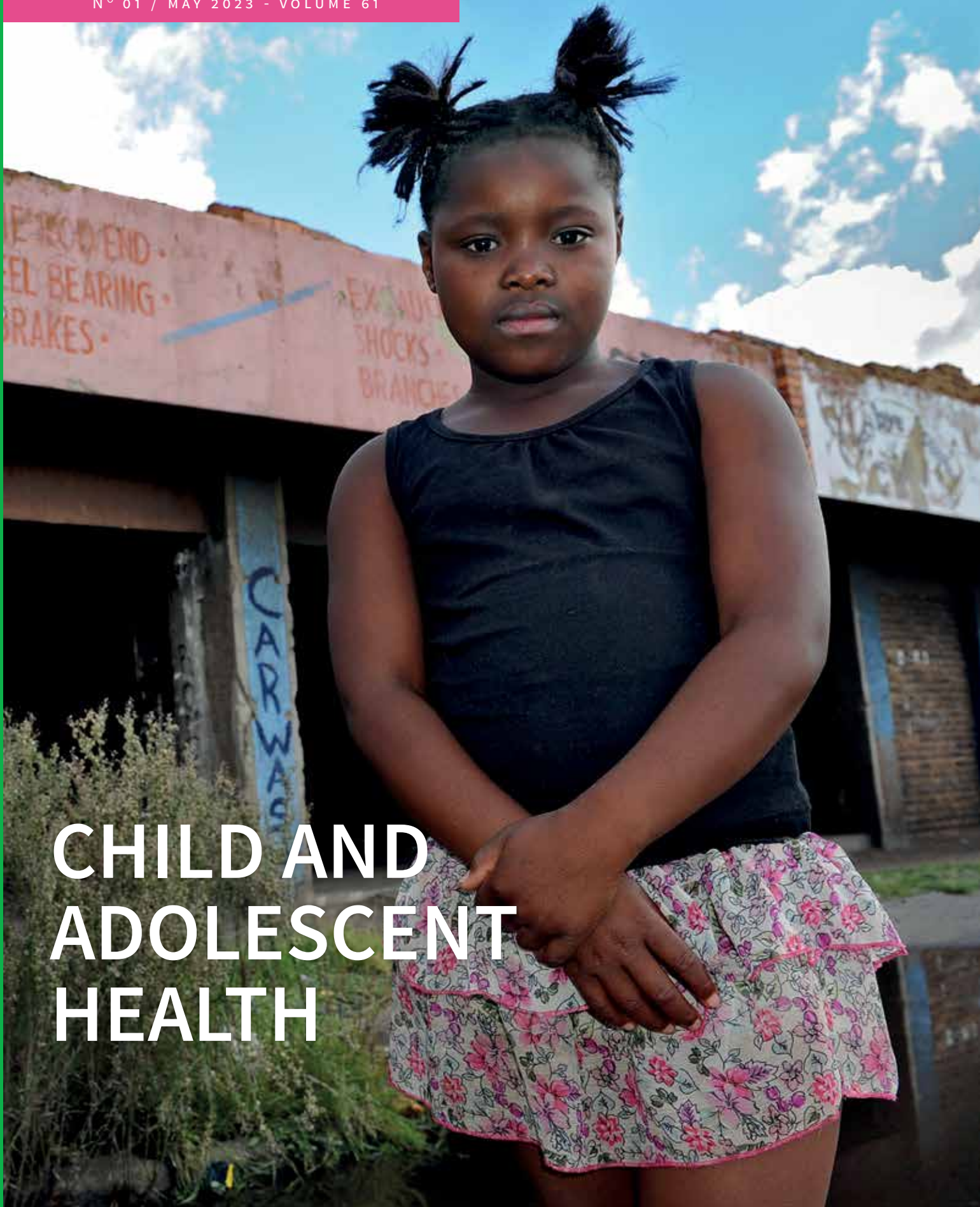


MT*b*

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CHILD AND ADOLESCENT HEALTH

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Optimising child and adolescent health: what does it take?

In their article, Mark Tomlinson and colleagues argue that “fully realising the potential of children and adolescents requires an ecological life-course approach, together with multisectoral, coordinated, integrated action for the provision of care and services for children and adolescents”.^[1] In other words, acknowledging that what happens in each of the development stages of a child, shapes and influences its growth into maturity. The ecological part refers to looking beyond the narrow “disease model” terms, and considering all levels of influence: family, community, institutions, policies, and environmental conditions.

This edition of *MTb* reflects an ecological life circle approach in many aspects. The opening article describes the ‘coming of age’ of Global Child Health (GCH) in the Netherlands: how, since the era of the Millennium Development Goals (1990 – 2015), the level of specialisation within the sector has increased, and how this had an impact on the quality and the quantity of GCH research and education in this field. One example is the recent introduction of the elective in Global Woman and Child Health in the existing medical curriculum at Amsterdam University Medical Center. Other examples from across the board include the establishment of a national Bachelor degree in paediatrics for clinical officers in Sierra Leone and twinning partnerships within global paediatric oncology.

The ecological life-course approach is also illustrated by articles on crucial interactions between medical care at the individual level and the essential role of supporting and enabling environments. These include the ‘birth’ of a neonatal intensive care unit in rural Tanzania, the empowering of caregivers as one of the interventions to improve cerebral palsy care in Malawi, and the critical role of (continuous) vital signs monitoring in the timely detection of complications in hospitalised children in low-resource settings. The article on the influence of early childhood TB on lung health later in life underlines the need to take

a life-cycle approach when addressing child health and well-being. Applying an integrated ecological life-course approach can capture social determinants of health, linking and addressing risk and protective factors over time. This is clearly illustrated in the articles on the effects of climate change on child health, the care for refugee and migrant children, and the article presenting tools to provide cross-cultural care for children.

So what does it take...? Targeted interventions at individual and public health levels – such as the large-scale child immunisation programmes carried out over the past decades – are essential in improving child health. However, they should go hand in hand with programmes that invest in creating enabling environments for children and young people. Across their life course. Across the globe. We hope that this edition of *MTb* will serve as an inspiration to accomplish this.

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REFERENCES

1. Tomlinson M, et al. (2021). Optimising child and adolescent health and development through an integrated ecological life course approach. In: *BMJ* 2021;372:m4784



Global Child Health coming of age

Well before the formulation of the eight Millennium Development Goals (MDGs) in 2000, it was recognized that child health forms an important component of global health - not only because children are the future of mankind on our planet and therefore investment in their health is critical for long-term productivity, but also because child mortality was still at an unacceptable high level. Although in comparison with 1990 huge improvements were made in child health, the MDGs were not reached in the target year 2015. This was one of the reasons for formulating the Sustainable Development Goals (SDGs) in 2015, with 2030 as the new target year. Within the framework of in total 17 SDGs, 160 more specific targets were formulated, which cover a very broad area beyond health and are extremely ambitious, not to say unrealistic. Yet, it can be concluded that the improvement of global child health (GCH) remains an important aspect on the global health agenda.

During the MDG-time period (1990-2015), we saw a maturation in GCH professionalism. Before 1990, doctors working in the field of GCH were often general paediatricians with an interest in care for children in Africa, South America and/or Asia. But in recent years, GCH-paediatricians have specialized within the GCH-field. We now have, for example, paediatric TB and HIV experts, specialists in global paediatric critical care and experts in the field of child nutrition. This development has had a significant impact on the quality and quantity of GCH research and greatly improved teaching in GCH.

In The Netherlands, in academic hospitals in Amsterdam, Groningen, Nijmegen and Utrecht, GCH came on the agenda in the 90s of the previous century and resulted also in the appointment of Bernard Brabin

as the first professor in Global Child Health (University of Amsterdam). GCH gained further momentum in recent years with a rapidly increasing number of paediatricians specializing in sub areas of GCH, like global pulmonology and oncology at the University Medical Centre Utrecht, nutrition at the University Medical Centre Groningen and neonatology, critical care, TB, oncology, malaria and nutrition at the Amsterdam Centre for Global Child Health (part of the Amsterdam University Medical Centers). In addition, an 'Expertise Group Global Child Health' was created under the Dutch Paediatric Society (NVK) together with the Dutch Society for Global Health (NVTG), which mainly focuses on the health of young migrants in the Netherlands. These developments in the Netherlands have contributed to a vastly growing number of GCH research projects, teaching and training activities for medical students, registrars and consultants, and to clinical care expertise. Due to the relatively uncontrolled growth of these GCH related sub-specialisations, a logical structure within the GCH area of expertise is missing. For example, there are currently experts in areas that are age-based (e.g. neonatology), next to experts in areas that are disease-based (e.g. Tb, HIV, Malaria) and syndrome-based (e.g. malnutrition, anaemia).

What is needed to make these positive developments in GCH-maturation in the Netherlands sustainable? The answer to this question is fourfold. First, recognition by the medical schools that GCH teaching should be part of the training of all medical doctors in the Netherlands. The main reason is that, even if you are not going to work as a doctor abroad, GCH knowledge will be important for most doctors in order to work in our 'multicultural' Dutch society. Second, further improvement of collaboration in the area of education and research between the GCH-specialists working in the various academic institutes in the Netherlands. Third, trying to structure GCH expertise areas by agreement on a limited but logical list of areas of expertise. Finally, the most important contributor to sustainability of GCH in

the Netherlands will be to educate and train the next generation of GCH paediatric experts in the Netherlands and abroad.



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FURTHER READING

- GBD 2019 Under-5 Mortality Collaborators: Global, regional, and national progress towards Sustainable Development Goal 3.2 for neonatal and child health: all-cause and cause-specific mortality findings from the Global Burden of Disease Study 2019. *Lancet* 2021; 398: 870–905.
- Clark H, Coll-Seck AM, Banerjee A: A future for the world's children? A WHO–UNICEF–Lancet Commission. *Lancet* 2020; 395: 605–58.
- Levels & Trends in Child Mortality United Nations Report 2020. Estimates developed by the UN Inter-agency Group for Child Mortality Estimation. United Nations Children's Fund, New York, 2020.

Implementing a national bachelor degree in paediatrics for clinical officers in Sierra Leone

Sierra Leone is one of the poorest countries in the world, with a Human Development Index ranking of 181 out of 195 countries.^[1] The devastating civil war from 1990 until 2002 and the Ebola epidemic in 2014 disrupted the basic healthcare functions and infrastructure. The population still has poor access to safe and affordable health care services, especially to specialised health care services such as paediatric and neonatal care.^[2] Sierra Leone has one of the highest neonatal and under-five mortality rates in the world, with 31 and 108 deaths per 1000 live births, respectively.^[3] Lack of healthcare professionals is one of the main contributing factors. The most recent data from the WHO documents 566 physicians in the country, representing a density of 0.74 physicians per 100,000 people.^[4]

Of these, only a few work in the area of paediatrics in the clinical context, serving a population of over seven million people out of which 13% are under five years old and 40% are under 15 years. The shortage of medical doctors is even worse in rural areas. Children in need do not receive medical care at all or receive care from insufficiently trained personnel. The lack of skilled health workers is considered a key factor for the high neonatal and under-five mortality rates. Globally, as an answer to the non-availability of human resources in low-resource settings, the WHO is promoting a model of task-sharing. In order to maximise the efforts of the existing workforce, tasks are rationally redistributed among healthcare workers.^[5] The task-sharing approach has been tested, investigated and proven effective in other sub-Saharan countries.^[6-8]

For example, 10 years ago, a successful task-sharing project was established in the field of surgical and obstetric care in Sierra Leone by the organisation CapaCare,

in cooperation with the Ministry of Health and Sanitation (MOHS).^[8]

In October 2021, the Ministry of Health and Sanitation of Sierra Leone, together with German Doctors, a German medical aid NGO, agreed to start a specialised Paediatric Training Programme (PTP) for clinical officers (COs) at the School of Clinical Sciences in Makeni (SCSM). Students can enter this programme after obtaining their diploma in clinical medicine at the SCSM. German Doctors and the SCSM closely collaborate in this project with two other international NGOs: the aforementioned CapaCare and Partners in Health (PIH), respectively responsible for the specialisations surgery/obstetrics and internal medicine. The 2-year bachelor paediatric specialisation training programme is a task-sharing project with the aim of increasing the number of clinically trained professionals in order to reduce child and neonatal mortality in Sierra Leone, in a manner comparable to other successful programmes in Sub-Saharan Africa.

PAEDIATRIC TRAINING PROGRAMME

As stated before, the students can apply for the programme after obtaining their diploma in clinical medicine. The programme consists of four clinical rotations of half a year in various partner hospitals, alternated by advanced theoretical modules of a month taught by national and international trainers. The first theoretical module focuses on the basics of paediatrics, such as the Emergency Triage Assessment Treatment (ETAT) course, Helping Babies Breathe, and malnutrition. The following modules cover the sub-specialisms within paediatrics, such as infectious diseases (with special focus on malaria, HIV, and tuberculosis), respiratory medicine, haematology, gastroenterology, nephrology, cardiology and neonatology. The modules focus most on the major causes of mortality in sub-Saharan Africa, as described by Perin et al in the Lancet in 2019^[9]. After finishing the 2-year programme and

writing their dissertation, a one-year housemanship is required, which takes place in the national paediatric referral centre, Ola During Children's Hospital in Freetown. After completion of the training, the graduates are rewarded with a Bachelor of Clinical Medicine. Twenty-two students are currently enrolled in the programme. The first students will complete their training in October 2024.

STRENGTHS AND CHALLENGES

One of the strengths of the Paediatric Training Programme is that the initiative for the programme came from the MOHS. The collaboration with the SCSM, which is affiliated with the University of Sierra Leone, was key for making it a recognized bachelor's degree in Sierra Leone.

Due to it being a novel programme for the country, it still needs to gain recognition. At the start, the involvement of national trainers, especially for the theoretical modules was challenging. One reason for this could be the fact that there are only a few doctors and even fewer paediatricians and the country has long relied on foreign expertise and support. However, with the increasing number of students enrolled and the involvement of partner hospitals, Sierra Leonian physicians are seeing the benefit of having clinical officers dedicated to paediatric and neonatal care. Since the start of a national postgraduate training programme in paediatrics for medical doctors 1.5 year ago, paediatricians in training are now joining the theoretical blocks as trainers. Just like in the CapaCare programme, we hope to use graduates of the paediatric training programme to teach the upcoming batches. The aim is that in 10 years' time the training will be fully run by Sierra Leonian paediatricians and experienced clinical officers, with minimal international support.

In October 2024, the first paediatric Clinical Officers (CO) will complete their training. Clinical officers are a new cadre in the healthcare system of Sierra Leone.

Therefore, it is important that they are included in the governmental scheme of service and laws and are offered positions with an appropriate salary. In 2020, before the start of the programme, these issues were included in a memorandum of understanding between the international partners SCSM and MOHS. There are also national and international stakeholders and NGOs that are positive about the CO training programme. For example, UNICEF, who are currently running the Special Care Baby Units (SCBU) in Sierra Leone, have shown interest in employing paediatric clinical officers.

CONCLUSION

The Paediatric Training Programme in Sierra Leone can reduce the shortage of paediatric healthcare workers, thereby contributing to reducing neonatal and child morbidity and mortality. Collaboration with governmental institutions, local stakeholders, and national paediatricians is essential and makes the programme sustainable.



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REFERENCES

1. UNDP. Human Development Report 2021. 2021. [Internet] Available from: <https://hdr.undp.org/content/human-development-report-2021-22>. [Accessed 11th April 2023]
2. World Health Organization. Scoping review of interventions to maintain essential services for maternal, newborn, child and adolescent health and older people during disruptive events: web annex: summary of interventions and evaluations by type of event. 2021; [Internet] Available from: <https://www.who.int/publications/item/9789240038318>. [Accessed 11th April 2023]
3. World Health Organization. WHO mortality-and-global-health-estimates. 2019. [Internet]. Available from: <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates>. [Accessed 11th April 2023]
4. World Health Organization. National Health Workforce Account Data Portal [Internet]. 2022. Available from: <https://apps.who.int/nhwportal/Home/Index>. [Accessed 11th April 2023]
5. World Health Organization. Task shifting: rational redistribution of tasks among health workforce teams: global recommendations and guidelines. 2007;
6. Eckerle M, Crouse HL, Chieme M, Phiri A, Kazembe PN, Friesen H, et al. Building sustainable partnerships to strengthen pediatric capacity at a government hospital in Malawi. *Front public Heal*. 2017;5:183.
7. Bolkan HA, Van Duinen A, Waalewijn B, Elhassein M, Kamara TB, Deen GF, et al. Safety, productivity and predicted contribution of a surgical task-sharing programme in Sierra Leone. *J Br Surg*. 2017;104(10):1315–26.
8. Zhao Y, Hagel C, Tweheyo R, Sirili N, Gathara D, English M. Task-sharing to support paediatric and child health service delivery in low-and middle-income countries: current practice and a scoping review of emerging opportunities. *Hum Resour Health*. 2021;19(1):1–16.
9. Perin J, Mulick A, Yeung D, Villavicencio F, Lopez G, Strong K, Prieto-Merino D, Cousens S, Black R, Liu L. Global, regional, and national causes of under-5 mortality in 2000–19: an updated systematic analysis with implications for the Sustainable Development Goals. *Lancet Child Adolesc Health*. 2022; 6: 106–15.



PHOTO HANNEKE DEKKER

Refugee Children in the Netherlands: an interview about a persistently vulnerable group

Each year, around 30,000 people request asylum in the Netherlands.^[1] Of these, nearly one-third are children. Nearly a third of these children have travelled to the Netherlands without parents or adult family members. An already vulnerable group has moved away from their home country and now has to deal with a foreign culture and language. Due to their place of origin and history, refugee children are at risk of specific health issues. Examples include anaemia, hepatitis B and C, HIV, tuberculosis, parasitic infections, vitamin deficiencies, malnutrition, incomplete vaccination status, and psychological disorders.^[2] Therefore, prevention and early diagnosis of medical and psychosocial problems is necessary. In the Netherlands, health care for these children is organized by a number of different organizations, so it is difficult for children and parents to achieve an oversight of where to find care, and difficult for health care workers to coordinate the care.

PERSONAL MOTIVATION

In this interview, Sara Sahba, a medical doctor, speaks about the challenges faced by these children regarding their health care. Sahba currently works for the organization Expertise Center Children and Adolescents New in the Netherlands (EKANN). She was interviewed because of her strong focus on health care for refugee children.

When asked what her personal motivation is to focus on this particular group, Sahba explains “the realisation that more can and has to be done. This comes from my personal experience of knowing what an impact a flight from a country has on a family and on a child. Even though I was only one year old at the time, I was still a refugee and had to start anew. This can mean that a health disadvantage has

already developed. I find it quite painful that we cannot offer the right health care to the children who need it the most. The realisation that I am willing and able to do something about that drives me.”

“I FIND IT QUITE PAINFUL THAT WE CANNOT OFFER THE RIGHT HEALTH CARE TO THE CHILDREN WHO NEED IT THE MOST.”

VULNERABLE HEALTH

Refugee children in the Netherlands are vulnerable. The reasons include higher risk of psychosocial problems, lack of access to health care in the country of origin, lack of timely treatment, or regional differences in disease prevalence. Sahba: “The health of these children is further endangered by the organisational mismatch between shelter and health care, such as when a child is transferred to another part of the country, or when a child comes too late to the attention of health care professionals. These children profit the most from timely health care and treatment. Unfortunately, they do not always get that.”

