
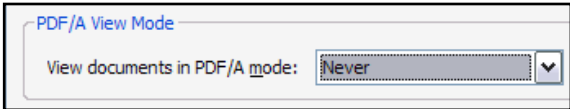
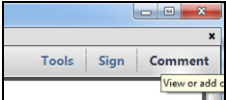
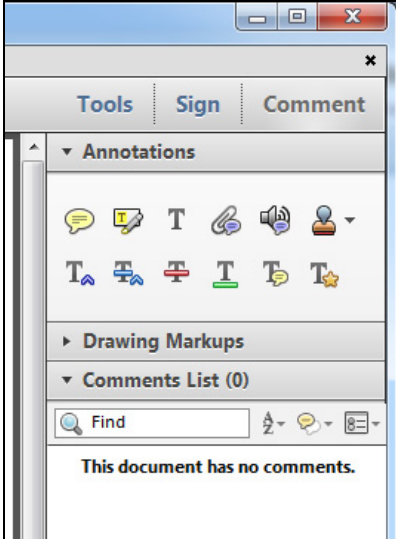


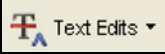


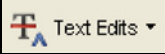

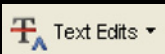





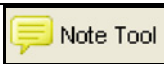

## INSTRUCTIONS ON THE ANNOTATION OF PDF FILES

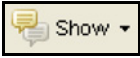
To view, print and annotate your article you will need Adobe Reader version 9 (or higher). This program is freely available for a whole series of platforms that include PC, Mac, and UNIX and can be downloaded from <http://get.adobe.com/reader/>. The exact system requirements are given at the Adobe site: <http://www.adobe.com/products/reader/tech-specs.html>.

*Note: if you opt to annotate the file with software other than Adobe Reader then please also highlight the appropriate place in the PDF file.*

PDF ANNOTATIONS	
Adobe Reader version 9	Adobe Reader version X and XI
<p>When you open the PDF file using Adobe Reader, the Commenting tool bar should be displayed automatically; if not, click on 'Tools', select 'Comment &amp; Markup', then click on 'Show Comment &amp; Markup tool bar' (or 'Show Commenting bar' on the Mac). If these options are not available in your Adobe Reader menus then it is possible that your Adobe Acrobat version is lower than 9 or the PDF has not been prepared properly.</p>  <p>(Mac)</p> <p><b>PDF ANNOTATIONS (Adobe Reader version 9)</b></p> <p>The default for the Commenting tool bar is set to 'off' in version 9. To change this setting select 'Edit   Preferences', then 'Documents' (at left under 'Categories'), then select the option 'Never' for 'PDF/A View Mode'.</p>  <p>(Changing the default setting, Adobe version 9)</p>	<p>To make annotations in the PDF file, open the PDF file using Adobe Reader XI, click on 'Comment'.</p> <p>If this option is not available in your Adobe Reader menus then it is possible that your Adobe Acrobat version is lower than XI or the PDF has not been prepared properly.</p>  <p>This opens a task pane and, below that, a list of all Comments in the text. These comments initially show all the changes made by our copyeditor to your file.</p> 

