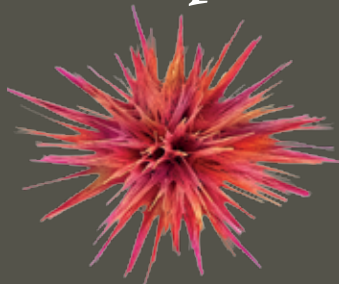


Volume I: Report

2011/12



ACKNOWLEDGEMENTS

The Strategic Planning and Policy Unit would like to thank the many people across the Trust involved in providing the information for this report.

The team responsible for compiling this report were Liz Allen, Kevin Dolby, Lily Ickowitz-Seidler, David Lynn, Jo Marsh, Briony Rayfield, Joanna Scott, Halina Suwalowska and Benjamin Thompson.

NOTES

A small number of figures have been removed from this version of the report as they are for internal purposes only such as grants assurance/audit and/or are commercial in confidence.

INTRODUCTION AND BACKGROUND

INTRODUCTION

1. This is the seventh Assessment Framework Report; it reports against the Indicators of Progress set out in the Strategic Plan 2010-2020 'Extraordinary Opportunities'.

BACKGROUND

2. The Assessment Framework was developed following consultation across the Trust in 2005/06 and sets out the types of quantitative and qualitative information that the Trust should collate and analyse to indicate it is making progress towards its aims. In 2010 the Assessment Framework was revised to support reporting against the newly updated **Outcomes** and **Indicators of Progress** outlined in the 2010-20 Strategic Plan (see below).

Outcome	Indicators of Progress
Discoveries	<ul style="list-style-type: none"> • Significant advances in the generation of new knowledge and understanding • Contributions to discoveries with tangible impacts on health
Applications of research	<ul style="list-style-type: none"> • Contributions to the development of enabling technologies, products and devices • Uptake of research into policy and practice
Engagement	<ul style="list-style-type: none"> • Enhanced level of informed debate on biomedical science issues • Significant engagement of key audiences in biomedical science, and increased audience reach
Research leaders	<ul style="list-style-type: none"> • Development of a cadre of research leaders • Evidence of significant career progression among those we support
Research environment	<ul style="list-style-type: none"> • Key contributions to the creation, development and maintenance of major research resources • Contributions to the growth of centres of excellence
Influence	<ul style="list-style-type: none"> • Significant impact on science funding and policy developments • Significant impact on global research priorities

3. The Assessment Framework Report predominantly describes outputs and achievements associated with Trust activities though, where appropriate, inputs are also included where considered a major Indicator of Progress. Through successive Assessment Framework Reports, we have been able to build trend data and develop benchmarks that allow us to assess our progress as an organisation. In addition, there are a number of external benchmarks that help to provide context to Trust-specific data.
4. The primary audience for this report is intended to be the Trust itself: the Board of Governors, the Executive Board and its staff. The report has a number of key uses, including:
 - input to the Trust's Annual Report and Summary Information Return filed with the Charity Commission;
 - to complement the Trust's Annual Review;
 - to support the work of the Trust's Challenge Development Groups; and
 - to help inform future Wellcome Trust strategy.

DATA SOURCES & METHODOLOGY

5. The information included in this report is drawn from a wide range of internal and external sources. The information gathering and production of the report is led by the Evaluation Team in the Strategic Planning and Policy Unit (SPPU), though it is reliant on the contributions of many staff from across the Trust.
6. To complement the more quantitative and metric-based information contained in Volume 1 of the Assessment Framework Report, Volume 2 contains a series of Research Profiles which describe the story (to date) of a particular outcome or impact associated with Wellcome Trust funding; these Research Profiles are again reported according to the relevant Trust Outcome goal. The use of case studies or stories have gained increasing currency as tools to support impact evaluation, and will be a core component of institution submissions within the forthcoming UK Research Excellence Framework.
7. The Wellcome Trust Research Profiles - taking the form of **Highlights** and **Histories** - have been agreed with the researchers involved and validated by senior Trust staff. A 'Profile Bank' containing all Research Profiles produced to date (since 2005), has been created by the Evaluation Team; over time Profiles are updated and revised as research progresses
8. Unless otherwise stated, **all information and data refer to outputs and achievements arising and reported during the Trust's financial year: 1 October 2011 to 30 September 2012.**
9. End of grant forms contain outputs (e.g. publications, books and other outputs) associated with a grant throughout the entirety of its life and not just those delivered in the year the End of Grant report is submitted (for this Assessment Framework Report, 1 October 2011 to 30 September 2012).
10. Publications (and other outputs) are also commonly the result of collaborations; where more than one individual is cited as an author on a paper (or contributor to an output) AND has a grant from the Wellcome Trust, the same paper (or output) may be associated with more than one individual and more than one grant. The use of median number of papers linked to a specific grant, for example, helps to provide a good indicator of the volume of outputs associated with a specific grant (though the papers may not be unique).
11. In future years, as the Trust further integrates its online grant progress reporting system throughout its funding activity (Wellcome Trust e-Val) it will be easier to provide access to, and updates on grant-associated outputs throughout their lifecycle.

REPORT STRUCTURE

12. The report is structured according to the specific Outcome area and associated Indicators of Progress - and colour coded.
13. Due to the nature of much of the research supported by the Wellcome Trust, many of the outputs and achievements presented in this report could have been reported against more than one Outcome area. For presentation purposes, they have been reported against the Outcome area to which, currently, they are most closely aligned.

REPORT AGAINST THE INDICATORS OF PROGRESS 2011/12

1. DISCOVERIES	Page 10
<p>SIGNIFICANT ADVANCES IN THE GENERATION OF NEW KNOWLEDGE AND UNDERSTANDING</p> <ul style="list-style-type: none"> • In 2011, 4,433 scientific research papers associated with the Wellcome Trust were published, indexed on PubMed and appeared on Thomson Reuters Web of Knowledge¹. Overall, there has been a gradual increase in the annual volume of Trust-associated publications since 2006, with a 16% increase in annual papers between 2006 and 2010, comparing with an overall increase of 13% in all papers covered by the Web of Knowledge over the same period². • The 2011 cohort of Trust-associated papers appeared across 132 subject fields, from the field with the largest number, 'Biochemistry & Molecular Biology' (780 papers), to 'Philosophy' (1 paper). • For 2011 papers, the Normalised Citation Impact³ (NCI) for all Trust-associated papers at the end of 2010 was 2.02; double the world average NCI of 1. • The NCIs of Trust-associated papers published in 2009-2011 compare favourably to world averages across all nine research fields featuring a high volume of Trust associated output, with the average NCI for 'Genetics & Heredity' — 3.04 (2009), 3.49 (2010), 2.80 (2011) — being particularly high and reflecting the world leading genomics and genetics work supported by the Trust both at the Sanger Institute and beyond. <p>CONTRIBUTIONS TO DISCOVERIES WITH (POTENTIAL) TANGIBLE IMPACTS ON HEALTH</p> <ul style="list-style-type: none"> • A number of Trust-funded research projects have shown the potential for tangible impacts on health in 2011/12, including: <ul style="list-style-type: none"> ○ A team of scientists led by researchers from the Wellcome Trust Sanger Institute and the University of Cambridge have, for the first time, corrected a gene mutation responsible for both cirrhotic liver and lung emphysema in human-induced pluripotent stem cells; ○ Researchers have demonstrated that a potential new drug could treat mixed-lineage leukaemia. The drug prevents genes that can cause the disease being activated. The research was conducted at the Wellcome Trust-Cancer Research UK Gurdon Institute and the Cambridge Institute for Medical Research, in collaboration with scientists from GlaxoSmithKline and Cellzome AG; ○ Research emerging from the Shoklo Malaria Research Unit has shown that frequent antenatal screening of pregnant women on the border of Thailand and Myanmar to detect and treat Malaria in its early stages resulted in a six-fold reduction in maternal deaths; ○ Research led by Dr Andrew Schache from the University of Liverpool has identified a new accurate test for identifying HPV-related head and neck cancers, which may become the diagnostic standard with potential for significant clinical impact; ○ In a trial led by Professor Robert MacLaren, 12 patients have received gene therapy for Choroideraemia, a progressive form of genetic blindness that first appears in childhood. If the trial is successful, the therapy could stop the disease developing with a single treatment; ○ The safety and tolerability of NVB302, a potential new antibiotic to treat the hospital 	

¹ Although this represents a decrease of almost 8% (n=383) on the volume of Trust-associated papers published in 2010, it is known that PubMed processes mean that some papers are indexed as being Trust-associated a significant time after publication, so the 2011 data is expected to rise over time.

² Figures as of 6 November 2012. Increase measured on 2006 to 2010 data, and not 2011 data, due to the time-lag on PubMed processing mentioned above.

³ This standardised metric assesses the citation performance of a research paper in relation to the performance of the average paper published in the same research field at the same time.

superbug *Clostridium difficile*, is being tested by Dr Mike Dawson and colleagues at Novacta Biosystems in phase I clinical trials.

2. APPLICATIONS OF RESEARCH

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CONTRIBUTIONS TO THE DEVELOPMENT OF ENABLING TECHNOLOGIES, PRODUCTS AND DEVICES

- 6% of grants ending during 2011/12 reported filing a patent associated with their research and 17% reported engaging with commercial collaborators during their research. This is an increase on the previous year (proportions over 2008/09-2010/11 = 5% and 14% respectively).
- Trust-funded investigators secured £185 million in venture capital finance to support the commercialisation of their R&D during 2011/12, an increase for the third year in a row (2009/10: £107 million, 2010/11: £122 million).
- The Trust gave its consent to the commercial exploitation of intellectual property arising from the research it has sponsored in ten new areas during 2011/12, the same proportion as last year.
- Eleven inventions arose from Wellcome Trust Translation Awards during 2011/12 compared to 20 last year.

UPTAKE OF RESEARCH INTO POLICY AND PRACTICE

- Similar to previous years, nearly a third (29%) of Trust grants ending during 2011/12 reported engagement with policy makers and healthcare professionals. As in previous years, grants from the Populations and Public Health funding stream are most likely to have engaged in this way (66%).
- Trust-funded researchers have impacted upon policy and practice in a variety of ways:
 - Professor Mike English and colleagues in the Health Services Research Group (HSRG) at KEMRI Nairobi, have developed national, evidence-based guidelines for the care of severely ill children and newborns, and established 'best-practices' within rural government hospitals. He has received the prestigious Sir Rickard Christophers Medal in recognition of this work;
 - Eurartesim®, an artemisinin combination therapy, has been approved by the European Commission for the treatment of uncomplicated malaria caused by the parasite *Plasmodium falciparum*. Wellcome Trust-funded research played a key part in the early development of this combination drug.
- The Trust is working with the National Centre for Biotechnology Information (NCBI) to digitise and improve access to clinical guidelines. This will allow funders and all stakeholders in research to better identify where research is reaching clinical policy and practice. To date the area where Trust-associated research is most commonly cited as underpinning clinical policy and practice on National Institute for Health and Clinical Excellence (NICE) guidelines is in the area of mental health and behavioural conditions.

3. ENGAGEMENT	Page 38
<p>ENHANCED LEVEL OF INFORMED DEBATE ON BIOMEDICAL SCIENCE ISSUES</p> <ul style="list-style-type: none"> • Overall 28% of Trust grants ending during 2011/12 reported some media coverage associated with their research (the proportion over 2008/09-2010/11 = 26%). • There has been extensive and positive media coverage of Wellcome Trust-associated research, including: <ul style="list-style-type: none"> ○ artemisinin resistance in South East Asia (Channel 4 News, BBC Today Programme and World Service, TIME); ○ brain scans suggesting IQ can rise or fall significantly during adolescence (BBC News, Channel 4 News); ○ the Health Innovation Challenge Fund award to researchers at Newcastle University who have developed a computer game designed to help stroke victims recuperate (ITV News, BBC News). <p>SIGNIFICANT ENGAGEMENT OF KEY AUDIENCES IN BIOMEDICAL SCIENCE, AND INCREASED AUDIENCE REACH</p> <ul style="list-style-type: none"> • Visits to Wellcome Collection continue to rise annually with 2011/12 being the most successful year to date, with almost 500,000 visitors. The exhibition “Brains: The Mind as Matter” attracted over 100,000 visitors. The exhibition will increase its reach as it travels to the Manchester Museum of Science and Industry in 2013. • 47% of Trust grants ending during 2011/12 reported presenting their work to non-academic audiences and 35% to research participants and related communities (the proportion over 2008/09-2010/11 = 41% and 35%, respectively). • <i>In the Zone</i> – inspired by the London 2012 Olympic and Paralympic Games - engaged people of all ages with the science of the movement of the human body; specifically: <ul style="list-style-type: none"> ○ nearly 30,000 science investigation kits were sent to primary and secondary schools and another 1,300 kits sent to schools with special educational needs; ○ a touring exhibition visited 16 events throughout the summer; ○ the Foreign and Commonwealth Office, as well as the Brazilian Ministry of Education and Ministry of Science and Technology are exploring whether the school kits could be adapted for the Brazilian context in advance of the 2016 Olympics. 	
4. RESEARCH LEADERS	Page 48
<p>DEVELOPMENT OF A CADRE OF RESEARCH LEADERS</p> <ul style="list-style-type: none"> • The Trust launched a new funding initiative, the Sir Henry Dale Fellowship scheme, in partnership with the Royal Society, in October 2011. The fellowships are aimed at outstanding postdoctoral scientists wishing to build their own UK-based independent research career addressing an important biomedical question. The first applications were considered in June 2012 and ten awards made. <p>EVIDENCE OF SIGNIFICANT CAREER PROGRESSION AMONG THOSE WE SUPPORT</p> <ul style="list-style-type: none"> • Researchers who have received Trust-funding have been awarded a range of high profile prizes during 2011/12: <ul style="list-style-type: none"> ○ David Mabey and Bob Snow were jointly awarded the George MacDonald Medal for research that has led to the improvement of the health of populations in tropical countries by the Royal Society of Tropical Medicine & Hygiene in 2011; ○ Professor Eileen Ingham received a UKRC Women of Outstanding Achievement Award in the category: Innovation and Entrepreneurship (Academia and Research); ○ Sandra Gorel was awarded the prize for the Best UK Short Film at the Raindance Film 	

<p>Festival in October 2011 and the Jury Award for the Best International Short Film at the 2011 Cornwall Film Festival for her film Love at First Sight, a short film drama about dementia. The film was also one of 10 films shortlisted for an Academy Award for Best Live Action Short Film 2012;</p> <ul style="list-style-type: none"> ○ Artist Luke Fowler's film on RD Laing, shown as part of an exhibition of his work in Edinburgh, has been nominated for the Turner Prize. The film was produced by Victoria Childs as part of a Broadcast Development Award Grant. Luke Fowler also undertook extensive research work on the RD Laing archive in Glasgow, which was supported through a Research Resources in Medical History Grant in 2001; ○ And Sir John Gurdon, Wellcome Trust researcher and former Governor, was awarded the Nobel Prize for Medicine and Physiology for the discovery that mature cells can be reprogrammed to become immature cells that are capable of developing into all tissues of the body. 	
<p>5. RESEARCH ENVIRONMENT</p>	<p>Page 61</p>
<p>KEY CONTRIBUTIONS TO THE CREATION, DEVELOPMENT AND MAINTENANCE OF MAJOR RESEARCH RESOURCES</p> <ul style="list-style-type: none"> • 11% of grants ending during 2011/12 reported the production of software and/or databases during their research, this represents a small increase on previous years (proportion over 2008/09-2010/11 = 8%). • Data from the Wellcome Trust Case Control Consortium and the 1000 Genome Project are providing the foundations for a number of genetic association breakthroughs, including the discovery of ten more DNA regions linked to Type 2 Diabetes. • The Wellcome Library has made significant progress towards the launch of its new digital library; over 1.2 million pages of books and archives have now been digitised. The Library has also begun a project to preserve the archives of the Human Genome Project and Sanger Institute. • Through the Research Resources in Medical History (RRMH) grant scheme, the Trust has preserved and archived the collections of a number of significant scientific and medical practitioners for future generations, including: <ul style="list-style-type: none"> ○ Cataloguing the papers of Nobel Prize winner, Professor Maurice Wilkins (1916-2004), and of King's College London's Biophysics Unit; ○ Conservation of Addenbrooke's Hospital Casenotes (1878-1947); ○ Transfer, cleaning and cataloguing the records of Peamount Sanatorium and the Women's National Health Association of Ireland. <p>CONTRIBUTIONS TO THE GROWTH OF CENTRES OF EXCELLENCE</p> <ul style="list-style-type: none"> • In the field of 'Neurosciences and Behaviour', the Wellcome Trust Centre for Neuroimaging at University College London continues to be a world leader in the field; over the last 10 years, the Centre has received more citations per paper than any other institution. 	

SIGNIFICANT IMPACT ON SCIENCE FUNDING AND POLICY DEVELOPMENTS

- In 2011/2012, the Trust has provided written evidence to eight Committee inquiries and gave oral evidence at three Committee inquiries on: science and international development; bridging the 'valley of death' (improving the commercialisation of research); and the administration of examinations for 15-19 year olds. The Trust also drafted amendments to the Health and Social Care Bill that were tabled by peers and provided briefings that were used extensively in debates in Parliament.
- The Trust has worked with a coalition of health research organisations to ensure that research is recognised in the Health and Social Care Act. There are now duties to promote research across the health service, including on the Secretary of State and the National Commissioning Board.
- The Trust has contributed throughout the development of the Government's Life Sciences Strategy, responding to the consultations about the Growth agenda, specifically on the topics of education and skills, and open data. In addition the Trust provided input to the NHS Innovation Review.
- The Trust continues to promote and support open access and data sharing. As part of this work the Trust has established the Expert Advisory Group on Data Access (EAGDA) for genetics and cohort studies with the Medical Research Council, the Economic and Social Research Council and Cancer Research UK. The Group aims to provide strategic advice to funders and will analyse emerging scientific, ethical and legal issues raised by data access across the fields of genetics, epidemiology and the social sciences.
- The Education and Learning and Policy Teams have been working to engage HM Treasury on the value of its on-going support of the National and Regional Science Learning Centres, including through Project ENTHUSE. In his Autumn Statement, the Chancellor announced that £10 million would be committed to Project ENTHUSE from 2013-18 alongside matched funding from the Wellcome Trust.

SIGNIFICANT IMPACT ON GLOBAL RESEARCH PRIORITIES

- The Trust has hosted/convened a number of Frontiers meetings and workshops during 2011/12, including:
 - Public Health Foundation of India Workshop;
 - MRC-TSB iPSC Grand Challenge Workshop;
 - Understanding Bottlenecks in the Discovery of New Therapies for Respiratory Syncytial Virus (RSV) Infection – Frontiers Meeting;
 - Scientific Challenge Area Meeting: Impact of Global Environmental Change on Food/Nutrition, Water and Human Health.

1. DISCOVERIES

- Significant advances in the generation of new knowledge and understanding
- Contributions to discoveries with tangible impacts on health

SIGNIFICANT ADVANCES IN THE GENERATION OF NEW KNOWLEDGE AND UNDERSTANDING

Figure 1.1 Wellcome Trust-associated publications output 2011

To enable the Wellcome Trust to draw on international benchmarks, unless otherwise stated, all bibliometric analysis refers to scientific research papers⁴ published within a specific *calendar year* (January - December).

Volume & distribution of scientific research papers

In 2011, **4433** new scientific research papers associated with the Wellcome Trust were published, indexed on PubMed and appeared on Thomson Reuters Web of Knowledge⁵. Overall, there has been a gradual increase in the annual volume of Trust-associated publications since 2006 (Fig. 1.2a), with the 16% increase in annual papers between 2006 and 2010 comparing with an overall increase of 13% in all papers covered by the Web of Knowledge over the same period⁶.

Thomson Reuters allocates papers to one or more of 253 research fields according to the journal in which they are published⁷; the 2011 cohort of Trust-associated papers is published across 132 fields, from the field with the largest number, 'Biochemistry & Molecular Biology' (780 papers), to 'Philosophy' (1 paper). In terms of volume of output, the 'top' ten research fields are presented in Fig. 1.3, along with corresponding data from 2009 & 2010⁸.

The institutions most frequently associated with the 2011 cohort⁹ are listed in Fig. 1.4, along with data for those institutions in 2009 & 2010 to show the trend. Fig. 1.5 lists the most frequently appearing Wellcome Trust-funded authors in each of our 'top' ten research fields, along with details of the grants most recently awarded to the individual.

Indication of scientific research paper impact¹⁰

To account for variations in citation patterns across research fields, Thomson Reuters data provide the ability to assess the citation performance of a specific research paper in relation to the performance of the average paper published in the same research field at the same time. This 'normalised citation impact' (NCI) has been calculated for all Trust-associated papers.

For 2011 papers, the NCI for all Trust-associated papers at the end of 2010 was **2.02**; double the world average NCI of 1¹¹ (see trend in Fig. 1.2a).

The NCIs for Trust-associated papers appearing in the Trust's 'top' (by volume) research fields are presented in Fig. 1.6.

The NCIs of Trust-associated papers published in 2009-2011 compare favourably to the world average across all the featured research fields, with the average NCI for 'Genetics & Heredity' — 3.04 (2009), 3.49 (2010), 2.80 (2011) — particularly noteworthy.

⁴ Research papers defined as articles and reviews, excluding letters, editorials, proceedings papers or other publication types.

⁵ Although this represents a decrease of almost 8% (n=383) on the 2010 volume, it is known that PubMed processes mean that some papers are indexed as being Trust-associated a significant time after publication, so the 2011 data is expected to rise over time.

⁶ Figures as of 6 November 2012. Increase measured on 2006 to 2010 data, and not 2011 data, due to the time-lag on PubMed processing mentioned above.

⁷ Papers published in major interdisciplinary journals (e.g. Nature, Science) are allocated to subject categories on an individual basis.

⁸ Our methodology for counting the papers in each specific field has changed slightly this year, so the numbers displayed here for 2009 and 2010 will not exactly match that shown in previous Assessment Framework reports.

⁹ But not necessarily funded by the Trust.

¹⁰ All citations — and averages for rebasing — taken as at end December 2011.

¹¹ Citation impact can change significantly over time — the 2010 cohort had an average NCI of 1.94 at the end of 2010, below the 2009 level it now exceeds — so the 2011 level of NCI is also likely to change

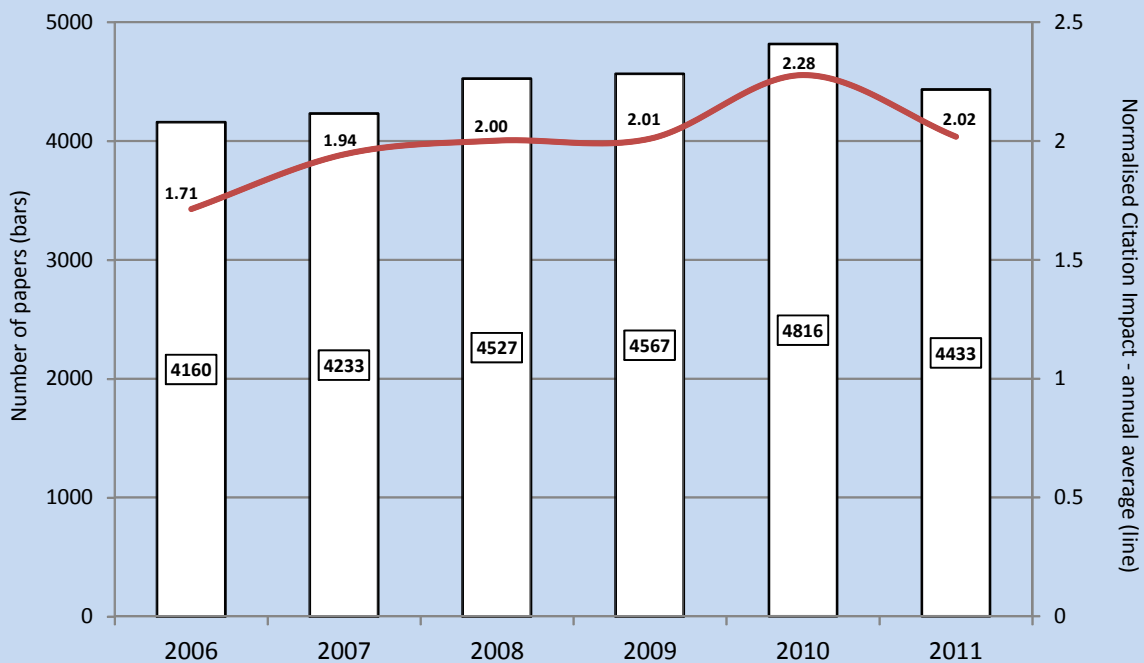
Fig. 1.7a lists the institutions most commonly linked to 'highly-cited' papers; 'highly-cited' refers to papers which have been cited at least four times the world average for that research field (i.e. NCI ≥ 4), typically thought to represent the top 5% of papers. The high proportion of Sanger Institute papers which fall into this category (28.5% for 2011) should be noted.

Fig. 1.7b lists the journals in which the 2011 cohort of Trust-associated papers most commonly appear.

Fig. 1.8 provides details of the 'top' Trust-associated papers for 2011 (in terms of NCI) across the ten research fields, together with a F1000 Prime¹² assessment if available.

