The role of the Wellcome Trust in support of biomedical research

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ABSTRACT The mission of the Wellcome Trust is ‘to promote and foster research with the aim of improving human and animal health’. In this paper the Director of the Wellcome Trust describes the organisation’s history, its current position in the UK and international arenas, and the strategies the Trust will pursue in meeting its mission. This includes an explanation of the role of the Trust in enhancing the UK science base by focusing on support of knowledge creation, scientific careers, infrastructure and the translation of research from the laboratory to the clinic, and in promoting the public’s appreciation of and confidence in science.

The history of the Wellcome Trust

The life of the Wellcome Trust’s benefactor, Henry Solomon Wellcome, is an extraordinary story. He was born into deep poverty in northern Wisconsin, USA, in 1853 and died, 83 years later, in London as a celebrated and greatly honoured millionaire. It is possible to trace the roots of the Wellcome Trust back to the 1870s when, after graduating from the Philadelphia College of Pharmacy, the young Henry Wellcome got a job as a travelling salesman with an American pharmaceutical company. After a few years he received a contract from his employer giving him exclusive agency for their products in Europe, Asia, Africa, the East Indies and Australia. Wellcome therefore moved to London in May 1880 and established a partnership, Burroughs Wellcome & Company, with his college friend Silas Burroughs. Arguably the firm was started in the right place at the right time. There were no big manufacturing chemists in Britain, no chains of chemists’ shops, and large-scale pharmaceutical production was limited to a few well-known lines. Most importantly, the new compressed tablets from America only needed to be made known and available for their sale to be assured.

This is exactly what Wellcome did. He coined the name ‘Tabloid’ and registered it as a trademark in 1884. He then went on to use his considerable marketing and advertising skills to guide the company through a period of prolonged growth. The only major problem for Wellcome in these years was his deteriorating relationship with his partner. At one stage Silas Burroughs issued a writ to dissolve the partnership but this was rejected. However, Burroughs died of pleurisy 15 years after they had formed the business, giving Wellcome sole control of the company. Wellcome saw this as fortunate, writing at the time about Burroughs’ death of a ‘wonderful relief from the strain of worry that has weighed me down for so long’.

In 1924, Wellcome established the Wellcome Foundation as a private company with a capital of £1 million. The firm was to co-ordinate all branches of Burroughs Wellcome & Co in Britain and abroad, including the associated scientific and research institutes. In 1930 a site was bought in Euston Road, London, to house the research labs and museums that Wellcome had been collecting for in the later part of his life. The Trust came into existence under the terms of Sir Henry Wellcome’s will when he died in 1936. Wellcome set up two funds, one for research and the other for the support of his museums and libraries. The ‘Research Fund’ – as it was known then – required the Trustees to support research ‘which may conduce to the improvements of the physical conditions of mankind’.

Although the Wellcome Trust is now known as a large and wealthy organisation, this has only really been true for the last decade or so. It took 20 years for the Trust to spend its first million pounds and by 1970 its total expenditure – over a 30-year period – amounted to only £50 million (Fig 1). As recently as 1981 the Trust was spending about £1 million a month; by 1987 this had expanded to about £1 million a week, and by 1999 to over £1 million a day. For the year 1999/2000 the Trust will spend some £600 million supporting biomedical research. The growth in the 1980s and 1990s was due to the Trust’s diversification of its asset base, culminating in the sale of its remaining shares in the Wellcome Foundation to Glaxo plc in 1995. Although the Trust is a shareholder in the company GlaxoWellcome, in all other respects it is entirely independent of the pharmaceutical industry.

The Wellcome Trust today

It is the sales of the shares, coupled with astute investment decisions, which has provided the Trust with its current financial strength. With assets of around £13 billion, over
the next five years the Trust will be able to build on its investment in the biomedical sciences by spending over £2 billion supporting 3,000 researchers at 300 locations in 30 different countries. Put in context, this means that the Trust supports about 10–20% of public funded biomedical research in the UK, and – given that the UK’s share of world biomedical publications is about a tenth\(^2\) – 1–2% of global biomedical research outputs.

The results of Wellcome Trust funding are illustrated in Fig 2, which compares the output of biomedical research publications for the world, the United Kingdom and the Wellcome Trust. The disciplines are defined using a combination of journal and title keyword text searches of bibliographic databases\(^3\). The Wellcome Trust’s output is determined by looking at the funding acknowledged at the end of a paper and this graph shows those fields where the Trust is particularly strong\(^4\). As it takes some time for research funding to lead to publications, the data reflect past activity. Therefore, the output of our recent increased investment in genetics research – which accounts for about 45% of our current commitment – is not shown. Figure 2 shows that the Trust funds significantly more research than would be expected in the UK in the fields of neuroscience, immunology and tropical medicine, all areas of current and historical interest to the Trust.

