MRC Delivery Plan
2015/16
MRI uses a magnetic field to non-invasively image the human body in great detail. The technique was developed by Peter Mansfield in 1973 while funded by the MRC. MRI is able to reveal internal detail of the brain and is not only used in clinical practice to discover tumours, infection and chronic diseases (such as dementia) but is also now increasingly used in acute settings to look for bleeds and stroke. In 2009/10 two million MRI examinations were performed by the NHS. In June 2014 the MRC launched the UK Dementias Research Platform (UKDP) (<http://www.mrc.ac.uk/research/facilities/dementias-research-platform>), a £16 million public-private partnership set up to speed up research into dementias. The collaboration aims to enable earlier detection, improved treatment and, ultimately, prevention of the disease, by looking not just at what is going wrong in the brain, but at the brain in the context of the whole body.
1.0. Introduction

In 2015/16, the MRC will continue to support excellent discovery science and strengthen partnerships where there is the greatest potential to deliver improved health and economic impact. This vision is set out in the MRC’s strategic plan for 2014-19 ‘Research Changes Lives’.

<table>
<thead>
<tr>
<th>Strategic Aim One</th>
<th>Priority Theme 1</th>
<th>Resilience, repair and replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Priority Theme 2</td>
<td>Living a long and healthy life</td>
</tr>
<tr>
<td>Strategic Aim Two</td>
<td>Research to people</td>
<td>Bringing the benefits of excellent research to all sections of society</td>
</tr>
<tr>
<td>Strategic Aim Three</td>
<td>Going global</td>
<td>Accelerating progress in international health research</td>
</tr>
<tr>
<td>Strategic Aim Four</td>
<td>Supporting scientists</td>
<td>Sustaining a robust and flourishing environment for world-class medical research</td>
</tr>
</tbody>
</table>

The MRC Strategic Plan sets out our key aims and objectives through to 2019. This delivery plan highlights the main activities planned for 2015/16, and follows on from the 2011/12 - 2014/15 MRC delivery plan and updates to this.

2.0. Research and Training Priorities

In 2015/16 the MRC will continue to support excellent discovery science across the spectrum of biomedical research and training, and strengthen partnerships to accelerate the pace of improvements in health and wealth. This primarily will be in response to high quality applications for funding that address any area of the MRC’s mission. In addition the MRC will seek to strategically support work in a number of specific areas:

- **Health and Biomedical informatics**; by 2015 MRC will be consolidating links between molecular, cellular, clinical and population level data; building links with industry; and strengthening training opportunities. This work is highly inter-disciplinary, it provides opportunities for mathematicians, computer scientists and statisticians to apply their skills to biological problems and is a cornerstone of the information economy. Investments in large-scale projects such as UK Biobank^4, and the Genomics England project to sequence 100,000 genomes ^5 will deliver an unprecedented volume of new data and MRC will ensure that this can be rapidly leveraged for patient benefit, as it completes a planned £90M commitment to this area.
Expected outcomes
- significant increase in basic and clinical discovery capability through; improved informatics and computational biology capacity and expertise, greater engagement of industry in pre-clinical and early clinical research stages, and strengthened interdisciplinary links
- greater understanding of environmental and genetic determinants of disease, leading to novel approaches for prevention and therapy
- increased national capability in quantitative skills in population data interrogation and analysis

- **Dementia:** MRC will build on a portfolio of high quality research, having doubled investment in this area to over £30M by 2015, to deliver greater understanding of neurodegenerative diseases and design new interventions that may prevent the later devastating impact of dementia.

**The MRC UK Dementias Research Platform (UKDP)**

The UKDP was launched in 2013 and is a new approach to public-private partnership aimed at accelerating progress in this important area. The first phase of the UKDP brought together 22 existing well-characterised cohorts within the UK, encompassing nearly 2M participants, to create a single, easily accessible resource for dementia research. The second phase of the UKDP established a programme of experimental studies focussing on the early detection and treatment of dementias. Substantial input from industry was secured by setting up a consortium of Pharmaceutical companies and SMEs to collaborate with the UKDP.

