World Federation of Pediatric Imaging

WFPI

www.wfpiweb.org

Strategic Framework 2016 – 2021

Table of contents

Preamble

1. Background

Diagnostic imaging services offered in modern medical settings have evolved enormously in recent decades, but even state of the art healthcare can overlook the specificities of pediatric imaging. Imaging children requires understanding the unique needs of the patient and family. A child is not a small adult; knowledge of illnesses and medical conditions specific to the pediatric population is a necessity. Equipment, procedures and staff need to be oriented to the special needs of children. Radiation safety, in particular, needs to be specifically addressed in this young population. Subspecialty training in pediatric radiology requires years of medical school, residency and fellowship – requirements which can impose a strain on the world's most advanced care centres.

Furthermore, organizations dedicated to pediatric imaging around the world need to communicate better among themselves, share knowledge and resources, and federate at international level to advocate for best practices and resource allocation.

While medical practice would suggest that around 80% of diagnostic problems can be solved using "basic" radiographic and/or ultrasound examinations, the WHO nonetheless reports that some two-thirds[1] of the world's population has inadequate or no access to medical imaging. It has defined technological availability as one of the world's major health infrastructure needs. Clinicians face many challenges in providing pediatric imaging services in low-resource settings: cost, access, a massive disease burden, climate, geographical dispersion, political instability and a lack of equipment, infrastructure and manpower. In human resources terms alone, 14 countries in Africa have no radiologists at all, and most have less than 30[2]**.** Zambia, for example, offers 4 public sector radiologists for an estimated population of just over 14.4 million (of which 47% is under 15 years of age)[3]. Rarer still is the facility offering a pediatric radiologist; for the entire African continent, only a handful exist[4]. These difficulties are compounded by the need to allocate scarce resources to basic life-saving issues such as the supply of safe, clean water and nutrition. Appropriate policies for diagnostic imaging services are thus rarely integrated into national health plans and viewed as a priority. Health authorities are simply unaware of the live-saving diagnostic tools; they are therefore unavailable.

2. Purpose

In 2011, the leaders of the world's regional pediatric imaging societies launched the World Federation of Pediatric Imaging (WFPI), a non-political, non-denominational and non-discriminatory organization operating for exclusively non-profit, educational, scientific, research and outreach purposes. By 2012, after extensive cross-regional consultation, two firmly held convictions – the need for a louder pediatric voice in the imaging arena, and strength lies in numbers – led to a mission statement: "WFPI provides an international platform for pediatric radiology organizations united to address the challenges in global pediatric imaging training and the delivery of services." Setting up its governing body in 2012[5], WFPI went on to prioritize "Communication and collaboration between

[1] World Health Organization. Essential diagnostic imaging. Available at: www.**who.int/eht/en/DiagnosticImaging.pdf** Accessed January 1, 2011.
[2] Andronikou S, McHugh K, Abdurahman N, Jkoury Bn Mngomezulu V, Brant W, Cowan I, McCulloch M, Ford N (2011) Paediatric radiology seen from Africa. Part I: providing diagnostic imaging to a young population Pediatr Radiol 41:811-825
[3] RAD-AID Country Reports, Zambia http://www.rad-aid.org/resource-center/country-reports/
[4] Andronikou S (2014) Unique Issues in Africa - Society for Pediatric Radiology http:// www.pedrad.org/Portals/5/Events/2013/AndronikouAfrica.pdf
[5] Bylaws - http://www.wfpiweb.org/Portals/7/About/FINAL_WFPI_Bylaws_revised_April2015.pdf

pediatric imaging practitioners, via their organizations" in its initial Strategic Framework (2012-2015[6]) to achieve its goals. With limited resources and a loose working mandate, WFPI set about carving its niche, drawing heavily on those among its members with developing world experience.

In 2016, after a review of its first five years[7], WFPI incorporated the priorities and concerns expressed by its membership into its working priorities and planned development, as expressed in this revised Strategic Framework (2016 – 2021).

3. Structure and governance

The WFPI is composed of pediatric imaging organizations and its governing Council includes representation from North America, Europe, South America, Asia-Pacific and Africa[8]. To ensure the WFPI's global span, it is open to other regional societies and national and supranational[9] organizations, whether pediatric imaging-centered ("full" members) or radiology organizations with pediatric sections/special interest groups and organizations for all professions related to medical imaging ("associate", non-voting, members). Together, the WFPI's members offer extensive international reach in terms of access to educational platforms, meetings, conferences, training courses, publications, contacts and networks.

It bears noting that WFPI is far from alone with its international goals. A number of non-profit imaging organizations and intrinsic international imaging efforts roll out in parallel, many pre-dating WFPI. The Rwanda ultrasound courses supported by the Société Francophone d'Imagerie Pédiatrique, the Swaziland teaching visit run by the South African Society of Paediatric Imaging and the RSNA4 Visiting Professor Program are just three examples. Institutions can run international pediatric imaging initiatives too – among others, Graz University Hospital, Austria, teaches in Eastern Europe, Toronto's Hospital for Sick Children, Canada teaches in India, and the Children's Hospital of Philadelphia (CHOP), USA offers a series of webinars in South Africa, in collaboration with the Radiological Society of South Africa and the South African Society of Paediatric Imaging. With its own resource limitations, WFPI cannot run such projects itself – but it embraces and supports the work of others and strives to ensure that resources are harnessed as opposed to duplicated.

---

[6] WFPI Strategic Framework 2012 - 2015 http://www.wfpiweb.org/Portals/7/About/WFPI_Strategic%20Framework%20_Full_version.pdf

[7] Saving the Starfish: World Federation of Pediatric Imaging (WFPI) development, work to date, and membership feedback on international outreach, http://www.ncbi.nlm.nih.gov/pubmed/26994001

[8] Founding societies: the Society for Pediatric Radiology, the European Society of Pediatric Radiology, the Latin American Society of Pediatric Radiology, the Asian and Oceanic Society for Pediatric Radiology. Joined later : the African Society of Pediatric Imaging.

