Measuring the worth of medical research

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Centre profile: MRC Epidemiology Resource Centre

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Measuring the worth of medical research

A new study has shown that every pound that the taxpayer or charity donor invests in medical research yields a wider chain of benefits equivalent to earning 39 pence each year, forever. This study throws into relief the wider importance of investment in medical research for economic growth as well as for social and health benefit.

The contribution of medical research to health is clear. For example, research conducted by the MRC in the 1950s established a link between smoking and lung cancer which has since saved millions of lives. But the wider health and economic benefits of medical research can sometimes be overlooked. In November, the report of a year-long study to investigate this area was published, commissioned in 2007 by the UK Evaluation Forum (the MRC, Wellcome Trust and Academy of Medical Sciences). The report’s findings provide some extraordinary insights into the wider benefits of medical research to both the health and wealth of the UK.

The study was carried out by a consortium involving Brunel University, RAND Europe and the Office of Health Economics. It focused on just two disease areas, the results indicate that total health and GDP gains arising from medical research were equivalent to an annual rate of return of around 39 per cent for cardiovascular disease, and 37 per cent for mental health research. Overall, around 30 per cent of the gains consisted of benefits to the UK economy, and the remainder was derived from health gains from new treatments or preventive measures.

The findings also showed that public and charitable funding of medical research encouraged greater investment from the pharmaceutical industry, a so-called “spill-over” effect. One example of this is that public investment in universities generates skilled graduates, new ideas, networking opportunities and high quality libraries. The report points out that it is no coincidence that high-tech firms choose to base themselves near top-quality universities. Each £1 of extra public charitable investment in UK medical research was shown to yield £2.20 to £5.10 of extra pharmaceutical company investment, which taken together earned an extra £1.10 to £2.50 GDP per year for the UK economy.

Professor Martin Buxton from the Health Economics Research Group at Brunel University, who led the study, said: “The report provides a fascinating insight into the wider health and patient and wider economic benefit. It can be hard to see the full potential of research at the outset, but rather as an opening into a new research field which will lead to even more robust studies in future. However, the results do provide the first real quantitative estimates of the economic benefits of UK public and charitable investment in medical research. Although the work focused on just two disease areas, the results indicate that total health and GDP gains arising from medical research across all areas could be even greater.”

Sir Leszek Borysiewicz, Chief Executive of the MRC, said: “The report provides a fascinating insight into the substantial benefits of medical research. A key message we can take from the findings - particularly during the current economic downturn - is that supporting a wide portfolio of research is very important for future patient and wider economic benefit. It can be hard to see the full potential of research at the outset, but this study shows that investment at an early stage can pay very healthy dividends further down the line.”

Download the full study at www.wellcome.ac.uk/economicbenefits

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Update from the MRC Chief Executive

This month I’ll be attending a two-day residential meeting, which will bring together the MRC Strategy Board and Council for the first time, to finalise the MRC’s strategic plan for the next 5–7 years.

The new strategy will go out for consultation early in the New Year. We expect to deliver our vision and future directions and priorities later in 2009. Watch out for updates in future issues of Network.

As the year draws to a close and we start to plan our future direction, it is a good time to take stock of the many positive strategic changes that have taken place in 2008. We have modified the MRC’s governance and head office structures, including the appointment of eight new members to Council. We also established the Strategy Board at the start of the year and have introduced a more formalised executive role for board chairs in the management and delivery of their board portfolios. This will help to sharpen the focus on how we deliver our research.

Earlier this month, I also co-hosted a Health Opportunities workshop in Scotland with Professor Sir John Savill and the Chief Scientist Office of the Scottish Government Health Directorates. The workshop’s aim was to investigate the merits of supporting early or late-stage research in different areas based on need and scientific opportunity. The workshop forms part of OSCHR’s project to identify areas based on need and scientific opportunity. The workshop forms part of OSCHR’s project to identify areas based on need and scientific opportunity.

The Act is expected to come into force in October 2009. Look out for more detailed guidance for stem cell and embryology researchers in future editions of Network.

KEY AMENDMENTS TO THE BILL: A GUIDE FOR RESEARCHERS

Human admixed embryos – These are viewed by many researchers as critical for more rapid progression of embryonic stem cell research towards potential therapies. The Act defines them and states that they may only be created subject to a HFEA licence; they cannot be kept for more than 14 days or implanted into a woman or animal.

Consent to use of material to create embryos – The Act allows for existing collections of material to be used for embryos subject to strict safeguards, from children and from adults who lack capacity to consent. This would only be legal if other material could not reasonably be used and is subject to HFEA approval. Research into rare conditions will now be able to take advantage of embryonic stem cell techniques and therapies.

HFEA Register – Regulations will now be made to allow researchers to access some forms of the information held by the HFEA on fertility treatments and outcomes. This should facilitate research into the effects of IVF treatments and health outcomes.

Human Fertilisation and Embryology Bill Passed

The Bill to update laws governing embryo research received Royal Assent on 13 November, becoming an Act after a year-long passage through Parliament.

In the final debates on the 29 October, the House of Lords approved several key amendments introduced by the Government during the House of Commons stages. These were all supported by the MRC, which has worked with the Wellcome Trust, AMS, AMRC and Royal Society in advising and briefing parliamentarians.

The Act is expected to come into force in October 2009. Look out for more detailed guidance for stem cell and embryology researchers in future editions of Network.

Draft Animals Directive raises research council concerns

Proposed changes to the European Union’s Animals Directive – which forms part of the regulations for research involving animals in the UK – have caused concern among research councils. The MRC, Natural Environment Research Council and Biotechnology and Biological Sciences Research Council argue changes are necessary - but those proposed may restrict research.