Source: SPPU;2012

Fig 1.2a: Volume and impact of Wellcome Trust-associated papers 2006-2011



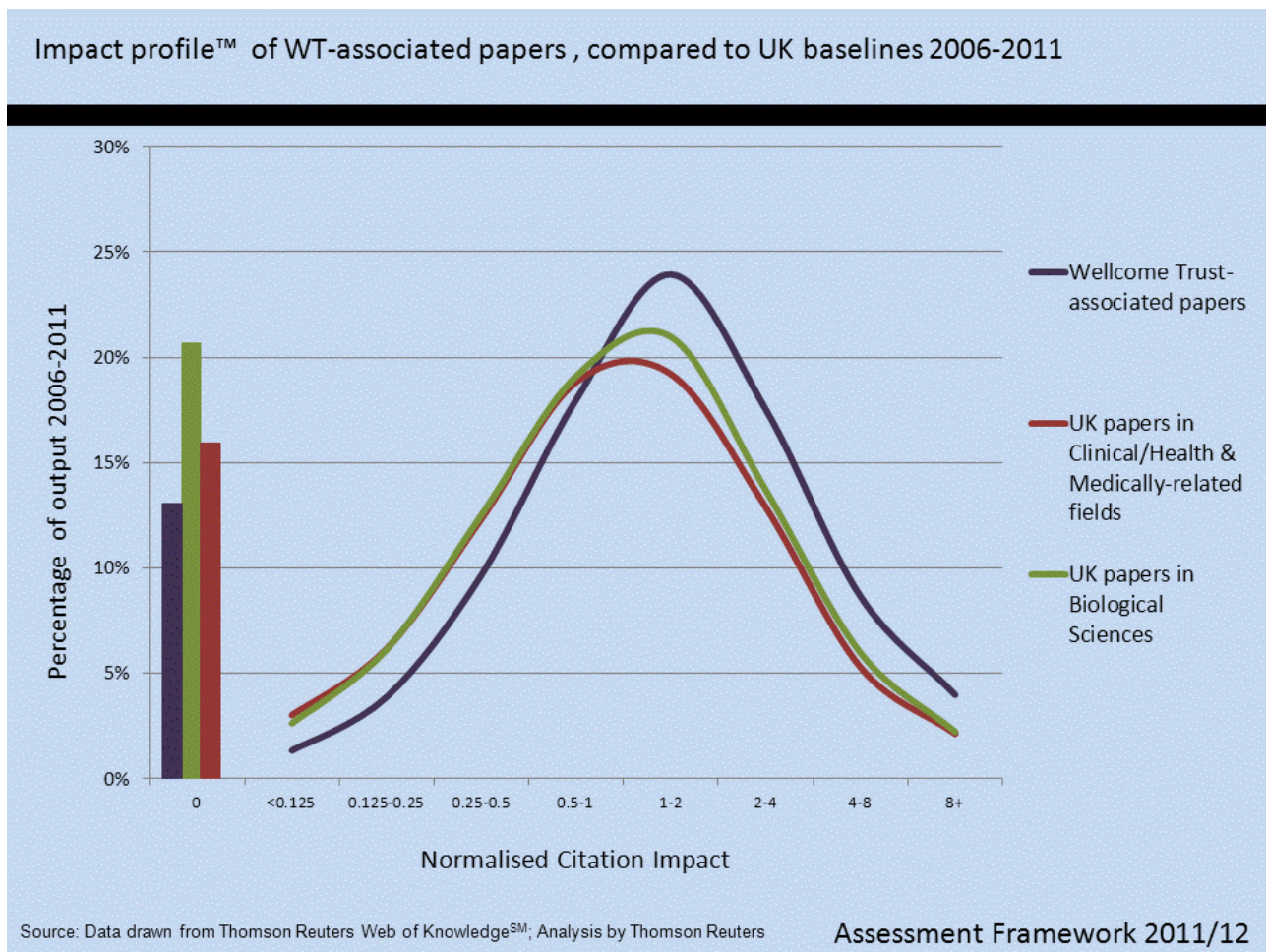
Source: Data drawn from Thomson Reuters Web of KnowledgeSM; Analysis by Thomson Reuters

Assessment Framework 2011/12

¹² F1000 Prime is a web-based "article recommendation service" which identifies and evaluates "the best" research publications.

Figure 1.2b Wellcome Trust-associated publications, compared to UK baselines 2006-2011

To provide context for the citation impact of Trust-associated papers, the 'impact profile' (below) provides a graphical representation of the impact of these papers compared to UK baselines in biological and health-related fields¹³ over time. Impact profiles indicate the proportion of publications in a range of normalised citation impact (NCI) values. For the cohort of Trust-associated papers a higher proportion fall into the higher categories of NCI than the average UK paper in related fields. A smaller proportion of Trust-associated papers remained uncited as of the end of 2011¹⁴, compared to the UK average.

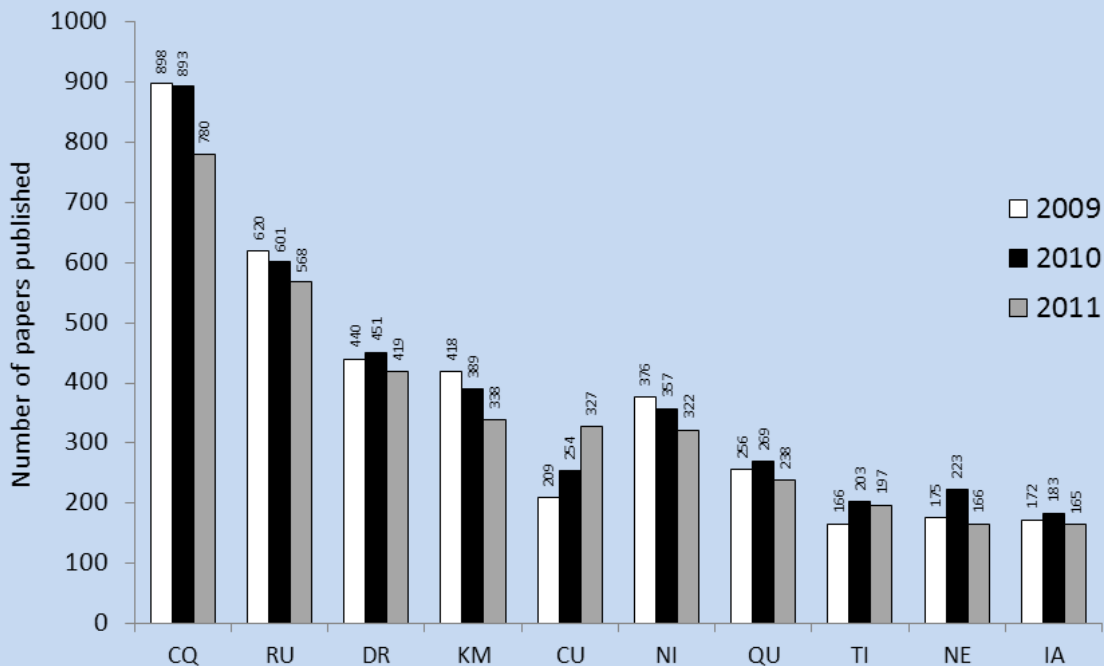


Source: SPPU;2012

¹³ Papers with at least one author based in a UK institution in Clinical/Health & Medically-related fields, or Biological Sciences, as defined by Thomson Reuters

¹⁴ The Trust and UK benchmark cohorts of papers include those published towards the end of 2011 which had little time to be cited by the end of the data gathering period. The proportion of these papers which is uncited will, therefore, fall over time.

Fig 1.3: Research fields in which Wellcome Trust-associated publications most frequently appear 2009-2011



Source: Data drawn from Thomson Reuters Web of KnowledgeSM; Analysis by Thomson Reuters

Assessment Framework 2011/12

Key to Research Field codes			
CQ	Biochemistry & Molecular Biology	NI	Immunology
RU	Neurosciences	QU	Microbiology
DR	Cell Biology	TI	Parasitology
KM	Genetics & Heredity	NE	Public, Environmental & Occupational Health
CU	Biology	IA	Endocrinology & Metabolism

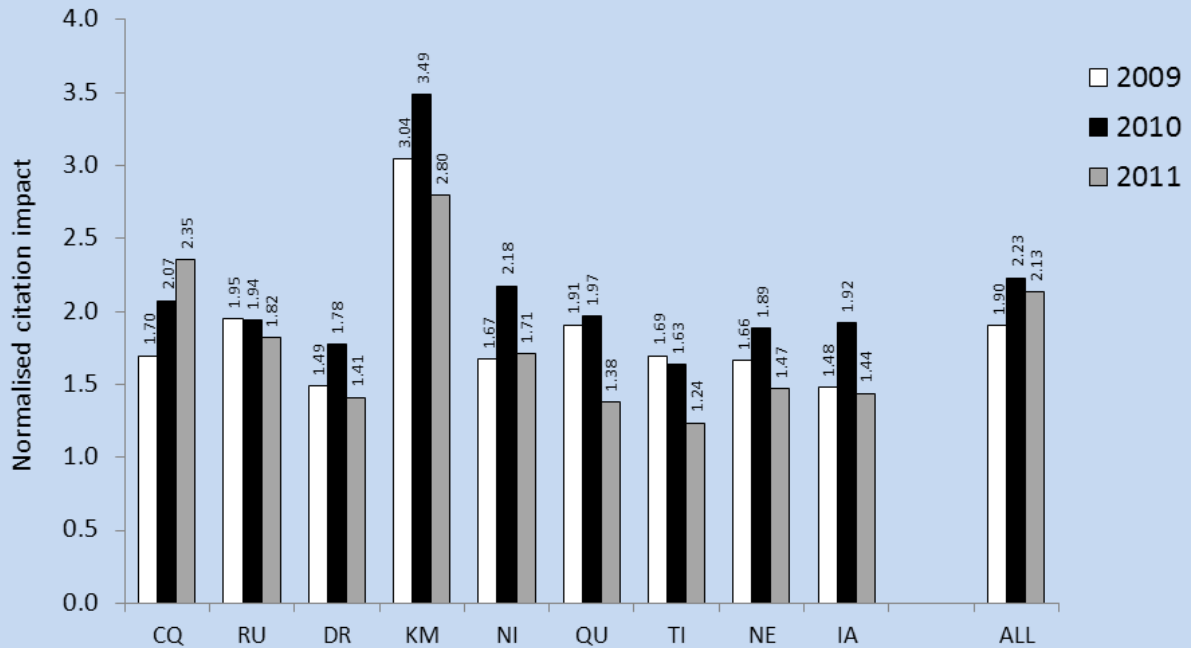
Figure 1.4 Institutions producing the most Trust-associated papers, 2009-2011

Institution	2009	2010	2011
University of Oxford	644	714	750
University of Cambridge	555	581	596
University College London	544	571	544
Imperial College London	408	443	430
King's College London	278	298	304
University of Edinburgh	289	293	295
London School of Hygiene & Tropical Medicine	217	225	233
Wellcome Trust Sanger Institute	227	241	200
University of Bristol	215	222	196
University of Manchester	202	197	184

Data drawn from Thomson Reuters Web of KnowledgeSM; Analysis by Thomson Reuters

Base: 10 organisations producing the most WT-associated papers in 2011. Note sorted on 2011 order.

Fig 1.6: Impact of Wellcome Trust-associated publications within specific research fields 2009-2011



Source: Data drawn from Thomson Reuters Web of KnowledgeSM; Analysis by Thomson Reuters

Assessment Framework 2011/12

Key to Research Field codes ¹⁵	
CQ Biochemistry & Molecular Biology	QU Microbiology
RU Neurosciences	TI Parasitology
DR Cell Biology	NE Public, Environmental & Occupational Health
KM Genetics & Heredity	IA Endocrinology & Metabolism
NI Immunology	

¹⁵ The 'Biology' research field is not included in Fig. 1.6 due to problems with Thomson Reuters data based on the rapid growth of articles in this field (largely due to the high throughput of the *PLoS One* journal) and resulting in oddly skewed averages.

Figure 1.7a Institutions producing the most highly-cited Trust-associated papers (NCI ≥ 4), 2009-2011. Number of papers, and as a proportion of total output of Trust-associated papers¹⁶

Institution	2009		2010		2011	
	No. of papers NCI ≥ 4	% of institution's WT-papers	No. of papers NCI ≥ 4	% of institution's WT-papers	No. of papers NCI ≥ 4	% of institution's WT-papers
University of Oxford	89	13.8%	143	20.0%	125	16.7%
University of Cambridge	90	16.2%	115	19.8%	97	16.3%
University College London	65	11.9%	90	15.8%	90	16.5%
Imperial College London	59	14.5%	83	18.7%	67	15.6%
Wellcome Trust Sanger Institute	66	29.1%	80	33.2%	57	28.5%
King's College London	42	15.1%	52	17.4%	56	18.4%
LSHTM	33	15.2%	41	18.2%	49	21.0%
University of Edinburgh	36	12.5%	41	14.0%	49	16.6%
Harvard University	42	37.2%	46	35.4%	38	30.6%
University of Bristol	26	12.1%	38	17.1%	30	15.3%

Data drawn from Thomson Reuters Web of KnowledgeSM; Analysis by Thomson Reuters.
Base: 10 organisations producing the most highly-cited WT-associated papers in 2011. Note: Sorted on 2011 order.

Figure 1.7b Journals in which Trust-associated papers most frequently appear, 2011

Journal	Journal Impact Factor	Number of papers		
		2009	2010	2011
<i>PLoS One</i>	4.092	138	193	269
<i>Journal of Biological Chemistry</i>	4.773	108	108	110
<i>Journal of Neuroscience</i>	7.115	70	92	89
<i>Proceedings of the National Academy of Sciences</i>	9.681	78	97	70
<i>Nucleic Acids Research</i>	8.026	47	54	53
<i>Nature</i>	36.28	33	44	47
<i>PLoS Pathology</i>	9.127	25	38	44
<i>PLoS Neglected Tropical Diseases</i>	4.716	20	42	42
<i>Journal of Immunology</i>	5.788	47	50	41
<i>NeuroImage</i>	5.895	34	32	40

Data drawn from Thomson Reuters Web of KnowledgeSM; Analysis by Thomson Reuters; 2011 Journal Impact Factors used.
Base: 10 journals indexed on Thomson Reuters databases which featured the most WT-associated papers.
Note: Top 10 journals for 2009 and 2010 are different, but PLoS One, *Journal of Biological Chemistry*, *PNAS* and *Journal of Neuroscience* constitute the top 4 for all three annual cohorts.

¹⁶ The institutions listed on Trust-associated papers are not necessarily funded by the Trust, but may be the locations of collaborating authors funded by other agencies. The appearance of Harvard University in Fig. 1.7a therefore means that it is the base for collaborators on a number of the most highly-cited Trust-associated papers.

Figure 1.8: Wellcome Trust-associated papers with highest NCI by research field, 2011

Publication details	No of citations ¹⁷	NCI	F1000 Prime ¹⁸	WT association
CQ - Biochemistry & Molecular Biology				
Winn MD et al. Overview of the CCP4 suite and current developments (2011) <i>ACTA CRYSTALLOGR D</i> 67:235-42	149	201.873		Senior Research Fellowship to GN Murshudov
Murshudov GN et al. REFMAC5 for the refinement of macromolecular crystal structures (2011) <i>ACTA CRYSTALLOGR D</i> 67:355-67	88	119.227		Senior Research Fellowship to GN Murshudov
Flicek P et al. Ensembl 2011 (2011) <i>NUCLEIC ACIDS RES</i> 39:D800-6	49	66.388		Wellcome Trust Sanger Institute; European Bioinformatics Institute
RU – Neurosciences				
Ingason A et al. Copy number variations of chromosome 16p13.1 region associated with schizophrenia (2011) <i>MOL PSYCHIATR</i> 16:17–25	17	25.893		Wellcome Trust Sanger Institute
Huang JK et al. Retinoid X receptor gamma signaling accelerates CNS remyelination (2011) <i>NAT NEUROSCI</i> 14:45-53	16	24.370	6 stars	Programme Grant to C Ffrench-Constant
Tollervey JR et al. Characterizing the RNA targets and position-dependent splicing regulation by TDP-43 (2011) <i>NAT NEUROSCI</i> 14:452-8	16	24.370	2 stars	Strategic Award to CE Shaw
DR – Cell Biology				
Polo SE et al. Dynamics of DNA damage response proteins at DNA breaks: a focus on protein modifications (2011) <i>GENE DEV</i> 25:409-33	18	18.638		Project Grant to SP Jackson

¹⁷ Citations as at end of December 2011 on Thomson Reuters Web of KnowledgeSM.

¹⁸ F1000 Prime recommendations as of November 2012. Around 2% of published articles are recommended through the F1000 Prime service by one or more of over 5,000 expert scientists who act as 'Faculty members'. Each recommended paper receives a 1 to 3 star rating, with multiple recommendations being added together.

Tabas I et al. Integrating the mechanisms of apoptosis induced by endoplasmic reticulum stress (2011) NAT CELL BIOL 13:184-90	16	16.567		Principal Research Fellowship to D Ron
Settembre C et al. TFEB Links Autophagy to Lysosomal Biogenesis (2011) SCIENCE 332:1429-33	14	14.496	8 stars	Principal Research Fellowship to D Rubinsztein
KM - Genetics & Heredity				
Anderson CA et al. Meta-analysis identifies 29 additional ulcerative colitis risk loci, increasing the number of confirmed associations to 47 (2011) NAT GENET 43:246-52	37	51.117		Wellcome Trust Sanger Institute
Mills RE et al. Mapping copy number variation by population-scale genome sequencing (2011) NATURE 470:59-65	35	48.353		Genome Structural Variation Consortium - Wellcome Trust Sanger Institute
International Parkinson Disease Genomics Consortium et al. Imputation of sequence variants for identification of genetic risks for Parkinsons disease: a meta-analysis of genome-wide association studies (2011) LANCET 377:641-9	30	41.446	1 star	Strategic Award to NJ Wood, J Hardy and A Schapira; Wellcome Trust Case Control Consortium II
CU – Biology				
O'Neill JS et al. Circadian clocks in human red blood cells (2011) NATURE 469:498-503	23	55.335	13 stars	Clinician Scientist Fellowship to A Reddy
Anderson CA et al. Synthetic Associations Are Unlikely to Account for Many Common Disease Genome-Wide Association Signals (2011) PLOS BIOL 9: e1000580	10	24.059		Programme Grant to CA Anderson; Programme Grant to JC Barrett
Di Meglio P et al. The IL23R R381Q Gene Variant Protects against Immune-Mediated Diseases by Impairing IL-23-Induced Th17 Effector Response in Humans (2011) PLOS ONE 6: e17160	6	14.435		Programme Grant to FO Nestle
NI – Immunology				
Martineau AR et al. High-dose vitamin D-3 during intensive-phase antimicrobial treatment of pulmonary tuberculosis: a double-blind randomised controlled trial (2011) LANCET 377:242-50	25	32.252	3 stars	Research Training Fellowship to Y Hanifa; Senior Research Fellowship in Clinical Science to RJ Wilkinson

Jenkins SJ et al. Local Macrophage Proliferation, Rather than Recruitment from the Blood, Is a Signature of T(H)2 Inflammation (2011) SCIENCE 332:1284-8	14	18.061	28 stars	PhD Studentship to LH Jones
Züst R et al. Ribose 2'-O-methylation provides a molecular signature for the distinction of self and non-self mRNA dependent on the RNA sensor Mda5 (2011) NAT IMMUNOL 12:137-43	12	15.481	6 stars	Project Grant to S Siddell
QU – Microbiology				
Croucher NJ et al. Rapid Pneumococcal Evolution in Response to Clinical Interventions (2011) SCIENCE 331:430-4	27	44.112	8 stars	Wellcome Trust Sanger Institute
Moore C et al. Evidence of Person-to-Person Transmission of Oseltamivir-Resistant Pandemic Influenza A(H1N1) 2009 Virus in a Hematology Unit (2011) J INFECT DIS 203:18-24	12	19.606		Project Grant to M Galiano
Berthoud TK et al. Potent CD8(+) T-Cell Immunogenicity in Humans of a Novel Heterosubtypic Influenza A Vaccine, MVA-NP+M1 (2011) CLIN INFECT DIS 52: 1-7	9	14.704		Senior Investigator Award to AVS Hill
TI – Parasitology				
Saralamba S et al. Intrahost modeling of artemisinin resistance in Plasmodium falciparum (2011) P NATL ACAD SCI USA 108: 397-402	7	13.865	1 star	Wellcome Trust-Mahidol University-Oxford Tropical Medicine Research Programme
Santos JM et al. Intramembrane Cleavage of AMA1 Triggers Toxoplasma to Switch from an Invasive to a Replicative Mode (2011) SCIENCE 331:473-7	7	13.865	4 stars	Project Grant to MJ Blackman
Stothard JR et al. Schistosoma mansoni Infections in Young Children: When Are Schistosome Antigens in Urine, Eggs in Stool and Antibodies to Eggs First Detectable? (2011) PLOS NEGLECT TROP D 5:e938	7	13.865		Project Grant to JR Stothard and NB Kabatereine (co-applicants)
NE – Public, Environmental & Occupational Health				
Anders KL et al. Epidemiological Factors Associated with Dengue Shock Syndrome and Mortality in Hospitalized Dengue Patients in Ho Chi Minh City, Vietnam (2011) AM J TROP MED HYG 84:127-34	7	19.638	2 stars	Vietnam Research Programme and Oxford Clinical Research Unit

Fall CH et al. Infant-feeding patterns and cardiovascular risk factors in young adulthood: data from five cohorts in low- and middle-income countries (2011) <i>INT J EPIDEMIOL</i> 40: 47-62	5	14.027		Project Grant to Consortium of Health Outcome Research in Transitional Societies – Brazil, Guatemala, India, Philippines, South Africa
Mutua MK et al. Childhood vaccination in informal urban settlements in Nairobi, Kenya: Who gets vaccinated? (2011) <i>BMC PUBLIC HEALTH</i> 11:6	4	11.222		Nairobi Urban Health & Demographic Surveillance System / Africa Centre for Health and Population Studies
IA – Endocrinology				
McQuaid SE et al. Downregulation of Adipose Tissue Fatty Acid Trafficking in Obesity A Driver for Ectopic Fat Deposition? (2011) <i>DIABETES</i> 60:47-55	8	12.517		Senior Research Fellowship in Clinical Science to F Karpe
Cochemé HM et al. Measurement of H2O2 within Living Drosophila during Aging Using a Ratiometric Mass Spectrometry Probe Targeted to the Mitochondrial Matrix (2011) <i>CELL METAB</i> 13: 340-50	7	10.952		Strategic Award to L Partridge and D Gems (co-applicants)
Prieur X et al. Differential Lipid Partitioning Between Adipocytes and Tissue Macrophages Modulates Macrophage Lipotoxicity and M2/M1 Polarization in Obese Mice (2011) <i>DIABETES</i> 60:797-809	6	9.388		Programme Grant to A Vidal-Puig and S O’Rahilly (co-applicants)


Source: SPPU; 2012


Figure 1.9: 'Altmetrics' – new, complementary indicators of research impact and re-use

Paper-level citations, and associated bibliometric analysis, continue to be an important measure of the use and impact of a research paper (and its authors); however, recent innovations in scientific publishing increasingly offer complementary tools and 'indicators' to support the assessment of the use and impact of research.

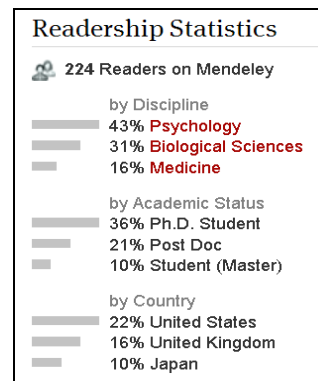
The growth of the field of '**Altmetrics**' - our ability to provide and analyse data ('metrics') on range of different ('**Alternative**') evidence of use of research such as downloads, bookmarks, blogs and social media mentions – is starting to provide the research community with potentially complementary types of research 'impact' measures that can be used alongside more traditional measures of research use and significance. A number of publishers, including PLoS and Nature, now make a range of article level metrics available online: bringing together paper citations alongside 'Altmetrics' such as paper downloads and social media data. A number of service providers have emerged that collate and provide analyses of such data, including *Altmetric.com*, *ImpactStory* and *Plum Analytics*.

The Evaluation Team are working with a number of output data providers to explore the potential for the more regular use of Altmetrics as part of a balanced portfolio of research output and impact metrics and information. Following some pilot explorations, there are some areas of obvious potential interest and value. One example comes with a paper¹⁹ published in the in *The Lancet* by Dr Dejan Zurovac and colleagues at the Kenya Medical Research Institute-Wellcome Trust Research Programme in Nairobi. While this paper (at the time of the analysis) had received relatively few citations, through the use of *Altmetric.com* it is possible to track where and who was reading this paper, including several significant policy-related organisations working in the field, who 'Tweeted' about it (see below). To date, it has not been possible to conclude that the *Lancet* paper has had a direct impact on policy, however through the use of such 'Altmetric' data, it is possible to see the potential for this.

	PAHO/WHO Equity @eqpaho	The effect of mobile phone text-message reminders on Kenyan health workers' adherence to malaria treatment guidelines http://t.co/BhbGRad
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	DFID_HDRC @dfid_hdrc	RT @mngreenall: The effect of mobile phone text-message reminders on Kenyan health workers' adherence to malaria treatment guidelines: http://t.co/z3m7uEn
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In another example, a Wellcome-Trust associated opinion piece by Ryota Kanai and Geraint Rees published in *Nature Reviews Neuroscience*²⁰ which, to date, has not been highly cited, has been accessed and read by 224 readers on Mendeley²¹ (an online reference management service). A paper that is widely read by other researchers, even if not (yet) cited by them, is another useful indicator of potential importance and impact which until now has been invisible; it is even possible to explore the demographic data of these readers.