**HOW TO...**

Action	Adobe Reader version 9	Adobe Reader version X and XI
<b>Insert text</b>	Click the 'Text Edits' button  on the Commenting tool bar. Click to set the cursor location in the text and simply start typing. The text will appear in a commenting box. You may also cut-and-paste text from another file into the commenting box. Close the box by clicking on 'x' in the top right-hand corner.	Click the 'Insert Text' icon  on the Comment tool bar. Click to set the cursor location in the text and simply start typing. The text will appear in a commenting box. You may also cut-and-paste text from another file into the commenting box. Close the box by clicking on 'x'  in the top right-hand corner.
<b>Replace text</b>	Click the 'Text Edits' button  on the Commenting tool bar. To highlight the text to be replaced, click and drag the cursor over the text. Then simply type in the replacement text. The replacement text will appear in a commenting box. You may also cut-and-paste text from another file into this box. To replace formatted text (an equation for example) please <a href="#">Attach a file</a> (see below).	Click the 'Replace (Ins)' icon  on the Comment tool bar. To highlight the text to be replaced, click and drag the cursor over the text. Then simply type in the replacement text. The replacement text will appear in a commenting box. You may also cut-and-paste text from another file into this box. To replace formatted text (an equation for example) please <a href="#">Attach a file</a> (see below).
<b>Remove text</b>	Click the 'Text Edits' button  on the Commenting tool bar. Click and drag over the text to be deleted. Then press the delete button on your keyboard. The text to be deleted will then be struck through.	Click the 'Strikethrough (Del)' icon  on the Comment tool bar. Click and drag over the text to be deleted. Then press the delete button on your keyboard. The text to be deleted will then be struck through.
<b>Highlight text/ make a comment</b>	Click on the 'Highlight' button  on the Commenting tool bar. Click and drag over the text. To make a comment, double click on the highlighted text and simply start typing.	Click on the 'Highlight Text' icon  on the Comment tool bar. Click and drag over the text. To make a comment, double click on the highlighted text and simply start typing.
<b>Attach a file</b>	Click on the 'Attach a File' button  on the Commenting tool bar. Click on the figure, table or formatted text to be replaced. A window will automatically open allowing you to attach the file. To make a comment, go to 'General' in the 'Properties' window, and then 'Description'. A graphic will appear in the PDF file indicating the insertion of a file.	Click on the 'Attach File' icon  on the Comment tool bar. Click on the figure, table or formatted text to be replaced. A window will automatically open allowing you to attach the file. A graphic will appear indicating the insertion of a file.
<b>Leave a note/ comment</b>	Click on the 'Note Tool' button  on the Commenting tool bar. Click to set the location of the note on the document and simply start typing. <u>Do not use this feature to make text edits.</u>	Click on the 'Add Sticky Note' icon  on the Comment tool bar. Click to set the location of the note on the document and simply start typing. <u>Do not use this feature to make text edits.</u>

HOW TO...		
Action	Adobe Reader version 9	Adobe Reader version X and XI
<b>Review</b>	To review your changes, click on the 'Show' button  on the Commenting tool bar. Choose 'Show Comments List'. Navigate by clicking on a correction in the list. Alternatively, double click on any mark-up to open the commenting box.	Your changes will appear automatically in a list below the Comment tool bar. Navigate by clicking on a correction in the list. Alternatively, double click on any mark-up to open the commenting box.
<b>Undo/delete change</b>	To undo any changes made, use the right click button on your mouse (for PCs, Ctrl-Click for the Mac). Alternatively click on 'Edit' in the main Adobe menu and then 'Undo'. You can also delete edits using the right click (Ctrl-click on the Mac) and selecting 'Delete'.	To undo any changes made, use the right click button on your mouse (for PCs, Ctrl-Click for the Mac). Alternatively click on 'Edit' in the main Adobe menu and then 'Undo'. You can also delete edits using the right click (Ctrl-click on the Mac) and selecting 'Delete'.

#### SEND YOUR ANNOTATED PDF FILE BACK TO ELSEVIER

Save the annotations to your file and return as instructed by Elsevier. Before returning, please ensure you have answered any questions raised on the Query Form and that you have inserted all corrections: later inclusion of any subsequent corrections cannot be guaranteed.

#### FURTHER POINTS

- Any (grey) halftones (photographs, micrographs, etc.) are best viewed on screen, for which they are optimized, and your local printer may not be able to output the greys correctly.
- If the PDF files contain colour images, and if you do have a local colour printer available, then it will be likely that you will not be able to correctly reproduce the colours on it, as local variations can occur.
- If you print the PDF file attached, and notice some 'non-standard' output, please check if the problem is also present on screen. If the correct printer driver for your printer is not installed on your PC, the printed output will be distorted.

## EDITORIAL

**Bringing Cancer Care to the Underserved Globally: A Challenging Problem for Which Radiation Oncology Can Pioneer Novel Solutions**C. Norman Coleman, MD,<sup>1</sup> on behalf of many others<sup>2</sup><sup>Q1</sup> *The International Cancer Expert Corps, Chevy Chase, Maryland and Wilmington, Delaware*

Received Mar 31, 2014, and in revised form Apr 1, 2014. Accepted for publication Apr 1, 2014.

