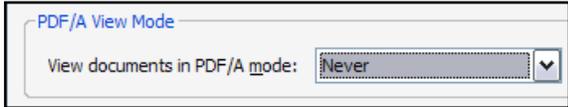
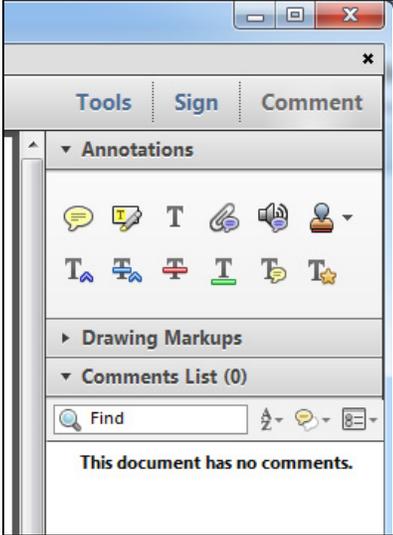


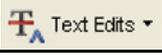
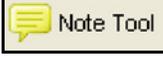
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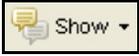
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EDITORIAL

A Commentary on Medical Student Perspective for Global Health Care in Radiation Oncology: Opportunities, Barriers to Sustainability, and Future Directions

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and Bhadrasain Vikram, MD

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Defining the Gaps

Radiation therapy is one of the most cost-effective ways to treat patients on both a curative and a palliative basis in low- and middle-income countries (LMICs) (1). However, supply is far below need, and a severe shortfall exists for basic radiation services. For example, assuming that a radiation therapy machine can treat 450 new patients per year, it has been recently estimated that Africa needs more than 700 additional machines (2). An equally important barrier to radiation therapy is the lack of trained professionals and technical support. This represents an underserved people problem: those who need services, provide services, and support the services and providers.

This commentary provides the perspective from those who may look ahead to a decades-long career and considers how resource-rich countries might help solve the shortage of radiation oncology expertise. Community service is often a key part in the selection process for medical school and residency positions. According to the 2011 National Resident Matching Program Charting Outcomes in the Match document for radiation oncology, 67% (142/211) of applicants for radiation oncology had 4 or more volunteering experiences, with 85% (120/142) matching to a residency program (3). Community service is valued in the selection process for medical school and residency, but after residency there is a lack of defined career paths to achieve sustainable outcomes, specifically in LMICs.

Based on experience at the National Cancer Institute, this commentary focuses on opportunities for medical students, residents, and faculty to assist the underserved in LMICs, addresses sustainability issues, and offers a new possibility for creating a

career path to address service to the underserved, which would apply to populations in the United States that face health disparities as well. It focuses on radiation oncology, given its potential central role in the treatment of common diseases in LMICs, but the concepts are broadly applicable.

Current Opportunities

A few of the programs that offer opportunities to medical students and residents to become involved in global health initiatives in radiation oncology are highlighted. The Association of Residents in Radiation Oncology (ARRO) and the American Society of Radiation Oncology (ASTRO) have developed the ASTRO-ARRO Global Health Scholars Program, an initiative to encourage international outreach among radiation oncology residents (4). This program allows residents to develop a greater appreciation for the culture and attitudes related to cancer care, with the goal of creating a global perspective of oncology and treatment in LMICs.

Residents in their final year and faculty may participate in the Health Volunteers Overseas program associated with American Society of Clinical Oncology. This program recruits oncology physicians who can share their medical expertise and build sustainable relationships with physicians associated with cancer centers in LMICs (5). Participants teach and train staff and gain insight into the cancer center's management needs and challenges.

The International Atomic Energy Agency (IAEA) offers an internship program, which provides medical students and residents the chance to gain practical work experiences and exposes them to the work of the IAEA and the United Nations as a whole (6).

Conflicts of interest: none

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125 Finally, Radiating Hope offers medical students and residents the
126 opportunity to participate in such projects as Cancer Care, which
127 provides basic hygiene items to cancer patients and hospitals, and
128 the Senegal Project, in which members help update the Cancer
129 Center in Senegal (7).
130

131 Sustainability Barriers

132 Successful cancer management in LMICs requires extensive
133 capacity building to develop sustainability. This involves recruiting,
134 training, and maintaining staff and obtaining equipment that can
135 function in the resource-limited environment. Realistic goals are
136 needed that are built from the inside out, with local champions,
137 investment, and solutions as key to understanding the unique situ-
138 ation in each site (8). Furthermore, progress is built on appropriate
139 metrics and oversight that allow investments to be spent wisely and
140 the directions changed as necessary by the evolving circumstances.
141

142 What is striking is that the same issues limit efforts toward
143 helping LMICs by both resource-rich and resource-poor countries.
144 These include political will, addressing social issues of working in
145 underserved places, economic pressures of personnel to fully sup-
146 port their salaries and often subsidize other institutional expenses,
147 and per capita costs for health care that are high in all countries
148 relative to the total economy of the country. Resource-rich countries
149 can learn from resource-poor countries because the latter must
150 optimize every health care dollar with creative solutions (9).
151
152

