NOGUCHI MEMORIAL INSTITUTE FOR MEDICAL RESEARCH,
UNIVERSITY OF GHANA, LEGON

ANNUAL RESEARCH REPORT

2025

UG | NMIMR | NOGUCHI
Memorial Institute for Medical Research
University of Ghana

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WHAT'S INSIDE

PREFACE

It is my great pleasure to present the 2025 Annual Research Report of the Noguchi Memorial Institute for Medical Research (NMIMR), College of Health Sciences, University of Ghana. The year 2025 was a challenging year as a result of funding cuts from the US government. Despite this, it was a year of remarkable progress, scientific excellence, and strengthened partnerships as we continue to advance our mandate of conducting cutting-edge biomedical research to improve public health in Ghana and beyond.

In 2025, NMIMR researchers made significant contributions to global scientific knowledge, producing over 200 peer-reviewed publications, including several in highly ranked and widely cited journals. These achievements underscore the Institute's growing impact and reaffirm our position as a leading centre for infectious disease research, diagnostics, and capacity building in Africa.

Our research portfolio continues to expand across priority areas such as malaria, neglected tropical diseases, antimicrobial resistance, vaccine development, and emerging infectious diseases. The breadth and depth of new and ongoing projects highlighted in this report demonstrate our commitment to addressing both longstanding and emerging public health challenges through innovation, interdisciplinary collaboration, and translational science.

A key strength of NMIMR remains its extensive network of local and international collaborations. In 2025, we deepened partnerships with academic institutions, governmental bodies and global health organizations, enabling us to leverage our diverse expertise and resources to drive impactful research. These collaborations not only enhance scientific output but also contributed to capacity strengthening and knowledge exchange.

The Institute also continued to play a critical role in national and regional disease surveillance, providing essential laboratory support and evidence to inform public health policy and response. Our contributions to outbreak detection, genomic surveillance, and vaccine-related research reinforce NMIMR's role as a trusted partner in safeguarding health security.

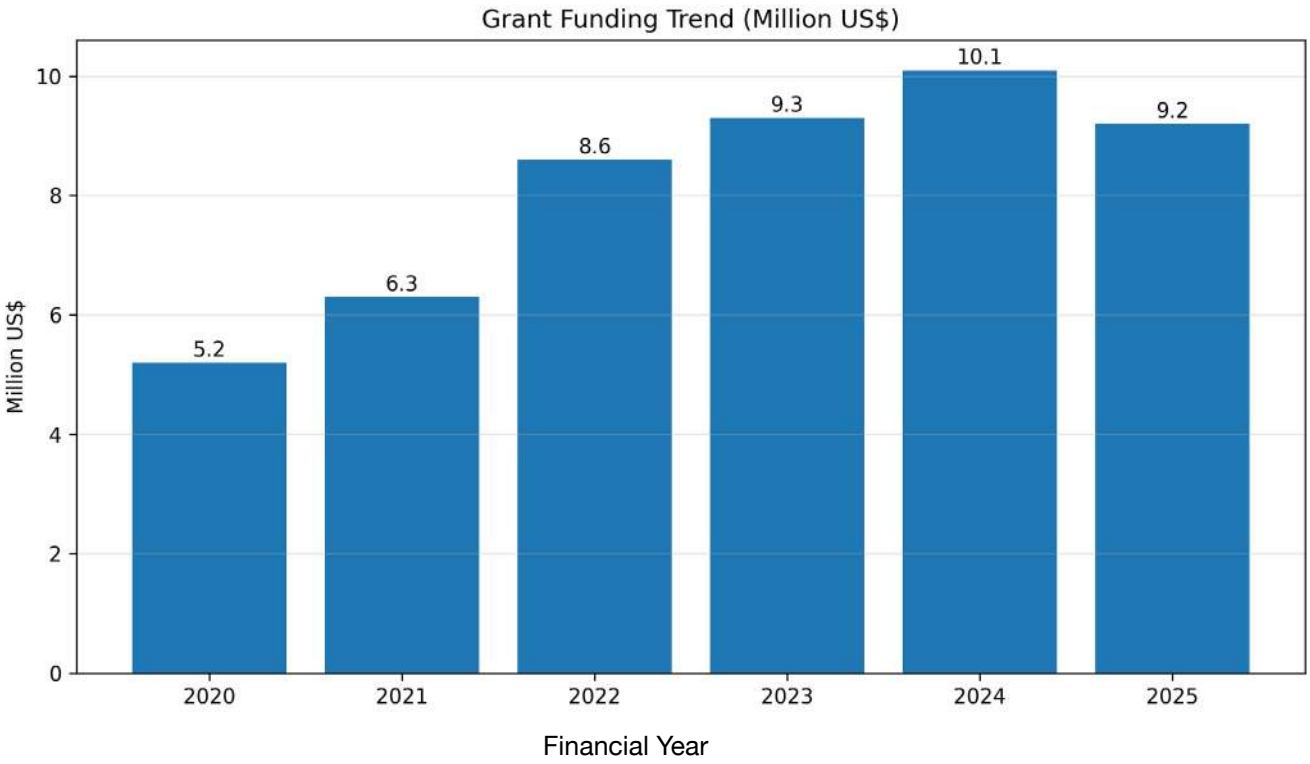
As we reflect on the year's accomplishments, we recognize that these successes are the result of the dedication and hard work of our researchers, technical staff, administrative teams, and partners. I extend my sincere appreciation to all who contribute to the Institute's mission, as well as to our funding agencies and collaborators for their continued support.

Looking ahead, NMIMR remains committed to strengthening research infrastructure, fostering innovation, and translating scientific discoveries into tangible health solutions. We will continue to invest in human capital development, expand our research frontiers, and contribute meaningfully to global efforts aimed at improving health outcomes. I invite you to explore this report and learn more about the impactful work being undertaken at NMIMR.

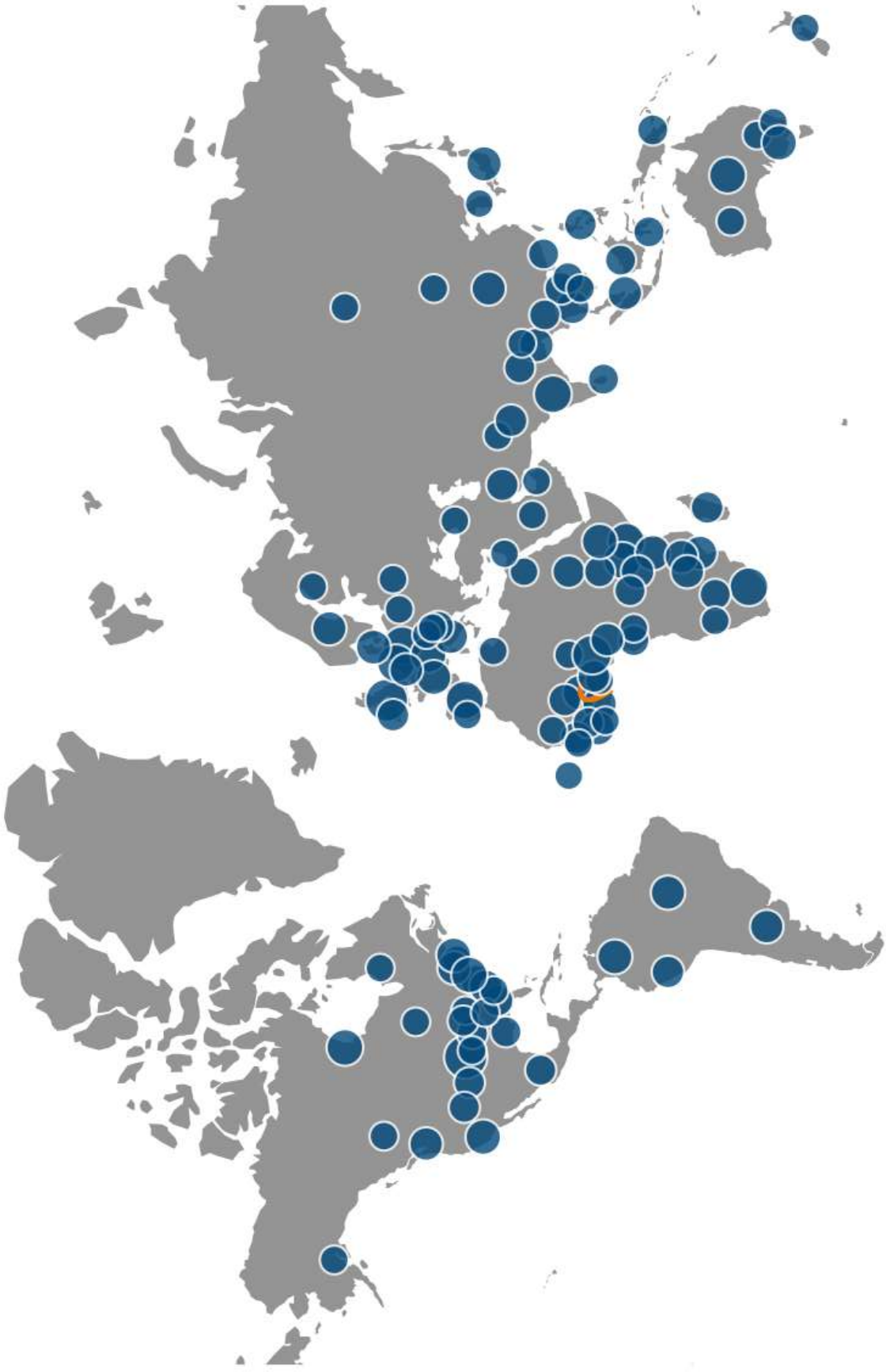
Prof. Dorothy Yeboah-Manu
Director
Noguchi Memorial Institute for Medical Research
University of Ghana

FACTS AND FIGURES

Funding



International collaborations (Source: UG PURE)



Publications Statistics

In 2025, there were 210 publications from NMIMR researchers.
Visit the link below to view all publications.
https://noguchi.ug.edu.gh/docs/publications/2025-publications/

Scopus publication statistics for 2025

- 190 publications in Scopus
- 17 (8.9%) publications in the top 10% most cited publications worldwide
- 1.1% of publications in the top 1% most cited publications worldwide
- 44 (23.8%) publications in the top 10% journals
- 254 citations received by publications from NMIMR researchers
- 19 (11.4%) publications in the top 10% most viewed publications worldwide
- 1.2% of publications in the top 1% most viewed publications worldwide
- 1,126 Scopus views received by NMIMR publications
- 5.9 average Scopus views per publication of NMIMR

Share of NMIMR publications per journal quartile in 2025 (Source: SciVal ; April 02, 2025)

Quartiles	Publications	Publication share (%)
Q1 (top 25%)	111	60.0
Q2 (26% - 50%)	41	22.2
Q3 (51% - 75%)	24	13.0
Q4 (76% - 100%)	9	4.9

Cumulative shares	Publications	Publication share (%)
Q1 to Q2 (top 50%)	152	82.2
Q1 to Q3 (top 75%)	176	95.1

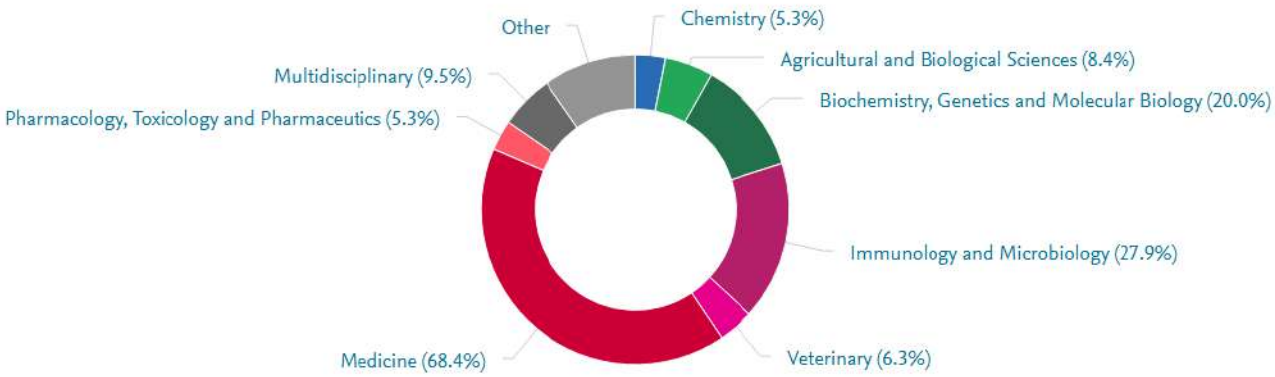
International, national and institutional collaboration by NMIMR in 2025 (Source: SciVal; April 02, 2025)

Metric	Publication share	Scholarly Output	Citations	Citations per Publication	Field-Weighted Citation Impact
International collaboration	77.4%	147	217	1.5	1.33
Only national collaboration	14.2%	27	20	0.7	0.52
Only institutional collaboration	7.9%	15	17	1.1	0.64
Single authorship (no collaboration)	0.5%	1	0	0.0	0.00

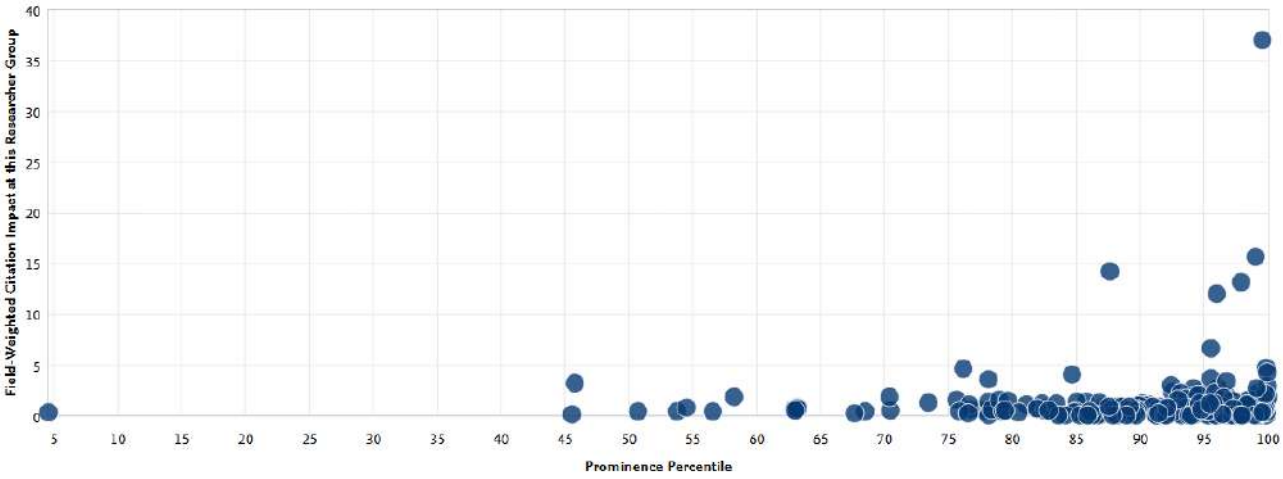
Academic-corporate collaboration by NMIMR in 2025 (Source: SciVal)

