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Health and Medical Research in the United Kingdom

Observatory on Health Research Systems

Sally Hargreaves

The research described in this report was prepared as part of RAND Europe’s Health Research System Observatory Documented Briefing series, funded by the English Department of Health.
The research described in this report was prepared as part of RAND Europe's Health Research System Observatory Documented Briefing series, funded by the English Department of Health.
This documented briefing provides an overview of health and medical research in the United Kingdom. The report is part of a series of country-specific reports available from RAND Europe’s Health Research Systems Observatory, funded by the English Department of Health.

The report is divided into three parts. In the first part, the Structure of the UK Health Research System, including funding sources, sectors performing health and medical research, and health research priority setting, is presented. The second part, Processes and Performance of the UK Health Research System, focuses on the types of funding available and how funding activities are conducted, and provides exemplars of the system’s performance. The third part presents an Outlook and considers current and emerging health research issues in the United Kingdom.

Whilst it is recognised that there are a number of charities dealing with Health Research in each of the constituent countries of the United Kingdom, the nature of some of the aggregated data means that necessarily this report focuses upon the UK as a whole. We recognise that this report does not consider in detail Health Research charities in Northern Ireland or Scotland.

The report is based on desk-based document review and will be updated on a regular basis. It does not attempt to discuss current policy options, or make recommendations for future strategy. The report will be of interest to government officials dealing with health and medical research policy, medical research councils, health and medical research charities, public and private institutions engaged in health research, and researchers.

The use of £ throughout this report stands for pound Sterling, unless stated otherwise.

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Summary

Summary: Key Points

- Key funder of health R&D in the United Kingdom is industry
- R&D is an important part of the UK economy
- UK R&D system benefits from links with the National Health Service, the largest health service delivery organisation in the world
- Government investment has been lower than in most EU countries
- Strong tradition of funding biomedical research
- Future challenges in emerging markets and workforce issues

The main funders of health research and development (R&D) in the United Kingdom are industry, government, and research charities. Industry contributes the overwhelming majority of funds to health research, and most of this work is undertaken commercially, resulting in the high profile of health R&D in the UK economy. Universities and the National Health Service (NHS) also play a part in the production of world-class research in the United Kingdom.

Government investment has historically been lower than in most other European countries. However, in 2004, the UK government published a ten-year plan for increased investment in health R&D, and a new health research strategy was launched in 2006. This strategy calls for the ring-fencing of funds for health R&D, and the facilitation of closer alignment with industry, which should help in the prioritisation and coordination of research.

Although the United Kingdom has a strong tradition of funding biomedical research, a government-commissioned review has called for a shift from basic research towards translational and applied research to make better use of the NHS, and to increase economic and health benefits for all UK citizens. This initiative has already involved the

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2 Basic research, also referred to as ‘fundamental’ or ‘blue skies’ research, asks questions about health and disease without any primary driver for practical application. Translational research refers to the process of
Medical Research Council in setting up university-based centres to work closely with industry to bring new innovations into the marketplace.

The United Kingdom now faces numerous challenges in terms of expanding its R&D programme and maintaining its high quality outputs. India and China are becoming more attractive than the United Kingdom as investment locations, so the UK government needs to find ways to attract and retain R&D companies. The current shortfall in suitably skilled scientists and technicians in the United Kingdom makes this issue all the more pertinent.

taking the findings from basic or clinical research and using them to produce innovation in healthcare settings. Applied research covers a wide range of research, primarily involving human volunteers. It is driven by the desire to answer a specific health-related question, need or desire to improve services or care (Cooksey, 2006).
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### Abbreviations and terms

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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>ABPI</td>
<td>Association of British Pharmaceutical Industry</td>
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<td>BBSRC</td>
<td>Biotechnology and Biological Sciences Research Council</td>
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<td>DALY</td>
<td>Disability-adjusted life year</td>
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<td>DfES</td>
<td>Department for Education and Skills</td>
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<td>DIUS</td>
<td>Department for Innovation, Universities and Skills</td>
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<td>DTI</td>
<td>Department of Trade and Industry</td>
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<td>EPSRC</td>
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<td>ESRC</td>
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<td>EU</td>
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<td>fEC</td>
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<td>GDP</td>
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<td>HEFRC</td>
<td>Higher Education Funding Council</td>
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<td>MRC</td>
<td>Medical Research Council</td>
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<td>NICE</td>
<td>National Institute of Health and Clinical Excellence</td>
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<td>NIHR</td>
<td>National Institute for Health Research</td>
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<td>NHS</td>
<td>National Health Service</td>
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<td>OSCHR</td>
<td>Office for Strategic Coordination of Health Research</td>
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<td>OSI</td>
<td>Office of Science and Innovation</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>RCUK</td>
<td>Research Councils UK</td>
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<td>UK</td>
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<td>UKCRC</td>
<td>UK Clinical Research Collaboration</td>
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Introduction

This documented briefing gives an overview of the health R&D system in the United Kingdom. The first section presents the structure of the UK health research system, which includes describing the key funders and detailing the funding mechanisms and funding flows within this system. An explanation of United Kingdom’s funding and research priorities is also provided. The second section focuses on processes and performance of UK health research system by concentrating on current government policy initiatives. The final section presents an outlook and considers future policy challenges.
Over £14 billion (1.09% of GDP\(^3\)) is spent each year on all UK R&D by a combination of public bodies, private enterprise, the non-profit sector, and international organisations. Approximately one-third of the United Kingdom’s total R&D budget is devoted to defence, with the remainder going to the civil government R&D budget (OECD, 2006). Available data from the 11 largest government and charity funders showed that, between 2004 and 2005, £950 million (0.04% of GDP) was spent specifically on health-related research in the United Kingdom (UKCRC, 2006).

Health R&D is an important part of the UK economy. The health R&D system benefits from the fact that the United Kingdom has a national health service that is the largest health-care delivery organisation in the world. The National Health Service (NHS) provides considerable opportunities for health research and has carried out world-class research since its inception in 1948.

UK investment in R&D, however, has historically been lower than most countries in Europe, with UK overall expenditure on R&D as a percentage of GDP just below the EU-15 average (OECD, 2006). Additionally, the United Kingdom is known to under perform in terms of capturing the benefits from the R&D it carries out (Cooksey, 2006). In a renewed attempt to address these shortfalls, in 2004 the UK government published a ten-

year investment plan (HM Treasury, DTI, DfES, 2004), which outlines its target of increasing UK R&D investment as a proportion of national income from 1.9 percent to 2.5 percent by 2014. Subsequently, in 2006, the UK government launched a new national health R&D strategy (Department of Health, 2006), which sets out how the Department of Health will invest in research and development with the NHS through the funding of relevant high-quality, patient-based research by 2010. The UK government has outlined three overarching and interlinked objectives to strengthen the UK health R&D base:

- **Health objectives**: to ensure research priorities are firmly grounded in the government’s wider health objectives, national and international, and that health research is rooted in, and a key priority for, the NHS.

