



Review of Wellcome Trust PhD Research Training  
The Supervisor Perspective



The Wellcome Trust

# Acknowledgements

The Wellcome Trust would like to thank all the supervisors who not only managed to fit 'questionnaire completion' into their busy timetables but also made their contributions so illuminating.

The Trust gratefully acknowledges the significant contributions of Iain Frame, Liz Allen and Patricia Chisholm in the production of this report. The Trust also acknowledges the work of Gail Fawcett and Damian de Aspey for their work in administering the questionnaire and processing the data and Sally Watts for her help and advice in designing the report.

Copies of this report, and of previous reports in this series, can be obtained on request from the Trust's Marketing Department (Tel: 020 7611 8651; Fax: 020 7611 8545; E-mail: [marketing@wellcome.ac.uk](mailto:marketing@wellcome.ac.uk)) or from the Trust's website ([www.wellcome.ac.uk/publications](http://www.wellcome.ac.uk/publications)). Correspondence concerning scientific or academic issues arising from the report should be addressed to Dr P M Chisholm, Scientific Programme Manager, Career Development Section, Wellcome Trust, 183 Euston Road London NW1 2BE.



Review of Wellcome Trust  
PhD Research Training

**The Supervisor Perspective**



	Preface	2
	Executive summary	3
<b>one</b>	Introduction	<b>6</b>
	1.1 Background	6
	1.2 Aims	8
	1.3 Method	8
<b>two</b>	The purpose of PhD training	<b>10</b>
	2.1 Introduction	10
	2.2 Supervisors' views	11
<b>three</b>	Being a PhD supervisor	<b>15</b>
	3.1 Introduction	15
	3.2 The role of the supervisor	15
	3.3 Working with PhD students	16
	3.4 Working with PhD training and supervision guidelines	21
	3.5 Responsibility for aspects of PhD training	23
<b>four</b>	Being a Wellcome Trust PhD supervisor	<b>25</b>
	4.1 Introduction	25
	4.2 Aspects of Trust PhD support	25
	4.2.1 Review process of applications	26
	4.2.2 Trust contact with students	27
	4.2.3 Trust student stipend	27
	4.2.4 Duration of Trust studentship	28
	4.2.5 Trust research costs	28
	4.2.6 Trust travel allowance	29
	4.2.7 Student attendance at Trust meetings	29
	4.3 Financial support for students	30
	4.4 Training opportunities	31
	4.5 The Trust's mixed portfolio of studentships	32
	4.6 The calibre of Wellcome Trust-funded students	33
	4.7 Recruitment and retention of high-calibre PhD students	34
	4.8 The perceived challenges for the future	36
<b>five</b>	Discussion	<b>39</b>
	Appendix	<b>42</b>
	Appendix: Questionnaire	42

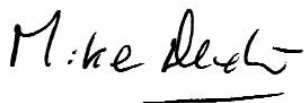
# Preface

The quality of the research training received by UK science graduates early in their careers has a profound influence on whether or not they choose to seek a long-term career in research. Hence, it is crucially important that the quality of PhD training programmes in UK higher education institutes is high, and that these are designed to meet the needs and aspirations of young people and enhance their ability to contribute to the science base.

The Wellcome Trust attaches considerable importance to assessing the outcomes of its various personal support schemes and monitoring the subsequent careers of the individuals it funds through them. Two previous reports, which form part of a wide-ranging review by the Trust of its PhD research training support, looked at the career paths of a 1988–1990 Prize Student Cohort and at the opinions of a large group of current Trust-funded PhD students at various stages during their PhD. This report, which presents the views of a substantial number of the academic supervisors of Trust-funded current or recent PhD students, is a natural successor to the previous reports and presents a snapshot of UK academic opinion on the quality of the Trust's PhD training programmes.

A number of initiatives within the wider UK academic and political landscape are wrestling with some of the key issues in PhD research training facing the universities, Government and the research-funding agencies. These include the Research Careers Initiative launched by the Committee of Vice-Chancellors and Principals (now UK Universities) which report to the Minister for Science, and the comprehensive Higher Education Funding Council for England (HEFCE) Review of Research Policy. The latter initiative has advocated the setting of national minimum standards for UK PhD student training and has plans to include quality assessment of PhD training within the national Research Assessment Exercise.

Whatever strategies are devised to improve the quality of PhD research training within UK universities, their successful implementation will depend on the acceptance and willing participation of the academic research community. A sample of this community has provided its views in this report. The group of nearly 200 individuals is currently responsible for the supervision of more than 500 full-time PhD students in the biomedical sciences, more than half of whom are supported from sources other than the Wellcome Trust. The opinions contained in this report therefore have relevance to contemporary issues in UK PhD student training in the biomedical sciences and not simply to issues pertaining to the Trust. We hope the opinions reported here will feed into the national debate on the quality of UK PhD student training.



**Dr T Michael Dexter FRS**  
Director, The Wellcome Trust  
*July 2001*

# Executive summary

This study explored the opinions and experiences of the academic supervisors of Wellcome Trust-funded PhD students. It is the third in a series of studies examining Wellcome Trust PhD research training and follows on from *The Student Perspective* and *Career Paths of a 1988–1990 Prize Student Cohort*, published in March 2000. Taken together, the reports constitute a comprehensive review of just over a decade of PhD student support by the Trust.

Nearly 300 UK academic supervisors of current Wellcome Trust-funded PhD students were invited to complete a questionnaire to provide their perspectives on their role and responsibilities in supervising PhD students. More than 60 per cent responded; their views provide a snapshot of UK academic opinion on contemporary PhD training in the biomedical sciences.

## Key findings

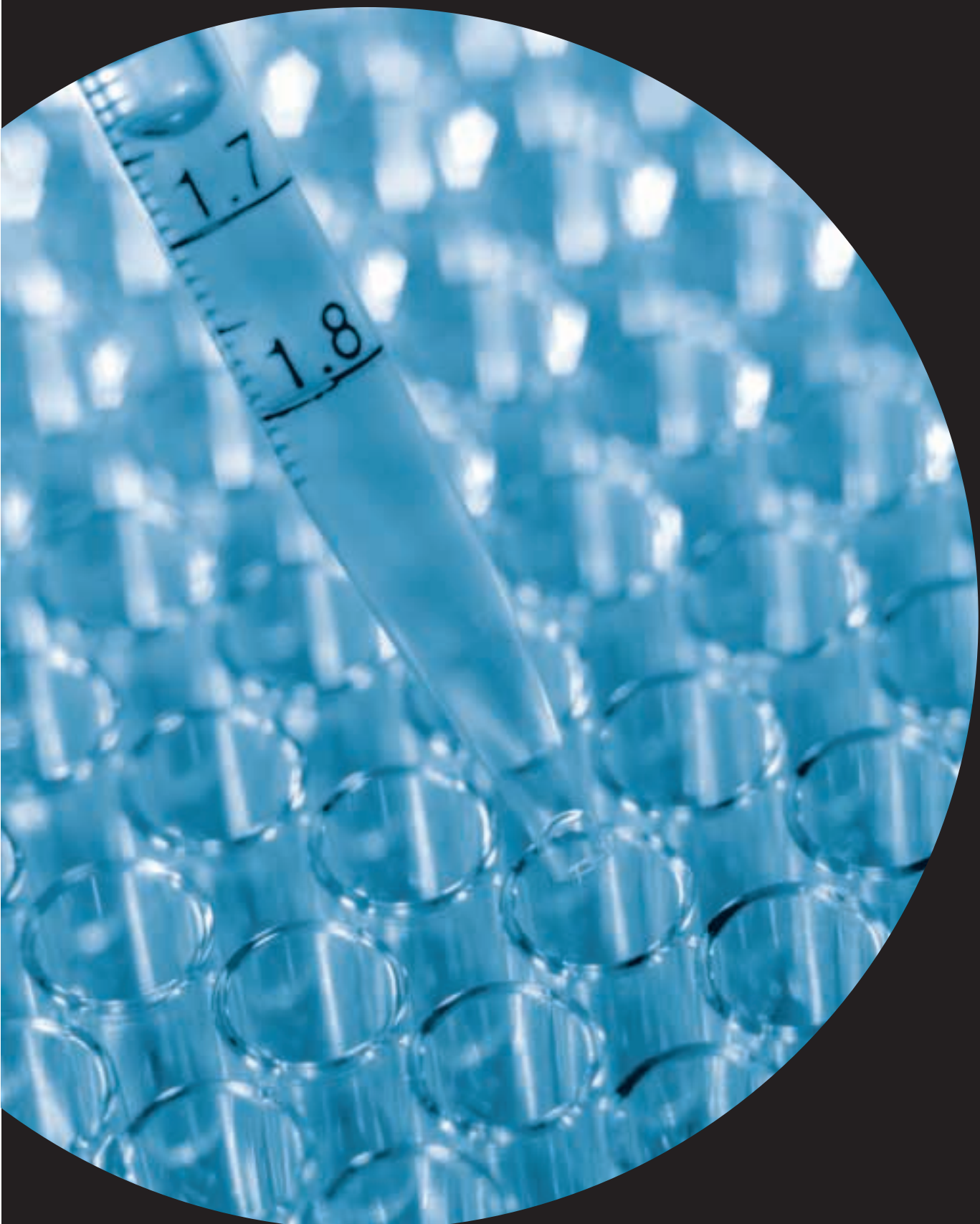
- The 172 respondents were currently supervising more than 500 full-time PhD students. Sixty per cent of these students received financial support from sources other than the Wellcome Trust; sources of funding included the UK Research Councils, other UK charities, university endowments and non-UK Government funds. The majority (71 per cent) of supervisors were currently responsible for up to three students, 17 per cent were supervising four or five students and 9 per cent were supervising six or more students. On average, supervisors spent almost two-thirds of their time on research, a quarter of their time on administration, and a tenth of their time on teaching.
- Most supervisors (83 per cent) had experience of working with an institutional mentoring or co-supervision policy and in general viewed this positively, although there was concern that such policies should not increase bureaucracy for the supervisor.
- Over three-quarters (77 per cent) of supervisors had no experience of working with formal PhD guidelines or specific academic PhD contracts. Those who did have experience with training guidelines found them useful, although they were keen that such guidelines should not be overly prescriptive.
- The majority of supervisors (72 per cent) felt that the purpose of PhD training was to train students for a career in scientific research in general, and there was a general consensus that it was unrealistic to train a student **solely** for a career in academic research. A fifth of supervisors felt that the purpose of PhD training was to train students for a wide range of careers, not necessarily only for scientific research.
- Supervisors described their role as multifaceted, with virtually all focusing on both the student and project. They gave an array of descriptions of the role of a supervisor, ranging from 'teacher', 'trainer' and 'mentor', to 'father' and 'mother'.
- There was strong feeling that the primary responsibility for the major aspects of PhD training – including financial administration and monitoring academic progress – rested jointly with the student and the supervisor. However, there was some feeling that universities or funding agencies could take greater responsibility for the broader training requirements of PhD training, such as career development and advice.

- Aspects of the Wellcome Trust's management of its studentships (review processes, student contact, student stipend, research costs and studentship duration) received high approval ratings from the supervisors. However, the usual three-year duration of studentship support was a subject with which many supervisors expressed dissatisfaction. Some supervisors expressed the view that all studentships should be for a period of four years.
- Students who did not submit their thesis during the period of their financial support were supported by various means, usually supervisors' research contingency funds or the student's personal funds. The university or university departments took limited responsibility for providing financial support to students in these circumstances.
- Supervisors were in favour (75 per cent) of the Wellcome Trust retaining a mixed portfolio of types of PhD studentship: three-year Prize Studentships, Four-Year Training Programmes and subject-dedicated studentships.
- Just over a third (37 per cent) of supervisors believed that the Trust does not need to offer further transferable skills training to the students it funds. In most cases this was because of a belief that host universities already have excellent training programmes of this kind. There was, however, suggestion that the Trust might provide careers guidance and training in ethics, communication and public engagement activities.
- Just less than half (44 per cent) of supervisors thought that the calibre of Trust-funded students was higher than that of other students; 45 per cent believed there to be no difference. The main reasons suggested for the higher calibre of Trust-funded students were the higher Trust stipend and the fact that supervisors could nominate non-UK EU nationals for Trust support.
- Almost half of the supervisors felt that it is now more difficult to recruit PhD students than it was five years ago. The main reasons given were that a scientific career is unattractive financially and that the long-term career prospects for students are poor.
- Suggestions for improving the quality of UK PhD student recruitment centred on improving academic salaries and career structure. Other suggestions included improving science education in schools, reducing the numbers of science undergraduates, reducing the number of available PhD studentships, and improving the profile of scientists and science in general.



one

Introduction



# Introduction

## 1.1 Background

The Wellcome Trust's mission is to foster and promote research with the aim of improving human and animal health. The production of excellent research is dependent on a high-calibre, well-trained research community, which in turn depends on high-quality PhD research training, in combination with excellent research facilities.

