



SUCCESS STORIES

2023



Vision

Evidence based best practice in maternal and child health.

Mission

Produce cutting-edge health information for maternal and child health decision making at all levels.



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Introduction

Haraghe Health Research (HHR) partnership is a joint research program established between Haramaya University and the London School of Hygiene & Tropical Medicine. The collaboration was established in 2017 to undertake the Child Health and Mortality Prevention Surveillance (CHAMPS) program in Ethiopia, together with the Ethiopian Public Health Institute, and as part of a global network led by Emory Global Health Institute and funded by the Bill & Melinda Gates Foundation.

Envisioned as a long-term program supported by the Bill & Melinda Gates Foundation, HHR seeks to identify definitive causes of stillbirths and child deaths through community engagement, mortality surveillance, diagnostic and laboratory innovation, and rapid, open access to data. HHR transforms data into action, working with partners to use findings to inform evidence-based solutions to save lives.

This document is a complement of the success stories that the partnership has documented in the past few years.

1. Advancement of Health Research, Projects

Whilst the CHAMPS program was one of the initial research programs prompted the formation of HHR, later various health research projects were born out of its data. The following are completed and ongoing research projects emerged under the HHR.

1.1. Maternal Infection Study (MIS)

- Initiated a prospective study in HF Hospital
- Recruited mothers (2017-2020) in mater-

nity ward

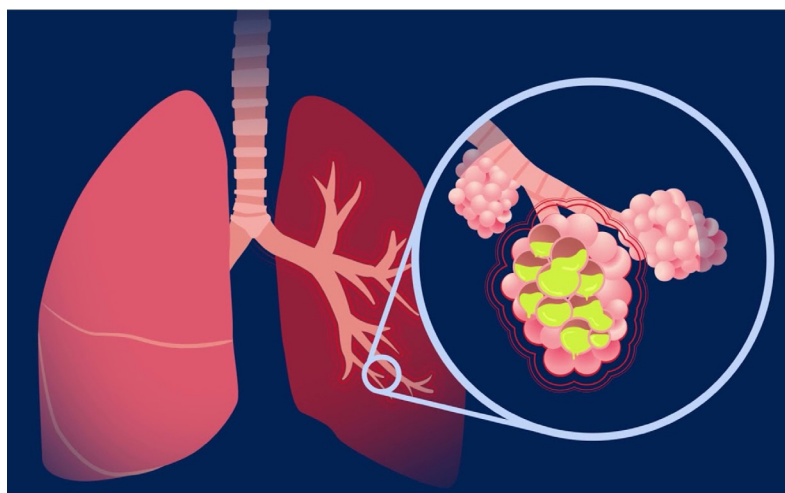
- Samples include blood, oropharyngeal/nasopharyngeal and rectal/vagino-rectal swabs.
- Laboratory investigation was done at HHR laboratory



- Both conventional (culture) and nucleic acid detection (multiplex PCR TaqMan Array Cards) test methods applied.

1.2. Pneumococcal Carriage Study (PCS)

Objective: to estimate the breadth of variation of the Case to Carrier Ratio (CCR) across different settings and the extent to which this can be explained by co-variables in a statistical regression model; to test the validity of disease prediction from carriage observations; and to



reveal the temporal dynamics of pneumococcal transmission and model disease in sites in Democratic Republic of Congo, Ethiopia, and Nigeria

1.3. Detection and Characterization of Viral and Bacterial Agents Causing Acute Febrile Illness in Ethiopia (AFI)

The main goal of this research is to strengthen bio-surveillance and laboratory detection capacity for broad range of pathogens of high security concern causing AFI and informing the public. This project is funded by Centre of Disease Control and Prevention (CDC) and Global One Health Initiative (GOHI).



1.4. Decolonizing Peace Education in Africa Gender-Based Violence and Health in Ethiopia (DEPA)

This is a completed research project aimed to contribute to improving maternal and child health by offering young people opportunities to



learn strategies to avoid violence.

It explored how people experience and narrate gender-based violence to build an understanding of how it affects health. The project run in collaboration with the Family Guidance Association of Ethiopia, Harar branch, to conduct research primarily among women who have experienced gender-based violence.