The UK Animal (Scientific Procedures) Act 1986 is based on the original EU Directive, ‘86/609’. The European Commission published the draft revision to update the original Directive on 5 November, with a particular emphasis on improving animal welfare and increasing harmonisation across Europe. However, the councils believe the proposed revisions would lead to more red tape and hamper essential research, with few additional animal welfare benefits.

Speaking on behalf of the three Research Councils, Dr Tony Peatfield, the MRC’s Acting Director of Corporate Affairs, said: “Europe-wide laws regulating the use of animals in research are important. It is time to update the 1986 Directive but we must make sure that any changes promote animal welfare, help to benefit patients, strengthen public confidence, maintain the UK’s economic competitiveness, and keep us at the forefront of global scientific research.”

He added that any changes should be appropriate: “We want to see regulations founded on good evidence and that keep levels of red tape in proportion. The Directive should deliver a consistent approach across EU member states in the use of animals in research but it should allow for flexibility in the way the Directive is implemented.”

The Research Councils are involved in discussions with Government which will prepare the UK response to the draft Directive. The process for approving the revised Directive though the European Parliament and Council of Ministers is complex and could take up to two years. In the meantime, the MRC is working with the Research Defence Society to brief UK MEPs on the Directive, and has offered some of them visits to MRC laboratories that use animals.

If any MRC-funded scientists are willing to host a visit by their MEP, they should first discuss this with their Certificate Holder, and then contact Tony Peatfield (tony.peatfield@headoffice.mrc.ac.uk).


THE RESEARCH COUNCILS’ VIEW

• The proposal to restrict research on non-human primates to the development of treatments or diagnostics for life-threatening or debilitating clinical conditions could exclude both valuable basic research and research on other serious conditions that impact on quality of life. For example, obesity or fertility.

• The Directive should avoid measures that add to bureaucracy – for example, multiple levels of authorisation and review prior to initiation, and during the conduct of research – but which do not lead to positive animal welfare outcomes.

• Specific invertebrate species should not be included in the regulation without better evidence that they may suffer.

• Some of the restrictions on the size of cages and on environmental conditions are over-prescriptive. They may be costly without significantly benefiting animal welfare, for instance.

• The existing restrictions on use of wild-caught animals should not be extended further during debates on this draft, as this could restrict research (including veterinary and behavioural research) on the health effects of environmental change and pollution.

Sir Leszek Borysiewicz

Sir John Savill
The MRC has teamed up with the California Institute for Regenerative Medicine (CIRM), the state’s stem cell agency, to help advance stem cell therapies towards tackling some of the most debilitating diseases.

The UK’s Minister for Science, Lord Drayson, and the chairman of the governing board of the CIRM, Robert N. Klein, signed an agreement in October to lay the foundation for joint UK-California research. The agreement will make it easier for researchers in California and the UK to obtain joint funding. The aim is to bring together the best expertise to focus on specific areas of research.

Research teams from both sides of the Atlantic will be able to apply for funding through a process that builds upon routine CIRM/MRC procedures. For successful applications, the CIRM will fund the California researchers and the MRC will fund those in the UK.

Sir Leszek Borysiewicz, Chief Executive of the MRC, said: “the CIRM and the MRC share the ambition of devising new treatments for currently incurable diseases using the promise of stem cell research. The joint effort we’re launching will make CIRM researchers key partners of UK stem cell scientists. By working closely together we have every reason to hope that we will be able to realise the full potential of stem cell research and bring breakthroughs to the clinic more quickly.”

The CIRM and the MRC plan to hold a conference with leading scientists in the field in January 2009 to discuss the most fruitful options for collaboration.

New ‘lifelong health’ centres have been established in Edinburgh, Newcastle and London as part of a cross-council investment in ageing research.

The Lifelong Health and Wellbeing Programme, funded by the BBSRC, EPSRC, ESRC and MRC, focuses on strengthening multidisciplinary and collaborative research in ageing. Over £11m was awarded to establish the three centres earlier this year. The centres will carry out research into the ageing brain, frailty and quality of life.

At the University of Edinburgh, the Centre in Cognitive Ageing and Cognitive Epidemiology has been established, directed by Professor Ian Deary. It will carry out research into the effect lifespan has on intelligence (cognitive ageing) and the effect intelligence has on lifespan (cognitive epidemiology). Uniquely, it will also pursue the recently discovered link between early life intelligence and morbidity and mortality.

Professor Deary explained: “The way we think is the core of our being, and I want to extend the period that we keep our personality and mental skills. We’re extremely lucky in Scotland to have access to data from the Scottish Mental Surveys of 1932 and 1947, and by following up the people who took part all these years later we’re hoping to develop key insights into the relationship between intelligence and lifespan.”

Newcastle University is hosting the Centre for Brain Ageing and Vitality, led by Professor Doug Turnbull. The first of its two main research programmes will look at age-related brain cell loss and degeneration and vascular disease. The second will aim to increase understanding of how exercise, mobility, nutrition and other aspects of lifestyle can influence vitality.

The third centre is the Crucible Centre, led by Professor Nick Tyler and based at UCL (University College London). It aims to inspire researchers to link the search for longevity with the aspiration to improve wellbeing. By encouraging research collaborations across disciplines, the centre will aim to improve understanding of all aspects of the ageing process from philosophy and economics to how the design of the built environment can affect wellbeing in old age.

