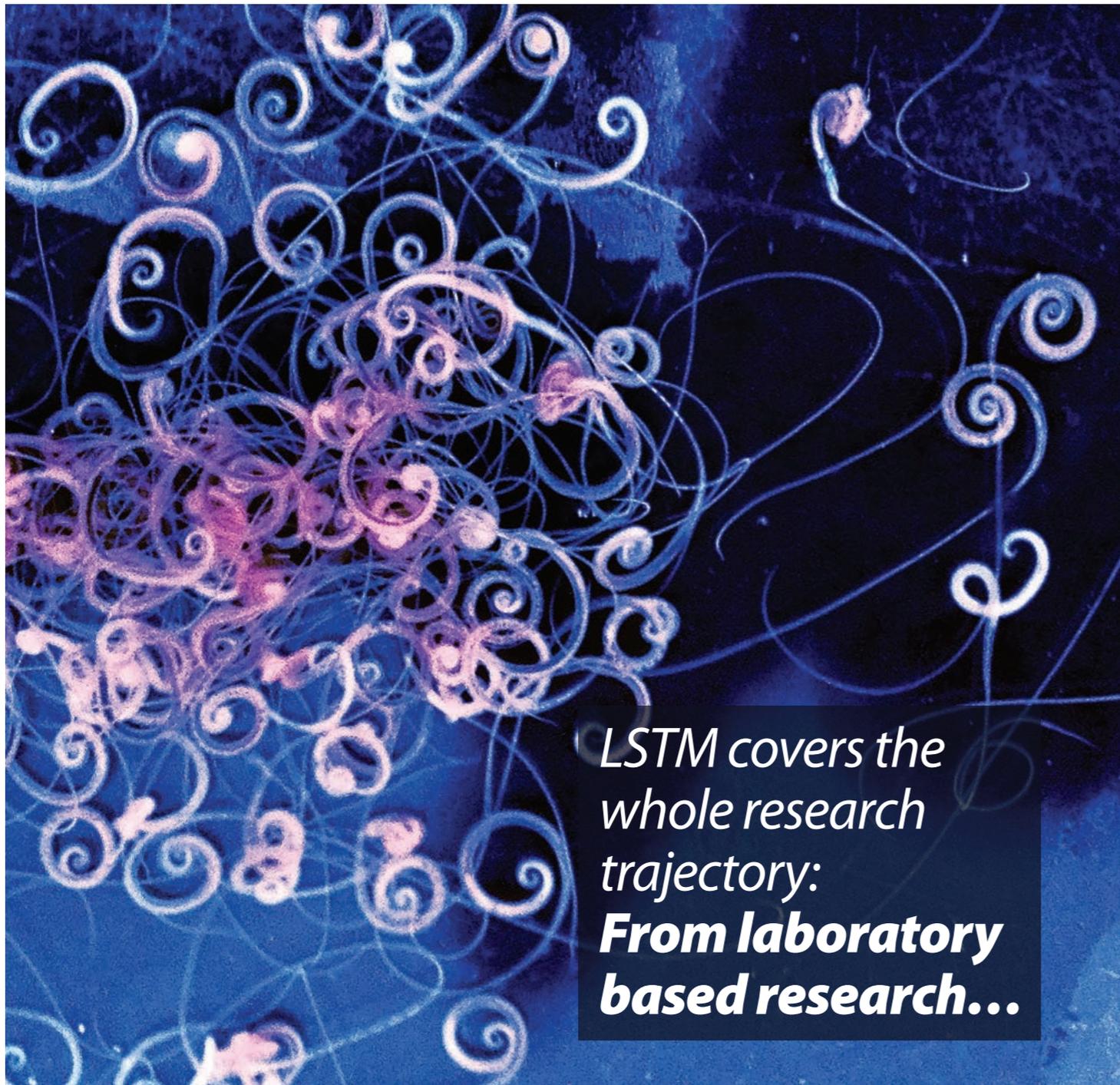




**NEGLECTED  
TROPICAL  
DISEASES**

**LSTM**  
LIVERPOOL SCHOOL  
OF TROPICAL MEDICINE



*LSTM covers the whole research trajectory: **From laboratory based research...***

## Neglected Tropical Diseases & Liverpool School of Tropical Medicine

**Over one billion people from the world's most disadvantaged and poorest communities suffer from at least one neglected tropical disease (NTD), which can significantly impact upon their physical and mental health. NTDs are markers, agents and drivers of poverty.**

Close to 60% of the world's children are expected to reside in the tropics by 2050. Health challenges, together with the wider impact of conflict, environmental degradation, climate change and the frequency of natural disasters put the progress made against NTDs under significant threat. Controlling and eliminating NTDs can make a proportionately greater contribution than any other investment – more health for less money.

Liverpool School of Tropical Medicine (LSTM) has over a century of experience of providing policy makers with the scientific evidence and programmatic success to inform policies and guidelines.