Metric	Publication share	Scholarly Output	Citations	Citations per Publication	Field-Weighted Citation Impact
Academic-corporate collaboration	2.6%	5	48	9.6	8.72
No academic-corporate collaboration	97.4%	185	206	1.1	0.95

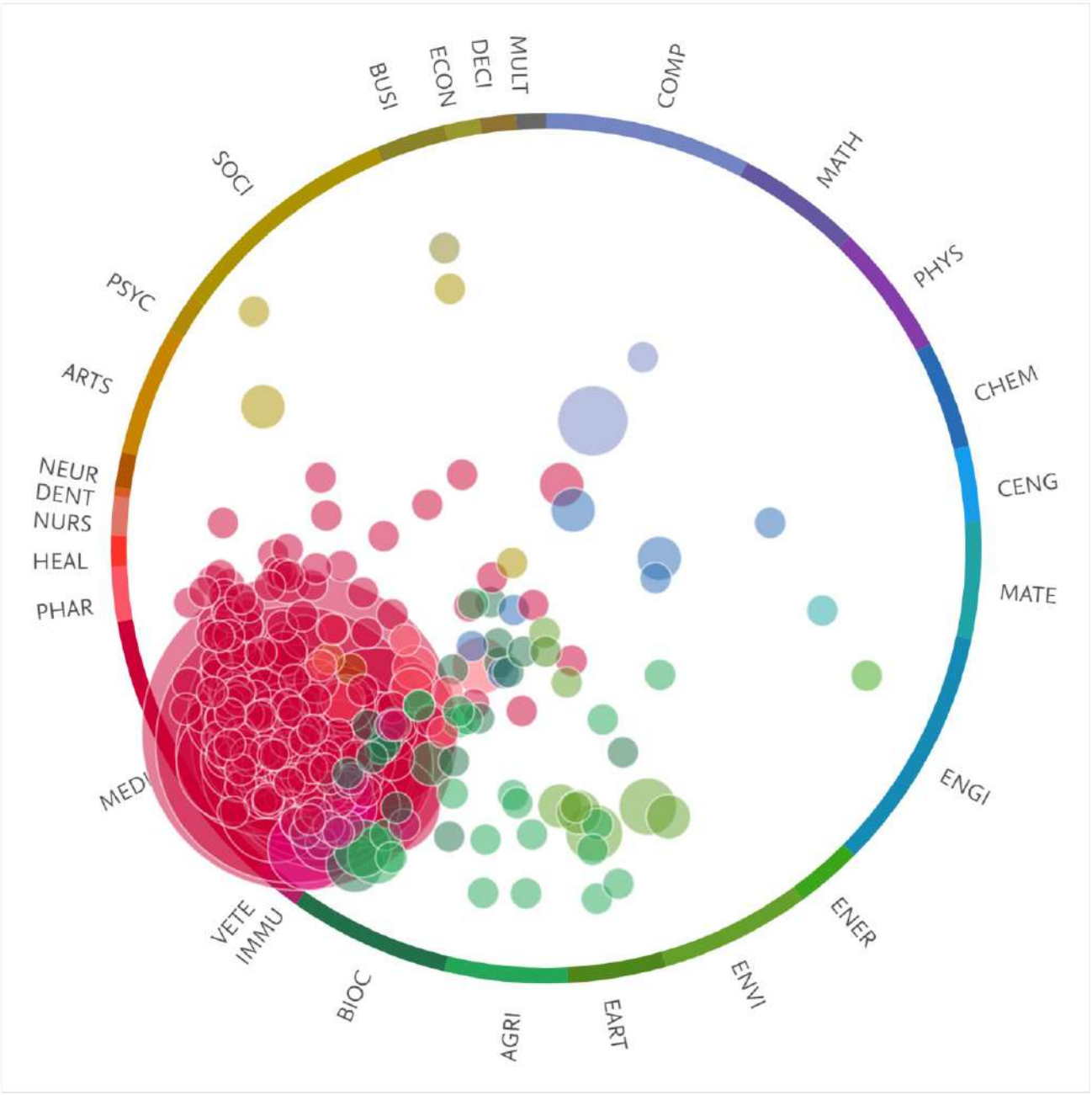
Subject areas of NMIMR publications in 2025. Segment size represents relative publication share per Subject area. Note that a publication can be mapped to multiple Subject Areas. (Source: Scopus; April 02, 2025)



Topics contributed to by NMIMR researchers between 2022 and 2025 (Source: SciVal; April 02, 2025)



Topics contributed to by NMIMR researchers between 2022 and 2025 (Source: SciVal; April 02, 2025)



Showing 363 Topics for NMIMR

Applied Filters:

Year range	2022 to 2025
Subject area	All subject areas

Bubbles represent Topics

Bubble size: Scholarly Output of this Researcher Group

Bubble position is based on dominant ASJC categories.

COMP	Computer Science	MEDI	Medicine
MATH	Mathematics	PHAR	Pharmacology, Toxicology and Pharmaceutics
PHYS	Physics and Astronomy	HEAL	Health Professions
CHEM	Chemistry	NURS	Nursing
CENG	Chemical Engineering	DENT	Dentistry
MATE	Materials Science	NEUR	Neuroscience
ENGI	Engineering	ARTS	Arts and Humanities
ENER	Energy	PSYC	Psychology
ENVI	Environmental Science	SOCI	Social Sciences
EART	Earth and Planetary Sciences	BUSI	Business, Management and Accounting
AGRI	Agricultural and Biological Sciences	ECON	Economics, Econometrics and Finance
BIOC	Biochemistry, Genetics and Molecular Biology	DECI	Decision Sciences
IMMU	Immunology and Microbiology	MULT	Multidisciplinary
VETE	Veterinary		

NEW PROJECTS

1

Prof. Gloria Ivy Mensah will investigate antimicrobial resistance as a public health threat: through an analysis of stakeholder's opinion from Bolivia, Italy, Ghana, Guatemala, and Nepal. This project aims to assess how One Health core competencies (e.g., systemic thinking, leadership, interdisciplinary work) are integrated into the education and practice of professionals in human, animal, and environmental health; identify knowledge, attitudes, and practices around antibiotic use among the general public and farmers; and develop targeted strategies to improve training, awareness, and collaboration across sectors to reduce the threat of AMR. This project is supported through funding from the German Academic Exchange Service (DAAD) with funds from the Federal Ministry for economic cooperation and development (BMZ)

2

Prof. John Kofi Odoom will assess contact tracing, infection and transmission through an interdisciplinary approach. The COVID-19 pandemic underlined the continuing threat from emerging novel zoonotic diseases, and the need for better national and global preparedness. Interpersonal contact, and contact tracing, has long been recognised as important in the transmission and control of communicable diseases. However, the notion of "contact" is frequently loosely defined, and there is limited information on the wide variety of interactions that may occur between individuals, particularly in lower-income settings where epidemic/pandemic threats most frequently emerge. As a result, there have been few in-depth assessments of the complex nature of

daily interactions or variations across settings. There is also little consensus on interplay between biology (virology) and related cultural, environmental and psychological factors, or the way in which prior historical events help shape contact patterns. To understand this better there is the need for innovative approaches that take a truly inter-disciplinary approach. The investigators will focus this interdisciplinary work in trying to better understand and model complex and changing human contacts in a specific high-risk setting - 'wet' and wild animal marketplaces. The study will reciprocally employ mathematical and geospatial modelling, epidemiology, social psychology, performance, cultural studies and historical perspectives to examine contact patterns across settings and identify likely shifts in both past behaviour and future disease outbreaks. It will be conducted in two distinct yet heterogeneous countries - Ghana and Thailand, distinguished by variations in their daily interactional patterns, population density and migration patterns, consumption of

wild animals, and availability of both pharmaceutical and non-pharmaceutical barriers to spread. First large general population surveys will be conducted in the two countries on their use and activities in markets, with questions partly informed by historical evidence on the societal role of markets and their part in disease transmission and psychological research on risk perception and social interaction. Then an observational study will be conducted in marketplaces noting interaction patterns between customers and traders using a novel interdisciplinary framework for risk analysis. Next the investigators will employ performance methodologies to better understand the everyday, interpersonal practices of marketplaces by engaging market traders in a variety of role play interactions exploring contact patterns across environments and time, using measures of key disease-risk factors for each scripted interaction (including distance, interpersonal touch, and interaction with surfaces). Additionally they will interrogate traders daily routines and networks and extend an internationally tested pictogram used to assess proximity and trust. The project is funded by the UKRI.

3

Dr. Dorotheah Obiri is scaling up biomarker discovery to understand the role of preeclampsia in women with sickle cell disease. The overall aim of this study is to identify biomarkers of disease and patterns associated with PE in SCD. The investigators hypothesize that PE in SCD is a unique phenotype that will generate novel biomarkers to complement existing clinical interventions. To achieve this, the study will determine the protein expression of placental gene transcripts from an existing discovery cohort of mothers with SCD, SC-trait or HbAA in healthy and PE pregnancies; determine serum levels of placental secreted proteins altered in the placental transcriptome from the discovery cohort as in SA1; and generate a validation cohort of pregnant women to test and validate the three most promising candidate biomarkers in maternal blood. This is supported with funding from AREF.

4

Dr. Dorotheah Obiri will be assessing the effect of placental malaria on the pathophysiology of Hypertensive disorders in pregnancy. This study aims to understand the role of placental malaria in hypertensive disorders of pregnancy. During pregnancy, malaria parasites preferentially hide in the maternal blood spaces of the placenta with adverse effects on the mother and developing baby. This has been reported to increase the risk of hypertensive disorders among pregnant women in malaria endemic regions. This study will enhance our understanding of the possible mechanisms involved in the interaction between placental malaria and hypertensive disorders of pregnancy. It will also enable identification of unique biological markers that may be useful predictors of placental dysfunction in women affected by both conditions. The findings from this study will be utilised to improve clinical management and reduce harm to mothers and babies which is a key UN Sustainable Development Goal. This is supported with funding from GSK.

5

Prof. Dziedzom Komi de Souza together with partners will be progressing a TPP-compliant serological test for *Schistosoma mansoni* to field testing and manufacturing process development. Schistosomiasis elimination programs urgently require new tests. Recognizing this, WHO issued two TPPs in 2021. Schistosomiasis is a WHO top-priority, surpassed in worldwide case numbers only by malaria. More than 200 million people are estimated to be affected, with 90% of cases occurring in Africa, caused by Schistosoma mansoni (Sm, intestinal disease) and *Schistosoma haematobium* (urogenital disease). Gap Analysis: None of the current diagnostics meets all needs. The reference test for Sm – Kato-Katz stool examination – requires

skilled personnel and underestimates infection prevalence due to low sensitivity. Antigen tests (CCA/CAA) are showing promise when monitoring active infection in medium-to-high endemicity settings but may be suboptimal when nearing interruption of transmission. Additionally, the CCA-test suffers from manufacturing issues, and the CAA-test is still in development. Experts agree that serological testing of preschool-aged children offers a viable, practical, and cost-effective solution to monitor progress of schistosomiasis control and elimination programs, particularly in low-prevalence settings. Objective: In previous work (G2023-110), the investigators developed excellent serological RDT prototypes for Sm which meet all the minimal, in some cases also the ideal TPP criteria. Herein, they will progress them to the stage of being ready for subsequent regulatory review and commercialization. Thus, the fully optimized RDT candidates will be validated in US-based (DDTD/CDC) and regional laboratories (KEMRI-Kenya/NMIMR-Ghana), and in a field study (Kenya), and transferred to manufacture. Encouraged by the success of G2023-110, DDTD and MBL wish to extend our alliance and further leverage Japanese expertise and innovation by entering a collaboration with Prof. Hamano (NUITM-NEKKEN). This is supported with funding from GHIT.

6

Prof. Dziedzom Komi de Souza will be comparing facility-based and molecular xenomonitoring pre-validation prevalence surveys in districts that have stopped mass drug administration for lymphatic filariasis. The Global Programme to Eliminate Lymphatic Filariasis (GPELF) has led to significant reductions in LF transmission through mass drug administration (MDA). However, ongoing surveillance is crucial to detect recrudescence and ensure sustained elimination. In Ghana, the cessation of MDA in Gomoa West District since 2014 necessitates a comprehensive surveillance strategy to monitor LF prevalence in human and mosquito populations. This project aims to develop a refined pre-validation survey (PVS) methodology using facility-based surveillance (FBS), integrating malaria and lymphatic filariasis (LF) diagnosis alongside molecular xenomonitoring (MX) to monitor LF transmission in human and mosquito populations post-Mass Drug Administration (MDA) in Ghana. Funding for this study is from Sightsavers/ Foreign, Commonwealth & Development Office (FCDO).

7

Dr. Eric Kyei-Baafour will be dissecting the quality of antibody responses to a polymorphic *Plasmodium* vaccine antigen. This study will provide useful insights into the design of next-generation malaria vaccines with improved efficacy by overcoming the challenges posed by antigenic variation, a major barrier to achieving sustained malaria immunity. The findings can also be leveraged on by pharmaceutical firms for development of more effective across strain *Plasmodium* vaccines. It is funded through the Noguchi Vestergaard Postdoc Fund.

8

Dr. Kwadwo Kyereme Frempong aims to identify novel resistant markers for monitoring old and new generations of insecticides in *Anopheles gambiae* s. I. Populations. The expected outcome of this project is that areas highly resistant to a particular insecticide will have a higher KD50 and KD95. It is also expected that transcripts relating to survival of vectors to the different classes of insecticides will be identified after analysis. Data on resistance will provide up-to-date information for making informed decisions. Identified transcripts will be useful for future functional studies using recombinant versions of these selected molecules specific to the different insecticides. The genes of these expressed transcripts will be used as molecular markers

for monitoring vector population as part of resistance management. This study will generate data for target genes for gene silencing and gene manipulation to mitigate resistance to the 5 classes of insecticides (including the new classes) for effective resistance management. It is funded through the Noguchi Vestergaard Postdoc Fund.

9

Prof. Linda Eva Amoah, Prof. Kwadwo Koram and Prof. Benjamin Abuaku will be working on a multi-stage malaria vaccine for control and elimination. This proposal responds to the HORIZON 2024 call "EDCTP3 Joint Undertaking: Research on existing Malaria vaccines and development of new promising candidates." The malaria epidemic will not stop without a safe, efficacious, and affordable vaccine that can interrupt transmission. The first licensed malaria vaccines, RTS,S and R21, will substantially reduce childhood deaths in Africa. The investigators propose to pursue accelerated approval of Pfs230D1+R21, the first multi-stage malaria vaccine to reduce transmission, which will reduce clinical malaria rates and support control and elimination.