Expected outcomes
- greater understanding of environmental and genetic factors that influence development of neurodegenerative disease, leading to novel approaches for prevention and therapy

- **Antimicrobial resistance:** The UK antimicrobial resistance strategy highlights that infections are increasingly arising that cannot be treated, and the development pipeline for new antimicrobial approaches is at an all-time low. The MRC is leading a three-year, cross-funder initiative to support new research in this important area, with up to £15M of MRC support (from 2014/15 – 2016/17). The work will involve the integration of novel chemistry with biology and extensive collaboration across research councils, industry and other UK and international funders to address this important interdisciplinary research challenge.
**Expected outcomes**

- an increase in high quality research effort, investment and training opportunities, directed toward addressing antimicrobial resistance
- an increase in innovative multi-disciplinary, UK and international collaborations in this area
- identification of new antimicrobial strategies, targets and therapies with the potential to enter early stage trials/application

**Experimental Medicine:** Experimental medicine is a key strategic area for the MRC, and forms an essential link between advances in basic science and clinical benefit. Funding in this area permits the bidirectional flow of mechanistic understanding between ‘basic’ science and clinical observations. The MRC has built up experimental medicine research in the UK with targeted initiatives since 2008, to foster more ambitious human studies in academia, and to increase academic-industry partnerships, closely co-ordinated with other medical research funders. In particular work in this area builds on NIHR investment in clinical research infrastructure. The MRC will run a third round of funding for MRC Experimental Challenge Grants in 2015/16 with a total of up to £60M committed since 2012/13.

**Expected outcomes**

- Increased portfolio of ambitious, challenge-led experimental medicine programmes with industry involvement

**Stratified medicine:** Stratified medicine is defined in the Academy of Medical Sciences 2013 report on ‘Realising the potential of stratified medicine’ as: ‘the grouping of patients based on risk of disease or response to therapy by using diagnostic tests or techniques.’

### Building UK research capacity in stratified medicine

UK funding agencies have highlighted the importance of stratification and a collective investment of over £200M to support stratified medicine approaches has been identified. The main challenges to progress were discussed in an OSCHR-led review of the area in 2013. The MRC has committed more than £60m to this area since 2011/12.

In 2015/16 the MRC will continue to encourage ambitious consortia bids from industry and academia to promote discovery and development of new molecular and cellular pathology tests and techniques essential to introducing precision medicine approaches. In 2015 MRC will begin close working with the new TSB funded Diagnostics for Precision Medicine Catapult to strengthen pull from industry, and continue work with the NIHR Diagnostic Evidence Co-operatives (DECs), funded in 2013, to improve clinical pull. The work will build on the MRC/OSCHR vision for molecular pathology which is to:

- establish joint research/clinical service hubs, aligned with industry to complement NIHR, TSB and other Research Council investments
- address the gaps in the UK’s regulatory, evaluation, adoption and delivery system
- produce clear and unified guidance setting out the critical path and required evidence for the discovery, development, approval and evaluation of tests
- address the skills gap by training the next generation of research leaders in molecular pathology, further developing the UK capacity statistics, bioinformatics and health-economics, and including molecular pathology in the under-graduate medical curriculum
Expected outcomes

- better models and markers of disease to accelerate therapeutic discovery, better patient cohorts and improved capability in medical bioinformatics, linking rich biomedical data to clinical/population data sets
- increased innovation in molecular and genetic pathology and adaptive clinical trial designs with more biological subgroup analyses.

- Regenerative medicine: MRC will continue to support UK stem cell research centres of excellence, an area where the UK currently has a competitive lead, despite other countries investing heavily.

The MRC funds 50% of all UK publicly supported work in this area, and this work is delivering the translation of discoveries into potential new treatments. In 2012/13 the MRC reported a portfolio of six early phase clinical trials of adult stem cell therapies, the world’s first clinical grade human embryonic stem cell line deposited in the UK Stem Cell Bank, and advances that demonstrated approaches to repair the retina may soon become a reality. If the UK is to realise the significant health and economic benefits of investments including the cell therapy catapult centre and the cross-research council regenerative medicine platform, then close co-ordination between funding agencies will need to continue.

The UK Regenerative medicine platform (UKRMP)
The UKRMP is a cross funder initiative announced in 2013. The first phase of support for the UKRMP included a total £13M commitment from MRC, BBSRC and EPSRC, plus a £7.5M investment from the British Heart Foundation. The second phase included £4.5M from the MRC, BBSRC, and EPSRC to establish a hub for pluripotent stem cell research involving Sheffield, Loughborough and Cambridge Universities. In addition £20M capital funding from the MRC has provided state-of-the-art facilities and equipment to support the work of the UKRMP and the wider regenerative medicine research community.

In 2015/16 the MRC will actively monitor the five hubs in the UKRMP against their delivery plans. The hubs will be encouraged to engage the wider UK regenerative medicine research community and secure further partnerships with medical research charities, the TSB Cell Therapy Catapult and international partners.