THE RIGHT TO HEALTH POTENTIAL

Sahba finds that, in order to attain health equity, these children have to be given the chance to reach the same health potential as children born in the Netherlands. “In the Netherlands there is a high standard of care. Even before birth, a lot of check-ups are done on the health of the child. Also after birth, screenings are done that are normal for the Dutch health system, but not for large parts of the world. Children that have not received all these screenings and check-ups already have a certain disadvantage. They are not necessarily ill, but they do already lag behind. Much is unknown about the health of these refugee children. This can be decisive for what first has to be done in the health care

for these children.” Sahba comes with the example of paediatricians keeping a wider scope in the analysis of refugee children in the outpatient department, and therefore considering diseases that children born in the Netherlands have already been screened for. She also mentions that prevention of transferral to another part of the country while the child is analysed in the outpatient department is recommended, giving the child a better chance to attain a good health potential. Unfortunately, this is not a given practice.

“THEY ARE NOT NECESSARILY ILL, BUT THEY DO ALREADY LAG BEHIND.”

ESSENTIAL COLLABORATION

Collaboration between different organizations is essential. Sahba: “When the health care system is not organised to recognize the health care needs of these children and ensure child health and wellbeing by providing care accordingly, a lot of effort is done by individual professionals with little result.” Sahba gives the example of a three-year old boy with a rare syndrome requiring a special diet and daily activity. However, he lived for six months in an asylum centre where that was not possible. He deteriorated physically and mentally. Other examples include children who have been properly screened at the initial intake in the Netherlands, but who have subsequently been transferred three times throughout the Netherlands and who therefore end up being seen by a paediatrician much too late. “There must be a better way to provide health care for these children. How can the collaboration between different health care professionals improve? And also between health care professionals and the coordination of asylum seeker centres?”

EKANN

That is the focus of the organization Expertise Center Children and

Adolescents New in the Netherlands (EKANN), set up by Sahba together with paediatrician Albertine Baauw.^[3] EKANN facilitates collaboration between health care professionals and gives advice regarding specific health care issues. Sahba: “It is very encouraging to see what is happening. In several regions in the Netherlands, networks are being formed in which general practitioners, doctors working in youth health care, and pediatricians collaborate. They hold periodic multidisciplinary meetings to evaluate what is going well and what needs improvement in the health care for refugee children, and how they can further improve collaboration to solve these problems. The goal is for this collaboration to spread throughout the Netherlands.”

Another aim is to improve knowledge and give advice regarding specific health care issues in refugee children. Baauw had a leading role in the publication of a new guideline for the Dutch association for paediatric health care (NVK). The guideline concerns evidence-based additional examinations for refugee children (new to the Netherlands) with specific health care risks.^[2] Additionally, the guideline focuses on ensuring efficiency and continuity of health care for this population.

EKANN also functions as a centre where cases can be reported in which the health of a child is threatened, or where the accessibility, continuity or quality of health care is under pressure. “In one year, 40 cases were reported. This data helps to recognize where improvement is needed most.”

CONCLUSION

“The final goal is that the health care for these children is improved and institutionalized.” EKANN now functions based on fundraising and personal enthusiasm, but this is not sustainable. Government recognition and funding are needed. Refugee children in the Netherlands have the right to the same standard of care as everyone else in the Netherlands.



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REFERENCES

1. Centraal Bureau voor de Statistiek. Hoeveel asielzoekers komen naar Nederland? [Internet] Available from: www.cbs.nl/nl-nl/dossier/dossier-asiel-migratie-en-integratie/hoeveel-asielzoekers-komen-naar-Nederland. [Accessed 4th April 2023]
2. Nederlandse Vereniging voor Kindergeneeskunde. Leidraad nieuwkomersonderzoek door kinderartsen. [Internet] Available from: www.nvk.nl/themas/kwaliteit/richtlijnen/richtlijn?componentid=239009792&tagtitel=-. [Accessed 4th April 2023]
3. Stichting EKANN. Over EKANN. [Internet] Available from: www.ekann.nl/over-ekann. [Accessed 4th April 2023]

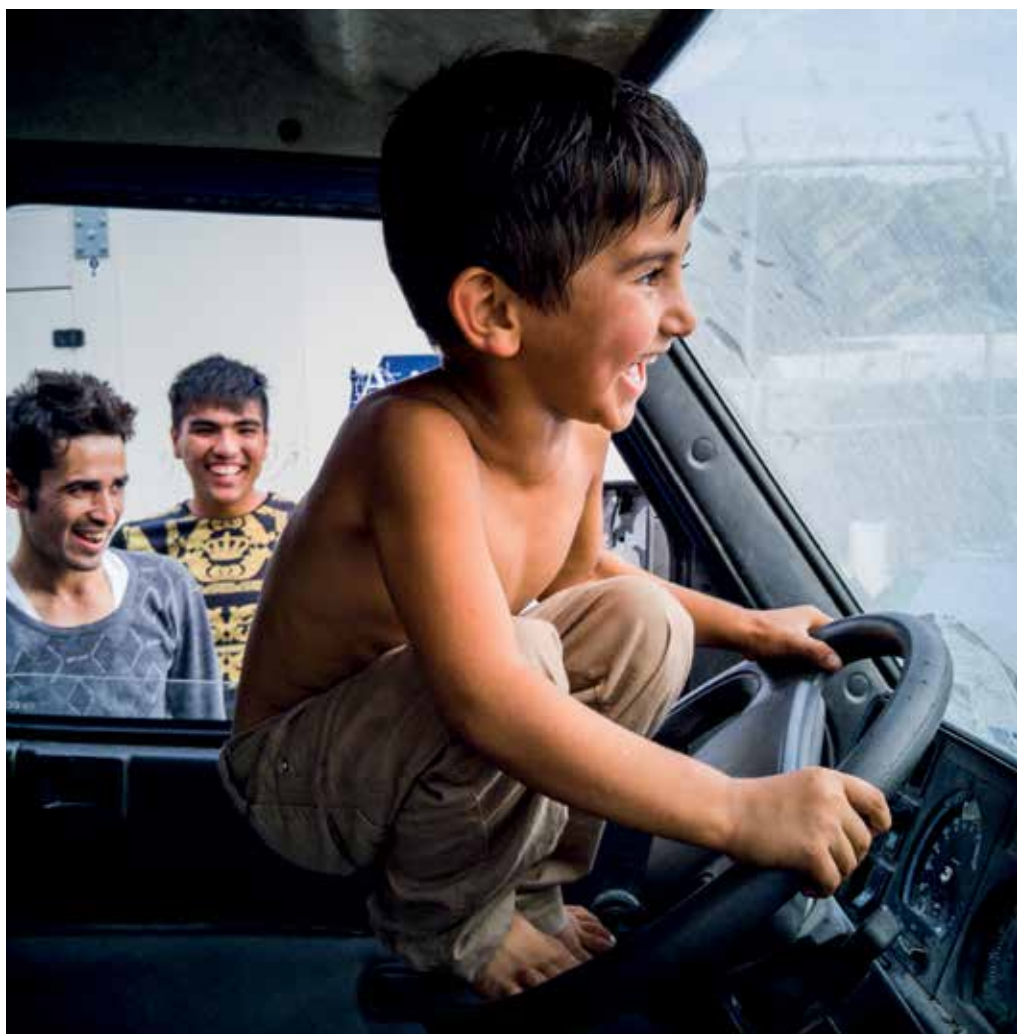


PHOTO MAARTEN BOERSEMA

Monitoring hospitalised children in low-resource settings: filling the gap and making a leap

BACKGROUND – SHOWING THE GAP

Childhood mortality causes around 3 million deaths annually in children under 5 years of age in low- and middle-income countries (LMICs). In sub-Saharan Africa (SSA) specifically, 1 in 13 children die before their fifth birthday – compared to 1 in 199 for high-income countries.^[1] These deaths are largely preventable, as more than half of these deaths can be treated with simple, affordable interventions.^[2,3,4]

To lower in-hospital morbidity and mortality, timely detection of deterioration and complications by (continuous) monitoring of vital signs is crucial. Children frequently exhibit only minimally visible symptoms, making them easy to be missed while they can rapidly progress into critical illness and death.^[5] As an example, in the case of sepsis, an hour's delay in treatment with antibiotics increases the mortality

rate by 10%.^[6] Thus, early detection and prediction of critical illness significantly improves the prognosis and chance of survival. Adequate monitoring is complicated in low resource settings (LRS) by shortage of staff and lack of suitable equipment.^[7,8] A tool that can assist in early detection, prediction and proactive management of critical illness in a LRS could significantly improve the prognosis and chance of survival in LRS.

In July 2020, an international consortium of experts in critical care, social science, health economics, medical technologies, laboratory science, artificial intelligence and e-health joined forces with a social enterprise to develop a vital sign monitoring system, i.e. an affordable, durable, and user-friendly monitoring system (IMPALA) for hospitalised children in LRS.^[9] The IMPALA consortium members are based in Malawi, the Netherlands

and the UK, and we initially focussed on Malawi. In this article, we describe our consortium's concept of monitoring, the challenges of monitoring in LRS that need to be overcome, our approach to the development so far, and some data leading up to our future plans.

MONITORING CASCADE

Monitoring in itself is not lifesaving, but is aimed at timely detection of a critical condition and should lead to early and effective action by health workers. We conceptualised this process into a model called the monitoring cascade (Figure 1). This model helps to understand what is needed for successful intervention and identifies potential gaps in this process. We use the model first to adjust the system design, addressing potential bottlenecks in the care process, and second to tailor the implementation to a specific hospital context.

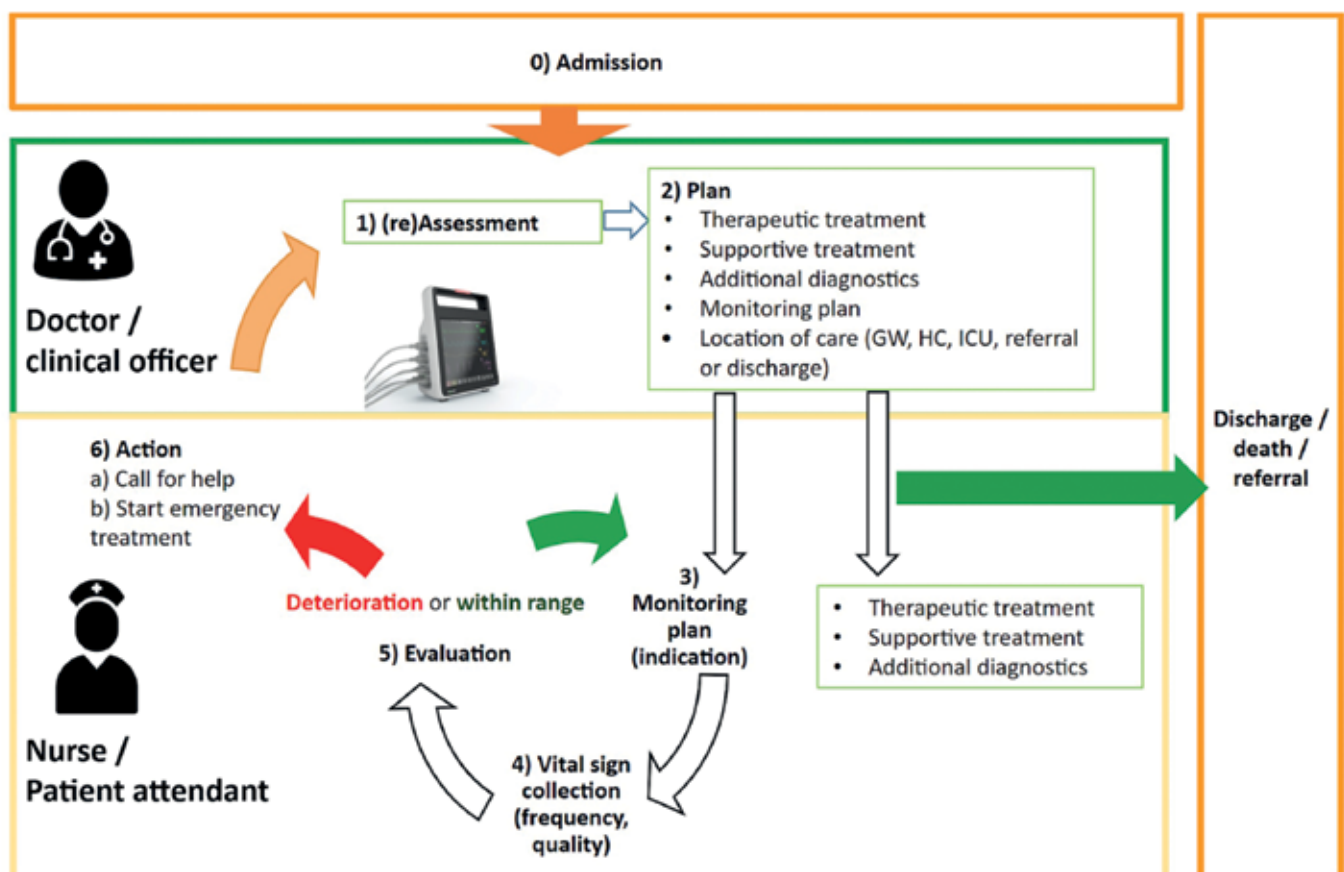


Figure 1 Cascade of monitoring and interventions in care systems.

SYSTEM REQUIREMENTS IN LRS

Having worked in high-care and intensive care settings in low-income countries, we noticed that there is a lack of functioning vital signs monitoring systems, as most hospitals have no or just a few monitors. Even in situations where these systems are available or being introduced, several problems diminish the potential effect of these systems. We categorised the problems as follows:

1. The systems used in high-resource settings (HRS) are too expensive for LRS. State-of-the-art systems produced by Philips, GE and WELCH can cost more than €16,000. Low-cost alternatives are less accurate, break down easily, and provide a poor user experience.
2. In general, monitors cannot withstand harsh environments, break down easily, and cannot be repaired locally. As a result, up to 70% of medical devices do not work when they reach their destination in the LRS.^[7,8]
3. Current vital signs monitoring systems are not user-friendly and complex to use, requiring skilled staff to use them. This reduces adoption, increases the need for training, and limits the impact of these systems.
4. Current systems *detect* at a late stage, which may be suitable for HRS with readily available staff and high-tech intensive care facilities, whereas LRS may benefit from earlier *prediction* and suggestion of therapies.
5. Current monitoring systems do not consider the specific complexities of LRS – such as local culture, end-users, infrastructure, and staff.

IMPALA APPROACH

1. PILOT STUDY IMPALA 1.0

This initial monitoring prototype consisted of a module from an existing monitor that records ECG, oxygen saturation, blood pressure and temperature. It additionally was equipped with a ballistography sensor, which was placed underneath the patient's mattress and detects respiratory rate, heart rate and patient movement

by sensing pressure changes. The sensor has the advantage that it is contactless, can be reused for months to years, and has the ability to also detect movement as a potential new vital sign. It was previously tested in a Dutch NICU and is widely used for monitoring adults during their sleep at home.^[10,11] Supported by the NWO start-up grant, we conducted a pilot study in the paediatric Intensive care unit in Malawi, in which the monitor was compared with GE and Draeger monitoring systems to detect clinical accuracy and patient deterioration. In several cases, hours before it became clinically apparent, our prototype could detect clinical deterioration, such as sepsis, as changes in vital signs showed contemporary deteriorations. This pilot study further included usability tests and focus group discussion with nurses and doctors to identify the facilitators and barriers for monitoring in LRS. These data were used to develop an upgraded monitor for use in LRS (IMPALA 2.0, Figure 2b), selecting more suitable sensors, adjusting screen size, alarm limits, and battery life to match the conditions..

2. CONSORTIUM

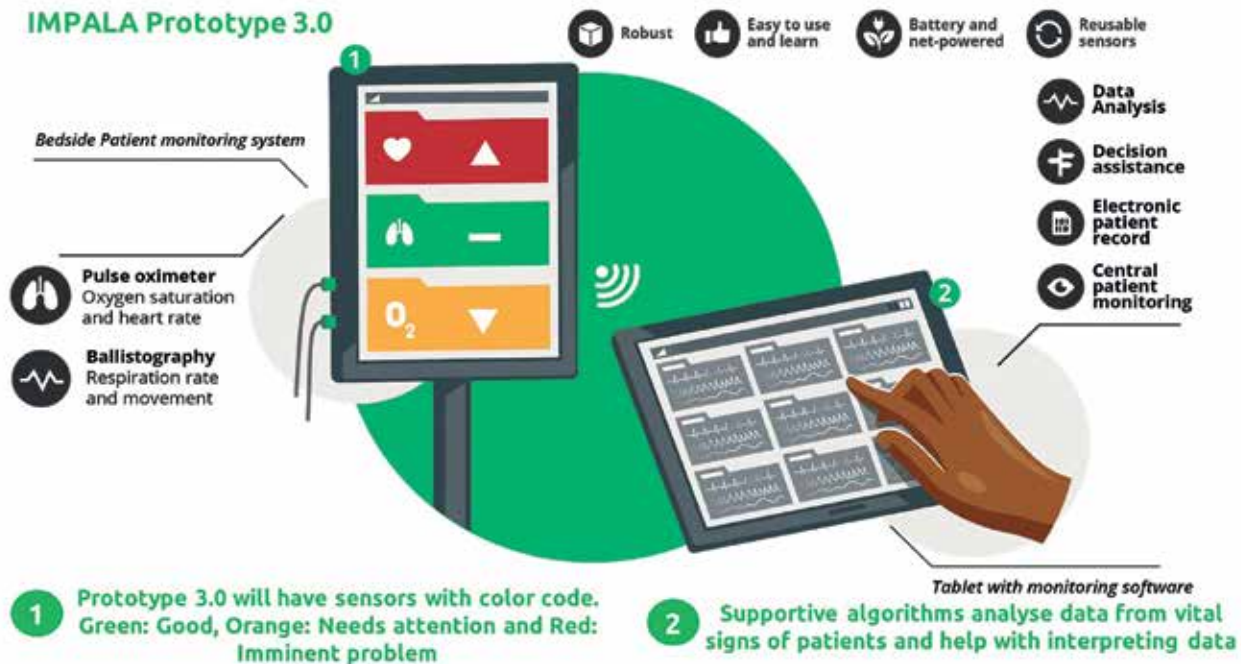
The pilot also made us realise that for successfully designing and applying a monitor in a LRS we would require a broader expertise. We formed an international multidisciplinary consortium with experts in the field of critical care, social sciences, artificial intelligence, e-health and Point of Care laboratory diagnostics. This consortium consists of three Malawian partners (TRUE, KUHeS, MUBAS), three Dutch partners (AIGHD, NeLL, GOAL3) and one British partner (Imperial College London), with each bringing their own expertise. In this consortium, we tried to match experts in Europe and Malawi to work on projects to share knowledge in both directions. The EDCTP funding opportunity boosted the formation of the consortium as well as consecutive studies and monitor development.

3. IMPALA STUDY

The main aim of the current stage of the IMPALA project is to further develop the IMPALA monitoring system to feature predictive algorithms based on vital signs,



IMPALA 1.0 & IMPALA 2.0



Potential design of Prototype 3.0

sociodemographic data, and biomarkers for early prediction of critical illness in children in LRS. This project was started in May 2021 and consists of three stages (Figure 3). In the first stage, the feedback from the pilot study using IMPALA 1.0 was used to develop an upgraded monitoring device (IMPALA 2.0), to perform a baseline clinical assessment prior to implementation and design and prepare the clinical studies. In the second stage IMPALA 2.0 was implemented and evaluated, and data was gathered for training and validation of the predictive algorithms for critical illness; this study is described in detail elsewhere.^[12] The iterative design and usability allows for improvements of the monitor. In the third phase, IMPALA 3.0 will be developed through integration of the predictive algorithms and the final User Interface and hardware design. IMPALA 3.0 will then be evaluated in a mixed-methods pilot study to test the performance in terms of critical illness prediction and impact on clinical decision making.

