



RAD-AID.org

Bringing Radiology to the World



2019-2020
ANNUAL REPORT

The Need for RAD-AID

Babies and mothers need **ultrasound** for safe delivery.

Cancer patients need **CT/MRI** for staging and treatment.

Trauma and infection victims need **x-ray, ultrasound, and CT** to address injuries and outbreaks.

Heart and stroke patients need **CT, angiography, and ultrasound** for diagnosis and treatment.

OVER HALF THE WORLD LACKS RADIOLOGY

(Source: World Health Organization)



Countries



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Letter from Chief Executive Officer

Dear RAD-AID Friends and Supporters,

Building radiology in low-resource regions means working shoulder-to-shoulder, hands-on, on-site, and in-house to help hospitals and communities advance their radiology capabilities for patients. This means RAD-AID creates infrastructure, connects equipment, teaches skills, exchanges ideas, and works TOGETHER with our partners at the front lines where the patients are. This means every RAD-AID team is not just one professional subset of radiology, but a team of radiology professionals having diverse and complementary skills essential for multidisciplinary work.

We are passionate in our pursuit to make the world better each day and every day. Our work is not always easy, so we persevere, find new paths, invent and then re-invent. We love this work so we take pride in showing you photos, updates, and examples of RAD-AID living this mission for over 11 years with over 12,000 volunteers, to span 30 countries. That is why we are pleased to give you this annual report, in showing you our goals, achievements as well as the challenges we face, in hopes that you will support our initiative to improve global health.

This annual report represents just a small part of the global work that RAD-AID performs every day to advance the health of the world through improved radiology. We aim to keep going shoulder-to-shoulder, hands-on, on-site, and in-house around the world, to make each day better.

Sincerely,

Daniel J. Mollura, MD
President and CEO
RAD-AID International



Officers and Management Team

Daniel J. Mollura, President and Chief Executive Officer
Melissa Culp, Vice President and Chief Operating Officer

(Alphabetical)

Genevieve Abbey, Program Manager, RAD-AID Breast Imaging
Kwasi Armah, Program Manager, RAD-AID Ghana
Gillian Battino, Director, RAD-AID Latin America
Val Brod, Program Manager, RAD-AID Malawi
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Anna Jackson, Program Manager, RAD-AID Country Reports Program
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Raymond Wong, Assistant Program Manager, RAD-AID Interventional Radiology
Andrew Woodward, Director, RAD-AID Malawi
Marianna Zagurovskaya, Program Manager, RAD-AID Kazakhstan

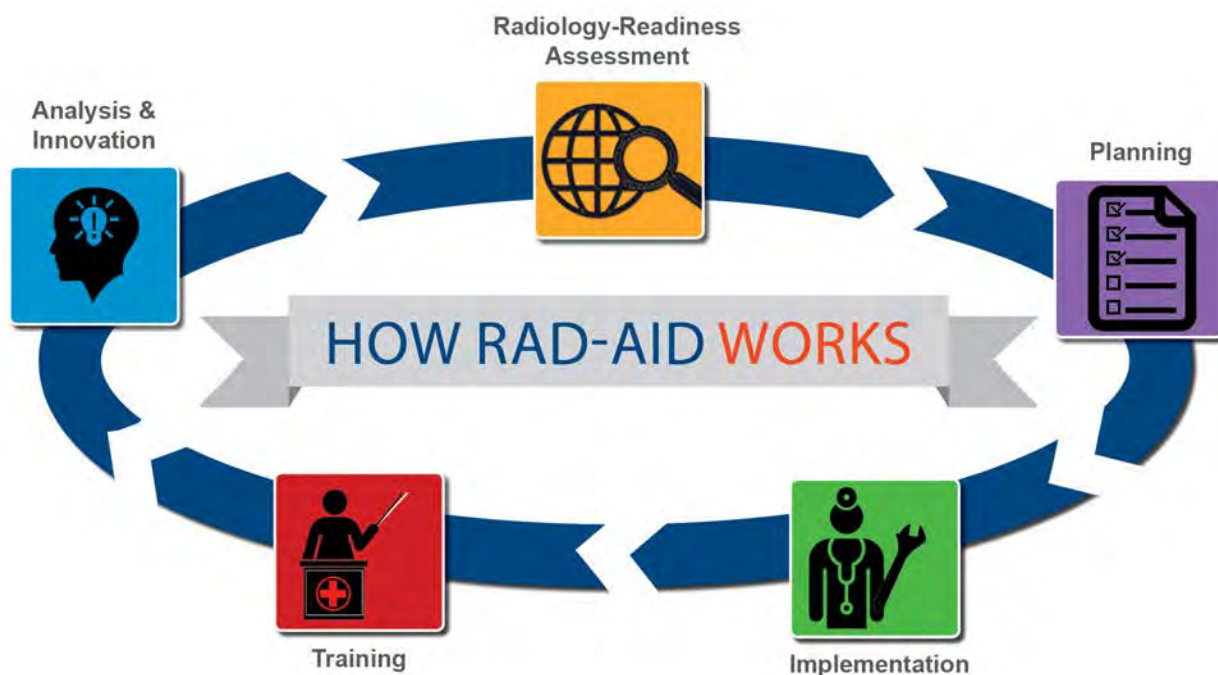
Board of Directors

Brian Choi, Chief Medical Information Officer, Co-Director of Advanced Cardiac Imaging, The George Washington University
Sonnie Dockser, President, Sonnie Foundation
Susan Harvey, Former Director of Breast Imaging, Johns Hopkins Hospital
Theresa Loar, Former Senior Vice President of International Programs, CH2M
Daniel J. Mollura (Board Chair), Founder, RAD-AID International
Alyse Nelson, CEO, Vital Voices Global Partnership
Geoffrey Rubin, George Geller Distinguished Professor of Radiology and Bioengineering, Duke University
Deb O'Hara Ruszkowski, Founder, Nurses with Global Impact
Paula Sanderson, Principal, Digital Marketing Consultant, WSI Digital Marketing of Connecticut
Michelle Starikovskiy, Vice President, PIMCO
Ryan Sydnor, Former RAD-AID Haiti Director (2009-2016); Radiologist, Colorado Imaging Associates
Liana Watson, Former Executive Vice President, American Society of Radiologic Technologists
David Youmans, Diagnostic and Interventional Radiologist, Princeton Radiology Associates, Penn Medicine Princeton Health





How RAD-AID Works



RAD-AID uses a simple method for analyzing, planning and implementing projects. The first step is **Radiology-Readiness**, which is RAD-AID's trademarked data collection and analysis tool, so that we can optimize every radiology project for the specific needs, infrastructure constraints, and health care system attributes of a region, community or facility. The Radiology-Readiness step measures existing resources at a facility, analyzes the clinical goals of that facility, and offers a targeted solution to fill vital gaps to connect existing resources with those goals.

Once we conduct the Radiology-Readiness Assessment, we **plan** the project based on the data. Third, we **implement** the project based on the plan, such as installing hardware, configuring workstations, organizing training, writing research, or designing a new technology, which are accomplished through RAD-AID's multidisciplinary team structure. Fourth, education is a central part of everything we do, and we hold **training** sessions so that RAD-AID can train in-country partners to use and maintain the implemented program. More importantly, our teams also receive training and education from our in-country partners so that we can learn from them about clinical and cultural factors that will influence the success of our collaborative program.

Lastly, we work with our in-country partners to **analyze** the results of the program, to find what worked and what did not work. In this way, we identify new challenges to solve and find new resources to strengthen the program. Then, we return to step one and repeat our **Radiology-Readiness** assessment so that we can see how our project had positive impact and what gaps need to be addressed. This circular iteration of data, analysis, planning, self-correction and new data collection keeps RAD-AID moving forward.

In 2019, RAD-AID advanced our Radiology-Readiness tool by adding more subspecialty assessment sections, such as Informatics, Interventional Radiology, Nursing, Radiation Oncology, Radiology Business Operations, and Equipment Planning, to provide more robust program planning for our volunteers and partners. We also translated Radiology-Readiness into four languages with more languages on the way, to widen cultural applications and facilitate partnership-development.

This approach to 'How RAD-AID Works' is flexible because it adapts to local cultural and clinical conditions so that each program is uniquely suited to the country and specific health goals, while scalable as a clear step-by-step process for improving health around the world.



RAD-AID Central and South America, & Caribbean

Haiti

RAD-AID has worked in Haiti since the earthquake of 2010. Over the last nine years of RAD-AID's radiology capacity-building in Haiti, our teams have supported University Hospital of Haiti in Port-au-Prince to improve educational resources available for radiology residents as the future medical imaging workforce of the country. RAD-AID also conducts trainings for technologists, nurses, and radiologists in Haiti.