[9] Supranational organizations are built up on linguistic or other, non-geographical criteria. E.G. Europe's German-speaking pediatric radiology society (GPR) which draws members from Germany, Austria, Switzerland and the Netherlands.

A. Working Priorities

1. Communication and collaboration between pediatric imaging practitioners, via their organizations
2. Virtual education
3. Outreach and training in lower resource settings
4. Radiation safety and protection
5. Advocating for appropriate practice and resource allocation for children

1. Communication and collaboration between pediatric imaging practitioners, via their organizations

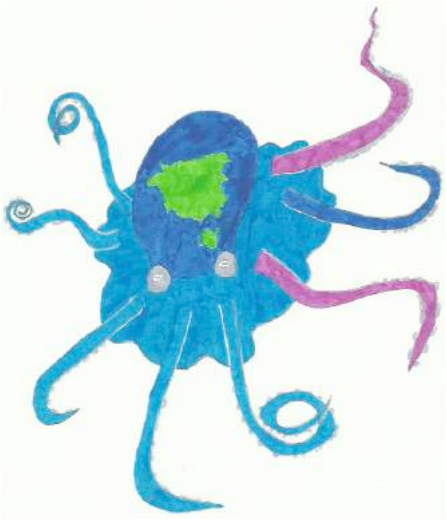
Fueled by its inclusive set up (all 5 regions with equal voting weight at board level), WFPI aims to facilitate communication and collaboration among physicians, providing a united front in raising awareness of the multiple needs of pediatric imaging and optimizing the sharing of resources and expertise.

From this communication and collaboration, all else flows.

Collage of photographs of radiology staff around the globe, taken during the International Day of Radiology 2015 Global Wave

1. Internal

All WFPI's working groups all have international compositions, with project success measured in part by global contributions. Yet regional input can be uneven; contributions to online education in 2012-2015, for example, largely originated from North America, while Asia and Africa played key roles in outreach. But one way or another all WFPI-represented regions influenced the organization's first five years. Through WFPI, communicating and collaborating across regions has become routine.



2. External

With regard to communications beyond WFPI, we have seen a pragmatic added value of our organization emerge. Through our own member organizations - whose individual members belong to other groups - we often get to hear of what's going on and where. This gives WFPI a unique "overview" of outreach work in our pediatric imaging community. We do not intend to coordinate these disparate efforts, but in an aid arena stymied by weak coordination and duplication, WFPI can use its information to encourage results and resources to be shared. Ultimately, it is unlikely that healthcare workers and patients in lower resource settings have strong opinions about who delivers the aid; they just need it delivered effectively. We call WFPI's reach into multiple arenas our "tentacles" and our subsequent efforts to harness resources and reduce duplication our "octopus effect".

2. Virtual education

New information technologies are proving to be the world's great leveler. A recent UN report suggested six billion people have access to mobile phones while only 4.5 billion have access to working toilets. There are around one billion mobile phones in both China and India. Africa is home to twice as many mobile phones as the United States and is the most advanced continent when it comes to "mobile money". Developing countries accounted for 80 percent of new mobile subscriptions in 2011, with the number of Internet users doubling over a four year period. Technology therefore offers great potential to enhance education opportunities, dramatically improve health outcomes, promote free speech and democracy, and offer greater access to global markets. As a caveat, however, it bears noting that while the Internet is the key driver of global connectivity and opportunity, different bandwidth speeds, limited access, and contrasting levels of openness can mean that the Internet exacerbates rather than offsets inequality[10].

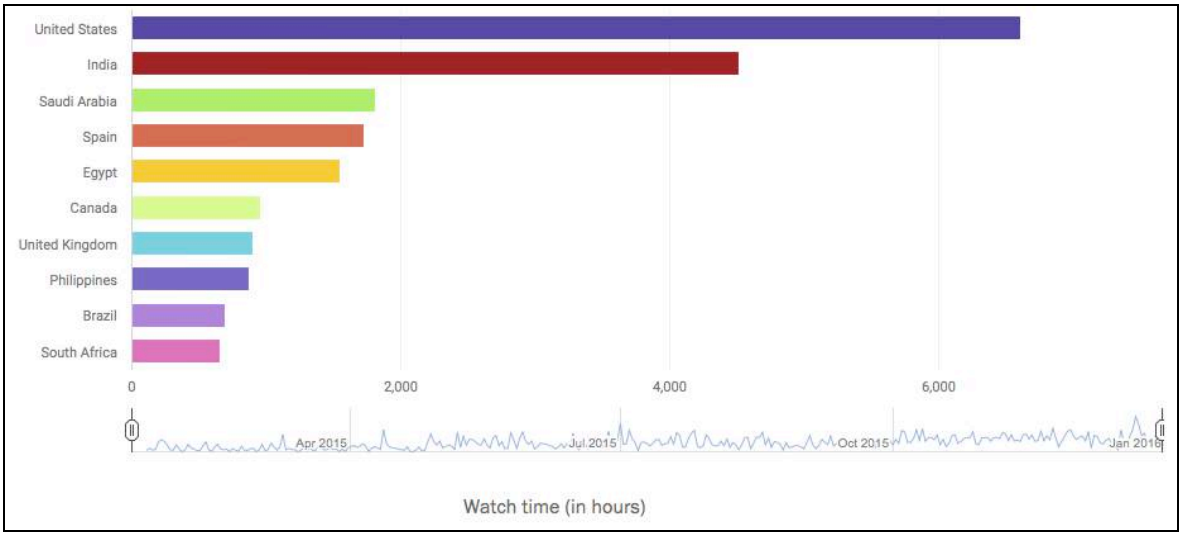
Nonetheless, the possibility of remote involvement can draw higher numbers of physicians into international education work. WFPI seeks to harness this through its provision of access to free, online education on pediatric imaging for pediatric radiologists, radiologists and trainees and other healthcare professionals via the following channels:

1. Online video library

In 2015 WFPI and SPR launched an internationally coordinated online video library https://www.youtube.com/channel/UCKr22IM3CM1IynQ1b9OzEpw/feed. With 13 videos posted during its first twelve months, including a Spanish video, "Como realizar una radiografia de tórax de calidad en niños", in 2015 the selection attracted over 9400 views from 140 countries.