The Wellcome Trust currently funds full-time PhD students through three main routes: three-year Prize Studentships, awarded to holders of Wellcome Trust major awards (Programme Grants, Senior and Principal Research Fellows); Four-Year PhD Training Programmes, which are run by selected groups of academics at UK institutions; and a smaller number of specific subject-dedicated studentships offered in research disciplines which it is felt need particular support<sup>1</sup>. Until recently, the majority of Trust-funded studentships were three-year Prize Studentships. However, with the introduction and expansion of the Four-Year PhD Training Programmes, there are now equivalent numbers of students training through the Prize Studentship Scheme and Four-Year PhD Training Programmes. Students supported through subject-dedicated initiatives remain a relatively small proportion of the total.

Given the importance it attaches to the production of well-trained scientists, the Trust has always maintained a keen interest in the students it funds. Two previous reviews<sup>2,3</sup>, published in 2000, explored the research training experiences and the career path choices made by Trust-funded PhD students. This review, the third in the series, adds the perspectives of PhD supervisors.

The opinions of supervisors were explored on a range of issues, including: experiences of working with Trust-funded studentships; the function and role of PhD supervisors; and the major challenges facing PhD supervisors. Individuals were also asked to comment on the current Trust policy of supporting a range of different types of PhD studentship and invited to suggest how this portfolio might be developed in the future. This report makes some comparisons between the views of supervisors and the opinions expressed by students in *The Student Perspective*.

All current<sup>4</sup> supervisors of Trust-funded PhD students were contacted in February 2001. A total of 282 individuals were contacted by e-mail and their opinions solicited by way of a questionnaire. The majority (84 per cent) of the supervisors were men. Supervisors were responsible for students funded through the range of the Trust's PhD programmes and most were also supervisors of students supported from other sources. The group as a whole therefore had interesting insights into the issues facing PhD supervisors from a broad perspective.

The 282 supervisors were based at a total of 34 higher education institutes in the UK and Republic of Ireland (Figure 1). For the majority of institutions (21) there were between one and five supervisors of Trust-funded students. Four institutions (University of Cambridge, University of Oxford, University College London and Imperial College) had between 20 and 55 supervisors of Trust-funded students.

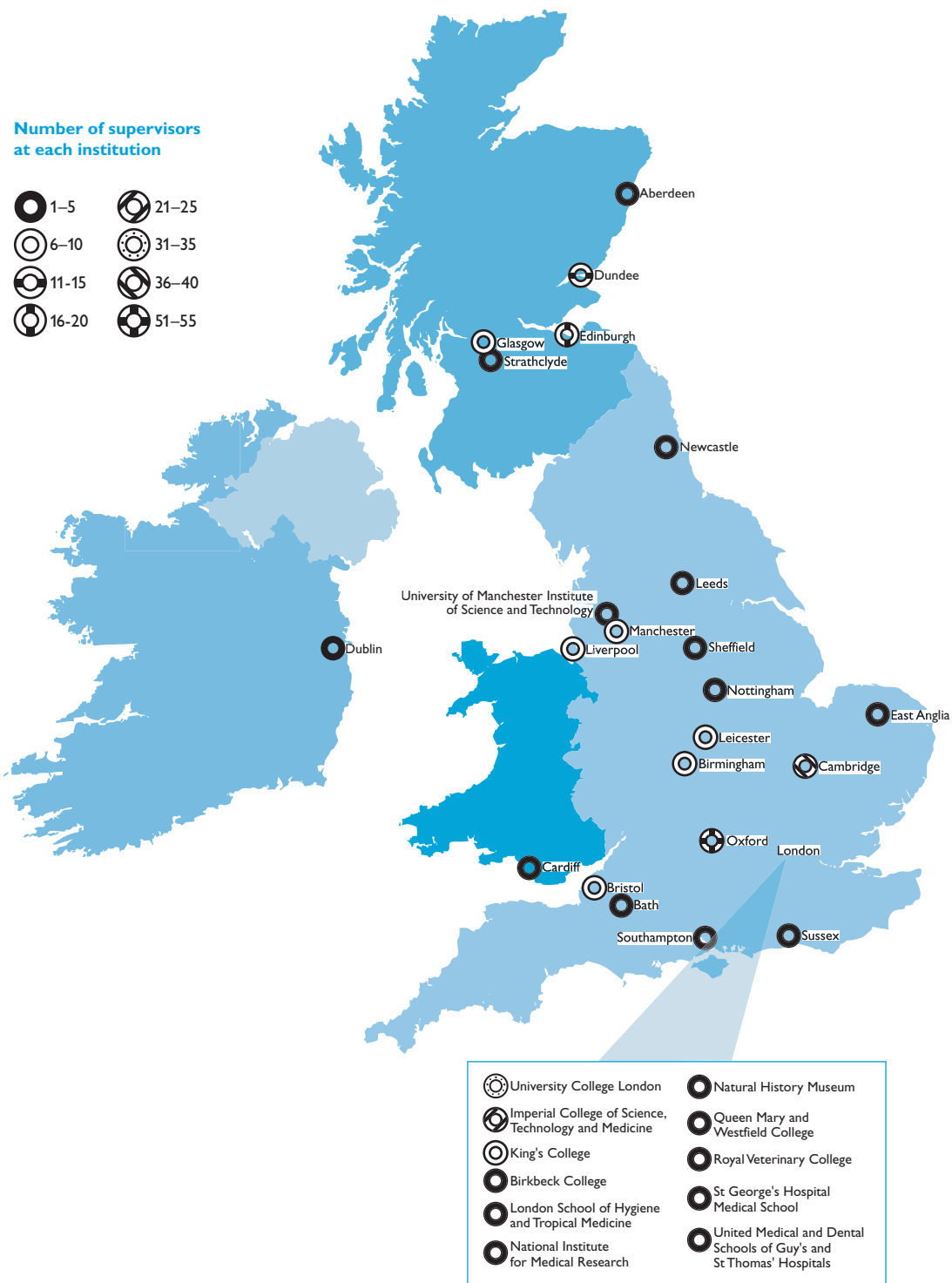
<sup>1</sup> Current subject-dedicated studentship initiatives include bioarchaeology, biodiversity, and cardiovascular research.

<sup>2</sup> The Wellcome Trust (2000), *Review of Wellcome Trust PhD Research Training: The Student Perspective*.

<sup>3</sup> The Wellcome Trust (2000), *Review of Wellcome Trust PhD Research Training: Career Paths of a 1988–1990 Prize Student Cohort*.

<sup>4</sup> Several supervisors were included in the survey who supervised subject-dedicated PhD students in initiatives that have been recently discontinued (for example, toxicology and veterinary studentships). This was to maintain the broad range of opinion from supervisors working in different fields. Trust Governors who were also PhD supervisors were excluded from the survey.

Figure 1 Affiliation of current Trust-funded supervisors



## 1.2 Aims

The specific aims of this survey were threefold:

1. to gain the supervisor perspective on issues previously explored with Trust-funded PhD students;
2. to identify the major challenges facing PhD supervisors today;
3. to inform the Trust's strategic thinking on the future of its PhD research training support.

## 1.3 Method

A questionnaire (see Appendix) was developed by the Wellcome Trust Policy Unit and staff managing the Trust's Career Development Programmes<sup>5</sup>. The questionnaire was designed to reveal opinions on a range of issues pertinent to PhD training, both in general and specific to the Wellcome Trust, and to identify the major challenges facing UK PhD supervisors today. In its draft form, the questionnaire was piloted with a group of current Trust-funded PhD supervisors, including members of the Trust's PhD Advisory Group, and with a number of the Trust's scientific staff who had been supervisors of PhD students.

In February 2001, the Trust's Policy Unit sent the questionnaire by e-mail to the supervisors of all current and some recent past Trust-funded PhD students. The e-mail contained a description of the purpose of the survey and an overview of the questionnaire contents. The Policy Unit is not directly involved in grant-funding decisions at the Trust, and its staff had no personal knowledge of individual supervisors.

Individuals were given two weeks to complete and return the questionnaire. As the questionnaire was distributed and returned (predominantly) by e-mail, it was possible to identify non-respondents and send an appropriate reminder. In total, 282 supervisors were e-mailed the questionnaire and 172 completed responses were returned, a response rate of 61 per cent. Five individuals were unable to complete the questionnaire due to pressure of time or because they felt they had insufficient knowledge or experience of PhD supervision.

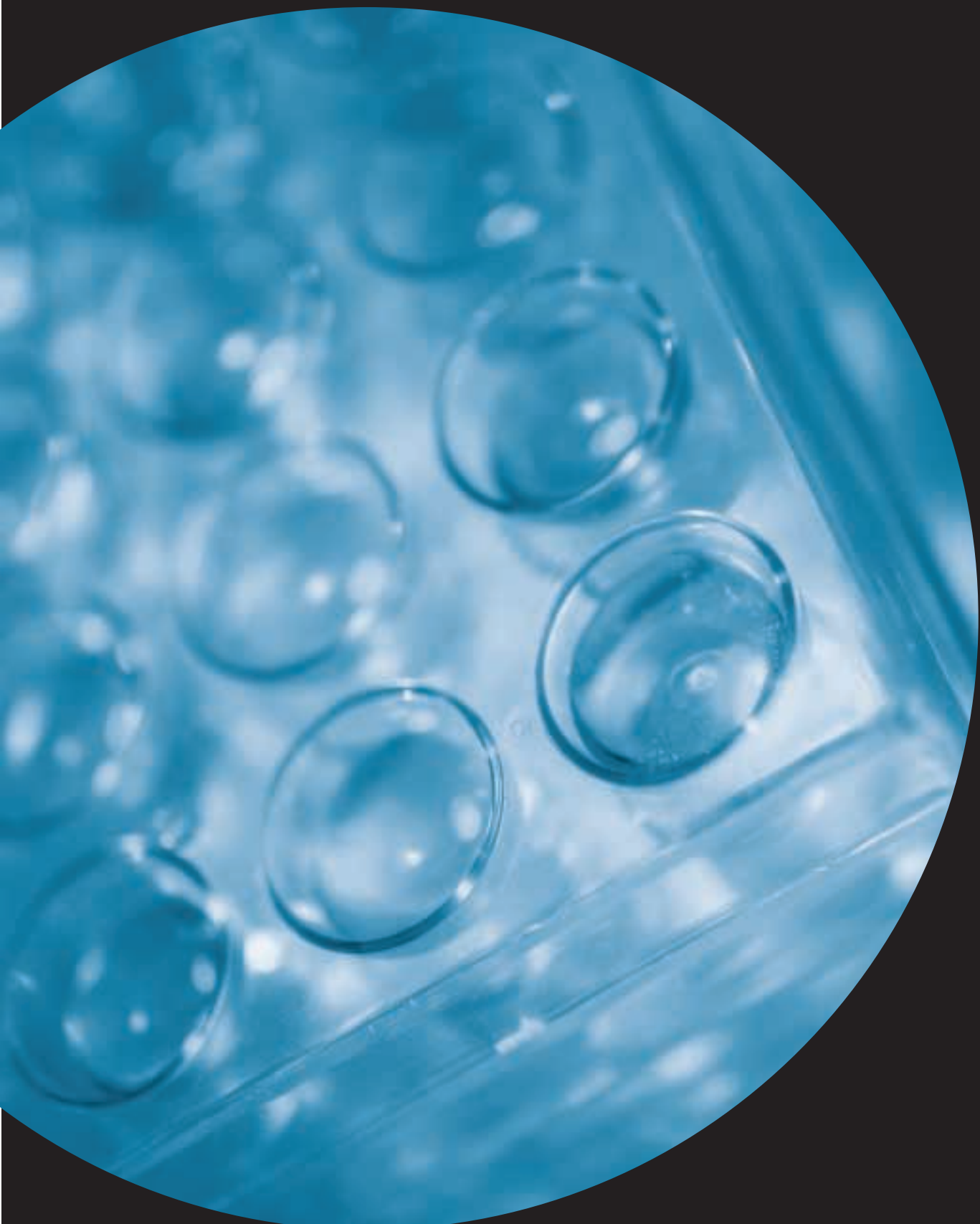
All data were anonymized, aggregated and stored in a separate database. This report displays respondents' information in two formats: firstly, in tabular and chart format derived from the more quantitative responses; and secondly, in 'quotation' format, where comments were received in free text in response to the more open-ended questions.

