GLOBAL HEALTH

Why Target the Globe?: 4-year report (2009-2013) of the Association of Residents in Radiation Oncology Global Health Initiative

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Introduction

By 2020, 70% of all cases of cancer in the world will arise in low-income and middle-income countries (1-5). It is estimated that only 25% of cancer patients in developing countries receive radiation therapy when indicated (5, 6). This lack of access to radiation therapy has created an enormous disparity in cancer treatment to the underserved, higher burden of disease, inferior outcomes, and elevated indirect and direct costs to society (5-8). In 1999, the World Health Organization mandated a global strategy to “assist and support nations in the development of effective cancer treatment strategies within the context of their national cancer programs” (9). More recently, the United Nations unanimously approved a resolution in support of the “prevention and control of noncommunicable diseases, among which cancer is a leading cause of death” (10). The realization that such a disparity exists in cancer treatments to underserved populations provides impetus for our specialty to develop strategies working toward closing the gap in standard cancer therapy.

Disparities in health care services are not unique to radiation oncology. Other specialties have made significant strides in global outreach over time through the advancement of trainee education, including international electives and research activities (11-17). To stimulate change in the culture of our specialty to look beyond the walls of our home institutions as venues to have a positive impact on people with cancer, it may be helpful to learn from the successes of our peers in surgery, medicine,
emergency medicine, otolaryngology, and diagnostic radiology, to name a few (11-17).

In 2009, the Association of Residents in Radiation Oncology (ARRO) restructured the Executive Committee by creating 3 subcommittees: Education, Global Health, and Website. The primary objective of this restructuring was to broaden active trainee participation in resident-driven initiatives beyond the work of the 6 elected officers, so as to affect change on a national level with greater efficiency.

The first action of the ARRO Global Health Subcommittee (GHS) was the launch of the Global Health Initiative (GHI). The central goal of the ARRO GHI is to help trainees, who may have a strong interest in global health, to pave the road for future work devoted to improving cancer care in underserved regions of the world. Since its inception in 2009, the GHI has collaborated with the American Society for Radiation Oncology (ASTRO) on various projects to help meet this goal, including (1) Global Health Interest Survey; (2) ARRO-ASTRO Global Health Scholars Program (GHSP); (3) web-based resource development; (4) ASTRO International Education Committee Regional Working Groups, and (5) International Atomic Energy Association (IAEA) resident representation. What follows is a report describing the evolution of the ARRO GHI since 2009. This report provides the rationale and evidence for why it is critically important to continue support and resource allocation for trainee initiatives in the area of global health.

**Global Health Interest Survey**

Data quantifying the interest of radiation oncology residents in global health have not been reported; therefore, a national survey of radiation oncology residents in the United States was conducted to help ascertain interest, attitudes, and perception of global health within our specialty. In September 2009, questionnaires were sent to all 566 residents on the ARRO e-mail database. Table 1 summarizes some of the key data from this survey. One hundred fifteen of the 566 residents (20.3%) responded. One hundred five (91.3%) respondents reported that there were currently no global health educational activities in their training program. One hundred three (89.6%) were interested in participating in an international radiation oncology educational experience during their residency training. Sixty-four of 115 (55.6%) respondents reported not having adequate faculty member guidance in their residency programs to enable them to acquire global health experience. Other barriers perceived by residents were obtained from optional responses, which were recorded and categorized by the primary author (Dad) and summarized as follows: from 72 respondents, cost (34.7%), elective time (27.7%), and program director approval (26.4%) were the most commonly listed. The free-standing responses of the most commonly perceived primary objectives of international experiences in radiation oncology have also been summarized from 115 respondents: learning radiation oncology practice patterns in developing countries (42.3%), global outreach (28.2%), and gaining clinical exposure to spectrums of disease not seen in the United States (21.1%).

ARRO was able to use these data to objectively describe resident interest in this subject and to highlight possible areas to help focus future efforts to enhance global health training, such as collaboration with residency program directors, achieving Accreditation Council for Graduate Medical Education (ACGME) support, and garnering funding resources to provide an avenue to decrease financial burden on trainees.