The library's cross-regional steering committee plans to solicit short talks from lecturers at future pediatric radiology meetings and as an on-going process throughout the year.

[10] Now for the Long Term", a report written by the Oxford Martin Commission for Future Generations, Oct 2013 http://www.oxfordmartin.ox.ac.uk/downloads/commission/Oxford_Martin_Now_for_the_Long_Term.pdf



YouTube top ten countries, "watch time" (in hours), WFPI / SPR online video library

2. Online cases

Reaching on average over 1000 people per post on Facebook in 2015, the production of online cases has been an important part of WFPI's online educational work. The partnership with Radiopaedia.org for the International Day of Radiology 2015 celebration, involving a series of international pediatric imaging cases run online, showed that WFPI's educational materials can reach remarkable numbers of interested learners through social media via strategic partnerships.

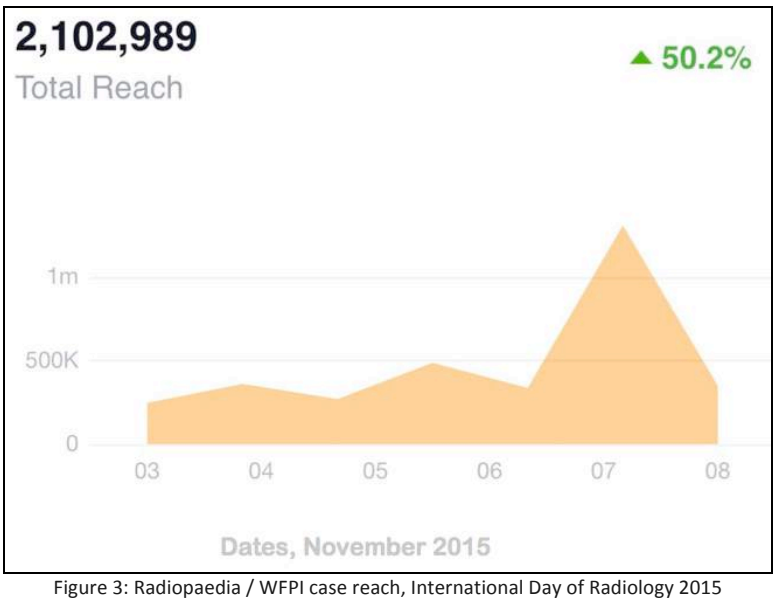


Figure 3: Radiopaedia / WFPI case reach, International Day of Radiology 2015

3. Website

WFPI uses its website – www.wfpiweb.org – as a platform to disseminate education to pediatric radiologists, radiologists, radiographers, and other medical professionals who do not have special pediatric expertise.

However, from 2012-2015, the website mainly served mainly as the gateway to online video education

offerings and educational cases, and an information harbor for social media posts.
Posting new content (produced internally to fill gaps identified or gathered externally, using the WFPI site as a repository) on the site's education pages, with subsequent increases in new and returning traffic, will be a priority in this upcoming period.

4. Harnessing social media for disseminating selected educational content

As Internet traffic moves away from laptops/desktops onto handheld devices, WFPI's aims to harness the social media and apps they access to spread free education, disseminating its offerings across Facebook, Twitter, Instagram, Figure 1 and other channels.

SPECIFIC ONLINE EDUCATION CHALLENGES BASED ON CONCLUSIONS DRAWN FROM 2012-2015

The countries reached by our video library in just its first 12 months and the 2 million health workers' screens reached by the Radiopaedia/International Day of Radiology 2015 Cases of the Day underscore the potential of WFPI's online presence. However, other patchy results highlight the need for a heightened focus on project management, team-building, continuity and results.

From 2016 on, WFPI's online educational development must be bolder and better resourced.

Specific efforts will be required to increase online cases contributions and explore additional ways to expand our audiences, particularly outside the USA, e.g., linking the 'case of the week' to videos on the online library, cross-posting case material and developing videos based on a core curriculum, among others.

Lack of engagement of more experienced radiologists becomes an issue of content creation, as our younger users could benefit greatly from their experience if it could be captured. This calls for a pro-active "recruitment" strategy.

Furthermore, social media reach to Asian countries such as China and Japan has been more difficult as this region uses WeiBo and other social media channels more often than Facebook or Twitter; we must aim to explore cross-channel reach with our Asian society members.

Our data also shows that our website needs heightened visibility, for example by linking communications and popular WFPI social media offerings back to the site, with regular new content to boost re-visits.

3. Outreach and training in lower resource settings

Given the global distribution of pediatric populations and disease burdens, much of WFPI's efforts concentrate on lower resource settings.

The WFPI's approach to outreach and training differs from one region to another, reflecting the diversity in imaging care. In some areas such care is simply unavailable; in others general physicians, nurses and technologists struggle to interpret x-rays. In rural settings where alternative diagnostic

tools are non-existent or inadequate, assistance via radiograph-reporting can prove life-saving – notably for HIV/AIDS and tuberculosis. And where adequate equipment and/or medical teams do exist, they may need further training and engineering support to provide sustainable imaging care[11].

