



Faculty of Epidemiology and Population Health

Ganvie – a 'stilt village' on Lake Nokoue, Benin. In 2011, staff from the Department of Infectious Disease Epidemiology established a multisite trial on alternative strategies for treating TB in HIV-positive patients in West Africa.



The research of the Faculty of Epidemiology and Population Health is focused on using methodologically rigorous and innovative approaches to inform the biological understanding of diseases and to provide evidence for decision making in public health. Its broad research portfolio ranges from investigations of the genetic determinants of specific health conditions to the prediction of future diseases and includes work on communicable and non-communicable disease epidemiology, evaluation of interventions, and demographic and reproductive health. The Faculty's work involves collaborations across disciplines, including epidemiology, statistics, demography, mathematical modelling and social sciences and is often conducted with partner institutions in the UK, other developed countries and in middle- and low-income countries. Further information is available at www.lshtm.ac.uk/epb.

DEPARTMENT OF INFECTIOUS DISEASE EPIDEMIOLOGY

The Department's research approaches include the aetiology and pathogenesis of infectious diseases, intervention trials, health systems and mathematical modelling, applied to, for example, maternal and child health, mental health, as well as infectious diseases in countries at all levels of income.

Highlights of the past year's research include studies on disease classification and burden, immunization, and

malaria vector control. We collaborated in a multinational study in south-east Asia and Latin America to revise the classification of dengue disease to better reflect clinical severity. Based on these results, an evidence-based classification system comprised of two entities, 'Dengue' and 'Severe Dengue' has been incorporated into new WHO guidelines. In another study, analysis of over 3 million UK death certificates showed that autoimmune diseases are a leading cause of death among females, comprising about 3% of adult female deaths. Grouping these disorders together may help to identify and promote prevention strategies in future.

Work continued on the public health potential of immunization. One key issue addressed is how to increase global access to medicines, vaccines and technologies. With the Chatham House Centre on Global Health Security, we examined how donor funds have been used to accelerate the development of low-price supply lines for conjugate vaccines. In a *Lancet* publication¹ we discussed the new 'decade of vaccines' and some of the issues faced by the GAVI Alliance, such as how to achieve consistently low prices and ensure sustained access. We welcomed to the Department Heidi Larson (Senior Lecturer) and her group who study issues around public trust in vaccines by tracking rumours and media sources and their implications for immunization programmes and policies.

Malaria surveillance in Equatorial Guinea confirmed

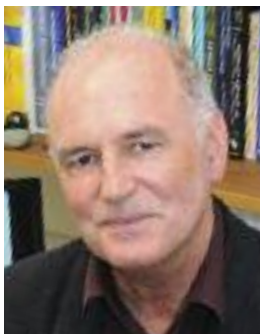
¹ Hargreaves JR, Greenwood BM, Clift C, Akshay G, Roemer-Mahler A, Smith R, Heymann DL. Making new vaccines affordable: a comparison of financing processes used to develop and deploy new meningococcal and pneumococcal conjugate vaccines *Lancet*, 9 June 2011 DOI: 10.1016/S0140-6736(11)60687-9.

the effectiveness of insecticide treated nets and indoor residual spraying (IRS) against infection with malarial parasites, finding that (a) the protective effect of nets lessened as they deteriorated; (b) untreated nets offered some protection in reducing infection relative to those with no net, if the net was intact; and (c) IRS protected those in sprayed and unsprayed houses if neighbourhood spray coverage was over 80%. The study concluded that universal coverage strategies should promote the repair and replacement of torn nets, and that IRS programmes need to ensure high spray coverage.

Other work by the Department is featured in the chapters *Working on Maternal, Newborn and Child Health* (see pages 21-23) and *Working on Tuberculosis* (see pages 18-20).

