

The Medical Physicist and Cancer Care: Transcending Your Comfort Zone

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Professor M. Saiful Huq is an esteemed Medical Physicist, Past-President of the American Association of Physicists in Medicine (AAPM), Professor of Radiation Oncology at the University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania, USA and the Director of Medical Physics Division for the UPMC CancerCenter.

Dr. Huq is responsible for the development of scientific activities of a large group of physicists and management of clinical medical physics operations of 21 cancer centers in western Pennsylvania, USA. He has served as an expert on many International Atomic Energy Agency (IAEA) initiatives, developing various documents (example, author of IAEA TRS398 CoP, author of IAEA/AAPM CoP on small field dosimetry, Member of the IAEA research project "Testing the recommendations of the IAEA AAPM Code of Practice for the Dosimetry of Static Small Photon Fields") which provide guidance to the worldwide radiotherapy community regarding various aspects of cancer therapy using external beam radiation.

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1. Professor Huq, how would you describe your professional journey?

From childhood I was interested in physics. My challenge was to find ways to coalesce my interest in physics with one of the values that I grew up with – rendering public service. I wanted to undertake initiatives that would be most impactful for me in my life but most importantly do something that would have a lasting impact on other people's lives. As I was going through this soul-searching process I stumbled into Medical Physics and became a medical physicist. Early on in my career I discovered that the most satisfying days were those in which I was involved in the *team-based care* of patients – when I left work at night, legs aching, knowing that my team's effort bettered a patient's life. Most importantly, I sought to have a *sense of purpose* and impact on the lives of patients I took care of. I developed strong connections with my patients and shepherded them through challenging,

emotional junctures in their lives. Some defining moments of my life were seeing a smile on the face of a mother on the last day of treatment of her young child who I helped treat with radiation and seeing a healthy newborn of a young breast cancer patient who was pregnant at the time of treatment and who wanted to keep the baby while getting radiation treatment of her breast. These events were very inspirational to me and continued to be so rewarding that I became fully immersed and enamored with my career as a medical physicist. I also sought to impact the field and make a difference on a greater scale as a clinical physicist, as an academic physicist via research initiatives, and by growing organized medical physics services. As a result, I got involved with many committees of the American Association of Physicists in Medicine (AAPM) and Task Group activities, other professional societies, and organizations such as IAEA, ASTRO and radiation oncology and medical physics societies around the world.

At the core of my enjoyment and passion in these initiatives was working in teams of motivated people with diverse backgrounds and ideas and a shared mission. Indeed, my life's most satisfying work has always involved succeeding as a team – in education, in clinical care, in research and otherwise. I am now drawn toward the team driving organized efforts to have AAPM, different professional societies, advocacy groups, governmental organizations, healthcare organizations, and other stakeholders lead the medical physics and radiation oncology profession into the future – in North America and beyond its borders.

2. Who influenced you and who were your role-models?

My parents. I was born in a middle-class family in Bangladesh. Making a difference in people's lives through public service was considered very important in our family. My father spent his entire professional life working for an organization that provided volunteer services to the country. My elder brother became a national role model for all age groups of people in the country, young and old, for his services as a business person and as the beloved mayor of the northern part of the capital city, Dhaka. One of my younger brothers dedicated his career to the service of the nation by working in the Bangladesh Army. The spirit of rendering public service was instilled in me very early in my life by my parents.

3. What are the qualities of a leader, in your opinion?

There are many qualities that a great leader must possess. One can write a book on it. I will mention just a few of them here. *Self-awareness* and *willingness to learn* are two very important qualities. Self-awareness means recognizing your strengths and weaknesses. You must know what you do not know and pretending that you know it all does not help. Practicing humility and learning sets up a great example for other leaders and followers. So, leaders should be great learners. *Humility* is one the most important qualities that a leader should have.

A good leader must be *visionary, thoughtful*, and know *how to inspire, motivate, and engage* his/her followers/team members over the long haul. It is important for a leader *to be a good listener* and *connect* with the team members, *build strong relationships* and mutual trust with them. Trust is the cornerstone of a good leader-follower relationship. A successful leader *thinks critically, establishes correct vision/goals/purpose*, and *develops a plan/process* to achieve them. A good plan should always include opportunities for growth of the team members. The leader must *communicate* the vision/purpose/goals and the plan to accomplish them to all team members effectively; *inspire* the team members so that they find meaning in achieving the goal. It is important to recognize the team members appropriately, their values, and their contributions. Establishment of such a positive environment leads to a sustainable relationship between the leader and the followers and success of the project.