1. Onsite teaching and training

Although costly and demanding significant investments of time, on-site imaging provider training must be envisaged to reinforce standards and patient safety. The complexities this entails are legion, so WFPI has prepared a set of guidelines - available on its website - to increase the lasting impact from its outreach work. They are underpinned by recognition of both volunteers' limited time for immersion into local contexts, and common pitfalls such as the assumption that knowledge, skills and procedures acquired in high-resource centers are readily transferable, or even relevant, to low-resource settings[12].

These guidelines specify that WFPI seeks to "**bolt on**" to existing initiatives – **and in doing so ensure the inclusion of pediatric content** - rather than set up tailored projects from scratch.

Past examples of bolt on

The example of Lao Friends Hospital for Children, a new hospital set up and supported by Friends Without a Border and RAD-AID, illustrates WFPI's bolt-on approach. In May 2015, RAD-AID encouraged the Laos hospital to call on WFPI for tele-opinion support until its own imaging team is in place.

A pediatric radiology fellowship program being conducted in Ethiopia - a country without a single pediatric radiologist for a population of 93 million, of which 60% is younger than 20 years, also illustrates the benefits of "bolt on". This project is organized and funded independently by the Addis Ababa University in collaboration with the Children's Hospital of Philadelphia, USA. Yet it is specifically run "under the auspices of WFPI", because its project leaders recognize the critical role WFPI can play in according such programs an international perspective, globally disseminating the tools developed, opening up networking and collaboration opportunities and sharing "lessons learned". And WFPI, by the mere fact of its organizational structure, offers recognition by an international pediatric radiology body.

Prior to 2016, WFPI forces have also been successfully joined with professional imaging societies (American College of Radiology in Haiti), other non-governmental organizations providing humanitarian medical aid (Médecins Sans Frontières/Doctors Without Borders in projects worldwide and Imaging the World for ultrasound work in Malawi and Uganda) as well as other institutions (UCLA's Center for World Health and the Dept. of Pediatrics in Maputo, Mozambique).

[11] WHO cites the "lack of user-training and . . . effective technical support" as reasons why up to 70% of medical equipment in sub-Saharan Africa "lies idle" (International Atomic Energy Agency. Thematic plan on diagnostic radiology. Available at: http://www-tc.iaea.org/tcweb/abouttc/strategy/thematic/pdf/reports/Thematic_plan_diag_radiology.pdf. Accessed December 2, 2010.)

[12] Mollura DJ, Azene EM, Starikovsky A et al (2010) White Paper Report of the RAD-AID Conference on International Radiology for Developing Countries: identifying challenges, opportunities, and strategies for imaging services in the developing world. J Am Coll Radiol 7:495-500

These examples reflect further specifications set out in our WFPI guidelines: WFPI-affiliated outreach needs to be driven by **engaged, onsite stakeholders** with some degree of **political/societal support**, ready to work with international aid to catalyze changes that **make sense for their realities**, and that can be **accepted and incorporated into a new medical/treatment culture**. In sum, there is the need to **identify partners and leverage points** that can have **impact at scale and facilitate change** in the care provided by the people and geographies involved.

It bears noting that in choosing to adopt this approach, WFPI differentiates itself from non-governmental organizations such as Imaging the World and Médecins Sans Frontières. WFPI - an international extension of professional imaging societies - can forge partnerships with, leverage, and "bolt on" to these organizations, but it cannot do what they do in terms of running entire projects themselves. WFPI simply does not have the contextual expertise and resource capacity (including funding) this demands. We must be make choices in how we get involved (which means, at times, consciously saying "no") in fulfilling our mission to serve children.

2. Tele-radiology

Systematic reviews have listed a number of advantages to tele-expertise services, including improved access to specialists and reduced traveling time/costs. But over the past five years, some reservations have been voiced about its use by WFPI. Our limited resources do demand careful calibration of our outreach aims, and tele-response times can be demanding. Some physicians pinpoint the informatics and technology issues tele-expertise must confront, others query the legal situation. We also hear concerns about the external filling of staffing gaps and the limited opportunities tele-expertise provides for long term improvements in the delivery of care onsite, echoed in an SPR member's comment: *"tele-radiology of overseas practices runs the risk of being paternalistic and impedes the growth and development as well as independence in those institutions"*.

Nonetheless, **in early 2016, WFPI's provision of tele-expertise can be considered firmly underwa**y. By February 2016, over 500 studies were referred to WFPI from South Africa in 2013, with 44 more from India in 2014 and 120 from Cambodia in 2014 and 2015. A rising number of tele-referrals were also sent to pediatric radiologists via Médecins Sans Frontières: one WFPI specialist received over 120 referrals in 2015 alone. Lastly, from 2014 through to early 2016, a further 500 studies were referred to WFPI via Collegium Telemedicus, the tele-platform WFPI now uses, largely from Laos (as well as Mozambique, Jamaica, India and Peru). Lao Friends Hospital for Children stated that responses were quick and useful; most provided validation for its own diagnoses, others offered additional ideas that were well received. As put by this hospital's executive director: "*Just knowing that we can call on an expert pediatric radiologist anywhere in the world is a relief to us. It makes the world a little smaller and more cohesive.*".

Data on our tele-platform use show the **swift mobilization of WFPI's support** at current referral levels. The 96 studies referred to WFPI in December 2015 were manually allocated to volunteers within a median delay of 1 hour, with a median time to tele-reader response of 4.5 hours.

To address membership concerns about WFPI's tele-expertise, we must put our work in context. Regarding our internal capacity, our international volunteer tele-reader numbers consistently outstrip current tele-expertise demand. In terms of functionality, the Collegium Telemedicus platform is **purposely constructed for store-and-forward telemedicine use in low resource and low Internet bandwidth settings**. Its users' Terms and Conditions specify that studies sent to WFPI for a "second opinion" **do not entail any transfer of legal responsibility from referrer to specialist**.

