CONTACT US

Postal Address:
Kintampo Health Research Centre
Post Office Box 200, Kintampo
Bono East Region, Ghana
West Africa

Digital Address: BK-00006-2937

Telephone number(s):
Administrative and general enquiries:+233 (0) 35 209 2038
Ethics/protocol submission enquiries:+233 (0) 504270501

Our Website Address: www.kintampo-hrc.org
For enquiries contact us through: enquiries@kintampo-hrc.org
For questions on Ethics, approvals contact us through: iec.sec@kintampo-hrc.org

Connect with us through the following social media platforms:
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Computer Centre (CC)

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Biostatistics Unit

CLINICAL LABORATORY
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<td>FDA</td>
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<td>FEV1</td>
<td>Forced Expiratory Volume in 1 second</td>
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<td>GBS</td>
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<td>LBW</td>
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<td>PE/E</td>
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<td>PF</td>
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<td>PM2.5</td>
<td>Particulate Matter (PM) that have a diameter of less than 2.5 micrometers</td>
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Mission, Vision, Core Values and Guiding Principles

MISSION AND VISION

Mission
Use our expertise and core values to:
- conduct public health and biomedical research that will influence policy direction and programme implementation that seek to significantly improve well-being and reduce ill-health.
- at all times be committed to the conduct of high-quality research that is ethical.
- ensure integrity of data generated.

Vision
Be a centre of excellence that conducts high quality research to shape local and international health policy, programs and practices.

Core Values
- Team work
- Excellence
- Collaboration
- Capacity development
- Integrity
- Accountability
- Innovation
- Equity
- Diversity

Guiding principles
- Population based research
- High quality and cost-effective research
- Strategic partnerships
- Formidable data management
- Inter sectorial collaboration
- Evidence-based practice.
- Publications and dissemination of findings.
Executive Summary

A lot was achieved in 2020 despite the challenges brought by the COVID-19 pandemic. We continued most of our research activities. However, at the peak of the pandemic from March – June 2020, we were forced to temporary suspend some of our ongoing and planned research to ensure the safety of our community members who volunteer to participate in our research.

For some of our staff who could work from home, arrangements were made for them to do so.

In carrying out our mandate, to conduct health research to inform decision and policy making within the Ghana Health Service/Ministry of Health, we played a key role in the regional and national response to COVID-19 pandemic. Our expertise, particularly in infectious and respiratory diseases, public health, clinical trials and, demographic and health surveys have been relevant to the health sector. We conducted a COVID-19 survey in a record time to inform management of the pandemic in Ghana. Findings of the survey is guiding the national response to the pandemic through educational messaging, campaigns, and training of health staff at all levels of the health delivery system.

On 30th November 2020, Kintampo Health Research Centre (KHRC) clinical laboratory started testing for COVID-19, and we are glad to report that the test results have helped in the diagnosis, treatment and management of COVID-19 cases across Ghana. While everyone and all sectors are facing challenges of the pandemic, KHRC has been able to show the relevance of having a local health research capacity which is committed to responding to emerging challenges.

Our 2020 report outlines many of the success stories of research activities that are already improving the lives of the people of Ghana and beyond such as our long-standing malaria research to reduce the burden of the disease. Since vaccinations of the RTS,S new malaria vaccine began on pilot basis in six regions of Ghana in 2019, KHRC has been coordinating a consortium of seven institutions to evaluate the pilot roll-out of the vaccine. A new tool that was shown to provide protection against malaria in children.

KHRC participated in the testing of the vaccine in Ghana and other countries. Other projects were the new approaches to malaria control like our Ghana malaria slide bank project, a platform created to improve the skills and competency of microscopists in Ghana and beyond. The report also features other new and ongoing malaria research activities.

As part of our focus on environmental science we have had a number of ongoing and new collaborative projects to provide data to impact decision and policy making. One of such initiatives was the adoption of clean cook stoves project, a collaborative research which collected data from over 100 households on barriers and facilitating factors for the adoption and sustain use of clean cook stoves.

The Government of Ghana has already shown great leadership in supporting the use of liquefied petroleum gas (LPG) as clean energy for cooking through the introduction of LPG cylinder recirculation model. KHRC led a study (clean-air Africa) to which helped to accelerate the pilot implementation of the model in selected communities in Ghana.

The child lung function study, is collecting data from 1415 mothers and infants to assess the impact of LPG cock stoves on adult respiratory health. The project will provide information on lung function in the population.

The COVID-19 pandemic interrupted what has been a successful year for the evaluation of use of clean cooking fuels. To overcome this challenge, KHRC commenced a study to assess the impact of COVID-19 pandemic on household use of clean cooking fuels. Results of the research will provide useful information to improve access and sustained use of clean cooking fuels during and after a pandemic.
A major focus of KHRC over the years has been the commitment to the importance of our research to reduce maternal, neonatal and child morbidity, and mortality. In 2020, we started the AdoPT project, a collaboration between KHRC, Harvard University and Beth Israel Deaconess Medical Centre.

The project will collect data and biological samples from 3,500 pregnant women in two years to create a harmonized data set to improve the understanding of pregnancy risk factors, morbidity and mortality. Information from the research will inform strategies to improve pregnancy and newborn health outcomes. Data collection for the GRIP project was concluded in 2020. This project sought to assess the problem of vaccine preventable diseases due to group B streptococcus, respiratory syncytial virus, influenza and pertussis in pregnant women and their infants. The study results will provide data on the burden of diseases and recommendations to prevent occurrence of infections.

These research activities would not have been made possible without the continued support of our collaborating institutions, communities and experts with interest in KHRC activities. I sincerely thank them especially our traditional and political authorities, opinion leaders and community members within the KHRC study areas in six regions (Bono East, Bono, Ahafo, Ashanti, Central, Volta and Oti) for their support.

My heartfelt thanks goes to our staff who are at the heart of KHRC, the Director, Research and Development Division of Ghana Health Service, Regional Directors of Ghana Health Service (Bono East, Bono, Ahafo, Ashanti, Central, Volta and Oti), District/Municipal Directors of Health Service in the regions, Chief Executive Officers, Medical Superintendents, facility in-charges and all other staff in KHRC operational areas for their unflinching support.

Finally, I would like to thank our generous donors, funding agencies, collaborators, sister institutions, Ghana Health Service Headquarters and Ministry of Health for the continued support to KHRC. We could not have delivered on our mandate without your involvement.

Dr. Kwaku Poku Asante Director, KHRC
MALARIA INTERVENTIONS AND RESEARCH ACTIVITIES

An Evaluation of the Cluster-Randomised Pilot Implementation of RTS,S/AS01 through routine health systems in Ghana

Investigators
Dr. Kwaku Poku Asante, Dr Abraham Oduro, Dr. Abraham Hodgson, Prof. Col. Edwin Andrews Afari (rtd.), Prof. Tsiri Agbenyega, Prof. Daniel Ansong, Prof. Fred Binka, Dr Thomas Gyan, Prof. Kwadwo Koram

Funder:
WHO

Project start date:
27 September 2018

Collaborator:
Ghana Health Service Hq, Regional and District Health Directorates, Sentinel hospitals, chiefs and opinion leaders, NMCP, EPI, FDA and PATH

Project end date:
31 March 2023

Study duration:
5 years

Kintampo Health Research Centre has been coordinating a consortium called the Consortium to Evaluate Mosquirix in Ghana (CEM-GH) to conduct an independent evaluation of the pilot implementation of the new malaria vaccine RTS,S in six regions of Ghana to inform public health policy.

The consortium is made up of experts from seven Research, Academic and Government institutions in Ghana and started preparatory activities for the evaluation in 2018. Following ethical and regulatory approvals in January 2019, three main surveillance systems were set up; household survey - February 2009, community mortality surveillance - May 2019 and sentinel hospital surveillance - May 2019. The baseline household survey was conducted from 25th February - 18th March 2019 across 66 districts in now six regions of Ghana.

On 30th April 2019, Ghana started the pilot introduction of RTS,S malaria vaccine into the routine health system.

On 1st May 2019, the community mortality surveillance to assess the impact of the RTS,S administration on all cause mortality and, sentinel hospital surveillance to examine any safety signals after vaccine administration commenced.

The consortium is in its eleventh month of the evaluation and has received monitoring visits from the consortium Advisory committee, an independent CRO Pharmalys, FDA, PATH and WHO.

Support for the evaluation has been received from Ghana Health Service Headquarters, Regional and Districts Health Directorates in the implementing regions, eight sentinel hospitals, chiefs and opinion leaders in all 66 districts and WHO. The final survey report was submitted to WHO on 2nd July 2019.
Background
Malaria microscopy continues to be a cornerstone for malaria diagnosis. Training and competency validation of microscopists is required for reliable results. Standardized sets of malaria blood slides are needed for the training and competency validation. KHRC with support from the collaborating partners established validated sets of slides to achieve the aim.

Activities
Samples were collected into EDTA-anticoagulated blood after informed consent was sought from donors and these samples were used to prepare the slides validated in the bank as described in previous reports.

The MSB currently holds over 6,000 validated slides comprising negative, *P. falciparum* (different densities), *P. malariae*, *P. ovale*, and mixed infection slides organized in slide cabinets. Information on each slide is stored in a Microsoft Access database which makes it easy to select required slide sets for training and competency assessment.

Slide from the MSB have been used for training of medical laboratory professionals and other institutions. The slides from the MSB have also been used for competency assessments, and Outreach Training and Support Supervision (OTSS) for malaria diagnosis by the Clinical Laboratory Unit of the Institutional Care Division, Ghana Health Service.

Added to the bank are more than 2000 placental tissue blocks fixed in paraffin wax and the corresponding H & E stained tissues from the placental tissues. These samples were prepared from a birth cohort study that enrolled and followed 2000 pregnant women and their babies for over a year.

Activities during the year under review have been to replenish the slides to be able to maintain the number of slides always needed in the bank for the intended purposes.
Investigators
Adu-Gyasi Dennis, Kwaku Poku Asante (KHRC), Dr. Anita Ghansah (Noguchi Memorial Institute for Medical Research (NMIMR), Prof Jeffrey Bailey (University of Massachusetts Medical School (UMMS))

Background
Helminth (parasitic worm) infections and malaria are still major causes of morbidity and mortality in sub-Saharan Africa. Despite great inroads into controlling these infections, both remain challenging public health problems and are still prevalent in West Africa and Ghana.

Both pathogens cause chronic and repeated infections that have ample opportunity to interact within the host and with the host's immune system. Maternal infections of both organisms have been shown to impact birth outcome as well as newborn growth and development.

In a previous study in Ghana, we demonstrated that malaria parasite infections co-exist with hookworm (Ancylostoma duodenalis, Necator americanus), Ascaris lumbricoides, Hymenolepis nana/diminuta, Strongyloides stercoralis, Trichuris trichuria, Microfilaria (undifferentiated) and Intestinal flagellates (undifferentiated) and these infections influence the immune response elicited to the parasites within their host.

Specifically, we examined the correlations between worm infections and malaria parasitemia along with major measures of immune response. We found helminth and malaria co-infected individuals had increased cytokine producing T cell populations including CD4+IL-4+ and CD8+Foxp3+IFN-γ+ while dendritic and TCR-γδ cell populations were decreased.

It was also evident that hookworm infections with malaria parasites largely stimulate Th2 effector cells. These differences highlight the possibility of these infections to interact with each other and dysregulate the immune system.

Method
In this study we propose to build upon this work using newer molecular techniques to dissect the malaria infections with regard to helminth infections. Our examination of helminth and malaria parasite interactions was not able to completely examine the pattern and nature of the malaria infections.

We will use high-throughput next generation sequencing to determine the strain complexity and genetic diversity of the malaria parasites within each individual comparing helminth infected and uninfected individuals.

Malaria infection could be impacted not only in terms of presence and level of parasites, but also more subtly in terms of longevity of infection and type of parasites infecting. In this study, we will specifically test the hypothesis that helminth infections decrease immunity and clearance of malaria parasites which will result in increased longevity and number of strains.

Our primary objective will be to determine if the complexity of infection (COI or number of strains) correlates with helminth infections.

Secondary objectives include examining correlations with specific helminths, immunologic status as measured in the parent study, and household and demographic data. The overall prevalence data will also importantly provide primary descriptive data of the parasite population including drug resistance that can further inform malaria control efforts.
KHRC Prospects with experts in probiotics and vaccinology to study impact of off-target effects of vaccines

Investigators
KHRC: Dr. Adu-Gyasi, Dr. John Amoah, Ms Irene T. Azindow.

Telethon Kids Institute - Australia: Prof. Tobias Kollmann, Nelly Amenyogbe.

University of Melbourne Australia: Prof. Frank Shann.

Georgetown University: Prof. Pinaki Panigrahi

This probiotics platform is being built on the foundation that was set up by the team carrying out a prevalence pilot study to assess the microbiota of new born babies and their mothers to ascertain if the strain used to prepare probiotics is foreign or already a normal commensal.

The team is at the stage of assessing the infrastructure available to conduct larger clinical trials to contribute to finding solutions to sepsis, preterm birth, low birth weight and others using probiotics given to either mothers or their babies.

Probiotics work from over 20 years and the clinical trial by Pinaki Panigrahi (https://www.id-hub.com/2019/10/10/probiotics-prevention-sepsis-interview-pinaki-panigrahi/) of Georgetown University, USA among new born babies in his hometown of Odisha, India revealed the ability of probiotics to prevent sepsis, pneumonia and diarrhea. Probiotics regained the headlines when Bill Gates said "he believes probiotics could help stem malnutrition over the next two decades" (https://www.independent.co.uk/life-style/health-and-families/bill-gates-malnutrition-world-hunger-probiotics-health-microbiome-bacteria-a9145831.html).

This has set the ball rolling faster than earlier thought and KHRC is preparing in the near future to become a major hub to contribute information to the important subject of probiotics.

