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Research and development case study



National Audit Office

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# Human health research

November 2017

# Introduction



This case study on human health research is one of a series that we have developed to support and complement our published report on research and development.

Our examination of human health research focused on arrangements to coordinate the funding of basic discovery research and clinical interventions, and the development of new treatments and products for patients.

Other case studies focus on research relating to:

- advanced materials;
- animal and plant health;
- climate;
- energy; and
- robotics and autonomous systems.

If you would like to know more about the National Audit Office's work on science and research, please contact:

#### Sian Jones

Director for value for money audit work on business, skills, science and industry

✉ [sian.jones@nao.gsi.gov.uk](mailto:sian.jones@nao.gsi.gov.uk)

☎ 0191 269 1889

#### Heather Thompson

Audit manager

✉ [heather.thompson@nao.gsi.gov.uk](mailto:heather.thompson@nao.gsi.gov.uk)

☎ 020 7798 7690

If you are interested in the NAO's work and support for Parliament more widely, please contact:

✉ [Parliament@nao.gsi.gov.uk](mailto:Parliament@nao.gsi.gov.uk)

☎ 020 7798 7665

The National Audit Office (NAO) scrutinises public spending for Parliament and is independent of government. The Comptroller and Auditor General (C&AG), Sir Amyas Morse KCB, is an Officer of the House of Commons and leads the NAO. The C&AG certifies the accounts of all government departments and many other public sector bodies. He has statutory authority to examine and report to Parliament on whether departments and the bodies they fund have used their resources efficiently, effectively, and with economy. Our studies evaluate the value for money of public spending, nationally and locally. Our recommendations and reports on good practice help government improve public services, and our work led to audited savings of £1.21 billion in 2015.

# Summary



## 4 What did we find?

- Collective action is facilitated by various groups and forums that coordinate and align activities within human health research
- Analysis of data on health research expenditure has facilitated discussions on funding gaps and opportunities, improved coordination and directed investment
- There is a clear strategy for translating and exploiting the results of research



## 1 Who is involved?

Funders, coordinators, researchers, influencers



## 3 How much is spent?

Government, industry and charities invest around £8 billion each year in health research



## 2 What happens?

Stages of research activity

### Video ▶

[The real world view: what happens at the Francis Crick Institute](#)

# 1 Who is involved?



## The funders

- UK government departments
- Research councils
- Higher education funding councils
- National Institute for Health Research
- Medical research charities
- Wellcome Trust
- Innovate UK
- Industry
- European Union



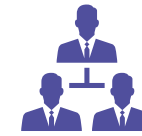
## The coordinators

- Office for Strategic Coordination of Health Research
- UK Clinical Research Collaboration
- Association of Medical Research Charities
- Catapults – specifically in Cell and Gene Therapy, and Medicines Discovery
- UK Health Funders Forum
- Ministerial Industry Strategy Group



## The researchers

- NHS
- Research institutes
- Universities
- Industry
- International



## The influencers

- Policymakers and parliamentarians
- Academies and learned societies
- Medical research charities
- Patients and the public

## 2 What happens?



### Stages of research activity

#### Description of research

#### Basic/fundamental/discovery

#### Clinical/applied

#### Translational/exploitation

#### Purpose of research

**Knowledge expansion** – asks questions about health and disease. Research is approached as a scientific study rather than to address specific clinical needs

**Prevention, detection and diagnosis of disease and the development of interventions.** Research is focused on answering a specific health-related question, need or desire to improve services or care

Takes the findings from basic or clinical research and uses them to **develop new products and treatments** for disease and illness

#### What is involved?

Academics and researchers at university laboratories or research institutions

Clinical testing and observation of volunteers (either diseased or healthy)

Both laboratory and clinic-based aspects

#### Funders include

Government departments; research councils; higher education funding councils; charities

Government departments; National Institute for Health Research; Innovate UK; charities; industry

Industry; Medical Research Council (MRC) Technology; Innovate UK

#### Examples of successes

**DNA repair** – fundamental research into how a living cell functions and can be used to repair damaged DNA is being used to develop new cancer treatments.

**Ebola virus** – positive results from clinical trials indicate that an effective vaccine has been developed to prevent people from contracting Ebola within one year.

**Pneumococcal vaccine** – based on the results of an MRC-funded study, a vaccine was developed to prevent pneumococcal disease, one of the biggest vaccine-preventable killers of children in developing countries.

#### Examples of current programmes and projects

**Antimicrobial resistance** – the MRC is leading a cross-funder initiative to acquire new insights into the emergence and spread of antibiotic resistant bacteria.

**Genomics** – through the 100,000 Genomes Project which aims to sequence the genomes of NHS patients with a rare disease or cancer, the UK is integrating whole genome sequencing into a comprehensive healthcare system. This project combines elements of both research and clinical application in routine NHS care.

**Regenerative medicine** – the Biomedical Catapult is a funding partnership supported by Innovate UK and the MRC that helps businesses and researchers to address healthcare challenges.

**Diabetes** – Cell and Gene Therapy Catapult has formed a new company to develop a novel treatment for type 1 diabetes.

## 3 How much is spent?



### Who are the principal funders of health research?

Collectively, the public sector, industry and charities invest around **£8 billion per annum in UK health research**. Industry is the largest contributor, accounting for around half of total investment, with the public sector and charities contributing the remainder.