4. What about a mentor? What makes someone a good mentor?

A good mentor is someone who enjoys the many rewards of giving back, understands the potential for growth of the mentee, cares for her/his mentee, and promotes professional and career

development of the mentee. They are committed to the success of the mentee. Great mentors instill *self-awareness, value, integrity, and empathy* in the mentee. They do so by building a strong trust-worthy partnership and professional relationship with the mentee and sharing knowledge, expertise, and skills with them. Good mentors create structure around meeting times, sit down with the mentee and set goals, expectations, milestones, and demand accountability. They *make the mentees think for themselves instead of giving answers* and *provide constructive feedback and guidance*. Good mentors are positive by nature and always see a cup as half-full rather than half-empty which always leaves a positive influence on the mentee. It is important to recognize that great mentors learn as much from the mentee as the mentee learns from them.

Great mentors always enjoy seeing the amazing transition that their mentees undergo in their professional and personal career through this mentor/mentee relationship.

5. What are your projects for the future?

I am passionate about partnering with health care facilities and organizations globally especially in low-and middle-income countries to help improve the quality of care provided to cancer patients. As I mentioned earlier, I have been working with an NGO, „Dăruiește Viața”, and their team to build a radiotherapy department in the children’s hospital that they are building in Bucharest, Romania. I am involved with the local leadership in Bangladesh to help build the capacity of radiation oncology professionals (radiation oncologists, medical physicists, radiation therapists) through the establishment of structured hybrid education and training programs. Other exciting future projects include, but are not limited to, establishing a cooperative group clinical trial network in Africa. To support this initiative, I am working with a team of highly dedicated medical physicists and physicians from Africa and the United States to build a cloud-based comprehensive cancer center that will be powered by artificial intelligence technology to provide support for protocol development, data quality and data management, remote treatment planning and quality assurance activities, audit, site credentialing, remote peer-review, education and training and other activities that are necessary to provide a high-quality safe care to cancer patients treated with radiation therapy. Another important African initiative include working with the local leadership and other stakeholders to help establish accredited graduate medical education programs in medical physics, clinical medical physics residency programs, and certification of clinically qualified medical physicists in Africa. I firmly believe that successful implementation of these programs will represent a paradigm shift in how cancer patients will be treated in Africa for decades to come.

6. What are in your opinion the good parts in working in radiation oncology field in the low-and-middle-income countries?

Published data show that cancer burden is expected to almost double over the next 20 years in low-and-middle income countries (LMICs). About 60-70% of the patients in the LMICs will receive radiation therapy as part of their treatment. Currently, about 80% of radiation treatments in LMICs are palliative. The majority of cases that the patients present with are at stage III or IV, making palliative radiotherapy and end-of-life care the only possible form of treatment. Most developing countries do not have the resources or infrastructure to prevent, diagnose, or treat this growing burden of cancer. The access to care is very limited in these LMIC’s and the lack of access to cancer care has tremendous impact on patients and families. This dire situation in the LMICs presents an opportunity for us to get involved. Professionally we will be exposed to a different type of patient population in a very different cultural setting with an amazing opportunity for tremendous personal and professional growth and hence much personal and professional satisfaction. A small effort by each of us can make a huge difference in the lives of these patients and their families. Together, we can make a big difference to the well-being of the global patient population that we serve.

7. What advice would you give to a young medical physicist or radiation oncologist?

Decide early in your career what it is that you love to do – clinical work, research, or some combination of the two, or something else. Your profession should not be a “job”. You should love what you do. Only then will you be able to make a true difference in the lives of the cancer patients that we serve. Our profession is a very rewarding profession. There are tremendous opportunities that lie ahead of you. Artificial intelligence is already in the space of radiation oncology. Flash radiotherapy using photon beams on a conventional linac platform will soon become a reality. In your career you will be dealing with these and other exciting new technologies. Using these and other new tools, you will be able to provide a quality of care to our patients that we may not have been able to provide to date. This is very exciting, and I believe will be a truly rewarding experience.

Collaborate. Collaboration will open a world of opportunities for you.

Volunteer. I ask you to give an hour or two of your time a week to learn about the needs of the healthcare considerations of the larger global community, especially the community of low-and-middle-income countries. Give a month of your professional career a year or every other year serving the patient population in the low-and-middle-income countries. This experience can be truly rewarding and enjoyable and a win-win for both you and the patient population around the world.

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