HASH NEWSLETTER

Welcome to this Issue of the HASH newsletter. Our sub-grantees are divided into 4 themes: Maternal Health, Sexually Transmitted Infections, Adolescent Sexual and Reproductive Health and HIV. Read on to learn about their work and have fun playing the HASH crossword puzzle.

Meet our sub-grantees

HIV Theme

Muhimbili University of Health and Allied Sciences (MUHAS) - Using Artificial Intelligence (AI) to forecast the contribution of maternal health investments to maternal health outcomes

Screening high-risk groups, such as people living with HIV (PLHIV), for tuberculosis (TB) is crucial for TB elimination. However, choosing the best approach for TB screening requires careful consideration of cost-effectiveness. Automated nucleic acid testing has increased diagnostic precision in Tanzanian regions with a high prevalence of tuberculosis. However, because of its high cost, the screening initiative has been ineffective in finding many TB cases.

To address this challenge, MUHAS has established a research and development laboratory for Emerging Technologies for Healthcare (mETH) in Tanzania. The laboratory's biomedical engineering unit is developing an AI algorithm using deep learning, specifically the Convolutional Neural Network (CNN), for detecting TB on chest X-rays.

The project's principal investigator is Dr. Deogratias Mzurikwao, a lecturer at MUHAS and the head of the mETH laboratory. He has a Ph.D. in the application of AI in healthcare and has published several machine learning papers in peer-reviewed journals.

Dr. Deogratias Mzurikwao, Tanzania

The Medical Concierge Group - Using Machine Learning and Artificial Intelligence (AI) modeling to identify high-risk sub-population eligible and willing to pay for PrEP services.

Despite rising rates of new HIV infections in Uganda, the uptake of pre-exposure prophylaxis (PrEP) remains suboptimal. This is partly due to the stigmatizing and non-inclusive nature of current PrEP service delivery models, which exclude specific sub-populations at high risk for HIV infection. Additionally, there is a need to explore self-sustaining PrEP service delivery models that are less dependent on donor funding.

To address these challenges, this project aims to understand the high-risk PrEP target audiences and profile them in the most innovative and impactful way to be reached with PrEP services. The proposed research leverages machine learning and artificial intelligence modeling to identify, quantify, analyze, and map high-risk populations eligible for PrEP and have the ability to pay for the services.

The project's coordinator is Natasha Umuhoza, a research and projects officer with The Medical Concierge Group. The Medical Concierge Group is a private digital healthcare company headquartered in Kampala-Uganda, committed to increasing access to high-quality healthcare for all individuals, regardless of socio-economic status or geographic location.

Natasha Umuhoza, Uganda

Maternal Health Theme

James Bumba - Prediction of miscarriages among women seeking antenatal care in Uganda: A machine learning approach.

James Bumba, Uganda

In Uganda, one-third of women report at least one adverse pregnancy outcome during their lifetime with a higher incidence of pregnancy loss due to spontaneous or induced abortion or other causes.

The team aims to build a classification machine learning algorithm to predict the risk of miscarriage among women seeking antenatal care while identifying the major factors that influence a pregnancy ending in a miscarriage. The goal of this project is to ascertain whether machine learning algorithms can predict women at risk of miscarriage using data collected during antenatal care.

The PI of this project is James Bumba, a Master of Science in Bioinformatics student at Makerere University, Uganda. He has experience in software design, development, testing and the use of Artificial intelligence and Machine Learning to develop predictive algorithms.

Pan African Information Communication Technology Association (PAICTA): Machine Learning for identifying teenage patients at risk of gestational hypertension.

Dr Gloria Iyawa, Namibia

Africa has the highest maternal mortality rate with gestational hypertension as the second leading cause of death among pregnant teenagers. Despite the utilization of ML techniques in maternal health research, there is a pressing need to develop more effective mechanisms for identifying teenage patients at risk of gestational hypertension.

The goal of this project is to develop an ML model to identify teenage patients at risk of gestational hypertension.

The project will gather clinical datasets relating to teenage pregnancies from the Namibian context, train the dataset based on nine binary classification models and compare the prediction performance of the different models trained. This will provide treatment options at an early phase which could prevent progression into preeclampsia.