### Table 1 Assessment of international interest, past and present activity

<table>
<thead>
<tr>
<th>Responses</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required responses (n=115)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GH educational activities offered in residency</td>
<td>10 (8.7)</td>
<td>105 (91.3)</td>
</tr>
<tr>
<td>Prior international experience during medical school</td>
<td>23 (20)</td>
<td>92 (80)</td>
</tr>
<tr>
<td>Prior international experience during residency</td>
<td>13 (11.5)</td>
<td>102 (88.7)</td>
</tr>
<tr>
<td>Interested in GH radiation oncology residency educational experience</td>
<td>103 (89.6)</td>
<td>12 (10.4)</td>
</tr>
<tr>
<td>Primary objectives of international experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning how RT practiced in developing countries</td>
<td>42.3%</td>
<td>N/A</td>
</tr>
<tr>
<td>Global outreach to the underserved</td>
<td>28.2%</td>
<td></td>
</tr>
<tr>
<td>Exposure to diseases not seen in the US</td>
<td>21.1%</td>
<td></td>
</tr>
<tr>
<td>Other (cultural, language, social)</td>
<td>8.4%</td>
<td></td>
</tr>
<tr>
<td>Wish to incorporate international work in future career</td>
<td>92 (80%)</td>
<td>23 (20%)</td>
</tr>
<tr>
<td>Availability of faculty guidance in home institution to foster GH interest</td>
<td>51 (44.3)</td>
<td>64 (56.6%)</td>
</tr>
<tr>
<td>Encountered international visiting trainees/faculty in home institution</td>
<td>66 (57.9)</td>
<td>49 (42.6)</td>
</tr>
<tr>
<td>Optional responses (n=72)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barriers to international education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td>34.7%</td>
<td>N/A</td>
</tr>
<tr>
<td>Elective time</td>
<td>27.7%</td>
<td></td>
</tr>
<tr>
<td>Program director support</td>
<td>26.4%</td>
<td></td>
</tr>
<tr>
<td>Other (graduate medical education, language, safety)</td>
<td>11.2%</td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviations:** GH = global health; RT = radiation therapy; US = United States.
ASTRO-ARRO Global Health Scholars Program

The results of the ARRO global health interest survey provided impetus for the resident leaders of the Global Health Subcommittee to conduct a self-funded pilot visit to Latin America at the Instituto Oncologico Nacional in Panama City, Panama, during the spring of 2011. The objectives of this visit included collaborating with the Asociacion Latinoamericana de Terapia Radiante Oncologica to help establish a formal resident rotation in Panama. The visit to Panama included site visits to local government and private cancer centers, grand rounds presentations, advocacy to political leaders and university heads on the role of radiation therapy in cancer treatment, and cultural immersion activities. We found that in Panama there was a great potential to inform the local medical education jurisdictions, community physicians, citizens, and governmental organizations on the role of radiation therapy in cancer treatment. Hence, in addition to gaining a greater individual understanding of radiation practice and resources in a less-developed Latin American nation, we learned that such international experiences may also improve global advocacy efforts to educate society about one of the cornerstones to cancer cure and disease palliation: radiation therapy.

Given that the Global Health Survey results revealed that cost and institutional support were primary perceived challenges to trainees in conducting an international elective, the ARRO GHSC began to focus efforts in collaborating with ASTRO in developing a formalized program to assist residents who may be traveling to an area where radiation therapy is a limited resource. During the fall of 2011, the ASTRO Board of Directors approved the formation of the ARRO-ASTRO Global Health Scholars Program (GHSP). This program provides competitively awarded travel grants to 3 senior radiation oncology residents each calendar year to implement a self-designed clinical, outreach, education, or research project in a resource-limited nation. Each scholar is awarded $1500 to assist with international rotation costs, including transportation, housing, and necessary vaccination. The central goals of the GHSP include educational collaboration and lifelong learning, research, advocacy, and cross-cultural exchange. The establishment of this program conveyed a clear message of ASTRO’s support for international outreach within radiation oncology and the perceived value of such an experience within radiation oncology residency training.