An important component of the Wellcome Trust’s portfolio is its support for clinical research in the NHS. Indeed, last year 19% of successful project and programme grants were awarded to individuals working within the NHS. In addition to our funding for project and programme grants, the Trust’s career development programme provides specific support for clinical research fellows, and manages our Clinical Research Facilities and the Cardiovascular Initiative.

Figure 3 illustrates the Wellcome Trust’s contribution to biomedical research publications in the NHS. The Trust’s support within the NHS is especially strong in the fields of neuroscience and genetics. Perhaps the most worrying observation to be made from Fig 3 is the comparatively low output in genetics research in the NHS. If the massive investment in the Human Genome Project is to be effectively exploited, it is essential that increased commitment be made to support high quality patient-oriented genetics research in the UK. But this must not be done at the expense of other NHS sponsored research. Rather, it is going to require fairly substantial increased investment by the government.

**The Wellcome Trust’s future**

The Trust is currently developing a corporate strategy, the foundation of which will be the mission ‘to foster and promote research with the aim of improving human and animal health’. At present, three strands guide our future programmes. The first is about ensuring that the research we support is carried out by the best people in the best places. The second is to fund the best quality research. The third is technology transfer, and how best to get the research we support in the lab into practice in the clinic. These strands are not independent – good facilities and good staff will lead to better research and health outcomes – but require different approaches to funding.

**Career development**

As an example, the purpose of the Wellcome Trust’s Career Development Programme is to provide opportunities, through fellowships and scholarships, for scientists to develop into highly skilled independent researchers who

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**Fig 1. The growth of the Wellcome Trust: annual expenditure (1971/2–1999/0)**. Notes: (a) data prior to 1986/7 collected using a different accountancy procedure and not directly comparable; (b) in 1992/3 an extraordinary payment of £257 million was made to the Burroughs Wellcome Foundation in the USA; this is excluded from the graph; (c) data for 1999/0 are estimated.

![Graph showing annual expenditure of the Wellcome Trust from 1971/2 to 1999/0](image-url)
can make important contributions to the advancement of biomedical knowledge. The Trust has a portfolio of personal award schemes for clinical research fellows to support individuals from the early stages of their research career through to senior academic level.

A fundamental feature of the Trust's Career Development Programme is our efforts to address the disgraceful career structure available to scientists working in the UK academic system. UK scientists working in universities are underpaid. They earn 70% of private market salaries, 67% of that earned by clinical scientists and less than 80% of that in other public sectors. In response to these awful statistics, the Trust has enhanced stipends and salaries to our PhD students and research fellows. In June 1999 we announced that all UK-based, scientific, non-clinical Trust-funded research fellows who are on contracts of three years or more and funded within the Trust's Career Development Schemes will receive a 30% enhancement above the basic university pay scale. Whilst the principal objective of this policy was to allow the Trust to recruit and retain the best scientists, our announcement was made just before publication of the Bett Report. Naturally, we hope that government will follow suit and implement the recommendations contained in the Bett report. We therefore welcome the recent initiatives announced in the spending review and white paper.

Infrastructure

In addition to supporting career development, the Wellcome Trust has been a major contributor to the scientific infrastructure of the UK. For example, between 1992 and 1997 the Trust spent some £250 million supporting equipment and buildings in the UK. Despite this support, and largely because of repeated government cuts in the 1980s and early 1990s to the funding councils, the state of laboratories and the outdated nature of technology were highlighted in the Dearing Report as needing urgent and massive investment. As a result, in 1998, the Wellcome Trust explored with government, through the Treasury and the Department of Trade and Industry, the nature of this problem and ways in which the interests of the scientific community and the country could best be served. The outcome of these discussions was the £750 million Joint Infrastructure Fund (JIF), the objective being to transform the working environment, and enhance the research capability of the UK research community by creating a flexible scheme that can respond to the real needs of the academic research community.

The third of the five rounds was completed in March 2000, resulting – in partnership with government – in the award of 109 grants to a value of £597 million. However,
the most worrying statistic is the £3 billion that have been requested — this is over four times the total size of the fund, with two rounds remaining. What this shows, of course, is that we had all seriously underestimated the problem. There is obviously a massive pent up demand for updating the scientific infrastructure of the UK. The recently announced Science Research Investment Fund (SRIF)4 goes some way toward addressing this. Nevertheless, a mechanism must be found, by government, to put in place long-term measures to ensure the continued improvement of university infrastructure. If not, the UK remains in danger of losing its position at the forefront of scientific research.

DNA to health: exploiting the Human Genome Project

Once we have the best people working in state-of-the-art labs we can then begin seriously to address our scientific strategy for the next millennium. By looking at the Wellcome Trust's support for genetics and post-genomics research, I would like to illustrate how we are doing this.

The Trust has had a long history in supporting genetics research, most notably through the Human Genome Project (HGP). However, we see this as the beginning of a process that should lead to new therapeutics. Therefore an essential component of our strategy is to ensure that the genome sequence data will translate into improved healthcare.