Lifelong Health and Wellbeing Call for Proposals
The second phase of the Programme is a call for proposals, supported by the AHRC, BBSRC, EPSRC, ESRC and MRC and UK health departments. Multi-disciplinary applications are invited in:

• Mental capital, mental health and wellbeing
• Markers for the ageing process
• Interventions that promote healthy ageing and independence in later life
• Interactions between determinants of healthy ageing

There will be two modes of funding: LLHW Collaboratives (awards to support high quality research by multidisciplinary teams), and Collaborative Development Networks (short-term awards to create new partnerships across research disciplines). A workshop will be held on 12 December 2008 for potential network applicants. Read more at: www.mrc.ac.uk/ApplyingforaGrant/CallsForProposals/LLHW/index.htm
Supporting safer medicine
The MRC has awarded £3.7m to develop a new centre aimed at reducing the risks of adverse drug effects.

The MRC Centre for Drug Safety Science, launched in October, is based at the University of Liverpool’s School of Biomedical Sciences and led by Professor Kevin Park. Scientists at the Universities of Liverpool and Manchester will work with leading pharmaceutical companies to improve understanding of adverse drug reactions and investigate how to refine the design, tailoring and selection of drugs.

Professor Park said: “Science has made huge advances in drug therapies for a wide range of medical conditions and in the majority of patients these treatments work extremely effectively and save lives. Our team will focus on drugs that have the ability to treat disease but may, in some cases, react badly to the body of individual patients.”

The centre will collaborate closely with pharmaceutical companies AstraZeneca, Novartis, Pfizer and Merck, the Medicines and Healthcare products Regulatory Agency, and the Association of the British Pharmaceutical Industry to improve patient care and help to develop new medicines for the future.

Read more about the centre at: www.mrc.ac.uk/NewsViewsAndEvents/News.

New asthma labs open
New laboratories were opened at the MRC Asthma UK Centre in Allergic Mechanisms of Asthma in October by the MRC Chief Executive, Sir Leszek Borysiewicz.

The new laboratories are part of a £10m investment from King’s College London, Guy’s and St Thomas’ Foundation Trust and Guy’s and St Thomas’ Charity in asthma and allergy research. The expansion of the centre will allow scientists to focus on environmental and respiratory health and the impact of the low emission zone in London.

Sir Leszek said: “The potential for this centre to lead the way in asthma and allergy research across the world is inching closer with the opening of new laboratories. The MRC’s collaboration with King’s College London, Imperial College and Asthma UK in establishing the centre has enhanced our insight into asthma and allergy. The expansion of facilities means we have taken another positive step towards creating new and improved treatments.”

With funding from the Japanese Health Sciences Foundation, the MRC’s Dr Arthur Mitchell ran a two-day training session for bio-safety officers at the Institute, covering topics ranging from the law and duties of a biological safety officer to transportation of hazardous substances and design of containment facilities. The course was attended by 40 participants from institutes across Japan, including representatives from the Japanese Ministry of Health.

Arthur said: “A strong impression I got was that prior to this course few interactive sessions have been designed in Japan. Most seminars are very much sit and listen. The response from the participants was extremely encouraging and those who participated really enjoyed the interactive sessions and particularly a design exercise for a Containment Level 2 laboratory.”

The MRC visit also included meetings with senior NIID staff to discuss the structure of MRC safety management and the new accreditation scheme for UK biological safety officers, a talk at a clinical microbiology seminar and a visit to Shiba University.

The NIID intends to use questionnaire responses from the training courses to inform the development of a national training and development programme in Japan.

Talking Japanese bio-safety
Staff from the MRC’s corporate Health, Safety and Security team recently paid a visit to Tokyo’s National Institute of Infectious Disease (NIID) to talk about how bio-safety training is carried out in the UK.

Hundreds of Hertfordshire residents whose birth records have helped MRC scientists to understand more about the effect of early life on health in adulthood attended a special meeting in September.

The Hertfordshire Cohort Study, now 20 years old, is run by the MRC Epidemiology Resource Centre (ERC) in Southampton. The event, held at Castle Hall in Hertford, highlighted how the participation of the ‘Hertfordshire babies’ has shed light on the links between early development – such as birth weight and growth in the first year of life – and adult health.

Professor Cyrus Cooper, Director of the ERC, explained: “If you compare the maps of common diseases, such as heart disease and osteoporosis, in England and Wales today with one of infant mortality 70 years ago, there is a startling similarity. The parts of the country which once had the least healthy babies are now the hotspots for heart disease. This led us to ask ‘do poor conditions in early life lead to heart disease and other diseases of adult life?’”

Hertfordshire was chosen for the study because, uniquely, it had preserved its midwife and health visitor records since 1911. This provided readily available information on the early growth and health of thousands of residents.

The study has allowed scientists to make many illuminating discoveries. For example, low birth weight can lead to worse adult lung function and diabetes, and the method of weaning and age at weaning can influence adult cholesterol concentrations. The study also provided the first evidence that growth in infancy is related to bone mass, and therefore the risk of osteoporosis, in later life.

For more information on the study, go to www.mrc.soton.ac.uk/herts

Professor Cyrus Cooper watches former Director, Professor David Barker, cut the cake

Thanking the ‘Hertfordshire babies’

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Top image: Hertfordshire baby Margaret Duff
Bottom image: Professor Cyrus Cooper watches former Director, Professor David Barker, cut the cake
A new web resource providing practical help for researchers carrying out experimental medicine studies has been launched by the MRC Regulatory Support Centre.

The Experimental Medicine Toolkit helps researchers to follow good practice for studies that fall outside the scope of current regulations, such as microbial challenge studies in which human volunteers are deliberately infected with micro-organisms in order to develop new vaccines.