While responses to R21 inhibits sporozoites entry into liver, Pfs230D1 lyses gametes in mosquitoes. In field trials with adults and children, Pfs230D1 reduced mosquito infection rates >75%. Pfs230D1+R21 development relies on in-vivo direct-skin-feeding (DSF) bioassay, that feeds mosquitoes on skin to recapitulate natural parasite transmission, to measure reasonably likely surrogate efficacy endpoints for accelerated licensure. Modelling R21 and Pfs230D1 field efficacy data suggests Pfs230D1+R21 will substantially reduce malaria burden in high-transmission zones, while other simulations predict accelerated elimination in low-transmission zones. Through innovative trial designs and capacity-building, the study will pursue EDCTP3 aims: 1) establish safety and efficacy of a multi-stage vaccine to reduce transmission; 2) pursue accelerated approval of Pfs230D1+R21; 3) expand population-wide long-term safety and efficacy data on R21; and 4) generate expertise and data to inform recommendations that expand cGMP and supply chain for vaccines in Africa. The program will expand clinical trial capacity for transmission-blocking interventions, build expertise and evidence to support future vaccine manufacture in Africa, and improve understanding of malaria immunity including correlates of protection. At project end, an approved multi-stage malaria vaccine to reduce transmission will be poised for Phase 4 cluster-randomized trials. It is supported through funding from the EDCTP.

10

Prof. Linda Eva Amoah will be developing high-throughput antimalarial screening capacity at NMIMR. This study aims to establish high-throughput antimalarial screening (HTS) capacity at NMIMR. The first objective is to procure manual liquid handling equipment suitable for high-throughput screening. Although NMIMR already has plate readers such as the SpectraMax® M5 and Varioskan™ LUX, which can read 384-well plates, the institute currently lacks appropriate manual liquid handling equipment, which are essential to increase assay throughput and enable large-scale antimalarial screening. The second objective is to provide hands-on training for the NMIMR biology team on the use of high-throughput screening instrumentation and protocols. This training will be conducted by researchers at the Drug Discovery Unit (DDU) at the University of Dundee, including Prof. Beatrice Baragana and Mark Anderson. Funding for travel and living expenses during the training has already been arranged between NMIMR and DDU, through a separate agreement

between the two entities. During this period, the team will screen < 100 compounds from the MMV Validation boxes, gaining practical experience with the equipment and protocols. The third objective is to implement and validate high-throughput screening workflows at NMIMR upon the team's return to Ghana. This will include conducting a pilot screening of < 10,000 compounds provided by DDU. Successful completion of this step will result in a fully operational HTS capability integrated into NMIMR's drug discovery pipeline. This is supported through funding from the Medicines For Malaria Venture (MMV).

11

Dr. Ivy Asantewaa Asante will be enhancing global health security by expanding efforts and strategies to protect and improve public globally. The purpose of this project is to support Ghana in improving and expanding its global health security efforts in surveillance, laboratory systems, emergency operations, human resource development, and public health delivery systems through a collaborative approach within the context of the IHR. The project seeks to also support Ghana, Sierra Leone, Liberia, Gambia and Guinea Bissau in large outbreaks to improve early detection and response to public health threats. Funding for this work is from the US CDC.

12

Prof. Samuel Dadzie and collaborators will be harnessing mosquitoes for epidemic and pandemic research in Africa (MOSEPIC). MOSEPIC is an innovative, African-focused research initiative committed to transforming epidemic preparedness and response across the continent. By leveraging cutting-edge molecular, ecological, and epidemiological approaches, the investigators aim to better understand, predict, and mitigate the impact of epidemics and pandemics in Africa. Our core approach involves using mosquitoes as natural bio-samplers of vertebrates and their pathogens across the forest-urban continuum. Through molecular and serological analyses of mosquito blood meals and mosquito tissues, including metagenomics, and integrated data interpretation, MOSEPIC aims to fill critical knowledge gaps and develop cost-effective surveillance tools to inform public health decisions. The project is funded by the Science for Africa Foundation.

13

Prof. Samuel Dadzie will be conducting Semi-field evaluation (Outdoor/Indoor) of the space spray efficacy of Fludora Co-Max against Anopheles spp. Culex spp. and Aedes spp. for Fludora Co-Max Registration in Ghana. This is a Space Spray registration trial in Ghana of Fludora Co-Max (PQT/VC Ref Number: P-00164; a.i.: Transfluthrin 52.5 g/L; Flupyradifurone 26.3 g/L; prequalified in 20 Oct, 2020) against wild naturally occurring mosquitos of Culex spp., Aedes spp. and Anopheles spp. or resistant lab mosquitos Anopheles gambiae Tiassalé with cold fogging ULV and thermal fogging TF compared to reference control AquaK-Othrine (PQT/VC Ref Number: P-00158; a.i.: Deltamethrin 20 g/L; prequalified in 29 Jan 2018). Trials will be conducted outdoor (ULV) and indoor (TF) to evaluate the space spray efficacy of Fludora Co-Max. The study is designed in accordance with the WHO guidelines for indoor and outdoor ULV and thermal fogging TF trials. This is funded by Environmental Science (ENVU).

14

Dr. Stephen Osei-Wusu aims to build capacity in cell biology to explore the immunological interplay driving the *Mycobacterium tuberculosis* complex epidemic in West Africa. Lineages 5 and 6 of *Mycobacterium tuberculosis* complex (MTBC), both referred to as *Mycobacterium africanum*, are restricted to West Africa, suggesting a relationship (local adaptation). Understanding of this relationship is very limited and a good model to study this adaptation is also a challenge. He will use human peripheral blood mononuclear cells (PBMCs) to generate 3D cultures (granulomas) to study tuberculosis in a way that looks more like that of the human. He will also use this opportunity to implement the 3D granuloma culture model at my home institution, NMIMR, which will further be used to gain insights into the evolution and diversity in the pathogenesis of the different lineages of MTBC. This is supported through funding from AREF.

15

Prof. George Enyimah Armah will be conducting a phase 2, randomized, observer-blind, placebo-controlled study to assess the safety, tolerability and immunogenicity of a bivalent Huma Papiloma Virus (HPV) vaccine in infants and toddlers aged 9 and 15 months and an open label single dose study in young unmarried females aged 15-20 years in Ghana. The purpose of the Research is to assess the safety and tolerability, and the immunogenicity of a bivalent HPV vaccine administered in healthy infants and toddlers (9- and 15-month-olds) comparing them to an immune-bridging population of 15–20-year-old unmarried females in an open label study in Ghana. It is funded through the International Vaccine Institute (IVI).

16

Prof. George Armah through funding from the WHO will support rotavirus surveillance activities in seven West African countries. The project involves coordinating the shipment and laboratory analysis of stool samples using certified techniques including ELISA, PAGE, RT-PCR, and genetic sequencing, as well as performing quality control on selected samples. In collaboration with WHO-AFRO, WHO-HQ, sentinel surveillance sites, and international partners including Dr. Houpt's laboratory and the University of Virginia, selected samples will be tested using the TaqMan Array Card (TAC) platform to detect multiple enteric pathogens. Molecular testing and genotyping of astroviruses, noroviruses, sapoviruses, and adenoviruses will also be conducted to monitor the impact of rotavirus vaccination and the emergence of other enteropathogens. The project will generate laboratory data linked with clinical and epidemiological information to support regional disease surveillance and reporting to WHO.

17

Dr. Believe Ahedor aims to explore the anticancer potential of medicinal plants from Ghana and zambia: a novel path to innovative therapeutics. The project seeks to assess the anticancer activity of extracts from these plants through in vitro cytotoxicity assays on various human cancer cell lines. Further phytochemical screening and fractionation will be conducted to isolate and characterize the active compounds responsible for their bioactivity. Mechanistic studies will explore their modes of action, including apoptosis induction, cell cycle arrest, and inhibition of cancer cell migration and invasion in vivo. Additionally, the study will evaluate potential toxicity to normal cells to determine therapeutic indices. The expected outcomes of this research include the identification of novel plant-derived compounds with significant anticancer activity, contributing to drug discovery and the development of new therapeutic agents. Findings will also provide scientific validation for the traditional use of these plants in cancer treatment, potentially influencing future clinical research and pharmaceutical development. Ultimately, this project aligns with efforts to bridge the gap between traditional medicine and modern oncology, promoting the discovery of affordable, plant-based cancer treatments, particularly in Africa. Funding for the work is from the Ministry of Environment Science and Technology, Ghana.

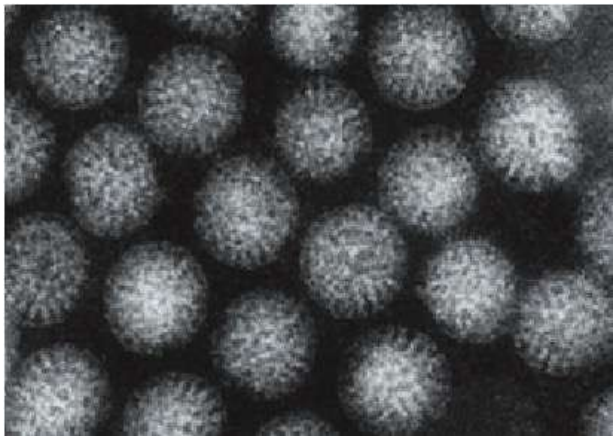
18

Dr. Samuel Ofori Addo will investigate the epidemiology and treatment outcomes of recurrent tuberculosis at three referral hospitals in Ghana over a ten-year period (2015-2024). Funded by the University of Ghana, this study seeks to determine the extent and correlates of TB recurrence and unfavourable treatment outcomes among patients with recurrent TB in Ghana. A retrospective cross-sectional study involving a review of routinely collected records of patients with recurrent TB over a ten-year period at three selected health facilities in two regions of Ghana will be conducted. Prevalence and trends of recurrent TB over the ten-year period, and factors associated with unsuccessful treatment outcomes will be identified. The study will contribute to the limited

research on TB recurrence in Ghana and emphasize the importance of tailored approaches in managing this challenging health issue. Analysing and reporting trends in occurrence and treatment outcomes for recurrent TB cases will be crucial in monitoring the effectiveness of the TB control program in Ghana and identifying factors associated with a higher risk of unfavourable treatment outcomes to inform context-specific control strategies to reduce TB transmission, morbidity, and mortality.

SELECTED ONGOING PROJECT SUMMARIES

Title: Molecular epidemiology of viral agents of gastroenteritis in Ghanaian children less than 5 years old



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Name and Affiliation of Collaborators:
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Graduate School of Medical and Dental Sciences,
Institute of SCIENCE TOKYO (Former Tokyo Medical and Dental University)

Funding source: Japan Agency for Medical Research and Development (AMED); T.E.N. Ghana MV25 B.V.

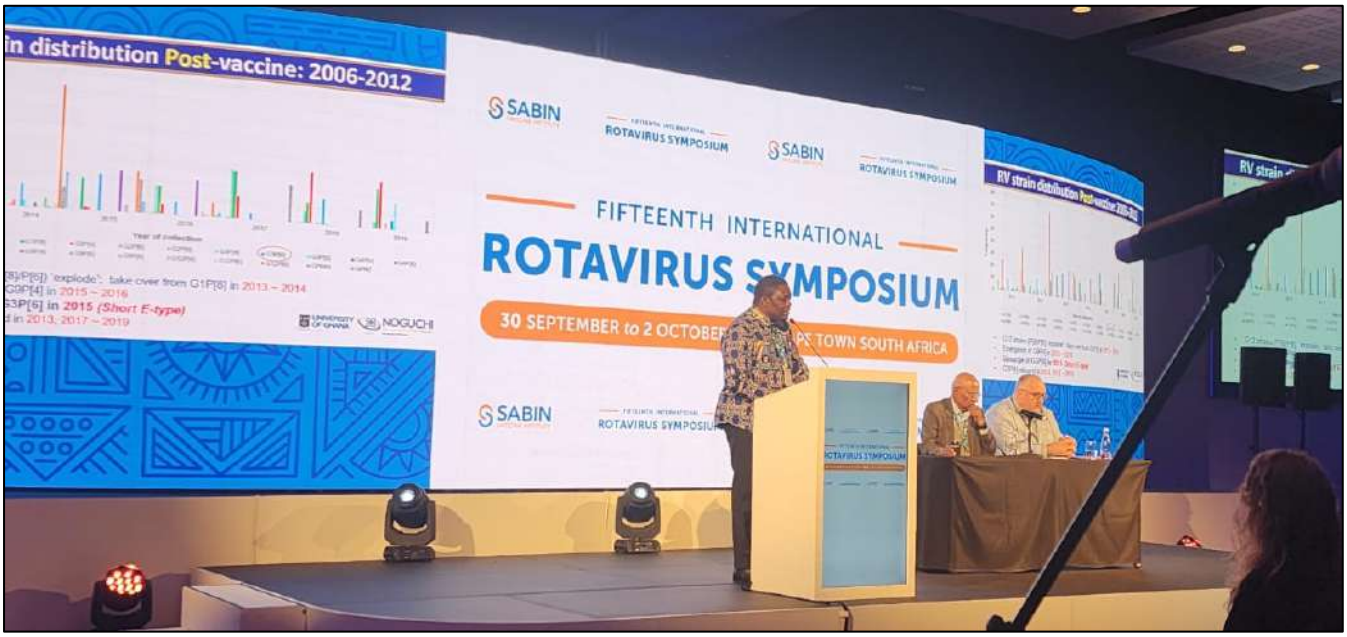
Summary:

The "Molecular epidemiology of viral agents of gastroenteritis in Ghanaian children less than 5 years old" study is a Japan Agency for Medical Research and Development (AMED)-sponsored, longitudinal surveillance project with collaborators drawn from NMIMR and partner Japanese institutions. The project aims primarily to detect and characterize viral gastroenteritis pathogens in Ghanaian children less than 5 years old, with a particular focus on monitoring rotavirus strains circulating in Ghana in the post-vaccine introduction era. This hospital-based surveillance is carried out at the War Memorial Hospital, Navrongo, in the Upper East Region, where children < 5 years old admitted with a primary complaint of diarrhoea are consented and enrolled.

