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LSTM
LIVERPOOL SCHOOL OF TROPICAL MEDICINE

Insecticide Testing Facility

2012-2013 issue

Viewpoint:

Professor Stephen Gordon
LSTM Chair in Respiratory Medicine

1. Lecturer, Researcher, Clinician, do these roles combine easily or sometimes clash?

These roles combine well in that enthusiasm for teaching and research is fired by clinical urgency – many people die daily of treatable and preventable disease. Nobel prizes are won by clinician scientists... but spanning disciplines has several costs. It's rare to be content with the amount of time available to any task and one must humbly acknowledge superior skill in each discipline found in those who have more focused lifestyles.

2. In what direction should teaching be heading?

As our research strives to make a difference, so should our teaching. We should generate an ambition, expectation and ability to make a difference in our students.

3. Has there been a defining moment of your career?

Many – but the wasted endeavour of nights spent in resuscitation attempts for 2 yr olds with HIV dying at birth weight in Zambia (1980s) convinced me that clinical care in the absence of teaching and research would not change anything...and was akin to bailing a sinking ship. I went home and aimed for research - a first Wellcome fellowship in Malawi came 3 yrs later. It doesn't get much better than taking a clinical question in to your own lab.

4. Can new technologies help to improve people's health?

Yes. They are essential. An example relevant to our pneumonia work was the invention of conjugate vaccines - making vaccines work in children under the age of two. Diagnostics have taken a leap forward in TB recently – we're working on something similar for pneumonia.

5. How did you find your recent television appearance?

Funny... and so did my family. Overall, the show conveyed the earnestness with which we all take the LSTM mission, albeit in a light-hearted manner.

6. Is there a particular country that you have a personal as well as professional connection to?

Ireland (land of birth), Kenya (childhood), England (wife, Uni, children), Uganda (first African job), Malawi (many years)....

7. Do you have any personal philosophies that help you through tough times?

My faith (Christian) is the "raison d'etre". It's useful to have some idea where the next laugh might come from too. Eating more helps if you are sleep deprived.

Contents

Improving Reproductive Health in Tanzania and Niger

Poor adolescent reproductive health (ARH) is a major cause of morbidity and worsening poverty in sub-Saharan Africa. The effectiveness of ARH programmes within the health and education sectors is seriously hampered by adverse cultural norms and practices within those sectors and the wider community and by poor programme integration.

Led by LSTM's Dr Angela Obasi, the Health, Education and Community Integration (IntHEC) consortium comprises Belgium's Catholic University of Louvain (UCL), Tanzania's National Institute for Medical Research (NIMR), Ministry of Health and Social Welfare (MoSHW) and Ministry of Education and Vocational Training (MoEVT), Niger's Laboratory of Study and Research for Social Dynamics and Development (LASDEL), Ministry of Public Health (MoPH), and the United Nations Population Fund (UNPFA).

Adverse cultural norms, including the prohibited use of contraception, limited access to education (including sexual education), access to work and a lack of decision making powers, can contribute to reduced take up of sexual and reproductive health services.

The major focus during the first phase of the project was the design, delivery and completion of the situation analysis. Qualitative research in health, education and community settings was conducted to determine the range, quality and integration of ARH promotion and treatment interventions currently being implemented in those sectors. A baseline household survey of nearly 14,000 respondents in Tanzania and Niger was conducted. Household survey data was collected onto hand-held PDAs to facilitate timely coverage of all study regions and allow quick analysis of data.

The results of the qualitative research contributed to the iterative process of intervention development, which collected data on preferred interventions from adolescents and service providers in Tanzania and Niger. In both countries interventions were reviewed through a process of stakeholder consultations. Prototype interventions are currently being pre-tested in formative wards, to prepare final iterations for implementation in the intervention wards.

The interventions are intended to increase the uptake of treatment for sexually transmitted infections, antenatal services and to improve acceptability and integration of reproductive health services. In addition to improvements in maternal morbidity and mortality and improvements in adolescent reproductive health, these interventions aim to contribute to improving gender relations in the workplace, equity of service provision and community attitudes to the rights of adolescents and young people. The project has been given a tremendous welcome by countries not only at macro level but also within communities, where it has stirred ARH discussions in connection with cultural and religious norms.

Pictured above: Mapping exercise for reproductive health consultation, Mwanza region, Tanzania © John Dusabe

Focus on: Ghana

The country today known as the Republic of Ghana, was formerly comprised of several distinct regions, which were brought together under British rule and named the British Gold Coast. During the Winter of 1899 LSTM's Second Malarial Expedition set out to the Gold Coast, the expedition included LSTM's lecturer on tropical diseases, Ronald Ross.

By 1901 the Governor of the British colony was concerned over the health of British colonial workers at the Cape Coast Castle. Between 1901-1902 two further expeditions led by Dr Taylor were conducted and helped improve the sanitation and health within the Castle. Today, the former seat of the colonial government of The British Gold Coast is a Museum to its colonial history.

During 1902-1903 there were outbreaks of Yellow Fever, which caused LSTM's scientists to return in 1904 and again in 1910 on Yellow Fever expeditions.

Formed from the merger of the British colony of the Gold Coast and the Togoland trust territory, Ghana in 1957 became the first sub-Saharan country in colonial Africa to gain its independence. It was around this time that LSTM shifted its focus from British national interests to concentrate more on the improving the health of people in the tropics.

Under the direction of LSTM Dean, Professor Brian Maegraith, Professor Herbert Gilles moved his attentions from Nigeria to Ghana in 1962, following a request from President Nkrumah for assistance in establishing a postgraduate centre in the capital Accra. Following a similar project in Nigeria, LSTM was seen as being largely independent of government control and therefore chosen to act in the best interests of the Ghanaian people. Doctors who returned from basic training overseas could now continue their training back in Ghana at a postgraduate level.

A study tour resulted in plans for a medical institution being drawn up with the National Research Council of Ghana. LSTM staff acted as consultants in the formation of the Institute for Tropical Medicine and helped in the recruitment of expatriate staff. To get things started LSTM waived the fees and trained three postgraduates and five technicians who returned to work at the Institute. For teaching, Professor Maegraith advised in the design of a suitable curriculum for postgraduate training in tropical medicine and hygiene with special reference to Ghana, even assisting in the writing of exam papers and acting as an external examiner. In particular the courses would prepare doctors who had trained elsewhere to work in rural areas.

