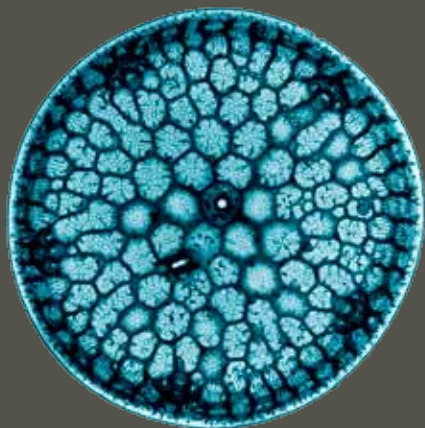


# Report Summary

## 2010/II



## Assessment Framework

### Report Summary

2010/11

#### Background

1. The Assessment Framework Report outlines the Wellcome Trust's achievements in relation to its Strategic Plan for 2010–20, *Extraordinary Opportunities*. The Strategic Plan outlines six outcome measures and 12 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.

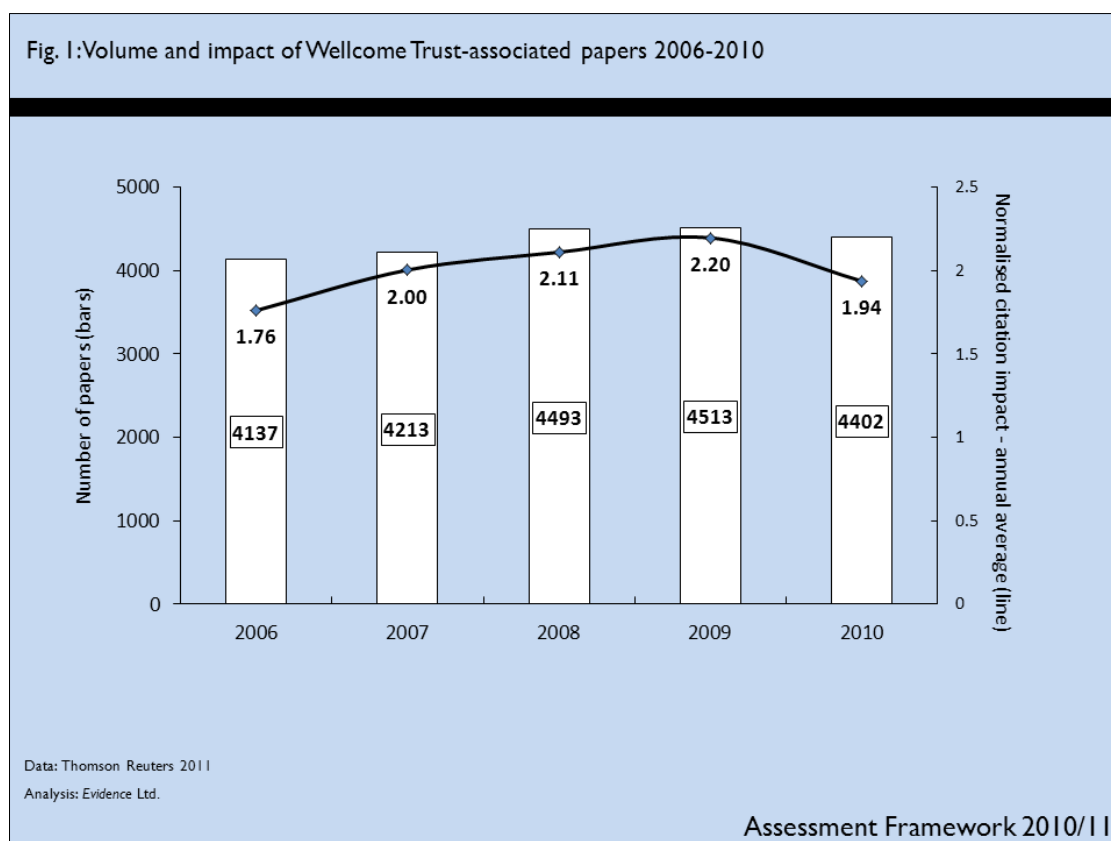
3. Unless otherwise stated, **all data refer to outputs and achievements arising and reported during the Trust's financial year: 1 October 2010 to 30 September 2011.**

4. The Trust's Assessment Framework Report will continue to be developed to help the Trust better track and understand the outputs and impacts of its funding and activities.