Designed in the style of an interactive route-map, the Toolkit plots the research process from initial questions through to the end of the study, particularly focusing on the planning and approvals stages.

Rachel Smith, who led the project, said: “It’s often difficult to get experimental medicine studies up and running because of complex and often unanticipated governance issues. This toolkit is designed to clarify the process and give researchers the confidence to take a risk-based approach by following accepted good practice. Time spent planning can pay dividends later.”

This is the latest of three toolkits produced by the MRC Regulatory Support Centre. The Clinical Trials Toolkit guides researchers through requirements for studies testing the safety or efficacy of a medicine, while the Data and Tissues Toolkit helps with the consent and confidentiality issues of using personal information and human tissues in research.

MRC researchers and research managers in the NHS and universities can also get authoritative answers to specific regulatory questions from the UKCRC Regulatory and Governance Advice Service, which is jointly coordinated by the MRC Regulatory Support Centre.

The Toolkits and other services can be accessed from the Regulatory Support Centre web pages at: www.mrc.ac.uk/regulatorysupportcentre

A new website has been launched to help clinical researchers and funders find UK clinical trials units with the most relevant expertise in coordinating multicentre trials.

UKCRC Registered Clinical Trials Units (www.ukcrc-ctu.org.uk) lists information on units with expertise in centrally coordinating multicentre clinical trials – from the design stage through to final analysis. Users of the website can search for units by name, location, research area or study type.

The website was developed and funded by the NIHR Clinical Research Network Coordinating Centre on behalf of the UK Clinical Research Collaboration (UKCRC).

Professor Janet Darbyshire, Head of the MRC Clinical Trials Unit and Joint Director of the Coordinating Centre, said: “Working with Clinical Trials Units can help to increase the quality of clinical trials which ultimately brings more meaningful results. The UKCRC Registered Clinical Trials Units website provides an easy route for researchers and funders to tap into the fantastic experience and expertise that these units provide.”

A new National Survey of Sexual Attitudes and Lifestyles (NATSAL) is to be carried out in 2010; the third such study in Britain in as many decades.

The team behind NATSAL has secured £7.3m funding from a group of funders, including the MRC, to study 15,000 randomly selected men and women aged 16 to 74. The survey aims to represent views and lifestyles from all walks of life across all regions. The age group covered has been extended to include the older population.

The 2010 survey will be based on the methods used in the previous surveys to allow comparisons to be made, but will also include anonymised biological data on sexually transmitted infections and sex hormone levels, and the study of human behaviour. Confidentiality is safeguarded by data encryption and ensuring that no personal identifiers are stored with interview data. Participants will be able to ‘interview themselves’ in privacy at home by entering answers into a laptop provided by the interviewer; a method that has been shown to lead to more accurate reporting, especially on sensitive topics.

Professor Anne Johnson, Director of the UCL Division of Population Health, said: “The 1990 and 2000 NATSAL surveys provided a wealth of information on sexual lifestyles, the risk of sexually transmitted infections, as well as the use and preferences for sexual health services. The data have been widely used to guide policy for sexual health education and services in Britain. We are delighted at the award of the funding and hope the 2010 survey will help improve sexual health promotion and treatment services.”

The new research will help to inform and evaluate interventions designed to improve sexual health status, including both ill-health and sexual wellbeing. It is hoped that the study will improve understanding of the relationship between physical and sexual health throughout life.

The research team will be based at UCL (University College London), the National Centre for Social Research and the London School of Hygiene & Tropical Medicine with collaborators from the Health Protection Agency and University of Manchester joining the team to study new areas. NATSAL 2010 will be jointly funded by the MRC, the Wellcome Trust, the Economic and Social Research Council and the Department of Health.
Ron Farr, 82, is a retired personnel director from Hitchin in Hertfordshire. He is married, has three children and enjoys painting. Ron is also a ‘Hertfordshire baby’ – a member of the Hertfordshire Study Cohort (HSC), a large group of county residents who are helping scientists to understand more about how our early life can affect our health in adulthood and the ageing process (see p9).

The HSC is just one of several large-scale epidemiological studies that are run by the MRC Epidemiology Resource Centre (ERC) in Southampton. Founded in 2003 under the direction of Professor Cyrus Cooper, the ERC is a centre of excellence in epidemiology; addressing the causes and prevention of common chronic disorders such as heart disease, osteoporosis, diabetes and obesity. The unit supports linked research programmes on the epidemiology of bone disease; occupation and health; and developmental origins of health and disease in India, as well as developing and managing long-term cohort studies like the one Ron belongs to.

Cyrus says: “The work of our unit fits in with key MRC health priorities such as musculoskeletal diseases, life-course studies of ageing, translational public health research and clinical medicine.”

The ERC occupies a purpose-built block on the campus of Southampton General Hospital and has around 60 staff, including many scientists who hold clinical appointments. The walls of the building are lined with stunning black and white photographs of the Southampton and Indian cohorts.

Developmental origins of adult disease

The ERC started out in 1979 as the MRC Environmental Epidemiology Unit (EEU), with a remit to investigate the occupational and environmental causes of disease within the UK. However, in the mid-1980s the unit’s focus shifted to the developmental origins of adult disease; looking at how growth and development in foetal life, infancy and childhood can influence the risk of coronary heart disease, stroke, type 2 diabetes and osteoporosis in later life.