The MRC will ensure that the UK strategic investments in cell line derivation and supply are co-ordinated (e.g. connecting research programmes such as the MRC/Wellcome Trust funded Human Induced Pluripotent Stem Cells Initiative, and UK-led StemBanCC and EBiSC projects), and that the UK Stem Cell Bank continues to deliver new clinical grade hESC lines to support clinical studies.

MRC will also engage with national policymakers in this area, for example working with the Department of Health and the Cell Therapy Catapult on efficient and safe regulation, and with the Government’s new regenerative medicine expert group on clinical delivery and adoption.

There are excellent interdisciplinary research opportunities in this area and the MRC will work closely with EPSRC and others to encourage engineers and chemists to join with medical researchers to address challenges in regenerative medicine.

Expected outcomes

- A national network of centres that deliver high quality regenerative medicine outcomes
- Strong co-ordination of investments in this area across all funding partners
- Continuation of supportive UK policy and regulatory frameworks
• **Translational research:** MRC will continue to invest in work to accelerate translation. The confidence in concept funding scheme will continue alongside support for the biomedical catalyst, but MRC will also introduce more flexible funding and efficient brokering of industry partnerships in the area of ‘proximity to discovery’.

We will follow on from the recently announced AstraZeneca/MRC UK Centre for Lead Discovery, and develop a coherent network of shareable high quality translational capabilities at the interface between academic research groups, SMEs and large industry.

**MRC Laboratory of Molecular Biology/AstraZeneca joint research fund**

In May 2014 AstraZeneca and the MRC Laboratory of Molecular Biology (MRC LMB) announced the launch of a joint fund for collaborative research. AstraZeneca pledged up to £6m and the MRC committed up to £3m for high quality projects that are likely to involve scientists from the two organisations working side by side, either within the MRC LMB at the Cambridge Biomedical Campus, or in AstraZeneca and MedImmune research facilities. Decisions on which projects will receive support from the fund will be made jointly by MRC LMB and AstraZeneca. The initiative is an example of open innovation and the importance of proximity to discovery.

**Expected outcomes**

- Enhanced engagement of new, inward investing companies with the science base
- Securing high value assets, expertise and facilities from industry for the benefit of the UK science base and UK economic growth

• **Training:** The MRC is about the people we nurture and support to become tomorrow’s leaders in discovery science. We will continue to prioritise investment in skills to develop and foster a highly skilled cadre of researchers able to respond to new research challenges and who are comfortable working alongside researchers from other disciplines. We will achieve this through:

  - Working with partners to articulate a revised career framework for non-clinical scientists, including those pursuing non-traditional routes.
  - Reviewing strategic skills for medical research in partnership with industry, including consideration of evolving areas of strategic importance where interdisciplinary approaches are paramount, for example experimental medicine and medical bioinformatics.
  - Promoting the diversity of our research base and ensuring enhanced career support and mentorship for researchers at all stages of their career.
  - Streamlining support mechanisms to ensure maximum flexibility and minimum administrative burden.

**Flexible MRC funding for doctoral training**

In March 2014 all MRC Doctoral Training Partnership (DTP) funds were provided with a supplement to support outstanding training opportunities for MRC students. These funds may be used, for example, to support placements with, or to provide training in industry, or at the interface with other disciplines.

**Expected outcomes**

- Alignment of investment to national skills needs enhancing the UK’s position as an internationally competitive research base which can respond to future challenges in human health
- Greater diversity in the research base with increased clarity on options and support available for researchers
2.1. National capability

The MRC will continue to work with Universities, research councils, funding councils and charities to identify and respond to gaps and opportunities (particularly as outlined in the RCUK “investing for growth” report\textsuperscript{xv}), achieve a step change in industry engagement through flexible approaches to joint working, and use regional and national approaches to increase the reach, sustainability, and impact of investment.

The UK Clinical Research Initiative

In 2013 the MRC announced the Clinical Research Infrastructure Initiative, following a £150M capital contribution from the Department of Health\textsuperscript{xvi}. The initiative will enhance translational capability, partnerships with industry and existing strategic clinical research infrastructures. Partnerships with the public, charity and private sectors will add value to all aspects of this work.

Working with HEIs, we will continue to support the rapid progression of key areas of discovery science – as well as continuing to explore opportunities for new world-class Units and Centres, we will reintroduce support for early development of highly promising areas in partnership with Universities, with responsive, flexible funding.