Regarding fears of impeding onsite growth and development, WFPI's tele-expertise, delivered via "bolt-on" arrangements with non-governmental organizations such as Médecins Sans Frontières or

RAD-AID, or directly to healthcare facilities, is requested by tele-referrers who are providing care in areas of the world **short of qualified medical staff** (see Preamble above). Development *is* therefore needed but imaging, and particularly pediatric imaging, is low on most national health systems' priority lists. So if our tele-referrers find our expertise useful, then WFPI is happy to provide this service.

WFPI has not yet formally assessed its platform-based support. Médecins Sans Frontières, however, has conducted a comprehensive analysis of user feedback on its own tele-expertise service (which includes WFPI volunteers). It also uses the Collegium Telemedicus platform. The study shows that of 163 respondents (30% of the 548 referrers and specialists who were sent the survey), **all recognized the benefits of providing access to specialist advice in lower resource settings, where there is usually no alternative way of obtaining such expertise**. Furthermore, the majority of referrers (91%) stated that they found the advice received via telemedicine to be useful. The most common reasons for this were in providing reassurance for the referrer or patient, in changing the management of the patient, and in changing the diagnosis[13] .

3. Childhood Tuberculosis (TB)

TB remains a global public health concern with one-third of the world's population being infected. Its burden is enormous, and it ranks as the second leading cause of death from a single infectious agent, after HIV. In 2014 alone, an estimated 9.6 million people developed TB (14 % with HIV co-infection) and 1.5 million died from the disease. The same year, an estimated 1 million children became ill and 136,000 died from TB[14] . Apart from the illness and death this generates, undiagnosed, untreated children with TB perpetuate the cycle.

While progress on development of simpler diagnostic tools for childhood TB remains slow, imaging still plays an important role – if reliable interpretation is at hand, which it frequently is not. Interpretation of chest radiographs in children suspected with TB can be challenging, especially to clinicians and general radiologists who do not routinely review pediatric x-rays. The inherent difficulties in obtaining radiographs in a crying and moving child are compounded by the less optimal x-ray machines and technique sometimes used in medically underserved areas.

In response, **WFPI has assembled experts from the high TB burden countries of Africa, Asia, and Latin America**, in an attempt to impact on childhood TB imaging diagnosis in lower resource settings. The Group and its objectives are presented on **TB Corner, a page on WFPI's website**. The group offers a **bi-monthly series of open access educational articles** for wide dissemination and a "**TB imaging hotline**" for colleagues around the world. Suspected childhood TB cases are referred from partners to the hotline's moderators, who forward the cases to the 19 members of the TB group. The final opinion is sent to the referral source within 24 hours. The TB hotline also serves as a **forum for TB imaging experts to share and compare practice standards**, with the cumulating cases providing valuable data for analysis. Thus practice modifications can be readily initiated with a consensus from experts. **The development of a standardized reporting template** is another major TB group drive.

The website traffic to our TB Corner, the open articles produced to date, our collaboration with the International Society of Radiology for its online TB educational model, and our hotline support for different tele-referring centers (Lao Friends Hospital for Children, Maputo General Hospital, Médecins Sans Frontières project sites) are an encouraging start.

---

[13] Bonnardot L, Wootton E, Liu J, Steichen O, Bradol JH, Hervé C, Wootton R (2015) User Feedback on the MSF Tele-Expertise Service After a 4-Year Pilot Trial - A Comprehensive Analysis. Front Public Health 3:257

[14] World Health Organization (2015) Disease burden and 2015 targets assessment. In Global Tuberculosis Report 2015 pp 13-34. World Health Organization, Geneva; http://www.who.int/tb/publications/global_report/en/ Accessed 20 January 2016

But this group's success will lie in take-up.
Expansion is a priority
WFPI's leadership and regional representatives will be called upon to assist with this task as we move forward.

4. Fostering the use of ultrasound in lower resource settings

US is an ideal imaging tool for undeserved areas because it is relatively inexpensive, portable, does not require sedation and does not use radiation. The use of ultrasound when other modalities including radiographs are not available are being studied, including the potential use in the diagnosis of pneumonias a leading cause of pediataric morbidity and mortality in lower resource settings. The availability of equipment has encouraged nonradiologists to get training in focused point of care ultrasound.

While the rapid evolution of this tool is exciting, delivering quality studies is key. **WFPI can play a useful role in addressing the barriers to application** – in print, online and onsite. Prior to 2016, WFPI ultrasound endeavors rolled out through **bolt-on affiliations** with non-governmental organizations, which we hope to pursue (Médecins Sans Frontières' field manual, Médecins Sans Frontières and Lao Friends Hospital for Children tele-expertise, onsite training in Uganda and Malawi with Imaging the World).

With a working group established, WFPI also seeks to **collate relevant literature and information on research and development, track pediatric radiologists worldwide who are involved, facilitate communication among them, and leverage resources for increased engagement and impact.**

WFPI working onsite: Dr. Tracy Kilburn, MSChB, FRCR (Cape Town, South Africa) training Peter Maseko, Clinical Officer (Salima, Malawi) in pediatric ultrasound at Pothawira Clinic, Salima, Malawi, 2014 - project run by Dr. Kay North, DO (Kansas, USA) / Imaging the World

SPECIFIC OUTREACH CHALLENGES BASED ON CONCLUSIONS DRAWN FROM 2012-2015

Our greatest challenge in outreach lies in identifying "bolt on" partnerships that achieve concrete results. Our TB efforts are a case in point. While we see their usefulness in a difficult domain starved of better diagnostic alternatives, we must secure greater access to TB networks to ensure our output has impact.

Our tele-expertise also needs to expand and diversify, framing constructive debate on its future through clear and rigorous programmatic evaluation.

