

MRC

Unit
The Gambia



ANNUAL REPORT 2015

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FOREWORD



Professor Umberto D'Alessandro,
Unit Director

In 2015 we consolidated the changes started last year in the structure of the Medical Research Council Unit The Gambia (MRCUG). The integration of the Nutrition group. In addition a new version of our Quinquennial plan covering the period 2016-2021 was submitted for funding to the Medical Research Council UK. Reviewers considered our plan of “extremely high quality”, and recognised the Unit’s influential international standing. The Unit was commended for the high quality of research, the excellent publication output and the capacity to compete for research grants. Thanks to the positive review of our plan, the Medical Research Council UK decided to provide the funding we requested for the next 5 years; these funds will be used to maintain our research facilities and allow us to compete internationally for research funds. This is a great achievement that has been possible thanks to the high quality and commitment of the MRCUG staff.

In the next 5 years, we would like to contribute to the post-2015 sustainable development agenda by producing the evidence base to improve health in West Africa and beyond. We will continue to work on infectious diseases of public health importance in West Africa and sub-Saharan Africa. In addition, it is our intention to strengthen our research on maternal and neonatal health and on non-communicable diseases, particularly on those associated with infections, and design and implement next generation interventions against nutrition-related diseases through discovery science.

We are in constant dialogue with the Gambian Ministry of Health and Social Welfare (MoHSW) and national control programmes and our relations with them are excellent. The 60th Gambia Government/MRCUG Joint Committee Meeting was held in September 2015. The Honourable Minister of Health Omar Sey, senior officials of the Ministry of

Health and Social Welfare, and of the Ministry of Higher Education & Research, and other stakeholders participated actively to the meeting in which the MRCC's strategic development and scientific programme, and the Gambian Government activities were presented and discussed, with special emphasis on common interests and synergies. We will definitely continue to hold at least one meeting per year as this is an important forum that provides the opportunity to link research to health policies and practices.

Our commitment to capacity building and training of young scientists has continued. We have recently appointed Dr Assan Jaye as Head of Training and Career Development. We are currently developing a well-defined career path in which young scientists who attain a PhD will be able to choose between two different paths: the research development path for those aiming to become independent researchers or the research support path for those who would like to follow another route. This scheme is important as it provides a framework and the option for researchers to plan their career and evolve.

Over the past few years, The Unit has been active in collaborating with other research institutions in West Africa. However, we would like to strengthen such collaboration with a few partners. We are currently discussing the possibility of a closer alliance with the University Cheikh Anta Diop (UCAD) in Dakar, Senegal. Such alliance would result in common research projects and exchange of staff, trainees, and technical expertise.

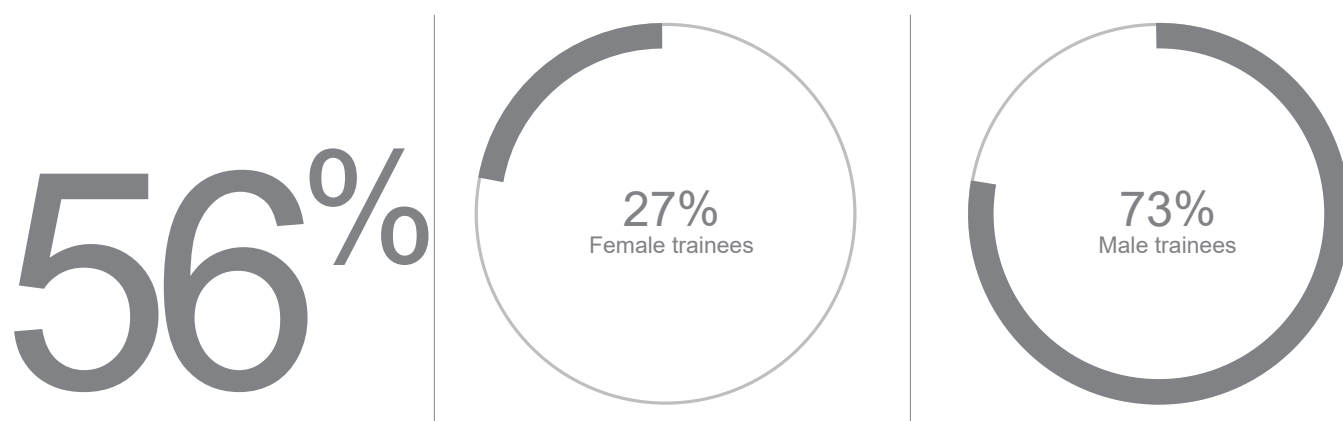
I would also like to highlight our newly established collaboration with the University of The Gambia, thanks to a research project on malaria currently implemented around Farafenni. This is an area where The Unit has a health and demographic surveillance system since 1981, one of the oldest in sub-Saharan Africa. We have reached an agreement with the University of The Gambia for the use of some of the buildings in the ex-MRCC field station in Farafenni. These include a space for the laboratory and a building to accommodate our staff.

We have also submitted for funding other research projects that if successful, will be based in Farafenni as they will benefit of the framework offered by our ongoing health and demographic surveillance system. This is a welcomed development as it provides another opportunity in strengthening our collaboration with the University of The Gambia.

The increasing visibility of The Unit is also shown by the number of international meeting/courses planned or held in The Gambia. For example in November 2015 we hosted the 3rd International Neonatal & Maternal Immunisation Symposium. Other achievements in 2015 include the introduction in our clinical services of the electronic medical record system which should allow for a better management of resources and patients, and the confirmation of the ISO 15189 accreditation for our diagnostic laboratories.

In conclusion, The Unit is in "good health" and I would like to thank all the staff for their continued support and contribution.

FACT SHEET

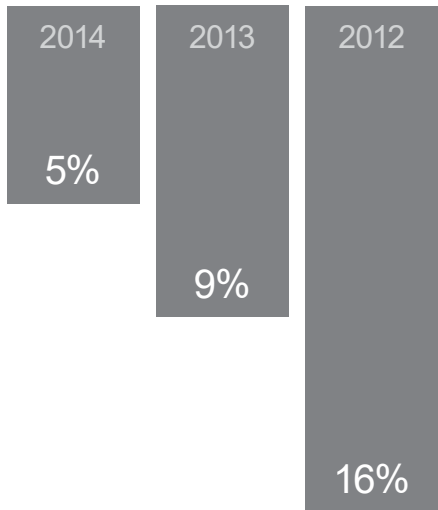


The percentage of women trainees (27%) is close to The Unit gender balance (25% January 2016). PhDs and MScs together represent about a third of all trainees. The percentage of male trainees (73%) is higher than female trainees. The majority of PhD graduates took ≥ 4 years to complete their PhD training. 56% (77/137) of the trainees are supported by the MRC Unit The Gambia's training budget whilst the remaining ones have been on external funding. Gambians represent the large majority of trainees, and for some degrees they are the only nationality represented. Most trainees completed their studies.

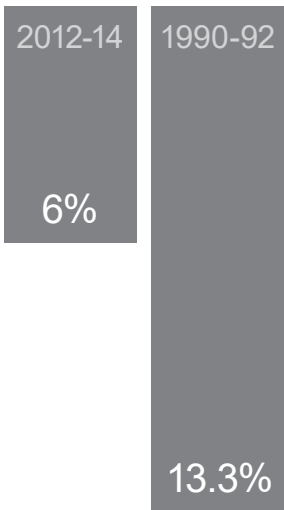
STAFF COMPOSITION



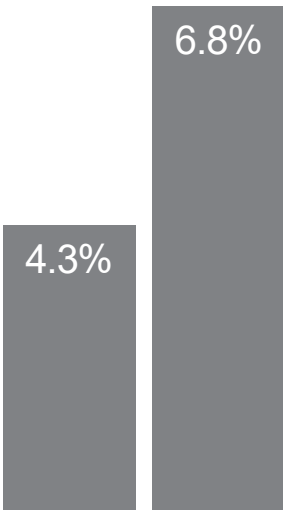
There has been a steady decline of malaria transmission as shown by the prevalence of infection, from 16% in 2012, 9% in 2013 and 5% in 2014 (Malar J 2015). Older children (5-15 years) and males remain those at the highest risk of recurrent infections in all seasons.



The Gambia meets the Millennium Development Goals (MDG-1) target by reducing the prevalence of undernourishment (for which the number of underweight children was a key metric) from 13.3% in 1990-92, to 6% in 2012-14.



As a result of the childhood TB research program, the notifications of childhood TB by the National Leprosy and Tuberculosis Programme (NLTP) have increased from 4.3% to 6.8%.



RESEARCH THEMES

The MRCG is structured into three research themes, a structure that provides important opportunities for inter-theme synergy.

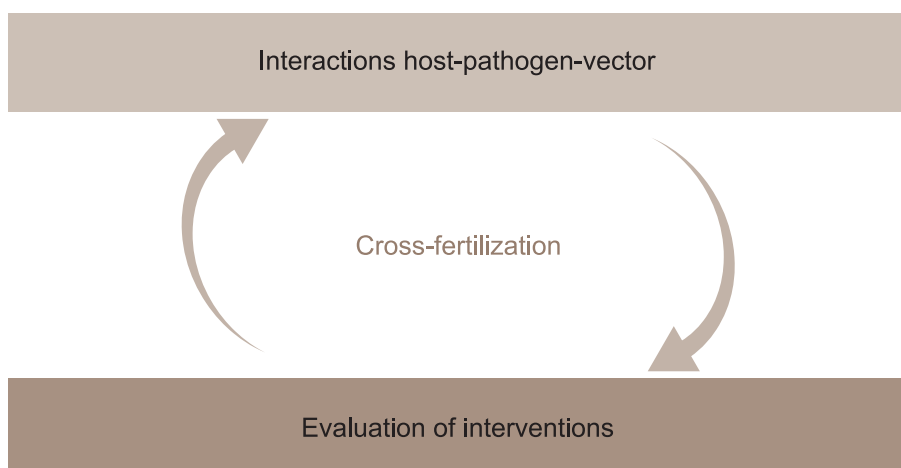
DISEASE CONTROL & ELIMINATION

With the integration of projects from the former Child Survival Theme, our research portfolio has increased substantially but also become more balanced. Though malaria remains a major research area, bacterial and viral infections have increased visibility within the theme. Overall, we have had a good year in terms of securing funds for new projects, continuing the ongoing ones and generating outputs.

The Gambia offers an excellent opportunity for research related to malaria elimination in sub-Saharan Africa as malaria transmission in the western Gambia has reached such a low level that it may be interrupted by additional interventions. We are investigating the determinants of the observed heterogeneity of transmission and the factors related the residual transmission. In 2015, we were successful in securing funding from the Global Health Trials Scheme for a new study which will evaluate whether systematically treating family members of a patient with malaria will further reduce or interrupt transmission.

Maternal and neonatal health is increasingly visible in our portfolio. The field work of the COSMIC trial (Community-based scheduled screening and treatment of malaria in pregnancy for improved maternal and infant health) has been finalized and the statistical analysis of the PregnAnZI trial (oral azithromycin given to women in labour to impact on neonatal infections) has been completed.

Our research activities will require the capacity to analyse large numbers of biological samples as rapidly as possible so that results can be used to formulate new hypothesis. This is the reason for requesting investment in high-throughput technologies and bioinformatics.





Staff in one of our labs

SCIENTIFIC STRATEGY



Disease Control & Elimination (DCE) scientific strategy focuses on investigating interactions between hosts, pathogens and vectors; and evaluating interventions aimed at interrupting transmission and/or reducing the disease burden. Aiming at control and elimination of diseases, we also target asymptomatic or subclinical infections as these are key components for maintaining transmission at community level.

The DCE Theme has a heterogeneous but coherent research portfolio that includes diseases of public health importance in West Africa at different stages of control or elimination. The research activities span from large epidemiological studies assessing burden of disease to clinical trials testing or assessing the effectiveness of new public health interventions.

