

IUPESM-HTTG Strategic Planning Meeting

**Brighton Convention Center, Brighton, UK
2 September 2013, 8-10.30 a.m.**

Introduction

The meeting, chaired by Herbert Voigt, IUPESM President, and Cari Borrás, Chair, IUPESM-HTTG, was attended by 13 people, whose names and e-mails are listed in the Appendix.

After the welcoming remarks by Herb Voigt, each participant identified him/herself.

HTTG Workshop on Digital Imaging X-ray Detectors: Historical Perspectives, Current Capabilities, Future Promises

Alluding to the HTTG Workshop that had taken place the day before, Herb Voigt recommended that future HTTG workshops be video-taped, and that the cost involved be included in the budget. Cari Borrás informed that the presentations will be made available in the IUPESM website in .pdf, and proceeded to review the publication status of previous Workshops. *(After the Brighton meeting, Kwan Hong Ng sent information on how to produce good-quality low cost videos, which the HTTG will take into account)*

Then, she invited Paulo Costa and Karim S. Karim to described the status of the IUPESM-HTTG projects they are currently working on.

On-line CT/QC Project

Paulo Costa briefly described the On-line CT/QC Project, a project consisting in documenting CT protocols in clinical use for adult head and abdomen scans, evaluating the scanner performance and image quality using a combination of commercial phantoms and in-house computer software and acquiring patient dose data in terms of $CTDI_{vol}$ through the DICOM metafiles, after validation following the methodologies developed by the AAPM and the ACR. A pilot study involving two institutions in Porto Alegre and three in Sao Paulo was undertaken, comprising a total of 10 scanners. The results of the pilot study were presented in a poster at the AAPM and the abstract was published in Medical Physics. Parallel to this pilot study, the Brazilian researchers have evaluated a commercially available software which would automatically analyze the results of the phantom scans and transmit the results to the two universities, where the CT-QC team leaders would further analyze the data collected, integrate it with the other parameters obtained directly from the PACS system of the hospitals and provide recommendations to the local QC-CT person in each facility; such a person could be a CT technologist with special

training in QC, a medical physicist or a biomedical engineer. Once fully developed, it is expected the program can be implemented throughout Brazil.

Low-Cost Digital Detector for Medical Imaging

Karim S. Karim reported that he and his colleagues at the University of Waterloo in Canada have developed a low cost digital X-ray solution (TBView 1000) based on off-the-shelf components that achieves low cost objectives by using a direct sales and an on-line support model. Pneumavision (the name of this social venture company) is planning to try out its first system prototype in Tanzania and compare its performance to a CR system. The device has been already approved by the Korean agency that is the equivalent of the US-FDA. While the detector is undergoing further testing, he is looking for partnerships (e.g. NGOs, government, industry and professional associations e.g. IOMP) that can help with publicizing this system, arrange for trials, training and support. He described his experiences in the Kyrgyz Republic during his sabbatical, which alerted him of the problems in resource-limited settings and prompted him to create the commercial venture, Pneumavision.

His presentation elicited many comments. Tony Seibert suggested that the detector-which is smaller than a 14"x17" standard chest one- could be ideal for neonatal and infant imaging. Shankar Krishnan asked whether the system is patented –which it is, and questioned the training needs, an issue discussed also by other meeting participants. Cari Borrás mentioned the fiasco in Haiti of 11 WHIS-RAD (World Health Imaging Systems – Radiography) installed in the 1990's which failed because the technicians did not have enough training to do simple things like changing a fuse or understanding that the machines had to be connected to the mains all the time to prevent the discharge of the batteries. Jin Wooi Tan explained problems he encountered in Malaysia, for example dust on ultrasound machines. Training programs for indigenous populations like the one from Bob Malcolm were recommended. Barry Allen suggested that, in the absence of properly trained maintenance engineers, the possibility of training junior medical physicists to do simple tasks is considered. (In China these persons are called "second tier medical physicists").

There were also suggestions regarding potential funding agencies for the development of such a project, for example: the Gates Foundation, the Aga Khan Foundation, Rotary International –their role in the polio eradication in the Americas and the distribution of WHIS-RAD units in cooperation with Northwestern University were briefly reviewed– and Engineering World Health a Washington-DC based NGO which has projects in Honduras and Tanzania. The potential production of the system in countries like China and India was proposed. As an example, it was mentioned that the University of Singapore has produced an autochthonous CT system which costs only US\$ 50,000. Karim Karim mentioned that the x-ray tube, which has a stationary anode, is manufactured already in both China and India with some input from Anders Tingberg from Sweden. Regarding questions whether any

commercial company had been approached, Karim Karim explained that a start-up company Pneumavision had been formed. The goal is to market the digital X-ray system for less than US\$ 15,000. Ideally the system should be portable and rugged.

The need of health technology assessment of new devices was emphasized, and the role of institutions such as the US National Science Foundation, described. Cari Borrás mentioned that the US FDA has offered Karim Karim to test the new detector, and that since she lives in Washington DC, close to the FDA, she would be happy to participate in the evaluation. In addition, two students of Karim Karim are already in FDA! Barry Allen mentioned that Siddique Rabbani from Bangladesh, who is developing a lot of new devices for resource-limited regions, would probably be happy to offer his site as a beta site. He formally proposed that the HTTG follow these two suggestions in parallel, and the meeting participants agreed to this action item.