With these new data and services in their very early stages of development, the Wellcome Trust's Evaluation Team will continue to monitor the development of Altmetrics, and over time incorporate into our monitoring and evaluation activity where this can add value and complement existing data and information.

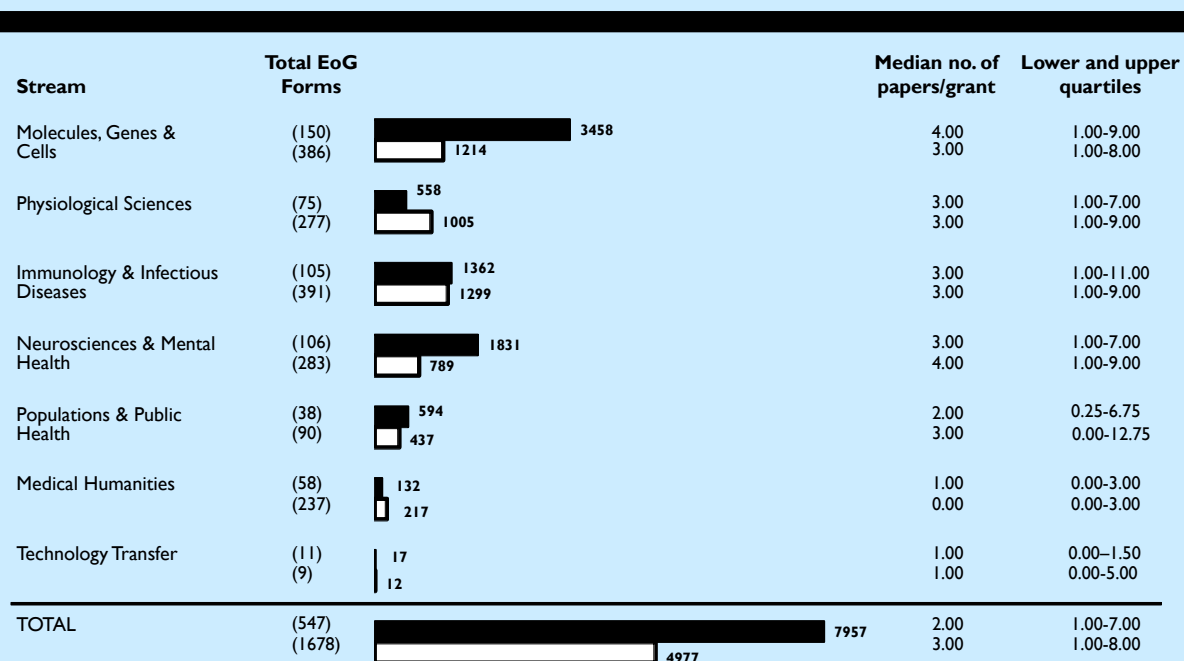
Source: SPPU; 2012

¹⁹ Zurovac D et al. The effect of mobile phone text-message reminders on Kenyan health workers' adherence to malaria treatment guidelines: a cluster randomised trial (2011) *The Lancet* 378:795-803

²⁰ Kanai R and Rees G. The structural basis of inter-individual differences in human behaviour and cognition (2011) *Nature Reviews Neuroscience* 12:231-242

²¹ As of October 2012.

Fig. 1.10a: Number of peer-reviewed papers reported at 'end of grant' per funding stream



Base: 547 EoG report forms returned 1st October 2011-30th September 2012; Total includes 4 non-stream grants; Please note that six grants reported more than 200 publications – see Fig 1.10b for details.
Base: 1678 EoG report forms returned 1st October 2008-30th September 2011 – data averaged for the three years; Total includes 5 non-stream grants.

■ 2011/12
□ Average of 2008/9 to 2010/11 data

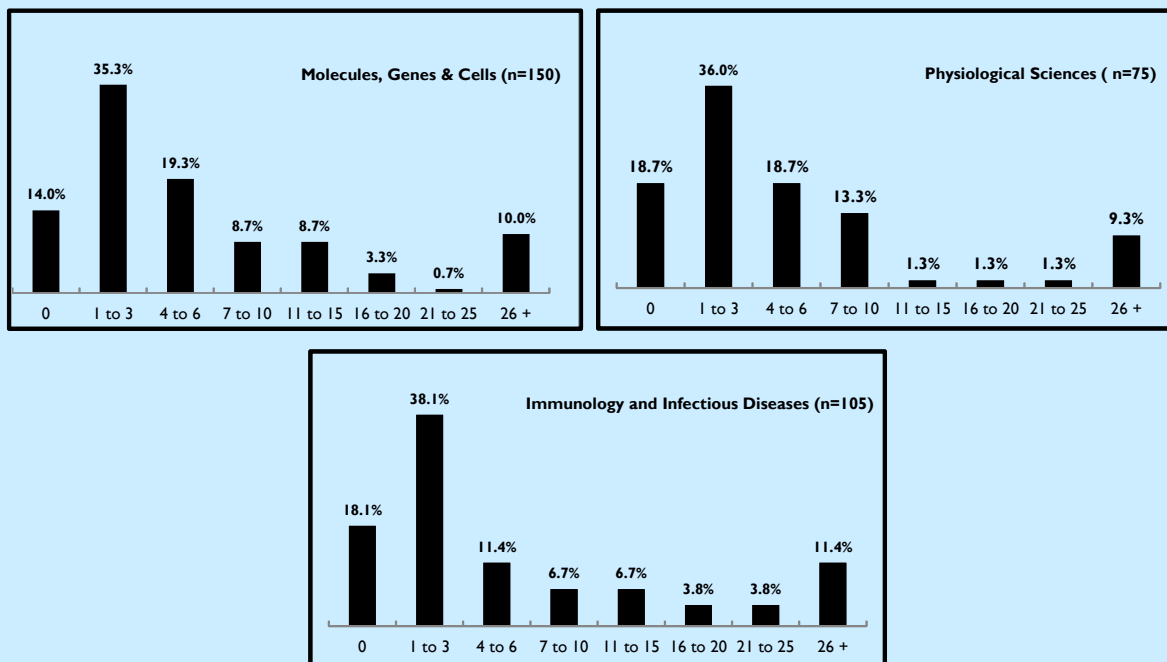
Assessment Framework 2011/12

Figure 1.10b: Details of grants with over 200 publications

PI	Stream	Grant Type	No. Publications	Grant Title
Prof Anthony P Monaco	Molecules, Genes & Cells	Other - Wellcome Trust Centre	1512	Identification and functional analysis of susceptibility genes in multifactorial disease.
Prof Raymond J Dolan	Neurosciences & Mental Health	Other – Strategic Award	909	Imaging neuroscience at the Functional Neuroimaging Laboratory (FIL).
Prof Richard F Mott	Molecules, Genes & Cells	Equipment Grant	772	Large scale data storage and backup strategy for the Wellcome Trust Centre for Human Genetics for the period 2006-2010.
Prof Nick J White	Immunology & Infectious Diseases	Principal Research Fellowship	421	Studies on malaria, melioidosis, and sexually transmitted diseases.
Prof Timothy D Spector	Populations and Public Health	Programme Grant	277	TwinsUK Genetic Epidemiology Resource.
Prof Ian Marshall	Neurosciences & Mental Health	Equipment Grant	204	Integrated image data storage and processing facilities to support research in clinical neuroscience.

Source: SPPU; 2012

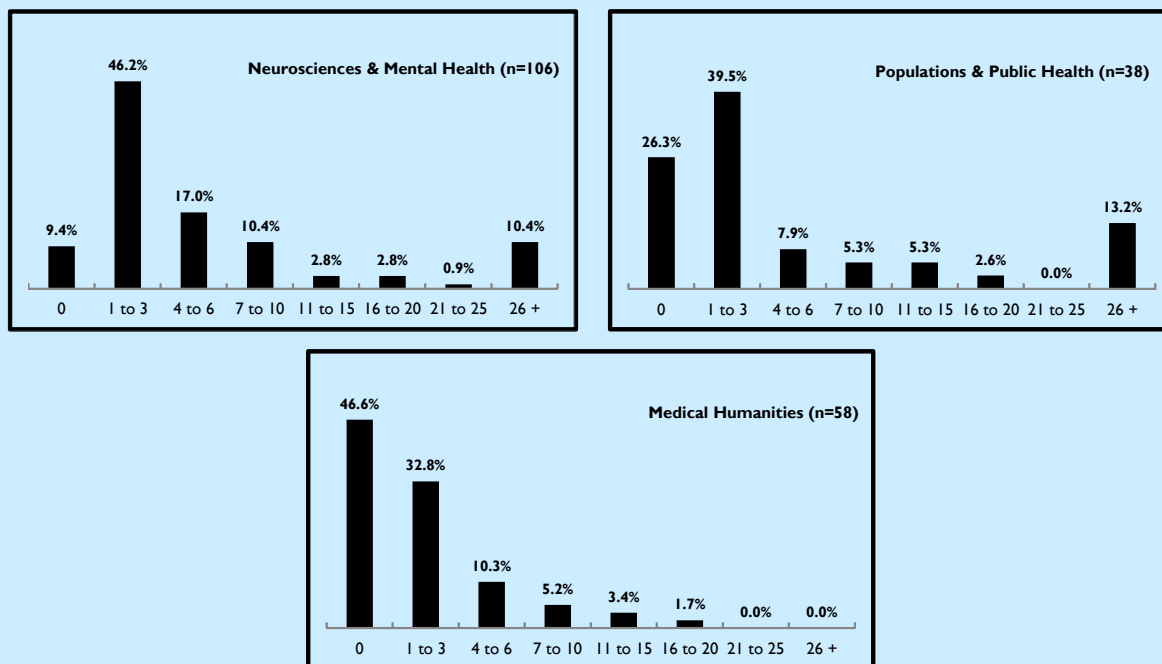
Fig. I.11: Number of peer-reviewed papers reported at 'end of grant' per funding stream - frequency distribution 2011-12



Base: 547 EoG report forms returned 1st October 2011-30th September 2012
(There were only eleven End of Grant report forms from Technology Transfer grants)

Assessment Framework 2011/12

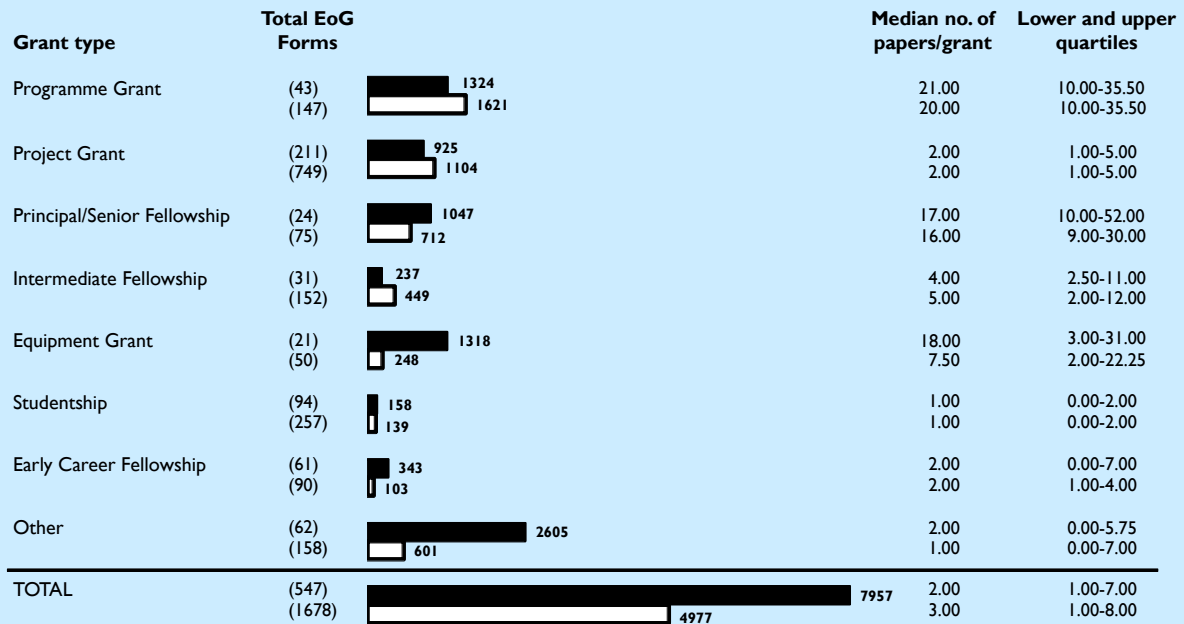
Fig. I.12: Number of peer-reviewed papers reported at 'end of grant' per funding stream - frequency distribution 2011-12



Base: 547 EoG report forms returned 1st October 2011-30th September 2012
(There were only eleven End of Grant report forms from Technology Transfer grants)

Assessment Framework 2011/12

Fig. I.13: Number of peer-reviewed papers reported at 'end of grant' per grant type



Base: 547 EoG report forms returned 1st October 2011-30th September 2012

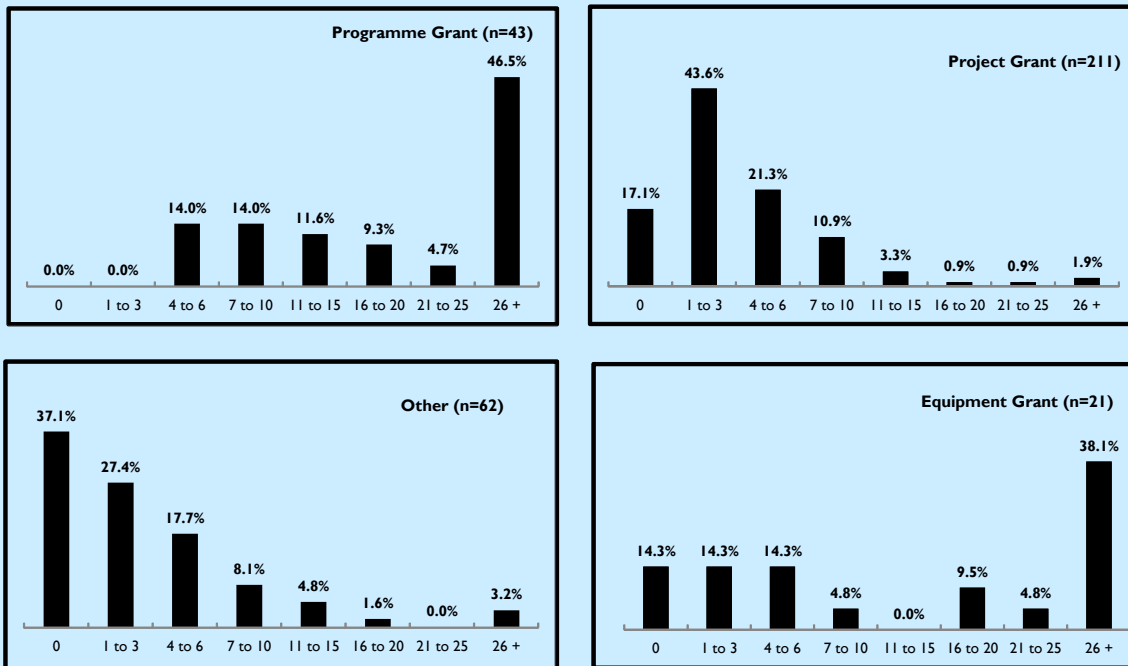
Base: 1678 EoG report forms returned 1st October 2008-30th September 2011 – data averaged for the three years

■ 2011/12

□ Average of 2008/9 to 2010/11 data

Assessment Framework 2011/12

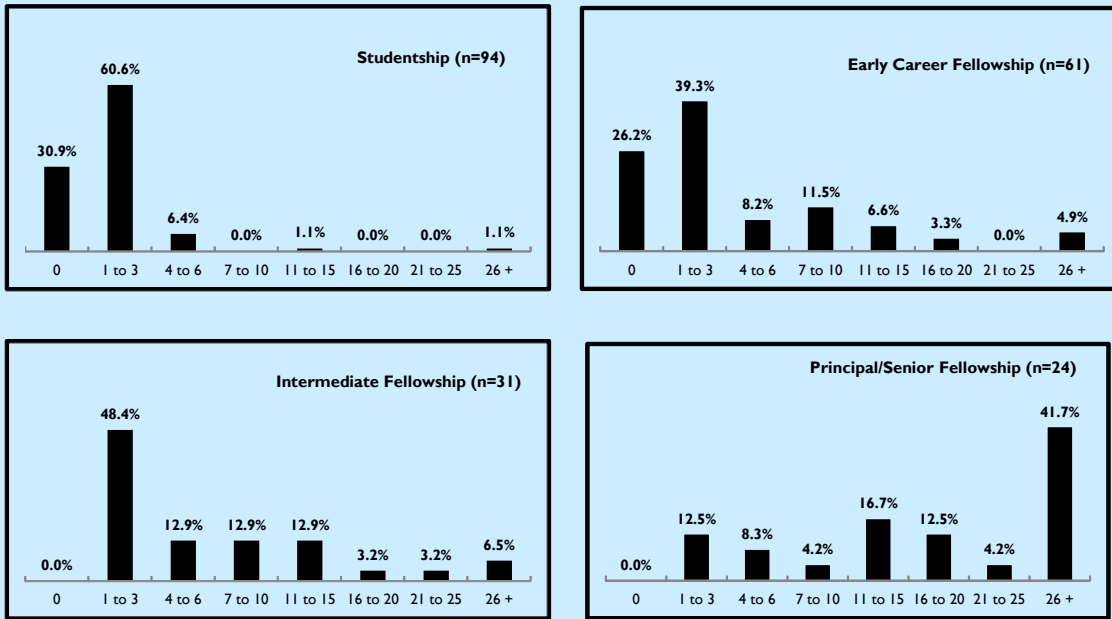
Fig. I.14: Number of peer-reviewed papers reported at 'end of grant' per grant type - frequency distribution 2011-12



Base: 547 EoG report forms returned 1st October 2011-30th September 2012

Assessment Framework 2011/12

Fig. I.15: Number of peer-reviewed papers reported at 'end of grant' per grant type - frequency distribution 2011-12



Base: 547 EoG report forms returned 1st October 2011-30th September 2012

Assessment Framework 2011/12

Fig. I.16: Number of books/monographs reported at 'end of grant' per funding stream

Stream	Total EoG Forms	2011/12	Average of 2008/9 to 2010/11 data	Range
Molecules, Genes & Cells	(150) (386)	172	65	0-69 0-15
Physiological Sciences	(75) (277)	43	65	0-9 0-31
Immunology & Infectious Diseases	(105) (391)	102	105	0-17 0-26
Neurosciences & Mental Health	(106) (283)	93	79	0-29 0-21
Populations & Public Health	(38) (90)	24	56	0-11 0-49
Medical Humanities	(58) (237)	42	45	0-12 0-18
Technology Transfer	(11) (9)	1	1	0-1 0-3
TOTAL	(547) (1678)	478	416	0-69 0-49

Base: 547 EoG report forms returned 1st October 2011-30th September 2012; Total includes 4 non-stream grants
 Base: 1678 EoG report forms returned 1st October 2008-30th September 2011 – data averaged for the three years; Total includes 5 non-stream grants.

■ 2011/12
 □ Average of 2008/9 to 2010/11 data

Assessment Framework 2011/12

Figure 1.19 Key examples of Trust-funded discoveries

Researcher/ award	Key grant(s) ²²	Area	Impact
Molecules, Genes and Cells			
Professor Allan Bradley	WT Sanger Institute Funding	Gene Therapy	A team of scientists led by researchers from the Wellcome Trust Sanger Institute and the University of Cambridge have, for the first time, corrected a gene mutation responsible for both cirrhotic liver and lung emphysema in human-induced pluripotent stem cells. The results, published in <i>Nature</i> , could open up new opportunities for patient specific therapies.
Dr Aylwyn Scally and Dr Richard Durbin	WT Sanger Institute Funding	Human Evolution	The sequence of the gorilla genome has been published, completing the set for the living great apes. The findings have provided a unique perspective on human origins and are an important resource for research into human evolution and biology. http://www.wellcome.ac.uk/News/2012/News/WTVM054614.htm
Dr Julian Rayner and Dr Gavin Wright	WT Sanger Institute Funding	Malaria	Researchers from the Wellcome Trust Sanger Institute have made a key discovery in understanding how <i>Plasmodium falciparum</i> , the most deadly species of malaria parasite, invades human red blood cells. Results showed that the parasite relies on a single receptor on the red blood cell's surface, offering a new focus for vaccine development. The paper was published in <i>Nature</i> . http://www.wellcome.ac.uk/News/2011/News/WTVM053401.htm
Dr Sanjay Sinha	Intermediate Clinical Fellowship	Cardio vascular	Scientists have used human pluripotent stem cells to create different types of vascular smooth muscle cells – the cells that make up the walls of blood vessels – using cells from patients' skin. This is the first time that all the major types of vascular smooth muscle cells have been developed in a system that could be scaled up for clinical-grade production. http://www.cam.ac.uk/research/news/smooth-muscle-cells-created-from-patients-skin-cells/ ; http://www.huffingtonpost.co.uk/2012/01/17/laboratory-grown-blood-vessels-heart-disease-stroke-treatment_n_1210047.html
Professor Melanie Newport	Project Grant	Podoconiosis	Genetic variations in the HLA class II region of the human genome, important for controlling immune responses, have been linked to an increased risk of Podoconiosis, a disfiguring and disabling leg swelling caused by an abnormal reaction to the minerals found in soil. The research was published in the <i>New England Journal of Medicine</i> and funded by the Wellcome Trust and the Association of Physicians of Great Britain and Ireland. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054822.htm
Dr Elizabeth Murchison and Professor Michael Stratton	WT Sanger Institute Funding	Cancer	Researchers have sequenced the genome of a cancer that is threatening the existence of the Tasmanian devil. The work gives important clues to how the tumour evades detection by the devils' immune system. The work was published in <i>Cell</i> and part supported by an Eric Guiler Tasmanian Devil Research Grant and a L'Oreal UNESCO For Women in Science Fellowship. http://www.wellcome.ac.uk/News/2012/News/WTVM054399.htm

²² Grants listed are the major grants most recently awarded to the researchers, up to and including 2012

Professor Gil McVean Professor Peter Donnelly	WT Centre for Human Genetics core funding and Wellcome Trust Sanger Institute Funding	Human Recombination	Scientists have constructed the first genetic map of DNA recombination in chimpanzees. The study found there was no overlap in the location of recombination hotspots between humans and chimpanzees and shows the process in chimpanzees has differences to the process in the human genome. The work was published in <i>Science Express</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054722.htm
Dr Rory Bowden	WT Strategic Award, Wellcome Trust Core Award, WT WTCCC2	Evolution	Research suggests that chimpanzee populations living in relatively close proximity are substantially more genetically different than humans living on different continents. The study found that genomics can provide a valuable new tool for use in chimpanzee conservation, with the potential to identify the population of origin of an individual chimpanzee. This work was published in PLOS Genetics. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054542.htm
Professor Adrian Bird	WT Centre for Cell Biology Funding	Genomics	Research on the role of DNA methylation has revealed its role in cellular differentiation. The results showed that methylation areas in the genome regulate gene expression during the early stages of cell specification. This work was published in <i>Genomics Research</i> .
Professor Paul Kellam Dr Aaron Everitt	Project Grant	Influenza	Research has identified for the first time a human gene that influences how we respond to influenza infection. The finding may help explain why influenza becomes a life-threatening disease for some people yet affects others mildly. The research was led by the Wellcome Trust Sanger Institute and published in <i>Nature</i> . http://www.wellcome.ac.uk/News/2012/News/WTVM054781.htm
Dr Mark Dawson and Professor Tony Kouzarides	Intermediate Clinical Fellowship; Wellcome-Beit Prize Fellowship; WT/Cancer Research UK Gurdon Institute Funding	Leukaemia	Researchers have demonstrated that a potential new drug could treat mixed-lineage leukaemia, the commonest form of leukaemia in babies. The drug prevents genes that can cause the disease being activated. The research, published in <i>Nature</i> , was conducted at the Wellcome Trust-Cancer Research UK Gurdon Institute and the Cambridge Institute for Medical Research, in collaboration with scientists from GlaxoSmithKline and Cellzome AG. http://www.wellcome.ac.uk/News/2011/News/WTVM052901.htm
Dr Mark Bass/Professor Martin Humphries	Research Career Development Fellowship/WT Centre for Cell-Matrix Research Funding	Cell Repair	Researchers at the University of Bristol and the Wellcome Trust Centre for Cell-Matrix Research, University of Manchester, have discovered the signalling process that occurs in damaged tissues and identified the cellular mechanisms responsible for activating repair. The findings could open up new opportunities for improving repair in patients after illness or surgery. http://www.wellcome.ac.uk/News/2011/News/WTVM053022.htm
Physiological Sciences			
Professor Andrew Hattersley	Research Leave Fellowship for Clinical Academics	Pancreatic Dysfunction/ Diabetes	Researchers have identified a mutation in the GATA6 gene that gives new insight into how the pancreas develops. The mutation was present in 15 out of 27 individuals studied with pancreatic agenesis – a condition where the pancreas fails to develop during embryonic growth – suggesting that GATA6 plays an important role in the development of pancreatic cells. The findings were published in <i>Nature Genetics</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054722.htm

			releases/2011/WTVM053665.htm
Dr John Achermann	Senior Research Fellowship; Biomedical Resources Grant	Development Disorders	Research has shown that a gene previously linked to too much growth in patients has now also been linked to growth restriction, with different forms of the gene leading to very different conditions. Scientists have identified the growth restriction was caused by a particular mutation of a gene known as CDKN1C. The work was published in <i>Nature Genetics</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM055161.htm
Immunology and Infectious Diseases/Populations and Public Health			
Professor Francois Nosten	Major Overseas Programme	Malaria	Research has shown that the Malaria parasite <i>Plasmodium falciparum</i> is becoming resistant to the frontline treatment (artemisinin) for malaria on the border of Thailand and Myanmar. The study, published in <i>The Lancet</i> , was carried out between 2001 and 2010 by researchers at the Shoklo Malaria Research Unit, part of the Wellcome Trust-Mahidol University-Oxford Tropical Medicine Programme. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054882.htm
Dr Marcus Rijken	Major Overseas Programme	Malaria	Researchers at the Shoklo Malaria Research Unit on the border of Thailand and Myanmar have used ultrasound scans to provide the first direct evidence of the effect of Malaria on fetal growth in pregnancies. The study, published in <i>PLOS ONE</i> highlights the importance of preventing Malaria in pregnancy. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054356.htm
Dr Rose MCGready	Major Overseas Programme	Malaria	Research from the Shoklo Malaria Research Unit has shown that frequent antenatal screening to detect and treat Malaria in its early stages has resulted in a six-fold reduction in deaths among pregnant women on the border of Thailand and Myanmar. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM055928.htm
Dr Robert Belshaw	Project Grant	Retroviruses	Researchers have searched the genomes of 38 mammals to try to understand how our genomes became invaded with viruses. The findings revealed that one particular group of viruses had lost the ability to infect new cells but is still able to amplify itself within a single cell, proliferating its genetic material throughout the genome. The findings were published in <i>Proceedings of the National Academy of Sciences</i> http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054943.htm
Dr Andrew Schache	Joint Royal College of Surgeons-WT Research Training Fellowship	HPV Cancer	A team of researchers has identified the most accurate test for identifying HPV-related head and neck cancers, which they hope will become the diagnostic standard and have immediate clinical impact. The work was published in <i>Clinical Cancer Research</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2011/WTVM052924.htm

