

HOW WE ARE MAKING
A DIFFERENCE:

ASSESSMENT
FRAMEWORK
REPORT SUMMARY
2008/09

How we are making a difference: Assessment Framework Report Summary 2008/09

BACKGROUND

1. The Assessment Framework Report outlines the Wellcome Trust's achievements in relation to its Strategic Plan for 2005–2010. The Strategic Plan outlines ten key indicators of progress, which we report against annually.

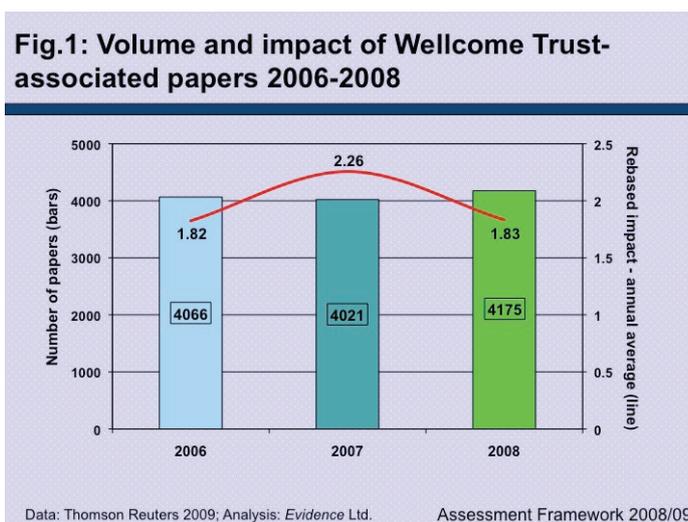
2. The Report contains quantitative and qualitative information that reflects the breadth and complexity of the impacts associated with Wellcome Trust funding support. Outputs and achievements associated with Trust activities predominate in the Report, although some new initiatives are included where these are considered to be key achievements. This summary provides highlights from the full Report.

3. Unless otherwise stated, **all data refer to outputs and achievements arising and reported during the Trust's financial year: 1 October 2008 to 30 September 2009.**

4. The Wellcome Trust's Assessment Framework Report will be developed to complement the new Strategic Plan for 2010–2020.

1. SIGNIFICANT ADVANCES IN THE GENERATION OF NEW KNOWLEDGE

- For the 2008 calendar year, 4175 research papers associated with the Wellcome Trust were indexed on PubMed and appeared on Thomson Reuters databases. (This compares to 4021 papers in 2007, and 4066 in 2006; see Figure 1.)



- These papers were spread across 119 of the 253 different research fields identified by Thomson Reuters; papers most commonly featured in *Biochemistry & Molecular Biology* (n = 613 papers, 15%).

- By the end of 2008, Trust-associated papers were performing well in terms of their citation impact. The average rebased impact (RBI) – a citation impact that takes account of the research field and year of publication – of the complete cohort of papers was 1.83¹.

¹ Data: Thomson Reuters, 2009; Analysis Evidence Ltd.

² Evidence Ltd, 2009 'International comparative performance of the UK research base'.

³ Source: Thomson Reuters Essential Science Indicators (Thomson Scientific), 2009.

This compares well with the world average RBI of 1.00, and the average RBI for UK biological sciences of 1.62² for papers published in the same time period.

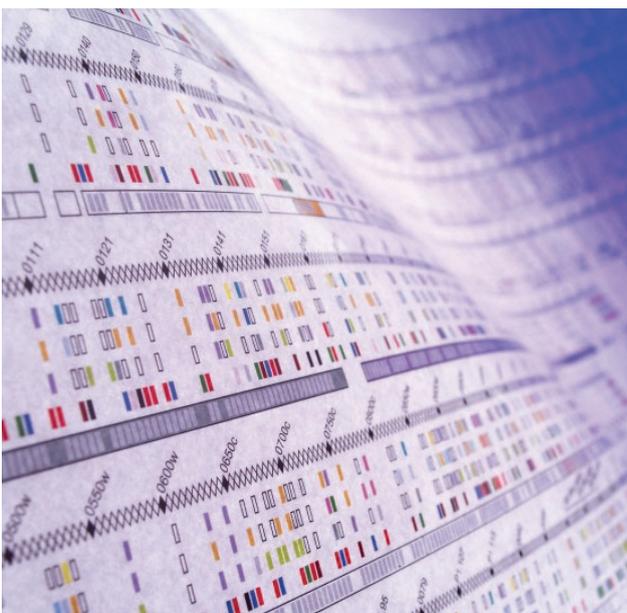
- Trust-associated papers in *Genetics & Heredity* and *Biotechnology & Applied Microbiology* performed particularly well against the international average paper in their research field, with average RBIs of 2.91 and 2.76 respectively.