1.5. Using seroprevalence of *Neisseria meningitidis* serogroups A and X to advance introduction of conjugate Meningococcal vaccines in Ethiopia (MSS)

The objective of this study is to describe the prevalence of antibodies to Meningococcal serogroup A and X in two areas of Ethiopia with differing meningitis epidemiology. To model waning of population immunity to Meningococcus serogroup A, both in terms of accumulated unvaccinated individuals, and immune waning among mass-campaign recipients, to predict the risk of outbreaks of MenA across Ethiopia in the absence of further vaccination; and to determine factors associated with seroprevalence of Meningococcal serogroups A and X. The project was funded by VactiVAC.

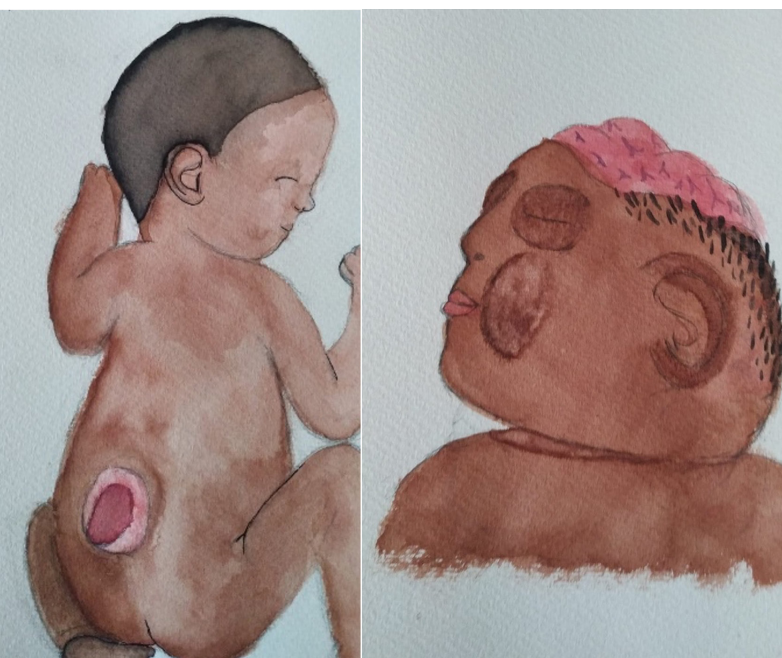
1.6. COVID-VE

It is a research project proposed readying the sites in the CHAMPS platform to perform a subsequent study to assess and monitor the effectiveness of vaccines against disease caused by SARS-CoV-2. This readiness phase activity was funded by Bill and Melinda Gates Foundation.



1.7. Spine bifida and Anencephaly in Ethiopia, folate for prevention (SALT)

This project aims to collaborate with other stakeholders to reduce the prevalence of Neural Tube Defects in Ethiopia to $<1/1000$ births by increasing the blood folate concentrations in at least 90% of women of reproductive age by conducting a project in the CHAMPS-sites in Eastern Ethiopia. Mortality surveillance identified that NTDs are common among stillbirths in Eastern Ethiopia, a region with high prevalence of folate deficiency among reproductive-aged women. The funder of this project is the BMGF.

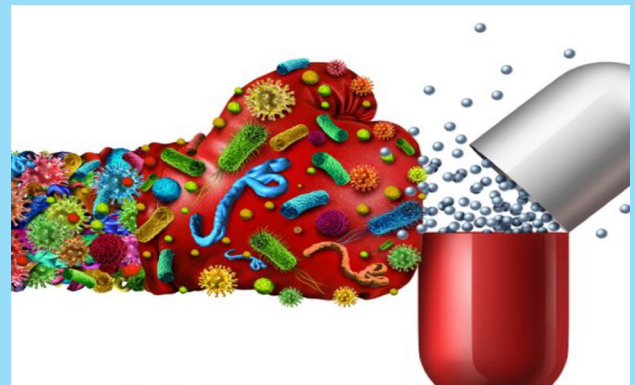


1.8. EChILiBRiST

This is development and validation of a quantitative point-of-care test for the measurement of severity biomarkers to improve risk stratification of fever syndromes and enhance child survival. By improving the way we screen, and risk-stratify patients with fever, there is ample room for improvement and innovation by developing and clinically validating a rapid test based on a magneto-actuated biosensor for quantitative assessment of STREM-1 (Soluble Triggering Receptor Expressed On Myeloid cells 1) and Ang-2 (An-

geopoietine-2) at the point of need; and assess the potential impact of such a risk-stratification tool in terms of guiding management decisions, improving short and long-term outcomes and reducing child mortality. It is funded by Horizon 2020.

