are therefore considered optimal. All fulfilled the second criterion.
For the year 2010, the first electron dosimetry intercomparison will be performed. It is planned to check each photon and electron energy used by an institution (not each beam, as performed with photons for example in this intercomparison). This means for instance: An institution with two identical machines has to check only one of them. The electron beams

will be applied to a water equivalent phantom (RW3 from PTW, Freiburg) which is inserted into a Perspex frame. The calibration will be carried out in collaboration with METAS.

It is suggested to introduce a three years cycle:

- planning intercomparison & photon measurements of all energies
- photon measurements of all beams
- photon and electron measurements of all energies.

We thank all institutions for their pleasing co-operation.

W.W. Seelentag H. Schiefer

1. [1] SGSMP, "Recommendations No 8: High-Energy Photon Beam Therapy Dosimetry with Ionisation Chambers, "ISBN 3 908 125 25-1, (2000).

W. Seelentag & H. Schiefer, St. Gallen

One of three linacs ordered shut down for five months

Practical consequences of Art. 19 of the accelerator ordinance

At the beginning of the year, Luzerner Kantonsspital found itself with only one medical physicist SGSMP and two physicists at the beginning of their 3-year training period. Strictly according to Art. 19[1] of the accelerator ordinance this would have meant keeping one of three linacs in clinical use and shutting down the other two. Thanks to the BAG letter of July 2 2009, however, it was possible to keep the two dual energy linacs in clinical use. The third linac (a low energy machine) needed to be shut down until June, when another medical physicist SGSMP will start. This was ordered by BAG despite the fact that it was already known that the situation would be resolved within five months.
One might think that the situation in Lucerne (exchange of a complete team) is not a frequent scenario, yet it has occurred a couple of times in the recent past (Hirslanden, Triemli, USZ). They seemed to have been luckier in replacing their staff with certified medical physicists or they were the reason for BAG's exception, making it thus possible for them to continue with reduced (certified) staff.

Whatever the reasons, the consequences that Lucerne had to face can very quickly befall any of the other clinics. Instead of someone changing jobs think of a female colleague leaving for maternity break or any colleague expressing the desire for a sabbatical leave. Those absences are of limited duration, yet jeopardize the clinical use of an accelerator, unless the clinic has more medical physicists employed than it has accelerators in use. And what if someone is unable to work for an extended period of time due to illness? There are numerous reasons why a department might be short of a certified medical physicist for a *limited* time.
Does this now mean that we will see more and more accelerators temporarily being closed for clinical use?

One reason given by BAG (besides the fact that it is written in the *law*) was that not enough physicists were available to do the required QA on all linacs. Due to Art. 19 being the law, we did not feel that we were in a position to argue with the BAG, but we certainly did not share that last argument. If the new colleagues could be of valuable help then it was precisely in taking over some of the routine jobs that don't need a deep and fundamental understanding of radiotherapy and / or the increasingly complex information systems. Shutting down one of the linacs (in theory) saved the medical physics group a total of less than 10 man hours *per month*. On the other hand, all patients were now scheduled on two linacs instead of previously three, inevitably prolonging each workday by a couple of hours *each day* (it would have been even worse had we not been able to reduce our appointment slots due to RapidArc). This was no big deal for the therapists who had one "extra team without a linac" and therefore could easily work in shifts. As for the single remaining certified medical physicist it unnecessarily prolonged her day as she did not feel that she should be walking away early. It's not clear (at least to us) what the law is saying about early morning to late evening treatments, all with only one certified medical physicist. Those colleagues amongst you who are working by themselves have probably long found a way to deal with this situation, but we preferred to always have someone around who thoroughly knew the equipment.

Did the linac shutdown help anyone? Certainly not the physicists even if that might have been the intention. Those linacs in clinical use ran longer than they would have, therefore pushing machine and patient QA into the night. Also, access for service engineers was made more difficult.

This situation will soon be resolved for Lucerne as we are very happy to welcome Mania Aspradakis to our team. But what does this precedence mean for the Swiss radio-oncology

scene? Was this just the beginning? Should the demand "1 accelerator requires 1 certified medical physicist" maybe be reconsidered? It seems that there is no doubt in the community that an adequate number of physicists is required, but we feel that the current implementation and/or interpretation of Art. 19[1] of the accelerator ordinance cannot be the solution. **It needs to be changed at the next possible occasion!**

Regina Seiler & Peter Thum, Lucerne

Below, an article reprinted from the BAG website.

For the online version in **French**:
http://www.bag.admin.ch/ksr-cpr/04309/04310/index.html?lang=fr

Risks associated with CT examinations

1. Wie gefährlich sind CT-Untersuchungen?

Die Gefährlichkeit einer CT-Untersuchung ist deshalb schwer zu beschreiben und von uns Menschen schwer zu verstehen, weil wir für Strahlen – anders als für Licht, Ton und Düfte – kein Sinnesorgan haben, also davon nichts spüren; aber auch weil eine einzelne Untersuchung – anders etwa als ein gewagter Einsatz eines Extrembergsteigers - nur ein sehr kleines Risiko

bringt, dessen **Folgen nicht sofort, sondern erst nach Jahren** bis Jahrzehnten erkannt werden können. In der Tat bringt keine übliche CT-Untersuchung eine so hohe Dosis an eine Körperstelle, dass dort innert Minuten bis Wochen erkennbare Veränderungen aufträten. Die Gefährlichkeit liegt darin, dass – oft über eine Kette von Genmutationen und Chromosomen-Veränderungen – in mehreren Schritten bösartige Tumorzellen entstehen können, welche darauf zu lebensgefährlichen Tumoren heranwachsen können [1].

Die CT-Untersuchung geschieht mit Röntgenstrahlen von ca. 120 keV Spitzenenergie, welche zu den **ionisierenden Strahlen** gehören. Um sich die Gefährlichkeit einer auf den Körper einwirkenden ionisierenden Strahlung vorstellen zu können, ist am ehesten der Vergleich mit dem Rauchen geeignet: Wie das kurzfristige Rauchen verursacht eine einmalige CT-Untersuchung keine Beschwerden; es dauert Jahre bis Jahrzehnte, bis die Folgen erkennbar werden, und diese Folgen können für das Individuum in Form eines tödlichen Krebses verheerend sein. In beiden Fällen sind es **Tumoren**, welche auch spontan – d.h. ohne Rauch- oder Strahleneinwirkung – häufig auftreten.
Verständlicherweise wird es dadurch im Einzelfall schwierig zu unterscheiden, ob der Tumor auch ohne oder nur wegen der Einwirkung der Strahlung entstanden ist. Ionisierende Strahlung aus dem Kosmos oder vom Boden ist etwas Natürliches, dem der Körper seit Jahrtausenden ausgesetzt war und ist; sie wird durch die zusätzliche zivilisatorische (medizinische oder industrielle) Strahlung vermehrt, und die Effekte addieren sich über viele Jahre. Nach diesem ausführlichen Vergleich nun aber die auf wissenschaftlichen Erkenntnissen beruhende konkrete Abschätzung der **Gefährlichkeit** einer Strahlenwirkung: Die meisten Experten nehmen zur Risikoschätzung die jahrzehntelangen Auswertungen der Folgen der japanischen Atombombeneinsätze zu Hilfe [1-3], weil nur spärliche gesicherte Langzeitdaten aus der Medizin zur Verfügung stehen und weil zum Nachweis des zu erwartenden prozentual geringen Effektes sehr hohe Patientenzahlen nötig wären. Dabei wählt man zwecks grober Vergleichbarkeit den Begriff der effektiven Dosis [Einheit Sievert Sv], welche bei Teilkörperbestrahlung, wie sie bei der CT erfolgt, den aus den Organdosen errechneten Wert einer Ganzkörperbestrahlung gleicher biologischer Wirksamkeit bezeichnet. Ab ca. 50 mSv effektiver Dosis kann man statistisch gesichert eine Erhöhung des **Krebsrisikos** nachweisen, welche grob **5%/Sv** beträgt. Eine einzelne **CT-Untersuchung** verursacht eine effektive **Dosis** von ca. 2 mSv (Kopf) – 7 mSv (Oberkörper) – 12 mSv (Bauch-Becken) – 20 mSv (Ganzkörper); die Variation ist allerdings sehr gross [4]. Dabei muss als wahrscheinlich angenommen werden, dass erstens mehrmalige CT-Untersuchungen (oder auch andere Strahlenexpositionen) sich in ihrer krebserzeugenden Wirkung addieren und zweitens auch bei Dosen unter 50 mSv das Risiko nicht null ist, sondern einfach proportional der Dosis kleiner wird [3].