In brief, on the issue of off-target effects of vaccines, some observational studies have described the beneficial effects of live vaccines and the harmful effects of non-live vaccines. A large systematic review by the WHO revealed that good strains of BCG vaccines reduced overall mortality (i.e. far beyond reducing death from tuberculosis).

The team is discussing the possibility of conducting a study to give a second dose of BCG to observe if it could improve effects of the current vaccine schedule on unrelated infections. The ultimate goal of the team is to recommend to improve the effects of existing vaccines in children.

Figure: Prof P. Pinaki making a presentation to a team of researchers in KHRC
Figure: Experts in probiotics and off-target effects of vaccine in the field with KHRC researchers, Ghana

Figure: KHRC welcomes team of researchers in probiotics and vaccinology

Figure: Experts in probiotics and vaccinology visit Methodist Hospital, Wenchi
District-level malaria prevalence surveys among children in the Greater Accra Region of Ghana.

Investigators
Kintampo Health Research Centre: Kwaku Poku Asante, Anthony Kwarteng, David Dosoo, Kingsley Kayan
Dodowa Health Research Centre: John Williams
Greater Accra Regional Health Directorate: Charity Sarpong

Funders:
National Malaria Control Programme (NMCP) / Global Fund

Project start date: September 2019
Project end date: December 2020

Background
Notwithstanding several control efforts at reducing malaria disease burden, malaria remains one of the world's greatest childhood killers especially in sub-Saharan Africa (SSA).

In Ghana and many malaria endemic areas, Plasmodium infections remain asymptomatic, undetected, untreated and consequently serve as a reservoir for transmission. The burden of malaria is influenced by the intensity of malaria transmission which is very often localized in specific hotspots.

Malaria parasite prevalence (MPP) is a widely accepted measure of malaria risk in a community. The heterogeneity of malaria transmission in Ghana requires aggregated community-level data for proper understanding of malaria risk for the design of effective interventions. The successful implementation of targeted interventions based on community-level data in reducing the burden of malaria is well documented in areas like The Gambia, Kenya and Zanzibar.

The primary objective of the study was to determine sub-district-level MPP during the high malaria transmission season for children aged 6 – 59 months and 5 – 10 years old in all districts of the Greater Accra Region using a malaria rapid diagnostic test (mRDT) kit.

Secondary objectives were to:

i. To determine the prevalence of different malaria parasites (Plasmodium falciparum, malariae, vivax or ovale) using light microscopy and molecular method (dried blood spot) in a subset of samples (10% randomly selected).

ii. To determine the prevalence of fever, insecticide treated bed-nets (ITN) ownership and use at the sub-district level.

Expected outcomes
This study seeks to provide accurate sub-district and district level estimates for the prevalence of malaria in districts of the Greater Accra Region. Such data will be complementary to national malaria estimates for effective planning and design of targeted intervention by local stakeholders and the Ghana National Malaria Control Program (NMCP).

Methods
A maximum of three sub-districts were randomly selected from each of the districts (87 sub-districts in total), and enrolling 100 children from each age category in each sub-district (i.e. 200 children from each sub-district). At the sub-district level, random selection of children was done at community and household levels.

Progress
Study preparatory meetings were held in Kintampo and Accra. Training of field teams (made up of District Malaria Focal Persons, Health Promotion Officers, Community/Public Health Nurses and Medical Laboratory Scientists) was done in ten (10) batches from 10th to 21st August 2020 in Accra, Dodowa and Sege.

Media briefings and community sensitization was done prior to commencement of field work. Field work was conducted between 21st September and 10th October 2020. Survey data were collected using the Online Data Kit (ODK). Data cleaning and analysis will be performed and results disseminated to stakeholders.

A cross section of participants who attended the training at the CLOGSAG Hall in Accra.
A prospective study to estimate the incidence of diseases specified as adverse events of special interest, of other adverse events leading to hospitalization or death, and of meningitis in infants and young children in Sub-Saharan Africa prior to implementation of the RTS,S/AS01E candidate vaccine.

Investigators
Seth Owusu-Agyei, Kwaku Poku Asante, Owusu Boahen, Mathilda Tivura and Samuel Ekow Harrison.

Funders:
GlaxoSmithKline Biologicals
Collaborator:
PATH

Project start date:
February 2016
Project end date:
May 2022

Background
GSK Biologicals is developing a pre-erythrocytic P. falciparum malaria vaccine, RTS,S/AS01E, for routine immunization of infants and children living in malaria-endemic countries of Sub Saharan Africa (SSA). RTS,S/AS01E will be the first vaccine for the prevention of malaria. This will be the first AS01-adjuvanted vaccine used in the paediatric population.

Most of these SSA countries have no baseline incidence data on rare diseases such as those that may be reported as Adverse Events (AEs) following vaccination. Lack of baseline data would compromise the interpretation of any Adverse Event detected following the implementation of the RTS,S/AS01E vaccine in the paediatric population.

GSK Biologicals has developed a set of studies to address this paucity of data, and to ensure optimal collection of information related to the occurrence of those events before and after implementation of the RTS,S/AS01E vaccine. This is one of those studies.

Objectives

To estimate the incidence of protocol-defined Adverse Event of Specific Interest (AESI) in a setting without existing surveillance systems designed to capture those rare events. To estimate the incidence of other Adverse Events leading to hospitalization or death, meningitis and malaria morbidity and mortality at the same time.

Brief methodology
Approximately 30,000 children have been recruited within the collaborating study site into the active surveillance. These children will be actively followed up through home visits and through continuous monitoring of outpatient visits and hospitalizations at all health care facilities in the study areas.

The study uses multiple data source, to increase opportunity to capture the event of interest. Among the 30,000 children, approximately 15,000 children were enrolled in the 6-12 weeks group and approximately 15,000 children were enrolled in the 5-17 months group.

Kintampo site has recruited 11,950 children.

Expected outcome
To estimate the incidence of Adverse Events of Specific Interest, and of other Adverse Events leading to hospitalization or death, and an etiology confirmed meningitis in children prior to implementation of RTS,S/AS01E.

Progress
In all Eleven thousand nine hundred and fifty (11,950) children have been enrolled into the study. Eight thousand nine hundred (8900) children have been enrolled into the active surveillance and 3050 into enhance hospitalization cohort respectively. The enrolment into active surveillance ended in March 2018 and those in the enhance hospitalization cohort ended in March 2019. Follow up visits will continue till 2022.
A Prospective Study to Evaluate the Safety, Effectiveness and Impact of the RTS,S/AS01E Vaccine in young Children in sub-Saharan Africa (Epi Mal-003).

Investigators
Kwaku Poku Asante, Seyram Kaali, Samuel Bernard Ekow Harrison, Prince Agyapong, Cynthia Yaa Bema, Owusu Boahen, Livesy Nafoe Abokyi, Seth Kwame Sakyi Arthur, Clifford Kwarteng Kyeremateng

Funders: GlaxoSmithKline Biologicals
Project start date: March, 2019
Project end date: December, 2025

Background
This study referred to as Epi Mal 003 is a phase IV study of the RTS,S/AS01E vaccine which is the first vaccine to be implemented for the prevention of malaria. The pilot implementation of the RTS,S/AS01E vaccine follows recommendation by the World Health Organization.

The vaccine is currently being implemented among pediatric populations (5-17 months) in sub-Saharan African countries within the routine health systems in Ghana, Kenya and Malawi on a pilot basis.

A baseline study referred to as Epi Mal 002 began ahead of this study to measure the occurrence of adverse events of special interest (AESI), other adverse events (AE) leading to hospitalization or death, meningitis and malaria illness and death. This Epi Mal 003 study is, therefore, intended primarily as a post-implementation safety study.

Objectives
The co-primary objectives are:
1. To estimate the incidence of AESI and AE leading to hospitalization or death in children vaccinated with RTS,S/AS01E
2. To estimate the incidence of aetiology confirmed meningitis in children vaccinated with the RTS,S/AS01E.

Methods
The study design is a disease surveillance with a prospective cohort event monitoring with both temporal thus before and after comparison with Epi Mal 002 and also concurrent cluster design comparison of exposed and unexposed clusters.

The occurrence of adverse and malaria events between vaccinated and unvaccinated participants living in exposed and unexposed clusters will be compared. Exposed clusters are areas within our study area where the RTS,S vaccine is being implemented on a pilot basis while the non-implementing areas are referred to as unexposed cluster.

The design also entails an active surveillance arm and enhanced hospitalization surveillance arm in both exposed and unexposed clusters. The active surveillance arm involves scheduled home visits and continuous monitoring of outpatient visits as well as hospitalizations at health facilities. The enhanced hospitalization surveillance also involves continuous monitoring of hospitalizations in both exposed and unexposed clusters.

For each participant enrolled into active surveillance, at least nine home visits are expected to be conducted over a period of 62 months. The enrollment target for active surveillance for all study sites in all three countries taking part in the study is 45,000 children.

However, the enrollment target for the Kintampo Health Research Centre is 12,000 out of which the exposed cluster is expected to recruit 6000 and same target for the unexposed in the unexposed cluster. There is, however, no definite enrollment target for the enhanced hospitalization which is expected to last for the duration of the study.

The study population comprises children less than five years of age living within a geographically defined demographic surveillance area. The study covers six adjoining districts within the Bono East Region. Four of the districts are among the pilot implementation districts (exposed cluster) while the remaining two are non-implementing districts (unexposed cluster). The districts in the exposed cluster are Kintampo North Municipality, Kintampo South District, Techiman North and Nkoranza North Districts while the unexposed cluster covers Techiman South and Nkoranza South Municipalities.

Expected primary outcomes
1. Occurrence of AESI
2. Occurrence of other AE leading to hospitalization or death
3. Occurrence of aetiology confirmed meningitis

Progress
The enrollment target of 12,000 participants into active surveillance for both exposed and unexposed clusters has been achieved within the recruitment period of 18 months of commencement of the study. The enhanced hospitalization surveillance arm has enrolled over 8,000 participants so far. Scheduled home visits for active surveillance is in progress. Enrollment into enhanced hospitalization surveillance is in progress and will continue over the duration of the study.
Epidemiology of malaria transmission intensity in sub-Saharan African

Investigators:
Kwaku Poku Asante, Kaali Seyram, Samuel B.E. Harrison, Prince Darko Agyapong and Owusu Boahen.

Funders:
GlaxoSmithKlineBiologics

Project start date:
September 2014

Project end date:
November 2023

Background
This epidemiology study (EPI-MAL-005) is planned to run in parallel with two conservative safety monitoring RTS,S vaccine studies (EPI-MAL-002 and EPI-MAL-003) which will monitor incidence rate of protocol defined adverse events of specific interest (AESI) and non-communicable and traumatic serious adverse events (NC/NT-SAE).

Objectives
- To obtain longitudinal estimates of P. falciparum parasites prevalence in order to characterize malaria transmission intensity in a standardized way at centres conducting the EPI-MAL-002 and EPI-MAL-003 studies before and after the introduction of the malaria vaccine RTS,S/AS01E in sub-Saharan Africa.
- To obtain longitudinal estimates of the usage of malaria control interventions in centres conducting the EPI-MAL-002 and EPI-MAL-003 studies before and after the introduction of the malaria vaccine RTS,S/AS01E in sub-Saharan Africa.

Methods
This is a multi-centric, epidemiology longitudinal cross-sectional study enrolling 1200 children aged six months to nine years children in nine consecutive self-contained Epochs. The survey is being performed at peak malaria parasite transmission season in the study area.

No vaccine is being administered in this study. All medications that may influence malaria parasites within 14 days prior to each survey is recorded. Axillary body temperature of all subjects at the time of the survey is recorded.

A capillary blood sample is collected for evaluation of malaria by blood slide and Nucleic Acid Amplification Test (NAAT). Serious adverse events (SAEs) associated with study procedure (capillary blood sampling) is collected. There is no defined follow-up period except in cases where there is an SAE, in which case participants will be followed until the SAE resolves.

Expected outcome
- Prevalence of asexual and sexual parasites as determined by microscopy and NAAT.
- Use of bednets and residual spraying in each survey; use of medications that may influence malaria in the last 14 days prior to each survey; other health seeking behaviors relating to malaria infection.

Progress
The study was approved by the Kintampo Health Research Centre Institutional Ethics Committee (KHRC IEC) and Ghana Health Service Ethical Review Committee (GHS ERC) prior to commencement of the study.

Seven annual surveys enrolling a total of 5400 children aged six months to < 10 years. The team has two more surveys to complete the study.
A Phase IIa, multi-center, randomized, open-label, dose-escalation study to determine safety of single (QD) and multiple (3 QD) doses of KAE609, given to adults with uncomplicated Plasmodium falciparum malaria.

Investigators
Dr. Kwaku Poku Asante, Dr Seyram Kaali, Dr Samuel Harrison, Dr Prince Agyapong, Elvis Wilson Owusu Boahen, Philip Bilson, Elisha Adeniji, David Dosoo, Kingsley Kayan.

Funders:
Novartis Pharma AG

Project start date:
May 2018

Project end date:
June 2019

Study duration:
2 years

Background and objectives
KAE609 is a novel spiroindolone class drug with potent and fast-acting schizonticidal activity, which acts by disrupting the malaria parasite Na+ homeostasis by inhibition of the ATPase PfATP4. It is being developed as an additional tool for the treatment of clinical malaria.

The objective of this dose escalation study design is to characterize hepatic safety aspects of single and multiple ascending doses of KAE609 and determine the maximum tolerated dose of the investigational drug KAE609 in malaria patients. The primary endpoint was at least two Common Terminology Criteria for Adverse Events (CTCAE) grades increase from baseline in Alanine amino transferase (ALT) or Aspartate amino transferase (AST).