4. Spreading child imaging safety globally, in particular radiation safety and protection

While WFPI has been present in radiation safety forums in South America, Japan, Switzerland and East Africa, it recognizes the need to **coordinate comprehensive global promotion and support.** Operating with partners such as the World Health Organization (WHO) and the International Atomic Energy Agency (IAEA), synergies are needed to collate and share the tools developed by the child safety movements underway. These include the Image Gently Alliance (which has evolved since its establishment in 2007 to comprise nearly 100 international organizations), the EUROSAFE campaign in Europe (launched in 2014), and AFROSAFE in Africa, LATINSAFE in Latin America, JAPANSAFE and CANADASAFE (launched in 2015), and the others forming around the world.

To further its goals, WFPI **formalized its partnership with Image Gently in 2015** so to assure the efficient and effective messaging and content and resource utilization. As regular interactions will be needed, an Image Gently representative has also joined WFPI's governing board.

5. Advocating for appropriate practices and resource allocation for children

WFPI is well positioned to **channel and support the work of its national and regional member societi**es through diverse forums. Such efforts have included WFPI's own Mini-Symposium published in *Pediatric Radiology* in May 2014[15], the South African Journal of Radiology's special issue dedicated to pediatric imaging, produced for the International Day of Radiology 2015 in collaboration with the South African Society of Paediatric Imaging[16] and the online International Day of Radiology 2015 pediatric imaging book, "The Gentle Way" authored by an international group[17]. We regularly **share events through social media, our website and newsletters**, including our member societies' annual meetings and courses, and the different society and institutional activities promoting international events of importance. We also strive to **ensure representation at global imaging meetings** (RAD-AID's annual conferences, for example).

[15] WFPI Mini-Symposium: Outreach in the Developing World, issued May 2014 http://www.wfpiweb.org/Home/WFPIMiniSymposium.aspx
[16] South African Journal of Radiology, Paediatrics edition November 2015 http://www.sajr.org.za/index.php/sajr/issue/view/53
[17] The Gentle Way: the Art of Paediatric Imaging
http://www.myesr.org/start/IDoR2015/IDoR2015_Paediatric%20Imaging%20Book_FINAL.pdf

WFPI representatives from around the world look to **lead the organization into global forums** (virtual or in person) to highlight the importance of imaging in disease diagnosis in children everywhere and the need for physicians and physicists with special knowledge in pediatrics to diagnose correctly, efficiently and safely.

Combined with WFPI's communication and dissemination efforts via its online tools, this advocacy aims **to raise awareness on the sub-speciality's practices, the education and training it requires, resource allocation and patient safety to shape future policy and p**ractice.

For its communications, WFPI mainly **relies on social media to disseminate its news** – both within and beyond pediatric radiologist circles. Between 2012-2015, Facebook was drawing the largest numbers by far, with over 2000 followers.

Graphics available via *Facebook Insights* throw light on the demographic of our social media audience, which reflects social media use at large. Most people are aged between 25-34 years, with a steep drop-off after 44. Hailing from 45 countries to date, they include a mix of radiologists, trainees and other healthcare professionals.

WFPI also **uses its website to communicate**, attracting 11,000 users to view 30,000 pages in 2015. The most viewed pages during the year included International Day of Radiology 2015 activities, newsletters, TB Corner, outreach tele-reading/training and worldwide educational initiatives as well as the portal to the YouTube online video library and educational links. Website activity has not been sufficiently sustained,

It bears noting that WFPI's International Day of Radiology 2015 efforts had considerable influence on the 2015 International Day of Radiology's visibility, contributing to the sharp rise in tweets using the #IDoR2015 hashtag (3980 in 2015 compared to 1825 the previous year).

Specific advocacy priorities include:

Reaching out to major radiology societies: The WFPI will support and reinforce the international efforts of major radiology societies with an expanded pediatric focus. When possible, permanent WFPI engagement will be assured via seats on working groups. Involvement in the American College of Radiology's outreach work and the International Society of Radiology's (IRS) tuberculosis steering committee/other projects will be pursued.

Forming other global partnerships: IAEA, WHO and others: Since the WFPI's launch in 2011, contacts have been initiated with the International Atomic Energy Agency (IAEA) and the World Health Organization (WHO) and the World Federation for Ultrasound in Medicine and Biology (WFUMB). We aim to consolidate contacts with IAEA and WHO via our partnership with Image Gently, and expand this network as a whole.

B. Aspirations – that we hope to realize

1. Publication
2. Virtual education courses
3. Research
4. Information harbor

1. Publications

1. Papers

WFPI produced its own Mini-Symposium published in Pediatric Radiology in May 2014 and in 2015 its TB Group began producing open access papers for TB Corner every two months. We aim to continue **promoting (free, online whenever possible) publications of relevance to global health and/or international outreach** while **channeling and supporting** the educational work of our national and regional member societies through its social media, website and newsletters.

2. Practical guidelines

While guidelines on pediatric topics of global concern and interest would have value, international consensus on guidelines that will have an impact is virtually impossible due to local practice conditions and realities. However, **practical guidelines** on imaging methods and applications are an area that WFPI and its members can positively impact. For example, in 2015 a group of WFPI-recruited authors partnered with Médecins Sans Frontières in the production of a pediatric point-of-care ultrasound manual for use in the field (projects in 60 countries in 2014), and hope to be involved as the manual moves into further editions.

2. Virtual education courses

Through its network and external alliances, WFPI aims to **facilitate course and meeting attendance**. But this will generate major costs if physical presence is required. Virtual meetings are therefore key to affordable international education, despite the infrastructure, interactive capacity, international times lines and intellectual property challenges they entail. Yet just as Brazil's extensive land mass has compelled it to offer virtual educational and scientific platforms, so worldwide webinar use is on the rise.

Contributing content when invited, WFPI also aims to **promote virtual initiatives already underway** (for example, RADPED in Brazil and the Children's Hospital of Philadelphia (CHOP), USA, series of webinars in South Africa, offered in collaboration with the Radiological Society of South Africa and the South Africa Society of Pediatric Imaging, among others), and **encourage and promote the inclusion of pediatric content** in any other courses that come to WFPI's attention.

