Outputs, outcomes and impact of MRC research

2014/15 report

SECTION 1.0
Introduction
Section 1: Introduction

Overview

The MRC has been funding and conducting ground-breaking medical research for more than 100 years. From producing the first antibiotic and developing the first monoclonal antibodies to demonstrating the link between smoking and lung cancer, MRC-supported researchers have been at the forefront of medical advances that have had a profound impact on society.

In more recent years the MRC has done much to highlight the compelling evidence that investment in medical research leads not only to significant improvements in health but also economic prosperity. The MRC's evaluation programme is set out in more detail in the MRC's strategic plan for 2014-19 Research Changes Lives.

For the MRC to better understand how research leads to impact, it must be able to capture and track the progress, productivity and quality of the research it funds. It does this predominantly through researchfish®, the online system used by researchers to feed back on the impact of their work (see the below section on researchfish® for more information on our data collection system and uses of the data). This approach is designed to encourage researchers to provide feedback on a wide range of different outputs, recognising that research delivers a diverse set of useful outcomes for society.

The 2014/15 Outputs, outcomes and impact report showcases some of the latest developments and academic, societal and economic gains arising from MRC-funded research, as reported in researchfish®. Details of outputs from almost 6,000 MRC awards are drawn upon for this report. The majority of the MRC researchfish® dataset, along with information from the other research councils, is openly available for anyone to read and re-use via the Research Councils UK (RCUK) Gateway to Research. The Gateway to Research aims to make available information about what the councils are funding and the outputs that have arisen from this work.

The results clearly demonstrate that MRC-supported research teams are making international impact; their work is delivering significant new health gains, and stimulating economic growth and changes to absorptive capacity across all sectors.

Journal articles remain the primary output reported by MRC-funded researchers, with publications resulting, either wholly or in part, from MRC funding in 85 per cent of awards. 29 per cent of MRC awards reported at least one publication within a year and 90 per cent reported at least one publication within five years. The impact of MRC research papers has consistently been shown to be twice that of the world average.

Almost half of our respondents (48 per cent) reported that their work had been supported by collaborations between 2006 and 2014. The nature of these collaborations varies greatly. They might take the form of industry interactions to begin research translation, such as Professor Derek Mann’s (University of Newcastle) work with GlaxoSmithKline (GSK) to develop drugs that can stop or even reverse liver fibrosis. Or they might be the coming together of many diverse organisations to drive innovation, such as the Clinical Trials Transformation Initiative (CTTI). This multi-stakeholder group, comprising more than 60 organisations, was established to increase the quality and efficiency of clinical trials.
Recipients of just less than half of our awards (47 per cent) reported that their research had attracted further funding, taking the total awarded to MRC-supported research groups to £4.2bn between 2006 and 2014, from more than 1,000 different funders. £286m (seven per cent) of this was from the private sector; including £135k from AmpliPhi Biosciences Corporation to Professor Martha Clokie (University of Leicester) to further develop bacteriophages — viruses that ‘eat’ bacteria — as a treatment for Clostridium difficile.

There were reports of more than 10,000 staff moving from MRC support between 2006 and 2014; the majority were researchers, post-doctoral researchers and research fellows, leaving to pursue roles in a natural career progression. More than half of MRC supported students (55 per cent) progressed to a postdoctoral research position and overall 60 per cent of staff remained in an academic organisation.

Researchers reported taking part in more than 35,000 engagement activities between 2006 and 2014. These included research that received substantial media coverage, such as that conducted by PhD student Camilla Nykjaer who demonstrated a link between light drinking by pregnant women and pre-term birth. 2014 was the first year that the MRC invited PhD students to complete their own researchfish® return and 85 per cent of MRC students provided feedback. Other activities reported in the engagement activities section included television appearances, festivals and open days, specifically to entertain, inform and educate the public about medical research. Dr Sam Wass (Cognition and Brain Sciences Unit) held an expert role on Channel 4’s documentary The secret life of four-year-olds and Dr Alan Gow (Heriot-Watt University and University of Edinburgh) took part in the Edinburgh Fringe Festival with a show called Brain training on trial, as part of the Cabaret of dangerous ideas.