The Francis Crick Institute

The Francis Crick Institute is a flagship example of the UK investing in national infrastructure. The institute will open in 2015 providing a world-leading critical mass of researchers with excellent links in the academic and private sectors spanning fundamental and clinical research. Six organisations have come together to establish the new institute; the MRC, Cancer Research UK, the Wellcome Trust, University College London, Imperial College London and Kings College London. In total funders have provided £650M to build and equip the institute. When it is fully operational it will employ 1500 staff (1250 scientists) and have an operating budget of about £100M a year.

Expected outcomes

- Establishment of world-leading infrastructure for medical research which attracts and retains scientific talent in the UK
- Evolution of capital investments in clinical research infrastructure into effective and well-connected open resources
- Identify the next generation of capability needs for clinical and population research, many of which may be about technology development rather than major capital
- Keep the UK at the leading edge in adoption of new animal technologies for more productive and refined research, including molecular and cellular imaging, physiological and behavioural sensing, and more precise genetic technologies

- Population studies.

Building on the recommendations of the MRC Strategic Review of Population Cohort Studies in the UK published in 2014, the MRC will ensure that all large MRC cohorts are readily discoverable, share and link data in a secure environment that safeguards participant confidentiality. In addition the MRC on behalf of the UKCRC partners will lead on developing a facility to improve discoverability, access and quality of tissue collections.
In 2014-2015 the MRC will coordinate an evaluation of the National Prevention Research Initiative (NPRI). Since 2004 this £33m joint investment by 16 Government and charity funders has supported research into prevention of chronic conditions through influencing health behaviours. The evaluation will inform future funding in prevention and public health research in the UK. The NPRI complements a new MRC funding scheme to support the early phase development of public health interventions.

There is a risk that proposed EU data regulations, currently planned to come into force in 2016 at the earliest, may cause a change to these plans. However the MRC and other stakeholders are closely following this debate and developing mitigation plans.

**UK Biobank**

The UK Biobank is a major international health resource which has successfully recruited 500,000 people aged 40-69 from across the UK to take part. Participants have undergone measures, provided blood, urine and saliva samples for future analysis, detailed information about themselves and agreed to have their health followed. Repeat measures have already been conducted on 20,000 participants and records on deaths, hospitalisations and cancer have been linked to the dataset. Extensive work has been undertaken to enhance phenotypic data held and biological samples have been turned into high quality genotype and biomarker data on a large scale. This rich data is available to academic researchers worldwide for the study of a wide range of conditions.

In 2015/16 UK Biobank will complete an pilot imaging study of 8,000 participants, ahead of proposals to expand this to 100,000, and provide genotype data for all 500,000 people recruited. Work will also continue to highlight ways in which the resource can be used to investigate the relevance of a wide range of exposures to health.

**Expected outcomes**

- A greater understanding of environmental and genetic determinants of disease leading to novel approaches for prevention and therapeutic intervention
- Increased national capability in quantitative skills for using population data.

**2.2. MRC contribution to cross-research council activities**

MRC priorities include programmes with significant cross-council investment, for example see details on the UK regenerative medicine platform, the Farr Institute, National Prevention Research Initiative (NPRI), and work on antimicrobial resistance described above, the Lifelong health and wellbeing cross-council programme described below, plus initiatives such as the UK clinical research collaboration centres of public health excellence. All these programmes involve working in close partnership with other research councils. Interdisciplinary links are crucial to work in medical bioinformatics, and also to ensure new technologies are brought into clinical and pre-clinical research. MRC will work closely with EPSRC in the area of new medical technologies (following up on an independent review of the importance of engineering and physical sciences to the life sciences), and also closely co-ordinate work on food and nutrition with the BBSRC. Both are areas in which MRC expects to increase its investment in 2015/16.

- **Lifelong health and wellbeing (LLHW)**: Almost £50M has been jointly committed on inter-disciplinary research supported by five Research Councils and four UK health departments through the LLHW cross-council ageing programme. Areas of focus for LLHW in 2014-2015 include the second phase of the Extending Working Lives strategic priority, building on the partnerships established in the first phase with the public and private sector organisations and improving performance of hearing aid technologies, working across disciplines, with the NHS and industry.
• **National Centre for Replacement, Refinement and Reduction of animals in research (NC3Rs):** The MRC is committed to the replacement, refinement and reduction of animal use in scientific research. The MRC and BBSRC have both agreed to continue with additional funding, originally allocated for specific initiatives, integrating this into baseline funding for the centre from 2015/16. Both organisations will also be capturing better information on scientific outputs which advance the 3Rs.