- **Science objectives**: to ensure the continued delivery of world-class basic science. Funding is to be awarded on the basis of excellence across the full spectrum of health research, from basic to clinical and public health.

- **Economic objectives**: to ensure the delivery of high-quality translational health research to deliver real economic and health benefits from the United Kingdom’s excellent science base.
Funding for health R&D comes via the following sources: industry, research charities, and public funds through the government.

Industry, particularly the pharmaceutical industry, is a major player in UK health R&D, and is by far the largest funder of health R&D in the United Kingdom, accounting for 69 percent. Much of the R&D funded by industry is undertaken in commercial facilities, but much also involves the universities and the NHS.

The government is the second largest funder, accounting for 23 percent, mainly through the Department of Health and the research councils. The two main public funders of health R&D in the United Kingdom are the Medical Research Council and the Health Departments of England, Wales, Scotland and Northern Ireland. The MRC has traditionally focused attention on basic research, while the Health Departments have focused more on clinical and applied research. However, overall the majority of public funding for health research has been spent on basic research (Cooksey, 2006).

The medical research charities account for 9 percent. In particular, the Wellcome Trust, Cancer Research UK, and the British Heart Foundation, make a vital contribution to UK R&D. The Wellcome Trust is one of the largest charities in the world, and there are currently over 100 other research charities in the United Kingdom.
The government supports health and science R&D in the United Kingdom in three key ways. First, the Department for Innovation, Universities and Skills funds basic research allocated via research councils. The DIUS is responsible for UK Science Policy and its core mission is to deliver the Government’s long-term vision to make Britain one of the best places in the world for science, research and innovation. There are seven research councils in total, of which the Medical Research Council (MRC), Biotechnology and Biological Sciences Research Council (BBSRC), Engineering and Physical Sciences Research Council (EPSRC), and Economic and Social Research Council (ESRC) are research councils that fund health-relevant research in the United Kingdom, with the MRC being by far the biggest funder.

Second, Higher Education Funding Councils (HEFCs) provide research infrastructure funding for university-based research through the Department for Innovation, Universities and Skills (DIUS). There are four HEFCs in the United Kingdom: the HEFC for England, the HEFC for Wales, the Scottish Funding Council, and the Northern Ireland Executive: Department for Higher and Further Education, Training, and Employment.

Third, the Department of Health allocates R&D funds to the Health Departments of England, and to the devolved administrations of Wales, Scotland, and Northern Ireland. Each has their own administrative body in charge of allocation and administration of funds for the NHS. The NHS is a conglomerate of numerous Trusts (hospitals), each with different operating structures and funding is channelled through these NHS Trusts. Some R&D will be led by the Departments of Health and the NHS and some by their research partners in the research councils, Universities, the voluntary sector, and industry. In addition, the Department of Health supports the Policy Research Programme and various non-departmental public bodies. The Department of Health takes the lead in defining and
addressing UK R&D needs and contributes to the strategies and priorities of the MRC and other research councils. A Partnership Agreement between the MRC and the UK Health Departments, the two largest public funders of health R&D, aims to ensure strategic co-ordination of publicly-funded health R&D.

All health and biomedical research bodies are bound to the Department of Health’s Research Governance Framework, a set of national standards for health care with the aim of improving safeguards for research participants (Department of Health, 2005). The framework applies to all research that relates to the responsibilities of the Secretary of State for Health. It therefore includes clinical and non-clinical research undertaken by the Department of Health, non-departmental public bodies, and the NHS, as well as any research undertaken by industry, research charities, research councils, and universities working within the health and social care system.
The Science Budget, administered through DIUS contributes the largest part of public sector investment in civil research and these departments have a key role in achieving the UK government’s aims as set out in the ten-year investment plan (HM Treasury, DTI, DfES, 2004). The budget for 2007–2008 will rise to an all-time high of £3451 million (0.13% of GDP), of which the majority (around 80 percent; £2791 million) will be channelled through the research councils, and the remainder through HEFCs. The MRC will receive £546 million in 2007–2008.

The research councils and HEFCs fund Higher Education Institutions through a ‘dual support system’. Whereas research councils fund specific projects and programmes on a competitive basis, the HEFCs will allocate quality-related funding as a block grant to institutions, informed by the results of the research assessment exercise. The research assessment exercise is a series of exercises conducted nationally to assess the quality of UK research and to inform the selective distribution of public funds for research across all disciplines by the four UK higher education funding bodies.

Several independent funding streams were brought together in the NHS R&D budget in 1997. The Department of Health’s budget for health research for 2006–2007 is £753 million (0.03% of GDP). £50 million is allocated for capital funding and the rest is allocated to research through a portfolio of national research programmes, channelled mainly through the NHS R&D Directorate, and the Policy Research Programme. In addition, the Department of Health meets the NHS costs associated with the work of research councils, research charities, and other funders.

Following the publication of ‘Best Research for Best Health’ in 2006 the National Institute for Health Research (NIHR) was launched to provide a key mechanism through which the
Department of Health will deliver the new R&D strategy throughout the United Kingdom and allocate funding. The NIHR will work alongside the Office for Strategic Coordination of Health Research (OSCHR), which will act as a central coordinating body for health research in the United Kingdom. Reporting to the Department of Health and the OSI, and with structures to allow strategic input from the devolved administrations, OSCHR’s role will be to set the government’s health research strategy and the budgets required to meet the aims and objectives.

Research budgets in the OSI are, in principle at least, already ring-fenced. The government plans to ring-fence the Department of Health’s R&D budget and the Secretaries of State for Health and Trade and Industry will create a single, jointly held health research fund of at least £1 billion per year, for which they will agree strategic priorities. This will enable policy makers and the NHS to plan the use of R&D funds in a more coherent way. The government is now moving towards the distribution of NHS R&D funds in a transparent way through open competition and peer review, whereas previously funds were allocated to NHS Trusts on a formulaic basis.
The United Kingdom has a strong tradition of funding basic biomedical research. Approximately two-thirds of public expenditure on directly funded health research is allocated to underpinning research, aimed at understanding normal functions and processes (UKCRC, 2006). Aetiology, which includes all studies into the risk, cause, or development of disease, also represents one-third of the total spend. The remaining third is spent on research into diagnosis of disease, development, and evaluation of treatments, disease management, and organisation of health care. A total of 2.5 percent of funds is dedicated to research focused on the primary prevention of disease.

