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HEALTH TECHNOLOGY

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CONTENT

In a letter to Dutch Parliament last April, the Dutch Minister of Health, Bruno Bruins, set out his vision on medical technology and gave an analysis of what MedTech has to offer and the challenges that it poses. With his focus on optimal use of innovations, the Minister explained how government tries to guide the development of new technologies and their integration in actual health practice. The range is diverse: from ICT solutions (eHealth) – such as tele-monitoring, wearables (e.g. blood pressure meters) and health apps (mHealth) – to robot surgery, 3D-printed orthopaedic prostheses, tissue engineering and much more.

The Netherlands has a long history of providing imaging equipment (X-ray, ultrasound, MRI) to district hospitals in most of sub-Saharan Africa, combining development cooperation with the promotion of Dutch business interests long before the Ministry of Development Cooperation was rebranded Foreign Trade and Development Cooperation. It was not always a success formula as several evaluations concluded, pointing at faltering user support and deficient maintenance of the hardware involved, but it definitely stimulated our foreign export.

Some technological innovations find their way to countries with weak health systems, including new forms of medication, medical devices, diagnostic tools for diagnosis at primary health care level or even self-diagnosis, and communication channels to support remote personalised care and training. The added value of new technologies is not always immediately clear, and sometimes there simply is not much added value. Time and again, it proves difficult to tailor technical solutions to local circumstances.

For each MedTech innovation it is appropriate to ask which unmet need it really tries to address. Does it have any added value, in terms of health benefits, and for whom? Is there sufficient human capacity and are the infrastructural requirements in place? Is it financially affordable, for patients, hospitals and health systems as a whole? What about its cost-effectiveness, a parameter typically used by health economists? For them it is perhaps the main decision-making criterion but not necessarily for health practitioners, who are keen to do anything that serves their patients. What would the health budget impact be if new technologies – expensive as they sometimes are – were financed from public resources? Can we afford to include all promising new technologies and medicines in our health insurance benefits package? How would that affect our health insurance premiums? There are also ethical dilemmas. Do we want to continue treating debilitating or terminal conditions just because we can? Now that we can monitor so many of our body indices and life style features on a 24-hour basis, do we still have the liberty to decide not to know?

Health technology assessment (HTA) is a field of expertise of growing importance. HTA science helps to gather evidence on the issues raised above, as the first article in this edition explains. Subsequent articles give insights in the work of health scientists and practitioners who develop MedTech solutions in the field: monitoring and improving adherence to TB treatment in the Philippines, Tanzania, Ukraine and in Paraguay, and ultrasound technology for pregnancies in Ethiopia. The implications of rapid diagnostic tests for the role of laboratories are the subject of another article. Judge for yourself whether MedTech offers solutions in resource-constrained working environments. We welcome any reactions you may have!

Lastly, we are happy to introduce our new column ‘News from the NVTG working parties’. The spotlight this time is on Ophthalmology, one of the smaller, less well-known groups. And guess what: it discusses the role of technology in eye care.

Leon Bijlmakers

How to best use resources to improve health outcomes: the added value of health technology assessment

The rapid diffusion of (often high cost) health technologies challenges decision-makers worldwide. How can one best provide high-quality care according to health needs, while managing health care budgets and safeguarding access, choice and equity? Decision-makers at multiple levels in the health system need to ensure value-for-money and at the same time be accountable. Health technology assessment (HTA) could serve both purposes. This is particularly important in low and middle income countries (LMICs), as many of them are faced with undiscerning procurement processes, severe budget constraints, and demographic and epidemiological transitions. These are situations which severely impact on the burden of disease and consequently on increased health expenditure.[1-2] This creates a vicious cycle in which HTA could play a prominent role.

HEALTH TECHNOLOGY ASSESSMENT: WHAT IS IT?

A health technology is 'an intervention developed to prevent, diagnose or treat medical conditions, promote health, provide rehabilitation, or organize healthcare delivery. The intervention can be a test, device, medicine, vaccine, procedure, program or system'.[3]

HTA is a multidisciplinary approach to assess the intended and unintended consequences of using health technology. Most often these include safety, clinical benefit, and economic, ethical, social, cultural and legal aspects.[4] The purpose is to inform health policy and decision-making about the best use of resources to improve health outcomes. HTA is – for example - used for:

- defining emergency kits, disaster planning, (basic) benefit packages, and essential medicines lists;
- medical device and equipment procurement planning;
- setting prices for health technologies;
- rolling-out broad public health programmes;
- formulating clinical guidelines;
- health technology acquisition or adoption, including procurement at the hospital level – i.e. hospital-based (HB-) HTA.[5]

INCORPORATION OF HTA INTO HEALTH SYSTEMS AROUND THE WORLD

HTA had its inception in the United States, where around 1975 the Office for Technology Assessment started collecting available evidence regarding efficacy and cost-effectiveness of health technologies. From 1985 onwards, the focus was on seeking more effective links with policy-makers, particularly in Europe. In the Netherlands, for example, HTA was introduced to address concerns of the Ministry of Health (MoH) about the rapid development of new health technologies, such as heart and lung transplantation and their impact, especially in terms of cost.[6]

Since then, many governments in high-income countries have established formal HTA units or agencies associated with the MoH or its equivalent. For example, in France, the government established the National Health Authority (HAS) which is tasked with improving the quality of care and ensuring equity in the health system. HAS provides recommendations to the National Union of Health Insurance Funds (UNCAM), mainly based on evidence about the therapeutic benefits of health technologies for specific target populations. The UNCAM makes the final recommendation to the MoH for inclusion in the social health insurance benefit package. In the Netherlands, the National Health Care Institute ('Zorginstituut') provides recommendations to the MoH with regard to the inclusion (or exclusion) of various health technologies in the standard benefit package, using severity of disease, effectiveness, cost-effectiveness and feasibility as criteria.

From 2000 onwards, some middle-income countries established formal national HTA agencies, including Brazil, Colombia, Malaysia, Mexico, and Thailand.[7-9] Hospital-based HTA is being implemented in several high-income countries, including Australia, Canada, Denmark, Finland, Italy, Spain, Sweden, the Netherlands, and the USA. Economic development is often associated with increased health care spending and improved access to health technology, which has led to a strong impetus for HTA.[10] It should be noted that in countries without formal agencies, HTA may be labelled as cost-effectiveness analyses or priority setting. The use of cost-effectiveness as the only criterion for allocating scarce resources could lead to flawed decisions as it does not explicitly incorporate considerations of equity.[11]

Political commitment has proven to be of utmost importance for the development of HTA. After a decade of financing several research projects, a formal statement by the European Commission led to the establishment of a network on HTA in Europe (EUnetHTA) in 2004. This network has developed methodological guidance for how to conduct HTA and methods for sharing HTA work and reports between countries.[12] The World Health Organization (WHO) has also emphasized the importance of HTA in several resolutions. In 2014, a resolution on using HTA in support of universal health coverage was approved during the 67th World Health Assembly.[13] This and other resolutions targeting specific regions included a call for strengthening national, sub-regional and regional HTA networks to promote exchange among institutions and countries. In the Americas, countries were

encouraged to actively participate in the Health Technology Assessment Network of the Americas (RedETSA).[14] RedETSA was established in 2011, with the (financial) support of the Pan-American Health Organization (PAHO). PAHO explicitly recommends using HTA for the procurement of medical devices and equipment.[1] In the Asia-Pacific Region, three HTA agencies started a collaboration that led to a regional HTA network (HTAsiaLink) in 2011. However, unlike RedETSA, HTAsiaLink does not have a continuous stream of funding, and this poses challenges for its sustainability and the use of HTA in this region.[15]

HTA AS A POLICY TOOL FOR LOW- AND MIDDLE-INCOME COUNTRIES

The intent of HTA is to inform health policy and decision-making. This means that HTA is context dependent and as such should reflect what is considered important to society, taking into account the complexity and dynamics of health systems. In countries that formally use HTA, it has shown decision-makers how to best use resources to improve health outcomes. Best practice examples include the establishment of essential medicines lists, the definition of health insurance benefit packages, and the acquisition of health technologies in hospitals (see textbox).