• **ELIXIR:** The BBSRC, MRC, and NERC are partners in the European life science infrastructure for biological information (ELIXIR). ELIXIR was launched with £75M of UK Government funding in 2011, building on preparatory work funded by the European Commission. The initiative now has 10 European countries as partners, and the partners will be actively exploring how the output from this initiative can be maximised.

### 2.3. Global Health

MRC will continue to provide opportunities to maintain strong UK research capabilities in Global health through management of joint funding schemes with the Wellcome Trust, DFID and other partners. We will support the development of work plans and funding opportunities though the European and developing Countries Clinical trials partnerships and we will take forward plans to partner activities with funding agencies in India for the improvement of health in both our countries.

### 2.4. Other partnership working

The MRC has an excellent track record of co-ordination and partnership working in a field in which there are a large number of private, public and charitable stakeholders.

• **Industry:** The UK has strong complementary assets in medical research. We have shown that strategic investment in high quality discovery science (e.g. currently regenerative medicine, and in the past structural biology research (c.f. Heptares™) and kinase research (c.f. the Dundee Signal Transduction Therapy group™) is a powerful attractor for industry collaboration and investment. We have also highlighted that industry can be encouraged to share assets and facilities (e.g. compound sharing and screening libraries with Astra Zeneca) that have taken many £M to develop, with UK researchers. These in kind contributions have the potential to provide UK researchers with a significant competitive advantage. The MRC secured the first of these agreements, quite spectacularly ahead of the US NIH, showing that the UK can lead the world in promoting ‘open innovation’. The MRC will continue to work to extend and enhance these interactions using our investments in Stratified Medicine, regenerative medicine and other areas as a focus for joint working.

• **Technology Strategy Board:** MRC works closely with TSB to deliver the Biomedical Catalyst programme, an integrated scheme providing grant support to UK academics and SMEs developing innovative solutions to healthcare challenges both individually and in collaboration. As of January 2014, 186 projects, over 60% led by SMEs, have received grant funding totalling nearly £150M. This funding has been matched by nearly £80M of private finance and enabled companies to raise over £50M of further private investment. By 2015/16 the MRC will have concluded a joint review of the Biomedical Catalyst, and expanded its collaboration with the TSB to include areas such as closer working on EU-level innovation strategy.

• **Department of Health and Devolved Administration Health Departments:** The MRC has successfully co-ordinated its work with the Department of Health (primarily with NIHR, but also via DH agencies and bodies such as Public Health England), and the UK devolved administration Health Departments, under the auspices of OSCHR and the UKCRC, for the benefit of UK health research. This has led to better co-ordination of high quality programmatic research funding and clinical infrastructure across the UK. This close co-ordination will continue, particularly in new areas of mutual interest (such as antimicrobial resistance and dementia).
• **Medical Research Charities:** The MRC has numerous joint activities with the charity sector, which has invested at least £1bn a year for the last four years in health research in the UK. An excellent example of MRC catalysing closer co-ordination across the sector is the fact that the majority of AMRC member charities and all UK Health Departments have chosen to use the Researchfish approach to capture detailed information about research outputs. This opens up the opportunity for closer co-ordination and evaluation of funding across the health research sector. The MRC is to co-ordinate a new analysis of UK funding for health research for the UK Clinical Research Collaboration, to be published in 2015.

• **Other Government R&D:** Other partnerships include our concordat with the UK Department for International Development for global health research, where the MRC delivers more than £40m of research expenditure each year that is relevant to overseas development.

• **International:** We will work with RCUK and other delivery partners to implement a successful programme of work under the Newton Fund. We will continue to engage with the European Commission in the development of its 8th research and innovation Framework Programme, Horizon 2020, and to provide National Contact Support for UK researchers. We will maintain our commitment to supporting multilateral partnerships such as the European Molecular Biology Laboratory and the International Agency for Research on Cancer. Where new regulations or EU directives emerge we will work with our partners to ensure that they do not disrupt the efficiency of the UK research environment and that, where appropriate, they enhance it.

### 3.0. Economic Impact

#### 3.1. Scientific Excellence

The MRC supports the most promising strategic and response mode research, with the greatest potential for long-term advances. Successful co-ordination with other public and charitable funding agencies means that the MRC has a unique role in funding discovery science through to early clinical studies, and the training needed to deliver this. The excellence of MRC funded research is a key part of maintaining the UK life science sector as an engine for economic growth, and this is essential to realising the Government’s Life Science sector strategy.