---

<sup>5</sup> The PhD Training Programmes at the Wellcome Trust are directed and managed by Trust staff responsible for the Career Development Programmes.

two

The purpose of PhD training



# The purpose of PhD training

## 2.1 Introduction

The purpose of PhD training is an issue that is currently widely debated and there has been much contemplation of whether the UK, Europe or indeed the world is over-producing PhD-qualified researchers<sup>6</sup>. Changes in UK academic institutions since the 1970s – in particular the shift in the balance between the number of contract and established (permanent) academic posts, the pay levels for academic research relative to other sectors<sup>7</sup> and the increased workforce mobility – have contributed to a view that, at least in the UK, there may be too many PhDs for the academic sector alone to absorb.

A recent study of the subsequent careers of US PhD students in the life sciences<sup>6</sup> reported that 61 per cent of a cohort of students who received a PhD in 1963–64 achieved a tenured position within ten years. For the cohort which graduated in 1971–1972, the percentage had dropped to 54 per cent; and for the 1985–1986 cohort, it dropped to 38 per cent. The Wellcome Trust's report<sup>3</sup> found similar evidence of an increasing departure of individuals from academic research: of a cohort of 135 PhD students funded by the Trust between 1988 and 1990, 81 per cent of students took a first position in academia but after five years the proportion employed in academic research had fallen to 46 per cent. Reasons given by these Trust-funded individuals for leaving the academic sector included the commonly expressed view of its 'low pay and lack of career structure'. However, the ex-students also offered more proactive reasons for their decision to leave, believing that there was a range of career opportunities on offer to well-trained researchers with appropriate transferable skills gained during the PhD.

From the supervisor perspective, there is evidence that the purpose of PhD research training may be changing to reflect the reality of careers in scientific research today.

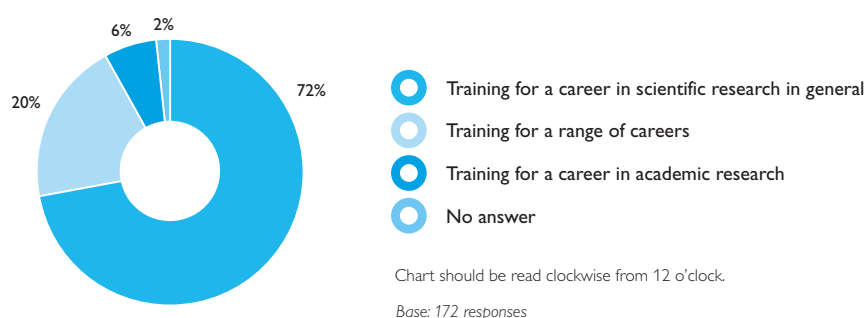
<sup>6</sup> See for example, National Research Council (1998), *Trends in the Early Careers of Life Scientists: Committee on Dimensions, Causes and Implications of Recent trends in Careers of Life Scientists*. Washington: National Academy Press.

<sup>7</sup> Hay Management Consultants (1997) commissioned as part of the Dearing Review (1997), *Higher Education in the Learning Society (The Dearing Report)*. The National Committee of Inquiry into Higher Education.

## 2.2 Supervisors' views

Supervisors were asked to select, from a choice of three, the definition that most closely fitted their perception of the *purpose* of PhD training (Figure 2). Respondents were prompted to give reasons for their choice.

**Figure 2** The purpose of PhD research training



Only a minority (6 per cent) of supervisors selected the most narrow, or 'purist' view of PhD training – where the primary purpose was 'training for a career in academic research' with a commitment to academia.

*"I have little interest in spending my time training individuals who do not aspire to making their own significant contribution...I do not wish to spend time with people who regard science as just a job like any other – I believe that science must be a passion to be worthwhile."*

*"As an academic I am very much against the idea of using specialist and expensive training...to provide someone with a job in the city. This is a waste of national university resources, not to mention supervisors' time."*

*"Training really good research scientists is the most difficult thing. Other purposes are okay secondary aims but should not interfere with the main purpose."*

Taking a wider view, a fifth of respondents described the purpose of PhD training in its broadest sense as 'training for a range of careers'. Supervisors were pragmatic in the reasons for their choice.

*"Skills learned during a PhD training are widely applicable. Most PhD students will not perform research because there are insufficient opportunities."*

*"Sufficient opportunities for pure research do not exist. A PhD project allows students to test their abilities and decide the direction of their subsequent career."*

*"Skills learned during PhD can be applied to a wide range of careers. Not all PhD students will be suited to remain in research."*

The majority of respondents took a middle position, with nearly three quarters (72 per cent) believing the purpose of PhD training to be 'training for a career in scientific research in general'. Training the next generation of research scientists was the goal, but it was felt that to assume that all PhD students would pursue an academic career was neither realistic nor appropriate.

*"Ideally, the majority of PhD graduates would fully exploit their training by pursuing a career in science or a closely related discipline. However, the low pay and poor career structure do not make this practical."*

*"It is no longer tenable to train people solely for research in an academic setting. Also, industrial research has moved much closer in style and content to academic research in the last ten years."*

*"I realize that most PhD students won't find long-term employment in research following their PhD; many of the skills acquired during the PhD are useful for careers in industry, patenting, education etc...."*

Indeed, good PhD research training was felt to be key to maintaining the supply of highly skilled research scientists to the science base and to the wider economy. Where opportunities in academia were becoming perhaps more limited, this was in fact thought to be a desirable scenario.

*"The need to have excellent scientists throughout the UK and world science and industrial base is clear. Only relatively few PhDs can currently expect to have an academic career."*

*"I used to think that it was to provide training for a career in scientific research in general, but two of my PhD students are now in unrelated areas (public health and teaching/science writing). Both students have told me that their training in how to think analytically and critically, and how to write and communicate effectively were a boon in their future careers."*

*"The PhD has changed in recent years, and needs to be viewed in this context. It is a preparation for many possible careers, and academic and even traditional industrial science will not absorb all PhDs. However, it does provide an excellent training in analytical thinking, technical skills etc, and hence is very valuable to the wider economy."*

Several supervisors went further, endorsing the view of a UK House of Lords Select Committee<sup>8</sup> that the movement of scientists between sectors was beneficial to the science base and should be positively encouraged.

*"If we are to provide training for an academic research career only, we are in danger of alienating industrial scientists (who often feel we do this anyway!). As the creation of small biotech/IT etc. companies is becoming so important for the creation of wealth and jobs in our society, we should be training students to be prepared to see, seize and realize opportunities when they arise."*

While a career in scientific research, in the broad sense, was viewed favourably, several supervisors felt that a career in a completely unrelated, non-scientific field, was however, less desirable and a waste of investment.

*"PhDs should be able to go into and succeed in industrial or academic research. However, it is a waste of a supervisor's time and Trust funds if a trained student goes into another completely unrelated career, e.g. investment banking."*

*"A PhD is essential training for any research career whether in academia or industry. I find it an appalling waste of time and resources to train PhDs only to be sales reps which is what a substantial fraction of those who do not pursue a research career end up as. It is not the point of a PhD to train for that. There is barely enough time necessary to train for research."*

<sup>8</sup> House of Lords Select Committee on Science and Technology (1995), *Academic Research Careers for Graduate Scientists*. London: HMSO.



Overall, there was a clear, practical recognition that there are currently insufficient opportunities for all PhD-trained graduates to remain in academia. US research<sup>6</sup> also suggests that opportunities in the wider economy, outside science, for PhD-trained life scientists are not as numerous or as attractive as previously. That research describes a 'crisis of expectation' among young scientists working within academia with little realistic prospect of obtaining career security in the sector.

One strategy suggested to maintain the employability of PhD students in the UK economy is to increase training in generic and transferable skills. There were, however, some concerns among the supervisors that moves towards a more generalist training for PhD students would be counter-productive; by encouraging more generic training the quality and strength of specialist science would be weakened. It was the view of a number of supervisors that this potential detrimental impact on academic research would have repercussions in the wider economy.

*"There is a current over-emphasis on the value of training for careers outside academic research. As a result, many potentially outstanding students are being trained to undervalue a career in academic work and basically to defect. There are serious long-term consequences for the quality of academic research in the UK."*

*"To me, the point of doing a PhD is to train yourself to be capable of doing science at the 'cutting edge' of your chosen field. Whilst this process may certainly make you more capable of working in any scientific research field (especially by learning how to carry out research and apply a scientific approach to problems), and may make you very capable of 'transferring' to a wide variety of other careers, I think that the PhD course itself should be resolutely directed to creating a person who can carry out and direct top-level research. If this aim is diluted we are in danger of lacking research leaders of the future with rigorous scientific training in their field who can compete at an international level."*

Many supervisors alluded to the need to train an appropriate number of talented life scientists to supply all appropriate sectors of the economy. It was suggested that the key might be to attract only the most committed and motivated students and to provide them with the best training possible, in the belief that junior scientists must be able to anticipate an exciting future in life-sciences research and feel that there are sufficient opportunities for them to thrive as independent scientists in a competitive world.

Achieving a balance between high-quality supply and effective demand is, of course, difficult and requires coordination from the plethora of stakeholders involved. One important first step might be for potential employers, research-funding agencies and supervisors to actively engage in the debate and perhaps develop clear PhD student recruitment, selection and retention policies.



# three

Being a PhD supervisor

# Being a PhD supervisor

## 3.1 Introduction

The previous section illustrated supervisors' thoughts on the general purpose of PhD research training. Clarification of the purpose of university PhD training is likely to dictate the specific responsibilities of academic supervisors and, therefore, determine the level of interaction with the student which is appropriate. This chapter explores perceptions among Trust supervisors of their role and compares these with the reality of being a PhD supervisor.

## 3.2 The role of the supervisor

Supervisors were asked, in an open-ended question, to describe the **role** of a PhD supervisor. Respondents (163) gave a vast array of descriptions, ranging from 'teacher', 'trainer' and 'mentor', to 'father' and 'mother'.

Almost all supervisors described their role as having a training focus, with a combination of shaping the research by providing technical and research support and guiding the student through the research experience. Thus the role of the PhD supervisor was felt to be to foster the development of an independent researcher who is able to think creatively and take the research forward.

*"Providing an intellectually challenging research project. Providing advice and constructive criticism. Helping the student to develop the intellectual and practical qualities required to be a successful independent research worker."*

*"Inspire students to develop a questioning mind, to enjoy doing science and be excited by it. Train them to become independent scientists."*

*"To train them in practical experimental skills, writing and giving lectures. To encourage them to think creatively and around the subject. To help them realize science is truly 'imagination in a straightjacket' and wild ideas are invaluable but must be constrained by the data...Above all to enthuse, inspire and stimulate a sense of wonder and excitement."*

At this stage, few supervisors described their role as ensuring that PhD students completed their PhD within the period for which they had financial support. This was perhaps surprising given the pressure exerted by universities and funding agencies to ensure best use of academic and financial resources. Completion rates have, in recent years, been taken as an indicator of PhD training quality and have been influential in the ability of universities to secure national funding for PhD students. However, this does not mean that PhD completion was not considered an issue for supervisors (see Chapter 4): when asked about the duration of funding support for PhD students, many supervisors were both concerned and critical of the requirement for students to complete their theses in three years.

*"There is a conflict which has a PhD award criteria which includes the idea of making a significant contribution to scientific knowledge and the pressure to finish a PhD within a fixed timeframe (i.e. three years). The more pressure is put on to judge institutes by how efficient they are at ensuring that all students finish their PhDs within three years, the less likely it is that students will receive a meaningful research education."*

The provision of pastoral support for their students was included in descriptions of the role of PhD supervisors by about one-third.