DEPARTMENT OF MEDICAL STATISTICS

During the year, staff of the Department played a leading role in setting up and successfully running the Centre for Statistical Methodology, as well as continuing to contribute to the Clinical Trials Unit. The Department's research has a broad base, covering both applied and methodological projects. Applied work is in randomized clinical trials (RCTs), epidemiology and clinical studies, mostly focused on non-communicable diseases, maternal and child health, clinical neurology, and pharmaco-epidemiology. With the appointment this year of Neil Pearce (Professor of Epidemiology and Biostatistics), our work now also includes studies of asthma, and occupational and environmental health. Our portfolio of RCTs, which we lead, run and analyse, continues to expand, including for example trials aimed at reducing neonatal mortality in the developing world. Underpinning all these activities is our extensive and internationally recognized methodological work. This year, we highlight a selection of substantive results in cardiovascular research and methodology. Full details can be found at www.lshtm.ac.uk/epb/msd/.



Neil Pearce, Professor of Epidemiology and Biostatistics.

We have recently been statistical collaborators in several clinical trials of exciting therapeutic breakthroughs. Trans-aortic valve implants are a much-less invasive alternative to surgical aortic valve replacement, and PARTNER A and B, two pioneering randomized trials, have demonstrated their efficacy and safety. EMPHASIS, a randomized trial of the drug eplerenone versus placebo in mild heart failure, was so successful in reducing both mortality and hospitalizations that the trial was stopped prematurely.

Our involvement in the analysis of RCTs has stimulated innovative methodology in analysing trials with composite endpoints, such as time to either death or hospitalization. Unlike conventional methods of analysis, our newly proposed 'win ratio' approach gives much greater emphasis to the occurrence of death, while other new methods we have proposed exploit the information on repeat episodes of hospital admission, as well as the timing between them, leading to increased ability (more precisely power) to detect treatment differences.

A major issue in preclinical work, especially in the pharmaceutical industry, concerns the analysis of repeated measurements from very small experiments in models. We showed that existing and proposed methods behaved poorly in various ways and developed a flexible alternative approach with good properties in a wide range of settings.

DEPARTMENT OF NON-COMMUNICABLE DISEASE EPIDEMIOLOGY

The Department undertakes research on a large range of non-communicable diseases both in the UK and internationally. We also contribute extensively to the School's teaching programme, including running several short courses on genetic epidemiology and statistics (in partnership with UCL through the Bloomsbury Centre for Genetic Epidemiology and Statistics) and on cancer survival. This report highlights our work in two conditions of major global public health importance: cancer and obesity.

Members of the Department conducted a large number of studies on the aetiology and prevention of cancer both in the UK and abroad. We led module 1 of the International Cancer Benchmarking Partnership study, the first results of which were published in *The Lancet*². These showed persistent international differences in cancer survival. With Professor P Rothwell (Oxford University), we contributed to an analysis of individual patient data from randomized trials and showed that a low dose of aspirin (75mg daily) reduces the risk of dying from colo-rectal and other forms of cancer. Our work on breast cancer genetics led to the identification of a novel breast cancer susceptibility locus at 9q31.2. We conducted the first comprehensive evaluation of a national cervical screening programme in low- and middle-income countries and found that the national programme in Chile has been effective in reducing mortality from cervical cancer in that country.

² Coleman, MP *et al.* Cancer survival in Australia, Canada, Denmark, Norway, Sweden, and the UK, 1995-2007 (the International Cancer Benchmarking Partnership): an analysis of population-based cancer registry data. *Lancet*, 2011; 377:127-38.