An early output from research is the production of research publications. The publication output from MRC research is exceptional, achieving more than twice the world average citation impact overall. 62% of papers published in 2011 were openly accessible via Europe PubMed Central providing the greatest opportunity for knowledge transfer to the health sector and spill-over benefits to all other sectors. The MRC will clearly seek to maintain the quality of research supported, and improve the proportion of open access publications.

MRC research outputs are immediately relevant to several of the ‘great technologies’ identified by David Willetts as areas in which the UK has potential to excel. MRC strategic initiatives have helped build research capacity, drive excellence and cluster expertise and activity, specifically for ‘big data’, ‘synthetic biology’ and ‘regenerative medicine’. These developments help underpin the overarching life science strategy.

#### 3.2. Growth in the UK Economy

MRC’s research strategy is focused on ensuring that there is quicker realisation of health and economic impact from basic research investments and that the UK remains an attractive environment for R&D investment from the pharmaceutical and biotechnology sector.
Any reduction in the time taken to develop new treatments or savings in the escalating costs of healthcare will deliver substantial economic impact. Medical research helps to address the most profound market failures and pressing requirements for a productive economy. In the UK the health service represents by far the largest taxpayer commitment. Faster and more accurate diagnosis, treatments with fewer contraindications, and entirely new interventions for previously intractable conditions will make contributions to achieving efficiencies. The ageing population presents an even greater challenge with the costs to the UK economy of patients with cognitive impairment estimated to be already £23bn per year (1.5% of GDP).

Demographic projections show that this burden, barring any impact from medical innovations, will be three to four times greater by 2050.

High quality academic medical research is the main attractor for the global pharmaceutical industry heavily investing in the UK. The UK Life Sciences Strategy recognises that growth in the pharmaceutical and biotechnology sectors is crucial to the UK economy; the Gross Value Added (GVA) per employee in this sector is twice that of any other ‘medium’ to ‘high technology’ manufacturing sector, the ‘economic rent’ generated by medical research is higher than any other sector, investment in R&D from the pharmaceutical sector is the largest proportion of UK business expenditure on R&D (£4.9bn in 2011, 28% of gross value added), and employment and turnover is significant (70,000 staff and £30bn in 2011).

Public funding for health research in the UK in 2009/10 totalled approximately £2.4bn, and this leveraged £1.1bn charitable funding, £0.2bn funding from overseas and £30bn from the private sector. After quality of discovery science, key factors for industry investment in the life sciences sector are:

- Ability to access critical mass in centres of excellence and consortia.
- Access to state of the art/unique research facilities and clinical research resources.
- Ease of forming/evolving academic partnerships; efficiency and speed in delivery.
- Reliable strategic alignment at Funder and Government level.
- Access to specialist research talent in key areas – e.g. informatics, regenerative medicine, experimental medicine; pharmacology.

MRC research provides a steady stream of innovative, research assets with high health impact, and these can often be commercialised. MRC funded researchers have reported 800 patents published since 2006 and, 35% of those that have been published for at least a year have been licensed to others. Knowledge transfer from MRC funded research since 2006 has resulted in the establishment or growth of more than 100 companies. Of these 100 companies, 40 are actively developing new products having obtained finance to do so, and a further 30 are successfully selling products and growing. These companies represent at least 535 new skilled jobs in the UK. Funding of high quality medical research provides a good long-term return on investment. It has been estimated that the regenerative medicine market alone will impact on 1 million UK patients, generate £5bn income and create 15,000 jobs by 2020.

Improved evidence from health research will inform social and public health policy. For example the long-term MRC funded Whitehall study, led to international policy recommendations on the social determinants of health. This work has highlighted that health inequalities result in productivity losses of £31-33bn, reduced tax revenue and increased welfare costs of £20-32bn and higher treatment costs in excess of £5bn each year, as well as providing ways in which policymakers could address these inequalities.

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1 Gross Value Added. The Office of National Statistics compiles information on the income generated by businesses in the UK, less the cost of goods and services used to create this income. This amount represents the approximate Gross Value Added at basic prices (aGVA). Using figures for the number of employees in each manufacturing sector, a GVA per employee can be calculated.

2 Economic Rent. Even if the resources currently employed in medical research are re-used in another productive sector of the economy (in their best alternative use) then they at best would produce less GDP than in the medical sector. In other words, medical research generates what economists call the highest “economic rent”.

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MRC Delivery Plan 2015/16 10
Medical research that changes clinical practice has a direct impact on the quality of life, and therefore the productivity of, people in the UK. There are many examples of transformative research funded by the MRC (from vaccines, medical technologies such as CT and MRI scans, to monoclonal antibodies).

