

ABSTRACTS

SESSION 1: LINKING BENCH TO BEDSIDE

Linking Bench to Bedside: Understanding how early placentation contributes to adverse outcomes

Professor Graham Burton, Mary Marshall and Arthur Walton Professor of the Physiology of Reproduction and Director of Centre for Trophoblast Research

Like all structures, the placenta must be built off solid foundations in order to function optimally in later pregnancy. Placental development starts at the time of implantation, and growth over the next few weeks is prolific. Evidence from animal species illustrates that a signalling dialogue between the placental trophoblast and the endometrial glands lining the uterus promotes the secretion of growth factors and nutrients during early pregnancy. These factors stimulate proliferation of the trophoblast, and through this loop the placenta regulates its own development. We speculate that an equivalent dialogue takes place in the human but early pregnancy is difficult to research systematically. The recent derivation of endometrial and trophoblast organoids that reflect physiological functions offers new possibilities. This new approach emphasises the contribution of the endometrium to early placental development and hence pregnancy outcome.

Linking Bench to Bedside: Development of a vaccine for malaria in pregnancy

Caroline Pehrson, Consultant Obstetrician and Gynaecologist Hvidovre Hospital/University of Copenhagen

Pregnant women are particularly vulnerable to infection with *Plasmodium falciparum* malaria. *P. falciparum* infected erythrocytes express a protein, VAR2CSA, on the erythrocyte surface, enabling infected erythrocytes to adhere in the placenta. Accumulation of parasites in the placenta is associated with maternal anemia, low birth weight, and stillbirth.

Preventive strategies such as insecticide treated bed nets, intermittent preventive treatment in pregnancy, and prompt diagnosis and treatment of infections are recommended to reduce the impact of placental malaria. However, these interventions do not reach all

women at risk and often the most vulnerable women are left unprotected.

During exposure to *P. falciparum*, pregnant women develop antibodies against VAR2CSA that inhibit parasite adhesion in the placenta and reduce the clinical consequences of placental malaria in subsequent pregnancies. This discovery led to an intense focus on VAR2CSA resulting in two VAR2CSA based vaccines against placental malaria that are currently in phase I clinical trials.

Linking Bench to Beside: Discovery science in rural Africa: parental influences on their offspring's epigenome

Andrew Prentice, Prof of International Nutrition, MRC Unit, The Gambia, London School of Hygiene & Tropical Medicine

In our exciting modern world of collaborative science, it becomes ever more possible to conduct discovery research deep in rural Africa; and ever more relevant to do so. As nutritionists, we seek to understand how the mother's (and the father's) diet just before they conceive a baby might influence the very early development of the resultant embryo. By exploiting a seasonal 'experiment of nature' we have shown that season of conception has a profound effect on the offspring epigenome with evidence that certain genomic regions have evolved to sense the environment, record the information and adapt the phenotype accordingly. This may help us to design pre-conceptional nutrition interventions to optimise fetal development and life-long health in populations worldwide.

SESSION 2: AT THE BEDSIDE

Bench to Bedside: screening for preeclampsia and fetal growth restriction

Gordon Smith, Professor of Obstetrics & Gynaecology, University of Cambridge

Fetal growth restriction (FGR) is defined as a fetus whose growth has failed to reach its genetically determined potential. Multiple aspects of obstetric care are influenced by suspected FGR, including antenatal assessment of fetal well-being, maternal assessment for preeclampsia, the interpretation and response to fetal monitoring in labour, and the timing and mode of delivery. However, currently, screening for FGR in the USA and UK is based on clinical grounds an approach known to have poor sensitivity. An alternative is universal ultrasound, and this has been implemented in some European countries. However, a meta-analysis of randomized controlled trials (RCTs), including 13 studies which recruited a total of ~35,000 women, failed to show any improvement in outcomes. We hypothesise that combined ultrasonic and biochemical screening might have a future role in screening for FGR.

