



Global pediatric radiology education: responding to training-level specific needs

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Abstract

Pediatric radiology education for pediatric and radiology trainees and practicing professionals must be adapted to the target audience. In efforts to narrow the gaps in global pediatric radiology education, the Children's Hospital of Philadelphia's radiology department's Global Outreach and Education Program has designed specific interventions and curricula according to different levels of training and desired expertise. Our initiatives include an online "Introduction to Pediatric Imaging" lecture series for pediatrics residents in Botswana, Ethiopia and Vietnam; access to a learning management system (Outreach RADIAL) for radiology residents; case-based review sessions for pediatric radiology fellows; and in-person seminars for professionals from Eastern Europe and Africa. Here, we highlight our global education efforts to encourage other departments to take a similar systematic approach to outreach activities.

Keywords Global health · International cooperation · Learning · Radiology

Introduction

Pediatric radiology education is not widely and equally accessible around the world [1, 2]. Even large educational programs often lack sufficient human resources and/or expertise to train medical professionals on the full scope of pediatric imaging acquisition and interpretation [3, 4]. From practicing radiologists keen to refresh their knowledge and skills to pediatricians-in-training looking to improve care for children, pediatric radiology educational resources are in high demand, especially in resource-limited regions [2]. However, expert faculties' time is limited and structured educational resources are generally scarce. We have taken a systematic approach to global pediatric radiology teaching engagements that adapts the content and delivery method by level of training, allowing us to recruit a larger number of participants and optimize faculty time and educational

resource utilization. Here, we highlight our global education efforts (Fig. 1), hoping to encourage other departments to take a similar systematic approach to outreach activities.

Highlights of the Global Outreach and Education Program

Radiology residents: pediatric radiology learning management system

Since October 2022, we have granted over 100 radiology trainees from low- and middle-income countries (LMIC) access to our global learning management system (LMS). This LMS, "Outreach RADIAL" (RADiology's Intelligent Adaptive Learning), was established by our department's Global Outreach and Education team following the careful drafting of a curriculum comprising more than 60 topics relevant to radiology residents. The content was curated from archived lectures in our department's LMS, RADIAL, previously presented by faculty to pediatric radiology clinical fellows at our institution and to which new lectures were incorporated as required [5]. To seamlessly integrate this tool into local programs, we have continuously engaged in preliminary discussions with local attendings to identify the most effective ways to utilize it for their