1.9. Mortality from Bacterial Infections Resistant to Antibiotics – MBIRA



The objective of this project is to quantify the association between Antimicrobial resistance (AMR) status and clinical outcomes; by collecting data over a 12 month period in 2020-21 in Hiwot Fana Specialized University Hospital. Harar is one of the sites of a multicenter study conducted in 10 hospitals in different African countries.

1.10. Pregnancy Surveillance (PS)

This project is one of the researches funded by the BMGF through the CHAMPS program. It outlines a plan to conduct surveillance among women of reproductive age in the catchment areas of the Child Health and Mortality Prevention Surveillance (CHAMPS) Network.

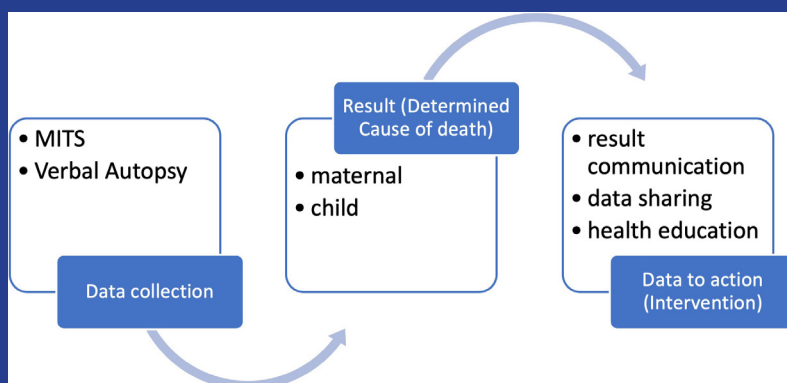
guides life-saving maternal and child health interventions through comprehensive, accurate, and timely identification of pregnancies and their outcomes in CHAMPS catchment areas with accompanying epidemiologic data collection.



1.11. Data to Action (DTA)

This is a range of activities focusing on preventing childhood morbidity and mortality predominantly emanating from CHAMPS. It tries to address some of the important question related to meningitis in Ethiopia. The funder of this project is BMGF.

Data-to-Action beyond meningitis, have several activities including the SALT program, and other various programs which targeted to tackle the causes of morbidity and mortality in women and children.



1.12. Maternal Immunization Study (MI)

This project aims to Harmonize Maternal Immunization readiness activities by developing shared approach to assessing MI readiness across delivery pathways and and to develop readiness agenda for provision of maternal immunization for new vaccines. Maternal Immunization is the practice of vaccinating pregnant women to induce immunity and protect the fetus and infant through transplacental transfer of immunity. It is a promising approach to

reducing maternal and infant mortality and morbidity and it is also a time-tested intervention.



2. Research Capacity Building

The HHR has looked for ways of improving qualities of researchers and also supporting staffs. From short term capacity building workshops upto long term academic opportunities are provided in the past years.

2.1. PhD Candidates and Their Research

Dr. Yonus Edris - A Success Story in Pediatric Healthcare Research

Dr. Yonus Edris, is a dedicated pediatrician. His journey from a pediatric healthcare practitioner to a Ph.D. student at the prestigious London School of Hygiene & Tropical Medicine (LSHTM), under the mentorship of Dr. Lola Madrid and Prof. Anthony Scott, exemplifies HHR's commitment to fostering local talent for the betterment of healthcare in Ethiopia. His research project, focused on the etiology and outcomes of invasive bacterial disease among children under five at Hiwot Fana Hospital in Harar, Eastern Ethiopia, showcases the critical role HHR plays in addressing pressing healthcare challenges.