*“To provide academic supervision on a regular basis – personal support where appropriate and career advice.”*

*“To be interested, available, critical, supportive and encouraging.”*

*“Providing scientific guidance, support in times of need, overall perspective, inspiration when the going gets tough, career advice later.”*

This emphasis on providing pastoral support is significant, given the growing evidence that one of the most important factors in determining a student’s satisfaction with the PhD training process is the quality of their day-to-day relationship with their supervisor<sup>2</sup> – and, hence, the production of a thesis and a likelihood of wanting to remain in scientific research.

While publication in the peer-reviewed press was the most cited endpoint for PhD research, this was not the only goal: a number of supervisors included the provision of science communication training as an additional important part of their role.

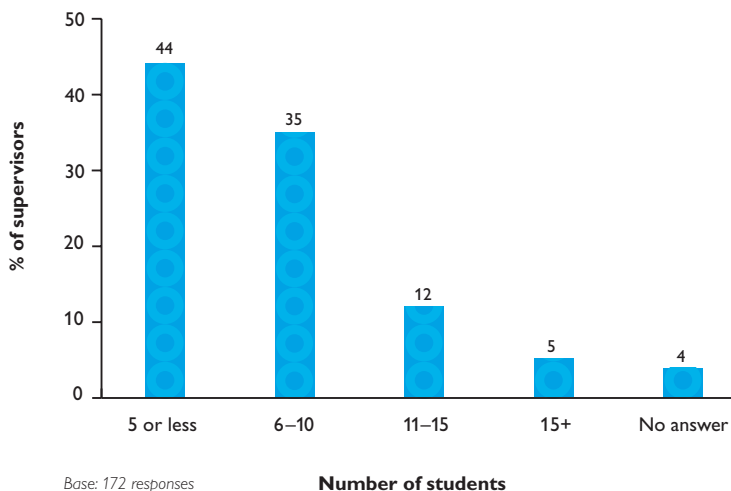
*“As a supervisor I devise a research project designed to make a valid contribution to science, evidenced by publications in good-quality specialist journals.”*

*“Training in both basic and specific scientific methods; intellectual guidance; development of oral and written presentation skills.”*

### 3.3 Working with PhD students

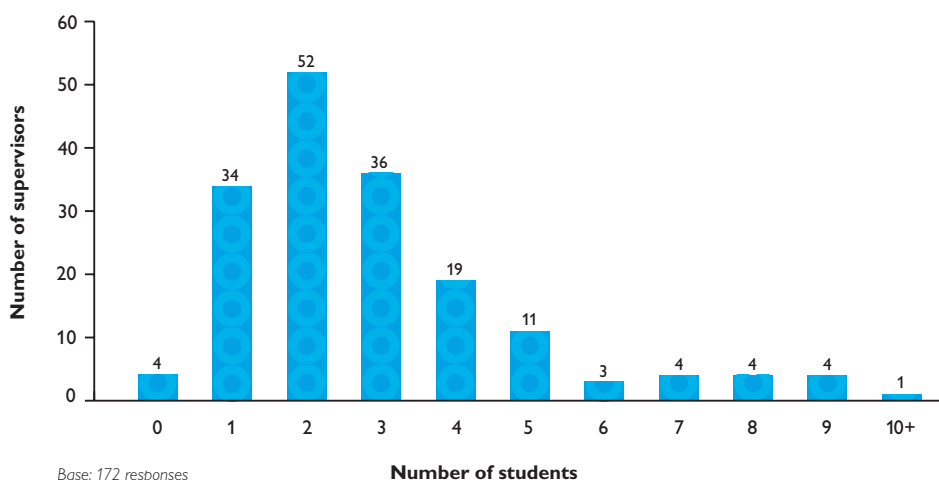
Supervisors were asked how many **full-time** PhD students they had supervised over the last ten years and how many they were currently the primary supervisor of. The majority of the supervisors (70 per cent) were over 40 years old. There was a considerable range in the level of experience of past PhD student supervision among respondents. Over half the supervisors had supervised more than six full-time PhD students during the last ten years, and 17 per cent had supervised more than ten students (Figure 3).

**Figure 3** Number of full-time PhD students supervised over the last ten years



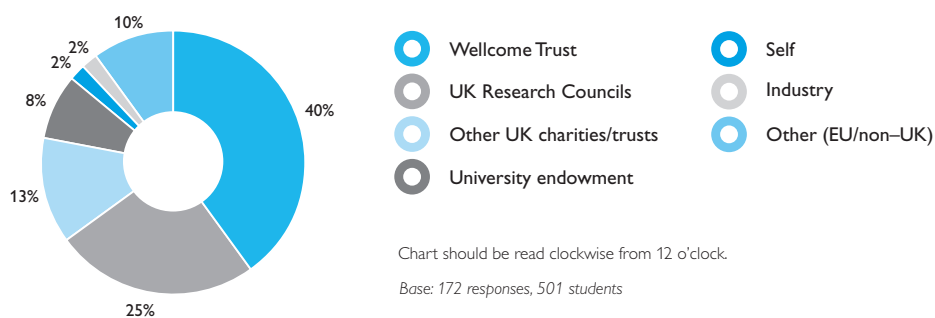
At the time of the survey, the 172 respondents were currently supervising around 500 full-time students. Of the 172 supervisors, 122 (71 per cent) were currently supervising between one and three students each, 30 (17 per cent) were supervising four or five students, and 16 (9 per cent) were supervising six or more students (Figure 4).

**Figure 4** Number of students currently supervised



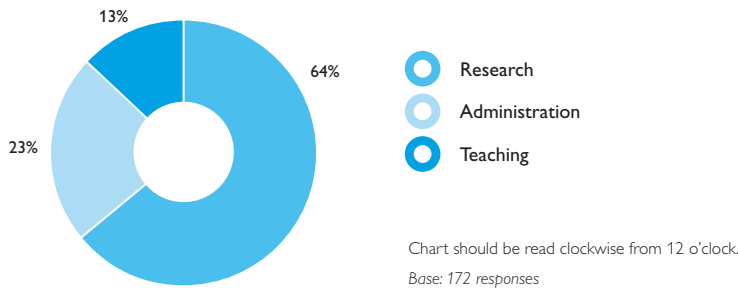
The supervisors were clearly successful in obtaining funding for PhD students from a variety of sources. The non-Trust-funded students of supervisors in this survey were funded from a range of sources: the UK Research Councils, mainly the Medical Research Council (MRC) and the Biotechnology and Biological Sciences Research Council (BBSRC); UK charities; university endowments; industry; non-UK Government support; and some students were self-financing (Figure 5).

**Figure 5** Funding source of supervisors' students



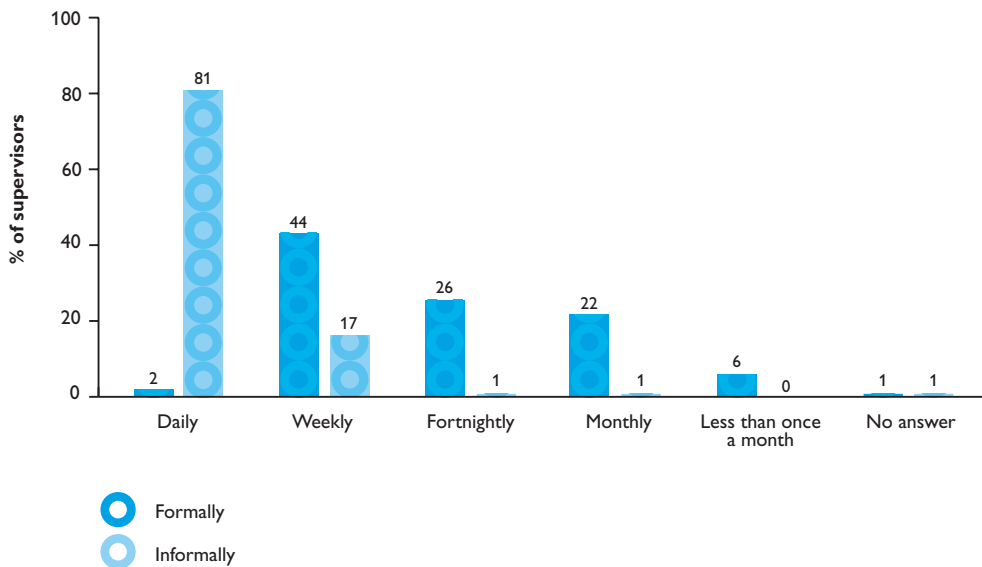
Respondents were asked to estimate the proportion of their time spent carrying out the various duties associated with academic life (Figure 6). On average, supervisors spent around two-thirds (63 per cent) of their time on research and nearly one-quarter (23 per cent) on administration. Relatively little of their time (13 per cent) was spent on formal teaching.

Figure 6 Estimated time spent on research, administration and teaching



On the whole, supervisors met with their students frequently both formally and informally. Nearly half of respondents (46 per cent) met with their students on a formal basis to discuss their PhD research at least once a week, and almost all (98 per cent) met on an informal basis at least once a week (Figure 7).

Figure 7 Frequency of contact with PhD students



Base: 172 responses

In contrast, the Trust's report on the student perspective<sup>2</sup> presented evidence that students often had problems accessing their supervisor. This difference may reflect a mismatch between student and supervisor perceptions of when a supervisor is actually available: a supervisor may feel him/herself to be available when it appears to the student that he or she is otherwise occupied.

The availability of a supervisor is, of course, likely to be determined by a combination of factors including how many supervisors a student is assigned to, how many students are assigned to a supervisor, and the other demands on the supervisor. In the UK today it is more likely for a PhD student to have more than one supervisor, or to have a second supervisor designated as a back-up to the primary supervisor. It is becoming more common for institutions to appoint a PhD supervisory committee for each student, where students are able to discuss their research with a larger group of faculty.

In *The Student Perspective*<sup>2</sup> half of those interviewed had a single supervisor. However, most felt that there were clear benefits to having more than one supervisor. Such benefits included: ensuring that someone was accessible if the primary supervisor was too busy; providing an alternative perspective on the research; and acting as an additional source of advice when one supervisor was perhaps less supportive.

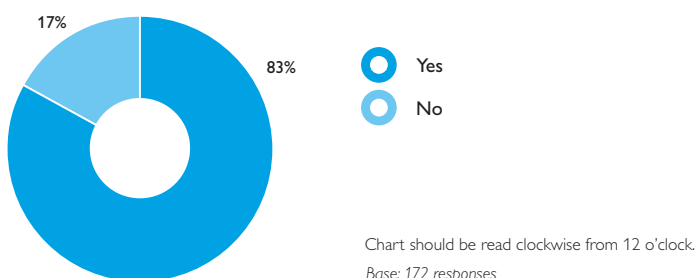
The majority of supervisors (83 per cent) involved in this survey were working within an institutional mentoring/co-supervision policy (Figure 8). There was overall, clear support for this practice, although a minority described such policies as either unnecessary or difficult to implement.

*"This is a new scheme and I do not yet have enough direct experience to comment. I do worry that it appears to increase the workload for staff already severely stretched."*

*"This seems largely a paper exercise and the students would notice little difference if it was discontinued. It could be greatly improved, but motivation would be needed for co-supervisors. Why should someone, already busy, give their time and energy to someone else's students?"*

*"Normally it serves no useful purpose if the supervisor is doing her/his job, and in fact can be irritating with someone else trying to second guess the supervisor. It is most useful, I suppose, when there is a supervisor-student conflict."*

**Figure 8** Proportion of supervisors working with a mentoring/co-supervision policy



The perceived benefits for supervisors of a co-supervision policy echoed those described by the students in *The Student Perspective*<sup>2</sup>. Co-supervision was viewed by students primarily as a back-up, providing a second person, or team, with whom ideas could be discussed and as especially important where there were differences of opinion.

*"I fully endorse it, since it gives the student the opportunity to hear two opinions about a particular issue. Also the student can often call on two areas of expertise."*

*"At regular meetings the co-supervisor can provide a valuable perspective, remote from the details of the project."*

It was also thought to be useful for the supervisor who may welcome the opinion of another scientist, either to reinforce or to offer an alternative opinion. A policy of co-supervision was therefore a useful 'safety net' for both student and supervisor:

*"Often the mentor has additional skills that cannot be provided by the main supervisor. Also, they can be slightly detached from the research work and can help the student to focus on work that is in his or her best interests rather than the best interests of the supervisor. Importantly, they can also act as an intermedicate between the student and supervisor when tensions arise. Finally, they can reinforce important messages coming from the supervisor that the student may be reluctant to take on board."*

*"It gives the students the opportunity to have another contact person in case of problems, and it provides some guidance for the supervisors as well (especially for junior faculty members)."*

*"I think it provides a useful safety net, both pastorally (if necessary) and experimentally."*

Furthermore, where one supervisor was less available or travelled frequently, a co-supervision practice was deemed eminently sensible.

