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- https://facebook.com/kintampohrc
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<td>AESI</td>
<td>Adverse Events of Specific Interest</td>
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<tr>
<td>BDM</td>
<td>Becker-DeGroot-Marschak Mechanism</td>
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<tr>
<td>CBR</td>
<td>Crude Birth Rate</td>
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<tr>
<td>CC</td>
<td>Computer Centre</td>
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<tr>
<td>CDC</td>
<td>Centres for Disease Control and Prevention</td>
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<tr>
<td>CoC</td>
<td>Continuum of Care</td>
</tr>
<tr>
<td>COTVET</td>
<td>Council for Technical and Vocational Education &amp; Training</td>
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<tr>
<td>CRESIB</td>
<td>Barcelona Centre for International Health Research</td>
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<tr>
<td>CRP</td>
<td>C-Reactive Protein</td>
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<tr>
<td>DECs</td>
<td>Data Entry Clerks</td>
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<tr>
<td>DFID</td>
<td>Department for International Development</td>
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<tr>
<td>EBA</td>
<td>Erythrocyte Binding Antigen</td>
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<tr>
<td>EMBRACE</td>
<td>Ensure Mothers and Babies Regular Access to Care</td>
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<td>EQA</td>
<td>External Quality Assessment</td>
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<td>GRAPHS</td>
<td>Ghana Randomized Air Pollution and Health Study</td>
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<td>GSK Bio</td>
<td>GlaxoSmithKline Biologicals</td>
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<tr>
<td>GSTs</td>
<td>glutathione S-transferases</td>
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<tr>
<td>HAP</td>
<td>Household Air Pollution</td>
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<tr>
<td>HIV</td>
<td>human immunodeficiency virus</td>
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<tr>
<td>HPLC</td>
<td>High Performance Liquid Chromatography</td>
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<tr>
<td>ICT</td>
<td>Immunochromatic Test</td>
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<tr>
<td>IDIs</td>
<td>In-Depth Interviews</td>
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<tr>
<td>IEC</td>
<td>Institutional Ethics Committee</td>
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<td>IEQA</td>
<td>International External Quality Assessment Scheme</td>
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<tr>
<td>IMaD</td>
<td>Improving Malaria Diagnosis</td>
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<tr>
<td>IMCI</td>
<td>Integrated Management of Childhood Illnesses</td>
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<tr>
<td>INDEPTH</td>
<td>International Network for Demographic Evaluation of Populations and Their Health</td>
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<tr>
<td>IYC</td>
<td>Infant or Young Child</td>
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<tr>
<td>JICA</td>
<td>Japanese International Cooperation Agency</td>
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<tr>
<td>kdr</td>
<td>Knock down resistance gene</td>
</tr>
<tr>
<td>KHDSS</td>
<td>Kintampo Health and Demographic Surveillance System</td>
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<tr>
<td>KHRC</td>
<td>Kintampo Health Research Centre</td>
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<tr>
<td>KHRCIEC</td>
<td>Kintampo Health Research Centre Institutional Ethics Committee</td>
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<tr>
<td>LLINs</td>
<td>Long-lasting insecticide treated bednets</td>
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<tr>
<td>LSHTM</td>
<td>London School of Hygiene and Tropical Medicine</td>
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<tr>
<td>LPG</td>
<td>Liquified Petroleum Gas</td>
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<tr>
<td>MNCH</td>
<td>Maternal, Neonatal and Child Health</td>
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<tr>
<td>MoPET</td>
<td>Ghana Ministry of Petroleum</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>MSB</td>
<td>Malaria Slide Bank</td>
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<tr>
<td>MSP-2</td>
<td>Merozoite Surface Protein – 2</td>
</tr>
<tr>
<td>MTI</td>
<td>Malaria Transmission Intensity</td>
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<tr>
<td>MVVC</td>
<td>Malaria-Vectored Vaccines Consortium</td>
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<tr>
<td>NIH</td>
<td>National Institute of Health</td>
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<td>NMCP</td>
<td>National Malaria Control Programme</td>
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<td>NMIMR</td>
<td>Noguchi Memorial Institute for Medical Research</td>
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<tr>
<td>PBMC</td>
<td>peripheral blood mononuclear cells</td>
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<tr>
<td>mRDT</td>
<td>Malaria Rapid Diagnostic Test</td>
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<tr>
<td>SDF</td>
<td>Skills Development Fund</td>
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<tr>
<td>SP</td>
<td>Sulphadoxine-Pyrimethamine</td>
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<tr>
<td>SRC</td>
<td>Scientific Review Committee</td>
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<tr>
<td>SRH</td>
<td>Sexual and Reproductive Health</td>
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<tr>
<td>SUMS</td>
<td>Stove Use Monitors</td>
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<tr>
<td>UK NEQAS</td>
<td>United Kingdom National External Quality Assessment Scheme</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<tr>
<td>WTP</td>
<td>Willingness To Pay</td>
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<tr>
<td>ZPP</td>
<td>Zinc Protoporphyrin</td>
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</table>
ACKNOWLEDGMENT

The Kintampo Health Research Centre (KHRC) is thankful to the almighty God for His mercy and grace which has brought the institution this far.

The centre is indebted to its funders who have supported the research activities carried out by KHRC as well as institutions the centre has collaborated with. Among these are; Children’s Investment Fund Foundation, GlaxoSmithKline (GSK) Biologicals, National Institutes of Health (NIH), World Health Organisation (WHO), Thrasher Research Fund, Global Alliance for Clean CookStoves, Barcelona Centre for International Research Centre (CRESIB), Japanese International Cooperation Agency (JICA), David & Lucille Packard Foundation, Program for Appropriate Technology in Health (PATH), PATH-Malaria Care Development, AngloGold Ashanti (Ghana) Malaria Control Limited, UK Department for International Development (DFID), Futures Group Global Outreach Inc, Royal Society of the UK, Leverhulme scheme, Translating Research into Action (TRAAction), Malaria Vectored-Vaccines Consortium (MVVC), Malaria Vaccine Initiative (MVI), Council for Technical and Vocational Education & Training (COTVET), Skills Development Fund (SDF), the INDEPTH Network, Danida Fellowship Centre, National Malaria Control Programme (NMCP), Columbia University, Massachusetts General Hospital and Harvard Medical School, London School of Hygiene and Tropical Medicine (LSHTM), Noguchi Memorial Institute for Medical Research (NMIMR), University of Ghana School of Public Health (UG SPH), The University of Tokyo, West African Centre for Cell Biology of Infectious Pathogens (WACCBIP), University of Health and Allied Sciences, Ho, University of Science, Techniques and Technology, Mali, Wellcome Trust Sanger Institute, UK, Harvard School of Public Health, USA, Department of Biochemistry, Cell and Molecular Biology, University of Ghana, Lekma Hospital, Teshie and DANADAMS Pharmaceuticals Limited. We are also indebted to funders and collaborators we have worked with in the past years. Among them are; Medicines for Malaria Ventures (MMV), Bill & Melinda Gates Foundation (BMGF), Clinical Trials Alliance (INDEPTH-MCTA), International Atomic Energy Agency (IAEA), United States Agency for International Development (USAID), African Malaria Network Trust (AMANET), United Nations International Children Emergency Fund (UNICEF), Ghana Atomic Energy Commission (GAEC), Neonatal and Maternal Research Programme Consortium, the African Media and Malaria Research Network (AMMREN).

We also appreciate the immense contribution of the KHRC advisory board, the Ministry of Health (MoH), the Food and Drugs Authority (FDA) Ghana, the Ghana Health Service (GHS), the Ghana Health Service Ethics Review Committee (GHS/ERC), our sister research institutions, the
Regional, Municipal and District Health Management Teams (MDHMTs) of the Brong-Ahafo Region as well as Municipal and District Assemblies in our study areas. Our profound thanks also goes to the chiefs and people of the communities in which our research activities are conducted for their cooperation all these years.

We also wish to express our heartfelt gratitude to the departmental and project leaders, and all who contributed reports on the activities of the various projects, departments and training that took place during the year under review.

Finally, we appreciate the support of Mr Kwame Kesse Adjei, Mr Williams Buunaaisie and Ms Irene Tampuri Azindow of the time and effort the invested in collating the 2017 annual report.
MISSION AND VISION STATEMENTS

Vision statement

Be an internationally recognized research centre of excellence which conducts needs based research of the highest quality that will shape health policy, programs and practices in Ghana and the world at large.

Mission statement

Our mission is to develop health research capacity to conduct public health research which will contribute to a significant reduction in ill-health and the achievement of the Millennium Development Goals for Africa’s most disadvantaged communities.

All our activities will be based on the following core values and guiding principles:

Core values

- Team work
- Capacity development
- Relevant research
- Integrity and Accountability
- Community participation
- Responsiveness to changing landscape

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.
FORWARD
Kintampo Health Research centre (KHRC) is one of three health research centres of the Ghana Health (GHS) service. KHRC falls under the Research and Development Division and is mandated to carry out health research work. Established in 1994, KHRC has over the years provided guidance in key decision making and policy development within Ghana’s health delivery system.

This current report covers all activities of the centre including the various research projects carried out with numerous collaborators for the 2017 fiscal year. A greater number of these projects sought to influence decision making and policy development by answering critical questions on malaria, maternal and neonatal/child health, mental health, sexual and reproductive health among others.

With the emergence of the Sustainable Development Goals (SDGs) in September, 2015 it is great to observe that KHRC’s recent research activities has focused on these goals and will go a long way in helping the Ghana Health Service achieve them. KHRC has also strategically positioned itself as one of the best sites in Africa for Phase II and III clinical trials as evidenced in the great progress made at the Centre in the development of a malaria vaccine.

I wish to congratulate the Director, Management and Staff of KHRC as well as their various collaborators for the wonderful work being carried out in the middle belt of Ghana. I also wish to acknowledge the crucial role being played by the chiefs, community members and participants of the various research projects being carried out by the Centre. KHRC has come a long way since its establishment and its remarkable efforts speak for itself and are acknowledged by all.

Dr. Abraham Hodgson, Director, RDD, GHS
EXECUTIVE SUMMARY FROM DIRECTOR

The year 2017 is one of the numerous years well spent by KHRC in terms of delivering on its mandate. Thus to opine that the Kintampo Health Research Centre (KHRC) has made and still making significant progress in carrying out its mandate, to conduct health research to help inform decision and policy making in the Ghana Health Service (GHS)/ Ministry of Health (MoH), will not be out of place as far as the year under review is concerned.

A lot has been done and a lot remain to be done in this journey. And as with the past years, the Centre have had to deal with some real challenges as it braved out strategizing for its continual existence as well as remaining relevant in its activity arena.

The fight against Malaria remains one of the key research activities of KHRC; a Centre of excellence in malaria research. The promising results gotten from the GlaxoSmithKline (GSK) RTS,S malaria vaccine which was tested here at KHRC among other several other study sites has brought in more enthusiasm in the fight against malaria. Thus a number of pre-licensure trials of the found-promising vaccine among other off-shoot malaria studies kick-started in the year under review with others tabled to start in 2018. The vaccine, as announced earlier by the WHO will be tested on a large scale in 2018 in Ghana, Kenya and Malawi.

The 2017 saw the continuation of a randomized comparison of household survey modules for measuring pregnancy outcomes in five INDEPTH HDSS sites which is to end in 2018. This project locally referred to as ENAP got funding from Children’s Investment Fund Foundation and in collaboration with London School of Hygiene and Tropical Medicine (LSHTM), INDETPH network and four research sites under the INDEPTH network. It seeks to compare household survey methods for the capture of stillbirths and neonatal death, evaluate household survey capture of birth weight and gestational age, identify barriers and enablers for survey and HDSS data collection of pregnancies and pregnancy losses as well as optimize HDSS capture of pregnancy outcomes.

