

# IMPROVING ACCESS TO PEDIATRIC ULTRASOUND IN MALAWI

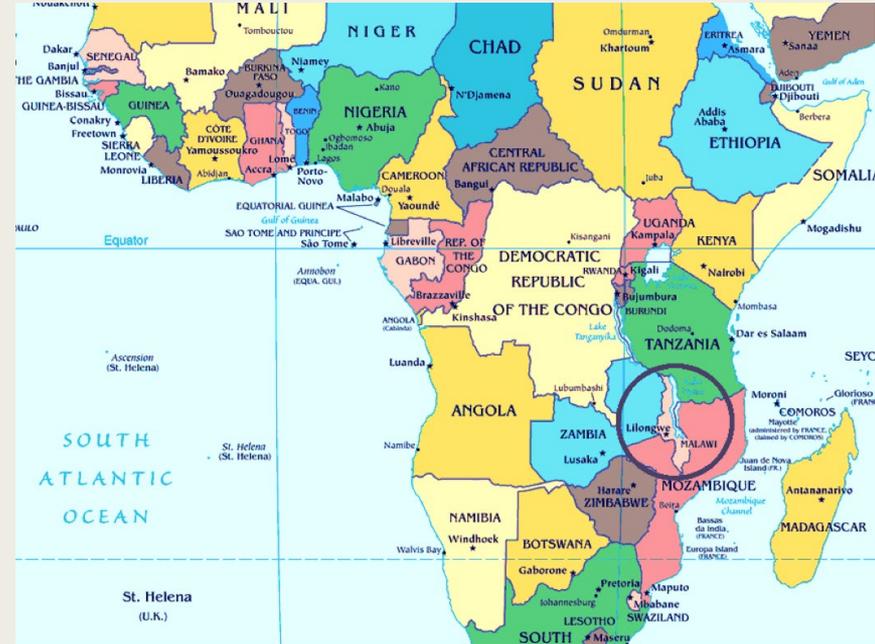
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# Brief Introduction to Malawi

- Malawi is a landlocked country in southeast Africa
- Malawi has one of the lowest GDP/capita rates in the world, although this is improving
- Malawi has one of the highest rates of HIV/AIDS in the world
- Endemic for other infectious diseases such as malaria, TB, schistosomiasis, yellow fever, typhoid, hepatitis A, rabies
- Malawi ranks 185/190 in the WHO report of health systems development. Mix of private and public hospitals



# Kamuzu Central Hospital

- KCH is a tertiary public hospital in the country's largest city, Lilongwe
- Approximately 600-1,000 beds, although the hospital is almost always above capacity
- Estimated 70% of admissions are related to infectious disease/HIV-related illness
- Equipment currently includes one stationary US machine with ECHO capabilities (Mindray) and two portable Sonosite machines, one of which includes ECHO capabilities



# Radiology Needs Assessment

- A pediatric death audit study at KCH reviewing data from 2014-15 demonstrated that 14.6% of patients whose deaths were reviewed had delays of greater than 24 hours in obtaining radiology studies
- Surveys and brief interviews were performed to gauge pediatric providers perceptions regarding the use of bedside ultrasound in pediatric acute care at KCH. Challenges identified by local clinicians:
  - Rotating consultants (some use POCUS, some do not)
  - Limited access to formal diagnostic imaging (CT, US) and/or specialty imaging (echo)
  - Accessibility of portable ultrasound machine
  - No formal training in using an ultrasound machine
  - Limited time for education or training when added to normal work requirements
  - Compensation for learning
  - No opportunity for reciprocal exchange or visiting a setting where this skill is used

# RAD-AID Malawi Initiatives

- Partnership between RAD-AID, UNC RAD-AID Chapter, and KCH started in 2013 after a radiology readiness assessment was completed
- Goals of RAD-AID include improving technical skill and curriculum of local sonographers, improving patient (specifically pediatric) access to ultrasound exams
  - Identified a cohort of learners of which to provide longitudinal mentorship to adapt and manage the needs of the local healthcare environment
  - Ensure sustainability of intervention by qualifying learners to have ability to train future technologists
- Partnership between RAD-AID and Malawi Children's Initiative began in 2019. The first volunteers traveled in August-December 2019
  - Focus of utilizing imaging in critically ill patients in pediatric wards, training clinical officers and radiographers in pediatric POCUS

Kamuzu Central Hospital pediatric ultrasound competency check list

Sonographic Procedures	Self evaluation	Date	Observer evaluation	Date	Notes
<b>Abdomen</b>					
Aorta					
IVC					
Pancreas					
Bladder					
Kidneys/Adrenal glands					
Liver					
Gallbladder/CBD/Biliary tract					
Spleen					
Main portal vein					
Hepatic veins					
Hepatic artery					
Aortic branches					
Renal vasculature					
Splenic vasculature					
<b>Superficial Structures</b>					
Scrotum and Testicle					
Scrotal hernia					
Thyroid					
Abscess					
Solid Mass					
Lymph nodes					