The core component of epidemiology and laboratory sciences is complemented, whenever possible, by social sciences investigating the human factors influencing the epidemiology of the diseases and the uptake/coverage of interventions. In addition, the theme has started adding health system and health economic research components to some of its projects with the aim of ensuring the interventions evaluated, when successful, are promptly translated into practice.

RESEARCH ACHIEVEMENTS



In The Gambia, there is marked heterogeneity of malaria transmission between villages, with monthly variation of malaria prevalence and vector density between transmission seasons. There has been a steady decline of malaria transmission as shown by the prevalence of infection, from 16% in 2012, 9% in 2013 and 5% in 2014 (Malar J 2015). Older children (5-15 years) and males remain those at the highest risk of recurrent infections in all seasons.

Many malaria control programmes in sub-Saharan Africa use indoor residual spraying (IRS) with long lasting insecticidal nets (LLIN), but studies addressing the benefit of the combination have given conflicting results. The added value of IRS in a setting with high coverage of LLIN was investigated in a large (35 clusters of Gambian villages) randomized controlled trial in which 8,000 children were followed up through two transmission seasons. Results show no significant difference between the study arms in clinical malaria (incident rate ratio 1.08 (95% CI 0.80-1.46), anaemia, prevalence of infection or vector density in houses. The study indicated that IRS may not provide additional benefit against malaria where LLIN use is high (Lancet 2015).

The Pneumococcal Surveillance Project (PSP) published the first results on PCV impact in a low-income country, reporting a 55% reduction in all invasive pneumococcal disease in children 2-59 months of age (Lancet Inf Dis 2016) and the societal costs of inpatient pneumonia (\$95 USD), pneumococcal sepsis (\$130 USD), and meningitis (\$158 USD) in The Gambia (Cost Eff Resourc Alloc 2016). Results of the Pneumococcal Surveillance Project were presented to the WHO EPI Department and GAVI in Geneva in February 2016.

A junior scientist in the theme, Dr Effua Usuf, has been able to obtain the prestigious West-African fellowships (WAF) offered by the MRCG and the London School of Hygiene and Tropical Medicine. She started her WAF in September 2015 which will focus on the relationship between pneumococcal serotypes found in sick individuals and healthy carriers. For this ambitious proposal she will use data on invasive pneumococcal disease and pneumococcal carriage collected in The Gambia for more than a decade, before and after the introduction of the Pneumococcal vaccine.

RESEARCH PROJECTS & HIGHLIGHTS



PROJECT	HIGHLIGHT
Malaria Program Grant	Two rounds of mass drug administration with Dihydro artemisinin piperaquine were conducted in June 2014 and 2015, achieving > 80% coverage in 6 pairs of villages (4,620 residents).
MalariSense	This proof of concept study evaluates the feasibility of using a vapor nanobubble technology for diagnosis of malaria. A total of 198 participants with suspected uncomplicated malaria and healthy volunteers were enrolled at Basse Health Centre and underwent testing with RDT, microscopy, PCR and MalariSense. Data analysis is currently ongoing.
Prinogam	This trial, comparing the capacity of different doses of primaquine of clearing gametocytes in asymptomatic malaria carriers, has been completed and the analysis is ongoing.
RooPfs	This study aims at evaluating whether improved housing reduces further the burden of clinical malaria. Improvement includes the provision of a metal roof, the closing of the eaves, and screened doors and windows. The intervention's preventive effect on malaria will be evaluated in the coming transmission season.
VIDA impact study	The objectives of the VIDA study are to assess impact and effectiveness of rotavirus vaccine for children aged less than 5 years. The recruitment started on 11 May 2015 and we have recruited the expected number of study subjects.
Hib surveillance	The strengthened surveillance for meningitis has been able to diagnose 3 cases of invasive Hib disease in the Western region.

FACT & FIGURES



In 2015-16, the DCE attraction of funds amounted to £1,051,055. This was with the integration of the Child Survival Theme projects; the total portfolio was £4.96 million and included large projects such as PSP and VIDA.

2015-16	£1,051,055
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Total	£4,960,000
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OUTLOOK 2016



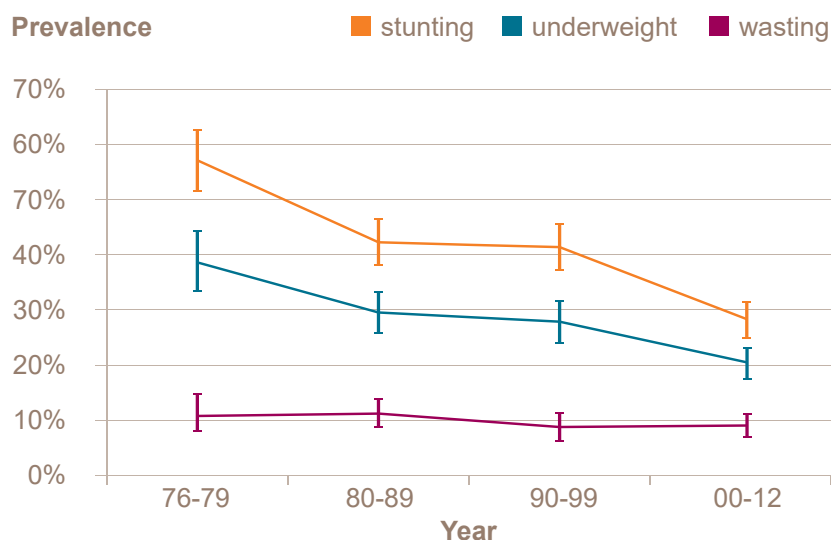
Some of our current trials have generated novel and interesting data that will naturally lead us to larger trials. During the next year, we will focus on increasing our commitment towards research on maternal and neonatal health, with new PhD students starting working in this area and proposals in the pipeline.

NUTRITION

In November 2014 Gambia was one of 5 African countries noted by the Food and Agriculture Organisation of the United Nations (FAO) as meeting the Millennium Development Goals (MDG-1) target by reducing the prevalence of undernourishment (for which the number of underweight children was a key metric) from 13.3% in 1990-92, to 6% in 2012-14. This was an important achievement that does credit to many of The Gambia's institutions.

Stunting has now replaced underweight as the preferred index of under nutrition. In Africa as a whole there has been a disappointing decline in stunting from 42% in 1990 to 32% in 2015 and, due to population growth, the absolute numbers of stunted children in Africa actually increased from 47 to 58m. The persistence of stunting remains a key challenge for much of the work of the Nutrition Theme at MRCG and there is much to be done to achieve the new Sustainable Development Goals (SDGs) of a 40% reduction in stunting worldwide by 2025.

The etiology of stunting is complex and multifaceted. An analysis of almost 4 decades of growth data from MRCG Keneba Field Station by Dr Helen Nabwera showed that, although the prevalence of stunting has halved (from 57 to 30%), it still remains unacceptably high despite the highly efficient implementation of a host of nutrition-specific and nutrition-sensitive interventions, and the provision of unparalleled health care. Our interpretation is that housing conditions and the supply of clean water into the home may be an essential pre-requisites for nutrition interventions to yield their full potential.



The prevalence of malnutrition has halved over the past 4 decades, but despite intensive nutrition-related interventions malnutrition remains far too common.



Assessing weaning food intake in a young child.

SCIENTIFIC STRATEGY



The Nutrition Theme is motivated by the conviction that, far from being obvious, the reasons behind the failures in growth and development so frequently seen in poor children in Africa are complex and still poorly understood. This drives our emphasis on discovery science designed to elucidate the causal pathways to malnutrition from the molecular level to the societal.

We take a lifecourse approach that attempts to understand how fetal and childhood responses to nutrient deficits or interventions are influenced by prior events. Our scope is much wider than the 'first 1000 days' window that has come to dominate thinking in recent years. We have strong evidence that an embryo's development can be profoundly influenced by the mother's diet before conception and even by intergenerational echoes of the diet of their grandparents.

Our capacity for discovery science was strengthened by the completion of a major laboratory refurbishment programme in 2015.

RESEARCH ACHIEVEMENTS



Our work on peri-conceptional epigenetic programming of lifelong health once again attracted global media coverage in 2015 and was featured in a BBC 2 documentary *'Countdown to Life: The Extraordinary Making of You'*. Among other discoveries we demonstrated that a gene (VTRNA2-1) lying at the centre of cell cycle control and affecting immune function and cancer resistance is exceptionally sensitive to seasonal variations in mothers' diets in rural Gambia.

Work on iron and infection has remained a prominent part of our portfolio with the HIGH studies coming to a conclusion soon. These trials are testing whether iron supplementation can be given more safely to mothers and children using a screen-and-treat approach based on hepcidin. The necessity of combatting iron deficiency has been further emphasised by our collaborative studies in Kenya demonstrating a major benefit of iron on birth weight in iron deficient women, and by our observation that maternal iron status may also affect the infant's calcium metabolism through an interaction between iron and IGF23.

Studies of placental development achieved mixed results. We showed that periconceptional micronutrient supplementation influenced placental vascular function in mid-pregnancy, but the effect was small. Modou Lamin Jobe's studies of placental iron and zinc transporters uncovered mechanisms by which the fetus can be partially protected from maternal iron deficiency.

RESEARCH PROJECTS & HIGHLIGHTS



PROJECT	HIGHLIGHT
Calcium, Vitamin D and Bone Health	Studies of child and adolescent growth following our prior randomised trials have demonstrated that supplemental calcium in gestation and childhood has later effects on skeletal development that differ between males and females. Studies on the aetiology of rickets in The Gambia, and now with a parallel study in Malawi, suggest that calcium deficiency is a common factor.
ENID	The Early Nutrition and Immune Development (ENID) trial recorded its final birth in 2015 and has entered the analysis and follow-up phase. With multiple add-on studies (ENID Growth, ENID Bone, ENID Placenta, ENID Aflatoxin, etc) this randomised trial of lipid-based nutrient supplements (LNS) provided in pregnancy and infancy is starting to yield rich rewards.
BRIGHT	Our studies using functional near-infra-red spectroscopy (fNIRS) to objectively assess brain function in very young children have been boosted by a Gates Grand Challenges Phase II award to our collaborators Prof Clare Elwell and Dr Sarah Lloyd Fox.
HERO-G	The Hormonal and Epigenetic Regulators of Growth (HERO-G) study led by Dr Sophie Moore and Robin Bernstein is nearing the end of the fieldwork. This study focuses on extremes of growth (positive and negative deviance) as a tool to describe the hormonal correlates of growth failure and looks in ultra-fine detail at individual episodes of growth faltering.

FACT & FIGURES



The Keneba Biobank has passed the landmark of 10,000 subjects from the West Kiang region. In addition to assessing nutrition-related phenotypes each adult provides 20 aliquots of biological samples (DNA, blood, plasma, serum, urine) each child provides 8 aliquots.



OUTLOOK 2016



The major results from The ENID trial and its numerous add-on studies will be published in 2016. A major study funded by the Bill & Melinda Gates Foundation to investigate the safety and efficacy of a novel nanoparticulate iron supplement (iron hydroxide adipate tartrate – IHAT) will commence in the Basse region. It will be led by Dr Dora Pereira a co-inventor of IHAT. Our epigenetics research will expand to include studies of miRNA and telomere length. Studies of neonatal hypoferrremia as a potential strategy to protect neonates from early sepsis will be initiated at Brikama Health Centre. A major series of recall by-genotype and recall-by-epigenotype studies based upon the West Kiang DHSS and Keneba Biobank will be initiated.