There are times in society in which problems with the descriptor “too hard to solve” can no longer be tolerated. This issue of the *Journal* contains 9 papers and a provocative editorial by Editor-in-Chief Anthony Zietman addressing radiation therapy for underserved nations. The need for attention to the emerging burden of non-communicable diseases (NCDs) in Low- and Lower-Middle Income Countries<sup>3</sup> (LMICs) was raised by the 2011 United Nations Declaration (1) and in a variety of recent publications (2-4). The challenge is a complex set of problems that requires a systems approach (5). Indeed, Love, Ginsburg, and I have proposed a framework called “Public Health Oncology” (6), which discusses the gaps and the interrelated social, economic, gender discrimination, corruption, and other issues that must be considered so as to be able to provide affordable cancer care in LMICs, as emphasized by Kerr and Midgley (7). The essence of the public health oncology concept is that there are clear mandates grounded in science for what interventions need to be addressed. These are service and research issues in which radiation oncology can have a key role.

Data from the International Atomic Energy Agency (IAEA) documents the dramatic shortage of radiation therapy capacity in LMICs (8). As presented in the

Reprint requests to: C. Norman Coleman, MD, National Cancer Institute, Division of Cancer Treatment and Diagnosis, EPN/Room 6014, 6130 Executive Blvd, Bethesda, MD 20892. Tel: (301) 496-6111; E-mail: ccoleman@mail.nih.gov

Conflict of interest: none.

<sup>1</sup> The professional affiliation for this editorial is the International Cancer Expert Corps, Chevy Chase, MD and Wilmington, DE. This editorial is the personal opinion of the author and does not represent the National Cancer Institute or any program of the US Government.

Int J Radiation Oncol Biol Phys, Vol. ■, No. ■, pp. 1–3, 2014  
0360-3016/\$ - see front matter © 2014 Elsevier Inc. All rights reserved.  
<http://dx.doi.org/10.1016/j.ijrobp.2014.04.002>

accompanying papers, there is a serious interest in addressing this crisis across the spectrum of radiation oncology professional age and experience groups. The professional oncology societies such as ASTRO, ASCO, and ARRO<sup>4</sup> have programs that emphasize education and “twinning” (9) between centers in resource-rich and resource-poor countries. There is much good will and many good intentions upon which to build.

The team of radiation oncology providers recognizes the curative potential of radiation therapy even in the advanced stages of disease that are frequently encountered in LMICs. Our field has developed hypofractionated radiation therapy based on improved imaging, technical feasibility, biological properties, and patient convenience. In settings where geographic access and limited treatment capacity are dominant problems, hypofractionation would be very useful for palliative and curative treatment, but methods and research are needed to do so with limited imaging and treatment technology. Patients with locally advanced cancers of the cervix, head and neck, lung, breast, and gastrointestinal tract are generally treated with combined modality therapies, including time-honored treatments using drugs that are much more affordable than the newer molecular-targeted agents. Combined modality therapy is

<sup>2</sup> Richard R. Love provided editorial advice. The list of individuals pertaining to the phrase “on behalf of many others” is on a manuscript under review.

<sup>3</sup> WHO. How we classify countries. Available at: <http://data-worldbank.org/about/country-classifications>.

<sup>4</sup> American Society of Radiation Oncology (ASTRO), American Society of Clinical Oncology (ASCO), Association of Residents in Radiation Oncology (ARRO).

administered by radiation and medical oncology teams and/or by clinical oncologists trained in both. So, worldwide our specialty has the knowledge and ability to bring cancer care to LMICs as part of an integrated public health approach (6).

Providing radiation equipment, such as functional units that are being replaced by newer technology and/or new units is one useful contribution, with Radiating Hope having that as a goal (10). There is a global shortage of ~5000 or more treatment machines (8), with the details of the technology gap now being examined by the Union for International Cancer Control (UICC) under the presidency of Dr. Mary Gospodarowicz. This is a huge opportunity for innovative technology and economic and business models. There is a major shortage in qualified personnel to deliver care and to service the machines. Well-trained radiation oncologists from LMICs have worldwide opportunities outside their home country; so can the local circumstances be changed such that they are part of a potentially transformational worldwide effort making it compelling for them to stay in country and help serve the underserved?