In Sir David Cooksey’s Review of UK health research funding (Cooksey, 2006), a key report commissioned by the UK government, Cooksey recommended that although current funding levels for basic science should be sustained, future increases in funding should be weighted towards translational and applied research until a more balanced portfolio is achieved.

The UK Clinical Research Collaboration (UKCRC) was founded in 2005 out of an identified need to strengthen clinical research in the United Kingdom and with recognition from the UK government of the need for further investment and the importance of a collaborative approach. The UKCRC is a partnership of organisations working to establish the United Kingdom as a world leader in clinical research. The UKCRC partner organisations, which include the NHS, MRC, DIUS, Wellcome Trust, National Institute of Health and Clinical Excellence (NICE), Association of British Healthcare Industries, and Association of the British Pharmaceutical Industries (ABPI), have agreed to collaborate on a programme of work that with time will improve the clinical research environment in the United Kingdom. Each of the activities is led by one of the partners or by the independent UKCRC Secretariat, depending on the nature of the task.
The Department of Health commissions and invests primarily in research through the NHS R&D Programme and the Policy Research Programme, but also funds research undertaken by non-departmental public bodies including the Health Protection Agency. Some funds are also earmarked for the training and education of future health researchers, for example through Fellowship Awards.

The Department of Health has defined seven key priority areas that are reflected in the R&D it funds: cancer, mental health, coronary heart disease, aging and older people, public health, genetics, and diabetes. Core spending focuses on treatment evaluation and health services research, followed by research on detection, diagnosis, and disease management (UKCRC, 2006).

In England, R&D in the NHS and the Policy Research Programme is led by the Department of Health’s Director General of R&D, who reports to the Secretary of State for Health through the Chief Medical Officer. The Director General is also the Department’s Chief Scientific Adviser and, additionally, has professional oversight of research undertaken by non-departmental public bodies. The structures and organisation of the NHS in Scotland, Wales, and Northern Ireland have diverged from those in England and have somewhat different structures.
NHS R&D Programme: Strategic Goals

- Establish the NHS as an internationally recognised centre of research excellence
- Attract, develop, and retain the best research professionals to conduct people-based research
- Commission research focused on improving health and care
- Strengthen and streamline systems for research management and governance
- Act as sound custodians of public money for public good

The NHS R&D programme investigates a range of health-care issues and supports the application of research-based knowledge across all health-care sectors. The mission of the NHS R&D programme is to create a health research system in which the NHS supports outstanding individuals, working in world-class facilities, conducting leading-edge research, focused on the needs of patients and the public and of relevance to the NHS.

Through the NHS R&D programme several national programmes have been established:

- The Service Delivery and Organisation programme provides and promotes research evidence about service improvement to increase the quality of patient care, ensure better patient outcomes, and contribute to improved population health.

- The Health Technology Assessment programme carries out research including assessing devices, equipment, drugs and procedures across all sectors of health care.

- The New and Emerging Applications of Technology programme promotes and supports, through applied research, the use of emerging technology to develop health-care products and interventions to enhance the quality, efficiency and effectiveness of health and social care.

This structure is underpinned by three cross-cutting programmes including research methodology, research capacity development, and the promotion of public involvement in NHS research. Funding is available through three main routes: research programmes, research units, and research centres.
The NIHR provides a key mechanism through which the Department of Health will deliver funds allocated through the NHS R&D Programme and achieve its strategic aims. The aim of the NIHR is to provide advice on strategic direction of R&D, implementation and programme review. The NIHR is an England-only organisation led by the Department of Health’s Director General of R&D and an Advisory Board and works with a range of key partners including other funders, academia, and industry. The Department of Health’s R&D Directorate sets the strategic direction for the NIHR under the umbrella of the newly formed OSCHR. OSCHR will jointly report to the Secretaries of State for the Department of Health and DIUS. By April 2008 the NIHR will be established as an Executive Agency of the Department of Health.

The NIHR is already making considerable progress on its objectives, working towards the establishment of the UK Clinical Research Network Central Coordinating Centre, and new Coordinating Centres for Medicines for Children, Diabetes, Stroke, and Dementia and Neurodegenerative Diseases, to add to existing network capacity in Cancer and Mental Health. The chief purpose of these new coordinating centres is to improve health service infrastructure to support clinical research and to focus on translational research that will take advances in basic medical research out of the laboratory and into the hospital clinic. Funding is being provided for research infrastructure, new academic posts and training programmes, including studentships.

The NIHR has launched a range of new funding programmes on a competitive basis, in line with the funding processes of the research councils and research charities. For example, the Research for Innovation, Speculation and Creativity Awards will award small, discrete grants to fund new and radical ideas for health research, which have a low chance of success but potential for high impact. These awards will be made to speculative, novel proposals that are unlikely to fare well in traditional peer review processes. In addition, Programme Grants for Applied Research will be offered in areas of high priority or need for the NHS. These will be substantial, prestigious awards aimed at attracting the top researchers. They will be awarded competitively to NHS providers to tackle areas of high priority for health over 3–5-year periods, to support the development of top-quality research groups working in the NHS.
The Policy Research Programme supports policy development and evaluation in public health, health services, and social care to ensure that policy is based on reliable evidence of needs and of what works best to meet those needs. The programme’s budget is approximately £32 million per year, of which £5.5 million is ring-fenced for work on Creutzfeldt-Jakob disease. The Policy Research Programme funds approximately 300 policy-related research projects at any one time. Key priority areas are health protection, health promotion, health inequalities, specific disease areas (particularly coronary heart disease, stroke, and diabetes), screening policy, and child and maternal health.

The three main modes of funding are through programmes of research in units and centres, initiatives consisting of linked groups of projects, providing a range of perspectives on a key policy issue, and for single projects and literature reviews. All of the research is commissioned directly, meaning it does not commission research in response to spontaneous proposals. Instead, all R&D is commissioned to meet the Department of Health’s research needs identified through policy work. Heads of the main policy groups in the Department of Health submit requests for research directly to the programme and liaison officers assess these requests in relation to specific criteria. Much of the commissioning is done via open competitive tender, especially for strategic initiatives and high-cost projects.

To ensure policy relevance, the Policy Research Programme is prioritised, commissioned, and managed as a collaboration between the NHS R&D Directorate and Department of Health staff in other directorates. It works alongside other national research programmes.

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4 RAND Europe is currently funded as a R&D policy research unit for the English Department of Health
and consults when necessary with policy research programmes in other government departments and a diverse range of stakeholders.
The research councils are widely considered to be a major asset within the United Kingdom’s science and innovation system. There are seven of them in total and they are all independent non-departmental public bodies with national remits. They are key public investors in basic research in the United Kingdom, with interests ranging from biomedicine to engineering and the environment. They are incorporated by Royal Charter and together manage a research budget of approximately £2800 million a year. The DIUS has statutory control of the Councils, supported by the Director General of Science and Innovation. Research Council members are appointed by the Secretary of State for Trade and Industry, who is answerable to Parliament for the Councils’ activities.