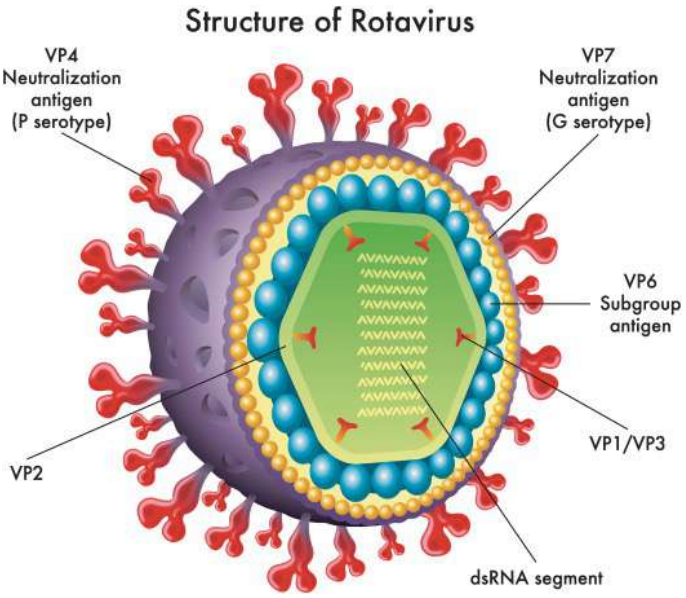
Adenovirus, Enteroaggregative E. coli (EAEC), rotavirus, Shigella and norovirus are the leading aetiologies of paediatric enteric diarrhoea in the Upper East Region. Rotavirus transmission is all year round, with distinct seasonal peaks observed between November and March coinciding with periods of low rainfall and high mean temperature range. Rotavirus and adenovirus seasons fundamentally overlapped.

Reassortant rotavirus strains (G3P[6] DS-1-like and G9P[4] DS-1-like) emerged shortly after Ghana introduced the rotavirus vaccine into its national immunization program in 2012. This phenomenon has also been reported globally, with the proportion of reassortant strains increasing after vaccine introduction. Genomic analyses conducted in this study revealed that some rotavirus genome segments detected in Ghana are of bovine origin, suggesting possible interspecies transmission and/or reassortment. A shift in predominant rotavirus strain was observed between 2020 and 2024, with the emergence of G3P[8] rotavirus strains displaying long or short electropherotypes suggesting a reassortant strain in circulation. To investigate immune responses against circulating strains, recombinant rotaviruses were generated using the SA11 strain, which exhibits high replication efficiency in cultured cells. These recombinant viruses carried the antigenic properties of circulating Ghanaian strains (G1P[8], G1[P6], G9P[4], and G2P[4]). Each recombinant virus was propagated in large quantities, and high-concentration virus stocks were prepared by ultracentrifugation using a sucrose cushion. Viral titers were determined using a fluorescent antibody assay. Based on these results, efforts are currently underway to establish an ELISA-based antibody titer measurement system using these recombinant viruses as antigens.

The next phase will involve genomic characterization of the main enteric viruses and the determination of their transmission dynamics, as well as the measurement of IgA antibody titers in the Ghanaian paediatric population. Some of these findings were presented at the 15th International Rotavirus Symposium, Cape Town, South Africa (September 30 - October 2, 2025) and the NMIMR Annual Research Meeting 2025, Accra, Ghana (25 – 27 November 2025).



Title: Sequencing and Antigenic Cartography of Enteric Viruses (SACEV), Ghana



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Next Generation Sequencing Unit and Division of Virology, Faculty of Health Sciences, University of the Free State, Bloemfontein, 9300, South Africa

Prof Jason Mathiu Mwenda
Sefako Makgatho Health Sciences University, Medunsa, Pretoria, South Africa.
Kenya Primate Research Institute, Nairobi, Kenya

Dr Celeste M. Donato
Department of Paediatrics, University of Melbourne, Parkville, Victoria.
Enteric Diseases, Murdoch Children's Research Institute, Parkville, Victoria.

Prof Kwamena W. C. Sagoe
Department of Medical Microbiology, University of Ghana Medical School, College of Health Sciences, University of Ghana, Legon, Ghana

Prof Christabel Enweronu-Laryea
Department of Child Health, University of Ghana Medical School, College of Health Sciences, University of Ghana, Legon, Ghana

Funding source: Gates Foundation

Summary:

The Sequencing and Antigenic Cartography of Enteric Viruses (SACEV) study is an international initiative which aims to generate comprehensive representative genomic datasets for the major circulating enteric viruses to understand their genetic diversity, track their spread, variability across geographic areas; as well as to cartograph important antigenic regions of these viruses to inform multiepitope-fusion-antigen (MEFA) enteric virus vaccine platforms.

The project has also carried out a burden of disease study for rotavirus in Guinea, generating highly anticipated data that provides evidence in support of the country's intentions to introduce rotavirus vaccines.

Dr. Frank Alioune Magassouba, an international MPhil student on the project was awarded the prestigious Mandela Washington Fellowship, spending 6 weeks at the Michigan State University, Michigan, USA (17th June – 28th August, 2025).

The study spans several African countries, with training of post-graduate students ongoing in Malawi, Kenya, South Africa, and Ghana. Following sequencing protocol optimization, complete genomes for several Adenovirus 40/41 strains have been generated from South Africa, Malawi, Benin, Burkina Faso, Nigeria and Ghana. Similarly, complete genomes for sapovirus, norovirus and astrovirus strains from Malawi and South Africa have been generated, several of which have now been published as genome announcements (doi: 10.1128/mra.00966-25; doi: 10.1128/mra.00545-25; doi: 10.1128/mra.00602-25) with four more manuscripts currently under preparation. Pending work include the generation and analyses of sapovirus, norovirus and astrovirus genomes from Benin, Burkina Faso, Nigeria and Ghana, and the completion of antigenic cartography for these enteric viruses.

Title: Establishment of Biological Potency and Safety Testing Services for Atlantic Lifesciences Biologicals at NMIMR

Name of NMIMR Investigators: Dr. Constance Agbemelo-Tsomafo and Dr. Samuel Adjei, Dr. R.S. Sarii, Dr. Believe Ahedor, Mrs. Shirley Nyarko Adu-Poku, Mr. Bonni Boukare

Name and Affiliation of Collaborator: Atlantic Lifesciences (ALS), Ghana

Funding source: Atlantic Life Sciences, Ghana

Summary:

The growing national drive toward local manufacture of vaccines and biologicals in Ghana necessitates the availability of credible, WHO-aligned biological testing services to support quality control, batch release, and regulatory compliance. Atlantic Lifesciences (ALS), a Ghanaian pharmaceutical and biologicals manufacturer, requires access to validated in vivo safety and potency assays for toxoid vaccines and parenteral biological products. Currently, these services are largely outsourced outside the country, resulting in increased costs and extended turnaround times.

This project seeks to establish and operationalize biological testing services in the Department of Animal Experimentation at NMIMR. The proposed services include the L+/10 dose test for tetanus toxoid potency, tetanus antitoxin potency assays, diphtheria toxoid potency testing, and rabbit pyrogen testing of biological products. All assays will be conducted in accordance with World Health Organization (WHO) Technical Report Series guidelines, British Pharmacopoeia, Indian pharmacopoeia and relevant regulatory standards, with strict adherence to Good laboratory practices (GLP) and ethical principles governing the use of laboratory animals. This project will strengthen NMIMR's role as a national reference centre for biological testing, build capacity, and support local pharmaceutical manufacturing, and generate sustainable internally generated funds (IGF).

GLP re-inspection by FDA in preparation towards Vaccine potency testing project in NMIMR

Presentation to Biofarma on behalf of Atlantic Life Sciences after a collaborative meeting.

Guidelines, British Pharmacopoeia, Indian pharmacopoeia and relevant regulatory standards, with strict adherence to Good laboratory practices (GLP) and ethical principles governing the use of laboratory animals. This project will strengthen NMIMR's role as a national reference centre for biological testing, build capacity, and support local pharmaceutical manufacturing, and generate sustainable internally generated funds (IGF).

Title: Stability Study of Adsorbed Tetanus-Diphtheria Toxoid Vaccine (ALS-Td) and Tetanus Antitoxin, (ALS-ATS) produced in Ghana, to Predict the Shelf-life and Establish Stability Profile of Both Products.

Name of NMIMR Investigators: Dr. Samuel Adjei, Dr. Believe Ahedor, Dr. Constance Agbemelo-Tsomafo, Prof. Kwadwo Asamoah Kusi

Name and Affiliation of Collaborator: Atlantic LifeSciences Limited

Funding sources:

Summary:

Ensuring the long-term stability of locally produced vaccines and biologics is critical for sustainable public health immunization programmes and regional self-reliance. This study aims to evaluate the physicochemical, immunological, and microbiological stability of two Ghana-manufactured immunotherapeutic products: the Adsorbed Tetanus-Diphtheria Toxoid Vaccine (ALS-Td) and the Tetanus Antitoxin Serum (ALS-ATS). Accelerated and real-time stability studies will be conducted under controlled storage conditions to assess potency retention, antigen integrity, sterility, adsorption/desorption characteristics, preservative system performance, and physicochemical properties over defined time intervals. Analytical parameters including pH, appearance, protein content, toxoid activity, endotoxin level, and potency measurements will be monitored following recommended international guidelines (WHO, EMA, USP). Data generated will be modelled to predict product shelf-life and establish stability-indicating parameters that can support evidence-based assignment of expiry dating periods for both products. Outcomes from this project will inform regulatory submission, strengthen quality assurance systems, and support commercial scale manufacturing, distribution, and deployment of ALS-Td and ALS-ATS in Ghana and the sub-region. Ultimately, the study will contribute to improved access to high-quality, stable, locally produced vaccines and antitoxins to support routine immunization, outbreak preparedness, and national health security goals.

Title: Integrative Surveillance of Tick-Borne Parasites in Ghana: Ecology, Genomics, and Public Health Risk

Name of NMIMR Investigators: Dr. Believe Ahedor, Mr. Norbet Teye

Name and Affiliation of Collaborators:
Dr. Jennifer Afua Afrifa Yamoah, CSIR-Animal Research Institute
Ms. Antoinette Keleve, CSIR-Animal Research Institute

Funding source: ACBF/WAAVP

Summary:

Ticks are the second most important arthropod vectors of viral, bacterial, and protozoan pathogens after mosquitoes and represent a major threat to livestock productivity, rural livelihoods, and food security in Ghana. Tick-borne pathogens (TBPs), despite their economic and zoonotic significance, remain poorly characterised. The diversity, distribution, and ecological drivers of tick-borne pathogens in Ghana are also poorly understood, particularly in the context of rapid urbanization, land-use change, and climate variability that are reshaping tick ecology and host–vector interactions. This project aims to use a long-read metagenomic sequencing approach to characterize microbial communities for the detection of known and emerging pathogens.

The resulting genomic data will be integrated with ecological and climatic variables using spatiotemporal modelling and geographic information systems to map pathogen distribution, identify transmission hotspots, and predict potential outbreak dynamics. The project will provide molecular profiles of zoonotic and veterinary pathogens circulating in tick populations and produce predictive ecological risk maps. In addition, the project will strengthen laboratory and genomic surveillance capacity, support postgraduate training, and foster collaboration among veterinary, public health, and environmental stakeholders, thereby contributing to improved One Health surveillance and preparedness against emerging tick-borne diseases in Ghana.

Title: Therapeutic efficacy of antimalarial medicines in Ghana

Name of NMIMR Investigators: Prof. Benjamin Abuaku, Prof. Nancy O. Duah-Quashie, Prof. Neils B. Quashie, Prof. Kwadwo A. Koram

Name and Affiliation of Collaborators:
Dr. Paul Boateng, Dr. Paul H. Abiwu, Dr. Keziah L. Malm - National Malaria Elimination Programme
Dr. Felicia Owusu-Antwi - WHO

Funding source: USAID and GFTAM through the NMEP

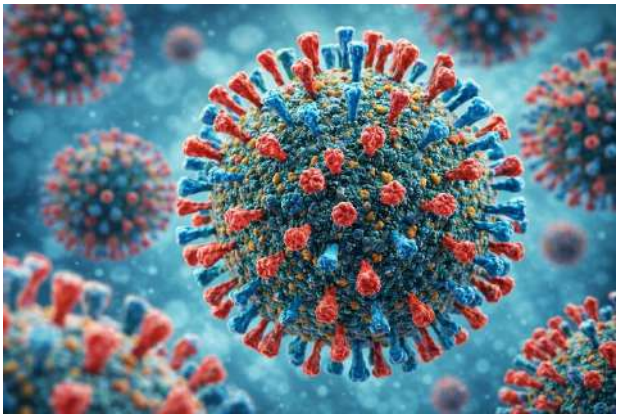
Summary:

Since 2005 the Noguchi Memorial Institute for Medical Research (NMIMR) has been supporting the National Malaria Elimination Programme to monitor the therapeutic efficacy of Ghana's first-line and second-line artemisinin-based combination medicines for treating uncomplicated malaria. Currently, artesunate-amodiaquine (ASAQ), artemether-lumefantrine (AL), and artesunate-pyronaridine (AP) are the first-line medicines whilst dihydroartemisinin-piperaquine (DHAP) is the second-line medicine. In 2025, the study concluded analysis of DHAP and AP data collected in 2023 and AL data collected in 2024. PCR-corrected cure rates were 100% for all DHAP sites, 91.9% (95% CI: 78.1-98.3) to 100% for AP sites, and 91.9% (95% CI: 78.1-98.3) to 100% for AL sites. None of the sites showed efficacy levels of < 90% (WHO threshold for change of antimalarial medicines policy) warranting the continuous use of these artemisinin-based combination medicines in the treatment of uncomplicated malaria in the country. Preserving the high efficacy of these medicines should be Ghana's motivation for implementing the multiple-first line therapy (MFT) intervention as a strategy to reduce drug pressure on each of the medicines and subsequent prevention of spread of drug resistance.