- Based on publication output over the last decade (1999–2009)³:

- the Wellcome Trust Sanger Institute is ranked second in the world in terms of citations per paper in the field of 'Microbiology', and eighth in the field of 'Biology & Biochemistry'

- four of the top ten most highly cited researchers in the field of 'Neuroscience and Behaviour' have received significant Wellcome funding: Ray Dolan, Karl Friston and Alan Thompson from University College London, and Trevor Robbins at the University of Cambridge.

- In 2007, the Trust introduced a system whereby all end of grant reports are reviewed by relevant staff to provide an indication of the overall 'quality' of the outputs associated with grants at a fixed point in time. Of the end of grant reports received by the Trust between 1 October 2008 and 30 September 2009, 12% were rated as excellent/outstanding, 39% as good, 41% as satisfactory and 5% as poor.

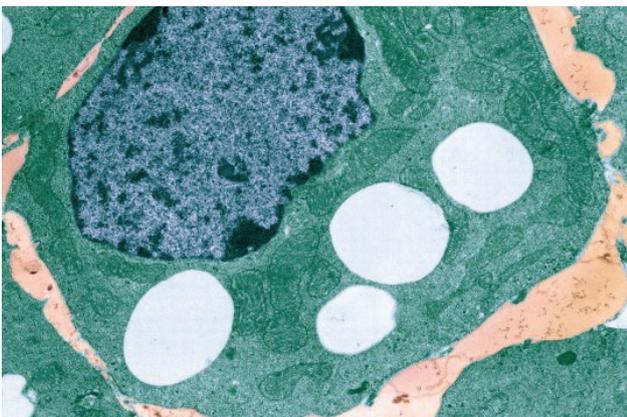


Unravelling the effects of genes and environments

To help to disentangle genetic and intrauterine influences on a fetus, Professor Anita Thapar and colleagues at Cardiff University have studied children conceived through *in vitro* fertilisation (IVF) who have differing degrees of genetic relatedness to their parents. They found that children of mothers who smoked during pregnancy had a lower birth weight, whether genetically related to the mother or not, showing that this was a direct toxic effect of smoking. If the children were directly related to the mother, they were also likely to develop antisocial behaviour and attention deficit hyperactivity disorder (ADHD) symptoms. This indicated that the genes influencing a mother's smoking were also influencing a child's antisocial behaviour and ADHD.

2. DEVELOP A CADRE OF HIGH-QUALITY RESEARCHERS

- Researchers who have received Trust funding have been awarded a range of high-profile prizes. These include:
 - John Stokes, who was awarded a Medical Devices prize at the National NHS Innovation Awards for a prototype surgical device that could simplify cataract surgery
 - John Gurdon, who was awarded the 2009 Albert Lasker Basic Medical Research Award (along with Shinya Yamanaka) for discoveries concerning nuclear reprogramming
 - Philip van der Eijk was the first candidate from the humanities to be awarded an Alexander von Humboldt Professorship worth €3.5 million (around £3.2m)
 - a number of Wellcome Trust award holders were elected to the Fellowship of the Academy of Medical Sciences and the Fellowship of the Royal Society in 2009.
- Several new careers funding schemes were launched by the Trust during the year, including: a student stipend competition to support the participation of UK teams in the International Genetically Engineered Machine (iGEM) competition; the Wellcome–Beit Prize Fellowships; and the Wellcome Trust–Massachusetts Institute of Technology Postdoctoral Fellowships.
- In 2008/09, the Trust introduced a new system to prospectively track the careers of key cohorts of award holders. The Wellcome Trust Career Tracker began in the summer of 2009 and is tracking the careers of cohorts of PhD Students, Research Career Development Fellows and International Senior Research Fellows.