Research Councils UK (RCUK) was established in 2002 to provide a research partnership between the United Kingdom’s seven research councils and to ensure that they fully contribute to the delivery of the government’s objectives for science and innovation. RCUK supports the Performance and Evaluation Group, responsible for providing strategic direction on all issues relating to evaluation and benchmarking including the evaluation of Science Budget investments in research, training, knowledge transfer, science and society activities and operational performance.

The research councils that fund health-relevant R&D are the MRC, BBSRC, EPSRC, and ESRC, with the MRC being by far the biggest funder. These research councils all fund health R&D following concordats with the other four UK health departments, and the Department of Health directly contributes to their strategies and priorities. Research councils work to a delivery plan that describes how they will contribute to the DIUS’s Public Service Agreement targets of improving the relative performance of the UK research base and the UK economy. The strategy and funding priorities are decided with a strong bottom-up input from their Funding Boards, working groups, and Directors of Units and
Institutes, as well as top-down input from their Councils and high level committees and partnerships.

The majority of funding is allocated through research grants on a response-mode basis. Most proposals are investigator-initiated submitted to them by the research community, although to encourage research in strategic areas research councils will issue highlight notices or calls for proposals in priority areas.
Basic biomedical research is a major strength of the MRC, but it supports research in almost all areas of basic and applied biomedical and health research. The MRC’s mission can be summarised as follows:

- To encourage and support high-quality research, with the aim of maintaining and improving human health
- To produce skilled researchers to meet the needs of users and beneficiaries (including health service providers, and the biotechnology, pharmaceutical, food, healthcare, instrumentation, and other biomedical-related industries)
- To advance and disseminate knowledge and technology to improve the quality of life and economic growth in the United Kingdom
- To promote dialogue with the public about medical research

In line with the priorities of the government’s new R&D strategy, the ten-year strategic priorities of the MRC have been defined as follows:

- To ensure advances at the molecular level are extended rapidly to increase understanding of health and disease
- To translate laboratory-based work into new and improved treatments, interventions and health-care services

The MRC places the major funding emphasis on underpinning research and aetiology. Its research spend is divided into five broad areas, with the majority of funds spent in the field of molecular and cellular medicine. The MRC’s current priority areas include clinical and...
public health research, infections and vaccine research, global health, biomarkers, age related research, and sustaining capability in areas of strategic importance.

Working through its council, scientific boards and committees, the MRC is independent in its choice of which research to support. However, it does work in close partnership with health departments through the Joint MRC/NHS Health Research Delivery Group, which has now in effect been superseded by the OSCHR, as well as other research councils and industry, to identify and respond to current and future needs. The MRC is governed by a Council of 16 members, including representatives of the UK Health Departments, industry and medical researchers, as well as lay members. Co-ordination of the MRC’s strategy with that of the new NIHR is to be overseen by the OSCHR.

The MRC’s gross expenditure for 2005–2006 was £525.8 million (0.02% of GDP), of which £459.5 million was core funding from the government’s Science Budget allocations. £546 million (0.02% of GDP) has been earmarked through the Science Budget for 2007–2008 (HM Treasury, DTI, DfES, 2006). In line with the other research councils, the MRC funds research in several ways: by employing full-time scientists to work on research topics in their own research establishment (intramural funding); by supporting university researchers through a range of grant schemes; and by personal awards for research training and career development. The MRC also supports national research infrastructure in universities, in the NHS, and in its own establishments. Additionally, the MRC supports research overseas, mainly in Africa, in areas such as HIV, malaria, tuberculosis, and growth and development.

The majority of funding is allocated through research grants on a response-mode basis, but to encourage research in strategic areas the MRC will issue highlight notices. The MRC’s funding decisions are made by our five Research Boards, after the proposals have been assessed by external reviewers through a robust peer-review process. Each of the Boards is responsible for one of the five major areas of medical science that together make up the MRC portfolio. They hold their own research budgets, and review and manage scientific activity within their specialist areas. In addition, the MRC puts a substantial proportion of its funding into its intramural units and institutes, which are outside the response-mode funding stream.

In 2005, the MRC supported around 3,000 researchers working in universities and hospitals through research grants, and funded research training for more than 1,800 fellows and postgraduate students through MRC career awards (MRC, 2006). The MRC has three research institutes and 27 units throughout the United Kingdom, and two units in Africa. It also funds 15 research centres in universities. In addition, the MRC owns MRC Technology, a company limited by guarantee with charitable status, which was established in 2000 to act as an agent for management and commercial development of intellectual property arising from the basic research carried out by the MRC’s directly-supported scientists. MRC Technology works closely with industry to ensure that our scientists’ findings are translated into health benefits as quickly as possible. Income from MRC Technology totalled £142 million in 2006, funds from which will be put back into biomedical research.
The medical research charities, in particular the Wellcome Trust, Cancer Research UK, and the British Heart Foundation, make an important contribution to UK R&D. Research charities contribute almost one third of all public expenditure on medical and health research in England, Scotland, Wales, and Northern Ireland. Their combined expenditure is approximately £700 million per year, generated through donations from individuals, the government, private sponsors and endowments.

There are 111 member charities and partners in the Association of Medical Research Charities, a membership organisation of the leading medical and health research charities in the United Kingdom. The Association of Medical Research Charities was founded to further medical research in the United Kingdom, and to develop the effectiveness of research charities in the R&D system. In addition, as with all charities in England and Wales, they are regulated by the Charity Commission.

The Wellcome Trust, Cancer Research UK, and the British Heart Foundation all fund research in two distinct ways: research grants on a response-mode basis, mostly investigator initiated around core areas of interest; and direct grants to the charities own research units, centres and institutions. Decision-making authority on grant applications is delegated to various funding committees and a rigorous peer review process underpins all research funded. In addition, these charities play an important role in funding education to reach the public and health professionals.

