

MRC UNIT, THE GAMBIA

ANNUAL REPORT 2013



Leading scientific research to save lives and improve health across the developing world

MRC | The
Gambia
Unit

Foreword from the Unit Director

As the Unit enters the final phase of the current 'business' cycle, I am happy to report that we met our external funding target for the financial year 2013/14. Nevertheless, we should not relax as the pressure to attract external funds remains: we need to continue to work and become even more competitive than we are now.

The Unit is working towards increasing its visibility regionally and internationally. Many of our researchers have strong links with 'Western' and African institutions; I come from the Institute of Tropical Medicine in Antwerp, for example. We look forward to increasing, enriching and expanding these relationships and welcome opportunities for new research synergies.



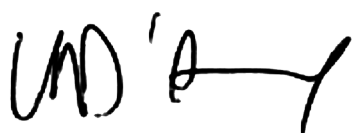
Ultimately, we want to provide the necessary elements to policy makers for better health interventions able to change the lives of millions of Africans

2014 promises to be exciting and busy. We commenced the review of our research early in the year, and this will provide the foundation upon which we will build our Quinquennial plan to be submitted by the end of June. This is an essential step towards ensuring that the Unit will continue to carry out excellent research in the period 2015-2020. Therefore, it is extremely important to have a scientifically credible plan. We will continue to support our areas of strength, including TB; vaccine research; malaria and hepatitis B, but we will also be open to new challenges such as neglected diseases and the impact of demographic transition/the emergence of non-communicable diseases. In addition, I would like to have more multidisciplinary research in which lab-based sciences work in parallel with field-based research, social sciences and health system research. Ultimately, with our research we want to provide the necessary elements to policy makers for better health interventions able to change the lives of millions of Africans.

I have a long and happy association with the MRC Gambia Unit as I started my research career here as a PhD student in the 1990s. Three years ago I returned to the Unit to set up the Disease Control & Elimination Theme, which is now thriving and well established. The Gambia Unit has been an integral and important part of my past and I am grateful to all people that helped me during my first steps into research and provided mentorship throughout my scientific career. I am also grateful to all staff that contributed and are contributing to my past and current projects. Without their efforts and commitment, we would not have been able to achieve so much.

I am looking forward to leading this great and respected institution into the bright future it deserves.

Professor Umberto D'Alessandro MD PhD
Unit Director

A handwritten signature in black ink, appearing to read 'Umberto D'Alessandro'.

...And a retrospective from the former Unit Director

December 2013 marked the end of my 10-year tenure as Unit Director, and closed the 30 year chapter of my career with MRC Unit, The Gambia. It was an exciting year both personally and for the Unit. We joined the Medical Research Council in celebrating its centenary, and we were delighted to host Mr Donald Brydon CBE (Chairman of the Medical Research Council) and Professor Sir Keith Peters (an advisor to the new Francis Crick Institute, London) who graced our centenary celebrations in November. Activities included a schools open day and a panel discussion 'Ask the Experts' that was open to the public.

There were many important developments in 2013, including the award of over £1 million by the Medical



I look forward to the development of tomorrow's scientists and the continuation of excellent research at the Unit.

Research Foundation for full time undergraduate scholarships. A new joint initiative of MRC and LSHTM saw the inauguration of the West African Fellowship Scheme, which seeks to strengthen the postdoctoral training pipeline.

We welcomed a number of other distinguished visitors from research institutions in 2013, including the Director of the Institute of Tropical Medical (Antwerp), Professor Bruno Gryseels and Dr Kara Hanson (LSHTM) who gave talks at our research retreat in February. A special finale to the retreat was the announcement of the results of a students' poster competition, judged by the Unit's Scientific Advisory Board, showcasing the outstanding talent of our MSc, PhD and postdocs. MRC people were also honoured in November at a Director's Award ceremony, celebrating excellence in team building, researcher potential, science support, leadership and networking.

The current Business Plan cycle (2010-2014/15) is entering its final phase and the new Director is busy planning the Unit's scientific future. The last few years have seen the successful migration from an MRC-core funded programme model to the re-organisation of externally funded research under the 3 Themes, and the future looks very promising.

I am delighted to say that I have not left the MRC entirely: from 1st January 2014, I took up the new role of Director – Africa Research Development. Based in The Gambia, I will be working with international research institutions and funders, and I look forward to contributing towards the development of tomorrow's African scientists and the continuation of excellent science.

Professor Tumani Corrah CBE
Emeritus Director

A handwritten signature in black ink, appearing to be 'T. Corrah', written in a cursive style.



Centenary celebrations at MRC Fajara: from left – Donald Brydon at schools open day; MRC Basse drama using novel ways to communicate science; students touring the compound

Progress against our strategic objectives

Enhancing the quality of our science

the three Theme leaders have secured a complementary portfolio of competitive MRC and external grants, meeting funding targets for £6 million in 2012/13 and 8 million in 2013/14

Influencing and leading global networks

the three Theme leaders have secured a complementary portfolio of competitive MRC and external grants, meeting funding targets for £6 million in 2012/13 and 8 million in 2013/14

Getting research into practice

In 2013, two new vaccines were introduced into the Gambia's Expanded Programme on Immunisation. MVP and Rotavirus

Building capacity and developing staff

the three Theme leaders have secured a complementary portfolio of competitive MRC and external grants, meeting funding targets for £6 million in 2012/13 and 8 million in 2013/14

NEW GRANTS 2013

PRINOGAM	Umberto d'Alessandro	MRC	Disease Control & Elimination	21 months	1,150,268
IPV Clinical Trials - Gambia	Beate Kampmann	BMGF	Vaccinology	23 months	1,999,619
INTERUPTB	Martin Antonio	ERC/ Prins Leopold Instituut Voor Tropische Geneeskunde	Vaccinology	5 years	120,998
MenAfriCAR	Martin Antonio	BMGF/ LSHTM	Vaccinology	11 months	98,211
Building Capacity in Bioethics in The Gambia: A Multi-stakeholder Collaborative Approach Model	Jenny Mueller	UNESCO	Other	10 months	10,811
MVVC2	Dr Muhammed Afolabi	EDCTP/ European Vaccine Initiative	Vaccinology	1 year	184,000
GC6 2013	Jayne Sutherland	BMGF/ The University of Cape Town	Vaccinology	29 months	182,277
Plasmodium falciparum drug resistance in The Gambia: identification of potential markers by retrospective genomics approaches	Alfred Ngwa	MRC	Disease Control & Elimination	4 years	617,823
Genotypic variation of Cross border and isolated Plasmodium falciparum isolates in West Africa	Alfred Ngwa	MRC	Disease Control & Elimination	1 year	20,000
FIND Project	Jayne Sutherland	WHO FIND	Vaccinology	1 year	16,500
Evolution of human helminths under polyparasitism & integrated control	Florian Gehre	Royal Society / Imperial College London	Vaccinology	1 year	6,300
The ontogeny of innate immunity in Gambian infants	Anna Battersby	Wellcome Trust/ Imperial College London	Vaccinology	23 months	79,562
Programme Grant	Beate Kampmann	MRC	Vaccinology	5 years	2,000,000
Development and Proof of principle Oxygen Modular system	Stephen Howie	MRC	Child Survival	2.5 years	550,602
MRC-LSHTM West African Research Fellows	Tumani Corrah	MRC	West Africa	5 years	999,352
TB Global Fund Phase II	Adetifa Ifedayo	Global Fund	Disease Control & Elimination	32 months	560,112
Sigma Tau Clinical Trial					