### While not comprehensive, additional sources of funding for health research (non-domestic) include:

- The Department of Health Global Health Research Fund uses the NIHR to deliver equitable research partnerships with a budget of £429.5m (up to 2021), to deliver health impacts of direct and primary benefit to people in developing countries, in line with UK aid and international development strategy.
- The Ross Fund Portfolio – **over £700 million (out of a total fund of £1 billion) is expected to be allocated between 2016 to 2021** to research and development programmes managed by the Department for International Development and the Department of Health. These programmes aim to develop, test and deliver a range of new products (including vaccines, drugs and diagnostics) to help combat the world's most serious diseases in developing countries.
- **The Global Challenges Research Fund (£1.5bn) and the Newton Fund (£735m)** provide funding for global health research projects from BEIS, undertaken by UK organisations working in partnership with countries around the world as part of a portfolio which covers all areas of science.

## 3 How much is spent? *continued*

### Principal funders of UK health research in 2015

#### Medical Research Council (MRC), £772m

MRC's funding includes research grants to researchers in universities, medical schools and research institutes, and training postgraduate students and research fellows. Around 25% of MRC programme expenditure is spent in partnership with others, e.g. the Francis Crick Institute, UK Biobank, the Farr Institute

#### Other government, £540m

Includes funding from the Department for International Development, other research councils, Innovate UK, and devolved nations

#### National Institute for Health Research (NIHR), £1,034m

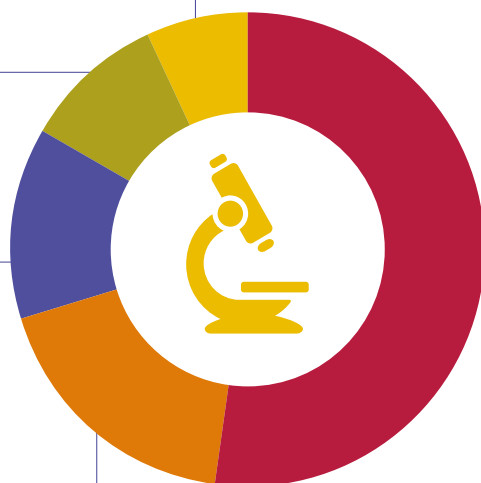
NIHR funds research, provides research facilities, works with the life sciences industry and charities, and trains and supports health researchers

#### Industry, £4,178m

Industry funders include large UK-based pharmaceutical companies

#### Charities, £1,443m

Charities fund research in all areas of health and disease across all stages of the research process



## 4 What did we find?



**Collective action is facilitated by various groups and forums that coordinate and align activities within human health research**



### Office for Strategic Coordination of Health Research (OSCHR)

#### Role and purpose

Facilitates conversations about how the funding agencies can collaborate in areas of research activity

#### Members

CEOs of the government funders of health research, along with independent representation from the NHS, life sciences industry and the medical research charity sector

#### Examples of work and impact

OSCHR has facilitated discussions about organisational funding for specific areas of health research including genomics, stratified medicine, and health informatics as well as the joint MRC-Innovate UK efforts to establish the [Biomedical Catalyst](#)



### UK Clinical Research Collaboration (UKCRC)

Convenes a wide range of stakeholders in the clinical research environment to facilitate collaboration

OSCHR partners plus representation from devolved nations health departments, charities, academia, industry, regulators and patients

Published [data analysis](#) of the distribution of health research spending by government and charities



### UK Health Funders Forum for Research in Developing Countries (UKCDS)

Brings funders together to share information and promote opportunities for collaboration

Representatives from government and charitable funders (secretariat provided by the [UK Collaborative on Development Sciences](#))

Mapped over 300 global initiatives with the aim of strengthening the focus on health research in low- and middle-income countries



### Ministerial Industry Strategy Group (MISG)

A forum to discuss and promote a strong and profitable UK bio-pharma industry

Department for Business, Energy & Industrial Strategy, Department of Health and HM Treasury ministers, industry and trade body representation

Instigated a 'task and finish' group, comprising industry and government representatives, to identify action needed to improve the UK research and development environment



### Association of Medical Research Charities (AMRC)

Works with members to share information, encourage collaboration, and share good practice and learning

140 member charities

Encouraged its members to use [Researchfish](#) to demonstrate the impact and outcomes of investing in research



## 4 What did we find? *continued*



### **Analysis of data on health research expenditure has facilitated discussions on funding gaps and opportunities, improved coordination and directed investment**

The UK Clinical Research Collaboration, with funding from the MRC, developed the Health Research Classification System (HRCS) which has been used to analyse health research expenditure in the UK. Three portfolio analyses have been conducted using the HRCS over the period 2004 to 2014. The [most recent analysis](#) used data from 64 public and charitable funders.

The first analysis showed that investment in prevention research was low – only 2.5% of expenditure was on primary prevention of disease or on promoting well-being. In response, government departments, research councils and medical charities established the National Prevention Research Initiative (NPRI) to promote research into chronic disease prevention and to increase funding in this area. It invested £34 million between 2005 and 2014.

A recent evaluation concluded that the NPRI had strengthened UK public health research. Research undertaken had helped to develop understanding of the potential effect of interventions in areas such as obesity, heart disease, smoking and alcohol consumption. In response to the review, research funders such as charities, Research Councils and DoH are supporting a new initiative in prevention research for non-communicable diseases such as diabetes and obesity.

### **A clear strategy for translating and exploiting the results of research**

The MRC's role in supporting translational research has been developed in partnership with the OSCHR, and involves close working with organisations such as NIHR and Innovate UK.

The MRC's aims for translational research are:

- driving innovation;
- speeding up the transfer of the best ideas into new interventions; and
- improving the return on investment in fundamental research.

Funding schemes, dedicated to taking fundamental discoveries through pre-clinical and clinical development to human proof-of-concept studies, are central to its approach to supporting translational research. One such example is the Biomedical Catalyst (BMC), an integrated programme operated in partnership with Innovate UK. BMC supports scientists from academia and industry in moving their research more quickly from discovery to commercialisation. Innovate UK and the MRC have joined forces to commission and co-fund a [joint interim evaluation of the BMC](#).



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