Although facilities, equipment, supplies and infrastructure are, of course, critical to cancer care, what is essential to their effective use is a capable workforce. To help address the need for a sustainable workforce, the International Cancer Expert Corps (ICEC) is now being established as a multi-national collaborative effort. The ICEC aims to establish a mentoring network of cancer professionals who will work with local and regional in-country groups and, along with required local investment, establish ICEC centers to develop and sustain expertise for cancer care (11). It is an active work in progress aiming for a rollout in 2014, with some details on the nascent website and more to follow. Among the underlying principles are the following:

1. Sustainability is better ensured with a critical mass of talent and projects. Currently, institution-to-institution projects are often dependent on the perseverance and dedication of a few persons or often just 1 person. Having a number of individuals on these projects work together, share ideas, and build expert teams to address critical social, economic, and research issues can provide both the necessary breadth of expertise and also a sufficient number of persons to allow for transitions as individual participants come and go.
2. Mentoring and person-to-person partnerships are a key to success that can help sustain the team working in the LMIC ICEC center. Much of the mentor-mentee educational relationship can be in weekly or biweekly case- and guideline-based conferences, with only limited travel necessary.
3. Service to the underserved through mentoring, teaching, and direct care provide extraordinary opportunities to learn for both the mentor and mentee. Nigel Crisp has

pointed this out at the global level in *Turning the World Upside Down* (12). At the local level, the care givers in LMICs have much to teach about compassion, courage, and dedication to mission, as related by Julie Livingston in *Improvising Medicine* (13).

4. Service to the underserved must be valued as an integral part of a career, not as a vacation add-on or as an activity considered a detriment to academic progress. This means establishing a bona fide career path including trainee, mid-career, senior mentor, and retiree, the latter expertise now often lost to retirement.

Although expertise is needed across the cancer care spectrum, addressing the global cancer crisis is an extraordinary opportunity for radiation oncology, because radiation is a very cost-effective treatment modality and will be the backbone of curative LMIC cancer care. Multi-modality oncology expertise can build from radiation oncology's technological and information technology expertise, adding on imaging, pathology, and guideline/protocol-based teaching. Because of the relatively small size of the field, we already have close international collaborations and networks. We can partner with industry to pilot new treatment technology and technological approaches to remote cancer medicine, for example, a pioneering start-up project Amader Gram in Bangladesh (<http://agbreastcare.org/>) that would be a great "laboratory" for new models, ideas, and treatment. Notably, we can also address "LMIC" issues domestically with programs for the rural underserved as pioneered at part of NCI's Cancer Disparities Research Partnership program (14).

Health care economics, research grant support, and career paths are rapidly changing. Although research, teaching, and patient care remain critical parts of an oncology career, there is a need to focus on greater societal issues (15, 16). Whether we do this through professional societies, institutional twinning, and/or broad international collaboration, as proposed by ICEC, radiation oncology has the opportunity to be a leader by taking on LMIC challenges, expanding our personal and specialty's horizons, and helping to bring altruistic service back as an integral part of health care careers.

## References

1. UN Declaration. Available at: [http://www.un.org/en/ga/ncdmeeting2011/pdf/NCD\\_draft\\_political\\_declaration.pdf](http://www.un.org/en/ga/ncdmeeting2011/pdf/NCD_draft_political_declaration.pdf). Accessed August 3, 2013.
2. Rosenbaum L, Lamas D. Facing a "slow motion disaster"—the UN meeting on non-communicable diseases. *N Engl J Med* 2011;365:2345-2348.
3. Sloan FA, Gelband H, editors. Cancer Control Opportunities in Low- and Middle-Income Countries. Institute of Medicine (US) Committee on Cancer Control in Low- and Middle-Income Countries. Washington, DC: National Academies Press (US); 2007.
4. Hunter DJ, Reddy KS. Noncommunicable diseases. *N Engl J Med* 2013;369:1336-1343.