Schliesslich kommt hinzu, dass der **jugendliche** Körper auf eine gleiche Strahlenmenge deutlich anfälliger ist als derjenige eines mehr als 60-jährigen Menschen und dass der **weibliche** Körper durch eine gleiche Dosis ein höheres Risiko erleidet als der männliche Körper [3]. Versucht man alle diese Erkenntnisse zusammenzufassen, so resultiert – mit erheblichen Unsicherheitsfaktoren – z.B. für eine CT-Herzkranzgefässdarstellung im Alter von 40 Jahren bei der Frau ein Krebsrisiko von ca. 1/270, beim Mann von ca. 1/800, während dieses für eine Hirndarstellung rund 1/8'000 bzw. 1/11'000 beträgt [4]. Erfolgt die Untersuchung im Alter von 20 Jahren, kann sich das Risiko grob verdoppeln, während es im Alter von 60 Jahren nur noch grob halb so gross ist [4]. In den USA wurden für die im Jahr 2007 durchgeführten CT-Untersuchungen 29'000 zusätzliche zukünftige Krebsfälle geschätzt [3], was bei längerfristig gleichen Dosen etwa **2% der Gesamtzahl neuer Krebsfälle** ausmachen würde. Wichtig war auch die Feststellung, dass das Risiko vor allem von Bauch-Becken-, in zweiter Linie von Oberkörper- und Kopfuntersuchungen herrührte und rund ein Drittel der Patienten schon im Alter von 35-54 Jahren die CT erhalten hatten [3].

2. Werden in der Schweiz zu viele Menschen mit einer CT untersucht und wenn ja warum?

Grundsätzlich ist festzuhalten, dass internationale Richtlinien für den Einsatz ionisierender Strahlung fordern, dass bei jedem einzelnen Patienten die **Abwägung** vorzunehmen ist, ob eine Strahlenanwendung **mehr Nutzen als Schaden** beinhaltet [2].
Zweifelsohne überwiegt der Nutzen eines medizinischen Strahleneinsatzes in sehr vielen Fällen dank rascherer oder besserer Diagnostik und entsprechend rascherem Behandlungsbeginn. In der Schweiz wurde und wird die CT-Methode ähnlich wie in vielen industrialisierten Ländern eingesetzt, wobei unser Land in einer 2004 publizierten Zusammenstellung bezüglich der Untersuchungsfrequenzen und auch des Risikos im Mittelfeld lag [1]. Es ist also nicht ein schweizerisches, sondern ein weltweites Problem, wenn Vorwürfe auftauchen, es würden zu viele CT-Untersuchungen durchgeführt. Im klinischen Alltag ist es tatsächlich nicht einfach, die meist vor oder direkt nach der Untersuchung evidenten Vorteile einer CT-Untersuchung (der sofortigen Diagnose, der Abkürzung der Abklärungsdauer und damit oft der Spitalbehandlung und –kosten, aber auch der kürzeren Verunsicherung der Patienten) gegenüber dem über Jahre nicht erkennbaren Nachteil der ev. Krebsentstehung abzuwägen. Im langjährigen Einsatz der CT-Methode bin auch ich persönlich zur Überzeugung gelangt, dass es in der Schweiz **unnötig durchgeführte CT-Untersuchungen** gibt. Darunter fallen „Ratlosigkeits"-Untersuchungen in schwierigen diagnostischen Situationen, in denen eine CT durchgeführt wird, obwohl man von ihr eigentlich kaum etwas erwartet oder nur weil der Patient darauf drängt; wenn zum Voraus feststeht, dass – unabhängig vom Resultat – keine Behandlungskonsequenzen resultieren, dann ist eine Abklärung nicht gerechtfertigt.

Bedenklich sind jene CT-Untersuchungen, welche ohne gründliche klinische Untersuchung und vor dem Einsatz einfacherer Verfahren veranlasst werden, nur weil sie die Antwort auf mehr Fragen liefern als z.B. eine einfache Ultraschalluntersuchung. Nicht selten werden CT-Untersuchungen auch nach zu kurzer Zeit wiederholt: Schuld ist dabei – neben der geringen Erfahrung von jungen Ärzten – oft das Verlangen, eine Krankheitsentwicklung (Rückbildung, Verschlechterung) möglichst rasch festzustellen und zu klären, ob eine teure oder gefährliche Behandlung wirksam ist bzw. abgebrochen und durch eine andere ersetzt werden muss. Auch nach neuesten wissenschaftlichen Erkenntnissen fallen darunter ferner alle Screening-Untersuchungen, also nicht im Rahmen einer bewilligten wissenschaftlichen Studie durchgeführte Vorsorgeuntersuchungen an Gesunden, welche allerdings in der Schweiz weit weniger Bedeutung erlangt haben als in den USA. Sodann gilt es die nicht im Interesse der Patienten, sondern zur juristischen Absicherung veranlassten Abklärungen zu erwähnen, für die die Schwelle noch höher gesetzt werden muss.

3. Wurden in den vergangenen Jahren auch in der Schweiz immer mehr Menschen mit einer CT untersucht?

Zweifellos ist die Antwort ja, da die Schweiz keine isolierte Insel darstellt und wie in den meisten Ländern mit hochentwickelter Medizin der klinische Einsatz der CT dem erweiterten diagnostischen Spektrum gefolgt ist. Grund dafür waren die grossen technischen **Weiterentwicklungen der Methode** in den Jahren 1989 bis 2006. Diese erlaubten es zusehends, dank rascherer Messung **neue, schwierigere Fragestellungen** mittels CT anzugehen. Wurde die Durchleuchtungstechnik schon in den 90-er Jahren stark zurückgedrängt, so ist seit 2000 z.B. auch die diagnostische Angiografie (die Gefässdarstellung mittels Katheter) fast verschwunden. Dass die CT-Untersuchung für den Patienten im Gegensatz zu den abgelösten Verfahren **kaum mehr unangenehm** ist, hat wohl die Schwelle für ihren Einsatz weiter gesenkt.

4. Wie viele CT-Untersuchungen werden pro Jahr schätzungsweise in der Schweiz durchgeführt und wie viele wären davon vermeidbar?