Training session for site teams


Supervisory visits to sites

Title: Surveillance of influenza and other viral respiratory etiologies in patients with influenza like illness (ILI) and severe acute respiratory infections (SARI) syndromes in Ghana



Name of NMIMR Investigators: Dr. Ivy Asantewaa Asante, Dr. Naiki Attram, Prof William Kwabena Ampofo

Name and Affiliation of Collaborators:
Dr Franklin Asiedu Bekoe: Public Health Division, Ghana Health Service
Dr. Dennis O. Laryea: Disease Surveillance Department, Ghana Health Service
Dr. Daniel L. Mingle: Ghana Armed Forces

Funding source:
US Naval Medical Research Unit EURAFCENT (Formerly NAMRU-3)
US Centers for Disease Control and Prevention

Summary:

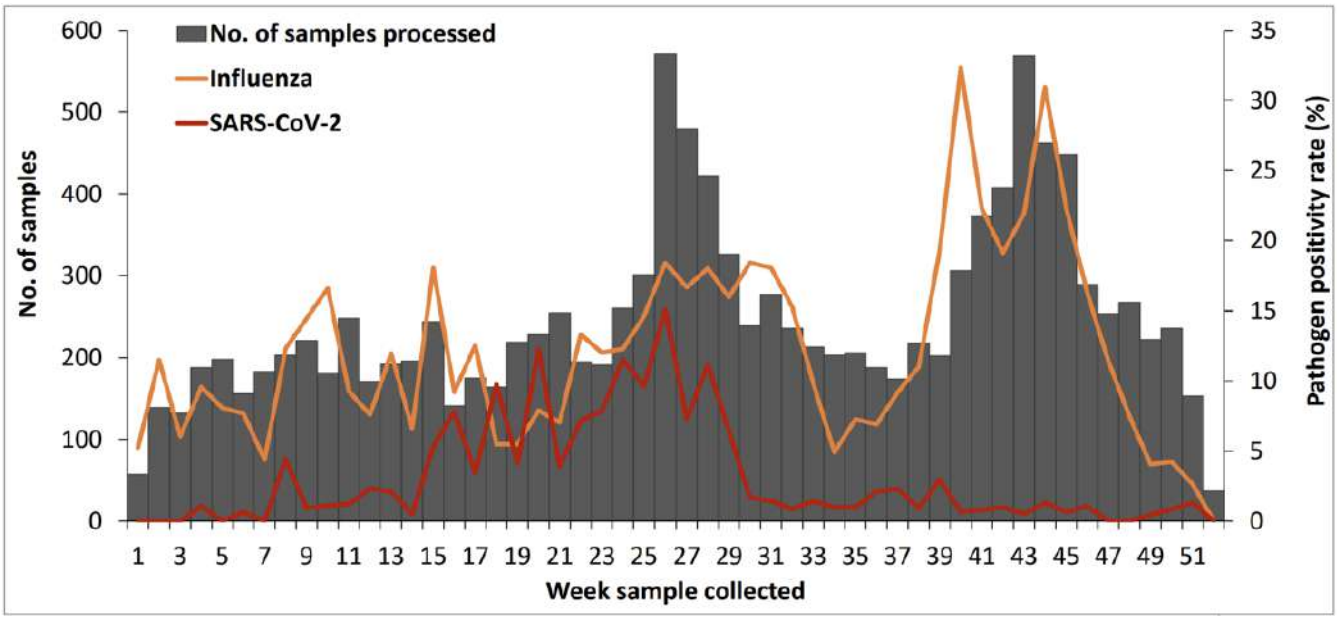
Surveillance for influenza viruses has been ongoing among the general human population in Ghana in 2007. From 2020, in collaboration with Ghana Health Service (GHS), the US Naval Medical Research Unit 3 (now EURAFCENT), the US Centres for Disease Control and Prevention and the WHO, this system has integrated SARS-CoV-2 and human respiratory syncytial virus (HRSV). Genomic surveillance for SARS-CoV-2 and influenza is also ongoing. This surveillance activity is modelled on sentinel sites, which comprise hospitals, health care centers and medical reception stations. Combined oro and naso pharyngeal swab specimen are collected from patients who present with influenza-like illnesses or are hospitalized due to respiratory infections at sentinel sites and transported in viral transport medium to the Virology Department, NMIMR. These samples are processed for the presence of influenza, SARS-CoV-2 and Human Respiratory Syncytial Virus (HRSV). In addition to surveillance in the general human population, the NMIMR in collaboration with the Veterinary Services Directorate with support from US Naval Medical Research Unit 3 (now EURAFCENT) also monitors avian influenza viruses at the human/animal interface.

From January to December 2025, a total of 12, 817 samples have been received and processed. Prevalence for influenza is 14.3% (1829/12817), while SARS-CoV-2 is 3.6% (460/12817). During this time, the NMIMR supported the GHS with outbreaks of SARS-CoV-2 among students of the University of Ghana. NMIMR was able to monitor and alert the GHS about the outbreak. Sequencing was also used to further characterize viruses from the outbreak. Sequencing showed that SARS-CoV-2 viruses were recently circulating global Omicron sub-variants XFG strains with little evolution. Data from the surveillance activity shows co-circulation of influenza and SARS-CoV-2 with an inverse relationship.

Table 1. Number of samples processed from January to December, 2025

Syndrome	No. of samples processed	A(H1N1) pdm09	A(H3N2)	B/Victoria	SARS-CoV-2	Total positives
ILI	10,919	853 (7.8%)	735 (6.7%)	36 (0.3%)	416 (3.8%)	**2,040 (18.7%)**
SARI	1,898	142 (7.5%)	59 (3.1%)	4 (0.2%)	44 (2.3%)	**249 (13.1%)**
Total	**12,817**	**995 (7.8%)**	**794 (6.2%)**	**40 (0.3%)**	**460 (3.6%)**	**2,289 (17.9%)**
Overall positivity (all viruses)				**1,829 (14.3%)**		

Note: Percentages are calculated based on the number of samples processed for each syndrome.



Co-circulation of influenza and SARS-CoV-2 cases from January to December 2025, showing an inverse relationship.

When SARS-CoV-2 cases are high, influenza cases are low and vice versa [Figure 1]. Genomic surveillance of influenza shows that; viruses do not evolve rapidly in-country and are well matched with Northern hemisphere vaccine strains. Therefore, Northern hemisphere vaccines can be used for the Ghanaian population.

This surveillance system has over the years been an important system in providing data on respiratory virus circulation in Ghana. It has served as an early warning system in detecting and identifying outbreaks which has supported rapid response by Public Health authorities.

Title: Study on Transmission and Resistance of M. Leprae / M. Lepromatosis (Starlep) in Africa

Name of NMIMR Investigators: Prof Dorothy Yeboah-Manu, Prof Adwoa Asante-Poku

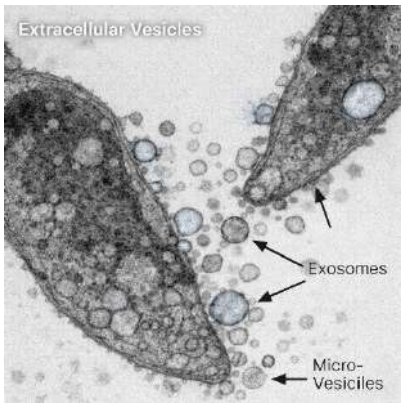
Name and Affiliation of Collaborators:
1. Dr. Sofie Braet - Institute of Tropical Medicine, Antwerp, Belgium
2. Prof Bouke de Jong - Institute of Tropical Medicine, Antwerp, Belgium

Funding source: Leprosy Research Initiative

Summary:

In this genomic observational study, the investigators will test whether drug resistance and M. lepromatosis infections contribute to endemicity of leprosy in four African countries. Out of the six African countries that have already conducted drug resistance screenings, only the Comoros and Ethiopia did not detect any resistance, albeit on few samples tested in Ethiopia. Therefore, Damian Foundation, Noguchi Memorial Institute for Medical Research, Institut Pasteur Cameroun, and INRB will recruit leprosy patients from Burundi, Ghana, Cameroon and the Democratic Republic of Congo respectively. In collaboration with the implementers of the Biomeme platform, biopsies from leprosy patients will be screened in the respective countries for the presence of the RLEP insertion sequence, specific for M. Leprae. Subsequently, DNA extracts will be sent to the Institute of Tropical Medicine (ITM). Positive DNA extracts will be tested for resistance mutations beyond the three known targets (folp1, gyrA, rpoB) using Deeplex MycLep and all extracts (both positive and negative) for the presence of M. lepromatosis. Furthermore, by genotyping (by targeted- or whole genome sequencing) M. leprae in the samples of patients, the study will test whether genotypic clustering of M. leprae is suggestive of recent transmission within the country and will investigate if any other gene target is possibly related to drug resistance. As the endemic countries differ regarding available molecular platforms and expertise, capacity building will be adapted, with south-south exchanges and collaboration with Skin Labnet encouraged. Bioinformatics analyses will be conducted jointly to enhance capacity

Investigating the role and impact of Nano-sized Extracellular VesiclEs and dRug RESisTance in protozoans (The i-NEVER REST project)



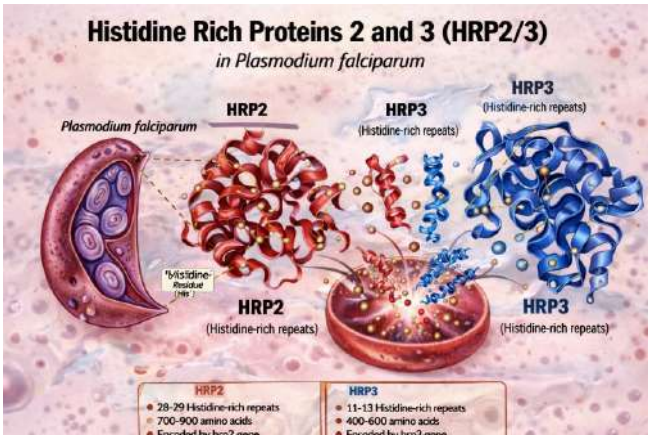
Name of NMIMR Investigators: Nancy Duah Quashie, Kwesi Tandoh, Elisabeth Laryea-Akrong, Esther Baafi

Name and Affiliation of Collaborators:
1. Christopher Fernandez Prada, University of Montreal, Canada
2. Neta Regev-Rudzki, Weizmann Institute of Science, Israel

Summary:

The emergence of antimalarial drug resistance increasingly challenges the global effort to eliminate malaria. This growing threat has the potential to undermine national malaria control and elimination strategies. To address this challenge, the I-NEVER-REST project aims to deepen understanding of the role of extracellular vesicles (EVs) in the molecular mechanisms that underlie resistance to artemisinin (ART), particularly in the context of artemisinin-based combination therapies. Findings from this work are expected to enable the discovery of novel, druggable targets and to support the development of cost-effective, high-performance rapid diagnostic tools that exploit the unique properties of these ubiquitous biological nanoparticles. To accomplish these goals, the project will employ an integrated strategy combining in vitro experimentation, observational clinical studies, and multi-omics approaches to investigate how EVs contribute to the development of ART resistance in Plasmodium falciparum and to the clinical presentation and severity of malaria. Central to this work is the EV export hypothesis, a conceptual framework previously proposed to interrogate the role of EVs in ART resistance. This hypothesis posits that EVs are required for the expression of the ART-resistant phenotype and that disrupting genes involved in EV biogenesis in resistant parasites will restore ART susceptibility. By rigorously testing these hypotheses, the project seeks to establish a foundational understanding of the contribution of EVs to ART resistance in P. falciparum and to translate this knowledge into tangible antimalarial interventions. Expected outcomes include evidence supporting or refuting a functional role for EVs in ART resistance, detailed characterization of the molecular cargo of parasite-derived EVs, and proof-of-concept validation of an EV-targeting, aptamer-based rapid diagnostic kit for malaria diagnosis. The study aims to investigate extracellular vesicle biogenesis and mechanisms of molecular cargo packaging, elucidate the role of EVs in the development of parasite-mediated antimalarial resistance, identify host and parasite factors that contribute to treatment failure and malaria relapses and to define EV-based molecular signature profiles for the detection of acute and chronic malaria infections.

Title: Determination of histidine rich protein 2 and 3 (HRP2/3) gene mutations in Plasmodium falciparum populations from Ghana



Name of NMIMR Investigators: Nancy Duah Quashie, Kwesi Tandoh, Selassie Bruku

Name and Affiliation of Collaborator:
Shirley Nimo-Paintsil, NAMRU-3 Ghana Detachment.

Summary:

Malaria is a disease of public health importance. The early detection of infection is paramount to disease treatment to avert death. The use of rapid diagnostic tests is highly recommended by the World Health Organization (WHO) for early detection of malaria for artemisinin–based combination therapy initiation. In this regard, the highly used diagnostic assays are the Plasmodium falciparum histidine rich protein 2 (PfHRP2) rapid diagnostic tests (RDTs). Deletions in the gene encoding this protein have resulted in false RDT negative results and therefore the need to constantly monitor the parasite population to determine the prevalence of the deletions. Additionally, monitoring the genetic diversity of PfHRP2 amino acid repeat types, some of which are the epitopes targeted by the RDT monoclonal antibodies is vital to malaria control efforts. This study aims to use microscopy, RDT results, and photo-induced electron transfer (PET) polymerase chain reaction (PCR) to determine the prevalence of false RDT negativity and the conditional probability of having malaria if RDT is negative. Secondly, conventional PCR and Sanger sequencing will be used to determine amino acid variants. Descriptive and analytical statistical summaries of the association between PfHRP2 amino acid variants identified and geographic/ecological regions of Ghana will be determined and compared with temporal trend observed previously and with historical data sets from other parts of the world. These data will directly help inform health protection guidelines as part of the country level malaria control and elimination efforts with the long-term goal of safeguarding accurate malaria diagnosis and prompt treatment.

Title: Antimalarial drug resistance surveillance in Ghana using targeted amplicon deep sequencing

Name of NMIMR Investigators: Nancy Duah Quashie, Kwesi Tandoh, Philip Opoku-Agyeman, Abigail Frimpong

Name and Affiliation of Collaborator:
Naiki Attram, NAMRU-3 Ghana Detachment.

Summary:

Malaria continues to be a major public health problem globally with high rates of morbidity and mortality especially in sub-Saharan Africa. Chemotherapy, with artemisinin-based combination therapy (ACT), is one of the main pillars of malaria control. In Ghana, chloroquine was replaced with ACT in 2005 for the treatment of uncomplicated malaria. Currently, the following ACT regimens are used: artemether-lumefantrine (AL), artesunate-amodiaquine (AA), dihydroartemisinin-piperaquine (DHAP), and artesunate–pyronaridine (AP). Sulphadoxine-pyrimethamine (SP) is used for intermittent preventive treatment in pregnancy (IPTp) and seasonal malaria chemoprevention (SMC) in combination with amodiaquine (AQ) in the savannah zone and parts of the forest ecological zone of Ghana. Molecular surveillance for the evolution of the emergence of drug resistance is critical for malaria control, particularly in elimination-focused settings. It is an efficient and effective approach for the early detection of resistance traits in malaria parasites and is the vanguard that aims to determine the effectiveness of antimalarial drugs. Molecular markers of drug resistance give firsthand evidence of the evolution of Plasmodium falciparum resistance to antimalarial drugs. This study leveraged the utility of the Centre for Disease Control and Prevention (CDC) Malaria Resistance Surveillance by targeted amplicon deep sequencing (MaRSTADS) pipeline to determine the distribution of markers of chloroquine (CQ), amodiaquine (AQ), lumefantrine (LF), sulphadoxine-pyrimethamine (SP) and artemisinin (ART) resistance in five genes (crt, mdr1, k13, dhfr, and dhps) in the P. falciparum population in Ghana using archived filter blood blots from 2018 to 2023. This study highlights the utility of MaRSTADS for monitoring drug resistance and underscores the need for continued surveillance to inform malaria control and elimination strategies in Ghana.