DISEASE CONTROL & ELIMINATION THEME

Professor Umberto D'Alessandro



The Theme's scientific strategy is to carry out cutting edge, multidisciplinary research on:

- Host pathogen/parasite vector interactions
- Evaluation of interventions/treatments

The Theme continues to focus on epidemiological research with a strong laboratory component, and encompasses a wide portfolio of diseases of public health importance.

In 2013, the Disease Control & Elimination Theme (DCE) secured two externally funded project grants:

- An MRC Career Development Award for Dr Alfred Ngwa Amambua: "Plasmodium falciparum anti-malarial drug resistance in The Gambia: Identification of potential genetic markers by retrospective whole genome approaches".
- Multicentre trial: "A phase II, open-label, multicentre, pharmacokinetic, pharmacodynamics and safety study of a new paediatric eartesim dispersible formulation and crushed film coated eartesimtablet, in infant patients with Plasmodium falciparum malaria", sponsored by the pharmaceutical company Sigma Tau (Italy).

On-going work

Malaria

MRC Programme Grant: In 2013, the 5-year programme funded by the Medical Research Council on malaria transmission dynamics in The Gambia (led by Professor Umberto D'Alessandro) completed its second year of activities which consisted of carrying out monthly bleeding on all residents in 12 villages (6 pairs in which villages have opposite transmission profiles).

Entomological data collections have been carried out in parallel and the social science component of the programme looked at human population movements between villages.

MMV study: The analysis of biological samples collected within the multicentre (Benin, Guinea Conakry and The Gambia) project on the burden of malaria in infants under 6 months and funded by Medicine for Malaria Venture has been completed and data are currently being analysed.

PRINOGAM study: (Primaquine's gametocytocidal efficacy in malaria asymptomatic carriers treated with dihydroartemisinin-piperaquine), funded by the Global Health Trial Scheme, started recruitment in Jahaly and Basse and will continue until the end of 2015.

The **COSMIC study** (Community-based scheduled

screening and treatment of malaria in pregnancy for improved maternal and infant health: a cluster-randomized trial), funded by the European Union, is a multicentre trial (The Gambia, Burkina Faso and Benin) aimed at bringing health services close to where women live, using village health workers to provide an antimalarial intervention to women with difficult access to the formal health system. The field work in The Gambia began in Basse in November 2013. The project is also being carried out by a multidisciplinary consortium of scientists and experts with different backgrounds in bio-medical research, health systems research, socio-economic and anthropological studies. These partners are The Royal Tropical Institute, Amsterdam, The Netherlands; The Medical Research Council Unit, The Gambia; Centre Muraz, Burkina Faso; The Centre de Recherche Entomologique de Cotonou (CREC), Benin; The Institute of Tropical Medicine in Antwerp, Belgium; Imperial College London, UK; and TDR, the Special Programme for Research and Training in Tropical Diseases, WHO.

The Disease Control & Elimination Theme also continued to provide expertise to – and collaborate with – the **National Malaria Control Programme (NMCP)** of The Gambia. Collaborations included an efficacy of the first line antimalarial treatment in The Gambia and a health facilities survey.

Tuberculosis

The **nationwide TB prevalence survey** funded by the UN Global Fund against AIDS, TB and Malaria (GFATM) has been completed, while the cluster randomized trial of the impact of an enhanced case finding is on-going.

On-going work

Hepatitis B

The **Gambia Hepatitis Intervention Study (GHIS)** was established in 1986 as a joint programme between the International Agency for Research on Cancer, the Government of The Gambia and the Medical Research Council (UK). The main goal is to evaluate the protective effectiveness of infant hepatitis B immunisation in preventing chronic liver disease, specifically, primary liver cell carcinoma and cirrhosis, in a high-risk population. Intensive surveillance for hepatocellular carcinoma (HCC) continues at population level with outreach clinics being held regularly at the MRC and health facilities around the country. Sufficient numbers of cases have now been confirmed to allow the link between detected HCC cases and the original GHIS vaccination database. This work is on-going and is supported by Professor Andy Hall, now a visiting senior scientist at IARC.

The **PROLIFICA project** (Prevention of liver fibrosis and cancer in Africa), funded by the European Union (FP7), is currently on-going. The HBV screening and treatment (WATCH) programme continues with a cohort of over 1,150 participants, over 850 of whom are HBsAg-positive. 73 are on oral Tenofovir treatment with over 100 patients still to be clinically assessed to determine whether they need treatment or not. The hepatocellular case-control programme (HC4) has recruited over 240 patients so far and is on-going. The effect of oral Tenofovir on bone health (PROBONE) in HBV infected individuals has started recruitment in Keneba. The acquisition of a bone densitometry scanner in Fajara will boost the numbers that are recruited into this sub-study.

The prevalence of hepatitis E (HEV) in our PROLIFICA cohort is being studied by our virologist, Dr Harr Njai, in collaboration with colleagues from Japan.

Bacterial infections

The **PregnAnZI** (Prevention of bacterial infections in the new-borns by pre-delivery administration of azithromycin trial) aims at determining the efficacy

of azithromycin given to pregnant women in labour in preventing bacterial carriage in the early neonatal period. By the end of 2013, 75% of study participants had been recruited and more than half of the biological samples processed.

Trachoma

The Trachoma Research Group, working in collaboration with the London School of Hygiene and Tropical Medicine and The Gambia's National Eye Health Programme, carried out the last of three rolling surveys designed to determine the prevalence of active trachoma and trichiasis across The Gambia. The results of these surveys have been shared with the Ministry of Health and Social Welfare and SightSavers

International and together partners have developed an action plan that will see The Gambia apply to be recognised, by the World Health Organization, as having eliminated trachoma as a public health concern.

The group also began a pilot study to field-test serology assays as potential tools for use trachoma elimination programmes.