*"I think this can be very useful, particularly when the main supervisor is extremely busy with administrative as well as scientific matters."*

*"It gives much better protection for students either in supervision or in circumstances such as institutional move by a supervisor."*



### 3.4 Working with PhD training and supervision guidelines

Mentoring or co-supervision systems are sometimes part of a wider practice of institutional provision of more formal PhD guidelines or formal PhD training contracts. The existence in UK universities of formal guidelines for PhD supervisors, intended to clarify expectations, establish minimum standards of PhD training, and help improve PhD training quality, is limited. While some universities operate their own policies, others have no such guidance. There is also considerable variation between funding bodies. For example, the BBSRC is currently testing a system of formal accreditation for its PhD supervisors (the Training and Accreditation Programme for Postgraduate Supervisors [TAPPS]<sup>9</sup>), which is designed to allow both new and more established supervisors, with a range of different experience and training, from varied backgrounds and organizational settings, to become accredited by the BBSRC and, hence, to receive academic recognition. The setting of minimum standards for PhD training is expected to be an outcome of the HEFCE Review of Research Policy.

Supervisors were asked if they had any experience of working with PhD supervision guidelines, and specifically those drawn up by research funding bodies. More than three quarters (77 per cent) had no experience of working with formal PhD guidelines and/or formal supervisor contracts. Among those who did actually have experience of working with guidelines, there was a wide spectrum of opinion on their usage and practice.

*“Local guidelines (university)...provide very useful framework for supervisor and student – so that each knows their expectations and commitments.”*

*“I think having a clear set of guidelines is very helpful to supervisors in order to act as a reference point when certain types of problem arise.”*

*“It is good to have these things written down, especially if you are unfortunate enough to end up in dispute with a student or a funding body.”*

However, a number of supervisors felt that, while useful, such guidelines should not be overly prescriptive.

*“Overall most of these sorts of document are fairly sensible, but can risk placing too much emphasis on training and other tasks outside the lab – overall a good idea but must not squeeze out the laboratory side of the training.”*

*“They are okay – common sense mostly. The more prescriptive they get, the less useful they are, i.e. so long as students are getting good supervision, training and monitoring, it should not be necessary to jump through hoops.”*

*“We have a university quality manual that specifies many aspects of supervision. My impression is that although many of the ideas are good, actually monitoring compliance is impossibly burdensome.”*

<sup>9</sup> [www.iah.bbsrc.ac.uk/TAPPS](http://www.iah.bbsrc.ac.uk/TAPPS)

Supervisors were asked what they thought any future national minimum standards for PhD supervision might include. The majority stated that these should include consideration of publication output and of PhD completion rates.

*“Regular and formal monitoring/assessment. At six months, one year, and two years (in the present three-year programme)...to make sure that progress is sufficient to complete on time.”*

*“Adequate completion rates; regular assessment of progress; provision of supplementary courses that foster both academic and non-academic skills, as well as careers advice.”*

*“At least five peer-reviewed original first or joint-first author research reports in international journals...A number of UK PhDs are completing without a single publication to their name. This is a shameful state of affairs, and causes our European and American counterparts to be derisive of the British PhD.”*

However, some supervisors were more sceptical of the concept of national minimum standards, especially where the teaching of specific skills or the production of specific research outputs might be the goal.

*“This is very difficult to define, and is likely to lead to meaningless over-regulation which looks good on paper but detracts from the real quality of education in research. They should definitely include a second supervisor/mentor system. They should NOT be biased excessively in favour of transferable skills courses – a PhD should be seen primarily as a training in research.”*

*“Not a minimum number of meaningless papers I hope!”*

*“Publications cannot be used as a fair guide of success because projects vary so widely and have no guarantee of success.”*

Some felt that minimum standards should be unnecessary and could in fact stifle the development of novel research.

*“I believe that the course of what the student does should be dictated entirely by the demands of the science – there should never be any pressure to proceed with any course of action for administrative reasons when rigorous scientific judgement argues against it. I believe that such an external set of standards, if applied in too close a fashion, will smother the process and simply result in mediocrity.”*

And one supervisor described student feedback as an alternative approach to determining the quality of PhD training.

*“What would be more informative is to have PhD students fill out a feedback questionnaire on their training – this would quickly identify individuals and/or departments that were neglecting their training duties.”*

### 3.5 Responsibility for aspects of PhD training

The opinion presented here and in previous research, suggests that the personal relationship between the student and supervisor is perhaps the most influential factor in determining a successful outcome for the student. Responsibility for a number of essential inputs to PhD training is, however, shared by a number of people and agencies. This issue was explored in greater detail by seeking opinion on where the responsibilities were thought to **currently** lie for certain major tasks involved in PhD training. Supervisors were then asked where they felt responsibilities **should** lie – whether or not the burden of responsibility for these tasks is allocated ‘correctly’ (Figure 9).

Although a number of supervisors found it difficult to allocate the tasks among the different agencies involved, there was little overall variation in their choices: the responsibility for the major aspects of PhD training rested predominantly with the student and the supervisor.

There was, however, some feeling that the universities and/or funding agencies could play a greater role in providing some of the broader aspects of the training, such as career development and advice.

*“Perhaps the funding organization could do more for students in terms of careers advice and transferable skills, provided that this is done in consultation with the university department to avoid duplication.”*

*“It would be helpful if the university provided more formal courses for PhD students. If the duration of the studentship were four years, the first year could be more general with the next three years concentrating on the specific project.”*

**Figure 9** Perceptions of roles and responsibilities for various aspects of PhD research training

Aspects	%		%		%		%		%	
	current	should	current	should	current	should	current	should	current	should
General administration	11	9	55	37	62	62	45	45	22	23
Financial administration	9	9	38	27	46	50	65	59	30	28
Development of transferable skills	50	45	77	59	63	66	16	23	15	17
Career development	53	42	86	77	40	51	8	17	14	23
Monitoring academic performance	34	32	96	88	59	66	16	14	2	5
Other skills e.g. entrepreneurial, intellectual property rights	34	28	35	31	39	47	26	33	23	33
Careers advice	12	12	90	80	38	50	27	39	20	40
	Student		Supervisor		University department		University administration		Funding agency	

Base: 172 responses

The percentage of supervisors is shown in rows.

Respondents could select more than one category if they felt responsibility was shared.



## four

Being a Wellcome Trust PhD supervisor

# Being a Wellcome Trust PhD Supervisor

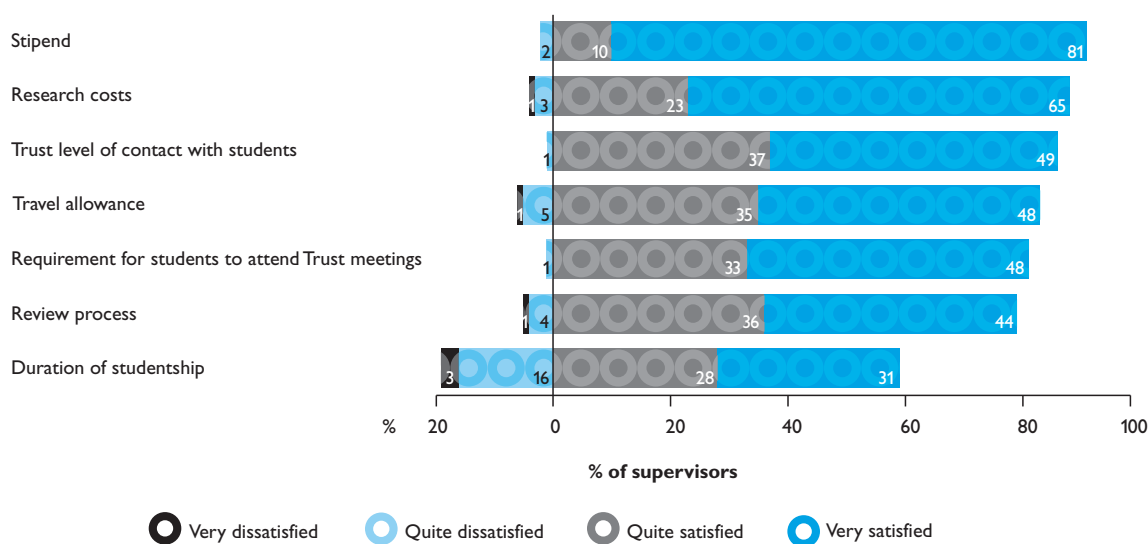
## 4.1 Introduction

This chapter explores perspectives on the Trust's provision of PhD training support. The first section focuses on levels of satisfaction with specific aspects of the support; the subsequent sections examine the broader issues of support and recruitment of Trust-funded students and the perceived challenges facing supervisors in the future.

## 4.2 Aspects of Trust PhD support

Figure 10 illustrates overall levels of satisfaction (positive and negative) with seven of the major aspects of Trust PhD support and the following sections address each aspect in turn.

**Figure 10** Levels of satisfaction with various aspects of the Wellcome Trust PhD Programme



Base: 172 responses

### 4.2.1 Review process of applications

Depending on the scheme, the Trust reviews studentship applications in slightly different ways. However, all applications are assessed on the basis of the same general criteria: calibre of the candidate; the suitability of the proposed full project for PhD research training; and the quality of the host laboratory and of the proposed supervisor. Potential candidates for three-year Trust Prize Studentships are nominated initially by the proposed supervisor and the Trust approves the candidate's curriculum vitae. A full application form is then reviewed by members of the Trust's external PhD Advisory Group and decisions are usually provided within six weeks. Candidates for the Trust's Four-year PhD Programmes are recruited and selected by the groups of academics responsible for each Programme and their nominations are then approved by the Trust. When the students move from the first to second year, full application forms which provide details of the research project and the proposed supervisor are reviewed in the same way by the external PhD Advisory Group. Full applications for Trust subject-dedicated studentships are reviewed by the relevant external advisory group, which makes its recommendations to the Trust.

Supervisors were asked for their opinions on a number of aspects of the Trust's review processes for studentship applications. Some supervisors (4 per cent) felt unable to comment, stating that the review process was either unfamiliar or unclear to them.

More than three-quarters (80 per cent) of supervisors were either very satisfied or quite satisfied with the Trust's process of reviewing applications (Figure 10).

*"It is an excellent scheme which should be emulated by other agencies."*

*"The review process seems to be thorough and reasonably quick; the criteria used – quality of student, supervisor and project – are appropriate."*

*"I think that the level of review which currently applies for the Prize Studentships is about right; that is the applicants can be reasonably confident of funding provided that the candidate has a very good academic record and the proposed project has been well thought out. This is better than 'quota' awards, or fully competitive studentships where there is a low probability that the application will be successful."*

*"The review process is effective but lengthy. Good students often go elsewhere."*

There was, however, some dissatisfaction with the process, with 5 per cent of the supervisors being either quite dissatisfied or very dissatisfied.

*"The application process causes problems. We have to identify a very good student, then write the application. Between first seeing the candidate and getting notice of the award there is a time gap of 3–4 months. But these are very good students who meantime have been offered other things and then go elsewhere. We need a faster system so that they can reasonably be expected to wait for an answer."*

*"The problem with the selection process is that you need to keep a good candidate waiting 2–3 months with no guarantee of success. It would be preferable for awards to be made to supervisors on the basis of the project and for the student to have to meet a minimum specification."*

### 4.2.2 Trust contact with students

Most supervisors (86 per cent) were satisfied with the level of contact the Trust has with the students it funds, with only 1 per cent of respondents expressing dissatisfaction.

*"It is very important that the Trust regularly provides the student with an opportunity to meet the Trust's staff and other students."*

*"The support of the Wellcome Trust through the meetings for students is greatly appreciated, as is the generous financial support. The meetings in particular make the students feel valued and are well worth the couple of days away from the lab."*

### 4.2.3 Trust student stipend

The Trust's studentship stipends are deliberately set at the level of a university graduate research assistant after tax, in order to ensure that students do not experience unreasonable financial hardship during their studies. Previous research with Trust-funded students<sup>2</sup> found that 95 per cent were satisfied with the stipend. Likewise, 91 per cent of the supervisors stated that they were either very or quite satisfied with the student stipend (Figure 10).