Dr Guy Thwaites	Intermediate Clinical Fellowship	TB	<p>Researchers have shown that peoples' immune response to TB is dependent on the version of the gene LTA4H that they have. The findings indicate that patients are likely to benefit from different drug treatments depending on their LTA4H gene profile. The research was published in <i>Cell</i>.</p> <p>http://www.wellcome.ac.uk/News/2012/News/WTVM054310.htm</p>
Prof Rob Wilkinson	Senior Clinical Research Fellowship	TB	<p>Work from Professor Wilkinson and colleagues is looking at the use of Vitamin D in the treatment of Tuberculosis. Results have shown that Vitamin D deficiency is associated with increased susceptibility to the disease. A clinical trial run by the group showed that giving both antibiotics and a high dose of Vitamin D appears to help patients with Tuberculosis recover more quickly.</p>
Professor Rory Bowden/Derrick Crook	Strategic Award	Pneumococcal Infection	<p>A study, published in 'Nature Genetics' has investigated how bacteria can change their coating to render vaccines ineffective. This finding may have implications for how future vaccines can be made more effective.</p> <p>http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054268.htm</p>
Professor Greg Towers	Senior Research Fellowship in Basic Biomedical Science	HIV/AIDs	<p>Scientists have found the 'key' that HIV uses to enter cells' nuclei, allowing it to disable the immune system. The finding, published in <i>PLoS Pathogens</i>, provides a potential new target for drugs that could be more effective against resistant strains of the virus.</p> <p>http://www.wellcome.ac.uk/News/Media-office/Press-releases/2011/WTVM053657.htm</p>
Dr Alex Aiken	Research Training Fellowship	Hospital Acquired-Infections	<p>Research has highlighted the vast scale of hospital-acquired infections in sub-Saharan Africa. The study, published in <i>The Lancet</i>, suggests that infections acquired might contribute to one in every 20 child deaths in hospitals in the region.</p> <p>http://www.wellcome.ac.uk/News/Media-office/Press-releases/2011/WTVM053557.htm</p>
Dr Khor Chiea Chuen and Professor Cameron Simmons	Genome Wide Association Study & Senior Fellowship in Basic Biomedical Science	Dengue	<p>Researchers in South-east Asia have conducted the first genome-wide association study to compare the genomes of children with severe Dengue fever against population controls, identifying two genetic variants associated with increased susceptibility to severe Dengue. The findings were published in <i>Nature Genetics</i>.</p> <p>http://www.wellcome.ac.uk/News/Media-office/Press-releases/2011/WTVM053157.htm</p>
Dr Stephen Baker	Major Overseas Programme	Typhoid Surveillance	<p>Researchers working in Kathmandu, Nepal, have combined DNA sequencing technology and global positional systems (GPS) to map the spread of Typhoid and trace its source. The research was published in <i>Open Biology</i>.</p> <p>http://www.wellcome.ac.uk/News/Media-office/Press-releases/2011/WTVM053156.htm</p>
Dr David Horn	Project Grant	African Trypanosomiasis	<p>The findings of a genetic screening study reported in <i>Nature</i> have identified how the parasite that causes human African Trypanosomiasis interacts with the drugs currently used to treat the disease. The team, led by researchers from the London School of Hygiene and Tropical Medicine (LSHTM), hopes the results will eventually lead to better treatments.</p> <p>http://www.wellcome.ac.uk/News/2012/News/WTVM054226.htm</p>

Professor Alan Fairlamb	Principal Research Fellowship	Leishmaniasis or (Tropical Diseases)	A study published in <i>Science Translational Medicine</i> has shown that the drug fexinidazole could potentially be used to treat visceral Leishmaniasis, a parasitic disease that kills 50 000 to 60 000 people a year in Africa, Asia and Latin America. http://www.wellcome.ac.uk/News/2012/News/WTVM054305.htm
Neuroscience and Mental Health			
Professor Geraint Rees	Senior Clinical Fellowship	Neuroscience and Social Medicine	Scientists have found a direct link between the number of 'Facebook friends' a person has and the amount of grey matter that is found in several regions of their brain. The study published by researchers at University College London (UCL) also shows that the more Facebook friends a person has, the more 'real-world' friends they are likely to have. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2011/WTVM053178.htm
Professor Nilli Lavie	Project Grant	Autism/ Psychology	Research has shown that people with Autism have a greater than normal capacity for processing information and are better able to detect information defined as 'critical', which may help to explain the apparently higher than average prevalence of people with autism spectrum disorders in the IT industry. The research was published in the <i>Journal of Abnormal Psychology</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054757.htm
Dr Misha Ahrens	Sir Henry Wellcome Postdoctoral Fellowship	Human Brain Function	A new technique developed in zebrafish is allowing researchers to measure brain activity in large populations of nerve cells (up to 2000) at the resolution of individual cells. This work was published in <i>Nature</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM055061.htm
Professor Eleanor Maguire	Senior Research Fellowship in Basic Biomedical Science	Cognitive Function	Research published in <i>Current Biology</i> has shown that structural changes occur in the brains of London taxi drivers after acquiring 'the Knowledge'. The study supports the increasing evidence that learning can change the structure of the brain in adult life, offering encouragement for lifelong learning and the potential for rehabilitation after brain damage. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2011/WTVM053658.htm
Dr Nick Wright	Research Training Fellowship	Social Endocrinology	Researchers have found that testosterone causes individuals to overvalue their own opinion at the expense of co-operation. The findings may have implications for how group decisions are affected by dominant individuals. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054290.htm
Professor Elaine Fox	Project Grant	Psychiatry/ Anxiety Disorders	Researchers from the University of Essex have shown that a genetic variant of the serotonin transporter could make some people more sensitive to their emotional environment – and more susceptible to anxiety disorders – than others. The study may have implications for predicting how well individual patients respond to treatments for anxiety disorders. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054035.htm

Dr Evan Reid	Senior Clinical Research Fellowship	Neuron-degenerative diseases	Researchers have discovered mutations in the gene reticulon 2 that causes a form of hereditary spastic paraplegia, caused by selective and specific degeneration of axons (nerve fibres). This discovery may provide insights into the reasons that nerve cells degenerate in diseases such as multiple sclerosis. The research was published in the <i>Journal of Clinical Investigation</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054022.htm
Dr Rick Livesey	Gurdon Institute	Alzheimer's	Researchers have developed a new way of studying Alzheimer's disease in the laboratory by creating stem cells from volunteers' skin cells and using them to generate nerve cells. The research was published in <i>Science Translational Medicine</i> and will help researchers understand how the disease progresses in real life. http://www.wellcome.ac.uk/News/2012/News/WTVM054385.htm
Professor Chris Frith	Principal Research Fellowship	Brain Development	A study published in <i>Current Biology</i> has found a link between the amount of grey matter in one specific brain region – the lateral orbitofrontal cortex – and an individual's likelihood of conforming to social pressures. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054438.htm
Dr Janaina Mourao-Miranda	Research Career Development Fellowship	Mental Health	Researchers have shown that it may be possible to design computer programs to differentiate accurately between the brain scans of healthy adolescents and those most at risk of psychiatric disorders, such as anxiety and depression. The research was published in <i>PLOS ONE</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054382.htm
Dr David Batty	Research Career Development Fellowship	Mental Health	A large scale UK population-based study has found that people with mental health problems have a lower life expectancy. Their results reveal that people who experienced symptoms of anxiety or depression had a lower life expectancy than those without any such symptoms. The study was published in the <i>British Medical Journal</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM056026.htm
Dr Paul Ramchandani	Intermediate Clinical Fellowship	Child Psychology Psychiatry	Researchers have found that children whose fathers are more positively engaged with them at the age of three months have fewer behavioural problems at the age of twelve months. The study was published in the <i>Journal of Child Psychology and Psychiatry</i> . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM055927.htm
Technology Transfer			
Novartis Institutes for BioMedical Research; Novartis Institute for Tropical Diseases	Technology Transfer Award	Malaria	Research describing a new class of dual-acting antimalarial compounds, which target both the liver and the blood stage of the parasite's life cycle, was published in <i>Science</i> . The study was part funded by the Wellcome Trust and researchers hope that this could provide a next-generation treatment for the disease. http://www.wellcome.ac.uk/News/2011/News/WTVM053484.htm

Source: www.wellcome.ac.uk; Science Funding; 2012

CONTRIBUTIONS TO DISCOVERIES WITH (POTENTIAL)TANGIBLE IMPACTS ON HEALTH

Figure 1.20 Key examples of research with (potential) tangible impacts on health 2011/12

Researcher/award	Key grant(s) ²³	Area	Impact
Novacta Biosystems/ Dr Mike Dawson	Strategic Translation Award	Antibiotic Development	The safety and tolerability of NVB302, a potential new antibiotic to treat the hospital superbug <i>Clostridium difficile</i> , is being tested in phase I clinical trials. http://www.wellcome.ac.uk/News/2011/News/WTVM053339.htm
Professor Robert MacLaren	Health Innovation Challenge Fund	Genetic Blindness	12 patients have received gene therapy for Choroideraemia, a progressive form of genetic blindness that first appears in childhood. If the trial is successful, the treatment has the potential to halt the disease with a single treatment. http://www.wellcome.ac.uk/News/2011/News/WTVM053307.htm
Professor Sharon Peacock	Project Grant	Tropical Diseases- Melioidosis	Researchers in South East Asia have identified a novel mechanism that allows <i>Burkholderia pseudomallei</i> , a bacteria that causes the neglected tropical infectious disease Melioidosis, to develop resistance to ceftazidime, the standard antibiotic treatment. The change also makes the drug-resistant bacterium difficult to detect. This study helps us understand how resistance can occur and can hopefully lead to better detection and treatment of drug-resistant forms of Melioidosis. http://www.wellcome.ac.uk/News/Media-office/Press-releases/2011/WTVM052937.htm
Professor Simon Cousens and Roy Head	Strategic Award	Maternal and Child Health	In Burkina Faso Professor Simon Cousens, Roy Head and colleagues have been funded to use 60-second radio adverts and radio phone-ins to deliver health messages on the most important causes of infant mortality to pregnant and new mothers. The researchers aim to reduce infant morbidity and mortality – particularly in the under-fives. http://www.wellcome.ac.uk/News/2012/News/WTVM054631.htm

Source: www.wellcome.ac.uk; Science Funding; 2012

²³ Grants listed are the major grants most recently awarded to the researchers, up to and including 2012

2. APPLICATIONS OF RESEARCH

- Contributions to the development of enabling technologies, products and devices
- Uptake of research into policy and practice

CONTRIBUTIONS TO THE DEVELOPMENT OF ENABLING TECHNOLOGIES, PRODUCTS AND DEVICES

Figure 2.1 Number of grants involved in IP-related activity (reported at end of grant)

Activity	2008/2011	2011/12
Number of grants resulting in patent filing	N=80/1678 (4.8%)	N=33/547 (6.0%)
Number of grants acquiring product licences	N=25/1678 (1.5%)	N=8/547 (1.5%)
Number of grants collaborating with commercial partners	N=232/1678 (13.8%)	N=91/547 (16.6%)

Base: 1678 EoG report forms returned 1 October 2008 - 30 September 2011

Base: 547 EoG report forms returned 1 October 2011 - 30 September 2012

Figure 2.2 Overview of Technology Transfer activity: developing technologies, products and devices

Activity	2008/09	2009/10	2010/11	2011/12
Cases where consent to commercial exploitation granted by Trust	12	15	10	10
Projects partnered through licensing	8	12	9	10
Inventions arising from Wellcome Trust Translation Awards	7	17	20	11
Number of Translation Awards that received follow-on funding	5	10	19	18
Venture capital finance secured in follow-up to Trust funding (in £million)	192	107	122	185

Source: TTD; 2012

Figure 2.5 Overview of venture capital & industry finance secured in follow-up funding, 2011/12

Source	Amount
Achaeogen Inc.	US \$8m (£5.1m)
Cell Medica Ltd	US \$26.5m (16.9m)
Orthox Ltd	EUR €711,000 (£450,556)
Population Genetics Technologies Ltd	US \$5.7m (£3.7m)
PsiOxus Therapeutics Ltd	£22m
PTC Therapeutics Inc.	US \$30m (£19.1m)
Sapiens Steering Brain Stimulation B.V	EUR €13m (£11.2m)
Genable Technologies Ltd	EUR €5m (£4.3m)
Oxford Immunotec Ltd	US \$28m (£18.2m)

Source: TTD; 2012

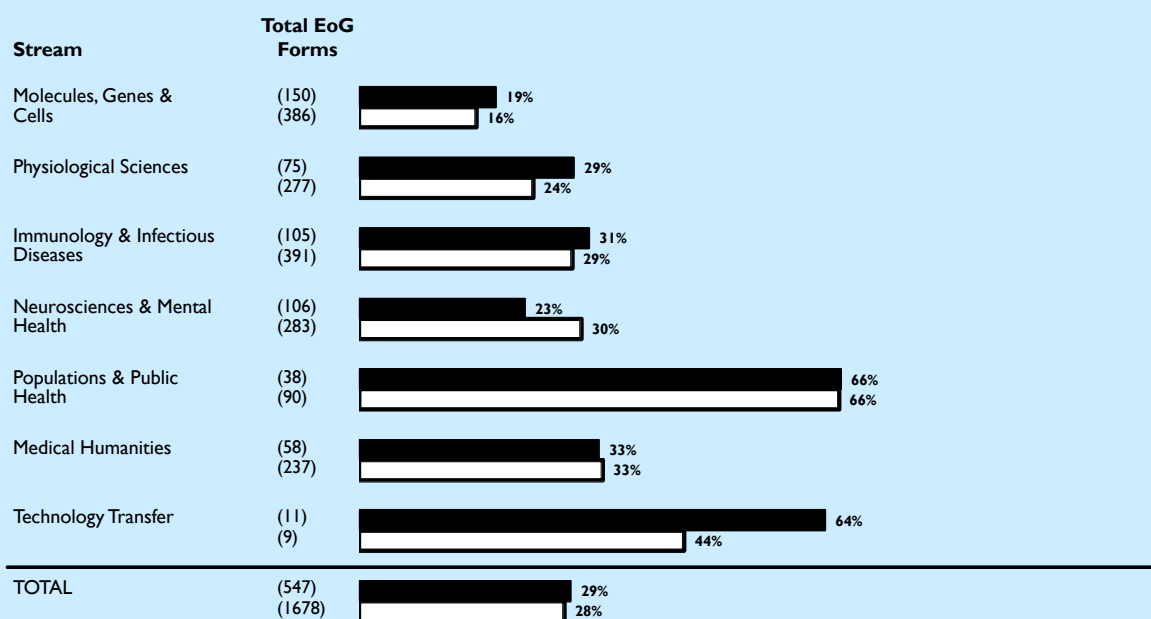
Figure 2.6 Details of Translation Awards receiving follow-on funding during 2011/12 (n=18)

Research area/Product	Researcher	Details
Gram-negative antibiotics	Dr Kenneth Hillan Achaogen Inc	Novel aminoglycoside compounds for the treatment of multi-drug resistant Gram-negative bacteria including MRSA and Enterobacteriaceae. Achaogen raised USD \$8 million (£5.1 million) venture funding in Nov 2011.
cGMP Manufacture of T-cells for immunotherapy	Dr Greg Sando Cell Medica Limited	cGMP procedure to isolate and prepare T-cells for anti-viral therapy. Cell Medica raised USD \$26.5 million (£16.9 million) Series A venture funding in Jul 2012.
Development and Evaluation of a Bio-resorbable, Load Bearing, Tissue Regenerative, Meniscal Cartilage Implant.	Dr Nick Skaer Orthox Limited	Spidrex® meniscal cartilage implant to protect the knee and preserve its long-term functionality. Orthox raised EUR €711,000 (£450,556) follow-on funding in Feb 2012.
Novel technology for the rapid identification of genetic variants in large populations of interest	Professor Conrad Lichtenstein Population Genetics Technologies Ltd	Identification of high confidence causal genetic variants using phenotypically characterised populations. Population Genetics raised US\$5.7 million (£3.7 million) Series B venture funding in Oct 2011.
Clinical development of a virus that attacks cancer cells	Professor Leonard Seymour PsiOxus Therapeutics Ltd	Development of ColoAd1 virus with preferred specificity for cancer cells as a possible new therapy for cancer. PsiOxus raised £22 million Series B venture funding in Jul 2012.
Gram-negative antibiotics	Dr Vara Prasad Josyula PTC Therapeutics, Inc	Novel bacterial DNA synthesis inhibitors for the treatment of nosocomial infections caused by multi-drug resistant Gram-negative bacteria. PTC raised US\$30 million (£19.1 million) venture funding in Jul 2012.
Development of next generation deep brain stimulation	Dr Michel Décré Sapiens Steering Brain Stimulation	Deep brain stimulation (DBS) therapy used to treat patients with Parkinson's disease and other degenerative brain disorders. Sapiens raised EUR €13 million (£11.2m) Series A venture funding in Nov 2011. Plus an additional €6.5m (£5.6m) funding from The Michael J Fox Foundation and the Dutch government organisation Agentschap.
Medical Engineering Solutions in Osteoarthritis Centre of Excellence Imperial College London	Professor Ross Ethier Imperial College London	The Royal British Legion provided £5m to establish a Centre for blast injury studies. Professor Anthony Bull is the Director of the new Centre.
Meeting the diagnostic needs of resource-poor settings	Professor Helen Lee Diagnostics for the Real World	Technology Strategy Board provided over £1m funding to "assess the impact of near-patient testing". The project will focus on sexually transmitted infections. With past Wellcome Trust funding, Professor Lee and her team have produced a rapid diagnostic test kit to be used in resource-poor settings for Chlamydia and also HBsAg (the surface antigen for the Hepatitis B virus).

Source: TTD; 2012

UPTAKE OF RESEARCH INTO POLICY AND PRACTICE

Fig. 2.8: Proportion of grants reporting engagement with policy makers and healthcare professionals at 'end of grant'



Base: 547 EoG report forms returned 1st October 2011-30th September 2012; Total includes 4 non-stream grants

Base: 1678 EoG report forms returned 1st October 2008-30th September 2011 – data averaged for the three years; Total includes 5 non-stream grants.

■ 2011/12
□ Average of 2008/9 to 2010/11 data

Assessment Framework 2011/12

Figure 2.9 Key examples of uptake of research into policy and practice in 2011/12			
Researcher	Key Grant(s) ²⁴	Area of Research	Impact
Dr Peter Gething	Research Assistant on Simon Hay's Wellcome Trust Senior Research Fellowship	Malaria	A multinational team of researchers from the Malaria Atlas Project (MAP) have created a new suite of malaria maps, which show the current global pattern of the disease in detail, highlighting how disease burden has changed over several years. This work was published in <i>Malaria Journal</i> . The maps have been made freely available, along with a wide range of other malaria resources, via the launch of a new online portal . http://www.wellcome.ac.uk/News/Media-office/Press-releases/2012/WTVM054208.htm
Professor Nick White	Major Overseas Programme – Principal Research Fellowship	Malaria	Eurartesim®, an artemisinin combination therapy, has been approved by the European Commission for the treatment of uncomplicated malaria caused by the parasite <i>Plasmodium falciparum</i> . Wellcome Trust-funded research played a key part in the early development of this combination drug. http://www.wellcome.ac.uk/News/2011/News/WTVM053342.htm
Professor Mike English	Senior Research Fellow	Child and Newborn health	Professor English and colleagues in the Health Services Research Group (HSRG) at KEMRI Nairobi, has developed national, evidence-based guidelines for the care of severely ill children and newborns (www.idoc-africa.org), and established 'best-practices' within rural government hospitals. He has received the prestigious Sir Rickard Christophers Medal in recognition of this work. http://www.kemri-wellcome.org/engagement/prof-mike-english-awarded-2012-sir-rickard-christophers-medal
Dr Sridhar Venkatapuram	POST Fellowship	Ethics & Society	The UK Government began a project measuring national wellbeing, dubbed by the media as 'the happiness agenda'. With the support of the Wellcome Trust, Dr Venkatapuram worked at the Parliamentary Office of Science & Technology (POST) for three months. As part of his POST fellowship he produced a briefing for UK parliamentarians on 'measuring national wellbeing' which was released in early September.
Professor Jonathan Montgomery (Chair)	Strategic Award	Ethics & Society	The Nuffield Council's report Human Bodies: donation for medicine and research recommended that lost earnings should be fully reimbursed for those donating eggs or sperm for others' treatment, so that they are not left out of pocket. Nuffield specifically recommended that the cap of £250 on recovery of lost earnings for egg and sperm donors should be removed. Following the publication of the report, the Human Fertilisation and Embryology Authority decided that women who donate their eggs for others' treatment should be compensated £750 per cycle, and that sperm donors should be compensated £35 per clinic visit.
Freddie Yauner; George Pepper, Research.ms	People Award	Multiple Sclerosis	Shift.ms is a social network for people with Multiple Sclerosis (MS). The network developed the Research.ms project, which encourages communication between scientist and the MS community. Wellcome Trust funding has supported a collaboration between Research.ms and the MS research centre at Queen Mary, University of London (QMUL). This collaboration led to Research.ms to deliver researcher communication training to QMUL MSc and PhD students. Following the training, the QMUL MS research blog's output and hits have increased ten-fold (78 posts and 18,900 hits)

²⁴ Grants listed are the major grants most recently awarded to the researchers, up to and including 2011

			per month since June 2011).
Professor Marcus Longley	People Award	Genetics	The Risks and Benefits Citizens' Jury was an examination of how patients with rare and/or serious conditions perceive the balance between the risks and the benefits of new medicines. The jurors' findings have been presented in a report, now available via the Genetic Alliance UK website. Genetic Alliance UK, the project team at the Welsh Institute for Health and Social Care and the jurors themselves are currently working to disseminate the findings amongst key stakeholders, such as the Medicines and Healthcare Regulatory Agency.
Jia Hepeng	International Engagement Award	Media and Public Health	The Health Researcher-Media Role Exchange Programme gave journalists the opportunity to work in public health organisations, to learn more about health research, and scientists the opportunity to work in media groups, to gain skills in dealing with the media and science communication. The Chinese Ministry of Health highly praised the project report and has adopted this as a national project, engaging dozens of pairs of scientists and journalists in a similar exchange programme. The grantholder is also planning to run a similar programme in the field of agribiotechnology.

Source: www.wellcome.ac.uk; Science Funding, 2012; MH&E, 2012

Figure 2.10 Wellcome Trust – associated work featuring on National Institute for Health and Clinical Excellence (NICE) guidelines

The National Institute for Health and Clinical Excellence (NICE) develop and disseminate clinical guidelines for the NHS in England and Wales. Clinical guidelines are recommendations on the appropriate treatment and care of people with specific diseases and conditions and they are based on the best available evidence.

As a result of a collaboration between the Wellcome Trust, National Centre for Biotechnology Information (NCBI) and NICE, a project to digitise and improve access to clinical guidelines is underway.

A total of 114 NICE guidelines are now available on the US National Library of Medicine (NLM) Bookshelf service with a further 13 in the process of digitisation²⁵.

An analysis of the 114 guidelines has been conducted to investigate the extent to which Trust-associated scientific research papers underpin aspects of clinical guidance through official NICE guidelines. Currently a total of 123 Trust-associated papers are cited across 54 different guidelines²⁶; seven papers are cited by two distinct guidelines, two papers are cited by three guidelines and one paper is cited by four guidelines.

The papers featured on guidelines are published across 68 different journals: the most commonly featured journals are the *BMJ* and the *Lancet*, each publishing fourteen papers, followed by the *British Journal of Psychiatry* with eleven papers. NICE group the guidelines under broad topic areas and the area where Trust-associated papers most commonly appear are listed below.