Training

PhD Studentship

Dr Muhammed Afolabi	Is currently doing PhD, sponsored by MVVC consortium and funded by EDCTP [Vaccinology]
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MSc Studentships

Ya Jankey Jagne	Has completed an MSc in Immunology (London School of Hygiene & Tropical Medicine), sponsored by MVVC consortium and funded by EDCTP [Vaccinology Theme]
Ismaela Abubakar	Completed MSc project in data management, sponsored by GMZ2 malaria vaccine trial consortium and funded by EDCTP [Data Management]
Mamkumba Sanneh	Is currently doing an MSc in Project Management funded by the Malaria in Pregnancy Consortium [HR Department]

Collaboration with the other Research Themes

The Disease Control & Elimination Theme provides statistical and epidemiological expertise to the other two research Themes (Child Survival and Vaccinology) and manages the demographic surveillance systems established at Farafenni (about 45,000 people) and the south bank of the Upper River Region (about

CHILD SURVIVAL THEME

Dr Stephen Howie



Our vision is to reduce child mortality by targeting the leading causes of death using our core strengths in epidemiology and clinical paediatrics with a strong field and clinic infrastructure firmly linked to the laboratory. Our top **targets** are serious infections in children - pneumonia, diarrhoea, meningitis and sepsis. Our aim is understanding that leads to intervention, specifically by undertaking studies of: vaccine effectiveness; etiology, diagnosis and determinants of severe childhood infection; , and treatment.

We are delighted to have recently added Dr Akram Zaman of LSHTM to our team, which will strengthen our clinical epidemiological research and grant capacity.

On-going work

PERCH

Pneumonia remains the leading cause of death in children globally and a better understanding of its evolving aetiology is crucial to its control. The Pneumonia Etiology Research for Child Health (PERCH) project coordinated through Johns Hopkins

University is a large 7-country \$40m Bill & Melinda Gates Foundation-funded study targeting this need. The Gambia site, led by Dr Stephen Howie, and the project as a whole, had a highly successful year and we look with anticipation towards the analysis phase in 2014 /15.

GEMS

The Global Enteric Multicentre Study (GEMS) has provided us with the fullest picture yet of the causes and impact of moderate-to-severe diarrhoea. GEMS is a multi-country Bill & Melinda Gates Foundation-funded project coordinated through the University of Maryland and led at the Gambia

site by Dr Jahangir Hossain. In 2013 GEMS results published in The Lancet showed that Interventions targeting five pathogens (rotavirus, Shigella, ST-ETEC, Cryptosporidium, typical enteropathogenic E coli) can substantially reduce the burden of moderate-to-severe diarrhea, the second largest killer of children globally. We look forward to building further on this work in The Gambia.

PSP

Following in the tradition of the seminal Hib vaccine work of which the Unit, the \$6.9 million Bill & Melinda Gates Foundation-funded Pneumococcal Surveillance Project (PSP) led by Dr Grant Mackenzie continued its important work measuring PCV effectiveness. Vaccine effectiveness work from The Gambia has

been influential in global vaccine policy and there was intense interest from the global pneumococcal in key interim data presented at the recent ISPPD Conference in Hyderabad. Important data concerning Hib disease have also contributed to the Hib vaccine policy discussions of the WHO's Strategic Advisory Group of Experts (SAGE).

Teknon02

Oxygen is a key treatment for the prevention of death in children with severe pneumonia but developing countries struggle to provide it to these children. The Novel Oxygen Solutions Project (Teknon02), funded by the Medical Research Council's Developmental

Pathway Funding Scheme, commenced in 2013 and is led by Dr Stephen Howie. The project builds on the work of the Unit in this area in recent years and aims to develop and field-test robust oxygen delivery systems for developing countries. In this way we hope to contribute to filling a crucial gap in the child survival armamentarium.