- 249 5. Kim JY, Farmer P, Porter ME. Redefining global health-care delivery. 265  
250 *Lancet* 2013;382:1060-1069. <http://dx.doi.org/10.1016/S0140-> 266  
251 [6736\(13\)61047-8](http://dx.doi.org/10.1016/S0140-6736(13)61047-8). pii: S0140–6736(13)61047-8. 267
- 252 6. Love RR, Ginsburg OM, Coleman CN. Public health oncology: A 268  
253 framework for progress in low- and middle-income countries. *Ann* 269  
254 *Oncol* 2012;23:3040-3045. 270
- 255 7. Kerr DJ, Midgley R. Can we treat cancer for a dollar a day? 271  
256 Guidelines for low-income countries. *N Engl J Med* 2010;363: 272  
257 801-803. 273
- 258 8. Availability of radiation therapy. From Directory of Radiotherapy 274  
259 Centres, IAEA. Available at: [http://www.iaea.org/newscenter/focus/](http://www.iaea.org/newscenter/focus/cancercare/dirac2012.pdf) 275  
260 [cancercare/dirac2012.pdf](http://www.iaea.org/newscenter/focus/cancercare/dirac2012.pdf). Accessed August 3, 2013. 276
- 261 9. Institute of Medicine. IOM report: Cancer control opportunities in low- 277  
262 and middle-income countries. Available at: [http://www.iom.edu/Reports/](http://www.iom.edu/Reports/2007/Cancer-Control-Opportunities-Low-Middle-Income-Countries.aspx) 278  
263 [2007/Cancer-Control-Opportunities-Low-Middle-Income-Countries.](http://www.iom.edu/Reports/2007/Cancer-Control-Opportunities-Low-Middle-Income-Countries.aspx) 279  
264 [aspx](http://www.iom.edu/Reports/2007/Cancer-Control-Opportunities-Low-Middle-Income-Countries.aspx). Accessed March 22, 2014. 280
10. Radiating Hope. Available at: <http://www.radiatinghope.org/>. 265  
Accessed March 22, 2014. 266
11. International Cancer Expert Corps (ICEC), Inc. Available at [http://](http://iceccancer.org) 267  
[iceccancer.org](http://iceccancer.org). Accessed March 22, 2014. Q3 268
12. Crisp N. Turning the World Upside Down. Boca Raton, FL: CRC 269  
Press; 2010. 270
13. Livingston J. Improvising Medicine. Durham, NC: Duke University 271  
Press; 2012. 272
14. Petereit DG, Guadagnolo BA, Wong R, et al. Addressing cancer disparities 273  
among American Indians through innovative technologies and patient 274  
navigation: The Walking Forward experience. *Front Oncol* 2011;1:11. Q4 275
15. Kerry VB, Auld S, Farmer P. An international service corps for 276  
health—an unconventional prescription for diplomacy. *N Engl J Med* 277  
2010;363:1199-1200. 278
16. Coleman CN. Fukushima and the future of radiation research. *Radi-* 279  
*ation Res* 2013;179:1-8. 280

UNCORRECTED PROOF

**AUTHOR QUERY FORM**

 <b>ELSEVIER</b>	<b>Journal:</b> ROB  <b>Article Number:</b> 22166	
--	---	--

Dear Author,

Please check your proof carefully and mark all corrections at the appropriate place in the proof (e.g., by using on-screen annotation in the PDF file) or compile them in a separate list. Note: if you opt to annotate the file with software other than Adobe Reader then please also highlight the appropriate place in the PDF file. To ensure fast publication of your paper please return your corrections within 48 hours.

For correction or revision of any artwork, please consult <http://www.elsevier.com/artworkinstructions>.

Any queries or remarks that have arisen during the processing of your manuscript are listed below and highlighted by flags in the proof.

<b>Location in article</b>	<b>Query / Remark: Click on the Q link to find the query's location in text Please insert your reply or correction at the corresponding line in the proof</b>
	If there are any drug dosages in your article, please verify them and indicate that you have done so by initialing this query
<b>Q1</b>	Author affiliations will appear differently in the print and online versions of your paper. The PDF shows how the affiliations will present following journal style, whereas the searchable online version will present as follows in order to provide complete unabridged affiliations. Please check the accuracy of the affiliation(s) of each author and make changes as appropriate. The International Cancer Expert Corps, Chevy Chase, Maryland. The International Cancer Expert Corps, Wilmington, Delaware.
<b>Q2</b>	Please verify that "Having a number of individuals on these projects work together" is correct as edited (changed from "Having a number of these projects work together").
<b>Q3</b>	Please provide document or Web page name for reference 11 if applicable.
<b>Q4</b>	Please verify journal volume and article page range for reference 14.
<b>Q5</b>	Please verify that "The list of individuals pertaining to the phrase "on behalf of many others" is on a manuscript under review" is acceptable as edited (changed from "The list of the "behalf of many others" is on a manuscript under review").
<b>Q6</b>	Please confirm that given names and surnames have been identified correctly.

(continued on next page)

Please check this box or indicate  
your approval if you have no  
corrections to make to the PDF file

Thank you for your assistance.