Oumie Secka, Scientific Officer, Vaccines & Immunity

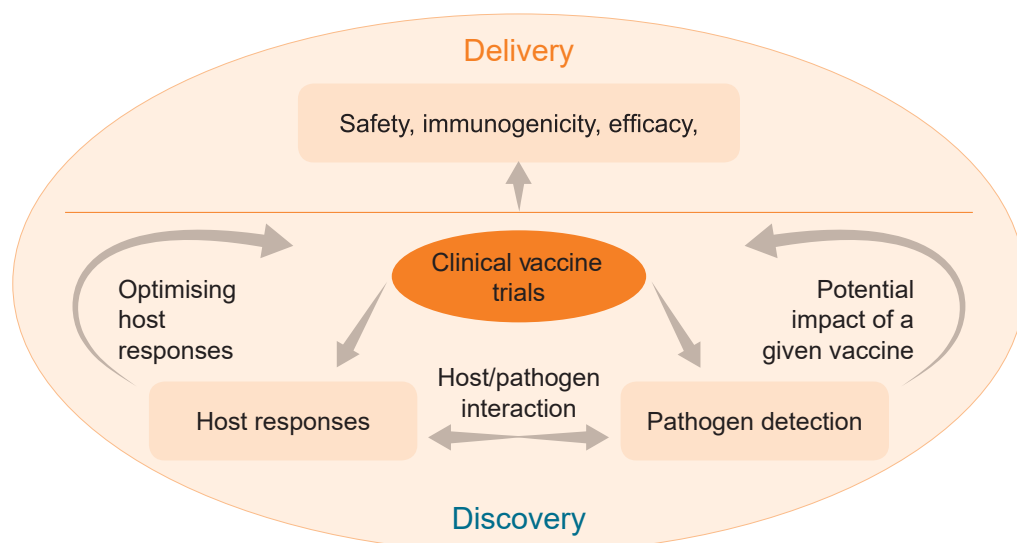
VACCINES & IMMUNITY

The Vaccines & Immunity (VI) Theme contributes to the development of new vaccines and informs the best use of existing vaccines throughout West Africa and beyond. We have developed a portfolio of “discovery and delivery” science and projects around this ambition.

Supported by the considerable infrastructure, the diversity of skills of the leading investigators and our dedicated personnel in the lab and field, we work towards a better understanding of the ontogeny of immunity to inform the next generation of vaccines, and we conduct clinical trials to assess safety and immunogenicity of novel vaccines.

Our senior investigators lead projects in infant immunology, molecular biology and tuberculosis:

1. No vaccine against Tuberculosis (TB) that is more successful than Bacillus Calmette–Guérin BCG has yet been developed, primarily because our understanding of protective immunity against TB remains rudimentary. Hence our efforts for vaccine development against TB centre around the discovery of correlates of protection and correlates of risk to inform how we should assess more promising vaccines in field trials, if and when they eventually become a reality.
2. The requirement for state-of-the art molecular diagnostics remains key to establish what pathogens are causing morbidity and mortality in neonates, young children and also pregnant women and mothers in our setting, where the maternal and neonatal death toll remains unacceptably high. Surveillance pre and post introduction of vaccines remains key to assess the impact of interventions involving vaccination.
3. The VI Theme has identified maternal immunisation as a central area of development within our research, and a number of clinical trials are now starting. To understand the impact of maternal vaccines on neonatal health and—importantly the subsequent vaccine responses remains key, as we embark on this novel area, incorporating the new tools of systems vaccinology.



Research Strategy of the VI Theme

SCIENTIFIC STRATEGY



Clinical trials remain at the centre of our activities. These provide important opportunities to link the delivery of safe and immunogenic vaccines to the discovery of the key factors predicting vaccine success in the field. We are using sophisticated cellular and serological methods to dissect infant immune responses and international collaborations to understand the interactions between host and pathogen that shape the infants immune system. This work leads to better insights into age-related immunity- elemental to the development of successful vaccines aimed at infants and young children.

RESEARCH ACHIEVEMENTS



Vaccines & Immunity research output continues to have a major impact on both vaccine and TB-related public health policies.

Preventing meningitis-MenAfriVac: Vaccine studies conducted by MRCG continue to inform policy makers' vaccine deployment strategies; for example, the MenAfrivac study confirmed the safety and immunogenicity of this vaccine, which was introduced by the Government of The Gambia into the vaccine schedule in late 2013.

Better pneumococcal vaccines: A large Global Alliance for Vaccines and Immunizations (GAVI)-endorsed trial on 13-valent conjugated pneumococcal vaccine, single-dose preparation versus a new multi-vial preparation, sponsored by Pfizer, is now completed and will lead to licensure of the new formulation in the very near future. The team also conducted the first trial of protein-based pneumococcal vaccines in Africa, enrolling over 1300 infants.

Informing the endgame for polio: Similarly, the results of a trial studying the potential interference of intramuscular polio vaccine (IPV) with EPI vaccines given to over 1,500 nine-month-old Gambian infants via routine and alternative delivery devices has been reported to the Strategic Advisory Group of Experts (SAGE) committee to provide essential information for the polio endgame decisions.

Addressing childhood tuberculosis: As a result of the childhood TB research program, the notifications of childhood TB by the National Leprosy and Tuberculosis Programme (NLTP) have increased from 4.3% to 6.8% national, and our TB researchers have contributed directly to the next application to the Global Fund and National TB program in collaboration with the NLTP. The evaluation of TB diagnostics at the MRCG has contributed to the WHO guidelines for use of these assays in resource-poor settings.

RESEARCH PROJECTS & HIGHLIGHTS



PROJECT	HIGHLIGHT
IPV Clinical Trials – Gambia	Informing the polio endgame strategy. This project funded by the BMGF recruited 1500 young children to establish if the plans to introduce inactivated polio vaccine would interfere with any of the other immunisations given at 9 months of age, and if it might be possible to give a smaller dose without jeopardising vaccine responses. The results were presented to the WHO and are now published in The Lancet Global Health.
SIIPCV10 Study	First clinical trial in SSA to assess a novel PCV10 vaccine produced in a LMI country. The current 10 or 13 valent conjugated pneumococcal vaccines remain expensive for developing countries. The Serum Institute in India is developing a novel preparation, which is aimed to be as efficacious but cheaper. Dr Ed Clarke is leading its evaluation in our trials in The Gambia.
AETBC Follow up-Screen TB	This EDCTP-funded, collaborative project led by Dr Jayne Sutherland and Prof G Walzl at the university in Stellenbosch, South Africa builds on precious samples collected from TB patients in The Gambia via our unique TB-case-control study to validate diagnostic biomarkers.
Next Generation Molecular Diagnostics Technology for developing countries	Bringing cutting-edge molecular biology tools and analysis opportunities to the MRC Unit The Gambia. Led by Dr Martin Antonio gives us the opportunity to subject samples collected during our extensive microbiome studies to next generation sequencing in collaboration with partner universities. The project also provides a rich source for training in this increasingly important area and increase our own bioinformatics capacity.

FACT & FIGURES



Current Active Grants for VI Theme	17
Clinical Trials	5
Others	12

Overall Grant Income year by year from 2010/2011 to date

2010/2011	£1,329,622
2011/2012	£1,605,972
2012/2013	£1,360,322
2013/2014	£3,719,709
2014/2015	£3,086,432
2015/2016	£1,946,459

OUTLOOK 2016



We are excited to start up our clinical trials for maternal immunisation. The preparations for trials of this nature have been extensive, as many safety procedures need to be put in place, including the possibility to conduct antenatal ultrasound to date pregnancies accurately.

We look forward to the continued engagement with the NLTP to train and partner around adult and childhood TB research and policy activities, and we are proud to remain an esteemed partner of the WHO with our surveillance programs and our role in the advisory boards for a number of vaccines and interventions. The new collaborations and emerging data on systems vaccinology will inspire our science at the bench, accompanied by a number of new training opportunities.

RESEARCH PLATFORMS & CLINICAL COHORTS

Represent the basis on which a large proportion of scientific research funded through competitive grants is conducted. They provide an important competitive advantage when submitting research grants, the opportunity to carry out preliminary, exploratory work and to host PhD and career development students. MRCG researchers have equal access to all platforms and cohorts.



MRCG staff conducting ward round at the special care paediatric ward, EFSTH

CLINICAL RESEARCH

SCIENTIFIC FOCUS



Providing clinical support to MRCG study participants is a key component of the work of the Clinical Services Department (CSD) as we embed more research directly within the Department, with the added benefit of enabling nursing and medical staff to gain research skills and experience. Due to our adaptable and skilled workforce, we are ideally placed to complete small, well-defined studies, especially where intensive patient management is required.

RESEARCH ACHIEVEMENTS



In 2015 an Electronic Medical Records System (EMRS) for MRCG's CSD was developed to aid physicians and clinicians. This project is a major project milestone which serves as a tool to improve quality care, patient safety and reduce costs. Moving into automation with the EMRS has significantly improved efficiency, speed, and safety within the CSD. It enables a seamless and timely flow of information with regards to streamlined processes as well as implement automated validation controls in critical areas of the system.

Time spent on capturing and confirming information has been reduced drastically. The system enables the various groups within the CSD i.e. doctors, labs, pharmacists, and billing to share information as the patients proceed through the clinic.

RESEARCH PROJECTS & HIGHLIGHTS



The Department provided clinical support for several different studies in 2015 including the recently concluded, EUCLIDS study at the CSD together with Dr Kalifa Bojang and the EFSTH. MRCG continues to make strong impact in improving the health of Gambians especially the paediatric population who has special health needs. The MRCG team at Edward Francis Small Teaching Hospital (EFSTH) provides specialised care for prevention, diagnosis and management of childhood diseases.

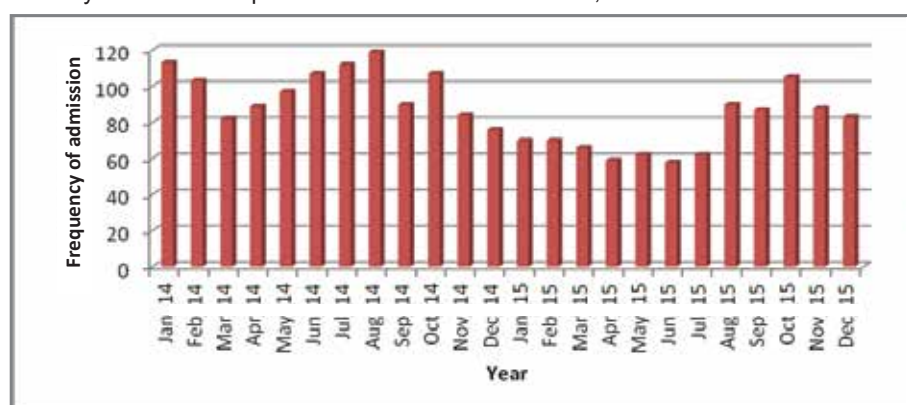
The team also coordinates the paediatric training of medical students at the School of Medicine and Allied Health Sciences of The University of The Gambia. More than 40 medical students were successfully trained in 2015; while several nursing students, house-officers and medical officers were trained in various aspects of paediatrics and child health.

Apart from the recently concluded EUCLIDS study and ongoing Hib surveillance, upcoming studies to be hosted by MRCG staff include; clinical audit of paediatric admission and mortality, aetiology of neonatal infections and a randomised controlled trial of early kangaroo mother care for hospitalised newborns with low birth weight.