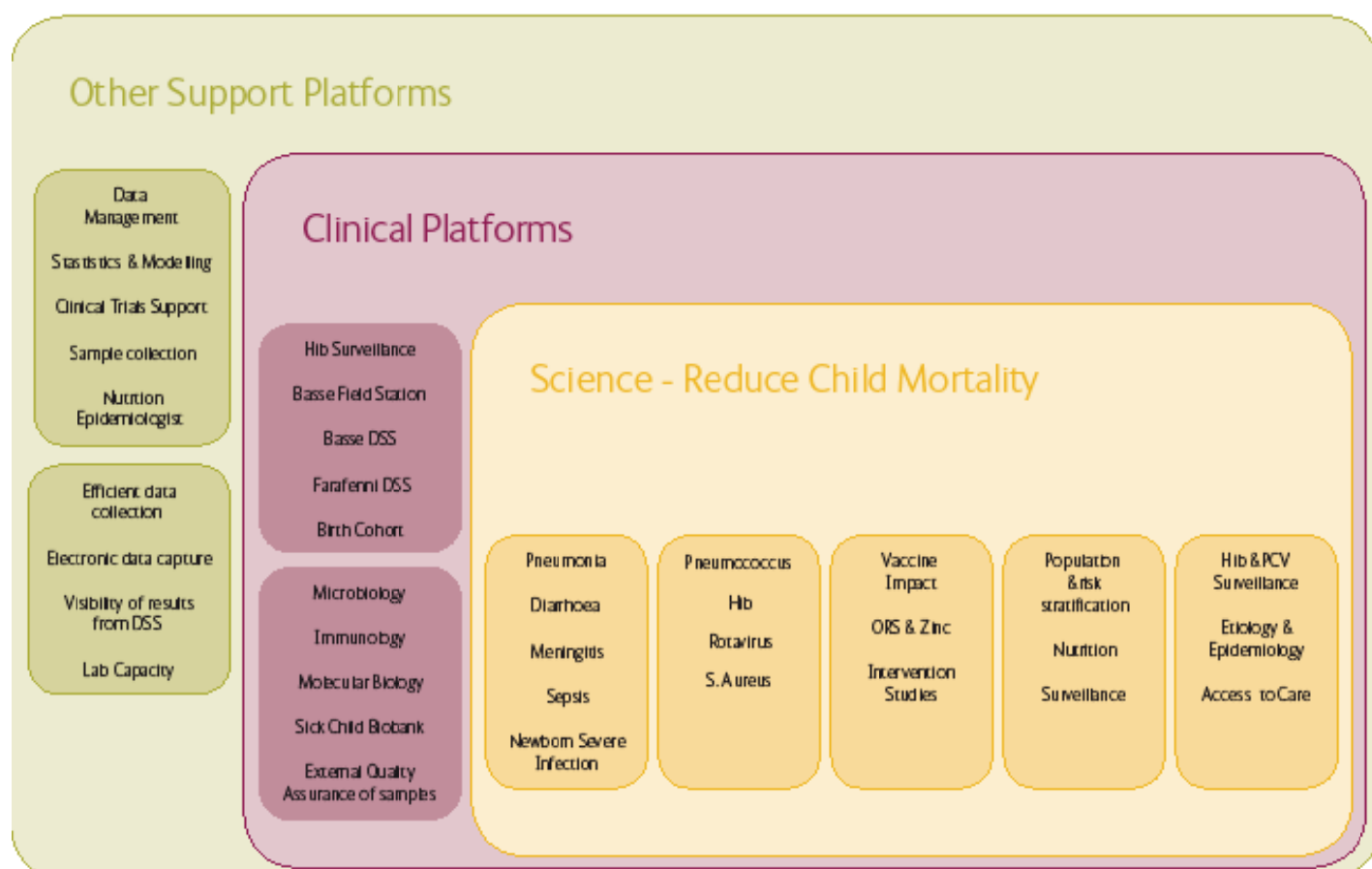
On-going work

EUCLIDS

The EUCLIDS study, an EU-funded multi-country study coordinated through Imperial College London and led in The Gambia by Drs Kalifa Bojang and Suzanne Anderson, is looking at the genetic basis of meningococcal and other life-threatening bacterial infections of childhood. The study has been actively engaged at various hospitals including the MRC

and EFSTH wards and is progressing well with recruitment.

The progress of 2013 has been made possible because of the dedicated staff we have at the bench, field and bedside, the partnership we have with the Unit's other themes, and the underpinning of the Unit's research platforms and support services.



Training

Uduak Okomo	MRC PhD Studentship in newborn sepsis (ongoing)
James Jafali	partners with Statistics Department in the Darwin Edinburgh MRC Gambia Studentship to study transcriptomic expression in serious childhood infections- awarded 2013
Anne Rerimoi	in partnership with Demography Department - MRC Studentship (Anne Rerimoi) to study demographic aspects of newborn mortality- awarded 2013
Teresa Litchfield	PhD through LSHTM to study the effect of stove and cooking fuel intervention on exposure to indoor air pollution

VACCINOLOGY THEME

Professor Beate Kampmann



In 2013, the Vaccinology Theme attracted external funding of more than £3 million and continued to follow its vision to conduct research from bench to bedside and back to the lab, across its 3 main areas of strategic investment and in collaboration with the other 2 Themes.

On-going work

Tuberculosis: creating an integrated toolbox

Professor Kampmann's MRC programme grant kicked off in 2013 and provides the support for the Theme's childhood tuberculosis research programme, initially funded by a StopTB partnership Wave 2 grant in 2012.

The childhood TB programme is now firmly embedded in the TB Case Contact platform (TB-CC), an integrated platform for adults and children with TB that remains an internationally recognised resource for in-depth and state-of-the-art studies of TB epidemiology, diagnostics and markers of protective immunity. The platform has further strengthened its connections with the National Leprosy & Tuberculosis Programme (NLTBP) in The Gambia and has added an important training element for community workers in TB.

Further international collaborations have been formed, including evaluating novel diagnostics with FIND and implementing the GeneXpert; MRC is the only facility in West Africa currently equipped with this new technology.

The Vaccinology Theme continues to conduct basic science research in TB with a particular focus on the differences between *M. africanum* and *M. tuberculosis* and evaluation of promising diagnostic host biomarkers from a variety of specimens. It now has a unique set up to conduct research linking TB epidemiology with host and pathogen.

In October 2013, Dr Jayne Sutherland was appointed as the permanent Head to lead activities within the TB-CC.



On-going work

Infant Immunology: Combining basic science research with Clinical Vaccine Trials

2013 was a busy year for the Infant Immunology Platform, led by Dr Ed Clarke, as 2 major clinical trials kicked off: over less than 6 months 1300 children have now been enrolled in a clinical trial assessing the use of inactivated polio vaccine in the context of the existing EPI programme for 9-month olds, including randomisation to a number of needle-less devices. In addition to Sukuta and Faji Kunda, a third trial site was set up at the Jammeh Foundation Hospital for Peace with a purpose-built clinic. The data from this BMGF-funded trial will directly influence the WHO Strategic Advisory Group of Experts (SAGE) committee decision process on the endgame strategies for polio eradication. (stick pics form polio in here)

Multi-Vial Trial: The Pfizer-sponsored clinical trial evaluating the multi-vial preparation of PCV13 versus the currently used single vial preparation was also initiated, led by Dr Anna Roca and Dr Olubukola Idoko. If equivalence of the preparations can be shown, this trial will lead to licensure of the preparation, with GAVI endorsement.

The Infant Immunology platform at Sukuta remains a major resource not just for clinical trials, but also for a number of our PhD and MSc projects focusing on mechanisms of immune and vaccine responses in infants to a variety of antigens.

We are delighted that 2 new vaccines (rotavirus and MenAfriVac) were introduced into the Gambian EPI schedule in 2013, endorsed by the results from important studies conducted at the MRC Unit (GEMS, Meningitis Vaccine Project).

Molecular Diagnostics

Under Dr Martin Antonio's leadership, important capacity-building projects within our regional networks and analysis of samples for prestigious international studies such as PERCH have continued very successfully and an upgraded molecular facility is now completed. An NIH-funded neonatal microbiome project led by Dr Brenda Kwambana is nearing completion in Sibanor and set up further integrated

work between molecular microbiology and infant immunology.

Training

The Theme has a monthly cross-cutting scientific meeting where data from ongoing work are presented by staff in all areas of Vaccinology.

PhD students from Imperial College have also recently joined the group on site and the weekly Kampmann lab meetings between the Imperial and the MRC labs are attended by all post docs and trainees, independent of location, using web-based technology.

The Vaccinology Theme currently sponsors, mentors and supports a number of PhD students and several MSc students.

Current PhDs

Jorjoh Ndure	
Fatou Noho-Konteh	
Dr Muhammed Afolabi	
Dr Toyin Togun	
Saikou Y Bah	
Dr Uzochukwu Egere	
Usman Nurudeen Ikumapayi	

PARTNERSHIPS

Edward Francis Small Teaching Hospital Dr Kalifa Bojang



EFSTH is The Gambia's main tertiary care centre receiving patients from all over the country and provides a range of medical services on both an inpatient and outpatient basis. The paediatric unit has 93 beds and cots with bed occupancy commonly over 130% during the rainy season. The Paediatric Unit provides an opportunity to study both large numbers of patients with common diseases such as pneumonia, diarrhoea and uncomplicated malaria, and relatively uncommon conditions such as meningitis, neonatal sepsis and severe malaria.