Hiwot Yegzaw - A success Story in Healthcare Research

Hiwot Yegzaw's journey from a dedicated health officer with an MPH to a promising Ph.D. student at the prestigious London School of Hygiene &

Tropical Medicine (LSHTM) is a resounding success story that reflects the profound impact of HHR's support in nurturing Ethiopian healthcare talent. Under the guidance of mentor Prof. Anthony Scott, Hiwot is actively engaged in pioneering research aimed at estimating the impact of Pneumococcal Conjugate Vaccines (PCVs) and influencing policy to combat pneumococcal disease in Ethiopia.



Lemma Demisse – Focusing on Impact on Public Health Policy

Lemma Demisse's journey from a dedicated biostatistician to a Ph.D. student at LSHTM, supported by HHR, is a resounding success story that illustrates the organization's commitment to nurturing local talent and addressing pressing healthcare challenges in Ethiopia. His academic pursuits exemplify the powerful synergy between biostatistics and public health research and how they can drive transformative change.



Ketema Begna - Bridging Anthropology and Healthcare Research at HHR

Ketema Begna, an accomplished anthropologist and dedicated Ph.D. student at HHR, personifies the organization's commitment to nurturing local talent and addressing critical healthcare challenges unique to Ethiopia.

His academic journey is a remarkable fusion of anthropology and healthcare research, showcasing the invaluable synergy between these fields.

Ketema's research project, titled "Between biomedicine and culture: the role of malnutrition in child mortality in Ethiopia," delves into a pressing issue facing the country: child malnutrition's role in mortality.

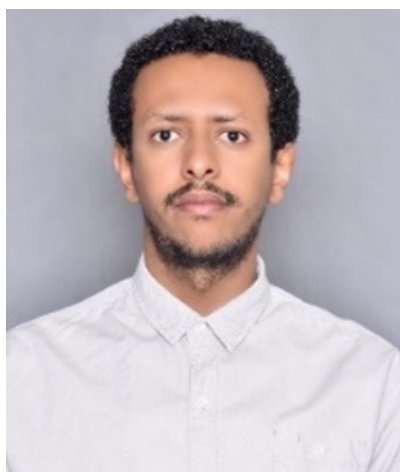
Yohanes Alemishet - Leading Perinatal Research for Healthier Beginnings

Yohanes Alemishet's journey from being a recipient of HHR's Ph.D. scholarship to his current pursuit of a Ph.D. at LSHTM represents a remarkable success story driven by a commitment to improving maternal and neonatal healthcare in Ethiopia. The complex world of

perinatal mortality is explored in depth by Yohanes' research project, "Perinatal motility pattern, causes, and implications for action: Based on CHAMPS Ethiopia data." Yohanes is looking for solutions to important questions about the patterns of stillbirth and early neonatal death and their underlying causes.

Yasir Younis - Forging the Path to Transformative Nutrition Policy

Yasir Younis's remarkable journey from a dedicated frontline healthcare worker and regional hospital leader to a Doctor of Public Health (DrPH) candidate at LSHTM is a testament to HHR's profound impact in nurturing future healthcare leaders and policy influencers. His research, which aims to estimate dietary intake adequacy of essential micronutrients among pregnant mothers and evaluate the impact of micronutrient fortification in staple foods, reflects his visionary approach to improving maternal and child health.



Helina Heluf - Illuminating the Path to Preventing Neural Tube Defects in Eastern Ethiopia

Helina's research project, "Neural tube defects in Eastern Ethiopia: Burden, factors associated, and community perceptions and acceptability



of prevention strategies," focuses on a critical health issue in Eastern Ethiopia: neural tube defects (NTDs). These defects can have devastating consequences for both mothers and infants, and their prevalence is alarmingly high in the

region. Helina's work aims to shed light on the true burden of NTDs by implementing a comprehensive surveillance system, which includes assessing folate deficiency, NTD prevalence, and outcomes of affected infants. Her research is not confined to academic pursuit alone; it has the potential to influence healthcare policies and practices at a national level by evaluating the fea-

sibility and acceptability of a food fortification program to prevent NTDs.