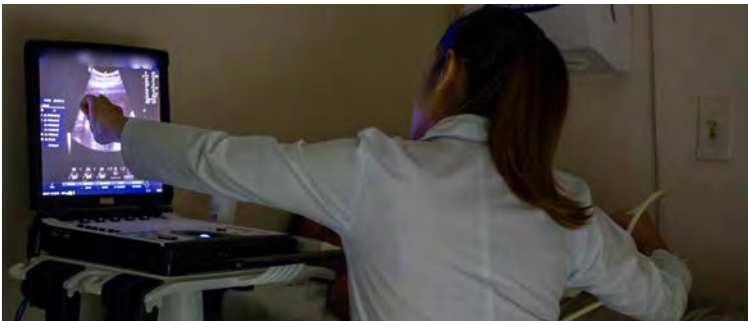
In 2016, RAD-AID donated two CT scanners to Haiti in Caracol and Gonaïves, which includes personnel-training and equipment-planning in 2018-2020, with support from Philips Foundation. In 2019, RAD-AID advanced tele-lecture support for radiology residency training in Haiti along with nursing and breast imaging educational initiatives.



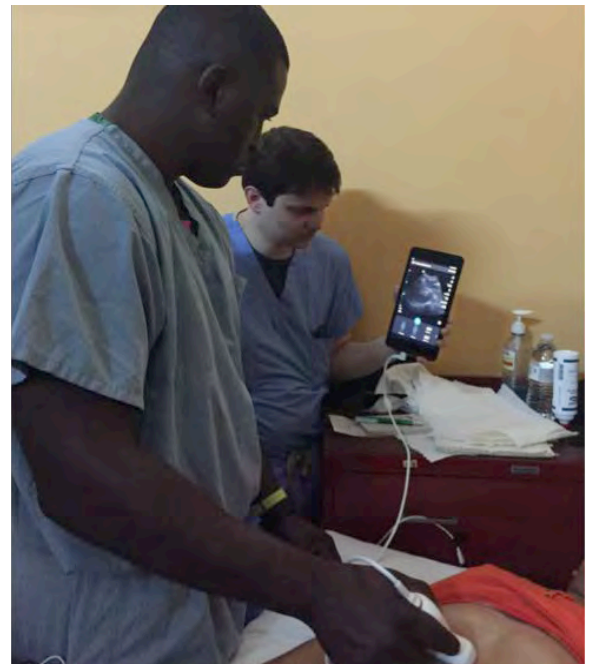
RAD-AID Haiti team giving instructional session and case rounds on plain film radiographs at University Hospital of Haiti in Port-au-Prince in 2015.

Nicaragua

The RAD-AID Nicaragua program brings vital radiology support and training to rural and urban regions of the country, including general ultrasound, women's health, and pediatrics. RAD-AID implemented Picture Archiving and Communication Systems (PACS) for digital imaging and storage at four Nicaraguan hospitals in 2016 with support from Merge Healthcare (an IBM company). This means improving health care for hospitals serving 3 million people and enabling the first-ever computer-based medical systems in Nicaragua. RAD-AID gave funding support to local Nicaraguan radiologists, in partnership with Amos Health and Hope in the Nejapa community, for providing ~665 free ultrasound exams to patients in 2018.



RAD-AID supports ultrasound in collaboration with Amos Health and Hope for Nicaragua and donated over 665 free ultrasound exams in 2018



Ultrasound outreach and radiology education support for Nicaragua.



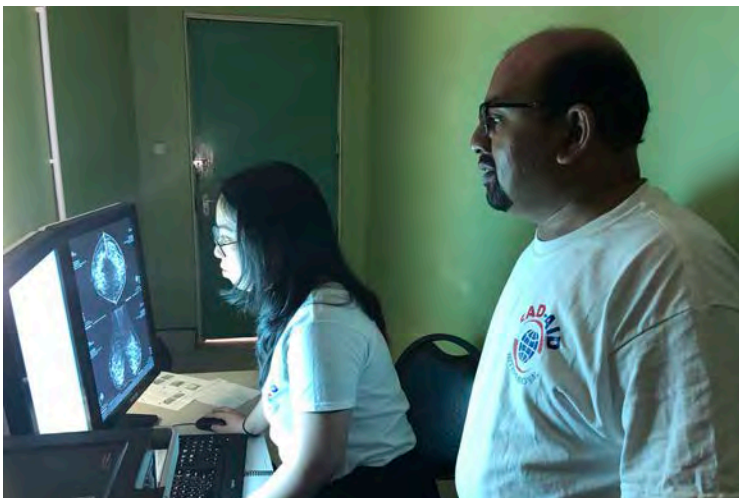
RAD-AID ultrasound education in Guyana, and planning Guyana's first radiology residency program, which launched in 2017.



RAD-AID and Philips' donation of CT scanner at New Amsterdam Hospital in Guyana for RAD-AID's CT and radiology residency training initiative

Guyana

The RAD-AID Guyana Program began in 2013 in partnership with the World Health Organization's Pan American Health Organization (WHO/PAHO). In 2016, RAD-AID donated 2 CT scanners to Guyana at Bartica and New Amsterdam Hospitals, with support from Philips Foundation, and partnered with Northwell Hofstra School of Medicine's RAD-AID Chapter to establish the first radiology residency in Guyana's Georgetown Public Hospital. In 2019, RAD-AID donated and implemented PACS (RAD-AID Friendship Cloud) in collaboration with Google Cloud, Ambra Health, Tribalco, and Society for Imaging Informatics in Medicine (SIIM). RAD-AID's ongoing efforts now also include radiology-pathology instruction, breast imaging, and radiologic nursing in Guyana.



RAD-AID installation and donation of PACS (RAD-AID Friendship Cloud) in Guyana, in collaboration with SIIM, Google Cloud, Ambra Health and Tribalco, in May 2019 to advance tele-teaching and global radiology at Georgetown Public Hospital.



First class of Guyana's radiology residents at 2017 RAD-AID Conference.

Jamaica

RAD-AID Jamaica launched operations in 2016 under the leadership of Dr. Krystal Buchanan of the Yale RAD-AID Chapter. Project activities include multi-institutional Radiology-Readiness Assessments, information technologies assessment, and educational training for radiology residents, technologists, and local health personnel. RAD-AID currently supports radiology development at Kingston Public Hospital, University of the West Indies and Cornwall Regional Hospital.

RAD-AID's mission is to increase and improve radiology resources in the developing and impoverished regions of the world.



Photo of ultrasound training in Jamaica. Renee McDermott, Ultrasound Technologist from Yale RAD-AID Chapter, teaching radiology residents at the University of the West Indies in Kingston and St. Andrew, Jamaica.

Grenada

RAD-AID is building radiology in Grenada through our support of Grenada General Hospital, Spice Isle Imaging Center, Princess Alice Hospital, Princess Royal Hospital, and St. George's University, through projects that include general and obstetric/midwifery ultrasound, radiation safety, emergency radiology services, clinical radiology training, and nursing.



RAD-AID teaching emergency and obstetric ultrasound in Grenada (2019) with support for radiology, midwifery and nursing.

Guatemala

RAD-AID Guatemala has partnerships with Instituto de Cancerología (INCAN) and Hospital Roosevelt in Guatemala City. RAD-AID supports cancer imaging and PACS at INCAN. In 2019, RAD-AID completed a Radiology-Readiness assessment at Hospital Roosevelt, with plans underway to provide educational support across many modalities for the Guatemalan radiology residents at Roosevelt.



RAD-AID Guatemala team at INCAN (led by Mallinckrodt RAD-AID Chapter) in Guatemala City, 2016, assisting radiology training and health information technology development for cancer diagnostics and treatment.

Peru

RAD-AID signed an agreement in 2019 to launch a novel program in Peru linking women's health resources in rural regions of Cusco near the Andes Mountains with tertiary care services in Lima through partnerships with CerviCusco and Instituto Nacional de Enfermedades Neoplásicas (INEN). RAD-AID will provide educational training and imaging resources, such as mammography and ultrasound, with community-based outreach for strengthening referral networks across Peru between primary and specialty care.



RAD-AID visiting CerviCusco in Peru for cancer outreach, nursing and radiology support, 2017



CerviCusco RAD-AID collaborative teaching event in Peru (2018) to develop and launch program linking Lima and rural Peruvian communities for women's health.



RAD-AID delivering ultrasound training to a rural clinic in North Carolina (2019).