Cyrus explains: “For many years we have known that birth weight and weight in infancy predict the future risk of several chronic disorders including osteoporosis and heart disease. These observations were initially made in studies such as the HSC and have been widely confirmed around the world. Birth weight is a general indicator of the environmental circumstances of a mother prior to and during pregnancy. The findings led to the hypothesis that poor conditions in utero (such as under-nutrition) cause the developing foetus to make physiological and metabolic adaptations that persist into adult life and predispose him or her to later disease.”

Hertfordshire Study Cohort

So how do Ron and the three thousand other Hertfordshire babies fit in with this hypothesis and the unit’s research programmes? To study the developmental origins of disease you need to study a person closely from conception to adulthood. Hertfordshire residents were chosen for the cohort as their birth details were included in comprehensive midwife and health visitor records kept in the county. Measurements taken before, during and after birth could be compared to health assessments made by ERC scientists of the ‘babies’ in adulthood; for example medical histories, exercise patterns, strength tests, DNA and blood tests.

The HSC data have provided a basis for a wide variety of investigations into the associations between early development and clinical outcomes such as osteoporotic fracture.

Dr Elaine Dennison, a rheumatologist at the unit, says: “This unique cohort has allowed us to relate an individual’s early life experience, their genetic makeup and their adult lifestyle to their adult bone health. We now hope to follow these individuals to see if the factors identified are also associated with their risk of fracture.”

The HSC is closely linked to the ERC’s bone and joint programme. Professor Avan Albie Sayer, an MRC clinical scientist and Honorary Chair in Geriatric Medicine at the University of Southampton, uses birth cohorts to study the causes, consequences and prevention of sarcopenia (degenerative loss of skeletal muscle mass and strength associated with ageing) and frailty in older people.

She says: “We can learn so much about the ageing process from studying cohort members. By assessing the decline in physical function which accompanies ageing and performing detailed physiological studies (such as examining specimens of muscle) we can delineate precisely the mechanism for sarcopenia and aim to develop strategies which improve the physical capacity of our ageing population.”

Southampton Women's Survey

While the HSC has shown the importance of development in utero and in early life in determining the risk of chronic diseases later in life, the Southampton Women’s Survey (SWS) uses cohorts to explore how maternal influences might initiate developmental adaptations and have long-term consequences for a baby’s health.

Between 1998 and 2002, around 12,500 non-pregnant Southampton women aged 20-34 were interviewed about their diet, physical activity, lifestyle and social circumstances; their body composition was measured, blood and samples from the cheek inside the mouth were taken. Of these women, more than 3,000 have delivered babies and these babies are now being monitored as they grow up to find out how maternal nutrition affects foetal, neonatal and childhood development.

So what has the SWS revealed so far? Professor Hazel Inskip, who runs the survey, says: “The survey has led to a focus on the health and nutrition of young women. A woman’s diet before she becomes pregnant influences the development of the foetus and the child. For example, the mother’s diet before pregnancy is associated with the level of blood flow to the foetal liver. We also found that lower levels of bone mineral density are found in children born to mothers with lower levels of vitamin D during pregnancy. We are now developing interventions to improve diets in women and their families, and to educate teenagers in schools about their health and, in due course, that of their children.”

Data from the SWS also support additional studies on depression, placental function and bone development.
Bone and joint research
The ERC has studied the epidemiology of bone disease, specifically osteoporosis, since 1985. Osteoporosis, characterised by low bone mass and the breakdown of bone tissue, leaves people more vulnerable to fracture and affects 50 per cent of women and 20 per cent of men over the age of 50 in the UK. This in turn places a huge burden on NHS resources, making it a vital area for research.

There has already been research into the extent to which the disease might be linked to environmental influences before and just after birth. Using data from the SWS, ERC researchers have observed that a baby’s ability to accrue bone mineral is at a peak during intrauterine and early post-natal life. Therefore, environmental changes during this important period in development may profoundly affect the risk of osteoporosis in later life.

Cyrus, who leads the bone and joint programme, says: “We’re aiming to gain a greater understanding of interactions between genetic markers for osteoporosis, the intrauterine/early post-natal environment and adult lifestyle as determinants of bone strength, propensity to skeletal trauma and fracture risk. The ultimate goal is to create a platform of intervention studies in young women that will optimise skeletal health in their offspring.”

He adds: “This has led to the planning and funding of a large randomised control trial in which mothers insufficient in vitamin D take dietary supplements with a view to enhancing the bone development of their offspring.”

Occupation and environment
Some of the ERC’s research continues within its original remit to investigate occupational and environmental causes of disease. This programme of work is being led by Professor David Coggan and Professor Keith Palmer.

Now that the causes of most of the serious occupational hazards of our modern world have been identified and addressed, attention has shifted to non-fatal work-related disorders that give rise to widespread illness and disability and put financial pressure on employers and healthcare services. Important among these are musculoskeletal disorders of the spine, upper limbs and large joints. Back pain alone costs the NHS an estimated £690m each year.

At the same time, increased public awareness of the potential dangers of workplace hazards, including using mobile phones, could also pose important recognised risks to health.

Keith, an Honorary Professor of Occupational Medicine at the University of Southampton and Consultant Occupational Physician, explains: “Evidence is showing us that conditions such as repetitive strain injury and lower back pain do not always occur simply through over-exposure to a hazardous agent or activity. Rather, the risk of symptoms and disability appears to be importantly modified by individual psychology and by societal beliefs and expectations.”

He adds: “Understanding the contribution of these non-occupational influences is crucial to tackling the problem. For example, efforts to prevent back pain through restrictions on lifting might have unintended adverse consequences if they reinforce workers’ expectations of injury.”

