WELLCOME TRUST

MONITOR 1

TRACKING PUBLIC VIEWS ON MEDICAL RESEARCH

wellcome trust

Wellcome Trust Monitor

Survey report

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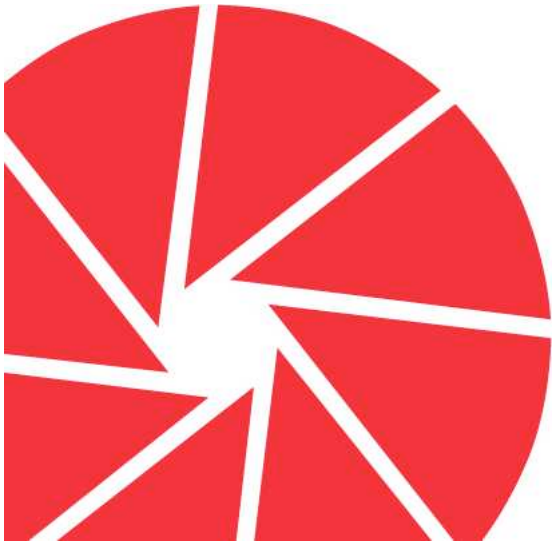

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- This research report presents findings from the Wellcome Trust Monitor. The Monitor explored awareness, interest, knowledge and attitudes relating to medical research for adults and young people aged 14-18 and examined the latter group's attitudes to science education and careers.
- 1,179 adults aged 18+ and 374 young people aged 14-18 took part. Random probability sampling was used, with a 'core' sample drawn from the Postcode Address File (PAF), commonly used in general population surveys. Focussed enumeration (FE) was used to obtain a boost sample of young people. Interviews were conducted in early 2009.

Exposure to science

- 15% of adults reported that they had held a job in a scientific or medical field at one time in their life, while a quarter had studied for a biology/genetics qualification at school.
- 41% of 14-18 year olds were currently studying or intending to study a science subject at level 3 (A-level or equivalent). The most popular subjects to study at this level were biology (58%), chemistry (40%) and physics (33%).
- Over a quarter (26%) of young people said they would consider studying science at higher education; for this group, the most popular subjects to study at higher education level were biology (26%), medicine (17%) and chemistry (16%).
- The majority of adults and young people (69% and 81% respectively) said they found science lessons very or fairly interesting at school.
- More than half (55%) of young people interviewed had visited a scientific place of interest in the last 12 months, with the most popular places including zoos and science museums.
- Older adults were more likely to read a newspaper or watch television regularly than were younger adults and young people aged 14-18. Younger adults and young people were much more likely to use the Internet and to engage in a range of computer-based activities.
- Involvement with and attitudes to alternative medicine were diverse. 31% of adults thought that homeopathy was more effective than or just as effective as medical treatment available from one's GP. Those in younger age groups, women and those who had previously used homeopathy were more likely to think this.
- Adults and young people expressed very similar views about the origins of life on earth. 53% of adults thought that humans have evolved over time as a result of natural selection, in which God played no part, while 18% thought that living things were created by God and have always existed in their current form.

Scientific literacy and knowledge of medical research

- Adults and young people obtained a similar profile of scores on our science 'knowledge quiz'; both groups answered an average (median) of six out of nine items correctly.
- The scientific knowledge of adults aged 65+ was comparatively low, with only 15% attaining the highest scores of 8 or 9 on our quiz, compared to 32% of those aged 35-49.
- Educational background emerged as key to scientific knowledge levels. For adults, being male, having higher educational qualifications and having a qualification in biology or genetics remained significantly associated with levels of scientific knowledge, even when their interactions with other factors were controlled for. For young people, willingness to

undertake non-compulsory science qualifications and parental qualification levels were relevant.

- When asked what it means to "study something scientifically", just 21% of adults and 24% of young people interviewed spontaneously identified theory construction or experiments and tests. Those with higher levels of scientific knowledge were much more likely to do so.
- 70% of adults and 55% of young people correctly identified that the scientific way to test the effectiveness of a drug was to give it to some patients but not others and compare their outcomes.
- Adults demonstrated a good understanding of probability in relation to science, with 63% answering four questions about genetic probabilities correctly and 37% answering one or more questions incorrectly. This understanding was lowest amongst low scorers on the more general scientific knowledge quiz and those aged over 65 (45% and 57% respectively answered one or more questions incorrectly).
- Spontaneous definitions of the term "medical research" varied, with cures and treatments (39%), illness and disease (25%) and cancer (23%) being the most popular responses identified by adults. Among young people, "medicine, drugs and tablets" was the most common response, identified by 30%.
- Understanding of common terms such as DNA and stem cells varied considerably. 49% of adults felt they had a very good or good understanding of DNA, compared to 63% of young people. But only 26% of adults and 31% of young people felt the same in relation to the term stem cells. Even among these respondents, considerable numbers were unable to provide more detail as to the meanings of these terms.

Engagement with medical research

- A third (34%) of adults and just over a fifth (22%) of young people said they were very interested in medical research.
- Among adults, women and those who were older, who had a disability or long term limiting illness or who had worked in a scientific job were more likely to be interested in medical research. Among young people, young women and those who expressed a willingness to study for non-compulsory science qualifications were more likely to be interested.
- The development of new drugs, vaccines and treatments and how the body works were the two aspects of medical research most commonly identified as areas of interest.
- 39% of adults and 51% of young people said they had actively tried to find information about medical research in the past 12 months.
- Most frequently, adults who said they had tried to find information had done so because they or someone they knew had an illness or disease they wanted to find out more about. Young people had most frequently tried to find information because it was connected with their studies.
- The Internet was the most common method used to try to find information about medical research (88% of adults and 93% of young people who said they had tried to find information had used the Internet).
- People were generally very positive about their experiences of trying to find information. 90% of adults said they had managed to find the information they were looking for and 96% of this group said the information they found had been very or fairly useful.
- As well as information they had sought, a substantial minority of respondents were able to recall at least some details of information they had come across relating to medical research (43% of adults and 34% of young people). Most commonly, this was information they had come across on television or in the newspapers.
- A minority of adults (27%) and young people (14%) who said they were very interested in medical research had not tried to find information about this and could not recall details of

any information they had come across. Adults who were older, who had no educational qualifications and who did not have access to the Internet were particularly likely to fall into this group.

Becoming informed about medical research: the public's preferences

- 47% of adults and 52% of young people felt they saw or heard too little or much too little information about medical research.
- The Internet would be the public's preferred method for finding or accessing information about medical research, selected by 65% of adults and 82% of young people.
- Around 6 in 10 adults or young people would prefer to find or access information about medical research that had been produced by a doctor, nurse or other medical practitioner.
- Around 3 in 10 adults and young people believe that the media exaggerates what medical research is likely to achieve.
- 72% of adults had a great deal of or complete trust in doctors, nurses and other medical practitioners to provide accurate and reliable information about medical research.
- Around 6 in 10 adults said they had a great deal of or complete trust in scientists working in universities. This was a higher proportion than said they had trust in scientists working for the government or for drug or pharmaceutical companies.

Support for medical research

- Virtually all respondents thought that medical research should be supported and encouraged, even if a lot of public money would need to be invested (95% of adults; 93% of young people).
- Levels of support for funding medical research varied according to the type of research in question: 84% of adults and 77% of young people said this was very important for clinical research compared with 60% of adults and 41% of young people in relation to basic research.
- A high proportion of both adults (92%) and young people (94%) said they felt medical research would improve the lives of people in the UK in the future.
- Expectations that medical research would produce cures varied considerably depending on the illness asked about. Over half of adults (56%) and over two-thirds of young people (67%) said that they thought medical research would definitely or probably produce a cure for cancer in the future. This compares to 65% of both groups who said this about HIV/AIDS, and 31% of adults and 44% of young people who felt this about schizophrenia.
- Expectations about finding a cure for cancer were higher among young people than adults. Among adults, these expectations were higher among men and older people.
- The two main concerns adults and young people had about medical research were the lack of investment in some areas (55% of adults and 35% of young people) and not knowing what the future risks would be (46% of adults and 41% of young people).
- Around half (52%) of adults felt there was the right amount of regulation of medical research.

Participation in medical research

- Just under a quarter of adult respondents or a family member (23%) had taken part in medical research; for this group, the most common activities were providing a blood or tissue sample (48%) and testing a new drug or treatment (40%).
- Participation in medical research was higher among the 65+ age group, those with a disability or long term illness and those who said they were very interested in medical research.

- Willingness to take part in medical research varied according to the type of project: 71% would be very or fairly willing to give a blood or tissue sample; 74% to allow access to their medical records; while only 30% would be willing to test a new drug or treatment. However, if they were suffering from the illness which the drug was designed to address, an additional 32% indicated they would be very willing to test a new drug or treatment.
- Willingness to take part was related to age, health and past participation in medical research.
- Three-quarters of adults (75%) said they would have concerns about testing a new drug or treatment for medical research. Amongst this group, the most common concern was the possible risk to one's health (93%).
- Around a third of adults said they would have concerns about allowing access to their medical records (28%) or giving blood/tissue samples (32%).
- The vast majority of the public thought that medical research in the UK is carried out in a way that protects privacy and confidentiality (63% said this was "probably" the case, and a further 19% thought it "definitely" was).