Global Health Scholar Experiences

One of the components of the ARRO-ASTRO GHSP is for the scholars to present their experiences during the ARRO Career Seminar at the ASTRO Annual Meeting. To date, ASTRO has supported 6 Global Health Scholars: Drs Tracy Sheretz (Cambodia), Niraj Mehta (Brazil), Rachel Jimenez (India), Sarah Milgrom (Senegal), Youssef Zeidan (Lebanon), and Etiin-Osa Osa (Tanzania). Table 2 details each of the host sites where the Global Health scholars have visited to date. What follows is a summary of the experiences described by the scholars during their presentations at the most recent 2 ASTRO Annual Meetings.

While in Cambodia, Sheretz, led daily case-based review sessions to radiologists, internists, surgeons, residents, and staff at the Sihanouk Hospital in Phnom Penh. During her visit overseas, Sheretz blogged her experiences, noting the effects of the genocide in Khmer Rouge and its impact on health services in Cambodia. In Cambodia there is 1 cobalt machine for a population of 14.8 million. Perceptions of cancer diagnosis and treatment were at times quite disparate. Highlighting the more advanced stages of disease at presentation seen on this trip, Sheretz recounted during her ASTRO presentation that “a patient had a clear mass in the cervix seen on both ultrasound and computed tomography, and when teaching the differential diagnosis, the students, residents, and ultrasonographers unanimously agreed that the patient couldn’t possibly have cancer. I asked them to clarify why not, and they said because the patient had no metastatic lesions.”

For 7 weeks Mehta took the role of a resident at Hospital de Cancer de Barretos in the rural town of Barretos, Sao Paulo, where he rotated with various physicians, performed gynecologic brachytherapy, and led didactic sessions for trainees. This facility treated over 450 patients per day. “The hospital’s entire campus included a state-of-the-art research facility, robotic training program, pediatrics sector, palliative care unit, and the inpatient care unit,” described Mehta. According to Mehta, the mission of the hospital has always been to attend to the poor population at no cost to patients, to humanize the health care delivery process, and to staff full-time dedicated physicians earning equal pay. The radiation treatment facilities are “very self-sufficient,” with 1 orthovoltage machine, 1 cobalt unit, 3 linear accelerators (1 SRS capable), 1 HDR brachytherapy unit, and CT and 2D simulation capabilities. Mehta notes, “My work at the Hospital de Cancer De Barretos in Brazil changed my life. It helped me to understand the challenges of a less-developed country and that having more doesn’t always mean better care for patients.”