At the Bedside: The quality chasm, crossing closed awaiting urgent repair

Mike English, Professor of International Child Health, University of Oxford

In 2001 the then Institute of Medicine (USA) published a seminal call to arms 'Crossing the Quality Chasm' to create health systems that have high quality health care at their core in the 21st Century. This followed their earlier report To Err is Human. In the same period the global community launched the Millennium Development Goals. Major strides were made in reducing avoidable mortality by 2015, linked to unprecedented development assistance and major efforts to expand coverage with simple, essential interventions. Averting many residual deaths now requires high coverage with high quality often more complex care – so-called effective coverage. Most research and funding remains focused on developing new interventions. Research that tackles the challenge of delivering effective coverage is sparse. Taking neonatal care as an example the presentation will show that the

resultant fragile crossing points enabling transitions from bench to bedside are completely inadequate and must be repaired to benefit populations health.

At the Bedside for child and newborn care: From surviving to thriving

Cally Tann, Consultant Neonatologist & Training Lead, UCLH and Associate Professor, London School of Hygiene & Tropical Medicine
The Global Strategy for Women's, Children's and Adolescent's Health emphasises the need for all children to not only survive but also to thrive. Intrapartum-related neonatal encephalopathy is a leading contributor to death and disability amongst young children in Africa and in high-resource settings, ground-breaking bench to bedside research has dramatically improved outcomes for affected children. However, the existing evidence base on prevention, detection and intervention in low resource settings remains scarce. Dr Tann will present some of the key findings from the ABAaNA studies, examining encephalopathy risk factors, outcomes and interventions for children and their families affected by neonatal encephalopathy in Uganda.

At the Bedside: CRADLE - diagnostics in pregnancy for improved clinical outcomes in LMIC

Andrew Shennan, Professor of Obstetrics, King's College London
The cradle projects have involved developing a unique device, the Cradle Vsa (vital signs alert) to detect blood pressure and pulse that incorporates an early traffic light warning system to indicate risk of shock and hypertension in pregnancy. This talk will discuss the need, development and implementation of the device. It will also discuss its future use and potential in high- income and non-pregnancy settings. The device can be bought from Apec (info@apex.org.uk) for £20. Over 10,000 devices are in use in 20 low income countries.

SESSION 3: IN-COUNTRY PERSPECTIVES: INFLUENCING APPROACHES AND OUTCOMES IN M&NH IN AFRICA

Panel discussion with experts from LMICs,

Angela Chimwaza, Angela Koech Etyang, Annette Nakimuli and Uduak Okomo (Chair, Wendy Graham)

Multi-disciplinary research is widely-viewed as crucial to strengthening the evidence-base on the determinants, consequences and effective interventions to improve maternal and newborn health. Ensuring and enabling the field attracts and retains excellent researchers from low-and-middle-income countries and from a range of disciplines requires understanding the constraints individuals face in the local science and learning environment. In this panel, we will hear personal perspectives from four outstanding women scientists from sub-Saharan Africa in terms of the challenges they have encountered and overcome in their own careers, the advice they would give to the next generation, and their wise words on how to encourage more multi-disciplinary research in MNH.

SESSION 4: PARTNERSHIPS FOR IMPROVING MATERNAL AND NEWBORN HEALTH

Maternal health research in basic science in Africa

Annetee Nakimuli, Makerere University/Mulago Hospital and Charlotte Patient, Consultant Obstetrician, Rosie Maternity Hospital

The partnership between Makerere University/Mulago Hospital, Kampala and University of Cambridge/Addenbrookes Hospital began in 2008. This partnership was initiated under the auspices of the Cambridge Africa programme that aims to provide research strengthening and scientific training to African scientists. The large numbers of women admitted to Mulago Hospital suffering from pre-eclampsia motivated Annetee Nakimuli to conduct PhD research with Ashley Moffett on the genetic basis of pre-eclampsia. Ten years on she is now Head of O&G at Makerere University and has built up other joint initiatives including studying the risk of cardiovascular disease after pre-eclampsia, skills training with clinicians from Addenbrooke's

and writing a book 'Principles of African Obstetrics' to be published by Cambridge University Press.