Attitudes towards genetics

- 2 in 10 adults and young people had seen or heard "a great deal" or "quite a lot" about genes and genetics in recent months, while five in ten reported that they had encountered "not very much" information, or "none at all".
- Self-assessed understanding of the ethical issues relating to genetic research varied widely, with 4 in 10 adults and young people agreeing they had a good knowledge and three in ten in each group disagreeing. Understanding of ethical issues was strongly linked to recent exposure to information on this topic and scientific knowledge in general.
- Adults were more optimistic than 14-18 year olds about medical advances as a result of genetic research (with 85% compared to 72% stating they were at least "somewhat optimistic"). Levels of optimism were strongly linked with levels of scientific knowledge and education.
- Public support for genetic tests varied, depending on the outcome of a disease being detected. 80% of adults and 81% of young people interviewed thought it was at least "quite likely" they would take such a test, if there were ways of reducing the likelihood of any disease detected, such as the availability of effective treatments.
- Attitudes to direct-to-public genetic tests were mixed, with 36% of adults and 56% of young people indicating such tests were a good idea.
- Family doctors or GPs and the NHS were the only organisations trusted by more than half of adults and young people to use genetic information held on a medical database responsibly.

Experiences and perceptions of science education

- Young people aged 14 to 18 were generally positive about their experiences of learning science at school. 81% found science lessons interesting, with 23% finding them very interesting. 59% rated science lessons as more interesting than maths lessons whilst a similar proportion (55%) thought they were more interesting than English lessons.
- Around half (51%) of the young people aged 14 to 18 agreed science was a popular subject among young people in general.
- Young women held less positive attitudes towards school science lessons than young men and were less likely to agree science was a popular subject among young people.
- A majority of 14 to 18 year olds (84%) found science more interesting at secondary school than primary school.

- There was widespread agreement that a good understanding of science would improve a person's career prospects and that doing well in science at school was important for people wanting to go to university.
- Nearly all young people aged 14 to 18 (95%) thought it was important for science to be taught in schools up to the age of 16. However, only just over half (54%) thought it was very important.
- Nearly all young people felt it was very important to their parents for them to do well in science at school. However, when asked to pick which subjects their parents would think were most important, they were less likely to pick science than maths and English.
- The quality of teaching was a particularly important factor in encouraging or putting off young people from learning science at school. Just over half (52%) said having a good teacher encouraged them to learn science whilst just under half (47%) identified a bad teacher as something that had put them off.
- Around four in ten young people were put off learning science because they found the subject too difficult (40%) or boring (41%). Young women were especially likely to be put off because they found the subject difficult.
- Just over half of young people (52%) mentioned the chance to do experiments as a factor which had encouraged them to learn science.

Science as a career choice

- A majority of young people aged 14 to 18 (81%) said they thought science was a good area of employment for young people to go into. This was even true for those (71%) who did not personally express interest in a career in science.
- The main reasons why science was considered a good choice of career were because it was interesting and because there were lots of different types of job available.
- A majority of young people aged 14 to 18 (82%) agreed scientists have a wide range of jobs to choose from, whilst 74% agreed scientists can find jobs anywhere in the world.
- The vast majority of young people aged 14 to 18 (93%) agreed that scientists make a valuable contribution to society, with 36% agreeing strongly.
- Only a minority of young people aged 14 to 18 thought scientists were poorly paid compared with other jobs (11%) or came from a limited range of social backgrounds (7%). Even among young people who themselves came from lower social backgrounds (whose parents did not have post-16 qualifications), only a minority (5%) disagreed with the view that scientists come from a wide range of social backgrounds.
- 44% of young people aged 14 to 18 said they were very or fairly interested in having a career in science. When asked about the sort of science career they might be interested in, careers in medicine and forensic science were commonly mentioned.
- Young people aged 14 to 18 were more likely to express interest in a scientific career if they thought their parents were interested in science or if they found science lessons interesting at school.

1 Introduction

Elizabeth Clery

In this report, we analyse and interpret the results of the 'Wellcome Trust Monitor'. The survey explored public attitudes about medical research, alongside people's knowledge and awareness of medical research and their behaviour in relation to it. In addition to the main sample of adults aged 18 plus, the survey was also fielded to young people aged 14-18. Both groups answered questions about medical research topics, while young people were also asked about their attitudes towards and experiences of science education and their perceptions of a scientific career[1].

The Wellcome Trust Monitor was designed with repetition in mind, as the aim is to repeat the survey every three years in order to measure continuity and change in public awareness, interest, knowledge and attitudes in relation to biomedical research. This report describes the findings of the 2009 (baseline) survey. In the future, these results will become an important tool for mapping long-term developments in this area.

In this opening chapter we set out the main aims of the research, explain the rationale for its focus on the topic of medical research and present a brief overview of the survey methodology.

1.1 Background and objectives

In 2008, the Wellcome Trust commissioned NatCen to carry out a survey of attitudes to medical research in the United Kingdom. The main aim of the survey was to explore public attitudes towards and knowledge and awareness of medical research, in addition to people's levels of interest in and engagement with this topic. There was a particular interest in exploring the views of young people, both on these issues and on the topic of science education and careers. For this reason, the survey involved a boost sample of young people aged between 14 and 18. As the major non-governmental funder of biomedical science in the UK, the Wellcome Trust has a critical interest in understanding public attitudes to biomedical science and technology, and in fostering greater citizen understanding and engagement with the scientific research that is conducts. The survey was designed to expand on the existing knowledge base in this area, to enable its more effective use in informing and influencing policy making and public funding decisions (for a review of existing research into attitudes towards medical research see Sturgis and Allum, 2006).

It was envisaged that the Wellcome Trust Monitor would have benefits, both for its funder and for other organisations working in the areas of science and medical research – most importantly in influencing strategy in relation to public engagement and education. It was also intended that the findings would have a broader impact on science policy and would provide an impartial and objective source of evidence on public attitudes that could inform and fuel future debates – amongst government policy-makers, in the media, amongst practitioners and in a range of other spheres.

1.2 Medical research context

Medical research is a highly relevant topic in public life, and can have a range of different impacts on people's lives (whether or not it is perceived in this way by the public). The most immediate way

[1] Our adult sample was defined as being aged 18 years and over. However, as Level 3 education, in which most young people in the UK take part, finishes at age 18, it was felt that any consideration of experiences of and attitudes to science education and career planning should incorporate the views of 18 year olds. For this reason, 18 year olds who agreed to take part in the survey were designated either as "adults" or "young people" and were routed to the appropriate set of questions for that survey population.

in which medical research has an impact is in relation to receiving health care and taking medicines – as such, members of the public are actual and potential recipients of the medical interventions developed through medical research. As tax-payers, adults have a vested interest in this area, as medical research attracts substantial sums of public funding each year; in 2007, it was estimated that the UK had a public expenditure of £5.3 billion in this area, including infrastructure and support costs and funding by government, charities and the ABPI[2]. Moreover, medical research receives considerable coverage and discussion in the media, meaning the public may be aware of information on this topic which could influence their perceptions and decision-making in relation to their own health. In addition, there are a wide range of information sources on medical research available to the public, including television programmes and, increasingly, Internet coverage, which can be viewed, accessed or received, both passively and actively.

In addition to such everyday impacts, there are also more strategic and high level ways in which medical research is relevant to public life in the UK. As the range of possible medical interventions expands, due to cutting-edge developments in science and technology, the desirability of making these interventions widely available has emerged as a contentious issue for discussion and debate, not just in the media and amongst the public, but for policy-makers and government. In recent years, the desirability and the ethical issues associated with cloning, the use of stem cells and the uses of genetic information have all been hotly contested. As the boundaries of possible medical interventions expand, the regulation of the medical research undertaken and the uses of its findings have become prominent issues, in some instances, leading to the consideration and implementation of government legislation. Most recently, in 2008, the UK Parliament passed the Human Fertilisation and Embryology Act which stipulated that all human embryos outside the body are subject to regulation.

As can be seen, medical research can have many impacts on the lives of the public, who – whether they appreciate it or not – have a range of potential interests in its development. For this reason, a survey focussing specifically on their awareness, interest, knowledge and attitudes in relation to this area is very relevant, and should allow public opinion to be given its due weight in discussion and debate, information dissemination and the decision making processes in this area.

For young people, exposure to medical research can also have impacts on both education and careers. All young people now cover some elements of medical research and its associated concepts as part of their compulsory science education. What they learn and the ways in which they are taught at this stage may have consequences for their understanding, awareness and attitudes to medical research in later life. In addition, young people are the potential doctors, scientists and researchers of the future, who will carry forward the task of undertaking the work of medical research. There has been an ongoing concern in the UK about the declining proportion of young people opting to take science qualifications, particularly at university level, and the implications of this trend for the availability of an adequately skilled workforce in the areas requiring scientific knowledge and skills, such as medical research (HM Stationery Office, 2006). An exploration of the attitudes and experiences of those in or near to their final years of schooling in relation to science education and careers is therefore extremely important – as this may shed light on the factors underpinning a declining involvement and interest in science education and point towards how these might be addressed in the future.