Jimenez traveled to the All India Institute of Medical Sciences (AIIMS) in New Delhi, India. She recalled during her presentation that “As a resident some of my goals were to gain an understanding of radiation oncology practices abroad, to learn about some of the challenges of cancer care delivery in an underresourced environment.” She went on to describe the challenges she observed at AIIMS, citing patient volume as an obstacle. “Many of them [patients] travel very far. They camp out at night, build bonfires outside the hospital, and sleep there. They wait there until they can be seen; there is no telephone number, no scheduling of appointments. People just show up and will wait patiently to see doctors.” She indicated that at this particular facility, “300 to 350 patients [are being treated] at any given time, with 80 to 100 brachytherapy procedures per month.”
<table>
<thead>
<tr>
<th>Scholar/home institution/year of travel</th>
<th>Host site</th>
<th>Treatment delivery</th>
<th>Treatment planning</th>
<th>Radiation oncology training</th>
<th>Internet access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Rachel Jimenez, Harvard 2013</td>
<td>All India Institute, New Delhi, India</td>
<td>3 Linacs (all IMRT capable) 1 Gamma Knife 3 Co60 units 2 surgical procedure suites with HDR unit</td>
<td>2 CT simulators 1 2D simulator</td>
<td>Training available for 25 medical residents; Training available for clinical physics</td>
<td>Internet access available with ability to share educational materials and electronic resources via dropbox (blackouts do occur daily)</td>
</tr>
<tr>
<td>Dr Niraj Mehta, UCLA 2012</td>
<td>Hospital de Cancer de Barretos, Sao Paulo, Brazil</td>
<td>3 Linacs (1 SRS capable, no IMRT) 1 Co60 unit for EBRT 1 orthovoltage unit 1 HDR brachytherapy unit</td>
<td>1 CT simulator 1 2D simulator</td>
<td>Training available for 6 medical residents, also for clinical physics and dosimetrists</td>
<td>Internet access available and used for electronic resources and for virtual conferences with full video conferencing capabilities</td>
</tr>
<tr>
<td>Dr Sarah Milgrom, MSKCC 2013</td>
<td>L’Hospital Aristide le Dantec, Dakar, Senegal</td>
<td>1 Co60 unit for EBRT 1 HDR brachytherapy unit</td>
<td>1 2D simulator</td>
<td>No training in Senegal; Travel to France or Morocco for radiation oncology or clinical physics training</td>
<td>Internet access available with good wireless connection; Unknown if used for case discussion or sharing resources; One physicist Skypes frequently with physicist in US</td>
</tr>
<tr>
<td>Dr Etin-Osa Osa, NYU, travel pending</td>
<td>Bugando Medical Center, Mwanza, Tanzania</td>
<td>2 linear accelerators 1 HDR brachytherapy unit</td>
<td>1 CT simulator</td>
<td>No training in Tanzania; Travel out of the country for radiation oncology or clinical physics training</td>
<td>Internet access available with access to online learning modules and online textbooks; Unsure if case conference capability available</td>
</tr>
<tr>
<td>Dr Tracy Sheretz, Loyola 2012</td>
<td>Sihanouk Hospital, Phnom Penh, Cambodia</td>
<td>1 Co60 unit for EBRT</td>
<td>1 2D simulator</td>
<td>No training in Cambodia; Travel out of country for radiation oncology training</td>
<td>Internet access available with access to shared web-based educational resources</td>
</tr>
<tr>
<td>Dr Youssef Zeidan, Stanford 2013</td>
<td>University of Beirut, Beirut, Lebanon</td>
<td>2 linear accelerators (IMRT, SBRT, SRS capable) 1 HDR brachytherapy unit</td>
<td>1 CT simulator</td>
<td>Training available for 2 medical residents; No clinical physics or dosimetry training</td>
<td>Internet access available with wireless connection; Monthly case conferences with MD Anderson; Poor educational resources from school of medicine</td>
</tr>
</tbody>
</table>

**Abbreviations:** 2D = 2-dimensional; CT = computed tomography; EBRT = external beam radiation therapy; HDR = high-dose-rate; IMRT = intensity modulated radiation therapy; UCLA = University of California—Los Angeles; SRS = stereotactic radiosurgery.
Milgrom traveled to Dakar, Senegal. She described the status of radiation facilities, noting their single “cobalt-60 machine at the Institut Curie L'Hôpital Aristide Le Dantec, received in 1989 to serve a population of 13.5 million…The neighboring 4 countries have no radiation machines, so cancer patients from those countries that have the means will travel to Senegal for their radiation treatments.” She went on to explain that “the facility is kept quite busy, generally treating from 4 am to 11 pm, however functions with no treatment planning system, hand calculations and hand-placed blocking/blocks based on surface anatomy.” Milgrom traveled to Senegal with a group of radiation oncologists, physicists, and therapists associated with Radiating Hope (501c3) to help establish and implement the country’s first brachytherapy program; the majority of the time was spent training local providers in the use of HDR brachytherapy to treat cervical cancer. She explained that previously, cervical cancer patients at this facility received “induction chemotherapy followed by pelvic external beam radiation therapy using a 4-field box to 45 Gy with concurrent cisplatin. At that point, if patients were deemed to have resectable disease they underwent hysterectomy. Otherwise, a cone-down was performed to treat the tumor to a total dose of 60 to 70 Gy. As a result of these efforts, cervical brachytherapy is being implemented in the definitive management of cervical cancer in this nation.