LSTM is identifying and overcoming critical bottlenecks through research and implementation activities, whilst evaluating alternative strategies to overcome the barriers to control and elimination. It does so with a multidisciplinary approach having established a cross cutting theme in NTDs, which builds on the strengths of all its research departments.

LSTM's Senior Professorial Fellow, David Molyneux, is leading this approach and in doing so advocates for a better understanding of what he has termed the 'chronic pandemic of NTDs and their debilitating impact and for effective sustainable elimination and control programmes'.

**Professor Janet Hemingway FRS**  
Director LSTM



# LSTM & Neglected Tropical Diseases

## Cross-sector expertise

### Cutaneous Leishmaniasis

Old World cutaneous leishmaniasis (CL) is generally not fatal but clinical symptoms can lead to disfiguring scars that result in social stigmatization and life-long psychological sequelae. WHO estimates that around 2.4 million disability-adjusted life years (DALYs) are lost due to CL. LSTM addresses the epidemiology, diagnostic development, discovery and implementation of sandfly biting exposure markers, and vector control of Old World CL.

### Dengue and Zika Vectors

LSTM is developing novel diagnostic tests for dengue, Zika and Chikungunya in collaboration with industrial partners. It also works on evaluation and development of effective insecticide-based tools suitable for vector control in high-density urban zones; using vector population monitoring to predict dengue outbreaks. Understanding the role of Wolbachia in vector competence.

### Human African Trypanosomiasis

LSTM's expertise ranges from basic research to vector control. LSTM leads a multi-country programme trialling the large-scale use of 'Tiny Targets', insecticide-impregnated baits to kill tsetse flies cost-effectively to reduce and prevent transmission of sleeping sickness. Studies on basic aspects of the molecular interactions between tsetse flies and trypanosomes are aimed to develop new tools to prevent the natural transmission of African trypanosomiasis.

### Snakebite Research

A unique, multi-faceted strategy to reduce the burden of snakebite (>95,000 deaths and ~350,000 disfigurements annually) in rural, remote and impoverished communities of low middle income countries (LMIC) is being developed. This includes a smartphone app-activation of specially-designed, inexpensive motorcycle ambulances equipped with appropriately trained clinical staff and effective antivenoms to speed rural snakebite victims to hospitals; science-guided, antivenom production systems enabling the manufacture of affordable, safe, cold chain-independent antivenom effective against all snakes in a defined region and a first point-of-care, affordable snakebite RDT for sub-Saharan Africa. Importantly, each facet can be readily adopted for any LMIC region where snakebite poses a significant public health burden.

### Onchocerciasis and Lymphatic Filariasis

LSTM has a long history of working on the parasitic worm infections that cause river blindness (onchocerciasis) and elephantiasis (lymphatic filariasis). Activities range from fundamental research on Wolbachia and disease pathogenesis and translational drug discovery and development through the Anti-Wolbachia Consortium (A-WOL), and in-country support for programme implementation, morbidity management and operational research through the Centre for Neglected Tropical Diseases (CNTD), with operational research on the role of vector control and loiasis in relation to filarial programme implementation policy in Africa.

*...to (clinical)  
field trials...*





*...to implementation of  
MDA programmes...*

## LSTM & Neglected Tropical Diseases

### Cross-sector expertise

#### Mosquito Vector Control

The successful global elimination of LF could hinge upon the addition of insecticide treated bednets to complement the current MDA strategy but the role of insecticide resistance requires to be defined hence the development of a close relationship with the vector biologists to develop alternative strategies to reduce transmission.

#### Schistosomiasis

LSTM hosts a broad portfolio of research on several aspects of the basic epidemiology and control of schistosomiasis in sub-Saharan Africa. Emphasis has been placed on supporting scale-up of praziquantel treatment in school-aged children and expanding access to preventive chemotherapy to currently overlooked groups, especially infected infants and pre-school-aged children. Seminal work undertaken within the Research Centre for Drugs and Diagnostics (RCDD) has shown that young children benefit from raised praziquantel dosing. Using novel antigenic assays LSTM explored better ways to assess the efficacy of treatment demonstrative of heterogeneities between schistosome populations. As part of multi-country DFID supported initiative COUNTDOWN, significant steps are being taken to describe and address the burden of female genital schistosomiasis in West Africa highlighting links within the health system between urogenital schistosomiasis and HIV.

#### Soil-Transmitted Helminths (STH)

LSTM routinely conducts epidemiological assessment of the burden of STH namely: whipworms, roundworms and hookworms, having published the first global assessment of evolution and phylogeny of *Ascaris lumbricoides* and *Ascaris suum*. The latter highlights the important connection of these worms with zoonotic transmission and the need to develop OneHealth approaches. We are also interested in assessing the performance of albendazole and mebendazole on worm populations and are developing assays real-time PCR assays to detect antihelminthic drug resistance markers. LSTM's long tradition of research on *Strongyloides* continues within COUNTDOWN using DNA diagnostic tools to better describe the local burdens of disease in Africa and throughout the world.

