tropical

LSTM
LIVERPOOL SCHOOL
OF TROPICAL MEDICINE

Higher Education Institution status awarded to LSTM

2013-2014 issue

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During a 115 year history, LSTM has adapted to the environment in which it operates. Just as the organisational mission has evolved to focus on changes in the health needs of resource-poor countries, the institutional status also evolves. Over the past few years LSTM has been working towards, and has now been successful in obtaining Higher Education Institution (HEI) status.

Increased government controls and regulation placed on research and teaching institutions has made it increasingly difficult for LSTM to operate under the current institutional status. Speaking recently, LSTM Director Professor Janet Hemingway explained: "In the past there were fewer rules and regulations governing student visas, access to research council funding and capital funding. Previously all of these were open to LSTM collaborating with the University of Liverpool (UoL) and gaining HEFCE funding via UoL."

A long-standing partnership with UoL will continue to build upon past success, through collaboration in areas of mutual expertise in both research and teaching. LSTM currently offers a number of postgraduate programmes leading to UoL awards. High standards of academic excellence will continue with the implementation of LSTM's strategy for the quality assurance of learning and teaching. The Quality Assurance Agency for Higher Education (QAA) undertook an institutional review of LSTM as part of the HEI application. The review was successful with LSTM meeting all the required UK expectations.

With approximately 600 students from 67 countries receiving specialist education and training both in Liverpool and overseas, becoming a HEI will improve both the sustainability and the delivery of teaching. Director of Education Dr Sue Assinder and her team are currently preparing an application for Taught Degree Awarding Powers (T-DAPs), which will allow programmes to be offered, leading to LSTM awards.

Not having HEI status has acted as a barrier in recent years when applying to some UK funding bodies, a situation that is hindering growth. With this status in place LSTM will see a boost not only to funding opportunities but also the formation of new partnerships and collaborations to deliver our remit of saving lives through research, education and capacity development. A strategic partnership with the University of Warwick is establishing a new £4.5 million collaboration that is creating a joint team of researchers, from a range of disciplines, to study the science, policy and economics of applied health research and delivery. Warwick's Vice-Chancellor, Professor Nigel Thrift has said: "This collaboration draws on our complementary areas of expertise and will provide an excellent opportunity for talented researchers to make a significant contribution to the international health agenda."

An additional benefit will be the raising of LSTM's profile both on the national and international stage, as Professor Hemingway explains, "in future it will make it easier for LSTM to collaborate with UoL and with other institutions, giving us greater visibility. LSTM is now a serious player in Global Health and when international organisations look at league tables, they expect to see us there."

The granting of HEI status will not change LSTM's research or teaching agenda, it will simply place us in a stronger position to develop it.

The Rt Hon David Willetts MP (left), government Minister for Universities and Science, with LSTM Director Professor Janet Hemingway, during a recent visit to LSTM.

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Delivering LSTM's vision for improved maternal and child health

Each year 300,000 women die as a result of complications of pregnancy and childbirth. For each death 30 women live but suffer lifelong morbidity. In addition there are 3 million still births per year. 99% of these deaths are in developing countries and most are preventable. LSTM is at the forefront of bringing life-saving health interventions to those most in need.

"Every day 800 women die from complications of pregnancy and childbirth."

Work is now underway to create a £7m modern fit-for-purpose maternal and child health building, which will create over 100 new jobs and become an internationally recognised centre of excellence for maternal and child health. Allowing LSTM to further develop a multi-national, multi-disciplinary team of experts, delivering a range of research, teaching and technical assistance programmes, that will save lives in low-income countries.

The majority of maternal and newborn deaths that occur within the first 24 hours of birth can be avoided if women and newborns receive the appropriate interventions from a skilled health worker. LSTM's Maternal and Newborn Health Unit (MNH Unit) operates a number of research, teaching and technical assistance programmes in conjunction with a range of multi-disciplinary experts from across LSTM. One project run by the MNH Unit that will be expanded further is the highly commended Making it Happen programme, increasing life-saving skills and neo-natal care training for midwives and skilled birth attendants from low-income countries and improving the availability and quality of essential (emergency) obstetric and newborn care.

The new facilities will allow the Unit to double in size, attracting research and teaching staff from all over the world, working collaboratively with LSTM staff across a range of scientific and academic disciplines.

Head of the MNH Unit Professor Nynke van den Broek said "I'm delighted that the go-ahead has been given for this exciting new development. The state-of-the-art facilities will match our ambitions as a globally recognised centre of excellence in maternal and newborn health, and will help us engage leading academics, strategic partners and policy-makers."

Improving maternal and child health significantly contributes to several of the Millennium Development Goals, including: ending poverty; improvement of gender equality; the significant reduction of under five and maternal mortality rates and the achievement of universal access to reproductive health. The world is still a long way from achieving those goals and concerted efforts and resources will be required in the coming years in order to meet them. LSTM's role in tackling these problems has been recognised by a World Health Organisation (WHO) designation of LSTM as a WHO Collaborating Centre for Maternal and Newborn Health.

Baroness Hélène Hayman, Chair of the MNH Unit External Advisory Board said "LSTM has a proud tradition of leading the way in research, with Maternal & Newborn Health an example of an area of excellence and strategic importance. The MNH Unit has developed a unique reputation for designing, implementing and measuring intervention packages. I am delighted that the success of the MNH Unit is being recognised through the creation of this new facility"

The refurbishing and re-purposing of an existing building adjacent to LSTM's four current buildings near the centre of Liverpool will run from October 2013 to the end of 2014. The building, shown in an architect's impression below, will house 140 staff and thanks to the generous support of the Regional Growth Fund and the Wolfson Foundation, much of the required funding is already in place, but LSTM is now seeking further support to complete the building.

To support this project visit www.lstmliverpool.ac.uk and select fundraising. Or contact Billy Dean by email: william.dean@liv.ac.uk or phone: +44 (0)151 705 3272

Architects impression of the new building.

Progressing worm control in Namibia: Mapping schistosomiasis and soil-transmitted helminthes in school children

Schistosomiasis is a parasitic disease caused by trematode flatworms. Larval forms of the parasites, which are released by freshwater snails, penetrate the skin of people whilst in water or making use of it. In the body, the larvae develop and then later release eggs that pass out of the body in the urine or faeces, while other eggs remain trapped in body tissues, causing an immune-mediated disease. In sub-Saharan Africa control of schistosomiasis is based foremost on drug treatment with the oral medication praziquantel while snail control, improved sanitation and health education are also important.