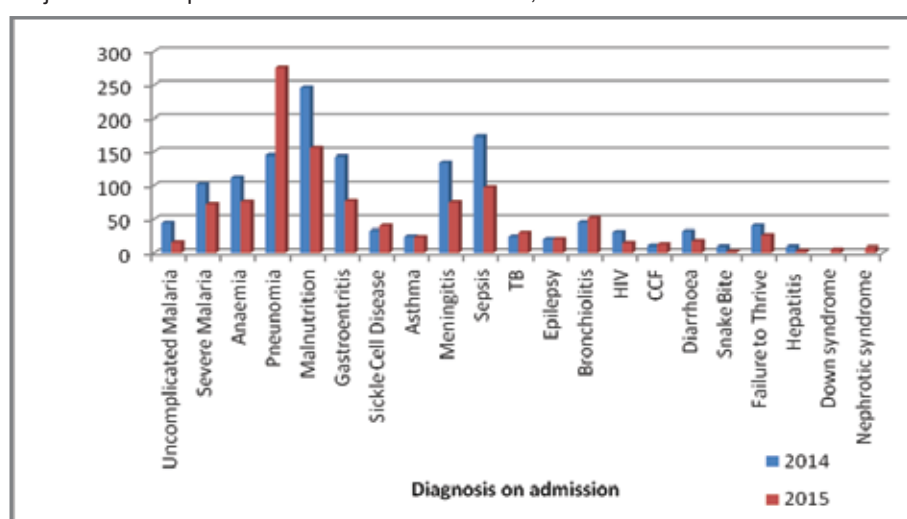
FACT & FIGURES



Monthly distribution of paediatric admissions at EFSTH, 2014 and 2015



Major causes of paediatric admissions at EFSTH, 2014 and 2015



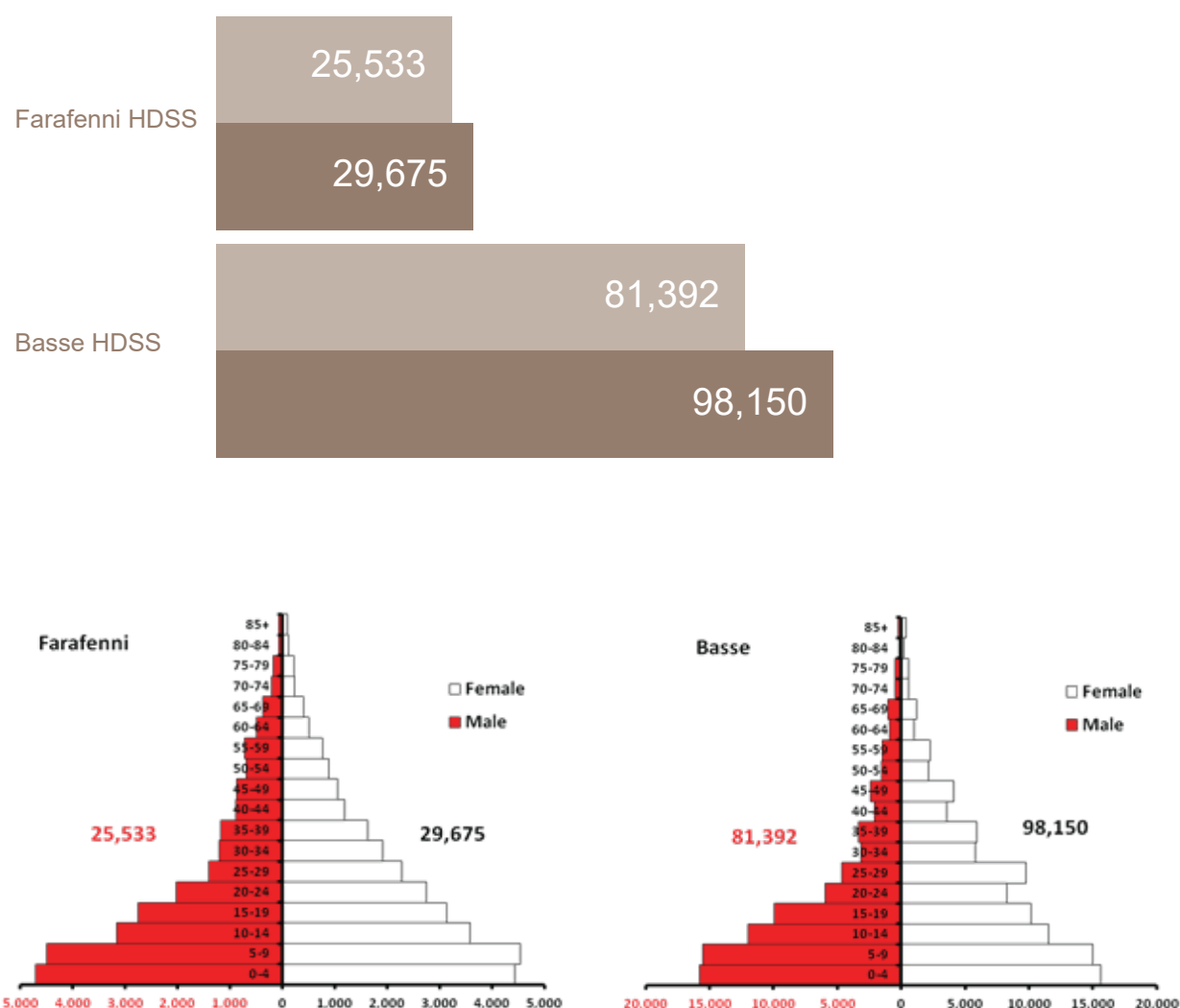


HDSS data entry clerks

HEALTH DEMOGRAPHIC & SURVEILLANCE SYSTEMS

MRCG focuses on the Farafenni and Basse Health and Demographic Surveillance Systems (i.e. FHDSS and BHDSS). As at 31st December 2015, the total populations undersurveillance at the two sites were 55,209 and 179,548; with overall sex ratios of 86 and 83 males per 100 females, implying significant out-migration of males from both sites to either the main urban area of Greater Banjul or abroad.

Population structures of Farafenni and Basse HDSS sites 31st December 2015



SCIENTIFIC FOCUS



The Farafenni and Basse Health and Demographic Surveillance Systems continue to underpin large-scale field-based epidemiological investigations; host multi-disease studies and facilitate sequential investigations; as well as generate relevant and reliable data to ascertain the current health and demographic status of the respective populations, as well as determine cause-of-death structure through verbal autopsy (VA), which also serve as baseline information for the development of new proposals. Data is collected through four-monthly rounds of demographic updates to register all pregnancies, births, deaths and movements in and out of the surveillance areas. The Basse HDSS continues to support the Pneumococcal Disease Surveillance project (PSP), Vaccine Impact against Diarrhoea in Africa (VIDA), the Malaria Programme Grant, ICEMR and PRINOGAM.

The Farafenni HDSS is located in the Upper Baddibu District in the North Bank Region; whilst the Basse HDSS covers the entire south bank of the Upper River Region in the eastern part of The Gambia. As at 31st December 2016, the total populations under surveillance at the two sites were 55,209 and 179,548 respectively; with overall sex ratios of 86 and 83 males per 100 females, implying significant out-migration of males from both sites to either the main urban area of Greater Banjul or abroad.

RESEARCH ACHIEVEMENTS RESEARCH ACHIEVEMENTS



New initiatives for data collection, validation and management

Transformation from paper-based to electronic data capture (EDC)

Transformation from paper-based to electronic data capture (EDC)
Following a visit to Niakhar HDSS in Senegal and a formal agreement to adapt its electronic data capture system to suit the needs of Gambian HDSS sites, a team of consultants were contracted to design an appropriate platform to conduct routine demographic and health updates through electronic data capture (EDC). Implementation commenced in October 2015 in Farafenni; and December 2015 in Basse after the relevant staff were adequately trained and familiarised with the new method of data collection. As with any new system, a number of challenges were encountered in the first few weeks and were continuously being investigated and resolved by the Data Management Department and the Consultants.

The instruments used include a Household Form, administered for selected households to determine membership and individual socio-economic details; a 'Woman' Questionnaire, administered for all female members of selected households aged 15-49 years and solicited pregnancy and sibling histories. The former will be used to reconstruct births and child deaths reported in selected households for up to five years prior to the survey for comparison with the routine HDSS data; whilst the latter will verify adult deaths among siblings resident in the respective sites, as well as estimate adult and maternal mortality in the two sites. The pregnancy histories data will also constitute one of many data sources for a PhD student working on methods of improving the measurement of neonatal mortality at HDSS sites. The survey will be concluded in the first half of 2016.

Re-enumeration
As a way of ascertaining the integrity of the systems and the quality of the data generated at the Farafenni and Basse HDSS sites for use in the estimation of demographic indicators, a quality control exercise was embarked upon in September 2015 at both sites. This was in the form of an independent sample re-enumeration survey conducted by a team of 10 trained female enumerators in Farafenni, and 21 in Basse through electronic data capture. A total sample of 8,997 households were selected for the survey: 4,762 in Farafenni and 4,235 in Basse. The instruments used include a Household Form, administered for selected households to determine membership and individual socio-economic details; a 'Woman' Questionnaire, administered for all female members of selected households aged 15-49 years and solicited pregnancy and sibling histories. The former will be used to reconstruct births and child deaths reported in selected households for up to five years prior to the survey for comparison with the routine HDSS data; whilst the latter will verify adult deaths among siblings resident in the respective sites, as well as estimate adult and maternal mortality in the two sites. The pregnancy histories data will also constitute one of many data sources for a PhD student working on methods of improving the measurement of neonatal mortality at HDSS sites. The survey will be concluded in the first half of 2016.

RESEARCH PROJECTS & HIGHLIGHTS



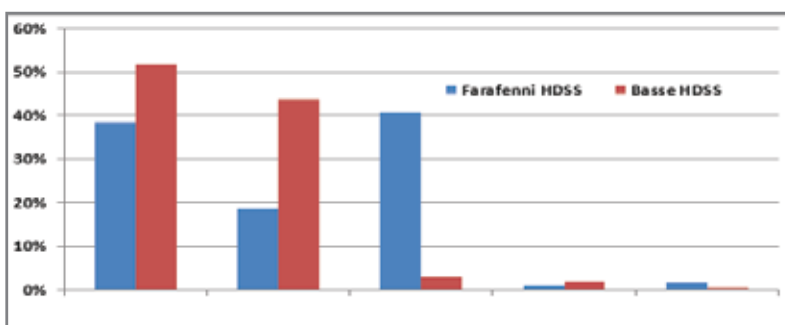


FACT & FIGURES

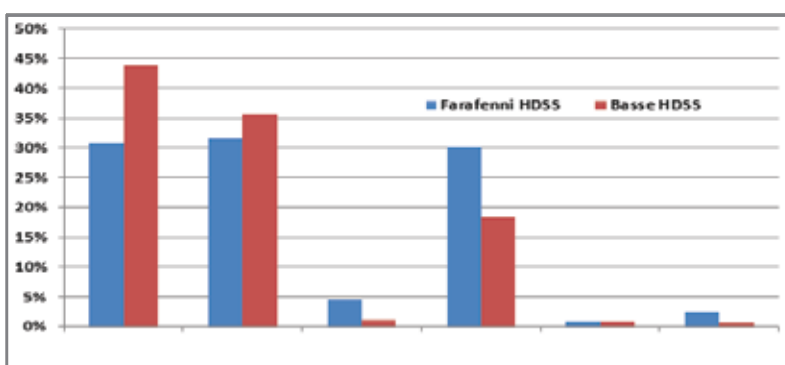


Preliminary outcomes of recent HDSS enhancement: Child Health Information

Recent enhancement of the systems in Farafenni and Basse aimed at collecting additional information at the perinatal period for children born from 1st January 2014. The information generated for the two-year cohorts — of 3,263 and 11,516 births in Farafenni and Basse HDSSs will be made available for detailed analysis by interested Unit Scientists and students; as well as in the preparation of research proposals. Preliminary results give, for the first time, an idea as to the distribution of places of birth and assistance during delivery in both parts of the country. Whilst a little more than half of deliveries occur at home in the Basse HDSS area, about 60% of deliveries in the Farafenni area occur in health facilities.