Brief methodology
Eligible participants were adults ≥18 years old with signs and symptoms of uncomplicated malaria and malaria parasites between 500 and 50,000 parasites/µl. Starting dose of KAE609 is a single dose of 10 mg and following acceptable safety results in the 10 mg treatment arm, the dose of KAE609 was increased stepwise up to a single dose of 75 mg and multiple doses of 50 mg (QD x3 days).

All patients were followed up for four weeks with close monitoring in an inpatient setting for at least the first three days for efficacy and safety followed by outpatient monitoring up to Study Day 29. Safety parameters such as liver enzymes, renal function, electrocardiographic findings and treatment failure were strictly monitored.

Expected outcome/Key findings:
In the overall cohort from all countries, 2/135 (1.48%) participants treated with KAE609 had at least two CTCAE grades increase from baseline in ALT or AST compared 2/51 (3.92%) participants in treated with Coartem. There was no significant difference in proportion of participants between any KAE609 treatment group and the pooled Coartem group.

Progress
In the Kintampo cohort, 31 malaria patients were screened and 21 randomized. Out of the 21 participants enrolled, 20 successfully completed the study, with only one participant withdrawing their consent. Retention rate was, therefore, around 95%.
Impacts of Environment, Host Genetics and Antigen Diversity on Malaria Vaccine Efficacy

Investigators
Kintampo Health Research Centre (KHRC): Kwaku Poku Asante and David Kwame Dosoo
Noguchi Memorial Institute for Medical Research (NMIMR): Anita Ghansah
University of North Carolina (UNC), USA: Michael Emch
Brown University, USA: Jeffrey Bailey

Funders:
National Institute of Health (NIH)

Project start date: August, 2019
Project end date: August, 2024

Background
An effective Plasmodium falciparum vaccine in addition to the existing malaria intervention tools will be important to eliminating malaria. One of the leading malaria vaccines in clinical trials is the RTS,S vaccine which just completed its Phase III trial in 11 sites. In this trial, however, the efficacy of the vaccine varied among different populations.

The vaccine candidate showed 50.4% efficacy against clinical malaria in children from 5 to 17 months of age after 12 months but only 30.1% after 14 months in children 6 to 12 weeks old. Despite this results, RTS,S/AS01E can still play a significant role in reducing the existing disease-burden. Based on this outcome, WHO has rolled out the RTS,S vaccine on pilot bases in three African countries (Ghana, Kenya and Malawi) in 2019.

Reasons for the modest efficacy of this vaccine are unclear. To better understand the efficacy of the results, assessment of both the individual factors that modify vaccine efficacy and combinations of the factors is extremely important as RTS,S/AS01E will not be deployed in isolation, but rather as part of already existing malaria interventions.

Other vaccines and initial analyses of RTS,S/AS01E indicates vaccine efficacy is influenced by ecologic and genetic factors at individual and community levels, therefore, it is unlikely to work equally effectively in every locale and population. Age and malaria exposure peculiarly highlights this problem in the RTS,S/AS01E. Exploring a wide range of factors that may modify efficacy is key to understanding the efficacy of the vaccine.

This study aims to determine how ecological factors (behavioral and environmental), human host genetics and parasite antigen diversity; and combinations of these factors modify vaccine efficacy at three ecologically diverse RTS,S Phase III field sites in Kintampo, Ghana; Lilongwe, Malawi; and Lambarene, Gabon.

Methods
For participants of the Phase III RTS,S study (2009 to 2013), informed consent and assent were obtained, after which approximately one teaspoons (5 mL) of venous blood was drawn from each subject who were now between 9-12 years of age by a trained phlebotomist using sterile technique into an anticoagulated blood collection tube and transported to the KHRC Clinical Laboratory. Samples were centrifuged and separated into plasma, red blood cell pellet and white cells and appropriately frozen and/or preserved for DNA for human studies to be performed using molecular inversion probe (MIP) and high-throughput sequencing technology.

Expected outcomes
The expected outcomes of this study are:
• identification of spatial, environmental and behavioral factors that modify the efficacy of the vaccine.
• quantification of relative amount and longevity of strain specific efficacy of the vaccine.
• detection of significant risk of whether human leucocyte antigen (HLA) Class 2 polymorphism affects vaccine efficacy along with other host polymorphisms associated with immune response and resistance to malaria infection
• an explorative understanding of how combinations of these factors modify vaccine efficacy with the primary endpoint of detecting interactions among all factors and their relative contribution.

Progress report
A total of 507 participants of the Phase III study were recruited, 251 had moved out of the study area, 66 were temporarily absent, 22 refusals and seven dead. No serious adverse events were recorded during the period of blood sample collection from August 2019 to June 2020.

Statistical analysis currently ongoing to determine the effect of ecological variables on efficacy of the RTS,S vaccine (Aim 1). This will be followed with laboratory analysis to answer Aims 2 and 3 of the study.
Effectiveness and Safety of Four or More Doses of Sulphadoxine-Pyrimethamine (SP) Administered as Intermittent Preventive Treatment against Malaria during pregnancy among Ghanaian Women

Investigators
Kintampo Health Research Centre (KHRC): David Dosoo, Dorcas Atibilla, Seth Owusu-Agyei, Kwaku Poku Asante
London School of Hygiene & Tropical Medicine: Daniel Chandramohan, Jane Bruce, Brian Greenwood

Funders:
Kintampo Health Research Centre

Project start date:
July 2017

Collaborators:
London School of Hygiene & Tropical Medicine (LSHTM), London, UK
Brown University, RI, USA

Project end date:
December 2020

Background
Malaria in pregnancy is a major public health problem, causing maternal, foetal and infant morbidity in malaria endemic areas of sub-Saharan Africa. It is the cause of unfavourable pregnancy outcomes such as stillbirth, low birth weight (LBW), preterm delivery, abortion, maternal anaemia and neonatal mortality.

Intermittent preventive treatment in pregnancy using sulphadoxine-pyrimethamine (IPTp-SP) clears parasites in mothers and prevents subsequent infections. Ghana has adopted the new WHO IPTp-SP policy which recommends monthly SP administration starting early in the second trimester to as close as possible to delivery.

Objectives
- Determine the impact of four or more doses of IPTp-SP, compared to three doses, on the prevalence of active (acute or chronic) placental malaria, peripheral, cord and placental blood smear parasites in mothers and their newborns, and adverse pregnancy outcomes (abortion, stillbirth, pre-term delivery, LBW, congenital malformations).
- Estimate the prevalence and risk factors of malaria parasites and anaemia at first antenatal care clinic visit.
- Estimate the current frequencies of P. falciparum dihydroxyfolate reductase (dhfr) and dihydropteroate synthase (dhps) gene mutations responsible for resistance to SP in the study area.
- Determine prevalence and levels of VAR2CSA antibodies.
- To investigate the risk of malaria infection in babies born to women receiving three doses of IPTp-SP compared to those who received four or more doses.

Methods
This cohort study enrolled 1700 pregnant women early in the second trimester, prior to commencement of IPTp-SP at Antenatal Care Clinics in the Kintampo Districts and adjoining Nkoranza Districts in the middle belt of Ghana. Pregnant women were followed up to delivery and a month after.

At enrolment, samples were collected for malaria microscopy, haemoglobin estimation, SP resistance markers genotyping. Placental samples (approximately 2.5cm3), cord blood, maternal peripheral blood were collected at delivery for placental, peripheral and cord blood parasitaemia and haemoglobin estimation.

Babies were weighed within 24 hours after delivery. Children were followed up monthly up to six months and samples capillary blood samples collected for malaria parasites and haemoglobin estimation.

Expected outcome
This study will provide information on the safety and effectiveness of the additional doses of SP among pregnant women in an area of high malaria transmission intensity in Ghana.

Progress
Field work was completed in March 2020. Laboratory determination of malaria parasites (using microscopy), placental malaria (using histology) and haemoglobin levels have been completed. Analysis of sequencing data for markers of resistance to sulphadoxine and pyrimethamine and measurement of VAR2CSA antibody levels are being performed.

The study found a high prevalence of malaria parasites (20.4%) among pregnant women at their first antenatal care clinic visit.
The effects of Artemisinin-based combination therapy (ACT) on the dynamics of Plasmodium falciparum, P. malariae and P. ovale infections in Ghana

Investigators
KHRC: Kwaku Poku Asante, Dennis Adu-Gyasi, David Dosoo, Jones Opoku-Mensah, Nicholas Amoako, Osei Musah
WACCBIP: Felix Ansah, Gordon A. Awandare, Yaw Aniweh, Emmanuel Amlabu

Funders:
University of Edinburgh in United Kingdom and WACCBIP at the University of Ghana.

Project start date: June, 2019
Project end date: June, 2020

Background
Malaria parasites elimination programmes has mainly targeted P. falciparum which is the most virulent and dominant human malaria species in Africa. However, complete will require a comprehensive control and elimination measures that equally target all the human malaria Plasmodium species.

In sub-Saharan Africa, other Plasmodium species including P. malariae, P. ovale and P. vivax have persisted, usually detected in co-infections with P. falciparum.

These less common non-falciparum species could potentially emerge as a major threat. Lessons can be drawn from South-East Asia, where P. vivax is now the leading cause of malaria, accounting for greater than 74% of the disease burden.

Therefore, this study seeks to address a gap in knowledge on the in vivo dynamics of P. malariae and P. ovale during ACT treatment of P. falciparum malaria.

Also develop a reliable and robust diagnostic biosensor that all the malaria species for diagnosis and epidemiological studies.

Objectives
1. Assess the prevalence of the various malaria parasites and their involvement in clinical malaria.
2. To see if the current treatment regime is able to treat these parasites.
3. To design bed side Nucleic Acid probe to help identify these parasites in the clinics.

Methods
The study had two arms, the clinic and community arms. With the clinic arm, 100 participants reporting to the Out Patients Department (OPD) at the Kintampo Municipal Hospital were screened for the type of malaria parasites they were carrying. Participants were followed up on day 7, 14 and 28 for parasite clearance. Plasma and Peripheral blood mononuclear cells were isolated and stored. Parasites were isolated and cryopreserved at day 0.

About 2000 people were recruited from the various communities in the Kintampo Municipality. 25 people carried the other parasites apart from P. falciparum. These 25 people were treated with Arthemeter Lume-fantrin and follow ups were done at day 3, 7, 14, and 28. Plasma and Peripheral blood mononuclear cells were isolated and stored. Parasites were isolated and cryopreserved at day 0. Those who harbored P. falciparum were also treated but not followed up.

Expected outcome
It is expected that the other Plasmodium species would be susceptible to the current malaria treatment available (ACTs).

Progress
All field work and blood sampling are done. Data analyses is still ongoing. The bed side Nucleic Acid probe that will help identify the various malaria parasite too is ongoing.
ENVIRONMENTAL HEALTH
Reducing Household Air Pollution in Ghana through Community-Level Transitions to Clean Cookstoves and Fuels

Investigators
KHRC: Kwaku Poku Asante, Sulemana Watara Abubakari
Columbia University: Darby Jack
University of California Santa Barbara: Kelsey Jack
Funder:
Columbia World Projects

Project start date:
November, 2019

Project end date:
November, 2024

Background
Globally, nearly three billion people use traditional cookstoves and fuels. In Ghana, about 70% of the population generates energy for cooking by burning biomass and other solid fuels in open fires.

These inefficient energy sources produce one-quarter of all black carbon emissions globally and lead to nearly four million preventable pollution-related deaths per year, including half a million children under the age of five years who die from pneumonia. Women are also particularly impacted because of their exposure in the home; the burden of collecting firewood and other fuels falls to them.

A number of interventions over the last decade have not significantly reduced the negative impact of the use of traditional cookstoves. Study participants continue to use polluting energy systems, and emissions from neighbors which effectively negate the health benefits of any one household’s transition to clean energy systems.

This study consolidates past experiences with clean household energy – with a particular focus on behavioral and cultural questions – and also draws on novel insights into both clean cooking technologies and behavioral antecedents to their sustained use.

Objectives
The primary objective is to reduce household air pollution exposure by promoting community-level transitions to clean cooking with the target of achieving WHO health-based air quality targets. Specifically:
1. Develop and integrate new – but evidence based – behavior change approaches that consider decision-making within the home and at the community level to encouraging exclusive, sustained use of clean cooking technologies.
2. Develop a portfolio or stack of clean options (fuels, stoves, and practices) that together can fully displace traditional open fires in homes and small businesses, and enable exclusive, sustained use of clean alternatives.
3. Aim to transition entire communities towards clean alternatives, rather than being focused on the number of households affected, in order to achieve anticipated air-quality improvements.
4. Identify broader energy system changes that will support and sustain household and community-level transitions.

Methods
The project will have two main phases: an assessment phase and an intervention phase. The assessment phase will develop a detailed quantitative picture of Ghana’s current household energy systems and evaluate constraints and opportunities. To accomplish this, four main tasks will be carried out:
1. Nationally representative household energy use survey. This will entail a detailed questionnaire, to be designed in close consultation with Government of Ghana partners, to understand household energy needs, strategies for meeting those needs, and expenditures on household energy.
2. National-level assessment of exposure to household air pollution. In a subset of households surveyed, we will deploy both personal air pollution monitors and neighborhood air pollution monitors.
3. Evaluation of behavioral constraints and opportunities surrounding adoption and sustained use of clean household energy. We will carry out a series of studies that will provide novel insight into factors including but not limited to cost.
4. Systematic review of potential household energy technologies.
Previous experience with clean household energy in Ghana has centered on LPG. We will assess the feasibility and cost of ethanol, electricity, and processed biomass (pellets) to coexist with LPG in the Ghanaian market. We will also assess the viability of novel business models for fuel delivery.