Ghana has one of the fastest growing economies in the world. However many diseases continue to cause significant health problems to the population. LSTM continues to have a presence in the country, through multiple partnerships.

Diploma in Project Design and Management

The Diploma in Project Design and Management (DPDM) is awarded by LSTM and based entirely in Africa. The aim of the DPDM is to equip health professionals with research skills and to contribute to enhancing the research culture of their institutions. The DPDM started in Kumasi (Ghana's second largest city) eight years ago and is a joint initiative of LSTM, Komfo Anokye Teaching Hospital (Kumasi, Ghana) and the School of Medical Sciences at the Kwame Nkrumah University of Science and Technology (KNUST) (Kumasi, Ghana). The original DPDM faculty from Kumasi have now expanded the course to centres in Accra, Ghana and to Harare, Zimbabwe. This expansion has partly been facilitated by the T-REC programme, which is funded by the EU to develop research capacity within Africa's blood transfusion services. Programme Director Professor Imelda Bates says 'by creating a critical mass of individuals who understand how to do research, and supporting their institutions to commission and use the results of research, the DPDM is making a major contribution to institutions' capacity to find their own ways of solving problems and delivering better health care'.

Lymphatic Filariasis National Elimination Programme

LSTM's Centre for Neglected Tropical Diseases (CNTD) has been active in Ghana for ten years and the LF elimination programme there is at an advanced stage. CNTD manages a large UK Department for International Development (DFID) programme for LF treatment, as well as being the secretariat for the Global Alliance to Eliminate Lymphatic Filariasis (GAELF). The Global Programme to Eliminate Lymphatic Filariasis has a global reach delivering over two billion treatments. As well as implementation support, CNTD is also providing laboratory, infrastructure and research support, working in partnership with Noguchi Memorial Institute, a Ghana-based regional centre leading research in the verification of the interruption of transmission of LF.

Dr Nana-Kwadwo Biritwum, Ghana Programme Manager, said, "Support from LSTM's CNTD has put us in a position to now focus on the remaining critical parts of the LF picture, such as treating complex and populous urban centres. Having reached national coverage, we are now carrying out transmission assessment surveys and have stopped MDA in four districts. CNTD's support in capacity building and operational research has enabled us to move the programme into hopefully its final phase."

The Ghana NTD Programme has completed 10 rounds of mass drug administration, since its inception in 2000. Only possible through the support of LSTM's CNTD, DFID funding, GlaxoSmithKline drug donations and the vital support of the Ghanaian government. This support is now helping to improve urban treatment coverage in the Greater Accra region, which has Ghana's most populous LF endemic urban centres.

Capacity building and operational research have been key components of the programme that is able to complete mass drug administration in four districts of the country which marks the beginning of the programme's process to stop mass drug administration by carrying out transmission assessment surveys.

If the final phase is successful LF may be eliminated as a public health problem by the year 2015 in all 74 LF endemic districts of Ghana.

A·WOL
ANTI-WOLBACHIA CONSORTIUM

Onchocerciasis (river blindness) is caused by a large worm (known as Onchocerca volvulus) which is transmitted to humans via black flies which breed in rivers and streams. The flies cause, intense itching, dermatitis and depigmentation; this create conditions like lizard skin and leopard skin. If the larvae migrate to the eye their death results in inflammation leading ultimately to blindness. Lymphatic filariasis (elephantiasis) is caused by thread like nematode worms that live in the lymphatic vessels of humans. It is estimated that up to 120 million people in 83 countries worldwide are affected by some form of filariasis. People suffer from swollen legs due to old worms dying and causing blockages in the lymphatic system, and arms, breast tissue and groin areas can also become affected.

Led by LSTM's Professor Mark Taylor, A·WOL is an international consortium that is concerned with the discovery and development of drugs to target the *Wolbachia* bacterial symbionts of the nematodes that cause onchocerciasis and lymphatic filariasis. A·WOL began their third clinical trial to optimize antibiotic therapy against these diseases in the Denkyira and Adansi districts in 2012. The trials were conducted in collaboration with Professor Ohene Adjei and Dr. Alex Debrah (Kwame Nkrumah University of Science and Technology, Kumasi, Ghana) and Professor Achim Hoerauf (University of Bonn, Germany).

Further implementation trials are planned for 2013 in collaboration with Dr Nana-Kwadwo Biritwum (LSTM PhD student and Head of the Neglected Tropical Disease National Control Programme for Ghana) and Dr. Mike Osei-Atweneboana (Council for Scientific and Industrial Research, Ghana). Professor Taylor also acts as a mentor to Dr. Osei-Atweneboana, a recipient of an EU-NTD fellowship, to investigate genetic markers of resistance in onchocerciasis.

www.a-wol.net

Woman suffering from lymphatic filariasis

Mass Drug Administration in Tanzania

ReBUILD and PERFORM

ReBUILD: rebuilding health systems in post-conflict settings

Funded by the UK Department for International Development (DFID) the six-year research programme is looking at approaches to health systems development in countries that have suffered political and social conflict. Led by a team from LSTM, partner countries include Cambodia, Sierra Leone, Uganda and Zimbabwe.

ReBUILD recently completed their inception year and have now been selected to host a panel at the 2012 Global Health Systems Symposium in Beijing, China.

One aspect of ReBUILD is exploring new approaches to public health financing. Assessing the practicalities of Health Equity Funds in Cambodia, free healthcare for mothers and children in Sierra Leone, and in Zimbabwe and Uganda research is being conducted into the impact of user fees on the quality and accessibility of health services.

Human resources represent further problems for health systems in post-conflict countries. Staff performance and shortages are key issues, with low salaries, geographical distribution and payment mechanisms all factors influencing them. Differing incentive schemes for health workers from the study countries will be evaluated by the researchers. Successful innovations can help ensure that health systems are appropriately staffed to meet the needs of communities they serve.