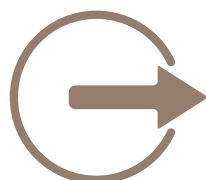


Place of birth, 2014-2015

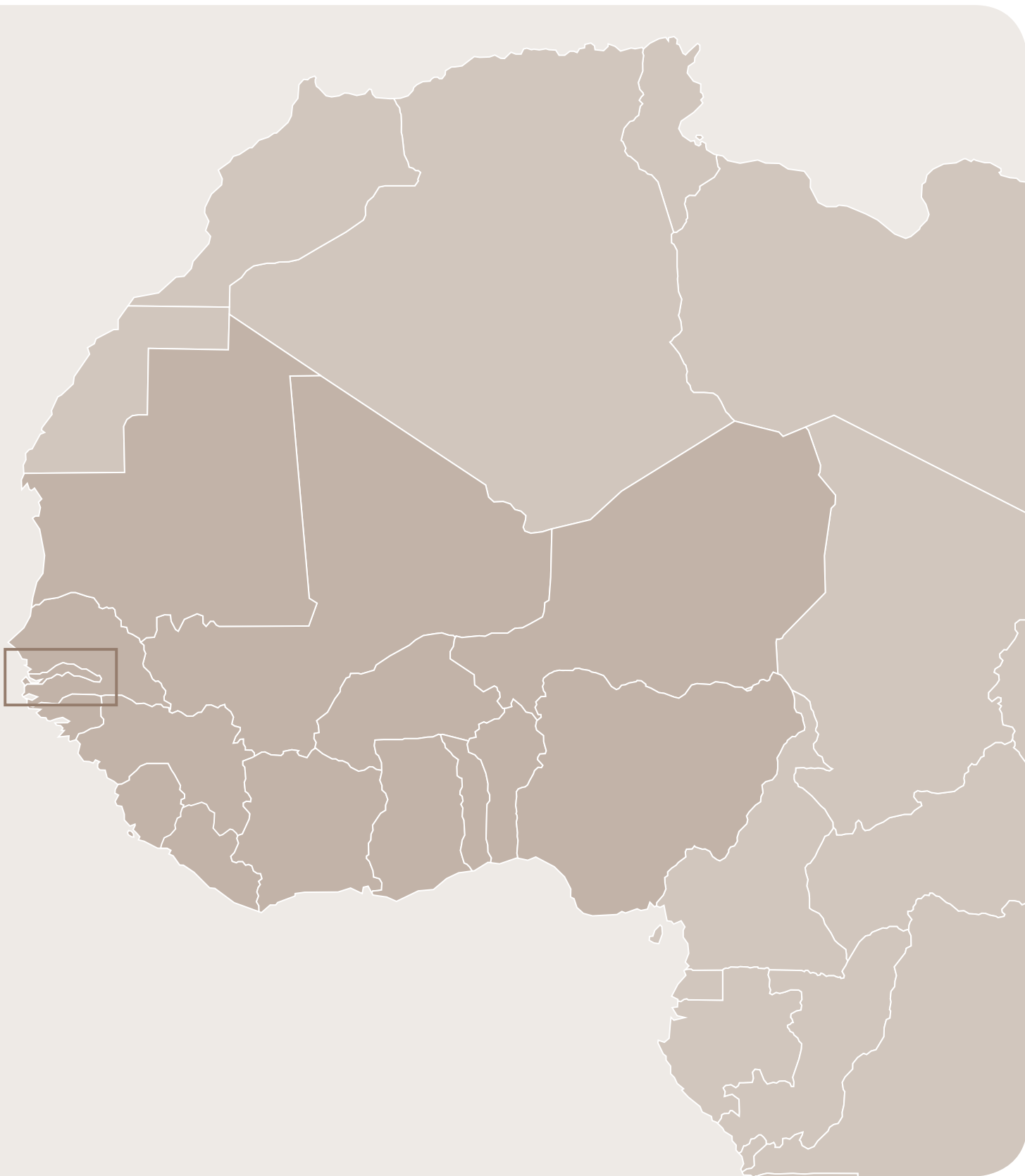


Assistance at delivery by type of health personnel.

OUTLOOK 2016



Activities in 2016 will focus on the analysis of the re-enumeration data to evaluate the integrity of both systems and the quality of the respective data they have generated over the past few years. Outputs will be in the form of methodological advances in HDSS data validation and will be published in appropriate peer-reviewed journals. Preparatory work will also be undertaken to continue with the HDSS enhancement plan by introducing modules to collect relevant health information on adolescents from January 2017.



The Gambia highlighted within West Africa

WEST AFRICA COLLABORATION

MRC Unit The Gambia has a long history of collaboration with West African research/academic institutions, supported both by its own core funding, and externally sourced funds, including specific activities with Senegal. These include a senior MRCG scientist seconded to the Laboratory Bacteriology-Virology, University Cheikh Anta Diop (LBV-UCAD) headed by Prof Mboup; the West African regional networks (WANETAM and WANETAM-plus) supported by European & Developing Countries Clinical Trials Partnership (EDCTP), and the Canadian Global Health Research Initiative (GHRI/IDRC) for HIV intervention research (WAPHIR). A number of clinical trials competitively secured by The Unit are multicentre and involve several West African partners/countries.



Dr Jaye (right), Prof Mboup (3rd from right) and the LBV-UCAD staff

Deeper engagement of the MRCG in the West African region is considered essential to MRCG's scientific vision for the next 5 years, which is to contribute to the post-2015 sustainable development agenda by producing the evidence base to improve health in West Africa and beyond. Such collaboration will be strengthened as the MRCG has the ambition of becoming a regional hub for health research and training. This will be done by further strengthening our collaboration with UCAD, which will focus on research in three main topics, namely HIV, malaria, and maternal and neonatal health.

SCIENTIFIC FOCUS



Besides the capacity building activities within the EDCTP-funded regional networks, MRCG has carried out several research projects involving other West African countries. These included a study on the burden of malaria in young infants (≤ 6 months old) in Guinea Conakry, Benin and The Gambia; a cluster randomised trial on the effect of intermittent screening and treatment for malaria of pregnant women by village health workers, carried out in Burkina Faso, Benin, and The Gambia; and a project on the treatment of patients with chronic liver disease in Senegal, Nigeria and The Gambia.

RESEARCH ACHIEVEMENTS



The West Africa collaborative research has strengthened the link between the LBV-UCAD and the MRCG and provides the basis on which a stronger alliance can be built. It has also enabled the extension of research by MRCG Themes, e.g. research on malaria and tuberculosis, to other research groups in West Africa. Such collaboration also includes the building of clinical trial skills and performance of multicentre clinical studies and disease surveillance. Our publications below describe our research achievements.

1. The Prevention of Liver Fibrosis and Cancer in Africa (PROLIFICA): a story of West African clinical and research collaborations to target hepatitis B-related hepatocellular carcinoma in West Africa. June 2015
2. The gamma-glutamyl transpeptidase to platelet ratio (GPR) predicts significant liver fibrosis and cirrhosis in patients with chronic HBV infection in West Africa. June 2015

3. Malaria Prevalence among Young Infants in Different Transmission Settings, Africa. July 2015

RESEARCH PROJECTS & HIGHLIGHTS



Apart from the HIV research conducted collaboratively between LBV-UCAD, MRCG and INASA-BHP of Guinea Bissau, there are other ongoing research collaborative links such as:

- The International Center for Excellence in Malaria Research (ICEMR) network of independent research centers in malaria-endemic settings comprising three disease-endemic countries, namely The Gambia, Senegal and Mali working in collaboration with the BROAD Institute and Harvard School of Public Health, Boston USA.
- Community-based scheduled screening and treatment of malaria in pregnancy for improved maternal and infant health: a cluster-randomized trial (COSMIC) - a multi-centre study implemented in three West African countries: The Gambia, Burkina Faso and Benin.
- PneumoWAR is a collaboration between the MRCG and WHO/AFRO and the goal is to enhance invasive bacterial disease (IBD) surveillance in West and Central Africa by establishing a supporting Regional Reference Laboratory (RRL) at MRCG. The RRL provides Sub-regional oversight, clinical-epidemiological technical support, coordination, and data management to support the network.

PROLIFICA project, funded by the European Commission, was carried out in MRCG, LBV-UCAD and University of Jos, Nigeria for 5 years and ended January 2016.

FACT &
FIGURES

WEST AFRICA PLATFORM MAP

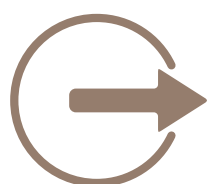


WANETAM: Burkina Faso, Ghana, Guinea Bissau, Mali, Nigeria, Senegal; (EDCTP)

WANETAM PLUS: The above plus Benin, DRC (EDCTP)

WAPHIR: Guinea Bissau and Senegal (EDCTP)

PneumoWAR: Niger, Nigeria, Benin, Togo, Ghana, Ivory Coast, Cameroon, Sierra Leone, DRC, Senegal

OUTLOOK
2016

In 2016, we will finalise our planned alliance with UCAD and hopefully some of the projects submitted with our West Africa collaborators would be funded. We are planning to appoint an experienced researcher to work on maternal and neonatal health in close collaboration with our Senegalese colleagues. We are also collaborators in three grants (Prof Gaye, Senegal; Dr Awandare, Ghana, and Prof Djimde, Mali) of the Developing Excellence in Leadership, Training and Science Africa (DELTAS Africa) funded by the Wellcome Trust and the Department for International Development (DFID). We expect these grants will provide the opportunity of doctoral and post-doctoral training in which there will be exchange of junior scientists between the involved institutions.

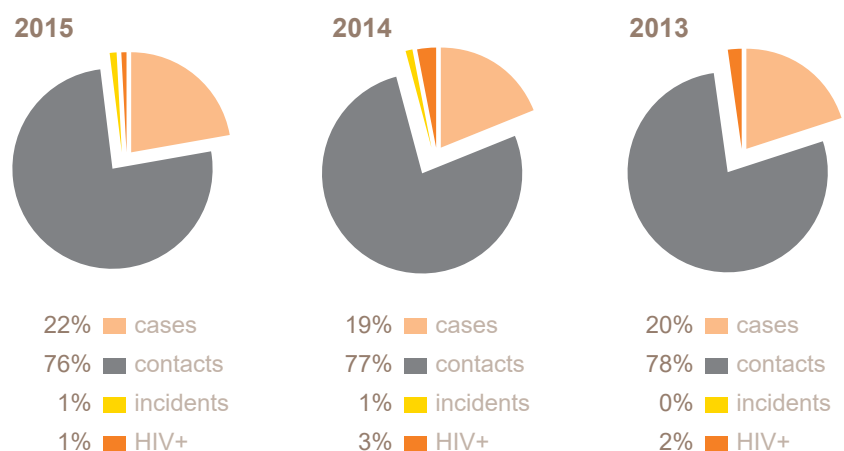


Drama group singing and dancing during World TB Day celebrations

TUBERCULOSIS CASE-CONTACT

The MRCG Tuberculosis Case-Contact (TBCC) study platform was established in May 2002. The main aim of TBCC is to recruit and follow-up exposed contacts of tuberculosis patients (index cases) over time, obtaining samples for immunological, microbiological, clinical and epidemiological profiling at various time points. Exposed contacts that later develop tuberculosis (secondary cases) are then compared with those who do not develop the disease (non-progressors) using a multi-pronged approach to determine differences in immunity. This will help to define protective immunity, which can then be used for development of novel TB vaccines.

The platform encompasses several interlocking studies across all age groups. The studies include longitudinal observational and cohort studies, randomised control trials, and qualitative methods. Since 2011, the platform has facilitated observational, interventional and biomarker studies for the MRCG Childhood TB Program grant, led by Prof Kampmann. These studies collectively aim to assess and identify biomarkers for TB diagnosis, pathogenesis and protection; differences in immunity induced by different *Mycobacterium tuberculosis* (Mtb) strains; understanding TB in the context of co-morbidities; development of novel diagnostics and therapeutics; and exposure prophylaxis implemented for children.