MRC researchers reported that their work had had an influence on local, national or international policy in almost a quarter of awards, totalling more than 5,000 influences. These included citations in clinical guidelines, such as Professor Rustam Al-Shahi Salman’s (University of Edinburgh) work on the American Heart Association guidelines for arteriovenous malformations of the brain.

Researchers also reported influences on policy-setting processes, such as Professor Cornelis Kros at the University of Sussex who was an expert witness at the 2014 Commission on Hearing Loss.

Recipients of almost a third of awards (28 per cent) reported that their work had resulted in the generation of research materials for others to use, from cell lines and transgenic animal models to databases and new techniques. These include a mathematical model to assess under which circumstances anti-virulent drugs would be useful in treating bacterial infections, a new method to analyse genome-wide DNA damage and repair and a cell line to help investigate how an immune system process is regulated.

There are 1,213 reports of intellectual property in the @researchfish database, including a way to prevent Campylobacter bacteria from colonising poultry and hydrogels — an economic method of storing and transporting stem cells.

Researchers reported that their work had led to the development of more than 1,200 medical products or interventions, 35 software or technical products and 112 artistic and creative products. The medical products ranged from genetic testing for rare diseases to a successful trial of a hepatitis C vaccine. Technical products included the first UK virtual clinical care pathway allowing patients to self-manage chlamydia infection, whilst creative products included a poem on the PROUD HIV trial.
The MRC has evidence of MRC-supported research leading to the creation or growth of more than 100 companies. Recent additions include ProAxsis Ltd, a company developing tests that will enable patients to monitor respiratory diseases at home and PH Therapeutics, a company aiming to develop antibody therapies for pulmonary arterial hypertension, a collection of rare conditions characterised by high blood pressure in the arteries that supply blood to the lungs.

Recipients of 52 per cent of awards reported that their work had resulted in an award or personal recognition for either themselves or a member of their research group worthy of reporting. This might include an invitation to speak at a conference, being appointed to the editorial board of a journal or being awarded a research prize. Those awarded research prizes include Professor Malcolm Jackson, director of the MRC-Arthritis Research UK Centre for Integrated Research into Musculoskeletal Ageing (CIMA) who was awarded the Lord Cohen Medal by the British Society for Research on Ageing. Professor Hannah Gould at King’s College London who was awarded the 2014 Paul Ehrlich Award by the European Academy of Allergy and Clinical Immunology (EAACI) for ‘Improving Experimental Research’ and Professor Anna Gloyn at the University of Oxford who was awarded the 2014 Minkowski Prize by the European Association for the Study of Diabetes.

Further examples of these outputs can be found throughout the pages of the report, as well as the associated impact where reported. A full list of the case studies contained in the report is in the index.
researchfish®

researchfish® is an online system, supported by Researchfish Ltd and used to collect information on the outputs, outcomes and impact of MRC-funded research. MRC-funded researchers are asked to record these data all year-round and, once a year, to formally submit this information to the MRC (usually between February and March).

Formerly MRC e-Val, the approach was licensed to Researchfish Ltd in 2012, which created a federated version of the system to allow it to be used by multiple funders to collect comparable research outputs. There are currently more than 100 research organisations and funders using researchfish®. 2014 was the first year that all seven research councils used the system. A harmonised approach to collecting output information suitable for all research disciplines will enable funders to obtain a common qualitative and quantitative view of the progress, productivity, quality and impact of the research they individually and collectively support. In 2015 the MRC also played an instrumental role in starting to align researchfish® with university and other researcher systems. In 2015, researchfish® was integrated with ORCID, a central registry of unique identifiers for individual researchers, meaning that information can be exchanged between the two systems and potentially between a wider range of research information systems.

The data collected — both qualitative and quantitative — is invaluable to the MRC and is used in a multitude of ways, from contributing to the evidence submitted to the Government to make the continued case for sustained investment in medical research, assessing progress against the MRC’s Strategic Plan, *Research changes lives 2014-2019*, and importantly, making the data available to universities for re-use.

As noted above, the data collected through researchfish® are published on the RCUK Gateway to Research. The MRC expects that the public availability of this data will help continue to encourage accurate and complete reporting within researchfish®. Further information on the research featured in this report can be found in the Gateway to Research by using the search function to enter the project reference number listed underneath each case study.