## 1. Discoveries

### 1.1 Significant advances in the generation of new knowledge and understanding

- In 2010, 4402 scientific research papers associated with the Wellcome Trust were published, indexed on PubMed and appeared on Thomson Reuters databases.
- In the same year, the UK as a whole produced 123,594 papers, including 29,043 in the biological sciences, 6,931 in health and medical sciences, and 45,232 in clinical sciences<sup>1</sup>.



- Thomson Reuters allocate papers to one or more of 253 research fields according to the journal in which they are published; the 2010 cohort of Trust-associated papers appeared across 126 fields, from the field with the largest number, 'Biochemistry & Molecular Biology' (577 papers), to 'Criminology & Penology' (1 paper).
- For all Trust-associated papers in 2010, the average Normalised Citation Index (NCI), a measure of the citation performance of a paper, was 1.94<sup>2</sup>, double the world average NCI (which is set at 1.00), but down slightly on the average NCI for 2009 papers of 2.20 (see trend line on Fig. 1)<sup>3</sup>.

<sup>1</sup> Data from *International comparative performance of the UK research base – 2011* prepared by Elsevier for the UK Department of Business, Innovation and Skills. As these data are derived from Elsevier sources, rather than Thomson Reuters, precise comparisons are not possible and the data are included for indicative purposes only.

<sup>2</sup> All citation data on Wellcome Trust-associated publications: Thomson Reuters, 2011.

<sup>3</sup> Citation impact can change significantly over time – the 2009 cohort had an average NCI of 1.99 at the end of the 2009 calendar year, below the 2008 level it now exceeds – so the NCI for 2010 is also likely to change.

- The NCIs of Trust-associated papers published in 2008–10 compare favourably to world averages across all the featured research fields, with the average NCIs for ‘Genetics & Heredity’ – 4.19 (2008), 3.44 (2009), 3.69 (2010) – particularly noteworthy.
- 2010 saw a 26% increase in the combined number of Trust-associated papers published in the journals *Nature* and *Science*. The year also saw a 27% increase in the number of Trust-associated papers published in the open access *PLoS* family of journals. In particular, 2010 saw 168 papers published in *PLoS ONE*.
- The three institutions producing the most Trust-associated papers in 2010 were the University of Oxford, University of Cambridge and University College London (637, 544 and 520 respectively).

## 1.2 Contributions to discoveries with tangible impacts on health

- Professor David Beech and colleagues, from the University of Leeds, described a potential new treatment to reduce heart bypass failure. They have shown that venom from the Central American bark scorpion may prove to be effective against neointimal hyperplasia, the most common cause of coronary artery bypass graft failure.
- Dr Anna Murray and colleagues, from the University of Exeter Peninsula Medical School and the Institute of Cancer Research, have identified four common genetic variants that may have a significant impact on the odds of having early menopause. The findings could have a considerable impact on women in higher-income countries, many of whom have children at a later age. The researchers say these are the first steps towards developing a genetic test to predict a woman’s reproductive lifespan.
- Professor Jonathan Seckl and colleagues, from the University of Edinburgh, have identified a new compound that can improve memory and cognitive function in mice. This is being further investigated with a view to developing a drug to slow the natural decline in memory associated with ageing.
- The UK drug discovery company Summit has developed a new class of antibiotic to target the hospital superbug *Clostridium difficile*; the drug has proved to be more effective than current treatments in preclinical studies.
- New research from Professor Bob Snow and Dr Dejan Zurovac has shown that sending text-message reminders to healthcare workers in rural Africa can improve the implementation of national guidelines for treating malaria. The intervention has led to more patients receiving correct antimalarial treatment.