Index TB cases recruited on TBCC

SCIENTIFIC FOCUS



The biomarker program focuses on novel diagnostic and prognostic markers, used to assess treatment outcome and potential to identify antigens useful for the design of better TB vaccines.

The continued success of the platform is due to its powerful epidemiological design, multi-site studies, collaboration with the National TB control program, local community engagement, efficient sample handling, introduction of the bio-bank item tracker storage system and excellent data management. The field worker team is imperative to the success of the platform, allowing recruitment of entire families to the project.

The platform's main scientific focus is to determine mechanisms involved in protective immunity against TB. This is achieved by analysing host-pathogen interactions across the spectrum of TB infection and disease. The nature of TB means only 5-10% of people progress to disease, the majority remaining infected but asymptomatic. If we can understand what cell types/functions are required to control progression to active disease and even to prevent Mtb infection, we can target these findings for generation of novel vaccinations and other immunological interventions such as host-directed therapies.

The ability to recruit exposed contacts of TB patients allows us to obtain samples at various stages of host-pathogen interaction. In addition, the platform enables the collection of specimens for evaluation of novel TB diagnostics such as GeneXpert, TB-LAMP and other molecular methods. To find and develop an inexpensive, user friendly point-of-care test that can differentiate TB Infection and disease as well as enhance TB case findings is core business for adult and childhood TB and 2 patents of promising biomarkers have been generated from the platform.



RESEARCH ACHIEVEMENTS



In 2015, 10 papers were published from the TB case-contact platform with another 3 in press. These included studies on the role of Iron and Vitamin D in TB; basic science analysis of apoptosis in TB patients and their contacts; differences in the transcriptome and metabolomics profiles of patients infected with *M. tuberculosis* compared with *M. africanum* and the first field-friendly demonstration of a lateral flow point-of-care test for TB.

In addition, TB diagnostic development was shown with a study on comparison of TB-LAMP with GeneXpert in adults and the first demonstration of GeneXpert for diagnosis of children. Importantly, this study highlighted the continued requirement for culture in diagnosis of children in The Gambia.

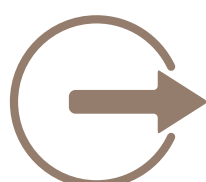
RESEARCH
PROJECTS &
HIGHLIGHTS

PROJECT	HIGHLIGHT
GC6-2013: Biomarkers for TB Consortium	This project began in 2006, funded by the Bill and Melinda Gates Foundation. It is a multi-site study aimed at defining Correlates of Risk (CoR) for TB regardless of ethnicity. Initial transcriptomic results from this study have recently been accepted for publication in The Lancet.
TB-SEQUEL	Assesses the pathogenesis of lung diseases and risk factors associated with functional lung impairment and its socio-economic impact.
TB VAC 2020	This project aims to improve and diversify current TB vaccine candidates. It engages 30 partner sites. The role of MRCG is to define immunological correlates of protection from Mtb infection, using samples collected since 2002.
SCREEN-TB	This is a multi-site study to develop an inexpensive, user-friendly point-of-care test for diagnosis of active TB. It is collaboration of 7 African and 5 European institutions.
REACH4KIDS	This comprehensive research program in childhood TB aims to improve the diagnosis and management of childhood TB by assessing host, pathogen and environmental aspects and integrating them in prediction models.
Delivering Training in Childhood TB to Health Care Workers	This program is implemented in collaboration with the NLTP and delivers a training program specifically developed by MRCG investigators and targeted at childhood TB.

FACT &
FIGURES

TB cases and household contacts recruited using TBCC 2013-2015

	2013	2014	2015
Index TB cases	121	150	201
Household Contacts	470	614	688
Incident TB cases	1	6	11
HIV+	10	24	11

OUTLOOK
2016

2016 will involve the 'kick-off' of two important studies analysing TB patients: TB-SCREEN will identify a pan-African point-of care test for TB while TB-SEQUEL will aim to identify host and pathogen factors involved in long-term lung damage in TB to facilitate host-directed therapy for reducing these sequelae.

In addition, 2016 is the final year of our decade-long study on TB biomarkers in the context of HIV/AIDS funded by the Bill and Melinda Gates Foundation. This study was part of the Grand Challenges for TB, which has enabled us to establish networks throughout Africa and facilitated publication of several high-impact publications on TB biomarkers.

Research Governance & Support Services

Created with the aim of better coordinating activities between its different components (clinical trial support, data management and statistics, research development, project management and library) and thus providing support to investigators to carry out clinical research at the highest possible standards. Research development and project management provides support for negotiating and managing research projects and it's entirely supported by competitive funds.

Laboratory Services

Includes all laboratory activities carried out at MRCG plus the biobank and biomedical engineering, and it's essential for producing world-class science. The clinical lab, serology and TB lab have successfully achieved full GCLP accreditation and the more stringent ISO 15189 accreditation standards. The increasing number of large-scale population-based studies, community interventions and novel genomic approaches requires high-throughput technologies and increased capacity in bioinformatics.

RESEARCH GOVERNANCE & SUPPORT SERVICES

The Research Governance & Support Services Department was founded in 2015 to support investigators in regulatory and ethical matters, to oversee compliance of research at The Unit and to coordinate a cluster of 5 research support departments. These include the Clinical Trial Support Office, Data Management & Archives, Statistics & Bioinformatics, Research Support Office and Library.

Clinical Trial Support Office (CTSO): In 2015, eight regulatory studies were conducted at The Unit, including four MRCG-sponsored and four externally-sponsored clinical trials. All trials at MRCG received CTSO support ranging from ad-hoc advice to a total regulatory and trial management service resulting in successful completion of four trials in 2015. CTSO has continued its successful GCP & Ethics course for Unit staff and West African partners and streamlined the GCP-refresher training to reach more participants.

Data Management & Archives (DM): In addition to accomplishing its core mission of delivering data management solutions for research projects, the DM Department developed and implemented an in-house EMRS for the internal Clinical Services Department. This improves operational efficiency and safety in the clinic via enhanced data capture technology and integrated cross-checks. In addition, an electronic data archiving system was developed serving as The Unit's universal study data repository, handling historic collections as well as electronic data sets for ongoing and future projects.



Dembo Kanteh and Elizabeth Stanley-Batchilly from MRCG Research Support representing The Unit at the West African Research and Innovation Management Association (WARIMA) meeting in Ghana, 2015.

These steps towards integrating electronic data collection and duration are a milestone in establishing a platform that facilitates future discovery and exploitation of existing datasets.

Statistics & Bioinformatics: The increased number of clinical trials and non-interventional studies lead to high activity in the Statistics Department which provided specialised support to investigators during all project phases. Unit Statistical support ensured accurate analysis and reporting of data at the end of projects, and routinely involved early activities such as informing trial/study design, sample size calculation, study conduct and performance of key safety activities, such as reporting to safety oversight committees. Formal training sessions and ad-hoc in-house support was successfully delivered ensuring the statistical needs of researchers and students were met.

Research Support Office (RSO): Over the last year, RSO has continued to deliver research support solutions covering identification of donors and funding opportunities, grant development and budgeting, contracts review and negotiations as well as customised research project management. The team continued to strengthen regional collaborations and expanded internal reporting activities gathering, analysing and reporting internal performance metrics in quarterly reports and ad-hoc bulletins. These covered a broad spectrum from attraction of funds to publication and analysis of research impact. 2015 also saw the integration of the Nutrition Theme into The Unit with RSO taking the leading role in managing a smooth transition process including the merging of capacities, identification of synergies and harmonisation of departmental processes across all MRCG sites.

Library: The Library was successfully relocated and refurbished in 2015 and is now housed in a bright and modern space providing state of the art research information services to researchers, students and visitors. The new facility boasts the latest IT infrastructure ensuring the Library remains a popular and user-friendly Unit resource for the years to come. Being the central hub for Unit research information, the Library has evolved to become the central point for archiving and reporting of The Unit’s research outputs to MRCG management and external stakeholders.

ICH-GCP and Ethics training courses conducted by MRCG Clinical Trial Support in 2015

ICH-GCP and Ethics Courses Conducted



Staff and Collaborators Trained



LABORATORY SERVICES

The Laboratory Services Department comprises of the Research Platform Labs (RPL), Clinical lab, TB, Malaria and Microbiology labs, and field stations laboratories in Basse and Keneba. Biological sample storage, archiving and retrieval are handled by the Biobank and the Biomedical Engineering Department undertakes equipment maintenance, calibration, repairs and procurement functions. The overarching mission of the department is to provide reliable and efficient platform to support innovative and cutting-edge research in The Unit and to serve as a centre of excellence for training in the sub-region. Activities undertaken in the various laboratories span from basic research in immunology, microbiology, virology and molecular biology to diagnostic tests to support large epidemiological studies, intervention trials and routine clinical diagnosis.

Our primary role include assay development, implementation of laboratory quality systems and accreditation schemes, training, generation of baseline data and establishment of a robust system for biological sample archiving, tracking and retrieval.

Individual labs develop and optimise assay protocols which are made available to users in SOPs and test menus on The Unit's intranet portal.

A major highlight of the year was the accreditation of the routine diagnostic laboratories to ISO15189 by Kenya Accreditation Service (KENAS) effective from July 2015 following an intensive verification exercise. A successful surveillance visit has since been conducted and we are confident that the laboratories will maintain the accreditation status going forward.



Managers of the ISO 15189 accredited laboratories (Bola Lawal, Tisbeh Faye Joof, Ousman Secka), and Head of Laboratory Services (Dr Davis Nwakanma) with the ISO 15189 certificate in the background.

In addition to the in-house function of the Biomedical Engineering Department, a contract to map and certify Biological Safety Cabinets in some health facilities across a number of West African countries was secured in 2015. The Biobank continued to perform its primary role of maintaining the over 800,000 biological sample repository of The Unit in a controlled storage condition for sample integrity as well as the logging of specimens into sample management database, provision of on-call service and access to stored samples.

As part of our continuous process improvement strategy, the routine labs conduct annual client satisfaction surveys. This is complimented with workload analysis to enable planning and re-allocation of resources for continued efficiency. Overall, in 2015 the routine labs recorded average workload increase of 10-15% over the previous year.



The laboratory team conducting trial run of the Ebola Diagnostics Procedure in The Unit's Category 3 Facility.

Also during the year, the Clinical lab was linked to the in-house EMRS introduced in collaboration with the CSD. This has significantly improved the management of patient information and assay turnaround time.

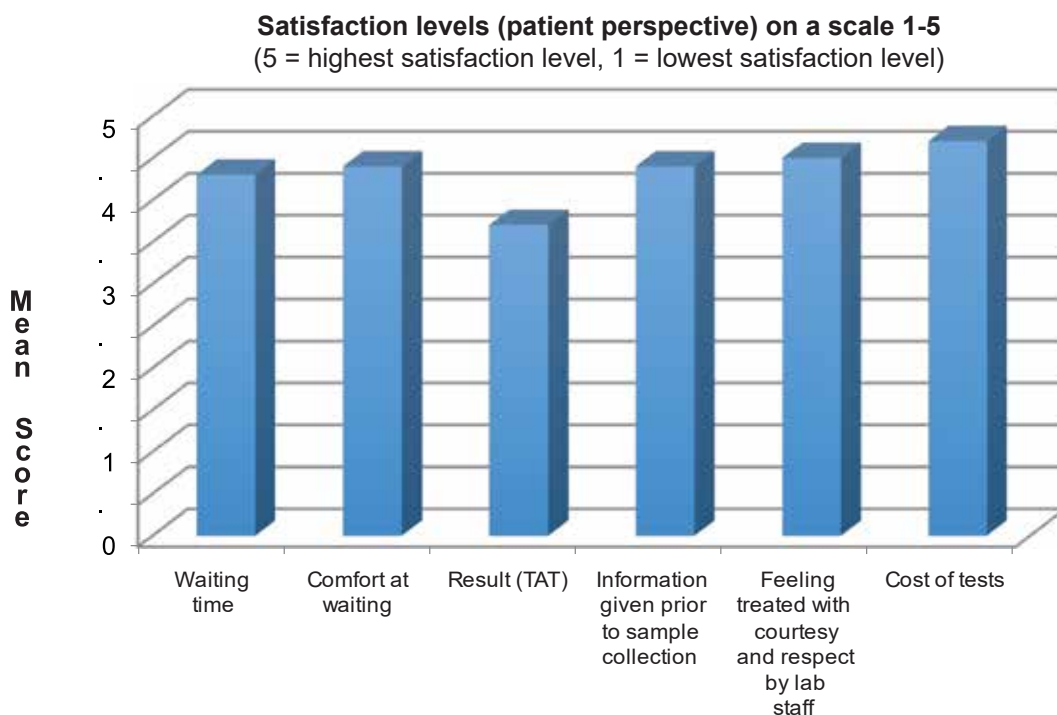
Laboratory Services continued implementing the programme of introducing new equipment to support cutting-edge research and also to renew basic scientific equipment in the laboratories. An Ion Torrent Next-Gen Sequencer, a GeneXpert 16, automated dried blood spot processing robots and eight new real-time PCR machines were acquired.



