

Benefit Exchange

A newsletter of *Medical Physics for World Benefit*



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Working together for effective patient care

Inside This Issue

- 1 Global Awareness
- 2 Automated Treatment Planning; Webinar Series
- 3 Virtual Mentoring Survey
- 4 Open Syllabus Project
- 5 VersantCast Podcast
- 6 IAEA Guidance on Promotion of the Profession of Medical Physics
- 7 IOMP Academic Programs List
- 8 AAPM 63rd Annual Meeting; Attendance Scholarships
- 9 Continued, Awareness...

Virtual Mentoring Survey

Please participate!

<https://bit.ly/3DfIWYb>

details within newsletter

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Introduction

Greetings Physicists! To facilitate and encourage collaboration, we seek contributions describing both MPWB-affiliated and non-affiliated projects and updates that may be of interest to our readership. Examples include the work of IAEA, various international professional societies (IOMP, AMPI, FAMPO, et al.), non-governmental organizations like Radiating Hope and Rayos Contra Cancer, and institutional teams. Our newsletter aims to highlight and connect individuals and organizations involved in improving physics in medicine internationally.

Global Awareness

As part of our effort to increase awareness and collaboration, we highlight a specific geographic region in each publication. In this issue we travel to northern Iraq, where medical physicist **Hawbir Ghafour** in Iraqi-Kurdistan shares the current state of radiotherapy physics:

Iraqi-Kurdistan is an autonomous region recognized by the current (2005) Constitution of Iraq. After years of war, which continue today with civil unrest, Iraq is developing country located in Western Asia. Iraq belongs to the region commonly referred to as the “middle-east,” a name that traces its origin to European trade routes relative to the far-east. Iraq is ethnically diverse; Assyrians, Armenians, Arabs, Kurds, and Persians are some of the many groups. With two official languages, Arabic and Kurdish, ≥95% of Iraq’s nearly 40 million citizens are Muslim.

A relatively recent publication in the Red Journal, “Cancer Care in Times of War: Radiation Oncology in Iraq,” ([Mula-Hussain and Al-Ghazi, 2020](#)) describes the history of health care in Iraq with focus on radiation oncology. The Radiology Institute in Baghdad started in the 1920s with attention to diagnostic and therapeutic applications. The country experienced steady development, peaking in 1980s with establishment of the Iraqi Cancer Board. Although the Iran-Iraq conflict (1980-88) was intense, it was confined to the border regions and health care delivery remained stable.

The Gulf Wars (1990-91 and 2003) were devastating, with significant damage to physical infrastructure during both invasions. Losses due to brain drain were considerable. The exodus of physicians and academics started in 1991 and peaked in 2006 when 60% of all physicians left the country, with only 17% stating a desire to return. There were only four functional radiotherapy units from 1991 to 2005, this number increased in 2010 to six. - *Continued, pg. 4*



Automated Treatment Planning; Webinar Series

Moderated by **Sarah Ashmeg** and **Arjit Baghwala**, MPWB has initiated a series of webinars to disseminate high-quality educational content. The first two webinars shared the topic of Automated Treatment Planning. Quality of contouring and treatment planning for radiotherapy is rate-limited by human resources. Several groups are developing machine learning and automation tools to improve clinical workflows. Radiation Planning Assistant (RPA), developed by The University of Texas MD Anderson Cancer Center (MDACC) Court Lab, is an example designed to support high-quality treatment planning globally: <https://rpa.mdanderson.org/>



With a total of 514 registrants from 85 countries, representing nearly all global regions, RPA was discussed in the first webinar: *Automated Treatment Planning: A Resource with Potential Benefits in Both High- and Low-Income Countries* by **Laurence Court** (MDACC, Texas, USA). Dr. Court's group consists of about 20 members, including faculty, graduate students, postdoctoral fellows, computational scientists, and research assistants. Dr. Court shared the benefits and challenges of implementing automated treatment planning in regions with budget/resource limitations. The session can be accessed here: <https://youtu.be/L1faPo3b8z0>

Following the success of the first webinar, **Ben Heijmen** (Erasmus Medical Center, Netherlands) shared: *Technologies, Opportunities and Challenges of Automated Treatment Planning in Radiotherapy*. Building on our knowledge of how automated treatment planning reduces planning time while improving plan quality and consistency. Dr. Heijmen reviewed common automation algorithms, advantages, and current obstacles in the development of automated planning techniques. The recorded session will be uploaded to our MPWB YouTube channel.