1.3 Methodology

The Technical Appendix to this report (Appendix A) and the full Technical Report (Clery et al, 2011) provide details of the survey methodology, including sampling and weighting. In this section we

[2] This figure approximates government, charity and APBI annual spend.

highlight the key details required to equip the reader with an understanding of the design of this survey and how it was implemented.

Sample

The Wellcome Trust Monitor used a random probability sample. The sample for the survey was drawn from the Postcode Address File (PAF). This is a list of all postal addresses in the United Kingdom and is the sampling frame commonly used in general population surveys. The sample was stratified by Government Office Region (GOR), the percentage of households in owner-occupied accommodation and the percentage of the population with qualifications at A-level or above. It was envisaged that the latter two factors would relate to attitudes, knowledge and awareness of medical research, in the case of owner-occupation because this is known to be linked with profession and levels of income and education, which tend to relate to attitudes to 'academic' topics.

A total of 2,650 'core' postal addresses were selected and issued to interviewers. The aim was to identify, where possible, an adult aged 18 years or over and a young person aged between 14 and 18 years, at each core address. The interviewer screened the household members by age and, where there was more than one member of the household who was aged 18 years or over (or more than one young person aged between 14 and 18 years), selected one individual for each of the adult and young person interviews, using strict procedures. The interview with the adult was always undertaken first in core households and, only if this was achieved was an interview with the selected young person carried out.

To obtain sufficient numbers of interviews with young people, the sampling strategy also involved an element of focussed enumeration (FE). Two or four FE addresses were identified and issued to interviewers alongside each of their core addresses; for each of these addresses, the aim was to screen (initially at the core address but later at the FE address where necessary) for the presence of young people in the age group of interest. Where one or more eligible young people were resident at the FE address, one respondent was randomly selected for interview.

Questionnaire development

The Wellcome Trust Monitor questionnaire included questions on the following aspects of science and medical research: interest in and engagement with science and medical research; knowledge and awareness of science and medical research; experiences of acquiring information on medical research and preferences for doing this in the future; support for medical research; expectations and concerns for future developments; experience of and attitudes towards participating in medical research projects; awareness, knowledge and attitudes to genetics. Questions developed specifically for the sample of young people focussed on experiences and perceptions of science education and science as a potential career choice.

One key aim of the survey was to establish how far, in what ways and for what reasons the awareness, attitudes and experiences of different sections of the public vary. For this reason, data focussing on medical research were complemented by a range of socio-economic, demographic and more general attitudinal information, to allow the analysis of attitudes and experiences by a range of respondent characteristics.

The questions for the survey were primarily new, having been designed specifically for this study. In some instances, replicas or modified versions of questions which had been used on previous

surveys, such as the British Social Attitudes survey and the Eurobarometer, were included[3]. The new questions went through an iterative process of question design and those which were most innovative or challenging were tested in a small-scale cognitive pilot and modified on the basis of results from the pilot test. A full dress rehearsal pilot of the Computer Assisted Personal Interviewing program and all survey procedures took place prior to the main fieldwork, and further amendments to the questionnaire and procedures were made on the basis of interviewers' feedback and respondents' reactions to the pilot. The survey as a whole was designed with repetition in mind.

Fieldwork

Interviewers were briefed in December 2008 and the fieldwork was carried out between January and March 2009. Fieldwork took place in England, Wales, Scotland and Northern Ireland, with the Northern Ireland Statistics and Research Agency (NISRA) undertaking the fieldwork in Northern Ireland.

An advance letter explaining the purpose of the survey was sent to all selected core addresses. A modified advance letter was posted through the letter boxes of FE addresses if it became apparent that contact needed to be made at the address. There was also an introductory letter aimed specifically at the sample of young people, which was provided to them once they had been identified.

Once an adult and, where available, a young person had been identified, the respondent was interviewed using Computer-Assisted Personal Interviewing (CAPI). Interviews took, on average, 53 minutes to complete for adults and 39 minutes for young people. An incentive of a £10 high-street voucher was given to all those who took part.

The total achieved sample was 1,179 adults and 374 young people. The response rate achieved for adults at core addresses was 49%[4], with a response rate for young people at core addresses of 86%. 64% of young people identified and contacted at FE addresses agreed to take part in the survey[5].

Weighting

The survey dataset has been weighted to ensure that it is representative of the two survey populations – adults aged 18 years and over and young people aged 14-18. Two stages of weighting were applied: first, the data were weighted to take account of the fact that not everyone at an address had the same chance of being asked to participate. Secondly, calibration weighting was applied, meaning that the weighted samples are representative of the respective populations in respect of age, sex and region. Further details of the weighting are given in Appendix A.

As a further check on how far our achieved sample could be taken to be representative of the general population and/or whether it contained any potential bias, our achieved adult sample was compared against the achieved sample on some other well-established general population surveys with relatively good response rates (Health Survey for England, National Travel Survey). Comparisons were made with regard to several key demographic indicators with the potential to

[3] Appendix B provides details of the replica or modified existing questions that were included in this survey, including a note about their previous use in survey research and the reasons for any modifications.
[4] Appendix A provides details of the maximum and minimum response rates for this survey.
[5] It is not meaningful to describe a "response rate" for the young people at FE addresses as, due to the FE processes employed, we cannot know for certain at how many of these addresses there were young people available for interview. For instance, informants at core addresses may have wrongly stated that there were no young people available at FE addresses, when in fact there were.

influence attitudes to medical research, namely education and health status. Full details are given in Appendix A.

1.4 The report

The report is divided into a number of chapters. After the introduction, we start by presenting an overview of people's involvement with and exposure to science, including employment in scientific jobs, interest in science at school and engagement with science through leisure activities, such as watching television and visiting places of interest (Chapter 2). In Chapter 3 we examine public understanding of science and medical research and report on a "knowledge quiz" undertaken with respondents, recognising the fact that knowledge and understanding are likely to be key factors in understanding experiences and attitudes in this area. These chapters provide a backdrop for the more narrowly focussed chapters on medical research that follow. The next two chapters focus on public engagement with medical research: in Chapter 4 we examine levels of interest in and engagement with information on this topic, while in Chapter 5 we turn to the issue of engagement from the angle of public preferences, exploring how the public would like to access information in the future. We then consider public support for medical research and expectations and concerns for future developments in this area (Chapter 6). In Chapter 7 we examine the extent to which the public have been involved in medical research and the factors that would foster and discourage any involvement in the future. Chapter 8 focuses on one specific area of medical research – genetics – where we seek to understand public attitudes, knowledge and awareness of this topic, which has been designated one of the 'key' focuses of the first Monitor. While the first eight chapters include data for adults and, where relevant, young people, in the final two chapters we focus specifically on those questions asked exclusively of the young people, exploring their experiences and perceptions of science education (Chapter 9) and attitudes towards science as a career choice (Chapter 10).

Throughout the report the data is analysed by a number of key sub groups of interest. In addition to comparisons between the responses of adults and young people, we analyse differences on the basis of age, sex, level of scientific knowledge, levels of educational qualifications (in general and in scientific subjects in particular) and experience of having a scientific job. However, analysis is not undertaken on a country by country basis or for groups defined by ethnic origin, due to the samples of key sub groups of interest not being sufficiently large.

A note on our definition of 'science'

The boundaries of the subject area of 'science' can be defined in a number of different ways, ranging from limiting this definition to covering only the pure science subjects (such as biology, chemistry and physics), to including practical subjects based on the application of scientific theory (such as electronics and engineering), to encapsulating all subjects with some scientific theory or content (such as mathematics and psychology). For the purpose of this survey, when asked about science qualifications, the young people were presented with as inclusive a list as possible; however, for the analysis undertaken in this report, the second definition of science outlined above was adhered to.

It should be noted that, where adults and young people were asked questions about 'science' in general, not pertaining to qualifications, no definition of this term was provided, meaning that the answers provided would have related to personal and subjective definitions, that could have reflected any of the three definitions of 'science' suggested above.

Conventions for reporting data

The following conventions are used throughout the report:

- Percentages have been rounded to the nearest whole percent. As a result, tables for single-code items will not always sum to 100% (and the addition of several figures from a table in the text will not appear to equal the sum of those figures within the table).
- Unweighted bases of less than 50 have been indicated by the placement of square brackets [ ] around the relevant percentages.
- The symbol '+' indicates that the percentage in question is less than 0.5%, whereas 0 explicitly shows that there are no cases in the cell.
- Whenever the text comments on differences between sub-groups these differences have been tested for significance and found to be statistically significant at the 5% level or above. Wherever differences are reported that did not attain the required level of significance this is stated explicitly.