3. Research

Pediatric radiology research poses far more challenges than adult or even pediatric medical research in general: low patient numbers, high ethical demands, little industry and pharmaceutical support due to low equipment sales and low drug use, lack of research personnel (radiologists, physicists, statistical experts etc.) and increasing demands in justification, optimization and, in particular, radiation protection and safety. Yet there is an urgent need for multidisciplinary, multi-institutional, multinational and prospective research on highly relevant topics impacting cost effectiveness, life quality and society. Existing pediatric radiology "guidelines" are more opinions or results drawn from consensus meetings rather than evidence-based.

Although WFPI has yet not moved ahead in this domain, it still **aims to foster efforts to narrow the '10/90 gap' in health research**, in which less than 10% of funds spent on health research target the health problems of low- and middle-income countries, which account for 90% of the global disease burden[18]. A simple and successful future avenue might be **mentoring colleagues in low resource settings** to implement focused and regionally relevant research projects. Such partnerships might also help change the current paradigm whereby research questions and protocols are written, analyzed and published in high- income centers while the data are collected by those at low- and middle-income centers[19]. **National academic leaders and institutions need to be involved** if research is to be translated into clinical practice[20].

These aims could

- ⇒ **optimise the WFPI network for research** - members will be encouraged to use the WFPI network to identify research opportunities and multi-center collaboration; the WFPI will act as a mediator between institutions, and
- ⇒ **harness the WFPI network to propose research** on agreed upon general and specific topics (TB, AIDS, etc.) steered by experts within the WFPI to the benefit of children worldwide.

4. Information harbor

When appropriate and feasible, the WFPI website aims to **compile information on other imaging initiatives, grants, scholarships, meetings and diverse useful information and links**.

[18] Nuyens Y (2007) Setting priorities for health research: lessons from low- and middle-income countries. Bull World Health Organ 85:319–321

[19] Zar HJ (2014) Partnering with centers of excellence in high- and low-middle-income countries: a strategy to strengthen child health globally. Pediatr Radiol 44:709-710

[20] Andronikou S, Mngomezulu V (2011) Paediatric radiology seen from Africa. Part II: recognising research advantages in a developing country. Pediatr Radiol 41:826-31

C. Our limits

1. Equipment maintenance and donations
2. Tele-expertise: controlling peaks and ebbs in the flows

1. Equipment donations and maintenance

1. Equipment donations

WFPI does not look to become an imaging equipment donor.

It will not always have the necessary understanding of local infrastructure and set-ups to make the most judicious choice of equipment, and it is unequipped to handle customs and exercise demands.

That said, there have been two scenarios since WFPI's creation in 2011 in which it has donated ultrasound machines (Ethiopia and Malawi ; the latter transported by air to the site by a visiting WFPI teacher).

There is a general consensus, however, that whatever the circumstances might be, WFPI (a small organization with no systematic ties to state-run equipment maintenance services) should **steer clear of X-Ray equipment donations**, where

⇒ a radiation dose is involved ;
⇒ the equipment requires servicing ; and
⇒ the users need QA to use of the machines becoming dangerous.

If WFPI is contacted by physicians looking to donate machines, the following links can be provided for North America :

1. A blog on donating used imaging equipment: http://www.diagnosticimaging.com/blog/5-tips-donating-used-diagnostic-imaging-equipment):

2. The American Medical Resources Foundation charges a small fee to collect, test, refurbish (if needed), store, and ship donated medical equipment. According to the AMRF website, they have donated free medical equipment to 190 hospitals in 90 countries valued at over $200M.

3. PROJECT C.U.R.E. stands for PROJECT Commission on Urgent Relief and Equipment. According to the PROJECT C.U.R.E. website, they have delivered medical relief by providing medical equipment and supplies that help build sustainable healthcare infrastructures in over 120 countries.

4. MedShare collects surplus medical equipment and supplies then redistributes them to qualified healthcare facilities in 85 different countries. According to the MedShare website, they also outfit medical missions and safety net clinics in the United States and abroad.

   [Similar sites may exist elsewhere in the world]

2. Equipment maintenance

Maintenance of equipment is well beyond WFPI's mandate and capacity, but we help third party donors understand that proper equipment maintance is essential for patient and provider safety. High end equipment is particularly susceptible to staying unused for long periods when it breaks down, due to lack of funds (often state-provided) for its repair.

2. Tele-expertize: confronting peaks and ebbs in the flows

1. An overly-low tele-expertize role (given the needs)

As explored above, WFPI's tele-reading is expanding. However, many of these cases have been generated by one site alone (Lao Friends Childrens Hospital, Laos). Following a WFPI site visit in March 2016 and re-organization discussions with the hospital's staff, from mid-March 2016 onwards, this hospital will only refer "problem" cases to WFPI as opposed to all its imaging. This will reduce the overall flow of referrals to WFPI radically.

Other than Loas, WFPI receives few referrals from lower resource setting sites. Why is referral generally so slow?

Studies have shown that while experiencing growing success in the NGO arena, telereading has not always proved the hoped-for panacea in terms of providing affordable and ongoing imaging support to state-run facilities located medically underserved areas.

Apart from the key challenge of lack of control over image quality/safety at the radiology-site, which limits the usefulness of remote interpretation, there is also a frequently observed reluctance to implement teleradiology referrer-side. RAD-AID[21] suggests in its 2013 White Paper[22], suggests that this might be explained by the concerns in many countries that externally-delivered interpretation

- ⇒ lacks accountability,
- ⇒ drains local health care economy of necessary expertise, and
- ⇒ distorts communication across health care providers when radiology personnel are physically absent.

WFPI has observed another major obstacle while working in partnership with Minstry of Health (MoH) healthcare sites: access to computers with internet. Many MoH staff cannot secure this access easily, and when they do, their internet bandwidth speed can be slow. Already challenged by financial issues and towering patient loads, there is simply little time to spare for the hours required uploading cases for "extra" tele-expertise.