Several of the participants, for example Arun Chougule and Paulo Costa expressed interest in getting the detector and asked Karim S. Karim for its availability. Tony Seibert suggested that the new detector is ideal for pediatric imaging, as there are no digital detectors commercially available of this size.

IUPESM-HTTG Heavy Metal Detection Workshop

An international workshop on the health effects of heavy metals ingested or inhaled by humans and the detection methods in biological samples is planned for 2014 in Peru under the leadership of Herb Voigt. He asked the HTTG Meeting participants for detection methodologies. The elements in question are Pb, As, Hg and Cd, mostly from mining activities. Herb asked about the possibility of using x-ray fluorescence, Kwan Hoong Ng wondered about neutron activation and Karim Karim mentioned the possibility of using microplasma. The obvious choice, mass spectrometry was discarded because of cost and weight.

Cari Borrás indicated that Helen Khoury from the University of Pernambuco in Recife, where she was a Visiting professor from 2009 to 2011, had developed an x-ray fluorescence analysis system that was being used to identify materials in archeological samples, and she offered to investigate whether a portable system could be manufactured. *(After the Brighton meeting, Helen Khoury was asked of such a possibility, to which she responded positively and indicated she is already working on environmental samples in collaboration with Rene Van Grieken from Belgium. Cari Borrás is pursuing the issue.*

Also after the Brighton meeting Kwan Hoong Ng, wrote that he did not think the neutron activation method was doable and that the best would be a chemical test).

International Council of Scientific Unions (ICSU) Activities

Colin Orton, an HTTG member, has been appointed by the IUPESM Administrative Council to be a liaison to ICSU. Of the 33 unions that are part of ICSU, 12 are considered bioclusters or geoclusters because they are involved in biological or geological projects. Of interest to the HTTG is Health and WellBeing in the Changing Environment and Future Earth. ICSU supports young people to attend the Workshops and Symposia it organizes. HTTG should take advantage of this. Colin Orton will explore the best ways.

Low cost instrumentation and phantoms for diagnostic radiology quality control

Simone Kodlulovich, President of the Latin American Medical Physics Association (ALFIM), stated the difficulties that Latin American countries have to do quality control (QC) in diagnostic radiology because of the high prices of test objects and phantoms. She wondered what the HTTG could do in this regard. In response, Paulo Costa mentioned that Tania Furquim from the University of Sao Paulo in Brazil. Is developing a set of phantoms, and after the Brighton meeting, he provided the following information.

Support from University of São Paulo for producing low-cost QA Phantoms

The University of São Paulo developed a set of QA Phantoms in a partnership with a Brazilian company and financial support of the Foundation for Support Research of the State of São Paulo. The patents of the products were required. The phantoms were tested by qualified Brazilian Medical Physicists. Nowadays, the production of the kit for commercialization requires some improvement in order to optimize the mechanical process.

After the HTTG meeting in Brighthon, the director of the Brazilian Company responsible for the patent deposit and production of the materials was contacted and declared his interest in contribute to the immediate study of the development of low-cost QA kits for improvement of the image quality culture in Brazil and, in the future, in other developing countries.

Other project in progress in the University of São Paulo is the development of tissue-substitute materials for the development of QA phantoms. A set of samples of materials were produced and tested and a second group of samples will be produced in October 2013. Depending on the validation of the materials in terms of its response to the interaction with ionizing radiation, as well as other mechanical and chemical tests, these materials could be used as the basis for simple and low-cost image quality phantoms.

In regards to plastic phantom production, the advantages of 3D printing was discussed and recommended by some of the participants.

Phantom Publications

Regarding phantoms, Cari Borrás mentioned the chapter Kwan Hong Ng has written for a Springer publication: "Imaging Phantoms: Conventional X-ray Imaging Applications", which is a comprehensive review of the subject. Barry Allen suggested to request permission from Springer to place this particular chapter in the IUPESM website.

Other potential resources like the phantom library developed and maintained by the IPEM as well as the bibliographic references on medical physics in the IOMP website were also mentioned.

2nd WHO Global Forum on Medical Devices

Herbert Voigt and Cari Borrás informed about the forthcoming 2nd WHO Global Forum on Medical Devices to be held in Geneva, Switzerland, November 22-24, 2013 to which the HTTG plans to make some presentations. The IOMP and the IFMBE will also submit their own abstracts; Herbert Voigt asked that Cari Borrás be informed of all the submissions, since the cost of the HTTG participation will be shared among the three societies, the IUPESM, the IOMP and the IFMBE.

(The WHO has accepted the two submissions made by the HTTG, each one with three presenters: "The Role of Key Professionals in Improving Patient Outcome through Technology Life Cycle Management – Medical Physicists, Biomedical Engineers, and Clinical Engineers" by Cari Borrás, Yadin David and Nicolas Pallikarakis, and "Disaster Preparedness for Health Technology Managers" by Yadin David, Cari Borrás and Fred Hosea)

Conclusion

The meeting was formally closed at 10.30 a.m. with the request by the participants that a schedule for "face to face" HTTG meetings be posted on the IUPESM website.

Respectfully submitted



Cari Borrás, D.Sc.
HTTG Chair

Appendix

2 September 2013 / IUPESM-HTTG Strategic Planning Meeting Participants

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