All Higher Education Institutions (from 1st September 2005) must subscribe to full economic costing (fEC) when submitting a research grant applications. Full economic costing is the forecasting and accounting for full economic costs at a project level. It is the basis of a Government directive to recover the full costs of research, to put costing and
pricing activity on a stable footing. The aims of fEC is to improve research funding schemes to ensure long-term sustainability and build confidence in the funding capabilities of research councils (e.g. MRC) and government departments. To be fully sustainable, institutions need to be recovering the full costs on their broad range of activities. It is also intended that the flow of funds from the public sector and from non-public sources can be managed effectively and that their accountability can be demonstrated. With consideration of public funds, the Treasury indicated that, under fEC, Research Councils would pay 80% of research costs while the other 20% is guaranteed from elsewhere. From 2009, research council are schedules to pay the full 100% of research costs. Under fEC, the calculation of overheads as a percentage of salary costs has been replaced by Indirect and Estate Costs, based on an established base figure, the full time equivalent of Investigators and research staff, and project length. Now using fEC are higher education institutions, Research Councils, government departments (unless specially exempted by the government), NHS Trusts from April 2006, Department of Health, Royal Society, the British Academy, the Scottish Executive, the Higher Education Funding Council for Wales. Some charities are now requesting fEC for monitoring purposes, for example The Wellcome Trust and the British Academy. A full description on fEC and the directly incurred, directly allocated, and indirect costs charged to a project are available online.5

5 http://www.iop.kcl.ac.uk/iopweb/blob/downloads/locator/l_27_Full_Economic_Costing_notes_Sept_07.doc (as of December 27, 2007)
Established in 1936, the Wellcome Trust is the United Kingdom’s largest non-governmental source of funds for biomedical research. The Wellcome Trust is one of the world’s largest charities and is privately endowed, therefore independent from governments, from industry and from donors. Ultimate responsibility for its activities lies with its Board of Governors.

The Wellcome Trusts’ mission is to foster and promote research with the aim of improving human and animal health. To achieve its mission, the Wellcome Trust has set out six strategic aims to be achieved by 2010 (Wellcome Trust, 2005):

1. Advancing knowledge: To support research to increase understanding of health and disease, and its societal context
2. Using knowledge: To support the development and use of knowledge to create health benefit
3. Engaging society: To engage with society to foster an informed climate within which biomedical research can flourish
4. Developing people: To foster a research community and individual researchers who can contribute to the advancement and use of knowledge
5. Facilitating research: To promote the best conditions for research and the use of knowledge
6. Developing our organisation: To use our resources efficiently and effectively.
The Wellcome Trust offers grants through various funding streams. Decision-making authority on grant applications is delegated to various funding committees, which make decisions on most of the applications for financial support received by the Wellcome Trust. Large or strategically important awards are approved by the Board of Governors. Competitive grant schemes are run in the Wellcome Trust’s areas of interest: biomedical science; technology transfer; and medicine, society, and history (history of medicine, biomedical ethics, and public engagement with science). The following areas have been identified as priorities for Strategic Award applications (Wellcome Trust, 2006):

- Mathematical biology/statistical methods—training and capacity building
- Public health research—training and capacity building
- ‘In vivo’ physiology—training and capacity building
- Neuroimaging—interdisciplinary networks/programmes
- Emerging diseases—interdisciplinary networks/programmes
- Promotion of interactions at the clinical–basic science interface.

The Wellcome Trusts total charitable expenditure for 2005–2006 was £484.1 million (0.02% of GDP), of which £324.7 million was through grants, £119.3 million through direct activities (including projects managed by the Wellcome Trust itself, such as the Wellcome Library and the Wellcome Trust Sanger Institute), and £40.1 million on support costs, including expenditure required to run the Wellcome Trust and Genome Campus (Wellcome Trust, 2006). Grant expenditure dipped slightly between 2005 and 2006, reflecting additional work at the Wellcome Trust Sanger Institute and preparation for the opening of the new public venue, the Wellcome Collection, in 2007.

Total expenditure on careers support across all funding areas was £100 million in 2005–2006: the bulk of this support is for Principal, Senior, and intermediate-level fellowships, along with 4-year Ph.D. Programmes and Research Training Fellowships for medically qualified researchers. In addition, approximately £2.6 million was awarded directly to researchers at overseas institutions and £46.2 million to researchers at UK locations for research overseas. Most international support is targeted at developing and restructuring countries. Awards for buildings, refurbishment, and equipment amounted to £15.7 million.
Cancer Research UK is the world’s leading charity dedicated to research on the causes, treatment and prevention of cancer, and is the largest independent funder of cancer research in the world. The charity works independently and in partnership with other organisations.

Cancer Research UK supports and undertakes a comprehensive programme of research in institutes, hospitals, universities, and medical schools throughout the United Kingdom. Its research portfolio targets all aspects of cancer and covers work in four broad subject areas: the biology and causes of cancer; developing cancer treatments; cancer prevention; and improving quality of life.

Cancer Research UK supports over 500 research group leaders throughout the United Kingdom, through a variety of funding mechanisms including research institutes, clinical centres, programme and project grants. As well as basic research, Cancer Research UK funds more than 35 clinical research centres based within major hospitals throughout the United Kingdom. They fund scientists and clinicians, and support personal award schemes. Its total expenditure on research in 2005–2006 was £257.1 million (0.01% of GDP), of which £150 million was spent on research to understand cancer, £101 million on the development of new cancer treatments, and £6 million on information and advocacy (Cancer Research UK, 2006). Cancer Research UK funded grants worth £125.4 million. In addition, it spent £120.3 million on direct activities, for example funding its own research institutes and units. Support costs amounted to £11.2 million.
The British Heart Foundation plays a leading role in the fight against disease of the heart and circulation by supporting research into its causes, prevention, diagnosis, and treatment. The British Heart Foundation aims to play a leading role in the fight against diseases of the heart and circulation by supporting pioneering, vital research into its causes, prevention, diagnosis and treatment. The Foundation is the largest independent funder of heart research in the United Kingdom, and also plays an important role in funding education to reach the public and health professionals. Funds are raised through various mechanisms, including shops, local fundraising, national events, corporate partners, and donations from government funds.

In the financial year 2005–2006, the British Heart Foundation spent over £55 million on research into the causes, prevention, diagnosis and treatment of diseases of the heart and circulation (British Heart Foundation, 2007). Funds are allocated through clinical and non-clinical Fellowships, Programme Grants, Special Projects, Infrastructure Grants, and Project Grants through open competition on a response-mode basis. In 2005, they awarded 237 new research grants. The charity currently funds the salaries of 28 professors and their support staff. In addition, the British Heart Foundation also provides direct support to particular research facilities, and in 2005 they funded 11 UK centres.

The British Heart Foundation has invested in the Cardiovascular Initiative, which is a multimillion investment (£6.8 million in 2005–2006) in providing heart specialists with the equipment and facilities that they need for cutting-edge research and treatment. In addition, it funds the British Health Foundation Family Heart Study, which is the largest study of its kind, involving 2000 families to discover the genes that predispose to heart disease. The British Heart Foundation is also involved in education, raising awareness, and medical training activities.
Industry is a major player in UK health R&D, funding around 70 percent of total health R&D (Department of Health, 2006). The leading UK companies in R&D are GlaxoSmithKline, AstraZeneca, Pfizer, Eli Lilly, Wyeth, Roche, Merck Sharp & Dohme, and Novartis, with 78 percent of industry R&D carried out and commissioned by pharmaceutical companies. Much of the R&D funded by industry is undertaken in commercial facilities, but much also involves academic institutions and the NHS with whom they engage in collaborative research.