EFSTH has worked very closely with the MRC unit since the latter was established in The Gambia 67 years ago. Three paediatricians (Drs Kalifa Bojang, Baderinwa Abatan and Fatou Secka) from the MRC work in the Department of Paediatrics. They are involved in research, teaching and clinical care.

Edward Francis Small Teaching Hospital (formerly Royal Victoria Teaching Hospital), Banjul

On-going MRC Research Projects based at EFSTM

EUCLIDS

The EU-funded childhood life threatening infectious diseases genetics study (EUCLIDS) project aims to identify genes controlling the susceptibility, severity and outcome of life-threatening infection, as well as to identify genes controlling the success or failure of immunisation. The project is based at the Paediatric Unit and the MRC Ward, Fajara.

Risk factors for malaria in pregnancy

In sub-Saharan Africa, malaria and hypertension are common diseases of pregnancy. They have pathophysiological similarities such as placental ischemia, endothelial dysfunction, and production of proinflammatory cytokines. This study investigates whether or not placental malarial infection is a risk factor for hypertensive disorders during pregnancy.

Haemophilus influenzae type b surveillance

The Paediatric Unit is one of the sites for surveillance of Haemophilus influenzae type b (Hib) disease. The project aims to assess the long-term effect of routine conjugate Hib vaccination in the Gambia.

Training

The Paediatric Department provides training for student nurses, medical students, house officers and postgraduate doctors. EFSTH is now a site for the primary exams for the Fellowship of West African College of Physicians.

The Paediatric Unit continued to attract medical students from Europe and West Africa for their electives. Twenty medical students from University of Swansea were hosted by the paediatric department.

A number of medical officers have attended GCP training at MRC

Capacity building

A 5-part haematology analyser has been installed in the SMAC laboratory

PARTNERSHIPS

West Africa Collaboration and HIV Research Dr Assan Jaye



The MRC West Africa Collaboration (WAC) initiative has made major progress in the last 3 years to reinforce sub-regional partnerships in research and building a strong network.

MRC initiated the strengthening of health research capacity at West Africa partner institutions from the beginning of the initiative and this was strongly supported by capacity development grants from the EDCTP for the creation of WANETAM (West Africa Nodes of Excellence); and from Canadian GHRI for the WAPHIR (West African Platform for HIV Intervention Research) network. Two WAPHIR annual retreats that involved partner institutions of MRC, Fajara, LBV, Senegal and INASA/BHP, Guinea Bissau have enabled the experiential development of work plans that address pre-defined gaps, coordination and synergy of capacity building activities within the funded programs and the building of intercommunication links.

Consolidating the network with collaborative research

The current research includes:

- > EDCTP funded senior fellowship project (Gambian and Senegalese) to jointly study functional characteristics of NK activated responses in HIV infected adults in Bissau and healthy infants in the Gambia respectively, who had received HIV vaccine candidates in two previous EDCTP phase I trials within the framework and platform of WAPHIR and WAC
- > MRC WAC platform-supported host genetic and epigenetic determinants that mediate outcomes in HIV-2 versus HIV-1; specifically examining the role of CCR5 methylation and genotype in HIV progression.
- > Development of a quantitative HIV-1 and HIV-2 real-time PCR for feasible use in the monitoring of HIV infection in the West Africa HIV platform
- > Epidemiological observation of morbidity, mortality and immune activation levels in infected treatment-naïve patients in West Africa
- > WAC supported externally funded/MRC thematic projects: 'A proof-of-concept Phase IIb clinical trial to evaluate the protective efficacy of a booster MVA85A vaccination administered to healthy, HIV-infected adults'; and the 'Prevention of liver fibrosis and cancer in Africa (PROLIFICA)' project.

Training

Activities included training in laboratory GCLP/GCP, clinical trial management, data management, TB, Malaria and HIV specific laboratory skills; laboratory equipment maintenance and engineering training; post-graduate training in epidemiology, basic science, clinical trial, biostatistics and data distribution and management; and development of inter communication tools.

Ancillary research support training such as project management, grant writing skills and English language for our Francophone and Lusophone partners were also carried out. The establishment of the WAPHIR SQL server with developed management tools and SOPs for the amalgamated HIV database and new Bio-bank with item tracking system at Laboratoire de Bacteriologie-Virologie in Dakar are evidence of system strengthening in the network. Through these programmes, the research network in the region has generated stakeholder awareness and engagement, and research skills to support joint research and clinical trials with MRC.

Capacity building: postgraduate training within the Network

Assan Diouf	(LBV/Fann, Senegal – PhD Epidemiology Montreal, 2012 'Mortality, morbidity and immune activation among HIV infected treatment naive people in West Africa
Alberta Davis	(MRC Unit, The Gambia): PhD Immunogenetics, Open University UK 2011 – 'Host genetic and epigenetic determinants that mediate differential outcomes in HIV 2 vs HIV 1
Aminatta Mboup	(LBV Senegal) – MSc Epidemiology at Emory – completed 2013. 'Prospective study of the incidence of HIV among registered female sex workers in Dakar (1992-2010)
Gilleh Thomas	(MRC Unit, The Gambia) – MSc Computer Science & Data Management, University of Hertfordshire UK (2013)
Siry Diop Dieye	(LBV, Senegal) – MSc Public Health and Epidemiology, University of Dakar, 2013
Ibrahim Pierre Ndiaye	(LBV) MSc Clinical Trials, LSHTM, 2013
Abdou Salam Mbengue	(LBV) Biostatistics and Epidemiology, Witswatersrand, South Africa, 2014
Delfim Mendes Vincente	(INASA, Guinea Bissau) – MSC Clinical Trials LSHTM, 2012

Trained personnel in 2010 - 2014

Hands-on-training and workshops	Number
Laboratory Skills (Diagnostics, Immunology & Molecular Biology)	60
Epidemiology of multi-drug resistant TB in West Africa	16
GCLP, GCP and Lab Quality Management; sample shipping	82
Bio-Bank Management	3
Biomedical Engineering & Equipment Maintenance	21
Data management	25
Project Management	27
English Language for French and Portuguese partners	39
Grant Writing course	28
TOTAL	301

EDCTP – funded Senior Fellowships – 2012-2014

Dr Moustapha Mbow (above) received the best Abstract Ward for the MRC NK Project at the African AIDS conference (ICASA 2013) in South Africa in October 2013. He is presented the award by the WHO Director for the regional Office in Africa (AFRO), Dr Luis Gomes Sambo.



