EssentialMed

The Essential Medical Devices Foundation
www.essentialmed.org

Graveyard for failed donated medical equipment. Sites like this can be seen in almost every hospital in low-income countries. The foundation's mission is to make such scenes history. ©Gradian Health

Annual Report 2017

— Creating a world where access to the benefits of medical technology is universal —

Strengthening health systems through medical devices involving complete value chains

Since its inception, the Foundation has proposed and initiated several important projects in the field of medical technology, which are being executed under the leadership of EPFL, the Swiss Federal Institute of Technology in Lausanne. One notable example is the project *GlobalDiagnostiX*: a sustainable digital diagnostic X-ray imaging solution. This project is in a very advanced stage, and industrialization has started! This great success is a wonderful tribute to the vision of EssentialMed, which started the project in 2010, with only a rough concept, but great dedication.

The Foundation's fundamental vision has always been that medical technology needs to rely on a complete value chain, which is the only way to create a sustainable long-term impact on health. For the project *GlobalDiagnostiX*, and for others, the Foundation has discovered that the aspect of training was not being properly addressed. The skills to use a device properly, to understand its output and to maintain it in operational condition are essential components of a sustainable solution that will have a real impact. This is why, as an essential part of its mission to ensure sustainable access to essential medical devices, the Foundation has provided support and expertise to fill this gap.

In 2017, one of the principal activities of EssentialMed was therefore to finalize its modular training package in medical imaging. This kit is intended for use at the level of district hospitals, in low-and-middle income countries. It makes use of modern teaching approaches and incorporates communication technologies such as e-learning, telemedicine, and quality assurance by IT-based communities of practice.

The World Health Organization defines six building blocks of a well-functioning health system. One of them is the availability of *medical products, vaccines and technologies* and another one is a well-performing *health workforce*. EssentialMed assures that its projects always fully integrate these elements, with the purpose of strengthening health systems in low and middle-income countries.

During this year, the Foundation has also supported the production of a documentary film on the issues surrounding medical devices in low and middle-income contexts. Indeed, the problems involved are not widely known to the public and the Foundation is striving to raise awareness, which is the only way to bring about change, especially in relation to donations which do not provide sustainable improvement.

Dr. Guy Morin
President of the Board

Diagnostic imaging for the Global South

In spite of its crucial importance for the diagnosis and treatment of health conditions such as traumatic injuries, tuberculosis and pneumonia, radiology remains out of reach for 2/3 of the world's people. Project GlobalDiagnostiX is addressing the problem of access to diagnostic imaging by developing an affordable and robust digital X-ray system adapted to the context of low-resource settings.

GlobalDiagnostiX

EPFL has transferred the technology that it has developed to a spin-off company, Pristem SA, which was especially created to industrialize the technology. In parallel, the technology development in the framework of the GlobalDiagnostiX alliance will progressively come to an end. Pristem will be ramping up its operational capabilities, with the perspective of a product release within 2 years. This additional time is necessary in order to assure that the technology complies with all regulatory and normative constraints.

As the initiator of the project, EssentialMed remains strongly committed to its success. In 2017, the Foundation has supported the project by focusing on the aspect of training. This is an often-neglected area, but it is a crucial factor of success (see next page).

The Foundation also continued discussions with important stakeholders in the World Health Organization as well as with high-level executives at the ministries of health of several countries. All have confirmed the urgency of ensuring access to adequate diagnostic imaging, now more than ever.

(Photo courtesy EPFL/CODEV/EssentialTech, ©Sylvain Liechti)

www.globaldiagnostix.org

Diagnostic imaging capacity-building in resource-poor settings

In most developing countries, the competence of health service and technical staff members in the domain of medical imaging is often poor. Training courses are non-existent or outdated, and are poorly adapted to the new technologies.

Continuous Medical Imaging Training (CMIT)

In 2017, we finalized the project of the development and testing of a modular continuous inter-professional and interdisciplinary training package in the domain of medical imaging (CMIT) at the level of the district hospital. We carried out our fifth and last mission to Cameroon in May 2017 to test and evaluate the different parts of the training course. We carried out a highly condensed pilot test of our training modules with key identified staff, working with hospitals where the medical imaging diagnostic technologies are already present, but training is lacking. A four - day training session was organized in Yaoundé at the office of CURES (see page 7).

The mission also allowed us to discuss the prospective next steps for the deployment phase with our core training team and local partners. Together with the participants, we identified the need for an e-learning tool in the domain of radio- and echo-anatomy. Such an e-learning tool would allow the participants to improve and/or revise their knowledge of the underlying anatomy. An additional advantage would be to provide a better understanding of imaging practice. We found such a tool at the University of Bern. The e-learning tools RadioSurf and PediSurf are very well-constructed and pedagogically relevant e-learning tools. We signed a convention of collaboration with the "Institut für Medizinische Lehre" in Bern, and aim to translate the material into French during 2018.

A final report has been produced which summarizes the context of CMIT. It develops the different elements of the modular training and describes the implementation network, showing the feasibility of the application of CMIT. The report concludes with the presentation of our integrated approach dealing with all dimensions needed to obtain an imaging service of guaranteed quality which will be well adapted to the patients, secure and emergency-proofed.

Test of the modular training in medical imaging – Yaoundé May 2017. ©2017/BKo/EssentialMed

Newborn and child mortality, expanding the scope.