The pharmaceutical industry conducts 35 percent of the R&D undertaken by the top 800 UK R&D companies (OECD, 2006). The pharmaceutical industry alone invested over £3308 million (0.27% of GDP) of expenditure in the United Kingdom in 2005. The industry employs around 73,000 people, 29,000 of which are employed in R&D-related activities, with a further 250,000 jobs in the supply chain. The industry is growing at a rate of 4–5 percent per year; exports in 2004 were over £12.3 billion (1.05% of GDP), creating a trade surplus of £3.75 billion. The ABPI is the trade association for more than 75 companies producing prescription medicines in the United Kingdom and represents companies engaged in R&D of medicines for human use.

The UK biotechnology sector is the largest in Europe, and funds approximately 13 percent of UK clinical research; globally, it is second only to the United States. There are approximately 455 dedicated biotechnology businesses in the United Kingdom, employing around 22,400 staff, with revenues of around £3.6 million in 2003. UK biotechnology companies spent £1.23 billion (0.11% of GDP) on R&D in 2003. The BioIndustry Association is the trade association for innovative enterprises in the UK bioscience sector. In March 2007, the then Prime Minister Tony Blair announced a “big push” for improving the environment of the UK biotechnology industry, and improving research...
links with the NHS, and invited Sir David Cooksey to review current progress in this area (Cooksey, 2006).

To stimulate business investment in R&D, the UK government currently supports industrial R&D in several ways. The government introduced a R&D tax credit scheme in 2000 (extended to large companies in 2002), in the form of tax relief for companies of all sizes, as an incentive to raise R&D investment, which has provided nearly £1.5 billion in support to nearly 20,000 businesses to date. It also has various R&D grants for businesses, as well as knowledge transfer partnerships, which allow businesses to gain access to expertise from academic establishments.

Research-based pharmaceutical companies have major facilities in the United Kingdom to interact with the UK academic research base for recruitment purposes. The pharmaceutical sector is a significant supporter of academic research, hosting nearly 700 Ph.D. students in laboratories and funding over 400 separate collaborative research projects. This equates to funding over £70 million on collaborative research (excluding contract and clinical research). The majority of industry R&D funding goes towards clinical research (70 percent), which includes research into the prevention, detection, and diagnosis of disease and the development of interventions, with the remainder going towards discovery and pre-clinical research (30 percent).6 Medicines are developed by the private sector in response to what they perceive to be the demand of health-care systems.

Traditionally, foreign companies have often selected the United Kingdom as their European operational base. This is partly driven by the world-class reputation of the UK science base, but also relates to the wider investment climate. The NHS, as a major public health provider, is also a key attraction. In recent years, the UK government has taken action to sustain and promote R&D investment by the pharmaceutical industry. This includes the creation of the UKCRC to improve the infrastructure for clinical and medical research. The Department of Health has developed joint working in science and innovation with industry in particular through the Pharmaceutical Industry Competitiveness Task Force, the Bioscience Innovation and Growth Team, and the Healthcare Industries Task Force.

In addition, the Department of Health collaborates with industry through the Health Technology Device programme. This programme stimulates, commissions, and monitors collaborative research projects on new and improved technology devices which will improve the health and wealth of the United Kingdom. Funding through the Health Technology Device programme is approximately £2 million a year, allocated on a response-mode basis via the NIHR. The Small Business Research Initiative is an initiative, managed by the Small Business Service, which is designed to help small businesses gain greater access to publicly funded R&D contracts.

The pharmaceutical industry is highly regulated. There are rigorous guidelines for conducting clinical trials, and a code of practice governing all promotional activities. The

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6 Information sourced from the ABPI Web site (www.abpi.org.uk).
United Kingdom is now subject to the EU Clinical Trials Directive which, among other things, bolsters internationally-agreed standards of good clinical practice.
# Processes and Performance of the UK Health Research System

## Overview of Funding Processes

<table>
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<tr>
<th>Key Funder</th>
<th>Core Focus of Research Funded</th>
<th>Types of Funding and Value</th>
<th>Allocation Process</th>
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<tr>
<td>Research Councils/MRC</td>
<td>• Basic biomedical research&lt;br&gt;• Clinical and public health research more recently</td>
<td>• Studentship and Fellowship awards (£151.8m)&lt;br&gt;• Grants to universities, hospitals, NHS (individual projects, larger programmes, research centres £172.4m)&lt;br&gt;• Intramural to MRC’s own units and institutes (£279.4m)</td>
<td>• Research grants on a response-mode basis, mostly investigator initiated&lt;br&gt;• Encourage research in priority areas, i.e. issue highlight notices&lt;br&gt;• Rigorous peer review, mostly devolved to specialist Boards and Committees&lt;br&gt;• Intramural MRC units and institutes are outside of the response-mode funding streams</td>
</tr>
<tr>
<td>Department of Health</td>
<td>• Clinical research&lt;br&gt;• Policy-related research&lt;br&gt;• Public health research&lt;br&gt;• Applied research (health technology assessment and health service delivery)</td>
<td>• Studentship and Fellowship awards&lt;br&gt;• Programme grants, and grants to Research Units and Research Centres&lt;br&gt;• R&amp;D support costs to NHS providers (Total spend: £753m)</td>
<td>• Institutional grants to NHS Trusts. Previously allocated to NHS Trusts on a formulaic basis, now on a competitive basis&lt;br&gt;• Programme grants and direct funding to Research Units and Research Centres administered through the NIHR&lt;br&gt;• Policy Research Programme provides direct funding to identified Research Units, Research Centres, and others via open competitive tender</td>
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<tr>
<td>Research Charities/Wellcome Trust</td>
<td>• Basic biomedical research</td>
<td>• Grants (Total £324.7)&lt;br&gt;• Studentship and Fellowship awards&lt;br&gt;• Building, refurbishment, equipment costs&lt;br&gt;• Direct activities eg The Wellcome Library (Total £119.3m)</td>
<td>• Research grants on a response-mode basis, mostly investigator initiated&lt;br&gt;• Encourage research in priority areas, i.e. issue highlight notices&lt;br&gt;• Rigorous peer review&lt;br&gt;• Direct activities are outside of the response-mode funding streams</td>
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<tr>
<td>Industry</td>
<td>• Clinical research</td>
<td>• Studentships and Fellowship awards&lt;br&gt;• Collaborative research project grants to academic institutions (£70m)&lt;br&gt;• Direct funding to their own major facilities</td>
<td>• Fund their own major facilities throughout UK&lt;br&gt;• Encourage research in priority areas, applications undergo rigorous peer review</td>
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The UK R&D funders administer a wide range of different grant schemes and encourage research applications in many different priority areas. Applications are often investigator led and will undergo a rigorous peer review process. The above table provides an overview of the grant schemes, funding processes, and available funds by funding source.
As previously mentioned, the majority of UK health funding from government and charity funders is allocated towards understanding normal function or cause of diseases, and most is laboratory-based biomedical research. In addition industry funds around 70 percent of UK health R&D, predominantly focusing on clinical research.