Title: Acute flaccid paralysis surveillance

Name of NMIMR Investigators: Prof. John Kofi Odoom

Summary:

Acute flaccid paralysis (AFP) surveillance is the clinical search for poliomyelitis in children under 5 years or in adults where a clinician suspect polio in Ghana. It is the effort the county is making to eradicate polio. The polio laboratory in NMIMR is the National polio laboratory and doubles as a WHO Regional Reference Polio Laboratory for Ghana, Benin, Niger and Togo. The mandate includes processing all AFP samples for virus isolation, intratypic differentiation by PCR and genomic sequencing. The laboratory also shares timely reports with the above-named countries and WHO. Within the period January to December 2025, a total of 2656 AFP samples were received and processed for virus isolation. Niger submitted the highest of 1008 (37.9) followed by Ghana (777). One hundred and twenty-five polioviruses were isolated: 89 from Niger and 28 from Benin and 8 from Ghana. The total non-polio enterovirus isolation rate was 10.0% with Niger having the highest of 12.0% as shown in table 1. Majority (99.6%) of the virus isolation results were reported within the stipulated 14 days. Of the 127 contact samples received, 13.4% yielded polioviruses while 13.4% were NPEVs. Majority of the PCR results from the 125 PV were found to be nOPV2 (76) and PV2 (16), table 2. Sequencing results indicated that 12 of the PV2 were circulating vaccine-derived poliovirus type 2 (cVDPV2) while 52 were nOPV2 as shown in table 3.

Country	CASES	CONTACT	COMMUNITY	Number of samples	Complete results	Results Pending	Results in 14 days		Suspected polio virus	NPENT	
							Number	*Percent*		Number	*Percent*
BEN	485	53	60	1082	1082	0	1070	*98.9%*	28	107	*9.9%*
GHA	777	5	0	1557	1557	0	1553	*99.7%*	8	124	*8.0%*
NIG	1008	59	0	2071	2071	0	2071	*100.0%*	89	267	*12.9%*
TOG	384	10	0	778	778	0	774	*99.5%*	0	52	*6.7%*
TOTAL	2654	127	60	5488	5488	0	5468	*99.6%*	125	550	*10.0%*

Distribution AFP cases submitted to the polio lab and the virus isolation rate

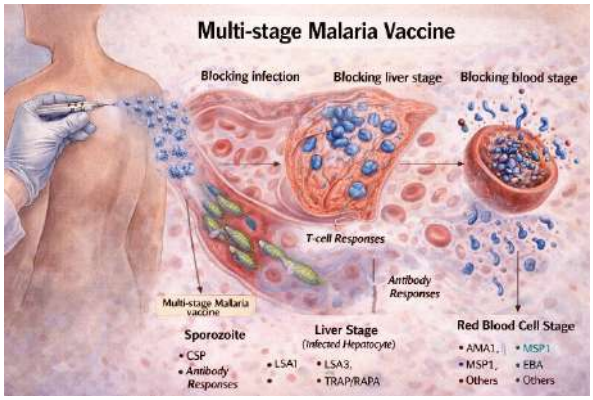
Country	Number of isolates	With Complete	ITD	With Result in 7 days		P1		PV2		P3		RNPENT	Non ENV
			Pending	Number	*Percent*	Wild	Vaccine	PV2	nOPV2	Wild	Vaccine		
BEN	28	28	0	28	100%	0	6	7	12	0	9	0	0
GHA	8	8	0	8	100%	0	4	0	0	0	4	0	0
NIG	89	89	0	89	*100%*	0	6	9	64	0	13	0	0
TOG	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	125	125	0	125	*100%*	0	16	16	76	0	26	0	0

PV ITD results as of September 2025

Country	Number of isolates received	With Complete Result	PENDING SEQ	With Result in 7 days		Serotype 1			Serotype 2				Serotype 3		
				Number	*Percent*	Wild	Vaccine	VDPV	PV2	nOPV2	vaccine	cVDPV2	Wild	Vaccine	VDPV
BEN	13	13	0	13	100	0	0	0	0	7	0	6	0	0	0
GHA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NIG	51	51	0	51	100	0	0	0	0	45	0	6	0	0	0
TOG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	64	64	0	64	100	0	0	0	0	52	0	12	0	0	0

Genomic sequencing results of PV2 isolates

Title: A Multi-stage Malaria Vaccine for Control and Elimination



Name of NMIMR Investigators: Prof Linda Eva Amoah, Prof Kwadwo Ansah Koram, Prof Samuel Dadzie, Prof Benjamin Abuaku, Dr. Festus Kojo Acquah

Affiliation of Collaborators:
- Institut de Recherche pour le Developpement
- Universite des Sciences des Techniques et des Technologies de Bamako
- The Registered Trustees of The Ifakara Health Institute
- Imperial College of Science Technology aand Medicine
- Institut de Recherche Clinique Du Benin
- Groupe de Recherche Action en Sante Sarl
- Kenya Medical Research Institute
- The Chancellor, Masters and Scholars of The University of Oxford

Funding source: Global Health EDCTP3 Joint Undertaking

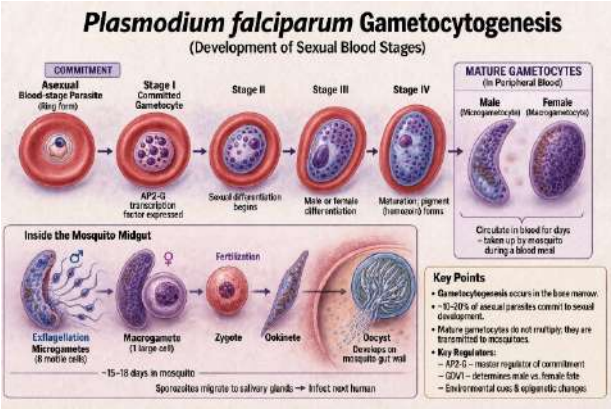
Summary:

This study investigates malaria transmission from asymptomatic individuals to mosquitoes in Obom and surrounding communities in Ghana using the Direct Skin Feeding Assay (DSFA). Malaria remains a major global health burden, with an estimated 263 million cases and 597,000 deaths reported in 2023, disproportionately affecting sub-Saharan Africa, particularly children and pregnant women. Despite recent advances in malaria vaccines targeting the pre-erythrocytic stage, effective tools to interrupt transmission are still lacking. Transmission-blocking vaccines (TBVs), which target sexual-stage parasites and prevent parasite transfer from humans to mosquitoes, represent a promising strategy for malaria elimination. However, assessing their effectiveness requires robust assays that closely mimic natural transmission dynamics, with DSFA being the most sensitive and representative method. The overall objective of this study is to assess human-to-mosquito transmission of Plasmodium falciparum among healthy, non-febrile individuals in a malaria-endemic community. Specific aims include developing a standard operating procedure for DSFA at the Noguchi Memorial Institute for Medical Research (NMIMR), determining the prevalence of malaria parasites among participants, and assessing the proportion of individuals capable of transmitting malaria to mosquitoes. The study hypothesizes that at least one participant will transmit P. falciparum to mosquitoes during DSFA. Ethical approval has been obtained from NMIMR-IRB. A cohort of 220 asymptomatic children aged between 5-15 years old have been enrolled in the study, which spans the off-peak and peak malaria seasons. These children will be sampled monthly for 9 continuous months, 6 of which will involve DSFA. For the DSFAs, insectary capacity at NMIMR has been expanded to enable to rearing

of over 15,000 Anopheles mosquitoes monthly as 12,000 female Anopheles mosquitoes are needed for the monthly DSFA. After each DSFA, the fed mosquitoes are maintained for a week afterwhich their midguts are dissected and stained to search for P. falciparum oocysts in their midguts, indicating a successful transmission event.

Safety monitoring for the study includs assessment of local site reactions such as itching, swelling, redness, and pain at mosquito bite sites. Severe reactions are noted and referred for medical care. Data analysis will quantify parasite prevalence and transmission rates, with statistical associations explored between participant characteristics and mosquito infectivity. The expected outcomes include establishing the dynamics of malaria transmission in the study area and developing an in-house SOP for DSFA. This study will contribute critical insights into asymptomatic malaria transmission and support the development and evaluation of transmission-blocking interventions.

Title: Plasmodium falciparum Gametocytogenesis in vitro and in vivo.



Name of NMIMR Investigators: Prof. Linda Eva Amoah and Prof. Ben Abuaku

Name and Affiliation of Collaborators: Professor Kim C. Williamson, Microbiology and Immunology Department, Uniformed Services University of the Health Sciences. USA

Funding source: NIAID/NIH, United States of America

Summary:

Controlling malaria transmission is key to global malaria elimination and eradication efforts and continues to be highlighted as a critical research area by the recent Malaria Eradication Refresh (MalERA) panel 3. However, very little is known about the in vivo production and maturation of sexual stages, called gametocytes, that are required for human-to-human transmission via a mosquito. In P. falciparum only mature transmissible, stage V gametocytes can be detected in the blood and levels have been shown to vary widely between individuals 9-12, but the underlying reasons for these differences in carriage remain unknown, including the role of immunity, and therefore have not been targeted to decrease gametocytemia. Defining the host and parasite factors involved in the initial commitment/production and maturation/ survival of gametocytes is the first step toward designing new control strategies, including new drugs and vaccines. The aim of this project is to conduct a Longitudinal analysis of gametocyte dynamics in a cohort of school children through the malaria season. A cohort of 200 children aged between 3 and 15 years old living in Simiw in the Central Region of Ghana were followed for 3 consecutive years, with periodic biweekly blood sample collection. The blood samples were used to quantify parasitemia, DNA and RNA analysis as well as for metabolomic and immunologic assays. Samples positive for P. falciparum 18srRNA were further evaluated for parasite stage using markers for rings (sbp1), gc-rings (ap2-g, msrp1) and female (Pfs25) and male (mget) gametocytes. A total of 1235 samples have been processed so far, 823 out of this number have been identified as Pfg377 positives. Ongoing work includes Pfg377 genotyping of the remaining Pf18sRNA /Pfs25RNA positive samples for year 1 and year 2. This is the first time the maturation of gc-rings into stage V gametocytes two weeks later has been assessed in vivo. The study will provide insight into the seasonal, metabolic and immunological factors that influence both gametocyte commitment and survival

Title: Non-falciparum malaria surveillance

Name of NMIMR Investigators: Prof. Linda E. Amoah

Name and Affiliation of Collaborators: Naval Medical Research Unit Europe, Africa and Central (NAMRU-EURAFCENT)

Funding source: Armed Forces Health Surveillance Division (AFHSD), Global Emerging Infections Surveillance (GEIS).

Summary:

Although *Plasmodium falciparum* remains the dominant malaria parasite in Ghana, non-falciparum species are often underdiagnosed due to reliance on PfHRP2-based rapid diagnostic tests and limitations in routine microscopy, posing challenges to malaria elimination efforts. This study aims to utilise highly sensitive molecular tools to determine the prevalence, distribution, parasite density, and genetic diversity of non-falciparum malaria species, including *P. malariae, P. ovale, P. vivax* and *P. knowlesi* among symptomatic malaria patients across all 16 regions of Ghana.

This multiple cross-sectional study employs random sampling to select archived dried blood spot (DBS) samples collected from 30 sentinel health facilities across all regions of Ghana. The health facilities were purposively distributed to represent the country's three malaria transmission zones: Forest, Coastal, and Savannah, with 10 health facilities selected from each zone. Samples collected between January 2023 and December 2024 have been fully analysed, while processing and laboratory analysis of samples collected in 2025 are currently ongoing

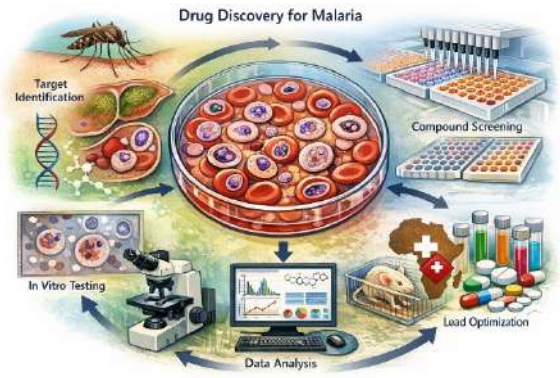
In 2023, 11,849 samples were analysed whilst in 2024, 7,800 samples, were analyzed. Both P. malariae and P. ovale species were detected across multiple regions, though prevalence varied significantly by region and ecological zone. The Forest zone consistently recorded the highest burden. In 2023, the Eastern, Central, Volta, and Upper East regions showed relatively higher prevalence. In 2024, the Western region recorded the highest *P. malariae* prevalence, while Ashanti and Eastern regions showed higher *P. ovale* prevalence. Significant regional variation was observed for *P. malariae* in both years, while variation for *P. ovale* was significant in 2023 but less pronounced in 2024. No *P. vivax* nor *P. knowlesi* have been identified to date.

Parasite quantification showed that *P. ovale* infections generally had higher parasite densities than *P. malariae*. These findings indicate that although non-*falciparum* infections are less prevalent, they can occur at clinically meaningful parasite densities.

Genetic analysis revealed no detectable diversity among *P. malariae* isolates, suggesting a conserved population. In contrast, *P. ovale* showed moderate genetic diversity, with the highest variation in the Forest zone.

Overall, *P. malariae* and *P. ovale* species continue to circulate at low but significant levels in Ghana. Their nationwide presence, clinical relevance, and genetic diversity highlight the need for improved molecular diagnostics, strengthened surveillance, and species-specific case management strategies to support malaria elimination efforts.

Title: Further development of antimalarial drug discovery capability in Ghana



Name of NMIMR Investigators: Prof. Linda Eva Amoah, Prof. Dorothy Yeboah-Manu

Name and Affiliation of Collaborators: Prof Susan Wyllie and Prof Marcus Lee, University of Dundee, Scotland

Funding source: Bill and Melinda Gates Foundation

Summary:

To explore further on potential antimalarial compounds beyond phenotypic screening for capacity building and expansion, the investigators received a grant from Bill and Melinda Gates Foundation to delve into mode of action studies (MOA), which began in April 2025. This project specifically aims to support the establishment of in vitro resistance selections, drug target validation through various genetic approaches as well as HepG2 and HEK293 toxicity assays in the Ghana Drug Discovery Hub (DDH) over the next 2 years with continued support from the University of Dundee. In the first year of this project, ten (10) compounds were received from Drug Innovation Group (DIG) purposely for Mode of Action (MOA) studies. These compounds were carefully selected based on potency. To confirm the activity of these compounds, Sybr Green Growth Inhibition assay was performed against 3D7 Plasmodium falciparum parasites. Then, for the purpose of resistance selection and other mode action studies, the compounds were screened against DD2 (a resistant P.f strain) and DD2 Delta Pol (a genetically modified P. falciparum strain from Prof. Marcus Lee, University of Dundee). Having generated activity data of compounds against the three P. falciparum strains (3D7, DD2, DD2 Delta Pol), two highly active compounds with IC50< 1 µM against DD2 parasites were evaluated for resistance selection using the bulk Minimum inoculum of resistance (MIR) assay. Briefly, DD2 parasites were seeded at 2.5 × 10^6 cells in plates and 3 × 10^7 cells in T25 culture flasks and exposed to 3xIC50 of compounds and maintained for 60 days with media change and addition of uRBCs. Three compounds were also used to perform Parasite reduction ratio assay (PRR) to evaluate parasite time-kill profile of compounds. Briefly, 3D7 strain parasites were exposed to 10xIC50 of compounds for 5 consecutive days, where drugs were washed off from aliquot of the cultures and limiting dilution was performed to a single parasite in a in 96-well plate. The plates were maintained for 24 days with media change and addition of uRBCs. Acceptable differential time-kill activity was obtained for the compounds relative to controls. Six compounds from the set were used to validate and optimize HepG2 cytotoxicity assay. This was to evaluate the effect of compound on the host cells and its selectivity. The study aims to perform additional MOA studies on more compounds and also establish HEK293 and target-based assays to add to the screening pipeline.