Year 2017 saw several other sub-studies coming up as off-shoots of the main Ghana Randomised Air Pollution and Health Study (GRAPHS), a cluster randomized trial which tested the impact of reducing Household Air Pollution (HAP) exposures on birth outcomes and on pneumonia during the first year of life which was done with funding from National Institute of Health (NIH). Among
them is the Household Air Pollution and Adult Respiratory Health: Evidence from GRAPHS which seeks to test the hypothesis that significant reduction in the incidence of respiratory symptoms and annual significant reduction in annual decline in lung function would result in the use of LPG over 16 months during GRAPHS. Another study is the understanding the adoption of clean cookstoves with the aim to study factors that proliferate the adoption of clean cookstoves, and to test strategies to promote adoption and continued use.

Other noteworthy activities were the setup and maintenance of a malaria slide bank, with the aim to develop validated sets of slides for training and competency assessment of malaria microscopists among other innovative researches like the development of a Continuum of Care (CoC) card to enhance contraceptive uptake and the cross-sectional diagnostic accuracy evaluation to assess the performance of the PrCr dipstick test and to explore the operational feasibility of using this test as an alternative to the current protein-only test.

All the above and many other successful research activities that have been done with some still going on at the Kintampo Health Research Centre would not have been possible without the support of other institutions, communities and resourceful individuals with interests in our work. I, therefore, wish to take this opportunity once again to thank everyone, especially the traditional and political authorities, the opinion leaders, the community members within the KHRC study area (i.e. Kintampo North Municipality and the Kintampo South district, Nkoranza North and South districts, Techiman Municipality, Wenchi and Tain districts) for their unflinching support, co-operation and interest in the Centre’s activities.

My sincere thanks also goes to the hard working staff of KHRC, the Director of the Research & Development Division of the Ghana Health Service, the Brong Ahafo Regional Director of health, the District/Municipal Directors in KHRC’s area of operations as well as the Medical Superintendents, the various health facility “in-charges” and all other staff for their immense support.

This will not be complete without a mention of our wonderful donors, funding agencies, collaborators, sister institutions and our sector ministry for the continued interest and support for the Centre’s research activities. A lot has been done with your support and much still remains to be done with your support. Thank you and God bless.

Dr. Kwaku Poku Asante, Ag. Director, KHRC
CHAPTER 1: ORGANIZATIONAL OVERVIEW

Below is an organogram that shows the structures of KHRC and its link to the Ghana Health Service.

Organogram
Administration
The Kintampo Health Research Centre (KHRC) collaborated with several institutions such as the London school of Hygiene and Tropical Medicine (LSHTM), Columbia University, Nouguchi Memorial Institute for Medical Research (NMIMR), The Centre continues to attract funding from:

- System Science Consultants Inc(sponsored by the Japanese International Cooperation Agency(JICA)
- AngloGold Ashanti (Ghana) Malaria Control Limited
- GSK Bio
- National Institutes of Health
- Thrasher Research Fund
- Global Alliance for Clean Cookstoves
- World Health Organisation (WHO)
- Program for Appropriate Technology in Health (PATH)
- PATH-Malaria Care Development
- Danida Fellowship Centre/INDEPTH
- Noguchi Memorial Institute for Medical Research
- Barcelona Centre for International Research Centre (CRESIB) amongst others.

Staff

KHRC recorded a total staff strength of 350 at the close of 2017. Various projects were carried out under year of review namely:

<table>
<thead>
<tr>
<th>ADULT LUNGS FUNCTION STUDY</th>
<th>LiCSS II</th>
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<tbody>
<tr>
<td>ENAP STUDY</td>
<td>MAL 073 STUDY</td>
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<tr>
<td>CoC Card for Family Planning in Ghana</td>
<td>SP Intermittent Preventive</td>
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<tr>
<td>Measles-Rubella Study</td>
<td>Field Validation Pre-Eclampsia</td>
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<tr>
<td>NIH Immunology Study</td>
<td>COREMAL Study (Comic Relief)</td>
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<tr>
<td>ADOPTION STUDY</td>
<td>DHIMS 2 Study</td>
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<td>CHILD LUNGS FUNCTION</td>
<td>MAL067</td>
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<td>MCT Study</td>
<td>EPI MAL 002 STUDY</td>
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<tr>
<td>ABACUS</td>
<td>EPI MAL 005 (MTI 2)</td>
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**Student project**

The centre hosted two students from Georgetown University in the USA and a student from the University of Ibadan Nigeria. The carried out research activities in the Centre in the areas of Mental Health and Reproductive Health.

**Study Areas**

The Centre continues to operate in six contiguous districts of the Brong Ahafo region namely Kintampo North and South, Nkoranza North and South, Wenchi and Tain with Kintampo North as the Headquarters. Links with Afrancho, Akumadan and Nkenkensu communities are maintained for future work.

**Transport**

The Centre under the year of review has three (3) pickups, one (1) TATA truck, and Fourteen (14) Toyota land cruiser station wagons. The total number of motorbikes stood at one hundred (100).

**Guest House**

The KHRC guest house is still in operation. This has ten comfortable self-contained rooms. The rooms have air conditioners, fans, mosquito nets, hot shower, television, wireless internet, excellent water systems, security and a large car parking space.

**Visitors**

The Centre was privileged to host over a hundred very important personalities during the period under review. Due to constraint of space just a few will be mentioned.

“**THE PENTAGON**”

The staff eating area continues to provide breakfast, lunch and supper for staff and visitors to the Centre. It also has drinks available and alcohol is sold after 17:00Hrs.
Infrastructure updates

The Administration building:

The roofing sheets on this building together with its garages were replaced with new sheets. The other garages at the Laboratory and main car park areas also had roofing sheets changed. The work was carried out by Rocksters roofing systems. This work became necessary as some parts of our offices experienced leakages during rains.

Solar panels

The Centre in its fight to ensure efficient and reliable power supply engaged DENG Limited to install solar panels with batteries at the Paul Arthur building. This building houses the computer centre and other offices. The building is now virtually on solar power. This has cut down on electricity costs. It is our plan to extend solar to other sensitive areas such as the medical laboratory.
Dr. Saunders road repairs

This road leads to the quest house and the residential area of some senior staff. The road was so bad it was difficult to use it even with 4X4 vehicles. Management therefore engaged the Highways department in Kintampo who remolded culverts for efficient water drainage. Most part of the road was graveled and the rest paved.

CCTV

Management enhanced security in the Centre during 2017. This was by installing CCTV cameras at some places within the set up. The Centre has 24/7 human security and police guard at night.
Accounts Departments

Introduction

Kintampo Health Research Centre (KHRC) accounts department provided accounting services and financial support to the Centre. The accounts department in 2017 was made up of five (5) persons of various expertise and experiences for proper financial management of the Centre and multi-donor fund: the Financial Administrator who is the head of accounts, two (2) Accountants, One (1) Finance Officer and one (1) Accounts Officer. One of the accounts officers moved to Stores Department in May 2017.

KHRC Accounts helped in providing a number of pre-award and post-award contract services associated with the fiscal management of all projects, including, but not limited to budgeting and budget negotiation, establishing accounting and budget records for all projects; interpreting sponsored and KHRC financial policies to staff. We also worked with Principal Investigators/Project Managers to provide accurate and timely financial information in relation to sponsored projects; monitoring expenditures for compliance with sponsor and KHRC policies and procedures; preparing annual KHRC financial reports and financial reports for sponsors based on sponsor’s requirement as and when due. Accounts with the supports of other departments carried out all cash-management responsibilities associated with all projects in addition to preparing monthly bank reconciliations statements and acting as a liaison between KHRC and other collaborating institutions, administrative support units, sponsors, and auditors.

Accounts department continued to use Pastel Evolution for recording our accounting transactions and Pastel Payroll for processing employees’ salaries. All records from entry to bank reconciliations are done electronically. Incomes and expenditures of each project are tracked separately with the Pastel Evolution Accounting software.

Activities during the Year 2017

During the year under review the Accounts continued to support projects heads and Principal Investigators in budgeting and negotiating budget for new proposals submission and give financial guidelines. Accounts supported in review of contracts and offered advice where necessary.
Accounts also prepared timely financial reports for all projects that reports were due in 2017 including monthly management reports.

Additionally, Accounts continued to monitor projects cash flows of transfers for both locally (Ghana) and internationally (External) funded projects during the year 2017. We offered advice to project principal investigators on expenditure lines compared to budget lines for each project.

In 2017 KHRC Accounts run about 30 projects in addition to the core KHDSS. Twelve (12) out of the 30 projects were new projects that KHRC received funding for in 2017. Five life projects also ended in the year of 2017.

The Department continued with its routine activities of processing payments to supplies and service providers, processing of accounting information (expenditure and receipts) into the accounting software (Pastel Evolution) to generate financial reports, receiving and depositing of cash into the bank on daily basis, invoicing for project activities and preparation of monthly bank reconciliation.

For the first time KHRC prepared its 2016 financial statements on accrual basis in line with the International Public Sector Accounting Standards (IPSAS).

The payroll section ensures that KHRC pays its employees accurately and promptly, including bonuses, allowances and other benefits. It pays all taxes and pension contributions promptly to the Ghana Revenue Authority (GRA) and the Social Security and National Insurance Trust (SSNIT) respectively as well as union dues and other withholdings from employees’ pay.

In 2017 KHRC also automated its inventory system which used to be done manually. This is to support smooth transition from the cash accounting to the IPSAS reporting.

**Audit Activities**

KHRC had two (2) separate external audits in 2017. The first by Ghana Audit Service in March 2017 and the second audit by Deloitte & Touché in September 2017 for the financial year January to December 2016. All the audits expressed an unqualified opinion which was good news to KHRC.

The internal audit unit also continued to conduct its quarterly internal audits and submit reports with recommendation to management for implementation. The internal audit unit carried out 4 quarterly internal audit reports during 2017. Also served us the liaison between KHRC and external auditors. Management followed up on all audit observations and recommendation for
implementation. Internal audit also carried out with the pre-audit processes before payment and also inspection of all items received into stores.

**Way Forward for 2018**

Accounts department will continue to give it supports to all projects by helping in budgeting and providing timely financial reports and offering financial advice to management, Principal Investigators and project coordinators. We will also put in measures that will improve internal controls and structures leading to auditors expressing unqualified audit opinion on the Centre’s financial statements. Accounts with the support of KHRC management will review the existing accounting manual to comply with the International Public Sector Accounting Standard (IPSAS) requirements.
**Computer center (CC)**

**Introduction**

The Computer Centre (CC) is where all field data is processed into electronic form for easy analysis. Data processing goes through several stages of quality checks to ensure that the final electronic data reflects exactly what was collected from field. From the filing stage, unique batch and form numbers are assigned to each data form. This unique identification enables tracking of each form throughout the data processing cycles. Accuracy checks such as double data entry and range and consistency algorithms are used at first stage of data processing. The computer centre operates a centralized database system in processing electronic data. There are redundant database systems and offshore backup mechanisms in place to minimize data loss in case of any unforeseen circumstance.

We explored the use of alternate appropriate technologies for data collection and processing during the year under review (2017). This included setting up paperless data collection systems using Android tablets. Consequently, data entry clerks (DECs) and data supervisors were sensitized on the staff implication with regards to the implementation of these new data collection tools hence some staff may be laid off.

**ICT Infrastructure**

The infrastructure of the Computer Centre has gone through significant innovations, changes and upgrades from the middle of the year under review. We started with the introduction of paperless data collection systems. Three different software Applications, namely the Open Data Kit (ODK), the Survey Solutions and the Research Electronic Data Capture (REDCap), have been configured. Each of the Applications have been tested and approved for deployment. We have moved the mail services to a more flexible service provider to enhance our individual mail storage capacity. We are also introducing the Barcoding system to support and boost the tracking of forms in terms of storage and retrieval.

We are ready to migrate from the Household Registration System2 (HRS2) to Open Health and Demographic System (OpenHDS). This falls in line with the decision of KHRC to deploy Android tablets for data collection effective the last quarter of 2017. Barring any unforeseen obstacles, the KHDSS will surely deploy OpenHDS in 2018.
Solar Power
We have successfully installed a Solar Power system at the Dr. Paul Arthur Building which houses the Computer Centre and it is functioning well. We hope our electricity costs would reduce drastically with this system in place in the long run.

Way Forward
It is quite a challenging time for the leadership in the Computer Centre to see some of our routine roles dissolved. These roles have been in place since 1995 and honestly are quite expensive to run. We have adopted the optimal technologies to cut down operational cost in order to remain more efficient and competitive.