In the intervention phase we will deploy a set of promising technologies, business models and behavior change approaches in a carefully monitored, large scale test program in a to-be-determined set of communities in Ghana. This will give us the opportunity to evaluate how well the technologies and business models meet household energy needs, and also to track the costs and logistical challenges associated with delivering clean energy services at scale.

Expected outcomes:
- Nationally representative dataset with a strong empirical understanding of energy use patterns, prices end users are currently paying, and spatial distribution of air pollution risk.
- It is expected that behavior change intervention will improve clean cookstove adoption and sustained use.
- Government of Ghana will have a state-of-the art system for tracking household energy and resulting air pollution exposures.

Progress: Ethical approvals have been received but it delayed due to the COVID-19 pandemic. Study is now planned to start in the first quarter of 2021.

Investigators
Dr Kwaku Poku Asante, Dr. Dennis Adu-Gyasi, Dr Thomas Gyan, Dr. Abubakari Sulemana W., Mr. Charles Zandoh, Mr. David Dosoo, Mr. Samuel Kofi Tchum, Prof. Alex Dodoo, Dr. Patrick Adjei

Background
This current household survey data is an update to the 2011 data for Newmont Ghana Gold Limited in Akyem using a team of internationally and locally recognized experts in the field of HIA.

The primary objective was to conduct a survey to update the 2011 community data for the Newmont Akyem Mine Project. The goal of this project was to provide detailed and comprehensive update on emerging trends between the baseline and current data as a basis 1) for development, mitigation and future monitoring; 2) to provide an updated assessment based on the current situation which includes both positive and negative health impacts of the mine; 3) to optimize positive impacts and mitigate negative impacts from the mining activities throughout the Mine lifetime.

Specifically, the survey assessed data of women’s reproductive health and their health status e.g. maternal health situation; ascertain the knowledge, attitude and practices and prevalence of HIV/STDs within the study area; assess the prevalence of heavy metals among community members in the study area; determine if all previously indicated health risks have been addressed during project execution; and develop Integrated Health Mitigation measures.

Project area
The update was conducted in the Birim North and Birim South Districts. The study area was classified into i). high impact, ii). low impact and iii). control. The High impact area includes communities such as New Abirem, Afosu, Ntronang, Mamanso, Old Abirem, Adausena, Hweakwae, and Resettlement Village (Amanfrom) which is composed of communities indicated earlier (i.e. Yayaaso and hamlets in...
the area including the main ones of Togbe Ayesu Zigah, EK Marfo, Yaw Tano, Ata, Agrivi Donkor and Adjetye). These settlements and hamlets are known in the previous Household survey as the “local study area” which extends approximately 5km radius from the Project site. The Low Impact area includes Abenaso, Akoase, Dodoworaso, Nkwateng, Noyem, Nwinso, Nyakman and Obohemaa with the Control area covering Adekuma, Aduasa, Akim Swedru, Anyinam Kotoku, Nyankomase and Osorase.

Methods adopted for the survey
The study team carried out initial community engagement exercise by working together with the Eastern Regional and District Health Directorates, the Traditional heads and units, representatives of the District Assemblies and the unit committee members.

The team carried out a census of the project area with a survey consultant with vast experience in population census to update the population of the study area. A sampled population (1650 households) was used to carry out a field survey which included the collection of biological samples (urine from respondents to survey tools and blood sample from children less than five years in each selected household) for the household survey the project area.

Samples collected from the field were transported using cold boxes with calibrated temperature monitoring devices to a central storage laboratory before analysis. The urine samples were used to measure exposure to heavy metals (lead, mercury, cadmium and arsenic) at the Ghana Standards Authority (GSA) while the blood samples were used to screen for malaria parasites, assess blood lead and haemoglobin levels in children less than five years.

In addition to review of literature, health facility data from each district, using data from the District Health Information Management System (DHIMS2) were reviewed for morbidity assessment over the period of update. Records of interventions and developmental programmes by Newmont were also reviewed. The project was approved by the Kintampo Health Research Centre Institutional Ethics Committee (KHRCIEC).

Progress report
A draft report has been completed. Findings from the final report will be disseminated to the community and stakeholders.
Background
Household air pollution (HAP) has emerged in the last 15 years as a top-priority global health issue. About 2.8 billion people – 40% of the world’s households – cook with solid fuels, and combustion typically occurs in inefficient cookstoves.

Incomplete combustion generates a complex mixture of pollutants, many of which are known toxicants (e.g., particulate matter, carbon monoxide (CO), nitrous oxides, formaldehyde and polycyclic aromatic hydrocarbons (PAHs). Exposure occurs indoors or in the immediate vicinity of the home, hence the term HAP.

In utero HAP exposure is associated with low birth weight and respiratory symptoms and infections in childhood, and is an independent predictor of childhood mortality. In adults, WHO estimates that 35% of chronic obstructive pulmonary disease (COPD) worldwide is attributable to HAP.

A recent systematic assessment found that HAP causes 3.5 million premature deaths; women and children are most affected. However, there is evidence to suggest that improvement in indoor air quality using chimney woodstoves and biogas stoves is associated with 1) reduced respiratory symptoms and 2) reduction in the annual decline in lung function.

Therefore, greater reductions in HAP by cleaner fuels such as LPG may have substantial health impacts. The hypothesis being tested is that use of LPG over a 16-month period during the Ghana Randomized Air Pollution and Health Study (GRAPHS) will result in 1) significant reduction in the incidence of respiratory symptoms and 2) significant reduction in the annual decline in lung function (measured by pre and post bronchodilator Forced Expiratory Volume in 1 second (FEV1)).

Aim 1. Early Life Cookstove Intervention Status Affects Respiratory Outcomes (Intention to Treat)
We hypothesize that Cookstove intervention status (LPG versus 3-stone fire) used from the second trimester of pregnancy through age one will independently predict:

a) Outcome 1: Lung function at ages 4 (impulse oscillometry (IOS)) and 7 (IOS and spirometry). We hypothesize that LPG will be associated with better lung function at ages 4 and 7.

b) Outcome 2: Prevalence of wheeze age 1-7. We hypothesize that LPG use will predict decreased wheeze.

c) Later childhood (ages 1-7) exposure will be independently associated with worse lung function at age 7 and reduced lung function growth between ages 4 to 7.

Aim 3: Mechanisms of HAP injury
We will examine novel mechanisms in the placenta, which plays a central role in the prenatal programming of lung growth. Using banked placenta samples from GRAPHS, we will measure microRNAs (miRNAs) and long non-coding RNAs (lncRNAs), two classes of RNAs that control messenger RNA (mRNA) expression, modulate placental functions, and can be altered by HAP exposure.
Methods
This study takes advantage of a well-designed community randomized cookstove intervention trial, the Ghana Randomized Air Pollution and Health Study (GRAPHS), to evaluate the independent effect of LPG cookstoves on adult respiratory health.

GRAPHS used a cluster randomized design to compare two cookstove interventions: Liquefied Petroleum Gas stoves (LPG) and the Biolite improved cookstove to the traditional three stone cookstove (control arm).

In all, 1415 maternal-infant pairs were recruited and followed up over a period of four years to quantify the impact of clean cook stove intervention on birth weight and incident pneumonia during the first year of life.

In this Child Lung function study, a subset of 800 women belonging to the LPG, Biolite and control arm is being followed up. During this extended follow-up, data on exposure monitoring will be collected on all participants at four time points, while respiratory symptoms and lung function will be collected on all participants at two time points, when children are 4 years and 7 years respectively.

Expected outcome: Effect of cookstove status on FEV1, other lung function parameters and effect of HAP exposure during GRAPHS on FEV1 decline over the study period.

Progress
Enrolment has ended after achieving the 700 sample size in 2019. The first phase of the Exposure Monitoring for PM2.5 has also been completed as of December 2019.

Six hundred and sixty-one Spirometry respiratory assessment for women alone, 715 impulse oscillometry (IOS) assessment for both infants and their mothers for the phase 1 respiratory assessment have been done.

The project is currently on the monthly follow-up of the study cohort at their homes to ascertain caregivers report on symptoms, specifically wheeze, in the past month using ISAAC study tool.

So far month 3, 6 and 12 are done and followed up. While waiting to do the next round of the exposure and the lung function assessment when the children are at age 7, the team will continue to do follow-up for month 15, 18, 21, 24 and 27 250 of the participants since enrolment begun in April 2018.

Funder(s) National Institute of Health (NIH)
Understanding adoption of clean cookstoves

Investigators
Kwaku Poku Asante1, Rebecca Dwommoh Prah1, Theresa Tawiah1, Francis Agbokey1, Mujtaba Mohammed Nuhu1, Kenneth Ae-Nighbise1, Ellen Boamah-Kaali1, Charlotte Tawiah1 and Seth Owusu-Agyei1. Darby Jack3, Patrick Kinney3, Steven Chillrud3, Georgette Owusu-Amankwah3, Kelsey Jack4

Institutions:
1 Kintampo Health Research Centre
2 University of Health and Allied Sciences
3 Columbia University (CU):
4 University of California, Santa Barbara (USCB):

Project start date:
July, 2015

Project end date:
June, 2021

Background
This study builds on the Ghana Randomized Air Pollution and Health Study (GRAPHS), a cluster randomized trial investigating the impact of reducing Household Air Pollution (HAP) exposures on birth outcomes and on pneumonia during the first year of life.

The aim of this current study is to investigate the factors that promote the adoption of clean cookstoves, and to test strategies to encourage adoption and sustained use.

Aims
1. Collect stove use data in Ghana Cookstove Study (GCS) homes and regress use on household characteristics
2. Assess the effects of stove type and usage on household time allocation using time activity diaries
3. Test strategies to improve adoption and sustained use of LPG
4. Determine the demand curve for LPG

Methods
This study employed both qualitative and quantitative study methods. Stove use monitors (SUMS) were installed on participants’ cook stoves (both intervention and traditional cook stoves) to measure stove temperature as proxy for stove use. A time use survey, comprising two rounds of data collection was conducted to assess households’ time use in a 24-hour period prior to interview.

Households were visited three times in each round of data collection. To explore and understand reasons behind households’ usage of clean cook stoves, barriers that impede usage as well as household’s time use as a result of the interventions, 10 Focus group discussions (FGDs) were conducted with participants in the intervention arms.

Each group comprised eight to 10 women participants 33 conveniently sampled. Two approaches to promote stove use (providing a behavior change intervention and offering convenient access to LPG refueling) was tested to assess the best ways to encourage LPG stoves adoption and sustained use among participants in the BioLite and control arms of GRAPHS who will receive LPG stoves at the end of the study.

The demand for LPG will be assessed to derive the demand curve and also understand the effect of price, distance and other relevant variables on household’s demand for LPG in the study area. Participants will be randomly assigned to different LPG discounted prices and distance to LPG supply points to ascertain how these will influence their demand for LPG.

Expected outcome
1. Household characteristics such as, size, mother’s education, and household wealth are expected to be predictors of intervention stove use.
2. Significantly lower time will be spent for cooking and fuel gathering for the intervention arms compared to control arm.
3. It is expected that study interventions (behavior change interven-

anticipated and convenient access to LPG refueling) will improve clean cookstove adoption and sustained use.

4. Household’s demand for LPG will be influenced by price and distance variations.

Progress: Surveys on the first three aims of the study have been completed. Data cleaning, analysis and report writing for objective three is ongoing. Three manuscripts have been published with another two currently under review in peer review journals. Aim 4 is currently in the piloting phase.

Funder(s): National Institute of Health (NIH).
Clean Energy Access for the prevention of Non-communicable disease in Africa through clean Air (CLEAN-Air (Africa))

Investigators
Kwaku Poku Asante1, Theresa Tawiah1, Rebecca K D Prah1, Mujtaba Mohammed Nuhu1, Samuel Asiedu-Afari1, Daniel Pope2, Elisa Puzzolo2

Institutions:
1 Kintampo Health Research Centre; 2 University of Liverpool

Background
In Ghana, biomass fuels are the primary cooking fuels for about 70% of households. Consequently, exposure to Household Air Pollution (HAP) is responsible for 16,600 deaths and the loss of 502,000 disability adjusted life-years.

Ghana was the first country to publicise the Sustainable Energy for All Action Plan, as called for by the United Nation’s Sustainable Energy for All (SEforALL) program in June. Among other things, the plan emphasised the importance of promoting LPG as clean energy for cooking. Ghana’s SEforALL plan also called for LPG cylinder recirculation as a model for the distribution of LPG to accelerate the adoption and safe use of LPG for cooking.

The goal of this study is to examine what influence LPG adoption and evaluate the implementation of the LPG cylinder recirculation model in peri-urban and rural communities in the Techiman area of Ghana.

The study has four components:
1. Research activities
2. Research capacity building
3. Health systems capacity building
4. Public sector and stakeholder engagement in research and dissemination

Objectives
Research activities
1. To conduct surveys of fuel use patterns and health in peri-urban and rural communities in locations relevant to national plans to scale LPG use.
2. To measure household air pollution (small diameter particulate matter (PM2.5)) in kitchens (concentrations), women and children (exposure) in a sub-set of biomass and LPG using households, spanning wet and dry seasons.
3. To conduct semi-structured interviews and focus group discussions of women and men using (i) primary LPG, (ii) mixed LPG and biomass and (iii) exclusive biomass, to identify factors influencing fuel choice and exclusivity of using clean cooking fuel.
4. To conduct visual participatory methods to understand how best to support adoption and use of clean fuel from a community perspective (Photo Elicitation).
5. To model health and climate impacts of LPG adoption and analyze routine data to identify health impacts from household fuel use.
6. To evaluate LPG recirculation and delivery model to facilitate adoption of LPG.
7. To conduct case studies of commercial use of biomass for cooking through semi-structured interviews and focus group discussion.

Research capacity building
1. To train in household air pollution measurement, monitoring and analysis.
2. To train in qualitative (including visual participatory methods) and quantitative data collection for field-based research.