2 Exposure to science

Varunie Abeywardana

2.1 Summary

- Among adults, 15% reported that they had held a job in a scientific or medical field at one time in their life, while a quarter had studied for a biology/genetics qualification at school.
- Over four in ten 14-18 year olds were currently studying or intending to study a science subject at level 3 (A-level or equivalent). The most popular subjects to study at this level were biology (58%), chemistry (40%) and physics (33%).
- Over a quarter (26%) of young people said they would consider studying science at higher education; the most popular subjects to study at higher education level were biology (26%), medicine (17%) and chemistry (16%).
- The majority of adults and young people (69% and 81% respectively) said they found science lessons very or fairly interesting at school.
- More than half (55%) of young people interviewed had visited a scientific place of interest in the last 12 months, with the most popular places including zoos and science museums.
- People were exposed to information about science in their day to day lives via a range of sources including books, TV documentaries and TV drama. Men were more likely to watch factual programmes about science whilst women were more likely to watch medical and other dramas with a scientific content. Young people were also more likely to watch fictional rather than factual based programmes.
- Just under three fifths of adults (56%) and 46% of young people have a disability or know someone close to them who has a disability.
- Older adults were more likely to read a newspaper or watch television regularly than were younger adults and young people aged 14-18. Younger adults and young people were much more likely to use the Internet and to engage in a range of computer-based activities.
- Involvement with and attitudes to alternative medicine were diverse. 31% of adults thought that homeopathy was more effective or just as effective as medical treatment available from one's GP. Those in younger age groups, women and those who had previously used homeopathy were more likely to think this.
- Adults and young people expressed very similar views about the origins of life on earth. 53% of adults thought that humans have evolved over time as a result of natural selection, in which God played no part, while 18% thought that living things were created by God and have always existed in their current form.

2.2 Introduction

Public attitudes, knowledge and understanding of medical research and science do not form and develop in a vacuum, but will be influenced by a range of related attitudes, knowledge and experiences. In this chapter, we present an overview of the general contexts in which the chapters on medical research in the remainder of the report need to be understood. Firstly, we examine the extent to which adults and young people have encountered and are engaged with science (and medicine) in their day-to-day lives. Specifically, we consider: to what extent adults have a scientific background (either through jobs or education); what proportion of young people at school are studying science, or thinking of studying science based subjects at a higher level; and the extent to which people choose to engage with science in their leisure time – by watching particular television programmes, reading scientific books, or visiting scientific places (such as the zoo, science museums etc). The chapter then moves on to focus more closely on potential exposure to science and medical research in respondents' personal lives, as we consider a number of factors related to

health, including whether or not they or someone they are close to has a disability. Finally, we consider attitudes and behaviour in a range of areas that are likely to be related to attitudes and experiences in science and medical research, including consumption of different media and information sources and attitudes to related (and potentially alternative or conflicting) approaches to traditional science and medicine (namely alternative medicine, horoscopes and views on the origins of human life). By exploring these different aspects, this chapter will attempt to establish the context in which attitudes, behaviour and knowledge in relation to science and medical research can be accurately understood.

2.3 Adults' scientific background

We asked adult respondents whether they (or any of the other adults in their household) had ever had a job in a scientific or medical field. For respondents themselves, the vast majority (85%) had not had a job of this kind. This proportion falls slightly to 78% when we expand our category to include respondents and any adult household members (Table 2-1). Overall, 15% of adult respondents had had a scientific job at one time in their life, and women were more likely than men to have a job of this kind (18% compared with 12%). There were no significant differences by age.

Table 2-1 Job in scientific or medical field

Base: All adults *Wellcome Trust Monitor*

Scientific/medical job	Total %
Yes, respondent	12
Yes, both respondent and someone else in household	3
Yes, someone else in household	7
No, no adult in household has had scientific job	78
Unweighted base:	*1179*
Weighted base:	*1179*

Adult respondents were asked whether they had ever studied for a qualification in biology or genetics[6] at school[7], college or university. Around a third had studied for a biology or genetics qualification, with a quarter of respondents (25%) having studied for such a qualification at school (see the 'total' column in Table 2-2). There is a strong correlation between age and studying for a biology or genetic qualification. Those in the youngest (18 to 34) age group were much more likely to have studied these subjects at school than older respondents (34% compared to 8% of the 65+ age group). This marked difference by age may reflect a changing emphasis in the school curriculum at different points in time.

Sex is also related to having a biology or genetics qualification; women were more likely than men to have studied for a qualification of this kind at school (28% compared with 21%), and less likely to have never studied for such a qualification (65% compared to 72%). There were no differences at college or university level. It may be that this relationship is particularly relevant to the specific subjects asked about in the question – respondents may of course, have studied for other scientific qualifications, such as chemistry and physics.

[6] It is worth noting that this is a much stricter definition of a science qualification than the definition we use later in the chapter in relation to young people studying at school.

[7] Genetics is not taught as an individual subject at school, but forms part of the compulsory science curriculum at GCSE level.

Table 2-2 Studied for biology or genetics qualification, by age

Base: All adults *Wellcome Trust Monitor*

	Age				
Biology/genetics qualification	**18-34** %	**35-49** %	**50-64** %	**65+** %	**Total** %
University	6	3	2	1	3
College	6	4	2	2	4
School	34	31	20	8	25
Have never studied for a qualification in biology or genetics	53	62	76	89	69
Unweighted base:	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*312*	*354*	*270*	*244*	*1179*

As we might expect, Table 2-3 shows that those who have had a scientific or medical job were more likely to have studied for a biology or genetics qualification at university or college than those that have never had a scientific occupation (20% compared to 5%).

Table 2-3 Studied for biology or genetics qualification, by whether had a scientific job

Base: All adults *Wellcome Trust Monitor*

	Adult scientific job		
Studied for qualification in biology or genetics	**Had scientific job** %	**Never had scientific job** %	**Total** %
University	9	2	3
College	11	3	4
School	37	22	25
Have never studied for a qualification in biology or genetics	43	73	69
Unweighted base:	*186*	*993*	*1179*
Weighted base:	*176*	*1003*	*1179*

2.4 Young people's science education

We saw in the previous section that relatively small minorities of adults have either had a scientific job or have studied for a biology/genetics qualification. We now examine young people's experiences of science education. We use a broader definition of science here than in our questions about adult qualifications (see note on 'science' definition in Chapter 1 for more details). Here, we are primarily interested in outlining the proportions studying at different levels, and the intention to study science in the future. Chapter 8 explores the subject of young people's science education in more detail.

Current status

The majority of young people interviewed (88%[8]) were currently in education; the majority of this group were at school (57%), followed by college (30%) and university (2%). 6% of the 14-18 year olds were in paid work. Table 2-4 shows the sample broken down by the educational level respondents were currently at (or whether they were not studying at all). Most were studying either at level 2 (GCSE level) – 42% – or at level 3 (A-level or equivalent) – 32%.

[8] The sum of the proportions for school, college and university produce a different figure due to rounding.

Table 2-4 Studying at what level

Base: All young people *Wellcome Trust Monitor*

	Total
Current level	%
Not studying	12
Below GCSE level	5
Level 2 - GCSE or equivalent	42
Level 3 – A-level or equivalent	32
HE qualification	7
Unweighted base:	*374*
Weighted base:	*374*

We were, or course, primarily interested in the proportion of young people studying science at each level. The 'total' column in Table 2-5 shows that four in ten were studying science at level 2 or below. Young people studying up to level 2 are required to study the core science subjects of biology, chemistry and physics, so this figure is simply a reflection of the proportion studying at that level[9]. A further two in ten (20%) were studying science beyond compulsory education (that is, at level 3 or above). A sizeable group of 41 per cent of young people said they were not studying any science based subject. Table 2-5 illustrates that there was little variation between young men and young women in terms of the studying of science at different levels. However, analysis of take-up by individual science subjects within England has indicated that, within science, there is considerable variation between young men and young women, with the former being much more likely to study physics and the latter to study biology (Bell et al, 2003).

Table 2-5 Studying science at what level, by sex

Base: All young people *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Science level	%	%	%
Not studying	39	43	41
Below GCSE level	3	1	2
Level 2 - GCSE or equivalent	33	39	36
Level 3 - A level or equivalent	20	13	16
HE qualification	3	3	3
Unweighted base:	*183*	*191*	*374*
Weighted base:	*193*	*181*	*374*

Studying for non-compulsory science qualifications

We also asked young people at level 2 or below whether or not they were considering studying science in the future. The next table combines those results with the proportion already studying science (or other subjects) at level 3 to give an overall picture of level 3 science education. A sizeable minority of 41% were already studying or considering studying science at level 3. This proportion comprised 20% who were considering studying science at A-level or equivalent and a similar proportion (21%) who were already studying for such a qualification. Just over half of young people (53%) were not studying or considering studying science at level 3. This figure was made up of 29% not studying science at level 3, and 24% not considering studying science at this level. There was little variation on the basis of sex: 43% of young women were studying/considering science at level 3, compared to 40% of young men.

[9] The proportion of young people studying at level 2 may have been very slightly higher than the proportion who indicated they were studying science subjects at level 2, as some young people may have repeated a small number of GCSEs post-16, for example, that might not include the science subjects.