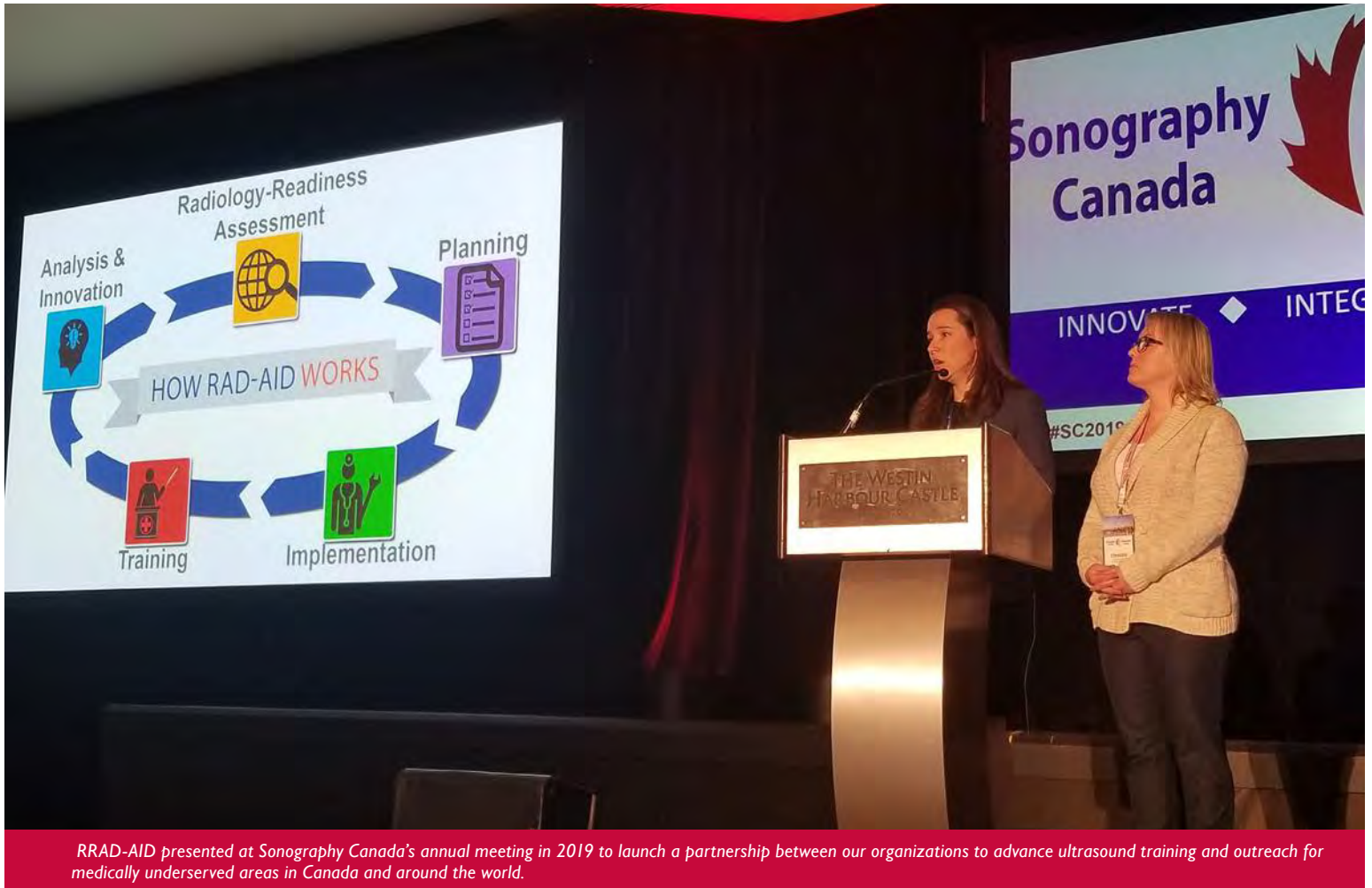
University of Alabama RAD-AID Chapter delivers hands-on ultrasound and procedure training using models and advanced simulators to health care providers in underserved Selma, Alabama (2019)

USA

RAD-AID is rapidly expanding programs in the US for rural and urban regions with health care disparities. RAD-AID's partnership with Breast Care for Washington (BCW) brings mobile mammography services to underserved populations in the Washington DC area that currently lack mammography and lead the US in breast cancer mortality. In Appalachian Virginia, RAD-AID is partnered with The Health Wagon to bring PACS, ultrasound, and x-ray services to rural underserved populations lacking access to advanced medical imaging. In Alabama and North Carolina, RAD-AID has programs in Selma and Piedmont, respectively, to support ultrasound and health IT for family medicine services at rural clinics.



RAD-AID Appalachia team (photo) delivered free ultrasound exams in Wise, Virginia along with donated PACS installation to advance radiology accessibility in the Appalachian regions of the United States in collaboration with the Health Wagon.



Canada

RAD-AID is actively developing programs for northern regions of Canada where health resources are scarce in remote locations. These efforts include geographic information systems GIS research using geospatial computing tools to measure health care disparity, identify isolated populations, and strategize geographic navigation to bring mobile medical outreach to remote regions. RAD-AID is also working with Straightline Aviation and Lockheed Martin on developing hybrid airship technologies for transporting advanced health equipment and services to northern Canadian regions lacking transportation infrastructure. These outreach efforts also include Canadian RAD-AID Chapters and RAD-AID's partnership with the Canadian Association of Medical Radiation Technologists (CAMRT) for jointly increasing medical outreach initiatives within and outside of Canada.

RAD-AID International and Sonography Canada are pleased to collaborate on a program that offers sonographers in Canada the opportunity to contribute to the health care needs of the developing world.



RAD-AID Ethiopia team at Black Lion Hospital, Addis Ababa, in November of 2017.

Ethiopia

RAD-AID's program in Ethiopia was launched in 2015. RAD-AID provides essential MRI, CT, ultrasound, mammography, radiography training to St Paul's Hospital and Black Lion Hospital's residents and staff in Addis Ababa. RAD-AID implemented PACS at Black Lion Hospital in early 2018 with support from Medweb. RAD-AID works closely with Children's Hospital of Philadelphia (CHOP), Emory University, and NYP/Weill Cornell Medical Center (all of whom have RAD-AID chapters) for educational training of radiologists and technologists in Ethiopia. In 2019, RAD-AID initiated its Radiology Business Education program in Ethiopia to train local radiology professionals and administrators in procurement, maintenance and clinical imaging workflow management, which will expand to other international sites in 2019-2020.

Ghana

RAD-AID's program in Ghana began at Korle Bu Teaching Hospital (KBTH) in 2012 and has grown to include installation of PACS in 2013, upgrade of PACS in 2016, and installation of Radiology Information System (RIS) in 2018 with support from Society of Imaging Informatics in Medicine and IBM Watson Health Imaging. These IT operations are integrated with ongoing RAD-AID clinical training and support across many imaging modalities in Ghana, such as MRI, CT, breast imaging, ultrasound, and pediatrics. RAD-AID Ghana is also expanding to other sites, such as Eastern Regional Hospital (Koforidua) and Komfo Anokye Teaching Hospital (KATH).



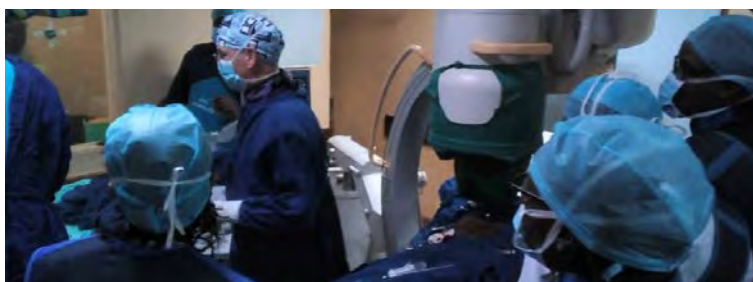
RAD-AID Ghana hosted informatics bootcamp training sessions (photo, 2018) for radiology IT professionals to learn PACS and other vital clinical imaging technology platforms.



RAD-AID supporting interventional radiology in Ghana, September, 2017.

Kenya

RAD-AID's work in Kenya focuses on breast imaging, interventional radiology and radiation oncology, through clinical support and educational training at Aga Khan University Hospital and University of Nairobi. Through support of educational symposiums and on-site procedure trainings, RAD-AID is helping to increase instructional opportunities for interventional radiologists and breast imaging radiologists in Kenya. RAD-AID Radiation Oncology program is advancing safety, dosimetry, and oncologic treatment planning in Kenya.



RAD-AID Kenya launched interventional radiology (photo, 2019) training and multi-site collaboration for clinical education at University of Nairobi and Aga Khan Hospital



RAD-AID Kenya team teaching ultrasound-guided biopsy and breast imaging in Nairobi, 2018.

Tanzania

RAD-AID's program in Tanzania began in 2015 to help address severe radiology personnel shortages in which Tanzania has nearly 60 radiologists to care for 58 million people. RAD-AID Tanzania includes Arusha, Moshi, Mwanza, and Dar es Salaam. RAD-AID supports advanced cross-sectional imaging via training of radiologists, sonographers, radiation therapists, radiologic nurses, interventional radiology specialists, and radiologic technologists. RAD-AID is



RAD-AID Tanzania team teaching in Arusha.

partnered with the Society of Nuclear Medicine and Molecular Imaging (SNMMI) since 2016 for assisting Aga Khan Health Services. In 2019, RAD-AID coordinated inter-institutional partnerships in Tanzania for nursing and radiology residency rotations, such as Kilimanjaro Christian Medical Centre (KCMC) to advance the career development of Tanzania's future-radiologists.