Soil-transmitted helminthes (STH) infections are transmitted by eggs or larvae present in human faeces which in turn contaminate soil in areas where sanitation is poor. Once inside the body either by ingestion or by direct skin penetration, intestinal worms develop to reside within the lumen of the bowel and can cause abdominal pain, diarrhea, blood and protein loss, rectal prolapse, and physical and cognitive growth retardation. The World Health Organization estimates that all children in Namibia are at risk for STH and that 275,000 children are at risk for schistosomiasis.

Both schistosomiasis and STH are treatable via mass drug administration (MDA). In many places in Africa, however, current information on the distributions of these diseases is not based on accurate and systematically gathered data. To best guide a nascent MDA programme, new data and mapping is required before the government begins MDA and commits to this method of control in the longer term. For example in Namibia the levels of schsitosomiasis and STH remain largely unknown. Therefore a highly detailed map will display accurate data that will let the government understand levels of schistosomiasis and STH in Namibian school-aged and preschool-aged children and plan ahead for drug distribution for several years. By showing which types of schistosomiasis (intestinal or urogenital) are endemic in Namibia an evidence-based strategic plan for mass drug administration of praziquantel and albendazole at the school-level can be developed alongside establishing whether there is a need for treatment of preschool-aged children.

As a detailed map will define areas within the country that require different interventions this results in increased efficiency and reduced drug wastage, for estimating drug requirements, selecting appropriate control measures and determining the frequency of interventions are derived from this information.

As Namibia is a large country, mapping is being conducted in four phases, the first phase took place September to November 2012 and covered 397 primary schools in the Caprivi and Kavango regions. Researchers used rapid diagnostic tests to examine for blood in the urine and faeces of 60 children per school . The results from the rapid diagnostic tests show that schistosomiasis, although prevalent, does not reach alarming levels. Prevalence of schistosomiasis (both intestinal and urogenital) was found to be 16% in Caprivi and 18% in Kavango (overall prevalence of 17%). The results from rapid mapping teams were also bolstered by other teams that used traditional parasitological methods e.g. microscopic examinations of stool and urine. Hookworm was the most prevalent of the soil-transmitted helminths with 17% of the schools having at least one case. The most extreme case was a school where 81% of students were found to be infected with hookworms. 40% of the schools had no toilets or they were in a bad condition and 31% of the schools visited had no safe source of water.

Similarly to the school surveys, the snail surveys generally found there to be few concentrated snail populations of *Bulinus* and *Biomphalaria* capable of transmitting schistosomiasis. Significant populations of snails were found in parts of Caprivi, where flooding could be the cause at certain times of the year. Kavango held even more snail populations at many of the sites surveyed. Showing that some areas are considered high risk and others low risk. This knowledge is vital to the people planning MDA in these regions as the seasonality of flooding should be considered as an important variable influencing this disease landscape.

Overall, Phase 1 of mapping was a success and brought together a new dialogue between teachers, researchers and all local health stakeholders. It is clear that the previous albendazole drug distribution campaign did not meet the World Health Organization requirement and therefore greater support should be given to raise the performance of this programme. While the data gathered suggests that there is a desperate need for treatment against schistosomiasis and STH infections in these regions.

The second phase, which commences in September 2013 covers Omusati, Oshana, Oshikoto and Ohangwena regions. These regions are highly populated and known as endemic of STH infections and schistosomiasis. Following the second stage of mapping a field trip will be conducted by technical consultants from the UK, who will carry out capacity building training workshops for Namibian technicians, ensuring these sentinel sites are re-surveyed on a regular basis after chemotherapy campaigns. The gathering and storing of genetic material of both worms and snails for future genetic work would be essential to ensure accurate snail species identification (snail) and to ascertain schistosme population diversity prior to drug pressure.

Phase three will examine Kunene, Otjozondjupa and Khomas regions and lastly phase four looks at Erongo, Omaheke, Hardap and Karas regions, which includes some of the more sparsely populated regions of the country and environmental conditions are not ideal for STH or schistosomiasis transmission (dry, hot and arid).

"This Phase I survey has shown that a quality disease map can be generated in a relatively short time and at low cost. Using parrallel mapping teams with several individuals allows daily sampling of up to ten school per day. Taken as a whole, this model of logistics is important for developing cost-effective mapping which then tailors future MDA to be most stream-lined through time, thereby ensuring the best chances of longterm sustainability and impact." said Professor Russell Stothard, from LSTM.

The mapping project is led by LSTM, Jose Sousa-Figueiredo and Liverpool Associates in Tropical Health, in collaboration with Geneva Global, the Namibian Ministry of Health and Social Services, the University of Namibia and the Namibian Polytechnic and is funded by The End Fund.

Turning the worm

River blindness and elephantiasis, two of the Neglected Tropical Diseases (NTDs) are spread by filarial worms that carry the essential symbiotic bacteria, *Wolbachia*. It is this bacteria and its elimination that is the focus of the A·WOL consortium at LSTM. Professor Mark Taylor, Dr Denis Voronin and Dr Joe Turner have been awarded two grants from the prestigious Grand Challenge Exploration (GCE) initiative funded by the Bill and Melinda Gates Foundation.

Dr Voronin and Professor Taylor will in their project screen for drugs that activate the autophagy immune system of filarial worms to kill their essential bacterial symbiont, *Wolbachia*. Turning the immune system of the nematode against its own symbiont leads to killing of the bacteria, which will deliver a bactericidal action, which could shorten treatments for safe macrofilaricidal therapy of river blindness and elephantiasis.

In his project Dr Turner will exploit gene-knockout technologies to develop a model of onchocerciasis together with Professor Samuel Wanji's team from Cameroon. The lack of a suitable model of onchocerciasis hinders the development of new macrofilaricidal drugs. The challenge is to neutralise critical immune responses that render the host resistant to *Onchocerca* parasites by genetic and/or chemical manipulations. This new model could then be validated to increase the throughput of pre-clinical testing for novel macrofilaricidal drugs under development by the A·WOL consortium.

On hearing of the award notification Professor Mark Taylor said: 'It is quite an achievement to win one of these Grand Challenge Exploration grants, so we were especially pleased to be awarded two.'