To this end, WFPI hopes to conduct research on secured mobile applications, including one offered by our tele-reading platform Collegium Telemedicus. Hopefully this will facilitate many sites that need imaging support but do not have the facility-based infrastructure required to receive tele-opinions. Smart phones, however, are ubiquitous.

[21] RAD-AID http://www.rad-aid.org
[22] RAD-AID 2013 White Paper "Improving Radiology in Resource-Limited Regions and Developing Countries http://www.ncbi.nlm.nih.gov/pubmed/25189930

Smart phones: who doesn't have one?

It bears noting that when tele-reading passes through an NGO (MSF/DWB, Imaging the World), with project-dedicated, remunerated staff onsite, telereading flow can be considerable higher. Is this "middle man" a necessity or can we expect a stead flow of tele-expertize referrals when working directly with MOH/other facility staff?

In March 2016, the answer to this is not yet clear. To be monitored!

2. An overly-high tele-expertize role (given the capacities onsite)

Should the flow of referrals to WFPI become particularly significant, all efforts will be made to back-up our tele-expertize with an onsite teaching visit and support, thereby reducing the flow – when possible - to "problem" cases only (i.e. when we can be a consultant for local readers, as opposed to a replacement).

D. Organizational performance

1. Leadership
2. Staff
3. Institutional communications

During WFPI's first five years of life, we have seen how demanding it can be to chart the course and set priorities, and keep ambitions unwaveringly commensurate with our means. From fund raising to the deep complexity of delivering medical aid, international organizations are constantly grappling with internal and external challenges. We have needed time to mould our mandate, and our trajectory can never be fully pre-set; our resources are constantly shifting and we operate within a fast-changing world.

Within this challenging environment, WFPI's leadership (as constituted in our bylaws) and staff are charged with organizational performance.

1. Leadership

The WFPI Council is led by the President, Secretary and Treasurer. Due to geographical dispersion, Council meetings (and WFPI Anual Members' Meetings) are held both onsite and online.

During the 2016-2021 period, avenues will be explored for greater involvement of the WFPI Council's Representative Directors

The Council's key officers form WFPI's Executive Committee (EXCOM), which has on-going strategic planning responsibilities and such powers and duties as may be delegated to it by the Council. It "fast tracks" simple Council business.

From mid-2016 on, WFPI's virtual education and outreach leaders will have seats on WFPI's EXCOM. Based on the results secured in 2012-2015 and their diverse support needs, committee leaders will aim to

- develop action plans and timelines for their follow through and results. The plans will include resource needs (volunteers and staff), budgets and other forms of support;
- report to EXCOM on progress made as a minimum biannually so as to discuss what works, what doesn't and where the solutions might lie.
- Leadership suggestions will be incorporated into the plans so as to ensure their follow through and translation into results, with EXCOM officers playing an active role therein.

2. Staff

The WFPI staff includes a General Director and input from the SPR's Executive Director. Staff assists the WFPI leadership with:

- operational planning, resourcing, implementation, monitoring and reporting for WFPI's virtual education, outreach, international child imaging safety and advocacy efforts;

- internal & external communications;
- the WFPI membership base, including administration and Annual Member/other WFPI meetings;
- Council business.

All members of staff report to EXCOM and any regional board providing sustained and exclusive/significant funding for their positions, while referring to WFPI's Founding President for hierarchical line management.

3. Institutional communications

The Council and Committee leaders seeks to **communicate with WFPI organization members and the individual physicians who constitute them via social media followings, its website and its quarterly newsletters** circulated via social media outlets and WFPI member organizations themselves. For the latter, forward circulation to individual physicians has proven highly variable as it depends on societies' own communication with their members – this will be monitored moving forward, in the hope of stabilization.

E. Financial Status

1. Funding

As a “satellite” organization, WFPI has received capital injections during its initial years from those “parent” founding societies whose resources allow. WFPI extends its grateful thanks to the SPR’s R&E foundation, the SPR and the ESPR, along with individual donors and its members paying fees.

WFPI’s financial situation, however, remains precarious, with no steady stream of revenue secured, and fund raising will remain a challenge. Stand-alone individual project work is considerably easier to finance than fueling communication and collaboration between physicians and helping others make the starfish saves. But such comprehensive project work vastly outstrips our ambitions, time, and expertise. The consequent limits on our resources render the honing and re-honing of our mandate critical.

2. Financial reporting

The WFPI President and Treasurer will provide member organizations with an annual activity and financial report during the WFPI’s Annual Members’ Meeting, to be made available on the website. Additional reporting will be provided on member (when feasible) or donor request.

Conclusion

Five years into its existence, WFPI seeks to create tools and generate resources that can be leveraged by multiple groups to be used where the need/desire for that expertise arises – be they high resource settings, middle income, or low (with a particular focus on low, given the massive imbalance of global resources and the high number of children living in these areas). And while this choice may not have the direct "feel-good" of a more focused or direct intervention, it is nonetheless relevant and impactful, and has the chance to make change at scale. In its self-styled "octopus" role, WFPI can keep hold of the big picture, reduce naivety, provide tools and up the chances of success in the international work its members choose to undertake.

We have seen this wish becoming action since our launch in 2011, with plenty of opportunities ahead. On the review of the available member societies' opinions and the accomplishments to date, we believe that WFPI can go even further. Moreover, the worldwide celebrations of the 2015 International Day of Radiology demonstrated true unity of purpose in this global drive. Communication and collaboration delivered with such passion and pride can only spur WFPI on to achieve its goals.

Introductory drawing from the paper "Saving the Starfish: World Federation of Pediatric Imaging (WFPI) development, work to date, and membership feedback on international outreach" Pediatric Radiology, April 2016