Health systems capacity building
1. To develop basic training materials for community health workers (CHWs) around HAP, health and prevention strategies - ensure transferable to all contexts.
2. To develop a training package for clinicians on air pollution and NCDs (CHD, stroke, lung cancer, COPD, child ALRI) - ensure transferable to all contexts.

Public sector and stakeholder engagement in research and dissemination
1. To engage the public sector and stakeholder in research and dissemination

Methods
Component 1
Study method: This was rapid survey of 2000 compounds (1000 peri-urban and 1000 rural) among representatives of households to provide general overview in the context of the study.

Following the rapid survey, another survey will be done among a sample of 400 randomly selected exclusive biomass and primary LPG users. This will include 200 exclusive biomass users (100 rural and 100 peri-urban households) and 200 primary LPG users (100 in rural and 100 in peri-urban households). All women surveyed will receive blood pressure measurements for cross sectional comparison by fuel group. Intensive 48hr PM2.5 monitoring of non-LPG vs LPG primary users (n=35 per group, for a total of 70 kitchens + 70 women primary cooks and 70 children)
dren). This includes stove use monitoring (SUMs) over a 7-day period.

There will be qualitative semi-structured interviews (approx. n=20) with women and men around household energy, cooking practices and health. This will be supplemented by four focus group discussions with men. The photo voice project will involve two groups of participants (biomass exclusive (n=10) and mixed LPG/biomass LPG (n=10) users), selected from community based on short survey.

This modeling work will be led by the University of Liverpool modeling team but access to the local data will be needed to identify required datasets to inform modeling. For climate, the modelling will be led by CICERO and they might make (limited) requests for access to datasets from Ghana.

Evaluation of the recirculation of LPG bottle will include collection of information on household characteristics, fuel use, cooking activities and health. Alongside surveys, participants will receive loan beneficiaries and blood pressure measurement at each data collection period. Surveys of loan beneficiaries approximately 150 participants preferably.

Component 2
Study method: Mixed methods field-based training will be delivered by University of Liverpool during the first year of research activities. Training in using data collection software (Research Electronic Data Capture (REDCap)) and training on HAP exposure measurements using MicroPEM technology.

Component 3
Study method: Development of basic training materials for CHW and clinicians around HAP, health and prevention strategies.

Component 4
Study methods: Community sensitization and local stakeholder engagement, public engagement events with communities and policymakers based around photographic exhibitions from the photo voice participatory work and lastly engagement with ministries in LPG scaling policy through working group.

Expected outcome
1. Highlighted community solutions to scaling adoption and sustained use of LPG as a clean fuel.
2. Quantified reductions in household air pollution (HAP: PM2.5) concentrations and exposure from switching to LPG as a clean fuel.
3. Quantified summary of the impacts and scalability of microfinance initiatives to support purchase of LPG equipment to scale adoption of LPG.
4. Modelled quantitative estimates of the positive health and climate impact from scaling use of LPG.

Progress: Fieldwork commenced after the team received full ethical approval from Kintampo Health Research Centre Institutional Ethics Committee and the University of Liverpool Ethics Review Board.

Households which were within the inclusion criteria were enrolled for the rapid community survey (n=2,000). Based on responses to the rapid community survey, 350 households were randomly selected from the two fuel using groups for the pre-cylinder recirculation model household in-depth survey.

Upon the successful completion of this survey, the research team proceeded to the Household Air Pollution and Stove Use Monitoring survey.

A random sub-sample of 40 households from each fuel use group (as defined above) with at least one infant under five (5) years were selected and interviews conducted on (PM2.5 and CO).

Finally, in order to evaluate the CRM, the team embarked on enrolling a total of fifty participants from the six LPG refill stations in Obuasi for the post-CRM household in-depth survey.
Impact of COVID-19 on Household energy use in Ghana

Investigators
Kwaku Poku Asante1, Darby Jack2, Daniel Pope3, Elisa Puzzolo3, Rebecca K D Prah1, Theresa Tawiah1, Mujtaba Mohammed Nuhu1

Institutions:
1 Kintampo Health Research Centre;
2 Columbia University
3 University of Liverpool

Project start date: September 2020
Project end date: December 2020

Background
Household Air Pollution (HAP) is a public health concern globally including Ghana. The adoption and sustained use of clean fuels and cookstoves is a viable solution to reducing HAP exposure and associated problems.

Ghana’s energy policy seeks to enhance clean fuel use through promotion of Liquefied Petroleum Gas (LPG) use with the aim of achieving 50% of LPG adoption by 2030. A key strategy is the Cylinder Recirculation Model (CRM) which is the Government of Ghana’s response to safety issues associated with consumers owning their cylinders and fire outbreaks/explosions at LPG refilling stations.

CRM was being piloted in areas including Obuasi Municipality (our study area) when Ghana recorded its first COVID-19 case in March 2020. The outbreak of the COVID-19 pandemic has caused immense havoc to health systems and economies, causing major disruptions across the world including Ghana.

It is unknown how the pandemic and the different government response and control measures have affected the clean energy landscape in Ghana, including the demand and supply of clean energy and government policies on clean energy.

The aim of this study is, therefore, to assess the impact of the COVID-19 pandemic on household access to and sustained use of clean energy for cooking (LPG and electricity) in Ghana and also the implementation of the CRM.

Research aim and objectives
The overarching aim of this research is to assess the impact of the COVID-19 pandemic on household access to and sustained use of clean cooking fuels (LPG and electricity) in Ghana.

Study objectives:
1. To assess the impact of COVID-19 on existing and planned implementation of the CRM policy across the national territories and strategies that can be adopted to enhance it
2. To explore factors that have influenced supply of clean cooking fuels by fuel suppliers during the pandemic and strategies that can be employed to sustain supply
3. To assess how COVID-19 has influenced household access to and sustained use of clean fuels use and cooking practices and how clean fuels use can be sustained during the pandemic
4. To assess how affordable clean fuels are to households and to find out if household expenditure on clean fuels shifted during the pandemic
5. To develop recommendations and guidelines that can be used to guide clean fuel access and use during COVID-19 outbreak to ensure sustainable gains of the national CRM policy

Methods:
This is a comparative cross sectional study which will employ the mixed method approach for data collection. The study is being conducted in the Kintampo Municipality located in the Bono East Region and the Obuasi Municipality in the Ashanti Region. It will involve key players in the clean energy sector such as households, LPG purveyors and relevant policy makers and implementers.

The impact of COVID-19 will be assessed using the EPIS framework. The framework will be used to guide the study from inception through to project completion; including designing the study stages, structuring the research questions, approaches and outcomes (see figure 1). A sample of 800 households (400 from each study area) who are primary LPG users will be randomly selected and interviewed. Stakeholders in the energy sector of Ghana will be purposively selected to be part of stakeholder workshop. LPG sellers will be purposively selected to be part of In-depth interviews. Qualitative data will be analysed with Nvivo and quantitative data will be analysed with STATA.

Ethical Approval: Received ethical approval from KHRC Institutional Ethics Committee

Expected outcome
1. To provide an understanding of how COVID-19 affected the LPG landscape and CRM in Ghana
2. To outline lessons and guidelines that will improve the resilience of the household clean energy sector, ensure sustained use of clean fuels and inform the implementation of clean fuels programs/policies during pandemics
Progress: Enrollment and data collection is on-going. So far, 129 interviews in the Kintampo area have been conducted and 154 interviews completed for the Obuasi area.
Constructing a Clean Cookstove Stack in Ghana

Investigators
Kwaku Poku Asante¹, Darby Jack², Rebecca K D Prah¹, Theresa Tawiah¹ Mujtaba Mohammed Nuhu¹

Institutions:
1 Kintampo Health Research Centre;
2 Columbia University

Project start date:
July 2020

Project end date:
December 2020

Background:
The adoption of Liquefied petroleum gas (LPG or LP gas), is low in Ghana, and those that do adopt are highly likely to stack LPG with biomass fuels. The primary barrier to biomass fuels cessation is cost, poor performance of LPG for cooking specific foods, LPG safety, and logistical barriers to LPG purchase. The potential for combinations of fuels and appliances to address these barriers is unknown.

We hypothesize that households that have access to a range of clean cooking options with different performance characteristics will meet a larger share of their cooking energy needs with clean fuels, holding cost constant. These alternative clean fuels may, in the long run, help overcome the cost barriers that limit LPG adoption.

Although, Ghana is a significant producer of LPG, its price is driven by the world market price. Electricity, ethanol, and processed biomass fuels can be produced throughout Ghana. Significant up-front investment will require, marginal cost of production will be low and lack of global market.

The overall aim is to assess the feasibility and acceptability of ethanol, LPG, processed biomass and induction electric stoves/fuels.

Methods
The Kintampo Municipality in the Bono East region is the study area and it an observational study using quantitative and qualitative methods. Random sample technique is used from Kintampo Health Demographic surveillance Survey data base, where the sample size of 10 households is selected for this survey.

First, we provided each household n = 10 households with four stove/fuel combinations (one after the other). Households had each stove for two weeks. Fuel was to be provided for free (zero cost to the household).

After each two-week trial period, interviews were carried out to determine acceptability, with a focus on identifying the specific energy needs that a given stove met. All stoves were be fitted with stove use monitors. After the single technology assessment period, households will be provided with their most preferred intervention stove for one month. During this period, household air pollution (HAP) will be monitored through the use of personal exposure monitors (MicroPEM). KHRC IEC gave the approval and written informed consent were sought from study participants.

Expected Outcome:
The findings of the study is expected to provide information on the preferred cook stove stacks and how that can be scaled up to nationwide adoption.

Progress
Enrollment and data collection is ongoing. So far 10 households have been enrolled onto the study, and the 10 households have so far received all the three types of cookstoves and all activities have been performed. Field work activities are still ongoing. See figure 1 below types of cookstove

Fig: 1 LPG cookstove
Fig: 2 Ethanol cookstove
Fig: 3 Electric Induction cookstove
Fig: 4 Processed Biomass cookstove (Mimi moto)
Background
Evaluating the tick-borne pathogen prevalence in the human, animal, and tick populations is a necessary first step to delineate how geographic differences; environmental variability, and host factors influence pathogen prevalence and transmission.

Aim
The aim of this study is to conduct animal, vector and human surveillance for tick and mosquito-borne infections. This surveillance targets selected populations in areas of high density co-mingling between humans, animals, and vectors. High risk populations (animal handlers, abattoir workers, livestock ranchers, etc.) within Kintampo North Municipality and South district. Ticks will be collected from grass vegetation and livestock, identified entomologically in the study area. Mosquitoes will also be collected using different trapping methods.

Methods
All livestock ranchers’ /abattoir workers in Kintampo North Municipality and South district who have contact with live animals and/or animal parts are eligible for participation. Demographic and occupational data, recent medical history, and blood samples will be collected from all volunteers.

At each sample collection visit, basic data (species, origin, sex, age) will be collected from approximately four hundred domesticated animals (one hundred animals for Kintampo site). About 50% of live-stock were selected to undergo investigation for ticks by veterinarians or technicians under their supervision and all ticks removed for analysis. Traps are set in houses and at specific areas to trap Aedes mosquitoes.

Expected outcome
To detect medically important ticks and mosquito-borne viruses and bacteria as well as other arbovirus in Kintampo.

Progress
We received renewal approval certificate from Kintampo Health Research Centre Institutional Ethics Committee (KHRC IEC) and Ghana Health Service Ethical Review Committee (GHS ERC).

A total of 8628 ticks have been collected from March 2019 to September 2020 from cattle. This comprises: 5795 (67.24%) Boophilus geigy, 2216 (25.7%) Amblyomma variegatum, 610 (7.1%) Hylomma truncatum and 7 (0.08%) Rhipicephalus spp.

2303 mosquitoes were also collected for the same period using CDC light traps and Biogent trap. Culex quinquefasciatus recorded highest percentage of 1264 (55%), followed by Anopheles gambiae 856(37.2%). Aedes spp. recorded 132 (5.7%), Mansona spp. 34(1.5), Anopheles pharoensis 9 (0.4) and the lowest being An. funestus complex and An. Arabiensis with 4 (0.4%) each. Fifty (50) human blood samples were also collected for the sero-prevalence study.
Investigators

(Ghana): Dr. Kwaku Poku Asante, Prof. Sam Newton, Mrs. Charlotte Tawiah Agyemang, Mrs. Irene Apewe Adjei, Mrs. Ellen Boamah-Kaali, Mr. Seeba Amenga-Etego, Ms. Stephaney Gyaase, Mr. Eliezer Ofori Odei-Lartey, Dr. Dennis Adu-Gyasi and Mr. Dennis Konadu Gyasi.

Harvard University: Dr. Emily Smith
Beth Israel Deaconess Medical Centre: Dr. Blair Wylie

Funder: Bill and Melinda Gates Foundation

Project start date: November 2020
Project end date: May 2022

Background

Quality antenatal and postnatal care services are important and gaining recognition with increasing antenatal care coverage in low- and middle-income countries.

However, the ANC coverage rate is much lower among more vulnerable populations (e.g. lower quintile, rural regions), and the quality of care that women receive is inconsistent, often poor, and frequently fails to detect risks in a timely fashion or to prepare women for the birth process. While most women access skilled antenatal care at least once during pregnancy, there is poor continuity of care and only about 60% of women receive the recommended four ANC visits.

From a surveillance perspective, there is a lack of robust population-level burden data to inform global and local estimation of key risk factors, vulnerabilities and morbidity and mortality outcomes among pregnant women and mother-infant pairs during the duration of antenatal and postnatal care.

Robust data on pregnancy risks, including medical history, clinical symptoms and diagnostics, social determinants, as well as antenatal and intrapartum care are critical to developing strategies to effectively manage pregnancy risk and improve outcomes, within resource-constrained environments.