1998 kam eine schweizweite Erhebung auf **46.3 CT-Untersuchungen pro 1'000 Personen** und einen Beitrag der CT von 28% an die medizinische Strahlendosis der Gesamtbevölkerung von 1 mSv/Jahr [6]. In einer Zwischenauswertung 2003 wurde bereits ein **Anstieg** der CT-Untersuchungszahl **um 70%** gegenüber 1998 und damit der Bevölkerungsdosis auf 1.2 mSv festgestellt [7]. In Universitätskliniken wurden jährliche Zuwachsraten von 8-18% beobachtet [6], und dieser Anstieg dürfte sich bei der neuen Erhebung für das Jahr 2008, also 10 Jahre nach der grossen Bestandesaufnahme, **fortsetzen**, deren Auswertung allerdings noch im Gange ist (Zahlen fehlen noch).
Weltweit gehen Experten davon aus, dass die CT-Untersuchungen bald 50% zur medizinischen Strahlenbelastung industrialisierter Länder beitragen werden, eine Schätzung, die auch für die Schweiz nicht unrealistisch ist.

Persönlich schätze ich, dass die **vermeidbaren Fälle** zusammen ca. 10-15% der CTUntersuchungen ausmachen; es sind vornehmlich die im Abschnitt 2 genanntenSituationen. Dabei sind die Zahlen bei einer gründlichen Analyse des vorgängig zu treffenden Überweisungsentscheides wohl nicht so hoch, wie sie gelegentlich – aufgrund nachträglicher Abschätzungen - erwähnt werden (bis zu 1/3). Es ist leichter, rückblickend bei fehlender Konsequenz aus einer Untersuchung deren Berechtigung abzulehnen als anhand der vor der Untersuchung vorliegenden Informationen den Nutzen gegenüber dem Risiko richtig abzuschätzen.

Vermeidbare Untersuchungen müssen über eine gründlichere **Ausbildung** der Ärzte und mittels **Richtlinien für den korrekten Einsatz der Bildgebung** in verschiedenen häufigen Fragestellungen möglichst eliminiert werden [4]. Gegenwärtig arbeitet z.B. die EU an solchen Richtlinien. Ähnlich wichtig erscheint mir die parallel dazu anzustrebende **Standardisierung der Untersuchungsprotokolle** auf eine tiefe, jedoch die erforderliche Information liefernde Strahlendosis [4]. Die vermehrte **Information der Patienten** kann über deren Rückfrage an die behandelnden Ärzte eine zusätzliche Hilfe bedeuten; hier gilt es immerhin zu bedenken, dass ängstliche Patienten dann zum eigenen Nachteil dazu neigen können, auf medizinisch notwendige Untersuchungen zu verzichten. In einem stark durch den Kostendruck geprägten medizinischen Umfeld [5] stellen diese Ziele anspruchsvolle Herausforderungen dar, welche nur durch Zusammenarbeit der Behörden, der Ärzte, der Spitäler und der Kassen gemeistert werden können.

5. Wann sind CT-Untersuchungen unbedingt erforderlich, wann gibt es Alternativen?

Diese Frage kurz zu beantworten, ist nicht möglich, da die kontinuierliche Verbesserung der CT-Geräte die wissenschaftliche Datenbasis immer wieder überholt hat und da deshalb die **Rechtfertigung noch nicht einheitlich** gehandhabt wird. Auch das Risiko-Nutzen-Verhältnis ist bei noch nicht einheitlichen Abklärungsprotokollen deshalb für die einzelnen Fragestellungen oft zu wenig bekannt. Richtlinien riskieren weiter dem einzelnen **Individuum** zu wenig Rechnung zu tragen, also etwa dem Vorliegen anderer Erkrankungen, der individuellen Lebenserwartung und der Lebensqualität. Die folgenden Angaben sind deshalb sehr allgemein und sollen auch die generelle Entwicklung in den nächsten Jahren aufzeigen.
Unbestritten erforderlich sind CT-Untersuchungen beim Polytrauma (d.h. der Mehrfachverletzung), bei komplexen Skelettverletzungen, bei frischem Schädel-Hirntrauma, beim Wirbelsäulentrauma. Auch der akute Schlaganfall wird in den allermeisten Fällen zu Recht zuerst mit einer CT-Untersuchung abgeklärt. Grossvolumige Tumorausdehnungsbestimmungen, heute oft kombiniert mit einer Darstellung der Stoffwechselaktivität in Form der PET-CT,

sind bei erwiesenem bösartigen Tumor sehr oft eine Voraussetzung zur Wahl der richtigen Behandlung. Auch die Darstellung der Blut-Gefässe über grössere Bereiche vom Kopf bis ins Becken und die Beine stellt bei älteren Menschen, wenn Gefässerweiterungen mit Blutungsrisiko oder Verschlüsse vermutet werden, eine sehr wertvolle, schonende Methode dar. Flüssigkeits-Ansammlungen und Entzündungsherde mit Eiter sind zwar mit anderen Verfahren zu finden; für ihre genaue Ausdehnungsabklärung und schonende Behandlung ist die CTMethode jedoch oft unumgänglich.

Alternativen zur CT-Abklärung gibt es in vielen Fällen, namentlich in Form des **Ultraschalls** (US) und der **Magnetresonanztomographie** (MRI). Beim Kind und vorallem bei Fragestellungen, welche sich auf eine Körperregion beschränken, bieten diese Methoden oft einen gleichwertigen Ersatz. In allen Anwendungen mit wiederholten Verlaufskontrollen bei guter mittelfristiger Prognose wird nach Umstellungsmöglichkeiten gesucht, etwa bei Infektionsverdacht unter Immunabwehrunterdrückung nach Organtransplantation oder bei regelmässig erforderlichen Tumornachsorge-Kontrollen. Es sind wichtige Entwicklungen in Richtung der Darstellung des gesamten Körperstammes bei Tumoren und Gefässerkrankungen mittels MRI im Gange; sobald die Methode genügend rasch ist – die neueste Gerätegeneration geht in dieser Richtung –, können damit in einer einzigen Messperiode von maximal 1 Stunde die erforderlichen Informationen gesammelt werden. Dieser Wechsel wird bei Kindern und jungen Erwachsenen bald die in der Summe bezüglich Strahlenbelastung problematischen vielfachen CT-Verlaufskontrollen ersetzen können.

Bern, 12.1.2010
Peter Vock, Bern

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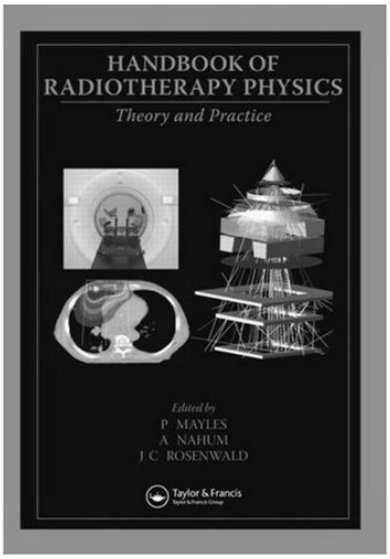
To download this article:
http://www.bag.admin.ch/ksr-cpr/04309/04310/index.html?lang=de

Book Review

Handbook of Radiotherapy Physics – Theory and Practice



Edited by Philip Mayles, Alan Nahum, Jean-Claude Rosenwald

CRC-Press, Taylor & Francis Group, New York/ London, 2007, ISBN 978-0-75030-860-1, price $289.95
Number of pages: 1450.