Developing research capacity in LMIC settings: challenges and successes

Angela Chimwaza, Associate Professor in Reproductive Health, Kamuzu College of Nursing, Malawi

Evidence from research has shown to improve quality of care as well as patient outcomes. It also prevents physical, psychosocial, and financial harms to patients. Therefore, the need for research in nursing/midwifery education, practice and management cannot be overemphasized. Modern nursing which was established in the 19th century focused on practical skills and affection. This begun to change in the 21st century when nursing/midwifery education moved into universities and marked the beginning of the need to search for evidence for the profession.

While high income countries have made great strides in research and publications, LMICs have made slow progress. Challenges include inadequate knowledge in research process, grants writing skills and lack of mentorship. Success in research is observed through Lugina Africa Midwives Research Network, in partnership with University of Manchester. The network provides opportunities to overcome the stated challenges and promote quality research in the region to improve reproductive health

Therapeutic Hypothermia, from bench to bedside and beyond

Topun Austin, Consultant Neonatologists, Rosie Maternity Hospital, Cambridge and University College London

Every day nearly 2000 babies die worldwide after birth from a shortage of blood supply and oxygen to the brain (hypoxic-ischaemic encephalopathy – or HIE). Approximately a quarter of all newborn deaths result from HIE, with 96% occurring in low and middle-income countries (LMIC's). Of those that survive, over half will go on to develop cerebral palsy, epilepsy and other forms of lifelong disability. Protecting the brain has become a major focus of neonatal care in high-income countries. Clinical trials have shown that cooling these infants after birth, not only reduces death, but also results in a

significant number of babies growing up into school age with minimal or no disability. It is surprising that, given the simplicity of the treatment, cooling has not become universally adopted in LMIC's, and is possibly a missed opportunity to make a significant impact on the burden of death and disability in the newborn.

Making a difference in maternal and neonatal health in low-income countries using multimedia

Catherine McCarthy, Chief Executive, Medical Aid Films

Medical Aid Films is a unique organisation bringing together world-class health and medical expertise with creative filmmakers, to develop innovative film and animation to transform the health and wellbeing of women and children in low-income countries. Working in partnership with leading global organisations, NGOs and academic institutions, our films are used to strengthen training and education in over 145 countries, with over 5 million views online each year.

This presentation will highlight the powerful role that media and communications can play in building knowledge, skills and encouraging healthy behaviours in low-income settings and by providing some clips will show examples of our current work with a variety of partners on a range of media platforms and channels.

Drawing on findings from recent project evaluations we will demonstrate that remote rural populations significantly value education through visual images and storytelling, and community films can significantly increase knowledge and skills in maternal and neonatal health in low- income countries.

SESSION 5: NEXT GENERATION RESEARCH AND RESEARCHERS

Maternal sepsis: causes and solutions for low income settings David Lissauer, Institute of Metabolism and Systems Research, Birmingham Women's Hospital Foundation Trust

Maternal sepsis remains a major cause of maternal mortality, yet has not received the international attention it needs. Only recently has it been formally defined, and concerted international efforts made to better understand its epidemiology. I will explore the underlying causes of the high rates of maternal sepsis, including lessons that can be learnt from our developing understanding of maternal immunology and explore some of the myths and truths surrounding maternal susceptibility to infection.

Beyond the biology I will examine efforts from our team and the wider WHO maternal sepsis initiative to prevent maternal sepsis in low income countries. This requires actions to address the whole pathway leading to maternal sepsis related morbidity and mortality. Including infection prevention efforts, and programmes to improve the detection and treatment of maternal sepsis, such as the FAST-M sepsis bundle approach.

Future Generation: funding global maternal and neonatal health research and research leadership

Panel discussion, (Chair, Joy Lawn)

Leading experts from a range of Funders particularly from the UK (Government, MRC, Foundations and others) will discuss major new investments, the changing landscape, and highlight shifts and opportunities particularly for maternal newborn health research and fellowships.

CLOSING SESSION

Awards, next conference, closing comments

Andrew Weeks, University of Liverpool