The Wellcome Trust, in collaboration with the UK Medical Research Council (MRC), first began supporting the HGP in 1992 with a £45 million investment to establish the Sanger Centre in the UK. As the project progressed, and the need to keep the data in the public domain became ever more apparent, the Trust invested another £60 million in 1996 and a further £105 million in 1998, bringing our current total commitment to the project to £210 million. This has meant that the Trust is the largest single contributor to the HGP, supporting about one-third of the sequence. As a result, a 'working draft' sequence was published in June this year.

More importantly, however, the Trust's involvement has been crucial in leading the fight to keep sequence data in the public domain. Although there is an agreed policy of immediate and free release of sequence data this has, at times, been put under threat because of the increased involvement of the private sector in genome sequencing. This does not mean that the Trust is 'anti-business' — our position is simply to ensure that medical research progresses as rapidly as possible from the lab to clinic. The best way to achieve this is to publish the data in the public domain, allowing access to all scientists, whether based in the UK or abroad, and whether working in universities or for industry.

The clinical benefits of genetics research that the Trust and others are funding will only become apparent when the information arising from sequencing and other efforts is combined with population studies of human diseases. The Wellcome Trust has begun to address some of these issues through a new £100 million post-genomics initiative. In the first instance funding applications will be considered for the development and maintenance of databases; collections of resource material; and short visits to promote the sharing of technologies.

In parallel to this initiative, the Wellcome Trust has been considering how best it can support — in partnership with the MRC and others — a national population biomedical collection or survey. What is especially exciting about this project is that it will enable the integration of laboratory-based, basic science, often developed around our growing knowledge of genetics, with more applied areas of research such as clinical epidemiology, medical sociology and public health research. Obviously the NHS will be key to the success of such a project given that it is the guardian of national patient records.

Getting research into practice

A number of other initiatives have resulted from this determination to see that the new knowledge generated by our support for genetics — and other areas of basic research — leads as rapidly as possible to the clinic. One way the Trust is encouraging this is through our patient-oriented Clinical Research Facilities. Undoubtedly, the UK has the invaluable advantage of a National Health Service. However, the financial pressures on the NHS and the various health care reforms over the past decade have — understandably — meant that patients requiring treatment take priority, leaving no spare capacity that could be used by researchers. Through our £16 million Clinical Research Facility scheme, the Wellcome Trust is enabling universities and hospital trusts to work together to create new facilities dedicated to patient-oriented research. These have been established in Birmingham, Cambridge, Edinburgh, Manchester and Southampton.

Likewise, the establishment of Catalyst Biomedica Ltd — a business subsidiary of the Trust — aims to improve the likelihood that a medically important product will be developed from biomedical research by enabling the appropriate transfer of results to commercial development. This involves a range of activities — from providing a business development service to host institutions and researchers, to administering a development fund for translational research.

However, a key component to the success of the majority of today's research is public confidence in, and appreciation of, biomedical science. It is important that, as scientists, we do not underestimate this. Many people are scared of the 'Big Brother' eugenic connotations associated with genetics, and especially population genetics. They are disturbed by inaccurate stories appearing in our media. They are unsure and feel alienated because we, as scientists, have failed in explaining the benefits of our research? The real question — and it is a social question — is how do we begin to build confidence in our research. Most crucially, it is improving the public appreciation of science that will enable new technologies to be 'pulled' into practice.
Conclusion

By using its influence, through funding and policy, the Trust will be able to develop biomedical research, both in the UK and abroad. This can be done by providing firm and independent leadership whilst working in partnership with government, industry and other funding organisations. That said, the Trust does have its own priorities and is distinct from government-funded R&D in several aspects. First, the Trust is independent of Government science policy priorities and as such can choose where it sees fit to fund research. Second, we are able to use our discretion in being as flexible as possible in the funding of researchers, subject to our need for research excellence. Third, because of our funding approach (ie all projects are ‘front funded’) we, in effect, start off each year with a clean sheet and can respond rapidly to scientific opportunities as they arise. Fourth, although we focus the majority of our funds within the UK, we are not bound to do so. We could, if there were sound scientific arguments, place a greater amount of our research investment overseas. Fifth, apart from our ‘core’ science funding activities, the Trust makes a substantial (and unique) investment in areas such as the History of Medicine, public appreciation of science and other areas allied to research funding. Finally, when compared to many other medical research charities we do not have a single disease focus. These values will enable the Trust to continue to foster and promote research with the aim of improving human and animal health as we enter the new millennium.

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Further information concerning the Trust's activities can be found at www.wellcome.ac.uk. This features details of a number of Wellcome Trust publications, including the Annual Review, the Annual Record and The Wellcome News, all of which can be obtained from Lucy Evans, The Wellcome Trust, 183 Euston Road, London NW1 2BE. E-mail: marketing@wellcome.ac.uk.