The GCE grant programme was established to solve persistent global health and development challenges, by applying bold ideas in critical global health and development topic areas that include agriculture development, neglected tropical diseases and communications.

www.a-wol.net

A·WOL
ANTI-WOLBACHIA CONSORTIUM

A nasal vaccine for pneumonia

Pneumococcus is the bacterium that causes most pneumonia. Pneumonia caused by pneumococcus occurs in about 1 in 1,000 adults each year. Pneumococcal infection can affect anybody but young children, the elderly and people with HIV infection are at increased risk.

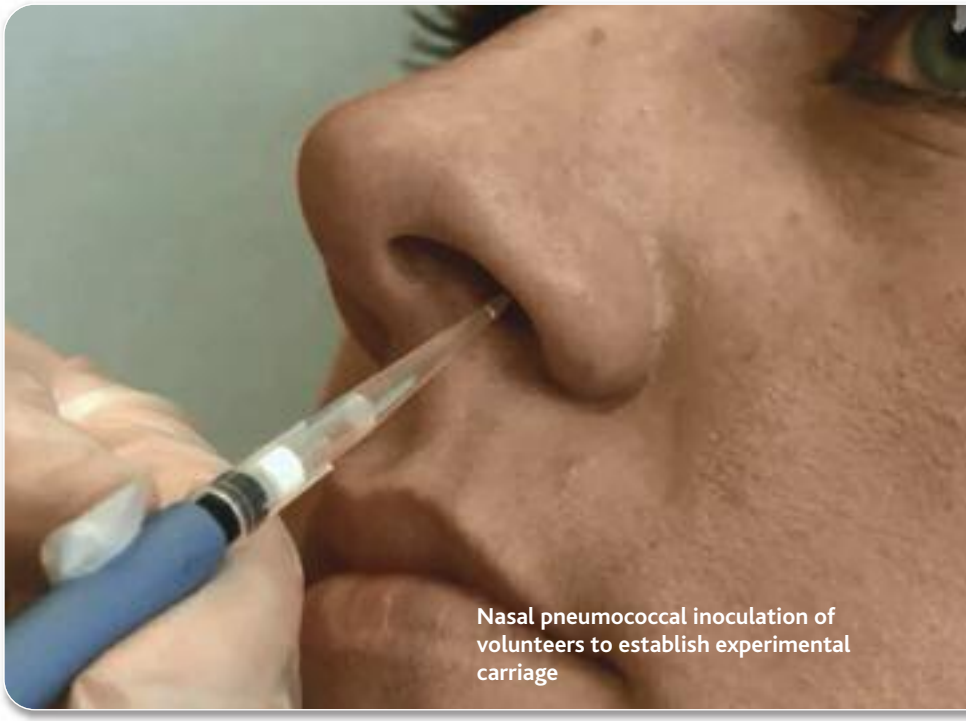
Pneumonia in both children and adults are potentially preventable by vaccination but current vaccines offer only partial protection. These vaccines focus on bacterial capsule and only contain up to 13 of the more than 90 capsular types of pneumococcus. Moreover, following the first introduction of the pneumococcal conjugate vaccine for children in the UK, the types included in the vaccine disappeared and were replaced by new types capable of causing disease.

"Pneumonia kills more children under the age of five than any other disease, claiming 1.3m young lives a year."

A new vaccine for application in both the developing world and the UK is required and scientists at LSTM aim to develop a nasal vaccine that will be universally effective against pneumonia. Nasal delivery mimics the natural route by which infection is acquired.

LSTM's Respiratory Infections Group have shown that pneumococcal carriage (harmless presence of the bacteria in the nasopharynx) is beneficial and works as a natural boosting mechanism to sustain protective immunity against pneumonia in adults or in vulnerable groups.

Researchers have therefore adopted an experimental human pneumococcal carriage model to investigate the immunising effect of carriage episodes. Using over 200 healthy volunteers in clinical trials, researchers established that nasal inoculation of pneumococcus boosted immunity to the bacteria that can cause pneumonia.



Nasal pneumococcal inoculation of volunteers to establish experimental carriage

Further, volunteers that were colonized during the study were protected against recolonization by the same strain up to one year after their first carriage episode. Several aspects of their immune responses were improved after colonization which could be associated with their protection against bacteria reacquisition. The researchers observed increased antibodies to more than 27 pneumococcal proteins and T cell responses in blood, nasopharynx and in the lung of the volunteers following colonization.

This study led by LSTM's Prof Stephen Gordon and Dr Daniela Ferreira was reviewed as giving early support for nasal colonization as an effective universal vaccine against pneumonia. "We aim to develop an optimal vaccine that will protect all age groups against pneumonia caused by all serotypes of pneumococci."

Several research groups in the world have been trying to develop novel pneumococcal vaccines based on single pneumococcal proteins. The use of the whole cell pneumococcus without capsule has also been investigated as a means to induce immune responses to several proteins that are conserved in all pneumococcal strains at once.

New directions in the control of NTDs

Neglected Tropical Diseases (NTDs) are a group of infectious diseases caused by parasites that affect people living in the poorest communities in the world. Some examples of NTDs include onchocerciasis ("river blindness", transmitted from person to person by black flies) and lymphatic filariasis ("elephantiasis", transmitted by mosquitos). NTDs all have chronic, debilitating, disabling, and disfiguring effects. NTDs can have a devastating affect on individuals' lives, and on their capacity to provide for themselves and their families. NTDs almost exclusively occur where there is limited access to adequate health care.

To eliminate NTDs, the World Health Organization recommends that community members living in high-risk areas take a yearly course of anti-parasite treatment. While we know that this can be a good way of eliminating NTDs, we also know that there are important limitations. For example, elimination of onchocerciasis from affected communities requires yearly or bi-annual treatment distribution for at least 15 to 17 years. Administrating and sustaining these drug distribution programmes for such long periods of time can be challenging. Additional difficulties are encountered in hard-to-reach rural areas and in urban areas where there is high population mobility and in areas where co-endemic Loaisis increases the risk of severe adverse events.

New and exciting evidence suggests that an alternative macrofilaricidal treatment strategy for onchocerciasis and lymphatic filariasis may be able to overcome some of these challenges. Rather than provide these treatments to everyone in the community, a targeted "test and treat" strategy will become more cost effective as programmes enter the end-game. "Test-and-treat" involves identifying individuals infected with the parasite and providing them with a longer treatment course to cure the infection. However, it is not known how feasible or acceptable this approach will be for individuals targeted and for communities and health programmes.