Conclusion
The Computer Centre would continue to be the relevant team to champion the Information and Communication Technology (ICT) course for KHRC. We are looking forward to a really exciting and yet gloomy 2018 because we would be radically changing our modus operandi not without casualties.
Clinical trial facility

KHRC has a clinical trial facility located close to the research centre and the hospital with the capacity to provide modern clinical research space and equipment for volunteers to participate in research activities.

The Clinical trial facility has 12 bedrooms self-contained units with a large well ventilated reception area for patients. The facility also has two consulting rooms fitted with necessary equipments. Additionally, there is a dispensary for the storage and dispensing of drugs at the trial facility.

The centre has a kitchen which serves to provide food for patients on admission. Finally, the facility has a well-equipped launderette for washing and ironing at the facility.
Clinical Laboratory

The KHRC Clinical Laboratory consists of the following units: Bacteriology, Clinical Chemistry, Entomology, Haematology, Immunology, Micronutrients, Molecular Biology, and Parasitology. 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 Organisation/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.
Clinical Chemistry
A Horiba Medical Pentra C200 automated clinical chemistry analyzer has been acquired for carrying out analyses such as liver function tests, kidney function tests, lipid profile, glucose and uric acid. 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 2 Research Officers. Major equipment in the unit include:

- An ELISA plate reader (DYNEX®) with Revelation 4.2 software
- An automated ASYS Atlantis plate washer
- CDC light traps and accessories
- WHO vertical test tubes for susceptibility bioassays
- Insecticide susceptibility papers
- Mosquitoes rearing cages
- Stereo Dissecting Microscope

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 and 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, -80°C and -150°C freezers.
and liquid nitrogen tanks. Currently, isolation and cryopreservation of peripheral blood mononuclear cells (PBMCs) is being done at the unit.

**Molecular Biology**
The unit has a C1000 Thermal Cycler with 96-Well Fast Reaction. 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 bio-equivalence 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 18 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 to 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), 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.
Scientific Review Committee
Mandate of the SRC
The Kintampo Health Research Centre’s (KHRC) Scientific Review Committee (SRC) is a multidisciplinary committee made up of its senior scientists. The SRC is primarily mandated to review all proposals for their scientific merit. Studies that are considered to be of scientific relevance are given full approval by the SRC but can only be carried out after obtaining approval from the Institutional Ethics Committee of KHRC.

Executives
The SRC is chaired by the Director of the centre; Dr. Kwaku Poku Asante. The rest of the current executives were elected into office during the year under review are as follows: Charlotte Tawiah Agyemang - Deputy Chairperson, Solomon Nyame – Secretary and Irene Tampuri Azindow - Deputy secretary.

Meeting Schedules and procedure
All proposals are first submitted to the SRC through the Protocol Administration for Standard Submission (PASS) and then scheduled for meetings on the first Monday of every month. Also, meetings are held on other Monday based on the urgency of these proposals. Mostly, three (3) main reviewers are selected based on their expertise to review the study protocol. During the year under review, the Chair introduced a “mystery reviewer”, where any member of the committee is called to provide their review comments. The committee retains the right to give full approval, conditional approval and reject proposals based on the scientific merit and relevance of the study. Generally, the full approval is given after the investigators have satisfactorily responded to the comments raised at the meeting.

Review activities in 2017
During the year under review, a total of thirty-three (33) proposals were reviewed. Fifteen (15) of these were student proposals (MSc/ Ph.D.) and the rest were KHRC related or some other institutions/individual proposals. Out of the thirty-three (33) proposals, thirty-one (31) proposals were also given ethical approval by the Institutional Ethics Committee of KHRC for the commencement of the studies.
Institutional Ethics Committee (IEC)
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 protocol. During the year under review (2017), twelve full board meetings were organised and thirty-one protocols reviewed.

Current Membership

In conformance with international ethical regulations and guidelines, at least one member of the Committee is a clinical scientist, one a non-scientist and one a community representative.

During the year under review the Committee saw the exit of Dr. Evans Gyimah Boateng who had gone on transfer to another region and Dr. Denis Aprese who left for further studies.

The current membership is made up of staff from KHRC (two social scientists, a reproductive health expert, entomologist and a clinician), two Community Representatives, 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 14, eleven voting and three non-voting members.

Protocols received/reviewed

The Committee received and reviewed thirty-one (31) new study protocols in 2017. Of these, nine (9) had full approval from the initial review, twenty-two (22) received conditional approval, of which nineteen (19) were subsequently granted full ethical approval after the Investigators addressed the concerns of the Committee. Three of the conditional approvals were still pending ethical consideration. Out of the thirty-one new protocols that were reviewed, fourteen (14) were student research projects while the remaining seventeen (17) were either KHRC or individual research projects.
Continuing review activities were also undertaken. A total of eight study amendments were reviewed and approved for implementation. Six progress reports and two final reports were submitted in 2017. The Committee also received about 17 SAEs from the EPI-Mal 073 study which started in June 2017. The Committee’s SOP was reviewed for accuracy and appropriateness and adopted for use in 2018.

**Capacity Building/Workshops**

The Committee facilitated an ethics training for health professionals in Kintampo. Some Committee members participated in a Good Clinical Practice workshop organised by the Food and Drugs Authority in September 2017 at KHRC. Others were registered to undertake the CITI online refresher course for IRB members in the year under review. The Administrator of the Committee also attended a symposium in Accra which discussed the role of stakeholders in promoting ethical research in Ghana.

**Future plans (2018)**

The future plans of the committee include:

- Apply for capacity building grant for the Committee
- Facilitate research ethics training for Committee members.
- Conduct refresher “learn how we operate” seminar for investigators.
- Conduct field monitoring visits of approved studies.
**Biostatistics Unit**
Statistics is applicable in all phases of public health, epidemiological and implementation research. Our mission is to advance in epidemiological research through computational strategies, applications and dissemination of statistical outcomes. The unit is endowed with a lot of expertise in the use of modern statistical tools such as STATA, R, SAS, MPlus and WinBugs.

During the year under review, the unit has delivered on important research areas including longitudinal data analysis, clinical trial data analysis and cross-sectional design and analysis. The unit also collaborated with Columbia University, London School of Hygiene and Tropical Medicine and Georgetown University in several statistical analyses. Some of these analyses are on the effect of stress on birth outcomes, time activity survey among a cohort of child bearing women on the use of clean cook-stoves, Communities’ perception and treatment options for infertility, Validation of symptom checklist-90-R (SCL-90-R) among adolescents and the influence of Household socio-economic status on RTS,S malaria vaccine. Also, analysis of data from completed projects in the year under review were also performed. The unit also assisted with research planning including design of sampling schemes, sample size and power calculations. In addition to that, the unit continuously offer statistical advice to staff of KHRC and other collaborators.
CHAPTER 2: RESEARCH PROGRAMMES
Kintampo Health and Demographic Surveillance System (KHDSS)


Background
The Kintampo Health and Demographic Surveillance System (KHDSS) covers the population resident in the Kintampo North Municipality and Kintampo South District of the Brong Ahafo Region. As part of its operations, the KHDSS collects and routinely updates the health and demographic information of the population and helps in selecting study participants and following them up in the community in the course of studies. The KHDSS serves as the backbone of work at the centre. The resident population in 2016 was 156,145. The KHDSS as at December 2017 operated with 2 demographers, 2 Research officers, 11 fieldworkers and 8 supervisors. The supervisors are responsible for conducting Verbal Post Mortem (VPM) interviews for physicians to establish the cause of death.

Field operations
In 2017, the KHDSS continued with the one round per year schedule which was initiated in 2016. Thus, round 27 was completed between January to November 2017, with updates for pregnancies, births, deaths and migration as well as data collection on verbal autopsies and marriages. Vaccination status and socio-economic characteristics were also updated. The KHDSS is migrating its data management from FoxPro to OpenHDS in 2018. Data collection will be done electronically using the OpenHDS android platform for tablets for all the core events (pregnancy, births, migration in and out and deaths). VPM data collection and physician coding of VPMs will also go electronic by June 2018 to complete the migration from paper to paperless data collection and processing.
Demographic Characteristics of Kintampo HDSS 2016

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Number</th>
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<tbody>
<tr>
<td>Total Population (n)</td>
<td>156,145</td>
</tr>
<tr>
<td>Male Population (n, %)</td>
<td>76,356 (48.9%)</td>
</tr>
<tr>
<td>Female Population (n, %)</td>
<td>79,789 (51.1%)</td>
</tr>
<tr>
<td>Recorded Pregnancies (n)</td>
<td>2880</td>
</tr>
<tr>
<td>Recorded Births (n)</td>
<td>3235</td>
</tr>
<tr>
<td>Antenatal attendance (%)</td>
<td>97.9% (by third trimester)</td>
</tr>
<tr>
<td>Facility delivery Rate (%)</td>
<td>64.1%</td>
</tr>
<tr>
<td>Recorded Deaths (n)</td>
<td>779</td>
</tr>
<tr>
<td>Recorded Neonatal Deaths (n)</td>
<td>26</td>
</tr>
<tr>
<td>Recorded Infant Deaths (n)</td>
<td>59</td>
</tr>
<tr>
<td>Recorded Under Five Deaths (n)</td>
<td>124</td>
</tr>
<tr>
<td>In-migrations (n)</td>
<td>4358</td>
</tr>
<tr>
<td>Out-migrations (n)</td>
<td>4255</td>
</tr>
</tbody>
</table>

Antenatal attendance (at least one) increased by 0.9% for 2016 over the 2015 (97.0%) coverage and health facility delivery also increased from 61.0% in 2015 to 64.1% in 2016.
CHAPTER 3: RESEARCH PROJECTS

Antibiotics studies

Community-level antibiotic access and use in low- and middle-income countries; Finding targets for social interventions to improve rational antimicrobial use.

Investigators:

KHRC: Kwaku Poku Asante, Ellen Boamah-Kaali, Martha Ali Abdulai and Samuel Afari-Asiedu
Oxford University, UK: Heiman Wertheim
INDEPTH Network, Accra, Ghana: Osman Sankoh
Umea University, Sweden: John Kinsman

Project start date: September 2016
Project end date: November 2018

Background

Antibiotic resistance urges global dedication to facilitate the appropriate use of antibiotics. Antibiotics are life-saving medicines that have a profound worldwide impact on both individual and public health. Lack of access to antibiotics denies people their benefits and whilst even appropriate antimicrobial use contributes to resistance development, antimicrobial overuse and misuse promotes antibiotic resistance without corresponding benefit. Therefore, any unnecessary antibiotic use should be discouraged to reduce antibiotic pressure, while on the other hand ensuring that those who need antibiotics have access to them. Improving rational use of antibiotics necessitates understanding of their supply as well as social and cultural factors in the outpatient community. As different low and middle income country settings show distinct rates of over the counter antibiotic dispensing, sociocultural determinants of antibiotic practices are likely to be site specific.
Objectives
This project seeks to compare community-based antibiotic access and consumption practices across communities in low and middle-income countries (LMICs) in Asia and Africa in order to inform the design of, and identify targets for community-based intervention strategies that may be used to promote rational antibiotic use.

Methods
The main drivers of antibiotic access and use in the community between six (6) different LMICs will be assessed through both qualitative and quantitative methods. Initially, antibiotic resources will be discerned by mapping all antibiotic suppliers and by performing inventories of antibiotics supplied. Factors affecting community antibiotic access and use that prevail in each study site will be explored through preparatory qualitative in-depth interviews and Focus Group Discussions (FGDs). The results would be used to refine the subsequent quantitative longitudinal HDSS household surveys conducted in phase 3, entailing 2 contacts with each of 1,100 participating households over a one-year time period. Simultaneously to the household survey, antibiotic supply to the community would be quantified through standardized customer exit interviews. Each supplier would be surveyed 4 times in on 4 days spread over a one-year period. Finally, to explain any potential discrepancies between results from the household survey and the customer exit survey, another round of exploratory in-depth interviews and FGDs will be performed.