4. INITIAL RESULTS

The clinical study was started in July 2022, as part of the IMPALA 2.0 stage, and at time of writing 500 patients have been recruited in the study. The study is aimed at registering Critical Illness Events, and

so far a third of patients had one or more of these events recorded during their high dependency unit (HDU) admission. We chose to apply it in the HDU areas as PICUs are relatively scarce and, if present, already have monitors and a high nurse to patient ratio. The most commonly recorded events are respiratory events (31%) and mortality was 6.0%. The social science study noted several useful observations, such as the potential role of parents/guardians in the response to monitor alarms, the importance of implementation training for nurses and doctors, and several other facilitators and barriers of monitoring in LRS.

5. FUTURE

The IMPALA 2.0 is based on a conventional monitoring system, and this is currently approved for use in Malawi. The social enterprise developing and manufacturing the monitor, GOAL3, has developed an implementation training using the lessons learned and has currently implemented the system successfully in the first hospital in Malawi. In Rwanda, the process of registration and licensing has started as well as an implementation study for assessing clinical impact.

The IMPALA project will lead to development of one or more algorithms,

which will be implemented in the updated version IMPALA 3.0 (Figure 4). An implementation training and strategy is being created and will be included. Lastly, the search for biomarkers to detect and predict critical illness events may lead to additional predictors for disease severity and pathogen detection, which may be included in our algorithms and decision aids.

6. CONCLUSIONS

There is a need for early detection of potential need for treating critical illness events in hospitalised children in LRS. Appropriate monitoring in these settings cannot be achieved by just applying monitors used in HRS and requires an approach that is specifically designed to face the local challenges and needs. Using new techniques and a multidisciplinary consortium, we are trying to fill the gap and make a leap forward.

FOR MORE INFORMATION

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PERSONAL MOTIVATION OF THE AUTHOR

Having set up an intensive care department in Malawi, I noticed that despite all available resources some children cannot be helped. Late detection of deterioration

in the wards often led to irreversible presentations in PICU or even unnoticed deaths in the wards. A large proportion of this may be preventable if imminent deterioration is detected early and timely and adequate treatment is given. This may not only reduce mortality and morbidity but also reduce the resources needed, which are already limited. A lack of sufficient nursing staff in full wards, long night shifts, and lack of adequate critical care training to detect and treat these conditions were factors contributing to these late presentations. Monitors could potentially help the overstrained nurses, but I noticed that these were often lacking, required expensive sensors, often broke down beyond repair, were poorly responded to, and detected problems too late to allow early interventions. After returning to The Netherlands, Bart Bierling was introduced to me by my head of department of the PICU in the Amsterdam UMC (Job van Woensel). His ballistographic sensor and ideas to improve monitoring sounded like what was needed. Together with Niek Versteegde (AIGT), he started GOAL3, and the four of us were funded to start a pilot project in Malawi. The IMPALA consortium was a second step towards a full solution and our dream of leaving the frustration of being too late behind us and making an impact on child health care.



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REFERENCES

1. Levels and Trends in Child Mortality - UNICEF DATA [Internet]. UNICEF DATA. 2019 [cited 6 August 2020]. Available from: <https://data.unicef.org/resources/levels-and-trends-in-child-mortality/>
2. Children: reducing mortality [Internet]. Who. int. 2020 [cited 6 August 2020]. Available from: <https://www.who.int/news-room/fact-sheets/detail/children-reducing-mortality>
3. Child Mortality - UNICEF DATA [Internet]. UNICEF DATA. 2020 [cited 6 August 2020]. Available from: <https://data.unicef.org/topic/child-survival/under-five-mortality/>
4. Ending preventable child deaths from pneumonia and diarrhoea by 2025 [Internet]. World Health Organization. 2013 [cited 6 August 2020]. Available from: https://www.who.int/maternal_child_adolescent/documents/global_action_plan_pneumonia_diarrhoea/en/
5. Guideline: updates on paediatric emergency triage, assessment, and treatment: care of critically ill children [Internet]. Apps.who.int. 2016 [cited 6 August 2020]. Available from: https://apps.who.int/iris/bitstream/handle/10665/204463/9789241510219_eng.pdf
6. Zaidi A, Ganatra H, Syed S, et al. Effect of case management on neonatal mortality due to sepsis and pneumonia. *BMC Public Health*. 2011;11(Suppl 3):S13. DOI: 10.1186/1471-2458-11-S3-S13.
7. World Health Organisation. MEDICAL DEVICES: Managing the mismatch; WHO 2010, [cited 1 February 2020] http://whqlibdoc.who.int/publications/2010/9789241564045_eng.pdf
8. Malkin, R. A. (2007). Barriers for medical devices for the developing world. Expert review of medical devices, 4(6), 759-763.
9. IMPALA project; [Internet]. AIGHD; [Accessed on 26 March 2023]. Available from: <https://www.projectimpala.org/>
10. Joshi R, Bierling BL, Long X, et al. A Ballistographic Approach for Continuous and Non-Obtrusive Monitoring of Movement in Neonates. *IEEE J Transl Eng Health Med*. 2018 Oct 12;6:2700809.
11. Vesterinen V, Rinkinen N, Nummela A. A Contact-Free, Ballistocardiography-Based Monitoring System (Emfit QS) for Measuring Nocturnal Heart Rate and Heart Rate Variability: Validation Study. *JMIR Biomed Eng* 2020;5(1):e16620
12. IMPALA study group; Innovative monitoring in paediatrics in low-resource settings: an aid to save lives? *ISRCTN71392921* <https://doi.org/10.1186/ISRCTN71392921> accessed on 26 mar 2023

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EDCTP



Improving Cerebral Palsy care in Mangochi District, Malawi

Cerebral palsy (CP) is a disability that affects movement of the muscles, posture and tone. It is caused by brain damage that occurs during the prenatal period, perinatal period or in the first years of life.^[1] CP is the major cause of childhood disability.^[2]

The precise burden of CP in low- and middle-income countries (LMIC) is unknown, but it is estimated to be 2 to 2.5 per 1000 live births, which is 5 to 10 times higher than in high-income countries (HIC).^[3] The majority of children with CP not only have motor impairment but also associated impairments including chronic pain, swallowing difficulties, intellectual disabilities, behavioural problems and epilepsy.^[4] Around a third of patients with CP will never be able to walk and these children are also at great risk of malnutrition.^[5]

In LMICs, diagnosis is often done at a late stage. This is mostly due to a lack of knowledge by health professionals and the lack of a structured screening procedure. This leaves many children with unrecognized disabilities and without appropriate intervention.^[1,6] The delayed diagnosis and lack of rehabilitation leads to severe motor impairment.

Children with disabilities and their families in African countries are frequently excluded from society because of stigmatization. Most of these families are confronted with many social and economic challenges.^[1] Having a life-long condition with great impairment has the potential to affect physical, psychological, cognitive and social functioning.^[7] Those affected in LMICs face additional challenges because of poverty, which makes it more difficult to get access to health, education, food and basic needs, thus compromising quality of life for children with CP.^[1,8]

Taking care of a child with CP has a big impact on the caregiver, and the needs of caregivers may often not be recognized. The special needs of a child with CP may add to the emotional, physical and financial strain inherent in raising children with a disability in a LMIC.^[9] The long-term care is an extra burden on the well-being, marital relationships, and financial status of caregivers.^[10,11] This leads to a low quality of life for caregivers who take care of a child with CP.^[1,10,11]

In Malawi, the care that is given to (families with) children with CP is poorly organized and fragmented. Children suffering from malnutrition need to go to the malnutrition outpatient clinic (OPD), children with motor problems need to go to physiotherapy, and if you have epilepsy you need to go to the epilepsy clinic. These clinics are all on different days and there is no holistic approach to the patient. Due to restricted access to transportation, financial issues, and inability to move patients with severe CP easily, attending all these individual clinics is impossible for patients and their caregivers. One way to improve the quality of care for these children and their families may be to establish multidisciplinary care to address different aspects of care and support as required.

We describe our own experiences in Malawi, exploring the way forward in providing health care to children with cerebral palsy and their caregivers. To set up multidisciplinary care, we first had to assess and increase the existing knowledge of health workers on cerebral palsy



and understand the situation of these families in their respective communities.

SETTING

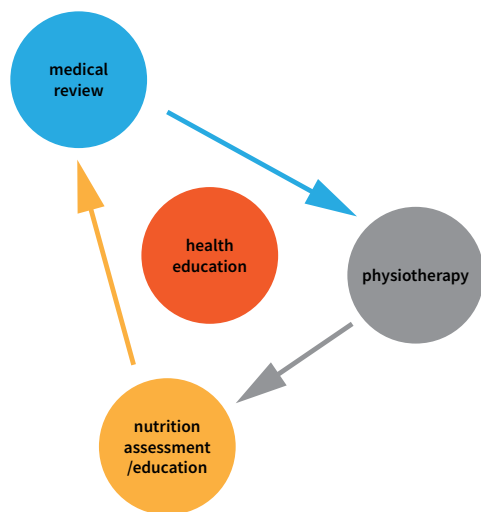
Mangochi District Hospital is a 400-bed hospital situated in a rural district where 88.9% of the population is categorized as the poorest households (International Wealth Index value <35).^[12] (Figure 2) It is a referral hospital for 47 health centres and 4 community hospitals with a catchment area of 1.3 million people. The CP care that was offered previously was only a physiotherapy OPD. There were around 40-50 patients attending this OPD monthly. Because of the large catchment area, it was likely that many patients were not attending the clinic and were not receiving any CP care.

INCREASING KNOWLEDGE

Lack of knowledge among health workers is a big barrier for (early) identification and assessment of children with CP, which is why the first step of the programme was to increase knowledge. Every week we started doing ward rounds in the nursery of Mangochi District Hospital

to identify children with birth asphyxia or prematurity. These are risk factors for developing CP, and the caregivers of these children are counselled to attend the CP clinic after 3 and 6 months to assess the child and to see if there are any early signs of CP. In addition to this, multiple lectures were given about CP in Mangochi District Hospital and in 13 selected health centres and community hospitals that are included in a pilot study for increasing quality of care for children with CP and their families.

Feedback received during these teaching sessions was that CP is not a condition that the health workers understood well. Not all health workers know about the different aetiologies, comorbidities and care that should be given. Most of the patients and caregivers were told that there was nothing they could do for their child and were sent home. During teaching sessions, these points were addressed and strengthened. After these sessions, we saw an increase of 73% in the number of patients attending the clinic.



COMMUNITY

To get a better understanding of the situation in the communities around Mangochi District Hospital, we conducted a qualitative study to explore the knowledge, attitudes and perceptions of community leaders towards CP. It became clear that many families are in great financial distress due to the care for their child. The care for a child with this disability prevents the mother from going to the market or working on the farm. With 85% of the people in Malawi depending

on farming for income, this places a large financial burden on the family, making it difficult for them to survive and meet basic needs. As a lay leader stated:

‘The presence of financial inactivity for both parents brings about a lot of problems and marital tension. The husband may want to leave the wife and remarry somebody else. This will pile more misery in the life of both the mother and her child with CP.’

SIMILARLY, A SHEIKH STATED:

‘These families with children with CP have no time to go and do something that may be beneficial financially, and also they lack funds that may support the child’s medical needs, and as a result, they may end up selling home properties to meet the medical needs of the child, and this puts them in a very difficult corner financially.’

Facilitators addressed by community leaders to improve the care for these children included a multidisciplinary care approach so patients can receive all the care at once and better counselling by health workers to increase understanding of the disease.

MULTIDISCIPLINARY CARE

As a response, we came up with a project to increase the quality of life of children and caregivers with cerebral palsy by providing patient-centred care and a holistic approach that addresses their needs. The literature indicates that the most common physical problems that these children face are motor problems, intellectual disabilities, behavioural issues, communication issues, epilepsy and feeding problems (Figure 2). With a multidisciplinary OPD, we are addressing all these different issues at once, including: nutrition assessment, food supplements and counselling, physiotherapy with a special CP programme focusing on improving the ability to do daily activities, support with CP devices like special chairs and standing frames, and medical consultation and health education in which caregivers also have time to discuss their situation and get peer support.

The first responses after one month of providing multidisciplinary care are very promising. Caregivers say it is a relief that they can attend all health workers in one

visit and that they have the feeling they are taken more seriously. The children attending the OPD do have untreated comorbidities: 47.6% of the patients have epilepsy of whom over 85% were not receiving any epileptics, and 33% of the patients showed signs of moderate or severe malnutrition. This OPD helps them to obtain better physical health overall. We hope this will lead to more possibilities for integration in the communities and to decreasing part of the burden on the caregivers.



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REFERENCES

1. Donald, K. A., Samia, P., Kakooza-Mwesige, A., & Bearden, D. (2014). Pediatric cerebral palsy in Africa: a systematic review. *Seminars in pediatric neurology*, 21(1), 30–35. <https://doi.org/10.1016/j.spn.2014.01.001>
2. Oskoui, M., Coutinho, F., Dykeman, J., Jetté, N., & Pringsheim, T. (2013). An update on the prevalence of cerebral palsy: a systematic review and meta-analysis. *Developmental medicine and child neurology*, 55(6), 509–519. <https://doi.org/10.1111/dmcn.12080>
3. Cruz, M., Jenkins, R., & Silberberg, D. (2006). The burden of brain disorders. *Science (New York, N.Y.)*, 312(5770), 53. <https://doi.org/10.1126/science.312.5770.53b>
4. Eunson, P. ‘Aetiology and epidemiology of cerebral palsy’. *Paediatrics and Child Health*, Volume 22, Issue 9, 361 - 366
5. Donkor, C. M., Lee, J., Lelijveld, N., Adams, M., Baltussen, M. M., Nyante, G. G., Kerac, M., Polack, S., & Zuurmond, M. (2018). Improving nutritional status of children with Cerebral palsy: a qualitative study of caregiver experiences and community-based training in Ghana. *Food science & nutrition*, 7(1), 35–43. <https://doi.org/10.1002/fsn3.788>
6. Jahan, I., Muhit, M., Hardianto, D., Laryea, F., Chhetri, A. B., Smithers-Sheedy, H., McIntyre, S., Badawi, N., & Khandaker, G. (2021). Epidemiology of cerebral palsy in low- and middle-income countries: preliminary findings from an international multi-centre cerebral palsy register. *Developmental medicine and child neurology*, 63(11), 1327–1336. <https://doi.org/10.1111/dmcn.14926>
7. Novak, I., Hines, M., Goldsmith, S., & Barclay, R. (2012). Clinical prognostic messages from a systematic review on cerebral palsy. *Pediatrics*, 130(5), e1285–e1312. <https://doi.org/10.1542/peds.2012-0924>
8. Mohammed, F. M., Ali, S. M., & Mustafa, M. A. (2016). Quality of life of cerebral palsy patients and their caregivers: A cross sectional study in a rehabilitation center Khartoum-Sudan (2014 - 2015). *Journal of neurosciences in rural practice*, 7(3), 355–361. <https://doi.org/10.4103/0976-3147.182778>
9. Moster, D., Wilcox, A. J., Vollset, S. E., Markestad, T., & Lie, R. T. (2010). Cerebral palsy among term and postterm births. *JAMA*, 304(9), 976–982. <https://doi.org/10.1001/jama.2010.1271>
10. Davis, E., Shelly, A., Waters, E., Boyd, R., Cook, K., Davern, M., & Reddihough, D. (2010). The impact of caring for a child with cerebral palsy: quality of life for mothers and fathers. *Child: care, health and development*, 36(1), 63–73. <https://doi.org/10.1111/j.1365-2214.2009.00989.x>
11. Dambi, J. M., Jelsma, J., & Mlambo, T. (2015). Caring for a child with Cerebral Palsy: The experience of Zimbabwean mothers. *African journal of disability*, 4(1), 168. <https://doi.org/10.4102/ajod.v4i1.168>
12. Global data lab, accessed on 23 February 2023, <<https://globaldatalab.org/areadata/profiles/MWlrl04/>>

Childhood Tuberculosis – life is like a jigsaw puzzle

Tuberculosis (TB) is the leading cause of death from infectious diseases for children of all ages globally. Children with vulnerable immune systems, such as the very young, HIV-infected or severely malnourished, are most at risk of falling ill or dying from tuberculosis.^[1]



Marieke vd Zalm

A diagnostic gap in children with tuberculosis refers to the discrepancy between the actual number of children with tuberculosis and the number of cases that are detected and reported by healthcare systems. This gap is primarily due to the challenges of diagnosing tuberculosis in children, such as the non-specific symptoms of the disease, the difficulties in obtaining good quality samples for microbiological testing, and the limitations of current diagnostic

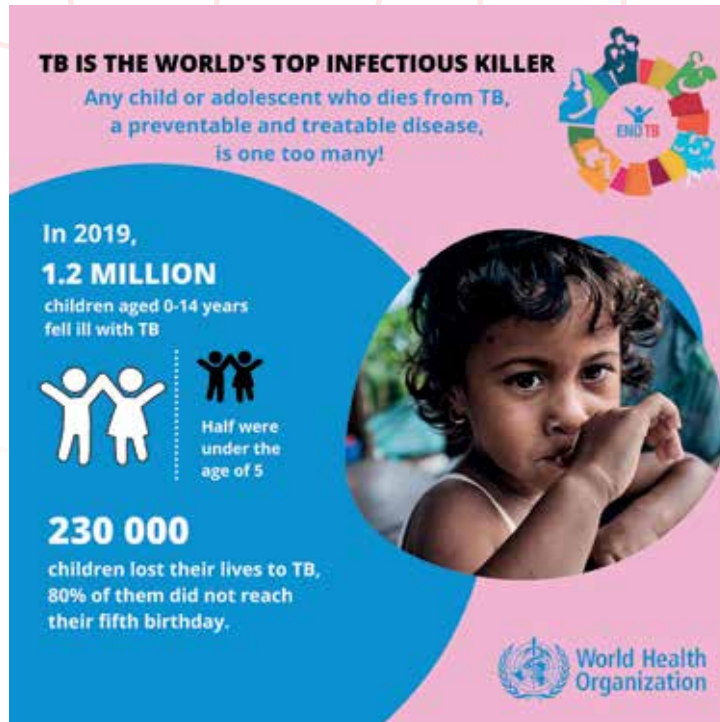


Figure 1: World Health Organization

tools in detecting tuberculosis in children. As a result, many cases of childhood tuberculosis are not diagnosed, treated, or reported.^[2] In addition, the low bacterial load of tuberculosis in children, which confers a lower risk of disease transmission, has made the identification and treatment of tuberculosis and tuberculosis infection in this age group a lower priority than in older individuals.^[3] Also, national tuberculosis programmes tend to allocate lower priority to children in terms of the prevention, diagnosis, and treatment of tuberculosis. However, in the last decade there has been more awareness about TB paediatric cases^[4], and with surveillance and mathematical modelling, the estimation of paediatric TB incidence has become more accurate.^[2,3]

PERSONAL EXPERIENCE

In many cases you can be impressed by reading information like TB is the

world's top infectious killer (figure 1). However, the full realization often only happens when you are confronted with the personal stories of the patients. That is what I realised when I was working for a few months in 2022 in Tygerberg Hospital (Stellenbosch University, Cape Town). South Africa has one of the highest TB rates in the world, and during a normal working day on the paediatric emergency ward you see many cases of TB. Two patients' stories illustrate this:

- A happy toddler of 3 years old: his mom tells us that he was always smiling, playful and giving the family so much joy. Now this little boy is admitted at the emergency ward in coma with TB meningitis. The boy was hospitalized for a long period and is now suffering from long-term neurological complications (including hydrocephalus) and sitting in a wheelchair.
- A 5-year-old girl living with HIV and multi-drug-resistant TB (MDR-TB; resistant to at least two of the most important first-line anti-tuberculosis drugs, isoniazid and rifampicin) is showing us how many pills she

needs to take per day for a minimum of 6-9 months! The pill burden is high, and the tablets are not child-friendly in formulation, size or taste.