LMICs often do not have a clear framework for integrating HTA results in decision-making processes. In countries that have no established formal HTA mechanisms, decision making is often ad hoc and driven by individual or collective perceptions rather than by evidence. In addition, the majority of LMICs often lack the research infrastructure, capacity and financial resources for conducting HTA, both at the national and local level. To assure appropriate use of HTA in health care decision-making, strong support from policy makers is needed.[10]

EXAMPLES OF THE ADDED VALUE OF HTA IN LMICS

In Thailand, a semi-autonomous HTA agency (HITAP) was established as part of the MoH in 2007. HTA has informed both the development of the national essential medicines list and the benefit package. Coverage decisions were mainly based on incremental cost-effectiveness, although in some cases additional criteria were used (e.g. for imiglucerase for Gaucher disease type 1 and peritoneal dialysis as initial treatment for patients with end-stage renal disease).[16]

In 2001, HTA was introduced in a public hospital in Buenos Aires (Argentina), targeting a national paediatric facility with its own budget. It aimed to inform hospital administrators and clinicians about the safety, effectiveness and organizational impact of acquiring new health technologies. Since its introduction, HB-HTA has been shown to be a valuable tool for the development of clinical practice guidelines and for optimizing use of the facility's budget.[17]

HOW TO MOVE FORWARD?

As HTA has shown its potential for informing health policy and decision-making around the globe, it is important to support countries that wish to develop and use HTA. Therefore, the role of international networks, such as HTAi and INAHTA, and regional networks, such as HTAsiaLink and RedETSA, in building capacity – in close collaboration with WHO, PAHO and other partner organizations – continues to be of utmost importance.

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From DOT to DAT – Digital Adherence Technologies in TB control

Historically, the most widely known means of supporting TB patients and ensuring adherence to their treatment is in-person directly-observed treatment (DOT), either at the health facility or the patient's home, whereby a health worker or volunteer directly observes the patient taking his daily medication. Despite the successes of DOT, there are several challenges for both patients (Fig. 1) and providers (Fig. 2) that can be overcome by using digital technologies.

Fig. 1: Patient challenges with current DOT approach.

Fig. 2: Health care providers challenges with current DOT approach.

IMPROVING TB ADHERENCE THROUGH DIGITAL TECHNOLOGIES

In the last few years, several technologies have been developed (see textboxes) that can support patient-centred observation, and provide healthcare workers (HCWs) with accurate, real-time, and detailed dosing histories for people on TB treatment. Accurate patient dosing histories allow HCWs to make data-driven decisions and provide patients with personalised care, including counselling to improve their treatment adherence.

TB treatment outcomes are highly dependent on proper medication adherence. With the availability of affordable and scalable digital technologies, there is a rapidly growing interest in using these to improve adherence to treatment.

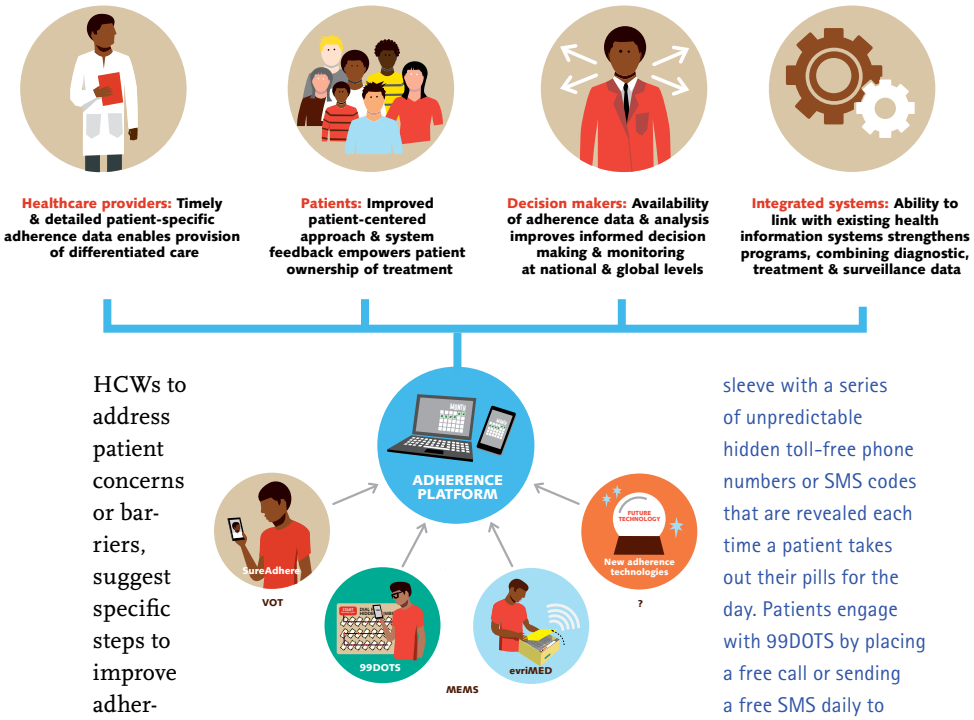
KNCV SUPPORT FOR DIGITAL ADHERENCE TECHNOLOGIES (DATS)

As an implementer and technical assistance organization, KNCV Tuberculosis Foundation is closing the gap in terms of global and country-level evidence creation as well as the development of operational guidance for the use of DATs-enabled interventions. Funded by the TB REACH initiative of the global Stop TB partnership, KNCV is implementing projects in the Philippines, Tanzania and Ukraine that aim to demonstrate how to customize DATs to the local context and how to integrate these technologies into standard practices of TB care. In addition, these projects assess the feasibility, acceptability by patients and health care providers, and the accuracy of DATs, as well as the impact of DATs interventions on adherence behaviour and treatment outcomes.[1]

KNCV is one of the frontrunners when it comes to implementing and utilizing digital health solutions for TB control. As lead partner of the ASCENT consortium, we are finalizing a comprehensive four-year project proposal to catalyse global and country uptake and equitable access to DATs by addressing three main access barriers: (i) demand and adoption, (ii) affordability, and (iii) supply and procurement. The ASCENT project includes five countries- Ethiopia, Philippines, South Africa, Tanzania and Ukraine – and builds on the experience of our ongoing TB REACH demonstration projects. The ASCENT project implements and utilizes an open-source adherence platform, capable of linking several digital adherence technologies (Fig. 3) in diverse geographic, cultural and infrastructural settings.

While the implementation of DATs is not a panacea to fix the root causes of TB (e.g. health inequity, human behaviour, health system shortcomings, drugs toxicity), we believe that DATs can contribute to solving some of the underlying challenges to treatment adherence by promoting better patient self-management and providing an alternative for 'observed' dosing of TB medication. This, in turn, would empower patients and offer providers a wider variety of options for outpatient treatment management. At their core, these technologies offer the flexibility and customizability required to enable context-specific features for each country and patient/clinician preference. For the health system, DATs can help improve efficiencies by continuous and automatic detection of patients who fail to adhere to their treatment and who are therefore most at risk of poor treatment outcomes. This allows

Fig. 3: A unified open source digital adherence platform.



HCWs to address patient concerns or barriers, suggest specific steps to improve adherence, and mitigate potential loss to follow-up. In this way, DATs become part of an integral package of treatment adherence interventions offered to TB patients. Also, by supplementing or replacing traditional facility-based DOT, it can provide TB patients with a more diverse set of treatment administration options.