Tim Martineau, ReBUILD's Co-Director for Research and Senior Lecturer in Human Resource Management at LSTM, said:

"The consortium will identify particular opportunities that arise during the recovery from conflict. Growing resources available to the health system as the economy recovers and aid flows increase can be targeted on reducing the direct financial burden on poor women and children, and health workforce development."

Professor McPake, Co-Director for Research at the Institute for International Health and Development at Queen Margaret University, Edinburgh, said: "There are particular opportunities in post-conflict fragile states for reshaping health systems to give poor people better access to services and reduce the burden of health expenditure."

Keen to ensure that their research has a tangible impact on health policy and practice, the ReBUILD teams have been actively engaging with stakeholders including government, donor organisations, academia, professional bodies and civil society.

A malaria patient and his mother, Gondama hospital in Bo, Sierra Leone. Courtesy of Panos Pictures

Their proactive approach has achieved early support of the project, reflected in the recent comments by Dr Robert Limlim, Director of the Technical Support Team to the Office of the Prime Minister in Northern Uganda. He said:

"All research needs a versatile arm for communication, so that your stakeholders eagerly anticipate your results. ReBUILD is finding dynamic ways of using information networks, supporting the Ministry of Health to deliver evidence based policy and significant improvements to health service delivery."

www.rebuildconsortium.com

PERFORM: strengthening the health workforce in Africa

Scaling-up health services to meet the Millennium Development Goals in Sub-Saharan Africa can only happen by addressing an under-staffed, poorly distributed and inadequately trained workforce.

Governments across sub-Saharan Africa are decentralising authority to lower levels, and in particular to districts, for the planning and management of health services. PERFORM is conducting research into how a management strengthening intervention can be used in a decentralised setting can be used to improve health workforce performance at district level.

PERFORM consortium is also led by Tim Martineau at LSTM. It began in 2011 and is funded by the EU until 2016. Consortium partners include the School of Public Health at the University of Ghana, the Institute of Development Studies at the University of Dar-es-salaam in Tanzania, Makerere School of Public Health in Uganda, the Swiss Tropical and Public Health Institute in Switzerland and the Nuffield Centre for International Health and Development at the University of Leeds.

The research will be conducted in Ghana, Tanzania and Uganda. Each of these countries faces major problems of inadequate health workforce. PERFORM will support health managers, using an action research approach, to carry out a situation analysis concerning the performance of health workers and to try out strategies for improving workforce performance.

"Improving the performance for existing health workers in Africa is critical to saving lives."

Dr. Sebastian Baine of Makerere School of Public Health is a keen advocate of PERFORM, he said: "It's an ambitious project that will lead to strengthening the performance of our current workforce and the wider health system". Dr. Patricia Akwengo of the University of Ghana echoes this view: "The human resource crisis in the Ghana Health Sector challenges our ability to meet the Millennium Development Goals relating to maternal, child health, Malaria, TB and HIV. The policy of increasing the numbers of health training schools is necessary but focusing on improving the performance of existing staff is critical for better health in Ghana." Dr. Sydney Ndeki, part of the PERFORM team in Tanzania, is confident that the research will "address local problems by innovating with human resource strategies to retain and develop health workers".

www.performconsortium.com

ReBUILD is funded by the UK Department for International Development

SEVENTH FRAMEWORK PROGRAMME

PERFORM is funded by the European Union

Coverage of malaria protection in preg sub-Saharan Africa

Insecticide-treated nets and intermittent preventive treatment with combination antimalarial sulfadoxine–pyrimethamine are recommended for the prevention of malaria during pregnancy in endemic areas in sub-Saharan Africa, but to date there has been no detailed analysis of coverage data at a sub-national level. Coverage data has been synthesised from national surveys for both interventions, accounting for disparities in malaria risk within national borders.

In 2007 the World Health Organisation's recommended intervention for malaria prevention and control during pregnancy in areas of stable malaria transmission in Africa was a package of intermittent preventive treatment and insecticide treated nets together with effective management of clinical malaria and anaemia, which is commonly delivered through collaborations between malaria and reproductive-health programmes.

Researchers from the Malaria in Pregnancy (MiP) Consortium, which is funded through a grant from the Bill and Melinda Gates Foundation to the Liverpool School of Tropical Medicine, in collaboration with the Malaria Atlas Project, funded mainly by the Wellcome Trust, UK synthesised coverage data from national surveys for intermittent preventive treatment and insecticide treated nets, accounting for disparities in malaria risk within national borders.

The MiP Consortium is a six year MiP programme of research that aims to directly benefit the 50 million women globally who face exposure to malaria whilst pregnant every year. Ten major projects direct research in four key areas of malaria in pregnancy: burden assessment, treatment, prevention and how best to scale up existing strategies and interventions

In 2010, MiP Consortium researchers extracted data on specific policies and strategies for malaria control in pregnant women from national malaria policies across endemic countries in Africa. The team identified the most recent national household cluster-sample surveys recording intermittent preventive treatment with sulfadoxine–pyrimethamine and use of insecticide-treated nets. Data was reconciled to sub-national administrative units to construct a model to estimate the number of pregnant women covered in 2007.

This data analysis indicated that 45 (96%) out of 47 countries surveyed had implemented a policy for distribution of insecticide-treated nets for pregnant women and the estimated coverage in 2007 was 4·7 million (17%) of 27·7 million pregnancies at risk of malaria in 32 countries where data was available. 39 (83%) of 47 countries surveyed had an intermittent preventive treatment policy; in 2007, an estimated 6·4 million (25%) of 25·6 million pregnant women received at least one dose of treatment and 19·8 million (77%) visited an antenatal clinic (31 countries). Estimated coverage was lowest in areas of high-intensity transmission of malaria. Despite success in a few countries, coverage of insecticide-treated nets and intermittent preventive treatment in pregnant African women is inadequate and increased efforts towards scale-up are urgently needed.

These findings highlight that there are missed opportunities when women attended clinics but were not given intermittent preventive treatment (or insecticide treated nets). Although distribution of insecticide-treated nets to pregnant women through antenatal clinics is an attractive option, acquisition often depends on the timing of the first antenatal visit, and might leave women unprotected in the susceptible first trimester.