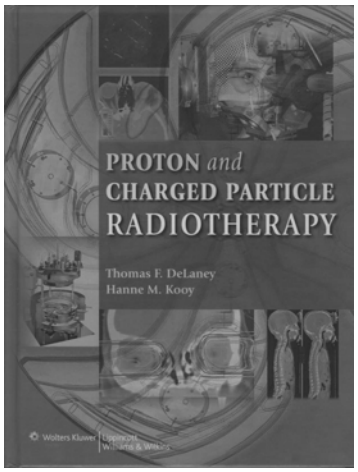
Summary by publisher:
"From background physics and biological models to the latest imaging and treatment modalities, the Handbook of Radiotherapy Physics: Theory and Practice covers all theoretical and practical aspects of radiotherapy physics.
In this comprehensive reference, each part focuses on a major area of radiotherapy, beginning with an introduction by the editors and then subdividing into self-contained chapters. The first three parts present the fundamentals of the underlying physics, radiobiology, and technology involved. The ensuing sections discuss the support requirements of external beam radiotherapy, such as dose measurements, properties of clinical beams, patient dose computation, treatment planning, and quality assurance, followed by a part that explores exciting new advances that include developments in photon and particle therapy. Subsequent sections examine brachytherapy using sealed and unsealed sources and provide the framework of radiation protection, including an appendix that describes the detailed application of UK legislation. The final part contains handy tables of both physical constants and attenuation data.
To achieve safe and effective radiotherapy, there needs to be a close understanding among various disciplines. With contributions from renowned specialists, the Handbook of Radiotherapy Physics: Theory and Practice provides essential theoretical and practical knowledge for medical physicists, researchers, radiation oncologists, and radiation technologists."

In my opinion this is an excellent book covering a broad range of topics relevant to medical physicists working in the field of radiation therapy, hereby also providing an overview of literature the authors considered important at the end of each chapter. Despite the relatively high price and the publication year – resulting in a lack of information about recent developments and technical implementations - I can clearly recommend it for buying and reading. I personally also found this book very helpful in the preparation for the SSRMP certification exam.

Carlos Calle, Winterthur

Proton and Charged Particle Radiotherapy

The more protons and charged particles are used in new radiation therapy facilities the more such books are a must to be used in “normal”, i.e. photon and electron based radiotherapy clinics. This volume serves two purposes: It gives an introduction and actual overview of treatments. And for advanced readers it gives practical recommendations how to treat.
The first chapters deal with technical and biological aspects of producing and planning charged particles, also including patient positioning and setup verification as well as quality assurance. The second part discusses clinical applications like pediatric tumors, central nervous system, eye, skull base and cervical spine, head and neck, bone and soft tissue, prostate, lung, gastrointestinal malignancies, gynaecologic carcinomas, breast and lymphoma. For every chapter the authors are, of course, international experienced and well known.



Released: 2008
Editors: Thomas F. DeLaney, Hanne M. Kooy
ISBN-10: 0-7817-6552-8
EAN: 9780781765527
Publisher: Lippincott Williams&Wilkins
Pages: 320
Weight: 1098 g
Language: English
Layout: more than 100 colour figures and tables, hardcover
Price: ca. 227.- CHF

Medizintechnik
Verfahren, Systeme, Informationsverarbeitung

Aus dem Klappentext hier:
„Ein gebündelter Wissensschatz in kompakter, verständlicher und transparenter Form für Ärzte, Pflegekräfte, Medizintechniker, Studenten der Medizin, der Informatik und des Gesundheitsingenieurswesens, Krankenhaus-Architekten, Krankenhaus-Manager bzw. alle, die sich mit der Medizintechnik beschäftigen.“ – insbesondere auch Medizinphysikerinnen und Medizinphysiker! ☺

Inhaltlich gliedert sich das Werk in einen eher kurzen allgemeinen und einen umso ausführlicheren speziellen Teil. Im allgemeinen Teil werden von verschiedenen Autoren die Rolle der Technik im Gesundheitswesen, Vorschriften für Medizinprodukte, Qualitätssicherungs- und Ökonomische Aspekte ausgeführt. Der spezielle Teil befasst sich mit den medizintechnischen Aspekten der Funktionsdiagnostik (u.a. EKG, Lungenfunktion, Neurophysiologie), der Teil für die Bildgebung ist eher knapp gehalten, dafür enthält es auch endoskopische Systeme und Infrarotbildgebung. Die therapeutischen Systeme und das Monitoring bilden den umfangreichsten Anteil mit Beiträgen zu Beatmung, Defibrillatoren, Lasersystemen, zur Anästhesie, Blutreinigung, Herz-Lungen-Maschinen, verschiedener Strahlensysteme, Infusionstechnik, Herzschrittmacher u.a.

Der vierte Teil ist der Informationsverarbeitung und Kommunikation gewidmet und befasst sich auch mit Themen wie der Virtuellen Realität in der Medizin oder computerunterstützten Lehr- und Lernsystemen.
Vervollständigt wird das Buch durch Spezialthemen wie Operationstischsysteme, Biomaterialien, Robotersysteme usw.
Der Anhang ist mit zahlreichen ergänzenden Tabellen und Graphiken, aber vor allem mit einer Übersicht über die historischen Meilensteine der technischen Medizin seit 2800 vor unserer Zeit, gefüllt.

Erschienen: 2007
Autor: Rüdiger Kramme
ISBN-10: 3-540-34102-1
EAN: 9783540341024
Verlag: Springer
Seitenzahl: 1014
Gewicht: 2651 g
Sprache: Deutsch
Auflage: 3. vollst. überarbeitete u. erweiterte Auflage
Ausstattung: 585 SW- und 99 Farbabbildungen
Preis: ab 239.- CHF

Fehlentscheidungen in der Radiologie
Analyse der Ursachen und Strategien zur Fehlervermeidung

„Fehler passieren ständig. Fehler sind Teil der menschlichen Natur und werden überall gemacht, wo Menschen in Entscheidungen involviert sind. Das Begehen von Fehlern ist eine der wichtigsten Voraussetzungen für die Weiterentwicklung geistiger und praktischer Fähigkeiten. Aus Fehlern kann man lernen, wenn man sie erkennt und über sie spricht.“ – Soviel verspricht der Einband.

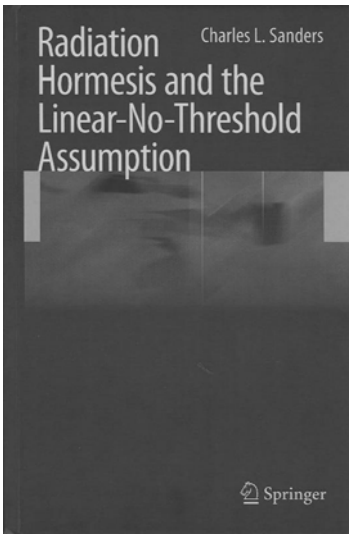
Dargestellt werden über 115 Fälle aus der gesamten radiologischen Praxis, die mindestens suboptimal behandelt wurden. Es liegt in der Natur der Sache, dass zahlreiche dieser Fälle interdisziplinäre Betrachtung erfordern – von Anatomie bis Radio-Onkologie. Mitgeliefert werden selbstredend Hintergrundinformationen, die v.a. die medizinischen Aspekte beinhalten. Sehr schön ist das umfangreiche Bildmaterial. Schwierig nachvollziehbar sind m.E. lediglich die Strategien zur Fehlervermeidung im Einzelnen. Zusammengefasst zieht das Buch seinen Sinn einfach daraus, dass es sich überhaupt mit dem Thema „Fehlentscheidungen“ befasst. Hier sind die Radiologen den Radio-Onkologen (wieder einmal?) einen Schritt voraus.

