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Radiation Oncology Solutions in Tanzania

Stephen Avery, PhD[*], **Owen Kenton, MS**[*], **Jumaa bin Dachi, BSc**[†], **James Metz, MD**[*], and **Wilfred Ngwa, PhD**[‡]

[*]Department of Radiation Oncology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania

[†]Ocean Road Cancer Institute, Dar es Salaam, Tanzania

[‡]Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts

The latest census indicates the population of Tanzania at 45 million (1), with only 1 radiation therapy center. All treatment of cancer is free of charge for a Tanzanian citizen; however, those who have medical insurance are required to pay through their insurance as cost sharing. Most of the people in Tanzania die with cancer before reaching the Ocean Road Cancer Institute, because the majority are low-income people who cannot afford the expense of medical examinations for early detection.

In September of 2013 physicists at the University of Pennsylvania began working with Jumaa bin Dachi, a therapy physicist at the Ocean Road Cancer Institute. We hoped to develop a working quality assurance (QA) program that could be easily implemented from abroad. After entering into this partnership it became readily evident that QA was not the only area in which we were needed. Instead we found ourselves entering into a bilateral learning partnership over the course of 8 qualitative meetings with Jumaa and established the following needs at the Ocean Road Cancer Institute. Clinical needs were these: local service support; treatment planning for external beam radiation therapy; treatment planning for brachytherapy; clinical markings; quality control of the treatment planning system; portal verification; dosimetry; in vivo dosimetry techniques in radiation therapy; establishment of protocol; radiation protection; and radiobiology. Academic needs included teaching Radiation Therapy Technologists RTT students; e-learning programs in medical physics; and preparing examination/homework questions.

Meetings were held bimonthly via Skype and supplemented with e-mail exchanges. We ascertained that there is a gap between the installation of new equipment and treating patients. We concluded that a memorandum of understanding needed to be created between our institutions to develop an educational program. Building a strong educational foundation can fill the gaps to lead to sustained care of patients needing radiation. We first plan to

Reprint requests to: Stephen Avery, PhD, Department of Radiation Oncology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA 19104. Tel: 215.615.5631; avery@uphs.upenn.edu.

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implement a certificate program to address immediate needs and then expand into a traditional university Masters program.

Currently, the Ocean Road Cancer Institute faces a workload of more than 200 patients per day. Before treatment, tumors are delineated using a conventional simulation technique of kV imaging. These patients are then treated using 2 external beam radiation therapy and 2 high-dose radiation brachytherapy units, all with ^{60}Co sources. Priority is given to patients with cervical cancer and patients who are aged <18 years. There are few curative cases owing to the late diagnosis in the disease.

Three physicists work at the facility; compare this with the International Atomic Energy Agency guidelines, which recommend a patient-to-physicist workload of 400 to 1 per annum (2); ideally there should be 5 to 6 physicists on staff. On average the medical physicists at Ocean Road Cancer Institute have not completed the minimal requirements of a qualified medical physicist in developed countries. In addition to their clinical responsibilities, physicists face time constraints through teaching radiation therapy courses to therapists—providing additional courses to current physicists will enable them to become effective instructors. There is no dedicated technical support at Ocean Road Cancer Institute; therefore, physicists must troubleshoot issues usually reserved for information technology staff and engineers in the United States. The high patient workload, teaching responsibilities, and low physics staffing have led to little time for quality assurance.

Although we are just in the beginning stage of this partnership, we believe there is great potential for success between both parties. We hope to develop solutions in delivering advanced therapy techniques through updates to the resources available. Training and education are our priorities, because new technology is of little use without the expertise behind it. For us, this is an opportunity to work with Ocean Road Cancer Institute to possibly develop solutions to these healthcare problems. We agree with the Institute of Medicine's findings (3) that university partnerships can be highly effective in fighting the cancer pandemic.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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