To answer these questions the Anti-Wolbachia (A·WOL) consortium has employed a social scientist, Eleanor MacPherson. Eleanor specialises in qualitative research methods and has extensive experience of working on tropical diseases in Africa. Eleanor plans to conduct studies with A·WOL partners in Cameroon, Ghana and Zanzibar to explore community and individual perceptions of adhering to these novel approaches.

Short courses prove popular

LSTM offers Diploma and Masters programmes in a wide range of subjects relating to tropical medicine and global health. However, for students who are unable to commit the time to take one of these courses, LSTM short courses offer an affordable and relevant alternative. The range of courses reflects the breadth and depth of LSTM's expanding research portfolio, featuring courses from Statistical Methods of Epidemiological and Clinical Research, to Media, Policy and Advocacy in Humanitarian Action. Short courses have attracted 164 students from 45 countries over the past year.

A new course entitled 'Introduction to Ultrasound in Low Resource Settings' was introduced as a pilot in 2013. This interactive course uses a range of educational virtual tools, including online ultrasound videos, case studies as well as practical hands-on time using ultrasound machines at least twice per day to enhance the learning experience. The students also spend a day on obstetric ultrasound in the training suite at Liverpool Women's Hospital. The pilot course received excellent feedback and 100% of survey respondents would recommend this course, which is planned to run again in 2014. Students will also receive additional support once they are working in the field by logging into a secure site to upload ultrasound videos for comment from the other students as well as professional radiologists involved in the course.

LSTM is one of the few learning institutions in the world to offer a Diploma in Tropical Nursing (DTN). To maximise flexibility, the course involves three weeks of intensive study at LSTM with participants completing pre- and post-course assignments in their own time. It has been re-accredited by the Royal College of Nursing after a rigorous Quality Assurance exercise. The course has become very popular since launching in 2011, so much so that it will be now running twice a year with 60 students in each cohort. The DTN provides students with a wide knowledge base, incorporating laboratory work, clinical aspects of infectious diseases, child health, sexual health, neglected tropical diseases, non-communicable diseases as well as professional topics such as leading change, governance and ethics.

"The like-minded, active and engaged student base, coupled with the most experienced developing country practitioners, set the stage for an incredible energetic learning experience."

Ravi Jaipaul, DTN student, 2012.

Another new course is Systematic Reviews for Policy and Practice, a two week course giving students critical, higher-order skills in order to find, read, appraise and interpret relevant, reliable research summaries. It aims to provide knowledge and critical understanding of how research evidence may be used in policy and practice in middle and low income countries. Students are expected to carry out assigned reading prior to each session and to feed this knowledge into discussion alongside reflection upon their own professional practice.

During 2013 LSTM successfully tendered to deliver training to the UK Ministry of Defence on Tropical Pathogens and Disease Vectors. Ten students were welcomed in January for five days training. The course was designed to equip students with the knowledge and skills to carry out situation analyses and risk assessments for tropical pathogens, disease vectors and their prevention and control. We received excellent feedback from the students and plan to build this relationship further.

LSTM is expanding the in-country provision of short courses, coordinated and delivered in partnership with local government and NGOs leading to the franchising of LSTM-certified courses for delivery entirely by local providers.

Putting insecticides to the test

In 2012 LSTM's Insecticide Testing Facility rebranded as the Liverpool Insecticide Testing Establishment (LITE). Based in Liverpool, LITE is dedicated to the testing of new insecticide based products against a wide range of mosquito colonies. Funding from the Innovative Vector Control Consortium (IVCC) has allowed LITE to establish four purpose built state of the art insectaries, along with a dedicated testing laboratory.

Having worked for the pharmaceutical industry for over 20 years, Head of LITE, Helen Williams has ensured the systems are in place to deliver high quality and consistent data for clients. LITE is supported by LSTM's Vector Biology Department, whose research team are characterising the mechanisms responsible for insecticide resistance and mapping the spread of resistance genes throughout regions of the tropics where mosquito borne diseases are endemic. This expertise and the strong link between the Department, led by Professor Hilary Ranson and overseas collaborators are valuable resources to LITE, helping ensure that the mosquito colonies maintained are accurate reflections of the insecticide resistance populations evolving in the field.

During 2012 LITE was working with IVCC business partners testing novel insecticides to help manage insecticide resistance and to counteract the spread of infection by insecticide resistant vectors as these pose a massive threat to the control of diseases throughout the tropics.

The range of insecticide susceptible and resistant colonies of mosquitoes offered is a unique feature of LITE. These have been characterised phenotypically and genotypically for known insecticide resistance alleles. LITE plans to expand the number of colonies offered for testing through the addition of new strains collected from the field. *'The colonies we have in LITE are a key asset to the department'*, according to Helen Williams. *'We offer both susceptible and resistant colonies for client testing'*.

LITE offers a number of alternative testing methods for insecticide efficacy studies. All testing is performed according to standard operating procedures and quality standards by fully trained and qualified staff. *'The test procedures can be developed to meet individual client needs'*, says Helen Williams, *'In addition to the wide range of standard WHO testing methods we also specialise in other techniques such as topical application of insecticides'*.

Quantitative analysis using HPLC is offered to determine levels of active ingredients in treated products such as bed-nets. A recent addition to the services offered is the availability of bacterial membranes (Bactosomes) containing P450s associated with pyrethroid metabolism and metabolic resistance in mosquitoes. The membranes include mosquito cytochrome P450 reductase and b5 and are a valuable resource for high throughput screening, during the insecticide discovery process.

LITE
LIVERPOOL INSECT
TESTING ESTABLISHMENT

photo credit: Chris Barrett/chrisbarrett.info

Accessing emergency obstetric care in India

MATIND

In India, lack of access to emergency obstetric care is a major cause of maternal deaths for poor women. In 2005, the state of Gujarat launched a public-private partnership programme, *Chiranjeevi Yojana* (Scheme for Long Life), to increase demand for services among poor women by providing access to free obstetric care from a range of accredited private providers. In Gujarat, where *Chiranjeevi Yojana* is based, nearly 2,000 maternal deaths are reported each year. In low income contexts, removing the financial barriers to care is seen as a crucial means of decreasing maternal mortality.