NICE Guideline Topic	Number of WT-associated papers cited	Total number of digitised guidelines	Total number of guidelines in topic area
Mental health and behavioural conditions	50	19	30
Gynaecology, pregnancy and birth	22	7	15
Endocrine, nutritional and metabolic	15	8	11
Cardiovascular	10	8	14

Of individual guidelines the Post-Traumatic Stress Disorder (PTSD guideline²⁷ published in 2006 cites the most Trust-associated papers (n=12), followed by the guidelines for Antenatal Care²⁸ (n=9) and Obesity²⁹ (n=9).

Source: SPPU, 2012

²⁵ As of June 2012

²⁶ Search conducted on PubMed using the search command: *Wellcome Trust [gr] "books pubmed nicecollect" [Filter]*

²⁷ NICE (2006) CG26 Post-traumatic stress disorder. <http://publications.nice.org.uk/post-traumatic-stress-disorder-ptsd-cg26>

²⁸ NICE (2008) CG62 Antenatal care: routine care for the healthy pregnant woman. <http://publications.nice.org.uk/obesity-cg43>

²⁹ NICE (2006) CG43 Obesity. <http://publications.nice.org.uk/obesity-cg43>

3. ENGAGEMENT

- Enhanced level of informed debate on biomedical science issues
- Significant engagement of key audiences in biomedical science, and increased audience reach

ENHANCED LEVEL OF INFORMED DEBATE ON BIOMEDICAL SCIENCE ISSUES

Fig. 3.1: Proportion of grants reporting their research receiving media coverage at 'end of grant'

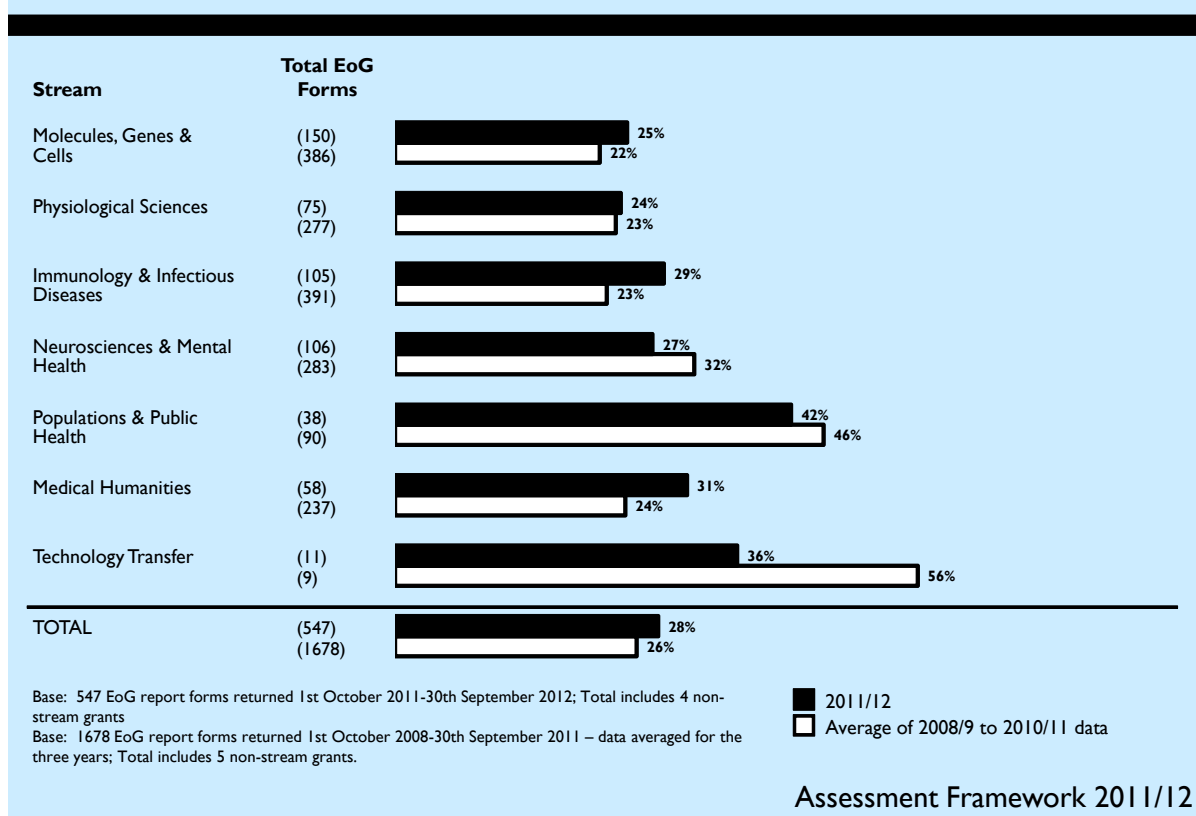


Figure 3.2 Media coverage of the Wellcome Trust

Year	Volume				
	2007/08	2008/09	2009/10	2010/11	2011/12
Broadcast	170	119	181	87	99
Consumer	232	320	317	373	350
National	1017	602	514	502	471
Regional	1045	1086	1158	1043	1029
Trade	899	1139	1242	1279	1277
Web & Wires	2342	3993	6809	7617	9374
TOTAL	5705	7259	10221	10901	12600

Source: MH&E; 2012

Figure 3.3 Communications campaigns delivered 2011/12

Launching eLife, promoting open access

- A visual identity for the new journal was developed and personalised letters and emails to explain enforcement of the Trust's Open Access (OA) Policy to key audiences, including Trust-funded researchers were produced.
- Media coverage of the OA Policy and eLife included Guardian (front page), BBC Today Programme and online, Nature and Times Higher Education.

Promoting our funding schemes

- Our portfolio of funding opportunities have been marketed to potential applicants including the Sir Henry Dale Fellowships, Senior Research Fellowships, Health Innovation Challenge Fund, Translation Awards, Wellcome Trust Centres for Global Health, Science Journalism Studentships, Engagement Fellowships and International Engagement Awards; tactics included display advertising, online search and third party promotion, e-newsletters, press releases and printed materials.

Grant holders News: updating our researchers

- Following an online consultation survey with grant holders to inform changes to the design and content of the Trust's quarterly e-bulletin produced in conjunction with Grants Management. The revised format e-bulletin has recorded increases in the newsletter's open rate, attracting more click-throughs to further information online. The number of subscribers has also doubled to 5,000 recipients, with the mailing now including grant co-applicants.

In the Zone: our Olympics-inspired campaign

- The Communications Team provided support for the Trust's Olympic and Paralympic public engagement campaign with media relations work, a visual identity, interactive website and associated e-newsletter.
- The website attracted more than 90,000 visits and over 7,000 people subscribed to the newsletter. National media coverage included the ITV Lunchtime News, BBC Schools and online.

Big Picture

- During 2012, two more issues of the Trust's schools' resource magazine *Big Picture* were published, one focusing on Exercise, Energy and Movement and most recently another exploring Careers from Biology.
- The magazine has 10,000 print subscribers with a further 13,000 visiting the online resources this year.

Engaging with our Challenges: an internal initiative for Trust staff

- Several public engagement grant holders presented their work to Trust staff for the first time, including a fashion exhibition inspired by ageing and a lecture reflecting on the health implications of toxic waste. The events were included as part of a series that focussed staff on the challenges behind Trust strategy and further included screenings of films and exhibitions curated through Wellcome Library.
- Effective engagement was reflected through high attendance numbers from across all divisions, running out of time during question and answer sessions and receipt of unsolicited positive feedback for all events.

Wellcome Trust Screenwriting Prize 2012

- The Trust partnered with the British Film Institute Film Fund in launching this prize and developed a visual identity with associated marketing and print materials.
- The Trust's social media network was mobilized reaching an audience of over 500,000 through Twitter. Media coverage has included BBC Radio 4 Film Programme, Guardian Science podcast, Screen International and Science.

Other Wellcome Trust Awards

- As part of the Trust's Awards Programme the Communication Team helped communicate the Trust's annual Book and Science Writing Prizes and Images Awards.
- There was high attendance at the Book Prize sponsored events including at the Cheltenham Literature Festival. 600 entries were submitted for our second Science Writing Prize, delivered in partnership with the Guardian. An active Facebook group was enabled for the Wellcome Images Awards, which were also covered in The Observer, Wired, New Scientist, Daily Mail, Huffington Post, Wall Street Journal and Times Higher Education.

Supporting Wellcome Collection activities

- The Trust designed the book which accompanied the Brains exhibition; this became the highest selling Wellcome Collection publication to date (2,250 copies sold).
- Media coverage of Brains was widely picked up including The Economist, London Review of Books, New Yorker and Guardian (including a G2 cover) as well as BBC2 Review Show, Front Row and World at One.
- Media coverage of Miracles & Charms included Daily Telegraph, Sunday Telegraph, Times, Independent on Sunday, BBC1 Breakfast Show, BBC World News with further magazine coverage.

Avoiding the transfer of mitochondrial diseases

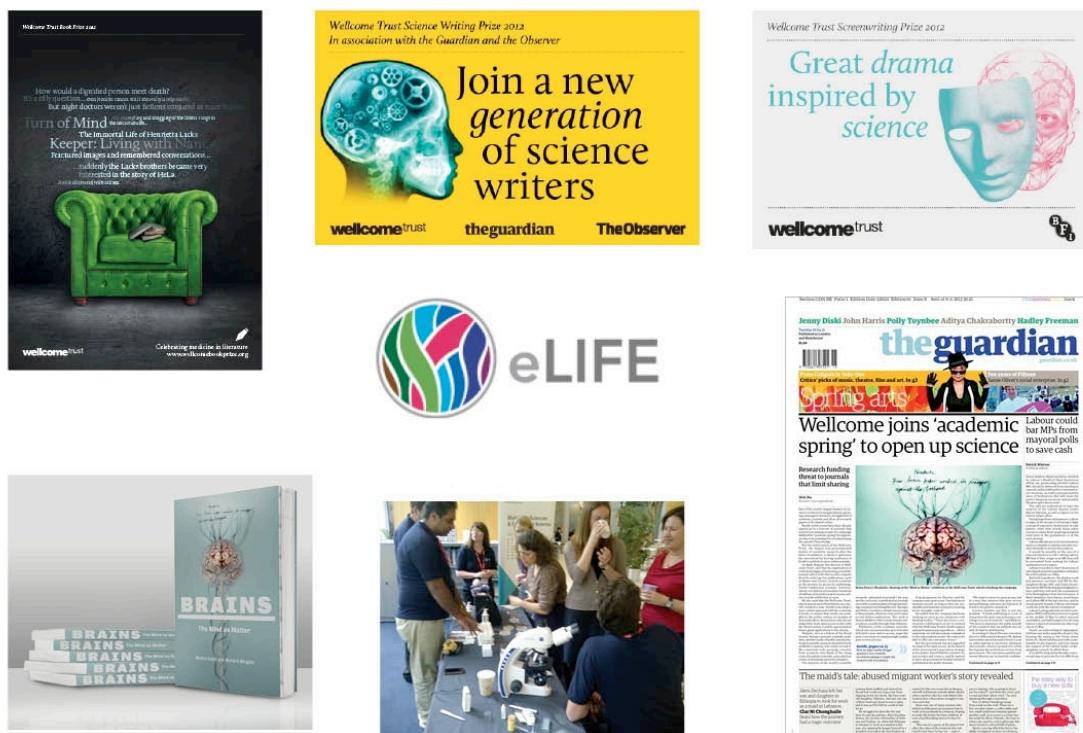
- The Media Office has helped coordinate nationwide coverage of mitochondrial diseases research, including around the announcement of the new WT Centre for Mitochondrial Research in Newcastle, a report into the ethics from the Nuffield Council and the launch of the Human Fertilisation and Embryology Authority (HFEA) public consultation.
- Susan Golombok, a Medical Humanities Senior Investigator, has been heavily involved in the debate around the ethical and social implications, taking part in debates at the Cheltenham Science and Literature Festivals and a Q&A in the Observer.

Wellcome Trust in the news: media round-up

- Significant coverage of Wellcome Trust research has included artemisinin resistance in SE Asia (Channel 4 News, BBC Today Programme and World Service, TIME), brain scans suggesting IQ can rise or fall significantly during adolescence (BBC News, Channel 4 News) and the Health Innovation Challenge Fund (ITV News, BBC News).

Source: MH&E; 2012

Figure 3.4 Images to accompany: the visual identities for eLife and the 4 prizes/awards (book prize, screenwriters, science writers and images), a photo of engaged Trust staff with the World of Microbiology plus the cover of the Brains exhibition book.



SIGNIFICANT ENGAGEMENT OF KEY AUDIENCES IN BIOMEDICAL SCIENCE, AND INCREASED AUDIENCE REACH

Figure 3.5 Public Engagement grants: audience reach 2011/12

Type of grant (number of grants for which there is data)	Total number of participants	Examples of Public Engagement Grant projects
National Science Learning Centre through Project ENTHUSE, 2008-13.	3,080 teachers and technicians from across the UK	<p>Project ENTHUSE provided bursaries for participants totalling of 10,321 training days. A wide range of courses are available tailored to the subjects taught and experience of participants – including those with little background knowledge in the subjects they are teaching; there are also courses for senior managers, technicians and teaching assistants. Evaluation of the training days found that 99% of participants would ‘recommend their course to others’, 95% of participants ‘improved their knowledge, understanding and skills’, 90% ‘improved their practice’ 86% of participants described ‘having an impact on pupils’ and 64% ‘demonstrating wider impact on their school or college’.</p> <p>(Note that a positive quinquennial review conducted this year has led DfE and the Trust to each commit a further £10m of funding from 2013.)</p>
People Awards (36)	2,807,765	<p>Epidemic, Steven Winter, The Old Vic</p> <p>Epidemic is a newly commissioned musical created by the award-winning Old Vic New Voices. The musical explored the pressing public-health issues of mental illness and the recent dramatic rise in obesity. This large-scale production engaged 100 members of the Old Vic’s London community as participants and was performed for free in March 2012. A scaled-down version will tour schools and community centres later in 2012 and 2013.</p> <p>The production, coupled with resources and support work, will highlight the biomedical science behind the conditions, raise debate and challenge traditional perceptions of these afflictions. The research and development stage for the project was funded through a Small Arts Award.</p> <p>Primary Audience Reach: 1,781 (including the general public, academics/researchers, health professionals, teachers, arts practitioners and the media)</p>
Society Awards (7)	275,318	<p>Wondermind, Sharna Jackson, Tate Kids</p> <p>Wondermind is an online game and digital experience exploring neuroscience and how the brain works, linked to Tate Liverpool’s Alice in Wonderland exhibition that took place in 2011. The project aimed to reach audiences not normally engaged with biomedical science by delivering a highly interactive and immersive website for children aged 8-12.</p> <p>Primary Audience Reach: 238,308 (including the general public)</p>
Arts Awards (26)	967,017	<p>2401 Objects, Hannah Barker, Analogue Theatre</p> <p>2401 Objects was a theatre production performed at the 2011 Edinburgh Festival. The show tells the story of Henry Molaison (HM), who underwent experimental brain surgery in 1953 to try to cure the severe epilepsy he had suffered since childhood. The surgery successfully</p>

		<p>abated his seizures but left him with severe memory impairment - he lost the last two years of his life, as well as the ability to form new long-term memories. He lived the rest of his life eternally trapped in the present. In 2009, scientists dissected HM's brain in a procedure that was streamed live on the internet to a global audience of 400,000 people and fundamentally changed our understanding of memory. Henry's brain now exists in 2401 carefully preserved slices: manuscripts of tissue like the pages of a book, which tell the story of a man who could no longer remember but has proved impossible to forget. The play draws upon collaborations with leading neuroscience experts - including the man who dissected HM's brain, Dr Jacopo Annese of the Brain Observatory in San Diego.</p> <p>Primary Audience Reach: 3,500 (including the general public, academics/researchers, health professionals, teachers, arts practitioners, science communicators and the media)</p>
International Engagement Awards (10)	45,558	<p>Art and Health in Urban India, Wasundhara Joshi, the Society for Nutrition, Education and Health Action</p> <p>This project conducted a series of activities to foster dialogue between formerly segregated communities: slum dwellers, professional artists and health scientists in Mumbai, India. The activities involved collaborations between established artists and emerging artists from Mumbai's majority communities. Artworks were developed for an exhibition of pictorial and plastic arts, film and live performance on an urban health theme. The project culminated in an exhibition of creative works on the health of people who live in India's slums, which was displayed at the International Conference on Urban Health, held in India in 2011.</p> <p>Primary Audience Reach: 2,900 (including the general public, academics/researchers, health professionals, policy makers, teachers, arts practitioners and the media)</p>

Source: MH&E; 2012

Figure 3.6 Public Engagement grants: primary audience focus 2011/12

	Type of grant (number of grants for which data are available)			
	People Awards (36)	Society Awards (7)	Arts Awards ³⁰ (26)	International Engagement Awards (10)
The public	34	6	25	9
Academics	18	4	16	8
Health professionals	17	3	15	9
Policy makers	9	2	10	5
Teachers / educators	26	5	19	6
Arts practitioners	13	2	24	4
Science communicators	14	2	15	3
Media	14	2	17	6

Source: MH&E; 2012

³⁰ Arts Awards data consist of 23 Small Arts Awards and three Large Arts Awards

Figure 3.7 New MH&E award schemes 2011/12

The **International Engagement Awards** scheme was relaunched in 2011/12 in line with the new International Engagement strategy approved by the Board of Governors in July 2011. Projects must now be linked to Wellcome Trust-funded research or researchers and take place in low and middle income countries. The first Committee met in July 2012 and awarded four small grants (up to £30,000). The first Committee to consider larger awards will meet in November 2012.

The **Science Journalism Studentships** grant programme was started, funding six studentships at City University over the next three years in line with the Communications strategy.

Source: MH&E; 2012

Figure 3.8 Education work 2011/12

Reaching Education Audiences

There are now 10,680 subscribers to the Trust's *Big Picture*, biannual magazine targeted at post-16 biology teachers; online reach has also increased via the Times Educational Supplement website. The January issue covered *Exercise, Energy and Movement* and the June issue on *Careers from Biology* has already yielded many requests for additional copies. Evaluation through a user survey (with 730 responses) and follow-up focus groups was very positive and provided ideas to inform future development including an App for tablet computers or mobile phones to accompany the January 2013 issue on the brain.

The third *Perspectives in Education* on inquiry based learning was published in January 2012, emailed to 8,500 contacts, launched at the ASE conference and circulated at others. Nearly 400 people responded to an online survey with readers indicating that *Perspectives in Education* prompted them to find out more about the topic and would impact on their work. The new streamlined format was also well received. The next issue will be published in March 2013 with high profile authors considering how school accountability systems affect science education.

Education Focus areas

We developed a strong programme of work on primary science, including policy work and a 24-day Primary Science Specialist (PSS) course delivered at Science Learning Centres. A randomised control trial will be used to assess the impacts of the PSS course; this allows us to set a new standard for evidence in education policy and will establish an enormous amount of information about primary science.

All fieldwork for the two reviews of informal learning was completed and reports were received in September 2012. Over 200 providers participated in the work and many came to the associated seminars and a session at the British Science Association Science Communication Conference.

Source: MH&E; 2012

Figure 3.9 Wellcome Monitor 2011/12

Data collection is underway for Wave 2 of the Wellcome Trust Monitor that tracks public attitudes to and understanding of biomedical science and young people's perceptions of science teaching and careers. As well as engaging many audiences and informing the Trust's work, Waves 1 and 2 together will provide a rich data resource for social scientists. The Trust is working to make these data widely accessible. (There have been three publications and several conference presentations on data from Wave 1.)

Source: MH&E; 2012

Figure 3.10 MH&E Activities: In the Zone

In the Zone – the Wellcome Trust's major initiative inspired by the London 2012 Olympic and Paralympic Games – has developed school kits and a touring exhibition on the theme of using science to explore the mind and body in motion.

Nearly 30,000 science investigation kits were sent to primary and secondary schools across the UK in February and March, and over 1,300 kits were sent to Special Schools with over 30 enrolled pupils. Preliminary evaluation data show that 87% of schools were aware of *In the Zone* and so far over 65% have used the kits. The kits aim to bring the science of the human body to life in the classroom, and there has been an exceptionally positive response from teachers. The British Council is also adapting the kits for use as an English Teaching Resource overseas.

Alongside the school kits, the *In the Zone* touring exhibition has been engaging people of all ages with the science of the human body, in relation to sport and movement. The exhibition visited 16 events throughout the summer, including being delivered at BT London Live in Victoria Park throughout the Olympic Games period.

Adverse weather affected delivery at five shows; however by the end of the tour in mid-August, almost 55,000 people had visited the exhibition at an event, with another 35,000 people involved through viewing the busking and live shows. An average of 36% of participants visited the project website, with an average duration of 7 minutes.

In the Zone 'lite' – a pop-up sport science experience – has been part of the BBC's Bang Goes the Theory and Blue Peter Olympic Tour roadshows and overall appeared at 20 out of 21 planned community events across the UK. It has also been supported by the British Council to deliver at the Bangkok Science Festival. Estimated visitor figures are approximately 60,000 people discussing the science and activities with the staff, and there has been an excellent response from audiences.

In the Zone training for scientists, youth leaders, and communicators was also completed, with 200 people trained at 14 events across the UK.

In the longer term, the Foreign and Commonwealth Office, as well as the Brazilian Ministry of Education and Ministry of Science and Technology, have shown strong interest in *In the Zone*, including exploring the possibility of adapting the schools kits for Brazil in the lead up to the Rio 2016 Olympic Games.

Source: MH&E; 2012

Figure 3.11 Wellcome Collection overview 2011/12

Figures for visits to Wellcome Collection continue to rise annually with 2011/12 the most successful year to date, with almost 500,000 visitors. The exhibition "Brains: The Mind as Matter" attracted a total audience of over 100,000. *Brains* examined the long quest to understand the workings of the brain, concentrating on the physical organ rather than the more evasive concept of the mind. The exhibition will reach a new audience when it travels to the Manchester Museum of Science and Industry in 2013. "Superhuman", the exhibition which followed *Brains*, looked at the history and future of humankind's efforts to extend its abilities. It worked well in tandem with the Olympics and – especially – the Paralympics, which boosted the already extensive media coverage and the audience.

The live events programme continues to expand and now includes regular events designed for - and sometime by – young people. The 'Packed Lunch' series of lunchtime in-conversations with local, London-based scientists proved particularly popular, with topics ranging from synaesthesia to sewage systems. Live events in the temporary exhibition space as well as in the Forum were successfully trialled, beginning with series of demonstrations and performances relating to human enhancement, staged in a specially-designed area of the "Superhuman" exhibition.

Following a publishing partnership with Profile Books, sales of Wellcome Collection publications are growing, with, for example, copies of the book that accompanied the "Brains" exhibition selling well both nationally and internationally, including over 1,000 copies sold through the Collection's Blackwell's outlet.

