Winter School on Dosimetry Guided Treatment Planning for Radionuclide Therapy 2021 Bern – 20-22 January

Mission and Scope

The winter school targeted medical physicists, physicians, technologists and researchers involved and interested in the workflow of clinical dosimetry in support of precision radionuclide therapy. The aim of this winter school is to present bases of quantitative imaging and dosimetry methodologies to support patient-based treatment planning and verification in clinics. The school also aimed to promote a common/shared knowledge and cooperation of different partners involved. Research and commercial solutions to assist quantitative imaging and dosimetry workflows were also presented and discussed.

Program and Speakers

The dosimetry school had the contribution from eminent and recognized international experts in the different topics covered by the school program:
The school was opened with the wishes of international and national societies regarding the clinical implementation of dosimetry first by the IAEA (represented by Prof. Francesco Giammarile), followed by the Swiss society of nuclear medicine (Prof. John Prior Lausanne University Hospitals CHUV, Switzerland), the Swiss medical physics society (Prof. Michael Fix, University of Bern, Switzerland). And the Swiss Federal Authority presented by Dr. Sebastien Baecler (head of the radioprotection division, Swiss Federal Office of Public Health, Switzerland).
The first morning covered topics of quantitative imaging in support of personalised dosimetry (Prof. Mark Konijnenberg, Erasmus Medical Center, Netherlands and Dr. Johannes Tran-Gia, University of Würzburg, Germany). The afternoon started with talks on the topic of simplistic vs. individualized approaches to therapeutic activity administration first in the view of the physician (Prof. Alex Rominger, Inselspital, University of Bern and Prof. Niklaus Schaefer, Lausanne University Hospitals CHUV, Switzerland), followed by the view of the medical physicist (Dr. Silvano Gnesin, Lausanne University Hospital, Switzerland, Dr. Mark Konijnenberg and Dr. Michael Lassmann, University of Würzburg, Germany). And lastly with the point of view of the big pharma (Dr. Germo Gericke, Advanced Accelerator Applications, Novartis).

The second day was dedicated to calculation methods and clinical application and experiences of different types of radionuclide therapies with talks from Prof. Ernesto Amato (University of Messina, Italy), Prof. Manuel Bardies (Institut du Cancer de Montpellier, France), Dr. Elisa Richetta (Azienda Ospedaliera Ordine Mauriziano di Torino, Italy), Prof. Richard Baum (DKD Helios Klinik, Wiesbaden, Germany) and Dr. Iain Murray (Royal Marsden Hospital and Institute of Cancer Research, UK). The day concluded with a discussion on the need for and practical implementation of clinical dosimetry (Dr. Carlo Chiesa, Foundation IRCCS Istituto Nazionale Tumori, Milan, Italy)

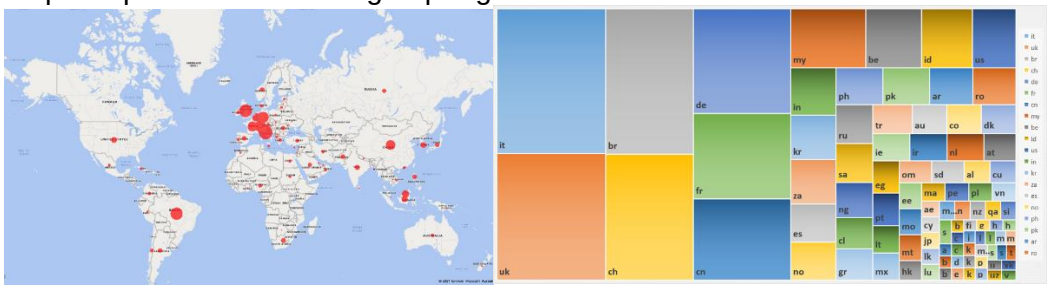
The third morning was devoted to biokinetics (Prof. Gerard Glatting, Ulm University, Germany) and multicenter trials dosimetric challenges to achieve accurate and comparable dosimetry information (Prof Michael Lassmann). The last afternoon was dedicated to AI in support of dosimetry (Prof. Kuangyu Shi, Inselspital, University of Bern, Switzerland), methodology and challenges of pre-clinical dosimetry (Dr. Francesco Cicone, Magna Graecia University of Catanzaro, Italy) and new radioisotopes for theranostics (Dr. Christina Muller (Paul Scherrer Institute, Villigen-PSI, Switzerland).

During the three days of the school, we had the support from commercial sponsors involved in the domain that animated specific sessions where they presented their solutions for clinical

dosimetry workflows. . We highlight that vendor-independent, research dosimetry software is also developed and proposed by the Open Dose collaboration presented by Dr. Alex Vergara (CRCT, UMR 1037, Inserm, Université Toulouse III Paul Sabatier, Toulouse, France).