Erschienen: 2009
Autoren: Klaus-Jürgen Lackner, Kathrin Barbara Krug
ISBN-10: 3-13-147821-7
EAN: 9783131478214
Verlag: Georg Thieme Verlag
Seitenzahl: 361
Gewicht: 1364 g
Sprache: Deutsch
Ausstattung: 977 Abbildungen 37 Tabellen, gebunden

Radiation Hormesis and the Linear-No-Threshold Assumption

From time to time it seems reasonable to rethink facts and former evaluations. And for that I would recommend this book. I am still not convinced that small radiation doses really protect something but it is still a challenge how to find how small doses operate.

"Increased ionizing radiation in radiation-deficient environments provides an increased lifespan and abundant health. (TD Luckey)"



Contents:

- Molecular and Cellular Mechanisms
- Natural Environmental Radiation
- Accidents, Tests, and Incidents
- Medical Exposures and Workers
- Nuclear Workers
- Biased Epidemiological Studies
- Evidence Negating the Healthy Worker Effect
- Lung Cancer
- Breast Cancer
- Leukemia
- Liver, CNS, and Thyroid Cancers
- Lifespan, Birth Defects, and Experimental Cancer
- Animal and Human Cancer Therapeutic Studies

Conclusion, Summary, and Importance

Released: 2010
Author: Charles L. Sanders
ISBN-10: 3-642-03719-4
EAN: 9783642037191
Publisher: Springer
Pages: 217
Weight: 581 g
Language: English
Layout: ca. 140 sw and colored figures and drawings, 61 tables, hardcover
Price: ca. 272.- CHF

Angelika Pfäfflin, Basel

Feedback of the SSRMP Annual Scientific Meeting 2009

Angelika Pfäfflin gave me a mission: to convert into black on white the pleasure and the impressions of the meeting of Basel. So here is my feedback from that “two days trip”. I say trip because I go back home the evening in the middle (a sign that Basel is less far from Fribourg than Chur last year). Therefore the contents and corresponding feedback of a selected subset of the presentations will be exposed here and no official party (sorry for the organizers but my time is not so extensible and my presence was required in my french speaking region).

The contents

The presentation of Philippe Trueb concerning the art. 74 was not a surprised but a sort of "jump in the future" and my impression during the talk was that each administrator of each hospital / clinic should be warned on that near future by the BAG. Somebody in the public ask: "What are the position in the radiologist and nuclear medicine societies (reworded)?" . Apparently according to Philippe it will not be an issue!
A clear surprise was the presentation of Hans Roser, entitled "QA of Xray clothing in University Hospital Basel". In particular when he says say that more than 20% of clothes were defective at each QA campaign (annually performed). What is the situation in my hospital? Sure that art. 74 and the new coming physicists for radiology department will improve that distressing situation.
But the atomic bomb was not yet arrived. The presentation of Daniel Twerenbold was that great revelation. The Swiss Metrology of the Gray is no more the best in the world. We simply joined the herd. The k_q results now from a fit and no more from a measurement. That is always sad when technology or science moves back. Moreover, this was not news of a coming future, but just a description of the present giving up the 10 last experienced years, a spoonful of this famous semi-sparkling bitterness for the medical physicist.
Then Hans Schiefer gave us a refreshing presentation on the IMRT inter-comparison. Thank you Hans, you are tall!

The next day, Thomas Bortfed gave a very awaited presentation (people hoped for one following the publications, answers and re-answers in the Phys. Med. Biol. of January 2009). The followed way was not so polemical, but very interesting all the same. He spoke mainly about the Pareto frontier and the chance we have in IMRT that a small set of cases (20 to 30) seems sufficient to fully describes this Pareto frontier of the optimization problem. That is we will soon profit in our clinic from that possibility. The process will follow something like describing the problem (ranges on DVH constraints) and a meta-optimizer will build that Pareto frontier (perhaps during the night). After that just in an interactive mode one will get the possibility to choose the best case in that set of cases on the Pareto frontier. A good image for the Pareto frontier is that it is the frontier between the unfeasible and the feasible plans.
I enjoyed the presentation by Peterhans describing the Monte-Carlo method on deforming anatomy. It's a milestone in direction of next step after IGRT that is adaptive radiotherapy. We need to know how to deposit the dose if the medium is geometrically no more the same.
The “Molecular Imaging State of the Art” presentation was like a visit to the zoo, too many new concepts and definitions in not enough time for my poor brain. But that made increase the desire to see further and deeper to acquire more of these essential concepts in our field.

Between the numerous sessions, A no so short stay in front of the posters shows a colossal work of the "ticinese" part of Switzerland and their use of RapidArc for a multitude of cases like (lymph node, Hippocamp avoidance, QA, etc.).

I have not mentioned a too great number of very interesting presentations, but it is fair to say that to have everything in the eyes and head, you must be present. So see you next year for SSRMP meeting.

Really thank you for the work done by the Basel team and specially Hans Roser.

Pierre-Alain Tercier, Fribourg

PHYSICS for HEALTH in EUROPE workshop

2-4 February 2010

CERN – Switzerland

http://physics-for-health.web.cern.ch/physics-for-health/

This workshop was organised by CERN in its main auditorium with the support of several organisations[1], including the EU and the European Federation of Organisations for Medical Physics (EFOMP). The number of registrants to the event was about 400 with about 200 submitted abstracts and participants came from 32 countries. The program and details of the meeting can be found online at:

http://indico.cern.ch/conferenceDisplay.py?confId=70767

The presentations given during the meeting are available for viewing online through CERN's webcast service:

http://cdsweb.cern.ch/record/1237559

The meeting was organised in four sessions covering aspects of radiobiology and space science, radioisotopes for diagnostic and therapeutic applications, medical imaging and technological advances in radiotherapy. The purpose of the meeting, according to the organisers,

[1] "Physics for Health" was supported by the EU, EANM, ESA, ESF, ESRF, ILL, ESR, EFOMP, EuCARD, PARTNER, ENLIGHT.

was to bring together medical doctors and physicists to discuss and develop European strategies and synergies between them for applying state of the art science from particle physics primarily into cancer diagnosis and treatment. The first keynote speaker Prof. Gillies McKenna of the CR-UK/MRC Gray Institute for Radiation Oncology and Biology at the UK's University of Oxford, stated that ''such workshops are very useful because often medical doctors and physicists may not know which aspects of their work will be relevant to one another''.

The talk by a Dr J P Gerard, a clinician from France, served as a good overview to the history and basics of cancer radiotherapy and I enjoyed this. However it ended without presenting the state of the art radiotherapy treatment techniques currently available in hospitals. The attendees not involved in the field of radiation oncology and radiotherapy physics, may probably left with the impression that still hand planning is what is being carried out (the only slide showing a 2D dose distribution was from that era!). None of the talks presented and/or speculated on developments to IMRT, IGRT technologies for cancer therapy. There were more presentations on charged particle radiotherapy. There were only two contributions from the PSI (one oral and one poster), but several interesting posters on the dosimetry of medical ion beams and on the design of new facilities. Overall in my view the session on 'novel technologies in radiation therapy' did not do much justice to its title.