Dr. Haleluya Leulseged - A Ph.D. Scholar's Triumph from LSHTM with HHR's Support

Dr. Haleluya Leulseged, a medical doctor and aspiring researcher, has achieved an inspiring milestone in his academic journey through the support of HHR. Haleluya's path began with a solid foundation in medicine, but his passion for advancing healthcare led him to pursue higher education. After completing an MPH in Epidemiology at Haramaya University, he embarked on an academic adventure at the London School of Hygiene & Tropical Medicine (LSHTM), where he's currently finalizing his MSc in Clinical Trials. His remarkable journey took a pivotal turn when he was recruited for ECHILIBRIST project as a Ph.D. student. ECHILIBRIST is a clinical trial focused on the rapid identification and triaging of infectious diseases.



3. Research Structure Capacity Building

HHR's laboratory has three divisions; Microbiology, Molecular Biology and Pathology. The microbiology and Molecular laboratories based in Haramaya Health Science College and Pathology lab located in Hiwot fana Referral Hospital.

3.1. Microbiology and Molecular Laboratory

Part of the remit of the CHAMPS was to establish

a high-quality laboratory for the processing, and identification of the pathogens from the Minimally Invasive Tissue Samples (MITS), and this led to the renovation and refurbishment of the Hararghe Health Research Laboratory (HHRL) in the space that was previously a student skill teaching and demonstration laboratory. This was done from 2017 to 2018. The building of a new multicomplex health research laboratory is in progress (Figure 1).

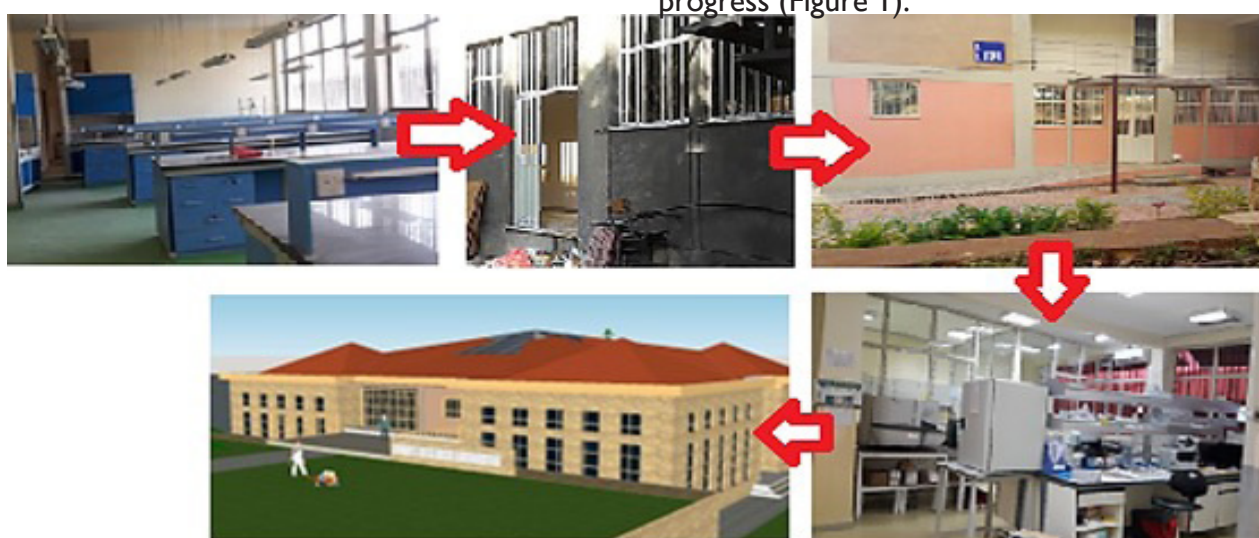


Figure: Stage of the HHRL development

The Microbiology, and Molecular biology laboratory have been equipped with cutting-edge laboratory equipment capable of detecting multiple pathogens.



Figure: Hi-tech instrument

The laboratory started accepting and processing samples from MITS in February 2019 with a staff complement of six staff including laborato-

ry technologists, which currently has grown to 20 staff members.

Laboratory systems

The HHRL established efficient biosecurity and biosafety, biorepository, and data management, and ensured that all requirements of the 12 Quality Management Systems (QMS) essentials were achieved. All the equipment is calibrated, serviced, and scheduled maintenance done. The laboratory has also been enrolled in the

United Kingdom National External Quality Assessment Service (UK NEQAS) since mid-2019 and performs EQA for eight panels representing the testing menu of the laboratory. The performance has been consistently above 80% pass. There is an efficient procurement and inventory system.