Goal

The goal of this study is to develop a harmonized data set to improve our understanding of pregnancy risk factors, vulnerabilities, and morbidity and mortality and to estimate the burden of these risk factors and outcomes in Low and Middle Income Countries. Ultimately, these data will inform development of innovative strategies to optimize pregnancy outcomes for mothers and their newborns.

Methods

This is a multi-country population based study involving six countries including Ghana. For Ghana, this study forms part of the Adverse Outcomes in Pregnancy Trial (AdOPT) research study which would be conducted in two phases.

Phase 1 of the study (current study) is an observational study to provide data to inform the AdOPT phase 2 intervention study. A total of 16,000 pregnant women would be enrolled into the study.

For Ghana, 3,500 pregnant women would be enrolled by field workers and followed up. Monthly visits would be made to women of reproductive age and pregnant women would be enrolled into the study. They would be subsequently scheduled to have an ultrasound scan to determine the viability of the fetus and gestational age. Monthly follow up visit would be made to the mothers at antenatal care clinics and at home.

At delivery pregnancy outcome and delivery information would be collected. Biological samples including vaginal swabs and blood samples will be collected from participants at each trimester and cord blood and placental tissues at delivery. Participants would be followed up from pregnancy and for those who have a live birth till their babies are a year old to collect information on vital status, morbidity and nutrition.

Progress

Approval has been obtained from the Scientific Review Committee of Kintampo Health Research Centre (KHRC). Applications have been made for ethical approvals from the KHRC Institutional Ethics Committee and the Ghana Health Service Ethics Review Committee.
Study on the Burden of Diseases Potentially Preventable by Maternal Immunization in Sub-Saharan Africa.

Investigators
(Ghana): Dr. Kwaku Poku Asante, David Dosoo, Irene Apewe Adjei
Zimbabwe: Zivai Mupambireyi, Patience Musasa and Maye Masomera
(LSTM): Prof. Matthews Mathai, Dr. Alexander Manu and Elizabeth Mathai

Funder: European Commission.
Collaborator: Liverpool School of Tropical Medicine

Project start date: October 2018
Project end date: December 2020

Background
Infections contribute to over 10% of maternal deaths and approximately a quarter of newborn deaths worldwide. These infections are commoner in low and middle-income countries (LMICs) particularly in sub-Saharan Africa.

Pregnancy could result in increased susceptibility of women to infections which they can pass on to babies in utero or around the time of birth resulting in adverse outcomes for infants. These are further compounded by co-infection with malaria, human immunodeficiency virus (HIV) or tuberculosis (TB).

However, pregnancy also provides an opportunity to use vaccines (maternal immunisation) to protect newborns in the riskiest time of life - the first month of life – when over 44% of all deaths in children under five years occur. The near elimination of neonatal tetanus in many countries is partly attributed to improved coverage of the tetanus toxoid immunisation in pregnancy.

This study aims to quantify the burden of vaccine-preventable diseases due to group B streptococcus (GBS), respiratory syncytial virus (RSV) influenza, and pertussis (GRIP) in pregnant women and their infants in Ghana and Zimbabwe and bridge the knowledge gaps that impede the advancement of maternal immunisation in sub-Saharan Africa. It will explore the impact of co-morbidities with HIV, TB and Malaria.

Objectives
1. To provide evidence on the burden of GRIP infection among pregnant women and infants and to identify the gaps in current knowledge in sub-Saharan Africa.
2. To quantify the burden of group B streptococcus, respiratory syncytial virus disease, influenza, and pertussis among pregnant women and their infants in Ghana and Zimbabwe.

Methods
This was a multi-country (Ghana and Zimbabwe) study carried out by the Kintampo Health Research Centre in Ghana and the Centre for Sexual Health and HIV/AIDS Research Zimbabwe (CoSHHAR, Zimbabwe). The study was a population-based prospective cohort study that recruited and followed-up mothers from pregnancy until childbirth; and their infants for up to the first year of life. The target population was pregnant women residing in the catchment areas within the two countries and all infants born to them during the period of the study.

Pregnant women with gestational ages of 13 weeks or more but less than 28 weeks residing in the study area were eligible for the study. A total of 12,000 pregnant women were to be recruited from both sites.

Progress
Following ethical approvals, field and laboratory staff were trained on the project activities. Potential participants were consented and recruited into the study and followed till the end of their pregnancy.

For participants who had live births their infants were also followed for the first year of life. The Kintampo site started recruitment on 30th October, 2018 to 27th March, 2019. A total of 613 participants were recruited. Field activities for the study has been completed. A total of 564 babies were born into the study and the last follow up of infants was in October, 2020. Preparation is being made for the analysis of samples to assess the burden of GRIP infection among the cohort.
**Investigators**
Dr. Seyram Kaali, Dr. Jacqueline Gyapomaa Asibey, Dr. Samuel Harrison, Dr. Prince Agyapong, Elvis Wilson Owusu Boahen, Japhet Anim, Elisha Adeniji, Dennis Adu-Gyasi, Kingsley Kayan, Dr. Kwaku Poku Asante

**Funder:**
Imara Inc.

**Collaborator:**
Holy Family Hospital, Techiman

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### Background and objectives
The sponsor is developing IMR-687 for the treatment of patients with sickle cell disease (SCD) β-thalassemia. The population for this study includes subjects with the following forms of SCD: homozygous sickle hemoglobin (HbSS), sickle-β0 (HbSB0) thalassemia, and sickle-β+ (HbSB+) thalassemia.

SCD is caused by a specific point mutation (E6V) in the gene encoding hemoglobin (Hb) subunit beta that leads to the production of abnormal Hb (“sickle hemoglobin” or HbS).

The prevalence of SCT and SCD in Ghana is estimated to be 20% and 2% respectively. There is currently no cure for SCD. Treatment options are few with hydroxyurea the only therapeutic approved by the Ghana Food and Drugs Authority for the prevention of vaso-occlusive crisis among other complications.

### Brief methodology
This is a phase IIb, randomized, double-blind, placebo-controlled, multicenter study of subjects aged 18 to 65 years with sickle cell disease (SCD; homozygous sickle hemoglobin [HbSS], sickle-β0 [HbSB0] thalassemia, or sickle-β+ [HbSB+] thalassemia) to evaluate the safety and efficacy of the phosphodiesterase type 9 (PDE9) inhibitor, IMR-687, administered once daily (qd) for 52 weeks.

After providing documented informed consent, subjects will enter an up to 28-day screening period to assess eligibility. Following randomization, participants will enter the treatment phase lasting 52 weeks and lastly, the follow-up phase, lasting four weeks. The primary objectives are to evaluate the Haemoglobin F response to IMR-687 versus placebo and to evaluate the safety of IMR-687 versus placebo.

### Expected outcome/Key findings
The primary efficacy endpoint is defined by an increase of ≥3% in HbF from baseline to Week 24. Safety endpoints include Adverse Events, Serious Adverse Events, clinically significant changes in laboratory tests, clinically significant changes in vital signs, and clinically significant changes in Electrocardiogram.

### Progress so far
The study is in the ethical and regulatory approval phase. The protocol received full approval by the KHRC Scientific Review Committee and has been conditionally approved by the KHRC institutional Ethics Committee, the Ghana Health Service Ethics Review Committee and the Ghana Food and Drugs Authority.
Investigators:
Professor Michael David Wilson, Dr Kwaku Poku Asante, Dr Mike Yaw Osei-Atweneboana, Dr Irene Larbi

Funder:
National Institutes of Allergy and Infectious Diseases (NIAID), National Institutes of Health (NIH), 9000 Rockville Pike, Bethesda, Maryland 20892, USA.

Project start date: June, 2018
Sample size: 560
Project end date: June, 2022

Background
Hookworm infection is among the leading cause of anaemia and malnutrition in resource-limited countries. Current global strategies to control hookworm and other soil transmitted helminths (parasitic worms) rely on regular mass drug administration of single dose albendazole (400mg). Recent evidence confirms that deworming drugs are losing effectiveness against hookworm in endemic areas, and our previous studies in Kintampo North Municipality, Ghana confirm this. The emergence of genetically mediated resistance would have potentially devastating public health implications.

Sub-Studies
The NIINE project has two studies under it, namely:
1. Hookworm Exposure and Treatment (HEAT).

Kintampo Health Research Centre (KHRC) collaborated with the Noguchi Team on the HEAT component within the Kintampo North Municipality while the CSIR and the Noguchi team carried out the AR-Mapping study all around the country.

HEAT study:
The Hookworm Exposure and Treatment (HEAT) is to demonstrate the effect that host factors have on albendazole absorption, response to treatment, and use GPS tracking monitoring, together with socio-economic data to identify critical exposure pathways for hookworm reinfection.

It is designed to investigate hookworm infections and outcome of treatment with the drug albendazole. Previous studies have shown that in some cases this drug which is recommended for hookworm treatment does not work properly in some people and we want to know why.

The study also aims to try and better understand what determines the exposures and influences on reinfection of hookworm, so that we can develop a better hookworm control approach.

Objective for the HEAT study
1. To identify host modifiable factors associated with improved response to single dose albendazole.
2. To investigate the individual and community level factors associated with hookworm reinfection.

The project will conduct a three-year longitudinal community study of hookworm transmission and reinfection.

Methods
The study is being carried out in nine (9) communities were selected along the Kintampo – Buipe Highway which the centre knows from past studies that hookworm infection is predominant.

Participants were consented at baseline (Visit 0) and are to be followed up every nine months till they exit the study on the 36 month. Stool and blood samples were taken and transported to the laboratory for analysis.

Kato Katz method was used for the detection of ova/egg of helminthes especially hookworm ova. Blood samples were for malaria microscopy, haematology, serum and plasma for albendazole and immunological analysis.

Expected outcomes / results
The measurement of albendazole absorption will allow an objective as-
assessment of both the role of recent dietary patterns on albendazole absorption and the importance of albendazole absorption for clearing hookworm infections.

The GIS spatial analysis and the GPS movement monitoring will allow the innovative assessment of the intersection of environmental and behavioural influences on re-infection. The inclusion of all household members will allow more comprehensive analysis of household level influences on exposure and risk of reinfection.

**Progress of work**
The study consented and enrolled 560 participants at baseline (Visit 0) which started on the 30th of June, 2018. All 560 participants provide stool samples. However, the team had 530 blood samples from the participants. For GPS movement monitoring, 15 hookworm positive and 15 hookworm negatives participants were tag to monitor their movement and specific location were identified for soil samples collection.

Visit 1 (9th month) began on the ?? April, 2019. Out of the initial baseline enrolment of 560 participants, 536 of them were met for this follow up visit. All 536 had stool sample with 500 of them providing blood sample in addition to the stool samples.

The 18th month visit was skipped due the restrictions implemented by government to mitigate the spread of the COVID-19 disease.

Visit 2 (27th Month) took off on the 27th July, 2020. A total of 495 participants were met for this follow up visit. All 495 provide stool sample with 481 blood sample collected. Thirty (30) hookworm positive and hookworm negative participants were tag on the GPS movement monitor to track their movement.

Stool analysis for ova of helminths, malaria microscopy and haematology were done for all the visits. Serum and plasma sample were shipped to Noguchi Institute for further immunological analysis.

The team is currently working on logistics to analyse the serum samples for albendazole absorption in hookworm positive participants who were treated.
Study Team:
Dr. Kwaku Poku Asante, Prof. Jacob Plange-Rhule (RIP), Prof. Gbenga Ogedegbe, Prof. Juliet Iwelunmor, Joyce Gyamfi, William Chaplin, Kezia Mantey, Kingsley Apusiga, Solomon Nyame, Kwame Adjei, Oscar Agyei

Study duration: 60 months
Project start date: 28th September 2017
Project end date: 31st May 2022

Background
In Ghana, hypertension (HTN) is a major public health problem, and the second leading cause of morbidity in adults 45 years and older[1]. An epidemiological study conducted in the middle-belt of Ghana reported a prevalence of hypertension to be 28.1% (95% CI: 26.3%–29.8%).

Worryingly, less than half, that is 45.9% (95% CI: 42.2%–49.6%), of the respondents were aware of their hypertensive status[2]. Thus, it became imperative that we intervene particularly at the community level (CHPS zones) where majority of the community members receive their care.

Task shifting of primary care duties from physicians to non-physician health workers, such as community health workers and nurses is a viable and cost-effective strategy for Hypertension Management.

Uptake TASSH study
In 2017, National Institute of Health through the National Heart Lung Blood Institute approved a study in Ghana to build the capacity of community health workers to identify hypertensives, counsel and refer cases to the next level of care.

The goal of this current study is to evaluate, in a hybrid clinical effectiveness-implementation design, the effect of practice facilitation (PF) on the uptake of an evidence-based Task-Strengthening Strategy for Hypertension Control (TASSH), among 700 adults with uncontrolled hypertension identified within communities under 70 Community-Based Health Planning Services (CHPS) zones.

Attempts to improve access to health services for individuals identified at the community level: Uptake TASSH Programme interventions
The practice facilitation intervention has three components:
1. Formation of a steering committee to help identify barriers and enablers to implementing Uptake TASSH at the CHPS zones (national, regional and district committees); and to help with the implementation of the program at the CHPS zones (local regional committee).
   a. The membership of the national level the steering committee are: Bono Regional Director of Health Services, Bono East Regional Director of Health Services, Director Policy Planning Monitoring and Evaluation of Ghana Health Service, Deputy Director Policy Planning Monitoring and Evaluation of Ghana Health Service, Director, Research and Development Unit Ghana Health Service, Director Clinical Care Ghana Health Service, Senior Manager at National Health Insurance Authority, Nationals CHPS Coordinator, Ghana Health Service, Representative, Community Health Nurses and the NCD Programme Manager, Ghana Health Service
2. Development of the Task Strengthening Facilitation (TSF) strategy. The TSF strategy includes training of task strengthening facilitators (TSFs) on coaching strategies (Engaging, Enhancing, and Evaluation) to help CHOs perform their tasks; training the CHOs on Identifying, Counseling and Referring (ICR) of adults with HTN to the health centres using the 5 As counselling strategy (ask, assess, advise, assist and arrange); and creation of a community learning environment that will support learning opportunities for the CHOs and TSFs.
3. Engagement of the community to create a community urgency and persistency of the importance of HTN screening and referral for adults.