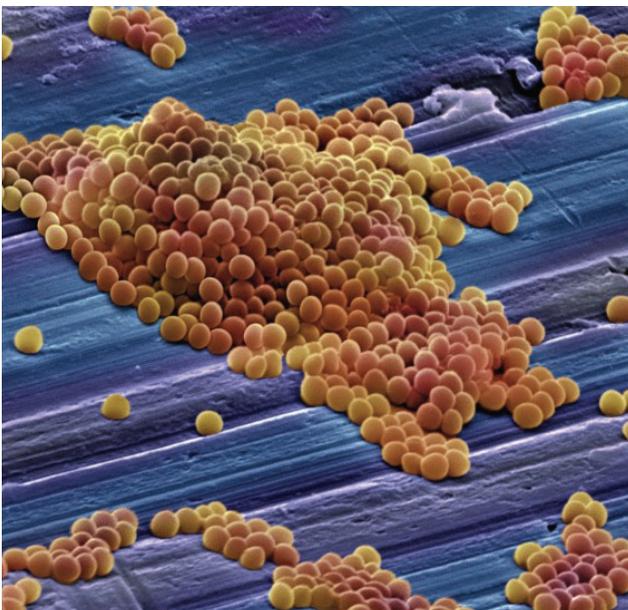
Jonathan Seckl:

Glucocorticoids – balancing our physiology

The hormones that regulate homeostasis and responses to stress have far-reaching effects in the body and require tight regulation. Professor Seckl of the University of Edinburgh has established key principles in the control of glucocorticoid activity and how these are altered in chronic diseases that range from atherosclerosis to age-related cognitive decline. This work points towards fertile ground for drug targets and design.

3. CONTRIBUTE TO DISCOVERIES WITH TANGIBLE IMPACTS ON HEALTH

- A number of research projects have resulted in health impacts in 2008/09. For example, work by Rod Escombe has demonstrated that the spread of tuberculosis, including drug-resistant strains, can be reduced by as much as 70% by the installation of ultraviolet C lights in hospital wards.
- A study led by Andy Clark and conducted at the Wellcome Trust Clinical Research Facility in Cambridge has demonstrated the first successful treatment for severe peanut allergy. By increasing daily doses of peanut flour, over six months, children built up a level of tolerance such that they could eat the equivalent of ten peanuts. Previously, eating one peanut could cause a life-threatening anaphylactic shock.
- The Wellcome Trust, the Medical Research Council and the Department of Health are working with the US National Library of Medicine and the UK National Institute for Health and Clinical Excellence (NICE) to extend access to clinical guidelines and to link their content and supporting research evidence to PubMed. This will provide the ability to track the nature and origins of research that features in guidelines to UK clinical practice.



New for old:

Developing next-generation antibiotics

Aminoglycoside antibiotics have been used for decades as effective treatments for serious hospital-based infections. Recently, however, their use has been limited by increasing bacterial resistance and unwanted side-effects, including the potential for kidney and ear damage. To overcome these limitations, San Francisco-based biopharmaceutical company Achaogen is developing the next generation of aminoglycosides, termed 'neoglycosides', for the treatment of multidrug-resistant Gram-negative bacterial infections and MRSA. Its lead compound, ACHN-490, entered a phase I clinical trial in January 2009, and a phase II study is planned to begin in early 2010.

4. CONTRIBUTE TO THE DEVELOPMENT OF ENABLING TECHNOLOGIES, PRODUCTS AND DEVICES

- Of the Wellcome Trust grants that ended in 2008/09, 7% reported filing a patent and 16% reported engaging with commercial collaborators during their research. These proportions of grants reporting intellectual property activity associated with the research were similar to those in previous years.
- Wellcome Trust-funded investigators secured £192 million of venture capital and other follow-on finance to support the commercialisation of their R&D efforts; this was an increase of £73 million from 2007/08.
- The Trust gave its consent to the commercial exploitation of intellectual property arising from the research it has sponsored in 12 new areas during 2008/09, an increase from eight last year.
- Eight new projects have been licensed successfully to industry partners for their ongoing development and commercialisation, one fewer than the previous year.
- Seven inventions arose from Wellcome Trust Translation Awards during 2008/09 compared to 15 last year. These include the development of two drugs for which composition of matter patents have been filed.



McGrath® video laryngoscope

Matt McGrath and colleagues founded the company Aircraft Medical Ltd in 2001, and have designed the award-winning McGrath® Series 5 video laryngoscope. McGrath® Series 5 products are now available in most EU countries, Australasia, Asia-Pacific and North America.