Biobank staff at work: Biological samples are logged into ItemTracker© software and stored in the freezer bank.

Relevant laboratory processes that leverage these enhanced capabilities such as high resolution melting (HRM) and SNP barcode assays, amongst others, have been introduced. Laboratory Services also responded to the threat of emerging infectious diseases in the sub-region by taking advantage of the scientific capabilities available on the platform to support establishment of in-house capacity for Ebola diagnosis to compliment the country's containment effort at the height of the outbreak.

Overall, 2015 was a challenging but rewarding year for Laboratory Services and look forward to 2016 with optimism.



Laboratories on a scale of 1 to 5 representing Low to High.

Waiting time - 4.3

Convenience of waiting area - 4.4

Result turnaround time (TAT) - 3.7

Adequacy of information before sampling - 4.4

Treatment with courtesy and respect by lab staff - 4.5

Affordability of tests - 4.7

SUPPORT SERVICES

Our organisation operates cohesively and is strong because departments support each other. Our staff are professionals that understand the value of research and science in turn they consistently strive to do even better. Our work with the community, government and collaborators are integral to our success.

OPERATIONS

2015 was a very positive year. It was marked by the ISO 15189 certification and the launching of some initiatives to increase efficiency. Our Stock Reduction Task Force, Capital Projects Monitoring Board and the Risk Management Board were able to reduce our stock levels by 30%, within six months.

In addition, MRCG achieved the 1% max budget deviation target, a major achievement as we are managing a £16 million yearly budget, as robust systems are in place which are well recognized by funders and yearly audit reports. The Unit also received “the most compliant PAYE tax payer of the Year” award in 2015.

In 2015, we invested £1.9 million to refurbish and improve our laboratories in Keneba and Basse, built a new accommodation for our staff, upgraded our electric system and currently increasing our server capacity.

Providing operational support to more than 50 research projects ongoing at MRCG, is quite challenging and can only be achieved through a well-coordinated professional team. With close to 1200 staff working to ensure that we achieve our mission, we are conscious that our competitive advantage lies in the professionalism of our staff, from the Manager to field worker.

Lastly, in 2015 we launched the MRC and Me Wellbeing Programme, to promote health and wellbeing in and outside the workplace for all MRCG staff and their families. The employee Wellbeing Programme reflects The Unit’s commitment to promote the health and wellbeing of staff to maintain the innovation, expertise and knowledge that exist with the MRCG family.

We provide operational support to more than 50 research projects ongoing at MRCG, with close to 1200 staff working to ensure that we achieve our mission.



1200^{Staff}



LEARNING & DEVELOPMENT

Training and career development plays an important role in enabling the MRC Unit The Gambia to attract and retain staff talents. The Unit's leadership is committed to nurturing and growing staff talents with about £0.5 million spent annually to support staff development courses as well as placements to enhance productive capacities.

In 2015, we had 137 external/academic trainees in the following categories; 26 PhD, 33 Masters, 23 BSc, 19 Foundation degrees and 36 other professional trainings. Most undertake distance learning with practical work at The Unit; six are registered with the Open University, 15 with the London School of Hygiene and Tropical Medicine, three with the Institute of Tropical Medicine, Antwerp, Belgium, and the rest with other research-intensive Universities overseas.

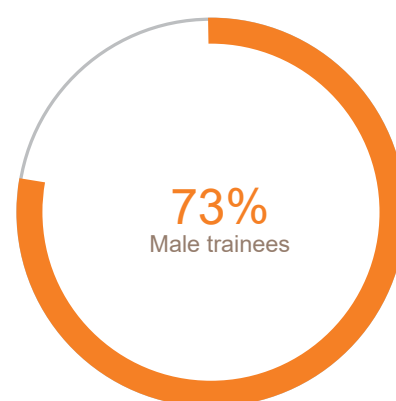
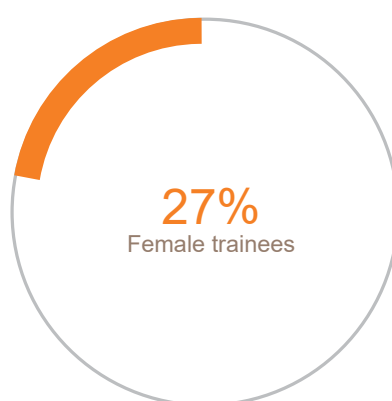
Five of our PhD students are full-time residents overseas – at Aberdeen, Edinburgh, The Sanger Institute and The University of Melbourne.

The percentage of women trainees (27%) is close to The Unit gender balance (25% January 2016). PhDs and MScs together represent about a third of all trainees. The percentage of male trainees (73%) is higher than female trainees (27%). The majority of PhD graduates took ≥ 4 years to complete their PhD training.

56% (77/137) of the trainees are supported by MRCG's training budget whilst the remaining ones have been on external funding.

Gambians represent the large majority of trainees, and for some degrees they are the only nationality represented.

The percentage of women trainees (27%) is close to The Unit gender balance (25% January 2016). PhDs and MScs together represent about a third of all trainees. The percentage of male trainees (73%) is higher than female trainees (27%). The majority of PhD graduates took ≥ 4 years to complete their PhD training.



COMMUNITY & GOVERNMENT ENGAGEMENT

The focus for 2015 was to further strengthen trust with The Gambia Government, the community and local stakeholders as research in The Gambia requires the support and partnership of three components; Researchers from MRCG, The Government and the community. To achieve our desired objectives, we embarked on various activities to strengthen engagement.

Strong partnership between The Gambia Government and MRCG

Most projects implemented are done in strong collaboration with government partners. This has generated mutual partnerships in implementation, capacity building and resource sharing and optimisation. These strong partnerships are evident at the Jammeh Foundation for Peace Hospital, Edward Francis Small Teaching Hospital, Basse Health Centre, Bansang Hospital, Sukuta Health Centre, Fajikunda Health Centre, and Alliance for Patriotic Reorientation and Construction (APRC) Hospital in Farafenni. In addition we provide relevant health departments with training.



Equipping Health Facilities

- MRCG Tuberculosis Global fund handed over a mini truck, motor bicycles and a vehicle to the National TB Unit attended by The Unit Director, Professor Umberto D'Alessandro and the Honourable Minister for Health and Social Welfare Dr Omar Sey.
- Donations of X-ray films was made to Sulayman Junkung Hospital in Bwiam to help equip the hospital's X-ray department to better serve the community
- Handing over a water borehole to the Fajikunda Health Centre was done at the ceremony attended by Government representatives, MRCG and health staff from the Ministry of Health and Social Welfare as well as local and traditional leaders.
- MRC Unit The Gambia on the 14th August 2015, signed a £50,000 agreement with the Ministry of Health and Social Welfare for the refurbishment of the Basse Health Centre's Clinical Services.



Giving back to the Community

The Keneba community benefitted from a solar water borehole costing over three million dalasis. This was commissioned by The Unit Director Professor Umberto D'Alessandro and the Governor of Lower River Region, Mr Saliou Puye, and the unveiling was attended by a range of people, villages including local and traditional leaders.

Community outreach and sensitisation

As part of The Unit's community engagement and sensitisation activities, The Vaccine Impact on Diarrhoea in Africa project in Basse organised a massive community outreach and sensitisation in the Upper River Region and Central River Regions attended by government representatives, local and traditional leaders, study participants and other dignitaries in the community. This meetings were held in Mansajang, Fatoto, Bakadagi, Bansang and BrikamaBa.



Schools' visit

As part of our community outreach activities MRCG encourages and invites schools to visit The Unit to have a first-hand knowledge and information of our research. During 2015 the following schools were received:

Fandema School, Gambia Collage Public Health School, Al-manara Islamic school from the North Bank Region, St Therese's Basic school in the Central River Region, The Gambia College Student Teachers, Mansa Colley Bojang Primary School and SBEC International School.

PARTNERSHIPS, COLLABORATIONS & NETWORKS

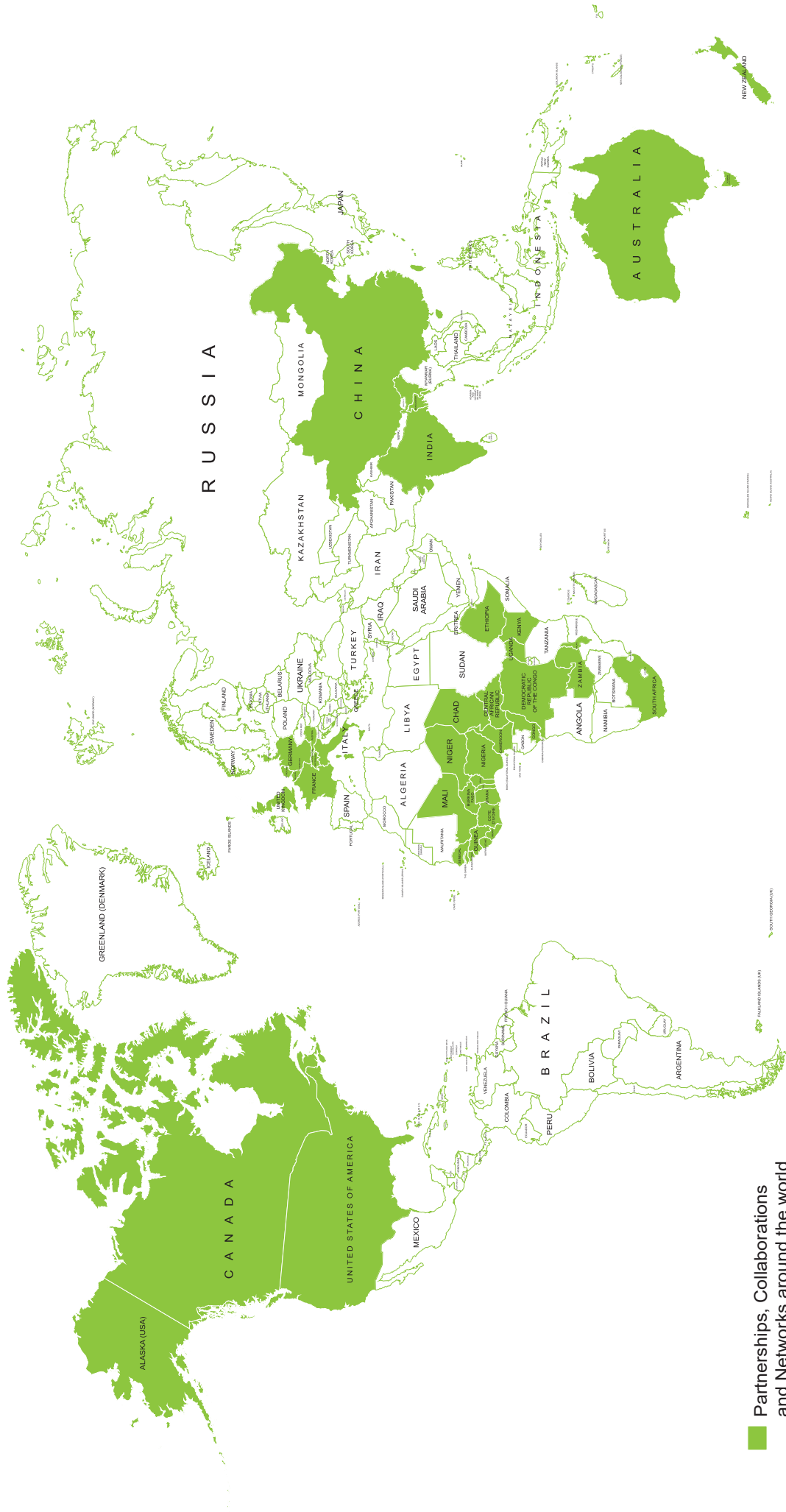
In the modern world of 'big science' with its multitude of new methods and technologies spanning all aspects of research from bench to bedside collaborations have become ever more essential. This drives the the large number of collaborations and networks that are central to achieving our mission.