Under the scheme, participating private health practitioners are required to provide free skilled comprehensive obstetric care to pregnant women belonging to families living below the poverty line. Deploying a demand-side finance model, similar to a voucher scheme, women may access maternity services on production of proof of their eligibility, while the state reimburses the doctors for care. Following the successful pilot of the scheme in five districts of Gujarat state, it was scaled up to include all 25 districts of the state in January 2007. The number of obstetricians and gynaecologists registered in the scheme had increased from 173 in 2005 to 817 in 2009, with more than 384,920 deliveries conducted under the scheme by 2009.

Participation of private providers is a key element of success for any public-private partnership, and Dr Parthasarathi Ganguly of the Indian Institute of Public Health Gandhinagar, in collaboration with Dr Helen Smith and Dr Kate Jehan at LSTM, are exploring the scheme from the perspective of the providers. They aim to understand why doctors participate in the scheme, withdraw their participation or choose never to participate at all. Their study offers lessons for similar public-private partnerships and demand-side finance schemes aiming to widen access to services for poor people in low to middle income countries.

In spite of the scheme's immense potential, the research finds retention of providers to the scheme has been problematic owing to a number of possible factors: a trust deficit between government and private sectors; bureaucratic and time consuming administrative procedures; provider confusion arising from a number of competing maternal health schemes; inadequate incentives and lack of perceived benefit to providers in participating in the scheme, and failures of the scheme to successfully target eligible women. The data suggests further operational problems, including ambiguous levels of quality and accountability in patient care, and "cherry picking" of uncomplicated pregnancies by doctors keen to reduce costs. These findings question the scheme's ability to meet its long term goal of reducing maternal mortality.

The research suggests a number of possible solutions to the problems, including: streamlining financing for maternal health care schemes; targeted, not mass enrolment of the scheme among doctors; reduction in procedural burden for both beneficiaries and private doctors; creation of a market-linked remuneration package for providers; assurance of regular and timely reimbursements from the government; adequate provision of blood storage at the sub-district level; implementation of mechanisms to improve access to antenatal and postnatal care to complement institutional delivery; and improved monitoring and quality assurance to ensure greater accountability in both public and private sectors. Dr Ganguly says,

"Unless you improve health systems, you cannot improve the delivery of maternal health care".

This research is part of a larger study, MATIND, an EU FP7 funded project exploring demand-side finance models for widening access to maternal health care in India. The project is led by Dr Ayesha de Costa at Karolinska Institutet in Sweden, with partners Liverpool School of Tropical Medicine (Dr Rachel Tolhurst as LSTM lead), Indian Institute of Public Health Gandhinagar (Professor Dileep Mavalankar as IIPH lead) and R D Gardi Medical College, Madhya Pradesh, India (Dr Vishal Diwan as R D Gardi lead).

Health system reconstruction and gender equity

The LSTM-based ReBUILD Consortium and the Stockholm International Peace Research Institute (SIPRI) Gender Working Group (led by Professor Valerie Percival at Carleton University, Canada) are collaborating on a study to analyse how efforts to strengthen and rebuild health systems in fragile states contribute to the development of gender equitable health systems.

Four case studies were analysed relating to Timor-Leste, Northern Uganda, Sierra Leone and Mozambique. While there are clear opportunities for developing gender-equitable systems in the post-conflict environment, findings from these case studies highlight a number of barriers to this. These include a lack of political will at an international level, at times, a narrow focus on gender violence and maternal health outcomes (without a broader focus on gender and health) and the lack of effective indicators for measuring the impacts.

Although the United Nations is committed to encouraging the participation of women in senior decision making positions within peace negotiations and within elected assemblies, that intention has yet to become a reality in many post-conflict countries. There is little focus on equitable representation of men and women in high level positions across various social sectors, such as health, where arguably gender equity has the greatest impact.

The report produced by the SIPRI Gender Working Group and ReBUILD has also found that the focus of NGOs and funders in a post-conflict setting is failing to address the broader causes and consequences of gender inequities, including developing comprehensive health systems strategies that more fully address gender inequalities within fragile societies. With those involved in health system reform having little guidance or evidence base to work from. Therefore it is often unknown whether measures introduced may exacerbate or alleviate gender inequity.

To achieve gender equitable health systems, health system models need to be analysed to evaluate their impact on gender equity. ReBUILD is calling for further research on health system reform that includes clear indicators to measure and evaluate gender equitable health system outcomes.

While more research is needed to look at the best strategies to rebuild health systems in fragile states and those emerging from conflict, this research must integrate gender into its analysis. Policy choices during this period are critical as there is an element of path dependency inherent in post-crisis health system reform: policies selected will have a lasting legacy on the health system, and restrict future policy choices.

www.rebuildconsortium.com

Above image shows ReBUILD Researcher, Sally Theobald who recently presented this stream of work at a special event welcoming United Nations Secretary-General's Special Representative on Sexual Violence in Conflict (UN SRSG), Zainab Hawa Bangura (pictured left) to the University of Aberdeen.

Bugs, Bites and Parasites: Tropical Diseases Uncovered

Bugs Bites and Parasites is a six-part observational documentary broadcast by the Discovery Channel exploring the clinical treatment of UK travellers by doctors and health professionals from LSTM, Well Travelled Clinics and the Royal Liverpool Hospital during 2012. As well as showing the experiences of British travellers, the series travels to Tanzania, Zanzibar and Sri Lanka showing how devastating malaria, schistosomiasis and snakebite can be to people in these countries. LSTM's involvement in partnerships with organisations and Ministries of Health working in resource-poor settings, ensures that the expertise of our clinicians is world class. Resulting in patients in Liverpool being treated by some of the world's leading experts in treating tropical diseases.

Dr Nick Beeching, Clinical Director of the Tropical and Infectious Diseases Unit at the Royal Liverpool Hospital, features in the series.

LSTM's Professor David Lalloo travelled to Zanzibar to meet Khalfan Mohammad and his team at the Schistosomiasis Control Programme. Where viewers see the impact of this parasitic disease on local populations and the locally run initiatives to control schistosomiasis, which worldwide affects over 243 million people. Professor Lalloo welcomed the opportunity to put these diseases under the spotlight, saying: "The programme has provided a unique opportunity to demonstrate the extensive research undertaken by LSTM to improve health in resource poor settings in the tropics. It also shows the close relationship between improving treatment in the tropics and looking after patients with tropical diseases in the UK. And emphasises the importance of ensuring that UK travellers receive high quality advice from clinics like Well Travelled Clinics before travelling to ensure that they can protect themselves against disease".

The six-part series airs on Sundays from 21st July 2013 to 25th August 2013 at 10pm on Discovery (SKY 520 and Virgin 211).