*"The stipend is generous relative to most other funding agencies and a major reason for the success of the scheme."*

*"The higher stipend means that you can attract the brighter and/or more motivated students."*

*"The higher stipend attracts the best students. The high level of competition facilitates the selection of those students with good laboratory experience beforehand."*

However, some supervisors commented that there were some negative aspects to the Trust student stipend being substantially greater than for the majority of UK PhD students.

*"The generously high stipend is better suited to more mature (in age or personality) students. In my limited experience of one Prize student, this new found financial freedom was initially explored to the detriment of focus on his work in the lab."*

*"I feel that the grant is too high (makes for awkward comparison with other graduate students in the same lab). Be better to support the student for four years at a lower level."*

*"I have some concerns that the high level of the Trust's stipends, while excellent for the student, creates two tiers of studentship income in the laboratory."*

The students who took part in *The Student Perspective*<sup>2</sup> study were also conscious of the negative aspects of the higher Trust stipend. These ranged from envy or animosity from other PhD students and from postdoctoral research assistants, to the unhappy realization that they face an effective reduction in net income when they take up a first postdoctoral position, if it is not Trust funded.

#### 4.2.4 Duration of Trust studentship

Although more than half of the supervisors were satisfied with the duration of Trust studentships, this issue revealed the greatest level of dissatisfaction with the Trust's policies and practices. Some (59 per cent) of supervisors were satisfied (31 per cent were very satisfied, and 28 per cent were quite satisfied), but almost a fifth (19 per cent) of supervisors expressed dissatisfaction (16 per cent were quite dissatisfied, and 3 per cent were very dissatisfied). Of 100 comments received on aspects of the Trust's PhD research programme in general, 55 were specifically about the studentship duration. Most respondents (53 of 55) felt that three years was insufficient time to complete a PhD and some felt that the length of time should be more flexible. Some supervisors believed that *all* PhDs should be of four years' duration.

*"It is, in practice, very difficult for students to complete a PhD in three years and even very good students take a little longer. The bodies who provide studentships are reluctant to recognize this reality and this is a failing. A simple procedure to apply for an extra six months' support would be the greatest improvement that the Trust could make."*

*"I do feel that three years is too short a period for a PhD, but just accept that this is how most funding agencies work."*

*"A three-year studentship is probably too short now that the university demands significant amounts of taught courses and seminar attendance."*

*"No fault of the Trust but the three-year model is flawed and limits innovation in PhDs. A four-year model is more appropriate for research training."*

*"Some degree of flexibility here would be welcome. Very often, research takes off in the last year and the student is unable to do the exciting experiments that would enable the work to be published in a higher ranking journal."*

However, many students questioned for the earlier *The Student Perspective*<sup>2</sup> report were less willing to embrace the idea that all PhD studentships should be four years. Those who knew what they wanted to do, and where they wanted to work, were not convinced that they would have chosen to do a PhD via a Trust Four-Year PhD Training Programme. Nevertheless, there was a similar recognition among students that three years was often insufficient time to both complete the research and write up the thesis.

#### 4.2.5 Trust research costs

Since 1998, the Trust has provided all appropriate research costs with its studentships and all current Trust supervisors have experience of this system. There was a high level of satisfaction with the practice, with 65 per cent of supervisors being very satisfied and 23 per cent quite satisfied.

*"The new funding arrangements, stipends and laboratory costs are major improvements. Hopefully, others will follow."*

*"The possession of a significant research consumables budget also made a difference in independence and free thinking."*

*"It is very nice to have a consumables budget associated with the studentship."*



### 4.2.6 Trust travel allowance

The Trust allocates a £1000 travel allowance to each studentship for attendance and participation at scientific conferences. It will also consider awarding funds for student travel to collaborating research laboratories and for participation in specialist research training courses where these requests are scientifically justified. Conference travel allowances provided by other funding agencies are shown in Figure 11.

Figure 11 PhD Travel allowances 2000–2001

Organization	Travel allowance
MRC <sup>†</sup>	£300 p.a. for UK meetings. Considers applications for overseas meetings on a case-by-case basis
BBSRC <sup>§</sup>	£160 p.a.
CRC <sup>#</sup>	1 UK conference p.a. (£150) and 1 international conference per studentship (£650)
PPARC <sup>‡</sup>	£165 p.a.
EPSRC <sup>¥</sup>	£165 p.a.
BHF <sup>*</sup>	A contribution of up to £300 p.a.

<sup>†</sup> Medical Research Council

<sup>§</sup> Biotechnology and Biological Sciences Research Council

<sup>#</sup> Cancer Research Campaign

<sup>‡</sup> Particle Physics and Astronomy Research Council

<sup>¥</sup> Engineering and Physical Sciences Research Council

<sup>\*</sup> British Heart Foundation

The majority (83 per cent) of supervisors were satisfied with the travel allowance awarded with Trust studentships. Six per cent expressed dissatisfaction, however, and voiced them in a number of ways.

*“Trust student travel allowance is relatively good, but I would increase – meetings give a really good return for students.”*

*“Travel allowance very welcome, but may not be enough to cover costs. Perhaps should be allowed to apply for more if necessary?”*

*“The travel allowance is quite meagre if the student is to go to international meetings.”*

*“The travel allowance is too low. The benefit to the student of a travel allowance of say £2000 per year would far exceed the cost.”*

### 4.2.7 Student attendance at Trust meetings

The Trust invites its students to attend meetings in the January of their first year and in the July of their final year. Until recently (the 1999–2000 academic year), first-year students also attended a two-day Science Communication Workshop. Most supervisors (81 per cent) were satisfied with the Trust’s requirement for students to attend such meetings. However, supervisors took the opportunity to express some of their concerns about the value of the meetings for the students.

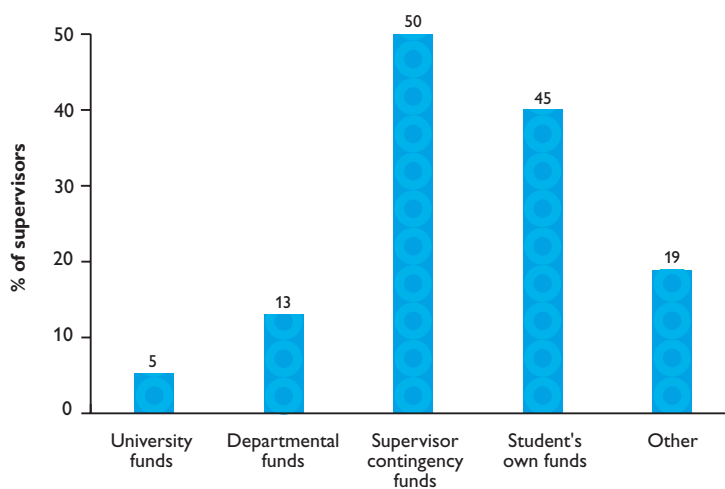
*“The level of student satisfaction with visits to the Wellcome Trust is not high. The purpose of these visits is often unclear and they disrupt research.”*

*“My student did not benefit greatly from the communicating science workshop, especially given the amount of preparation time involved.”*

### 4.3 Financial support for students

Not all the students supported by the Trust submit their PhD thesis within the period of their award. Many of the supervisors had little experience of this happening, but it was clear from those who did that funding to support students in this position was found from a variety of sources (Figure 12).

**Figure 12** Source of funding for Wellcome Trust students who go beyond the period of funding



Base: 172 responses

Supervisors could select more than one option.

Supervisor research contingency funds and the student's own personal funds were the main sources, with the universities contributing limited financial support for students in these circumstances.

*"I have always made it a policy not to pay students after their three years is up. I tell them this before they start so that they are in no doubt that they have to complete in three years. As a result, all my students have finished their lab work within three years and have all submitted well within four years."*

*"I expect my students to have saved some of their grant if necessary."*

*"The department tries to bridge students by employing them as teaching assistants, library attendants etc. Other students fund this period through private sources. There is no doubt that this problem is a serious area of concern. When the students are forced to take any type of employment it can seriously slow thesis completion. There are no central university funds to support students in this situation."*

## 4.4 Training opportunities

The Trust currently provides support for its students to attend the Research Councils' Graduate Schools Programme and encourages students to participate in the Researchers in Residence Scheme. Supervisors were asked what other training opportunities the Trust could provide which were perhaps not available locally: 37 per cent of those who responded stated that there were none. The reasons given included a belief that the students received sufficient training from their host institution, and that students should be able to spend more time in the lab.

*"Much more training is given in university postgraduate training programmes and the Trust should be careful not to duplicate those good practices."*

*"I think that students have more than enough commitments, especially if they are asked to finish their PhD research in three years. There is a danger that students will get diverted too much from their research. Although 'broadening their outlook' is good in principle, students are already required to attend various university-organized events, and in my experience they are close to being overloaded by such things."*

*"Not clear to me if the Trust should take a primary role in this, or if it should be left up to the university (as is increasingly demanded by the other Research Councils)."*

*"I think there are probably enough. They need some time to work in the lab!"*

*"Keep it down. The requirement to finish in three years is not compatible with lots of side activities."*

*"I would not burden them further. At the end of the day it is quality time in the lab that determines their research output."*

Other supervisors felt that the Trust should support students attending specialist scientific training courses.

*"Trust-funded students might be offered places for a nominal fee on Trust research training courses. Perhaps organize workshops for specific skills, techniques, methodologies, e.g. genomics, biophysical methods."*

*"Techniques courses organized at Trust centres or other organizations that are dedicated to teaching students advanced methodology in cell and molecular biology (for example)."*

*"Some mechanism to provide funding for specialist scientific training courses. Ideally this should be a rapid response system to provide crash courses in areas that might not have been readily perceived prior to the start of the programme."*

There was also some support for the provision of training in more general aspects of scientific research, for example, ethics, communication and public engagement activities.

*"Public understanding of science, career opportunities."*

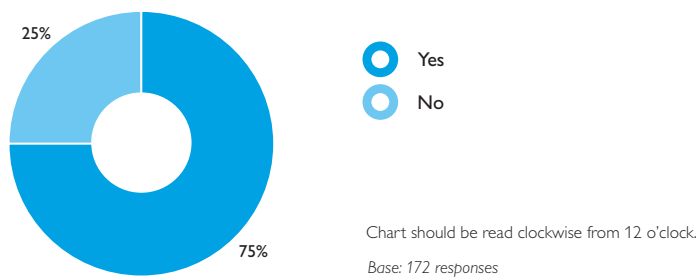
*"Ethics and good scientific practice (authorship issues, whistle-blowing etc.). Good writing and presentation skills and grant writing."*

*"Workshops on scientific writing or intellectual property rights; business perspective; requirements of industrial employers."*

## 4.5 The Trust's mixed portfolio of studentships

The Trust currently provides a mixed portfolio of PhD research training schemes: three year Prize Studentships, Four-Year PhD Training Programmes, and subject-dedicated schemes. The supervisors were asked if this system should be maintained and were overwhelmingly supportive that it should (Figure 13), their comments echoing those from students<sup>2</sup>.