Expected outcome
- Community access to antibiotics in low and middle income countries
- Sources of antibiotics in low and middle income countries
- Consumption levels of antibiotics in low and middle income countries
- Antibiotic use and practices in low and middle income countries
- Knowledge on antibiotics

Progress
Phase three of the study is in progress. In this phase, quarterly exit interviews are being done across 20 antibiotic point of sale facilities over one year (chemical seller shops, hospitals and health centres). The round for the first quarter has been completed with 20 facilities visited. Household surveys to measure community antibiotic consumption in 1100 households is also underway and will be done bi-annually over a year. A total of 334 households have been visited out of 1100.

Funder(s): Welcome Trust.
Bioequivalence study

A balanced, randomized, two treatment, two-period, two-sequence single dose crossover, open-label, analyst blind and single centre bioequivalence study of test product; Tenofovek of Danadams Pharmaceuticals Industry Ltd., Ghana and reference product; Viread (Gilead Sciences, Inc., CA, USA) in healthy, Ghanaian adult, male, human participants under fasting conditions.


Collaborators: DANADAMS Pharmaceuticals Limited

Project start date: August 2014
Project end date: project not yet started

Background
Bioequivalence (BE) of drugs registered in Ghana have been carried out in India and other foreign countries due to the lack of a well-established BE Centres. Due to differences in race, ethnicity and genetic polymorphisms of drug metabolising enzymes, it is best to use the data of BE studies of the population manufactured drugs are intended for.

In applications for generic medicinal products according to regulatory directives, the concept of bioequivalence is fundamental. The purpose of establishing bioequivalence is to demonstrate equivalence in biopharmaceutics quality between the generic medicinal product and a reference medicinal product. KHRC has set up a BE study Centre to facilitate the approval and registration of drugs with regulatory authorities.

Objectives
- To monitor the safety and tolerability of the test product as compared to the reference product in healthy human participants.
- To assess the oral bioavailability of the test product (Tenofovek); of Danadams Pharmaceuticals Industry Ltd., Ghana with reference product (Viread); in healthy, adult,
male, human participants under fasting conditions in a balanced, randomized crossover design.

Methods
Screened and consented participants will be randomized after overnight fast of at least 10 hours to receive a single dose of test or reference product administered orally. Participants will be admitted in the clinical facility the night before dosing. With the cross over study design participants will receive the alternate treatment in the subsequent period after the wash out period of Tenofovir and in such a way that each participant will receive both treatments at the end of the study. The order of receiving the products during the two periods of the study will be determined according to randomization schedule. The code will be broken using standard operating procedures if any adverse event occurs that requires the knowledge of drug received by the participant. Venous blood samples will be taken at specified time points and processed and analyzed to estimate concentrations of the drug in each period using a validated method on a mass spectrophotometer. With statistical tools the concentrations in the absorption, distribution, metabolism and excretion phases of the active drug will be compared for the investigative and reference products to determine if they are bioequivalent. The safety and tolerability of the test drug will be evaluated from the periodic clinical assessment of the participants.

The study is open label; however, the analysts will be blinded to the sequence of administration of the test or reference product. There will be a maximum of thirty participants in the study.

Expected outcome
We expect to determine the bioavailability and safety profile of the test and reference product.

Progress
The project has received approval from the following regulatory bodies: KHRC- Institutional Ethical Committee, GHS –Ethical Committee and Ghana Food and Drugs Authority. Funding for the project is yet to be finalized.

Funder(s)
DANADAMS Pharmaceuticals Limited and Kintampo Health Research Centre (KHRC).
Clinical Trials:
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.

Collaborators: IQVIA

Project start date: 09 February 2016
Project end date: 09 February 2023

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 Sahara Africa. 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 countries have no baseline incidence data on rare diseases such as those that maybe 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 these 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.

Methods

Approximately 40,000 children will be recruited within the collaborating study sites and enrolled into 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 multiply data source, to increase opportunity to capture the event of interest. Among the 40,000 children, approximately 20,000 children will be enrolled in the 6-12 weeks group and approximately 20,000 children will be enrolled in the 5-17 months group. Kintampo site will recruit about 10000 of the children.

**Expected outcome**

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

**Progress**

The study is progressing steadily. Eight thousand, one hundred and twenty eight (8128) children have been enrolled into the active surveillance and 1035 into enhance hospitalization cohorts respectively. The enrollment will be completed in March 2018 and the follow up visits will continue till 2023.

**Funder(s)**

GlaxoSmithKline Biologicals
Phase IIIb randomized, open, controlled, multi-center study to evaluate the immunogenicity and safety of the RTS,S/AS01E candidate malaria vaccine, when administered as primary vaccination at 6, 7.5 and 9 months of age with or without co-administration of measles, rubella and yellow fever vaccines followed by an RTS,S/AS01E booster vaccination 18 months post Dose 3, to children living in sub-Saharan Africa.

**Investigators:** Seth Owusu-Agyei, Kwaku Poku Asante, Kaali Seyram, Owusu Boahen, Japhet Adomako Anim, Samuel B.E. Harrison, Prince Agyapong Darko and Elvis Ato Wilson.

**Project start date:** June 2017

**Project end date:** June 2020

**Background**

In sub-Saharan Africa, most of the EPI vaccines are given in early infancy while measles, rubella and YF (Yellow Fever) vaccines are given at 9 months of age. Between the first Expanded Programme on Immunization (EPI) vaccines and the measles, rubella and Yellow Fever vaccines, children receive Vitamin A supplementation at 6 months of age as recommended by the World Health Organization. The implementation of RTS,S/AS01E vaccine in EPI could occur in children aged 5-17 months. To limit the number of clinic visits for young children and to optimize vaccine implementation, it would be more efficient to administer the first dose of RTS,S/AS01E during the EPI visit at 6 months of age when Vitamin A is given and to administer the third dose of RTS,S/AS01E on the same day as the YF, measles and rubella vaccines at 9 months of age according to the EPI schedule. This study intends to demonstrate that anti-CS immune response of the candidate malaria vaccine RTS,S/AS01E is not inferior when
RTS,S/AS01E is administered at 6, 7.5 and 9 months of age with the third dose given alone or in co-administration with a YF vaccine and a combined measles and rubella vaccine.

**Objectives**

The primary objective is to demonstrate the non-inferiority of the antibody response to the CS antigen when RTS,S/AS01E is co-administered with YF vaccine and a combined measles and rubella vaccine versus RTS,S/AS01E administered alone.

**Methods**

The study is a Phase IIIB, open, randomized, controlled, multi-centric study with three parallel groups. A total of 349 children have been randomly assigned into three study groups. In the Coad group, children have been randomized to receive Vitamin A at 6 months of age, RTS,S/AS01E vaccine at 6, 7.5 and 9 months of age, and YF vaccine and a combined measles and rubella vaccine at 9 months of age. Children will receive a booster dose of RTS,S/AS01E vaccine 18 months post Dose 3. In the RTS,S group, children have been randomized to receive Vitamin A at 6 months of age, RTS,S/AS01E vaccine at 6, 7.5 and 9 months of age, and YF vaccine and a combined measles and rubella vaccine at 10.5 months of age. Children will receive a booster dose of RTS,S/AS01E vaccine 18 months post Dose 3. In the Control group, children have been randomized to receive Vitamin A at 6 months of age and YF vaccine and a combined measles and rubella vaccine at 9 months of age. These children will receive RTS,S/AS01E vaccine at 10.5, 11.5 and 12.5 months of age plus a booster dose 17.5 months post Dose 3.

**Expected outcome**

The non-inferiority of the antibody response to the CS antigen when RTS,S/AS01E is co-administered with YF vaccine and a combined measles and rubella vaccine versus RTS,S/AS01E administered alone will be demonstrated.

**Progress**

Recruitment of study participants started on 19th June, 2017 and ended on 27th September 2017. A total of 349 children aged 6 months were enrolled. Follow up activities such as sample collection, vaccination of the study participants, management of adverse events and serious adverse events are being done.

**Funders:**

GlaxoSmithKline Biologicals S.A.
Study of immune correlates of protection against malaria after vaccination with RTS,S/AS01E: a comprehensive immunological arm of a Phase III double-blind, randomized, controlled multi-center trial (MAL067)

Investigators: The Vaccine Immunology Workgroup

Collaborators:
Noguchi Memorial Institute for Medical Research, Accra, Ghana
ISGlobal, Barcelona, Spain
Malaria Vaccine Immunology Consortium (MalVIC)

Project start date: June 2009
Project end date: December 2018

Background
GlaxoSmithKline Biological in partnership with the Program for Appropriate Technology in Health (PATH) Malaria Vaccine Initiative (MVI) has tested and developed the candidate malaria vaccine RTS,S and seen it through advanced stages of clinical trials. RTS,S has been shown to be safe and to induce significant protection against *P. falciparum* infection and/or clinical malaria in naïve adults, semi-immune adults, semi-immune children, and infants. RTS,S has shown evidence of protective efficacy up to 21 months and sustained protection up to 45 months after full vaccine course in one Phase IIb trial conducted in Mozambican children; however, it induced a short-term protection in Gambian adults. The vaccine has also shown to be immunogenic by inducing high levels of IgG antibodies to CSP, and modest cellular immune responses. Despite attempts to describe both CSP-specific antibody and cellular immune responses, and to correlate them with protection, the mechanism of protracted protection induced by RTS,S is not yet clearly defined.

Objectives
- Describe induction of antibody and cellular immune responses against pre-erythrocytic and asexual erythrocytic stage *P. falciparum* antigens after vaccination with RTS,S/AS01E
- Compare antibody and cellular immune responses induced by RTS,S/AS01E between age cohorts (infants 6-12 weeks of age vs. children 5-17 months of age)
- Assess the effect on antibody and cellular immune responses of a fourth "booster" dose of RTS,S/AS01E vaccine.
- Compare antibody and cellular immune responses induced by RTS,S/AS01E between areas of different malaria transmission intensities.
Describe immune correlates associated with vaccine and naturally acquired protection

**Methods**

KHRC is participating in only the antibody component of this multi-centre study. Serum samples were collected at months 0, 3, 20, 21 and 32 during the main Phase 3 RTS,S malaria vaccine trial from infants 6 – 12 weeks and children 5 – 17 months at enrolment. Samples were stored in aliquots at -80°C, and are being used for the various analysis in different laboratories.

**Expected outcome**

This study will help provide an understanding of the how the RTS,S malaria vaccine works, and also contribute to the development of more effective next generation malaria vaccines.

**Progress**

Anti-CSP antibody concentrations, avidity, IgG subclass and IgM response, anti-HBsAg measurement using Luminex and ELISA techniques has been completed at ISGlobal (Spain) and the International AIDS Vaccine – Human Immunology Laboratory (IAVI-HIL, United Kingdom). Arrangements have been made for protein microarray analysis to be done by Antigen Discovery Inc, Irvine, USA.

**Funder(s):**

Program for Appropriate Technology/Malaria Vaccine Initiative and National Institute of Health
Environmental studies
Understanding adoption of clean cookstoves

Investigators:
KHRC: Kwaku Poku Asante, Rebecca Dwommoh, Theresa Tawiah, Francis Agbokey, Mohammed Mujtaba, Kenneth Ae-Ngibise, Ellen Boamah-Kaali, Charlotte Tawiah and Seth Owusu-Agyei.
Project start date: July, 2015
Project end date: June, 2019

Background
This study builds on the Ghana Randomised 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.

Objectives
• Collect stove use data in Ghana Cookstove Study (GCS) homes and regress use on household characteristics
• Assess the effects of stove type and usage on household time allocation using time activity diaries
• Test the effects of convenient access and health education on household stove use
• Carry out willingness to pay (WTP) experiments

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 of two rounds of data collection was conducted to assess households’ time allocation. Households were visited 3 times in each round and during each visit, time activity dairies were administered to measure their time use over a 24hour period. 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, ten Focus group discussions (FGDs) were conducted with participants in the intervention arms. Each group comprised of eight to ten women participants 33 conveniently sampled. Two approaches to promote stove use (providing a behaviour change intervention and
offering convenient access to LPG refueling) is being 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. Willingness to pay experiments using the Becker-DeGroot-Marschak Mechanism (BDM), a simple bidding procedure, will be conducted to assess participant’s willingness to pay for clean cook stoves. The willingness to pay survey will be conducted in areas outside of the current study region.