RAD-AID Tanzania team teaching in Moshi (2017), developing partnered radiology training of radiology residents and medical imaging professionals in Arusha, Dar es Salaam, Mwanza, and Moshi.

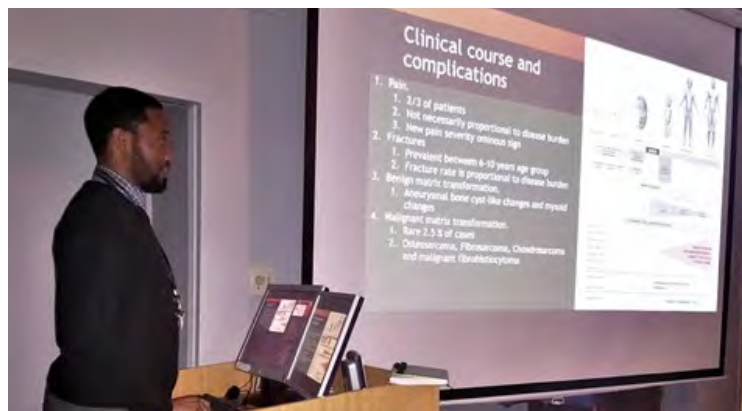
Malawi

The RAD-AID Malawi program was launched by the RAD-AID Chapter at University of North Carolina, with our Radiology-Readiness assessment data showing a significant need for training radiologists, technologists and sonographers. Malawi has fewer than five radiologists serving over 18 million people with no in-country training programs to boost capacity. Therefore, the

RAD-AID Malawi program supports training of medical imaging professionals and gives scholarship support for physicians in need of training. RAD-AID currently teaches technologists and MDs at Malawi College of Health Sciences, Kamuzu Central Hospital, and Partners in Hope, located in Lilongwe.



Teaching radiologic techniques and safety in Malawi (Source: University of North Carolina RAD-AID Chapter) at Radiography Programme at Malawi College of Health Science



RAD-AID sponsors and supports physicians from Malawi (photo) to receive formal diagnostic radiology training so that we can address Malawi's severe scarcity of radiology professionals.

RAD-AID began in 2008 to answer this need for more radiology and imaging technology in the resource-limited regions and communities of the world.

Cape Verde

The RAD-AID Cape Verde Program began in 2013. Cape Verde is a nation of 10 islands having 500,000 people off the coast of West Africa. Having little or no local educational infrastructure for radiology professionals, RAD-AID teams focus on ultrasound and radiography at imaging and primary care centers, including São Filipe Regional Hospital and Mosteiros Hospital.

RAD-AID has numerous programs throughout the world. We welcome you to participate!



Reviewing x-ray radiographic image interpretation, RAD-AID Cape Verde.

Morocco

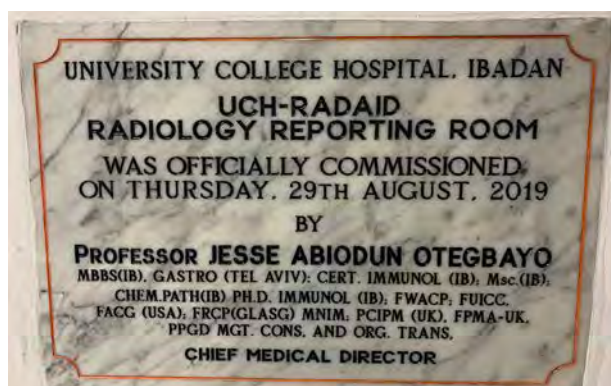
The RAD-AID Morocco program began in 2016, with great support and leadership from the University of Texas Health McGovern RAD-AID Chapter, with outreach projects including mobile radiology in collaboration with Moroccan Association for the Protection of Health, as well as PACS, image quality, medical physics, safety, and clinical radiology education at Ibn Sina Hospital in Rabat. Our approach in Morocco combines education at tertiary academic centers and rural community outreach.



The RAD-AID team in Morocco (2019) combined educational radiology at Ibn Sina Hospital in Rabat with mobile radiology outreach in rural Moroccan communities.

Nigeria

Nigeria's population of 186 million people has an estimated 250-300 radiologists, fiftyfold fewer than the US per capita, with large gaps in radiology equipment and health IT resources. Since 2016, RAD-AID's program in Nigeria has supported the education of radiologists, technologists and nurses at Lagos University Teaching Hospital (LUTH). In 2019, RAD-AID installed a donated PACS (RAD-AID Friendship Cloud) at University College Hospital in Ibadan, which will advance tele-teaching, remote consults, and IT expansion.



RAD-AID installed PACS at University College Hospital (2019) in Ibadan, Nigeria, and UCH named the new reading room after RAD-AID.



RAD-AID Nigeria team teaching CT-guided biopsy techniques at Lagos University Teaching Hospital (LUTH) in 2017.

Liberia

The RAD-AID Liberia program started in 2009 at JFK Memorial Hospital, which we then expanded to also include Redemption, ELWA, Phebe, and JFD-Tappita Hospitals in 2017. Through a robust partnership with Mount Sinai Medical Center (NY) and the World Bank, RAD-AID is helping to build the Liberian health care workforce through dedicated training of radiology professionals in our partner hospitals. These efforts include specific support for radiography, CT, interventional radiology procedures, ultrasound and radiology residency curriculum development.



RAD-AID Liberia: providing training to radiologists and technologists via near-continuous rotation of RAD-AID teams for on-site education of local staff and national curriculum development.



Educational demonstration of ultrasound by RAD-AID Team in Liberia (2017).



RAD-AID South Africa team, conducting interviews in Cape Town and Western Cape medical institutions in 2016 for strengthening radiology development and health service delivery.

South Africa

RAD-AID's program in South Africa launched in 2016 in conducting Radiology-Readiness Assessments at multiple health institutions in Western Cape, including urban and rural settings. Ongoing efforts include radiology training, information technologies and mobile health outreach strategies. In 2017-2018, RAD-AID initiated Geographic Information Systems (GIS) research for advanced mapping of health care disparities in parallel with infrastructure features (roads, airports, railroads, etc.,) in the Limpopo region. GIS enables RAD-AID to propose specific radiology and health care solutions that may help address essential shortages of medical services and overcome transportation gaps with aircraft and automotive mobile health outreach.

Jordan/Middle East

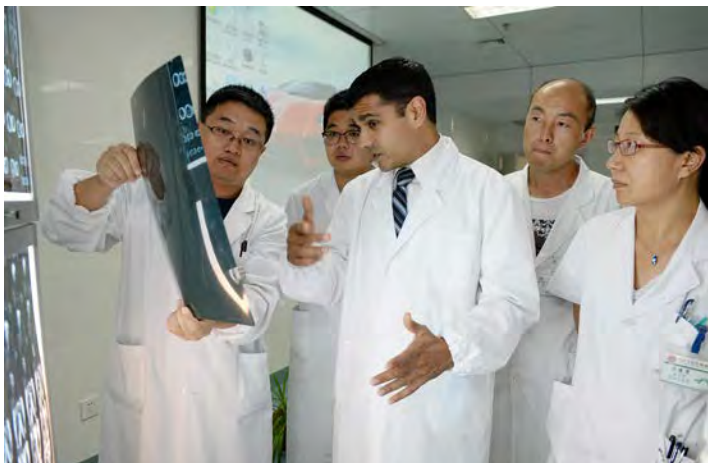
Over six million refugees have been displaced by the last decade of turmoil and conflict in the Middle East. Refugee camps and health care centers have been set up to help refugees, often afflicted by a wide range of diseases and conditions in need of medical support such as pregnancy, obstetrics, pediatrics, infections, and trauma-care. RAD-AID is helping to address this humanitarian crisis by providing radiology support to refugee camps, such as a collaboration with Syrian American Medical Society in Jordan. For example, RAD-AID is providing ultrasound imaging for refugee healthcare at Za'atari refugee camp in Jordan, and we aim to further increase the radiology resources at sites needing urgent care for displaced populations.



RAD-AID is supporting the development and implementation of radiology at Za'atari refugee camp (photo) in Jordan in efforts to help address the refugee health crisis.