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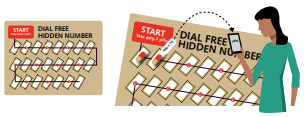
99DOTS: A MEDICATION EVENT MONITORING SYSTEM VIA PHONE CALL / SMS



99DOTS (simple phone call technology)

99DOTS pairs customized medication packaging with basic phone call / SMS technology to provide accurate, real-time data on patient treatment adherence. In this approach, existing Fixed-Dose Combination (FDC) antibiotic medication blister packs are repackaged in a custom cardstock sleeve with a series of unpredictable hidden toll-free phone numbers or SMS codes that are revealed each time a patient takes out their pills for the day. Patients engage with 99DOTS by placing a free call or sending a free SMS daily to the revealed number, at which point the system will automatically log their medication intake on the adherence platform. The modality of calling versus texting, as well as the language, dimensions and design iconography of the sleeves can be customized to each country context. This DAT is best suited for patients receiving their TB medication in standardized FDC blisters.[2]

evriMED MEDICATION EVENT MONITORING SYSTEM VIA SIM-ENABLED SENSOR

evriMED (cardbox custom dispenser)

evriMED is a digital medication monitor that combines the functionality of a low-cost medication box with a small-scale, battery-powered sensor and mobile data connection. Patients store and organize their TB medications in the box, and when they open the box for daily medication intake, the sensor is activated and sends dosing event information in real-time to the adherence platform using the mobile data connection. When outside of mobile signal connection, opening events are stored in the device memory for later upload. The box can be fully customized to include treatment-specific instructions and its small LED display and speaker enable configurable audio-visual reminders. This DAT is appropriate for patients that take non-injectable medications; it is particularly well-suited for drug-resistant TB patients, as the box format is medication-agnostic and appropriate for storing the diverse types of regimens.[3]

VIDEO SUPPORTED TREATMENT (VOT)

Video Supported Treatment (VOT)

A phone and tablet application (app) that utilizes video recording and mobile communication to remotely monitor and support TB medication intake. Using an asynchronous video approach (in contrast to synchronous 'live' video), patients are guided to record videos of themselves when taking their daily medication. These videos are automatically synchronized via a secure mobile connection with the adherence platform, where they are then reviewed by the patient's health care provider and marked as complete. While the other DATs rely more on the technology as a proxy for daily dosing, VOT is the closest approach to 'remote' DOT. It can be used for all treatment regimens (drug sensitive TB, drug resistant TB and latent TB infections), but requirements for smartphone devices, mobile connectivity infrastructure, and technology literacy mean it is not well-suited for all patients and contexts.[4]

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3. https://www.wisepill.com/
4. http://www.sureadhere.com/

Field epidemiology training all around the world

Tropical cyclone Idai hit three provinces in northern Mozambique in early March 2019. One week later, the WHO Global Outbreak Alert and Response Network (GOARN) [1] issued a request for assistance to its partners around the world to identify field epidemiologists and other technical specialists for immediate deployment to Mozambique.
The tasks outlined for field epidemiologists included: leading the development of an information repository on core public health indicators (e.g. crude and under-five mortality rates, prevalence of malnutrition, vaccination coverage) for Mozambique; working with other team members to analyse outbreak intelligence in real-time for epidemic forecasting and detection; and conducting health needs assessments. In addition, field epidemiologists were needed to collate and verify data on reported outbreaks, including rumours, received from multiple sources, and assess the efficiency of the verification mechanisms. They were expected to analyse reported incidents and determine trends and distribution patterns.
Immediately after the cyclone, residents of the Mozambique Field Epidemiology and Laboratory Training Program [2] were deployed to Beira province for surveillance and early outbreak detection, gathering information to support other health professionals, 'acute watery diarrhoea' surveillance, case finding, and monitoring and communication. On 27 March 2019, one day after the GOARN request for assistance to international partners, the first cases of cholera were confirmed in Mozambique.[3]

WHAT IS FIELD EPIDEMIOLOGY?

Field epidemiology is the practical application of epidemiologic methods and tools to public health problems. It can mean working in difficult situations with incomplete information, and limited resources, but the focus is on timely intervention and using available data to support public health action.

DISEASE SURVEILLANCE

An important component of field epidemiology involves working with surveillance systems for detection of disease outbreaks, monitoring disease trends, identifying risk groups, and evaluating interventions. While most countries have national surveillance systems to monitor a set of notifiable diseases, humanitarian response can necessitate rapid implementation of surveillance in challenging conditions. Early warning syndromic surveillance systems can be set up in order to promptly detect outbreaks that may occur, given the local circumstances. This could include surveillance for acute watery diarrhoea to detect cholera following floods, or surveillance for clusters of fever and rash to detect vaccine-preventable diseases in crowded refugee settings, such as the crowded Rohingya camps in Bangladesh.[4-6]

OUTBREAK INVESTIGATIONS

The main objective of an outbreak investigation is to identify the cause of the outbreak and to implement control measures to prevent the occurrence of more cases. In a foodborne outbreak, it is critical to identify the source in order to prevent further illness and to intervene in the food chain or food service

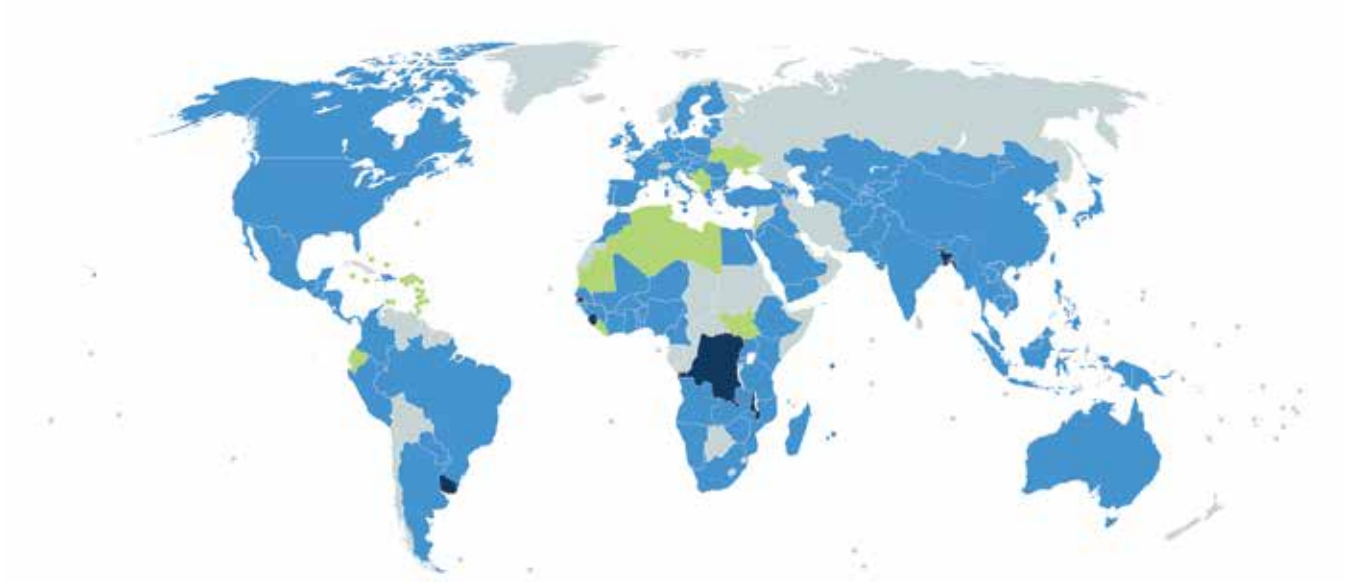

Fig. 1. Countries with a field epidemiology training program (FETP): official TEPHINET members in medium blue, interested in joining TEPHINET in dark blue, no TEPHINET affiliation in green.

Source: https://www.tephinet.org/training-programs

setting to prevent similar outbreaks in future. When a sudden increase of a vaccine-preventable disease is observed in an area with high vaccine coverage, a key question is whether the cause is vaccine failure or a failure to vaccinate. In the 2014/2015 Ebola outbreak in West Africa, field epidemiologist played an important role in detecting and describing the geographical spread of the outbreak in the affected countries.[7]

OPERATIONAL RESEARCH

Another core activity in field epidemiology is operational research, which can have various objectives such as evaluating the effectiveness of an intervention or the performance of a surveillance system or the distribution of risk factors for a communicable disease, with the aim of informing public health policy and programme resource decisions.

FIELD EPIDEMIOLOGY TRAINING PROGRAMMES (FETPS)

Field epidemiology training programmes are a practical solution to building skills among public health professionals in the basic concepts of outbreak investigations, disease surveillance, and the evaluation of public health interventions, in order to strengthen the local, national, and international public health infrastructure.

The first FETP was the Epidemic Intelligence Service (EIS), which started in 1951 at the United States Centers for Disease Control and Prevention (USCDC).[8] Since then, more than 70 programmes have been established in over 100 countries (Fig. 1). Many national and regional FETPs now incorporate a laboratory and/or veterinary track to encourage collaboration, build capacity through the entire health sector, and strengthen laboratory networks.