Figure: Biosafety and documentation

Public health actions

The HHRL was one of the first laboratories selected by the Federal Ministry of Health and Ethiopian Public Health Research Institutes to provide training for many SARS-COV-2 laboratories in Eastern Ethiopia. We analyzed 34,647 nasopharyngeal samples collected from: eastern, and western Hararghe, Dire Dawa Administration, and Somali regional state. In addition, it supports the establishment of COVID-19 laboratories in these regions. Moreover, the laboratory notifies public health importance pathogens from local to the relevant Ministry of Health Agencies.

The laboratory provides clinical microbiology diagnostic services for severely ill children admitted at Hiwot Fana Specialized University Hospital, supports national epidemic surveillance, and serves as an advanced laboratory attachment training center for undergraduate and postgraduate students of Haramaya University and the London School of Hygiene & Tropical Medicine (LSTHM), and Amoud University, Somaliland.

ISO 15189:2012 accreditation

From the outset, one of the objectives of the HHRL was to establish an internationally accredited laboratory. The laboratory submitted a formal accreditation application to Ethiopian Accreditation Services (EAS) in April 2022. An on-

site assessment of the laboratory was conducted in late 2022 and nine minor non-conformities were identified which were all cleared by March 2023. The laboratory was given a certificate of accreditation on 3rd May 2023.



3.2. Pathology Laboratory

The pathology laboratory at Hiwot Fana Specialized University Hospital was serving the hospital through cytopathology diagnostics until 2019. The major instruments that are required for histopathology service like tissue processor, autostainer, microtome and embedding station were not in use, hence, needs maintenance by the time CHAMPS starts. Even if there was a plan to initiate histopathology service in the hospital along with the cytopathology, it didn't

hospital management a room for storage and MITS sample collection were secured.

The calibration of the histopathology lab equipments, development and modification of SOPs and testing the functionality of the histopathology lab was a success.

These activities were further expanded by providing surgical pathology (biopsy) service by CHAMPS histotechnicians for the hospital patients.

As the number of cases build over the years, so did the numbers of slides and paraffin blocks.



showed much progress for over several years until CHAMPS casts light on it.

The CHAMPS facilitates the the start of pathology lab with renovation of the pathology room. Through lots of discussion with the hos-

Archiving such a valuable specimen in separate room and orderly way is important. Therefore, All report by site pathologist is stored by browser based research database management system – REDCap.



4. Research Platform Creation and Building

Formative research's primary findings showed that the community finds it difficult to accept the taking of tissue samples from a dead child. Basically, the religious and cultural values the community stands against experimenting on a deceased person. Families were unwilling to consent to MITS because of rumors about organ theft. It was crucial to build the research platforms to enhance acceptability.

4.1. Socio-Behavioral Science

The Socio-Behavioral-Science (SBS) team's aim is to explore socio-cultural background of the community and to facilitate community engagement activities. Depending of the findings from the formative research, the team applied variety of community engagement techniques to familiarize the community with CHAMPS program and to ensure its feasibility. The major community engagement activities are:

- Discussions with community leaders,
- Community health volunteer (CHV)s,
- Participatory community theater (TfD),
- Radio programs,
- Community advisory boards (CAB) meetings
- Open-lab-visits



Figure: Radio listening groups-discussing on broadcasted radio programs

With major efforts of the Social and Behavioral Science team, the community have accepted the CHAMPS program and showed sense ownership on the study, and number parents who participated in MITS have welcomed a new baby from the continuous health education and follow-ups. These days, parents of the deceased child are seen notifying the death of their child.

4.2. Data to Action

CHAMPS Advocacy on NTD

In the CHAMPS study, Neural Tube Defects (NTD) have emerged as one of the major cause of mortality, particularly in stillbirth. CHAMPS has played a pioneering role in breaking the silence surrounding NTD, being the first to initiate public discourse within the community and at health centers.