Nepal

The RAD-AID Nepal program began in 2014 at Tribhuvan University Teaching Hospital in Kathmandu, and expanded via RAD-AID's Disaster Response team in the aftermath of Nepal's earthquake in 2015. In 2016, RAD-AID donated and implemented PACS at three institutions with supportive radiology education running in parallel. RAD-AID launched a partnership with Hospital and Rehabilitation Centre for Disabled Children (HRDC) in Nepal in 2018 to advance Nepal's pediatric radiology, ultrasound and musculoskeletal imaging, in addition to presenting the RAD-AID Nepal Program at the United Nations Civil Society Conference in 2019. RAD-AID Nepal's 2019 project mission included the advancement of PACS and ultrasound education at partner institutions in Kathmandu.



RAD-AID China Cancer Care Initiative, with radiation oncology and therapists, in collaboration with ASRT Foundation; Yinchuan, China in 2015.

Bhutan

The RAD-AID Bhutan program began in 2014 in collaboration with faculty from George Washington University Medical Center and the World Health Organization. Bhutan has only one CT scanner serving a population of 750,000 scattered by large distances of mountainous terrain. RAD-AID sponsored Radiology-Readiness assessments in Bhutan in 2015 and 2016, showing large gaps in imaging technology and substantial needs for CT, ultrasound and radiography education. Ongoing efforts in Bhutan are focused on educational efforts and modernization of imaging infrastructure.



RAD-AID teaching clinical ultrasound in Nepal in 2018.

China

RAD-AID's program in China sustained radiology and radiation-oncology capacity-building efforts in Yinchuan from 2010-2018. Our program successfully achieved its collaborative milestones, and has now transitioned to the Chinese partner institutions for self-management and sustainability. We thank our partner hospitals in Yinchuan for collaborating with RAD-AID for over eight years to advance radiology and radiation-oncology for the medically underserved in China.



RAD-AID Bhutan Program for modernizing imaging infrastructure and analyzing clinical use of radiology for broad-based health care.



Line of patients outside PGIMER Chandigarh RAD-AID mobile women's health clinic, Asha Jyoti ("Ray of Hope").

India

RAD-AID's work in India began in 2010 with the establishment of Asha Jyoti ("Ray of Hope" in local Punjabi language) in the innovation of a specially designed mobile women's health clinic for osteoporosis, breast cancer and cervical cancer screening of marginalized women in Northern India. Surpassing the targets set by RAD-AID and the partner hospital (PGIMER Chandigarh), Asha Jyoti has now delivered care to over 20,000

women, and has established a model for mobile screening and treatment referral in India. RAD-AID is also now conducting outreach activities in the Maharashtra province in the Mumbai region for breast imaging and breast cancer screening.



Patients waiting for PGIMER Chandigarh RAD-AID mobile women's health clinic, Asha Jyoti ("Ray of Hope") in Northern India



RAD-AID Laos program, teaching pediatric radiographic techniques and interpretation at Lao Friends Hospital for Children (LFHC) in 2015.

Laos

The RAD-AID Laos program assists the development of new radiology for Lao Friends Hospital for Children (LFHC), which opened in 2015. RAD-AID sends regular teams to train and support the radiology department in the hospital, particularly for ultrasound and x-ray radiography services that never existed before in the hospital. In October 2015, RAD-AID implemented the first PACS system in the country at LFHC, providing digital imaging and radiology exam storage for the hospital. RAD-AID donated a new ultrasound unit to LFHC, and advanced the radiology protocols and ordering systems for the hospital. For these accomplishments, RAD-AID won the Healing Asia Award from LFHC's NY-based foundation, Friends Without A Border in April 2017. In 2018, RAD-AID expanded PACS and initiated new CT support for LFHC and the adjacent government hospital, Luang Prabang Provincial Hospital (LPPH), and upgraded LFHC's PACS to a RAD-AID Friendship Cloud system in partnership with Google Cloud, Ambra Health, Tribalco and SIIM.



RAD-AID providing neonatal ultrasound training at Lao Friends Hospital for Children (LFHC) in August, 2017.



RAD-AID Laos program, teaching ultrasound techniques: (source: RAD-AID/ASRT Foundation Technologist Fellowship recipient)



RAD-AID working in Kazakhstan in support of the radiology department at Kazakh Institute of Oncology & Radiology (KazIOR).

Kazakhstan

RAD-AID launched a program in Kazakhstan in 2016 at Kazakh Institute of Oncology & Radiology (KazIOR) in Almaty, Kazakhstan. RAD-AID's efforts in Kazakhstan are focusing on transitioning from post-Soviet training models for radiology residents, and increasing educational resources for CT, MRI, and x-ray radiography. In 2019, RAD-AID initiated educational support for PET/CT imaging in Kazakhstan to advance resources for oncologic diagnostics and treatment-management.



RAD-AID working in Kazakhstan in support of the radiology department at Kazakh Institute of Oncology & Radiology (KazIOR).

Albania

The RAD-AID Albania program launched operations in November of 2017, starting with a Radiology-Readiness Assessment in Tirana, Albania. Albania currently has large gaps in diagnostic imaging and screening due to insufficient staff training and equipment. There is no national breast cancer screening mammography program in Albania. RAD-AID is working to strengthen radiology training and screening programs. .



RAD-AID Albania program, working in Tirana, in November of 2017



RAD-AID breast imaging demonstrations and trainings in Albania.



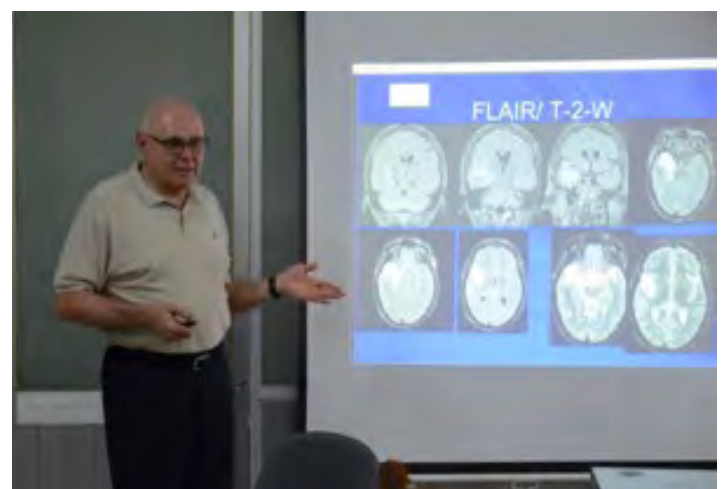
RAD-AID provided lectures, case-based, and demo trainings in Vietnam on diagnostic and interventional radiology in 2019

Vietnam

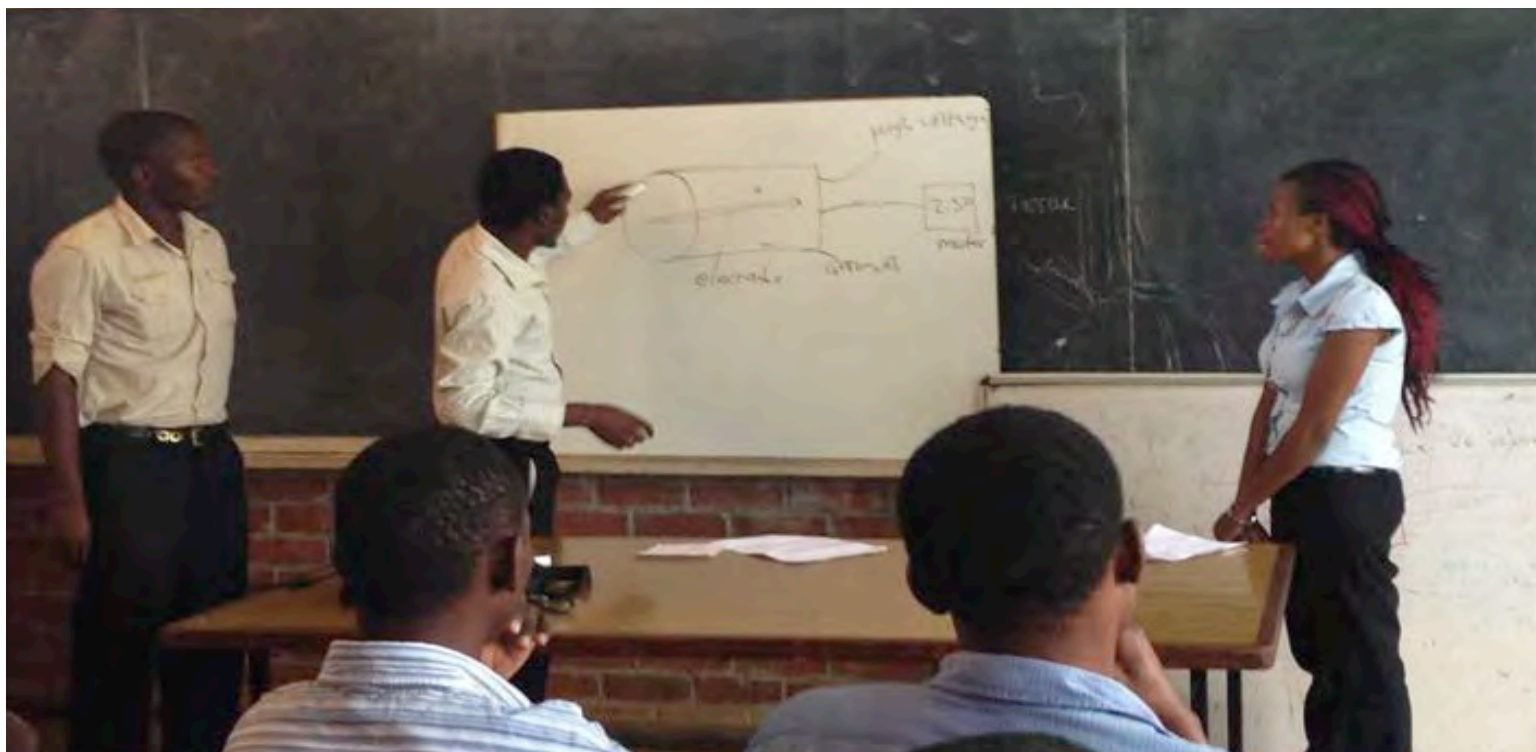
RAD-AID launched a program in Vietnam in 2017 via support from the RAD-AID Mayo-Jacksonville chapter. The program is currently based at Da Nang General Hospital and Hue University Hospital. RAD-AID goals include radiology education for interventional radiology and neuroradiology, as well as support for PACS and health informatics.