Scientists at MRCG partner in several hundred international collaborations with some of the world's pre-eminent research teams from 36 countries. Over 40 of our collaborations are with fellow African institutions across 20 different African countries (see also West African Collaboration on page 30). We work with over 50 different institutions in the UK and more than 30 from other European countries and 30 in the USA and Canada.

Networks also form a key element of our science with WANETAM, PERCH, VIDA, MVVC, GEMS and PneumoWAR being good examples. These are especially favoured in some funding calls because multisite studies can leverage geographic and ecological variations to bring a better understanding of some of the major health challenges of the region.

Technology-based collaborations are also crucial. EUCLIDS is a major EU-funded consortium that pulls together partners across academia and industry to apply the very latest advances in molecular diagnostics to identify causal organisms in childhood sepsis. The Unit's epigenetics research involves multiple collaborations with teams in the UK, US, Germany, India and China working at the cutting edge of discovering how early-life nutrition might affect life-long health. The exciting new tools of Systems Vaccinology are being explored in the context of our vaccine trials in our collaborations with our partners in North America and the UK.

It is key to our vision that the intellectual centre of gravity for our work remains within The Unit so far as is practicable and, where this is not possible, that our young scientists benefit from training and career advancement through their opportunities to work alongside world leaders from abroad.



QUALITY MANAGEMENT

In 2015, the key activities of the Quality Department focused on preparing for accreditation to ISO 15189:2012, and ensuring The Unit maintained compliance to the applicable standard requirements for a surveillance visit by the assessors.

ISO 15189 is an international quality standard for the quality and competence of medical laboratories. It was introduced and implemented in our system/laboratories in the summer of 2012. In preparing for the accreditation visit in April 2015, the Quality Department coordinated ISO 15189:2012 training sessions, to ensure staff have a basic understanding of the standard.

MRCG staff from all three field stations attended introductory sessions to ISO 15189:2012. In addition, personnel in the laboratories and those identified as internal auditors had a more indepth training of the standard. As the figure (Figure 1) shows below, 131 staff were trained in the standard in 2015. Other training courses provided or facilitated by the Quality Department in 2015 included Good Clinical Laboratory Practice (GCLP), Risk Management, and Internal Auditor courses.

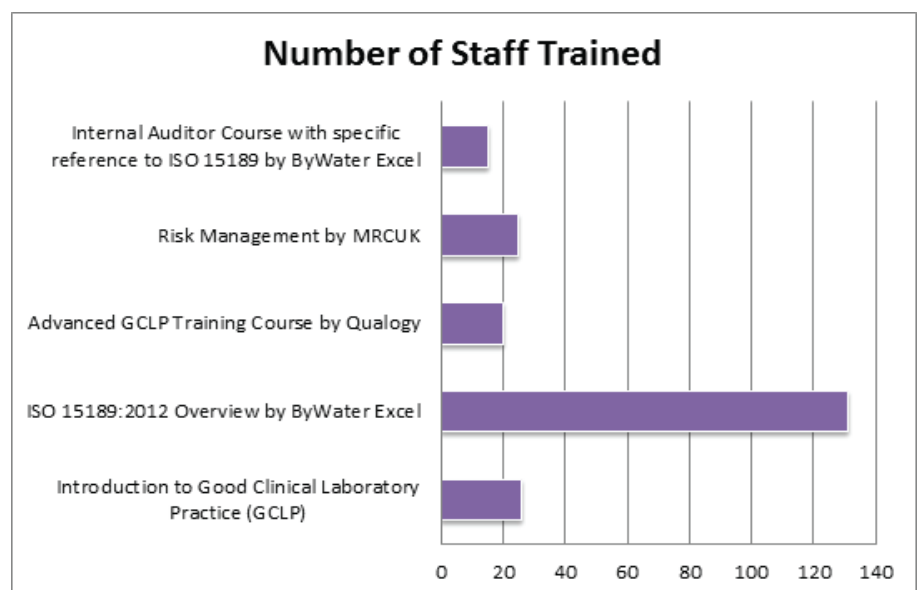


Figure 1. 2015 Quality training courses

The preparation toward accreditation also required the laboratories going for accreditation and their support departments to develop new and/or revise, if necessary, relevant standard operating procedures (SOPs) and assay documents. Figure 2 below illustrates the areas, including laboratories, that implemented new controlled documents as well as those departments that reviewed applicable documents.

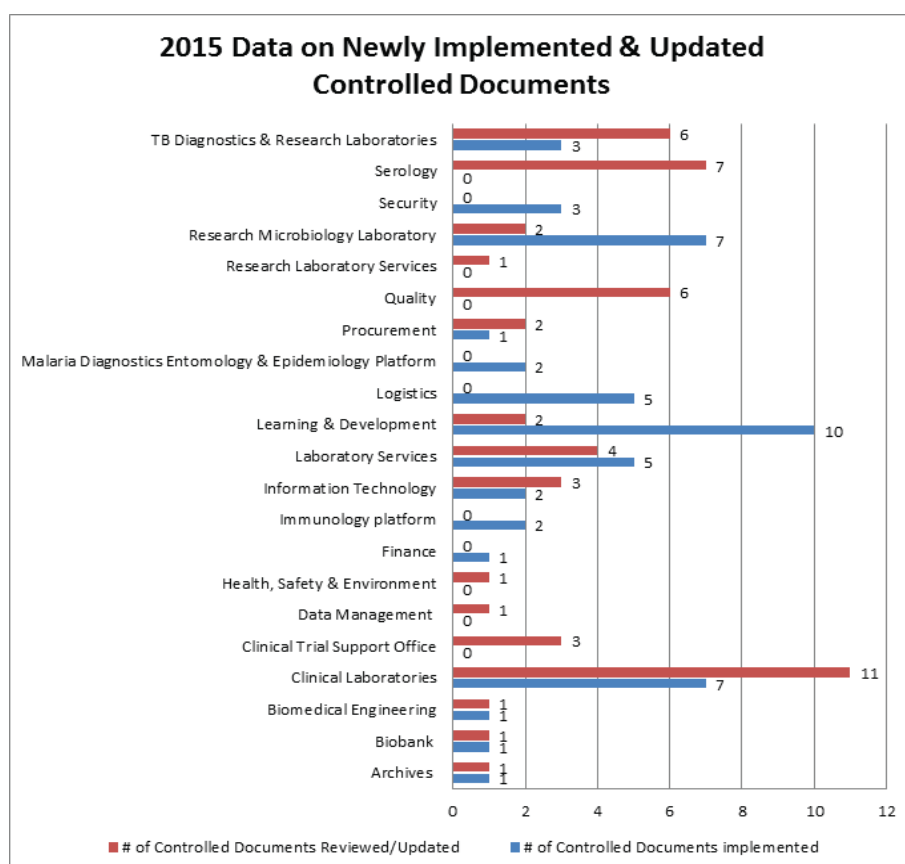


Figure 2. 2015 Newly Implemented and/or Revised Existing Controlled Documents

In addition, the Quality Department conducted internal audits of the laboratories and support departments addressed by the standard. This helped to further give assurance to the Leadership Board, Laboratory Management, and MRCG staff that The Unit was ready to be assessed for accreditation.

Figure 3 compares internal audit data of 2014 and 2015. The data include the number of internal audits conducted and the number of closed internal audits closed (i.e. one audit cycle has been completed with satisfactory responses received from audited areas).

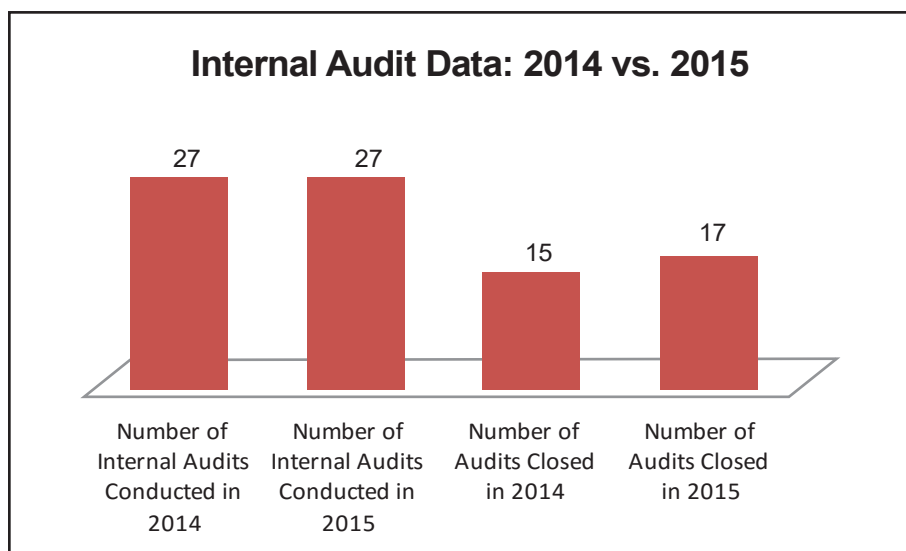


Figure 3. Comparison of 2014 versus 2015 Audit Data

Achievements

After a successful assessment, five of our routine laboratories were accredited to ISO 15189:2012 in June 2015. The assessors planned to return for a surveillance visit in January 2016. The assessment scope included the applicable support departments, and the assessors confirmed these areas also comply with relevant requirements of the standard.

In June 2015, the same five routine laboratories stated were assessed against GCLP. The laboratories were granted full accreditation, which is valid until 2017. Moreover, besides the two external audits, The Unit was externally audited by other institutions and collaborators. The table below gives a comprehensive list of all external audits that took place in 2015.

Standard Audited	Auditor/Assessor	Dates
ISO 15189	KENAS	14-17 April
ISO 15189	EDCTP	27-28 April
GCLP	GSK	12-15 May
GCLP	Qualogy	18-22 May

The Quality Department is proud to state that we have had successful outcomes with each visit.

OUR RESEARCH PUBLICATIONS

In terms of scientific publications, an analysis of the trends over the past 10 years showed a decrease during the period 2007-2010, with only 66 publications in 2009-2010 period. When a major restructuring in the MRCG occurred, 157 were produced in 2014-2015, the highest in the last 10 years. The average impact factor in 2013-2014 was 5.58 and 6.17 in 2014-2015. A large proportion of publications had a first and/or last author from MRCG.

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MRC Unit The Gambia
Atlantic Road, Fajara
P. O. Box 273 Banjul
The Gambia

Communications
T: 4495 442 Ext. 2306
E: communications@mrc.gm