Currently, participant recruitment is ongoing in 36 randomized CHPS zones (the remaining CHPS zones will be added in two other waves). Figure 1 highlights the screening done by the community health officers.

Since the start of participant recruitment, the community health workers were able to screen a total of 1,527 individuals across 36 CHPS zones and identified and referred 377 hypertension patients to the next level of care.
Best Practices for Uptake TASSH study
- Creation of community awareness
- Training and refresher trainings of CHOs and PAs
- Monitoring and supervision
- Provision of logistics
- Key stakeholder engagements
- Dissemination of study findings within the GHS/MOH channels as well as other international avenues for dissemination.

Changes in study leadership structure:

Following the death of Prof. Plange-Rhule, the study team initiated a change in host institution from KNUST to KHRC. The current collaborator at KNUST is Dr. Kweku Bedu-Addo. The other institutions (NYU, SLU, NIH and NHLBI) are still on board.
Introduction
Antimicrobial resistance (AMR) is still a threat to global health with disproportionately high burden in low and middle income countries (LMIC) largely due to inappropriate antibiotic access and use. As a Ghana Health Service institution and a member of the Ghana AMR platform, the KHRC continues to conduct studies to understand the context of antibiotic access and use particularly at the community level. Below are updates on study activities for 2020.

Background
As reported previously, the wide variability in the appearance of antibiotics due to colour, shape and size could lead to their misidentification among dispensers and consumers leading to inappropriate use.

ABACUS II proposes to build a case for an international system that harmonizes the appearance and thus improves recognition of oral solid antibiotics for consumers and sellers, taking into account the appearance of other drugs. The study aims to explore the feasibility, benefits, disadvantages and potential design of an international, standardised appearance system for oral antibiotics. Appropriate identification of antibiotics could reduce inappropriate use among consumers and dispensers prescription. The study funded by Wellcome Trust, UK is currently ongoing in two LIC (Mozambique and Bangladesh), two LMICs (Ghana and Vietnam) two Upper Middle Income Countries (South Africa and Thailand) and the UK.

Methods
Using a mixed methods approach the study is concurrently being implemented under four sub-studies:

a. Assess the potential impact of and obstacles to standardizing the physical appearance of commonly used oral antibiotics to be followed by co-creation of prototypes.

b. Qualitatively assess the implications of better antibiotic identification using the prototypes.

c. Perform a health economics analysis related to inappropriate identification of oral antibiotics.

d. Assess the proportion of substandard and falsified oral antibiotics among three commonly sold antibiotics.
Progress
The study which was originally scheduled to start in early 2020 delayed until August, 2020 due to the COVID-19 pandemic. The project started with meetings among study sites and collaborators to discuss how to implement the various sub-studies especially the first which largely involves stakeholder discussions and engagements. The modalities for the stakeholder engagement have been designed and virtual meetings started from the last week in October, 2020 until early 2021. Discussions are yet to start on the qualitative component which is the second sub-study.

With regard to the third sub-study, KHRC in collaboration with Radboudumc is currently designing a proposal and workplan for a pilot data collection and analysis in Ghana. This study could be replicated in the other study sites following the successful completion of the pilot. Discussions have also started on the fourth sub-study to develop the protocol for data collection and analysis in a prequalified WHO laboratory. Scientist from the study sites will be involved in the analysis for sub-standard antibiotics as part of capacity building.

Background
SABAUSE is a PhD study between the Radboud University Medical Centre in the Netherlands and the Kintampo Health Research Centre, Ghana. This study seeks to examine contextual determinants of antibiotic access and use in rural Ghana.

Methods
The study involves the use of quantitative and qualitative methods to identify the main social and cultural drivers of antibiotic access and use at the community level.

Progress
The first three papers of the study have been published and three are expected to be submitted by the end of December 2020.

Characterizing antibiotic use in a Municipal Veterinary clinic in part of rural Ghana.

Background
This is a WHO training programme which aims to document the antibiotic consumption in animal husbandry within a veterinary clinic in the Kintampo North Municipality of Ghana. As a vehicle for capacity building the study is being conducted through four modules that are meant to equip researchers from participating institutions in Africa.

Methods
The study is using existing data (from 01 Jan 2013 to 31 Dec 2018) to characterize the use of antibiotics in a veterinary clinic in the Kintampo North Municipality.

Progress
The study started in September, 2019 with the first two modules followed by data collection which ended in December, 2019. The last two modules have been delayed due to the COVID-19 pandemic as participants were unable to travel to meet in Uganda to participate in the course. Module 3 which focuses on writing the manuscript is scheduled to take place through a virtual platform in February, 2021.
Background

The Kintampo Health and Demographic Surveillance System (KHDSS) has three sites which cover the resident population of six administrative districts within the Bono East Region of Ghana.

These are the Kintampo site (Kintampo North Municipal and Kintampo South District), Techiman site (Techiman South Municipal and Techiman North District) and the Nkoranza site (Nkoranza South Municipal and Nkoranza North District).

The Kintampo site covers a total of 161 communities with 27,812 compounds and 39,134 households. The Techiman and Nkoranza sites were started in 2014, in Techiman and Nkoranza North districts and updated in 2018 to include Techiman and Nkoranza South municipalities.

The Nkoranza site operates in 97 communities with 16,677 compounds and 20,927 households while Techiman site operates in 84 communities with 25,004 compounds and 37,979 households. In all, the KHDSS covers over 98% of the population in the three sites.

KHDSS records health and demographic information of its target population through routine data collection and updates. The KHDSS also serves as a platform for research that informs policy. The resident population across the three sites in 2019 was 430,722.

The KHDSS as of October 2020 operated with two Research Fellows, two Research Officers, one Data Manager, one National Service person, seven field supervisors and 46 fieldworkers consisting of 36 field workers responsible for the update and 10 field workers responsible for the conduct of Verbal Post Mortem (VPM) interviews, across all sites.

Field operations

Since its migration from FoxPro to OpenHDS in 2018, data collection is done electronically using the OpenHDS android platform together with the ODK Collect software.

The main focus is currently on the core demographic events (pregnancy, births, migration in and out and deaths).

The KHDSS is at the moment operating a six-monthly update cycle. The present round is being carried out between June and December 2020 for update of round 30 at the Kintampo site and round 03 at the Techiman and Nkoranza sites.

VPM data collection is also being done electronically by trained field workers using the WHO 2016 InterVA tool.

**Demographic Characteristics of Kintampo HDSS by site**

<table>
<thead>
<tr>
<th>Characteristics of the resident population (2019)</th>
<th>Kintampo</th>
<th>Techiman</th>
<th>Nkoranza</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>163,186</td>
<td>173,732</td>
<td>93,804</td>
<td>430,722</td>
</tr>
<tr>
<td>Male Population (n, %)</td>
<td>80,273 (49.2)</td>
<td>81,271 (46.8)</td>
<td>44,189 (47.1)</td>
<td>205,733</td>
</tr>
<tr>
<td>Female Population (n, %)</td>
<td>82,913 (50.8)</td>
<td>92,461 (53.2)</td>
<td>49,615 (52.9)</td>
<td>224,989</td>
</tr>
<tr>
<td>Rural Population (n, %)</td>
<td>102,339 (62.7)</td>
<td>69,151 (39.8)</td>
<td>69,345 (73.9)</td>
<td>240,835</td>
</tr>
<tr>
<td>Urban Population (n, %)</td>
<td>60,847 (37.3)</td>
<td>104,581 (60.2)</td>
<td>24,459 (26.1)</td>
<td>189,887</td>
</tr>
</tbody>
</table>

**Other Demographic Indicators (2018)**

| Recorded Pregnancies | 3,246 | 3,090 | 2,229 | 8,565 |
| Recorded Births | 2,953 | 1,580 | 587 | 5,120 |
| Recorded Deaths | 766 | 399 | 68 | 1,233 |
| Verbal Post Mortem Conducted (VPM) | 716 | 229 | 43 | 988 |
| In-Migration | 11,168 | 7,636 | 7,015 | 25,819 |
| Out-Migration | 10,568 | 3,708 | 1,106 | 15,382 |

**Reported figures are expected to improve after the current update**
Introduction
The Computer Centre is doing a lot of research into innovative applications to achieve efficient data collection and processing. The paperless systems are all running perfectly and the unit is neck deep in exploring emerging applications. The unit is hopeful to roll out the Microsoft Team Productivity Application before the end of 2020 which was a target for last year.

Data Collection and Processing
The implementation of paperless systems have been very successful and this enhanced data collection greatly. The unit is looking into making a choice among the numerous tablet tracking software to secure tablets in the field.

Currently only the clinical trials use paper questionnaires to collect data from the field. All other projects run on the paperless systems. All staff on the clinical trials have been spaced out in line with the COVID-19 guidelines. Two new offices have been allocated to the Computer Centre for this purpose while an additional office was also allocated to the Date Entry Clerks and a Data Supervisor in Techiman.

ICT Infrastructure
The NAS backup system has been setup and is functioning smoothly. This system is setup off site to enhance data security.

We have also successfully acquired Cloud Service to enhance our operations off site. The KHRC e-Memo that we developed would be moved onto the Cloud so that it can be accessed anywhere in the world. The Cloud Service will also host an application for ethics submission and approval process. The Cloud Service will also host an application for ethics submission and approval processes to both KHRC and Ghana Health Service Institutional Review Committees.

Our Firewall is doing very well in terms of security. We were hit more than 20 times within 24 hours but the hackers could not get through owing to our functioning Firewall. We traced the IP Addresses to East Asia.

Staff
Staff development is still high on the agenda in the Computer Centre. One of our senior data managers has just completed his MSC while one data manager has just started an MSC in Data Science in Bremen, Germany. Our IT Manager would start a PhD programme of studies before the end of 2020.

Conclusion
The Computer Centre would continue to explore for more cost-effective applications to maintain and improve data processing systems and security.

Contact:
Amenga-Etego Seeba
Email: seeba.ae@kintampo-hrc.org
Eliezer Ofori Odei-Lartey
Email: eliezer.lartey@kintampo-hrc.org
Our mission is to help design, analyse and draw conclusions of research through computational strategies and applications.

The unit is endowed with a lot of expertise in the use of modern statistical tools such as STATA, R, SAS and WinBugs.

During the year under review, the unit delivered on important research areas including survey design and analysis, longitudinal data analysis, clinical trial data analysis and cross-sectional design and analysis.

During the recent COVID-19 pandemic, the unit helped with the design and analysis of a survey which assessed community’s knowledge, perception and attitudes towards the virus infection.

The community’s fear, anxiety and stigmatization of the virus were also assessed. The preparedness of workers of the Community Health Planning and Services (CHPS) towards the pandemic was also assessed.

The unit also collaborated with the Ghana Health Service, Kwame Nkrumah University of Science and Technology, Columbia University and London School of Hygiene and Tropical Medicine in several statistical analyses.

Also, analysis of data from completed projects during the year under review were also performed. The unit also assisted with research planning including design of sampling schemes, sample size and power calculations.

Furthermore, the unit continuously offered statistical advice to staff of KHRC and other collaborators.
The KHRC Clinical Laboratory, named after a former director, Prof. Seth Owusu-Agyei during the grand durbar of the 25th Anniversary of KHRC, consists of the following units: Bacteriology, Clinical Chemistry, Entomology, Haematology, Immunology, Micronutrients, Molecular Biology, and Parasitology.

The Virology unit was developed in the course of the year as a testing center to support the fight against the COVID-19 pandemic in the three former Brong Ahafo Regions. These units are well resourced with staff and equipment to run the activities of the units. The laboratory’s capacities in the various areas, as well as quality assurance systems are described below:

**Bacteriology**

The unit is equipped with a class II biosafety cabinet which is the main workstation, a carbon dioxide (CO2) incubator, two BACTEC machines for blood cultures and an autoclave. Samples processed include blood, Cerebrospinal Fluid (CSF), urine, nasopharyngeal swab, ear swab and stool. Culturing, identification and antimicrobial susceptibility testing are performed according to Clinical Laboratory Standard Institute (CLSI) guidelines.

To ensure that results generated from this unit are of high quality and reliable, the unit was previously enrolled in External Quality Assessments provided by World Health Organization/National Institute for Communicable Diseases (WHO/NICD) and currently with United Kingdom National External Quality Assessment Scheme (UK NEQAS).

Excellent results have been obtained from these schemes in both the identification of microorganisms and antimicrobial susceptibility testing. In addition to the participation in EQAs, daily, weekly and monthly internal quality controls on both equipment and reagents are performed to ensure they are all working effectively.

The unit provides support to the children’s ward of the Kintampo Municipal Hospital by processing patient samples. The unit was instrumental in providing Quality Management System training in bacteriology to medical laboratory personnel from the sentinel sites of the Malaria Vaccine Pilot Implementation and Evaluation study. To support with continuous QMS at the various sites, the unit is serving to provide external quality assurance services on the malaria vaccine project in Ghana.

**Clinical Chemistry**

A Horiba Medical Pentra C200 automated clinical chemistry analyzer is available in the unit for carrying out analyses such as liver function tests, kidney function tests, lipid profile, glucose and uric acid.

The equipment has the capacity to be programmed and used for quantitative estimation of other substances including G6PD activity, Urine protein and creatinine, etc. The analyzer replaces the VitaLab Flexor E clinical chemistry analyzers previously used.