For more information on the history of Researchfish and its principles of use, please see: [http://www.mrc.ac.uk/funding/guidance-for-mrc-award-holders/researchfish/](http://www.mrc.ac.uk/funding/guidance-for-mrc-award-holders/researchfish/)

2014 data collection

The November-December 2014 Data Gathering Period (DGP7) for researchfish® had a compliance rate of 94 per cent with 5,086 responses out of an expected 5,416.

Notes on the quantitative data

Percentages in this report are rounded up or down to the nearest whole number and so some may appear as zero if this represents less than half of one per cent and not all tables may sum to 100 per cent because of rounding.

Where instance of further funding are reported in currencies other than Pounds Sterling, the values are converted using an average exchange rate for each calendar year as reported on [http://www.oanda.com/currency/historical-rates/](http://www.oanda.com/currency/historical-rates/).
One particular output, for example a publication or a collaboration, might have arisen from more than one award. In this report a particular output is always reported against each individual award where the unit of analysis is at the award level (for example the number of instances or distribution of activity). Duplicate outputs are removed, where possible, in analyses at the level of the type of output generated (for example publications per year, top five locations for collaborations). Duplicate outputs are removed using system-generated codes to indicate when a researcher has attributed an output to more than one award. This cannot identify duplicate outputs where researchers have entered similar information independently of one another. Supplemental information is used to identify duplicate outputs where available, for example PubMed IDs or Digital Object Identifiers (DOIs) can be used to generate unique sets of records for publications. In the case of further funding reports, the details of duration, amount of money and funding organisation are used.

In addition to de-duplication, outputs were also removed from analysis if the researcher indicated that they occurred before the start of the funding for their award. We have used the term valid and invalid in relation to these outputs. A valid output is one that was realised during or after the award to which it has been attributed. An invalid output is one realised before the start of the award to which it has been attributed. In most cases researchers are asked to indicate the year only for their outputs and not specify a month. This means that a one year difference in year could be almost two years in actuality (for example, January 2012 – December 2013). For removal from analysis a particular output would have to be in at least the year before the funding started.

Report by Ellen Charman with quantitative data and analysis provided by Craig Haskins, David Morgan and Jim Carter, MRC Evaluation Team.
End Notes

1. http://www.mrc.ac.uk/successes/
3. http://www.mrc.ac.uk/research/strategy/
4. www.researchfish.com
5. http://gtr.rcuk.ac.uk/
6. For example see Figure 2, page 18 of MRC’s 2014/15 Economic Impact report http://www.mrc.ac.uk/publications/browse/mrc-economic-impact-report-2014-15/
7. Page 18 of Industry interactions and other collaborations chapter.
8. Page 23 of Industry interactions and other collaborations chapter
9. Pages 7-9 of Industry interactions and other collaborations chapter
10. Page 17 of Policy and engagement chapter
11. Page 13 of Policy and engagement chapter
12. Page 11 of Policy and engagement chapter
13. Page 7 of Policy and engagement chapter
14. Pages 19-20 of Policy and engagement chapter
15. Page 7 of Research materials chapter
16. Page 20 of Research materials chapter
17. Page 9 of Research materials chapter
18. Pages 17-18 of Development of products and intellectual property chapter
19. Pages 21-25 of Development of products and intellectual property chapter
20. Page 5 of Development of products and intellectual property chapter
21. Pages 13-14 of Development of products and intellectual property chapter
22. Pages 14-15 of Development of products and intellectual property chapter
23. Page 15 of Development of products and intellectual property chapter
24. Pages 2-3 of Industry interactions and other collaborations chapter
25. Page 21 of Industry interactions and other collaborations chapter
26. Pages 7-8 of Awards and recognition chapter
27. As at March 2016. An up-to-date list of organisations using researchfish® is at: https://www.researchfish.com/ourmembers
28. For details of RCUK policy on the collection of output information, background to the implementation of the researchfish® system and use of the data see http://www.rcuk.ac.uk/research/researchoutcomes/
29. http://orcid.org/
31. A list of the outputs that have drawn on researchfish® data can be found at http://www.rcuk.ac.uk/documents/documents/useresearchfishdata
tapublications2009-2015-pdf/
32. http://gtr.rcuk.ac.uk/