Now as an attending at University Hospitals Case Medical Center, Sheretz remains in close contact with her colleagues from Cambodia. She will be speaking at an international symposium in Moshi, Tanzania, this upcoming March, and she is currently focused on helping further advance gynecologic radiation therapy training in Guyana. Mehta is currently an attending at 21st Century Oncology, and since his time as a Global Health Scholar, he has returned to Brazil to help start an MRI diffusion-weighted imaging project. He plans to incorporate global outreach into his new clinical practice. Similarly, Jimenez aims to further her international travel and global outreach as an academic physician and to work collaboratively “to improve treatment for patients in under-resourced regions.” Milgrom has expressed that she would like to devote a part of her professional life to improving access to medical care and educating people about global cancer care disparities. Etin-Osa Osa will be traveling to Bugando Medical Center in Mwanza, Tanzania, where she plans to help establish effective hypofractionated approaches to breast cancer. Interestingly, shortened courses of therapy may provide reasonable solutions for populations that struggle with resources and high patient volumes.

This program has highlighted what other specialties have demonstrated as long-term benefits of international electives, such as improved clinical proficiency, cultural sensitivity, physical examination, and communication skills (14, 18, 19). The trainees were able to study the disparity in global access to cancer care, witness the variability in radiation treatment options for both curative and palliative intent, observe the availability or lack thereof of medical/physics training, and appreciate the differences in the culture of medicine in different regions of the world. From the experiences of our Global Health Scholars, one can see how international electives may provide educational opportunities for residents to enhance competency in each of the 6 ACGME domains (patient care, medical knowledge, practice-based learning and improvement, systems-based practice, professionalism, and interpersonal skills and communication). Moreover, these brief excerpts from our Global Health Scholars demonstrates how such experiences overseas may stimulate lifelong learning and alter future career paths, inspiring scholars to take on leadership roles in global health education, research, mentorship, and outreach. We look forward to surveying former Global Health Scholars during the course of their careers to learn more about the enduring effect of the program on their career trajectory. Currently, at the conclusion of the program, the scholars complete an evaluation. One component of this evaluation is made up of questions on the perceived impact of this experience on the scholar and the host institution. Ultimately, the success of this program will be measured by the proportion of residents who participate in it and go on to launch a career that includes international outreach as a component of their future work.

With regard to the impact of this program on residency training, it provides a unique understanding of global public health issues, oncologic issues, and enhanced cultural sensitivity. Specifically, with respect to systems-based practice, this competency requires residents to demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.

Discussion

It would be naïve to assume that the GHSP is intended for trainees to become equipped to close disparity gaps or affect cure rates in a short 4-week rotation in a resource-poor setting. However, from the experiences of the recent scholars described here, it is clear that this program does increase awareness of our future generation of radiation oncologists of the current inequities in cancer care in resource-limited nations. The potential scope is (and has been) more than observational. A month does allow for some impact on care at a local level, if not a regional level. An example would be the scholar’s experience in Cambodia. We do point out that one of the greatest potential gains of the program is lifelong interest in global health outreach. By this measure thus far, the program is a success, as evidenced by the program participants’ continued outreach endeavors beyond residency.

The momentum gained from the launching of the GHSP helped ARRO broaden the scope of the GHI to create a closer partnership with the ASTRO International Education
Subcommittee (IES). Currently, a resident member serves on each of the 5 region-specific working groups (Africa, China, India, Latin America, and Southeast Asia). The GHSC members are working to assist the IES working groups in conducting country-based needs assessments, so as to better understand radiation treatment-related educational needs, and in generating potential projects and resources that may be useful to radiation therapy staff in developing countries. The subcommittee members are currently working on compiling a list of available online resources for easy access and availability on the ASTRO International Education Subcommittee (IES) webpage.