Table 2-6 Whether currently studying or considering studying science at Level 3

Base: All young people *Wellcome Trust Monitor*

Level 3 science status/intentions	Total %
Studying/considering studying science	41
Studying science post 16	21
Considering studying science post 16	20
Not studying/considering studying science	53
Has not gone on to study science post 16	29
Not considering studying science post 16	24
Unweighted base:	*374*
Weighted base:	*374*

The most popular science subjects to be studying at level 3 were the compulsory subjects of biology (58%), chemistry (40%) and physics (33%) (Table 2-7). Amongst those young people that stated that they would consider studying a science based subject at level 3, the most popular intended subjects were the same: biology (55%), chemistry (38%) and physics (27%) (Table 2.8). However, the base is fairly small so some caution is needed.

Table 2-7 Currently studying non-compulsory science qualifications, by which subject being studied

Base: Young people studying at level 3 *Wellcome Trust Monitor*

Scientific subjects currently being studied	Total %
Biology	58
Chemistry	40
Physics	33
Electronics	5
Applied science	4
Science in society	3
Double award science	2
Environmental science	2
Geology	1
Unweighted base:	*60*
Weighted base:	*72*

Percentages add up to more than 100% as respondents could give more than one answer.

Table 2-8 Considering studying science at Level 3, by which subject

Base: Young people studying at level 2 and considering studying science at level 3 *Wellcome Trust Monitor*

Scientific subjects intends to study	Total %
Biology	55
Chemistry	38
Physics	27
Applied science	12
Electronics	9
Geology	4
Environmental science	4
Science in society	1
Unweighted base:	*90*
Weighted base:	*76*

Percentages add up to more than 100% as respondents could give more than one answer.

Science at higher education

We also asked young people whether they were considering studying science at higher education[10]. The majority (68%) of 14-18 year olds said they had no plans to do so, while a quarter

[10] We directly asked the question of young people who were currently studying or intending to study at level 3. We assumed the answer for all other young people was that they were not intending to study science at HE level.

(26%) expressed an interest in studying science at higher education (and 1% of our sample were already studying science at this level). There was little variation between young men and young women in their intentions.

Amongst those young people that said they would consider studying science at higher education the most popular subjects ranged from biology (26%), medicine (17%) and chemistry (16%) (Table 2-9).

Table 2-9 Intend to study a science at Higher Education, by subject

Base: Young people considering studying science at HE *Wellcome Trust Monitor*

Subjects intends to study	Total %
Biology	26
Medicine	17
Chemistry	16
Engineering	14
Physics	12
Nursing	9
Other science subject	8
Veterinary science	7
Environmental science	5
Geology	4
Dentistry	2
Biochemistry	1
Unweighted base:	*145*
Weighted base:	*134*

Percentages add up to more than 100% as respondents could give more than one answer.

Interest in science lessons at school

Beyond the age at which science is compulsory, the proportions studying or intending to study science give us some indication of how much young people are interested in, or enjoy science lessons at school. However, we cannot be sure of this – it may be, rather, that science is seen as a sensible subject to pursue in terms of career prospects or keeping options open. For that reason, and because we cannot use prevalence measures for the pre-16 age group (when science is compulsory), we also asked respondents directly how much they had found science lessons interesting. The following question was put to both young people and adults: "Overall, how interesting [if at all][11] [do/did] you find science lessons at school?"

Just over 80% of young people and under 70% of adults said they found science lessons very or fairly interesting (Table 2-10). Respondents can overstate their interest in a topic during surveys, so it is likely that the proportion stating they were fairly interested is slightly exaggerated. Nevertheless, over a quarter of adults and 23% of young people said they were very interested in science lessons at school. Further exploration of young people's interest in science can be found in Chapter 9.

[11] The clause "if at all" was included for young people, to persuade them that providing a negative response was not an invalid or unexpected response.

Table 2-10 Interest in science lessons at school

Base: All respondents *Wellcome Trust Monitor*

Interest in science lessons at school	Adults (Aged 18+) %	Young people (14-18) %
Very interesting	27	23
Fairly interesting	42	58
Not very interesting	15	12
Not at all interesting	11	6
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

For adults, this table reports answers to the question "Overall, how interesting did you find science lessons at school?" For young people, it reports answers to the question "Overall, how interesting, if at all, [DO/DID] you find science lessons at school?"

For adults, as might be expected, those that have worked in scientific or medical jobs were more likely to have found science very interesting at school than those who had never had a job of this kind – 41% compared to 24% gave this answer (Table 2-11).

Table 2-11 Scientific job, by interest in science at school

Base: All adults *Wellcome Trust Monitor*

	Adult scientific job		
How interesting find science at school	Had scientific or medical job %	Never had scientific job %	Total %
Very interesting	41	24	27
Fairly interesting	33	44	42
Not very interesting	16	15	15
Not at all interesting	8	12	11
(SPONTANEOUS: It varies/varied between science subjects)	2	3	3
Never studied science/does not remember studying science	0	1	1
Unweighted base:	*186*	*993*	*1179*
Weighted base:	*176*	*1003*	*1179*

2.5 Engagement with science in daily lives

In this section we look beyond people's exposure to science at school and in their employment and we examine how much people are exposed to science through a variety of leisure activities. We look at how often respondents watch different science based television programmes, what books they read and how often they have visited different scientific places of interest. The final part of this section reports on factor analysis which was used to explore relationships between these different aspects of science in everyday life.

First, we asked people how frequently they watched a variety of different television programmes with scientific content, including documentaries on various topics and police and medical dramas. Of all these types of programmes, the ones that were most likely to be watched at least once a week, across both sample types, were police dramas, wildlife programmes and medical dramas (Table 2-12). Of course, the frequency that is reported for different types of programme may simply reflect the availability of these, rather than an explicit preference.

In terms of how often adults and young people watched different scientific programmes; we can see from Table 2-12 that each group tended to be interested in different types of science based programmes. Adults were more likely than young people to say they watched programmes about animals and wildlife once a month or more (76% in comparison to 59%). In contrast, young people were more likely than adults to say they watched medical, police/forensic dramas and programmes on unusual medical problems at least once a month.

Table 2-12 How often people have watched television programmes on different aspects of science

Base: All respondents *Wellcome Trust Monitor*

	Types of scientific television programmes													
	Animal and wildlife		Stars and planets		New inventions		Advances in medicine		Medical dramas		Police dramas including forensic experts		Unusual medical problems	
Frequency	Adults %	Young people %	Adults %	Young people %	Adults %	Young people %	Adults %	Young people %	Adults %	Young people %	Adults %	Young people %	Adults %	Young people %
At least once a week	41	23	7	3	16	10	6	3	32	37	40	43	11	11
Once/couple times a month	35	36	17	16	32	39	30	24	17	31	27	32	37	46
Once/several times a year	14	27	34	39	30	31	42	34	12	13	14	12	32	27
Never	9	14	42	41	22	20	22	39	39	19	19	12	20	16
Unweighted base:	*1179*	*374*	*1179*	*374*	*1179*	*374*	*1179*	*374*	*1179*	*374*	*1179*	*374*	*1179*	*374*
Weighted base:	*1179*	*374*	*1179*	*374*	*1179*	*374*	*1179*	*374*	*1179*	*374*	*1179*	*374*	*1179*	*374*

We also asked respondents how frequently they read novels or other fiction that had "a scientific storyline", and how often they read or consulted a factual book about science. Only very small proportions of both adults and young people said they read a book with fictional scientific content regularly (Table 2-13), while the most common answer for both adults and young people was that they never read such books – 56% of young people said this, compared to 63% of adults. The proportions of each group who said they read a scientific novel infrequently (between once and several times a year) was broadly similar: 28% of adults and just over a third (35%[12]) of 14-18 year olds. A similar pattern was seen when looking at the amount of time each group spent reading or consulting factual science books in their spare time.

Table 2-13 Read scientific novel or factual book about science

Base: All respondents *Wellcome Trust Monitor*

How often read science fiction	**Adults (aged 18+)** %	**Young people (aged 14-18)** %
At least once a week	3	1
A couple of times a month	2	2
Once a month	4	6
Several times a year	12	13
Once a year	16	22
Never	63	56
How often read factual book about science		
At least once a week	7	6
A couple of times a month	5	8
Once a month	4	4
Several times a year	16	13
Once a year	15	14
Never	54	55
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

We were particularly interested in any science-related out of school activities which young people might have engaged in. We presented these respondents with a list of activities on a show card and asked which, if any, they had done in the past 12 months. Over half of the young people interviewed (55%) had visited a scientific place of interest out of school hours in the past 12 months (Table 2-14). The findings show that the most common places to visit were zoos, science museums and nature reserves. For comparison we also included "art galleries" in the list of places to visit to see how often young people visited places of interest not associated with science. 27% of young

[12] The proportions in table produce a different figure due to rounding.

people had visited an art gallery in the past year, similar to the proportion who had visited a science museum (23%).