Virtual Mentoring Survey

Medical Physics for World Benefit is performing an international survey to investigate whether the Medical Physics community considers virtual mentoring to be of benefit to the community, especially for under-resourced contexts? Questions regarding challenges and successes in the virtual mentoring process will be addressed as a way of optimizing the virtual mentoring experience. All Medical Physicists (clinical, academic, industrial, or governmental) or Medical Physicists in training (graduate students or residents) from both high-income and lower-income countries are invited to participate. The link to the survey can be found here: https://uwo.eu.qualtrics.com/jfe/form/SV_dgtHBEO2gPi2aS9

Open Syllabus Project

In February, The International Atomic Energy Agency (IAEA) held its third International Conference on Advances in Radiation Oncology (ICARO-3), program. **Parminder Basran** presented: *The "Open Syllabus" project – improving global access to radiation oncology medical physicist residency training content*. Work on this important project continues, with 80% migration of IAEA content to on-line learning tools, and website expected to start beta-testing early 2022. The ICARO presentation is available here: <https://bit.ly/3kAICnf>

VersantCast Podcast

A featured episode on Global Oncology with MPWB President **John Schreiner** in the VersantCast Podcast has now had over 650 listens. In the podcast John and Dr. **Eric Ramsay** discuss how John came to be a medical physicist, the challenges faced by medical physicists internationally, and the history of MPWB's global outreach. The full series of podcasts can be found here: <https://versantphysics.com/podcasts/>

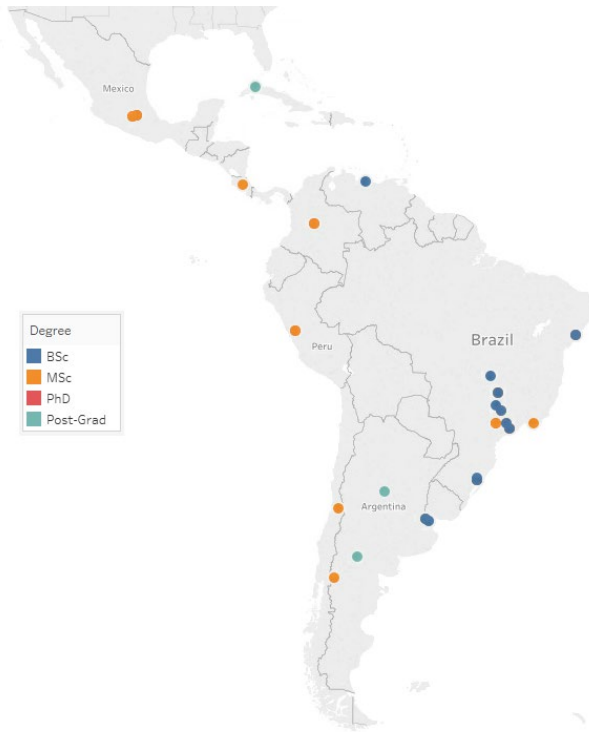
IAEA Guidance on Promotion of the Profession of Medical Physics

Supporting efforts to address the shortage of qualified medical physicists internationally, the IAEA has released a new guidance document on certification. Outlining the steps for national certification and registration, the full document can be viewed here: <https://bit.ly/3FsEop2>

IOMP Academic Program List

The Education and Training Committee of the International Organization for Medical Physicists has published a global listing of academic training programs. Collated by region: Middle East, Latin America, USA, Africa, Europe, Asia Pacific, and Canada the list is provided as a spreadsheet, with details including contact information for students seeking study opportunities. The resource can be accessed here:

<https://www.iomp.org/education-training-resources/>



Above, distribution of Medical Physics training programs in Latin America, from IOMP data.

AAPM 63rd Annual Meeting; Attendance Scholarships

Thanks to industry partners IBA Dosimetry, Elekta, and Siemens Healthineers, as well as membership support, 37 LMIC candidates received scholarships to attend the virtual annual meeting of the American Association of Physicists in Medicine. The award recipients were evaluated through several criteria including:

- ***Location**, World Bank list of LMIC countries.
- ***Stage in Career**, ability to put knowledge into practice.
- ***Demonstrated Need**, how knowledge would impact clinical practice.
- ***MPWB Membership**, preference given for those with an active membership.

The following are some excerpts from recipient reports:

"I am part of the faculty of Medical Physics Graduate Program, and... several thesis oversight committees. The range of topics in which students develop their thesis work is very wide. This year we have students working on topics related to nuclear medicine and ultrasound, both areas beyond my current expertise... attending this AAPM will allow me to be a better supervisor to these students, particularly in the case of ultrasound topics." – **Mariela Porras-Chaverri**, Costa Rica

"The presentations also gave me a rich appreciation of the history of the profession. I was particularly interested in the pieces on Harold Johns, and John "Jack" Cunningham, as I am familiar with their book, The Physics of Radiology. This showed me where medical physics is coming from... Medical Physicists are a small group of people and it can be easy to feel lost in the routine work of treatment planning, QA, and administration, but attending this conference made me feel more connected to the wider community of physicists around the world doing different things." - **Brian Morris**, Jamaica

"I was able to assess the practices in our clinic, particularly in VMAT, SRS and SBRT. I noted that we can... improve our performance... to provide better quality to our patients" - **Sofia Jebarri**, Morocco