In addition to internal quality control systems, the unit is enrolled onto the External Quality Assessment (EQA) schemes organized by the Royal College of Pathologists, Australasia (RCPA) and the International External Quality Assessment Scheme (IEQAS) from the United Kingdom.

**Entomology**

The unit has one Entomologist and two Research Officers. The unit has been pivotal in studies that collect insects (mosquitoes at various stages and ticks) for speciation and classification as well as further molecular analysis.

**Clinical Chemistry**

A Horiba Medical Pentra C200 automated clinical chemistry analyzer is available in the unit for carrying out analyses such as liver function tests, kidney function tests, lipid profile, glucose and uric acid.

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plate washer
• CDC light traps and accessories
• WHO vertical test tubes for susceptibility bioassays
• Insecticide susceptibility papers
• Mosquitoes rearing cages
• Stereo Dissecting Microscope

The unit has planned to build an insectary to be able to indulge in projects to test the efficacy of insecticides and other interventions.

Haematology
This is a very active unit since most studies require a full blood count to assess health status in recruiting participants for clinical trials and other studies. It is also for the management of study participants as well as determination of absolute parasite counts for the various malaria studies.

The unit is equipped with an ABX Pentra 60 C+ (5-part differential) Haematology analyzer, ABX Micros 60 (3-part differential) analyzer, electrophoresis equipment for haemoglobin genotyping, and two photometers for quantitative determination of Glucose-6-phosphate dehydrogenase (G6PD). The unit participates in external quality assessment scheme organised by the United Kingdom National External Quality Assessment Scheme (UK NEQAS) with great performance over the years.

Immunology
The unit has separate sections for cellular and humoral assays, with equipment such as a class II biosafety cabinet, refrigerated centrifuge, microplate washer and pipetting accessories. The unit is also equipped with a laminar flow cabinet, a carbon dioxide incubator, -80oC and -150oC freezers and liquid nitrogen tanks. Currently, isolation and cryopreservation of peripheral blood mononuclear cells (PBMCs) is done at the unit.

Molecular Biology
The unit has a newly installed Applied biosystems 7500 Fast Real Time PCR in addition to C1000 Thermal Cycler with 96-Well Fast Reaction.

The qPCR equipment was purchased and installed with the support of a philanthropist who happens to be a former Kintampo Municipal Chief Executive Officer. The support was towards the setting up of KHRC as a testing center for COVID-19 in the former Brong Ahafo Region.

The molecular biology unit with the presence of the qPCR is establishing protocols for bacterial and parasitological molecular analysis to minimize the shipment of samples to external laboratories after sample collection on most projects within KHRC.

The following are among tests the unit is capable of carrying out:
• Plasmodium species identification
• Merozoite Surface Protein – 2 (MSP-2) genotyping
• Glucose-6-phosphate dehydrogenase (G6PD) genotyping
• Haemoglobin genotyping
• Knock-down-resistance (kdr)
• Anti-malarial drug resistance

Micronutrient
A High Performance Liquid Chromatography (HPLC) machine with auto-sampling, UV Scanning Spectrophotometer and a Zinc Protoporphyrin (ZPP) analyzer are the major equipment at the Unit. Following the support of Novartis to develop capacity in the development and validation of an HPLC method for the determination of efavirenz concentrations in plasma, the unit is now adequately prepared to perform bioequivalence studies for both local and international pharmaceutical companies prior to registration of the drugs locally.

The unit also has the capacity to determine vitamin concentrations in blood (especially serum retinol), ELISA assays (e.g. for ferritin, transferrin, etc.) and C-Reactive Protein (CRP).

Parasitology
This unit is one of the most active ones in the Clinical Laboratory as most studies require malaria microscopy results. For quality purposes, each malaria blood smear is examined by two independent certified microscopists. Discordant slides are examined by a third microscopist. For external quality assessment, the unit participates in the following malaria External Quality Assessment Schemes: Clinical Laboratory Services/National Institute for Communicable Diseases (CLS/NICD), South Africa, and UK NEQAS.

There are currently at least 10 malaria microscopists certified at “Expert” level by CLS/NICD. The unit also has capacity for detection and quantification of parasites in stool specimen using the wet mount, formol-ether concentration and the Kato-Katz techniques.

Quality Assurance Systems
The Clinical Laboratory complies with Good Clinical Laboratory (GCLP) and ISO 15189:2012 standards. The laboratory, which enrolled with the World Health Organization Regional Office (WHO-AFRO) Strengthening Laboratory Quality Improvement Process towards Accreditation (SLIPTA) was rated 4 Stars (out of the maximum 5 Stars).

The laboratory is providing technical support to the laboratories of the Kintampo Municipal Hospital, Kintampo South District Hospital (Jema), St. Theressah Hospital, Nkoranza and the Holy Family Hospital (Techiman) in the development and maintenance of laboratory QA systems.

The laboratory undergoes periodic assessments by sponsors (such as GSK, Sanaria, Novartic) and regulatory inspections (Foods and Drugs Authority, Ghana). We acknowledge the support of Clinical Lab Services (CLS), South Africa for the quality management system.
Validation work of G6PD RDT in KHRC clinical laboratory

**Background and Method**

KHRC is continuing validation work on Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency Rapid Diagnostic Test (RDT). Dr. Dennis Adu-Gyasi with the team in the Chemical Pathology unit of the institution’s Clinical Laboratory is undertaking a repeatability and reproducibility study with Medical Laboratory Personnel from Kintampo Health Research Centre, Methodist Hospital, Wenchi and Holy Family Hospital, Techiman. As part of the validation, apart from room temperature, the testing panel with blood controls will also be performed at 18C and 32C. Work has started and progressed well but got stalled due to the COVID-19 pandemic. Hopefully, the project will resume in the coming year.

**Investigators:**

Dennis Adu-Gyasi, David Dosoo, Kwaku Poku Asante, Seth Owusu-Agyei

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**Figure 1:** Testing carried out in KHRC Clinical Laboratory

**Figure 2:** Training and testing to personnel in Holy Family Hospital Clinical Laboratory

**Figure 3:** Training and testing to personnel in Methodist Hospital, Wenchi Clinical Laboratory
Introduction

As an independent representative body, the Kintampo Health Research Centre Institutional Ethics Committee (KHRCIEC) is mandated to review, evaluate and decide on the ethical merits of research protocols to ensure that the rights, safety and wellbeing of study participants and communities under its jurisdiction are protected.

The committee has the mandate to give full approval, conditional approval, and request for re-submission or to reject a research proposal. In the year under review (2020), six full board review meetings were organised, with 19 protocols reviewed.

Current membership

In conformity with international ethical regulations and guidelines, the committee should at least be made up of a clinical scientist, a non-scientist and a community representative.

Members of the committee include: Dr. Damien Punguyire (Chairperson), Mrs. Charlotte Tawiah Agyemang (first vice-Chair), Nana Franklin Fei (second vice-Chair), Mr. Fred Kanyoke (Administrator) and Ms. Ophelia Opoku (Assistant Administrator).

The Director of the Centre, Dr. Kwaku Poku Asante, serves on the committee as an ex-officio and non-voting member. The membership of the committee has not changed since there were no new entries or exits in 2020. Meanwhile, a national service person was brought in to support the work at the ethics office.

The current membership is made up of staff from KHRC (two social scientists, a reproductive health expert, entomologist and a clinician), a Community Representative, a nurse from the Kintampo Municipal Hospital/College of Health & Wellbeing, a clinician and Health Service Director, a Biomedical Scientist from College of Health & Wellbeing and a Civic Educationist.

The Director of KHRC and the two Administrators of the Committee are members but do not have voting rights when it comes to decision making on the committee. The committee has a current membership of 13 - nine voting and four non-voting members.

Protocols received and reviewed

The committee received and reviewed nineteen (19) new study proposals in 2020. Out of these, three (3) had full approval from the initial review, sixteen (16) received conditional approvals, of which fifteen (15) were subsequently granted full ethical approval after the investigators addressed the concerns of the committee.

One of the approved (HESTIA 5) studies was later terminated by the study sponsor. Out of the nineteen (19) new protocols that were reviewed, eleven (11) were KHRC affiliated protocols, four (4) were student research projects while the other four (4) were protocols from external researchers.

Continuing review activities were also undertaken. A total of nine (9) study amendments were reviewed and approved for implementation. Fourteen progress reports and two final reports were received during the year under review.

Challenges

In the initial period of the COVID-19 outbreak in Ghana, some of the committee’s scheduled meetings were cancelled due to the restrictions imposed by the government. The committee, therefore, resorted to using the expedited review process to review study documents that met the criteria. The committee also adopted the use of electronic review via zoom services for some of its meetings.

Plans for the upcoming year (2021)

The plans of the Committee include but not limited to the following:

1. Facilitate research ethics training for committee members.
2. Acquire and install an ethics online portal for the submission and review of study documents.
3. Conduct field monitoring visits of approved and ongoing studies.
4. Continue to provide support on all matters about the ethics of research on human participants under our jurisdiction.
Collaborators:
The Kintampo Health Research Centre maintained its working relationship with a number of organizations. The centre also got new partners during the year under review. The centre collaborated with the institutions listed below:

<table>
<thead>
<tr>
<th>External</th>
<th>Internal</th>
</tr>
</thead>
<tbody>
<tr>
<td>GlaxoSmithKline Biologicals S.A.</td>
<td>Ghana Health Service</td>
</tr>
<tr>
<td>Columbia University, NY</td>
<td>Newmont Ghana Gold Limited</td>
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<tr>
<td>National Institute of Health</td>
<td>Kwame Nkrumah University of Science and Technology</td>
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<tr>
<td>Program for Appropriate Technology in Health (PATH)</td>
<td>University of Ghana, School of Public Health</td>
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<tr>
<td>United Nations Foundation</td>
<td>National Malaria Control Programme (NMCP) - Ghana</td>
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<td>World Health Organisation (WHO)</td>
<td>Noguchi Memorial Institute for Medical Research (NMIMR)</td>
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<tr>
<td>Barcelona Institute for Global Health (ISGLOBAL)</td>
<td>West African Centre for Cell Biology of Infectious Pathogens</td>
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<tr>
<td>University of Massachusetts</td>
<td>USAID/Ghana Evaluate for Health</td>
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<tr>
<td>European Commission/Liverpool School of Tropical Medicine</td>
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<tr>
<td>Novartis Pharma AG/Quintiles Clinepharm (Pty)</td>
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<tr>
<td>Makerere University School of Public Health (“MakSPH”), Uganda</td>
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<tr>
<td>Brown University</td>
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<td>Massachusetts General Hospital</td>
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<td>Fogarty International Center</td>
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<td>Bill &amp; Melinda Gates Foundation</td>
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<td>NIHR CLEAN-Air(Africa) Global Health Research Group</td>
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<tr>
<td>The University of Wyoming</td>
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<tr>
<td>New York University (NYU) School of Medicine, University of Illinois at Urbana-Champaign</td>
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<td>London School of Hygiene and Tropical Medicine (LSHTM)</td>
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<td>George Town University</td>
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<td>The University of Liverpool</td>
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<tr>
<td>Radboud University Medical Center</td>
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<tr>
<td>Beth Israel Deaconess Medical Center</td>
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</table>
Staff
KHRC recorded a total staff strength of 517 during the year under review. This figure represented an increase of 57 employees from the previous year. The staff worked on different projects.

In line with the centre’s strategic plan to make it attractive to its partners, the existence of a Health and Demographic Surveillance System (KHDSS) offers support to all projects at the centre. Also, the KHDSS serves as a database that informs prospective collaborators in making informed decisions about research activities. The KHDSS currently has 70 staff.

Study areas
The centre continued to operate in seven (7) contiguous districts of the Bono East and Bono regions namely the Kintampo North and Techiman municipalities, the Kintampo South, Nkoranza North and South, Wenchi and Tain districts with the Kintampo North municipality being the Headquarters.

The centre also maintained its links with Afrancho, Akumadan and Nkenkesu communities in the Ashanti Region. KHRC will carry out studies in these communities when the need arises.

Transport
The Centre has six 4X4 pickups, one Tata truck and 21 station wagons. The total number of motorbikes during the year under review stood at seventy three.

Guest House
The facility offers decent accommodation for visitors to KHRC. The guest house is a 15-minute walk from the centre. It has a 24-hour security service. The rooms are fitted with air conditioners and fans. Also, the guest house provides 24/7 internet service. There are mosquito nets fitted in all the rooms.

The rate per night at the guest house is US$50, while meals are $5 for breakfast and $7 for lunch and dinner. Other amenities are a bar which is stocked with a variety of drinks. There is also a standby generator to provide power when the national grid goes off.

The guest house received 12 visitors within the period under review.

“The Pentagon”
This is the staff eating place. Breakfast, lunch and dinner can be ordered here. Special meals can also be requested for. This can be served at either the Pentagon or at the guest house depending on the visitors preference.

Capacity building
One of the crucial developments the centre has always embarked on is offering staff the opportunity to further their studies. A good number of employees went on seminars and workshops within and outside Ghana during the year under review.

Some senior staff who left for further studies included David Dosoo, Kofi Tchum, Ellen Abrafi-Boamah Kaali, Martha Ali Abdulai, Samuel Afari-Asiedu, Kenneth Asaya, Akua Kyerewaa Botwe all pursuing their PhD in different institutions.

Wilson Elvis Ato, Charles Kyei, Fred Kayoke and Abubakari Mahama are all still pursuing their Master of Science degree.

Website
The centre’s website continues to be the outlet which provides information to people within and outside the country on activities at the centre.

Auditing
To ensure that funds given to the centre by funders and donors are judiciously used and accounted for, the centre hosted Deloitte and Touché and the Audit Service during year under review.

Visitors
The centre was privileged to host about nine important personalities during the 2019 fiscal year. The low number of visitors was due to the COVID-19 pandemic.