During my stay in South Africa, I met highly motivated and active health care workers who want to make a difference. One of them is Marieke van der Zalm, a Dutch paediatrician, clinical researcher and Associate Professor working for the Desmond Tutu Tuberculosis Centre (DTTC); see box 1. In this interview, she tells us about her career, about paediatric TB, the importance of having a research centre, and her dreams for this centre.

FROM DUTCH PAEDIATRICIAN TO (ASSOCIATE) PROFESSOR IN SOUTH AFRICA

Since her medical training, Marieke van der Zalm has had a special interest in paediatric infectious diseases and lung health. Her initial work as an undergraduate

student on the role of respiratory viruses in children with cystic fibrosis (CF) resulted in her PhD at the paediatric pulmonology department at Wilhelmina Children's Hospital in Utrecht on "the role of respiratory viruses during the first year of life" in 2009. After completing her PhD, she specialized to become a paediatrician (at University of Utrecht). Based on her strong interest in working in sub-Saharan Africa, she completed part of her clinical training in paediatrics at Tygerberg Hospital, Stellenbosch University in South Africa and later also at Red Cross Children's Hospital in Cape Town. Van der Zalm told me that both clinical training periods in South Africa were hectic and confronting but also a beautiful life-changing experience. During this time, she realised that her passion was to do research in order to improve health care in low- and middle-income countries (LMICs) like South Africa, by performing highly relevant clinical research to address

the pressing health care issues experienced in these settings. In 2014, she started working at the DTTC, Stellenbosch University, and has since received multiple grants for her work on lung health in children with pulmonary tuberculosis.

Looking back on her working life path, van der Zalm sees a common line going through all the work she did, by following her ambitions and dreams and working in her field of interest. This also included working in infectious disease together with pulmonary diseases, working in sub-Saharan Africa, doing clinical research, and maintaining a strong network of health professionals on a global level.

Box 1: Desmond Tutu Tuberculosis centre (DTTC) – Stellenbosch University

The Desmond Tutu Tuberculosis Centre (DTTC) is an academic research centre located in the Department of Paediatrics and Child Health, Faculty of Medicine and Health Sciences, Cape Town, South Africa, established in 2003. In 2004, Archbishop Emeritus Desmond Tutu, who suffered from tuberculosis as a child, became its patron and the centre was formally named.

South Africa has one of the highest Tuberculosis (TB) rates in the world. The DTTC adopts an outward focus on a holistic approach toward understanding and combating the TB and HIV pandemics.

Their vision is to have a TB-free world for the next generation. Their mission is to be a global leader in TB and HIV research. Research areas are: Paediatric TB (including Lung Health), Health systems and operational research and HIV prevention. ^[11]

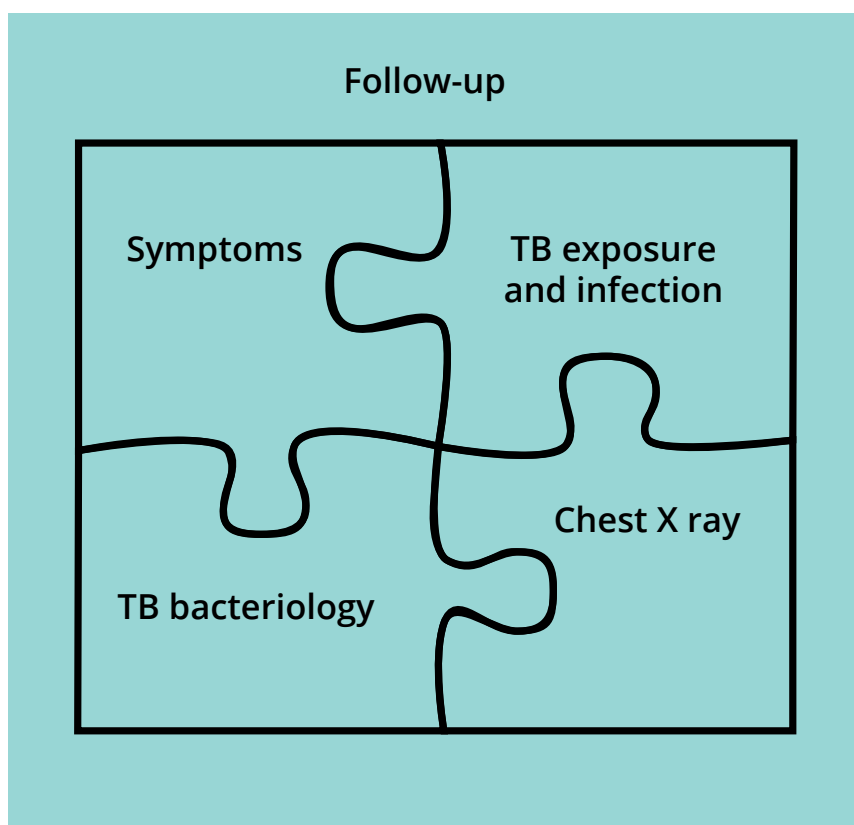


Figure 2



Lungfunction test in child with TB

**PAEDIATRIC TB DIAGNOSING
- CLOSING THE GAP**

TB is a preventable and treatable disease, but the diagnosis of childhood and adolescent TB requires a special approach. Van der Zalm explains that it is like “a jigsaw puzzle” (Figure 2). You need to review all pieces of the puzzle and, even if not all parts of the puzzle are complete, if the picture is suggestive of TB one should consider treating for TB. It is important to realize that *symptoms* of children with TB are less typical and that they are at increased risk of developing serious forms of TB after being infected (exposed to individuals with TB), especially TB meningitis and miliary TB, associated with higher mortality. TB diagnostics are challenging and *bacteriological confirmation* is only achieved in 40-50% of children with TB, the other 50-60% of children are clinically diagnosed. The *chest X-ray* findings in children with TB are often non-specific and can be



PHOTO MAARTEN BOERSEMA

difficult to distinguish from those of other respiratory infections or lung diseases.

Van der Zalm goes on to further explain the jigsaw puzzle: *TB exposure and infection*. Children that are exposed to TB or infected have an increased risk of progressing from primary infection to TB disease. For smaller children, it’s important to realize that they can easily get infected with TB if their caregiver has TB.[5] Many adolescents also develop adult type cavitating disease that can transmit TB, and due to the high number of social contacts made by adolescents, the transmission rate is high.[6] Van der Zalm further stresses that for her, it was important to realise, that if a child is coming from a high burden TB setting and the symptoms suggest TB, you need to think of TB, do investigations, and start treatment, even if the diagnostics may be negative for TB, as

only 40-50% of children with TB actually have microbiologically confirmed TB.

PAEDIATRIC TB AND LUNG HEALTH

After this brief introduction, van der Zalm talks passionately about her field of research: the combination of TB and lung health. It’s a research field that is still developing, and not many studies have been performed in paediatric TB and lung health. Van der Zalm and her research team are looking at the impact of TB and other respiratory diseases on lung health by looking at the long-term outcomes in children diagnosed with TB and children in whom TB was ruled out, and investigating the role of viral co-infections and lung function measurements. In collaboration with the DTTC socio-behavioural science team, they are investigating the impact of respiratory illnesses on quality of life in young children living in South Africa.

There is more and more evidence that paediatric TB can cause long-term lung problems and children can potentially develop chronic respiratory illnesses at a younger age. Van der Zalm hopes that in future she will be able to do intervention studies to evaluate if adjuvant treatment with TB treatment together with immunomodulators can make a difference in long-term lung health outcomes. Here, van der Zalm also refers to her previous experience in research with Cystic Fibrosis (CF). In the field of paediatric TB, there is also much to learn from the holistic approach in children with CF, where, besides the pharmacological treatment, it's important to pay attention to airway clearance techniques, lifestyle habits (smoking cessation including vaping which is very popular, especially in adolescents), and nutrition.

DREAM – VISION

When asked whether she has a dream for her field of work, van der Zalm responds that indeed even for an “old and well-known disease such as TB” it's important to keep dreaming and wishing for a better future. Prevention is key, and still number one. But besides that, she is glad that the DTTC is investing in research to make treatment for TB more child-friendly, for example by reducing the number of pills and the size of the tablets and improving the taste of medicine. On an international level, DTTC works together with a lot of partners. A good example is the Shine Trial^[7], which showed that it's possible to give a shorter TB treatment for non-severe TB in children (reduction from 6 months to 4 months of TB treatment). These results are included in the new International Paediatric TB guidelines issued by the WHO.^[8] When it comes to her own field, van der Zalm hopes that lung health will be integrated in TB treatment and TB research. To that end, it's important to develop easy tools for health workers to focus on the long-term lung effects of TB in children.

TIPS AND TRICKS IN PAEDIATRIC TB

Marieke van der Zalm and the author present some general ‘tips and tricks’ about paediatric TB:

- It's good to realize that the TB burden exists not only in Africa and Asia but also in the eastern part of Europe. With people coming to the Netherlands from different parts of the world (e.g. Ukraine, where the burden of TB disease is higher) it's good to also consider the possibility of paediatric TB to avoid delay in diagnosis and treatment.^[6]
- There is an updated WHO guideline (Sept 2022) on Management of tuberculosis in children and adolescents.^[8]
- For health care workers in resource-limited settings, also check the WHO operational book on tuberculosis – it's very useful.^[9]
- Check the *Diagnostic CXR Atlas for Tuberculosis in Children Image Library*, which contains a collection of CXRs from children less than 15 years of age who present with symptoms and signs of TB.^[10] It's a great source for the interpretation of chest x-rays in children with TB.
- As paediatric TB experts, the people from the DTTC are always open to giving advice about clinical cases.^[11]
- For complicated paediatric tuberculosis cases, you can also ask advice of the European PTBnet group.^[12]
- Every year in September, an International paediatric TB course is organized by the DTTC and Stellenbosch University. Participants come from everywhere in the world. Check the Stellenbosch University website later this year.
- Young doctors with an interest in short-term research on paediatric TB or lung infections may contact Marieke van der Zalm.



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REFERENCES

1. Unicef. Child Health - Tuberculosis [internet 2019] [cited 5 April 2022] <https://data.unicef.org/topic/child-health/tuberculosis/>
2. Sabine Verkuil, Moorine Penninah Sekadde, Peter J Dodd et al. Addressing the Data Gaps on Child and Adolescent Tuberculosis. *Pathogens* 2022 2022 Mar 14;11(3):35 doi: 10.3390/pathogens11030352.
3. Carvalho AC, Kristki AL. What is the tuberculosis burden among children. 2022. *The Lancet*. Volume 10, issue 2, E159-160, February 2022. [http://doi.org/10.1016/S2214-109X\(21\)00548-9](http://doi.org/10.1016/S2214-109X(21)00548-9)
4. World Health Organization. Pediatric Tuberculosis report 2019. WHO. [Internet] [Cited 5 April 2022]. <https://www.who.int/news/item/20-11-2020-overcoming-the-drug-resistant-tb-crisis-in-children-and-adolescents>
5. Annaleise R Howard-Jones, Ben J Marais. Review. Tuberculosis in children: screening, diagnosis and management. *Curr Opin Pediatr*. 2020 Jun;32(3):395-404. doi: 10.1097/MOP.0000000000000897.
6. World Health Organization. WHO Global Tuberculosis report 2020. [internet 2020] [Cited 10 May 2023] <https://apps.who.int/iris/bitstream/handle/10665/336069/9789240013131-eng.pdf>
7. Chabala C, Turkova A, Thomason MJ, Wobudeya E, Hissar S, Mave V, et al. Shorter treatment for minimal tuberculosis (TB) in children (SHINE): a study protocol for a randomised controlled trial. *Trials* 2018;19(1):237 (<https://doi.org/10.1186/s13063-018-2608-5>, accessed 23 February 2022)
8. World Health organization. WHO consolidated guidelines on tuberculosis. Module 5: Management of Tuberculosis in children and adolescents. 2022. WHO. [Internet] <https://www.who.int/publications/i/item/9789240046764>
9. World Health Organization. WHO Operational book on tuberculosis. Module 5: Management of Tuberculosis in children and adolescents. 2022. WHO. [Internet] <https://apps.who.int/iris/bitstream/handle/10665/352523/9789240046832-eng.pdf>
10. Diagnostic CXR Atlas for Tuberculosis in Children – image library. The union. [Internet] [cited 5 April 2022] <https://atlaschild.theunion.org>
11. Desmond Tutu Tuberculosis Centre. [Internet] [Cited 5 April 2022] <https://blogs.sun.ac.za/dttc/>
12. Pediatric tuberculosis network European trialgroups. [Internet] [Cited 10 April 2022]. (<http://www.tb-net.org/index.php/ptbnet>). Contact details; ptbnet@googlegroups.com

The impact of climate change on child health in Malawi

The world stands before the biggest threat to global health in the 21st century.^[1] Climate change will have far reaching consequences, probably further than we can now foresee. The monumental Paris agreement has kept the hope alive to limit global warming to 1.5 degrees Celsius. Recent developments, however, have put this on hold. With a remaining carbon budget that will be spent in nine years, the urgency of emission mitigation steps is clear.^[2] According to the World Health Organisation (WHO), around 23% of all global deaths are attributable to environmental risk factors, and up to 26% of all under-age-five deaths could be prevented by removal of these environmental risks; see Figure 1 for a breakdown in burden of disease by age.^[3]

Already, in 2003, the worrying effects of climate change on child health were reported by Bunyavanich et al.^[4] The researchers explain three pathways via which climate change will negatively impact child health: through environmental changes (e.g. respiratory disease and skin malignancies), through direct effects of extreme weather (e.g. heat stroke and drowning), and through ecological changes (e.g. increased malnutrition and allergies). In the Climate Change Risk Assessment (CCRA) published by WHO in 2014, an additional annual mortality of 250,000 people is expected by 2030 due to climate change. Around 84% of this mortality will occur in children in low-income countries due to undernutrition, malaria, dengue and diarrheal disease. Besides the additional mortality, the growth of millions more children will become stunted with far-reaching consequences.^[5]

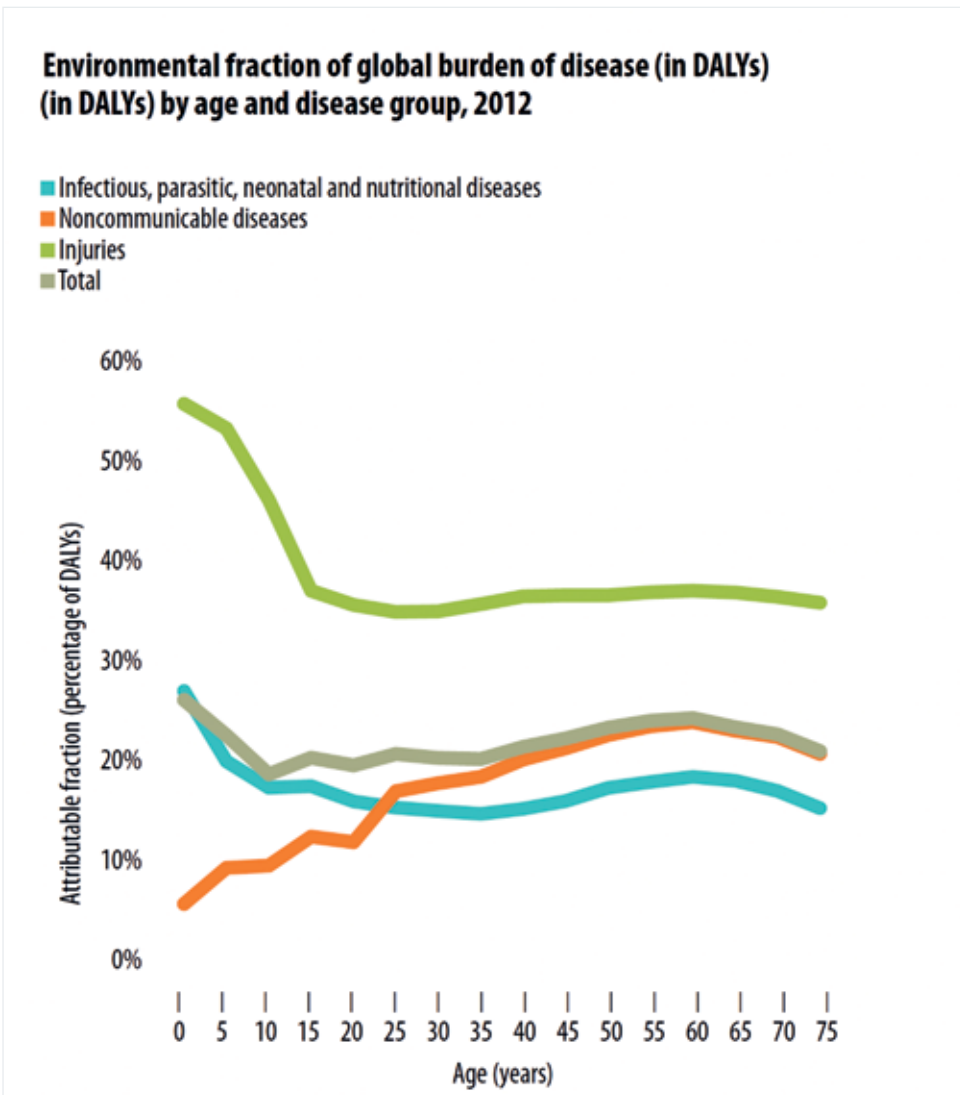


Figure 1. Environmental fraction of global burden of disease by age and disease group^[3]

In this paper, a literature review is presented on the effects of climate change on child health in Malawi. The work was done in the context of a Master of Science thesis in International Health. Malawi is a low-income country that is already experiencing negative effects of climate change, for example from increased extreme weather events. Malawi was used as a case study due to its success in reaching Millennium Development Goals 4 (reducing child mortality) a few years ahead of its target.^[6]

METHODS

A literature review was performed to analyse the effects of climate change on

child health in Malawi. Due to the large scope of the effects of climate change on health a focus was put on infectious diseases, undernutrition and air pollution. The expanded framework on climate change and child health published by Helldén et al was used (Figure 2).^[7]

RESULTS

CLIMATE CHANGE

The effects of climate change on Malawi will primarily occur through increased temperature, rainfall variability and extreme weather events. By the end of this century, mean temperature could increase by 2.3 – 6.3 degrees Celsius. Although