Dr Khalfan Mohammad shows LSTM's Professor David Lalloo the work of the schistosomiasis control programme in Zanzibar.

Left to right: Dr Elizabeth Jukes, Dr Tim O'Dempsey, Professor David Lalloo, Professor Bertie Squire and Dr Wendi Bailey, who feature in the series.

Developing strategy, delivering impact: LSTM's

Dr Sally Theobald, Chair of LSTM's Research Committee gives an insight into how the strategy is helping LSTM to fulfil its mission

LSTM's research strategy sets our direction and priorities for the next five years and beyond. Outlining how we will focus our research activity to have the greatest impact on global health, in particular saving lives in resource poor countries through research, education and capacity strengthening. Our research activity is at the heart of this mission and sets out specific objectives for achieving these goals. The strategy provides the organisation with a plan to ensure we maximise and deliver quality research activity, partnerships and strategic outputs.

The LSTM research committee takes the lead in defining and shaping the research strategy, with responsibility for overseeing its implementation at an operational level and monitoring progress towards achievement of the defined priorities. A year into chairing the research committee, Dr Sally Theobald, reflects on the progress made towards meeting strategic objectives and the way forward.

How does the committee work?

We have restructured the committee membership in line with the reorganisation of LSTM, so we have representation from across our four research departments, cross cutting themes, the Research Management & Business Development Office and our Director of Communications. LSTM's key strength is its highly skilled, multidisciplinary staff, and we need to

ensure we maximise the opportunities this brings. One of our seven research strategy objectives speaks explicitly to this: "To support a vibrant, collaborative, multi-disciplinary research community that stimulates staff and students and attracts and retains people with outstanding talents."

We have reflected this multidisciplinary approach in our committee structure. I am an applied social scientist, with on-going research in gender equity, health systems, human resources, HIV and tuberculosis; whereas the Deputy Chair, Professor Richard Pleass is an immunologist who specialises in antibodies and their role in controlling pathogens and autoimmune diseases. Needless to say we bring different disciplinary perspectives and ideas to the table! This is important to ensure we build on the strengths and opportunities offered by the range of skills, technologies, methods and disciplines we have at our disposal as we implement our research strategy.

Ensuring opportunities to maximise dialogue across and between our departments and disciplines is important as we continue to grow in size. We are planning a number of formal and informal interactions between different new and established research staff later in the year to ensure that these conversations keep happening. Think 'speed dating' meets academic discussion.

What are some of the achievements of the previous year?

LSTM's new Centre for Applied Health Research and Delivery (CAHRD), directed by Professor Bertie Squire has been successfully rolled out and is generating pace and momentum. In collaboration with the University of Warwick and a host of international collaborators, CAHRD focuses on developing and successfully implementing effective, innovative and affordable policies and practices to benefit the health of poor populations.

Applied practical approaches to supporting health care delivery is evidenced by a range of practical resources available from LSTM's website. LSTM CAHRD members have co-authored new reports and policies with key global stakeholders and policy players, such as "Addressing poverty in Tuberculosis Control" (with WHO) "Planning, implementing and monitoring home-based HIV testing and counselling" (also with WHO); "Guidance on Methodologies for Researching Gender Influences on Child Survival, Health and Nutrition" (with UNICEF). This work paves the way in meeting another of our research strategy objectives: "To translate research and knowledge into policies and practices that improve health outcomes, particularly for people living in resource poor contexts."

Being an international leader and the partner of choice for Ministries of Health and international partners is a central pillar of our research strategy. One of several units at LSTM that is responding to the demand to address the lack of global

Research Strategy 2012 – 2017

progress in preventing maternal and newborn deaths is the Maternal and Newborn Health Unit. Having established itself as an internationally recognized centre of excellence, it is currently the largest academic group in Europe focussing on global issues of maternal and newborn mortality and morbidity. The Unit serves as the global coordinating centre for the Making it Happen (MiH) programme, reducing maternal and newborn mortality and morbidity by increasing availability and improving the quality of Skilled Birth Attendance and Emergency Obstetric and New-born Care in 11 resource poor countries. The MiH programme has, by March 2013, built the capacity of 4,300 health care providers in emergency obstetric and newborn care.

Another major challenge for the coming years is insecticide resistance. Working with industry is crucial to combating insecticide resistance and LSTM's state-of-the-art facilities provide the Liverpool Insecticide Testing Establishment (LITE), a recent insecticide-based product testing initiative from LSTM, with the necessary tools for the job. LITE is operating in an increasingly important area, with insecticide resistance currently the biggest threat to malaria control. Commercial partners recognise LSTM's international expertise in this area and are keen to collaborate on product development. In addition to developing new insecticides, the Vector Biology Department at LSTM also leads several projects to develop new tools to monitor insecticide resistance.

In the increasingly competitive field of international development and research we are horizon scanning and taking a proactive approach to the continued monitoring of trends in donor priorities, identification of funding opportunities and potential partners through both published information and our international network of contacts both on the ground and within donor organisations. Managing that information has required the internal expansion of research management.

To improve the competitiveness of our proposals we have revitalised our internal peer review system for grant applications, developed strategies to maximise sharing of ideas and intelligence from the multiple high profile meetings our staff attend and the global, regional and national networks we are part of. The Research Management & Business Development Office have led the way in a new research management data base - converis, a business intelligence tool, which supports management of information across the research life cycle, from initial idea, application and project

results to exploitation. This in turn will support internal decision making processes.

What's up and coming?

LSTM is leading the way in research into Pneumonia contracted as a result of smoke from cooking stoves, one of the leading causes of death and one of the commonest causes of morbidity among infants and the under fives in Malawi. Pneumonia kills almost 1.6 million children each year, and new approaches to tackle this are urgently needed. The new Cooking and Pneumonia Study (CAPS), led by LSTM is tracking 10,000 children aged under five in village settings in Malawi. The homes of the children involved in the study are supplied with two clean cook stoves to see if the new stoves will stop the children getting pneumonia.

Maintaining our position at the forefront of the development of new drugs against diseases such as malaria and TB has led to the current development of the UK's first dedicated centre for therapeutics discovery and development specializing in dangerous human pathogens. An open-access policy will attract SMEs to develop or reposition therapies in partnership with LSTM, allowing unique access to technological platforms, predictive disease models, training and domain expertise.