5. MAKE KEY CONTRIBUTIONS TO THE CREATION, DEVELOPMENT AND MAINTENANCE OF MAJOR RESEARCH RESOURCES

• In 2008/09, several Wellcome-funded projects resulted in the development of software/databases. These included:

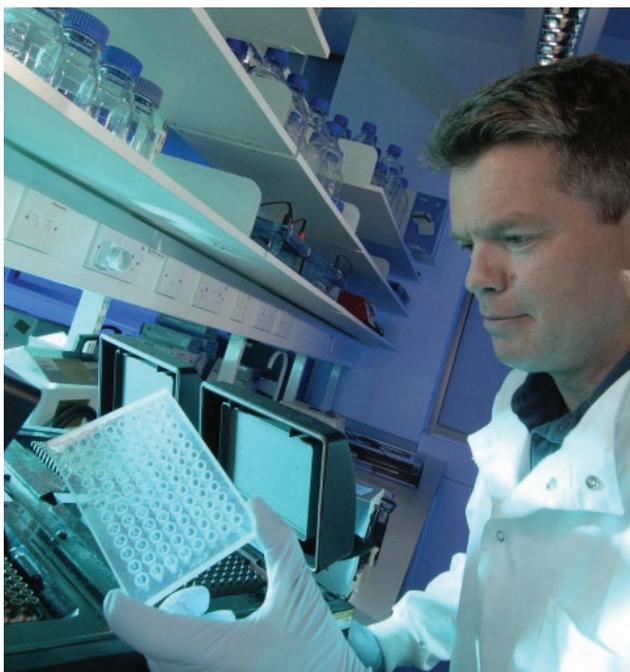
- an archive to manage data flow from the 1000 Genomes Project and to create a broader 'sequence read archive' (SRA), developed by Ewan Birney and Paul Flicek, based at the European Bioinformatics Institute (EBI)

- new publicly accessible databases that classify new protein structures (PDBsum, CATH and Gene3D) developed by scientists at the EBI.

• UK Biobank's cryostorage facility in Cheadle, Manchester was opened officially by the Princess Royal on 22 July 2009.

• Data requested from the Sanger Institute's extensive web-based genome and informatics resources continued to increase year on year.

• User visits to the Wellcome Library increased by 15% from the previous year (to over 38 000). Notable acquisitions to the Library's resources include the 'Acts of Mercy', a series of four large paintings by Frederick Cayley Robinson, a copy of *Kunstformen der Natur* ('nature's art forms') by the German evolutionary biologist Ernst Haeckel, and a series of videos made for GlaxoSmithKline to promote new products including Cervarix (a cervical cancer vaccine), Ondansetron (an anti-emetic treatment) and Salmeterol (an anti-asthma drug).



John Todd: the genetics of type 1 diabetes and complex genetic diseases

Professor Todd is Director of the Juvenile Diabetes Research Foundation/Wellcome Trust Diabetes and Inflammation Laboratory at the University of Cambridge. He leads a multidisciplinary approach to understanding type 1 diabetes that ranges from the genetics of susceptibility to the cellular and molecular events underlying the disease. His findings extend to other autoimmune diseases, including coeliac disease and multiple sclerosis, and are establishing the principles of complex disease genetics. This work has been greatly enhanced by the research resources, such as the Cambridge BioResource, and collaborations established by Professor Todd and his Co-Principal Investigators, Linda Wicker (Co-Director of the Diabetes and Inflammation Laboratory) and David Clayton.

6. ENHANCE CAPACITY DEVELOPMENT IN PRIORITY AREAS

- To help to build capacity across key areas, a number of new capacity-building funding initiatives were launched in 2008/09. These included:

- the African Institutions Initiative – launched to develop research networks and build sustainable research capacity across Africa

- the Wellcome Trust–Department of Biotechnology India Alliance fellowship scheme (which has now made its first awards)

- a joint funding scheme for health policy research established with the Alliance for Health Policy Research, an international collaboration based in the World Health Organization Geneva, to strengthen the capacity of policy makers to use health research evidence in policy making.

- The Health Research Capacity Strengthening Initiative in Kenya and Malawi, which aims to strengthen capacity to generate health research knowledge and to improve its use in evidence-based decision making, policy formulation and implementation, established new local institutions in 2008/09 and the first grants have been awarded.

- The Wellcome Trust Thailand (including Laos) and Vietnam Major Overseas Programmes (MOPs) underwent quinquennial review and were deemed to have made “outstanding achievements” and supported investigators who are “exceptional international leaders” in their fields. Both MOPs will have their funding renewed for the next five years.



The London Pain Consortium

Pain is a familiar yet relatively little-understood element of our physiology. Its study can offer insights into our nervous system and treatments for the largely neglected area of chronic pain. The London Pain Consortium has brought together pain researchers in the Greater London region to facilitate better collaborations, broader approaches to study, and the training of the next generation of pain scientists. Through this they hope to deepen our understanding of pain processes and find new targets for the development of pain-relieving drugs.

7. HAVE DISCERNIBLE IMPACT ON WIDER POLICY DEVELOPMENT AND PRACTICE

- Around a quarter (26%) of Wellcome grants ending during 2008/09 reported engagement with policy makers and healthcare professionals during their research; as in previous years, grants supporting 'Populations and Public Health'-type research were most likely to report engaging with policy makers during their research (52%).