Title: Developing High-Throughput Antimalarial Screening Capacity at NMIMR

Name of NMIMR Investigator: Prof. Linda Eva Amoah

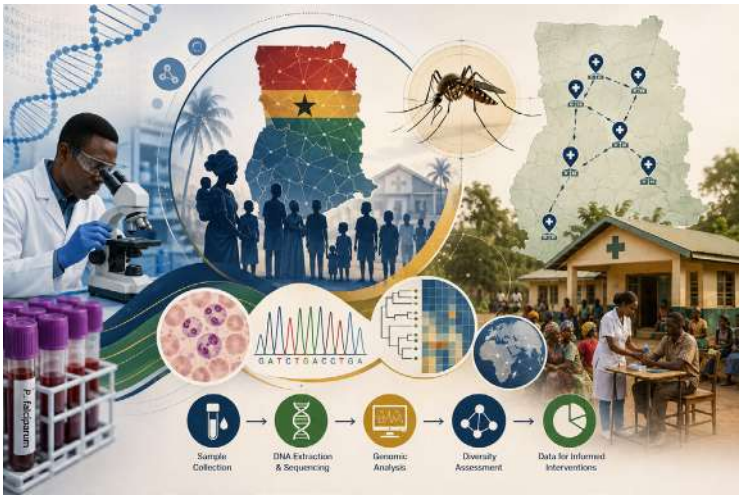
Name and Affiliation of Collaborator: Prof Beatrice Baragana, University of Dundee, Scotland, Uk.

Funding source: Medicine for Malaria Ventures

Summary:

This project aims at developing high throughput screening capacity for testing antimalarial compound libraries in Ghana. The main objectives of the project are to Acquire High-Throughput Screening Equipment: A Welljet liquid and reagent dispenser has been purchased for high-throughput screening. To Build Technical Expertise through Training: hands-on training was provided for the NMIMR biology team (Prof Linda Eva Amoah and Dr. Festus Kojo Acquah, Project Principal Investigator and Postdoctoral fellow, respectively) on the use of high-throughput screening instrumentation and protocols. This training was provided by Prof. Beatrice Baragana and Dr. Mark Anderson at the Drug Discovery Unit (DDU) at the University of Dundee (Scotland). To Establish and Validate HTS at NMIMR. The last objective is to implement and validate high-throughput screening workflows at NMIMR upon the team's return to Ghana. This will include conducting a pilot screening of about 9,000 compounds provided by DDU. Successful completion of this step will result in a fully operational HTS capability integrated into NMIMR's drug discovery pipeline.

Title: Characterization of the genomic diversity of P. falciparum isolates collected from malaria infected individuals receiving treatment at selected health facilities in Ghana



Name of NMIMR Investigator: Professor Linda Eva Amoah

Name and Affiliation of Collaborators: Prof. Hikaru Nagaoka and Prof. Eizo Takashima. Division of Malaria Research, Proteo-Science Center. Ehime University. Japan

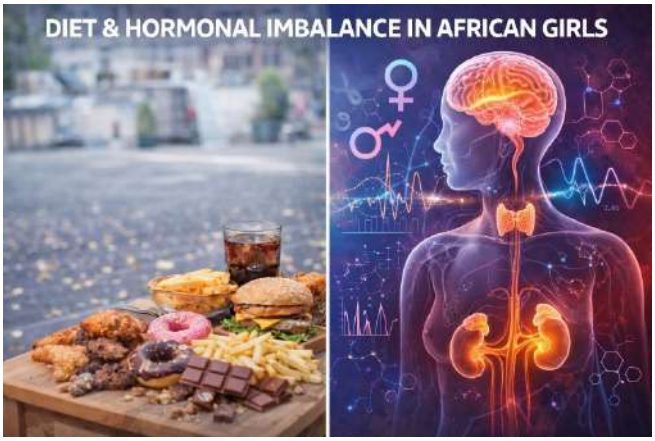
Funding source: Japan Agency for Medical Research Development (AMED)

Summary:

Malaria remains a major public health challenge in most of sub-Saharan Africa of which Ghana is part, where Plasmodium falciparum accounts for most of the severe disease and malaria-related mortality. According to the World Health Organization's Global Malaria Program classification, Ghana and much of West Africa are classified among nations considered to be in the control phase. Even though frontline artemisinin-based combination therapies (ACTs) have significantly decreased morbidity and mortality, current control and elimination efforts are seriously hampered by growing parasite genetic variation, including mutations linked to drug resistance. Continuous genomic surveillance of circulating field isolates is therefore important to identify adaptive variations, monitor the spread of resistance associated variants, and inform national treatment guidelines.

This project aims to characterize the genomic diversity of P. falciparum isolates collected from malaria infected individuals receiving treatment at selected health facilities in Ghana. By integrating parasite culture, parasite cloning (limiting dilution) and whole genome sequencing to identify genetic variations in the clinical parasite isolates. Venous blood samples are collected from consenting symptomatic malaria patients prior to treatment and transported to the NMIMR. The blood samples are washed and the parasites cultured in vitro. Serial limiting dilutions are then prepared until clonal parasite populations are established. Genetic DNA from the parasite clones will be sequenced to determine their genetic makeup.

Title: Diet and hormonal imbalance in adolescent girls: An awareness exploratory study



Name of NMIMR Investigators: Dr. Sawudatu Zakariah-Akoto, Prof. Benjain Abuaku, Prof. Collins Ahorlu, Prof. Michael Ofori, Eric Kyei-Baafour, Dr. Egbi, Mr. Edem Oklu, Evelyn Boakye-Danquah

Funding source: Prof and Mrs. Kimura, Japan

Summary:

Adolescent girls are particularly sensitive to hormonal imbalance, with significant implications for their nutritional, reproductive, physical, psychosocial and academic wellbeing. Despite this, the extent of adolescent girls' knowledge, perceptions and management of symptoms of hormonal imbalance, together with their hormonal levels, dietary intake and nutritional statuses has not been adequately explored. To address this gap, a multidisciplinary research team from the Departments of Nutrition, in collaboration with the Departments of Immunology and Epidemiology at the Noguchi Memorial Institute for Medical Research (NMIMR), secured internal funding in 2022 to undertake a comprehensive study on adolescent girls' hormonal health. Northern and Greater Accra Regions were purposively selected as study sites and implementation of the project commenced in October 2022 and has since been completed, yielding two peer-reviewed publications, with a third manuscript currently under review. Following the publication of the project's primary outputs, the need to share findings with relevant stakeholders and fulfill the institute's mandate to disseminate research findings to local communities became evident. Consequently, dissemination activities were carried out between 4th August and 11th October 2025. Key beneficiaries included Ghana Education Service (GES) and a cross-ection of their schools. Dissemination durbars were held in schools under Tamale Metropolitan and La-Nkwantanang Municipal Education Directorates. In total, about 500 students from 16 schools, along with teachers, School Health Education Programme (SHEP) coordinators and parents, participated in the programme. Research findings from the project and recommendations were presented followed by and interactive sessions led by six research assistants. These engagements focused on reproductive health-related issues affecting adolescent girls, including menstruation and the menstrual cycle, drug abuse, and dietary habits. Discussions on nutrition highlighted Ghana's Food-Based Dietary Guidelines, which served as a key reference point for promoting healthy eating practices among the students.

In addition, the research team paid courtesy calls on the Directors of Education at the respective education directorates to brief them on the study. Each director was presented with a summary of the research findings and recommendations. Copies of the report were also submitted to the Director-General of GES and SHEP at the national level. In conclusion, the dissemination activities were highly successful. While participating schools expressed strong interest in having similar dissemination activities conducted at the school level, SHEP officials also requested access to the presentation slides for teaching and learning purposes.


PI presenting research findings to students

Metropolitan Director of Education, Tamale
talking to a cross-section of students

Municipal Director of Education, La Nkwantanang,
talking to a cross-section of students

Donation of Sanitary Pads and
Carbolic soap to students

Greater Accra session

Northen Region session

Title: Tolerability and efficacy assessment of small molecules/compounds in rodent models

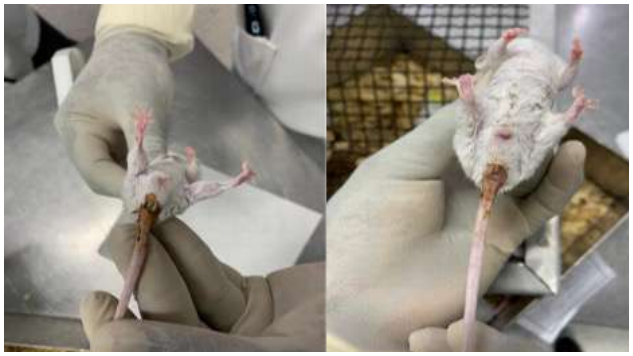
Name of NMIMR Investigators: Dr. Samuel Adjei, Department of Animal Experimentation

Name and Affiliation of Collaborators: Prof. Herman O. Sintim, University of Notre Dame, USA.

Funding source: Adashi Research Group, USA

Summary:

The project was implemented to establish, standardize, and validate robust in vivo disease models capable of supporting high-quality preclinical tolerability, safety, and efficacy assessment of synthesized small-molecule compounds with anti-inflammatory potential. During the 2025 reporting period, the project focused on the systematic development and optimization of two complementary and translationally relevant experimental platforms: dextran sulfate sodium (DSS)–induced colitis and lipopolysaccharide (LPS)–induced acute kidney injury (AKI) in mice. These models were selected to address key inflammatory and organ-injury pathways commonly implicated in drug development and toxicity screening. For the DSS-induced colitis model, structured pilot and validation studies were conducted in BALB/c and C57BL/6 mice to determine strain-specific susceptibility, optimal DSS concentrations, and suitable experimental endpoints. The studies revealed marked strain-dependent differences in disease induction, with C57BL/6 mice exhibiting greater sensitivity at lower DSS concentrations, while BALB/c mice required higher DSS exposure for consistent and reproducible colitis. Based on these findings, a standardized and reproducible colitis model was successfully established in BALB/c mice using 4% DSS, accompanied by the identification of a vehicle formulation that did not confound disease severity or experimental outcomes. This optimization ensured both experimental robustness and compliance with ethical and institutional animal research standards. In parallel, an LPS-induced AKI model was developed and validated in both mouse strains using intraperitoneal LPS administration. This approach reliably induced systemic inflammation and renal injury, as evidenced by clinical manifestations, biochemical markers of renal dysfunction, and corroborating histopathological findings. To further demonstrate the utility of the model for pharmacological evaluation, intervention studies were conducted using H-151, a STING pathway inhibitor, which produced dose-dependent renal protection. These studies also highlighted strain-specific differences in susceptibility and therapeutic responsiveness, underscoring the importance of strain selection in preclinical efficacy and safety studies. Overall, the SAFFICACY Project successfully achieved its primary objectives by delivering ethically sound, reproducible, and validated in vivo models for inflammatory bowel disease and acute kidney injury. The outcomes of this work provide a strong experimental foundation for advanced preclinical investigations and position the SAFFICACY platform as a reliable resource for translational safety and efficacy evaluation of novel therapeutic candidates.



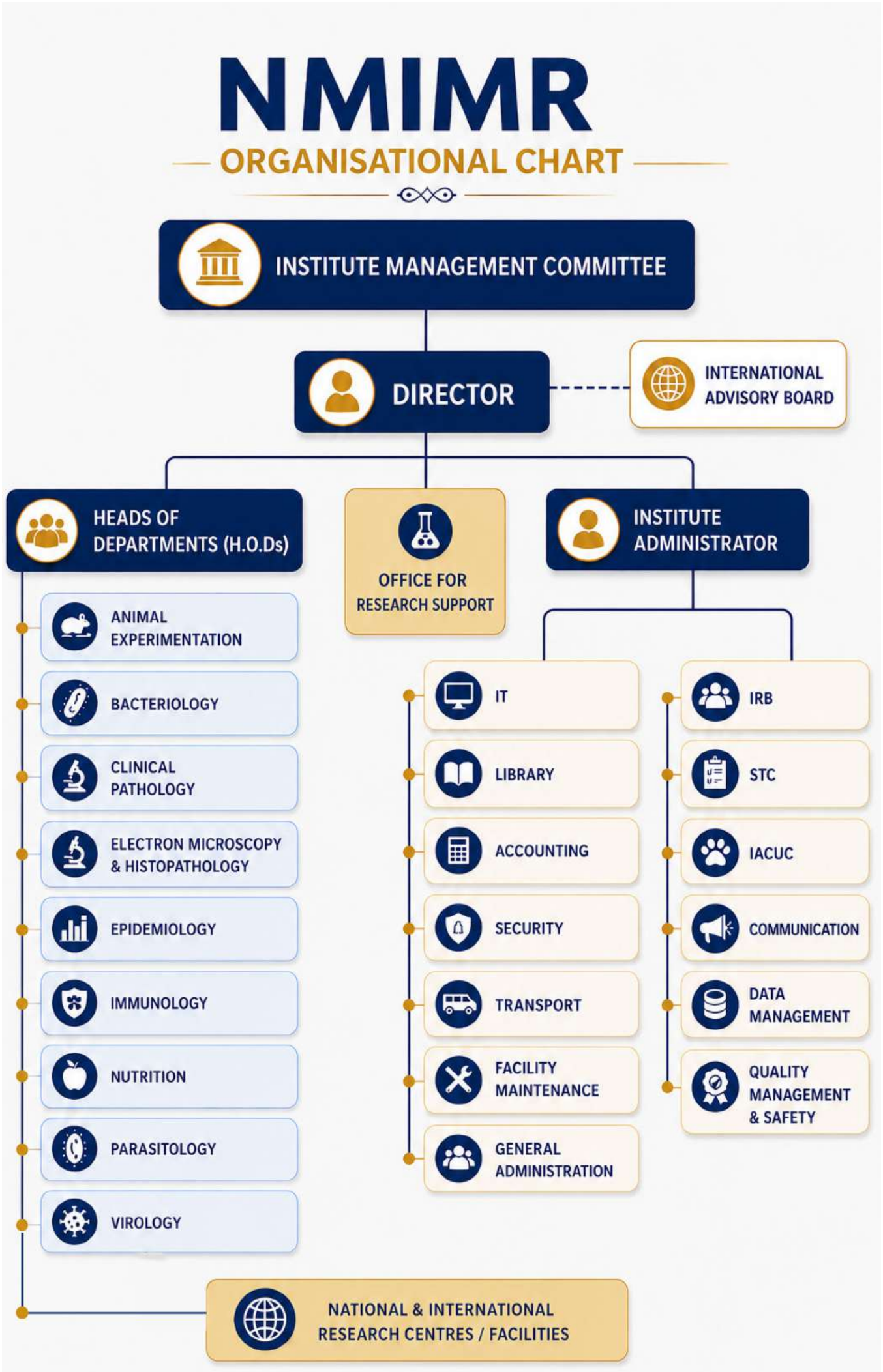
MANAGEMENT

Summary:

The administrative management of the Noguchi Memorial Institute for Medical Research is structured to ensure effective coordination of both its scientific and operational functions within its semi-autonomous status under the University of Ghana. Overall responsibility for administration rests with the Director, who provides strategic leadership across research and institutional operations, supported by an Administrator and senior management structures such as the Institute Management Committee, which includes departmental heads and key officers. The Central Administration Unit plays a pivotal role in day-to-day institutional governance by coordinating human resources, managing internal and external communications, maintaining institutional records, and ensuring compliance with university policies and procedures. It also supports operational efficiency by designing work processes, strengthening administrative capacity, and facilitating partnerships and external engagements. Complementary administrative functions, including financial management, are handled by specialized units such as the Accounts Office, which ensures adherence to regulatory standards and supports decision-making through timely financial reporting. Together, this integrated administrative framework enables NMIMR to maintain a well-coordinated, compliant, and research-supportive environment.