**Expected outcome**

- Household characteristics such as, size, mother’s education, and household wealth are expected to be predictors of intervention stove use.
- Significantly lower time will be spent for cooking and fuel gathering for the intervention arms compared to control arm.
- It is expected that study interventions (behavior change intervention and convenient access to LPG refueling) will improve clean cookstove adoption and sustained use.
- Larger, wealthier and more educated households are expected to have higher WTP

**Progress**

SUMS and Time Activity data collection have ended. Data cleaning, analysis and report writing are ongoing. Willingness to pay for clean cook stoves will be carried out in 2018. The survey on the effects of convenient access and health education on household stove use started in July 2017 and the team have distributed 875 LPG stoves and has consented and enrolled 808 participants into the study. The participants will be followed – up for one year.

**Funder(s):**

Columbia University, New York / National Institute of Health (NIH).
Case study of Ghana’s Liquefied Petroleum Gas Scale Up, adoption and sustainability

Investigators:
**KHRC:** Kwaku Poku Asante, Martha Ali Abdulai Samuel Afari Asiedu
**Columbia University:** Darby Jack
**Navrongo Health Research Centre:**
Colorado School of Public Health-USA
Daniel Carrion
Katie Dickinson Maxwell Dalaba

**Project start date:** September, 2016  
**Project end date:** September, 2017

Background
About 84% of Ghanaians meet their household energy needs by burning solid fuels; this corresponds to about 22 million people. Air pollution from the use of solid fuels for household cooking and other energy needs is the main risk factor for respiratory, cardio-vascular and ocular diseases. In Ghana, exposure to household air pollution accounts for the annual loss of 502,000 disability adjusted life-years and approximately 16,600 deaths per year. Ghana became the first country to promulgate a Sustainable Energy for All Action Plan in line with the United Nation’s Sustainable Energy for All (SE4All) program in June, 2012. This plan establishes strategies to significantly increase Liquefied Petroleum Gas (LPG) use for cooking in Ghana, particularly in rural areas.

The Government of Ghana launched the Rural LPG promotion program in 2013 as part of efforts to reduce deforestation and overdependence on wood as the primary fuel for cooking. The focus of the program is to increase access and use of LPG in rural areas where the majority of Ghanaians live and the use wood for cooking is high. The Rural LPG promotion program is coordinated by the Ministry of Energy and various stakeholders.

The Ghana case study falls within a broader aim of case studies (being developed in other countries) that seek to evaluate historical or ongoing clean cooking policy and intervention efforts. The goal of these case studies is to extract lessons useful for future program development as well as features that influence scale up and spread of successful efforts and how these may vary across populations and settings.
**Objectives**

To document Ghana’s scale up of LPG through a careful examination of Ghana’s Rural LPG promotion program which seeks to expand LPG access to 50% of Ghana’s population by 2020.

**Methods**

A desktop review/document analysis of literature on the Ghana Rural LPG promotion program was embarked on in September 2016. Each document was reviewed for information related to the elements of the Reach, Effectiveness, Adoption, Implementation and Maintenance framework as it pertained to Rural LPG promotion and adoption. In-depth interviews were held among key stakeholders in Ghana. Existing data from an evaluation of the Ghana Rural LPG promotion program in five rural communities in the Nkoranza District in the Brong Ahafo Region of Ghana was also assessed.

**Expected outcome**

A case study of Ghana’s Rural Liquefied Petroleum Gas Program Scale Up

**Progress**

Completed

**Funder(s)**

Implementation Science Network, National Institute of Health, USA
Adult Lung Function Study

Investigators:

KHRC: Kwaku Poku Asante, Seyram Kaali, Kenneth Ae-Ngibise, Ellen Boamah and Seth Owusu-Agyei.
Mount Sinai School of Medicine, New York, USA: Alison Lee
Columbia University: Darby Jack

Project start date: July 2016
Project end date: June 2018

Background
Interventions such as provision of Liquefied Petroleum Gas (LPG) stoves and other clean cook stoves to rural populations in Africa have been proposed as potential measures to reduce exposures to HAP. But the potential of such interventions to translate into real life health gains have not been evaluated. 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 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 1second (FEV₁)).

Objectives

- Cookstove intervention status (liquefied petroleum gas (LPG) versus 3-stone fire), after adjustment, for covariates/confounders (e.g., socioeconomic status (SES)/household characteristics, anthropometrics, tobacco smoke exposure), will independently predict:
  - Lung function and respiratory symptoms at proposed study enrollment. We hypothesize that LPG will be associated with better lung function and fewer respiratory symptoms at proposed study enrollment.
  - Rate of lung function decline and frequency of respiratory symptoms over proposed study period. We hypothesize that LPG will be associated with better rate of lung function decline and fewer respiratory symptoms over proposed study period.

- HAP exposure Effects of Respiratory Outcomes (Exposure-Response)
  - HAP exposure over GRAPHS 16-month study period, after adjustment for covariates/confounders, will independently predict lung function and respiratory
symptoms upon study enrollment. We hypothesize that reduced GRAPHs HAP exposure will be associated with better lung function and fewer respiratory symptoms upon proposed study enrollment.

- HAP exposure over proposed study period, after adjustment for covariates/confounders, will be independently associated with rate of lung function decline and frequency of respiratory symptoms over proposed study period. We hypothesize that reduced HAP exposure will be associated with better rate of lung function decline and fewer respiratory symptoms over proposed study period.

**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 4 years to quantify the impact of clean cookstove intervention on birth weight and incident pneumonia during the first year of life.

In this study, a subset of 437 women belonging to the LPG and control arm is being followed up. During this extended follow-up, data on respiratory symptoms and lung function will be collected on all participants at three time points.

**Expected outcome**

Effect of cookstove status on FEV1 other lung function parameters

Effect of HAP exposure during GRAPHs on FEV1 decline over the study period

**Progress**

The first round of data collection has been completed. Preparations are on-going to start the second round in March 2018

**Funder(s)**

Global Alliance for Clean Cookstoves
Innovative technology research:  
Continuum of Care (CoC) card for family planning implementation research project

Investigators: Kwame K. Adjei, Irene Tampuri Azindow, Yeetey Enuameh, Felix Oppong, Kwaku Poku Asante and Seth Owusu-Agyei.

Project start date: January, 2017  
Project end date: May 2018

Background

Despite the high importance placed on family planning in Ghana, the use of modern contraceptives amongst women in their reproductive age remains low (23%) as reported in the most recent Ghana Demographic and Health Survey (GDHS). The situation is not different amongst adolescent females (19.5%). In Kintampo, the contraceptive prevalence rate amongst women is also low. Challenges in information, communication, education and stigmatization as well as documentation and supervision of health workers are evident in the district. The ‘Continuum of Care (CoC) card for family planning’ implementation research aims to address some of these challenges

Methods

An implementation effective hybrid design was employed for the study using three main phases: baseline, intervention and endline. Contraceptive use in the study area served as baseline. For the intervention phase, the CoC card is being used to schedule participants for family planning activities such as counseling and uptake of a contraceptive method. Women of reproductive age (15-49) who receive any of these services on time are given a golden star to encourage them. Women who do not receive their services on time get an orange star and women who do not show
up at all do not receive a star. An end line survey would be conducted at the end of the intervention. Qualitative interviews would also be conducted amongst purposively selected participants and health workers as part of the end line survey.

**Progress**

Regulatory approvals have been obtained. A Continuum of Care (CoC) card for family planning has been developed with the help of some selected health workers in the study area and this has been gratefully received by all health workers and relevant stakeholders. Implementation phase of the study is currently ongoing.

**Funder(s)**

David & Lucille Packard Foundation
Validation of a Protein Creatinine (PrCr) dipstick diagnostic test for proteinuria screening in antenatal care clinics in Ghana

Investigators:
KHRC: Charlotte Tawiah
KNUST: Sam Newton
PATH: Emily Gerth-Guyette, Troy Leader, Pooja Bansil and Nicole Advani

Project start date: October 2017
Project end date: October 2018

Background

The World Health Organization estimates that preeclampsia/eclampsia (PE/E) - pregnancy induced high blood pressure and excess protein in urine— which can lead to seizures and other fatal complications accounts for at least 16% of maternal deaths in low-resource settings (LRS). The risk that a woman in a low-resource country will die of PE/E is approximately 300 times greater than that for a woman in a high-resource country. Currently, blood pressure and proteinuria are the cardinal clinical indicators for identifying pregnant women at risk for developing PE/E. These indicators are commonly measured in hospitals and community clinics in national antenatal care (ANC) programs.

To meet the need for more cost- and performance-effective proteinuria screening, PATH is working with LifeAssay Diagnostics (Pty) Ltd. (Cape Town, South Africa) to advance a PrCr urine dipstick.

PATH and KHRC are undertaking an evaluation research which aims to validate the LifeAssay PrCr dipstick in a prospective use of the prototype in ANC settings in the Brong-Ahafo Region of Ghana. This evaluation will not only build understanding of the use of the prototype to achieve
these aims, but also generate pivotal data on the performance of the prototype, compared to reference testing and clinical data, when used in target antenatal clinic settings.

**Objectives**

Assess the accuracy of the PrCr dipstick test for detection of proteinuria in representative antenatal care settings in a target low-resource setting/country.

**Methods**

This cross-sectional diagnostic accuracy evaluation will employ mixed methods to assess the performance of the PrCr dipstick test and to explore the operational feasibility of using this test as an alternative to the current protein-only test. These methods include: detection of proteinuria using the PrCr dipstick test compared to the current standard of care and laboratory reference assay used for confirming proteinuria; analysis of pregnancy outcomes and review of referral records and assessment of use of PrCr test with other clinical indicators and integration into diagnostic algorithms. Others include Pre- and post-evaluation of ANC staff training on use of the PrCr test; Interviews with ANC staff and consultations with key district and national stakeholders.

**Expected Outcome**

- To generate a body of evidence that will determine performance characteristics of the current PrCr dipstick test.
- To generate pivotal data on the performance of the prototype, compared to reference testing and clinical data, when used in target ANC settings.
- To test the feasibility of its use in target ANC settings

**Progress**

Ethics approvals are being sought to commence the study.

**Funder(s):**

Program for Appropriate Technology in Health (PATH)
Sexual and Reproductive Health (SRH)

Knowledge, Community Perceptions, and Treatment Options for Infertile Males and Females in Central Ghana.

Investigators:
KHRC: Ellen Boamah-Kaali and Kwaku Poku Asante
Georgetown University: Ashley Osatohanmwen Uzamere and Bernhard Liese

Project start date: August, 2017
Project end date: December 2017

Background:
Infertility, often a neglected area of research, is a global health issue that affects people all over the world. Although infertility is universal, its burden differs from place to place. In the Brong Ahafo Region of Kintampo, Ghana, the community perceptions of infertility along with the scarcely available treatment options may create a heavy psychological, financial, and social burden on couples and their families. It necessary to raise awareness of the problem of infertility as a public health issue, to shift community perceptions and promote provision of necessary reproductive health services. This study aimed to investigate the knowledge and community perceptions of infertility and to explore the existing methods used to treat infertility among males and females in the Central Ghana.

Methods
Twelve interviews were conducted among community stakeholders and 400 community members to explore the perception of the community in relation to infertility and the available treatment options. We interviewed males and females (18-49 years of age), infertile couples, modern medical care providers, religious leaders, a traditional medical care provider, a traditional spiritual healer, and a 90 year old woman in the community. Both qualitative and quantitative research methods were applied using in-depth, semi-structured interviews and structured questionnaires. The qualitative results were thematically analyzed using the study objects as a guide. The quantitative results were analyzed using STATA version 14.
Results
The findings showed that the community had little to no knowledge on the meaning and causes of infertility. The community perceptions of infertility were generally negative and infertile people were seen to be depressed, angry, mistreated, and unsupported. There was a significant association between one’s educational level and treatment seeking behavior. Modern/hospital based treatments methods were seen as ideal however traditional/herbal treatment methods were most utilized due to factors like affordability and accessibility.