In 1995, the European Commission funded European Programme for Intervention Epidemiology Training (EPIET) welcomed its first cohort of fellows to a two-year competency-based training scheme. The Fellowship Programme is now managed by the European Centre for Disease Prevention and Control (ECDC) and comprises two paths, EPIET for field epidemiology and EUPHEM for public health microbiology.[9] During the programme, while working in public health agencies across Europe, fellows learn to apply epidemiological or microbiological methods to provide evidence to guide public health interventions for communicable disease prevention and control.

Field epidemiology networks are important. Having a network of professionals that know each other, speak the same 'language' (professionally), and can easily access each other's expertise represents an important resource for global public health (see Table 1). TEPHINET is a worldwide professional network of FETPs that provides a global platform for scientific and practical information exchange, and accreditation of newly established FETPs.[10]

TABLE 1. ONLINE FIELD EPIDEMIOLOGY TRAINING RESOURCES

Textbooks:
- From US CDC: Principles of Epidemiology in Public Health Practice, Third Edition. An Introduction to Applied Epidemiology and Biostatistics. https://www.cdc.gov/ophss/csels/dsepd/ss1978/index.html
- US CDC: Field epidemiology manual https://www.cdc.gov/eis/field-epi-manual/index.html
- Public Health series: https://www.cdc.gov/publichealth101/index.html
- Having fun: Solve the Outbreak: https://www.cdc.gov/mobile/applications/sto/index.html

Epidemiologic Case studies:
- From US CDC, classroom and computer-based. https://www.cdc.gov/epicasestudies/index.html
- Case studies from the African Field Epidemiology Training Network AFENET, e.g. Ebola, cholera and measles outbreaks. http://www.afenet.net/index.php/resources/training-materials

Other networks include the African Field Epidemiology Training Network (AFENET), the South Asia Field Epidemiology Training Network (SAFETYNET), the Eastern Mediterranean Public Health Network (EMPHNET), the South American Field Epidemiology Network (REDSUR), and the European EPIET Alumni Network (EAN).[11-14]

CURRICULUM

FETP trainees, residents, or fellows take part in a two-year fulltime FETP programme. The training is a learning-by-doing, which means working at a public health agency on a national or regional level. The curriculum is based on the target competencies for public health professionals, as defined by national or regional bodies.[15-17] The classroom-based training supports fellows in putting their learning into practice and demonstrating their 'competency'. FETP requirements vary but can include: investigating an outbreak; designing, evaluating or coordinating a surveillance system; designing and implementing an applied epidemiological field study; producing oral and written scientific communication; and developing and delivering training to others. Field epidemiologists are often required to build and work with ad hoc teams during field investigations, and to train team members for the tasks required for the investigation. In addition to their technical learning, FETP students develop excellent communication skills and competencies in teaching.

FRONTLINE (OR SHORT) FETPS

The 2013–2015 West Africa Ebola epidemic, which primarily affected Guinea, Liberia, and Sierra Leone, demonstrated a lack of field epidemiologists at local levels, where detection and response could have happened earlier in the outbreak. In 2015, the USCDC launched the so-called FETP-Frontline, a 3-month field training programme targeting local Ministry of Health staff in 24 countries to strengthen local public health capacity.[18] The programme enhances

global health security by training local public health staff to improve surveillance quality in their jurisdictions, as part of a strategy to help countries to detect, respond to, and contain public health emergencies more rapidly.

FETP-Frontline participants have used their training to identify gaps and promote change in the public health systems in which they work. For example, Guinea-Bissau FETP-Frontline participants made policy recommendations to improve the way in which dog bites are tracked, in terms of follow-up with rabies testing, and to improve data confidentiality and protection for patients. In The Gambia, under the resident advisor's guidance, members of the first cohort came up with recommendations for improving the surveillance system such as: appointing district surveillance officers where there were none previously, training new staff in basic epidemiology, and including private health clinics in the national surveillance strategy. In Côte d'Ivoire, Senegal, and Togo, where training has included participants from both the human and animal health sectors, trainees have worked together to conduct coordinated joint investigations to combat rabies.

CONCLUSION

People working in health programmes or facilities in low or middle-income countries can suddenly find themselves on the frontline of an epidemic. Every healthcare worker in these settings can benefit from familiarization with some basic principles of field epidemiology in order to enhance readiness to deal with a public health crisis. There is a lot of free online training material available (see Table 1) to review and practice concepts of field epidemiology.

Ongoing capacity building in the core field epidemiology functions of disease surveillance and outbreak response is essential in an era with ongoing threats and potential emerging infections. Investing in training local health experts in field epidemiology will therefore contribute to a sustainable increase in the much-needed public health global workforce.

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Rapid Diagnostic Tests and what they mean for laboratories in resource constrained countries

Rapid diagnostic tests (RDTs), which were initially developed for rapid field testing, were quickly incorporated in routine laboratory testing and have now become commonplace in the health delivery system.[1] In resource constrained settings, a number of donor funded programs have pushed for their use in non-laboratory settings such as health clinics. This expansion raises the question of what this means for laboratories.

LABORATORIES IN RESOURCE CONSTRAINED COUNTRIES

Laboratories in resource constrained countries are typically organised into a four-tier system consisting of peripheral, district, provincial and central laboratories. The breadth and complexity of tests within this network increases from the peripheral laboratory, where basic tests are performed, through to the central laboratory, where highly complex tests are conducted.[2] The parcelling out of test menus and upward referral of complex tests through the tier seeks to take advantage of the different resource capacities (infrastructure, equipment, staff etc.) at each level.

The major push for improvements in laboratories in resource-constrained settings has been the need to improve quality and increase access to testing. Although significant efforts have been made to strengthen laboratories over the past few years, challenges still exist. These include limited infrastructure and personnel, unavailability of functional equipment, lack of equipment maintenance contracts, and intermittent power supply. In addition, specimen referral systems may not always operate as efficiently as intended and reagent stock-outs that are attributed to funding gaps and/or shipping delays occur frequently, resulting in repeated work interruptions.[3,4]

RAPID DIAGNOSTIC TESTS

RDTs are basically non-automated testing devices that can be used individually or in sequence with other devices to provide, in a relatively short time frame, a qualitative or semi quantitative result from patient samples.[5] The tests detect markers such as bacterial, viral or parasite antigen or antibody in body fluids and can employ any of three techniques: direct agglutination, latex agglutination and lateral flow strips. Tests that employ the first two techniques often require refrigeration and are performed within a traditional laboratory setup. Examples include tests for febrile antigens (Widal and Weil Felix), rheumatoid factor, C-reactive protein, and rapid plasma reagin (RPR) for syphilis. Lateral flow based tests such as those for pregnancy, HIV, malaria, and syphilis generally do not require refrigeration. These tests have a long shelf life of up to 2 years and can be performed outside the traditional setting with minimal training required. They also require very small sample volumes, and results are usually available within 15 minutes. Most RDTs are comparable in performance to established methods.[6]

RDTS: BENEFITS AND CHALLENGES

RDTs have many benefits such as low cost, close to patient, and same day testing options that allow for more prompt patient management decisions within a single visit to the health facility, thereby reducing follow-up loss. In areas with limited infrastructure or personnel, non-laboratory cadres such as community health workers (CHWs) can be trained rather quickly and inexpensively to perform RDT outside the traditional laboratory environment, thereby improving access to testing.[7] RDTs also present a viable option as they utilise small sample volumes where testing is conducted immediately after sample collection. This in turn eliminates steps that are usually taken when samples are referred to the main laboratory. The small size and portability of the RDT also make them more suitable to a variety of testing environments.[8]

The use of RDTs offers a simple solution to address access to testing. However, various challenges need to be addressed and taken into consideration when implementing RDTs. First, some tests have several alternatives, which may vary in performance or not even be WHO prequalified. In order to ensure reliable results, minimum test performance standards must be established. Second, although RDTs are relatively easy to perform, errors can still occur, especially when testing is conducted by lay people who lack understanding or training in the use of RDTs and interpretation of the results (e.g. a positive syphilis antibody RDT result does not distin-