The PI of this project is Dr Gloria Iyawa, a Senior Lecturer at the Namibia University of Science and Technology and the UNESCO Chair for Gender and Digital Technologies. She is also a Research Consultant at PAICTA.

Makerere University - A Machine Learning-aided Platform for Point-of-Care Pregnancy Risk Assessment from 2D Ultrasound.

Dr Andrew Katumba, Uganda

Despite global efforts to improve maternal health outcomes, increasing maternal mortality rates remains a key challenge in many developing countries Most of these deaths could be prevented by the timely diagnosis of high-risk pregnancies and potential prenatal complications, through regular access to Antenatal Care.

The team aims to develop a smart, robust, and rapid screening solution for high-risk pregnancies utilizing a combination of Ultrasound imaging modalities, and a computational platform backed by AI in the form of Deep Learning Models.

The solution will ensure wider and quality-assured use of ultrasound for high-risk pregnancy screening support in Uganda and this ultimately reduces maternal mortality rates amongst women.

The PI of this project is Dr Andrew Katumba, a Lecturer in the Department of Electrical and Computer Engineering at Makerere University, Uganda. He holds a PhD in Photonics Engineering and leads the Marconi Research and Innovations Lab in the College of Engineering, Design, Art and Technology.

Adolescent SRH Theme

University of Embu – BESHTE - A Chatbot to enhance HIV testing, status awareness and status disclosure among adolescent boys and girls and young men and women in Kenya.

Dr Victoria Mukami, Kenya

Adolescents and young adults in Kenya are disproportionately affected by HIV/AIDS, accounting for 40% of new infections in the country, with females bearing a higher burden. Factors such as HIV-related stigma, inadequate knowledge, community norms and structural barriers hinder HIV testing and treatment behaviour among adolescent boys and girls and young men and women.

The project will develop an AI-based chatbot that incorporates slang to enhance HIV testing, status awareness and status disclosure while addressing discrimination and stigma towards adolescents and young adults seeking testing and treatment. The chatbot seeks to reduce new HIV infections among this group by providing information and support.

The principal investigator is Dr Victoria Mukami, a health informatics expert and lecturer at the University of Embu with extensive experience in implementing information technology for positive health outcomes. She has published various research works in the field of health informatics and has received training on protecting human participants, ensuring that the project adheres to ethical and legal guidelines.

University of Ghana, Legon – Utilizing AI to Promote Sexual and Reproductive Health Outcomes for Adolescents with Disabilities in Ghana.

Dr Abigail Adubea Mills, Ghana

Adolescents with disabilities face difficulties in receiving adequate sexual and reproductive health (SRH) education beyond classroom engagement. Although SRH education is part of the Ghanaian educational curriculum, non-school programs on SRH often do not cater to the communication needs of adolescents with disabilities. It is therefore imperative that adolescents with disabilities receive augmented SRH education, which would be reliable and accessible to them.

This team aims to use AI-based interventions to improve SRH outcomes for adolescents with hearing, speech, and visual disabilities in Ghana. The project's goal is to promote better sexual and reproductive health outcomes for this group of adolescents by removing information barriers and making reliable and accessible SRH education available to them.

Dr. Abigail Adubea Mills, a Senior Lecturer at the Department of Social Work, University of Ghana, Legon, is the Principal Investigator of this project. Her research work has mainly focused on disability, education, and health, and she has been involved in various independent and collaborative research projects.

Rogers Mwavu - Leveraging Artificial Intelligence (AI) techniques to inform choice of modern contraceptives among adolescent girls and young women.

Rodgers Mwavu, Uganda

The UNFPA's State of World Population 2022 report highlights a concerning trend: over 60% of unintended pregnancies worldwide end in abortion, with up to 45% of all abortions in Sub-Saharan Africa (SSA) being unsafe, perpetuating cycles of poverty and inequality. Many adolescent girls and young women in the region face significant barriers in accessing and effectively using modern contraceptive methods due to the lack of reliable information and inadequate support from healthcare providers. As a result, there is an urgent need to develop and implement effective strategies to address this unmet need for contraception and empower young women to make informed choices that align with their individual needs and preferences.

To address this challenge, our team plans to leverage AI techniques to predict the likelihood of side effects and failure rates to inform the choice of modern contraceptives among adolescent girls and young women that align with their needs and preferences.