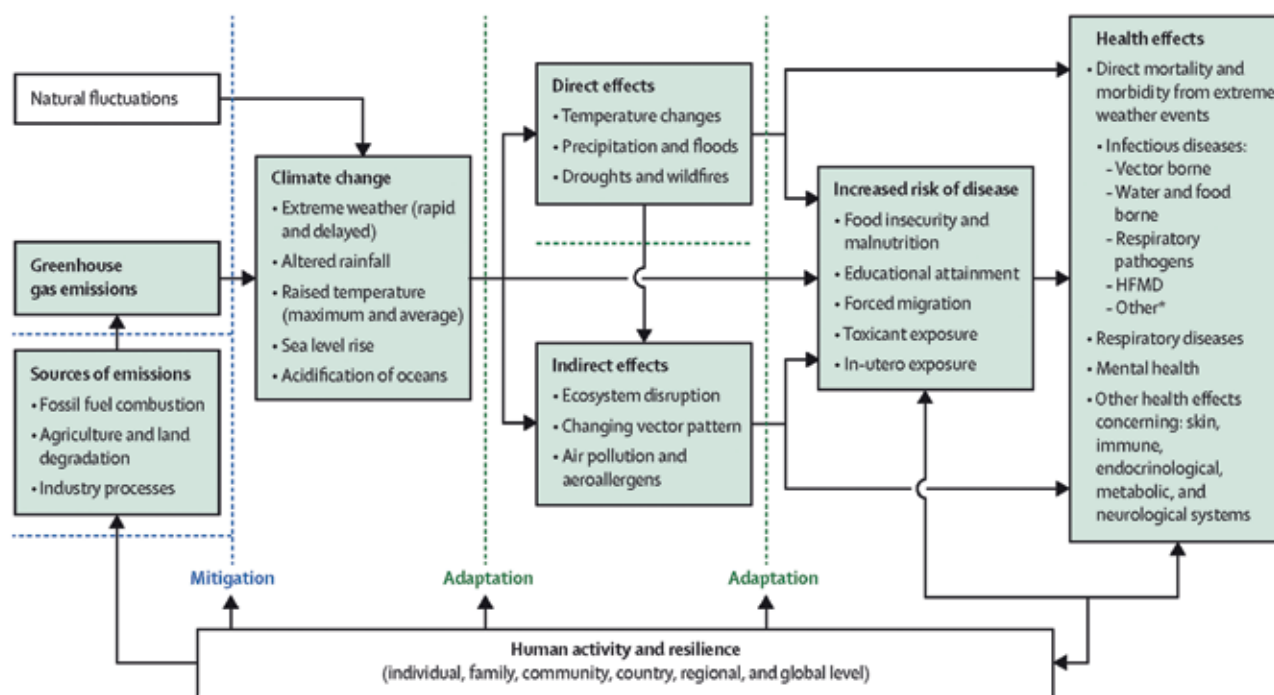


Figure 2. Hellden et al 2021^[7]

there is considerable uncertainty considering rainfall projections, mean annual rainfall is projected to stay the same but the number of rainy days will decrease and the amount of rain per day will increase, leading to longer dry spells and an increase in days with heavy rains.^[8] Extreme weather events have significantly increased over time^[9] and have affected the lives of many people, recently mostly through floods (Figures 3 and 4).^[10,11]

DIRECT AND INDIRECT EFFECTS

Woodland degradation due to land clearance for agriculture and wood fuel harvesting leads to soil erosion and an increased vulnerability to these extreme weather events.^[12] This has resulted in reduced crop yield, loss of livestock, increased food prices, internal displacements, damaged (health and education) infrastructure, direct casualties, reduced access to safe drinking water, and spread of waterborne diseases.^[13,14] During the next El Nino phase, which will happen in the next few years, Malawi will again be particularly prone to prolonged droughts and increased heat. The last severe episode resulted in a 30%-40% decrease in maize production and 6.7 million food-insecure people (Figure 4).^[11]

The longer warm conditions could raise the incidence of malaria during 7-9 months rather than the historical 3-4 months (January-April) and also expand the area affected towards the highlands.^[15] The higher temperatures could also affect plant pathogens and could make the environment more suitable for cattle diseases like “East Coast Fever” caused by *Theileria parva*.^[15,16]

Air quality is affected by climate change in several ways. Increased temperatures will increase ground level ozone levels and aeroallergens, which are known triggers for childhood asthma. Due to increased evapotranspiration and decreased precipitation, there is an increase in particulate matter (PM), ie. air pollution of particles with a diameter of ≤ 2.5 microns (PM_{2.5}). This is due to smoke from forest fires and wildfires and increased wind-blown dust due to drought. Children under 12 could be particularly affected by this since their lungs are still developing. They spend more time outdoors, are more active, and breathe twice as fast as adults.^[17] Pregnant women and infants are also at increased risk of morbidity and mortality from air pollution. Maternal exposure to PM air pollution and ozone

was associated with Low Birth Weight (LBW), Small for Gestational Age (SGA), and Preterm Birth (PTB). Postnatal exposure to air pollutants (PM, ozone and nitrogen dioxide) has been associated with increased infant mortality.^[18] Unfortunately, in contrast to household air pollution, no studies on ambient air pollution targeted children in Malawi.

INCREASED RISK OF DISEASE

The national and household food insecurity created by the increased temperature and extreme weather events lead to more stunting and acute malnutrition.^[9,14] The large number of internally displaced people in the aftermath of these extreme weather events leads to increased vulnerability to infectious diseases: routine vaccination services are disrupted, the large number of people moving may inadvertently spread diseases, there are insufficient mosquito nets, more risk of diarrhoeal disease because of insufficient WASH facilities, exposure to sexual and gender based violence, and decreased access to primary care facilities due to infrastructure damage and unavailability. After the floods of 2019, for example, an estimated 460,000 children lacked basic supplies like food, water and access to

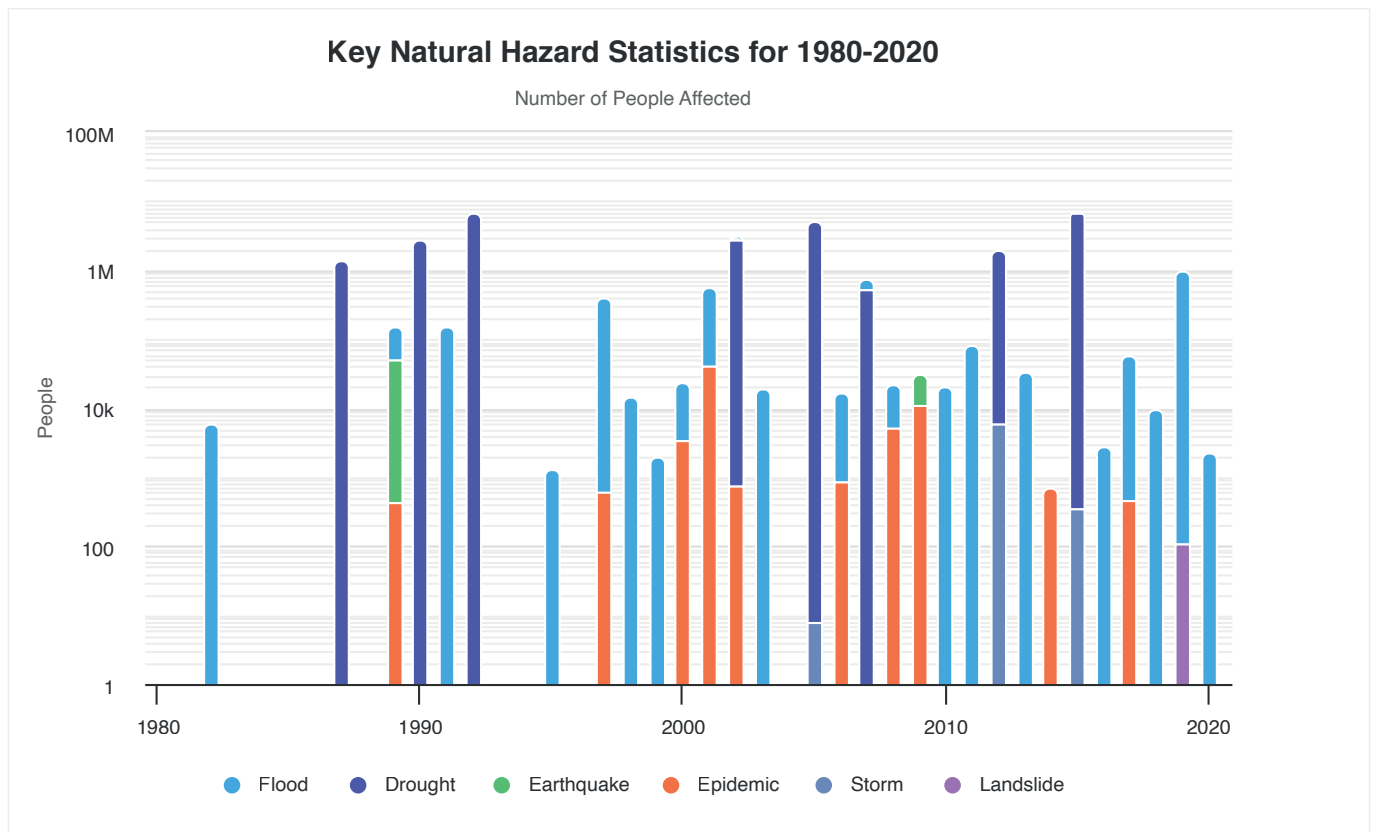


Figure 3. World Bank statistics for Malawi^[10]

toilets.^[19] Another example is the aftermath of the recent storm Freddy that washed away houses, crops and infrastructure, and will likely lead to a worsening of the ongoing cholera epidemic.^[20]

Due to climate change, the distribution and burden of disease by infectious diseases is also expected to change. The incidence of malaria, cholera, dysentery, scabies and schistosomiasis is expected to increase in Malawi. For viral vector borne diseases, the burden of disease is expected to increase, but so far there have been no significant outbreaks of chikungunya, Zika or yellow fever, and no outbreaks have been reported of dengue in the past 10 years in Malawi.^[21] In February 2022, Malawi declared an outbreak of wild poliovirus type 1, the first outbreak in Africa in five years, but the reason for this resurfacing is multifactorial.

CHILD HEALTH EFFECTS

Besides the direct effects of morbidity and mortality from extreme weather events, climate change will affect child health and development in multiple ways: increased food insecurity, limited poverty reduction, forced migration, reduced access to WASH facilities and healthcare / quality

of healthcare, decreased educational attainment, air pollution, direct morbidity and mortality, and increased risk of infectious diseases. Little is known about the effect of potential increases of in- and ex utero exposure to toxicants and pollutants and increased temperatures on perinatal outcomes and the development of children in Malawi. In a recent systematic review, only two studies were published on mental health in Sub-Sahara Africa in Namibia and Nigeria describing Post-Traumatic Stress Disorder and focussing on floodings.^[22]

LIMITATIONS

Limited studies were found studying the effect of heat waves on infant / child mortality in low-income countries. CCRA studies by WHO have had a limited scope and have not studied the effects of heat stress on children. Limited studies were found on the effects of ambient air pollution on mothers, new-borns and children. Limited studies were found on the effect of temperature increase on educational attainment in low-income settings. Limited studies were found studying the effects of increased temperature and/or acidification on the inland lakes of Malawi and thus its food and water supply.

CONCLUSION

From what we know at this moment, climate change is already affecting child health in a negative way in Malawi. There are considerable knowledge gaps which limit our ability to quantify the multitude of effects for low-income countries. High-income countries have an obligation, from an equity and from a climate justice perspective, to assist low-income countries in addressing these knowledge gaps and in developing effective adaptation policies.



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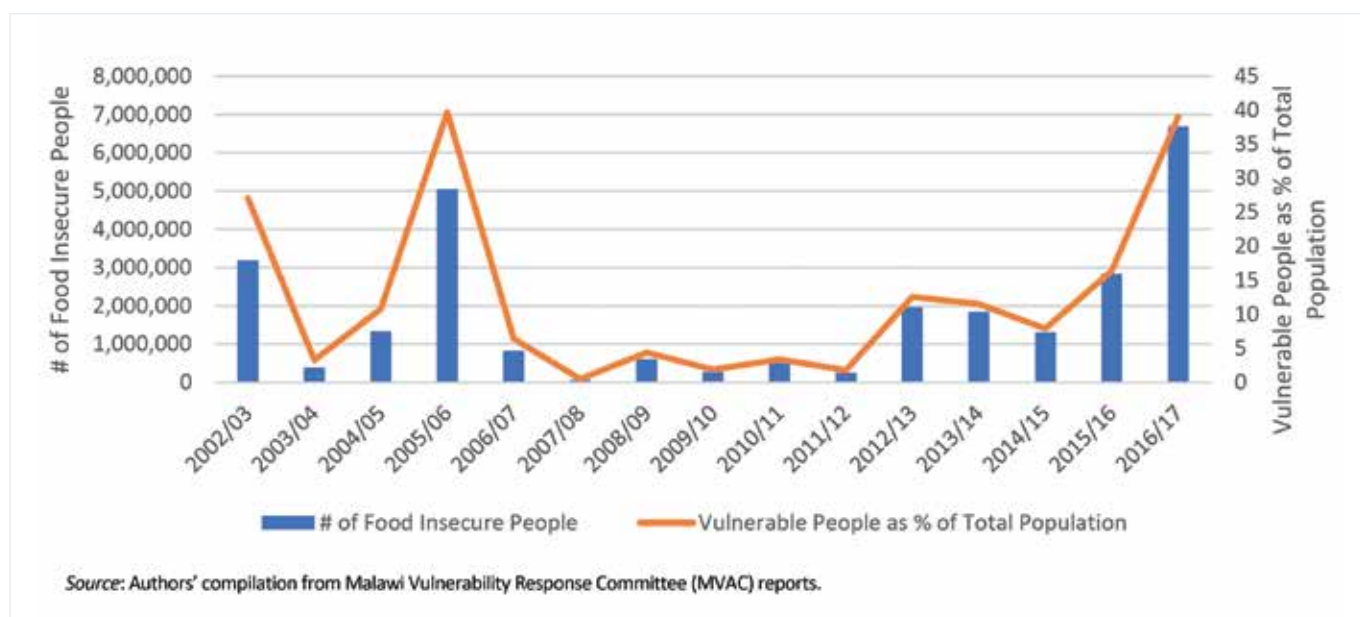
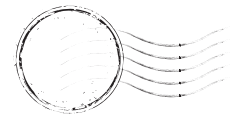


Figure 4. Number of food insecure people (2002-2016)^[11]

REFERENCES

- Costello A, Abbas M, Allen A et al. Managing the health effects of climate change. *Lancet and University College London Institute for Global Health Commission*. *Lancet*. 2009;373(9676):1693–733. [https://doi.org/10.1016/S0140-6736\(09\)60935-1](https://doi.org/10.1016/S0140-6736(09)60935-1)
- Friedlingstein P, O'Sullivan M, Jones MW et al. Global Carbon Budget 2022. *Earth Syst. Sci. Data*. 2022, 14, 4811–4900. <https://doi.org/10.5194/essd-14-4811-2022>
- Prüss-Ustün A, J Wolf, C Corvalán et al. Preventing disease through healthy environments: A global assessment of the environmental burden of disease. World Health Organisation [Internet 2016, cited 2023 April 11] Available from: <https://www.who.int/publications/i/item/9789241565196>
- Bunyavanich S, Landrigan CP, McMichael AJ et al. The impact of climate change on child health. *Ambul Pediatr*. 2003;3(1):44–52. [https://doi.org/10.1367/1539-4409\(2003\)003%3C0044:TIOCCO%3E2.0.CO;2](https://doi.org/10.1367/1539-4409(2003)003%3C0044:TIOCCO%3E2.0.CO;2)
- World Health Organisation. Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. [Internet, September 2014, cited 2023 April 11]. Available from: <https://www.who.int/publications/i/item/9789241507691>
- Kanyuka M, Ndawala J, Mleme T et al. Malawi and Millennium Development Goal 4: a Countdown to 2015 country case study. *Lancet Glob Health*. 2016 Mar;4(3):e201-14. [https://doi.org/10.1016/S2214-109X\(15\)00294-6](https://doi.org/10.1016/S2214-109X(15)00294-6)
- Helldén D, Andersson C, Nilsson M, et al. Climate change and child health: a scoping review and an expanded conceptual framework. *Lancet Planet Heal*. 2021;5(3):e164–75. [https://doi.org/10.1016/S2542-5196\(20\)30274-6](https://doi.org/10.1016/S2542-5196(20)30274-6)
- Mittal N, Vincent K, Conway D, et al. Future climate projections for Malawi. *Future Climate for Africa* [Internet October 2017, cited 2023 April 11]. Available from: https://www.futureclimateafrica.org/wpcontent/uploads/2017/10/2772_malawi_climatebrief_v6.pdf
- Government of Malawi - Ministry of Forestry and Natural Resources. The Third National Communication of the Republic of Malawi to the COP of the UNFCCC. [Internet February 2021, cited 2023 April 11]. Available from: <https://unfccc.int/documents/268340>
- The World Bank Group. Climate Change Knowledge Portal - Country Malawi - Vulnerability [Internet, cited 2022 July 15]. Available from: <https://climateknowledgeportal.worldbank.org/country/malawi/vulnerability>
- Botha, BN, Nkoka, FS, Mwumvaneza, Valens. *Hard Hit by El Niño: Experiences, Responses and Options for Malawi*. The World Bank, Washington, DC. [Internet May 2018, cited 2023 April 11] Available from: <https://hdl.handle.net/10986/30037>
- The World Bank. *Malawi Systematic Country Diagnostic: Breaking the Cycle of Low Growth and Slow Poverty Reduction* [Internet December 2018, cited 2023 April 11]. Available from: <https://hdl.handle.net/10986/31131>
- World Bank Group. *Malawi Country Environmental Analysis*. [Internet 2019 January, cited 2023 April 11]. Available from: <https://hdl.handle.net/10986/31326>
- Government of Malawi. *Malawi 2015 Floods Post Disaster Needs Assessment Report* [Internet March 2015, cited 2023 April 11]. Available from: <https://reliefweb.int/report/malawi/malawi-2015-floods-post-disaster-needs-assessment-report>
- IFRC Climate Centre. *Climate Change Impacts on Health: Malawi Assessment*. [Internet April 2021, cited 2023 April 11] Available from: https://www.climatecentre.org/wp-content/uploads/RCRC_IFRC-Country-assessments-Malawi_Final3.pdf
- Olwoch JM, Reyers B, Engelbrecht FA et al. Climate change and the tick-borne disease, Theileriosis (East Coast fever) in sub-Saharan Africa. *Journal of Arid Environments* 2008;72(2):108-20. Available from: <https://doi.org/10.1016/j.jaridenv.2007.04.003>
- UNICEF. *Unless we act now: The impact of climate change on children*. [Internet November 2015, cited 2023 April 11]. Available from: <https://www.unicef.org/reports/unless-we-act-now-impact-climate-change-children>
- Schraufnagel DE, Balmes JR, Cowl CT et al. *Air Pollution and Noncommunicable Diseases: A Review by the Forum of International Respiratory Societies' Environmental Committee, Part 1: The Damaging Effects of Air Pollution*. *Chest* 2019;155(2):409–16. Available from: <https://doi.org/10.1016/j.chest.2018.10.042>
- UNICEF Malawi. *Annual Report 2019*, page 38 [Internet, July 2020, cited 2023 April 11]. Available from: <https://www.unicef.org/malawi/reports/unicef-malawi-annual-report-2019>
- UNICEF. *Children at risk of cholera in aftermath of cyclone Freddy*. [Internet, March 2023, cited 2023 April 17]. Available from <https://www.unicef.org/press-releases/children-risk-cholera-aftermath-Cyclone-Freddy>
- Adam A, Jassoy C. *Epidemiology and Laboratory Diagnostics of Dengue, Yellow Fever, Zika, and Chikungunya Virus Infections in Africa*. *Pathogens*. 2021 Oct 14;10(10):1324. Available from: <https://doi.org/10.3390/pathogens10101324>
- Rother HA, Hayward RA, Paulson JA et al. *Impact of extreme weather events on Sub-Saharan African child and adolescent mental health: The implications of a systematic review of sparse research findings*. *Journal of Climate Change and Health* 2022;5:100087. Available from: <https://doi.org/10.1016/j.joclim.2021.100087>





Setting up an NICU in rural Tanzania

Can you imagine working on a very busy labour ward, with an average of 30 births per day without enough colleagues and training? And a high level of complicated deliveries, preterm deliveries and a high incidence of severe congenital malformations, resulting in a high case load of babies with (severe) asphyxia, prematurity, sepsis and major congenital malformations? Before 2015, the care of these patients in Sengerema Hospital in rural Tanzania was insufficiently organized and no formal neonatal care department existed, contributing to high neonatal mortality rates of 17%.^[1] Through a strong collaboration between Sengerema Hospital and the Friends of Sengerema Hospital Foundation, which continues to this day, the perspectives for this vulnerable group improved.