RAD-AID Vietnam team is focusing on interventional radiology, neuroradiology and imaging informatics.









RAD-AID team in Vietnam teaching neuroradiology, 2017.



RAD-AID Malawi team teaching radiographic techniques in Lilongwe, Malawi (Source: University of North Carolina RAD-AID chapter)

Education and training constitute the cornerstone of RAD-AID's effort to build in-country radiology capacity for health care in medically underserved regions. RAD-AID has several key interlocking, synergistic and complementary forms of education that form a well-rounded approach:

-  **On Site** in-country RAD-AID teams performing hands-on training to local personnel
-  **Online learning** via the **RAD-AID Learning Center** and learning management system to provide pro bono internet-based didactic educational content
-  **RAD-AID textbook**, “**Radiology in Global Health**,” second edition, which was published in 2018.
-  **Global Health Radiology Certificate of Proficiency** is a successful program launched by RAD-AID in 2015 providing semester based courses led by RAD-AID's Chief Operating Officer, including lectures, discussions and project mentorship. The course results in a certificate of proficiency from RAD-AID in global health radiology disciplines.
-  **Medical Student Global Health Education** program at RAD-AID offers an online course so that students may receiving comprehensive radiology global health training to earn the RAD-AID Global Health Radiology Medical Student Training Certificate, and then complete fieldwork in our teams to become a RAD-AID Global Health Radiology Medical Student Scholar.
-  **RAD-AID Chapters Network**, now consisting of 77 Canadian and US-based academic radiology institutions, receives project support, funding, and educational webinars from RAD-AID in support of radiology residents, faculty, students, and technologists to boost global health projects in underserved and international settings.



RAD-AID Haiti team teaching radiographic imaging techniques and protocols at University Hospital of Haiti, Port-au-Prince, 2015.








RAD-AID team, teaching ultrasound, Port-au-Prince, Haiti.



RAD-AID leads health IT and radiology informatics training bootcamps and workshops for in-country IT specialists to learn PACS and other vital medical imaging platforms (photo: Tanzania, 2019).

RAD-AID's data driven model requires robust attention to data collection, analysis, and planning. This model includes:

-  Radiology-Readiness Assessments for optimizing radiology at the facility-level in planning RAD-AID programs
-  Country Reports for analyzing general national health care needs and systemic features in developing countries.
-  RAD-AID Conference – a unique international radiology forum (annual since 2009 and now in its 11th year, co-sponsored by the World Health Organization in Washington DC).
-  Sub-specialty assessment tools have been added to our general Radiology-Readiness tool, such as interventional radiology, informatics, nursing, radiation-oncology, breast imaging, equipment planning and more, along with translation into four languages.
-  At the time of this writing, new RAD-AID programs in development include Rwanda, Bangladesh, Benin, Indonesia and Mozambique.

RAD-AID builds an organizational culture that inspires creativity, drives innovation, and rewards perseverance. Always persevere.

ANNUAL RAD-AID CONFERENCE: 11 YEARS



Annual RAD-AID Conference in main hall at World Health Organization, Pan American Health Organization (WHO/PAHO) regional headquarters in Washington DC.

Although there are numerous conferences on medical imaging and radiology for radiology professionals held throughout the year, there was never one dedicated forum for global outreach and international radiology development. To answer this need, the RAD-AID Conference was formed at Johns Hopkins in 2009 and was run on an annual basis every year since. The RAD-AID Conference has increased attendance by about 500% since the founding, now

regularly attended by over 300 participants and hosted by the World Health Organization. The conference is essential for RAD-AID as a central insight and vision-formation event that sets the plans in motion for the following year. The Conference is routinely scheduled for the first Saturday in November, and coincides with the International Day of Radiology (IDoR) in early November.

RAD-AID's management team consists of three key components to bring the best talent, experience and expertise to the development of RAD-AID programs: Operational, Regional and In-Country Leaders.

INTERDISCIPLINARY INITIATIVES

Informatics & Health IT

RAD-AID implemented digital radiology, health IT and PACS in over 9 countries, and provides advanced training on medical software applications to low-resource hospitals.

Nursing

Nursing is vital for radiology such as prenatal ultrasound, emergency triage for trauma imaging, CT patient safety, and nurse-practitioners' primary care. RAD-AID integrates best-practice nurse education into radiology outreach for low-resource health care capacity building.

Interventional Radiology

RAD-AID supports interventional radiology training for fellowship programs and hospitals in Guyana, Nicaragua, Ethiopia, Ghana, Tanzania, Vietnam, Kenya, and Nigeria,

Radiation Oncology

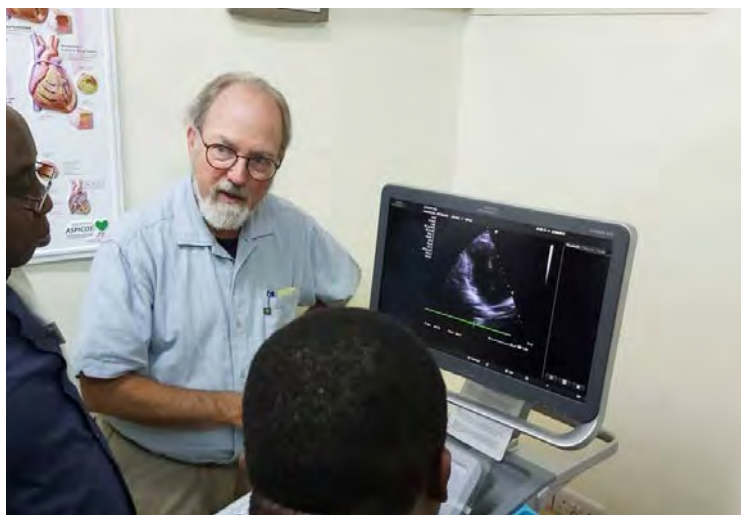
RAD-AID offers a broad range of checklists and tools for helping our partner sites to procure and manage radiology equipment, for increasing quality, safety, and efficiency.

Equipment Planning

RAD-AID's medical physicists work in our teams to optimize radiology image quality, accuracy, and patient safety.

Business Education

RAD-AID implemented a business education program in 2019 with a comprehensive curriculum for training in-country radiology managers, leaders and administrators, on such topics as workflow management, human resources, operations, marketing, finance and more.



RAD-AID ultrasound instruction and training at Kilimanjaro Christian Medical Centre, 2019)



RAD-AID provides emergency-response training for radiology staff and residents to maximize patient safety during imaging procedures (Guyana, 2018).



RAD-AID is collaborating with Bayer to provide IV contrast training and CT safety education for high quality imaging and patient care.

RAD-AID is about the holistic vision of radiology. Not just the equipment but also the people and all of the other resources that go into making radiology effective.

Partnerships play an essential role in RAD-AID's efforts to form well-rounded approaches to international health and public service. RAD-AID's partnerships include a vast system of contractual and Memorandum of Understanding (MOU)-based relations with international hospitals and academic centers. Our partnerships are also in place with professional societies and nonprofit organizations to implement collaborative outreach goals.