### 3.3. Leveraging inward investment

30% of MRC funded groups establish productive interactions with private sector organisations involving co-publication, co-funding, training, access to facilities, or exchange of materials and expertise. These productive collaborations involve more than 530 separate companies worldwide, and the extent to which MRC researchers publish with authors from the private sector is increasing steadily.

As noted above, medical research is a UK success story, particularly with respect to the inward investment leveraged from the private and third sectors. Annual UK expenditure on health research R&D is in the order of £8 billion, just over 50% of which is led by the private sector, and around £1.1 billion of which is contributed by charities.

MRC funded groups specifically obtain £140m additional funding each year from the not-for-profit sector and £100m additional funding each year from organisations outside of the UK.

### 4.0. Delivery Analysis

#### 4.1. Resource costing over main areas of activity 2014/15–2015/16 (£M)

<table>
<thead>
<tr>
<th></th>
<th>2014/15</th>
<th>2015/16</th>
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</thead>
<tbody>
<tr>
<td>Institutes and Units</td>
<td>157.9</td>
<td>115.9</td>
</tr>
<tr>
<td>University Units</td>
<td>73.5</td>
<td>73.6</td>
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<tr>
<td>Francis Crick Institute</td>
<td>-</td>
<td>42.0</td>
</tr>
<tr>
<td>Extramural programme</td>
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<td></td>
</tr>
<tr>
<td>Research Grants</td>
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<td>284.4</td>
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<tr>
<td>Fellowships</td>
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<tr>
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<td>21.3</td>
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<tr>
<td>International</td>
<td>18.5</td>
<td>18.5</td>
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<tr>
<td><strong>Gross DEL programme</strong></td>
<td><strong>609.9</strong></td>
<td><strong>603.2</strong></td>
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<tr>
<td>Funding</td>
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<tr>
<td>IP Income</td>
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<td>DEL programme</td>
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<tr>
<td><strong>Total Funding</strong></td>
<td><strong>606.9</strong></td>
<td><strong>603.2</strong></td>
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</tbody>
</table>
### 4.2. Capital projects and programmes 2014/15 – 2015/16 (£M)

<table>
<thead>
<tr>
<th>Capital programmes</th>
<th>2014/15</th>
<th>2015/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Business (replacement, renewal &amp; new initiatives)</td>
<td>28.8</td>
<td>20.5</td>
</tr>
<tr>
<td>Francis Crick Institute</td>
<td>48.7</td>
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<tr>
<td>Bioinformatics</td>
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<td>-</td>
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<td>Regenerative Medicine</td>
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<td>Infrastructure</td>
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<tr>
<td>Clinical Research</td>
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<tr>
<td>Infrastructure Initiative</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>125.6</strong></td>
<td><strong>186.0</strong></td>
</tr>
</tbody>
</table>

**Funding**

<table>
<thead>
<tr>
<th>Funding</th>
<th>2014/15</th>
<th>2015/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital DEL Baseline</td>
<td>31.0</td>
<td>36.0</td>
</tr>
<tr>
<td>Autumn Statement 2012</td>
<td>48.1</td>
<td>-</td>
</tr>
<tr>
<td>Department of Health</td>
<td>18.0</td>
<td>150.0</td>
</tr>
<tr>
<td>Land Sale</td>
<td>28.5</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>125.6</strong></td>
<td><strong>186.0</strong></td>
</tr>
</tbody>
</table>

### 4.3. MRC Commitment budget 2015/16

For financial year 2014/15 MRC has set a core science commitment budget of **£310M** for medium- to long-term scientific commitments. The MRC draft commitment budget for financial year 2015/16 is also for **£310M**.

### 4.4. Efficiency

Building on an active programme of work to improve efficiency MRC will continue to drive down the costs and overheads associated with research. The savings derived from this programme are being re-invested in research. This work includes:

- **University Unit Programme**: MRC has sought substantial added value for the benefit of front-line science by striking stronger partnerships with Universities. The MRC’s University Unit programme has transferred 14 MRC Units to University ownership with a total annual research expenditure of £65M. 970 high quality research staff have been transferred to University employment.

- **RCUK Research Efficiency Programme**: MRC will work with other research councils and UK SBS Ltd. to improve the efficiency with which public money is invested including building on successful initiatives across the academic sector to fully utilise and share equipment and also embedding improvements to peer review processes. Further details are available in the RCUK delivery plan.
• **Research outputs harmonisation;** The research councils have agreed a common approach to the capture of output information from research council funded projects. Output information is published via the RCUK ‘Gateway to Research’ project[^44], a website which makes information about grants across all seven research councils available for the first time in the same place.