- The first genome scan for womb cancer has revealed a genetic region associated with a reduced risk of the disease. This region has also been linked to lower prostate-cancer risk in men. The study, funded by the Wellcome Trust, the National Health and Medical Research Council in Australia and Cancer Research UK, is the first to find a common genetic factor for these two different cancer types, suggesting there may be shared mechanisms of disease not previously recognised.
- A study carried out by researchers from the Wellcome Trust Sanger Institute, the Van Andel Research Institute, USA, and the National Cancer Centre of Singapore identified a gene that is mutated in a third of people with the most common form of kidney cancer. The finding provides new insights into the biology of the disease and reveals possible opportunities for treatment.
- Psoriasis is an autoimmune disease that affects 2–3% of the European population. Researchers from the Genetic Analysis of Psoriasis Consortium and the Wellcome Trust Case Control Consortium 2 have found evidence of an interaction between two areas of DNA, potentially identifying genes that play a role in people’s susceptibility to the condition. The work provides evidence of possible targets for future treatment strategies.
- Research led by Dr Sarah Gilbert, from the Jenner Institute at the University of Oxford, has successfully tested a universal vaccine for influenza that differs from traditional vaccines. It targets the proteins found inside the influenza virus rather than those on its external coat. The two internal proteins are more similar across viral strains than those on the outside, meaning that a new vaccine would not have to be created for every strain.

---

## ADHD genetic link found

Professor Anita Thapar

- Children with ADHD are more likely to have a small segment of DNA duplicated or missing, particularly in chromosome 16, which is linked to brain development.
- ADHD shows a biological overlap with autism and schizophrenia.

*J-Elgard/iStockphoto*

---



## 2. Applications of research

### 2.1 Contributions to the development of enabling technologies, products and devices

- Of the Wellcome Trust grants ending in 2010/11, 5.5% of grant holders reported filing a patent associated with their research, up from 4% last year.
- 12.3% of grants reported collaborating with commercial partners in 2010/11.
- Wellcome Trust-funded researchers secured £122 million in additional venture capital to support the commercialisation of their R&D in 2010/11 (up from £107 million in 2009/10).
- In 2010/11, the Trust consented to commercial exploitation of intellectual property in ten cases.
- During 2010/11, 20 inventions arose from Wellcome Trust Translation Awards. These ranged from the i-Snake, a self-propelled surgical robot, to a new vaccine for typhoid.

### 2.2 Uptake of research into policy and practice

- Overall, 28% of Trust grants ending in 2010/11 reported engagement with policy makers and healthcare professionals. Grants under the Populations and Public Health stream reported the highest levels of engagement (77%).
- In a pilot project, the Trust has been working with the National Institute for Health and Clinical Excellence (NICE) and the US National Library of Medicine to digitise NICE clinical guidelines, enabling greater access to them and the underlying research. The NICE guidelines recommend the appropriate treatment and care of people with specific diseases and conditions, based on the best available evidence. An initial analysis of 77 guidelines has been conducted to investigate the extent to which Trust-associated scientific research papers are having influence on clinical activities. In total, 79 Trust-associated papers are cited across 30 of the 77 guidelines<sup>4</sup>. Trust-associated papers are particularly well-represented in the areas of mental health and gynaecology/pregnancy.

---

## Controlling the mosquitoes that spread dengue fever

Dr Luke Alphey  
Oxitec

- Oxitec scientists aim to combat dengue fever by preventing its transmission. They have created a genetically modified male mosquito that produces sterile progeny.
- A successful release of these mosquitoes dramatically reduced the local mosquito population in the Cayman Islands.

Audio Visual, LSHTM/Wellcome Images

---



<sup>4</sup> Search conducted on PubMed using the search command: *Wellcome Trust [gr] "books pubmed nicecollect" [Filter]*. Results as of September 2011.

- Further examples of impact on policy and practice:
  - The World Health Organization (WHO) has revised its guidelines for the treatment of malaria in African children, as a result of the Trust-funded AQUAMAT study. AQUAMAT – the African quinine versus artesunate malaria trial – was the largest ever clinical trial among patients hospitalised with severe malaria, and involved researchers across Africa collaborating with scientists from Thailand and the UK. The randomised controlled trial showed a 22.5% reduction in mortality among patients treated with artesunate compared to those given the standard treatment of quinine. The WHO has now changed its treatment guidelines to recommend artesunate as the first-line treatment for severe malaria in African children.
  - Professor Anthony Scott’s research has been instrumental in informing the KEMRI–Wellcome Trust Research Programme in Kenya to include pneumococcal vaccine during routine child immunisations offered on a national scale.
  - Professor Matthew Hotopf from King’s College London conducted a detailed study assessing the mental capacity of 350 patients entering acute psychiatric wards. His work showed a significant proportion of psychiatric inpatients are capable of making autonomous decisions about their care, and he recommended that healthcare providers should ensure these patients are enabled to do so. The analysis of the interaction between the Mental Capacity Act and the Mental Health Act will help inform clinicians about the application of Deprivation of Liberty Safeguards.