Discussion
The importance of sexual and reproductive health education is recognized, as education significantly determines one’s course of treatment. Infertility is generally seen in a negative light and infertile people are often stigmatized within the Central Ghanaian community. Treatment options for infertility vary but traditional/herbal treatment options are most likely used.

Funder(s)
Georgetown University and Kintampo Health Research Centre
Mental Health
Prevalence and correlates of antenatal depression among pregnant young women in Accra metropolitan area, Ghana

Investigators:
University of Ibadan: Harriet Yayra Adzofu and Akinyinka Omigbodun.
Project start date: May, 2017
Project end date: February, 2018

Background
Pregnancy among young women remains a serious public health and social problem globally. It is often associated with many hormonal, physical and psychological changes, during which women are vulnerable to psychological disorders such as depression. In Sub-Saharan Africa, major depressive disorder is one of the leading causes of Disability Adjusted Life Years (DALYs). Antenatal depression is a form of clinical depression that can affect a woman during pregnancy and found to be the strongest risk factor for postnatal depression if not properly treated. Any form of prenatal stress felt by the mother can have negative effects on various aspects of fetal development, which can cause harm to the mother and child. Despite its enormous burden, antenatal depression remains undiagnosed and undertreated in low and middle-income countries including Ghana.

Objectives
To determine the prevalence of antenatal depression and its associated factors among pregnant young women (15-24 years) in Accra Metropolitan area of Ghana.

Methods
A facility-based cross sectional survey was conducted among 336 pregnant young women in their third trimester (28 weeks’ gestation and above). Data was collected using a pre-tested interviewer-administered structured questionnaire in six health facilities providing antenatal care services in the study area. Participants were screened for depression using the patient health questionnaire depression module (PHQ-9) to ascertain DSM-IV classification of depression. All eligible pregnant young women were enrolled consecutively until sample size was obtained. Microsoft Excel and STATA version 14 were used for data entry and analyses respectively. Bivariate analysis
was conducted to determine the relationship between explanatory variables and antenatal depression. Variables which showed significant association (p<0.05) at the bivariate level was exported onto multi variable logistic regression model to adjust for confounders and determine associations. Level of significance was set at 5%.

**Results**

A total of 327 young women (97.3%) were eligible for final analysis. The mean age of study participants was 20.9 ± 2.3(SD) years. There was an 18.7% prevalence of major depressive symptoms among respondents. The odds of antenatal depression among younger women (15-19 years) was 1.6 (AOR=1.6 95%CI: 0.79-3.05) times more compared to the odds of 20-24 years’ group. Social support was generally high from all three sources (family, friends and significant others). High and moderate levels of family support showed a protective effect for antenatal depression. Significant association was determined between antenatal depression and death of a parent, child or spouse (p=0.000), break-up of a steady relationship (p=0.038), loss of a close friend or other relative (p=0.004), and hypertension (p=0.030).

**Conclusion**

Antenatal depression is prevalent in this study population. The findings underscore the association of specific stressful life events, hypertension and the occurrence of antenatal depression. Clinical attention to these medical and psychosocial factors is recommended for early detection and treatment of vulnerable groups.

**Progress**

Fieldwork was completed successfully and the report submitted.

**Funder(s)**

African Union Commission, University of Ibadan and Kintampo Health Research Centre
Validation of the Symptom Checklist-90-R (SCL-90-R) among adolescents in the Kintampo districts in Ghana.

Investigators:
KHRC: Solomon Nyame, Felix Oppong and Kwaku Poku Asante
Georgetown University: Briana White and Bernhard Liese
Project start date: August, 2017
Project end date: December 2017

Background
Adolescent mental health is an important global health issue. It is particularly important in Sub-Saharan Africa where there is a large adolescent population. Ghana is no exception. There is a void in the area of adolescent mental health research in Ghana. For research in this area to be completed, properly validated research tools must be available. There have been very few studies, which have validated the diagnostic capabilities of mental health questionnaires in adolescent populations in Ghana and none which have done so in rural areas. This study explored the concurrent and factorial validity of the Symptom Checklist-90-R (SCL-90-R) in the Kintampo districts in Ghana, a predominantly rural area.

Objectives
To assess the validity of the SCL-90-R among adolescents within Kintampo North Municipality and Kintampo South District.

Methods
In this quantitative study, 425 students responded to the SCL-90-R and 80 students consulted with clinical psychologist to evaluate the SCL-90’s diagnostic capabilities, which was analyzed using Receiver Operator Characteristics Curve (ROC). Confirmatory factor analysis was conducted to evaluate the proposed 9 sub-scales. Internal consistency was evaluated using Cronbach’s alpha. Correlations between sub-scales were evaluated using Pearson Coefficient. The frequency of questions which students did not understand was tallied.

Results
Confirmatory factor analysis did not support the original 9 sub-scales, as indicated by a CFI of 0.83. However, the Root Mean Square Error of Approximation (RMSEA) and Standardized Root
Mean Residual (SRMR) models indicated a good fit with values less than 0.05. Further exploratory factor analysis did not propose a satisfactory alternative model, although a four-factor model did have the best CFI (Confirmatory Fit Index) value of 0.85. Analysis of Cronbach’s alpha indicated acceptable internal consistency. Pearson's Coefficient indicated the sub-scales were highly correlated. Forty-eight percent (48%) of the participants did not understand at least one question. The SCL-90-R’s had an acceptable Area Under the Curve (AUC) value of 0.71 although results displayed a low specificity (0.57) and Positive Predictive Value (PPV) (0.21).

**Progress**
This project was completed successfully and the report submitted.

**Funder(s)**
Georgetown University and Kintampo Health Research Centre
CHAPTER 5: Malaria studies

Strengthening Quality of Malaria Care and Surveillance in Ghanaian Communities

Investigators:

KHRC: Kwaku Poku Asante, Charlotte Tawiah Agyemang and Francis Agbokey
NHRC: Abraham Rexford Oduro and Evelyn Sakeah
DHRC: John Williams and Vida Kukula
INDEPTH Network: Osman Sankoh and Mamusu Kamanda

Project start date: December 2017
Project end date: May, 2020

Background

Malaria is one of the leading causes of death in sub-Saharan Africa and though preventable, the disease remains a public health threat in Ghana. Children under 10 years of age and pregnant women are most at risk. Malaria control has primarily focused on children under 5 years, but there is also a high burden in older children. Though malaria exists throughout Ghana, patterns of malaria vary across the country. There are also differences between regions in access to health services and social context, which impact malaria treatment seeking behaviour. In most communities in Ghana, the first point of call for treatment of fever is at the licensed chemical shops and other community health workers, where malaria diagnosis and treatment is largely inadequate; with < 10% of the population accessing quality malaria care.

Stakeholders busily fashioning out strategies to implement the project during the Project Implementers Meeting organized by INDEPTH-Network on July 27, 2017 in Accra, Ghana.
There have been efforts by the National Malaria Control Programme (NMCP) to scale up community-based treatment of malaria in all districts through home-based care of malaria targeting children to complement efforts of malaria care in the existing health system. However, this is challenged by inadequate human resource and logistics supply, poor supervision, inadequate community involvement and inadequate capacity for quality data collection that is required for monitoring the progress of malaria control.

To address this gap, INDEPTH Network seeks to implement a community based project called “Strengthening quality of malaria care and surveillance in Ghanaian communities”. This proposed study will evaluate the existing health system on malaria care and put in measures to improve it. The primary beneficiaries of this project will be children <10 years of age and pregnant women.

**Objectives**

- To enhance access to quality malaria care at the community level.
- To improve knowledge among malaria care providers at the community level.
- To enhance community demand for quality malaria care.
- To generate quality malaria data for decision making.
- To improve monitoring and supervision at the community level.

**Methods**

This is a cross-sectional study using both quantitative and qualitative methods to provide quantitative estimates of the project on study desired outcomes and qualitative evidence that explain some aspects of the project respectively. The study will be carried out in six districts: Ningo Prampram and Shai Osu-doku Districts in the Greater Accra Region, Kintampo North and South Districts in the Brong-Ahafo Region and Kassena Nankana Municipality and Kassena-Nankana West Districts in the Upper East Region.

**Expected outcome**

1. Enhanced access to quality malaria care at the community level.
2. Improved knowledge among malaria care providers at the community level.
3. Community demand for quality malaria care enhanced.
4. Quality malaria data for decision making generated.

**Progress**

- The study has received full approvals from the KHRC Scientific Review Committee and KHRC Institutional Ethics Committee, GHS Ethics Review Committee.
- Preparations underway for baseline data collection to be done from February, 2018.

**Funder(s)**

Comic Relief

**Collaborators**

- Ghana Health Service
- National Malaria Control Programme (NMCP)
- The INDEPTH-Network
- Africa Media Malaria Research Network (AMMREN).
Epidemiology of malaria transmission intensity in sub-saharan African


Project start date: September 2014
Project end date: November 2022

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 introduction of the 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 600 children aged 6 months to 9 years children in nine consecutive self-contained Epochs. The survey is being carried out at peak malaria transmission season in the study area. No vaccine is been administered in this study. All medications that may influence malaria parasitaemia 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 parasitaemia 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

Received Kintampo Health Research Centre Institutional Ethics Committee (KHRC IEC) approval and Ghana Health Service Ethical Review Committee (GHS ERC) approval prior to commencement of study. Completed 4 surveys enrolling a total of 2400 children aged 6 months to 9 years. The team has five more surveys to complete the study.

Funders: GlaxoSmithKline Biologicals (GSK)
Baseline indicator estimates for monitoring the impact of sulphadoxine-pyrimethamine intermittent preventive treatment of malaria during pregnancy in Ghana

**Investigators:** Kwaku Poku Asante, David Dosoo, Richard Gyasi, Seth Owusu-Agyei

**Project start date:** January 2017  
**Project end date:** December 2017

**Background:**

The World Health Organization (WHO) has recommended administration of SP to all pregnant women at each scheduled antenatal care visit, starting early in the second trimester with the last dose administered late in the last trimester (after 36 weeks). In Ghana, the new WHO policy is currently being implemented at Antenatal Care clinics. Monitoring the impact of the current regimen of SP IPTp is key in making decisions regarding malaria control among pregnant women in Ghana.

**Objective**

To determine the prevalence of placental malaria among pregnant women at the three ecological belts (southern, middle and northern) of Ghana.

**Methods**

This cohort study enrolled 1100 pregnant women in their 3rd trimester from the three ecological zones of Ghana (i.e. Navrongo, Kintampo and Dodowa). At delivery, placental tissue, cord blood and maternal peripheral blood were collected to determine placental malaria, peripheral malaria parasitaemia and haemoglobin levels in mother and baby. Babies were be weighed within 24 hours after delivery to determine low birth weight (weight <2.5 kg).

**Expected outcome**

This study will determine the prevalence of placental malaria and key pregnancy outcomes (such as low birth weight, maternal anaemia) as baseline data for subsequent monitoring and evaluation of SP IPTp in Ghana.
Progress
The study received Scientific and ethical approvals from the Kintampo Health Research Centre (KHRC) Scientific Review Committee, Kintampo, Navrongo and Dodowa Health Research Centres Ethics Committees, and Ghana Health Service Ethics Review Committee. Field data collection is completed. Blood slide reading for malaria parasites and haemoglobin estimation has been completed. Placenta histological slide reading for malaria parasites and data entry is currently ongoing.

Funders:
Global Fund / National Malaria Control Programme

Collaborators:
- Navrongo Health Research Centre
- Dodowa Health Research Centre
Improving access to malaria rapid diagnostic tests for test-based management of malaria at private licensed chemical shop in the middle belt of Ghana (LiCSS II).

Investigators


District Health Directorate (GHS): Anthony Ofori,

Project start date: January, 2017.
Project end date: July, 2018.

Background

The scale up of test-based management of malaria at licensed chemical shops using malaria rapid diagnostic test kits by the National Malaria Control Programme was to improve malaria diagnosis and treatment at the community level. Low community awareness of the initiative, frequent stock-out and high cost of malaria rapid diagnostic test kits are barriers to successful implementation.