One key area of partnership is the radiologic technologist community, which comprises 65% of RAD-AID's volunteers. RAD-AID formed robust partnerships with ASRT Foundation (US-based technologists), Society and College of Radiographers (SCoR, UK-based technologists), Sonography Canada, and the Canadian Association of Medical Radiation Technologists (CAMRT). These partnerships give outreach opportunities to radiology professionals seeking to help underserved regions of low-resource countries. Moreover, by bridging these organizations through RAD-AID teams, we foster an international team spirit and mix of skills necessary for being impactful in the developing world. These partnerships with technologist organizations integrate effectively with RAD-AID's physician partner societies, including ACR, RSNA, and ISR.

In 2016, RAD-AID launched an MOU-based partnership with Society of Nuclear Medicine and Molecular Imaging (SNMMI) to support the Hyman-Ghesani RAD-AID SNMMI Global Health Scholarship, adding nuclear medicine radiology capacity to Tanzania by sending residents and faculty to teach and work at Aga Khan Health Services in Tanzania.

In 2019, RAD-AID launched a partnership with Breast Care for Washington (BCV) to bring mobile mammography to underserved women in the Washington DC area.

In 2017, RAD-AID established an MOU-based partnership with Society for Imaging Informatics in Medicine (SIIM) to create the Global Ambassador Program sending health IT specialists on RAD-AID teams to implement informatics software in low-resource medical imaging facilities, and train in-country informatics professionals on Picture Archiving and Communication System (PACS), Electronic Medical Records (EMR), Radiology Information Systems (RIS) and other IT applications.

RAD-AID has created, coordinated, and led public-private partnerships to integrate technologies, education, innovation and health care in philanthropic service to poor and underserved regions. These efforts bring together robust sources of expertise from public and private sectors to help low-resource regions via such innovative programs as RAD-AID Asha Jyoti for mobile cancer screening in India, CT and MRI development in Africa and South America, artificial intelligence-enhanced mobile outreach in the US, and aircraft-based mobile clinics for remote locations. This range of community service philanthropic initiatives include such collaborators as Philips, Bayer, Siemens, Hologic, IBM, Mentice, Quest Diagnostics, SonoSite, MedWeb, Ambra Health, Aperian Global, Google Cloud, ConexSys (HI-IQ), Straightline Aviation, Tribalco, Matthews Specialty Vehicles, Lockheed Martin, Butterfly, Koios, MD.ai, and many more.



RAD-AID establishes important partnerships to build radiology capacity in medically underserved communities, such as launching mobile mammography with Breast Care for Washington (BCV) in DC (2019).

RAD-AID is partnered with the Association for Radiologic & Imaging Nursing (ARIN). ARIN members contribute vital roles on RAD-AID's interdisciplinary teams in order to provide training and deliver support to medically underserved communities.

In 2018, RAD-AID announced MOU-based partnerships with Intellos and Sonography Canada to expand ultrasound training for personnel in underserved areas. RAD-AID also established a joint program with Society of Interventional Radiology (SIR) to give SIR members opportunities to serve on RAD-AID Interventional Radiology teams. In 2019, RAD-AID launched and developed collaborations with private practice radiology organizations such as vRad and Envision Physician Services to team up with leading radiology and medical practice groups in RAD-AID's global health initiatives.



Partnerships with health institutions across the world create our network of collaborations to build radiology and global health outreach initiatives, such as this partnership with Georgetown Public Hospital in Guyana (photo, 2019).



RAD-AID CHAPTERS NETWORK

The RAD-AID Chapters Network launched in 2012 and gives US and Canadian academic medical centers the ability to form RAD-AID chapters approved by the Chairs of the respective radiology departments. This grass-roots horizontal approach gives residents, faculty, staff, nurses, and technologists at these centers the ability to organize their own projects and strategies while benefitting from scale, efficiencies, and funding from RAD-AID's global organization. The RAD-AID Chapters Network grew to 7 institutions in 2013, 25 chapters in 2014, 53 institutions in 2016 and 77 chapters by early-2019.

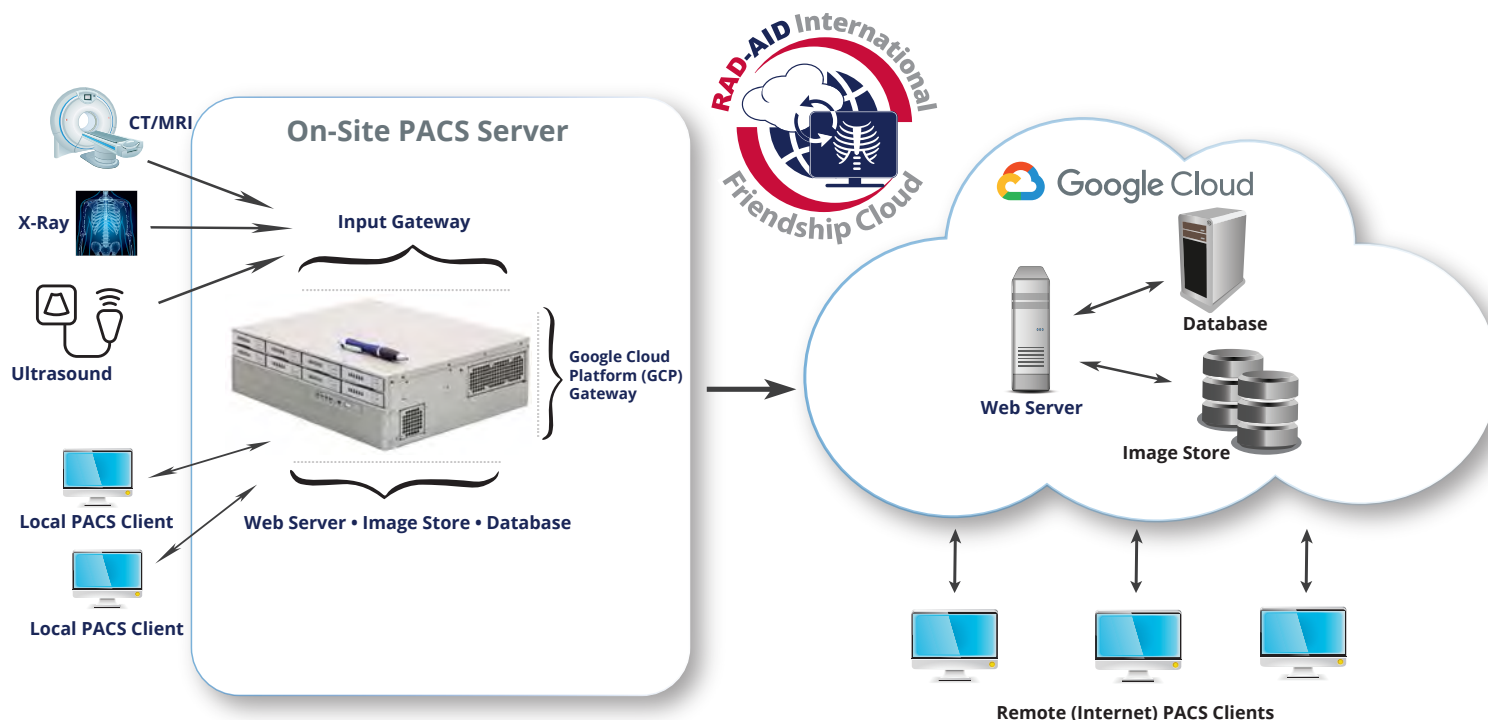
Some chapters have helped formed new RAD-AID programs, such as Weill Cornell in Ethiopia, University of Virginia in Appalachia (USA),

Northwell Health in Guyana, UTHealth McGovern in Morocco, University of Wisconsin (UW) in Nicaragua, and University of North Carolina in Malawi. Other chapters have provided key support to broad RAD-AID programs with rotating volunteers, such as Tufts, University of Pittsburgh, Columbia, and UC Davis in RAD-AID Haiti; SUNY Downstate in RAD-AID Informatics and Ghana; UNC and UW in Nepal; University of Pennsylvania RAD-AID in Tanzania, and Columbia's chapter actively supporting RAD-AID Liberia and the RAD-AID India Women's Health program. The RAD-AID Chapters Network has the yearly Chapters Roundtable Meeting immediately following the RAD-AID Conference, as a governance forum to discuss ways to improve chapter activities and expand opportunities for project development



US/Canada Chapters





RAD-AID blends charity, public service and technology innovation to push the envelope of what radiology can bring to the world. Integrated into our numerous teams working in hospitals all over the world, our innovations are driving our vision for the future. RAD-AID is developing new ways of bridging PACS and artificial intelligence (AI) for low-resource regions by working on advanced architectures for cloud and local servers that can advance image storage, retrieval, and analysis so that these technologies help settings that currently lack skilled personnel and IT infrastructure.

We are introducing and teaching AI applications so that low-resource hospitals can participate in the emergence of AI-based radiology. For example, in 2018 RAD-AID launched the RAD-AID Friendship Cloud, a novel turn-key compact system integrating secure on-site server, cloud platform and PACS, in partnership with Google Cloud, Ambra Health, SIIM, and Tribalco, for delivering health IT and radiology software to low-resource hospitals.