Both scientists, and their colleagues, contribute widely to the public debate on the risk factors and clinical management of occupational health. David has been involved in investigations into Gulf War illnesses, mobile phone-related issues, chronic fatigue syndrome/ME and multi-chemical allergies. Keith chairs the Industrial Injuries Advisory Council, a government body that advises ministers on occupational causes of illness and their compensation.

Future directions
The ERC has created a formidable body of research findings in a wide variety of health-related areas. The unit’s findings and subsequent interventions may one day directly inform and affect the health of ageing populations across the world. Where does Cyrus think the unit will go next? “The future evolution of our research programme will see an emphasis in two directions. Firstly, translation to effect public health interventions before and during pregnancy which improve one’s health status many decades later; secondly, to move towards a more profound understanding of the molecular and cellular mechanisms for this developmental component of disease risk.”

For more information on the Epidemiology Resource Centre, go to www.mrc.soton.ac.uk
What’s new on mrc.ac.uk

Latest podcasts

Sir Leszek Borysiewicz: a year at the helm of the MRC
The MRC Chief Executive reflects on achievements and changes during his first year leading the MRC. Sir Leszek (pictured left) discusses new working relationships with NIHR and OSCHR, the MRC’s renewed focus on basic research and translation, as well as putting the organisation’s research performance under scrutiny to ensure that funds are spent wisely.

Sarah Kenyon on the difficult findings of the Oracle Children Study
What happens when a research study reveals unexpected results? And how do MRC scientists deal with sharing the results responsibly? MRC Scientist Sarah Kenyon discusses what happened when an MRC follow-up study on treating women in premature labour with antibiotics revealed difficult and complicated findings.

Annual Review: people talk about experiences of medical research
The MRC’s Annual Review 07-08 tells the stories of MRC research achievements over the last year, featuring profiles of scientists and people who have helped them in their quest to improve health. One such profile is of ex-journalist David Ward (pictured left), who took part in the National Survey of Health and Development from his birth in 1946. He talks about what it’s been like to have his life studied in intimate detail – from records of what he ate for breakfast as a toddler to how his childhood verbal reasoning skills compared with those of his daughter at the same age.

To download these and other MRC podcasts go to: www.mrc.ac.uk/NewsViewsAndEvents/Podcasts/index.htm
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Below: Smallpox virus

From pregnancy to prostates: public talks on hormones and disease
Following the success of its first public talks series last year, the MRC Human Reproductive Sciences Unit has announced that a second series, Let’s talk about… hormones and disease, is to run this winter.

Let’s talk… is an initiative from the Centre for Reproductive Biology, a partnership between the Unit and Edinburgh University’s Division of Reproductive and Developmental Sciences.

Professor Alan McNeilly, the Unit’s programme leader and chair of the organising committee, explained the format: "At each event, a clinician presents a health problem for which there is currently only limited management or treatment. This is followed by a talk from one of our scientists who describes how their research might offer solutions to the problem."

"The talks are aimed at non-specialists, rather than non-scientists, and we were thrilled that people from so many different backgrounds came to the first series. I’m delighted that we have the support of the unit and university to run a second series," he added.

2008/09 Let’s talk about… hormones and disease programme

- Pregnancy in the wrong place: causes and diagnosis of ectopic pregnancy
- Who’s in control? How hormones rule our lives from start to finish
- Things that go p** in the night: how well do you know your prostate?
- Catching the silent killer: understanding ovarian cancer
- Born too soon: causes, consequences and dealing with premature babies.

The talks are taking place between November 2008 and March 2009. Full details can be found at www.crb.ed.ac.uk/letstalk

Apocalypse How?
Scientists from MRC Harwell and Imperial College London recently joined forces to host a café scientifique in Oxford about pandemic ‘flu. The event was part of a series of ‘catastrophic’ talks held at Science Oxford on the theme of ‘Apocalypse How?’ - held to commemorate the popular science centre’s third birthday.

The ‘Apocalypse How?’ theme explored issues around the biggest risks to human life on earth and featured a diverse range of talks from cataclysmic cosmic explosions to volcanic super-eruptions.

The MRC event was entitled ‘Atishoo! Atishoo! We all fall down: Pandemic ‘flu and the end of the human race.’ MRC Harwell PhD student Sulzhan Bali introduced the audience to the structure and abilities of viruses: from smallpox to tuberculosis and HIV. Dr Miles Slimmer, a virologist at Imperial College London, then took a tour through the history of global influenza epidemics and identified why we should be concerned about possible mutations to H5N1 – the avian ‘flu virus.

Dominic McDonald, Head of Public Programmes at Science Oxford, said: “It was a good evening and it seems that everyone enjoyed themselves. There was a good variety of questions related to ‘flu and ongoing research; from where to buy Tamiflu to how the credit crunch may affect the continuation of influenza research.”

For more information on Science Oxford go to: www.scienceoxford.com

Below: Smallpox virus

What’s new on mrc.ac.uk

Latest podcasts

Sir Leszek Borysiewicz: a year at the helm of the MRC
The MRC Chief Executive reflects on achievements and changes during his first year leading the MRC. Sir Leszek (pictured left) discusses new working relationships with NIHR and OSCHR, the MRC’s renewed focus on basic research and translation, as well as putting the organisation’s research performance under scrutiny to ensure that funds are spent wisely.

Sarah Kenyon on the difficult findings of the Oracle Children Study
What happens when a research study reveals unexpected results? And how do MRC scientists deal with sharing the results responsibly? MRC Scientist Sarah Kenyon discusses what happened when an MRC follow-up study on treating women in premature labour with antibiotics revealed difficult and complicated findings.