Most countries in sub-Saharan Africa have adopted national policies aimed at reduction and control of malaria in pregnancy. The irregularity of routine survey data collection means that up-to-date information is scarce, but from the surveys included in this analysis, with some notable exceptions, data shows not enough progress has been made towards the new Roll Back Malaria (RBM) Initiative goals or the policy ambitions of each country. There will be difficulty in meeting the Millennium Development Goals (MDG's) by 2015 (specifically for malaria, goals 4, 5, and 6), with coverage rates of two key interventions falling short in most countries in sub-Saharan Africa to meet targets.

© Gates Foundation

gnant women in

Major obstacles to understanding and addressing the reasons for poor coverage include weak health systems, a lack of reasonably accurate monitoring data, and inadequate use of data for managing programmes at the local level. Innovative strategies are needed to identify, measure and address bottlenecks in delivery at the district level, in order to support programme managers maximise service delivery outputs with limited resources. This is the subject of a further sub-study funded by the Bill & Melinda Gates Foundation, being undertaken by MiP researchers entitled "The scale up of MiP interventions". The study aims to expedite the mapping of the current status of the delivery and uptake of malaria in pregnancy interventions in sub-Saharan Africa and what is known about the reasons for the disappointingly low intervention coverage levels.

The findings will be disseminated at an international meeting between the malaria and reproductive health communities in Istanbul in June 2012, with the aim of informing future investments in the scale-up of malaria in pregnancy interventions in order to achieve global RBM malarial targets and contribute to the MDGs.

www.mip-consortium.org

LSTM's first ever Student Led Humanit Health Studies Research Symposium

by Aimiee-Louise Laphan, MSc Humanitarian Studies Student, LSTM

In December 2011, LSTM held its first ever Humanitarian Health Studies Student Led Research Symposium. Organised by Karolina Griffiths, an MSc graduate in Humanitarian Studies at LSTM and included special guest speaker Professor Peter Winstanley, President of the Royal Society of Tropical Medicine. The interdisciplinary research symposium for original research relating to healthcare in humanitarian settings, featured a range of presentations, infused with the charm and talent of the presenters and student organisers. The following presentations, amongst many more by the Humanitarian Studies students, were well received.

The first session, *Women's Health* was chaired by Karolina Griffiths. Trent Corr showed the shockingly low levels of emergency obstetric care available in Nepal. As a male working in a female dominated area in a developing country he didn't have the easiest job but through building a good relationship with his female translator and a bit of charm and enthusiasm he managed to win them over.

Nina Castree discussed her research on psychosocial recovery for survivors of sexual and gender-based violence, in the Ituri district of the Democratic Republic of Congo. The audience was completely captured by Nina's presentation. Nina highlighted the shocking rates of gender based violence and also focused on the follow-up care. It certainly would not have been an easy task to build the level of trust that Nina gained from these women but without it she would have never heard their stories and been able to share the issue within the academic community.

LSTM Senior Research Assistant Esther Richards is part of ReBUILD, a major post-conflict health care initiative. Esther's focus was gender equity and health sector reform in Timor Leste. It is clear that a lot of passion and determination is going into the ReBUILD project. Esther expressed how, as a result of the research she would like to see more specific gender sensitive policy making in the future.

Improving Healthcare with UK Links was chaired by Dr Tim O'Dempsey, who introduced Chris Williams, an MSc student in Humanitarian studies and Liverpool medical student played a touching video and presentation on the Mulago maternity hospital in Uganda, part of the Liverpool-Mulago Partnership. He emphasised the importance of simple methods of observation in hospitals as a means of preventing complications and further illness. However the quality of medical equipment is poor and neither the human resources nor the time are available.

LSTM's Nyankunde room was filled with an air of enthusiasm and inspiration at lunchtime. Students, medics and academics gathered around the bright array of poster presentations on display. Each unique in their illustration of the issues facing the world today.

Professor of International Health at LSTM, Joseph Valdez, was the Chair of the third session on *Health in Resource Poor Settings*, starting with Natalie Thurtle from Medecin Sans Frontieres, who highlighted the problems of lead toxicity in children in northern Nigeria as a result of small-scale gold extraction. MSF have been cleaning the environment and also provide the DMSA chelation therapy

arian

programme used as an antidote to heavy metal toxicity in the children.

Liverpool medical student Joe Malone discussed sepsis in HIV positive children suffering acute malnutrition in Malawi. Joe outlined the problems of poor diagnostic testing and the difficulty in diagnosing sepsis in the malnourished.

Dr Sally Theobold from LSTM presented in her usual enthusiastic fashion on the gender dimensions of the ReBUILD project. Helen Barlay presented on Disability as a part of humanitarian relief work to start the fourth session on *Conflict and Disasters*, chaired by Professor Emeritus Barry Munslow. Helen is an LSTM student who travelled to Haiti after the 2010 earthquake. Her work focussed on how the badly dealt with issue of disability has now become a chronic problem, producing economic and psychosocial vulnerability of children.

David Lawrence from the University of Durham gave his mirthful and charismatic presentation which looked at a pragmatic solution to food security in Eastern Uganda, a region affected by famine and drought.

The extremely brave former LSTM student, Mary Curran, presented on her experiences working with the Non Governmental Organisation Merlin in Afghanistan on disasters in remote communities. Mary had the attention of everyone in the room as she described how she worked in such a fragile country. The content and eloquent delivery of her presentation did not go missed by the academics in the room and she was rightfully awarded the prize for Best Oral Presentation by Professor Winstanley.

The day was a great success and the attitudes and enthusiasm of students is truly inspirational to their peers. In recognition of the talent, Chris Williams, Helen Barley, Nina Castree and David Lawrence all received a commendation from Professor Winstanley. Heidi Jones received the prize for the best poster.

Furthermore, Karolina Griffiths, who masterminded and organised the event was awarded the Munslow Prize for Humanitarian Innovation.

Professor Winstanley closed the symposium with a reflection of the day. He expressed how gratifying it was to see a continuum of all the disciplines coming together from microbiologists to humanitarian aid workers, becoming more aware of each other's roles and contributing to global health and wellbeing. Along with many others who attended, he looks forward to next year's symposium.