---

## Predicting pre-eclampsia with a biomarker-based screening test

Professor Louise Kenny  
Professor Phil Baker

- Scientists identify 14 biomarkers in the plasma of pregnant women at 15 weeks’ gestation that are significantly altered in those who go on to develop pre-eclampsia.
- These biomarkers are being used to develop an early-pregnancy screening test to identify pregnant women who are at risk of developing the condition.

*Anthea Sieveking/Wellcome Images*

---



### 3. Engagement

#### 3.1 Enhanced level of informed debate on biomedical science issues

- 26% of grants in 2010/11 reported that the funded research received media coverage, consistent with previous years. 41% of grants reported that the work had been presented to non-academic audiences.
- The Howard Hughes Medical Institute, the Max Planck Society and the Wellcome Trust made a joint public announcement of their proposals for a new top-tier, open-access life sciences journal entitled *eLife*.
- 2011 also saw the first Wellcome Trust Science Writing Prize in association with the *Guardian* and the *Observer*, a competition to find the next generation of undiscovered science writing talent. The first year of the competition saw nearly 800 entries.
- Wellcome Collection's Dirt Season of events took place between March and September 2011, which included the major exhibition *Dirt: The filthy reality of everyday life*, in addition to online games and special events in the Eden Project and the Glastonbury, among others.
- In 2011, the Trust celebrated its 75th anniversary with a variety of activities and events. A VIP dinner was held in June, and there were a number of events organised by Wellcome Trust Centres around the country. A series of 14 features was published to showcase the work of people who have been significant during the Trust's history.

---

## High Society

- This Wellcome Collection exhibition, tackling the subject of drugs in history and culture, was the most popular to date, with long queues forming in the final weeks.
- There was excellent press coverage of the exhibition, which inspired a well-received book and a popular online game.

Wellcome Images

---





### 3.2 Significant engagement of key audiences in biomedical science, and increased audience reach

- 2010/11 was Wellcome Collection's busiest year since the venue opened its doors in June 2007, with 466,043 visitors passing through its doors. It hosted an average of two live events per week.
- The Trust supported the second series of *Inside Nature's Giants*, a television series on Channel 4 that explores evolution by dissecting iconic animals and examining their anatomy, with evolutionary commentary provided by Professor Richard Dawkins. This series had audiences of 5.5 million, with a 90-minute special on the giant squid attracting 1.7 million.
- The Wellcome Trust Engagement Fellowships were launched in 2010/11 to support the brightest and best people working in public engagement. The first two fellowships were awarded to Dr Kevin Fong and Dr Richard Barnett.

---

## New play highlights ethical issues raised by drug trials

### Y Touring

- Y Touring developed the play *Starfish* to inform audiences about, and stimulate debate on, the issues surrounding clinical trials.
- The play was performed to more than 10,400 students and 230 teachers.