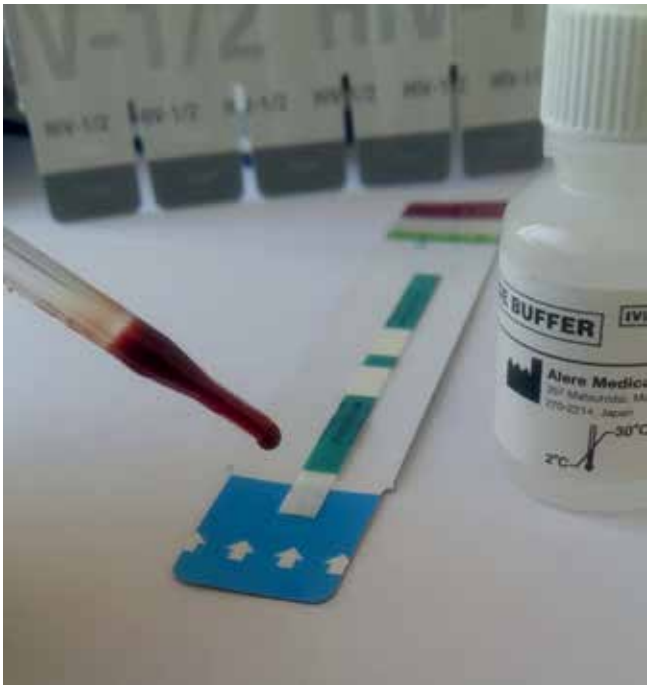

Figure 1. HIV Rapid Diagnostic Test.

guish between an active and a previously treated infection) as well as QA/QC related issues.[8] Also, post market surveillance may not be diligently conducted. Finally, it is important to note that understaffing is common in resource constrained countries, and at times the introduction of new RDTs in non-laboratory settings such as clinics may still increase workload pressures on existing staff, thus impacting on workflow and patient waiting times.[9]

RDTS IN ROUTINE LABORATORY TESTING

The many attributes of RDTs present an opportunity for incorporation into routine testing within the core laboratory. For instance, RDTs are being used as alternative or supplemental tests for the screening and diagnosis of infectious diseases.[1] Typical examples include RDTs for HIV, malaria, syphilis, TB and cryptococcal meningitis. Additionally, the organisation of national laboratory networks into a tiered system in which RDTs are conducted at peripheral level demonstrates the value and contribution of RDTs to not only increasing access but affording an opportunity for timely patient management decision making.[2]

Figure 2. Malaria Rapid Diagnostic Test.

QUALITY RDT RESULTS: LABORATORY ROLE

The implementation of RDTs and especially their deployment in non-laboratory settings does not diminish the importance of the laboratory. In fact, the laboratory is expected to play an even bigger role. The laboratory's responsibility in providing quality RDT results lies in ensuring that standardised quality diagnostics are available. One of the key attributes of RDTs is that results should be comparable to an established laboratory method.[10] By inference, the laboratory's role is to identify the established method and set minimum test performance criteria for the RDTs to be evaluated. The performance criteria are then used as the basis for the selection and evaluation of RDT technologies. The laboratory should also ensure that the evaluation process extends beyond the laboratory setting, so that RDT performance results accurately reflect the clinical setting testing in which the test will eventually be conducted.[11,12]

By working closely with the Ministry of Health and other partners, laboratories should also take the lead in the development and implementation of guidelines, testing algorithms, standard operating procedures, end user training, and providing QA/QC support to testing sites through preparation and distribution of proficiency testing (PT) and QC material.[13] Laboratories in turn need to implement quality management systems (QMS) and participate in external quality assurance (EQA) schemes to ensure that they in turn are able to provide quality testing within their network.[9]

CONCLUSION

RDTs have been shown to complement and support routine laboratory testing in resource-constrained settings. A number of quality issues arise with testing being done in non-laboratory settings. The laboratory should anticipate and address these issues so that diagnostic quality is not compromised. This will ensure that RDTs are powerful resources to increase access at points of care and reduce loss to follow-up.

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The use of Video Observed Therapy (VOT) to improve TB treatment adherence in indigenous people in Paraguay

Even though the global incidence of Tuberculosis (TB) has been declining over the past decades, TB remains a major global health problem.[1] In Paraguay, the national burden of TB is considered 'intermediate', with 42 cases per 100,000 inhabitants and approximately 2800 new patients annually.[2] However, in the indigenous populations of Paraguay, which comprises 1.7% of the national population, the TB burden is much higher.[2-4] A recent study performed in the Central region of Paraguay found that the indigenous population had a 66 times higher TB incidence compared to the non-indigenous population of Paraguay.[5] Indigenous populations are considered more vulnerable to the disease due to various factors, including poor living conditions, low education levels, language barriers, cultural beliefs, and distance from their homes to health care centres.[3,6]

ADHERENCE TO TREATMENT THROUGH DOT

Successful treatment is essential in order to control TB. Adherence to TB treatment, however, is a major challenge in many countries as the currently available treatment is extensive, complex, moderately tolerated, and lengthy. [7] The risk of low treatment adherence increases when patients have a negative treatment experience (e.g. when treatment involves considerable time and money, when side effects to the medication are frequent or substantial or, the opposite, when patients start to feel better and lose their motivation to finish the TB treatment (which may take up to nine months or sometimes more).[8] Low treatment adherence increases the risk of treatment failure and poor outcomes, including disease progression, relapse, development of drug resistance, ongoing transmission, and increased morbidity and mortality.[7,9,10] This highlights the importance of TB treatment adherence and the need for regular and close contact between health worker and TB patients.[8]

In-person Directly Observed therapy (DOT) was introduced in 2002 in Paraguay to improve treatment adherence. This strategy, recommended by the World Health Organization (WHO) and the US Centres for Disease Control and Prevention (CDC), is considered the gold standard for TB treatment monitoring.[11] DOT consists of a 6-month therapy course together with the provision of information, support, and close supervision of medication intake by a health worker.[11] In Paraguay, free medication and regular visits to the patient's home are provided by the national TB programme (PNCT), and treatment is monitored by a so-called health promotor, who is often a family or community member.[3]

Figure 1. Talking about the impact of TB with an indigenous family at Hospital Indígena in Paraguay.

Despite the introduction of DOT in Paraguay, the treatment success rate was only 70% in 2016, while the international target set by the WHO is 90%.[1,2] This shows that DOT is not as effective as intended in improving treatment adherence and thereby treatment success in Paraguay. In actual fact, DOT is more difficult to apply in low and middle income countries, especially in indigenous populations, as the vast majority of these patients live in resource limited settings far from health care centres.[12,13] DOT visits are logistically complicated (involved both patient and health worker) and resource demanding (requires substantial money, personnel, time, and transportation).[7,9] In addition, DOT can be experienced as inconvenient and disturbing by patients, and issues concerning ethics and privacy have been raised, especially in indigenous populations.[9]

VIDEO OBSERVED THERAPY (VOT)

There is an urgent need for more effective strategies in vulnerable and hard to reach populations. One of the proposed alternatives to overcome the barriers of DOT is Video Observed Therapy (VOT).[7] VOT is a method of treatment monitoring that involves patients recording and submitting daily videos of their TB medication intake using a smartphone.[10] The VOT system (SureAdhere) includes a smartphone application to record, transfer, and store videos of their medication intake, and a website where the uploaded videos in the cloud will be assessed by DOT workers. Also, patients can contact their health care worker in case of side effects, and the DOT workers send them medication reminders on their smartphones to encourage medication intake.[10] Once validated, VOT will replace the specific DOT visits by health workers to monitor treatment adherence, while the routine medication provision and health monitoring visits will remain the standard of care.[10]

VOT has several advantages: it improves patient privacy, it augments patient autonomy, and it is less time consuming. Constant internet connection (which is difficult for patients in remote and hard-to-reach areas) is not required as videos will be uploaded to the central cloud once the patient has

an internet connection.[8-10] VOT will enhance patient management efficiency by shifting the focus from treatment monitoring visits alone to increased patient care and real support.[10] Advantages also include the elimination of the need to coordinate DOT visits, improved staff safety, reduced travel time for both patients and health workers, and reduced costs for the national TB programmes and governments.[10]

Figure 2. Explaining the AdheGena TB study to a patient at the specialized respiratory disease hospital in Paraguay.