Table 2-14 Visited scientific place of interest in last 12 months

Base: All young people *Wellcome Trust Monitor*

	Total
Scientific places	%
Has not visited any of these attractions	35
Zoo	26
Science museum	23
Nature reserve	15
Science club e.g. an after school club	12
Science centre	11
Working laboratory	7
Planetarium	3
Science festival	2
Other answer	2
Non-scientific places	
Art gallery	27
Unweighted base:	*374*
Weighted base:	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

Of those 14-18 year olds interviewed that had visited a science museum outside of school in the last 12 months, the majority were infrequent visitors, with 90%[13] of young people visiting between once and several times a year. It should be noted that we would not expect young people with particular interests in any of these places to necessarily visit them on a regular basis. A similar pattern was seen for the zoo and nature reserves (Table 2-15). This shows that some young people actively visit science related places outside of school, possibly on family trips or at times by themselves, but they tend to be infrequent visitors.

Table 2-15 Scientific places of interest, by frequency

Base: Young people who had visited scientific place of interest *Wellcome Trust Monitor*

	Scientific place		
	Zoo	Science museum	Nature reserve
Frequency	%	%	%
At least once a week	1	2	7
A couple of times a month	2	4	2
About once a month	0	4	3
Several times in past 12 months	14	21	42
Once in past 12 months	83	70	45
Unweighted base:	*102*	*98*	*60*
Weighted base:	*97*	*87*	*55*

We also asked adult respondents how often they had visited a science museum or science centre in the past 12 months. Overall 32% said they had made such a visit in the past 12 months, with 11% saying they had visited more than once.[14]

We were interested in the extent to which these different forms of science-related leisure activity (viewing television programmes, reading books, or visiting places of interest) were correlated with one another. Is it the case that people who are exposed to science in one way also tend to be exposed to science in other ways? We used a statistical technique called factor analysis to explore

[13] The proportions in the table produce a different figure due to rounding.

[14] When we asked respondents to the 2006 British Social Attitudes survey how often they had visited a science centre in the past 12 months, a similar proportion (25%) said that they had visited such a place in the past year. Further details of this study can be found in Appendix B.

the interrelationship between these different activities and the extent to which they tended to be done by the same people. In fact, we found that activities fell into three distinct groups, suggesting that different people may gain exposure to science in different ways. The three groups of activities identified by the factor analysis were: firstly, watching drama or entertainment programmes with scientific content i.e. medical or police dramas; secondly, watching factual based programmes or documentaries about aspects of science (wildlife, stars and planets, inventions or new medical advances); the final group of activities comprised visiting scientific places of interest and/or reading books about science (either fiction or non-fiction).[15] The results of the factor analysis are shown in more detail in the appendix to this chapter.

We used these three activity dimensions (or factors) identified to explore whether particular groups of respondents were more likely to be exposed to science through different types of activities than others. We calculated respondents' summary scores on each of the three factors identified – TV drama, TV documentaries and books/visiting places of interest – and then compared the scores obtained on each factor on the basis of respondent characteristics such as sex, age and education. The factors have been set up to have an overall mean of 0, with positive values indicating a higher than average exposure to science and negative values indicating a lower than average exposure.

There is some evidence that different groups tend to be exposed to science through different media. Among adult respondents we found that men got more exposure than women on factor one (watching documentaries) and factor three (reading books/visiting places of interest) whilst women got more exposure than men on factor two (watching drama). Younger age groups got more exposure than older age groups on the reading books dimension. Those with no educational qualifications got more exposure on the TV drama dimension whilst those with higher educational qualifications got more exposure on the books dimension. Using a measure of whether the respondent has ever had a scientific job as a proxy for involvement with science, we found no difference between those who had and those who had not had a scientific job on the two TV watching dimensions. However, those who had ever had a scientific job got more exposure on the reading books dimension. These findings are summarised in the appendix to this chapter.

Among young people, we found no significant differences in exposure on the basis of age. We did find that young men got more exposure than young women on the TV documentary dimension whilst young women scored higher than young men on the TV drama dimension. We also found that young people currently studying or intending to study science at level 3 or above got more exposure on the TV documentaries and books dimensions.

2.6 Health and disability

We turn now to the health of respondents and of their close family members, as this is likely to affect respondents' awareness of and exposure to medical research. Respondents were asked to rate their own health from very good to very bad. Significantly more young people (54%) said they felt that their general health was very good than adults (36%). Conversely, adults were more likely to rate their health as fair or bad than young people (Table 2-16).

[15] How often the respondent had visited a science museum or science centre was included in the factor analysis for adult respondents. However, for simplicity, out of school activities were excluded from the factor analysis for young people.

Table 2-16 General health

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)	Young people (aged 14-18)
Self-reported health	%	%
Very good	36	54
Fairly good	44	40
Fair	15	6
Bad	3	0
Very bad	2	*
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Respondents were also asked about disability and whether they, or someone close to them, suffered from a serious long term illness or medical condition that without treatment, would limit their ability to carry out normal day-to day activities. Just over a fifth of adults and 5% of young people said they had a disability that affected them in this way. Larger proportions had a close family member or friend with a disability. Around half of young people and adults had no disability, nor a connection with anyone who had a disability or long term illness (Table 2-17).

Both health and disability are correlated with age for the adult sample; Table 2-17 shows that younger groups were less likely to have a disability or long term illness than older age groups (one in ten 18-34 year olds have a disability, compared to four in ten of the 65+ age group).

In this report we tend to use disability rather than general health as an analysis variable, as it is arguably a more objective measure than self-reported health, and as having a specific long-term disability or illness is likely to be particularly relevant to the questions that we analyse by respondent characteristics.

Table 2-17 Disability, by age

Base: all respondents *Wellcome Trust Monitor*

	Young people (14-18)			Adults (aged 18+)				
	14-16	17-18	Total	18-34	35-49	50-64	65+	Total
Disability	%	%	%	%	%	%	%	%
Yes, respondent	6	5	5	12	16	28	38	22
Yes, close family member	33	42	37	31	39	33	25	32
Yes, close friend	4	3	4	2	2	3	1	2
No, no-one	58	53	56	56	49	40	42	47
Unweighted base:	*259*	*115*	*374*	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*223*	*151*	*374*	*312*	*354*	*270*	*244*	*1179*

We also asked respondents the following question:

> Has a doctor ever advised you, or any member of your immediate family, of a serious genetic condition in your family?

The majority of both adults and young people (and their immediate family) have never been told they have such a condition (86% of both groups). 14% of adults and 12% of young people reported a genetic condition in the family. It was felt that being in this situation might result in particular attitudes and knowledge in relation to genetics, and this measure is used as a key analytic variable in Chapter 8, which deals with this topic.

2.7 Consumption of media and information sources

A primary interest of the Wellcome Trust Monitor is in understanding if and how the public engage with information about medical research and how they would wish to do so in the future; these questions are addressed in detail in Chapters 4 and 5. Here we provide a context to those chapters, by examining the types and range of information sources that the public currently access and engage with. Specifically, respondents to the survey were asked about newspaper readership, Internet usage, their involvement in a range of computer-based activities and about their levels of television and radio consumption.

As shown in Table 2-18 below, consumption of different media and information sources varied dramatically between the adults and young people and between older and younger age groups. Newspaper readership and television were much more common among adults compared to young people: while around half of adults read a daily morning newspaper at least three times a week, only around a third of young people did this. Almost two in ten adults watched more than 30 hours of television each week, while just one in ten young people did this. Moreover, involvement in these activities was most common amongst the older adults; for instance, more than a third of adults aged 65 years and over watched more than 30 hours of television per week, and two-thirds of this group read a daily newspaper at least three times a week.

On the other hand, young people aged 14-18 and the younger age groups amongst the adults were more likely to use the Internet and engage with a range of computer-based activities. Almost all of the young people indicated that they used the Internet for reasons other than their work, compared to seven in ten of the adults, with the younger adults being much more likely to do this (nine in ten of those aged 18-34 years, compared to less than three in ten of those aged 65+ years). Consequently, it is not surprising that all of the computer-based activities, many of which involve Internet usage, were more likely to have been engaged with in the past month by young people and the younger groups of adults. It is interesting to note that, even amongst the young people with whom they are most popular, Internet-based activities such as downloading and listening to a Podcast, taking part in an Internet discussion or taking part in activities as part of a virtual community, are only undertaken regularly (at least once in the past month) by less than half – suggesting that, even among those aged 14-18 years, consumption of different media and information sources is highly varied.