Neonatal mortality Netherlands: 1.7 / 1000 (2021) ^[2]
Neonatal mortality Tanzania: 19 / 1000 (2020) UNICEF data warehouse ^[6]
Deliveries on a yearly base Sengerema: 6867 (2022) annual report Sengerema Hospital ^[1]
Mortality rate NICU Sengerema 2014: 89 / 509(17.5%) annual report Sengerema Hospital ^[1]
Mortality rate NICU Sengerema 2022: 92 / 1571 (10.5%) annual report Sengerema Hospital ^[1]
Admissions NICU Sengerema in 2022: 1571 annual report Sengerema Hospital ^[1]
<i>Table 1. Mortality rates, deliveries and admissions in Sengerema Hospital</i>

BACKGROUND

Sengerema is a poor and rural region in the northern part of Tanzania with a population of more than 700,000 people. Nowadays the district hospital is developing into a referral hospital and seriously investing in maternal, perinatal and neonatal health care. With a neonatal mortality rate ten times higher than the Netherlands^[1-2] (Table 1), the inequality in health remains enormous. A systematic analysis in 2019 shows a high percentage of neonatal mortality among child mortality in limited

settings^[3] (Figure 1). In line with the sustainable development goals (SDGs), one of the main focuses of Sengerema Hospital is to reduce neonatal mortality.

IMPROVING NEONATAL CARE

The management of the hospital and Dutch medical volunteers of the Friends of Sengerema Hospital Foundation developed a plan to invest in perinatal and neonatal care. As a result, project Neonatal Intensive Care Unit (NICU) was ‘born’ in 2015. With an average of 7,000 deliveries on a yearly basis, the idea was to open up a unit for essential newborn care. Besides setting up a neonatal ward, it was also important to compose a dedicated NICU team. By working closely with the nurses and doctors at the wards, but also with the district health officer from the local government, a team was formed with the motivation, spirit and skills to start this project. A training adjusted to the context and their prior skills equipped them with the essential knowledge and skills to provide appropriate care for the most vulnerable period in a newborn’s life. The full NICU staff was trained before the official opening of the unit in November 2015.

INCREMENTAL STEPS IN IMPROVING CARE

During the first year, the main focus was on creating the physical NICU, training of the new NICU staff, and implementation of the protocols based on the ‘National guideline for neonatal care and establishment of neonatal care unit’.^[4] This high-level unit started with four incubators, oxygen machines, two resuscitation tables, and some monitors. The local team was very dedicated and enthusiastic. During the first months of the training,

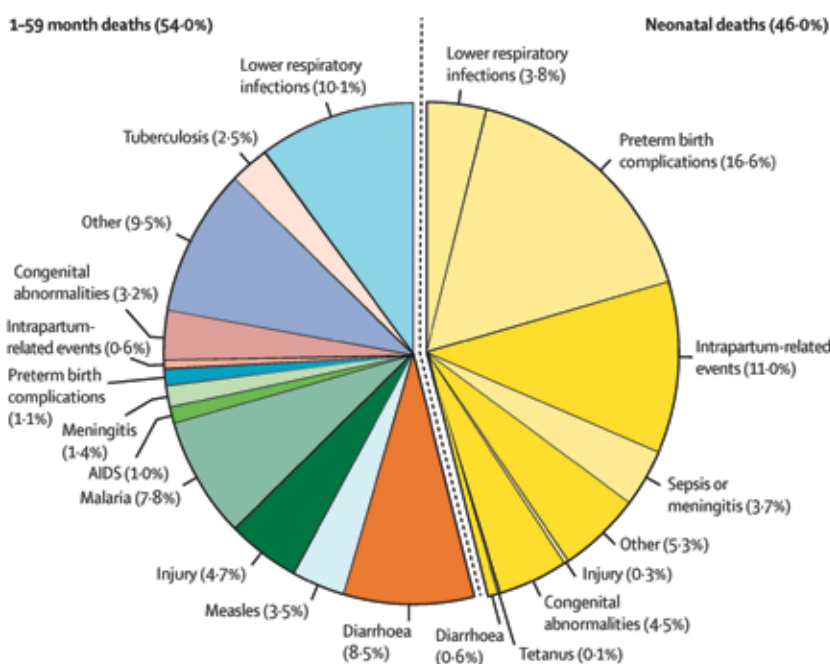


Figure 1. Global causes of under-5 deaths in 2019^[3] Perin et al, 2021, page 109

Examination of a new admission on the new NICU

the main focus was on neonatal resuscitation after birth. Guidelines and a training program of Helping Babies Breathe (HBB) were used as a basis and were provided through simulation-based training. This program teaches the skills of caring for healthy babies and assisting babies that do not breathe on their own after birth. Large-scale studies showed that HBB programs led to a 47% reduction in early 24-hour neonatal mortality in Tanzania.^[5] Continuous bedside training was provided to allow the team to learn new skills and grow into their role with increased responsibilities. The results within the first year were incredible. There was a decrease in neonatal mortality of 40%.^[1] With the complete NICU training, the local team achieved a lot. With the increasing pride of the team, the dedication and enthusiasm to take care of the most vulnerable patients in the hospital grew. Due to continued support and guidance over the seven and a half years that followed the opening, the local team was able to grow further and new interventions like Continuous Positive Airway Pressure (CPAP) were introduced.

PITFALLS AND CHALLENGES

Of course, opening this brand-new unit was not only a success. Especially in the beginning, there were some pitfalls and unexpected events. The capacity of the old generator was not sufficient after installing all the new medical equipment. The increased use of power increased the energy costs by 25% after opening the NICU - a wry twist considering that the NICU does not generate any income, since the care is offered free of charge.

High turnover of health care workers in rural Tanzania is a common threat to continued care. This makes it extremely challenging to build a team and increase capabilities and skills. Nurses are often placed in different wards or are relocated to different health facilities. In addition, the emotional, cognitive and physical burden on the nurses is significant, at times impacting their motivation and

willingness to work on the NICU. Discussing this with the team as well as hospital management was essential for success. It showed once again that regular retraining and intervision are needed for new staff members.

Financial sustainability is a serious challenge in this setting. Funding some of the (recurring) costs through donations allows a standard of care for newborns - care which would not be provided were it only to come from the regular financial resources of the hospital. To date, Friends of Sengerema Hospital Foundation pays for approximately 25% of the recurring costs of the facility. Stopping this support would immediately threaten the continued future of the project.

MIRACLE BABIES

The NICU has now been running for seven years. With an average of 1,500 annual admissions, there was a serious need to expand the unit and hire more staff. After raising the appraised financial support, the NICU underwent a complete renovation in 2022. The team designed the new unit themselves, according to their wishes and latest standards. The unit now can offer an even higher level of care as there is more and improved medical equipment.

The complete staff was trained on a daily basis for four months after the opening of the renovated NICU. Ever since, our local colleagues have reported additional unexpected successes. Some babies with a birth weight of only 500 grams survived without invasive ventilation, endotracheal surfactant and, for example, a peripherally inserted central catheter for parenteral nutrition. They survived as a result of very dedicated nurses who supported the kangaroo mother care: skin-to-skin contact with the baby for the greatest part of the day, which is the best and most incredible 'medicine' for preterm babies in low-resource settings.

In other parts of Tanzania, initiatives to start an NICU have arisen. Colleagues from other hospitals visit Sengerema

Hospital to follow accredited trainings on neonatal care. In addition, these trainings provided by the local staff and members of the Foundation generate income for the hospital.

LESSONS LEARNED

- Keep it simple and focus on the basics. Make sure that the interventions you propose are feasible, acceptable and sustainable. Only add new things when the basics are going well.
- The right team is essential for success. Cherish them and let them grow and make sure you keep an eye out for their needs.
- Bedside teaching, long-term involvement and support are key for success and sustainability.
- Local ownership and engagement of leadership are essential to ensure buy-in, especially since neonatal care is usually an activity that does not generate income.
- In case of projects that are (partly) financed by external parties, be prepared to invest in a sustainable plan that focuses on local ownership.



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REFERENCES

1. Voeten, M. Annual report Sengerema Designated District Hospital 2014 – 2022
2. Perined. Kerncijfers geboortezorg 2021. [Internet]. Available from: <https://www.perined.nl/onderwerpen/publicaties-perined/kerncijfers-2021> [Accessed 8th march 2023]
3. Perin J, Mulick A, Yeung D et al. Global, regional, and national causes of under-5 mortality in 2000–19: an updated systematic analysis with implications for the Sustainable Development Goals. *Lancet Child Adolesc Health*. Volume 6 2022; 6: 106–15
4. Ministry of health of the United Republic of Tanzania. National guideline for neonatal care and establishment of neonatal care unit. 2019 August.
5. Laerdal Global Health. Helping Babies Breathe 2001-2023. [Internet]. Available from <https://laerdalglobalhealth.com/partnerships-and-programs/helping-babies-breathe/>. [Accessed 28th march 2023]
6. Unicef. Maternal and Newborn Health Disparities 2015. [Internet]. Available from <https://data.unicef.org/country/tza/>. [Accessed 2nd April 2023]

Twinning partnerships within global paediatric oncology: the Dutch experience

ABSTRACT

Background: Cancer is a disease that affects over 400,000 children worldwide each year. However, around 80% of these children live in countries where healthcare is limited and survival rates are low (<20%). This is in sharp contrast to the 80% survival rates for children with cancer living in high-income countries.

Method: A descriptive report on the need for sustainable, long-lasting North-South collaborations within paediatric oncology, and the Dutch experience of such partnerships via the Outreach Programme of the Princess Máxima Center, a centre for paediatric oncology, in Utrecht.

Conclusion: Dismal outcomes of children with cancer in low- and middle-income countries are unacceptable, also because the majority of children with cancer live there. Twinning programmes between paediatric oncology centres can form a sustainable North-South collaboration to improve outcomes for these children globally.

BACKGROUND

Cancer is a disease that affects over 400,000 children worldwide each year. At least 80% of these children live in low- and middle-income countries (LMICs) where access to health care and survival chances are limited. In contrast, the survival rate of children with cancer in high-income-countries (HICs) is close to 80%.^[1,2] This significant inequality in health outcomes is one of the greatest global health disparities and is unacceptable.

In 2018, the World Health Organization (WHO) launched the Global Initiative for Childhood Cancer (GICC), with the overarching goal of achieving at least 60%

Outreach Programme

MISSION	To improve the care, quality of life and survival of children with cancer in low- and middle-income countries
OBJECTIVES	1. To improve care 2. To share knowledge 3. To acquire knowledge
PILLARS	1. Care 2. Education 3. Data Management 4. Research

Table 1. Outreach Programme of the Princess Máxima Center

survival for all children diagnosed with one of the six curable types of cancer by the year 2030, along with optimal quality of life.^[3] Various factors contribute to the dismal outcome of childhood cancer in LMICs, including delays and limited access to diagnosis and specialized treatment as well as social factors like social stigma and disbeliefs.^[1,4] For example, essential medicines for childhood cancer treatment are included in the WHO's Model List of Essential Medicines for Children, and 40% of patients in LMICs lack access to all medicines^[5,6]. Also, treatment abandonment can reach up to 50% due to the lack of information provided to caretakers by medical personnel as well as negative beliefs and misconception of childhood cancer and treatment.^[7]

Childhood cancer care involves specialist paediatric care, which requires trained multidisciplinary medical personnel. These include medical doctors, nurses, pathologists, radiologists, pharmacists and laboratory scientists, as well as social workers, child life specialists and other specialists. Over the last decade, the numbers of medical schools and trained

medical personnel have increased in LMICs, including countries in sub-Saharan Africa.^[8] Yet, training personnel for specialist care remains a challenge due to a lack of human resources and training opportunities. In order to provide reliable childhood cancer care, trained and available personnel are crucial. North-South collaborations can play an important role in overcoming these challenges in paediatric oncology care in resource restrained settings.



NORTH-SOUTH COLLABORATIONS WITHIN PAEDIATRIC ONCOLOGY

Improvement of the survival of children with cancer globally has been on the agenda of the International Society of Paediatric Oncology (SIOP) for over a decade. SIOP, as an advocate of the global paediatric oncology community, has been a major driver for the development of adaptive treatment guidelines, based on available resources and supportive care, to provide the best childhood cancer care possible. By the start of the GICC in 2018, the global awareness of childhood cancer took off on global, regional and national levels. This initiative influenced policymakers and created possibilities to launch global platforms like the initiative for Access to Childhood

Cancer Medicines, which improved accessibility of chemotherapy globally.^[8]

However, despite global and regional support, local implementation of specialized care remains challenging due to a lack of (human) resources and familiarity. Therefore, SIOP aims to stimulate twinning partnerships.^[9] Twinning partnerships refer to an inter-institutional partnership between an HIC and an LMIC paediatric oncology centre (North-South collaboration) or between regional paediatric oncology centres (South-South collaboration). A twinning partnership is by definition long-term, formalized, and multidisciplinary, and has an ultimate aim of improving care and outcomes for children with cancer.^[10] International twinning partnerships have demonstrated clear efficacy in improving the diagnosis, treatment, care and survival of children with cancer in LMICs.^[10,11] Partnership benefits are bi-directional, including opportunities for collaborative research, collaborative clinical problem-solving, and educational opportunities.^[9,10]

Research has been a key factor for improvement of childhood cancer treatment and supportive care and an increase in survival rates in HIC. However, a recent SIOP global mapping survey showed that only less than 1% of paediatric oncology publications come from Africa.^[9] This gap is crucial as patient populations in LMICs vary, including differences in ethnicity, high prevalence of infections (EBV, malaria and HIV), and nutritional status. Severe malnutrition due to underweight is very rare in HICs (< 1%), compared to LMICs, where rates of severe malnutrition above 30% at diagnosis have been described.^[12] Research to enhance regional evidence-based practice is therefore key to improving childhood cancer care in LMICs, such as countries in sub-Saharan Africa, but remains

scarce. Hence, North-South research collaborations could be a direct win for the global paediatric oncology community.

PRINCESS MÁXIMA CENTER OUTREACH PROGRAMME

Before 2018, childhood cancer treatment in the Netherlands was provided by eight university hospitals. However, since 2018, childhood cancer care and research has been centralized in the Princess Máxima Center in Utrecht. Several paediatric oncology departments with prior, long-lasting international partnerships transitioned to the Princess Máxima Center and these partnerships are now coordinated by the Academy & Outreach Department. Currently, the Princess Máxima Center is the largest paediatric oncology centre in Europe, and its Outreach Programme is the largest and most comprehensive international paediatric oncology programme originating from Europe. The goal of the Outreach Programme is to improve the care, quality of life, and survival of children with cancer in LMICs, primarily through Twinning Programmes.

A Twinning Programme is a partnership between the Princess Máxima Center and a partner hospital in an LMIC, with the aim of jointly improving the survival and quality of life of children with cancer. This is achieved through focusing on 1) the improvement of care, 2) sharing knowledge (education), 3) acquiring knowledge (research), and 4) data registration (Table 1). Partner hospitals within the Outreach Programme must meet certain criteria: being located in a country identified as an LMIC, preferably in Sub-Saharan Africa and/or Indonesia, treating over 100 new children with cancer per year, being a national teaching hospital with various types of healthcare professionals in training, demonstrating a need for a twinning partner (demand-driven), having a local leader, and being willing to work in a

multi-year partnership (generally at least 5 years) formalized by a Memorandum of Understanding (MoU), co-signed by the Hospital’s Board of Directors. Currently, there are seven twinning programmes within the Outreach Programme, involving hospitals in Eldoret and Nairobi (Kenya), Blantyre (Malawi), Moshi (Tanzania), Yogyakarta and Bandung (Indonesia) and Pristina (Kosovo).

Over the past few years, much has been accomplished: improvement of care, including availability of treatment guidelines and diagnostics, as well as reducing the burden of treatment abandonment. Improved care is illustrated by the increased event-free survival of children with nephroblastoma after protocol usage in Eldoret, and by the reduced abandonment rate from over 50% to less than 20% after integration of guardian education in Kenya and Indonesia.^[5,13-15] With regards to education, training is ongoing for health care workers including medical doctors and nurses. In 2022, a total of 711 healthcare workers, including circa 200 nurses, were trained. Also, collaboration with AMPATH-Indiana University, a paediatric oncology fellowship programme was started in Eldoret, Kenya in 2019. We are proud to report that in December 2022 the first two fellows graduated. These new paediatric oncologists are the very first to be trained and graduated in Kenya. Additionally, training for paediatric oncology fellows or young professionals is given by a hybrid 4-module Master Course. In 2022, modules on Haemato-Oncology and on Neuro-Oncology were conducted and a total of 12 colleagues from LMICs participated, including paediatric oncologists from our twinning partners.

Trained paediatric oncology nurses are also essential in the treatment of children with cancer, but in most LMICs are not locally available. To enhance sustainable nursing education, the Princess Máxima Center has assisted with establishing a local Master on Oncology Nursing at the School of Nursing in MOI University, Eldoret, Kenya. To facilitate structural nurse education at all Twinning Programmes, a train-the-trainer programme has recently been started. This programme,

Research Themes

1	Epidemiology and treatment outcome of children with cancer in LMIC
2	Childhood cancer treatment adherence and abandonment in LMIC
3	Quality of life, palliative care and supportive care of children with cancer in LMIC
4	Childhood cancer awareness and early referral in LMIC
5	Childhood cancer survivorship: late effects, stigmatization and social reintegration in LMIC
6	Global health issues impacting childhood cancer treatment and outcome in LMIC

Table 2. The six research themes within the Princess Máxima Center Outreach Programme



which was originally established by the Sub-Saharan African Nursing Network of SIOP, serves as a foundation for a 2-year nurse training programme within the twinning partner teams. The curriculum was developed in Africa via a Delphi survey approach to ensure that the programme is focused on the needs and concerns of nurses across the region.[15]

In addition, research capacity needs to be built so that future clinical trials can be conducted locally. The Princess Máxima Center Outreach Programme is supporting six research themes (Table 2). Currently, a total of 13 PhD-candidates are undertaking a PhD programme within the twinning collaborations: 6 from the Netherlands, 4 from Kenya, 1 from Malawi and 3 from Indonesia. A total of 6 PhD students are part of a twinning PhD programme where PhD candidates from the Netherlands and partner hospitals are working on a collaborative project. In 2022, a total of 14 international publications were published as part of Outreach research (Appendix 1).