Existing neonatal incubators often do not function properly in hospitals in developing countrie. This dramatically limits the chances of survival for premature babies. A reliable, robust device capable of maintaining a constant temperature despite frequent power cuts needs to be developed.

Access to oxygen is lacking in low and middle income countries. Therefore, child mortality linked to pneumonia is still unacceptably high.

Incubator and oxygen concentrator

The Foundation remains strongly involved in the development of incubator technology, which is being actively pursued under the leadership of EPFL. In the frame of the GlobalNeoNat alliance, the Foundation contributes in-depth knowledge of the African situation in the domain of public health. In parallel, the Foundation has decided to develop an innovative training program in neonatal health. This will propose a list of training modules to be delivered through inclusive implementation frameworks, to reinforce the skills of medical and paramedical staff in a sustainable way, both while they are in training and when they are in service.

©ICRC, Albert Gonzales Farran, South Sudan, 2016

The team also held discussions with the leaders of the Ifakara Health Institute in Tanzania, to determine their interest in participating in a large scale program for child health. This program will also integrate other technologies such as an **oxygen concentrator**. Oxygen is indeed urgently needed for children suffering from pneumonia, the single most deadly infection, which causes 120,000 child deaths per year. The Foundation intends to develop a sustainable training strategy for child healthcare around both newborn care and oxygen therapy.

For both the incubator and oxygen concentrator projects, fundraising was initiated in 2017 and will be pursued until sufficient funding is available.

Electrical power instabilities impair primary healthcare

Electrical power supply in hospitals in developing countries is very frequently unstable and unreliable. This is a major limitation to the availability of healthcare services and regularly causes breakdown of essential equipment, fires and even deaths (e.g. in the operating theatre). Recognizing that a reliable power supply is an essential prerequisite for operating medical devices, the EssentialMed Foundation has taken part in the creation of a joint centre in Cameroon: CURES. The centre's mission is to reinforce primary healthcare by developing solutions and services to provide a reliable, safe and sustainable electric supply, and to carry out related projects. EssentialMed participates in the CURES steering committee.

CURES – *Centre Universitaire de Recherche sur l'Energie pour la Santé*

Located in Cameroon, CURES is a joint initiative between EPFL, the Ecole Nationale Supérieure Polytechnique de Yaoundé (ENSPY), the EssentialMed Foundation and the Polytechnique Montréal, that aims to improve primary healthcare in the Global South through safe and reliable electric supply solutions. In 2017, CURES welcomed a new director, Prof. Rémy Etoua, who is replacing Prof. Charles Awono, the original director.

The Centre was able to recruit four doctoral candidates and four master's students to commence research on the theme of Electricity Micro-grids for District Hospitals, which is funded by the CETIC program of the World Bank. This allowed them to continue their important research on auditing electricity supply and needs in rural hospitals. In 2017, 3 new district hospitals and one reference hospital were audited.

On 31 May to 2 June 2017, fifteen health professionals; medical doctors, medical imaging technicians, and medical and sanitary engineers, took part in the first training workshop organized by the EssentialMed Foundation from Switzerland under the theme of Continuous Medical Imaging Training. The goal of the workshop was to offer health professionals an introduction to radiology and ultrasound with a focus on patient and personnel safety, including hygiene and radiation protection aspects.

Generator and mains supply in a Cameroonian hospital. Both are often out of order. Image courtesy EPFL ©Sylvain Liechti

During November 20-24, another training workshop was held on the theme of Energy Quality, Electrical Safety and Energy Efficiency in the domains of Building and Industry. CURES also featured prominently at the 2nd International conference IUTENT in Bandjoun, Cameroon in 2017, where they made three presentations of their ongoing research. The Centre also hosted notable visits from the French Ambassador to Cameroon and a delegation of the *Commission des Titres d'Ingénieur de France* in May.

www.energie-cures.org

About the Foundation

The aim of the Foundation is to foster universal, sustainable and equitable access to the benefits of health technology in general, and to medical devices and instrumentation in particular.

Essential*Med*

The Foundation strives to reduce the global inequalities in access to health technologies. Paying attention to the specific needs of impoverished populations, the Foundation makes every possible effort to provide access to affordable technologies which are adapted to the needs of local communities.

Since 2010, the Foundation has been formally registered in the Register of Commerce of Canton Vaud, Switzerland, and is recognized as a non-profit organization. As required by law, the Foundation is under the supervision of the Swiss Federal Authority for Surveillance of Foundations.

Climate is often a key factor of technology breakdown in low-income contexts. This control panel of a commercially available x-ray machine was not designed to resist the high temperatures, humidity and dusty environments found in Cameroon. Courtesy of EPFL, ©Sylvain Liechti.

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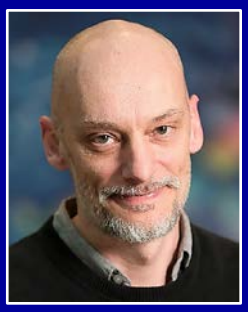

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Thanks to our sponsors, partners and friends

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We are particularly grateful to the interns, volunteers and employees of the Foundation: they are the Foundation's life-blood; they are at the heart of our success in promoting our vision of universal access to life-saving technologies.

Finally, we want to thank all the people who have believed in this initiative and helped us to spread the word.

If you would like to help the Foundation as well:

Make a high and durable impact, with a donation to the EssentialMed Foundation.
The EssentialMed Foundation is recognized by the Swiss government as an organization of public interest, and will provide a receipt allowing you to claim a tax deduction, if provided for by your country's law.
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