Objectives

To explore community engagements and district-wide marketing strategies to improve uptake of test-based management of malaria using malaria rapid diagnostic test kits at licensed chemical shops.
Methods

The study area is Kintampo North Municipality and Kintampo South District in the Brong Ahafo Region of Ghana. The research design is a mixed method using the sequential explanatory approach with the initial collection and analysis of quantitative data followed by that of qualitative data. The study implementation plan is in three phases namely pre-intervention, intervention and post-intervention. During the pre- and post- intervention phases, the same study tools will be used to collect data through household and drug outlet surveys. The intervention activities include information education and communication strategies, training on malaria rapid diagnostic testing and case-management as well as empowering the Licensed Chemical Sellers’ Association to leverage for the regular supply of malaria rapid diagnostic test kits. The perception of the community members as well as the opinion of key stakeholders in the malaria rapid diagnostic test supply chain and program implementers on the effectiveness or otherwise of the intervention will be assessed.

Expected outcome

The primary outcomes of interest will be the change in the proportions of LCS with no mRDT stock-out and change in the mean price of mRDT at the pre- and post-intervention phases. The secondary outcome is the change in the proportion of community members with a history of fever who had a malaria test with mRDT before treating malaria.

Progress

The approval of the study by the Scientific and Ethical Committees of the Kintampo Health Research Centre and the Ghana Health Service paved way for the commencement of field activities. A consultative meeting among key stakeholders was held on 7th Sep, 2017 to discuss the implementation activities.

At the completion of pre-intervention phase, 257 household interviews and seventy-six (76) outlet surveys at licensed chemical shops including inventories of antimalarials and mRDT were completed over 6 weeks period. The completed questionnaires are being entered for statistical analysis. Plans are far advanced to roll out fully the intervention packages till end of March 2018. This will be followed by quantitative data collection and finally the collection and analysis of the qualitative interviews until June 2018. A month will be needed for report writing with study expected to end in July 2018.
Funders:

- World Health Organization TDR
- University of Ghana School of Public Health

Collaborators:

- Regional Health Directorate, Ghana Health Service, Sunyani.
- The Pharmacy Council of Ghana, Sunyani.
- The Municipal Health Directorate, Ghana Health Service, Kintampo.
- The District Health Directorate, Ghana Health Service, Jema.
Employing Modified Contact Tracing as a tool to improve adherence to Sulfadoxine-Pyrimethamine for intermittent preventive treatment of malaria among pregnant women in the Kintampo north municipality and Kintampo south district of Ghana

Investigators:


Municipal Health Service, Techiman Municipality (GHS): Damien Punguyire

Project start date: October 2017
Project end date: October 2018

Background

Intermittent Preventive Treatment of malaria in Pregnancy (IPTp) with Sulfadoxine-Pyrimethamine (SP) is a proven effective public health intervention that reduces placental malaria, malaria episodes, malaria-related anaemia, and incidence of low birth weight and neonatal mortality in malaria endemic region. The updated World Health Organizatio (WHO) policy on IPTp recommends that all pregnant women receive at least three doses of SP starting from the second trimester, at each scheduled ANC visit until delivery. However, several studies have reported sub-optimal implementation and low coverage of the IPTp policy despite high ANC coverage. The drop-out rate from the programme is very high with increasingly smaller proportions of women receiving the second and subsequent doses of SP.

Objectives

- To determine the impact of the MCT strategy on the proportion of women who take 3 or more doses of SP for IPTp
- To determine the impact of MCT on birth weight
- Explore Client related perceptions concerning the MCT strategy
- Identify challenges that health systems might face in adhering to the MCT strategy
Methods

Our hypotheses will be tested in a pragmatic comparative trial involving pregnant women attending their first ANC visit at the Tuobodom and Tanoso Health Centres. Health workers and women attending Tuobodom Health Centre receive the intervention, plus routine antenatal care, while their counterparts in Tanoso Health centre receive only routine antenatal care. Women are followed-up for the entire duration of their pregnancy during which data on SP intake and birthweight at delivery will be collected. Exit interviews will be conducted among some health workers and women after delivery.

Expected outcome

- Proportion of women who take 3 or more doses of SP in the 2 districts
- Mean birth weight of babies born to women in the two districts
- Perceptions and acceptability of MCT strategy to women
- Challenges of implementing MCT in the health system from the perspective of the health workers.

Progress

We have enrolled 185 out of 220 women as at December 2017. Follow-up activities to record SP intake is on-going.

Funder(s)

- WHO-Strengthening Capacity for Implementation Research Programme
- University of Ghana School of Public Heath
Maternal and Child Health Studies:  
A Randomized Comparison of Household Survey Modules for Measuring  
Pregnancy Outcomes in Five INDEPTH HDSS Sites

Investigators

KHRC: Ernest Nettey, Seeba Amenga-Etego, Francis Dzabeng, Charlotte Tawiah, Kwaku Poku Asante and Seth Owusu-Agyei
INDEPTH network: Hannah Blencowe, Akuze Joseph Waiswa, Doris Kwesiga, Peter Waiswa
LSHTM: Vladimir Gordeev, Angela Baschieri and Joy E Lawn
KNUST: Yeetey A. Enuameh and Sam Newton
LSTM: Alex Manu

Project start date: February 2016
Project end date: December 2018

Background

The “Every Newborn Action Plan” (ENAP) was initiated in 2014 to further progress in ending the preventable death of mothers and children. In settings with weak Civil Registration and Vital Statistics (CRVS) systems, MNCH data have been collected over the past three decades through the Demographic and Health Surveys (DHS).

Some evidence suggests that a key component of data collection in the DHS known as the “birth history” approach underestimates stillbirths and newborn deaths, and that the alternative “pregnancy history” approach yields more accurate data. Both the birth and pregnancy histories do capture MNCH outcomes that occurred 5 years ahead of each survey in a reproductive history calendar. To this end, this study has the following aims:

Objectives

- Compare household survey methods for the capture of stillbirths and neonatal deaths
- Evaluate household survey capture of birth weight and gestational age
- Optimise HDSS capture of pregnancy outcomes (stillbirths, neonatal deaths, birth weight and gestational age)
- Identify barriers and enablers for survey and HDSS data collection of pregnancies and pregnancy losses
Methods

Women of reproductive age will be individually randomized to receive either the pregnancy history or the DHS-7 birth history questionnaires. Kintampo HDSS will conduct 15000 interviews.

DHS-7 questions on birth weight are administered to all sampled women as under objective 1. Also, additional questions regarding gestational age will be asked to assess whether women are able to recall length of pregnancy in weeks.

Level of misclassification between miscarriages, stillbirths and neonatal deaths will be assessed by comparing pregnancy history with HDSS data and birth history and the routine HDSS data.

A mixed methods approach will be implemented to identify the barriers and enablers for women reporting pregnancies and pregnancy losses. In addition, the interviewer questionnaire data will be analyzed to assess if the data collection of pregnancy losses is related to characteristics of interviewers.

Progress

The survey modules are being collected on tablets using the survey solution mobile data collection systems. All server equipment for hosting the collected data is stationed at KHRC with a secured network infrastructure that enables exchange of data between all devices.

Pilot fieldwork began on 9th October 2017 and actual field data collection started 16th October 2017. As of 1st December the team had interviewed 2,768 out of 15,000 women (17.9%) and recorded 4,344 births in the past 5 years.

Funder(s)

Children’s Investment Fund Foundation (CIFF), Canada

Collaborators

- London School of Hygiene and Tropical Medicine (UK),
- INDEPTH Network
- Kintampo Health Research Centre
Coverage and timeliness related issues of MCV1 and MCV2 in Kintampo North and South districts in the Brong-Ahafo region of Ghana


Project start date: March, 2017
Project end date: October, 2017

Background

Vaccination is one of the most cost effective interventions for the prevention of most childhood diseases, preventing more than 2.5 million child deaths every year. However, most children in developing countries are not fully immunized. One of the WHO strategic plans for measles is to ensure that 95% of all infants receive both the first (MCV1) and second dose of measles vaccine (MCV2) by 2020. There is a gap between the first and the second dose of measles vaccination in Ghana. For instance, in 2014 coverage for the MCV1 was 90%, but the MCV2 was only 60%. Therefore, a mixed method cross sectional study was employed to determine the coverage and timeliness of measles vaccination in the Kintampo North Municipality and Kintampo South District.

Objectives

To determine the coverage and timeliness of measles vaccination in the Kintampo North Municipality and South District.

Methods

This was a nested cross-sectional survey in the Kintampo Health and Demographic Surveillance Systems (KHDSS) activities. Both quantitative and qualitative methods were used to identify and generate appropriate strategies to help improve the coverage and timeliness of measles vaccination, particularly uptake of the second dose in the study area. The quantitative aspect analyzed retrospective data from the KHDSS from 2011 to 2015, using STATA 14.0, to document the coverage and timeliness of MCV1 and MCV2. The qualitative aspect of the study sought to gain an in-depth understanding into the experiences of identified stakeholders and caregivers on challenges and facilitating factors on why the coverages for the measles rubella vaccines are low and to make recommendations for improving coverage and timeliness of the vaccine. Approvals
were sought prior to the commencement of the study, from the Scientific Review Committee and Institutional Ethics Committee of the Kintampo Health Research Centre. Qualitative data collection was conducted over a period of three months (May – July, 2017). NVivo version 10 was used to analyze the data to outline the key themes, the challenges, facilitators and barriers and also made recommendations for improving coverage and timeliness within the study setting.

**Expected outcome/Key findings:**

The study was expected to help generate evidence of existing challenges, if any, encountered within the health system during the administration of MCV1 and MCV2, and to recommend appropriate strategies to address them.

Results from the study show that immunization coverages for the first dose of Measles (MCV1), in the two districts over the five years (2011-2015) was between 84% to 94%, while that for the second dose of Measles vaccine (MCV2), was between 25% to 33% for the three years (2013-2015). Timely uptake (receiving a vaccine at the appropriate date as scheduled) of both doses of Measles vaccine was found to be relatively low over the period (from January 2011 to December 2015). About 70% of the children who took both doses of the measles vaccine, took it late while less than 12% took it earlier than the expected date. Inadequate or no education on the importance of the measles-rubella vaccine, time wasting (Caregivers), distance to health facilities, unhealthy competition among the mothers in terms of what they wear for child welfare clinics and logistical constraints on the part of health workers were some of the factors found to be responsible for the low coverage of MCV2.

**Progress**

Study completed and results shared with Ghana Health Service.

**Funder:**

Expanded Program of Immunization (EPI) Department, Ghana Health Service

**Collaborators**

Ghana Health Service
Non Communicable Disease studies

Investigators

KHRC: Kwaku Poku Asante, Solomon Nyame, Kwame Adjei, Oscar Agyei and Felix Oppong

KNUST: Jacob Plange-Rhule, Kezia Mantey and Kingsley Apusiga, Joyce Gyamfi and William Chaplin

New York University: Gbenga Ogedegbe,

St Louis University: Juliet Iwelunmor

Project start date: September 2017

Project end date: December 2022

Background

In countries like Ghana, hypertension, once a rare disease, has become a major public health problem, and the 2nd leading cause of morbidity in adults. Epidemiological study on hypertension was conducted between October 2015 and December 2016 as part of the Kintampo Non-Communicable Disease Initiative. Results from the study revealed that the prevalence of hypertension was 24.6% and approximately 55% of those with hypertension did not know their status, hence, were not on any medication. Thus, intervention was needed. One of the greatest challenges to optimal hypertension control in Sub-Saharan Africa (SSA) is the acute shortage of healthcare workers. The World Health Organization (WHO) launched a series of evidence-based practices for low middle-income countries including WHO Cardiovascular Disease (CVD) Risk package utilizing the Task Shifting strategy to improve the shortage of health workers for CVD prevention and control. These strategies of using non-physician health workers, such as community health workers and nurses are proven to be viable and cost-effective.

Objectives

- Identify practice capacity for the adoption of TASSH at CHPS compounds and develop a culturally tailored Practice Facilitation (PF) strategy using qualitative methods.
- Evaluate in a stepped-wedge cluster randomized control trial, the uptake of a Practice Facilitation (PF) strategy versus the Usual Care (UC) in the control and management of blood pressure in Community Health Planning Services
• Compare in a stepped-wedge cluster RCT, the clinical effectiveness of the PF strategy vs. UC on systolic BP reduction among adults with uncontrolled hypertension.