CONCLUSION

Outcomes for children with cancer are currently unacceptably low in

LMICs, while the majority of children with cancer live there. To achieve 60% survival for curable types of cancer, a multi-disciplinary approach is required, including capacity building and acquiring knowledge as well as implementation of evidence-based care improvements in LMICs. Through twinning programmes between paediatric oncology centres, sustainable North-South collaborations can be formed. The Princess Máxima Center, as a centre of excellence in childhood cancer care, strives to improve specialized care and survival globally through such North-South collaborations.

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REFERENCES

1. Ward ZJ, Yeh JM, Bhakta N, Frazier AL, Girardi F, Atun R. Global childhood cancer survival estimates and priority-setting: a simulation-based analysis. *The Lancet Oncology*. 2019;20(7):972-83.
2. Lam CG, Howard SC, Bouffet E, Pritchard-Jones K. Science and health for all children with cancer. *Science*. 2019;363(6432):1182-6.
3. Organization WHO. CureAll framework: WHO global initiative for childhood cancer: increasing access, advancing quality, saving lives. 2021.
4. Israels T, Afungchwi GM, Klootwijk L, Njuguna F, Hesselting P, Kouya F, et al. Fever and neutropenia outcomes and areas for intervention: A report from SUCCOUR-Supportive Care for Children with Cancer in Africa. *Pediatric Blood & Cancer*. 2021;68(9):e29224.
5. Denburg AE, Fundytus A, Khan MS, Howard SC, Antillon-Klussmann F, Sengar M et al. Defining Essential Childhood Cancer Medicines to Inform Prioritization and Access: Results From an International, Cross-Sectional Survey. *JCO Glob Oncol*. 2022 Jun;8:e2200034. doi: 10.1200/JGO.22.00034.
6. Cohen P, Friedrich P, Lam C, Jeha S, Metzger ML, Qaddoumi I et al. Global Access to Essential Medicines for Childhood Cancer: A Cross-Sectional Survey. *J Glob Oncol*. 2018;4:1-11. doi: 10.1200/JGO.18.00150.
7. Njuguna F, Mostert S, Slot A, Langat S, Skiles J, Sitaresmi MN, van de Ven PM, Musimbi J et al. Abandonment of childhood cancer treatment in Western Kenya. *Arch Dis Child*. 2014 Jul;99(7):609-14. doi: 10.1136
8. Global platform for access to childhood cancer medicine,2022. Available online: Global Platform for Access to Childhood Cancer Medicines | St. Jude Global (stjude.org)
9. Howard SC, Zaidi A, Cao X, Weil O, Bey P, Patte C, et al. The My Child Matters programme: effect of public-private partnerships on paediatric cancer care in low-income and middle-income countries. *Lancet Oncol*. 2018;19(5):e252-e66.
10. The SIOP PODC Twinning, Collaboration and Support Working Group are pleased to launch the Twinning Guidelines document. Document version 1.3, 2022. Available from: Twinning Programs – POINTE, cancerpointe.com
11. Hopkins J, Burns E, Eden T. International twinning partnerships: An effective method of improving diagnosis, treatment and care for children with cancer in low-middle income countries. *Journal of Cancer Policy* 2013;1: e8-e19
12. Huibers MHW, Manda G, Silverstein A, Wanda W, Mtete I, Makuti S, et al. The Burden of Malnutrition in Childhood Cancer in Malawi–Risk Regardless of Age. *Nutrition and Cancer*. 2022;1-7.
13. Uittenboogaard A, Njuguna F, Mostert S, Langat S, van de Velde ME, Olbara G et al. Outcomes of Wilms tumor treatment in western Kenya. *Pediatr Blood Cancer*. 2022 Apr;69(4):e29503. doi: 10.1002/pbc.29503.
14. Mostert S, Sitaresmi MN, Gundy CM, James V, Sutaryo, Veerman AJ. Comparing childhood leukaemia treatment before and after the introduction of a parental education programme in Indonesia. *Arch Dis Child*. 2010 Jan;95(1):20-5. doi: 10.1136/adc.2008.154138.
15. SIOP Africa Sub-Saharan Paediatric Oncology Nursing Network Foundation Training Programme. Available from SIOP Africa Sub-Saharan Paediatric Oncology Nursing Network Foundation Training Programme – POINTE; www.cancerpointe.com

Setting up an elective in Global Woman and Child Health for 2nd year Medical students at Amsterdam University Medical Center (UMC)

The Netherlands is just a small country in a globalizing world. Combined with an increase of migrants in the Netherlands, this should lead to adjustments in the approach towards patients as well as in the existing medical curriculum. Amsterdam UMC is actively integrating internationalized education in the current medical curriculum.

In their second year, medical students have the opportunity to do an elective course in Global Woman and Child Health for three months. Global Child Health as well as Global Obstetrics & Gynaecology have not been part of the mainstream medical curriculum at the Medical Faculty of the University of Amsterdam. Paediatric and Obstetric-Gynaecological Consultants took the initiative and started a new, 12-week course in early 2022. The aim is to inspire the next generation of medical professionals to work in the field of Global Child Health and Global Obstetrics & Gynaecology. We felt strongly that this was currently missing in the Bachelor of Medicine at the University of Amsterdam and that it is important for medical students to learn that medicine, as we practice it in the Netherlands, is not the Gold standard. In addition, knowledge and skills learned in this course will help them to be a completer and more inclusive doctor later on.

The course incorporates a practical approach to learning, using (medical) cases to help students understand the various themes and apply their new-found knowledge to real-world low- and middle-income country (LMIC) scenarios. The aim is to not only impart medical knowledge but also to teach students about conducting research, building capacity, and collaborating effectively in an international context. Over the course of 12 weeks, the students follow the life of a fictive Malawian family who experience

the challenges of living in an LMIC. This story is described in a reader that the students receive at the onset of the course. Each week has a different theme, related to Women and Child health but also including Public Health, Nutrition, Infectious Diseases, Critical Care, Mental Health, and Surgery. The student is challenged to think from a broader perspective about different themes: immigrants, prevention, cultural differences, life in different socio-economic circumstances, implementing projects, etc.

Colleagues from all over the world with a strong background in Global Woman and Child Health teach the students the basic principles of these beautiful but challenging sub-specialties. Students attend lectures both live in Amsterdam as well as online from LMICs. Theory is combined with practical skills, from creating a vlog on life in different neighbourhoods in Amsterdam to hands-on training in basic life support. What makes this course special is its focus on low-resource settings, where the medical practices may be quite different from those in high-resource settings like the Netherlands.

To prepare the students for the challenges of working in diverse and multicultural environments, the course also includes an intercultural communication training. This training equips the students with the skills they need to communicate effectively with people from different cultures, appreciate cultural nuances, and

work collaboratively towards shared goals. Our future aim is to invite students from universities in LMICs to join this course, live or online, and to encourage greater interaction and exchange between students from all over the world.



Overall, the Global Woman & Child Health course at the Medical Faculty of the University of Amsterdam provides an enriching experience for medical students. It helps them develop a global perspective on healthcare and equips them with practical skills that will serve them well in their future medical careers.



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Cross-cultural consultation - tools to provide equitable health care for all

The immigrant population of the Netherlands has become significantly more diverse in the last 40 years. Currently one in five Dutch people has at least one parent who was born abroad. In 1972, 9.2% of the population had at least one foreign-born parent.^[1]

It has become apparent that the health-care system is well designed to care for the dominant cultural groups, but there are sometimes large health outcome disparities for those on the margins. The intercultural approach in paediatrics requires health workers to consider care as a specific approach which includes the diversity of cultures, pathologies or disorders, family environments, education, and other social determinants of health.

In this article, we consider eight examples of a global health perspective in the Dutch consultation room which can be helpful to provide equitable health care for all.

EXAMPLES FROM A DUTCH PAEDIATRIC CLINIC

1. Teenager 14 years old from Yemen with abdominal pain. Alternating complaints of diarrhoea or constipation. Diagnostics did not show abnormalities. He is living in an asylum seeker centre and depends on the food that is provided, which includes milk products. One of the registrars is discussing the patient with the paediatrician who is using her global health glasses.

Did you know that the majority of sub-Saharan Africa has Lactose intolerance.^[2] This can give such kinds of abdominal complaints? What do you know about lactose intolerance?

Check the world map for lactose intolerance.^[3] You will find that Yemen has 100% lactose intolerance.

INTERMEZZO - FOOD

It is always good to realise that moving to another country often means a changing diet and exposure to new food products. This can cause health problems, as in the example above. Another example is children with G6PD deficiency (a genetic disorder that affects red blood cells) who arrive in the Netherlands and are offered fava beans in their meals, which can cause haemolysis.^[4]

There is also another factor which is important to take into consideration. Migration to high-income countries is linked to an increased risk of non-communicable diseases. Immigrants from low- and middle-income countries moving to high-income countries experience an abrupt change from a more traditional food environment to a modern, industrialized one. Over time they suffer from higher rates of many negative health outcomes, including obesity, type 2 diabetes, and other diet- and metabolism-related chronic diseases, often at a younger age.^[5]

2. Girl Yasmina is 10 years old, referred to you, paediatrician, by the surgeon.

The girl has been seen three times at the emergency department over the last half year. Every time, the surgeon saw the patient because of suspected appendicitis. There were symptoms of fever and some elevated infection markers (CRP and Leucocyte) but ultrasound showed a normal appendix. What do you think? What question will you ask the patient to get more information?

An illustrative article from the NTVG^[6] describes that, in the Netherlands, Familiare Mediterrane Fever (FMF) in children is often diagnosed with a delay. The case of Yasmina could indicate she has FMF. It's important to have a good family history, and as diagnostics serum Amyloid A^[7] can be used, which is a sensitive but not specific marker; the other inflammatory markers are not specific markers. Nowadays, DNA analysis is more often used in diagnosing FMF.

Genetic testing may determine if your MEFV gene contains a gene change that is associated with FMF. And consider starting treatment with Colchine.

INTERMEZZO - INFORMATION ON WEBSITE FAMILY-DOCTOR AND MIGRANT

The beautiful (Dutch) website *Huisarts-Migrant* is an illustrative website with a lot of practical information about different diseases and disorders in migrants. Beside information for physicians, there is also practical patient information in different languages. I would advise all paediatricians working with immigrants to check out this website.^[8]

3. An infant of three months old is brought to your out-patient clinic with problems of constipation.

During examination of this child a pustule on the left upper arm has been noticed. What do you think?



PHOTO: HANNEKE DERKER

Did you know that all children born in the Netherlands, with one parent who was born in a TB-endemic country receive an invitation for BCG vaccine (for the children) from the GGD (municipal health service) tuberculosis service.

INTERMEZZO - INFECTIOUS DISEASES

You cannot exclude a diagnosis that you did not consider. There is a great overview article in the Dutch Magazine *Praktische Pediatrie* 'Fever in a child who is coming from the tropics'.^[9]

So a travel history is always useful. Sometimes you will diagnose, for example, malaria in a child without a travel history but with family members who have been traveling or who live close by an airport. This is called suitcase or airport malaria. It's also interesting to know that the number of cases of airport malaria in Europe from 2010 to 2020 was 7.4 times higher than that recorded during the 2000–2009 decade.^[10]

4. A boy of eight years is visiting your out-patient clinic with complaints of bed wetting. In the last three years, the boy was dry during the night. The family has been living in the Netherlands for the past five years; the boy speaks fluent Dutch, but an interpreter (by phone) was used because the mother only speaks a few words of Dutch. At the end of the consultation, the paediatrician asked if the boy was afraid of something. When the paediatrician asked again, the boy explained with a soft voice that he was afraid because his mother is almost dying. The mother looked surprised and didn't understand what the boy was talking about. With the help of the interpreter, it became clear that the boy had been his mother's translator when she visited the gynaecologist for myoma. The boy did not fully understand the explanation of the gynaecologist and thought that his mother had a tumour in her belly and that she would die.

INTERMEZZO – LANGUAGE BARRIER

What would you do? Would you engage a family member as an interpreter? In the Netherlands, a campaign was started to explain that a child is not an interpreter. Check for more information their website (in Dutch) 'Dit is een kind en geen tolk?' (This is a child and not an interpreter)^[11]



5. A six-week old infant comes to the Emergency Department with dyspnoea and low saturation. The parents are from Zimbabwe, and the father is working for an international company. The child is admitted in the hospital and needs oxygen (high flow) for two weeks. The temperature of the child was always stable, there are no symptoms of bronchiolitis, the inflammation markers are low, cultures are all negative, and gastric washing is negative for tuberculosis. The chest x-ray shows persistent diffuse alveolar infiltrates. What do you think? And what do you do?

Do you ask the parents if they use other types of medication like herbs or oil?

INTERMEZZO - COMPLEMENTARY OR TRADITIONAL MEDICATION

Global health physicians will probably all have cases in mind that show the different ways of diagnosing and treating sick children worldwide, depending on the context, culture or beliefs.

Exogenous lipoid pneumonia (ELP) is described in the literature as a disorder caused by inhalation or aspiration of mineral, plant-based or animal-based oils; it is generally uncommon. ELP in children has been reported in the literature in several parts of the world.

In small children, the oil is sometimes given in case of abdominal cramps. It can be given orally or nasally, but instead of going to the stomach it sometimes ends up in the lungs.^[12]

A second example in this category is the following photo – what do you think has caused the pattern of marks?

This is an example of marks after cupping (ancient form of alternative medicine by placing special cups on the skin). This picture shows a clear pattern, but sometimes that pattern is less clear and can make you worry.^[13]

Our advice is to be alert and always

ask caregivers if they use complementary medication / traditions.



6. Parents come in the middle of the night with their three-year old boy to the emergency room (without referral) because the boy is crying and complaining about anal pruritis. When the father changed the diaper of the boy he saw worms. He decided not to wait and came immediately to the emergency room. There is a language barrier, but a family member is helping on the phone. What would you think if you saw this child at the Emergency Department?

INTERMEZZO - HEALTH LITERACY

The example above (or Example 6) illustrates different aspects of health literacy including: how to use the health care system in the Dutch way, gaining access to the family doctor in the evening, using internet to find a first solution and basic health knowledge, and understanding of self-help medication that you can buy at a chemist.

Health literacy broadly refers to the ability of individuals to “gain access to, understand and use information in ways which promote and maintain good health”^[14] for themselves, their families, and their communities.^[15] One in four Dutch citizens has a decreased health literacy. Pharos (a Dutch Expertise centre about

CLINICAL COMMENT

health inequalities in the Netherlands) provides useful advice about this subject for you as a healthcare worker or for your organization.^[16] In your interaction with persons with decreased health literacy, please use simple educational material during your consultation (see medifoor^[17] of praat en gesprekskaart van Pharos^[18]) and always ask the patient to summarize your information back to you.

7. A 10-year-old girl has been seen at the in-patient ward with severe (chronic) pain. Thorough examinations have been done, and no abnormalities were found. Explanation has been given about complex regional pain syndrome and the standard care was started. This includes; multidisciplinary approach with the implementation of intensive physical therapy in conjunction with psychological counselling and pharmacological pain treatment in combination with non-pharmacological pain treatment. For this, medical hypnotherapy was suggested. The family has a religious background, and one of the family members mentioned that they think that it is not allowed. What do you think and what do you do?

INTERMEZZO - INTERCULTURAL APPROACH

Unconsciously, every health worker brings his/her own cultural frame of interpretation to a consultation room. Developing cultural competence helps to understand, communicate with, and effectively interact with people across cultures. Deardorff defines competence as *“the ability to communicate effectively and appropriately in intercultural situations based on one’s intercultural knowledge, skills, and attitudes”*^[19] A helpful book you can use is *Intercultural communication in healthcare* (in Dutch) or you can join one of the intercultural communication workshops by Dorian Maarsen and Charlie Obihare (Paediatrician).^[20]

A FEW TIPS YOU CAN ALREADY USE (ADOPTED FROM DEARDOFF):

Practice openness by demonstrating acceptance of differences. **Demonstrate humility** through suspension of judgment and the ability to learn. **Be sensitive to others** by appreciating cultural differences. **Show a spirit of adventure** by showing curiosity and seeing opportunities in different situations. **Use a sense**

of humour through the ability to laugh at ourselves. **Practice positive change** or action by demonstrating a successful interaction with the identified culture.^[19]

8. A 12-year-old girl has been seen at the OPD for being overweight. Combined lifestyle interventions have been started in the previous consultations but without the desired effect. At one point, the paediatrician asks about the girl’s progress with the physiotherapy / sport coaching. The parents (coming from a North African country) explain that they never went to the physiotherapy because their daughter is not disabled and that in their country you only go to a physiotherapist when you are disabled.

INTERMEZZO - OBESITIES IN MIGRANTS

Pharos has another useful document about overweight / obesity in vulnerable groups. Literature shows that combined lifestyle interventions are less successful among migrants. An integral approach is needed with an eye for all the different social determinants of health.^[21,22] There has been a growing awareness that providing culturally sensitive paediatric care, especially during child visits, is a potential way to address health care disparities and promote health equity.^[23]

WEBSITES TO BE CHECKED

- www.huisarts-migrant.nl
- The UK Migrant Health Guide
- www.pharos.nl
- www.medifoor.nl



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REFERENCES

1. Bevolking steeds verscheidener naar herkomst. Wetenschappelijk raad voor overheidsbeleid. Nieuwsbericht 29-05-2018. [Internet] [cited 1 May 2023]
2. Augusto Anguita-Ruiz Concepcion M, Aguilera and Angel Gil. Genetics of Lactose Intolerance: An Updated Review and Online Interactive World Maps of Phenotype and Genotype Frequencies. *Nutrients*. 2020 Sep; 12(9): 2689. Published online 2020 Sep 3. doi: 10.3390/nu12092689
3. Lactose intolerance by country. 2023. [internet] [cited 10 April 2023] <https://worldpopulationreview.com/country-rankings/lactose-intolerance-by-country>
4. Glucose 6 Phosphaat Dehydrogenase deficiëntie = Favisme. Website huisarts-migrant. [cited 10 April 2023] <https://www.huisarts-migrant.nl/glucose-6-phosphaat-dehydrogenase-deficiëntie-favisme/#>
5. Aravinda Berggreen-Clausen, Sai Hseing Pha, Helle Mølsted Alvesson et al. Food environment interactions after migration: a scoping review on low- and middle-income country immigrants in high-income countries. *Public Health Nutr*. 2022 Jan; 25(1): 136–158. Published online 2021 Sep 13. doi: 10.1017/S1368980021003943
6. Joost Frenkel, Frederike J Bemelman, Bert-Jan Potter van Loon et al. Middelandse koorts mis het niet. *Mei* 2013. *Ned Tijdschr Geneesk*. 2013;157:A5784
7. Mustafa Cakan, Nuray Aktay Ayaz, Gonca Keskindemirci et al. Serum Amyloid A as a biomarker in differentiating attacks of familial mediterranean fever from acute febrile infections. *Clinical Rheumatology* 2020 Jan; 39(1):249–253. doi: 10.1007/s10067-019-04765-1. Epub 2019 Sep 4.
8. Huisarts en migrant. [cited 8 April 2023] <https://www.huisarts-migrant.nl/>
9. K. Koop. Koorts bij een kind dat uit de tropen terugkeert. 2015. *Praktische pediatrie*. Jaargang 9, editie 4, nummer 4.
10. Leo Dilane Alenou, Josiane Etang. Airport malaria in non-endemic Areas; new insights into Mosquito Vectors, Case Management and Major Challenges. *Microorganisms*. 2021 Oct; 9(10): 2160. Published online 2021 Oct 16. doi: 10.3390/microorganisms9102160
11. Campaign een kind is geen toek. 2022. https://kindenzorg.nl/nieuws_achtergrond/dit-is-een-kind-en-geen-toek. [cited 1 April 2023]
12. Diana Marangu, Diane Gray, Anesa Vanker et al. Exogenous Lipoid pneumonia in children; A systematic review. *Paediatric Respiration*. 2022 Feb; 33: 45–51. Published online 2019 Jan 20. doi: 10.1016/j.prrv.2019.01.001
13. Francesco Lupariello, Elena Coppo, Illaria Cavecchia. Differential diagnosis between physical maltreatment and cupping practices in a suspected child abuse case. *Forensic Sci Med Pathol*. 2020 Mar; 16 (1): 188–190. doi: 10.1007/s12024-019-00155-w. Epub 2019 Aug 30.
14. World Health Organization. Internet [cited 14 April 2023] <https://www.who.int/teams/health-promotion/enhanced-well-being/ninth-global-conference/health-literacy>
15. World Health Organization. Common health needs of migrants and refugees. A literature review. 2021
16. Pharos. Laaggeletterdheid en beperkte gezondheidsvaardigheden. <https://www.pharos.nl/thema/laaggeletterdheid-gezondheidsvaardigheden/>
17. Medifoor van begrip naar gezondheid. – visuele medische metaforen in de spreekkamer. www.medifoor.nl [internet] [cited 17 April 2023]
18. Pharos. Praatkaarten. <https://www.pharos.nl/thema/begrijprijke-voorlichtingsmaterialen-en-beeldverhalen/>
19. Darla Deardorff. Chapter; how to assess Intercultural competence. In Book: Research methods in intercultural communication; A Practical guide. December 2015. (pp. 120–132) DOI:10.1002/9781119166283.ch8
20. Raya Nunez Mahdi, Charlie Obihara, Dorian Maarse, Carlos Nunez, Edwin Hagenbeek. Interculturele communicatie in de zorg. Kennis, vaardigheden en houding voor zorgprofessionals. Boek. 2019. Uitgeverij Koninklijk van Gorcum.
21. Pharos. Overgewicht en obesitas bij kwetsbare groepen. Infosheet. <https://www.pharos.nl/infosheets/overgewicht-en-obesitas-bij-kwetsbare-groepen/>
22. Maha Alsubhi, Joanna Goldthorpe, Tracy Epton et al. What factors are associated with obesity-related health behaviours among child refugees following resettlement in developed countries? A systematic review and synthesis of qualitative and quantitative evidence. *Pediatric Obesity/behaviours*. 30 June 2020. <https://doi.org/10.1111/obr.13058>
23. William Okoniewski, Mangai Sundaram, Diego Chaves-Gnecco. Culturally sensitive interventions in pediatric primary care settings; a systematic review. *Pediatrics*. 2022 Feb 1;149(2):e2021052162. doi: 10.1542/peds.2021-052162.