After exerting so much effort on health communication through, radio dramas, forum theatres, health education and community dialogues, families began reaching out to CHAMPS seeking help for mothers who had stillbirth due to NTD, as well as for living children affected by the condition. The team embarked on an exploration



Figure: Forum theatres session in a rural kebele

of options to facilitate access for rural families who has children living with NTD to Hiwot Fana Specialized University Hospital, which has a neurosurgery unit for NTD diagnosis and treatment. Number of families has been linked to the unit and has got treatment.

Gaaddisa waiting home, which intends to accommodate few families, was made possible in the compound of the zonal health office through



essential resources provided by Haramaya University. On 25th of Sep., 2023, Newly inaugurated waiting room welcomed the first family and commenced treatment at Hiwot Fana Specialized Hospital. CHAMPS remains committed to seeking additional partners to defray these expenses and enhance the facility's capacity, recognizing the anticipated growth in demand for its services.

Beyond death, clinical solution for alive children with NTD

A baby from the Water town site was promptly connected to the neurosurgery unit at Hiwot Fana Comprehensive University Hospital just one day after birth. Transportation arrangements were facilitated, leading to successful surgery on August 11, 2023. Subsequently, the infant received three post-surgery follow-up appointments, with plans for commencing physiotherapy in the near future.

Within the Spina Bifida and Anencephaly in Ethi-

opia, folate for prevention (SALT project), the outcomes of live-born children (including death or disability) with NTD are meticulously recorded. These surviving children are connected to Hiwot Fana Hospital for surgery and follow-up care. Families facing financial constraints regarding diagnostic and treatment costs receive support through this platform.

The project has brought together stakeholders who are poised to elevate the level of service, with Reach Another Foundation and the hospital working collaboratively toward establishing a Center of Excellence for the care of children with Spina Bifida and hydrocephalus.

Identifying Causes of Serious Illness in under 5 Children

CHAMPS conducted a clinical surveillance at Hiwot Fana Hospital and identified that severe bacterial infection is the primary cause of death in children aged <5 years. Those infectious diseases are treated using the empirical treatment regimen adopted based on the data collected from different populations though the specific bacteria vary based on time, geography, and age group.



Before the launching of this study, vancomycin is prescribed when there was no clinical improvement in the cases. However, the bacteria called *Klebsiella pneumoniae* and *Pantoea agglomerans* were identified to be the commonest culprit as seen from the analysis of this surveillance. These bacteria were seldom considered as a possible pathogen. Furthermore, the WHO recommended regimen is effective against 25% of these bacteria while the less-known drug in the pediatric group, ciprofloxacin is effective against 75% of the cases.

Hence, the laboratory-based selection of medications allowed clinicians to use targeted treatment options that inevitably improve kids' chances of survival and mitigate the development of antimicrobial resistance which is a global threat. The results of this study will have a lasting impact on the health and well-being of young children in the community and it will avail locally generated data to prepare institution-based empirical treatment in future, that most of the developing countries lack.

5. Data Archiving and Management

Prior to the CHAMPS grant from the Bill & Melinda Gates Foundation (BMF), Haramaya University College of Health Science (HU's CHMS) had outdated and inadequate IT infrastructure. This made it difficult for researchers to access and share data, and it also made the college and hospital vulnerable to cyberattacks.

Through the CHAMPS grant, HU's CHMS was able to establish a new IT datacenter and network infrastructure. The datacenter provides researchers with secure and reliable access to storage and computing resources, enabling them to conduct more complex and data-intensive research projects.



Figure: The old Datacenter

The new network infrastructure has also improved communication and collaboration between researchers and clinicians. In addition to improving research, the new IT infrastructure has also made the hospital more secure. The datacenter is equipped with state-of-the-art security features, and the network infrastructure is designed to be resilient to cyberattacks. The new IT infrastructure has also helped the hospital to improve its data privacy and data security practices.

Overall, the CHAMPS grant has had a significant positive impact on HU's CHMS and Hiwot Fana Teaching and Referral Hospital. The new IT datacenter and network infrastructure has improved research, data security, data privacy, data integrity and completeness, and the recruitment and training of competent skills at the hospital. To support the expansion of the Hararghe Research Programme's research portfolio, we are seeking funds and collaboration to scale up our current entry-level datacenter to a state-of-the-art datacenter.

This system will improve research data quality, provide data linkage, improve patient care, and further improve the quality and capacity of organizational collaboration and research outputs.