Sheila Burnett

---



## 4. Research leaders

### 4.1 Development of a cadre of research leaders

### 4.2 Evidence of significant career progression among those we support

- Based on publication output from January 2001 to August 2011, four of the ten most highly cited researchers in the field of 'Neuroscience & Behaviour' have been recipients of significant amounts of Wellcome Trust funding. Professor Ray Dolan, Director of the Wellcome Trust Centre of Neuroimaging, and Professor Trevor Robbins, Head of the Department of Experimental Psychology at the University of Cambridge, were placed first and second respectively<sup>5</sup>.
- The Sir Henry Dale Fellowships, a prestigious new scheme created in partnership with the Royal Society, was launched in 2011. The scheme will support outstanding scientists who wish to build a UK-based independent research career addressing an important biomedical question.
- Researchers who have received a significant amount of Wellcome Trust funding in recent years won a range of high-profile prizes during 2010/11, including:
  - Professor Nick White, Chairman of the South-East Asia Clinical Research Network, and Professor Kevin Marsh, Director of the KEMRI–Wellcome Trust Research Programme, were presented with the 2010 Prince Mahidol Award in the field of medicine. This was awarded in recognition of their “outstanding and exemplary contributions to the advancement of the world’s medical and public health services”.
  - Professor Adrian Bird, Director of the Wellcome Trust Centre for Cell Biology at the University of Edinburgh, won the Canada Gairdner International Award 2011 for his “pioneering discoveries on DNA methylation and its role in gene expression”.
  - Professor Eileen Ingham, Deputy Director of the Leeds WELMEC Centre of Excellence in Medical Engineering, was awarded a Women of Outstanding Achievement Award in 2011 in the ‘Innovation and Entrepreneurship, Academia and Research’ category.
  - Dr Rob Kloze from the University of Oxford was awarded the 2011 Lister Institute Research Prize, presented to young researchers to develop their careers.
  - *Love at First Sight*, a short drama about dementia starring John Hurt and Phyllida Law, won several awards after its release in early 2011 and was shortlisted for an Oscar.

---

## Understanding the nucleoli

### Professor Angus Lamond

- Professor Lamond’s work has revealed all the proteins found within the nucleolus and the proportion of proteins located within each subcellular compartment.
- He has developed new techniques and software platforms for the quantitative analysis of protein properties and nuclear structure.

*Wellcome Trust Centre for Gene Regulation and Expression*

---



<sup>5</sup> Source: Thomson Reuters Essential Science Indicators, 2011.

## 5. Research environment

### 5.1 Key contributions to the creation, development and maintenance of major research resources

- 8% of Trust grants ending in 2010/11 reported software or database development as part of their work. This is the same percentage as reported in 2009/10.
- The 1000 Genomes Project, funded by numerous foundations including the Wellcome Trust, has published the most comprehensive map to date of human genetic variation. The project's nine centres have so far sequenced the whole genomes of 179 people and the protein-coding genes of 697 people. By studying these maps, researchers hope to identify the genetic changes that contribute to diseases such as cancer.
- A consortium of scientists, led by researchers from the University of Oxford's Wellcome Trust Centre for Human Genetics and Harvard Medical School, has constructed the world's most advanced human genetic map, revealing differences between African and non-African populations. This map will help us understand the evolution of the human race.
- 2011 saw the launch of the Wellcome Arabic Manuscript Digitisation Project, created in partnership with the Bibliotheca Alexandria and the Department of Digital Humanities at King's College London.
- The Wellcome Library received 40,760 visits in 2010/2011, with 761,824 catalogue searches undertaken.

---

## Developing zebrafish resources

### Professor Corinne Houart

- A new technique has been created that produces targeted mutations in zebrafish. This is being used to build a collection of mutations in 80 genes.
- The collection will be housed at a new facility that more than triples the capacity for the model organism.

*Angharad Jones/Wellcome Images*

---



## 5.2 Contributions to the growth of centres of excellence

- Over the period January 2001–August 2011, the Wellcome Trust Sanger Institute was fourth in the world in terms of citations per paper in the fields of both ‘Microbiology’ and ‘Biology & Biochemistry’. The Wellcome Trust Centre for Neuroimaging was the second highest in the field of ‘Neuroscience & Behaviour’.
- The Health Research Capacity Strengthening initiative in Kenya and Malawi was jointly funded by the Wellcome Trust and the UK Department for International Development (DFID) in 2008 to the tune of £10 million in each country over five years. The aim is to strengthen capacity for generating health research knowledge and improve its use in evidence-based decision making, policy formulation and implementation. In Kenya, the Consortium for National Health Research (CNHR) has been registered as an independent NGO. Following a successful mid-term review in 2011, the CNHR receives direct funding from both the Trust and DFID. The first Research in Policy Forum was held in partnership with the Kenyan government.
- The Wellcome Trust–DBT India Alliance, officially launched in 2008, supports excellent Indian scientists at key career stages. The 2011 mid-term review recommended the Trust and Indian government Department of Biotechnology (DBT) should continue funding the Alliance for a further five years.

---

## Wellcome Trust Centre for Human Genetics

- The Centre has made major achievements in understanding the role of genetics in human disease and structural biology, and in developing methods for analysis of genomics data.
- It uses a variety of approaches, experimental and statistical, to uncover molecular mechanisms relevant to health.