**Figure 13** Should the Wellcome Trust maintain its mixed portfolio of studentships?



*"Four-Year Programmes are superb for students who have relatively few lab-based skills and/or interests in broad fields but insufficient background to choose and tackle new areas of research. However, able students who have extensive lab experience (after, say, a year in industry) are usually very keen to get on with their careers and therefore highly motivated to finish in three years. In practice, the majority of three-year students in the biological sciences need longer to complete and publish their work."*

*"I think a balance of three- and four-year PhD positions is important. To only have four-year PhD positions would potentially stifle the really high flyers who know exactly which area of research they want to pursue."*

*"Different schemes suit different students and it would be a mistake to try and fit all students into the same box."*

Not all supervisors agreed, however:

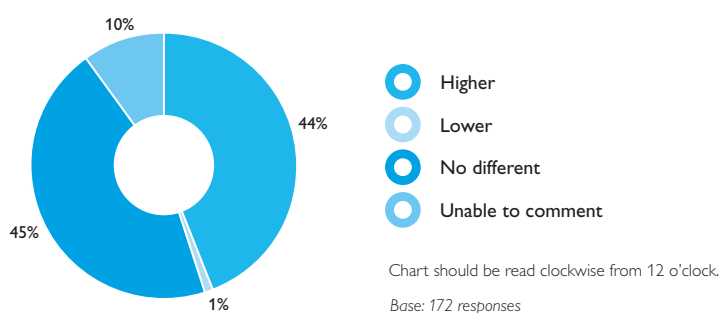
*"Three-year studentships should be abolished in favour of four-year schemes. Subject specific schemes should be abolished and the scientists working on those subjects should compete equally for students."*

*"The four-year and subject-dedicated programmes are by themselves too restricted: only certain institutes and certain subjects."*

## 4.6 The calibre of Wellcome Trust-funded students

The Trust's stipend, in addition to providing students with a reasonable level of remuneration, is expected to enable supervisors to attract high-calibre graduates. Supervisors were asked if this was indeed the case (Figure 14). Opinion was almost equally divided, with 44 per cent believing that Wellcome Trust-funded students were of a higher calibre, and 45 per cent believing that there was no difference between these and other PhD students. Ten per cent of respondents felt unable to comment and 1 per cent felt that, in their experience, Trust-funded students were in fact of a lower calibre than other students they had supervised.

**Figure 14** Calibre of Wellcome Trust students in relation to other students supervised



Of those who thought that the calibre of Trust-funded students was higher, most cited greater motivation and previous experience of research as the reasons for this. In many cases the supervisors stated that the high stipend, together with the lack of the restrictions on nationality which apply, for example, to UK Research Council studentships meant that they could select from a larger pool of candidates.

*"Some Wellcome students are clearly among the brightest and best of their generation – I think this particularly applies to those who compete successfully for the Four-Year Studentships. But some of the Prize students taken on by holders of programme grants or fellowships are actually no better (or worse) than any other PhD student in the department."*

*"Higher quality academically but not necessarily in laboratory skills."*

*"Somewhat higher in motivation. Furthermore, the WT studentship can be used to attract non-UK residents that are often better qualified and motivated. The pool of outstanding UK candidates is very small."*

*"It is higher because the award is highly prestigious, the stipend better than most, if not all, other studentships and lastly [because] EU nationals are eligible. All of these factors improve the pool from which one can select candidates."*

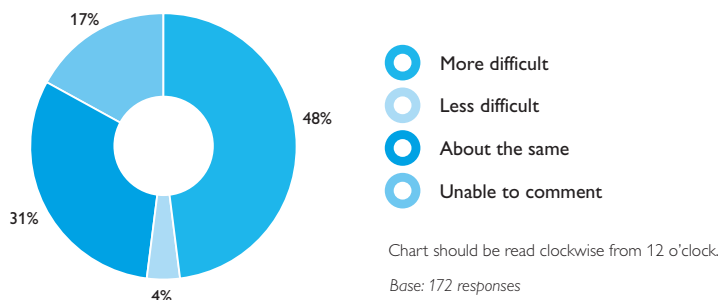
*"The higher stipend attracts the best students. The high level of competition facilitates the selection of those students with good laboratory experience beforehand."*

*"In the first couple of years of the Four-Year Programme, the students were clearly of an exceptional calibre – those differences seemed to have evened out in the subsequent years with the Wellcome students not standing out in ability over the other students any more."*

## 4.7 Recruitment and retention of high-calibre PhD students

Anecdotal evidence has suggested that, in the UK, supervisors are finding it increasingly difficult to attract high-calibre graduates into PhD research training. In this survey, 48 per cent of Trust supervisors felt that it was more difficult, 31 per cent reported that it was about the same and 4 per cent felt that it was less difficult than five years ago. Seventeen per cent felt unable to comment (Figure 15).

**Figure 15** Difficulty in appointing high-calibre PhD students compared with five years ago



The reasons given by those who thought it 'more difficult' focused on the unattractive nature of a scientific career, both financially and in relation to long-term career prospects.

*"Science as a career is not a particularly attractive one either financially, or for job security or for long-term opportunity for research. Although the Wellcome career development programmes are very attractive, they are limited in numbers and timeframe. The best students tend to go elsewhere."*

*"It is undoubtedly associated with poor remuneration. The last three graduates to leave my laboratory have taken jobs outside research, despite the fact that they were highly paid researchers with an excellent training and could easily have been guaranteed a successful academic career."*

*"Too many graduates in the UK. Too many graduates with a BSc 2i, therefore no selection on the basis of final marks possible. Too many students who don't have a specific goal for their future career; as a result, many start a PhD project because they don't have any better ideas."*

*"The increasing levels of student debt are discouraging many of the best students from considering a relatively poorly paid career in research and teaching."*

*"It is more difficult to recruit good British students, because they are put off by low salaries, lack of job security and competitive nature of a career in academic research. Most of my best applicants are now European."*

*"A career in science is held in poor esteem by the public. It is relatively poorly paid compared to careers in industry and commerce. Thus the best graduates often choose alternative careers."*

These opinions reflect those of Trust-funded students<sup>2</sup>, as many students in their final year did not see themselves having a career in academic research and planned to leave academia. This is in contrast to Trust-funded students who had completed their PhDs around a decade earlier<sup>3</sup>: almost all had stayed in academic research for their first postdoctoral position (81 per cent) although more than half (54 per cent) had left four to seven years later. Given the views reported here and in the student-focused research, it will be interesting to see what career choices are made by these later PhD graduates in the years to come.

Supervisors were asked what steps might be taken to help ensure that the best graduates were recruited to PhD training. A number of suggestions were made, which centred mainly on improving academic salaries and career structures.

*“Raising the profile of scientific (particularly academic) research as a career. This includes salary levels, of course, but goes well beyond that. Adverse publicity about the use of animals in research, for example, does not help and should be countered at several levels, including more overt supporting statements from Government, the universities and bodies such as the Wellcome Trust.”*

*“Global increase in salary, not just Wellcome-funded people, more attractive research opportunities within universities. It is not always a pleasing prospect to spend upwards of ten years learning how to do good research to get drowned by teaching and administrative duties in a lectureship.”*

*“The career situation is not as bleak as many students perceive it to be. We could do more to stress the very positive aspects of academic careers, and of course that the training a PhD provides can be useful in other careers.”*

*“Offer students a career from the outset. Treat them as trainee scientists whose job continues after training rather than as trainee scientists who are looking at the scientific dole queue as soon as they finish their PhD.”*

Some supervisors felt that the solution lay at a much earlier stage, with the provision of science teaching in schools.

*“Better science/maths teaching in schools so the pupils are not afraid of hard sciences. The WT programme has helped us recruit physicists and chemists into biology.”*

*“Careers advice to undergraduates and even sixth formers, presenting a positive view of science and a career in science.”*

*“Apart from the obvious (pay) there is a deeply ingrained anti-science culture in the UK. That’s a tough one to crack – science education in schools must be an important component in tackling it.”*

There was also a recognition that the problem might lie in the increase in numbers of undergraduate students in the UK over the last decade, combined with a parallel increase in the number of postgraduate places on offer:

*“Reduce the number of studentships funded. Reduce the number of undergraduate courses to the level of ten years ago to reduce the massive dumbing-down process that has occurred in undergraduate education throughout the UK.”*

*“Return to the grants-based system that paid for our education and that of the current generation of cabinet ministers and Government advisors. If this is deemed too costly then reduce the number of students to an affordable level.”*

*“Award less studentships in total but prolong the duration of the studentships (this will mainly be a legislative problem). Therefore train less people but provide a better and more intensive training during the PhD project. We don’t need quantity but more quality; British PhDs are under-qualified in comparison to other countries.”*

Finally, some supervisors felt that the way forward was to improve the profile of scientists and science in general.

*“To improve the public’s appreciation of science. To fund and support centres (units) of excellence that are internationally renowned in a manner similar to the way the Howard Hughes Medical Institute supports such centres in the USA. This would help increase the profile of science in the UK.”*

*“Improve the image of science.”*

*“More positive publicity about medical research.”*

## 4.8 The perceived challenges for the future

Supervisors were asked to describe what they felt to be the major challenges currently facing PhD supervisors in UK universities. Again, most comments related to difficulties in recruitment and retention of high-calibre graduates.

*“Recruiting high-calibre students. We train too many PhDs who are not really good enough to progress to the next stage. What we need are fewer and better quality graduates.”*

*“Attracting high-quality applicants. Attracting high-quality postdoctoral applicants who can inspire and contribute to teaching graduate students.”*

*“The salaries for UK academics are so low that many of the best students refuse to consider research as a career. They leave for the city or to train in law and medicine. Having completed their PhD some students find a further discrepancy between the work level expected of an academic and the salary. This is especially true I’m afraid for young women – they look at me (a woman) and say ‘I don’t want to live like that!’”*

*“Pressure to take substandard students in order to keep registration numbers high and PhD fees flooding in.”*

Supervisors were particularly concerned about the poor career structure offered to UK academics...

*“Not so much a challenge – rather a worry that we are training scientists but not offering a better career structure. This does not seem to worry the students who undertake PhDs at the time, but it does worry them later on in their first or second postdoc positions if still in universities.”*

*“Inadequate prospects for financially reasonable future as an academic investigator. This diminishes the pool of outstanding individuals choosing a scientific career.”*

*“To convince students that research is exciting and that, if you find it so, it is worth all the time and effort you have put in whilst having the lack of career security, low pay etc. that most young scientists experience.”*



...and about increasing demands on their time.

*"Finding the time to provide proper supervision of students in the face of competing claims of the Research Assessment Exercise (which awards inadequate credit for PhD supervision), administration, teaching and all the other tasks to fit in."*

*"The need to include more documentation, quality control and time for student general knowledge and training requirements that are not directly related to bench research skills, within a system that was set up for apprenticeship in research and not for these multiple purposes."*

*"Overcoming the handicaps imposed by the extreme time constraints resulting from the three-year time limit. Instilling a proper work ethic in a culture that seems obsessed with minimizing stress. The scientific lifestyle is dictated by the realities of the experimental system, not by time clocks or social considerations. Stress can be a very positive stimulator of creativity."*

Supervisors also expressed concerns, in the light of their perceptions of decreased standards in UK undergraduate education, that the three-year duration of most PhD studentships was not sufficient.

*"Finding students who are prepared to put in the kind of work necessary to obtain a PhD in three years starting from a pitifully low level of laboratory experience at the end of their degree courses."*

*"Under-educated, naive, ill-informed, over-confident students who got their 2i without the experience of hard work, expecting a PhD for a couple of restriction digests that took three years to work. Ignoring the acceptance of a low standard for PhDs in general and make sure students understand that the PhD certificate as such may put them in a worse position if they are not up for the job."*

*"The necessity to fully train almost completely inexperienced people and to get them successfully through a finite research project within three years."*



five

Discussion

# Discussion

This report presents the views of almost 200 academics, based in more than 30 different UK higher education institutions, on a wide range of issues concerning contemporary PhD research training in the biomedical sciences. These individuals are all research group leaders, have substantial experience of PhD students, and are all currently involved in the academic supervision of more than 500 PhD students. Their views and opinions are important and stand in their own right without need for significant additional comment. However, a number of clear themes emerged in looking at the responses; some views appearing repeatedly in different guises and from different directions.

It was the strongly held view of the group that PhD training should be directed not simply to the teaching of practical research skills, nor, in any substantial measure, towards equipping students with generic skills that might be useful in careers unrelated to science. Rather, there was a strong consensus that its primary purpose should be to provide students with an understanding of the scientific process and with the skills to enable them to contribute throughout their careers to the knowledge base in their particular research discipline.

The responsibility for most aspects of PhD training was thought to rest with the individual supervisor and the student – and there was some resistance to the idea that responsibility for key areas might devolve elsewhere, for example to the host academic institution. There was little real support for the notion that funding agencies should have a significant role to play beyond providing the funds. The group's perception of their role as PhD supervisors remained fundamentally the traditional one – as mentors to apprentice research trainees.

An issue of concern to the group was the three-year duration of most UK PhD studentships and the pressure exerted both by the host academic institutions and the various major funding agencies to ensure that PhD students completed their degrees on time. This concern was one of principle and related to a belief that the nature of experimental research was perhaps unsuited to uniform or rigid timescales.