Figure :The New Datacenter

6. Community Engagement and Support

6.1. Community Advisory Groups and Engagement

CHAMPS Community Advisory Board (CAB) members are community stakeholders who collaborate with the partnership by representing religious institutions, elders, government offices (Health Office, Women and Children Affairs' Office, Social Affairs' Office). These representatives were the core informants and also advisors to CHAMPS to clearly view the community's trust, fear and customs.

Currently, morethan 36 CAB members attend regular meeting with the SBS meeting in all the three catchment sites. In addition to 750 community health volunteers (CHV)s are enrolled in the rural kebeles for instant support on consen

process on happening of child death. Morethan 600 pregnancy detectors are trained from the community to trace pregnant women and convince them to initiate ANC follow-up through the Pregnancy Surveillance program of HHR.



6.2. Social Support Groups to Influence Child and Maternal Health Narratives

CHAMPS have initiated dialogues where families come together to openly discuss critical issues related to child and maternal health such as ANC, pre and post conception care, immunization, malnutrition, experience of stillbirth and so on. This platform has proven to be highly effective in fostering a supportive environment.



Families who have experienced stillbirths and child deaths are receiving emotional, psychological, and social support through these dialogues. These families are viewed as a formidable force for child and maternal health, as they generously share the experiences and insights they have gained through these conversations.

6.3 Neonatal Resuscitation Training

Birth asphexai is one of the dominant cause of early neonatal death. To address this critical issue, CHAMPS has been diligently working to provide neonatal resuscitation training for all



the midwives across 20 health centres and three hospitals, and provided neonatal resuscitation equipment to these health centers. The program has continued to actively engage the staff on a continuous on-the-job training.

6.4 Nutrition sensitive agriculture to influence nutrition practice

In collaboration with the Kersa and Haramaya agriculture offices and Haramaya University, CHAMPS embarked on a journey towards nutrition-sensitive agriculture in the catchment area.



Figure: demonstration on the ways of cooking a wholesome nutritious food

This initiative was started by enrolling 60 families who have begun receiving trainings and nutrition counselling. These sessions have covered diverse topics such as:

- diversified consumption
- good food hygiene practices
- diversified production
- vertical cropping.

The program will continue to contribute to the reduction of malnutrition and in the near future a model village with around 100 households will be built.

6.5 Delivering DeCoDe result and linking families to health facilities

The well-structured team of result communication (RC) deliver cause of death with the possible preventive measures recommended by the DeCoDe panel and links families to health facilities.

- More than 500 families received cause of death of their child with health education.
- Number of families have got alive babies with the support of better health facilities.



Fayo kedir, a mother who has stillbirth twice, started follow-up with the support from CHAMPS now had healthy twin kids.

6.6. Theatre for Development for Health Education

Theatre for Development has been implemented in CHAMPS for the last five years as a community engagement method and also adapted and used as data to action tool in the HHR. Besides communicating the findings to the policy makers, it has been crucial to take it back to the community for death prevention. Hence, Tfd is found one of the best methods in bringing health

behaviour change.

As mentioned above, initially it was started to communicate stillbirth as the title of the research indicates 'to unlock' the silence on stillbirth. Lately, after analyzing the power of this participatory method, it was also used as a part of CHAMPS to Data to Action (DtA).



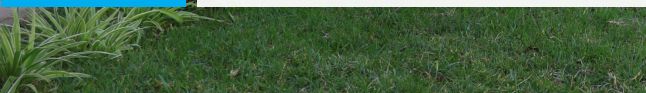
HHR has been tirelessly working on producing quality data for the improvement of maternal and child health. Moreover, the partnership is engaged in creating attractive working environment which encompasses a refreshing greenery and wellness center.



The leaders of HHR and the Haramaya university College of Health and Medical Sciences collaboratively planting trees at the compound



The current image of the renovated houses which is now serving as the office building



The wellness center is now accessible for the staff and it is expected to accelerate the working mood and escalate task accomplishment.



HHR | HARARGHE HEALTH RESEARCH

HHR successfully hosted the 3rd network meeting of CHAMPS in March 2023. The meeting was held in the capital Addis Ababa group visits to Harar where the catchment is located.



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