Cardiac		
PLAX	4	2019
PSAX	4	2019
Apical 2,3,,4,5 Chamber	3	2019
Subcostal	3	2019
Supra Sternal Notch	2	2015
PDA	3	2018
ASD	4	2019
VSD	5	2019
Ejection Fraction	4	2019
Pericardial effusion	5	2019

Gynecology (transabdominal)			Cardiac		
Uterus			PLAX	4	12/13/2019
Ovaries			PSAX	4	12/13/2019
<b>General</b>			Apical 2,3,,4,5 Chamber	4	12/13/2019
Abdominal wall			Subcostal	4	12/13/2019
Ascites			Supra Sternal Notch	3	12/13/2019
Appendicitis			PDA	3	12/13/2019
Intussusception			ASD	5	12/13/2019
Necrotizing Enterocolitis			VSD	5	12/13/2019
Pylorus			Ejection Fraction	4	12/13/2019
Malrotation			Pericardial effusion	5	12/13/2019
Neonatal Head					
Spinal canal content					
eFAST					
FASH					
Abdominal lymph nodes					
Pleural effusion					
Pneumonia					
Hernia-inguinal					

<b>Musculoskeletal</b>					
Infant Hip					
Hip effusion					

Stated desire to work on ECHO during the month and came to  
 Had one good learning case of PDA during the month

# 2019 Didactic Curriculum Schedule

Volunteer	Lecture Date	Lecture
<b>John Cambell, MD (UNC) Radiology Resident 8/26-9/20</b>	9/2	Ultrasound physics/artifacts
	9/4	Peds Basic Anatomy (Abdominal survey)
	9/6	Lymph nodes: Normal, Reactive, Burkitt lymphoma, TB, Superficial vs. abdominal
	<b>On-going In Country</b>	Peds self-assessments – work with Hastings/Miriam on scan techniques
	<b>On-going In Country</b>	Peds self-assessments – work with Clinical Officers on POCUS techniques
<b>Amit Sura, MD (RAD-AID) Pediatric Radiologist 9/11-9/22</b>	<b>On-going In Country</b>	Radiology Readiness Tool
	<b>On-going In Country</b>	Peds self-assessments – work with Hastings/Miriam on scan techniques
	<b>On-going In Country</b>	Peds self-assessments – work with Clinical Officers on POCUS techniques

<b>Erica Messina / Heather Jordan (RAD-AID) Sonographers 9/13-9/27</b>	9/17	Abdominal Masses(including Neuro/Nephroblastoma)
	9/18	Intussusception
	9/19	Appendicitis
	9/23	Duodenal Atresia
	9/24	Posterior Urethral Valves
	9/25	Pyloric Stenosis
	<b>Daily</b>	Work with Radiology sonographers on scan techniques
<b>Benson Langdon, MD (UNC) Radiology Resident 9/23-10-18</b>	9/30	Lung Ultrasound (Pleural effusion, POCUS techniques PNA, edema)
	10/2	Pulmonary/Extrapulmonary TV diagnosis by US (FASH)
	10/4	Kidneys/Adrenal glands
	<b>On-going In Country</b>	Peds self-assessments – work with Hastings/Miriam on scan techniques
	<b>On-going In Country</b>	Peds self-assessments – work with Clinical Officers on POCUS techniques
<b>Katrina McGinty, MD UNC Radiologist Abdominal Imaging 9/23-10/4</b>		

<b>Jon Weber, MD (RAD-AID) Radiology Resident Pediatrics (Northwestern U.) 11/18-12/4</b>	11/25	Schistosomiasis – Ultrasound findings
	11/27	Comparative Anatomy US vs. CT – clinical decision making – which test?
	11/29	POCUS techniques: Skull fracture Optical (FB, Detached retina)
	<b>On-going In Country</b>	Peds self-assessments – work with Hastings/Miriam on scan techniques
	<b>On-going In Country</b>	Peds self-assessments – work with Clinical Officers on POCUS techniques

# Goal: Improve Access for Pediatric Patients to Ultrasound

- Two dedicated US rooms in the KCH Radiology department
  - Majority of pediatric patients are evaluated with the higher-quality Mindray machine
  - Afternoons designated for portable exams for pediatric patients too ill to make it to the radiology department
- Build relationships with local clinicians
  - Close relationship with pediatric oncology for urgent consultation and help with image-guided biopsies
  - Dr. Bip Nandi is the pediatric surgeon at KCH and frequently texted our group via WhatsApp for urgent exams and follow up. He also provided us direct feedback with surgical findings on patients we examined with him
  - Fanuel Betchani trained in pediatrics, but has an interest in POCUS