The effectiveness of VOT has already been studied in various patient settings in the United States, England, Belarus, Kenya, Mexico and Vietnam.[14]. Substantial evidence of reliable treatment monitoring and increased treatment adherence, patient acceptability, and cost effectiveness have been reported.[7-10,12,13] In addition, the most recent study on VOT, a multicentre, analyst-blinded, randomized, controlled superiority trial, performed by Story et al. (2019), demonstrated that VOT was more effective in monitoring Tuberculosis treatment than DOT in a high-risk TB population.[14] It was concluded that VOT might be preferable over DOT for many patients and in different settings, by providing a more acceptable, effective, and cheaper option for TB treatment adherence monitoring.[14] However, up to now, only a few studies have been performed in resource limited settings, and there is not yet enough evidence available of the effectiveness of VOT in socially complex (i.e. indigenous) patient populations.

PILOT STUDY

With our pilot study, we aim to explore the usefulness and effectiveness of VOT on TB treatment adherence in indigenous populations in Paraguay. Participants will be recruited from three Paraguayan healthcare centres: one specialized respiratory hospital, one indigenous hospital, and one regional hospital. Patients are eligible for inclusion if their diagnosis is bacteriologically confirmed and they are drug susceptible, aged ≥ 18 years, and in possession of a smartphone. DOT, which is still the standard of care in Paraguay, will be replaced by VOT in the pilot. All other TB care will remain the same. PNCT will provide medications and monthly check-ups to monitor the health status as usual during their routine visits. During the hospital stay, patients will be adequately instructed on the correct use of the application. After discharge, participants will return home where they will record their medication intake on a daily base during the entire treatment period. Based on the study results, an evaluation will be made to determine whether VOT is suitable as the new standard of care for treatment monitoring in the indigenous populations (in Paraguay).

CONCLUSION

Despite the efforts made in recent years, TB continues to cause enormous suffering and mortality in Paraguay, especially in indigenous populations.[3] Adherence to TB treatment is still problematic, and new solutions are needed to tackle this problem. Mobile technology plays an increasingly influential role in health care, and mobile phone apps are increasingly being used to improve patient care and treatment outcomes.[8,12] Telemedicine in Paraguay is now considered useful after having been studied for several years. Nationwide telephone and internet coverage reaches 36%.[15] Paraguay has almost 7.5 million active mobile phone lines, which means that there are more active mobile devices than inhabitants.[15] So, as smartphones are increasingly accessible even for the indigenous population in Paraguay, VOT is becoming more feasible and could therefore be a suitable method to improve treatment adherence in the populations where it is currently most needed.

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Introducing prenatal ultrasound to midwives in resource-limited settings using deep learning

Ultrasound imaging is commonly used for prenatal screening. In recent years, the cost of ultrasound devices has decreased to a few thousand dollars and devices have become more portable, with possibilities for connection to laptops, tablets or smartphones.

Whereas in high-income countries ultrasound imaging in obstetrics focuses nowadays on foetal abnormalities (such as foetal growth restriction and structural abnormalities), it is often used for different purposes in low-income countries. These countries use ultrasound for pregnancy dating and diagnosing twin pregnancies and placenta praevia, to identify high-risk pregnancies, and to ensure optimal birth care. The WHO recommends an ultrasound scan for pregnant women in resource limited settings for accurate gestational age estimation, for detection of multiple pregnancies, foetal malpresentation, foetal anomalies, placenta praevia and polyhydramnios, for confirming foetal viability, and for improvement of a women's pregnancy experience.[1]

Unfortunately, ultrasound imaging still remains out of reach for most pregnant women in these settings. This is caused mainly by a severe shortage of trained sonographers, who are needed to both acquire and interpret the ultrasound images.[2,3] Depending on the formal diploma or course, training a sonographer can take months to years and forms a barrier to implementation of prenatal ultrasound imaging in these countries. In this article, we present a system that can automatically interpret ultrasound images using deep learning. By combining this with a standardized acquisition protocol that can be taught to midwives within two hours, it could be possible to widely implement prenatal ultrasound imaging in resource-limited settings.

THE STANDARDIZED ULTRASOUND ACQUISITION PROTOCOL

DeStigter et al. developed the obstetric sweep protocol (OSP), which is particularly suitable in rural areas.[4] The OSP consists of six predefined sweeps with the ultrasound transducer over the abdomen of the pregnant women (Figure 1). In their paper they mention: 'These sweeps can be learned by an untrained person with limited knowledge of internal anatomy in a few hours'. To put their claim to the test, we organised a workshop for five midwives at St. Luke's Catholic Hospital in Wolisso, Ethiopia in 2019. We were able to demonstrate that the OSP can indeed be taught to midwives without any prior knowledge of ultrasound within two hours.

AUTOMATED ULTRASOUND INTERPRETATION USING DEEP LEARNING

Deep learning is a machine learning technique that can be used to develop computer algorithms that can automatically perform tasks. This technique has become popular in recent years and is already used for various applications like speech recognition, natural language processing, and facial recognition. Since 2013, deep learning has also been successfully applied in the field of medical imaging.[5] We combined deep learning algorithms with the OSP in

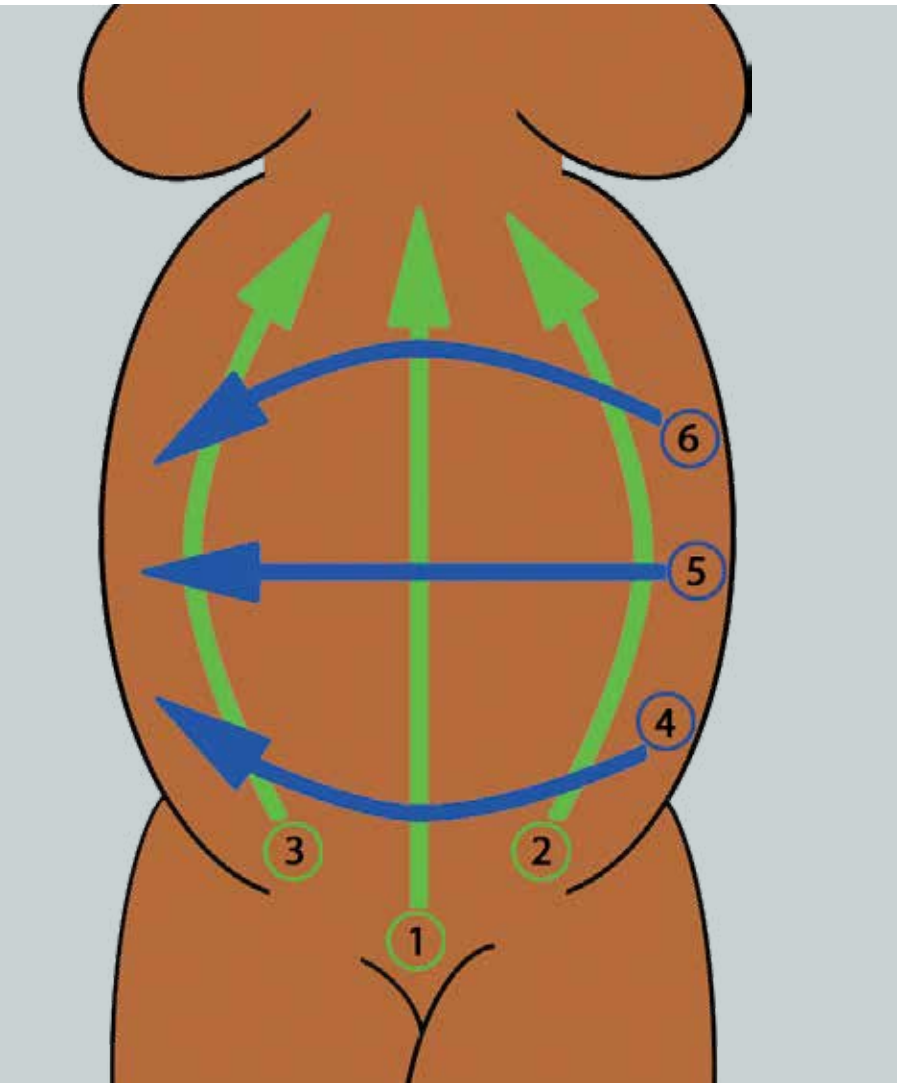

Figure 1: The six standard obstetric sweeps as per protocol.

order to eliminate the need for a trained sonographer to interpret the ultrasound images. A large dataset was required for the development of these algorithms. The OSP was therefore performed on more than 300 pregnant women at St. Luke's Catholic Hospital. This data was then used to develop the deep learning algorithms. The developed algorithms were used for three different applications: determining foetal presentation, detecting twin pregnancies, and determining gestational age by estimating the foetal head circumference.[6]