Annual Review: people talk about experiences of medical research
The MRC’s Annual Review 07-08 tells the stories of MRC research achievements over the last year, featuring profiles of scientists and people who have helped them in their quest to improve health. One such profile is of ex-journalist David Ward (pictured left), who took part in the National Survey of Health and Development from his birth in 1946. He talks about what it’s been like to have his life studied in intimate detail – from records of what he ate for breakfast as a toddler to how his childhood verbal reasoning skills compared with those of his daughter at the same age.

To download these and other MRC podcasts go to: www.mrc.ac.uk/NewsViewsAndEvents/Podcasts/index.htm
You can also read the latest MRC news or subscribe to RSS feeds to receive news as it is published at: www.mrc.ac.uk/NewsViewsAndEvents
OBITUARIES

Dr Jacob Brown Okoko, 1965 – 2008
Paediatrician Dr Okoko was Principal Investigator on the Meningococcal Vaccine Project at the MRC The Gambia field site in Basse. He died suddenly in his sleep in September during an official visit to Tanzania.

Dr Okoko graduated from the University of Calabar with a degree in Medicine and Surgery, and completed his postgraduate Paediatrics training at Jos University Teaching Hospital, Nigeria. He moved to The Gambia in 1996, heading the Paediatric Unit of Bansang Hospital until 1998. During his tenure, in collaboration with the MRC and the University of Liverpool, he conducted research into placental malaria which contributed to the World Health Organization’s policy of malaria prophylaxis for pregnant women.

He joined the MRC in 2000 as a research clinician with the Pneumococcal Vaccine Project in Bansang and later completed a Masters degree in Public Health at the University of Cardiff. A Clinical Research Fellowship at King’s College London followed, where he worked on antioxidants and childhood asthma.

Dr Okoko returned to The Gambia in August 2006 as Principal Investigator of the Meningococcal Vaccine Project, leading a phase II clinical trial of a meningococcal A conjugate vaccine in children aged 12 to 33 months and later a pivotal phase II/III trial of the vaccine in two to 29-year-olds. Paying tribute to her former colleague, Dr Monique Berlier of the Meningococcal Vaccine Project said that Dr Okoko’s wisdom, energy, common sense and commitment to community participation made a huge contribution to the trial’s success.

Dr Okoko is survived by his wife Caroline and their three young children, Grace, Elshaddai, and Ebenezer.

MRC PEOPLE

Director wins Genetics Society Medal
Professor Steve Brown (pictured right), Director of the Mammalian Genetics Unit at MRC Harwell, has been awarded the 2009 Genetics Society Medal for his research contribution in genetics.

Steve is internationally recognised for his seminal contributions to mouse and mammalian genetics. He played a leading role in developing high-resolution genetic and physical maps of the mouse genome. Most notably, he helped initiate the large-scale mouse ENU mutagenesis programme at Harwell for the generation of new disease models. Steve’s own research interests focus on mouse deafness models, through which he has contributed to our understanding of the genetic bases of hearing loss.

Steve said: “There has been enormous progress in mouse genetics over the last decade and Harwell has been at the forefront of these developments. It is a tremendous pleasure to receive this recognition.”

MRC scientists recognised for excellence in molecular biology
Several MRC scientists join a 59-strong list of leading international life scientists elected as members of the European Molecular Biology Organisation (EMBO) this year, in recognition of their proven excellence in research. EMBO membership is a lifelong honour, and is represented by a high-profile cross-section of researchers from all fields of molecular life sciences. The MRC scientists elected this year were: Alex Gould, James Briscoe and Brigitte Stockinger of the MRC National Institute for Medical Research; Sarah Bray of the University of Cambridge; Andrew Lumonde of the University of London; Javier Caceres of the MRC Human Genetics Unit; Len Stephens of The Babraham Institute; and Roger Williams of the MRC Laboratory of Molecular Biology.

Honorary OBE for top neuroscientist
Professor Paul Matthews, a Professor of Clinical Neurosciences at Imperial College London, has been awarded an Honorary OBE for services to science. Professor Matthews is internationally renowned for his innovative studies of the functional pathology of brain disease. He helped to pioneer development of advanced approaches to brain imaging, and plays a key role in rapid translation of fundamental biomedical research into improvements in healthcare as GlaxoSmithKline’s Vice-President for Imaging and Head of the GSK Imaging Centre. He was the first Director of the MRC-funded Centre for Functional Magnetic Resonance Imaging of the Brain within the Department of Clinical Neurology, and holds an MRC Clinical Research Professorship.

MRC scientists attend joint genetics retreat
More than 400 scientists, support staff and students from the Institute of Genetics and Molecular Medicine (IGMM) gathered for the Institute’s first scientific retreat in October.
Understanding embryo implantation offers insight into infertility

MRC and Wellcome Trust-funded researchers have discovered a process that governs embryo implantation in the lining of the womb. The research sheds light on what might go wrong when embryos fail to implant, which is a common cause of infertility.

A team from the University of Oxford and King’s College London studied the process by filming embryos implanting themselves into a layer of cells from the womb lining in a culture dish and discovered the involvement of two proteins from the Rho GTPase family. The first protein, Rac1, causes cells in the womb lining to move out of the way to allow embryo cells to invade, while the second, RhoA, stops this happening. The researchers believe that the balance of the two proteins is critical for successful implantation of the embryo.

Professor Helen Mardon of the University of Oxford, who led the study, said: “In many women, attachment and implantation doesn’t happen and this is a major cause of infertility. By understanding better how this process works, we may be able to inform the development of drugs to help embryos implant properly.”