Faith in mankind

Long live man, will we make it even with ten billion?

By Ralph Bodelier

Long live man, will we make it even with ten billion? Ralf Bodelier (in Dutch)
 Publisher Gompel&Svacina, 199 pp.
 Price 22.00 Euro

On the last but one page of his book *Long Live Man, will we make it, even with ten billion?*, readers can almost see author Ralf Bodelier (historian, theologian, philosopher and journalist) in person - a teacher in front of a class, with a raised finger trying to make something clear to an unwilling audience.

'I am writing this for the last time: if anything distinguishes us from all other species in this world, it is that we not only destroy, but also - and above all - create, produce and preserve. Man has enriched the earth in unimaginable ways. We build houses, schools and cinemas. We print books and make films. We produce vaccines, bake bread and make wine. Never did we become so old, never were we so healthy, never did so many children go to school, never was there so little poverty and so much music.'

So why should we fail to mitigate climate change and revive our biodiversity? It is high time for a more optimistic view of ourselves. More attention to our resourcefulness, to our ability to think and work together. We are not doomed. The future is what we make of it.'

Ralf Bodelier is not standing in front of a classroom. In his book, he takes the reader to places like Jerusalem, Malawi, the Ruhr industrial area, and the South of the province of Limburg where he was raised. Bodelier most certainly is not a denier

either. 'Yes, we cut down jungles', he writes. 'Yes, we are exterminating animal species. Yes, we are warming the earth...'

Many mistakes which mankind has made throughout history and still continues to make are cited in the book, but in his argumentation he offers a new perspective, namely that of a human race that so far has always been able to correct those mistakes.

Bodelier also manages to parry the demise of our species due to an explosive population growth, something which has been predicted by so many. 'Plato and Aristotle were already worried about population growth, and back then there were only a hundred million of us.'

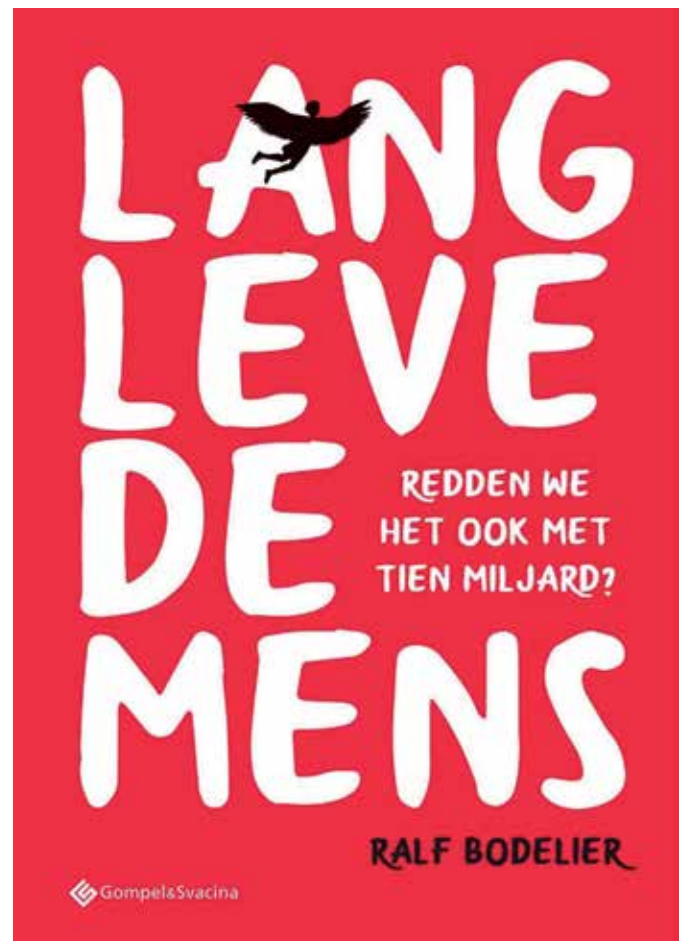
He also disputes others who have expressed the same fear, such as Malthus, Ehrlich, Einstein, Jacques Cousteau, Richard Attenborough, The Club of Rome, Jane Goodall and Midas Dekkers. Because, as Bodelier writes, together with population growth, the problem-solving capacity of that multitude of people also increased.

You could call Bodelier an incorrigible optimist, blind to reality. Nevertheless, while reading his book, even a defeatist like me caught myself several times with the hopeful thought that he might be right. Besides, in these times of one

crisis on top of another, it is very encouraging to hear the voice of someone who sees things from a less dark side.

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A girl with a bilateral swelling of the neck

SETTING

This case is from Nyeri, in the South of the Kati province, central Kenya. A team of the Dutch non-profit organization Medical Checks for Children (MCC) is working there on a paediatric project. Children of different schools and orphanages in the area are screened for medical problems. A regular physical examination is performed and there is a possibility for rapid haemoglobin, malaria and urine tests. For additional laboratory tests, imaging or advanced treatment, the patient must be referred to a hospital in the area. Often patients do not have the financial means to pay for this themselves. In some cases, financial support can be provided by a partner organization of MCC.

CASE

A 9-year-old girl presents with a swelling on both sides of the neck (Figures 1-3). The swellings have been there for as long as she can remember and have grown proportionally with her body growth. Except for the cosmetic appearance, she does not have any other complaints. On clinical examination, two fixed elastic tags are palpable, and the lateral side of the left tag has a small hardening. Palpation is not painful. Her voice sounds normal while talking, and she does not experience any problems swallowing food. Heart sounds are normal. The remainder of the general physical

examination shows no abnormalities. The haemoglobin level is normal. No additional tests were performed.

SPECIALIST ADVICE

The paediatrician thought of cervical chondrocutaneous branchial remnants. An ultrasound could support this diagnosis. A consultation of a paediatric surgeon would be advisable to discuss the possibility of removal.

CERVICAL CHONDRO CUTANEOUS BRANCHIAL REMNANTS

Cervical chondrocutaneous branchial remnants (CCBR) are rare, benign, congenital malformations that are present at birth.^[1] It is most often located in the middle or inferior anterolateral part of the neck, anterior to the sternocleidomastoid muscle.^[2,3] Although uncommon, chondrocutaneous branchial remnants can be present at other locations, including the oral cavity, nasopharynx, middle ear and eyes.^[1] Due to its rareness, little is known about these malformations, and literature mostly consists of case reports. Until 2020, only 117 cases had been described in medical literature.^[3]

CCBR is a form of choristoma, a histological term for a benign tumorous mass of developmental origin that consists of normal body tissue localized at an abnormal body site.^[1] A CCBR mass contains an elastic or hyaline cartilage core, covered by subcutaneous fatty tissue and normal

skin (dermis and epidermis).^[2,3] It usually presents as a solitary mass and has no connection to surrounding tissue but can be adhered to the fascia of the sternocleidomastoid muscle.^[3] It is not associated with underlying cysts.^[3] Diagnostic imaging by ultrasound or CT scan can support the diagnosis of CCBR, typically showing a tubular shaped cartilage core extending to the sternocleidomastoid muscle and surrounded by fatty and normal skin tissue.^[2] Histological analysis can confirm the diagnosis.^[3]

Although the exact origin of CCBR is not yet known, it has been established that it is an embryological remnant that most likely arises from incomplete disappearance of the embryonic pharyngeal arches, leaving cells that differentiate into cartilage at an abnormal body site.^[3]



Fig. 1, 2019



Fig. 2, 2019



Fig. 3, 2019



Fig. 4, follow-up 2022

The embryonic pharyngeal arches (also known as branchial arches) start to develop in the fourth week of pregnancy and are precursors for many structures in the neck, face and head of the devel-

Thymic cyst
Thyroglossal duct cyst
Branchial cleft cyst
Hair follicle naevi
Congenital hamartomas
Fibroepithelial polyp
(Epi)dermoid cyst
Squamous papillomas
Teratoma
Embryoma
Choristoma

Table 1. Differential diagnoses in Cervical chondrocutaneous branchial remnants.^[1,3]

oping embryo.^[4] The first and second branchial arch are, among other things, responsible for the development of the auricle.^[1,4] In the sixth week, these arches form auricular hillocks (precursors for the outer ear) that, in the seventh week, migrate from the inferior part of the anterolateral neck to the lateral side of the head.^[1,4] The second and third arches form, among others, the hyoid bone of the larynx.^[4] The fourth and sixth arches form the cartilage of the larynx.^[4]

Two theories exist about the origin of these malformations.^[1] The first one claims that CCBR originates from auricular tissue due to problems with the migrating process. The second one claims that it derives from the laryngeal remnant of the lower pharyngeal arches.^[1] The presence of elastic cartilage in CCBR therefore implies an auricular origin from the first or second pharyngeal arch, while the presence of hyaline cartilage

in CCBR implies an origin of remnants from the second or lower arches.^[1,2,3]

CCBR grows (very) slowly or not at all.^[3] It seems predominant in males and can present as bi- or unilateral, the latter being the most common appearance. Familial forms have been reported.^[1,2,3] CCBR generally presents with normal skin and no signs of inflammation or discharge.^[1,3] The differential diagnoses of masses in the neck of a new-born can be broad (Table 1).

Treatment of CCBR is mostly for cosmetic reasons since it is benign and shows little to no growth. It is important to keep in mind that it can have a negative psychological impact on a person's life.^[3] Recommended treatment is early and complete surgical excision for the best cosmetic results.^[1,2,3] However, surgical treatment can be postponed to a suitable time and place later in life.^[3] It is advisable to have histological confirmation of the tissue after removal.^[2,3]

Associated anomalies are common (11%-76%) with CCBR (Table 1). These most often present in the auditory, cardiovascular, or genitourinary tract (Table 2).^[1,3] Evaluation for potential anomalies is therefore advised via a full physical examination and (preoperative) imaging of the heart and abdomen.^[2,3]

FOLLOW-UP

The diagnosis in this patient was made through a combination of a detailed history (present since neonatal period, stable size, no physical complaints) and a thorough physical examination. Because of referral problems during the covid pandemic and the absence of direct clinical consequences, an additional ultrasound for the masses was not effectuated. The patient does not experience

any psychological problems because of the malformation. This, in combination with the absence of any physical need for intervention and the relatively high costs for removal, made the choice for a conservative approach in this setting preferable. She is being followed up every year (Figure 4), and the masses show no growth. If problems present in the future, she might need to be referred to the hospital for additional tests or surgery.



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REFERENCES

1. Raed Al-Taher, Marzouq Amarin, Zakaria Shkoukani, Ahmad Mansour, Nader M. Albsoul. Cervical chondrocutaneous branchial remnant. *Journal of Pediatric Surgery Case Reports* 2017 Jul;25:31-33
2. Ginat DT, Johnson DN, Shogan A, Cipriani NA. Cervical Chondrocutaneous Branchial Remnants. *Head Neck Pathol.* 2018 Jun;12(2):244-246.
3. Lee HS, Kim TH, Jang JY, Woo JW, Lee J, Jeong SH, Jung EJ, An HJ, Park T. Bilateral cervical chondrocutaneous branchial remnants: A case report and a review of the literature. *Medicine (Baltimore).* 2020 Jul 10;99(28):e21114.
4. Moore KL, Persaud TVN, Torchia MG. *The Developing Human: Clinically Oriented Embryology.* 8th edition. Philadelphia: Saunders, Elsevier; 2008.

SYSTEM	ANOMALY
Auditory	neurosensory deafness, serous otitis media, malformation of external ear
Respiratory	Tracheomalacia
Oral-gastrointestinal	Cleft palate, oronasal reflux, inguinal hernia
Genitourinary	Hydronephrosis
Cardiovascular	Atrial septal defect
Musculoskeletal	-
Visual	-

Table 2. Associated anomalies for cervical chondrocutaneous branchial remnants.^[3]

Gynaecology health services for children and adolescents: an integral part of a global health perspective

Imagine a 13-year-old girl with vaginal discharge in the rural Himalayas, Nairobi, Melbourne, or the Himba tribe region in Northern Namibia... What attention would she get, who would look after her, who would she tell, who would recognise it without her complaining, what would be the range of aetiologies, what level of care would she receive and when? Her care seeking behaviour will depend on her upbringing, her trust in her environment, the availability of services, and the sensibility of caregivers regarding the needs of the young girl.

integrated part of general paediatric services at the health centre level, in Under 5 clinics, or school health programmes. Also, this sub-speciality within paediatrics is not represented in medical curricula of doctors and health workers in a structured way. Such services should be integrated into existing health care structures at all levels.^[1]

The girl from our example might be left waiting to see how her condition develops, or maybe she will consult a general clinic, with inappropriate surroundings, under time pressure and an examination with insufficient tools by non-specialist staff. The handling she experiences can influence her perception of her integrity and her self-esteem. Utilisation of appropriate language, sensitive interaction, and an explanation of the steps of the examination should be integral parts of a paediatric gynaecological consultation and physical examination. Giving her the chance to follow the process, with the option of using a mirror for example, will teach her about her own anatomy in a professional way. This approach ensures that her self-determination is respected.

A study showed that, in Europe and other high-income countries such as Canada, general guidelines and best clinical practice are

limited.^[2,3] There is a strong need for defining the quality of training and standard of care. It is necessary to include this subject in the curricula of undergraduates and health related professional positions.

The first contact with gynaecological services tends to happen when pregnancy occurs. Professional sexual education, including continuous guidance on contraception and protection against sexually transmitted diseases (STDs), is not readily available to children and adolescents before their first sexual encounter. This is an international phenomenon despite excellent teaching and advocacy materials having been published via the WHO for many years now.^[4] Paediatric and adolescent gynaecology are strongly interlinked with child protection and individual rights, but these are not respected when it comes to FGM and reproductive health issues.

Let's also consider the situation of a young girl who is having her first sexual experience. How is she educated, where and from whom does she get support regarding the use of contraceptives, who can she address with upcoming physical discomfort and psychological problems, how can she resist cultural restrictions or contrary demands, and how can she find understanding?

Causes of vaginal discharge can include an acute infection or injury, congenital urogenital malformation, or female genital mutilation (FGM), depending on the context the girl is living in or has lived in.

Paediatric and adolescent gynaecology (PAD) services need more overall attention, since the subject is not an





Acceptance in the community, access to advice, counselling opportunities, and appropriate and safe abortion facilities vary greatly internationally.^[5] Integration in existing health structures should support the standard of care.^[1] A close interdisciplinary network is further needed to meet the professional demands of this discipline. Dermatology, endocrinology, surgery, infectious diseases and psychology are the disciplines that underly paediatric gynaecology.

There are many initiatives by civil societies and non-governmental organizations (NGOs) underway, together with well-defined guidelines from World Health Organization (WHO) programmes. However, coverage depends on the awareness and willingness of political leaders to facilitate implementation through staff training and supervising the integration of PAD services in a child-friendly and adolescent-appropriate environment. In reality, the structured access to Human Papilloma Virus (HPV) vaccination is an example of how fragmented scientific knowledge and programmes are translated into practice in respective contexts. Even though the vaccine has been available in high-income countries for over 15 years, implementation strategies to boost coverage in low-income countries with the highest disease burden were introduced with a delay of over 10 years. Similarly, approved methods of contraception are available to only a minority of adolescents.^[5]

It is high time that professional organisations like the European Organisation for Child and Adolescent Gynaecology and the World Society of PAD adopt a proactive approach towards pushing governments to implement good clinical care for the young female generation and to educate the target group and social environment alike. Advocacy channels via WHO should support the implementation of interdisciplinary training programmes in paediatric and adolescent gynaecology.

PAD and reproductive health deal with a sensitive personal issue during a vulnerable lifetime period. Girls of all ages have the right to be cared for in an appropriate professional context over the course of their life, as a precondition for living life as they choose and realizing their potential to the full.

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REFERENCES

1. Kangaude GD, Macleod C, Coast E, Fetters T. Integrating child rights standards in contraceptive and abortion care for minors in Africa. *Int J Gynecol Obstet* 2022;159:998-1004 doi: 10.1002/ijgo.14502
2. Roos E, Vatopoulous A. Health care service in paediatric and adolescent gynaecology throughout Europe: A review of the literature. *Review Article* | Volume 235, P110-115, April 2019. DOI:<https://doi.org/10.1016/j.ejogrb.2018.08.022>
3. Dumont T. The current state of pediatric and adolescent gynecology residency training in Canada: a needs assessment from program directors. *J Pediatr Adolesc Gynecol*. 2021; 34: 787-792.e1
4. 2018 WHO recommendations on adolescent sexual and reproductive health and rights <https://www.who.int/publications/i/item/9789241514606>
5. Huneus A, Obach A. The Continuous Textbook of Women's Medicine Series – Gynecology Module. Volume 2, Adolescent gynecology. Chapter: Social Determinants of Health in Pediatric and Adolescent Gynecology. ISSN: 1756-2228; DOI 10.3843/GLOWM.418153



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