Relief Camp, Islamabad, Pakistan. © 2005 Jacob Simkin, Courtesy of Photoshare

Insecticide Testing Facility

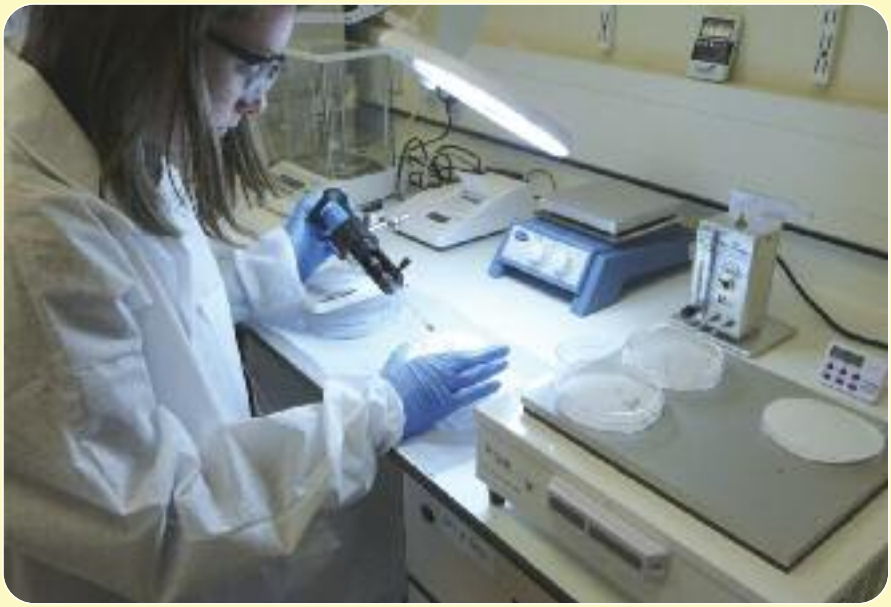
LSTM has established an Insecticide Testing Facility (ITF) dedicated to the testing of new insecticide based products against a wide range of mosquito populations. Mosquitoes transmit many human diseases, including malaria and dengue and new insecticides are urgently needed to help limit their spread. The facility was established by Professor Hilary Ranson in 2011 with funding from IVCC (Innovative Vector Control Consortium). The team is managed by Helen Williams and has four technicians Lori Flood, Rachel Piggott, Pauline Ambrose and Grace Matthews.

The ITF maintains a range of insecticide susceptible and resistant colonies of mosquitoes, many unique to LSTM. We offer a number of testing methods for insecticide efficacy testing including standard methods established by the World Health Organization or those especially developed to meet individual client needs, all performed to quality assurance standards by fully trained staff.

The ITF is housed in state of the art facilities including a suite of new insectaries and laboratories. In the future, the plan is to expand the number of colonies offered for testing through the addition of new strains of mosquitoes collected from the field. Insecticide resistance data is generated and is supported by rigorous quality control on the mosquito colonies. Resistant colonies are challenged with insecticide on a regular basis and the resistance profile of each colony is determined using seven different insecticides. A subset of mosquitoes are preserved for genotyping the quality control.

ITF works closely with the Vector Group at LSTM to further characterise the mechanisms responsible for insecticide resistance and to map the spread of this resistance throughout regions of the tropics, where mosquito borne diseases are endemic. Insecticide resistance is one of the biggest threats to malaria control and, by working with IVCC business partners, to discover novel insecticides, we are aiding in the battle to manage insecticide resistance and to counteract the spread of infection by insecticide resistant vectors.

The department provides clients with a highly professional and efficient service, and on completion of the study, the client is provided with data in the format of their choice, including a comprehensive written report, which details of all methods used and results obtained.



The current client base is international and includes:

- Akzo Nobel, China
- BASF Corporation, Germany and USA
- Bayer Cropscience, Germany
- DuPont Crop Protection, USA
- Syngenta Crop Protection, Switzerland
- Sumitomo Corporation, Japan

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The Anadkat-Wellcome Trust Adult Emergency Trauma Centre

LSTM and the Malawi-Liverpool Wellcome Trust Clinical Research Programme (MLW) have built a new Adult Emergency & Trauma Centre (AETC) funded by The Wellcome Trust (UK) and The Anadkat Family (Malawi). AETC opened in July/August 2011 in a refurbished wing of the Queen Elizabeth Central Hospital (QECH), Blantyre.

MLW, based within the grounds of the QECH, supports a large research effort to tackle the health problems in the region, which include malaria, HIV, TB, other serious bacterial and viral infections and non-communicable diseases.

QECH is the largest service and referral health facility in Malawi. The hospital also functions as the teaching hospital for medical students and a major centre for research. However, QECH until recently has lacked a critical component of health care service, an adult and emergency department.

For many years, the public have used a makeshift walk-in area with a few small rooms and a single emergency theatre to access emergency services. Medical attention has usually been in the form of clinical assistants each attending to over 700 patients a day in a very confined space. Without the necessary room for on-site care or emergency resuscitation, the conditions and lack of equipment have resulted in many deaths.

The old Trauma Wing was nothing more than a hot, low-walled space with a roof of corrugated zinc. It was always overcrowded, with no facilities for triaging the sickest people, non-existent privacy for patients and extremely limited scope for training.

In 2008 the Wellcome Trust decided to help modernize the QECH Adult Accident and Emergency Ward, committing £650,000 to the project. A second large donation was made by Malawi's Anadkat family. Hitesh Anadkat said "he was inspired to help by the realisation that his family would be helping thousands of people for many years to come".

Today a modern, purpose-designed Adult Emergency and Trauma Centre allows patients to be received in spacious, clean, well-equipped rooms, and rapidly assessed for priority treatment with an electronic patient tracking system linked to the diagnostic and research laboratories and wards. Doctors, scientists and nurses are now able to work in an enabling and motivating environment and will receive world-class training.

The new trauma centre is already reducing the death rate among emergency admissions, providing a disaster preparedness facility that can cope with major incidents, offers two theatres, X-ray and ultrasound facilities, a laboratory and a pharmacy. Above all, patients will have access to the best medical care and be treated with dignity.