The UKCRC’s analysis of funding allocations by the 11 largest UK government and charity funders across different health specific categories found that of the total health research funded, 25 percent is applicable to all diseases or relevant to general health and well-being, with 75 percent of funded research focusing on specific diseases and specific areas of health (most which is spent on cancer, neurological, infection, and cardiovascular research; UKCRC, 2006).
In general, public and charity funding for health R&D is closely aligned with the ranking of burden of disease as measured by disability-adjusted life-year (DALY) rates for the United Kingdom (UKCRC, 2006). Exceptions to this trend have been observed in the areas of respiratory and oral and gastrointestinal medicine, in which the comparative research funding is lower than the relative burden of disease and for infection, for which the relative research funding is higher than the UK DALY ranking.

A number of factors have been identified that may influence UK research priorities and subsequent activity in particular areas (UKCRC, 2006). These include:

- The scientific opportunity in an area
- The size and quality of the research workforce in each area
- The ‘researchability’ or tractability of an area
- The burden of disease in an area
- The level of charity fundraising conducted in an area.

The Cooksey Review of UK health research funding raised concerns about the lack of any overarching UK health research strategy to ensure UK health priorities are considered through all types of research, and called for greater coordination between key funders in terms of setting future research priorities (Cooksey, 2006). At present, research priorities for the Department of Health are determined through discussion with policy colleagues and Ministers. Priorities are identified through widespread consultation with those using, delivering, and managing services and are constantly under review. They take account of the actual or potential burden of disease, Department of Health objectives, the feasibility
of introducing research results into current policy activity or the formulation of future policy as well as the responsibilities and work of all other UK funders.

The MRC/NHS Joint Delivery Group, set up to improve coordination between the MRC and the Department of Health, is tasked with ensuring that research priorities and policy are coordinated across the two major public funders of health R&D. Under the reforms proposed in the Cooksey Review, the OSCHR will now be responsible for setting the UK health research strategy and priorities based on both top-down advice from the Department of Health and DIUS, and bottom-up advice from the NHS and the wider health research community. The OSCHR will therefore set the long-term objectives for the United Kingdom in terms of priorities within each disease area, and identifying R&D areas requiring greater investment.

Because it does most of the research, the pharmaceutical and biotechnology industries inevitably have a major influence on what gets researched in the United Kingdom and research priorities. ABPI found that research conducted by the pharmaceutical industry is to some extent aligned to the priorities of the NHS, with approximately 43 percent of new medicines introduced over the past ten years by the industry support four of the NHS’s key health priorities—cancer, coronary heart disease, mental health, and illnesses of the elderly.7 There are concerns, however, that this market-driven approach means that priority health needs are not being adequately met. The OSCHR has been tasked to work more closely with industry to review research priorities and to signal where the United Kingdom would like to see progress made on unmet health needs.

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7 Information from the ABPI Web site (www.abpi.org.uk).
In recent years, the UK government has made a strong commitment to expanding and developing health R&D and promoting investment. The current climate is one of renewed optimism towards improving and strengthening the United Kingdom’s research base and building the UK capacity to innovate in the long term, with the focus on facilitating a higher level of R&D intensity in the future. This commitment has been backed by increased funding and a series of reforms to the existing health R&D system in terms of funding, coordination, and structure. These include the ring-fencing of a health R&D budget of approximately £1 billion per year, the establishment of the NIHR and OSCHR, and a renewed focus on strengthening R&D within the NHS.
The United Kingdom is considered a highly successful research country. It has a long tradition of success and achievements, particularly in the medical and health basic sciences, and continues to be an important contributor to scientific output as measured by articles in scientific journals. Research from United Kingdom-based researchers accounts for over 12 percent of all cited papers and around 13 percent of papers with the highest impact (HM Treasury, DTI, DfES, 2006). UK scientists are awarded around 10 percent of internationally recognised scientific prizes every year.
Basic research is increasingly becoming interdisciplinary in nature as the challenges facing medical science become more complex. Some important medical and scientific advances have occurred through large-scale interdisciplinary research—for example, the development of magnetic resonance imaging was the product of high-risk interdisciplinary research at the University of Nottingham, linking physics, medicine, and engineering.

The research councils are at present working to address a number of challenges posed by interdisciplinary working in health R&D. In addition, they keep the peer review process under review to avoid any barriers for funding innovative and interdisciplinary research, amid concerns that the United Kingdom has traditionally channelled health R&D funding down established routes. By ensuring long-term funding to the research council’s intramural units and institutes, which are outside the response-mode funding stream, researchers are able to develop long-term strategic plans for their research programmes.

In addition, these growing complexities have encouraged organisations to pool resources and expertise as a more effective means of coordinating and influencing research activities within the United Kingdom and internationally. The Human Genome Project, of which the Wellcome Trust Sanger Centre was a major contributor, harnessed research from a wide number of disciplines to work towards a common aim. The UK Biobank project involves pooled resource from the MRC, Department of Health, and The Wellcome Trust. Partnerships have become an effective means of coordinating, influencing, and supporting research activities within the UK health R&D system. The MRC, for example, has strategic partnerships with other organisations, including other research councils, the NHS and health departments, other government departments, higher education institutions, industry, research charities, and local authorities, as well as having a large number of international collaborations.
The 2006 Cooksey Review highlighted a number of concerns with respect to the translation of research into practice in the UK R&D system and has outlined a series of reforms to address these shortfalls (Cooksey, 2006). He identified two major gaps in the translation process:

- **The 'First Gap':** translating ideas from basic and clinical research into the development of new products and approaches to treatment of disease and illness that can either be commercialised or in some way disseminated into wider healthcare practices.

- **The 'Second Gap':** evaluation and identification of those new interventions which are effective and appropriate for everyday use in the NHS, and the process of the implementation of these new products and approaches into routine clinical practice.