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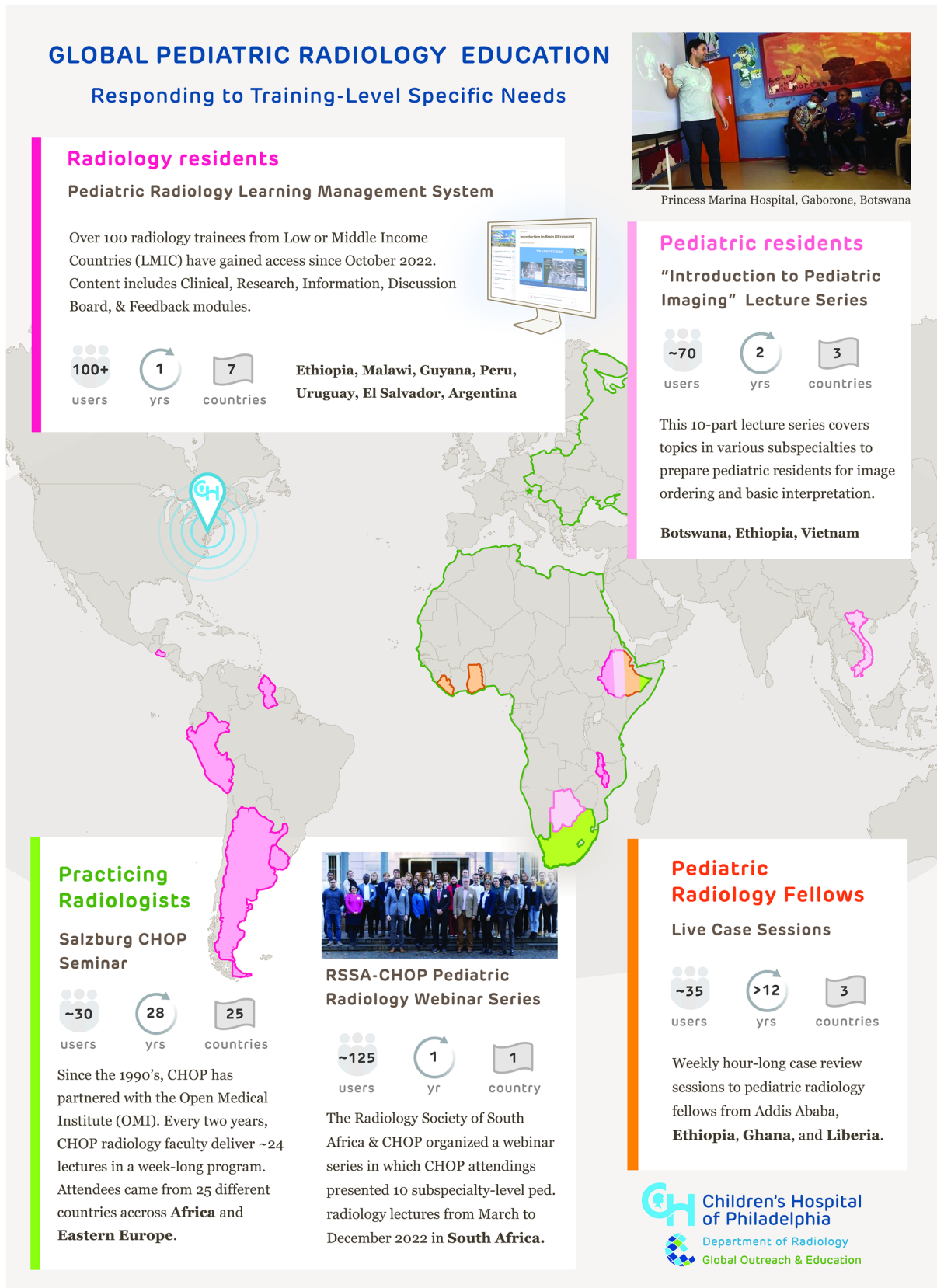


Fig. 1 The Children's Hospital of Philadelphia's (CHOP) Radiology Global Outreach and Education Program of educational initiatives (organized by the audience's level of training)

residents before granting access. Outreach RADIAL, while accessible to users for free, incurs a cost of \$7 per year per user that is covered by our institution. Currently, due to user limitations, RADIAL Outreach is exclusively available to existing partner institutions.

Outreach RADIAL can be accessed through a website hosted by the LMS online software Absorb (Calgary, Canada) [6]. Special consideration was given for LMIC to ensure easy accessibility despite low network bandwidth. The on-demand content is accessible to users with active licenses and is divided into *Clinical*, *Research* and *Information* modules, with *Discussion Board* and *Feedback* sections. The *Clinical Module* has 8 chapters for different subspecialties: Neuroradiology, Cardiac, Chest, Genitourinary, Gastrointestinal, Musculoskeletal, Oncology and Interventional Radiology. Each chapter includes a pre-recorded lecture, relevant reading material and questions. The *Research Module* includes introductory lectures and a quick reference guide to clinical research and academic publishing. The *Information Module* includes descriptions and useful websites regarding the program and the team. In addition, Outreach RADIAL, although not connected to a Picture Archiving and Communications System, has a *Discussion Board* section where users can upload de-identified images and questions to discuss with their peers. The *Feedback* section includes a survey the residents can complete, adding any suggestions or comments about the content.

This high-quality, up-to-date learning material allows users to learn in their own time. It also provides a shared space to facilitate discussion between trainees and exchange cases and teaching points at a global scale, allowing the global community a facility with which to engage beyond the traditional teacher-learner roles.