Watching a traditional dance for the opening of the AETC

Dr Charles Mwansambo, Permanent Secretary of the Malawi Ministry of Health and Sir Mark Walport, Director of the Wellcome Trust formally open the AETC

Sir Mark Walport, planting a tree in the grounds of the Malcolm Molyneux Learning and Training Centre

Malcolm Molyneux Learning and Training Centre

MLW Director Professor Rob Heyderman outside the Learning and Training Centre

Another part of the Malawi-Liverpool Wellcome Trust Clinical Research Programme, is a new Learning and Training Centre (LTC). With support from the Wellcome Trust the Learning and Training Centre has been constructed as an extension to the Wellcome Trust Research Laboratory, bringing most of MLW's activities under one roof.

The research and training work undertaken by MLW is critically dependent on its staff and infrastructure. Since its inception 1995 MLW has been highly successful and has developed an international reputation for research excellence. The Fellowship and grant activity has increased considerably and the requirement to expand facilities is a clear measure of this success.

The LTC is central to MLW's strategy to pursue a partnership programme led by Malawian and international scientists. This new development provides an important focal point for the capacity building activities of MLW, fostering the comprehensive and sustainable programme of interdisciplinary research and professional development.

Facilities within the LTC include a computer laboratory suitable for the delivery of computer-based advanced training courses. Courses in statistics and epidemiology, bioinformatics, bioethics and molecular microbiology all require a strong computer training infrastructure. Office accommodation suitable for MLW and COM researchers and PhD students features with meeting and seminar rooms suitable for lectures, regional workshops and speciality meetings.

The LTC provides greater cohesion and interaction within and between research groups, optimising governance of the MLW research and training agenda. The LTC will also free up laboratory space within the Programme enhancing the possibilities for collaborative research.

LTC provides significant new clinical research infrastructure, enhancing the training environment in close proximity to the Queen Elizabeth Central Hospital and the College of Medicine clinical departments. Collaboration is encouraged between scientists and clinicians, thus enabling more interdisciplinary research and providing a fertile learning environment for the research leaders of the future.

Images courtesy of MLW

United Against Neglected Tropical Diseases

2012 has been a momentous year for neglected tropical diseases and LSTM's Centre for Neglected Tropical Diseases (CNTD). In what is already the largest global coordinated effort to fight neglected tropical diseases (NTDs) to date, even further commitments to accelerate efforts were announced on 30 January 2012 by governments, pharmaceutical companies, international funders and global health organisations in a concerted push to eliminate or control ten neglected tropical diseases by 2020.

NTDs impose a terrible burden on the world's poorest people through, mortality, stigma, reduced educational and employment opportunities. NTDs are both a cause and a consequence of poverty. Reducing the burden and impact of NTDs is a key component of promoting economic development and attaining the Millennium Development Goals.

As part of the radically increased international focus and the UK Government's contribution to global efforts, CNTD was given a huge £20m boost to its original £10m elimination of lymphatic filariasis programme, aiming to treat 100m people across some of the world's poorest countries. CNTD also shares in a circa £25m increase to the Department for International Development's (DFID) grant for the Integrated Control of Schistosomiasis and Soil Transmitted Helminths in Sub-Saharan Africa (ICOSA) programme delivered in partnership by CNTD and Imperial College's Schistosomiasis Control Initiative.

The scene was set for the enhanced UK cooperation earlier last year, when the UK Coalition Against Neglected Tropical Diseases was launched on 13 September 2011. The coalition is a collaborative partnership between UK organisations actively engaged in NTD control. LSTM's Centre for Neglected Tropical Diseases (CNTD) is a founding member of the coalition together with SightSavers, Carter Centre UK, Partnership for Childhood Development and the Schistosomiasis Control Initiative.

Professor Moses Bockarie, Director of CNTD said "This partnership brings together those UK-based organisations working tirelessly to combat the harm caused by NTDs and will provide an invaluable forum to influence and shape future policy. I am proud of CNTD's contribution and very optimistic about the future benefits this partnership will bring, as well as being delighted by confidence in the centre's work shown by DFID through its expansion of our programmes."

Building upon the momentum created by the partnership the commitment to the 2020 goal will help to improve the lives of the 1.4 billion people worldwide affect by NTDs.

10 NTDs targeted

Eliminate
Sleeping Sickness
Leprosy
Blinding Trachoma
Guinea Worm
Lymphatic Filariasis
Control
Soil-Transmitted Helminths
Schistosomiasis
Visceral Leishmaniasis
River Blindness
Chagas

The pledges include commitments to:

- sustain or expand existing drug donation programs to meet demand through 2020 and in some cases 'for as long as needed'
- share expertise and compounds to accelerate research and development of new drugs
- provide more than $785 million to support research and development efforts and strengthen drug distribution and implementation programmes.

Very cost-effective interventions are now available for several of these diseases, supported by long-term donations of safe drugs from the pharmaceutical industry and mass drug administration is considered a 'best buy' in value for money terms within the international health arena.

Mass Drug Administration, Zanzibar
© Khalfan Mohammed

In London on 30 January 2012, pharmaceutical chief executives, international politicians and the heads of global health organisations gathered to make commitments to provide treatments, research and development funding and cooperation to control, eliminate or even eradicate ten NTDs by 2020.

13 pharmaceutical companies also announced massive donations amounting to billions of tablets each year to treat the most common NTDs in endemic countries. All the organisations present signed up to an agreement known as the London Declaration, expressing their firm commitment to the fight against these terrible conditions. These in-kind resources also represent a very significant contribution from industry towards tackling NTDs and this position was also reflected in a remarkably open approach to collaboration between pharmaceutical companies demonstrated at the meeting in London.

Stephen O'Brien, Minister for International Development, said: "The world has come together to end the neglect of these horrific diseases which needlessly disable, blind and kill millions of the world's poorest... [We will] provide critical treatments to millions of people, which allow children to attend school and parents to provide for their families so that they can help themselves out of poverty and eventually no longer rely on aid."

"Today, we have joined together to increase the impact of our investments and build on the tremendous progress made to date," said Bill Gates, co-chair of the Bill & Melinda Gates Foundation.