Installations of RAD-AID Friendship Cloud in 2018-2019 included Laos, Nigeria and Guyana, with numerous other sites in the pipeline for 2019-2020. In 2019, we launched partnerships with multiple AI entities, including Koios and MD.ai to teach and demonstrate AI's potential impact on future patient-care and clinical workflows.

We welcome you to become part of RAD-AID as a growing global organization of advocates for medical technology in poor and developing countries.

RAD-AID Mobile Health brings radiology to those in need via transport vehicles for overcoming geographic, infrastructural, and sociocultural barriers. In 2012, RAD-AID launched Asha Jyoti for cancer screening to marginalized women in India. In 2016, RAD-AID announced a novel partnership with Straightline Aviation to build the first medical airship with deployable container-based clinics, designed to reach remote areas that lack transportation infrastructure. In mid-2017, RAD-AID deployed assistance teams to The Health Wagon in Appalachia, Virginia, for rural underserved in the United States. In 2019, RAD-AID donated a mobile mammography vehicle to Breast

Care for Washington, to launch a partnership bringing breast cancer screening and diagnostics to the medically underserved communities of Washington DC.



RAD-AID Mobile Health designs and implements mobile solutions to overcome health care disparities, including truck-based clinics



RAD-AID is partnered with The Health Wagon for radiology capacity-building in Appalachian region of Virginia, including mobile outreach, low-resource rural medical facilities, and Remote Area Medical (RAM) free-clinic events.



In 2019, RAD-AID launched a partnership and mobile mammography program with Breast Care for Washington for community-based breast cancer screenings in medically underserved areas in and near Washington DC.



As a partnership between RAD-AID and PGIMER Chandigarh, Asha Jyoti has given medical care to over 19,500 women since 2012

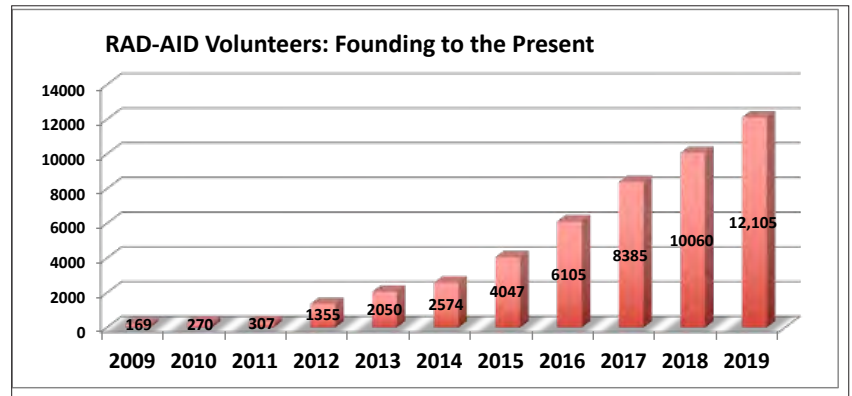
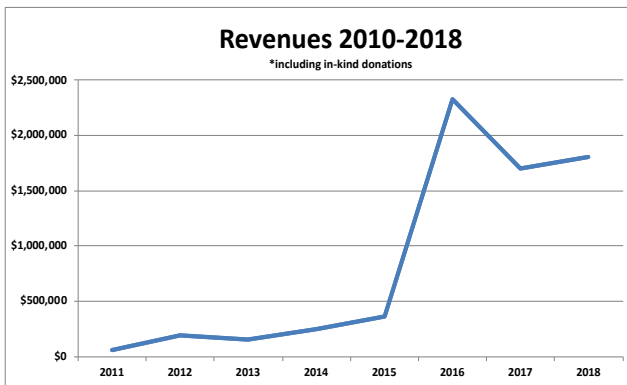


RAD-AID Medical Airship photo based on collaborative trip with Lockheed Martin to Ghana, 2017

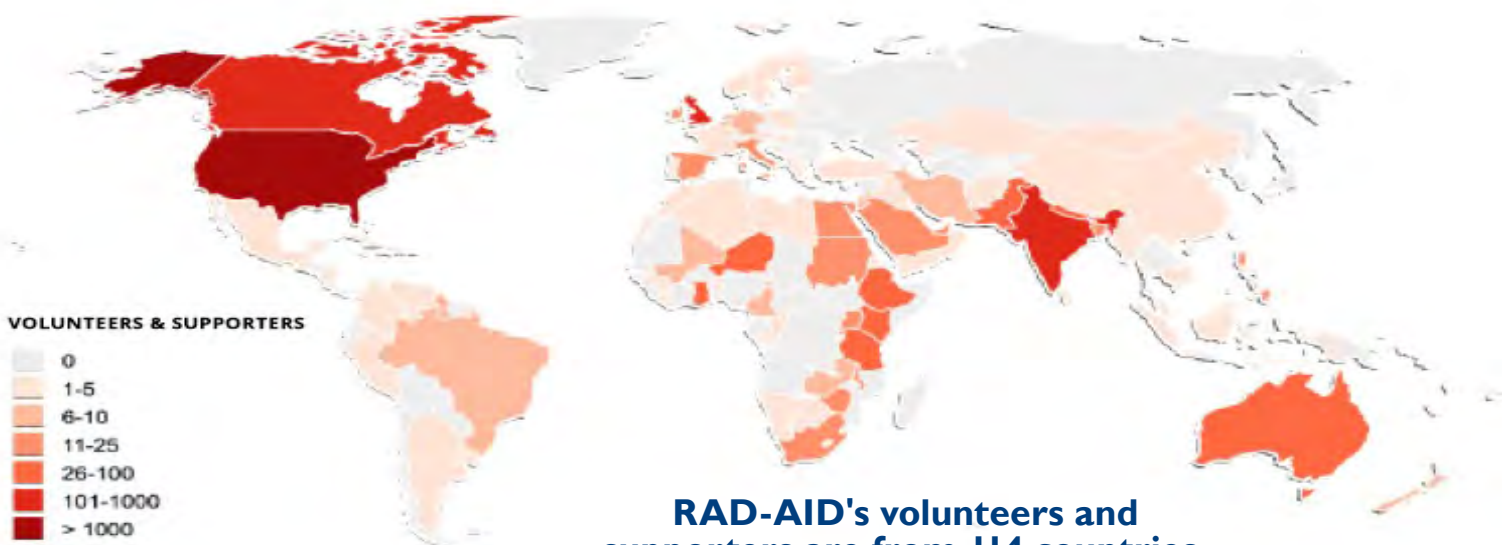
Every year since 2017, RAD-AID's volunteers donated over 25,000 hours of pro bono work for radiology capacity building in the developing world, valued at close to \$1.3 million of in-kind labor support. Since our inception, RAD-AID has contributed over \$8.1 million in donated equipment, grants and personnel-time to the underserved regions of the world.

Our administrative portions of expenses remain under 15% of revenues, achieving the best standard for nonprofit resource utilization.

The composition of RAD-AID's volunteers has been approximately 53% US, 9% Canadian, 8% UK, 6% Continental Europe and Australia, and 24% from African, Latin American and Asian low and middle-income countries (LMICs), which means we have achieved a strong diversification of our organizational community and opened great opportunities for international collaboration. RAD-AID's Management Team is diversely composed of ~50/50 men and women, and offers outstanding leadership tracks plus mentorship for our growing organizational volunteers and contributors.



RAD-AID INTERNATIONAL
is a GuideStar Exchange Gold Participant



RAD-AID's volunteers and supporters are from 114 countries.

Conclusion and Thank you!

We hope this 2019-2020 report from RAD-AID has been informative as an overview of our progress and efforts to help radiology across the world. 4 billion people have little or no access to radiology. This means RAD-AID has a lot of work to do, and we are inspired by the contributions from our volunteers and supporters. Having begun as a handful of supporters, the organization has grown in scale to surpass 11,000 while staying true to our fundamental mission and core strategy that interlocks data analysis, systematic program development, education, and on-site team presence. This approach yields a long-term sustainability that always emphasizes the building of in-country local radiology capacity. More importantly, our strategy is founded on a spirit of hope and charity to improve the world.

We thank you for taking the time to learn about our programs. This review only scratches the surface of the complex and inspiring challenge of bringing advanced radiology imaging to resource-limited and poor countries of the world. Radiology is fundamental for all aspects of medicine, including surgical planning, trauma, cancer staging and care, obstetric prenatal services, pneumonia/TB diagnosis, and cardiovascular management. Without radiology, health care systems across the world have numerous gaps that crack the chains of effective health care delivery. RAD-AID answers this call to meet those needs and serve the world.



A Nonprofit Public Service



RAD-AID.org

Radiology serving the world



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