To maintain our position at the forefront of global health research, we need to ensure we maximise our multidisciplinary strengths, and consolidate our partnerships with governments, research and non-governmental organisations to produce practical, useful and timely research outputs that promote improved health for poor women, men, girls and boys.

Is there any more room for growth?

With a portfolio of almost 300 active research projects and more starting every week, our impact on tropical medicine and global health is growing and our research strategy, supported by our research management team will ensure its successful delivery. By 2017 it is anticipated that LSTM will have grown by a further 15-20%.

Helping the RNIB to raise the profile of blindness prevention in Europe

LSTM's Short Course in International Health Consultancy (IHC) is continuing to go from strength to strength. The executive/senior level professional development programme, is aimed at health, management and social development specialists working in government, non-government and academic settings worldwide.

This highly intensive three-week post-graduate course provides emerging national, regional and international consultants with an opportunity to enhance and improve their professional knowledge and skills in the provision and management of consultancy services within the context of international health and deliver technical assistance that is robust, evidence-based and grounded in the reality of resource-poor settings.

As global health priorities change and the development assistance landscape adapts to these changes, ministries of health, NGOs and academic institutes increasingly require the knowledge and understanding of how to both demand and deliver effective technical assistance in health.

This unique course aims to mirror the reality of working as an international health consultant with a focus on both individual and multidisciplinary team working. One of its unique aspects is the application of skills and learning through undertaking a team consultancy assignment within the Merseyside area. Every year a range of local based charities, NGOs and service providers sign-up to be clients for the International Health Consultancy Course. Former clients have included Sahir House, Refugee Action, Brook Advisory, Women's Health Information and Support Centre, Family Refugee Support Project, Plus Dane Housing and Heart of Mersey.

The Royal National Institute of Blind People (RNIB) in partnership with the International Agency for the Prevention of Blindness (IAPB) and other partners have been investigating how to better raise the profile of eye health within Europe. David Allen, RNIB's Head of Prevention of Sight-loss is based at RNIB's Offices in Liverpool and he contacted LSTM for advice. When IHC Director of Studies, Dr Vicki Doyle met up with David Allen to discuss the nature and scope of this work, she felt that this could form the basis of a consultancy assignment for the IHC Students. She explained, "consultancy skills are quite different from academic or service delivery skills. In consultancy the client is looking for guidance and advice on how best to address a specific problem or answer a question. What the client is looking for is a set of practical recommendations, mapping out the next steps. In the case of RNIB, what they needed was a catalyst to get this work moving and to obtain an objective, external perspective on the different options for going forward."

A four-person multi-disciplinary team (pictured) with significant international experience in public health conducted this consultancy. Including Professor John Ashton (Team Leader) and Dr James Akpablie, Dr Lilian Kiapi and Dr Mariama Idrissa Boubou (Team Members)

Key elements of this consultancy included document review, telephone and face to face interviews with key stakeholders across Europe and developing a concrete action plan mapping out options for furthering this work. The results of this consultancy have proved successful in supporting RNIB and its partners to move the agenda forward. David Allen reports:

"We have put together a working group of international agencies and networks and are developing a European Coalition with around 40 agencies already signed up. With the support of partners we quickly developed an 'Eye health' event at the European Parliament in Brussels to coincide with the World Sight Day (10 Oct 2012) and this gained the support of several MEPs. I have personally participated in a European Public Health Agency development programme and we have just commissioned a consultancy to undertake detailed policy mapping work on behalf of the coalition in readiness for EU engagement for 2014-19. I have been supporting the development of an IAPB Action Plan in Europe on the strength of the experience I have gleaned in the last 6-9 months, linked to the World Health Organisation draft action plan for the prevention of avoidable blindness and visual impairment 2014-19)."

Commenting on his experience and involvement with LSTM and the International Health Consultancy course students, he stated, "the LSTM consultancy work has sparked a whole raft of activity and we are implementing the vast majority of recommendations from the group. It's been fascinating and moved us on considerably. More importantly it looks like it will have important ramifications in helping reduce blindness across Europe."

Please visit LSTM's website to find out more about the Short Course in International Health Consultancy.

Stronger together: LSTM's Capacity Research Unit

Low- and middle-income countries (LMICs) are faced with many development issues which hinder economic growth, effective prevention, diagnosis and management of serious health conditions and valuable research outputs. In 2012, LSTM set up the Capacity Research unit which uses evidence-based research to support LMICs to produce home-grown, sustainable solutions to overcome these inequalities. We work closely with partners in LMICs and with development funders, including the UK Department for International Development, the Royal Society and WHO, to help design, implement and evaluate robust and measurable capacity strengthening initiatives. The topics of our capacity strengthening projects include pan-Africa laboratory networks for neglected tropical diseases, PhD programmes in African universities and multi-partner UK-Africa research consortia outside the health sector.

According to the World Health Organisation (WHO), capacity strengthening or capacity development is "strengthening the ability of individuals, organisation or systems to perform appropriate functions effectively, efficiently and sustainably". In order to ensure that our capacity strengthening initiatives are effective and sustainable, our approach simultaneously focuses on individuals (e.g. technicians, students, researchers), organisations (e.g. universities, research institutions, clinical facilities), national governments and international agencies. Rather than setting up parallel systems we build on what is already in the country. Our flexible approach means that our activities and indicators for measuring progress can be adapted and tailored to changes in the local situation as time continues to ensure relevance and stability. Our ethos of working closely with partners overseas means that they are in the driving seat and we have a well planned and agreed strategy for gradual withdrawal as local capacity for autonomous decision-making increases.

We have developed a unique 5-step blueprint for designing a capacity strengthening programme which is based on evidence and has worked in many different LMICs projects. We determine what the goal of the project is, describe exactly what is needed to achieve that goal, decide what systems and resources are already available and what the gaps are, liaise with partners to devise a workable plan to fill in the gaps. As partners implement their plan we provide ongoing support to assist them to monitoring progress and to regularly revisit and update their plan. Our wide-ranging participatory process with its built-in opportunities for learning lessons to adapt and improve the plan, means that the initiatives can be scaled up and become independent and sustainable.

The unit was visited on 11 April 2013 by Mr Andrew Miller MP, chair of the Parliamentary Science and Technology committee and member of the All-Party Group on Malaria & Neglected Tropical Diseases. His committee has recently produced a report (House of Commons Science and Technology Committee (2012) Building scientific capacity for development. London: The Stationery Office Limited) for the UK government advocating support for developing countries by strengthening the capacity of local institutions to develop home-grown scientific excellence. The unit's activities directly contribute to turning these recommendations into action by strengthening the capacity of health systems in resource-poor settings.