Dr. Dr. Moustapha Mbow
MRC, The Gambia

Dr. Dr. Moustapha Mbow
LBV, Senegal

CLINICAL SERVICES DEPARTMENT

Dr Suzanne Anderson



Direct Clinical Care

Providing clinical support to MRC study participants is a key component of the work of the Clinical Services Department. 2013 was a particularly busy year and confirmed the skills and adaptability of our clinical team, strengthened by the appointment of Dr Ed Green, a consultant physician and infectious diseases specialist.

The Department provided clinical support for several different studies, all of which had large numbers of admissions to the ward. For the PROLIFICA study (Disease Control & Elimination Theme), we provided support for patients undergoing liver biopsy, while pain control and palliative care was required for many patients with end-stage liver disease. This has highlighted the need for improved access to opiate analgesics as well as better understanding and knowledge of palliative care among Gambian healthcare workers.

The neonatal vitamin A (MRC International Nutrition Group) and PregnanZI studies (DCE) both resulted in unprecedented numbers of sick neonates being admitted to the ward, presenting staff with new management challenges. While a prolonged diarrhoeal season resulted in many of the IPV trial recruits (Vaccinology) being admitted for treatment of severe dehydration.

Research within the CSD

One of the long-term aims of the CSD is to embed more research directly within the Department, with the added benefit of enabling nursing and medical staff to gain research skills and experience. Because of our adaptable and skilled workforce we are ideally placed to complete small, well-defined studies, especially where intensive patient management is required. In 2013 we began our first clinical

CLINICAL SERVICES DEPARTMENT

trial, in collaboration with the DCE Theme. The Malaria PK study is a multi-site trial evaluating a dispersible artemether combination tablet for infants with uncomplicated malaria. The Gambia Unit was the first site in Africa to obtain all regulatory approvals and the first site to start patient recruitment.

Further research into the causes of non-malarial febrile illnesses, using new molecular diagnostics, was completed within the EUCLIDS study with Dr Nathalie MacDermott, an Imperial College Global Health Fellow, with additional support from the Netherlands Public Health Unit.

Capacity Development

A key role of the Department is contributing to healthcare capacity development. One area of particular need is in the development of cardiology expertise to diagnose and manage the high numbers of Gambian children and teenagers with congenital and acquired heart disease. Together with Dr Kalifa Bojang (MRC and Edward Francis Small Teaching Hospital) and with generous support from the UK charity, Chain of Hope, we have successfully sent one young clinician from the EFSTH hospital for cardiology training in Aswan, Egypt; and in early 2014, Rahmatulai Maane, our junior MRC radiographer, will be travelling to the Aswan Heart Centre to learn cardiac echocardiography. In the near future we plan that these new skills will contribute to surveillance work on the prevalence of rheumatic heart disease within The Gambia.



LEARNING AND DEVELOPMENT

Dr Peter Dukes



People:
Developing elite capabilities through attracting and nurturing top talent

Pipeline:
Continuous professional development to meet Unit needs and KPIs

Partnerships:
Delivering new capabilities and partnerships to achieve excellence

Training and professional development are key to the Unit's effectiveness in delivering high quality research that has impact. In 2013, the Unit

- > Enabled XX staff to undertake formal training courses, wholly or partly funded by the Unit
- > These included XX new PhD studentship awards and XX new awards for Masters enrolments
- > Organised XX international capacity building workshops
- > Introduced new professional development programmes for early career researchers
- > Research managers and for field workers

Innovating learning

Skilled fieldworkers are crucial to the Unit's front-line operation and are highly "visible" to the communities on whom we depend. In 2013, Dr Ashwin Mehta undertook a pilot study with Mafugi Dibba at the MRC Unit to develop and implement "blended learning" (a mixture of online and offline teaching methods) for fieldworkers. The pilot, involving XX fieldworkers, showed that blended learning can achieve better learning outcomes for this group and more cheaply than our conventional, teacher-centred approach. The programme is likely to

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be extended and will be a valuable model for innovating learning at the Unit.

A new Head of Researcher Training and Development

Work with Unit staff in 2012 indicated a need to strengthen researchers' broader skills so that they are able to manage their research effectively to their own benefit and that of the Unit. While these are often called "transferable" or "generic" skills they have significant value for the Unit. As a result, the Director appointed Dr Peter Dukes to the role of Head of Researcher Training & Development. Peter joined the Unit on secondment from MRC Head Office in April 2013, where previously headed MRC's [Research Career Awards] group, responsible for MRC's investment in research fellows and studentships.

Attracting talented school-leavers to science

Concerned that the brightest of Gambian school-leavers were being attracted into careers in business and banking, with attractive training opportunities abroad, Professor Corrah established a programme in 2002 to draw Gambian talent into science – and into the Unit with funding from what has become the Medical Research Foundation (MRF). Abdul Khaliq Muhammed, the sixth of the seven MRF Scholars graduated in 2013, and brought back to the Unit much needed graduate skills in mathematics and statistics. The Director successfully persuaded the MRF generously to support a further ten BSc scholarships awards over the next five years, with opportunities for further advanced training at Masters level.

The Researcher Development Programme

The Unit appointed a team from the University of Manchester (UK) and Vitae to help develop and deliver a new programme of generic skills training for early career researchers. [The Manchester team draws on extensive local experience in staff and student development. Vitae, established by Research Councils UK to strengthen researcher development nationally in the UK, helps institutions implement policies and good practice, and individuals to reflect on and improve their own performance. Using the Vitae Researcher Development Framework, researchers at any level from PhD trainee to professor can assess their current skills and then identify, prioritise and review their development needs. Using their own RDF Planner, individuals track their progress towards their developmental goals.]

Together, we developed and launched the Unit's new Researcher Development in November 2013 (See Box). Following an open competition for places, we enrolled 25 PhD students and postdoctoral researchers for the 2013/14 session.

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Sharing learning resources

In January 2014, we launched a pilot blog, Learn & Develop (<http://learndevelop.mrc.gm>). The aim is to promote sharing of training resources and information. By early March 2014, Learn&Develop had published articles by eight different contributors, most of which had attracted readers' experiences, ideas and comments. We published the following resources, of value to a broad range of professional staff:

- > Social media and science communication, based on a Unit course delivered in November 2013 by Kath Nightingale, science writer at the MRC UK
- > Writing applications for a training opportunity, based on a course delivered by Peter Dukes in June 2006
- > Fearless presentations, to enable our scientists to present confidently and with impact.

We aim to develop the blog as a shared resource with the MRC/UVRI Uganda Research Unit on AIDS and in the longer term foster a larger, pan-African trainee community.