The massive harm caused by NTDs is now being attacked by the concerted effort of a wide range of organisations, and LSTM's Centre for Neglected Tropical Diseases, along with other school colleagues is superbly placed, right at the forefront of these efforts to make a huge contribution to this global challenge.

www.cntd.org

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Making it Happen
Phase 2

It is estimated that, each year, 358,000 women worldwide die from complications arising from pregnancy and childbirth. Many more survive but have long-lasting illness or disability. Worldwide, there are about four million neonatal deaths and three million stillbirths annually. These are staggering statistics, particularly given that more than three-quarters of all deaths occur in South Asia and sub-Saharan Africa.

Phase one of "Making It Happen" finished at the end of December 2011. Thanks to an £18 million grant from the UK Department for International Development and additional multiplier funding, Dr van den Broek and her colleagues will be scaling-up the programme for phase two.

More than 17,000 health workers in the world's poorest countries will be trained to provide emergency care for millions of mothers and babies by experts from LSTM's Making it Happen Programme (MiH).

"The whole aim of Making It Happen is to design evidence-based packages of care for developing countries to try and reduce the number of women and babies who die in childbirth"

says Dr Nynke van den Broek, who leads the Maternal & Newborn Health Unit. "Here in the UK you assume that your baby will be healthy and you will come out of it alive. We want to try and make a difference in countries where that is not the case."

Preliminary analysis from the three years that MiH has been running in five countries (Bangladesh, India, Zimbabwe, Sierra Leone and Kenya), shows an increase of 60% in the number of target facilities who could provide the full package of care to a women in child-birth, leading to reductions in both maternal mortality and still-births. "We started off not even daring to hope that we would have that effect," Dr van den Broek says. "But using a targeted training package and support to midwives and doctors in hospitals and health centres has really made a difference. It's all been over and above what we expected."

By the end of 2011, MiH, with the support of volunteer midwives and obstetricians, had trained almost 3,000 healthcare providers and almost 300 national facilitators. Analysis of all levels of healthcare workers showed that their knowledge and skills significantly improved after the training. Researchers from the Maternal and Newborn Health Unit at LSTM found that there had been better care and monitoring of women who had complications during labour and delivery, and that morale and teamwork on the labour wards had improved.

Attending the international Making It Happen conference in Liverpool, Parliamentary Under-Secretary of State at the Department for International Development, Stephen O'Brien said: "It is an international scandal that around the world, one thousand women die every day in pregnancy or childbirth. Nobody should die or suffer ill health because they are pregnant and too poor to afford treatment. The expertise of the Liverpool School of Tropical Medicine and skills of British health workers are envied the world over. Together, they are a vital part of our work to reduce infant and maternal mortality in the world's poorest countries."

"We are pretty proud of the fact that we can and have made a positive impact," says Dr van den Broek, "having ensured that over half-a-million women had more skilled attendance and a better birth experience". "Working with governments and our partners, we will continue working in the initial five countries across Asia and Africa," she says, "and we are also expanding the programme to include an additional seven countries who have invited us to come."

Photo: Ansem Ansari, Courtesy of Photoshare

Grandmother, mother and newborn child, Bangladesh. Courtesy of Photoshare

HIV amongst the over 50s in Uganda

In Uganda HIV incidence rates appear to be rising amongst the 50-59 age group. While there is a clearer picture of the reasons for HIV transmission amongst younger age groups, it largely remains unclear why the rate amongst older people is higher than the norm.

In 2012, funded by UNAIDS, LSTM and the Uganda Virus Research Institute (MRC/UVRI) are collaborating on a project to explore how social cultural factors within Ugandan society influence vulnerability in relation to HIV, both in terms of transmission and in terms of access to service provision.

MRC/UVRI was established with the assistance of the UK Medical Research Council in 1988 as a response to a growing HIV/AIDS epidemic in Uganda, which contributed to the decline in the number of people living with HIV and AIDS during the 1990s. Although much has been done by government and international partners to tackle this bloodborne infectious disease, there are still an estimated 1.2 million people living with HIV and AIDS in Uganda. Until now, there has been limited understanding of the factors that influence the vulnerability of the over 50s to HIV and its impact on the lives, wellbeing and livelihoods of older people.

In Uganda, national HIV prevalence is 5.4% (58% female) (UNAIDS, 2010). The rate at which one partner is HIV positive and one partner is HIV negative is around 50% among HIV infected individuals.

On the LSTM side the project was led by Dr Sally Theobald, supported by Research Assistant Esther Richards, working with a group of women and men who previously participated in an MRC/UVRI study on relationships. Critical to the project was the interaction between gender, age and other socio-cultural and economic structures and relations to identify and understand the differing vulnerabilities produced in specific contexts.

HIV incidence appears to be rising, particularly among married couples, maintaining the generalised epidemic. A national survey conducted by Government of Uganda (2006) estimated HIV prevalence to be 5.8% amongst the 50-59 years age group - higher than the average prevalence of 5.4%. However, there is limited information on the experiences of older people and their vulnerabilities to HIV in Uganda, as is the case in most African contexts.

There is limited understanding of experiences of gender-based violence (GBV) amongst older people. Intimate partner violence both reduces women's power to negotiate conditions of sexual intercourse, especially condom use (Rao Gupta, 2002) and limits access to HIV testing services, because of the fear surrounding the disclosure that only one partner is HIV positive.

The research team needed to know much more about the experience of older people in terms of how gender interacts with other social factors to drive GBV and influence intervention outcomes, in order to guide responsive HIV programming.

The findings of the LSTM MRC/UVRI study have demonstrated that social and cultural factors exert pressure on women's and men's decisions about education, marriage, employment and sexual relations. They also highlight how gender power relations lead to greater agency for men in these decisions. For women, their relative lack of agency is displayed in their schooling, marriage choices, sexual relations with partners and livelihood opportunities. While men also described mainly economic constraints, especially those from poorer and rural backgrounds, nevertheless their ability to pursue wage-paying labour and their greater ability to choose a marriage partner shows up these subtle and not-so-subtle differences between women's and men's experiences. Older women also describe experiencing gender-based violence which increases their vulnerability to HIV.