NMIMR

ORGANISATIONAL CHART



STRATEGIC PLAN

The NMIMR Strategic Plan (2025–2029) outlines a comprehensive roadmap to position the Institute as a leading global biomedical research centre while strengthening its contributions to national and global health. The plan is anchored in NMIMR's core mandate of conducting high-quality research, training the next generation of scientists, and supporting public health systems. It is guided by a strong commitment to Total Quality Management (TQM), ensuring that excellence, efficiency, and continuous improvement are embedded across all institutional functions.

SP 1 **Impactful Research**

At the heart of the strategy are five interconnected priority areas. The first, Impactful Research, emphasizes expanding cutting-edge research in genomics, data science, infectious and non-communicable diseases, and drug and vaccine development. The Institute aims to strengthen genomic surveillance, develop novel diagnostics and biomarkers, and enhance research translation through commercialization pathways. Ambitious targets include increasing external research funding, publishing high-impact scientific papers, establishing a biobank, and fostering interdisciplinary and international collaborations.

SP 2 **Sustainable Resource Mobilization and Utilization**

The second priority, Sustainable Resource Mobilization and Utilization, focuses on ensuring financial resilience through diversified funding streams, efficient resource management, and strengthened grantsmanship. Recognizing limited national funding for research, the plan underscores the importance of attracting competitive international funding and optimizing internal resource use to sustain growth and innovation.

SP 3 **Innovative Teaching and Learning**

The third priority, Innovative Teaching and Learning, aims to position NMIMR as a hub for advanced biomedical training. This includes expanding postgraduate training programmes, developing fellowship opportunities, and integrating emerging technologies such as genomics, artificial intelligence, and bioinformatics into teaching and research training. Capacity building is a central theme, with plans to train researchers in advanced methodologies and recruit new expertise in priority research areas.

SP 4 **Efficient Internal Processes**

The fourth priority, Efficient Internal Processes, addresses institutional strengthening through improved administrative systems, infrastructure development, procurement efficiency, and quality assurance mechanisms. It also incorporates a strong focus on staff welfare, gender equity, and social inclusion, recognizing that a supportive and inclusive work environment is essential for productivity and innovation. Enhancing laboratory infrastructure, data systems, and operational workflows is key to achieving institutional efficiency.

SP 5 **Strategic Communication and Public Engagement**

The fifth priority, Strategic Communication and Public Engagement, highlights the importance of visibility, stakeholder engagement, and knowledge translation. The Institute seeks to improve dissemination of research findings, strengthen community engagement, and enhance its national and global profile. Public education, policy engagement, and collaboration with health authorities are emphasized to ensure that research outputs translate into tangible health outcomes.

Overall, the strategic plan presents a forward-looking vision that integrates research excellence, capacity development, institutional efficiency, and stakeholder engagement. By aligning with the broader strategic goals of the University of Ghana and national health priorities, NMIMR aims to drive innovation, strengthen health systems, and contribute meaningfully to improving health outcomes in Ghana and beyond.

CORE FACILITIES

Flow Cytometry Core

The Flow Cytometry Core at NMIMR is a state-of-the-art facility designed to provide comprehensive support for advanced cell analysis and sorting in biomedical research. Its mission is to enhance research capacity by offering high-quality flow cytometric services, including experimental design consultation, data acquisition, analysis, and both theoretical and hands-on training for researchers, clinicians, and students.

The facility is equipped with cutting-edge instruments such as the BD FACSDiscover™ S8 Cell Sorter—featuring spectral cytometry, real-time imaging, 6-way cell sorting and multi-parameter analysis—as well as additional platforms like the BD FACSCanto™ II and BD Accuri™ C6 Plus for routine and flexible applications. These technologies enable detailed immunophenotyping, single-cell analysis, and high-precision cell sorting, supporting research in areas such as immunology, cancer, and infectious diseases. The core also provides expert guidance in panel design, gating strategies, and data interpretation, ensuring high-quality, publication-ready outputs while facilitating innovation, collaboration, and translational research.

Genomics and Bioinformatics Core Facility

The Genomics and Bioinformatics Core Facility, supported by the Africa CDC serves as a central platform for advanced molecular research, integrating high-throughput genomics technologies with computational biology and data science. Located within the Noguchi Advanced Research Laboratories, the core provides services to researchers, students, and external partners, supporting activities such as DNA/RNA sequencing, genomic data analysis, and bioinformatics pipeline development. The facility has been instrumental in providing sequencing support to some countries in the West African subregion, during the COVID-19 pandemic and continues to serve as a centre for research, teaching and learning. The facility plays a critical role in strengthening capacity for pathogen genomics, antimicrobial resistance surveillance, and precision medicine by combining both “wet lab” sequencing and “dry lab” computational analysis. It also supports training and capacity

building through workshops and hands-on programmes in genomics and bioinformatics, equipping scientists with skills in sequence analysis, data interpretation, and advanced computational tools. Overall, the core enhances NMIMR's ability to generate, analyse, and translate complex biological data into actionable insights, thereby supporting cutting-edge research, public health surveillance, and evidence-based decision-making at national and regional levels. Equipment available at the facility includes the: Illumina MiSeq, Illumina NextSeq1000 and NextSeq2000, MinION Mk1B, MinION Mk1C, GridION Mk1, PromethION 2 Solo, Agilent TapeStation, LabChip GXII Touch HT, Hamilton Microlab STAR Liquid Handler.

MALDI-TOF

The MALDI-TOF (Matrix-Assisted Laser Desorption/Ionization Time-of-Flight) service at the NMIMR is a specialized diagnostic and research platform that enables rapid, accurate identification of microorganisms based on their unique protein signatures. The facility supports clinical and research applications by providing high-throughput microbial identification, particularly for bacteria and other pathogens of public health importance. Using advanced mass spectrometry technology, MALDI-TOF significantly reduces turnaround time compared to conventional culture-based methods, thereby enhancing timely diagnosis and surveillance. The service is accessible to both internal and external users through a structured booking process, and it plays an important role in strengthening antimicrobial resistance monitoring, clinical microbiology, and infectious disease research at the Institute.

Promoting Public Health Through Commemorative Days

Commemorative health days play an important role in creating awareness and educating the public on the Institute's work and impact. The activities for these days are also used to inform the public about major diseases affecting our communities and preventive measures.

In 2025, the Noguchi Memorial Institute for Medical Research (NMIMR) together with its partners, used these occasions to reach out to various communities through education, screening, and community outreach.

"Involving Communities: A Hands-on Approach to Neglected Diseases"- World NTD Day

In observing World NTD Day on 6th February 2025, attention was drawn to neglected tropical diseases that mostly affect vulnerable communities. The 2025 commemoration was marked by a symposium held at the Noguchi Memorial Institute for Medical Research (NMIMR), bringing together researchers, health professionals, and other stakeholders.

The discussions focused on the burden of neglected tropical diseases in Ghana, including diseases such as schistosomiasis (bilharzia), leprosy, and yaws, and the need for stronger collaboration in addressing them. Emphasis was placed on community involvement in raising awareness, mobilising resources, and supporting elimination efforts.

Participants were also engaged on the importance of early detection, access to treatment, and continuous public education. The event provided an opportunity to share knowledge, strengthen partnerships, and highlight the role of research in controlling and eliminating these diseases, with a strong call for teamwork and community involvement.

"Yes! We Can End TB! Commit, Invest, Deliver"- World Tuberculosis Day

During the 2025 World Tuberculosis Day, the Institute and its partners: Health professionals engaged with the Korle-Bu community carried out awareness campaigns and screening exercises over several days in communities such as Chorkor and Korle-Bu, with awareness activities also passing through Mamprobi and Jamestown.

The focus was on helping people understand how TB spreads, recognize symptoms early, and make use of free treatment services. Activities included community education sessions, screening for TB, and direct engagement with the public. These activities also encouraged people to get tested and helped reduce stigma around the disease.

As part of the commemoration, The Church of Pentecost Home and Urban Missions donated medical supplies to the Korle-Bu Chest Clinic, supporting efforts to improve TB treatment.

Awareness campaign to reduce TB stigma

"Malaria Ends with Us: Reinvest, Reimagine, Reignite" - World Malaria Day

The 2025 World Malaria Day was celebrated under the theme: "Malaria Ends with Us: Reinvest, Reimagine, Reignite", the Malaria team organised a health walk, a school outreach programmes, and community education/medical outreach. These activities were used to remind people that malaria prevention starts with individual action and were held between 22nd and 25th April, 2025.

The health walk was held on 22nd April 2025 from Okponglo to Bawaleshie, suburbs in Accra, where participants interacted with community members and shared educational materials.

A school outreach programme was also carried out at Bishop Girls School in Jamestown, where students were engaged through discussions, quizzes, and demonstrations on malaria prevention.

On 25th April 2025, a free screening exercise was conducted at Jamestown Park, where community members were tested for malaria, received medication where necessary, and were educated on the use of mosquito nets, regular testing, and keeping their surroundings clean. These activities also helped the team interact directly with communities using clear, easy-to-understand messages without scientific jargon.

Malaria screening in action

"Unite, Act, Eliminate: A Hepatitis-Free Future for All" - World Hepatitis Day

The 2025 World Hepatitis Day was also marked with strong community involvement, including free screening, vaccination, and education. Outreach programmes were taken to busy areas such as Kasoa Old Station to make it easier for people to check their status.

During the outreach aimed to "Unite, Act, Eliminate: A Hepatitis-Free Future for All", participants were screened for hepatitis, vaccinated, and referred for further care where necessary. Educational sessions were also organised where participants were engaged through discussions and quizzes. The focus was on early detection, prevention, and the importance of protecting the liver through regular testing and vaccination.

The celebration also included the Institute's flagship Junior High School quiz competition with 12 schools demonstrating their knowledge of hepatitis and liver health.

Providing free Hepatitis vaccinations in the community

Publications in 2025

1: Yamoah JAA, Kwofie KD, Akorli J, Ladzekpo D, Kawada H, Boateng KY, Beyuo J, Keleve A, Danquah JB, Tawiah-Mensah C, Ansah-Owusu J, Dadzie SK, Wallace PA, Tsuji N, Hatta T. Beyond the usual suspects: Uncovering less-recognized pathogenic bacteria in Ghanaian blood-feeding Amblyomma variegatum ticks using16S rRNA amplicon sequencing. Parasitol Int. 2026 Jun;112:103228. doi: 10.1016/j.parint.2025.103228. Epub 2025 Dec 29. PMID: 41475684.

2: Issah I, Bawua SA, Arko-Mensah J, Duah MS, Simpson SV, Agyekum TP, Uthman OA, Fobil JN. Metals exposure and biomarkers of liver damage: a systematic review and meta-analysis of observational studies. Rev Environ Health. 2025 Oct 29;41(1):109-141. doi: 10.1515/reveh-2025-0089. PMID: 41147680.

3: Hui D, Sahu S, Ditiu L, Marais BJ, Yeboah-Manu D, Goletti D, Walzl G, Zumla A. Global tuberculosis response off track: urgent priorities to end the world's top infectious killer. Lancet. 2026 Mar 21;407(10534):1126-1129. doi: 10.1016/S0140-6736(25)02433-X. Epub 2025 Dec 11. PMID: 41391466.

4: Åhsberg J, Bjerrum S, Asare P, Osei-Wusu S, Afum T, Sorvor F, Adusi-Poku Y, Lartey M, Yeboah-Manu D, Opintan JA, Johansen IS. Diagnostic Yield of urine Xpert MTB/RIF ultra to detect Mycobacterium tuberculosis among severely immunosuppressed inpatients with HIV: A prospective cohort study in Ghana. Int J Infect Dis. 2026 Feb;163:108254. doi: 10.1016/j.ijid.2025.108254. Epub 2025 Nov 28. PMID: 41319788.

5: Aanensen DM, Okeke IN, Donado-Godoy P, Egyir B, Lingegowda RK, Sia S; NIHR Global Health Research Unit on Genomic Surveillance of AMR. The genomic surveillance gap: averting the antimicrobial resistance pandemic requires global equity and action. Lancet Infect Dis. 2026 Feb;26(2):122-123. doi: 10.1016/S1473-3099(25)00723-6. Epub 2025 Nov 21. PMID: 41285140.

6: Matsuba M, Mahazu S, Shimuta K, Ablordey A, Takahashi H, Saito R. Development of a rapid, simple multiplex PCR-dipstick assay for the detection of Neisseria meningitidis serogroups in clinical isolates. Front Cell Infect Microbiol. 2026 Jan 22;15:1745660. doi: 10.3389/fcimb.2025.1745660. PMID: 41659814; PMCID: PMC12872786.

7: Hayibor KM, Kenu E, Bandoh DA, Owusu-Arthur B, Odikro MA, Mensah GI, Awalime D, Asante-Poku A, Ivanova O, Rachow A, Hanson-Nortey NN. Barriers and facilitators of implementing public-private mix approaches for active tuberculosis case finding and health insurance access in at-risk populations in Ghana: a qualitative study. Front Health Serv. 2026 Jan 12;5:1738753. doi: 10.3389/frhs.2025.1738753. PMID: 41601474; PMCID: PMC12832754.

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