

MEDICAL PHYSICS FOR WORLD BENEFIT (MPWB):

A NOT-FOR-PROFIT, VOLUNTEER ORGANIZATION IN SUPPORT OF MEDICAL PHYSICS IN LOWER INCOME ENVIRONMENTS

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Abstract— Medical Physics for World Benefit (MPWB, www.mpwb.org) is a young, not-for-profit organization that was developed out of recognition of the limited human resource availability and insufficient training opportunities for medical physicists in low-to-middle income countries (LMICs). Its mission is to support activities which will yield effective and safe use of physics and technologies in medicine through advising, training, demonstrating and/or participating in medical physics-related activities, especially in LMICs. Operationally, its emphasis is on “partnering” with the goal of having individuals and/or educational or healthcare institutions in both LMICs and high-income countries (HICs) work together to meet well-defined needs. Practically, it also seeks to work collaboratively with other organizations wishing to provide similar support. MPWB is a membership-driven organization for individuals who have a passion for reducing global health disparities, especially as related to medical physics. Various projects are in progress, most of which relate to training and mentoring. Its vision, mission and values are summarized on its website along with links to newsletters and other relevant activities.

Keywords— Training, mentoring, low-to-middle-income-countries, partnering, collaboration.

I. INTRODUCTION

There is a growing recognition of healthcare disparities between high-income countries (HICs) and low-to-middle income countries (LMICs). These disparities have been highlighted by the United Nations Sustainable Development Goals, which in 2015 called for a reduction by one-third in premature mortality from non-communicable diseases, including cancer, by 2030 [1;2]. These disparities were also highlighted in a recent seminal Lancet Oncology Commission report by the Global Task Force on Radiotherapy for Cancer Control (GTFRCC) [3] that indicated if equal global access to radiotherapy is to be provided by 2035, another 30,000 radiation oncologists, 22,000 medical physicists, and 78,000 radiation therapists will need to be trained. Recognizing the limited reality of equal global access to radiotherapy by 2035, the GTFRCC recommended an action target for the training of 7,500 radiation oncologists, 6,000 medical physicists and 20,000

radiation therapists in LMICs by 2025. In addition to the cancer problem, medical physicists are also needed in the diagnostic imaging-related subspecialties. Considering staffing levels in HICs to estimate this need, an additional 20-25% imaging physicists will have to be trained, i.e., a total of 7,500 new medical physicists would be needed by 2025, which is approximately the total number of medical physicists currently in North America! These numbers are quite astounding, especially considering the very limited training opportunities for medical physics-related personnel in LMICs.

Medical physics training has been well-defined in HIC contexts, usually involving a post-graduate degree in medical physics, followed by 2 years of residency or on-the-job training. The International Atomic Energy Agency (IAEA) has several reports that define both the academic requirements [4;5] as well as the practical residency training component [6-8]. Both the academic and practical training components have limited availability in LMICs where little or no radiotherapy or diagnostic imaging expertise exists. While the suggestion of setting up “centres of excellence” is noteworthy [9], the scarce resources make the “bootstrapping” difficult. Collaboration and cooperation by multiple organizations has the potential to resolve the training needs [10;11].

II. VISION AND MISSION

It is out of recognition of the limited human resource availability and limited training opportunities in LMICs that the concept of Medical Physics for World Benefit (MPWB, www.mpwb.org) developed. MPWB is a young, non-profit, volunteer organization that was formally registered as a charitable association in Canada on 16 November 2016 and in the United States on 23 December 2016. It has a vision of a world with access to effective and safe applications of physics and technology in medicine. This includes all areas of medical physics although MPWB recognizes that radiation therapy has the largest need. MPWB’s mission is to support activities which will yield effective and safe use



Fig. 11 Schematic diagram emphasizing the partnering relationship between MPWB and the individuals or institutions being supported by MPWB.

of physics and technologies in medicine through advising, training, demonstrating and/or participating in medical physics-related activities, especially in LMICs. Thus, its emphasis is on providing intellectual support through educating, training, mentoring and collaborating. As shown in Figure 1, the theme is “partnering” with a goal of having individuals and/or educational or healthcare institutions in both LMICs and HICs work together to meet well-defined needs. To help ensure sustainability, the intent is to provide support in those LMIC circumstances where basic infrastructure and staff already exist.