It seemed that this was not the case for the session on radioisotopes in diagnostics and therapy (but then I admit I do now know much on this field to judge what is considered state of the art or not…). It was interesting for me getting an overview on the production of isotopes used for medical applications (talk by Dr N Ramamoorthy of the IAEA) and learning more on the current shortages in supplying hospitals with ^{99m}Tc for nuclear medicine and diagnostic imaging (talk by Prof Dewi M. Lewis of General Electric Healthcare). One of the posters in this session was on the SWAN project by the University of Bern, Inselspital, and SWANtec AG in Bern) describing the construction of a cyclotron laboratory for radioisotope production, proton therapy and research in Bern.

The session in medical imaging was rich in contents. One would anticipate that a lot of the detector technology developed for high energy physics could be transferred in diagnostic medical imaging, as well as in radiotherapy dosimetry (as for example is the case with monolithic silicon arrays based on microstrip technology already finding applications in narrow field and IMRT dosimetry). The talks by Prof. Stefaan Vandenberghe from the University of Ghent and Dr Peter Dendooven from the University of Groningen elaborated on the use of Time of Flight PET detectors (TOF-PET); the former speaking on their use inside a PET-MRI scanner and the latter on the development of monolithic crystals for such detector systems. From the posters in this session those which caught my eye were on the investigation by the team from DKFZ and HIT of a flat-panel pixelized amorphous silicon detector for measuring beam parameters (such beam profiles) from medical ion beams, carrying out patient plan verification and even for use ion radiography.

From the session on radiobiology the second keynote speaker Prof. Oliver Jaekel from the DKFZ gave an overview on radiobiology in ion therapy, which was good, but I doubt that many in the audience, having not been exposed to the subject before, would have been able to follow the extensive and detailed information presented in the limited time of the talk. Dr Yolanda Prezado from European Synchtrotron Radiation Facility (ESRF) in Grenoble presented the application of synchrotron x-rays for radiotherapy. Three techniques are under development at ESRF for the treatment of brain tumours: stereotactic synchrotron radiation

therapy (SSRT), microbeam radiation therapy (MRT) and minibeam radiation therapy (MBRT). With MRT brain tumours are to be irradiated with very high doses (~150-625 Gy) by an array of parallel x-ray microbeams (~25-50 μm wide and ~210 μm apart) with a beam-line spectrum of between 50-500keV (mean energy around 100keV). In MBRT the beam width is ~500-700 μm and separated by a similar amount. The speaker discussed pre-clinical studies from this very (very!) small x-ray field technology on rodents with aggressive tumours and went on to conclude on the need for clinical trials on patients. Unfortunately there was not much presented on dosimetric measurements and dose verification in such fields, who one would expect need to precede the onset of clinical trials involving patients. There are some articles in the literature on the topic where Monte Carlo methods are being used (mainly the GEANT and Penelope MC codes) to simulate such beams and MOSFETs and Gafchromic film for measurements.

The closing remarks to the workshop by CERN's Director General Rolf Heuer were that CERN would be willing to play a role in fostering the connection between medicine and physics. That is very nice and desirable but I was left thinking that this message, together with some of the good science presented in the talks and posters during the workshop, must reach those who indeed play a key role in the innovation and introduction of new technology into medicine and in particular cancer therapy. A pity really that during this workshop there were very few medical and radiation oncologists present in the room (I estimate less than 10) and not that many medical physicists (probably not more than 15 persons).

IMRT discussed in the main auditorium at CERN.

Maria Mania Aspradakis, Kantonsspital Graubünden, Chur, March 2010

Maria Mania Aspradakis, Chur

22. Winterschule in Pichl „Magnetresonanztomographie“

As usual the week in Pichl, Austria was great: many lessons to learn a lot, nice hotel and environment for non-intellectual exercises, many friendly colleagues for discussions – see photograph beside – sunny weather and fine skiing conditions.

And as usual I was the only participant out of Switzerland – what a pity ☹.

On my right side on the photograph you see the person who organized the whole week very well: Jürgen Reichenbach, Jena.

The program was presented by experienced MR-physicists in the fields of parallel imaging, cardiovascular imaging, Neuro-MRT, MR-Spectroscopy and High-Field MR applications and limits. Of course the whole program started smoothly with some physical and medical basics. If you are not sure if you have missed something I invite you now to the following little test ☺. The questions are a translated selection out of the 51 questions all participants answered during the week to get or keep their certification as medical physicists.

1. What is meant by the expression “Larmor-Frequency”?
2. How big (in eV) is the difference between the energy levels in a 1H-nucleus in a field of 1T?
3. Why are surface-coils usually not used as receiving coils?
4. Interventional MRI: Which of the following sentences is wrong?
   a. The advantage of MRT compared to CT is the improved soft tissue contrast.
   b. CT is preferred than MR for interventional examinations as it has better imaging of functional tissue parameters.
   c. With MR it is possible to measure temperature differences within different tissue.
   d. One disadvantage of MR interventions is the limited space to access the patient.
5. Explain the principle of Diffusion Weighted Imaging (DWI)?
6. How long is T1 for tissues like liver, kidney, muscle or brain approximately?
   a. 1 ns
   b. 1ms
   c. 1s
   d. 1min

… and did you know all answers?
You are not sure? Hey, yes you missed something! Probably you have to deal with MR issues from time to time – maybe we meet once if “Magnetresonanztomographie” will be taught again in Pichl, Austria – or elsewhere ☺.

Angelika Pfäfflin, Münchenstein

1st meeting of the IEC Light Ion Beam Working Group in Belgium

Last summer two so-called “new work item proposals” related to light ion beam accelerators were distributed by the International Electrotechnical Commission (IEC). These very first drafts were mainly copy-and-paste documents from two existing IEC standards on electron accelerators (IEC 60601-2-1 and IEC 60976, respectively).

Later in 2009, the national IEC committees voted with an approval of 100 % each for the addition of the two new proposals to the program of work of IEC’s technical committee TC 62C “Equipment for radiotherapy, nuclear medicine and radiation dosimetry”.

In addition to the positive votes, the national committees made more than 250 specific comments on the two documents and nominated a couple of experts for the further development of these standards within a subgroup of TC 62C working group 1 “Beam teletherapy and particle accelerators”, which is headed by Professor Geoffrey Ibbott, physicist at the M.D. Anderson Cancer Center in Houston, TX.

Meanwhile, the proton therapy system manufacturer IBA offered to organize a first meeting of the working group in their offices in Louvain-La-Neuve, Belgium, on March 22nd & 23rd, 2010.

The list of the 19 participants at that meeting looks partly like a who-is-who in proton or ion beam therapy: Represented were from the manufacturer’s side Hitachi, IBA, Mitsubishi, Siemens, Tomotherapy, and Varian (listed in alphabetic order), two representatives from the Chinese Medical Device Testing Authorities and a few Medical Physicists with at least some proton therapy background from throughout the world.

In his introductory words, Professor Michael Moyers from Loma Linda University Medical Center (who actually represented ASTRO) pointed out the necessity of the first standards on light ion beam therapy equipment, which in the meantime obtained the followings numbers and titles:

- IEC 60601-2-64: Medical electrical equipment - Part 2-64: Particular requirements for the basic safety and essential performance of medical light ion beam equipment in the range 10 MeV/n to 500 MeV/n.
- IEC 62667: Medical electrical equipment - Medical light ion beam equipment - Performance characteristics.

On one hand, these documents will give the manufacturers some basic and unified guidelines for their equipment’s safety and performance. And on the other hand, the costumers, who currently have to negotiate with all manufacturers about possible or sometimes even unknown specifications of the product of interest, can expect an improved comparability of the different systems on the market, as soon as the standards will be published.