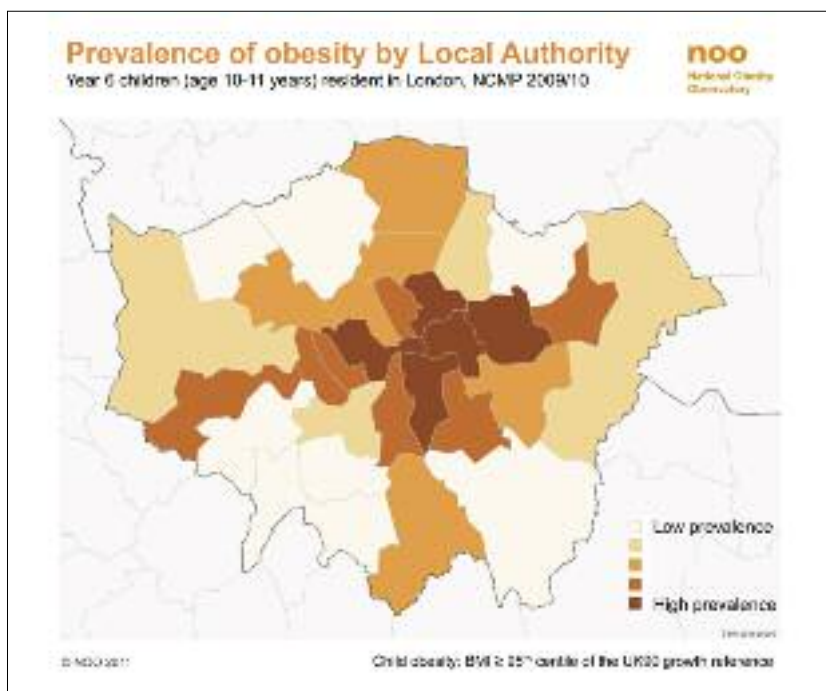


Our UK-based work on obesity includes a large-scale evaluation of the National Child Measurement Programme. An electronic tool for the management of child obesity within primary care is being developed and will be trialled in 2012. Our study of the prevalence and consequences of obesity in pregnancy showed that nearly 40% of women in South London were overweight or obese at the start of their pregnancy, and revealed clear links between obesity in pregnancy and increased risk of poor health outcomes for both the mother and the child. An intervention to increase activity and healthy eating during pregnancy is currently under way. Obesity-related work continues in low- and middle-income countries – see also *Working on Non-Communicable Diseases* (pages 16-17).

WHO Model List of Essential Medicines and its publication in *The Lancet*³ won the BMJ Group *Research Paper of the Year* award. The WOMAN trial⁴ aims to improve outcomes for women with postpartum haemorrhage. The *Txt2stop* trial showed that abstinence from smoking was significantly increased by motivational and supportive text messages (see also page 24). Systematic reviews were completed of the evidence supporting the use of mobile technologies by providers and health services, to encourage health behaviour change and help manage disease.

The DIVIDS study showed that provision of vitamin D supplements to infants in Delhi for the first 6 months of life improved physical growth but did not reduce

Map showing the prevalence of obesity in 11-year old children within London as measured by the National Child Measurement Programme (NCMP), a Department of Health initiative (www.noo.org.uk/visualisation/eatlas). Researchers from the Department of Non-Communicable Disease Epidemiology are undertaking a large-scale evaluation of the NCMP and feedback process to determine the impact of receiving weight-related information on parental weight perceptions and subsequent behaviour change.



their use of hospital services. The CENEX study in Santiago, Chile found that significant benefits for functional health in later life accrued from the provision of regular exercise classes. Studies in The Gambia have shown that a season of conception affects the epigenetic patterns of DNA which may programme individual health profiles in adulthood. Further information about the Nutrition Group's research can be viewed at its website⁵.

The NEWHINTS study is evaluating the impact of home visits by community volunteers on newborn

DEPARTMENT OF NUTRITION AND PUBLIC HEALTH INTERVENTION RESEARCH

The Department's broad research portfolio spans nutrition, maternal and child health, global mental health, emergency and critical care, mobile technologies, agriculture, transport and climate change.