Mwavu Rogers, the principal project investigator, is an innovative data scientist and software developer with a diverse skill set and creative drive for software application development. He is proficient at designing and formulating test automation frameworks, writing code in object-oriented programming languages, and developing and implementing AI models that improve access to the quality of healthcare services for underserved populations.

STI Theme

mDoc Healthcare - Harnessing the power of Artificial Intelligence to augment patients' knowledge, understanding and behaviors with Sexually Transmitted Infections

Dr. Aima Adebo, Nigeria

Sexually Transmitted Infections (STIs) pose a significant global health threat, with approximately 374 million new cases reported annually. An alarming 40% of this burden is concentrated in sub-Saharan Africa.

To tackle this issue, mDoc plans to enhance its AI-powered chatbot, Kem, to handle STI-related questions in a safe, impartial environment for both women and men. Kem's provision of information on STI awareness, prevention, and treatment enables individuals to make educated choices about their wellbeing. Additionally, Kem links users to expert healthcare providers via mDoc's NaviHealth.ai, offering extra support when necessary. Users can also speak to a health coach through CompleteHealth™ for more support.

Dr. Aima Adebo, Clinical Advisor at mDoc is the lead investigator for this groundbreaking initiative. mDoc, a digital health social enterprise headquartered in Nigeria, provides virtual self-care health coaching to people at risk for or living with chronic disease. mDoc harnesses behavioural science, quality improvement methods, data and technology to ensure a healthier, happier and more productive Africa.

Addis Ababa Science and Technology University (AASTU) – Sexually transmitted disease monitoring and assistance tool design in Ethiopian higher education institutes.

Prof. Surafel Lulesged Tilahun, Ethiopia

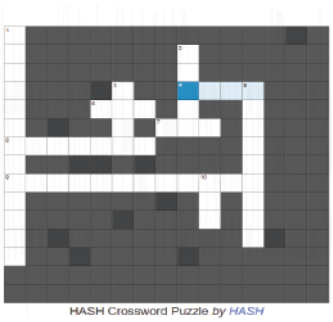
Sexually transmitted infections (STIs) are a major public health concern, with 1.4 million people being infected every day globally. In Ethiopia, young people aged 15-24 are particularly vulnerable, with the highest reported rates of STIs. However, access to quality health care services is often limited, leaving many at risk of STIs.

The team aims to identify parameters and construct an epidemiological model that will identify critical variables. Furthermore, they will develop a proper prediction approach based on artificial intelligence, specifically neural networks. An anonymous chatbot will also be implemented to disseminate information and provide help to students, allowing them to freely obtain starting help and information.

Prof. Surafel Luleseged Tilahun has extensive experience leading research, supervising graduate students, and coordinating activities in Artificial Intelligence and Big Data Analytics. His expertise in these areas makes him well-suited to lead this project, which has the potential to make a significant impact on public health in Ethiopia and beyond.

CROSSWORD PUZZLE

Let us see how much you know about MSRH and AI



PLAY

ACROSS

4 Factual information used for analysis and machine learning in artificial intelligence (4)
6 Acronym for a type of medication used in HIV treatment (3)
7 Abbreviation for a computer's ability to interpret, manipulate and comprehend human language (3)
8 OpenAI's groundbreaking 2022 invention (7)
9 Pregnancy complication characterized by high blood pressure and organ damage (12)

DOWN

1 Deliberate technique to prevent conception (13)
2 A _____ learns from data to make predictions or decisions in Artificial Intelligence (5)
3 Acronym for medicine people at risk of getting HIV take to prevent HIV infection (4)
5 _____ care is the special care offered to a pregnant woman (9)
10 Type of infection transmitted through sexual contact (3)

UPCOMING EVENTS

Data Science Africa:
DSA 2023 is planned to be from 08th to 12th May 2023 at the University of Rwanda.

To be part: https://www.datascienceafrica.org/dsa2023kigali/

OPPORTUNITIES

The Lacuna call:
Lacuna Fund is the world's first collaborative effort to provide data scientists, researchers and social entrepreneurs globally with resources needed to produce labeled datasets that address urgent problems in their communities.

To apply: https://lacunafund.org/climate/