There are limited data on the use of the internet by health care professionals in developing countries (20-23). At the Millennium Assembly of the United Nations in 2000, it was proposed that the right of universal access to information and communication services be added as a new component of the UN’s principles and conventions on human rights and development (23). Table 2 shows the general access to internet resources at the various host institutions where the scholars studied. Access to information and communication technologies is an area that should be explored in the development of evidence for improving usage of online resources and their integration into education and training. Studies have shown that online resources are not only as effective as paper-based resources in answering clinical questions but also more cost-effective and time-efficient (20). Priority should be given to developing partnerships to improve information technology infrastructure and maximize the potential of existing technologies (23). The advancement of information and communication technologies has been hailed as 1 potential solution to the inequities that exist in health care; therefore, this may be a future area where we may make a tremendous impact in helping close the gap that exists in education and training of radiation oncology health professionals in resource-poor regions.

Members of the GHSC took the first step in collaborating with the IAEA this year, attending monthly international case discussion teleconferences. These sessions are attended by physicians from across the globe to discuss how best to manage oncologic cases in certain resource-limited settings. Additionally, the GHSC recently embarked on the Mutual Mentorship Program, a project aimed at improving exchange of knowledge with our colleagues overseas, with objectives including (1) forming individual partnerships between interested residents for one-to-one mentoring and sharing of educational resources, (2) creating a forum for dialogue regarding difficult clinical cases, and (3) extending the availability of cross-institutional exchange.

Other committee projects include partnering with already existing radiation oncology—related outreach organizations such as Radiating Hope to update resources/information on the ARRO GHSC webpages, reaching out to the ACGME to further the role of global health in radiation oncology resident training, releasing a global health article of the month on the radiation oncology hub global health community for discussion among interested ASTRO community members, and collaborating with ASTRO to enhance the portion of the ASTRO Annual Meeting dedicated to health services and global outreach research and education.

The work to date of the ARRO GHSC serves only as a microcosm of the passion and interest of radiation oncology residents and young physicians in the United States toward international outreach and advancement of our field globally. As we look to close the global gap that currently exists in radiation therapy services to underserved populations, we must continue to focus on enhancing our educational resources for tomorrow’s generation of radiation oncologists, so as to have a more lasting impact on this issue (24).

In the current environment of severe fiscal limitations, it is difficult for us to imagine that professional societies such as ASTRO or ASCO would be equipped to burden the sole responsibility in helping close the gap on cancer services in underserved regions of the world. ASTRO’s support of the GHSP was a critical step in helping legitimize the importance of reducing cancer disparities globally, but there must also be buy-in from individual institutions, cancer centers, and philanthropic organizations. On the basis of this initial 4-year experience of the ARRO GHI, we have outlined our past and ongoing projects above, but in the future we look to promote the importance of the following recommendations to our colleagues in ASTRO:

1. Collaborate with ADROP, Society of Chairs of Academic Radiation Oncology Programs (SCAROP), and the ACGME to formally support the participation of trainees in a rotation overseas devoted to helping reduce cancer disparities.

2. Promote the inclusion of a global health session devoted to research conducted in resource-poor settings during the scientific session at the ASTRO Annual Meeting.

3. Advocate for academic institutions for continued efforts to create faculty positions with protected time to engage in clinical outreach, education, and/or research in global health.

4. Establish guidelines for practitioners in resource-poor settings on cost-effective approaches to cancer therapy.

5. Institutional adoption of information and communication resources in resource-poor regions.

References


6. IAEA. The Advisory Group on increasing access to Radiotherapy Technology (AGaRT) in low and middle income countries.

7. IAEA, Division of Human Health. Setting up a Radiotherapy Programme: Clinical, Medical Physics, Radiation Protection and Safety Aspects. 2008.


10. WHO. UN high-level meeting on increasing access to Radiotherapy Technology (AGaRT) in low and middle income countries.