### 4.5. Evaluation

MRC will continue to systematically capture structured information about the outputs and outcomes from MRC-funded research, build a high quality portfolio of studies that examine the link between research and economic impact, and use this learning to develop and monitor progress with strategy.

Evaluations that will be concluded in 2015/16 include a review of the National Prevention Research Initiative (NPRI) and work to develop and test metrics for MRC’s translational research programme.

**Expected outcomes**

- Comprehensive, structured feedback from researchers linked to MRC funded projects, in a format common across all research councils, UK health departments, many research charities and other UK funding organisations.

- Greater understanding of the factors that influence the productivity, quality and progress of medical research.
In December 2012 the Government announced £100m funding for ambitious work to sequence the genomes of 100,000 NHS patients with cancer and other conditions. The work is expected to deliver information with significant value for the further development of diagnostics and treatments.


The NIHR Office for Clinical Research Infrastructure (NOCR) provides an overview of Department of Health investments in this area, which total approximately £500M per year

http://www.nocri.nihr.ac.uk/media/12570/nocri_corporate_brochure_lr_-_final_revised_4_oct_2012.pdf

Taking Stock of Regenerative Medicine (BIS, 2011)


In May 2014 the MRC Laboratory of Molecular Biology and AstraZeneca announced a plan for a research fund to facilitate collaboration between LMB and AstraZeneca and MedImmune. The £9m, 5 year fund will support a range of pre-clinical research projects aimed at better understanding fundamental biology and disease.

http://www2.mrc-lmb.cam.ac.uk/lmb-and-astrazeneca-announce-plan-to-launch-joint-research-fund/

RCUK Strategic Framework for Capital Investment http://www.rcuk.ac.uk/Publications/policy/Pages/CapitalInvestment.aspx

European Commission’s proposal for a Data Protection Regulation (2012/0011(COD))

http://eur-lex.europa.eu/procedure/EN/201286

The UKCRC Centres of Public Health Excellence are funded as the result of a partnership between the MRC, ESRC, and three medical research charities and three UK health departments

http://www.ukcrc.org/research-coordination/joint-funding-initiatives/public-health-research/
The MRC spin-out Heptares Ltd. has developed a world-leading suite of techniques to design drugs for GPCRs, a class of proteins that is overwhelmingly the most attractive therapeutic target in the human body. Heptares has secured industry partnerships potentially worth £450m in the last three years, just recently reporting further achievement of key milestones in some of these programmes.


The DSTT is the largest industry-academic partnership in the UK, just recently renewed to 2016.

http://www.ppu.mrc.ac.uk/overview/DSTT.php

By June 2013 80 UK research organisations will be subscribing to Researchfish tracking in detail almost £3bn of annual expenditure on research.

The UK Government’s Strategy for the Life Science Sector


Commons Select Committee, first report of session 2010/11.
http://www.publications.parliament.uk/pa/cm201213/cmselect/cmhdev/651/65105.htm#a2


http://www.epsrc.ac.uk/SiteCollectionDocuments/Publications/reports/Remedi.pdf
The UCL Institute of Health Equity was launched in November 2011, to build on previous work to tackle inequalities in health led by Professor Sir Michael Marmot and his team, including the ‘Commission on Social Determinants of Health’ and ‘Fair Society Healthy Lives’ (The Marmot Review).
http://www.instituteofhealthequity.org/home

Following the invention of Magnetic Resonance Imaging by MRC funded researchers between 1974 and 1980, the resulting supply and service support for MRI scanners has grown to a $4.5bn pa global industry. This has been estimated to contribute £600m per year to the UK economy, even without factoring in the substantial benefits of this new imaging modality to health (see Economic impact case study MRI (Oxford Economics, 2012)
http://www.stfc.ac.uk/resources/pdf/oe_-_mri_final_case_study_21_1_2013.pdf)

Figures from an analysis of Researchfish data collected for MRC awards active between 2006 and 2012
http://www.mrc.ac.uk/news-events/publications/outputs-report-2012/

Efficiency 2011-15: Ensuring Excellence with Impact
http://www.rcuk.ac.uk/Publications/policy/Pages/Efficiency2011.aspx

The MRC is implementing improved performance management for referee selectors, smarter metrics for the peer review process, and better communications with reviewers.
http://gtr.rcuk.ac.uk/