Table 2-18 Consumption of media and information sources, by age

Base: All respondents *Wellcome Trust Monitor*

	Young people			Adults				
	14-16	17-18	Total	18-34	35-49	50-64	65+	Total
	%	%	%	%	%	%	%	%
Newspaper readership	%	%	%	%	%	%	%	%
Reads daily morning newspaper at least 3 times a week	29	43	34	40	44	49	66	49
	%	%	%	%	%	%	%	%
Doesn't read daily morning paper but reads paper on the Internet at least 3 times a week	3	11	6	15	5	6	2	8
Internet use	%	%	%	%	%	%	%	%
Uses the Internet other than for work	98	97	98	91	82	73	25	70
...for less than five hours per week	18	14	16	25	37	39	13	29
...for more than five but less than ten hours per week	27	18	23	21	20	10	5	15
...for more than ten hours per week	53	65	58	45	26	24	6	26
Computer-based activities in the past month	%	%	%	%	%	%	%	%
Played computer games	76	62	70	51	31	26	9	30
	%	%	%	%	%	%	%	%
Downloaded and listened to a Podcast	25	24	25	28	18	8	1	15
	%	%	%	%	%	%	%	%
Took part in an Internet discussion	42	41	41	25	9	5	2	11
	%	%	%	%	%	%	%	%
Took part in activities on Internet as part of a virtual community	25	21	23	24	9	4	1	10
	%	%	%	%	%	%	%	%
Watched an Internet broadcast	49	43	46	39	31	18	3	24
	%	%	%	%	%	%	%	%
Saved or printed information downloaded from the Internet	62	70	65	62	55	44	17	46
Consumption of TV and radio								
Watches TV for...	%	%	%	%	%	%	%	%
...less than 10 hours per week	40	29	36	33	28	18	9	23
...10-19 hours per week	31	38	34	34	32	34	19	30
...20-29 hours per week	21	20	20	24	28	31	37	29
...30+ hours per week	8	13	10	10	13	17	35	18
Watches TV news programmes...	%	%	%	%	%	%	%	%
...every day	24	38	30	47	74	78	90	71
...less often than every day	67	55	62	38	23	17	8	23
...never	8	5	7	9	2	2	1	3
...Never watches TV	1	3	2	7	1	3	0	3
Listens to radio news programmes...	%	%	%	%	%	%	%	%
...every day	17	19	18	29	47	50	42	42
...less often than every day	47	40	44	34	28	27	26	29
...never	36	41	38	37	25	23	32	29
Unweighted base:	*259*	*115*	*374*	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*223*	*151*	*374*	*312*	*354*	*270*	*244*	*1179*

What is clear from this data is that consumption of different media and information sources varies considerably between adults and young people, with younger groups of adults generally having more in common with young people aged 14-18 than their older counterparts. This will be a key context in which to interpret what the public currently do and do not do in terms of accessing information on medical research, and how they would like to do this in the future (Chapters 4 and 5).

2.8 Related attitudes to science and medical research

Science and medical research constitute one approach or body of knowledge for explaining human life and how it operates and for presenting solutions to problems that arise, such as illness and disease. However, there are a number of other disciplines or belief systems that can potentially conflict with the claims and interpretations of science and medical research and that might thus influence the attitudes to this area of those who subscribe to them. With this in mind, it was decided to ask respondents to the survey a small number of questions about three areas – alternative medicine, horoscopes and views about the origins of human life – as all three could potentially come into conflict with the practices, development or claims of science and medical research. An understanding of public attitudes to these areas is therefore crucial in understanding and interpreting public attitudes to science and medical research.

Attitudes to alternative medicines

Alternative medicine is often regarded as a discipline in conflict with traditional medicine, with its approach and assumptions sometimes being termed as 'unscientific', though there is also a competing standpoint which sees the two as far more complementary than this. To understand how involved the public are with alternative medicine and how far they subscribe to its rationale and claims, we asked adult respondents to the survey about their experiences of using a range of types of alternative medicine. As Table 2-19 below demonstrates, alternative medicine had been used by a sizeable minority of the public (45%), with more than half of adults stating they had never used this approach. The most frequently used type of alternative medicine was herbal medicine, which has been used by almost three in ten adults, with no other type of medicine having been by more than two in ten.

Table 2-19 Adults' experience of using alternative medicines

Base: All adults *Wellcome Trust Monitor*

Type of alternative medicine ever used by respondent	Total %
Herbal medicine	28
Homeopathy	18
Acupuncture	16
Reiki	6
Hypnotherapy	6
Crystal healing	3
Had used any	45
Not used any	54
Unweighted base:	*1179*
Weighted base:	*1179*

Interestingly, experiences of using alternative medicines varied for different sections of the population. Women were more likely to have ever used alternative medicine, with 51% claiming this was the case, compared to 39% of men. Use of alternative medicine was most common among adults aged between 50-64 years, with 55% of adults in this age group stating that they had used one of more of the techniques listed above. Whilst it seems plausible that the experiencing of problems for which alternative medicine presents a potential solution might increase with age, it is interesting to note that, among those aged 65+ years, the proportion who had ever used alternative medicine dropped to 35%. Finally, usage of alternative medicine also appeared to relate to educational qualifications; particularly noteworthy is the fact that adults with no qualifications were less likely to have used alternative medicine than any other group (with 39% having done this, compared to 48% of those with higher education qualifications).

However, we cannot simply interpret usage or non-usage of alternative medicine as indicative of public support or opposition; respondents may have used or not used alternative medicine for a range of reasons that had little to do with their own attitudes to this approach. To disentangle this issue further, we focussed on one branch of alternative medicine, homeopathy, and asked those adults who had and had not used this the reasons as to why this was the case.

The answers provided are presented in Table 2-20 and Table 2-21 below. What is clear is that those adults who had used homeopathy had motives for doing so which assumed this technique would be more or at least as effective as conventional drugs. Around half identified the perceived advantage that homeopathy does not have side-effects like conventional drugs, while the same proportion expressed a more neutral view – that they were willing to try any approach and did not think it would cause any harm. Just two in ten adults explicitly stated that they had used homeopathy because they felt it is more effective and can cure diseases better than conventional drugs.

Table 2-20 Reasons for using homeopathy

Base: All adults who had ever used homeopathy *Wellcome Trust Monitor*

Reasons for having used homeopathy	Adults (aged 18+) %
Does not have side-effects, unlike conventional drugs	49
Willing to try anything and didn't think it could do any harm	49
More effective and can cure diseases better than conventional drugs	16
Other reason (Please say what)	23
Don't know	3
Unweighted base:	*221*
Weighted base:	*207*

Percentages add up to more than 100% as respondents could give more than one answer.

On the other hand, those adults who had not used homeopathy generally explained this decision on the basis of factors that had little to do with a negative attitude to this type of treatment. Around one in three in each case indicated that they had not had an illness where this sort of treatment was needed or that nobody had ever advised them to use homeopathy. However, around two in ten explained their non-usage of homeopathy on the basis of the fact that there is no scientific proof of its effectiveness whilst one in twenty indicated that they felt conventional drugs are more effective. It is interesting to note that around one in four adults indicated that they had not heard of homeopathy before, demonstrating that knowledge of such alternative medicines is by no means universal.

Table 2-21 Reasons for not using homeopathy

Base: All adults who had never used homeopathy *Wellcome Trust Monitor*

Reasons for not having used homeopathy	Adults (aged 18+) %
Haven't had illness where this sort of treatment needed	33
Nobody has ever advised it	32
No scientific proof of effectiveness	17
Conventional drugs more effective	5
Too expensive	3
Never heard of homeopathy	25
Other reason	4
Unweighted base:	*958*
Weighted base:	*972*

Percentages add up to more than 100% as respondents could give more than one answer.

Therefore, there is some evidence that usage of homeopathy is influenced by perceptions of the effectiveness of this treatment. To measure these perceptions across the public, regardless of usage, we asked adults the following question:

> People have different views about how effective homeopathy can be at treating illness. Compared with medical treatments available from your GP or other qualified medical staff, do you think that homeopathy can be more effective, just as effective, less effective than other medical treatments or not effective at all?

Spontaneous responses that the effectiveness of homeopathy depended on the illness being treated or that they did not know what homeopathy was were also recorded by the interviewer. Table 2-22 below presents the findings, separated for those adults who had and had not used homeopathy in the past. What is immediately apparent is that attitudes to the effectiveness of homeopathy are very mixed; just 5% considered it more effective than other medical treatments, whilst 26% regarded it as just as effective. However, 27% and 13% of adults respectively regarded homeopathy as less effective than other treatments, or not effective at all. A sizable minority of 14% felt that its effectiveness depended on the illness being treated, whilst a similar proportion had not heard of this treatment[16].

When we consider those adults who had used and had not used homeopathy in the past, perceptions of its effectiveness are markedly different. 57% of the adults who had used homeopathy felt that it was at least just as effective as other medical treatments; this was the case for just 24% of adults who had never used homeopathy themselves. This might suggest that those with a positive attitude to alternative medicines such as homeopathy are more likely to undertake or agree to such treatments, or that the experience of such treatments produces a positive attitude in patients.

[16] Those respondents who stated at the previous questions asking about the usage of homeopathy that they had not heard of this treatment were not routed to these questions (meaning the original proportion reported who had not heard of homeopathy is in fact an under-estimate).

Table 2-22 Perceptions of the effectiveness of homeopathy

Base: All adults who had not indicated previously that they had not heard of homeopathy *Wellcome Trust Monitor*

Perceived effectiveness of homeopathy compared to other medical treatment	Has used homeopathy	Has not used homeopathy	Total
	%	%	%
More effective	13	2	5
Just as effective	44	22	26
Less effective	21	29	27
Not effective at all	6	15	13
SPONTANEOUS: Depends on the illness	17	14	14
SPONTANEOUS: Doesn't know what homeopathy is	0	13	10
Unweighted base:	*221*	*720*	*945*
Weighted base:	*207*	*727*	*939*

As well as previous usage, a number of other demographic factors appeared to link to perceptions of the effectiveness of homeopathy, notably sex and age. Women were more likely to regard it as effective than men, with 36% and 25% respectively indicating that homeopathy is at least as effective as other medical treatments. Even more markedly, positive perceptions of the effectiveness of homeopathy appeared to be far more widespread among younger age groups. 40% of those aged 18-34 felt it was at least as effective as other medical treatments, compared to just 19% of those aged 65 and over. Clearly then, when examining attitudes to medical research, it should be borne in mind that a sizable minority have a comparatively positive attitude to what could be regarded as an alternative or even rival set of treatments.