While there are challenges and barriers present in these respondents' lives over the years, the data show how the ageing process has led to even greater constraints for women and men in urban and rural areas.

There is a stark difference between those able to access health services and those who remain isolated and 'invisible' to the wider society. Those receiving some level of support, mainly through non-government health providers, appear to benefit psychologically as well as physically, and report that they are extremely grateful for the treatment they receive at these facilities. One man explained that his pension went towards supporting his entire family. In contrast many older women and men are anxious about their inability to cover their own expenses or to access services for themselves and for their families.

Age, gender and poverty interact to produce particular vulnerabilities and constraints for older women and men in Uganda in terms of HIV transmission, HIV services and care and older people's health care in general. It is crucial that HIV interventions go beyond conceptualising older people simply as 'carers' of families living with HIV in order to better address their gendered vulnerabilities in relation to HIV, especially given older women's experiences of gender-based violence.

A research team member talking to a participant in a previous study. © Celestine Ilakut, UVRI/MRC

LSTM PhD Studentship Programme

LSTM's PhD studentship programme has been developed to provide opportunities for those with exceptional research credentials to work on active LSTM research projects alongside some of the world's most distinguished researchers. The studentships cover a period of three years, full-time. Students receive an award equivalent to the Research Council stipend (Home/EU level) and contribution towards their running costs of £5,000 per year.

Katy Lloyd, LSTM PhD student, investigating the role of binding proteins in malaria pathogenesis

During my BSc (Hons) Applied Biomedical Science degree, I was fortunate enough to be involved in a research project studying prion disease in the United States.

The experience gave me an insight into immunology and infectious disease, and I decided there and then that I wanted a research career in these fields. After my undergraduate degree, I undertook a Masters of Research in Biosciences to gain more laboratory experience and to prepare myself for the mental hardships of a completing PhD, particularly the dreaded thesis!

Whilst searching for suitable PhD projects, I stumbled across the LSTM PhD Studentship programme and was amazed by the diversity of projects on offer. I had always wanted to work at LSTM as I hope my research will one day help improve the lives of vulnerable and less fortunate individuals, particularly those living in less developed countries. But the main reason I applied for the studentship was the fact that I was really interested in my current project, which investigates why *Plasmodium falciparum* parasites express IgM-binding proteins. It is thought that *P. falciparum* express IgM-binding proteins to avoid clearance by the host immune system. My project will explore the role of these IgM-binding proteins in malaria pathogenesis, to further understand and characterise malarial immune evasion mechanisms. An understanding of the immune escape mechanisms employed by *P. falciparum* will hopefully lead to treatments and help in the development of more effective malaria vaccines.

Clair Rose, LSTM PhD student, investigating tsetse fly parasite interactions

I chose to study Tropical Disease Biology as an undergraduate degree with the intention of pursuing a career in research and exploring ideas that may lead to novel vaccines and drug development. I have always been interested in biology and have developed a keen curiosity with its relationship to disease, with an emphasis on tropical and infectious diseases.

After gaining my degree with First Class Honours (2010), I was accepted onto the LSTM PhD studentship programme under the supervision of Dr. Alvaro Acosta-Serrano. My main area of interest is host-parasite interactions and the reasoning behind how parasites are able to manipulate their hosts ensuring their survival and subsequent transmission.

This is an exciting area that can potentially lead to control measures through a greater understanding of how the organisms interact. I am currently researching the challenging molecular interactions between tsetse flies (*Glossina spp.*), which transmit sleeping sickness, and their parasites, African trypanosomes. In order for trypanosomes to survive, proliferate and establish a midgut infection in the tsetse, they must cross the tsetse peritrophic matrix (PM), an acellular matrix surrounding the food bolos in most insects' midguts. How this process occurs is completely unknown as the molecular events involved in the host-parasite interactions have been poorly explored.

I will be involved in determining the proteomic and glycan composition of the tsetse PM and the parasite enzyme(s) that are necessary to degrade it or act as receptors, by genetically manipulating the expression of parasite and tsetse genes. This, in addition to using proteomics, transcriptomics and fluorescent microscopy, should provide an insight into how trypanosomes are able to cross the PM at a molecular level that may potentially lead to transmission blocking vaccines.

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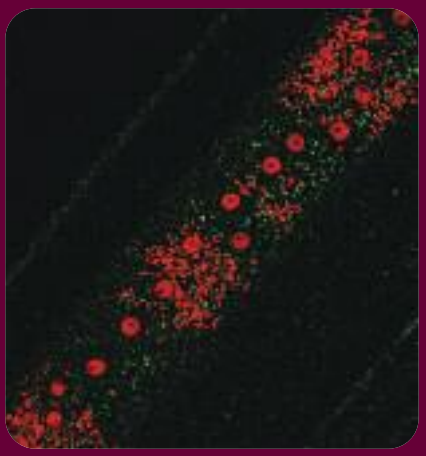

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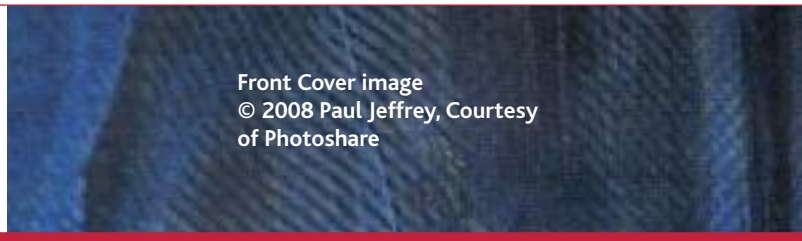

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LSTM Mission Statement

As a centre of excellence, the Liverpool School of Tropical Medicine, through the creation of effective links with governments, organisations and institutions and by responding to the health needs of communities, aims to promote improved health, particularly for people of the less developed countries in the tropics and sub-tropics by:

1. providing and promoting high quality education and training;

2. conducting first-class research and disseminating the result of that research;

3. developing systems and technologies for health care and assisting in their transfer and management;

4. providing appropriate consultancy services; in fulfilling this mission the Liverpool School of Tropical Medicine also provides a clinical service of acknowledged excellence.

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