Global Outreach in Radiology

- A growing number of radiologists participate in voluntary outreach programs that provide medical imaging expertise to underserved patient populations in developing countries
- Mass General Imaging's Global Health Programs primarily operate via teleradiology, a cost-effective means of providing diagnosis and second opinions
- Mass General Imaging outreach programs also help train technologists and physicians in developing countries
- Radiology residents in the US who participate in these programs gain exposure to cases of unusual and advanced diseases

The World Health Organization estimates that about 75 percent of the world's population is without access to ultrasounds, X-rays, magnetic resonance images and other medical imaging technologies that can detect tumors, diagnose tuberculosis infections, and monitor pregnant women. A number of programs in developed countries are addressing this problem by providing equipment. However medical expertise is still lacking in many developing countries. To meet this need, global outreach programs now provide assistance, including Partners in Health, Project Hope, the International Radiology Exchange (iRadX), and RAD-AID. Radiologists at Massachusetts General Hospital participate in many of these programs by providing teleradiology services, training technologists and physicians, and visiting overseas hospitals to assist in their programs.

Teleradiology Outreach Program in Haiti
Mass General Imaging's Global Health Programs have provided extensive assistance to the University Hospital in Mirabelais, a public hospital built by Haiti's Ministry of Health in conjunction with Partners In Health. Opened in 2013, this hospital offers X-ray, ultrasound, and CT imaging but does not employ any radiologists. Therefore, it depends on radiologists based in the US who volunteer to interpret the images.

In 2014, about 40 radiologists from several US hospitals, including those who volunteer for Mass General Imaging's Global Health Programs, interpreted approximately 4,000 CT scans acquired from the only CT scanner at the Mirabelais hospital (a 32-slice portable scanner) and stored on a picture archiving and communication systems (PACS) there and in Boston. The images were downloaded for interpretation, and the reports were sent back to the hospital. In each volunteer shift, radiologists interpreted 4-6 cases. If cases were urgent, turnaround time was expedited, and the primary team on the ground in Haiti was notified of any critical findings.

Volunteers of Mass General Imaging's Global Health Programs have also trained technologists at the University Hospital in Mirabelais in X-ray, CT, and MR imaging. For example, a trainee came to Mass General in February 2015 to study in partial fulfillment of the internship/observership requirements of his training program with the Universidad Catolica in Santo Domingo.

Outreach Programs in Africa
Mass General Imaging's Global Health Programs provide assistance in African countries such as Rwanda, Kenya, and Uganda. As in most of Africa, healthcare resources are minimal in these countries. In many hospitals, imaging is limited to X-ray radiography and ultrasound, although the Mass General Department of Radiology has provided assistance in obtaining CT scanners in some locations, including Sagam, Kenya. Mass General radiologists have also spent time in these countries, practicing radiology and developing training programs for physicians, including residents, and technologists.
Figure 1. CT images of chest of 43-year-old woman from Haiti shows large tumor in the left breast that is infiltrating the chest wall, indicating late stage breast cancer. On the basis of this diagnosis, chemotherapy was chosen as the most appropriate therapy.

Figure 2. A CT of 36-year-old man with an orbital mass, indicating a differential diagnosis of ocular melanoma or lymphoma, which requires pathological studies for final diagnosis.

Challenges and Limitations
Radiologists face many challenges in working with doctors around the globe. For example, Internet connectivity may be poor or even absent. Uploading images from Haiti via PACS is now possible but from most locations, the images must be sent in an email or via a smart phone. Additional challenges include time differences, language barriers, intermittent power supplies, and finding time to meet the demand for voluntary teleradiology services.

Benefits
Teleradiology offers numerous benefits to recipient hospitals. Because radiologists can provide services without traveling, the program offers continuity, and the opportunity for healthcare providers in developing countries to build relationships with specialists in the US. In countries where there are few or no radiologists, other doctors can learn to read images after studying the diagnoses provided by radiologists from programs such as Mass General Imaging’s Global Health Programs.
Radiologists and radiology residents in the US also benefit from the experience of providing teleradiology services to developing countries. Patients in these countries often do not present themselves to healthcare providers until their disease is advanced, which means that the images sent for interpretation are often very different from those typically seen in patients in the US. In addition, diseases occur in developing countries that are rarely seen in the US. For radiology residents, learning from these images can provide unique experiences.

For example, tumors may be much larger than those typically seen in the US (Figure 1). Yet these images are useful for staging cancer and making decisions about appropriate treatment. In other cases, imaging can help in differential diagnosis. For example, a 36-year-old man with an orbital mass underwent a CT scan (Figure 2) that indicated that it was due to an ocular melanoma or a lymphoma and led to a recommendation that a biopsy be prepared for pathological analysis.

**Further Information**

For further information on Mass General Imaging’s Global Health Programs, please contact Garry Choy, MD, Radiology, Department of Radiology, Massachusetts General Hospital, at **617-726-8315**.

We would like to thank, Garry Choy, MD, and Vyoma Sahani, Department of Radiology, and Noortje Trienekens, Center for Global Health and Disaster Response Massachusetts General Hospital, for their assistance and advice on this issue.

**References**

RAD-AID International

Mass General Imaging Global Health Programs.

*Mass General Imaging hosts radiology technologist in training (2015).*

Partners in Health. *Haiti: Radiology Improves Hospital Care.*

International Radiology Exchange (iRadX).


©2015 MGH Department of Radiology

*Janet Cochrane Miller, D. Phil., Author*

*Raul N. Uppot, M.D., Editor*