Registrations

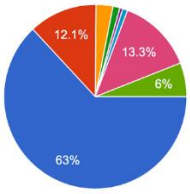
We received more than 1297 registrations from 90 countries. Among them Italy, UK, Brazil, Switzerland, Germany, France and China are the top 7 countries. In particular, IAEA selected 49 participants and made a group registration for them.



Background of participants

The attendees ranged across several professions. The most represented profession was medical physicists followed by students then nuclear medicine physicians. In total, 1434 certificates were produced, for those participants that requested a certificate.

Day 1



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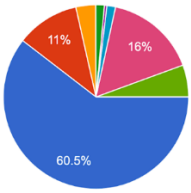

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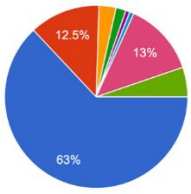

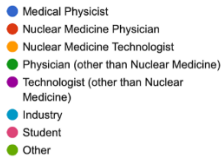

The review we received from one of the participants.

There are two types of medical physicists in nuclear medicine: the ones that work closely related to a research center or in clinics where personalized dosimetry has already started to be developed and implemented in the clinical routine, and the others, starting in a location where physicists' involvement in therapy planning is unexplored territory.
I am part of the second group. As soon as I accidentally got in contact with the concept of personalized dosimetry, I was hooked: this is fantastic, we need to have it too. However, where to start? One can read papers and projects oneself into a rabbit hole of peculiarities and complex details to pay attention to. One can get in contact with medical physicists from other institutions and get tips, hope and a sense of empowerment, however once alone in one's clinic, owning alone such a responsibility constitutes a frightening step to cross. One can find dosimetry winterschools where a specific set of tools is displayed and learn how to use it, however, once back, recollection lacks tiny details and one gets once again stuck at the beginning. One can participate to EANM and other international conferences, which give a view of how deep personalized dosimetry can go, but eventually even more tiny details to pay attention to, which makes it even more impressive to cross the bridge and endorse full responsibility for activity prescription.

This dosimetry winterschool was different. It managed to reach the "bang for the buck" effect for the humble and resources-limited local physicist who just struggles to get started.
Key parts of personalized dosimetry were mixed and matched in the menu:
-Easy beginner's classes on how to start with the first personalized dosimetry models: the basic theory, available calculation models and the first steps for "easy" therapies.
-Practical descriptions on how to set up and calibrate the cameras and counters, so that the patient's measurements, which personalized dosimetry relies on to adjust the model to the patient's specific biology, are reliable.
-Open discussions between physicists, but also medical doctors, offering the participant an overview of the key issues facing teams in individual clinics regarding the practical implementation of dosimetry and key facts and figures to give to the local medical team in order to be convincing of the necessity and scientific superiority of personalized dosimetry.
-Industry presentations of the available software packages in addition to talks from experienced physicists warning about the limitations of such software and the uncertainties hidden under the surface.
-Exciting talks about new radiopharmaceuticals, animal experiments, translational research, artificial intelligence, and current efforts to develop an open-source community, all giving the idealistic and hopeful impulse that is necessary to keep the motivation high.
-The necessary discussion about the problem of clinical trials and lack of sound data regarding dosimetry, which any physicist should keep in mind to avoid waiting for scientific data that will never come.
-Surprising talks on how to check the goodness of a fit, which was an unexpected but necessary reminder.
-Spot-on summaries: lists of therapies with available personalized dosimetry models, comments on the efficacy of such dosimetries, and recommendations on which to start with.

The participant could log off at the end of the third day and have a clear idea of what to do first, what to read, and how to be convincing so that motivation translates into activity prescription for real patients.

In addition to the high quality of the scientific content of this school, three aspects made it exceptional: it was well organized, online, and without charges.
Participants from all over the world could simply log in, take part, and learn, without having to find a significant budget for these three days, which could have been a barrier of entry for many.
Individual questions could be formulated in a separate but publicly visible window: each raised question was answered, no matter how many questions in total were asked (!), and every single participant could benefit from it.
The organizers passed organizational information in a parallel chat, allowing us all not to get lost, without having to interrupt presentations to remind people what needs to be done.
One could self-organize one's own breaks to have the maximum learning efficacy: one can surprisingly easily find one's own fridge and bathroom, no need to spend long periods of time waiting to go out of room or in line at the bathroom or developing strategies to get food one likes in unknown territory.
Heart-warming surprises could be spotted by the participant who was listening during the breaks: one could serendipitously witness discussions between speakers and, for instance, learn the favorite color of one presenter's ties (it's pink).
And finally, the remote aspect of the conference allowed many of us, I am sure, to get out of the ordinary conference setting and get new experiences: the ones from far away were able to avoid the jet lag, one speaker could face his childhood nightmare of being in front of a crowd while wearing sleepers, and I could partake in an international event while pregnant and gasping in surprise anytime my baby would kick - without becoming the international cuckoo.