*Wellcome Trust Centre for Human Genetics*

---



## 6. Influence

### 6.1 Significant impact on science funding and policy developments

- In 2010/11, the Trust provided written evidence to nine parliamentary committee inquiries. The Trust's Director, Mark Walport, gave evidence to the House of Commons Science and Technology Committee inquiries on the UK Centre for Medical Research and Innovation (now renamed the Francis Crick Institute) and on peer review.
- The Trust has been mentioned eight times in debates in the House of Lords and House of Commons and four times in Commons written answers, on topics including the contribution of science to the economy, immigration, proposals to establish a single health research regulatory authority, malaria research, and nutrition in prisons.
- The Trust has taken a variety of steps to influence the government's reforms of the NHS and public health system, as part of the Health and Social Care Bill, to ensure that research and innovation are embedded within the new structures. The Trust has submitted consultation responses and letters and had a number of discussions with senior figures including the Secretary of State, Andrew Lansley, and the Chief Medical Officer, Sally Davies.
- The Trust has worked closely with partner organisations to influence government policy on immigration and reduce the impact of restricting non-EU immigration on the research and higher education sector. The government made a number of concessions in response to the pressure from the Trust and other science and higher education organisations.
- The EU Physical Agents (EMF) Directive – legislation that sets minimum requirements to protect workers from risks arising from exposure to electromagnetic fields – was approved by the European Commission in 2004. This would have seriously limited the use of such imaging for research, diagnosis and treatment. The European MRI community, including the Trust, convinced the Commission of these concerns; the implementation deadline for the Directive was delayed to allow time for amendment. A revised version of the Directive was released in summer 2011, with a proposed exemption for MRI.
- The Wellcome Trust, the Medical Research Council and the Biotechnology and Biological Sciences Research Council commissioned an independent review of the use of non-human primates in research. The review considered research using non-human primates funded between 1997 and 2006 to assess the quality, outputs and impacts of research. The review found that, in the main, the case for using non-human primates was justified: a vast majority of the research produced medical, scientific or social benefit. The review made a number of recommendations that the funders are taking forward, such as on the need to publish, or make publicly available, negative results from research using non-human primates.

## 6.2 Significant impact on global research priorities

- As part of efforts to strengthen and develop the Wellcome Trust's evaluation activity, in 2008 the Assessment and Evaluation team developed portfolio reviews to measure the impact of Trust funding at a subject, portfolio level. In 2011, the second of these – focusing on human functional brain imaging – was completed.
- The Trust held a number of Frontiers Meetings in 2010/11, including:
  - Human Heredity and Health in Africa (H3Africa) Initiative (Cape Town, March 2011)
  - UK Research Response to Pandemic H1N1 Meeting (July 2011)
  - UK Biobank Frontiers Meeting (March 2011)
  - Foundation Doctors Academic Meeting (March 2011)
  - Healthy Lives, Healthy People: A workshop to discuss the future of UK public health (March 2011).

---

## Sharing research data to improve public health

- Major health research funders have committed to work in partnership to widen access to research data for the scientific community.
- A new framework will provide for funders to work with key partners in the research community to build the culture and resources needed to maximise the use of research data to improve public health.

*yesfoto/iStockphoto*

---



## Wellcome Trust

We are a global charitable foundation dedicated to achieving extraordinary improvements in human and animal health. We support the brightest minds in biomedical research and the medical humanities. Our breadth of support includes public engagement, education and the application of research to improve health. We are independent of both political and commercial interests.

Wellcome Trust  
Gibbs Building  
215 Euston Road  
London NW1 2BE, UK  
T +44 (0)20 7611 8888  
F +44 (0)20 7611 8545  
E [contact@wellcome.ac.uk](mailto:contact@wellcome.ac.uk)  
[www.wellcome.ac.uk](http://www.wellcome.ac.uk)

The Wellcome Trust is a charity registered in England and Wales, no. 210183. Its sole trustee is The Wellcome Trust Limited, a company registered in England and Wales, no. 2711000 (whose registered office is at 215 Euston Road, London NW1 2BE, UK). SP-5234.4/02-2012/AF

Cover: Centric diatom. Kevin MacKenzie/Wellcome Images