CLINICAL IMPLICATIONS

The OSP makes it possible to train midwives to use ultrasound in resource-limited settings within two hours. The combination of the OSP and the automated ultrasound interpretation would make prenatal ultrasound imaging much cheaper and easier to implement and has therefore the potential for widespread use in resource limited settings. Additionally, it is very important to carefully consider how patient management and follow-up are taken care of when these risks are detected in resource-limited settings. The automatically estimated gestational age could be used to manage pregnancy complications appropriately and refer high-risk pregnant women to a health care facility in a timely fashion. There are studies showing that ultrasound imaging increases antenatal care clinic visits [7,8] and even has the potential to decrease maternal mortality,[9] but there are also studies showing that ultrasound screening alone does not address barriers to referrals.[10] A recent cluster randomised trial found no effect of routine antenatal ultrasound, although in this study 43% of women in the control group who were not supposed to receive an ultrasound still received it.[11]

CONCLUSION

In implementing ultrasound imaging, it is clear that training of health care workers to appropriately use ultrasound imaging is essential for success. We are planning further studies to investigate whether automated interpretation, which makes the use of ultrasound imaging much easier, will be able to realise its potential benefit in resource-limited settings.

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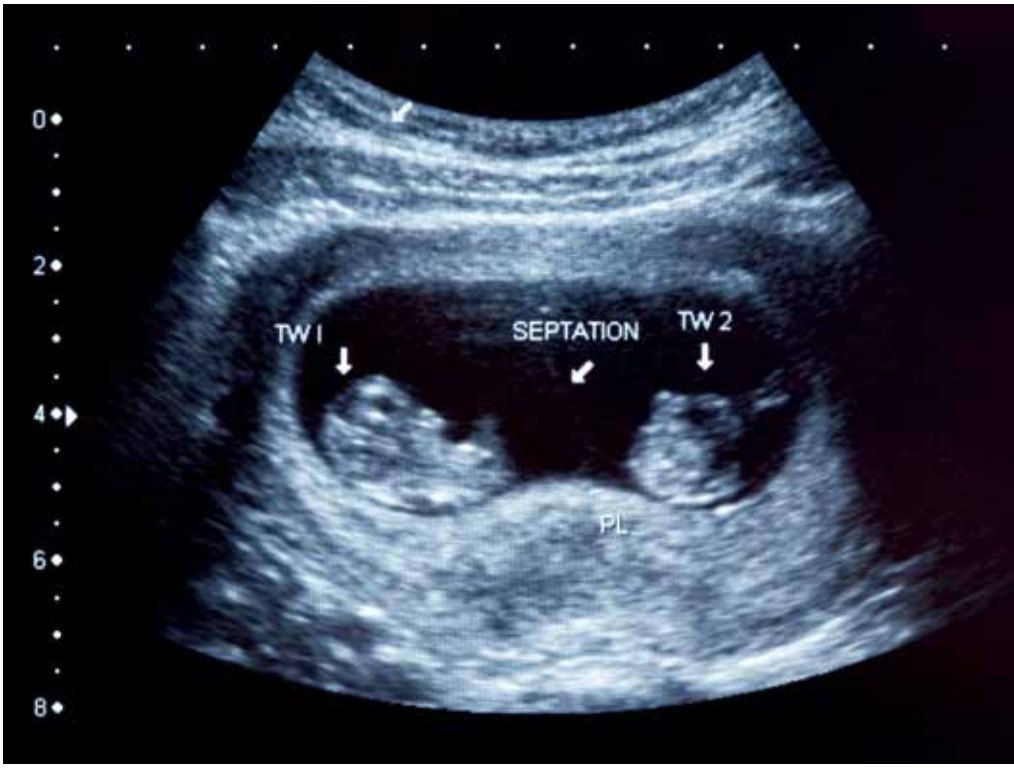

Ultrasound scan of twin boys

PHOTO: SHUTTERSTOCK

The changing role of technology in ophthalmology

The working party **Tropical Eye Care**, founded in 1973, aims to improve eye care in low- and middle-income countries. It organises two scientific symposia every year, provides training to Dutch AIGT doctors, and every two years it offers a two-day international training course in Utrecht.

THE CHANGING ROLE OF TECHNOLOGY IN OPHTHALMOLOGY

Ophthalmology is a wonderful part of medicine. It requires a wide range of skills, from psychology to microsurgery. In the past, the NVTG working group Tropical Ophthalmology put considerable emphasis on the development and implementation of 'appropriate technology' in eye care. In 1980, Professor Jan Worst founded the Intermediate Technology Information Ring (ITIR), an eye care knowledge centre in Groningen. The focus of the centre was to collect and disseminate simple technical solutions that are easy to apply in resource-constrained settings. The work at the centre ceased in 1996, but their archive is still intact with a rich compilation of publications available online.[1] Low resource solutions are presented such as how to make an eyelid retractor from a paperclip and how to make atraumatic suture material from disposable needles and nylon fishing line or even from stainless steel wire. Some of these 'tricks' are still useful, but our world is changing. Diseases such as onchocerciasis (river blindness) and trachoma are becoming less prevalent and have almost disappeared in many countries. For ophthalmologists trained in the Netherlands, it can be an attractive adventure to practise their skills using appropriate technology, but a colleague in Africa or South Asia who was able to familiarise himself with high-tech ophthalmology during training still has to deal with a local working environment at home in which such technology is often not available.

Technical advances in telecommunication through smartphones and the Internet have facilitated the diagnosis of eye diseases and refractive errors. Intraocular lenses and spectacles are increasingly being manufactured in cheap labour countries and have become much more affordable. But challenges remain. The production of a promising low-cost ophthalmoscope has been delayed, and several smartphone-based gadgets for fundus photography still do not deliver the quality images that are needed to make a reliable diagnosis. Since high-tech phacoemulsification (see Textbox) has now become the standard method for cataract surgery in high-income countries, our colleagues in LMICs have reasons to be unhappy when we suggest that a much cheaper method, sutureless small incision cataract surgery (SICS), is a good alternative.[2] Retinal disease as a result of diabetes mellitus is becoming a significant cause of poor vision and blindness worldwide. Its prevention and treatment pose challenges in LMICs, as low-cost laser machines are not available on the market.

PHACOEMULSIFICATION

Phacoemulsification is a modern form of cataract surgery in which the eye's internal lens is emulsified with an ultrasonic device and aspirated from the eye. Aspirated fluids are replaced with irrigation of balanced salt solution to maintain the anterior chamber.

Looking back, considerable progress has been made globally in the delivery of eye care. The Vision 2020 global initiative programme launched in 1999, called 'The Right to Sight', was set up to intensify and accelerate blindness prevention activities and set the very ambitious goal of eliminating avoidable blindness by 2020.[3] It sought to do this by focusing initially on the main causes of avoidable blindness, such as cataract and refractive errors, for which cost-effective treatment is available. It also stressed human resource development, particularly the training of auxiliary personnel. The more recent Global Health Action Plan, 'Universal Eye Health' (2014-2019), adopted by the World Health Assembly in 2013, set a more modest global target of reducing the 'prevalence of avoidable visual impairment by 25% by 2019' (compared to the baseline prevalence of 2010).[4] Such initiatives have encouraged governments to pay more attention to the prevention of blindness. More eye care workers are being trained, and spectacles, intraocular lenses, sutures, slit lamps and operating microscopes have become widely available.

Looking forward, I am optimistic. IT-applications facilitate telemedicine and enable auxiliary staff in peripheral facilities to diagnose eye diseases. Mobile phone text messaging enables remote care and direct patient advice. However, the high cost of laser machines will continue to be a barrier in the treatment of diabetic retinopathy for some time to come.

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A newborn with a thoracic mass

SETTING

The case originates from a 64-bed hospital in Makeni Town, northern Sierra Leone. About 60% of Sierra Leoneans live below the poverty line. Life expectancy at birth is 58 years. The hospital has an operating theatre, pharmacy and basic diagnostic facilities. The medical staff consists of an experienced Global Health doctor, a clinical officer, and a clinical health assistant. The nearest referral hospital is in the capital city Freetown, about 5 hours' drive from Makeni.