PNAS advance online publishing, Monday 29 September 2008

Free bed nets cut malaria infection in The Gambia

The introduction of free insecticide-treated bed nets has led to a significant fall in malaria infections in The Gambia since 2003, an MRC-funded study has shown. The study’s findings throw weight behind the proposal that increased investment in malaria interventions in Africa can have a major effect on reducing morbidity and mortality from the disease.

Researchers carried out a retrospective analysis of original records to establish the numbers and proportions of malaria deaths, in-patients and blood-slide examinations at one hospital over nine years, and at four health facilities in three different administrative regions in The Gambia over seven years. The study revealed that between 2003 and 2007, at the four sites with complete slide examination records, the proportion of people with malaria and parasites decreased by between 50 per cent and 82 per cent. At three sites with complete admission records, the proportions of malaria admissions fell by 27 per cent to 74 per cent. Between 2003 and 2007, the proportions of malaria-attributed deaths in two hospitals also fell dramatically from seven to none in one hospital and from 22 to one in the other. Dr David Conway from MRC Unit in The Gambia, and an author of the study, said: “These findings should urge leaders to push policies and research to see whether malaria can be eliminated as a public-health problem in some areas.”

Lancet 2008; 372: 1545–54

A new ‘smear test’ to prevent anal cancer

Scientists at the MRC Cancer Cell Unit in Cambridge have found a new and improved technique to detect anal cancer that could significantly cut deaths from the disease. The study, co-funded with Cancer Research UK, first involved screening anal tissue samples from patients to pick up the biological differences between normal cells and cancer cells. The researchers found that normal tissue lacked mini chromosome maintenance proteins (MCMs), whereas anal cancerous and pre-cancerous tissue had an abundance of the proteins. An independent group study of anal smears from 144 people successfully identified 84 per cent of the patients with anal pre-cancer, without producing a high rate of false alarms in people without disease. Dr Nick Coleman, lead author of the study, said: “Anal cancer is a difficult disease to detect and many cases are identified after it becomes too late for people to undergo simple surgery to remove it. We wanted to create a test which was easier to perform and had a high rate of accuracy. This study suggests that MCM testing fits the bill very well indeed.”

Cancer Epidemiology Biomarkers and Prevention 2008; 17:2855–2864

Improved vaccine could wipe out polio in Nigeria

Researchers at the MRC Centre for Outbreak Analysis and Modelling at Imperial College London have discovered that a polio vaccine recently introduced in Nigeria protects four times more children than previous vaccines. The study’s authors claim that monovalent oral poliovirus vaccine, known as mOPV1, could eradicate type-1 polio in Nigeria if it reaches enough children. The researchers analysed the vaccination histories of more than 20,000 children with acute flaccid paralysis, 14 per cent of whom had polio, between 2001 and 2007. They discovered that with each dose of mOPV1 received, a child in Nigeria has a 67 per cent chance of being protected against type-1 polio, compared with 16 per cent with the standard trivalent vaccine. Nigeria is one of the last four countries where polio has yet to be eliminated and accounts for the majority of global cases this year. Helen Jenkins, one of the study’s authors, said: “In Nigeria, we now have an effective vaccine to use and we’ve seen the start of improvements in vaccine uptake. These last pockets of unvaccinated children now need to be reached to achieve elimination in Nigeria and this in turn will have a dramatic impact on the prospects of worldwide eradication.”

Scientists gain an insight into the media

Scientists have been getting a behind-the-scenes glimpse of how the media works through short placements part-funded by the MRC.

Run by the British Association for the Advancement of Science, the Media Fellowships aim to boost awareness and understanding of the media among scientists and engineers. Over the three to eight-week placements, scientists work with journalists to produce science pieces under real media conditions. The aim is to leave participants better equipped to communicate their research and expertise to the public and their colleagues.

Dr Angela Hodges, a lecturer at the Institute of Psychiatry, has just completed a 2008 Media Fellowship with BBC news correspondent Nick Hightam. She said: “This has been a wonderful insight into the complexities of identifying TV news stories, pitching them to the various news outlets and producing them. Even though findings may be hugely significant, for many complex reasons good science frequently doesn’t make it to TV.

“Representing your main findings and their implications clearly and without jargon in as little as two sentences during an interview really is the difference between ending up on air or in an editor’s dustbin, no matter how good the science is.”

The closing date for next year’s BA Media Fellowships is 3 March 2009. For more information, visit www.the-ba.net/mediafellows

BBSRC Diamond Professors Research Fellowships

The BBSRC is planning to award up to two BBSRC Diamond Professors Research Fellowships (DPRFs), to be located at the new Research Complex at Harwell.

The DPRFs are available to outstanding researchers to encourage the development and application of new techniques in synchrotron radiation to biological research that falls in the BBSRC remit using the Diamond facility.

For more information go to: www.bbsrc.ac.uk/funding/fellowships/diamond_professorial_fellowships.pdf

Research Councils UK opens India office

October saw the opening of a new Research Councils UK (RCUK) office in India. The New Delhi office will encourage research collaboration between the two countries and foster relationships in the international research and business communities.

Working with Indian funding bodies, the office will share strategies, discuss funding priorities and pursue collaborative research. It builds on research projects which have already combined the talents of the two countries.

Professor John Beddington, UK Chief Scientific Advisor, said: “The opening of the RCUK Office in India is yet another demonstration of how the UK is recognising the value of global collaboration in tackling future challenges. Working with partners in emerging economies is vital to bring about the best possible research outcomes. In this time of economic gloom and doom, it is important that we keep sight of the big picture and work together with global partners to achieve solutions.”

For more information on the RCUK office go to: www.india.rcuk.ac.uk