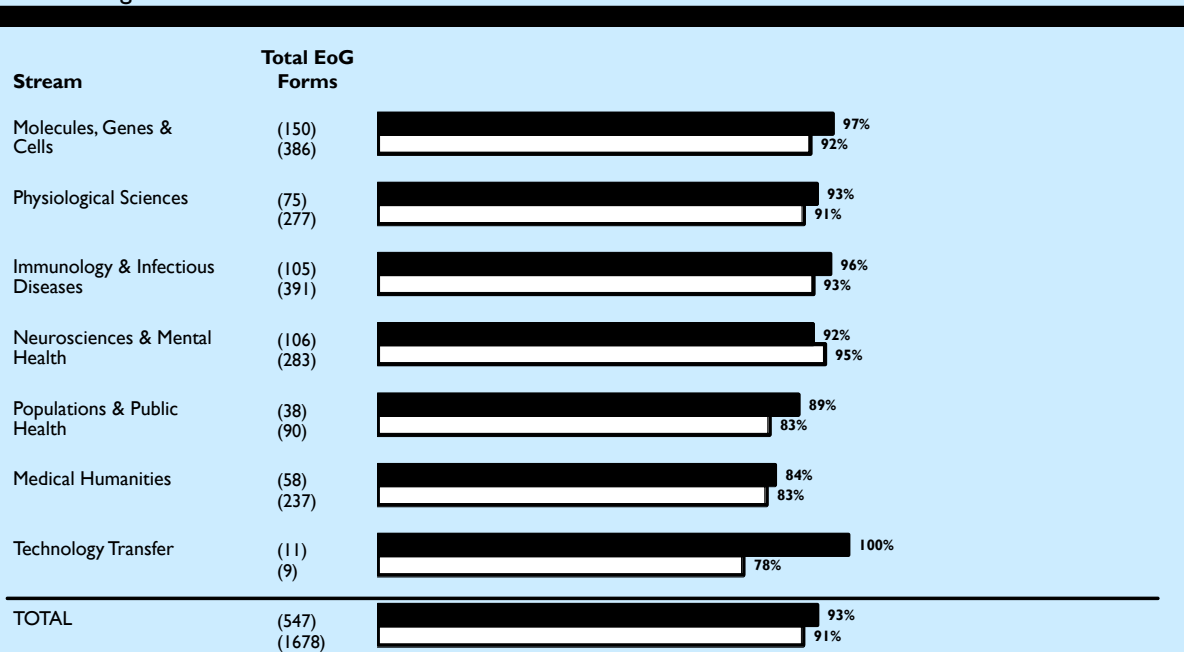
Source: MH&E; 2012

Figure 3.12 Wellcome Collection visit figures 2011/2012

	2007/2008	2008/09	2009/10	2010/11	2011/12
Building total	325,206	336,265	410,098	466,043	492,053
Galleries	160,454	149,233	230,741	304,769	324,605
Library	33,336	38,246	43,945	40,760	41,875
Conference Centre	27,130	24,152	26,261	27,600	33,869
Public events and tours (total)	17,221	17,457	20,410	22,499	24,747
- Public events	9,384	9,308	10,381	10,577	12,694
- Other special events	546	360	456	1,119	800
- Library insight tours	281	196	732	399	391
- Behind the scenes tours	276	176	99	197	139
- Perspectives tours	339	205	402	393	366
- Visitor Services group tours and gallery tours	6,495	6,803	8,340	9,879	10,357

Source: MH&E; 2012

Fig. 3.13: Proportion of grants reporting presentation of their work at academic workshops/conferences at 'end of grant'

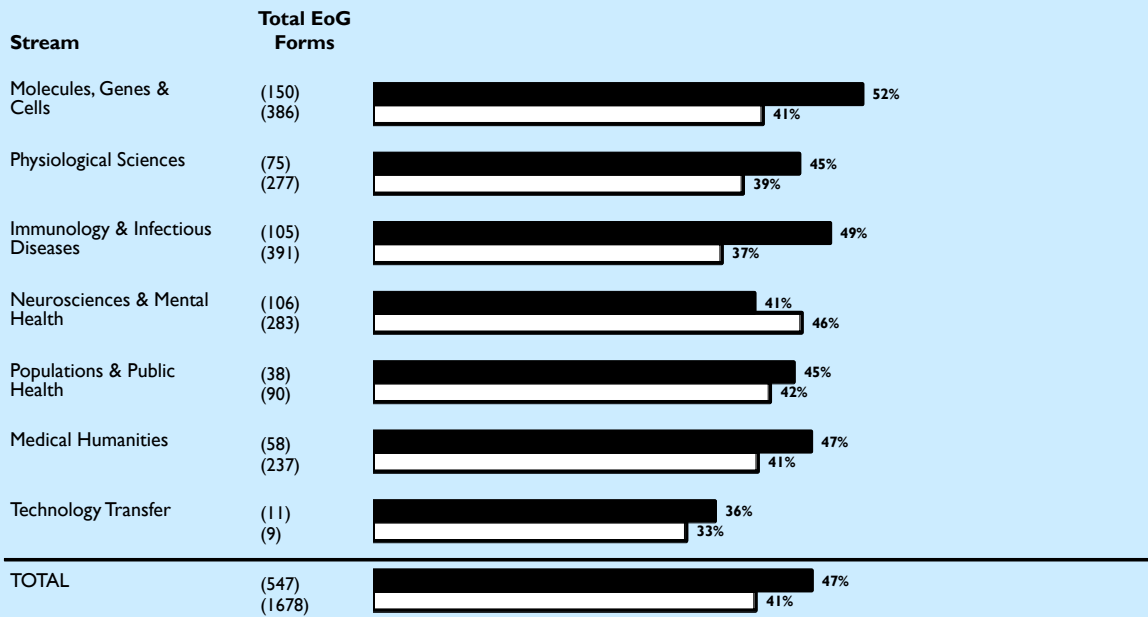


Base: 547 EoG report forms returned 1st October 2011-30th September 2012; Total includes 4 non-stream grants
 Base: 1678 EoG report forms returned 1st October 2008-30th September 2011 – data averaged for the three years; Total includes 5 non-stream grants.

■ 2011/12
 □ Average of 2008/9 to 2010/11 data

Assessment Framework 2011/12

Fig. 3.14: Proportion of grants reporting presentation of their work to non-academic audiences at 'end of grant'

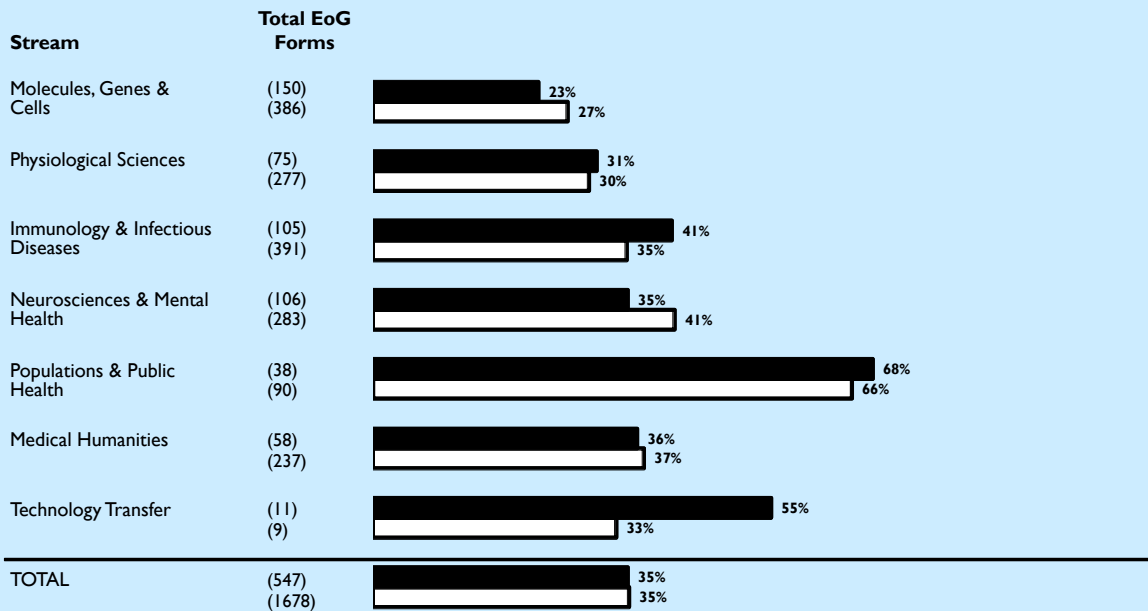


Base: 547 EoG report forms returned 1st October 2011-30th September 2012; Total includes 4 non-stream grants
 Base: 1678 EoG report forms returned 1st October 2008-30th September 2011 – data averaged for the three years; Total includes 5 non-stream grants.

■ 2011/12
 □ Average of 2008/9 to 2010/11 data

Assessment Framework 2011/12

Fig. 3.15: Proportion of grants reporting provision of feedback to research participants and related communities at 'end of grant'



Base: 547 EoG report forms returned 1st October 2011-30th September 2012; Total includes 4 non-stream grants
 Base: 1678 EoG report forms returned 1st October 2008-30th September 2011 – data averaged for the three years; Total includes 5 non-stream grants.

■ 2011/12
 □ Average of 2008/9 to 2010/11 data

Assessment Framework 2011/12

Figure 3.16 Sanger Institute public engagement activities 2011/12

The Sanger Institute's Public Engagement Programme provide resources and contributes to a broad range of projects designed to stimulate interest in, and encourage informed debate about, genomic science. These include:

- New resources on the Sanger Institute's dedicated public engagement site (www.yourgenome.org), including *Spot the difference: zebrafish* (a classroom-based activity which explores the use of model organisms in genomics research) and *Cell snap!* (an online game about the structure of the cell also developed into an application for mobile devices).
- Launching the *Malaria Challenge*, supplying over 500 CDs (containing 3D animations and researcher interviews) to teachers and lecturers in the UK and overseas. This resource was showcased at the 2012 Association for Science Education Conference in Liverpool and the Wellcome Trust Genomic Epidemiology of Malaria Conference in Hinxton.
- Developed in partnership with scientists from the Sanger Institute and EMBL European Bioinformatics Institute, *Genome generation* (a card-based discussion activity that aims to facilitate ethical debates on issues in personal genetics and genomics) has been widely distributed.
- Developing *Genome Futures* in partnership with Gallomanor (who run *I'm a scientist, Get me out of here!*) involved 14 Sanger Institute scientists engaging in online discussions about genomics with 70 15-16 year old school students. The project was part of the Wellcome Trust's 75th anniversary celebrations. Two of the Faculty members entered *I'm a scientist, Get me out of here!* as a direct result of their involvement in this project.
- Creating the activity *Protein line up* (demonstrating the technique of mass spectrometry and how it is used to identify amino acids in proteins) was developed with scientists from the EMBL-EBI and used at the Cambridge Science Festival.
- Running sessions for 130 pre-service and in-service teachers on contemporary genetics. These sessions have included updates on DNA sequencing technologies and the application of these technologies as well as hands-on sessions on how to use classroom resources including *Malaria Challenge* and *Genome generation*.
- Enhancing the Institute's media presence through Twitter and Facebook; a regular newsletter is sent to over 200 teacher and education colleagues to provide information about new education resources and the latest stories in genomics research from the Institute.
- Working with At-Bristol and the Association for Science Discovery Centres to enhance the *Inside DNA: a genomic revolution* exhibition as it travelled from the Museum of Science and Industry in Manchester to Intech in Winchester and on to ThinkTank in Birmingham. The team provide contemporary science updates for staff at these venues and are on the project board.
- Supporting artist Sally Sheinman in the development of her paper sculpture *Being Human* exhibited at the National Trust's Mottisfont Abbey in Hampshire in Autumn 2011.
- Providing support to more than 2,000 visitors to the Sanger Institute; visitors have included UK and international secondary school and undergraduate students as well as a broad range of community groups including the Cambridge Tourist Guides, University of the Third Age and Women's Institutes.
- More than 30 Sanger Institute and European Bioinformatics Institute volunteers have worked with visitors to the Biology Zone of the Cambridge Science Festival. This year the Sanger Institute also hosted talks on campus involving faculty members Julian Rayner and Carl Anderson as well as senior scientists Nick Thomson and Liz Murchison and were also involved in an event with the Royal Society of Chemistry to highlight the importance of chemistry graduates in our research.
- Offering two-day workshops in Developing Science Communication Skills for 20 Sanger Institute and European Bioinformatics Institute PhD students; the number of scientists from the Sanger Institute who provide tours for groups visiting the Institute during these workshops has increased from 17 to 27.

Source: Sanger Institute; 2012

4. RESEARCH LEADERS

- Development of a cadre of research leaders
- Evidence of significant career progression among those we support

Figure 4.1: Most highly cited researchers in the field of Neurosciences & Behaviour (January 2002 to June 2012)

Rank	Scientist	Institution	Trust funding	Total citations	Number of papers	Cites per paper
1	TW Robbins	University of Cambridge, UK	✓	13,958	217	64.32
2	RJ Dolan	WT Centre for Neuroimaging, UK	✓	13,784	196	70.33
3	DR Weinberger	US National Institute of Mental Health, USA		13,020	166	78.43
4	JQ Trojanowski	University of Pennsylvania, USA		12,377	221	56.00
5	EJ Nestler	Mount Sinai Medical Center, USA		11,959	164	72.92
6	KJ Friston	WT Centre for Neuroimaging, UK	✓	11,616	198	58.67
7	FH Gage	Salk Institute for Biological Studies, USA		11,386	115	99.01
8	VMY Lee	University of Pennsylvania, USA		11,040	165	66.91
9	DJ Selkoe	Harvard University, USA		10,731	53	202.47
10	J Hardy	UCL Institute of Neurology, UK	✓	10,133	123	82.38

Source: Thomson Reuters Essential Science Indicators, 2012

Figure 4.2 Career focused funding developments made in 2011/12

Sir Henry Dale Fellowship: This new fellowship scheme, funded in partnership with the Royal Society was launched on the 25th October 2011. The fellowships are aimed at outstanding postdoctoral scientists wishing to build their own UK-based independent research career addressing an important biomedical question. The first applications were considered in June 2012 and ten awards were made. This new fellowship scheme subsumes both the UK-based Trust Research Career Development Fellowships (RCDFs) and the Royal Society University Research Fellowships (URFs). Sir Henry Dale Fellowships will provide an award of up to eight years, based on the Society's URF model of five years plus a possible three years' extension rather than the five-year RCDF.

Source: SF; 2012

Figure 4.3 Wellcome Trust Career Tracking 2011/12

Basic Science Career Tracker (BSCT)

In 2009, the Evaluation Team at the Wellcome Trust launched the first wave of the Wellcome Trust Basic Career Tracker (BSCT): an online survey to enable the tracking of the career destinations of key cohorts of Wellcome Trust-funded researchers. Information on career choices and destinations of those we fund provides important evidence to help inform future funding mechanisms and strategy.

Each year, specific cohorts of Wellcome Trust-funded individuals receive a short online survey, focusing on career destinations. A new cohort of grant holders, in the final year of their grant, is added to the Tracker each year.

Current cohorts included in the BSCT are PhDs, RCDFs, ISRFs and Sir Henry Wellcome Postdoctoral fellows.

At present we have conducted four waves of the Basic Science Career Tracker. Overall participation is high, with a response per wave of circa 80%.

High level findings from the BSCT to-date are:

- Around three-quarters of former PhD studentship award holders are still in academia; however after three years post award there are indications that the proportion of women who remain in academia is somewhat lower than for men.
- Almost all former RCDFs (94%) remain in academia; no major career destination changes have been observed over the last four years.
- Former ISRFs were also well established in their academic careers with all (except one) employed in academic positions where they continued to do the same or similar research as they had been doing during their award.
- All Sir Henry Wellcome Postdoctoral fellows who had completed their award (n=13) were employed full time in academia, among whom the majority (62%, n=8) were based in the UK.

Given the trends emerging among the PhD cohorts, a qualitative study with former PhD students was commissioned in Summer 2012 to Ipsos MORI. The study is investigating career motivations and perspectives on the attraction of academia versus other sectors; findings from the qualitative study and Wave 4 BSCT report will be available in Winter 2012.

Wellcome Trust Clinical Career Tracker (CCT)

In 2011 we launched the first wave of Wellcome Trust Clinical Career Tracker (CCT), tracking key cohorts of Wellcome Trust-funded *clinical* researchers. Wave Two launched in October 2012, and is currently in field. The findings will be available in Winter 2013.

Wellcome Trust Sanger Institute Career Tracker (SICT)

Following the model of the BSCT, the Evaluation Team is assisting the Sanger Institute to develop its own career focused survey for former research employees of the Institute. The survey will be launched in November 2012.

Source: SPPU; 2012

Figure 4.4 Investigator Awards made in 2011/12

Grant holder	Institution	Grant title
SENIOR INVESTIGATORS		
Professor Julian Blow	University of Dundee	Understanding the cellular response to replication inhibition
Professor Mark Harris	University of Leeds	Coordinated use of the hepatitis C virus genome during the virus lifecycle
Dr Peter Lawrence	University of Cambridge	Planar cell polarity and morphogenesis
Professor Patrick Maxwell	University College London	Oxygen sensing
Dr Venki Ramakrishnan	MRC Laboratory of Molecular Biology, Cambridge	Structure and function of ribosomes
Professor Azim Surani	University of Cambridge	Principles and programming of the mammalian germ line
Professor Henning Walczak	Imperial College London	Studies of linear ubiquitin and different modes of cell death induction by TNF family members in aetiology and treatment of autoimmunity
Professor Fiona Watt	Centre for Stem Cells and Regenerative Medicine, King's College London	Reciprocal signalling between epidermal stem cells and their neighbours
Professor Rose Zamoyska	University of Edinburgh	Mechanisms that regulate T cell responses and their failure in autoimmunity
Professor Francis Barr	University of Oxford	Mechanism and structural analysis of Rab GTPase control systems in normal cells and human disease states
Professor Harry Gilbert	University of Newcastle	Understanding the contribution of the human microbiota to human health
Professor Raymond Goldstein	University of Cambridge	Synchronization of cilia
Professor D Grahame Hardie	University of Dundee	Non-canonical pathways for regulation of AMPK
Professor Paul Martin	University of Bristol	Investigating the links between inflammation and fibrosis during tissue repair
Professor Stephen McMahon	King's College London	Identifying novel pain mediators and mechanisms
Professor Daniel Wolpert	University of Cambridge	Computations in sensorimotor control
Professor Molly Stevens	Imperial College London	Exploring and engineering the cell-material interface for regenerative medicine
Professor Sussan Nourshargh	Queen Mary, University of London	Mode and dynamics of neutrophil transmigration in vivo: mechanisms and implications to pathological inflammation
Professor Raymond Dolan	Wellcome Trust Centre for Neuroimaging, University College London	The neurobiology of motivation in health and disease
Professor Mark McCarthy	The Oxford Centre for Diabetes, University of Oxford	Characterising causal alleles for common disease
Professor Miles Whittington	University of Newcastle	Learning and sleep: a network dynamic approach
Professor Guy Rutter	Imperial College London	Understanding pancreatic beta cell dysfunction in diabetes
Professor Jeffrey Errington	University of Newcastle	Chromosome segregation and cytokinesis in bacteria: mechanisms and regulation
Professor Gabriel Waksman	Birkbeck College and University College London	An integrated study of a bacterial secretion nanomachine
Professor Ronald Hay	College of Life Sciences,	Determining the role and mechanism of

	University of Dundee	action of the SUMO targeted ubiquitin ligase RNF4 in maintaining genome integrity
Professor Xiaodong Zhang	Imperial College London	Structures and mechanisms of key components in the DNA damage response
Professor Annette Dolphin	University College London	Physiological and pathological regulation of calcium-channel and other ion-channel functions by alpha2delta-subunits and their interacting proteins
Professor Benjamin Simons	University of Cambridge	Lineage tracing as a strategy to resolve mechanisms of stem cell fate: from development and maintenance to disease and aging
Professor Martin Allday	Imperial College London	Epigenetic reprogramming of B cells in viral persistence, disease pathogenesis and tumour immunosurveillance
Professor David Attwell	University College London	The development, plasticity and pathology of myelinated CNS axons
Professor Shankar Balasubramanian	University of Cambridge	The chemical biology of the genome and the epigenome
Professor Richard Elliott	University of St Andrews	Molecular analyses of arbovirus-host interactions
Professor Gerard Graham	University of Glasgow	Dissecting the chemokine basis for the orchestration of the in vivo inflammatory response
Professor Matthias Merckenschlager	Imperial College London	Genetic approaches to dissect the role of cohesion in gene regulation
Professor Terence Rabbitts	University of Oxford	Tracing cancer evolution using mouse models
Professor David Sherratt	University of Oxford	Illuminating the in vivo molecular mechanism of bacterial chromosome replication and segregation
JOINT INVESTIGATOR AWARDS		
Professor William Cookson and Professor Miriam Moffatt	Imperial College London	Genetics and genomics and respiratory disease
Professor Joachim Gross and Professor Gregor Thut	University of Glasgow	Natural and modulated neural communication: State-dependent decoding and driving of human brain oscillations
Professor Andrew Hattersley and Professor Sian Ellard	Peninsula Medical School, Universities of Exeter and Plymouth	New insights from neonatal diabetes
Dr James Briscoe and Dr Karen Page	MRC National Institute for Medical Research and University College London	Regulatory dynamics of vertebrate neural tube development
Professor Elizabeth Fisher and Dr Victor Tybulewicz	University College London and MRC National Institute for Medical Research	Understanding Down's syndrome phenotypes through innovative mouse genetics
NEW INVESTIGATOR AWARDS		
Professor Derek Jones	Cardiff University	Tractometry
Dr Steven Kennerley	University College London	Neuronal mechanisms underlying value-based decision-making and action selection
Professor Troy Margrie	MRC National Institute for Medical Research	The function and connectivity of cortical cells and circuits
Dr Finn Werner	University College London	An integrated study of RNA polymerase

		transcription
Dr John Christodoulou	University College London	Structural biology of protein folding on the ribosome
Dr Simon Myers	University of Oxford	Development of statistical and experimental approaches to understand the roles of recombination and migration in human biology and disease risk
Dr Claudio Alonso	University of Sussex	The molecular regulation of Hox genes during animal development
Dr Benedicte Sanson	University of Cambridge	In vivo mechanisms of collective cell movement and cell sorting
Dr Benjamin Willcox	University of Birmingham	The molecular basis of gamma delta T cell recognition in health and disease

Source: SF, Mlnet; 2012

Figure 4.5 Principal Research Fellowships awards made in 2011/12

Grant holder	Institution	Grant title
Professor Tomo Tanaka	Wellcome Trust Centre for Gene Regulation & Expression, University of Dundee	Molecular mechanisms regulating the kinetochore-microtubule interactions in mitosis
Professor Cathy Price	Wellcome Trust Centre for Neuroimaging, University College London	Structure function models of language and its recovery
Professor Masud Husain	University of Oxford	Understanding the inattentive and impulsive brain
RENEWALS		
Professor Doreen Cantrell	University of Dundee	Analysis of serine kinase function and regulation in T lymphocytes

Source: SF, Mlnet; 2012

Figure 4.6 Senior Research Fellowships awards made in 2011/12

Grant holder	Institution	Grant title
NEW BASIC SCIENCE		
Dr Ian Humphreys	University of Cardiff	Investigating immune regulation during cytomegalovirus infection of mucosal tissue
Dr Stuart Neil	King's College London	The molecular and cellular basis for the function of the HIV-1 Vpu protein in the targeting of host antiviral and immunomodulatory factors
Dr Andrew Oates	University of Cambridge	Patterning embryos with genetic oscillations
Dr Robert Klose	University of Oxford	Understanding the role of CpG islands in gene regulatory element function and transcription
Professor Simon Brooker	London School of Hygiene and Tropical Medicine	The epidemiology, spatial ecology and transmission dynamics of co-infection with <i>Plasmodium falciparum</i> and hookworm in East Africa
BASIC SCIENCE RENEWALS		
Professor Ilan Davis	University of Oxford	Elucidating the molecular mechanisms of intracellular mRNA transport and anchoring
Dr Andrew Morris	University of Oxford	Statistical methods for the analysis of whole genome association studies
Dr Lora Heisler	University of Cambridge	Delineation of discrete brain circuitry regulating obesity and type 2 diabetes in mice
Dr Ian Goodfellow	Imperial College London	Molecular characterisation and intervention of norovirus replication
Dr Brian Hendrich	University of Cambridge	Transcriptional control of stem cell fate
Dr Fred Antson	University of York (2nd renewal)	Structure and mechanism of multicomponent protein-nucleic acid assemblies
Professor Hiroyuki Ohkura	University of Edinburgh (3rd renewal)	Acentrosomal spindle formation in female meiosis
Professor Magdalena Zernicka-Goetz	Wellcome Trust/CRUK Gurdon Institute, University of Cambridge (2nd renewal)	Regulation and dynamics of progressive cell fate transitions and morphogenesis during development of the early mouse embryo
Professor Simon Davis	University of Oxford (3rd renewal)	Principles of early T-cell activation
NEW CLINICAL SCIENCE		
Dr Sarah R Walmsley	University of Sheffield	Regulation of neutrophilic inflammation by the HIF/PHD pathway
Dr George Vassiliou	Wellcome Trust Sanger Institute	Interactions between co-occurring leukaemogenic mutations identified in acute myeloid leukemia genomes
Dr Robert K Semple	University of Cambridge	Genetic dissection of mechanisms linking cell dysfunction, insulin resistance & major human disease
CLINICAL SCIENCE RENEWALS		
Dr John C Achermann	University College London	Novel mechanisms in adrenal and reproductive biology
Dr Michael Charles English	University of Oxford	Improving the ability of health systems to deliver essential, hospital services - Examining strategies targeting seriously ill

		children and newborns in Kenya
Professor Ismaa Sadaf Farooqi	University of Cambridge	Molecular and neural basis of obesity
Professor Matthew C Pickering	Imperial College London	The pathophysiological role of complement regulation in disease
Professor Anthony Scott	University of Oxford	Population impact of conjugate vaccine on pneumococcal transmission and disease in Kenya
Professor Liam Smeeth	London School of Hygiene and Tropical Medicine	Exploiting the potential offered by the increasing computerisation of health records for population- based research
PUBLIC HEALTH AND TROPICAL MEDICINE INTERVIEW COMMITTEE (PHATIC)		
No Senior scheme-specific PHATIC Awards were made in 2011/12.		

Source: SF, Mlnet; 2012

Figure 4.7 Key prizes and accolades associated with Trust-funded activity awarded 2011/12

Recipient	Associated Trust area	Prize	Details
Prof Patricia A Simpson	Science Funding	Fellow of the American Association for the Advancement of Science	
Prof Julian Blow Prof J Fisher Prof Anne Ferguson-Smith Prof Paul Fletcher Prof Michael Hausser Prof Ajit Lalvanil Prof Gero Miesenbock Prof James Naismith Prof Marie-Louise Newell Prof Randolph Noelle Prof Sussan Nourshargh Prof Sophie Scott	Science Funding/TTD	Fellow of the Academy of Medical Sciences	
Prof Margaret Scott Robinson Prof Daniel M Wolpert Prof John Aggleton	Science Funding	Fellow of the Royal Society	
Prof Vince Emery	Science Funding	Fellow of the Society of Biology	For his research on cytomegalovirus (CMV).
Prof Peter J Cullen Prof Jane A McKeating	Science Funding	Royal Society Wolfson Merit Award	This award provides a five year salary enhancement to help recruit or retain outstanding scientists in the UK.
Prof Jane Clarke	Science Funding	Received EMBO Membership	
Prof Sarah Cleaveland	Science Funding	Elected Fellow of the Royal Society of Edinburgh, 2012	
Prof Ismaa Sadaf Farooqi	Science Funding	Society for Endocrinology Medal, 2012	Awarded in recognition of outstanding studies.
Prof Peter J Ratcliffe	Science Funding	The Pasarow Award for Cardiovascular Research	The award is made for evidence of extraordinary accomplishment in cardiovascular medical research.