Building postdoctoral excellence

There are few opportunities for outstanding postdoctoral African scientists to develop their careers in Africa. So the award in 2013 of a highly competitive MRC Career Development Award Fellowship to Dr Alfred Amambua Ngwa was an important milestone both for Alfred and the Unit. This prestigious award enables Alfred to return to full-time research [on the challenges of drug resistance in malaria] after two years as the Manager of the Molecular Diagnostics Programme. "Establishing my new project is an education in itself," says Alfred. "My ambition is to ask the key research questions and then to deliver significant answers, using cutting-edge technologies in the hands of highly skilled and motivated African scientists."

Dr Brenda Kwambana was the first recipient of a new West African Global Health Research Fellowships (WAF). Three Fellowships have been created by the Unit jointly with the London School of Hygiene and Tropical Medicine (LSHTM) to enable outstanding early postdoctoral scientists to develop their research skills in West Africa – while further strengthening the close links that the two institutions already enjoy. Following a bid to MRC, the Council awarded Professors Tumani Corrah and Peter Piot (Director of the LSHTM) £1m to support the new programme. It will provide part funding for two West African and one EU Fellows

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The six components of the MRC Researcher Development Programme

1. **Reflective practice** Participants reflect on their researcher competencies. They are introduced to the Researcher Development Framework and use the RDF Planner to assess their own skills and needs. They identify and prioritise actions.
2. **Personal effectiveness** Maximising your strengths as a researcher, effective prioritisation, making time for your research and work-life balance, ways of working effectively with others and confident communication.
3. **Research excellence** Research strategy, grant writing, fellowship competitiveness, managing your research award, research integrity, publication and impact.
4. **Management and Leadership** Becoming a postdoctoral researcher, recruiting and managing a team, understanding management and leadership, the roles of supervisors, line-manager, directors, coaches and mentors.
5. **Career management** Making an impact, strategic academic career planning, networking and making informed career choices.
6. **Evaluation** This session provides trainees with an opportunity to reflect on their learning and to develop further their longer term professional development plan.

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Staff Trained in 2013

Name	University	Degree & Classification
Ismaela Abubakar	Sheffield Hallam University	MSc in IT Professional Databases, Merit
Ms Sarah Dufie Sarpong	University of Portsmouth	Master of Science in Occupational Health and Safety Management, Merit
Modupeh Betts	Kingston University	Bachelor of Science Honours in Biomedical Science, First Class
Adama L. Bojang	University of Manchester	Bachelor Of Science Honours in Biomedical Science, 2.1
Shola-Able Thomas	University of Manchester	Bachelor of Science Honours in Biomedical Science, 2.1
Ebrima Danso	Kingston University	Bachelor Of Science in Biomedical Science, 2.1
Abdul Khalie Muhammad	University of Reading	Bachelor of Science Honours in Mathematics and Statistics, Second Class, Division Two
Samuel Nyamweya	Open University	PhD
Ousman Secka	Open University	PhD Genotypes of Helicobacter pylori in Gambian Children and adults
Modupeh Betts	Kingston University	BSc Hons Biomedical Science, First Class
Ya Jankey Jagne	London School of Hygiene and Tropical Medicine	MSc in Immunology of Infectious Disease, Pass
Alieu Mendy	University of Salford	MSc in Molecular Parasitology & vector Biology, Distinction
Oumie Secka	University of Manchester	MSc in Immunology and Immunogenetics, Merit
Ebrima Bojang	St George's University of London	Foundation Degree in Science with Distinction in Biomedical Science
Abdoulie Drammeh	St George's University of London	Foundation Degree in Science with Distinction in Biomedical Science
Ndey Fatou Drammeh	St George's University of London	Foundation Degree in Science with Distinction in Biomedical Science
Abdoulie Kanteh	St George's University of London	Foundation Degree in Science with Distinction in Biomedical Science
Abigail Ayorinde	St George's University of London	Foundation Degree in Science with Merit in Biomedical Science

Introduction to Researcher Development Programme & Reflective Practice	Vitae	27 staff
Fieldworker Training, e-learning	Ashwin Mehta & Mafugi Dibba	274 staff
Introduction to Statistics & Stata II	Lindsay Kendall	68 Staff

Excludes staff whose training is in progress.

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Joan Vives Tomas,
Director of Operations



IT

2013, with the introduction of Oracle and Navision and the initiation of the virtualised MRC's servers at Fajara, Basse and Keneba, the Unit has a more robust management system in place. Experience has shown us that no IT solution is ever 'complete', but ultimately we hope that the new systems will support the production and delivery of our research more effectively and transparently.

People supporting science

Our experienced staff are the ones that really make the difference when managing research or providing research support. Key departments as Research Support office, Transport and Procurement have been reengineered to ensure a world class support to our research. Just as an example, all our Project Managers are now Prince 2 certified.

The Unit, in agreement with the MRC Workers' Union, has gone through an internal restructuring process. The changes have been required to bring the Unit's workforce into a modern pay and grading system, revised job descriptions with clear personal specifications, clear criteria on how posts are assessed and evaluated and respond to the external requirements of audit in reducing the number of allowances.

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Managing risk

In May 2013, MRC Unit, The Gambia won top prize with Cambridge Risk Solutions for 'Business continuity strategy through partnership' sponsored by London First. Both MRC entries were up against stiff opposition from multinational companies with multi-million pound business continuity management budgets, making these achievements all the more notable.

Improving facilities

The level of investment in Unit facilities has increased threefold from 2012. 2013 has seen the upgrade of our Himsworth Laboratory facilities and the introduction of a renewable energy system at the MRC Clinic.

Biomedical engineering

The Department provided service and training for Laboratories equipment in West African countries through service visit to different research centres in the region and hosting training in the Unit, MRC Unit the Gambia becoming a reference biomedical engineering training centre for the West African region.

After three years as Director of Operations at MRC Unit, The Gambia, Peter Noble left in October to take up a new role as the Chief Operating Officer for the Manchester Academic Health Science Centre (MAHSC) in the UK.

This year the Unit will exceed by more than £1.5m its external income target of £6m for 2013/14. The Unit also met its financial obligations in 2012/13 and is on track to achieve the year-end financial target for 2012/13.

External Funding

In three years MRC Unit The Gambia Operations departments had been able to manage with efficiency a 33% increase in the number of projects managed, a 46% increase in PI's attracting funds and nearly a 50% increase in attraction of funds.

Basse Field Station

In 2013, the Field Station strengthened its capacity to host more projects and meet the operational needs of our

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scientists and collaborators.

In April 2013, the Unit hosted its health and safety awareness celebrations in Basse field station. This underscored the commitment the Unit attaches to health and safety for all its employees across the Unit; and the strategic importance of the Basse Field station.

