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# PRESS RELEASE

## Researchers from Lausanne obtain funding for implementation of clinical algorithms to improve the health of febrile children while drastically reducing unnecessary prescription of antibiotics.

**Fondation Botnar has awarded CHF 7 million to researchers from Lausanne, for further deployment of electronic diagnostic and treatment tools based on algorithms which will help clinicians to manage febrile children. The research project is led by Unisanté* and the École Polytechnique Fédérale de Lausanne (EPFL), in collaboration with the Swiss Tropical and Public Health Institute (Swiss TPH) and two research institutes in Tanzania: Ifakara Health Institute (IHI) and National Institute for Medical Research (NIMR). The project could avoid millions of clinical failures and tens of millions of unnecessary prescriptions of antibiotics every year, in Africa and perhaps one day in Europe.**

Each year, around 3.3 million children die from acute febrile episodes worldwide, especially in countries with low-resources. The lack of diagnostic tools and clinical guidance to front-line health workers strongly contribute to this situation, and leads at the same time to unnecessary antimicrobials prescribed to "be on the safe side". Around nine in every ten children attending primary health care establishments in Tanzania receive an antibiotic, although only one in ten really need it. This over-prescription is a major factor in antibiotic resistance, which is one of the world's most serious health problems and a major healthcare challenge. Moreover, when an epidemic breaks out, young children are the first victims of resistant infections which can no longer be tackled using first line antibiotics and contribute in turn to this high mortality.

### New funding to develop dynamic algorithms

Thanks to their long experience in developing decision support algorithms that guide primary care clinicians all along the management of their febrile patients, Unisanté has obtained support from Fondation Botnar, a Swiss foundation with the core purpose of improving the health and wellbeing of children and young people in growing secondary cities around the world by leveraging artificial intelligence (AI) and digital innovation. The funding, of CHF 7 million, will enable the teams from Unisanté, EPFL, Swiss TPH, IHI and NIMR to develop novel algorithms enhanced by machine-learning and roll it out on a larger scale. The research project, named DYNAMIC, will start on 1 April 2019 and will be conducted in Switzerland and Tanzania, over a five-year period.

"Both the global shortage of health workers, and the lack of upskilling and training has a severe impact on the health and wellbeing of children and adolescents, especially in low-resource settings," said Dr. Aline Cossy-Gantner, Chief Learning Officer of Fondation Botnar. "Fondation Botnar is excited to work together with Unisanté, Prof. Valérie D'Acremont and their partners on this important opportunity to address some of the most pressing child health needs. The DYNAMIC project will also provide valuable insights for the foundation as we look to generate evidence on the application and use of digital technologies to improve and personalise health in other low-resource settings."

### The need for effective diagnostic tools

The Ebola, Chikungunya and Zika epidemics have highlighted the need for highly sensitive diagnostic tools to identify the causes of fever in patients and to ensure surveillance of febrile diseases. Professor Valérie D'Acremont (Unisanté* and Swiss TPH) and her research group have conducted very large-scale research studies on this subject with children and adults living in Tanzania. Their work led to the award of the Pfizer Prize in 2015. The following year, the SAfia research project, enabling the testing of new diagnostic platforms, obtained funding of CHF 2.7 million from the Bill & Melinda Gates Foundation.

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Swiss TPH
Swiss Tropical and Public Health Institute
EPFL
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE
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**First and second-generation clinical algorithms**
The identification of the causes of fevers in Tanzania enabled the development and implementation of a first generation electronic algorithm using tablets, as a basis for personalised evaluation and management of patients (ALMANACH). The second generation of this mobile tool, connected to biosensors and rapid point of care tests (ePOCT), guides health professionals throughout the consultation. It helps them identify the patient's personal characteristics and assess whether prescription of an antibiotic is necessary for this patient, or, most often, useless.

**Conclusive results**
The use of this second-generation electronic tool has proved highly effective in the treatment of children suffering from fever. It has enabled a drastic reduction in the misuse of antibiotics, from 95% to 11%, finding that has been awarded again by the Pfizer price this year. The effectiveness of this technological innovation encouraged Professor D'Acremont (Unisanté* and Swiss TPH), Professor Martin Jaggi (EPFL) and Dr Kristina Keitel (Swiss TPH) to launch a new stage in development.

**Innovation supporting personalised medicine**
By drawing on simple, cheap technological innovation, the new ePOCT+ tool has the potential to significantly improve treatment and health outcomes for sick children. ePOCT+ will benefit from significant technological and analytical innovation. It is hoped that it will adapt to epidemics in real time and to revolutionise the clinical response to changes in the environment, both at individual and population level.

The new mobile tool should improve the identification of children suffering from a serious illness requiring immediate treatment, so reducing mortality. The rational use of antimalarials and antibiotics should also lead to more reliable and rapid cure for the most frequent infections and reduction in drug resistance. At the public health level, computerised surveillance will improve the early identification of localised epidemics and support both the modification of the patient care algorithm and the implementation of appropriate interventions, such as vaccination campaigns or other preventive measures. At national level in Tanzania, the tool could thus avoid 1 million treatment failures and 28 million unnecessary prescriptions of antibiotics every year.

Professor D'Acremont said: "The project illustrates the value of reverse innovation. Because the Tanzanian health system is new, it is more flexible than the Swiss system. It is more connected and integrated and less governed by silos than Switzerland. What we are doing in Tanzania will have the secondary effect of providing experience which could be of benefit in Switzerland."

**Unisanté, a pioneering center in digital health**
The DYNAMIC project is part of the development of algorithms for clinical decision support and other electronic health care tools, in which Unisanté* is carrying out pioneering work. The work Unisanté has been doing on primary care for the past 15 years has enabled it to develop effective tools for clinical management, promoting modern, personalised medicine.

**Swiss TPH – excellence in global health**
The Swiss Tropical and Public Health Institute (Swiss TPH) is a world-leading institute in global health with a particular focus on low- and middle-income countries. Associated with the University of Basel, Swiss TPH combines research, services, and education and training at local, national and international levels. Over 800 people from more than 70 nations work at Swiss TPH focusing on infectious and non-communicable diseases, environment, society and health as well as health systems and interventions. www.swisstph.ch

*Unisanté is the brand new University Centre for General Medicine and Public Health, established on 1 January 2019, bringing together the Policlinique Médicale Universitaire, the Institute of Social and Preventive Medicine, the Institut Universitaire Romand de Santé au Travail and the association Promotion Santé Vaud.

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