Methods

This mixed-methods, “Hybrid Type II” Effectiveness-Implementation study will take place in six contiguous districts in the Brong Ahafo of Ghana (Kintampo North, Kintampo South, Nkoranza North, Nkoranza South, Techiman Municipal, and Techiman North). A culturally acceptable practice facilitation strategy will be developed based on recommendations from key stakeholders guided by Damshroeder’s Consolidated Framework for Implementation Research (CFIR). Community Health Officers will be trained based on the practice facilitation strategy developed. Seventy (70) CHPS zones will be selected and randomized into intervention and control groups. The intervention group will implement the practice facilitation strategy whereas the control group will provide the usual care in the first year. In the second year, the usual care group will implement the facilitation strategy whereas the implementation group will provide the usual care. At the post-implementation phase, the study team will evaluate the adoption and sustainability of TASSH in participating CHPS zones using the Reach Effectiveness Adoption Implementation and Maintenance (RE-AIM) framework.

Expected outcome

Primary Outcome: The rate of adoption of TASSH at the CHPS compounds.

The primary outcome will be assessed by the following measures:

• The number of newly detected hypertensive patients by the CHO using the WHO Risk Prediction Chart
• Proportion of patients who received lifestyle counseling by the CHO
• The proportion of eligible patients that were referred to physicians and specialist for further care.

Secondary Outcomes:

• The between-group difference in systolic BP
• Mediators of adoption of TASSH at the CHPS compounds
• The sustainability of TASSH uptake.
Progress

Obtained all IRB approvals (KNUST, Kintampo Health Research Centre, Ghana Health Services)
Finalized a list of Steering Committee members for the pre-implementation phase of the project
Held both National and Regional Stakeholders meetings
Engaged identified stakeholders (National, Regional and Districts) to documents the policies and activities of CHOs for hypertension control.

Funders:

National Institute of Health (NIH)

Collaborators

New York University, Kwame Nkrumah University of Science and Technology
CHAPTER 6: CAPACITY BUILDING
Human resource capacity of KHRC

The list below portrays the human resource capacity of KHRC

<table>
<thead>
<tr>
<th>Human Resource Capacity</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemiologist</td>
<td>5</td>
</tr>
<tr>
<td>MPH Clinical Research Fellows</td>
<td>3</td>
</tr>
<tr>
<td>MPH-non clinical</td>
<td>5</td>
</tr>
<tr>
<td>Medical assistant</td>
<td>3</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>1</td>
</tr>
<tr>
<td>Biochemist/Molecular Biologist</td>
<td>1</td>
</tr>
<tr>
<td>Parasitologist</td>
<td>1</td>
</tr>
<tr>
<td>Bacteriologist</td>
<td>4</td>
</tr>
<tr>
<td>Immunologist</td>
<td>4</td>
</tr>
<tr>
<td>Entomologist</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory technologist/technician</td>
<td>9</td>
</tr>
<tr>
<td>Analytical Chemist</td>
<td>1</td>
</tr>
<tr>
<td>Clinical Trialist</td>
<td>2</td>
</tr>
<tr>
<td>Statistician</td>
<td>1</td>
</tr>
<tr>
<td>Data Managers</td>
<td>8</td>
</tr>
<tr>
<td>Demographer/Population health</td>
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</tr>
<tr>
<td>Sociologist/Anthropologist</td>
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<tr>
<td>Social scientist</td>
<td>6</td>
</tr>
<tr>
<td>Nutritionian</td>
<td>1</td>
</tr>
<tr>
<td>Health Economist</td>
<td>2</td>
</tr>
<tr>
<td>Administrator-General</td>
<td>1</td>
</tr>
<tr>
<td>Human Resource Manager</td>
<td>1</td>
</tr>
<tr>
<td>Financial Administrator/Accountant</td>
<td>3</td>
</tr>
<tr>
<td>Transport logistics officer</td>
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</tr>
<tr>
<td>Archivist</td>
<td>1</td>
</tr>
<tr>
<td>Supply officer</td>
<td>1</td>
</tr>
<tr>
<td>Internal auditor</td>
<td>1</td>
</tr>
<tr>
<td>Research officers</td>
<td>15</td>
</tr>
</tbody>
</table>
Long term Staff training and capacity building

During the year under review staff completed various programmes whilst others enrolled for various programmes as listed below

<table>
<thead>
<tr>
<th>COMPLETED PROGRAMMES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TYPE OF DEGREE</strong></td>
</tr>
<tr>
<td>MPhil in Molecular Cell Biology of Infectious Diseases</td>
</tr>
<tr>
<td>University of Ghana, Legon</td>
</tr>
<tr>
<td>MSc. in Clinical Trials</td>
</tr>
<tr>
<td>University of Ghana, Legon</td>
</tr>
<tr>
<td>Professional Diploma in Systems Engineering</td>
</tr>
<tr>
<td>IPMC</td>
</tr>
<tr>
<td>Degree in Business Administration</td>
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<tr>
<td>Valley View University</td>
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<tr>
<td><strong>ON-GOING PROGRAMMES</strong></td>
</tr>
<tr>
<td><strong>TYPE OF DEGREE</strong></td>
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<tr>
<td>Master of Philosophy in Molecular Cell Biology of Infectious Diseases</td>
</tr>
<tr>
<td>University of Ghana, Legon</td>
</tr>
<tr>
<td>Master of Science in Public Health</td>
</tr>
<tr>
<td>London School of Hygiene and Tropical Medicine</td>
</tr>
<tr>
<td>Doctor of Philosophy in Population Health</td>
</tr>
<tr>
<td>University of Cape Coast</td>
</tr>
<tr>
<td>PhD in Molecular and Cell Biology of infectious diseases</td>
</tr>
<tr>
<td>University of Ghana, Legon</td>
</tr>
<tr>
<td>PhD (Infectious and Tropical Diseases)</td>
</tr>
<tr>
<td>London School of Hygiene and Tropical Medicine</td>
</tr>
<tr>
<td>PhD in Population and Health</td>
</tr>
<tr>
<td>University of Cape Coast</td>
</tr>
<tr>
<td>PhD in Public Health</td>
</tr>
<tr>
<td>University of Ghana, Legon</td>
</tr>
<tr>
<td>PhD in Biochemistry and Biotechnology</td>
</tr>
<tr>
<td>Kwame Nkrumah University of Science and Technology</td>
</tr>
<tr>
<td>PhD - Division of Paediatrics</td>
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<tr>
<td>University of Western Australia</td>
</tr>
<tr>
<td>PhD in Immunology</td>
</tr>
<tr>
<td>Kwame Nkrumah University of Science and Technology</td>
</tr>
<tr>
<td>PhD (Psychiatry)</td>
</tr>
<tr>
<td>University of Newcastle, Australia</td>
</tr>
</tbody>
</table>
Short term staff capacity building/training

Aside the various long term training to build capacity of staff, others were involved in short term training during the year under review. Below are some short term training that staff undertook.

Knowledge management and translation workshop

About 20 participants took part in a knowledge management and translation workshop held at KHRC from 16-17th February 2017. The workshop was organized to build the capacity of researchers and research institutions to manage their knowledge capital, and communicate research findings in a manner that is easily understood, valued, and utilized for decision making by constituents in health policy formulation and practice. It was facilitated by Dr. Godwin Afenyadu, the Senior Capacity Development Advisor of USAID Ghana Evaluate for Health Project and Professor Frank Nyanotor, the Project Director. Also in attendance was Mrs. Mercy Abbey from the Research and Development Division of the Ghana Health Service. The workshop was sponsored by USAID/EVALUATE FOR HEALTH.

Proposal development workshop

Eight staff of KHRC participated in a proposal development workshop in Accra from 26th to 30th June, 2017 organized by USAID/EVALUATE FOR HEALTH. It included participants from KHRC and the Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR). During the workshop participants were taken through different aspects of health research proposals to build capacity for quality proposal writing. At the end of the workshop two teams from each institution submitted a proposal. A small grant ($ 5000) was awarded to a team from each participating institution. The award for KHRC was to conduct the study “Utilization of the DHIMS 2 data for health service decision making at the district, Sub-District and community levels in Kintampo North Municipality of Ghana”.

Research management and contract negotiation workshop
A two day (17-18th July, 2017) was again organized by USAID/EVALUATE FOR HEALTH at KHRC. This was to build capacity of project managers and some staff of KHRC on research management and contract negotiation. The workshop sought to provide research project managers with the skills and competencies to effectively negotiate research project contracts as well as efficiently manage projects.

Continuous professional development training for clinicians
A days (1st August, 2017) workshop was organized by Bemuah Royal Hospital and held at KHRC. This was a continuous professional development training for clinicians. It sought to improve clinical skills and knowledge of clinicians of KHRC in the identification and management of cardiopulmonary emergencies in both paediatric and adult patients. It also included hands-on practicals on basic life support and advanced cardiac life support. The training was facilitated by Dr. William Ankobiah, a Consultant Pulmonologist and American Heart Association Certified Instructor in Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS).

Workshop on Implementation Research
In line with efforts to improve health delivery in Ghana, a workshop on Implementation Research (IR) was organized in KHRC from 18th to 23rd September, 2017. This included a one-day sensitization workshop for policy makers and policy implementers in the Ghana Health Service. This brought together representatives from the National Malaria Control Program (NMCP), Deputy Directors for Public Health, Directors for Health Institutions and Municipal and District Directors of Health Services from Kintampo North Municipality and South District, Nkoranza North and South Districts, Techiman North District and South Municipality.
This was followed by a 5 day proposal writing workshop on Implementation Research (IR) for health care providers in the Ashanti, Eastern and Brong Ahafo Regions. This was funded by the World Health Organization Special Programme for Research and Training in Tropical Diseases (WHO/TDR) with facilitators from WHO/TDR, University of Health and Allied Science (UHAS) and KHRC with two embedded scientist from KHRC. Also in attendance was the Director of the Research and Development Division of the Ghana Health Service. At the end of the workshop participants from each region development an IR proposal to be carried out in their regions.
Human Blood Collection for the Creation of Standardized Malaria Diagnostic Slides for Training and Proficiency Testing (Ghana Malaria Slide Bank - MSB)

Collaborating Institutions:
Institutional Care Division (ICD), Ghana Health Service
PATH MalariaCare
Improving Malaria Diagnosis (IMaD)
Centres for Disease Control & Prevention (CDC)
World Health Organisation (WHO)
Medical Care Development International (MCDI)
United States Agency for International Development (USAID)
Partners

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.

Objectives
To develop validated sets of slides for training and competency assessment of malaria microscopists

Methods
Thirty-eight (38) donors were enrolled following informed consent. Two millilitres (2 ml) of EDTA-anticoagulated blood was collected from each donor. Standardized thick and thin malaria blood smears were prepared on the same slide, processed according to WHO procedures. Stained slides were labelled with barcoded labels and both smears and labels mounted with coverglass for protection. Dried blood spots were prepared on Whatman Filter Paper for polymerase chain reaction (PCR) testing. Initial slide diagnosis (presence/absence of parasites, speciation and quantification), as well as PCR testing, was performed at KHRC. Final validation by microscopy was done at the Research Institute for Tropical Medicine, The Philippines, as per WHO requirements for validation of MSBs.

Expected outcome
The MSB will serve as a tool for maintaining and improving the diagnostic accuracy of malaria microscopists
**Progress**

The MSB currently holds over 6,000 validated slides comprising negative, *Plasmodium 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.

Slides from the Ghana MSB has been used in training of over 900 Medical Laboratory Scientists and Laboratory Assistants from government and private health facilities through Malaria Diagnostic Refresher Training (MDRT) and Proficiency Testing (PT) of microscopists in Ghana from 2014 to date. With the support of PATH MalariaCare, an operational manual for managing the MSB has been developed and is ready for printing.

Through a collaboration with Medical Care Development International (MCDI), KHRC also provided technical support for the development of MSBs for the Ministries of Health of Equatorial Guinea and Malawi.

**Funders:**

Medical Care Development International (MCDI); PATH MalariaCare; World Health Organization