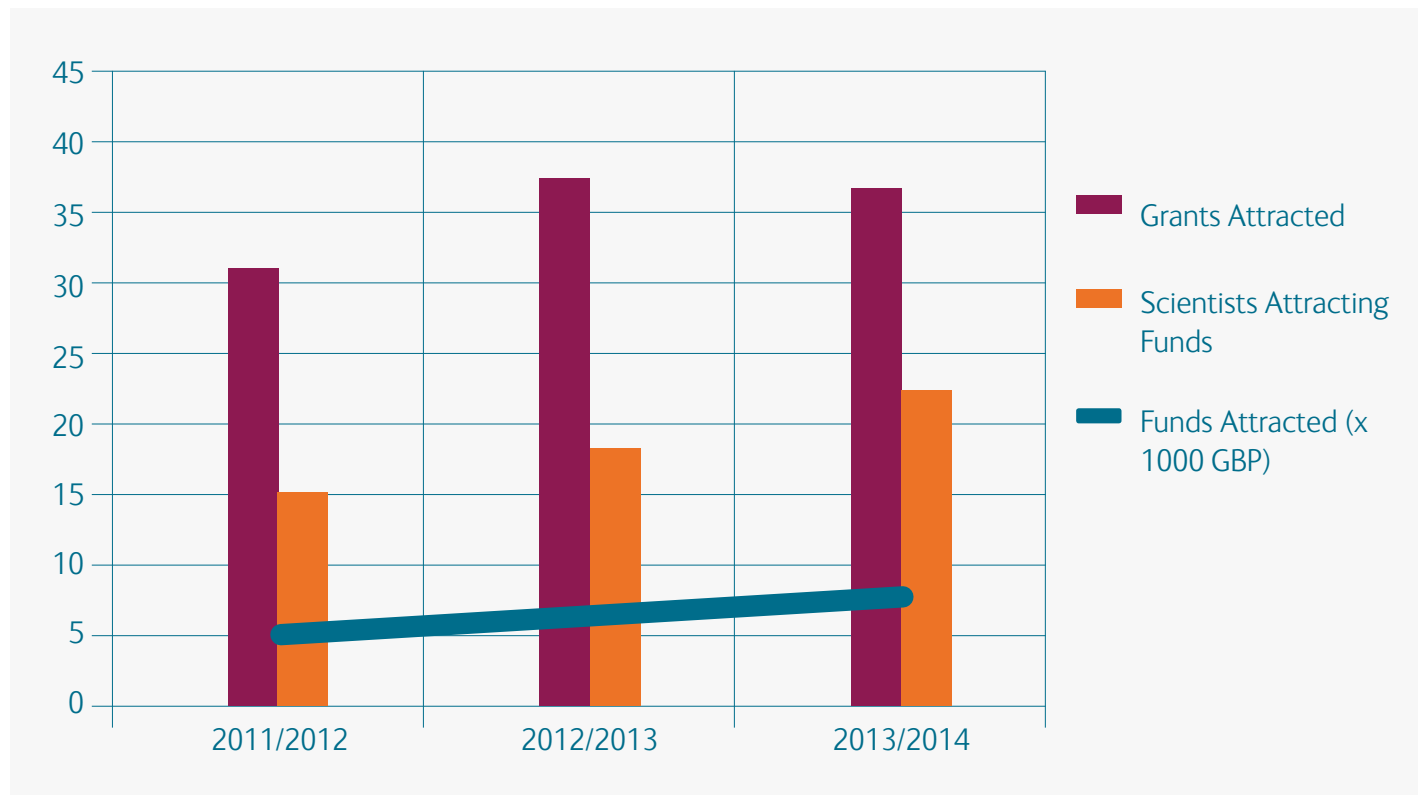
A new site was acquired last year and construction of 8 x 2 bedroom flats has as I write nearly finished. This will alleviate current accommodation problems and could serve as a flood response site.

An on-site general store has been constructed to help ensure proximity of consumables and supplies on demand for projects and the Platform.

There has been a major refurbishment of the Walikunda entomology field site. The site will be hosting the Prinogam and the MRC malaria programme grant projects for the next 3 years.



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UNIT PUBLICATIONS

Long-term morbidity from severe pneumonia in early childhood in The Gambia, West Africa: a follow-up study.

Puchalski Ritchie LM, Howie SR, Arenovich T, Cheung YB, Weber M, Moore S, Adegbola RA *Int J Tuberc Lung Dis* 01-Apr-09

Distinct roles for FOXP3 and FOXP3 CD4 T cells in regulating cellular immunity to uncomplicated and severe *Plasmodium falciparum* malaria.

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Five-year safety and immunogenicity of GlaxoSmithKline's candidate malaria vaccine RTS,S/AS02 following administration to semi-immune adult men living in a malaria-endemic region of The Gambia.

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Oxygen for treatment of severe pneumonia in The Gambia, West Africa: a situational analysis.

Hill SE, Njie O, Sanneh M, Jallow M, Peel D, Njie M, Weber M, Hill PC, Adegbola RA, Howie SR *Int J Tuberc Lung Dis* 01-May-09

Presence of a Multidrug-Resistance Mutation in an HIV-2 Variant Infecting a Treatment-Naive Individual in Caio, Guinea Bissau.

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Prospective identification of malaria parasite genes under balancing selection.

Tetteh KK, Stewart LB, Ochola LI, Amambua-Ngwa A, Thomas AW, Marsh K, Weedall GD, Conway DJ *PLoS One* 15-May-09

Genome-wide and fine-resolution association analysis of malaria in West Africa.

Jallow M, Teo YY, Small KS, Rockett KA, Deloukas P, Clark TG, Kivinen K, Bojang KA, Conway DJ, Pinder M, Sirugo G, Sisay-Joof F, Usen S, Auburn S, Bumpstead SJ, Campino S, Coffey A, Dunham A, Fry AE, Green A, Gwilliam R, Hunt SE, Inouye M, Jeffreys AE, Mendy A, Palotie A, Potter S, Ragoussis J, Rogers J, Rowlands K, Somaskantharajah E, Whittaker P, Widdens C, Donnelly P, Howie B, Marchini J, Morris A, Sanjoaquin M, Achidi EA, Agbenyega T, Allen A, Amodu O, Corran P, Djimde A, Dolo A, Doumbo OK, D *Nat Genet* 24-May-09

Quantitative detection of *Plasmodium falciparum* DNA in saliva, blood, and urine.

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Virological response to highly active antiretroviral therapy in patients infected with human immunodeficiency virus type 2 (HIV-2) and in patients dually infected with HIV-1 and HIV-2 in the Gambia and emergence of drug-resistant variants.

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Sex Differences in the Effect of Vaccines on the Risk of Hospitalization Due to Measles in Guinea-Bissau.

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