Figure 1. An evident mass on the left side of the newborn's chest.

CASE

A newborn with a large (12 x 6 centimetres) congenital mass on the left side of his chest was referred to the hospital (Figure 1). Apart from the mass, the boy was doing well. On examination, the painless mass felt soft and fluctuant, mobile from the chest wall and from the skin. Normal breathing sounds were heard over the chest on auscultation; no breathing sounds could be heard over the mass. Ultrasound examination showed fluid inside the mass. An X-ray showed a normal image of heart and lungs. It did appear however that the ribs on the left side of the chest were indented.

SPECIALIST ADVICE

The Global Health doctor thought of a congenital cyst. She consulted the specialists of Consult Online for advice on diagnosis and management, in particular if performing surgical excision would be the best treatment option. The paediatricians and surgeons of Consult Online responded the next day. It was felt that lymphangioma was the most likely diagnosis. The suggestion for treatment was aspiration of the content and injecting a sclerosing agent (such as aethoxysclerol or tetracycline - if possible dissolved in lidocaine, for local pain management). Surgical excision was not recommended. The preferred timeframe for performing the procedure was when the child would be a few months old.

FOLLOW-UP

The mother required prompt treatment, since the child's acceptance by the father depended on the treatment of the lymphangioma. Unfortunately, none of the options mentioned for sclerosing agents were available. After an extensive search, povidone iodine was found as a readily locally available sclerosing agent. At one week of age, the child was treated: aspiration of clear fluid was done and injection with povidone iodine 10%. After this, the location of the former mass was bandaged.

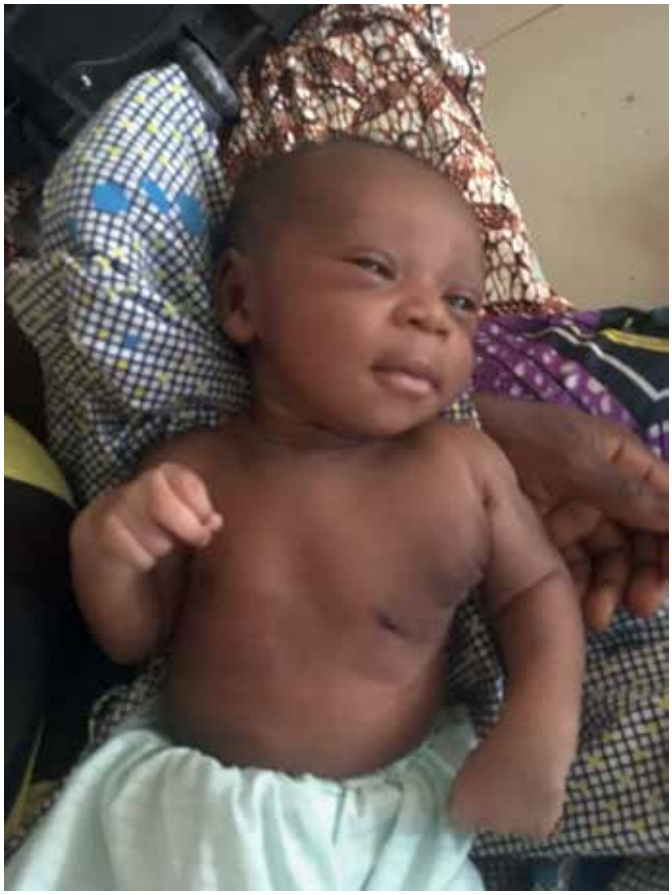

Figure 2. Presentation at follow-up consultation a few weeks later.

The child developed some fever, which responded well to paracetamol and antibiotics. After a couple of weeks, the mother brought the child for check-up to the outpatient clinic: he was doing very well and and a clear reduction in size of the mass was seen. (Figure 2).

BACKGROUND

The cystic variety of lymphangioma, called cystic lymphangioma or cystic hygroma, is a relatively rare benign congenital tumour of the lymphatic system. Cystic lymphangioma is the most common form of all types of lymphangiomas.[1] Cystic lymphangioma results from developmental malformation of the lymphatic system.

CLINICAL FEATURES

Cystic lymphangiomas can manifest anywhere in the body but usually affect the head and neck (75%), with a predilection for the left side. Approximately 20% of cystic lymphangiomas occur in the axilla, and they have also been reported to occur within the chest wall.[2,3] The usual time of presentation is at birth (>60%).[1] It presents as a painless, soft and compressible mass. Ultrasound examination of the mass shows a (multi-) cystic lesion without blood flow. Cystic lymphangioma itself is harmless and can remain asymptomatic for a long period of time, but complications may arise. Most importantly, they are prone to infection, spontaneous hemorrhage in the cyst may occur, and depending on the location and size of the cyst, respiratory distress or feeding difficulty can be a problem.[1] A minority of patients can show spontaneous partial regression of the lymphangioma, but complete spontaneous resolution is not to be expected.[1] On aspiration, cystic lymphangioma may produce milky, serous, serosanguinous or straw-coloured fluid.[1]

TREATMENT

Indications for treatment include the above-mentioned complications, cosmetic reasons, and interference with motor development. The ideal treatment used to be surgical excision, but this is not an easy task, with risks of possible complications (infection, bleeding, iatrogenic damage to nerves or other surrounding structures). Therefore, aspiration and injection of a sclerosing agent was recommended in this case. Povidone iodine is not the sclerosing agent of choice if other agents are available, since povidone iodine resorption could lead to hypothyroidism.[4] Fortunately, the child involved in our case showed no signs of hypothyroidism on follow-up.

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De derde wereld op je cv (The third world on your CV)

'EVERYTHING IS FOR A REASON'

One could summarise Judith van de Kamp's book in the above words. Often things are not what they appear to be at first sight. Don't take things for granted; realise that your version of the facts is not the norm.

It all started with the article 'Doctor Tourist' in a Dutch newspaper in 2006, in which Dutch 'tropical' doctors raised their concerns about the increasing popularity among Western health workers of travelling and working in a low- or middle-income country (LMIC) for a short period of time: 'A growing number of inexperienced Western doctors go to a developing country to "do good" in Asia and Africa. They act superior and paternalistic and do not discuss matters with the local doctors. [...] They think they know better and, as a result, they carry out operations with no follow-up.'[1] Judith – who had just started a master's in medical anthropology and sociology – was astounded by the article and decided to investigate this phenomenon further in her studies. Her academic interest and personal involvement first brought her to Ghana for her master's thesis and a couple of years later to Cameroon for her research PhD.[2]

The setting for her ethnographic research was a hospital in rural Cameroon which received many short-term Western health workers and students each year. This research formed the basis for 'De derde wereld op je cv', a practical guide for (young) people preparing themselves for short-term work in a LMIC. Though her PhD thesis offers a very interesting read on local and Western health workers' public and hidden transcripts (term used to describe the interactions between people, verbal and non-verbally) as well as their relationships and power dynamics, the book is more accessible. It takes you on a journey, starting from the first plans to work abroad, the experiences in the field, and finally the difficulties of settling in back home again. It perfectly combines theoretical notions with practical information, and the book is filled with illustrative examples from van de Kamp's personal experiences in the field. It's a pleasure to read, especially because the tone of voice is not condescending. On the contrary, the author speaks with a genuine concern for those at the receiving end, who have to deal with foreigners wanting to 'do good'. In 2018, a record number of young people embarked on a journey to developing countries. Though difficult to estimate, research from 2008 indicated there were already some 1.6 million volunteer 'tourists' travelling to LMICs. Over the past decades, a whole new industry has evolved, with unfortunately many organisations predominantly focusing on the supply side of the deal.

We are in the middle of this reality and, instead of fighting windmills, van de Kamp chose the role of counsellor. How do you deal with efforts to 'make a difference', when in fact it may turn out that you are replacing a local expert simply because you bring in hard needed cash for the hospital? Start valuing local resources instead of promoting your own solutions which are often not attuned to local circumstances or sustainable in the long term. In her book, van de Kamp presents the reality 'behind the smiles' and offers tips to ensure that the learning curves are reciprocal. In a very subtle way, she makes a plea for being humble and open-minded. The less you want to make a difference, the more likely you actually will.

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PHOTO: SHUTTERSTOCK

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