The first day of the meeting was dominated by the discussion of a few general questions. For example, the participants decided to include some chapters on moving or scanning beams and on imaging systems; the latter mainly to be copied, if possible, from a new IEC standard on IGRT, which is also currently under development by a different subworking group of IEC TC 62.

Several comments by the national committees were addressed to the above mentioned copy-and-paste procedure from the Linac standards, by which the first drafts have been created. For example, the dose rate limit of 1 Gy/s is absolutely not applicable for scanning proton or ion therapy techniques.

By the way, at this point the working group suddenly missed the knowledge of SGSMP's honorary member Arnold von Arx (1919-2004). He was member of TC 62C's working group 1 for a long period and would certainly have known where this value of 1 Gy/s had originally come from.

Sometimes - at first glance - even simple topics required longer discussions, like the mass required for the patient table to be loaded for the different safety and performance tests or the question, whether these standards should already contain a note related to ultra-modern proton accelerators like those using dielectric wall accelerator technology, which are not expected to be on the market within the next few years. On the other hand, PSI's experience of more than 25 years with proton therapy and almost 15 years with the spot-scanning treatment of deep seated tumors helped to answer several questions related to the required parameters for the development of the first standards on medical light ion beam equipment.

The tendency that some national authorities put the content of medical device standards into law had also to be taken into account, although from the regulatory point of view the application of an international standard is not obligatory at all. This behaviour makes the formulation of an IEC standard much more complicated, since it usually describes the "state-of-the-art" of the specified technology at the time of writing. Following standards during product development only supports the assumption, that this product fulfils the general requirements. And as we all know from our daily life - the compliance with certain standards does not automatically mean that the product is safe.

Within these two days, we were only able to get through the comments we had obtained on the safety standard IEC 60601-2-64 by almost 50 %. So we left Belgium with some determined writing assignments in our luggage; e.g., the next bigger step will be the inclusion of the scanning technology in a variety of chapters within both standards.

The next meetings of the working group will be scheduled during the upcoming PTCOG educational meeting in Chiba in May and for October 2010, when TC 62C working group 1 will anyway meet for several days in Seattle.

After these further meetings it should be possible to distribute the so-called committee drafts (CDs) of the two documents to the national IEC committees as scheduled in June 2011, and the final drafts of the international standards (FDIS) should hopefully be ready for the international voting procedure in 2013.

Werner Roser, Villigen PSI

Kantonsspital Graubünden

Das Kantonsspital Graubünden erfüllt mit seinen acht Departementen auf vielen Spezialgebieten Zentrumsaufgaben für den ganzen Kanton Graubünden und ist zudem für die erweiterte Grundversorgung der Spitalregion Churer Rheintal verantwortlich.

Für die **Abteilung Radioonkologie** suchen wir per sofort oder nach Vereinbarung eine/n

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Für weitere Informationen steht Ihnen Dr. Karl Rittmann, Leiter medizinische Strahlenphysik, Radioonkologie, gerne zur Verfügung
(Tel. +41 (0)81 256 64 98, mail: karl.rittmann@ksgr.ch)

Wir freuen uns auf Ihre schriftliche Bewerbung mit Foto unter Angabe der Referenznummer 26/10 an: Kantonsspital Graubünden, Personaldienst, Loëstrasse 170, 7000 Chur, www.ksgr.ch

P E R S O N A L I A

Dear colleagues, since beginning of this year I work for Varian Medical Systems in Zug. My job title is 'Education Instructor Physics'. This means I am a teacher for the courses on the configuration and operation of the planning system Eclipse as well as for courses dealing with IMRT, RapidArc and Portal Dosimetry. My new contact coordinate is: **Hans-Peter Hafner**, Varian Medical Systems International AG, Chollerstr. 38, 6303 Zug; e-mail: hans-peter.hafner@varian.com

Please note that I finished my PhD at IRA (Lausanne) last April. Since then, I have been working at the Hospital in Sion.
Cyril Castella, Hôpital de Sion, Service de Radio-Oncologie, Av. Grand-Champsec 80, 1950 Sion, Tel: +41(0)27 603 45 13, e-mail : Cyrill.Castella@rsv-gnw.ch

Karin Schombourg, who is currently finishing her PhD at the CHUV in Lausanne, will start a new job on the 5th of July. She will join Stefano Presilla and Alessandra Franzetti-Pellanda at the new tomotherapy center in Lugano, Clinica Luganese (091 960 81 31).

It is with a great pleasure that the "Clinique des Grangettes"(private clinic, Geneva) has just opened a new department of Oncology & Radio-Oncology, equipped with a Silhouette Clinac VARIAN with OBI, IMRT and RapidArc options. The first treatments began from mid-February 2010.The physics staff is made up of two physicists: **Dr Rachid Boucenna** and **Maxime Desplanques**, who are pleased to join the SSRMP.

From the 1st of March 2010, **Cécile Chatelain** is working at the Radio-Onkologie Zentrum Biel with Dr Daniel Vetterli and Dr Pascal Favre-Bulle. She is employed by the medical physics group of Inselspital Bern where she will spend 1 day per week in the future. Before that, she worked as an assistant medical physicist for 8 years in the radiotherapy department in La Chaux-de-Fonds. To complete her training, she will attend the MAS in medical physics in ETH starting this fall, her goal is to get the SGSMP certificate by 2012.

Medizinphysik an der Klinik für Radio-Onkologie am Kantonsspital Winterthur

Seit Mai 2009 besteht unser Team aus vier Medizinphysikern (s. Foto), wobei unser hauptsächliches Tätigkeitsgebiet die klinische Routine ist. In unserer Klinik werden jährlich über 1'000 Patienten an zwei Siemens Primus-Linearbeschleunigern behandelt, die beide mit einem a-Si-Portalbildgebungssystem und einem 58-Lamellen-MLC ausgerüstet sind. Eines der Geräte wird ausserdem zur Anwendung von Step&Shoot-IMRT-Therapieplänen genutzt. Des Weiteren gibt es einen Simulator (Nucletron Simulix HP mit digitaler Bildgebung), Computertomographen zusammen mit Radiologie, ein HDR-Brachytherapiegerät, und ein konventionelles Röntgentherapiegerät. Zur Planerstellung nutzen wir Oncentra MasterPlan und Kon-Rad. Als Informationssystem kommt z. Zt. Elekta/ Impac Mosaiq zum Einsatz. Als nächstes grösseres Projekt stehen der Austausch des älteren der beiden Siemens-Geräte inkl. der zugehörigen Softwaresystemanpassungen und damit verbunden auch eine Aktualisierung des vorhandenen Dosimetriewerkzeugs an. Während der Sommermonate dieses Jahres wird nach den notwenigen baulichen Anpassungsarbeiten an dessen Stelle ein Varian TrueBeam-Beschleuniger treten, dessen Ausmessung natürlich eine Menge an Arbeit mit sich bringen wird, auf die wir uns aber sehr freuen. Der klinische Einsatz des Geräts wird dann ab Herbst 2010 erfolgen.

Das Medizinphysikteam der Klinik für Radio-Onkologie am Kantonsspital Winterthur. Von links nach rechts: **Lukas Hirschi**, **Cezarina Negreanu-Macián**, **Carlos Calle**, **Helmut Härle**.