Prof David C W Mabey Prof Bob Snow	Science Funding	George MacDonald Medal	Awarded for research that has led to the improvement of the health of populations in tropical countries by the Royal Society of Tropical Medicine & Hygiene in 2011.
Prof Chittaranjan Yajnik	Science Funding	David Barker Medal	Awarded for the Developmental Origins of Health and Disease in 2011.
Mr David Barrett	Science Funding	Computational and Systems Neuroscience Award	For his work on Differentiation in Balanced Networks.
Dr Katie Hampson	Science Funding	Nexus West Young Life Scientist of the Year Award, 2011	This award acknowledges extraordinary contribution to life science from a young scientist in academia, the NHS or industry in the West or East of Scotland.
Dr Simon I Hay	Science Funding	The Back Award, 2012	Awarded for making an outstanding contribution to the development of national/ international public policy.
Prof Maria G Belvisi	Science Funding	AstraZeneca Women in Pharmacology Prize, 2011	Awarded in recognition of women whose career achievements have contributed significantly to our understanding of a particular field through excellence in research.
Prof Nicholas J Craddock	Science Funding	Stromgren medal, 2011	For research in psychiatry in 2011.
Prof Peter Dayan	Science Funding	Rumelhart prize, 2012	In recognition of important work at the interface between computational, algorithmic and implementational ideas in cognitive science and neuroscience.
Prof Timothy M Frayling	Science Funding	Minkowski prize, 2012 Morgagni "silver medal" prize, 2012	Awarded to the best diabetes researcher under the age of 45 in Europe. Awarded to the best two European researchers in the field of Metabolism under the age of 40.
Prof Emily Holmes	Science Funding	The Comenius Early Career Psychologist Award	Awarded to a young psychologist from Europe who has made an original contribution to psychology as a science and profession.
Prof Cathy Price	Science Funding	IPSEN Foundation Neuropsychology Prize	For an outstanding contribution to the domain of reading and writing.
Prof Karen Steele	Science Funding	Half of the €1 million Brain Prize,	For her work on hearing loss. Professor Steel identified

		Grete Lundbeck European Brain Research Foundation	the first mouse gene involved in deafness, Myo7a, in 1995 and continues to study mutations that contribute to loss of hearing.
Sir John Gurdon	Science Funding and former Wellcome Trust Governor	Nobel Prize for Medicine and Physiology	Awarded the Nobel Prize for the discovery that mature cells can be reprogrammed to become immature cells that are capable of developing into all tissues of the body.
Prof Jim McLaughlin	TTD	Order of British Empire (OBE)	Intelesens founder and Chief Science Officer, Professor Jim McLaughlin has been honoured in the Queen's New Year Honours List for 2012, receiving an OBE.
John O'Dea, Crospon	TTD	The 2012 European Enabling Technology Award for Surgical Imaging Technology by Frost & Sullivan	In recognition of his pioneering work in the development of a leading edge minimally invasive medical device for monitoring, diagnosis and therapy in the gastroenterology area - the EndoFLIP® (Endolumenal Functional Lumen Imaging Probe).
Dr Virender S Sangwan, LV Prasad Eye Institute, Hyderabad, India	TTD	The First annual 'Leadership in Uveitis'	The award is from the German and US-based company Lux Biosciences.
Dr David Selwood, Canbex Therapeutics	TTD	UCL Business Award 2012	Awarded for enterprise which recognises contributions to translational research.
Prof John Fisher	TTD	Queens Anniversary Prize for Higher and Further Education	Awarded for contributions to medical engineering.
Prof Eileen Ingham	TTD	Named as one of the UKRC Women of Outstanding Achievement Awards in 2011. Category: Innovation and Entrepreneurship (Academia and Research)	Awarded for inspirational work in the scientific field.
Prof Paul Emery	TTD	Carol Nachman Prize for Rheumatology	In recognition of outstanding, innovative research in rheumatology.

Prof Jennifer	TTD	Charles Tome Medal (Royal College of Surgeons)	For contributions to dental research.
Prof Constantin-C. Coussios	TTD	2012 R. Bruce Lindsay Award of the Acoustical Society of America 2012 Frederic Lizzi Award by the International Society for Therapeutic Ultrasound	For contributions to biomedical ultrasound. For the development of passive acoustic mapping for real-time monitoring of ultrasound therapy.
Prof Lionel Tarassenko	TTD	Appointment of a Commander of the Order of the British Empire (CBE)	Service to engineering in the 2012 New Year Honours List.
Dr David Clifton	TTD	J. A. Lodge prize	In recognition of "his outstanding work and contribution as an early-career biomedical engineer".
Samantha Moore	MH&E - Small Arts Awards	Nature Scientific Merit Award at the 3rd Annual Imagine Science Film Festival in New York	For her short animated film on synaesthesia, An Eyeful of Sound.
Michael Zev Gordon	MH&E - Small Arts Awards	Composer of the Year (Choral section), by the British Academy of Songwriters, Composer and Authors	Michael composed Allele, as part of Andrew Morley's Music from the Genome project.
Jacek Scarso	MH&E - Small Arts Awards	Fringe Report Award 2012 for Best Theatre Company	For Baroque Box by Elastic Theatre.
Alice Sharp	MH&E - Large Arts Awards	Lord Mayor of the City of London Air Quality award	Invisible Dust won the prize for its work in 2011, in particular for Faisal Abdu'Allah's film.
Anna Dumitriu	MH&E - Small Arts Awards	Society for Applied Microbiology's Communication Award	For her art work engaging the public in microbiology issues and for the Communicating Bacteria Project.
Siobhan Fenton	MH&E - Small Arts Awards	Best Animation at the Scinema Festival of Science Film, Australia	For her short animated film on labiaplasty, Centrefold.
Aura Satz and Marcus Coates	MH&E - Arts Awards	Shortlisted for the 2012 Jarman Award	The winner will be announced later in the year.

Frances Crow	MH&E - Small Arts Awards	Won the Noise Abatement Society's John Connell Innovation Award 2011 and received an Honorary Mention in the Digital Music and Sound Art Category of the Prix Ars Electronica 2012	The Organ of Corti won the prizes, which was part of the Tranquility is a State of Mind project.
Sandra Gorel	MH&E - People Awards	Best UK Short at the Raindance Film Festival in October 2011 Jury Award for the best International Short Film at the 2011 Cornwall Film Festival. The film was among 10 films to have been shortlisted for an Academy Award for Best Live Action Short Film 2012	For Love at First Sight, a short film drama about dementia starring John Hurt and Phyllida Law.
Victoria Childs	MH&E - Broadcast Development Awards	Turner Prize	Artist Luke Fowler's film on RD Laing, shown as part of an exhibition of his work in Edinburgh, has been nominated for the Turner Prize. The film was funded with the support of a Broadcast Development Award, which was produced by the grant holder. The winner will be announced in December 2012. Luke Fowler also did extensive research work on the RD Laing archive in Glasgow, which was supported through a Research Resources in Medical History grant in 2001.
Steve Winter	MH&E - People Awards and Small Arts Awards	Arts and Health Award from the Royal Society for Public Health	For Old Vic Young Voices production of Epidemic.
Nigel Townsend	MH&E - Strategic Awards	The overall winner in the STEM Category of the National Science & Engineering Week Event Awards 2012	For the first production of the Y Touring strategic award, Dayglo.

Emma Shepley	MH&E - People Awards	Visual Arts Award 2011 at the Ability Media International awards	For the exhibition Re-framing disability: portraits from the Royal College of Physicians.
Natalie Ireland	MH&E - People Awards	Recognition of Distinction from the online EngageU awards	The Seeking Perfection project won the prize as part of the EC-funded ULab project to identify the most innovative outreach and public engagement activities carried out by European Universities.
Julian Savulescu (Oxford University)	MH&E - Ethics & Society	Ranked number one in the Leiter Report for applied ethics in the UK, and number two globally.	The Leiter Report is a ranking of philosophy departments in the English-speaking world, based on a survey of philosophers who are nominated as evaluators by the Report's Advisory Board. The Report was first compiled and distributed in 1989.
Stuart Hogarth (KCL)	MH&E - Ethics & Society	Appointed to the Emerging Science and Bioethics Advisory Council (ESBAC)	The newly established ESBAC is responsible for providing advice to UK Health Departments on emerging healthcare scientific developments and their ethical, legal, social and economic implications.
Simon Szreter (Cambridge) and Kate Fisher (University of Exeter)	MH&E - Medical History and Humanities	Longlisted for the Samuel Johnson Prize for Non-Fiction 2011	For the jointly authored, <i>Sex Before the Sexual Revolution: Intimate Life in England 1918-1963</i> , which discusses the sex lives of ordinary people in early and mid 20th-century England.

Source: SF, MH&E, TTD, SPPU 2012

5. RESEARCH ENVIRONMENT

- Key contributions to the creation, development and maintenance of major research resources
- Contributions to the growth of centres of excellence

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

Fig. 5.1: Proportion of grants reporting software/database development at 'end of grant'

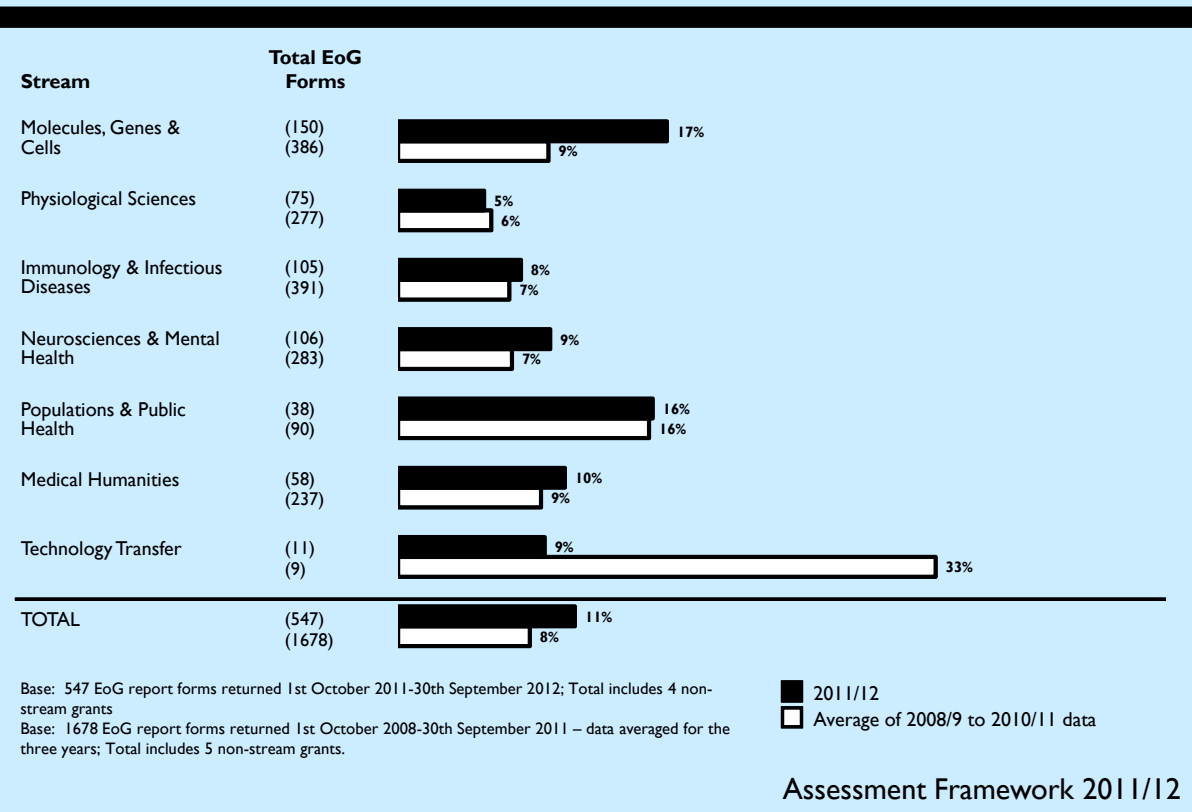


Figure 5.2 Key examples of the development of software/database and other research resources 2011/12

Researcher	Key grant(s)	Area	Details/Impact
Prof J David Barry	Principal Research Fellowship	Immunology and Infectious Disease	Researchers have produced a freely available database of Trypanosome genes that encode variant surface glycoprotein, which help the parasite evade the immune system. The database contains around 1000 genes, revealing much about glycoprotein organisation.
Prof Timothy R Walsh	Project Grant	Immunology and Infectious Disease	Researchers have established a web-based portal system for the submission of DNA Insertion Sequence Common Region (ISCR) sequences, which are important in the evolution of antibiotic resistant bacteria. This portal is recognised as the global depository for ISCR elements.
Dr Tracey Gloster	Sir Henry Wellcome Postdoctoral Fellowship	Molecules, Genes and Cells	Researchers have designed and patented a small molecule that can inhibit the production of O-GlcNAc, a cell surface glycoprotein that is important in cancer cell development. This method has the potential to be applied to other enzymes in the family and could have significant impact on this field of research.
Dr Nick Goldman	Technology Development Grant	Molecules, Genes and Cells	Researchers at the EBI have developed a number of freely-available online systems for analysing the data from high-throughput sequencing systems.
Prof Peter Ghazal	Technology Development Grant	Molecules, Genes and Cells	The software application SPRINT has been developed at the Edinburgh Parallel Computing Centre, University of Edinburgh. The package allows biostatisticians to use networked computer clusters to analyse genomic data, using the statistical language R .
Prof Ian Marshall	Equipment Grant	Neuroscience and Mental Health	Researchers have developed a number of software tools for imaging research, including anonymisation tools that remove personal information from medical images, allowing their wider sharing with researchers. Other work has led to the development of MCMxxxVI, a suite of image manipulation and analysis tools that allows MRI images to be colourised and fused together.
Prof Raymond J Dolan	Strategic Award	Neuroscience and Mental Health	<p>Professor Dolan's group have produced freely available software for the neuroimaging community to promote a common analysis scheme across laboratories - Statistical Parametric Mapping (SPM).</p> <p>The Physics Group at the Wellcome Trust Centre for Neuroimaging have developed sequences for a broad range of MRI applications. These sequences enhance the performance of commercially produced scanners for the research environment.</p>

Prof Angus Silver	Senior Research Fellowship Basic Renewal	Neuroscience and Mental Health	Researchers have developed several freely-available software applications, including NeuroConstruct, a tool for building neural network models with a high level of biological detail, and NeuroMatic an electrophysiological data acquisition and analysis tool. Professor Silver has developed a 2-photon microscope that substantially advances current functional optical imaging methods.
Dr Adrian L R Thomas	Project Grant	Physiological Sciences	Dr Thomas and colleagues have researched the relationship between the cytoplasmic movement within a cell and embryo development. Intellectual Property relating to this work has been licensed and is being developed to assess its use in determining the viability of human eggs in IVF clinics.
Dr Simon I Hay	Senior Research Fellowship In Basic Biomedical Science	Populations and Public Health	The Malaria Atlas Project database links medical information and satellite-derived climate data on <i>Plasmodium falciparum</i> and <i>Plasmodium vivax</i> . The data are available free-of-charge to researchers and public health officers and are the first evidence-based map of malaria prevalence and risk.
Prof Sarah Cleaveland	Collaborative Project	Populations and Public Health	Researchers have developed and implemented the Animal Disease Surveillance and Response System, a community-based livestock disease surveillance programme in Asembo, Kenya, which uses mobile phone reporting and open-source software.
Prof Paul Burton	Biomedical Resources	Populations and Public Health	This project created a database of all applications submitted to the access committee for data and/or samples from the 1958 Birth Cohort, which contains information on over 17 000 individuals born in March 1958. This has enabled monitoring of the access procedures and will allow for an audit of the Committee.

Source: Science Funding; 2012

Figure 5.3 Key outputs from major resources 2011/12

Major Resource	Wellcome Trust area	Details/Impact
Cancer Genome Project	Science Funding	<p>An international team, led by researchers at the Sanger Institute have sequenced the genomes of 21 breast cancers and analysed the mutations that emerged during the tumours' development.</p> <p>While whole genome sequencing from cancers is not a new concept, the Cancer Genome Project has allowed researchers a panoramic view enabling the identification of mutational patterns rather than individual mutations in specific genes. The work was published in <i>Cell</i> (<i>Cell</i> 2012;149;5:994-1007).</p> <p>The work was supported in collaboration with Breakthrough Breast Cancer.</p> <p>http://www.sanger.ac.uk/about/press/2012/120517.html</p>
Wellcome Trust Case Control Consortium (WTCCC) & 1000 Genome Project	Science Funding	<p>Ten more DNA regions linked to Type 2 Diabetes have been discovered by an international team of researchers, bringing the total to more than 60. The study provides a fuller picture of the genetics and biological processes underlying Type 2 Diabetes, with some clear patterns emerging.</p> <p>Data from WTCCC and the 1000 Genome Project underpinned the study which was conducted by an international team of researchers from the University of Oxford, the Broad Institute of Harvard and MIT, and the University of Michigan. The findings are published in <i>Nature Genetics</i> (<i>Nature Genetics</i> 2012;44(9):981-90).</p> <p>http://www.wellcome.ac.uk/News/2012/News/WTVM056115.htm</p>
Wellcome Trust Case Control Consortium 2 (WTCCC2) & International Stroke Genetics Consortium (ISGC)	Science Funding	<p>Data from the WTCCC2 and the ISGC has enabled the identification of a genetic variant that increases the risk of a common type of stroke. The research, led by Professor Peter Donnelly at the Wellcome Trust Centre for Human Genetics, was published in <i>Nature Genetics</i> (<i>Nature Genetics</i> 2012 5;44(3):328-33) and opens up new avenues for possible treatments.</p> <p>http://www.wellcome.ac.uk/News/2012/News/WTVM054323.htm</p>
Structural Genomics Consortium (SGC)	Science Funding	<p>Through collaboration with the Structural Genomics Consortium, researchers have designed the first small molecule inhibitor selective for an enzyme in the jumonji subfamily and presented its structure bound to this inhibitor.</p> <p>Considerable effort has been devoted to gaining a mechanistic understanding of the roles of the enzymes involved in DNA transcription, genome integrity and epigenetic inheritance. The inhibitor bound structures provide novel insights and the potential for the design of further small-molecule inhibitors. The work was published in <i>Nature</i> (<i>Nature</i> 2012; 16;488 (7411):404-8).</p>

Source: www.wellcome.ac.uk; Science Funding; 2012

Figure 5.4 Wellcome Trust Sanger Institute informatics statistics

The Sanger Institute hosts a large number of web-based genome and informatics resources. Over 50 domains are currently hosted, with the table below detailing the number of visits, pageviews, valid hits and bytes for ten significant resources (2011/12).

Domain	Visits	Pageviews	Pages/Visit	New Visitors	Returning Visitors	Valid Hits	Bytes
Cosmic	413003	3316297	8.02	144605	268398	18838073	2.08E+11
Decipher	113402	664794	5.87	23940	89462	10069372	5.66E+10
Ensembl ³¹	2399679	24918018	10.38	546218	1853461	1.29E+08	2.47E+12
Asia Ensembl	444774	3551799	7.99	157402	287372	34555732	2.72E+11
US East Ensembl	491305	3637217	7.37	196164	295141	35713112	2.5E+11
US West Ensembl	204084	1430393	7.01	77501	126583	14822940	1.38E+11
GeneDB	88007	545115	6.18	35243	52764	16173214	3.58E+11
UK10K ³²	6433	21358	3.33	3647	2786	194835	1.13E+09
Merops	77974	642433	8.22	29358	48616	3288627	2.19E+10
pFam	706349	4936089	7	277044	429305	79419964	6.8E+11
Sanger ³³	1253602	3745453	2.99	565066	688536	51164706	9E+11
WTCCC	16008	40085	2.51	10252	5756	313227	8.42E+09
YourGenome	160632	379596	2.27	139114	28438	12629806	5.41E+11

Visits: A series of page requests from the same uniquely identified client with a time of no more than 30 minutes between each page request, and no requests for pages from other domains intervening between page requests.

Pageviews: A request for a file whose type is defined as a page. A single page view may generate multiple hits as all the resources required to view the page (images, .js and .css files) are also requested from the web server.

Pages/Visit: The ratio of Pageviews per visit (e.g. If 10 pages were viewed on two separate visits this would give an average value of $10/2 = 5$)

New Visitors: A visitor that has not made any previous visits. A new visitor can also be defined as someone who enters the site, and does not have the "web cookie" set. If a user deletes their cookies, and re-enters the site, they will be seen as a new visitor again.

Returning Visitors: A visitor that has made at least one previous visit as defined by the presence of a web cookie in their browser.

Valid Hits: A request for a file on a web server. Valid Hits describe the number of successful connections to files on a web server, and can include images, javascript files, css files, html pages, and more.

Bytes: Measure of the number of bytes downloaded from the web servers.

Source: Sanger Institute; 2012

³¹ There are in total four Ensembl websites worldwide www.ensembl.org (main one hosted at the Wellcome Trust Genome Campus)
asia.ensembl.org
uswest.ensembl.org
useast.ensembl.org

These three are copies of the main www.ensembl.org data and website and as such are classed as mirror sites.

This has the advantage of allowing us to:

- 1) distribute Ensembl data around the world
- 2) allows the protection of data - copies of the resource will be held in four locations worldwide (disaster recovery plan)
- 3) provides protection from the resource being off-line since it is very unlikely that more than one mirror would be unavailable at any one time (business continuity plan).

³² Library domain is retired and has been replaced in the reporting metrics with UK10K

³³ Sanger now tends to generate subdomains and consortium sites rather than adding content to the main website (www.sanger.ac.uk)

Figure 5.5: ORCID (Open Researcher and Contributor ID) registry

The **ORCID** (Open Researcher and Contributor ID) **registry launched in October 2012**. ORCID is a not-for-profit, multi-agency, community effort to create a global registry of unique researcher identifiers. ORCID aims to address some of the long standing challenges faced by research funders, including the ability to link researcher outputs and outcomes to funding and individuals and the challenge posed by name ambiguity in the selection of peer reviewers and experts to support funding decisions and, if successful, will provide an important piece of infrastructure in the research management ecosystem. Greater precision and transparency on the research and associated outputs linked to a particular funder could also generate improved global research and development resource flow information which is vital for funding agency gap analysis and strategy.

The Wellcome Trust has been a part of the ORCID endeavour since shortly after its inception in 2010; Liz Allen (and Robert Kiley as alternate) is an ORCID Board Director and has been involved in setting strategy and development of the Registry.

As of 1 November 2012 over 15,000 researchers and affiliates across the globe have signed up for an ORCID. Alongside the Wellcome Trust, other funding agencies are considering how ORCID can be integrated into their workflows including the National Institutes of Health. A number of major research organisations are also working to integrate links to the registry as part of their workflow including: F1000, Aries Systems, Nature Publishing Group, Hindawi, Thomson Reuters, Elsevier and the American Physical Society. Through its affiliate ORCID EU, DataCite is also testing approaches to linking ORCID identifiers with research datasets.

Source: SPPU; 2012

Figure 5.6 Wellcome Library activity highlights: 2011/12

- Significant progress towards the launch of new digital library, with infrastructure created and over 1.2m pages of books and archives digitised
- Secured grant of £252,000 from the Joint Information Systems Committee (JISC) to support digitisation of Medical Officer of Health reports for London
- New project launched to preserve archives of the Human Genome Project and Sanger Institute
- Library organised and hosted 2011 Sanger Lecture on modern biomedicine and 2012 Roy Porter Lecture on history of medicine
- Appointment of second Wellcome Library Fellow, Dr Jane Seymour
- European Research Council joined UKMPC, which was rebranded as Europe PMC.

Source: MH&E; 2012

Figure 5.7 Wellcome Library activities: audience reach/volume

Activity	Audience reach/volume						
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
User visits to the Library	19,713	20,511	32,144	38,246	43,945	40,760	41,875
Visitors on Library tours	658	633	1,192	1,330	1,375	1,339	2,249
Research enquiries answered (e-mail/letter/telephone etc)	4,036	3,937	3,945	5,871	6,200	6,013	2,276
Wellcome Gateway searches	n/a	574,160	583,951	223,226	n/a	n/a	n/a
Library Catalogue searches	589,042	806,469	1,175,123	750,265	680,518	761,824	1,356,047
New items purchased	3,111	2,905	2,917	2,737	2,225	2,339	1,792
Items catalogued	10,507	14,694	25,016	18,932	22,139	22,745	30,033
Items lent to other libraries	357	445	378	149	398	379	24
Items conserved	431	552	701	1,083	2,234	4,219	12,686
Items preserved	1,737	818	1,238				
Items exhibited	46	149	40	149	193	171	110
Wellcome Images reproduced and broadcast	2,307	3,241	3,486	4,186	3,464	4,287	3,796
Items retrieved from store for public usage	19,584	21,463	21,149	21,462	23,628	22,269	23,948

Source: MH&E; 2012

Figure 5.8 Medical Humanities & Engagement – resources created and developed

Research Resources in Medical History (RRMH) Grants completed 2012

King's College London

'DNA and Social Responsibility: Cataloguing the papers of Nobel Prize winner, Professor Maurice Wilkins (1916-2004), and of King's College London's Biophysics Unit

The grant enabled full access to Wilkins's archive (1942-1999), addressing the wider social impact and the ethical conundrums associated with genetic research. The collection also includes records of the earliest experiments at King's relating to the advent of DNA sequencing (1949-1977).

Glasgow University Library

R.D.Laing in America: preserving the original, un-edited film of the 1972 lecture tour

This grant provided support for the digitisation and transcription of the film and audio from R.D. Laing's 1972 American Lecture tour, building a 2002 RRMH grant awarded to catalogue Laing's papers. Luke Fowler's documentary on Laing, made with the help of a Broadcast Development Award, was nominated for this year's Turner Prize.

Edinburgh University Library

Scoping the film collection of Eric Lucey and the Institute of Animal Genetics Research Film Unit

A small grant enabled an assessment of the content and condition of film footage created by Eric Lucey in the Institute of Animal Genetics's Research Film Unit, which was housed in the BFI vaults, neither accessioned nor catalogued. The project links directly to a larger grant awarded to Edinburgh to catalogue and preserve the records of the Roslin Institute and the Institute of Animal Genetics.

