



Project: "Health telematics for improvement of TB- and HIV-care in rural Tanzania"

Partners:

- Charité - University Medical Center, Berlin, Germany
- St Francis Referral Hospital, Ifakara, Tanzania
- Ifakara Health Institute, Dar es Salaam, Tanzania
- eHealth Africa, Nigeria & Berlin

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Figure 1 - Village healthcare worker entering data from a TB suspect

Background / Problem:

Despite the significant improvement in the diagnostic and therapeutic options for tuberculosis and HIV, the care of the rural population in Africa and other developing countries is still a major problem. Efficient test methods for diagnosing tuberculosis and for checking and adapting ongoing HIV therapy are based on molecular test procedures, which for technical, logistical and financial reasons can only be kept in central health facilities. The rural population in Africa usually does not have access to these modern test methods due to the long distances between home and central health facilities, a lack of financial resources and organizational difficulties in sending in samples and communicating results.

Solution approach:

TB diagnostics and therapy in rural areas is to be transferred from local use of inefficient test procedures and from paper-based documentation and transmission of findings to a **digital system** that also records sample transport, the return of findings and the further course after diagnosis of tuberculosis. In addition to improving care in rural areas, the system should provide valuable data on the performance of the health system and on public health.

Methodology:

After a detailed analysis of the existing structures of the local health system and the needs of the local population, an IT system ("**Health Telematics Infrastructure - HTI**") was developed which, in the case of tuberculosis, allows for the simple registration of people suspected of having tuberculosis and registering a sputum sample on a tablet computer or smartphone. The registered and tracked sample is transported to a central laboratory using local transport routes. After the sample has been tested, the result is recorded in the IT system and immediately sent to the healthcare worker on site via SMS. After interpreting the findings, the healthcare professional can forward the result to the tested person's mobile phone. In the same way, the therapy control for HIV-positive patients, which is necessary at least once a year, is organised. Patient adherence in TB and HIV management is supported with an

automated SMS reminder system and healthcare workers will be alerted by SMS in case of an appointment missed by the patient.

In addition, authorized persons (primarily those responsible for the local and regional health system or for public health) can view both the **performance data of the local health system** and the diagnosis and therapy statistics for tuberculosis and HIV treatment via browser-based access. The data is displayed in real time in various standardized views (so-called "data dashboards", see Fig. 3).

The developed health telematics system was developed on the **basis of several free open-source software components** (OpenDataKit, RapidPro, GATHER) and will soon be available for free use.

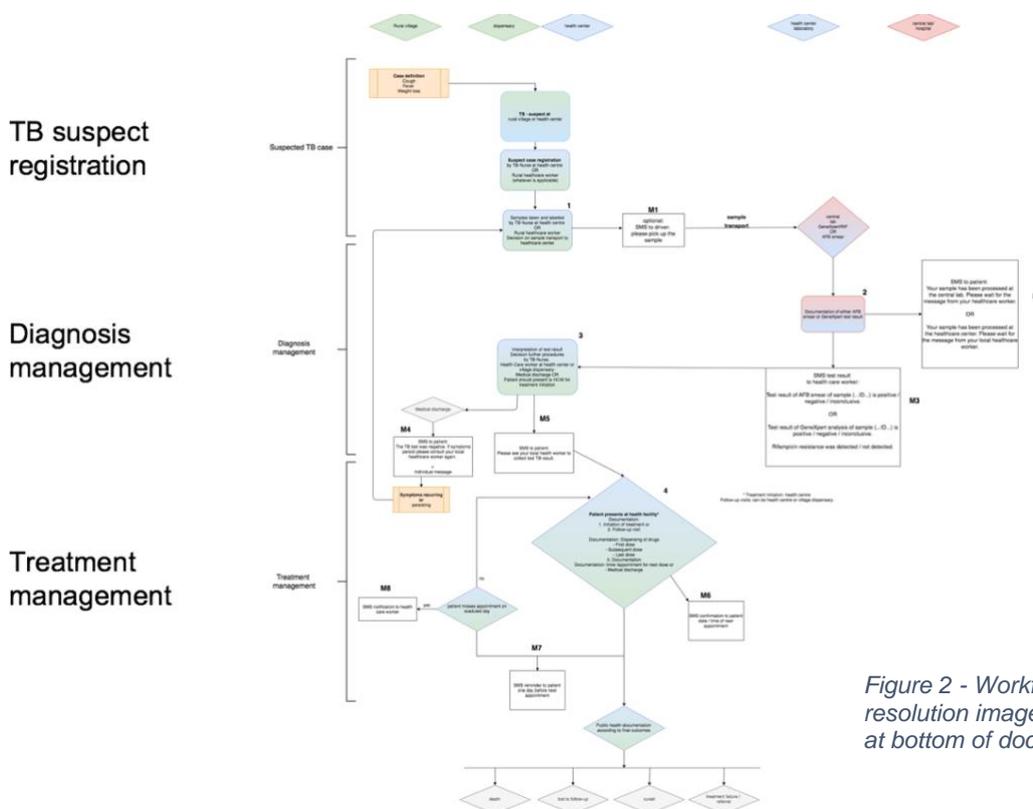


Figure 2 - Workflow in TB-telematics - high resolution image on project website (see link at bottom of document)

Results:

After the development, testing and implementation of health telematics in the Kilombero region in Tanzania, the proof-of-concept was successfully demonstrated in terms of functioning health telematics in rural areas and a drastic reduction in the time between the first symptoms of tuberculosis and the delivery of a sample and getting a TB or HIV test result from weeks to days. As a result, most of the people in the project area had access to modern test methods, especially TB diagnostics, for the first time. The "dashboards" of the system reliably displayed what was happening on site in real time. A comprehensive evaluation of the project and its effects on local health care as well as socio-scientific and socio-economic aspects will take place in the course of the year 2022, and results published in 2023.

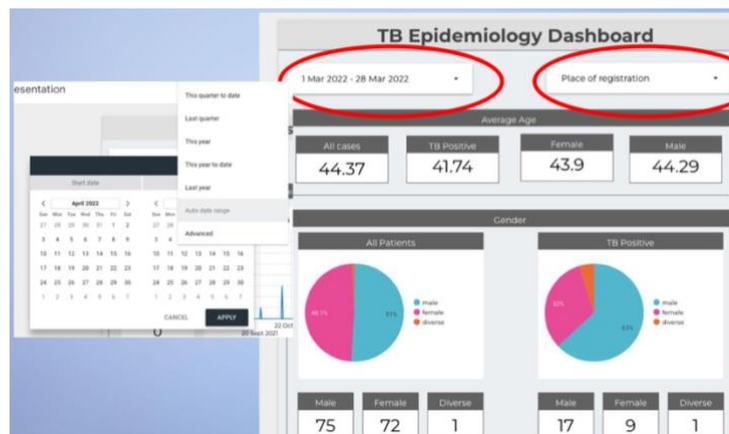


Figure 3 - TB epidemiology dashboard with automated analyses

Conclusion and outlook:

Due to the successfully completed proof-of-concept, HTI should be continued for a longer period of time with further scientific evaluation and extended to other areas in order to further evaluate the performance of the system with larger patient numbers and in the regular operation of the health system. **HTI can be easily configured to support many types of rural health care & campaigns, e.g. NCD care or vaccination campaigns.**

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Project website with constant evaluation & software updates: <https://www.charite-inflab.de/zoller-group/projects/hti/>