#### Visceral Leishmaniasis (VL)

Working in South East Asia focusing on vector control, LSTM has developed new tools such as Insecticide Quantification Kits and insecticide resistance assays to improve the effectiveness of insecticides used to kill sandfly vectors of Kala-Azar, a fatal form of leishmaniasis. The results of LSTM's quality assurance assessments of the Kala-Azar Indoor Residual Spraying (IRS) programme have been used to drive insecticide policy change. LSTM runs a comprehensive programme covering IRS monitoring and evaluation, quality assurance, entomological assessments, insecticide resistance and sand fly bite exposure to support the Indian VL elimination campaign. LSTM also conducts evaluations on novel diagnostics for VL in elimination zones including estimation of asymptomatic burden.

# LSTM & Neglected Tropical Diseases

Disease research and programmatic activities are complimented and strengthened by in-house expertise on:

## Support Systems

Validating and implementing innovative monitoring and evaluation tools to support informed decisions for the control and elimination of NTDs through linking to the expertise on Lot Quality Assessment Surveys.

## Capacity Strengthening

Diverse activities to strengthen capacity at the level of individuals, institutions and national/regional-laboratory networks and in-country programme related training workshops.

## Mathematical Modelling

LSTM and collaborators at University of Warwick are central to an international initiative to coordinate efforts on NTD modelling to inform policy.

## Pre-clinical NTD Models for the Evaluation of Next Generation Therapeutics

With a focus on priority helminth NTDs, LSTM has in-house capability to rapidly test novel curative drugs and anti-morbidity therapeutics to facilitate their development into clinical candidates.

## Diagnostic Tool Development and Evaluation

With a specific focus on Cutaneous and Visceral Leishmaniasis, Human African Trypanosomiasis and worm infections of the gut, LSTM's Research Centre for Drugs and Diagnostics works with partners, including FIND (Foundation for Innovative Diagnostics), on a broad portfolio of activities in NTDs.

## Social Science

LSTM's social scientists examine social, political and economic factors affecting NTD MDA programmes to produce a more holistic approach to NTD control and prevention to meet the elimination targets of the global NTD community.

*'NTDs are a chronic pandemic having a debilitating impact on over a billion people which require effective, sustainable elimination and control programmes across the globe'*

**Senior Professorial Fellow David Molyneux**





**...resulting in  
research uptake  
benefiting  
patients worldwide.**

## Cross sector initiatives hosted by LSTM



### A-WOL

A-WOL's academic and industrial partners aim to develop new drugs against onchocerciasis (river blindness) and lymphatic filariasis (elephantiasis). Funded by: Bill and Melinda Gates Foundation  
[www.awol.lstmed.ac.uk](http://www.awol.lstmed.ac.uk)



CENTRE FOR NEGLECTED TROPICAL DISEASES

### CNTD

CNTD supports national NTD programmes; provides technical assistance; strengthens the evidence base to inform policy makers and identifies and prioritises interventions that will eliminate lymphatic filariasis and reduce the burden of other neglected tropical diseases.  
[www.cntd.lstmed.ac.uk](http://www.cntd.lstmed.ac.uk)



### COUNTDOWN

COUNTDOWN is dedicated to investigating cost-effective, scale-up and sustainable solutions, necessary to control and eliminate the seven most common Neglected Tropical Diseases  
[www.countdownonntds.org](http://www.countdownonntds.org)



### EHCRC / CIDG

The Effective Health Care Research Consortium (EHCRC) focuses on reliable, relevant evidence by preparing and updating Cochrane Reviews about the effects of health care relevant to low-income and middle-income countries. LSTM hosts the Cochrane Infectious Disease Group.  
[www.evidence4health.org](http://www.evidence4health.org) and  
[www.cidg.cochrane.org](http://www.cidg.cochrane.org)



### GAELF

The Global Alliance to Eliminate Lymphatic Filariasis (GAELF) is hosted by LSTM and coordinates activities of partners and concentrates on political, financial and technical support.  
[www.filaria.org](http://www.filaria.org)



### IVCC

IVCC is a not-for-profit public-private partnership that was established as a charity in 2005. Its mission is to save lives, protect health and increase prosperity in areas where disease transmitted by insects is endemic.  
[www.ivcc.com](http://www.ivcc.com)



### RCDD

LSTM's Research Centre for Drugs and Diagnostics (RCDD) works with industry (SMEs and larger organisations), academia and other NGOs to discover, develop and deliver novel therapies and diagnostics against a range of pathogens. The Centre offers flexible models of collaboration from open access to commercial service provision.  
[www.rcdd.lstmed.ac.uk](http://www.rcdd.lstmed.ac.uk)



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