MPWB is a membership-driven organization with the formal membership application process having opened in June 2017. There are now over 150 registered Canadian, American, and International members, and a mailing list of over 800 individuals who have expressed an interest in

MPWB activities. The Board meets electronically biweekly and addresses requests for assistance from LMICs that have come largely, although not exclusively, from Africa. In addition to projects specifically targeted towards addressing needs in a LMICs, broader activities related to training and implementation are also addressed by the Board. For example, a generous grant from Dr. Jack Cunningham to MPWB is being allocated largely towards training activities related to treatment planning. In this context, the MPWB Board members are open and welcome to similar initiatives.

Another project is the development of an “Open Syllabus” to support residency training. Recognizing that there is a wealth of on-line, educational resources for medical physics residency and clinical training, MPWB is connecting elements of the IAEA Medical Physics Clinical Training syllabus [6] with open-access resources

that are readily accessible. In this context, the MPWB Board members would be pleased to receive information of any relevant, on-line resources for consideration and inclusion in the Open Syllabus. Multiple other projects are under discussion.

III. WHY INDEPENDENT OF EXISTING ORGANIZATIONS?

The question has been asked a number of times as to why MPWB does not function under the auspices of one of the major medical physics organizations such as the International Organization of Medical Physics (IOMP) [11] or the American Association of Physicists in Medicine (AAPM). The answer is that these bigger organizations have multiple priorities that go well beyond providing grass-roots support to individuals, to clinics or to educational institutions in LMICs. They have a broader mandate and more complex administrative structures such that charitable status, allowing tax-deductible donations, is often not available or appropriate. However, MPWB strives to work in close partnership with such organizations. Hence, MPWB has developed a memorandum of understanding with the AAPM, which helps clarify the communication and working relationship. For instance, if working on closely-related projects, MPWB and the AAPM agree to minimize the duplication of efforts and maximize potential benefits. MPWB is also in discussion about becoming an Affiliated International Organization of the IOMP.

MPWB is in frequent communication with the International Atomic Energy Agency (IAEA) about projects in LMIC environments. Indeed, at the recent IAEA International Conference on Advances in Radiation Oncology (ICARO2), the President of MPWB attended as representing MPWB as a non-government organization. MPWB is also working closely with the International Cancer Expert Corps (ICEC, www.ICECancer.org) on various projects including meetings on developing robust, low cost radiation treatment technologies for challenging environments [12;13]. Two of the MPWB Board members are on the Advisory Board for ICEC. Furthermore, right from the outset, the President of MPWB has been in close communication with the Board Members of Physicien Médical Sans Frontières (PMSF, www.pmsf.asso.fr) who have a similar, although not identical, mandate to MPWB; however, they are not well recognized in the English-speaking world. PMSF has been very supportive of MPWB developing a sister organization. MPWB continues to maintain close contact to ensure collaborative efforts where appropriate and to avoid overlapping projects. In the 2017 Canadian Organization of Medical Physicists (COMP) Strategic Plan, under Strategic Priority 4, “Engage in strategically aligned international initiatives”, the following is included: “COMP is providing support for the newly launched Medical Physics for World Benefit.”

IV. WHAT ABOUT EQUIPMENT DONATIONS?

MPWB is often asked about new and used equipment donations. The MPWB mandate is to provide educational and training support where appropriate, and it defers equipment donations to other organizations. MPWB recognizes the limitations and potential pitfalls of donation of large, expensive, used equipment (e.g., linear accelerators, cobalt-60 machines, CT scanners, other major imaging devices). The success of such donations often fail due to inadequate needs assessment and lack of support for training, service and parts [14;15]. However, MPWB has been in close communication with the IOMP/AAPM Equipment Donation Subcommittee which is focused on small equipment donations. MPWB is supportive of providing training assistance for equipment such as dosimetry systems that have been fully refurbished, recalibrated and safe for use.

V. SUMMARY

In summary, MPWB is a young, not-for-profit, volunteer organization with the mandate of partnering to provide education, mentoring and training support to LMIC contexts. MPWB seeks the support of individuals who have a passion for reducing global health disparities, especially as related to medical physics. More information can be found on the MPWB website (www.mpwb.org).

VI. REFERENCES

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