This year, our research had global impact: the CRASH-2 trial result led to the inclusion of tranexamic acid in the

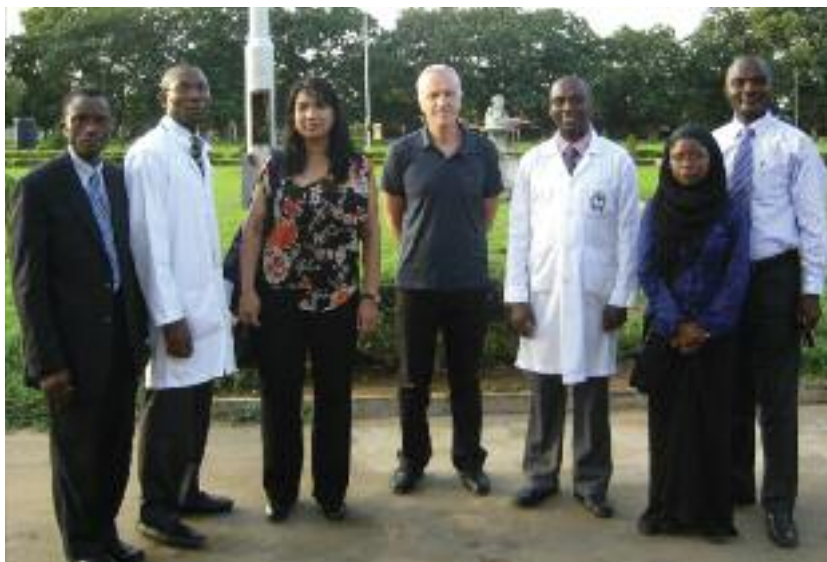
care practices and neonatal mortality in rural Ghana. Our global mental health programme saw completion of the MANAS trial in India, and the launch of the PRIME consortium with academic and ministry of health partners in five countries in Africa and South Asia; both aim to provide evidence-based interventions for people with mental disorders in primary care. With the Faculty of Public Health and Policy we are assessing the economic and public health effects of strategies to

³ Shakur H, Roberts I, Bautista R, Caballero J, Coats T, *et al*. Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial. *Lancet*, 2010;376:23-32.

⁴ www.womantrial.lshtm.ac.uk

⁵ www.lshtm.ac.uk/epb/nphir/research/nutrition

The WOMAN trial of tranexamic acid in postpartum haemorrhage is recruiting patients in ten countries, and more are in the process of applying for the necessary approvals. Hospitals in Nigeria are making a significant contribution and a meeting of local collaborators (seen here) was held in Ibadan in July 2011.



reduce greenhouse gas emissions in the urban transport, household energy, and food and agriculture sectors. Using estimated health impacts and micro-economic modelling, we are assessing changes to healthcare costs. We are also implementing computable general equilibrium models of the UK and Indian economies to estimate impacts on the wider economy.

DEPARTMENT OF POPULATION STUDIES

With support from the Global Fund for AIDS, TB and Malaria, the Department has been working with Tanzania's National Institute for Medical Research, monitoring the uptake and impact of antiretroviral therapy (ART). During the initial years, we mainly worked with the Kisesa population cohort study in Mwanza region to understand what factors determined whether HIV-infected individuals came forward for voluntary counselling and testing, and who would successfully initiate and continue with HIV care and ART treatment. Building on lessons learned in the cohort study, two workshops were organized for the Tanzanian National AIDS Control Programme, to show data managers from the ART service provider organizations how to analyse their clinic data. Tanzanian participants worked with members of

Right Members of the Department of Population Studies with international collaborators from Amsterdam, Athens, The Hague, Jönköping and Paris at a workshop on health inequalities in older people held in the summer of 2011.



the Department to produce an official report on progress of the Tanzania HIV Care and Treatment Plan up to 2010.

The Department has been leading work on health inequalities among older people in Europe as part of a European programme on the social determinants of health. Work continues on the structure of later-life health inequalities in Europe integrating individual and macro level health determinants within the life course

framework. The Centre for Longitudinal Study Information and User Support group (CeLSIUS) celebrated ten years of providing dedicated and expert help to researchers using data from the Office for National Statistics (ONS) Longitudinal Study (LS), a record linkage study including individual-level data from four censuses and vital registration sources. During the past five years the group has supported 150 projects leading to a large number of important publications. CeLSIUS is funded as part of the ESRC Census Programme and organized two sessions at a conference on the UK census held in Manchester in July 2011. Members presented results of research on the shifting balance of moves by older people to live with relatives or to institutional care and presented posters on ONS LS-based research.