Bodleian Library, Oxford

Cataloguing the papers of Sir Walter Bodmer and Julia Gwynnaeth, Lady Bodmer

Grants awarded by the Trust's RRMH scheme in 2010 and 2011 supported a project to catalogue the huge archive of Sir Walter Bodmer and that of his wife, Julia Gwynnaeth. The papers span Bodmer's entire career, which has covered major advancements in the field of cancer genetics, from the 1950's to the 2000's.

St Hugh's College, Oxford

Cataloguing the archives of Oxford's Military Hospital for Head Injuries

Following a scoping grant to assess the condition and content of the collection, a further RRMH grant was awarded to catalogue and preserve the records of the hospital, enabling access to previously unknown primary sources relating to the development of neurosurgery during WWII and details of follow up treatment.

Royal College of Physicians of Ireland

Cataloguing the historical Archives of the Royal College of Physicians of Ireland

An initial scoping grant and a full award have enabled the cataloguing of the Royal College of Physicians of Ireland's archives, which date back to the 17th century. The catalogue has been widely promoted via a blog, presentations, lectures, a conference and an annual prize for best history of medicine research paper.

London School of Hygiene and Tropical Medicine (LSHTM)

Cataloguing and Preserving the LSHTM Nutrition Collection

A Trust grant has supported an exhibition and journal articles about the LSHTM's records relating to scientific investigations carried out by LSHTM staff in the UK and colonial territories between the 1920s and 1950s. The collection has been prepared for inclusion in potential digitisation projects, such as the Wellcome Digital Library.

Queen Victoria Hospital, East Grinstead

Surveying the Archives of Queen Victoria Hospital: historic patient records and papers relating to Archibald McIndoe and the Blond/McIndoe Burns Unit

As a result of a Trust grant, grant negotiations are underway with West Sussex Record Office to secure the Queen Victoria Hospital's records relating to the work of the pioneering plastic surgeon Archibald McIndoe and the Blond McIndoe Burns Unit. The archives documenting the treatment of service personnel from 1939-1948 were inaccessible uncatalogued and in poor condition.

Birkbeck College**The Sloane Printed Books Project**

Following on from a previous grant awarded to UCL, a Wellcome Trust grant supported a project to reunite the dispersed printed book collection of Sir Hans Sloane, originally one of the four founding collections of the British Library by locating, identifying and cataloguing volumes now in repositories across the UK. The second phase of the project added 5,662 entries to the custom database, including 883 from the Bodleian Library.

Addenbrooke's Hospital**Conservation of Addenbrooke's Hospital Casenotes (1878-1947)**

The grant supported the conservation of 900 volumes of casenotes from 1878 to 1947 encompassing the beginning of the NHS. The records, which were cleaned, repaired and re-housed, have subsequently been catalogued and are now available to researchers.

Glasgow University Archives**Renwick and Ferguson-Smith Catalogue Enhancement**

The project enhanced the cataloguing of the Renwick and Ferguson-Smith collections, in preparation for inclusion in the Wellcome Library Pilot Project 'Foundations of Modern Genetics' a major digitisation initiative that brings together significant genetics collections from the Wellcome Library and partner institutions.

National Archives of Ireland**Transfer, cleaning and cataloguing the records of Peamount Sanatorium and the Women's National Health Association of Ireland**

A grant was awarded to transfer the records of Peamount Sanatorium and its forerunner, the Women's National Health Association of Ireland, to the National Archives of Ireland where they were cleaned, repaired and fully catalogued. The records of Peamount include 40,000 patient index cards, and 30,000 patient files, while the archives of the Women's National Health Association of Ireland contain over 100 archive boxes relating to its work.

Source: MH&E; 2012

CONTRIBUTIONS TO THE GROWTH OF CENTRES OF EXCELLENCE

Figure 5.9: Top global institutions in the field of Microbiology – ranked by citations per paper (January 2002 to June 2012)³⁴

Rank	Institution	Total citations	Number of papers	Citations per paper
1	Institute for Genomic Research, USA	17,045	175	97.40
2	Joint Genome Institute, USA	3,602	55	65.49
3	Santa Fe Institute, USA	3,031	50	60.62
4	US Navy, USA	6,214	116	53.57
5	Wageningen Centre for Food Sciences, Netherlands	4,000	82	48.78
6	Wellcome Trust Sanger Institute, UK	11,477	242	47.43
7	Rockefeller University, USA	18,967	413	45.92
8	Royal Netherlands Institute for Sea Research, Netherlands	4,321	100	43.21
9	George Washington University, USA	9,412	219	42.98
10	J. Craig Venter Institute, USA	6,847	167	41.00

Source: Thomson Reuters Essential Science Indicators; 2012

Figure 5.10: Top global institutions in the field of Biology & Biochemistry – ranked by citations per paper (January 2002 to June 2012)

Rank	Institution	Total citations	Number of papers	Citations per paper
1	Applied Biosystems Inc., USA	22,407	78	287.27
2	Institute for Genomic Research, USA	7,700	85	90.59
3	European Bioinformatics Institute, UK	18,156	217	83.67
4	Wellcome Trust Sanger Institute, UK	23,266	305	76.28
5	GlaxoSmithKline, UK	15,816	224	70.61
6	National Library of Medicine, USA	12,886	189	68.18
7	Tokyo Metropolitan University, Japan	17,286	268	64.50
8	Whitehead Institute for Biomedical Research, USA	11,587	188	61.63
9	Cold Spring Harbor Laboratory, USA	19,399	318	61.00
10	Dan Farber Cancer Institute, USA	23,762	393	60.46

Source: Thomson Reuters Essential Science Indicators; 2012

Figure 5.11: Top global institutions in the field of Neurosciences & Behaviour – ranked by citations per paper (January 2002 to June 2012)

Rank	Institution	Total citations	Number of papers	Citations per paper
1	WT Centre for Neuroimaging, UK	5,403	56	96.48
2	Cold Spring Harbor Laboratory, USA	19,643	308	63.78
3	Rush University Medical Center, USA	9,563	152	62.91
4	National Human Genome Research Institute, USA	4,805	86	55.87
5	American Academy of Neurology, USA	4,719	86	54.87
6	Douglas Institute, Canada	5,370	101	53.17
7	Western Psychiatric Institute & Clinic, USA	4,565	89	51.29
8	Amgen, USA	4,318	89	48.52
9	Salk Institute for Biological Studies, USA	35,788	755	47.40
10	Parkinson's Institute and Clinical Center, USA	5,074	112	45.30

Source: Thomson Reuters Essential Science Indicators; 2012

³⁴ Only institutions which have published at least 50 papers are included in Figs. 5.9-5.11

Figure 5.12 Key updates on capacity building for centres of excellence 2011/12

The following developments in capacity building activities have been made throughout the year:

Health Research Capacity Strengthening Initiative in Kenya and Malawi

The **Health Research Capacity Strengthening** (HRCS) initiative is jointly funded by the Wellcome Trust and the UK Department for International Development (DFID) since 2008 to the tune of £10 million each over five years.

In Kenya, the Consortium for National Health Research (CNHR) an independent Kenyan Non-Governmental Organisation, has supported the establishment of four Kenyan Centres of Research Excellence (in health systems research, vector biology and pharmacology), the first time many of the Kenyan research institutions involved have collaborated. A competitive competition has been held to provide re-entry grants and research positions to develop these programmes. The Wellcome Trust (including Anne Johnson) and DFID visited two of these Centres and attended a National Research to Policy meeting, co-hosted with the Kenyan Government.

In Malawi, the HRCS initiative is housed in the Government of Malawi National Commission of Science and Technology (NCST). The HRCS initiative in Malawi has developed and launched the first National Health Research strategy for the Government of Malawi. Over 40 Masters students are now working in areas of strategic need. The Initiative receives support from the PWC team who worked with the Kenya Programme. The Malawi Programme underwent a funders review in June 2012, which determined that the Programme should continue to the end of the current funding period. Consideration of any no-cost extension or encouragement of application for continued funding would be made at the Funders' next review in Q1 2013.

Indian Alliance

The **Wellcome Trust/DBT India Alliance** was officially launched in September 2008 as a joint funding venture between the Wellcome Trust and the Department for Biotechnology (DBT) of the Indian Government. The India Alliance has been operating in fully functional capacity since July 2009 from office premises in Hyderabad, India and underwent a mid-term review over the summer of 2011. The Mid-Term Review Committee recommended that the Wellcome Trust and DBT should continue funding the India Alliance for a further five years, at the same level (£40m) which has been approved by the Board of Governors. A new Chief Operating Officer is under recruitment.

The Alliance has established four fellowship funding programmes. In 2012 the Early Career Selection Committee and the Intermediate and Senior Selection Committee have awarded four early career awards, five intermediate fellowship and three senior fellowships. In addition, the prestigious Margdarshi Fellowship scheme has been launched for scientists who have made major contributions to science and have at least ten years of experience running an independent laboratory, who wish to relocate from their current institution to any non-profit research institute in India. It is expected that no more than two will be granted annually. The India Alliance's Selection Committees have representatives from scientific institutions in India, UK, EU and USA to support a review process judged by globally competitive standards.

In 2013 the Evaluation Team at the Trust will be working with the DBT India Alliance to collate and review the scientific career and outputs and outcomes of the collaboration to-date.

Source: SF, SPPU; 2012

6. INFLUENCE

- Significant impact on science funding and policy developments
- Significant impact on global research priorities

SIGNIFICANT IMPACT ON SCIENCE FUNDING AND POLICY DEVELOPMENTS

Figure 6.1: Wellcome Trust response to consultations 2011/12

The Policy Team in the Strategic Planning and Policy Unit (SPPU), in collaboration with colleagues across the Trust, produced 32 consultation responses between 1st October 2011 and 30th September 2012. Consultation responses are openly available on the Wellcome Trust website.

Parliamentary Monitoring

In 2011/12, the Trust provided written evidence to eight Parliamentary Committee inquiries and oral evidence at three Committee inquiries (science and international development; bridging the 'valley of death' - improving the commercialisation of research; and the administration of examinations for 15-19 year olds).

The Trust drafted amendments to the Health and Social Care Bill that were tabled by peers and provided briefings that were used extensively in debate in parliament. The Trust was mentioned nine times in debates in the House of Lords and House of Commons, once in House of Lords written answers, on the topic of animals in scientific procedures and eight times in House of Commons written answers.

Source: SPPU; 2012

Figure 6.2: Influencing Government policy and legislation

Subject theme	Update
Animals	<p>Following the adoption of the EU Directive on the protection of animals used for scientific purposes by the European Parliament in late 2010, the Trust has been working with the UK Bioscience Sector Coalition to ensure appropriate translation of the Directive into UK legislation. This has involved updating the current Animals (Scientific Procedures) Act 1986 through secondary legislation.</p> <p>The Home Office consulted on their proposals to transpose the Directive in early 2012, to which the Trust responded through the UK Bioscience Sector Coalition to emphasise the needs of life sciences research. The key needs include: (1) maintaining high animal welfare standards in the UK and promotion of the 3Rs (replacement, refinement and reduction), (2) enabling high quality science, and (3) reducing any unnecessary bureaucracy involved in animal research.</p> <p>Draft legislation will be laid and debated in Parliament in November 2012, with the updated Act in place by 1 January 2013.</p>
Data Protection	<p>In January 2012 the European Commission published a draft Data Protection Regulation with a view to replacing the existing Data Protection Directive and associated legislation in Member States' legislation. The Trust commissioned a legal analysis of the draft Regulation that has informed its policy work.</p> <p>In the UK, the Trust has submitted evidence to the Ministry of Justice (MoJ), led the development of a joint statement from eleven UK health research organisations, and met with officials from the MoJ and the Information Commissioner to inform the UK negotiating position. In Europe, the Trust has worked with the Federation of the European Academies of Medicine (FEAM) to develop a pan-European statement with a wide range of signatories, and joined FEAM for a technical discussion of the Regulation with DG Justice that has informed the development of amendments for the European Parliament.</p>

<p>Life Sciences Strategy and NHS innovation</p>	<p>In December 2011, the Government published its Life Sciences Strategy for the UK, with a speech by the Prime Minister to announce three related documents: the Life Sciences Strategy, a review of innovation in the NHS, and a White Paper for Research and Innovation.</p> <p>The Trust had contributed throughout the development of the Strategy, responding to consultations specifically on the topics of education and skills and open data, and to the NHS Innovation Review, as well as having a number of discussions with the Department of Business, Innovation and Skills throughout the process. The result was a comprehensive package of measures that has been welcomed across the research funding world. The Policy Team is now monitoring implementation of the plan, particularly relating to the announcements intended to unlock access to patient data for researchers.</p>
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Source: SPPU; 2012

<p>Figure 6.3: Update on key policy areas</p>	
<p>Policy area</p>	<p>Update</p>
<p>Open Access</p>	<p>The Wellcome Trust is a leading proponent of open access and 2012 has seen some monumental developments in the open access movement, with the rise of what The Guardian coined the “academic spring”.</p> <p>In June, an expert group chaired by Dame Janet Finch, and which included the Trust's Robert Kiley, published its recommendations for expanding access to research literature, and the Government accepted its key recommendation that the UK set a clear policy direction toward open access to publicly-funded research publications via the author-pays route. In addition, Research Councils UK and the European Commission both strengthened their commitments to open access.</p> <p>The Trust introduced its open access policy in 2005, and researcher compliance is now at 55-60%. The Trust recently introduced sanctions to enhance compliance and a requirement for licence terms that allow full-use of content upon payment of an open access fee. UK PubMed Central continues to expand and welcomed the European Research Council as its nineteenth funder member, and third from outside the UK. From the 1 November, UKPMC will be known as Europe PMC, reflecting a clear strategy to become a truly Europe-wide resource.</p>
<p>Regulation of clinical research</p>	<p>The Trust has continued to work with the Government and other stakeholders on the implementation of reforms to the regulation and governance of clinical research. The Health Research Authority (HRA) was established in December 2011 and the Trust was invited to sit on the HRA Collaboration and Development Steering Group, a UK-wide group that will lead projects for improvement in the research journey.</p> <p>The Trust drafted amendments to establish the HRA on a firmer statutory footing in the Health and Social Care Bill, which underpinned debate by peers in December 2011. Following this, the Government has published clauses to establish the HRA as a non-departmental public body in the draft Care and Support Bill. The Trust also provided input to shape the evolving landscape, for example responding to consultations on the role of the HRA and the future of the Human Tissue Authority and Human Fertilisation and Embryology Authority.</p>
<p>Flexible research careers</p>	<p>The Trust continues to be a keen advocate for the need for flexible research careers and the importance of ensuring a more diverse and talented scientific workforce which can only enrich ideas and approaches in scientific research and facilitate breakthroughs. In 2012, the Trust launched a new ‘Flexible Research Careers’ web page which highlights the opportunities offered in Wellcome Trust grant funding.</p> <p>The Trust also monitors our funding and has recently asked our top funded institutions how, as part of their science strategy, they support career development and equality and diversity in their scientific workforce, for example through accreditation such as the Athena SWAN Award or the European Commission’s HR Excellence in Research Award.</p>
<p>Enhancing data sharing</p>	<p>In collaboration with the Medical Research Council, the Economic and Social Research Council and Cancer Research UK, the Trust has established the Expert Advisory Group on Data Access (EAGDA) for genetics and cohort studies. The Group aims to provide strategic advice to funders and analyse emerging scientific, ethical and legal issues raised by data access across</p>

	the fields of genetics, epidemiology and the social sciences. EAGDA's initial meeting was in June 2012 and the group will meet again in October to finalise its work plan.
Research Integrity	<p>A Research Integrity Concordat was launched in July 2012. The Trust was a member of the Working Group and a signatory to the Concordat, which was developed by Universities UK in partnership with other funders and Government departments. The Concordat sets out the different responsibilities of researchers, employers and funders; greater transparency, it is hoped will provide a focus for efforts to strengthen the culture of research integrity across the UK.</p> <p>The Trust already meets all the requirements for funders included in the Concordat, though it intends to update existing policies, both on Good Research Practice and Handling allegations of research misconduct, to include explicit reference to the Concordat. This will make clear that the Trust expects all grant-holders and their organisations to adopt the principles of the Concordat.</p>

Source: SPPU; 2012

Figure 6.4: Education Team policy activities

- The Education and Learning Team worked with the Policy Team in SPPU on its submissions to the Plan for Growth and in making representations to HM Treasury for ongoing support of the National and Regional Science Learning Centres including through Project ENTHUSE. In his Autumn Statement, the Chancellor announced that £10 million would be committed to Project ENTHUSE from 2013 to 2018 alongside matched funding from the Wellcome Trust.
- The Wellcome Trust-funded report on Acquisition of Science Subject Knowledge and Pedagogy in Initial Teacher Training (Nov 2011) received much attention including from the Department for Education (DfE). DfE then invited the Trust to a meeting to advise on its examination of initial teacher training in physics, chemistry, mathematics and ICT which led to four workshops considering the issues raised.
- The Trust developed a definition of a *Primary Science Specialist* which has been discussed with DfE and significantly influenced DfE's draft definition of a primary science specialist teacher, to be used in planning new initial teacher training courses for Primary Science Specialists (planned for September 2013). The Trust's Primary Science Survey Report (December 2011) on the impact of removing primary science SATs was also included in the monthly research round-up that DfE circulates.
- The Trust has developed a programme of work to improve the practice of school Governors, with the support of the Secretary of State for Education and in close dialogue with DfE and a Statement of Recommended Practice for Boards of Governors which will now be tested in schools.
- The Education Team has engaged with civil servants from the Department for Business, Innovation and Skills around the Trust's forthcoming reviews of informal science learning and will be receiving pre-publication reports to inform the review of their Science in Society Programme.
- The Education and Learning Team has worked with the Policy Team in SPPU to provide responses to a number of consultations and inquiries (listed below) as well as letters to Ministers:
 - A-level Reform Consultation, OfQual, September 2012
 - Careers Guidance for Young People, House of Commons Education Select Committee, September 2012
 - National Curriculum for science: Key stages 1 and 2- Draft, DfE, July 2012
 - Vision for Science and Mathematics education 5-19, Royal Society, March 2012
 - Qualification support material and services, Ofqual, March 2012
 - Higher Education in STEM Subjects, House of Lords Science and Technology Committee, March 2012
 - How should examinations for 15-19 year olds in England be run? House of Commons Education Select Committee, December 2011
 - Attracting, training and retaining the best teachers, House of Commons Education select committee, October 2011

Source: MH&E; 2012

SIGNIFICANT IMPACT ON GLOBAL RESEARCH PRIORITIES

Figure 6.5 – Wellcome Trust Frontiers meetings and workshops 2011/12	
Meeting theme	Wellcome Trust lead department
Public Health Foundation of India Workshop	International
Joint Funders Workshop on Health Systems Research	International
MRC-TSB iPSC Grand Challenge Workshop	Science Funding-MPS
Genetics in the Clinic	Science Funding-MPS
Next Generation Brain Imaging Technologies Frontiers Meeting 2011	Science Funding-NMH
Pathogen Database Interoperability Workshop	Science Funding-PIPH
Host-Pathogen Deep Sequencing	Science Funding-PIPH
Understanding Bottlenecks in the Discovery of New Therapies for Respiratory Syncytial Virus (RSV) Infection – Frontiers Meeting	Science Funding-PIPH / TTD
Joint workshop: Wellcome Trust and Alliance for Health Policy and Systems Research “Enhancing capacity to apply research evidence in policy making – Progress and Dissemination”	Science Funding-PIPH / International
Scientific Challenge Area Meeting (#5): Impact of Global Environmental Change on Food/Nutrition, Water and Human Health	Various

Source: Science Funding; 2012

Figure 6.6: Scientific area Portfolio Review: Malaria 1990-2009

In 2012, the Trust published the third in a series of science-focused portfolio reviews, exploring developments in malaria research over the past 20 years and the role of the Wellcome Trust within the research landscape.

The review had three specific aims:

- to identify the key landmarks and influences on the malaria research landscape 1990-2009
- to consider the key features of the Wellcome Trust's impact on this malaria research landscape;
- to consider the current and future challenges for malaria research and where there may be opportunities for Wellcome Trust strategy and funding.

Key findings

Through a combination of landscape analysis and consultation with independent experts, the Trust's major contributions to the field of malaria research are thought to have been:

- sustained provision of project and people-based funding for researchers who have delivered a range of breakthroughs in our knowledge of, and approach to tackling, malaria;
- support of genomic science at the Wellcome Trust Sanger Institute that is helping to enhance our understanding of the basic biology of malaria;
- support of both researchers and research infrastructure in malaria endemic regions – particularly through the Major Overseas Programmes – which have helped to deliver important clinical investigation studies and tangible impacts on the human malaria disease burden;
- through involvement and support for multi-agency, cross-sector partnerships and collaborations.

The Review set out a number of current challenges and priorities for the future of human malaria research:

- to ensure continued support for research into basic immune and biological mechanisms, and clinical investigation;
- to support malaria prevention and control through the delivery of anti-malarial drugs, quality assured diagnostic testing and novel vector control tools;
- to continue to build research capacity and research resources in priority areas, supporting the development of malaria incidence and mortality surveillance tools and open databases for malaria research;
- to collaborate with appropriate strategic partners to maximise the effectiveness of research funds and the impact of research findings on malaria.

<http://www.wellcome.ac.uk/About-us/Publications/Reports/Global-health/WTVM054950.htm>

Source: SPPU; 2012

Figure 6.7 – Wellcome Trust staff key positions on external Committees/Boards	
Staff member	External Committee and role
Directorate	
Sir Mark Walport	<ul style="list-style-type: none"> • Council for Science and Technology – Member • India UK-CEO Forum – Member • UK-India Round Table – Member • Office for Strategic Co-ordination of Health Research – Non-Executive Board Member • UK India Business Council - Non-Executive Board Member
David Lynn	<ul style="list-style-type: none"> • BBC's independent Appeals Advisory Committee – Member • Governing Body and Executive Committee of the Public Health Foundation of India Board – Member • UK Association of Medical Charities Executive Council – Member • European Foundation Centre's Research Forum - Member
Liz Allen	<ul style="list-style-type: none"> • Open Researcher and Contributor ID (ORCID) Board - Member
Science Funding	
Candy Hassall	<ul style="list-style-type: none"> • BBSRC Industrial CASE Scheme Review Panel 2012 – Chair • Interview and Management Panel for CW Maplethorpe Postdoctoral Fellowships for Pharmaceutical Education and Research – Chair • EMBL Interdisciplinary Postdocs (EIPOD) selection committee 2011 and 2012 - External expert • Research Concordat Strategy Group and its Executive Group - Member • Vitae's Research Staff Development Advisory Group (ReSDAG) - Member
Danny Altmann	<ul style="list-style-type: none"> • UK Biobank Board – Director • UK Biocentre Board - Member
Jimmy Whitworth	<ul style="list-style-type: none"> • Board of Trustees of India Alliance – Trustee • South East Asia Infectious Diseases Research Network – Member of Governing Committee
John Williams	<ul style="list-style-type: none"> • The National Student Association of Medical Research – Honorary Vice President • Academic Medicine Committee – Member • Department of Health Dementia Research Champion Group – Member • INSPIRE shortlisting Committee (Academy of Medical Sciences) – Member • State of Psychiatric Health Care Services Inquiry Panel (Mental Health Foundation) – Member
Kevin Moses	<ul style="list-style-type: none"> • Genome Research Limited Board – Director • BioRad Labs Inc. Science and Technology Advisory Board - Member
Michael Dunn	<ul style="list-style-type: none"> • Serious Adverse Events Consortium Board – Director • National Cancer Research Institute (NCRI) Board – Member • Structural Genetics Consortium Board – Director • Wellcome Trust and Cancer Research UK Gurdon Institute Management Committee – Member • Stem Cell Funders Forum – Member
Technology Transfer	
Ted Bianco	<ul style="list-style-type: none"> • Board of MSD Wellcome Trust Hilleman Laboratories – Member • Observer to the Board of the Innovative Vector Control Consortium, Liverpool School of Tropical Medicine - Observer
Richard Seabrook	<ul style="list-style-type: none"> • EPSRC Strategic Advisory Network - Member • Multiple Sclerosis Society IP Advisory Group - Member • Wellcome Trust Sanger Institute Translation Committee - Member
Daniel Nelki	<ul style="list-style-type: none"> • Stevenage BioScience Catalyst Board - Observer • Hilleman Board - Observer • HIV Medicines Alliance Steering Group - Member

Tim Knott	<ul style="list-style-type: none"> • Royal Academy of Engineering's Biomedical Engineering Panel - Member • Wellcome Trust Sanger Institute Translation Committee - Member
Ann Mills-Duggan	<ul style="list-style-type: none"> • HealthTech Steering Board – Member • Medicines Knowledge Transfer Network – Member
Medical Humanities & Engagement	
Clare Matterson	<ul style="list-style-type: none"> • Science Gallery International – Director • Science Museum Advisory Board – Member • ENTHUSE Charitable Trust - Trustee • Queens Award for Excellence – Judge • Science in Culture Advisory Board, Arts and Humanities Research Board - Member
Simon Chaplin	<ul style="list-style-type: none"> • ACE Designation Panel - Member • JISC Strategic Content Alliance Board – Member
Robert Kiley	<ul style="list-style-type: none"> • EMBO Publications Advisory Board - Member • UKPMC Project Board - Member
Hilary Leever	<ul style="list-style-type: none"> • Camden Partnership for Educational Excellence

Source: Directorate, SF, TT, MH&E; 2012

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.

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