Current users of the LMS include partner institutions in Argentina, El Salvador, Ethiopia, Guyana, Malawi, Peru and Uruguay.

Pediatric radiology fellows: live case sessions

After making annual in-person visits to Ethiopia for over 12 years, we switched to virtual programming in 2021. Sessions consist of weekly hour-long Friday case review sessions for pediatric radiology fellows from the Addis Ababa University program. As the program has matured, we have incorporated resident-participants from Black Lion and Saint Paul Hospitals, the two major radiology residencies in Addis Ababa, Ethiopia. Recently, trainees from Ghana and Liberia have joined the sessions. More than 20 faculty members have participated and help increase the repertoire of pediatric cases that trainees are exposed to.

Current users of the live case sessions are based in Ethiopia, Ghana and Liberia.

Pediatric residents: “Introduction to Pediatric Imaging” lecture series

In 2022, we successfully completed our first full year of the “Introduction to Pediatric Imaging” lecture series for pediatric residents in Princess Marina Hospital, Gaborone, Botswana. This 10-part lecture series covers topics in various subspecialties to prepare residents for proper imaging ordering and basic interpretation. For the current iteration which began in January 2023, two additional institutions (VinUniversity in Vietnam and Yekatit 12 Memorial Hospital in Ethiopia) joined the program, which now includes online material for asynchronous studying and practicing through the Nearpod learning management software (Dania Beach, FL, USA) [7].

Current users of the “Introduction to Pediatric Imaging” lecture series are based in Botswana, Ethiopia and Vietnam.

Practicing radiologists: “Radiological Society of South Africa-Children’s Hospital of Philadelphia Pediatric Radiology” webinar series

The Radiology Society of South Africa, in partnership with the Children’s Hospital of Philadelphia, organized ten subspecialty-level pediatric radiology lectures from March 2022 to December 2022. Lectures were given by Children’s Hospital of Philadelphia attendings to practicing radiologists from South Africa. These lectures were predominately virtual with a few in-person talks. In attendance were up to 145 radiologists and radiology residents practicing in South Africa.

Current users of the Radiological Society of South Africa-Children’s Hospital of Philadelphia Pediatric Radiology webinar series are based in South Africa.

Practicing radiologists: in-person Salzburg Children’s Hospital of Philadelphia seminars in pediatric radiology

Since the 1990s, the Children’s Hospital of Philadelphia and the Open Medical Institute have partnered with the aim to increase pediatric radiology education in the medical field. The faculty of the Children’s Hospital of Philadelphia deliver eight clinical and leadership courses annually. Every two years, the Children’s Hospital of Philadelphia radiology faculty deliver about 24 didactic lectures in a week-long program, covering several imaging modalities and topics in pediatric neuroimaging and body imaging. The seminar is aimed at practicing radiologists. While initially planned for Eastern European physicians, the seminar has evolved over time, with the last cohort including 28 fellows from 25 different countries. Participants show interesting cases from their home institutions and contribute to roundtable discussions.

Current users of the Salzburg Children's Hospital of Philadelphia seminars in pediatric radiology are based in Africa and Eastern Europe.

Discussion

Challenges in clinical radiology training conducted in low-resource settings include a shortage of imaging equipment and deficiencies in curriculum content [8]. Outreach activities, as exemplified by our experience, can address this by supplementing existing radiology training, particularly in regions with limited access to content experts. Even though highly qualified individuals practice in these areas, clinical responsibilities and heavy workloads often hinder adequate training time. Lack of access to asynchronous educational tools and curated content can also limit the reach of educational efforts by local and regional experts. Through initiatives such as virtual case review sessions, lecture series and webinars, outreach programs facilitate access to specialized expertise and diverse clinical cases, bridging the training gap between trainees in different resource settings. Moreover, the described programmatic approach to education also helps maximize the reach and impact of expertise and resources from institutions willing to support global educational outreach. Integrating these activities into their curriculum helps healthcare professionals in LMIC bolster their radiology skills and competencies while decreasing the burden on local expert teachers.

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Declarations

Conflicts of interest None

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