Case Study: Strengthening capacity for research in academic institutions in sub-Saharan Africa

Undertaking high quality research and using the results of this research effectively are critical for ensuring socio-economic development, poverty alleviation and better health outcomes. Higher education institutions in sub-Saharan Africa (SSA) are struggling to match the levels of internationally competitive research produced by other regions. Reasons include inadequate training, poor retention and recruitment of staff, weak research infrastructure within higher education institutes and a lack of funding.

We are working hand-in-hand with the UK's Royal Society as they implement a 6 year £12 million programme funded by DFID. The programme is creating consortia of UK and African partners to build research capacity in the African institutions to increase research outputs from the universities, develop better qualified and trained staff and to encourage government and policy-maker engagement. Our Capacity Research unit is integrating a robustly designed and monitored capacity strengthening plan into this programme which will enable each of the African institutions to create their own plans for enhancing research capacity. We will also evaluate whether this is an effective method to build research and research training capacity by analysing current institutional reports, providing tailored questionnaires and undertaking interviews with stakeholders.

Generating impact around the world

What is the bottom line on all the relevant reliable research on the effects a particular treatment, vaccine or a new way organizing health care? Researchers carry out trials to make unbiased estimates but these often reach different conclusions from the play of chance, how well the study was conducted, or other factors influencing the outcome. Practitioners, policy makers and patients need a fast way to access reliable and independent summaries of research evidence to help inform their decisions, and they also need to know that the source of this evidence is trustworthy and kept up-to-date.

The Cochrane Collaboration is a not-for-profit, global network of approximately 28,000 dedicated people in 120 countries, bound by a shared passion for helping patients, policy-makers and practitioners make informed healthcare decisions based on all the best research evidence available. Widely recognised as the highest standard in assessing and reporting research to determine the effectiveness of different healthcare treatments and interventions, the Cochrane Collaboration is continually raising the standards for systematic reviews of evidence. Thanks to these efforts over the past 20 years, Cochrane is a recognised leader in furthering the science of systematic reviews, and the reviews are important in identifying gaps in research that need filling.

One of the review groups of the Cochrane Collaboration is the Cochrane Infectious Diseases Group (CIDG), for which LSTM provides the editorial base. CIDG prepares systematic reviews on the benefits and harms of healthcare interventions for infectious diseases, particularly malaria, tuberculosis, diarrhea, and tropical diseases.

As the Collaboration celebrates 20 years since its official foundation in 1993, we highlight several of the reports and policies that CIDG has been instrumental in changing for improved health.

In 1997 Cochrane authors working with the WHO showed that the drug amodiaquine was actually more effective than and is better than chloroquine to treat uncomplicated malaria. Along with another review on safety, this helped WHO decide to reintroduce Amodiaquine as an option to treat falciparum malaria.

In 1998 Insecticide-treated nets (ITNs) were seen as experimental and expensive. The Cochrane author working on this from Basel found ITNs reduce child mortality by 20%. With the support of policy makers and funders the distribution of ITNs has gradually increased from 5.6 million nets in 2004, to145 million nets in 2010. The number of children sleeping under ITNs in sub-Saharan Africa has increased from 2% to 39%, and it is one of the most important malaria interventions.

Thanks to a Cochrane review from the Liverpool team in 2002, a new formula for oral rehydration salts (ORS) which was less salty was shown to be more effective than the WHO standard at the time. Within two years, this review had been the most important piece of information that led to a global recommendation to change the formula for ORS throughout the world. The new formula ORS, a sodium and glucose solution, is widely used to treat children with acute diarrhoea, and is one of the most important interventions for a global killer.

Artemisinin-based combination therapies (ACTs) improve malaria cure treatments by 70%. The Liverpool team, working with lead researchers in WHO and globally, organised a large meta-analysis that demonstrated this massive increase in the cure rate, and was a substantive contribution to the rapid scale up of coformulated ACTS globally.

In recent years, the team have produced reviews that have underpinned global recommendations about use of artesunate in severe malaria and preventing malaria in children, and are currently working on a suite of 8 Cochrane reviews for the next WHO malaria treatment guidelines panel.

"The Cochrane Collaboration is a remarkable organization. It stands for collaboration, not competition; it aims to avoid duplication, and to keep reviews up to date. The Collaboration is having astonishing impact on health policies and practice It's a privilege to be able to contribute, and the progress made is the result of an astounding effort by many people, not least the 300 authors in the Infectious Diseases Group, the 14 editors, and the amazing staff working in Liverpool.

Right to left: Jimmy Volmink, Director of the South African Cochrane Centre, and Dean of the Medical Faculty, Stellenbosh University; Paul Garner (LSTM); Taryn Young, Director of the Centre for Evidence Based Health Care in the University of Stellenbosch; and Sir Iain Chalmers, the founder of the Cochrane Collaboration. Here they celebrate 20 years of The Cochrane Collaboration with other contributors attending the African Cochrane Indaba, Cape Town, South Africa, May 2013.

LSTM PHOTO COMPETITION

Left is the winner of our annual photo competition and below a selection of shortlisted entries. The 2014 competition is open to LSTM staff, students, alumni, or anyone working with LSTM on one of our many projects, please send in your images of that project activity for a chance of winning £250.

Visit **www.lstmliverpool.ac.uk/photocomp for further details and full terms and conditions.**

Space spraying in Bandur Lampung, Indonesia.
By Chris Barrett.

1. Lab technician capacity building course in Namibia, by Jose De Sousa Figueiredo
2. Furvela tent trap to catch mosquitoes in Cambodia, by Derek Charlwood
3. IRS workshop, Tanzania, Helen Williams
4. Spray Helicopter in Cote de Ivoire, by Dave Malone

researching and educating to save lives

INVESTORS IN PEOPLE

LSTM
LIVERPOOL SCHOOL OF TROPICAL MEDICINE

Vision

To save lives in resource poor countries through research, education and capacity strengthening

Mission

To reduce the burden of sickness and mortality in disease endemic countries through the delivery of effective interventions which improve human health and are relevant to the poorest communities

Values

- Making a difference to health and wellbeing
- Excellence in innovation, leadership and science
- Achieving and delivering through partnership
- An ethical ethos founded on respect, accountability and honesty
- Creating a great place to work and study

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