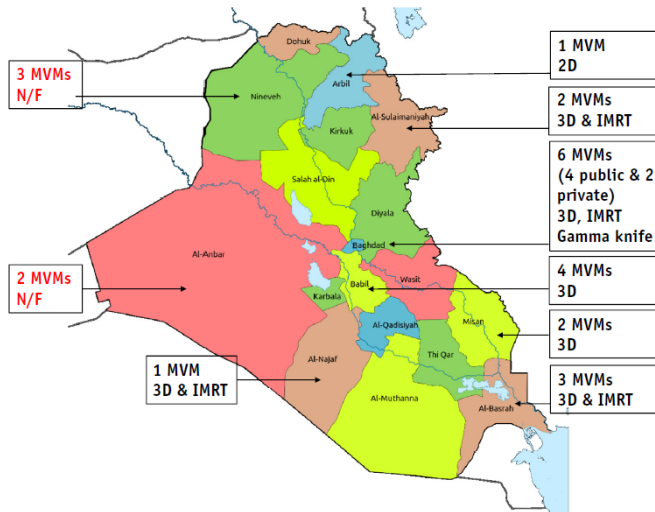
"As my hospital is considering purchasing a solid-state gamma camera system in near future, the presentation on this topic gave us a more clear picture of what solid-state technology is and how it differs from conventional scintillation-based systems in respect of performance, dose reduction, and set of required QC procedures. I also learned very useful things on deep learning which will help me in my research work." - **Sajid Bashir**, Pakistan

One ambitious physicist immediately applied what was learned and shared their, "... experience conducting a failure mode and effect analysis (FMEA) study of our current clinical workflow. I was introduced to this risked based technique and its application in evaluating radiotherapy workflows from an early presentation followed by reviewing current and previous eposters on the subject." - **Anil Singh**, Trinidad-Tobago

This pilot initiative was a resounding success, we look forward to sharing future opportunities.

Continued, Awareness...

Recovering from years of conflict, cancer care and education are gradually improving in Iraq. In 2015, the number of radiotherapy units doubled to 12, and have now nearly doubled again to 22. Still far below the IAEA aim of 1 unit per 1 million population, this progress is significant and encouraging.



Above, Iraq map with mega-voltage machines (MVM) as of mid-2020 ([Mula-Hussain and Al-Ghazi, 2020](#)), the rise of the Islamic State (2014-2017) was destructive in many ways, 5 MVMs were rendered non-functional (N/F); 2 in Al-Anbar and 3 in Niveveh.

At the present time, there are no meetings or scientific exchange between the physicists of different cities within Iraq. Practicing in the northern region, there is limited knowledge about the situation in middle and south of Iraq. This is a challenge due to political differences between the Iraqi central government and Kurdistan regional government (KRG).

Since publication of the referenced paper, two new Elekta Infinity linear accelerators have been installed at [Awat Radiation Oncology Center](#) in Erbil, Capital city of the Iraqi-Kurdistan region. A new public center it has started treating patients with 3D-conformal, with plans for VMAT in the future. There are now three radiotherapy centers in the Iraqi-Kurdistan region. [Riggary Teaching Hospital](#), first treated patients in 2007 with a single Cobalt unit using 2D techniques. In early 2020, they installed two new Elekta units under supervision of Turkish physicists who have been helping with on the job training of locals. The third center is located in Sulaymaniyah, [Zhanawa cancer center \(ZCC\)](#). ZCC is a public, tertiary cancer care facility dedicated to radiotherapy since its establishment in March 2009. Starting with 3DCRT, advancing to IMRT in 2013, and

VMAT in 2020. In this center we have two IGRT and VMAT capable linacs, and one Bebig brachytherapy unit focused on treatment of gynecological cancers. All services are free-of-charge. ZCC not only treats patients in Sulaymaniyah, but from all regions of Iraq. Starting with five BSc physicists, who received on the job training under supervision of Italian physicists, we now have three additional MSc physicists.

Medical physics has been identified as one of the key areas that needs to be developed to improve healthcare. For many reasons, state-of-the-art technology cannot be applied uniformly around the world. There is a wide difference in emphasis and approach when dealing with developing countries. The challenges are manifold: it is first necessary to build the required infrastructure, then acquire equipment, attract qualified professionals, develop educational and training programs, and enact political policies for effective and accessible care within budgetary constraints.

Some of our specific challenges are: **Lack of service**, preventative maintenance is often neglected, there can be significant downtime awaiting repair by local representatives. **Equipment capacity**, due to the limited number of machines relative to our population, we have long waiting lists and patients can wait up to 6 months. To keep up with demand we work 3 shifts. **Staffing**, we are still well below the level required to provide adequate professional support to both radiation therapy and diagnostic imaging. Our wages are also often insufficient to retain talent. **Barriers to information exchange**, paywalls limit diffusion of the latest treatment techniques and scientific advances.

Despite the challenges, we are optimistic about the future of cancer care in Iraq. Since the end of the wars we have witnessed significant improvements in our capacity to deliver quality care to our citizens. We have been fortunate to engage in telehealth training. With no budget for outside training, contact with qualified medical physicists is greatly appreciated. We look forward to a future of increased knowledge exchange and opportunities to share our triumphs, both domestically and abroad, as we continue to develop our health care system to its full potential.

Editor's Note: Please feel free to reach out to Hawbir with educational or research collaboration opportunities: hawbiromer@yahoo.com