153 Addressing Sustainability and Education

154 Issues

155 The education and training of medical students as future radiation
156 oncologists focused on global health should be an integral part of
157 the overall strategy for improving sustainable care in LMICs. We
158 suggest a targeted education and training plan to develop new
159 career paths for work in LMICs and also in underserved areas
160 within the United States. The effort would incorporate principles
161 of cancer care and public health and address the scope of chal-
162 lenges, which will vary with LMIC. For a medical student, short-
163 term initiatives may include seminars and workshops on global
164 health at the student's home institution, possibly in collaboration
165 with schools of public health.
166

167 After this training, for those interested in global health as a part
168 of their career, immersion within a LMIC is crucial. For a medical
169 student, short-term visits are important to immerse the student in
170 the local environment. Pairing the medical student with a local
171 radiation oncologist would provide exposure to how care is given
172 in the participating country. The participating resident would
173 spend time with all members of the staff, including physicians,
174 technicians, physicists, diagnostic imagers, and administrators, to
175 develop a better sense of the health care model. Education and
176 training would continue through telecommunications and web
177 conferencing back at the home institution to maintain collabora-
178 tion with the LMIC. Another idea is for senior residents in the US
179 to "adopt" a junior resident in an LMIC and build a long-term
180 relationship through tutoring, E-mail, videoconferencing, and
181 visits over the course of training. The ability to collaborate with
182 LMIC physicians and residents continuously may lead to long-
183 term professional collaborations, and that could help sustain the
184 cancer program in the LMIC.
185
186

187 Creating New Sustainable Programs and Career

188 Paths

189 As a new avenue to help address the sustainability of care to the
190 underserved, experts at the National Cancer Institute working with
191 academic, practice, and international colleagues have recently
192 created the International Cancer Expert Corps, Inc (ICEC), a not-
193 for-profit entity that will partner with government to develop
194 human resources for this critical gap. A detailed description and
195 ICEC website are forthcoming (C. N. Coleman et al, unpublished
196 data). Among the underlying premises is that the provision of Q1
197 long-term sustainable progress requires personal commitment,
198 which requires a fundamental change in what is rewarded in one's
199 career and a change in the value system of health care so that
200 human service is valued along with research, teaching, clinical
201 care, and practice revenue. The ICEC aims to sustain both on-site
202 projects and the connectivity over the long term, and it has metrics
203 for productivity and success. What would make the connectivity
204 sustainable would be the ability to have a committed percentage of
205 time and a career path with metrics for evaluation and promotion.
206 Given the cost-effective role of radiation therapy and its role in
207 curative and palliative therapy for the advanced stages of disease
208 seen in LMICs and the ability to develop quality assurance for
209 treatment delivery using telemedicine and chart-rounds-type
210 weekly conferences, radiation oncology will form a key platform
211 on which cancer care facilities in LMICs will be established.
212
213
214

215 Challenges and What Lies Ahead

216 The current situation of worldwide cancer burden in LMICs is un-
217 acceptable. Data from GLOBOCAN 2008 estimated 12.7 million
218 cases of cancer worldwide, with 7.6 million deaths (10). According
219 to this database, 70% of cancer deaths occur in the developing
220 world, and this number will continue to rise, inasmuch as the overall
221 cancer incidence is expected to rise to 15 million new cases in 2015,
222 with 10 million new cases occurring in LMICs. According to the
223 Directory of Radiotherapy Centers website (www.naweb.iaea.org/nahu/dirac), currently 2200 radiation therapy units are available in
224 LMICs, whereas 5000 are estimated to be needed. There are need,
225 opportunity, and potential huge advances to be made.
226
227

228 From the perspective of a medical student, the potential for ra-
229 diation oncology to address the shortage of cancer care to the un-
230 derserved is enormous. Building on well-intentioned programs,
231 continuity of participation from medical school to residency to
232 faculty and practice and even through retirement is needed to
233 generate sustainability of care in LMICs. The ICEC model is being
234 explored to address this critical need. All involved—residents, fel-
235 lows, faculty, and mentors—will gain greater appreciation for
236 different cultures and attitudes related to cancer care and will
237 develop an awareness of health disparities and an understanding of
238 the social, economic, cultural, and environmental factors affecting
239 cancer care in LMICs while working with colleagues with similar
240 global health interests.
241

242 The recognition in 2011 by the United Nations of the growing
243 burden of noncommunicable diseases in LMICs makes this the
244 right time to make fundamental changes (www.un.org/en/ga/ncdmeeting2011/pdf/NCD_draft_political_declaration.pdf). The
245 solution to this problem requires research, creativity, and sus-
246 tainable effort. Capturing the enthusiasm and altruism of students
247 and trainees and supporting them during their professional careers
248

249 require novel solutions and dedicated students, mentors, and
 250 partners. Big problems require innovative solutions, and radiation
 251 oncology is in a unique position to address the growing burden of
 252 cancer in LMICs.
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