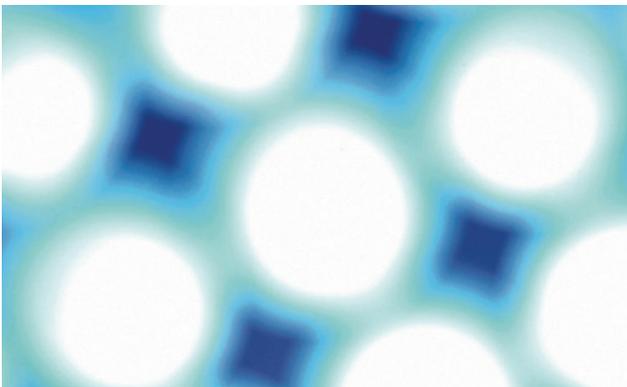
- Wellcome-funded research has had a range of impacts upon policy and practice in 2008/09. For example:

- Alan Emond (Avon Longitudinal Study of Parents and Children) provided evidence that has led to a new benchmark for lead safety levels in the environment; this has been acknowledged by the Health Protection Agency.

- Mathematical modelling and demographic surveillance work by Simon Gregson, Geoffrey Garnett and Catherine Campbell, using Manicaland Study data, has been credited with supporting the Joint United Nations Programme on HIV/AIDS and the US Global AIDS Coordinator health protection policy in Zimbabwe.

- Computer modelling by Thomas House and Matt Keeling (University of Warwick) to predict the spread of pandemic influenza provided evidence to support the development of a vaccination strategy to target children for vaccination. It was recommended that a policy to vaccinate children would not only help protect those at greatest risk of exposure to the virus, but also offer protection to unvaccinated adults.

- In 2008/09, the Wellcome Trust published *Towards Consensus for Best Practice: Use of patient records from general practice for research*, with endorsement from the British Medical Association and the Royal College of General Practitioners. The guidance is intended as the first step in a process to ensure that patients and GPs have confidence in the processes used to access patient information as a valuable resource in medical research.



Understanding the economic benefits of medical research

The Wellcome Trust's support for new economics-based research, in partnership with the Medical Research Council and the Academy of Medical Sciences, has helped to ensure that the UK has the beginnings of an evidence base to demonstrate that the benefits of medical research extend far beyond the patient. As a result of medical research the UK is richer – as well as healthier.

8. INCREASE AWARENESS AND ENHANCED LEVEL OF INFORMED DEBATE IN BIOMEDICAL SCIENCE ISSUES

- Wellcome Collection's second full year of operation saw a 3% increase (to over 300 000) in total visitor numbers compared to the previous year. Visitor satisfaction ratings also remained high, with more than 90% of visitors surveyed rating their experience as either good or excellent.
- The first wave of the Wellcome Monitor was conducted in September 2009 to explore and track the attitudes of adults and young people to medical research and science education. Key findings from the survey included:
 - very positive attitudes towards the medical research endeavour in the UK
 - more positive attitudes to school science education in the UK than has been shown previously.
- Overall, a quarter (24%) of Wellcome Trust grants ending during 2008/09 reported some media coverage associated with their grant to date.



Operating online: surgery brought to life by the internet: Using television and the internet, *The Operation: Surgery Live* brought live operations by leading surgeons to mass audiences on Channel 4. A key part of the project, a collaboration between Windfall Films, Channel 4 and the Wellcome Trust, was an interactive website that extended the audience and the reach of the factual television programming, acting as a lively discussion forum.

9. NURTURE AN ORGANISATIONAL CULTURE, SUPPORTED BY OUR STAFF AND PROCESSES, THAT MAXIMISES OUR ABILITY TO DELIVER OUR MISSION

- The Wellcome Trust had significant media coverage over the year, including appearances by the Director on the *Today* programme, to discuss stem cell research and the EU Directive on animal research.
- Wellcome Collection received a range of positive press coverage for its exhibitions, including *War and Medicine* and *Exquisite Bodies*.
- The Tree of Life (www.wellcometreeoflife.org) – an interactive website exploring the evolutionary links between living things – was launched as part of the celebrations of Charles Darwin’s bicentenary and received over 85 000 visits.

10. DELIVER AN INVESTMENT STRATEGY THAT MEETS THE LONG-TERM RETURN OBJECTIVE

- Financial and investment data are set out in the *Annual Report and Financial Statements* (www.wellcome.ac.uk/investments).