The four key NHS and NIHR organisations involved in research translation are: The Health Technology Assessment Programme, Service Delivery and Organisation Programme, NICE, and NHS Connecting for Health. In addition, a joint MRC/NIHR Translational Medicine Funding Board will be established to be set up, tasked with developing a translational research strategy to maximise the economic and health benefits of innovation, and to be responsible for allocation of both response mode and targeted calls for research relating to the translational research strategy. This new funding board would consist of representatives from the MRC, NIHR, health-care industries, Departments of Health in England, Scotland, Wales, and Northern Ireland, and the DIUS.
As previously highlighted, the MRC undertakes technology transfer activities through MRC Technology, focusing on work in MRC units and institutes. MRC Technology helps to translate scientific discoveries into products and technologies with a clear health-care benefit, working in partnership with industry to commercialise MRC discoveries to benefit healthcare. Income from MRC Technology totalled £142 million in 2006 from exploitation of its intellectual property, all of which was put back into biomedical research (MRC, 2006). More recently, the MRC has announced its 5-year plan to invest more than £15 million in the creation of six new research centres aimed at facilitating the translation of scientific discoveries into new drugs, therapies, diagnostic tools, or methods of prevention. The centres will focus on transplant medicine, obesity, neuromuscular diseases, genomics and global health, analysis and modelling of disease outbreaks, and the molecular causes and indicators of disease. They will be based at the University of Bristol, the University of Cambridge, King’s College London, Imperial College London, University College London together with the University of Newcastle, and the University of Oxford in partnership with the Wellcome Trust Sanger Institute.

The Wellcome Trust has made advancing the translation of trust-funded research into health benefits a core objective. Through its Technology Transfer Initiative, the Wellcome Trust funds applied research projects at an early stage where there is a need in healthcare, a potential new solution, and a realistic expectation that the innovation will be developed further by the market. The projects funded through the Translation Awards are distributed among 28 academic institutions and 19 companies that have subsequently raised in excess of £65 million investment finance.

Cancer Research UK has a Clinical and Translational Research Committee, and Development Committee responsible for developing a comprehensive portfolio of translational research for Cancer Research UK, for example by pursuing partnerships with the wider academic and industrial community. The charity also funds Cancer Research Technology Limited, formed in 2002, which aims to maximise cancer patient benefit from publicly funded research. Cancer Research Technology works closely with leading international cancer scientists, institutes and funding bodies to protect and develop intellectual property arising from their research and to establish links with commercial partners. It operates by seeking commercial partners to leverage the financial burden and risk of taking new technologies and products to the market. The committees work closely with Cancer Research Technology to ensure coordination of activities, joint development strategies and, where appropriate, joint or complementary funding.

The United Kingdom has other collaboration initiatives which encourage research into policy and practice. For example, the UKCRC brings together all key funders across the private and public sectors to speed up the development and translation of new medicines and treatment from the laboratory into practice.
Engaging the public is also integral to the translation of research. The UK government recognised in its ten-year investment plan that it is important to not only develop and promote world-leading research in the United Kingdom, but also to actively raise public awareness of, and engagement in, science and innovation, including in schools (HM Treasury, DTI, DfES, 2004).

RCUK’s new Science in Society strategy aims to secure more people of all ages and from all sectors of society to engage with researchers and to contribute their views on current research and future directions in biomedical science and to raise public awareness and engagement in science and innovation. The RCUK Science in Society Unit was set up in April 2005 and recognises the underlying need to sustain public confidence in the research councils’ independent and rigorous approach to its funding decisions. It brings together all the research councils’ activities in this area. The programme is yet to be evaluated.

The MRC encourages proactive engagement with stakeholders and regular evaluations to help improve communication efforts. Since 2000, the MRC has used advisory groups to help develop ways of promoting effective and appropriate public involvement in its activities, and to ensure that it is responsive to the public’s interests and concerns about research. The MRC’s Advisory Group on Public Involvement brings in a public perspective and has been appointed to influential MRC committees, working groups, and the Council Subcommittee on Strategy, Corporate Policy and Evaluation. The MRC is a member of issue-specific communication partnerships including the Coalition for Medical Progress, which aims to explain the medical benefits of research using animals. As a member of the UK Stem Cell Funders Forum Communication Coalition, the MRC has actively participated in a number of initiatives to increase understanding of stem-cell
science, including development of a new public information pack and media training for stem cell scientists.

In addition, the MRC reaches its stakeholders through the media, its website and its newsletter *MRC Network*. More recently, the MRC has recently been looking at creating a ‘public college’ of people willing to work with the MRC on specific projects in which patients’ or the public’s perspective would add value. The structure will be modelled loosely on its scientific peer-review body, the MRC College of Experts. The MRC also works closely with the UKCRC on a series of public involvement initiatives.

The Wellcome Trust’s Public Engagement programme has three core aims:

- To enhance interest and learning about biomedical science and its past, present, and future impacts on society;
- To stimulate an informed dialogue to raise awareness and understanding of biomedical science and its achievements, applications, and implications; and
- To informing the Trust’s research plans and policies in relation to public interests and concerns.

The Trust has developed a programme of projects and initiatives that supports others who engage with young people and adults, and that tests new ideas for engaging the public with biomedical science and the issues it raises.
Emerging economies, such as India and China, are undoubtedly becoming more attractive as investment locations, and the UK government is aware that it needs to find effective ways of both retaining and attracting R&D-intensive companies. The UK government has taken a number of actions to promote R&D investment by the pharmaceutical industry but considerable challenges remain. Concurrently, the domination of UK R&D system by a market-driven industry will continue to pose a number of challenges to the publicly funded R&D system, and steps will need to be taken to ensure that the priorities of industry are better aligned with those of the government to improving the health and wealth of the United Kingdom.

Incentivising applied research, ensuring better translation of research, and ensuring enough research focuses on meeting the health needs and priorities of the United Kingdom are now key objectives of the UK government. Work is underway to make best use of funds to help tackle barriers to research and innovation in the NHS specifically, and to promote a more research-friendly culture. There is an acknowledged need for further strengthening of the coordination mechanism between major public funders and between public funders and industry.

Future advances in terms of new technological improvements and new medical interventions, diagnostics, and treatments pose a number of important challenges. How to manage the introduction of new technologies rapidly, safely, and cost effectively will require a long-term policy framework. The anticipated increases in future demands on
health-care systems requires that the UK government develop strategies in terms of its research priorities, to ensure limited resources better support therapies that tackle clearly identified and understood health priorities.

The United Kingdom’s ambition to move to a higher level of R&D intensity, and to improve the productivity and competitiveness globally, will be unattainable without a strong supply of skilled scientists. This poses a number of challenges and addressing current shortfalls remains a key priority. In November 2006 Lord Sainsbury was asked by the Chancellor to carry out a review of science and innovation policies across government in time for the Comprehensive Spending Review in summer 2007. This review took a forward look at what needed to be done to ensure the United Kingdom’s continued success on the ability to generate innovative ideas and to translate new knowledge into high-value products and services.
Reference List