The issue of PhD studentship duration returned again when supervisors were asked to identify what they felt to be the greatest challenges to UK PhD training today. In this context, the question invoked opinion on the increasing inadequacy of undergraduate degrees as preparation for research. That many UK students are thought to finish their first degree with little or no relevant individual practical research experience and were felt therefore unlikely to be able to complete a substantial piece of high-quality individual research within three years, gives added importance to various recent UK initiatives which have introduced an additional period of research training to the traditional PhD structure. The Wellcome Trust's Four-year PhD Programmes and the UK Research Councils' combined Research Masters and PhD (MRes/PhD) degree programmes, introduced some five years ago, all have a first year in which students gain additional research experience before embarking on their major three-year research project. The UK Research Councils are also contemplating the more widespread use of block research training grants to allow universities to allocate funds as they see fit and to provide studentships of varying length. All these measures should deliver the greater flexibility advocated by supervisors in this report. It will be some years before their impact on both the quality of PhD research projects and completion times can be assessed.

The notion of a fully flexible, and perhaps longer PhD studentship, which may be attractive to supervisors, may however be less attractive to students. Increasing student debt incurred during undergraduate studies, together with the low level of PhD student stipend for the majority of students, makes it increasingly likely that students will want to complete their PhD in the shortest possible time.

Two UK national initiatives are currently wrestling with some of the key issues of quality in both PhD research training and academic research careers, and discussion around these issues has figured prominently throughout this report. The Research Careers Initiative, launched by the Committee of Vice-Chancellors and Principals, now UK Universities, will report next year to the Minister for Science on progress in improving academic research staff contracts in universities. The HEFCE's Review of Research Policy, published in 2000, advocated the setting of national minimum standards for UK PhD student training. The HEFCE is currently involved in a substantial consultation exercise about how quality assessment of research training might be included in the national Research Assessment Exercise. The Wellcome Trust hopes that the substantial body of academic opinion presented in this report will inform this wider debate on the quality of UK PhD training.



# Appendix: Questionnaire

## PhD supervisor survey

As you may be aware, the Wellcome Trust recently carried out two reviews of PhD research students it has funded. The first report focused on the career progression of a cohort of Trust students who carried out their PhDs between 1988–1993 (<http://www.wellcome.ac.uk/cohort>). The second report examined the attitudes of Trust-funded PhD students to various aspects of their research training (<http://www.wellcome.ac.uk/perspectives>). To complement these reports, and to provide a vital input to the Trust's continuing review of the way it funds PhD training, we would now like to hear from the supervisors of Trust-funded PhD students.

The attached questionnaire provides the opportunity for you to comment on your experiences of PhD student supervision, your perceptions of the role of a PhD supervisor and the major challenges facing supervisors today. We would also like to hear your suggestions on how the Trust's PhD training portfolio might be developed in the future. Many of the questions provide an opportunity for you to provide additional comment in writing – these comments will be extremely valuable to us and we would therefore appreciate you taking some extra time to provide more in-depth responses to those questions.

The questionnaire should take around 45 minutes of your time and should be returned via email to Gail Fawcett in the Policy Unit ([g.fawcett@wellcome.ac.uk](mailto:g.fawcett@wellcome.ac.uk)) by **Friday 16th February 2001**. If you have any problems opening the questionnaire attachment then please contact Gail who can send you a paper copy.

A summary of the results of the survey will be fed back to all those taking part and it is envisaged that the report will be ready for publication during the summer of 2001.

If you have any questions regarding the completion of the questionnaire, or about the review of PhD training in general, then please do not hesitate to contact me.

Many thanks for your help.

### Dr Iain Frame

Career Development Group

Telephone: 020 7611 8652

Email: [i.frame@wellcome.ac.uk](mailto:i.frame@wellcome.ac.uk)

---

Any information and opinion you provide will be treated in accordance with the Trust's data protection protocol, in particular:

- All data collected by or on behalf of the Trust for the purposes of this survey will be held and processed by the Trust in a secure environment.
- The survey results will be used solely for the evaluation of Trust activities and policy making; and no information contained in the results will be attributed to the person who submitted it.

## BIOGRAPHICAL

**Q1** Sex (Please tick one only)

Male

Female

**Q2** Age (Please tick one only)

Under 30 years

41–45 years

31–35 years

46–50 years

36–40 years

over 51 years

**Q3** Which of the following best describes your current Wellcome Trust supervisor status: (Please tick one only)

A supervisor of a Wellcome Trust Prize Student  
(Wellcome Trust Programme Grant holder; Senior or Principal Research Fellow)

A supervisor of a Wellcome Trust Four-year PhD Student

A supervisor of a subject-dedicated Wellcome Trust Student  
(e.g. Biodiversity, Bioarchaeology, Cardiovascular Research Initiative)

**Q4** Please indicate by ticking in the boxes below, the numbers of each type of FULL-TIME student for whom you are currently the primary supervisor

Funder	No. of students				
	1	2	3	4	5+
Wellcome Trust Three year Prize Studentship					
Wellcome Trust Four-year PhD Programme					
Other Wellcome Trust studentship					
BBSRC					
MRC					
NERC					
EU					
Other Research Councils					
Other charities (not Wellcome Trust)					
Other					

If you ticked Other Research Councils, Other charities or Other, please give further details by writing below:

.....

.....

.....

.....

.....

.....

.....

**Q5** Excluding those you currently supervise, of how many FULL-TIME PhD students have you been the primary supervisor over the past ten years? **(Please tick one only)**

- Fewer than 5
- 6–10
- 10–15
- 15+

**Q6** Please estimate the proportion (as a percentage) of your total working time currently spent on:

Research ..... %

Teaching ..... %

Administration ..... %

**Q7** On average what proportion of your time (as a percentage), do you spend working at the bench?

.....%



## THE WELLCOME TRUST PHD RESEARCH TRAINING PROGRAMME

**Q8** How satisfied are you with the following aspects of the Wellcome Trust PhD research training programme? (Please tick one on each line)

Very satisfied    Quite satisfied    Neither satisfied nor dissatisfied    Quite dissatisfied    Very dissatisfied

---

The Trust's review process of the applications it receives

---

The Trust's level of contact with students

---

The Trust's student stipend

---

Duration of studentship

---

Research costs associated with each Trust studentship

---

Student travel allowance

---

The requirement for students to attend Trust meetings

---

Please give reasons for your answers and any additional comments in the box below:

---

**Q9 a.** In your experience do you think the calibre of Wellcome Trust PhD students is higher, lower or no different, than other students you have supervised? (Please tick one only)

- Higher                        *Please answer part Q9b*
- Lower                        *Please answer part Q9c*
- No different                *Go to Q10*
- Unable to comment        *Go to Q10*

**Q9 b.** If you answered Higher, in what ways, e.g. laboratory skills, motivation, prior experience? (Please provide details below)

.....

.....

.....

**Q9 c.** If you answered Lower, in what ways e.g., laboratory skills, motivation, prior experience? (Please provide details below)

.....

.....

.....

**Q10 a.** In your experience is it more difficult, less difficult or about the same than it was five years ago to appoint high-calibre PhD students? **(Please tick one circle only)**

- More difficult
- Less difficult
- About the same
- Unable to comment

**Q10 b.** If you have encountered difficulties recently in attracting high-calibre graduates, what do you think the reasons for this might be? **(Please provide details below)**

.....

.....

.....

**Q10 c.** Can you suggest ways to address this problem? **(Please provide details below)**

.....

.....

.....

**Q11** From where do Wellcome Trust students obtain financial support if they go beyond the period of their studentship? **(Please tick as many as apply)**

- University funds
- Departmental funds
- Supervisor contingency funds
- Student's own funds
- Other

If you ticked Other, please explain below:

.....

.....

.....

**Q12** The Wellcome Trust currently maintains a mixed portfolio of types of PhD training awards, e.g. Three-year Studentships, Four-year Programmes and subject-dedicated schemes. Do you think this should be maintained? **(Please tick one only)**

- Yes
- No

Please give reasons for your answer below:

.....  
.....  
.....

**Q13** The Trust currently supports students to take part in the Graduate Schools Programme and encourages students to participate in the Researchers in Residence Scheme. What other training opportunities could the Trust offer? **(Please provide details below)**

.....  
.....  
.....

### THE ROLE OF THE PHD SUPERVISOR

**Q14** How would you define your role as a PhD supervisor? **(Please write below)**

.....  
.....  
.....

**Q15 a.** Does your department or institution assign a mentor or co-supervisor in addition to the primary supervisor for its PhD students? **(Please tick one only)**

- Yes                *Please answer part 15b*
- No                 *Go to Q16*

**Q15 b.** What are your opinions on this practice? **(Please write below)**

.....  
.....  
.....

**Q16 a.** On average, how often do you FORMALLY meet with each of your PhD students to discuss his or her project? (Please tick one only)

- Daily
- Weekly
- Fortnightly
- Monthly
- Less than once a month

**Q16 b.** On average, how often do you INFORMALLY meet with your PhD students? (Please tick one only)

- Daily
- Weekly
- Fortnightly
- Monthly
- Less than once a month

**Q17** In your experience where does responsibility CURRENTLY lie, for the following aspects of PhD research training? (Please tick as many on each line as applies)

	Student	Supervisor	University department	University administration	Funding agency
General administration of the studentship					
Financial administration of the studentship					
Development of transferable skills, e.g. communications skills, IT skills					
Career development, e.g. teamwork, leadership, networking					
Monitoring academic progress, e.g. ensuring completion of tasks and writing up					
Other skills, e.g. entrepreneurial, intellectual property, legal, industrial					
Careers advice					

Please give additional comments on any of the above below:

.....

.....

.....

**Q18** In your opinion where SHOULD responsibility lie for the following aspects of PhD research training?

(Please tick as many on each line as applies)

	Student	Supervisor	University department	University administration	Funding agency
General administration of the studentship					
Financial administration of the studentship					
Development of transferable skills, e.g. communications skills, IT skills					
Career development, e.g. teamwork, leadership, networking					
Monitoring academic progress, e.g. ensuring completion of tasks and writing up					
Other skills, e.g. entrepreneurial, intellectual property, legal, industrial					
Careers advice					

Please give additional comments on any of the above below:

.....

.....

.....

**Q19** Which of the following do you think best describes the purpose of PhD research training?

(Please tick one only)

- To provide training for a career in academic research
- To provide training for a career in scientific research in general
- To provide training suitable for a range of careers not necessarily in research

Please give reasons for your answers and any additional comments below:

.....

.....

.....

**Q20 a.** There are a variety of models of PhD supervisor guidelines or contracts which are used by different funding agencies. Do you have any experience of using such guidelines (e.g. BBSRC, Royal Society of Chemistry)?

- Yes  Please answer part 20b
- No  Go to Q21

**Q20 b.** If you have experience of using supervisor guidelines/contracts, which ones have you used and what is your opinion of them? **(Please write below)**

.....  
.....  
.....

**Q21** The current Higher Education Funding Council for England (HEFCE) Review of Research Policy proposes that minimum PhD training standards will have to be met by universities in order to retain specific HEFCE funds. What might these minimum standards include? **(Please write below)**

.....  
.....  
.....

**Q22** What do you think are the main challenges currently facing PhD supervisors in UK universities? **(Please write below)**

.....  
.....  
.....

**Q23** Do you have any other comments on PhD training in general? **(Please write below)**

.....  
.....  
.....

**Many thanks for your cooperation**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means electronic, mechanical, photocopying, recording or otherwise without the prior permission of the Wellcome Trust.

ISBN 1 841290 13 0

Design and production: Wellcome Trust Publishing Department

First published 2001

© The Trustee of the Wellcome Trust, London 2001

The Wellcome Trust is a registered charity, no. 210183

Trustee: The Wellcome Trust Limited

Registered in England, no. 2711000

Registered office: 183 Euston Road, London NW1 2BE

TR16-2356/2K/07-2001/SW

The Wellcome Trust is an independent research-funding charity, established under the will of Sir Henry Wellcome in 1936. It is funded from a private endowment, which is managed with long-term stability and growth in mind.

Its mission is to foster and promote research with the aim of improving human and animal health. Its work covers four areas:

**Knowledge:** improving our understanding of human and animal biology in health and disease, and of the past and present role of medicine in society.

**Resources:** providing exceptional researchers with the infrastructural and career support they need to fulfil their potential.

**Translation:** ensuring maximum health benefits are gained from biomedical research.

**Public engagement:** raising awareness of the medical, ethical and social implications of biomedical science.