CALENDAR 2010

10.-11.05.2010 D-Jülich	2nd Juelich MR-PET Workshop INFO: *www.fz-juelich.de/conference/mrpet_08*
19.-21.05.2010 F-Bordeaux	49ème Journées Scientifiques de la SFPM INFO: *sfpm.fr/js/2010/*
20.-22.05.2010 D-Heidelberg	10th Teaching Course on IMRT / IGRT INFO: *www.imrt.uni-hd.de*
03.-06.06.2010 D-Magdeburg	16. Jahreskongress der DEGRO INFO: http://www.degro.org/degro2010/
06.06.2010 D-Magdeburg	Kommunikation für Radioonkologen, Seminar der DEGRO 2010 INFO: http://www.degro.org/degro2010/
7.-8.06.2010 BE-Leuven	EPI2KX: 11th international workshop on portal imaging. INFO: *www.uzleuven.be/en/node/9747*
08.06.2010 Bern	**General assembly SGSMP / SBMP**
10.-12.06.2010 D-Bad Schlema	5. Biophys. Arbeitstagung, Biologische Wirkungen niedriger Strahlendosen INFO: *radiz.de/5_Biophys_AT_2010/5_biophys_at_2010.html*
16.-18.06.2010 E-Girona	International Workshop on Digital Mammography INFO: *iwdm2010.org/*
25.-26.06.2010 Bern	6. 3-Länder-Brachytherapie Symposium INFO: *www.3-laender-brachy.com*
01-03.09.2010 BG-Varna	International Conference on Radiation Protection in Medicine INFO: rpm2010.org
22.-25.09.2010 F- Berder Island	Workshop of „Biology of ionizing radiation" INFO: *axevectorisation-workshop-berder2009.com/*
01.-03.09.2010 BG-Varna	International Conference on Radiation Protection in Medicine INFO: *www.rpm2010.org*
23.-25.09.2010 I-Undine	IV-th Europ. Conference of Med. Phys. on High Field Magnetic Resonance Imaging INFO: *www.udine2010.fisicamedica.org*
29.09.-2.10.2010 D-Freiburg	41. Jahrestagung der DGMP, "Mehr sehen" - Bildgebung für Diagnostik und Therapie in der Medizin, INFO: kongress-und-kommunikation.com/cms/website.php?id=/DGMP2010.htm
11.-12.11.2010 Wabern BE	SGSMP Annual Meeting *INFO: soon*
19.-20.11.2010 A-Krems	27. Jahrestagung der ÖGRO INFO: *www.oegro2010.at/cms/website.php*
09-12.11.2010 A-Vienna	International Symposium on Standards, Applications and Quality Assurance in Medical Radiation Dosimetry, INFO: *www-pub.iaea.org/MTCD/meetings/Announcements.asp?ConfID=38093*

– P r e s s e s p i e g e l –

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

British Medical Journal der Artikel "Breast cancer mortality in organised mammography screening in Denmark: comparative study

Karsten Juhl Jørgensen, *researcher*[1], **Per-Henrik Zahl**, *senior researcher*[2], **Peter C Gøtzsche**, *professor*[1]

[1] The Nordic Cochrane Centre, Rigshospitalet, University of Copenhagen, Denmark, [2] Norwegian Institute of Public Health, Oslo, Norway

Objective To determine whether the previously observed 25% reduction in breast cancer mortality in Copenhagen following the introduction of mammography screening was indeed due to screening, by using an additional screening region and five years additional follow-up.

Setting Copenhagen, where mammography screening started in 1991, and Funen county, where screening was introduced in 1993. The rest of Denmark (about 80% of the population) served as an unscreened control group.

Participants All Danish women recorded in the Cause of Death Register and Statistics Denmark for 1971-2006.

Results In women who could benefit from screening (ages 55-74 years), we found a mortality decline of 1% per year in the screening areas (relative risk (RR) 0.99, 95% confidence interval (CI) 0.96 to 1.01) during the 10 year period when screening could have had an effect (1997-2006). In women of the same age in the non-screening areas, there was a decline of 2% in mortality per year (RR 0.98, 95% CI 0.97 to 0.99) in the same 10 year period. In women who were too young to benefit from screening (ages 35-55 years), breast cancer mortality during 1997-2006 declined 5% per year (RR 0.95, CI 0.92 to 0.98) in the screened areas and 6% per year (RR 0.94, CI 0.92 to 0.95) in the non-screened areas. For the older age groups (75-84 years), there was little change in breast cancer mortality over time in both screened and non-screened areas. Trends were less clear during the 10 year period before screening was introduced, with a possible increase in mortality in women aged less than 75 years in the non-screened regions.

Conclusions We were unable to find an effect of the Danish screening programme on breast cancer mortality. The reductions in breast cancer mortality we observed in screening regions were similar or less than those in non-screened areas and in age groups too young to benefit from screening, and are more likely explained by changes in risk factors and improved treatment than by screening mammography.

Source: BMJ, *doi:10.1136/bmj.c1241*

The New York Times

THE RADIATION BOOM

Radiation Offers New Cures, and Ways to Do Harm

As Scott Jerome-Parks lay dying, he clung to this wish: that his fatal radiation overdose — which left him deaf, struggling to see, unable to swallow, burned, with his teeth falling out, with ulcers in his mouth and throat, nauseated, in severe pain and finally unable to breathe — be studied and talked about publicly so that others might not have to live his nightmare. […]

[…] A New York City hospital treating him for tongue cancer had failed to detect a computer error that directed a linear accelerator to blast his brain stem and neck with errant beams of radiation. Not once, but on three consecutive days.

Soon after the accident, at St. Vincent's Hospital in Manhattan, state health officials cautioned hospitals to be extra careful with linear accelerators, machines that generate beams of high-energy radiation.

But on the day of the warning, at the State University of New York Downstate Medical Center in Brooklyn, a 32-year-old breast cancer patient named Alexandra Jn-Charles absorbed the first of 27 days of radiation overdoses, each three times the prescribed amount. A linear accelerator with a missing filter would burn a hole in her chest, leaving a gaping wound so painful that this mother of two young children considered suicide. […]

[…] The Times found that while this new technology allows doctors to more accurately attack tumors and reduce certain mistakes, its complexity has created new avenues for error — through software flaws, faulty programming, poor safety procedures or inadequate staffing and training. When those errors occur, they can be crippling.

"Linear accelerators and treatment planning are enormously more complex than 20 years ago," said Dr. Howard I. Amols, chief of clinical physics at Memorial Sloan-Kettering Cancer Center in New York. But hospitals, he said, are often too trusting of the new computer systems and software, relying on them as if they had been tested over time, when in fact they have not.

Regulators and researchers can only guess how often radiotherapy accidents occur. With no single agency overseeing medical radiation, there is no central clearinghouse of cases. Accidents are chronically underreported, records show, and some states do not require that they be reported at all. […]

[…] Dr. John J. Feldmeier, a radiation oncologist at the University of Toledo and a leading authority on the treatment of radiation injuries, estimates that 1 in 20 patients will suffer injuries.

Most are normal complications from radiation, not mistakes, Dr. Feldmeier said. But in some cases the line between the two is uncertain and a source of continuing debate.

"My suspicion is that maybe half of the accidents we don't know about," said Dr. Fred A. Mettler Jr., who has investigated radiation accidents around the world and has written books on medical radiation.. […]

[…] While the worst accidents can be devastating, most radiation therapy "is very good," Dr. Mettler said. "And while there are accidents, you wouldn't want to scare people to death where they don't get needed radiation therapy."

Source: Ney York Times, 24.01.2010

I M P R E S S U M

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