Attitudes to horoscopes

A number of explanations and solutions for individual experiences exist that are wholly ungrounded in traditional science. One of the most widely known is horoscopes and there was an interest in examining how far the public subscribe to such techniques and, indeed, even view them as comparable to science. For this reason, we asked adult respondents how often they read a horoscope or personal astrology report and how scientific they regarded horoscopes to be.

Their answers are presented in Table 2-23 below. These clearly demonstrate that horoscopes are consulted regularly and viewed as scientific by only very small proportions of the public. Just one in ten read horoscopes often, whilst a similar proportion stated that they did so fairly often. Almost six in ten adults indicated that they never consulted horoscopes or astrology reports. Moreover, less than one in ten adults viewed horoscopes as very or quite scientific, with almost seven in ten describing them as not at all scientific. Interestingly, when this question was originally asked on the 1996 British Social Attitudes survey, a substantially higher proportion of adults (33%, compared to 21% here) stated that they read a horoscope or personal astrology report often or fairly often. Whilst we should be cautious in concluding that there has been a significant shift in public practices in relation to horoscopes, due to the different methodologies and topics covered by the two studies, this may reflect the decline in newspaper readership, as newspapers are likely to be one of the most common places where horoscopes are accessed.

Table 2-23 Adults' behaviour and attitudes in relation to horoscopes

Base: All adults *Wellcome Trust Monitor*

	Adults (aged 18+) %
Frequency of reading horoscope	
Often	10
Fairly often	11
Rarely	21
Never	58
Perceptions of extent to which horoscopes are scientific	%
Very scientific	1
Quite scientific	8
Not very scientific	20
Not at all scientific	69
Unweighted base:	*1179*
Weighted base:	*1179*

As we might expect, those adults who regularly read horoscopes were more likely to regard them as scientific than those who did not. Among those who often read a horoscope, 23% regarded them as very or quite scientific, compared to 4% of those who never engaged in this activity. Perceptions of the extent to which horoscopes are scientific also varied on a number of demographic characteristics. Education appeared to make a difference, with 6% of those with a higher education qualification and 11% of those with no qualifications regarding horoscopes as very or quite scientific. Age was also related: 14% of those aged between 18-34 expressed this view, compared to just 5% of those aged 65 years and over. Finally, women were slightly though not significantly more likely than men to think that horoscopes were very or quite scientific. Whilst assessments of the extent to which horoscopes are scientific (and thus a possible alternative to predicting the future to science and traditional medicine) are much less positive than for alternative medicine, the fact remains that women and younger respondents in both cases tended to express more positive attitudes to these alternative approaches than did men and the older age groups. This is likely to be an important context in which to understand the attitudes of these two groups to science and medical research in the remainder of the report.

Attitudes to the origins of human life

The basic tenets of many religions and the traditional assumptions and approaches of science, including the direct testing of hypotheses to establish knowledge, often have the potential to conflict with one another, by upholding different key assumptions. It was therefore considered important to understand how far the public adopt religious or scientific explanations for a number of key questions around human life. We asked both adults and young people two questions – which of three explanations (ranging from the traditional creationist explanation on which many religions are based, to one based solely on evolution) best fitted their understanding of how life was created, and at which point they feel human life begins.

The answers given are presented in Table 2-24 below. Adults and young people expressed very similar views in relation to the origins of life on earth. The majority of each group expressed the evolutionary standpoint – that humans have evolved over time as a result of natural selection, in which God played no part. In contrast, slightly less than two in ten of each group indicated that living things were created by God and have always existed in their current form. Around two in ten in each case expressed a view encapsulating both the traditional scientific and religious angles – that human beings had evolved over time, in a process guided by God. It has been suggested that

views of the origins of life on earth represent the most concrete example of a topic on which scientists and followers of religion disagree on the concrete facts (Keeter et al, 2007). Public opinion research from the United States has revealed that levels of adherence to a belief in evolution, in which God played no part, have remained relatively constant over the past thirty years; a regularly-repeated Gallup poll asking a similar question to the one reported above found that slightly more than 10% of respondents identified with this view, at a number of points between 1982 and 2008 (PEW Research Centre, 2005). We cannot assume however that the distribution of views in the UK, which are clearly somewhat different, have been similarly static.

When asked at which point human life begins, around half of adults said this is at the moment of conception, while slightly more than one in ten chose 'at birth' and almost four in ten felt it was somewhere in between. Traditionally, proponents of a religious approach have tended to view human life as beginning earlier than those adopting a scientific approach, who have tended to focus on when the foetus develops key functions and awareness. Interestingly, young people were more likely to express a more scientific than religious approach to this question, with a significantly lower proportion (three in ten compared to five in ten adults) identifying human conception as the point at which human life begins.

Table 2-24 Attitudes to the origins of human life

Base: All respondents *Wellcome Trust Monitor*

Individual items	Adults (aged 18+) %	Young people (aged 14-18) %
Humans and other living things…		
…were created by God and have always existed in their current form	18	18
…evolved over time, in a process guided by God	27	23
…evolved over time as a result of natural selection, in which no god played a part	53	57
Human life begins…	%	%
At the moment of conception	51	32
At birth	13	29
Somewhere in between	35	38
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Inevitably, the public might hold these different viewpoints for a range of different reasons and we cannot necessarily conclude that they represent the adherence to a wholly religious or scientific understanding or way of thinking, or a compromise between the two. However, as we might expect, these different attitudes to human life are strongly associated with levels of religiosity, measured by levels of attendance at religious services. 71% of adults who attended a religious service once a week or more stated that humans were created by God and have always existed in their current form, compared to just 5% of those who did not subscribe to any religion[17]. The relationship is weaker, but still apparent in relation to views about the start of human life: adults who attended religious services once a week or more were more likely to think that human life begins at the moment of conception (51%) compared to those who indicated that they did not belong to a religion (43%). Clearly then, adherence to a religious standpoint will be a key factor to consider when examining attitudes to aspects of science and medical research which could potentially conflict with such belief systems. Religiosity (measured in terms of regularity of attendance at religious services) will be used as the key analytical variable, to encapsulate the holding of traditionally 'religious' standpoints, for the remainder of the report.

[17] Such analysis was not possible for the young people because only a very small proportion indicated that they ever attended a religious service.

2.9 Conclusions

This chapter has explored how much adults and young people have encountered and are engaged with science and related topics in their lives. For many 14-18 year olds their main exposure to science is at school, partly because science is compulsory up to the age of sixteen, but also because a sizeable minority are planning to study science at level 3 or at higher education. Among adults, small minorities have either worked in a scientific or medical field, or have studied for a biology or genetics qualification at university or college. However, we have also seen that engagement with science goes well beyond education and employment. In addition to watching science-related television programmes and reading books with scientific content, young people visited a variety of different scientific places ranging from the zoo to science museums.

The chapter also found considerable diversity in a range of things which might affect the ways in which people encounter science – or their attitudes towards it. Around half of adults and young people have or know someone close to them who have a disability. Adults and young people have very different levels of exposure to media and information sources; older age groups are more likely to read newspapers and watch television while young people and younger adults more frequently use the Internet and engage with a range of computer-based activities. And lastly, sizeable minorities of adults have engaged with alternative medicine, or express views on the origins of life on earth that reflect a religious rather than a scientific standpoint. An awareness of these factors will be key to interpreting attitudes to medical research throughout the remainder of the report.

Appendix

Factor analysis tables

Table 2-25 Factor analysis of dimensions of exposure to science among adults: loadings for principal components analysis with varimax factor rotation

Base: All adults *Wellcome Trust Monitor*

	Factor 1 TV documentaries	Factor 2 TV drama	Factor 3 Books
Watch TV – wildlife programmes	0.69		
Watch TV – programmes about stars and planets	0.70		
Watch TV – programmes about new inventions	0.76		
Watch TV – programmes about advances in medicine	0.72		
Watch TV – medical dramas		0.85	
Watch TV – police dramas		0.80	
Watch TV – programmes about unusual medical problems	0.45	0.57	
Read book – fiction			0.72
Read book – factual			0.73
Visit science museum or centre			0.62
% of variance explained	56.7		
Unweighted base: 1177			

Scores below 0.4 not reported

Table 2-26 Factor analysis of dimensions of exposure to science among young people: loadings for principal components analysis with varimax factor rotation

Base: All young people *Wellcome Trust Monitor*

	Factor 1 TV documentaries	Factor 2 TV drama	Factor 3 Books
Watch TV – wildlife programmes	0.68		
Watch TV – programmes about stars and planets	0.78		
Watch TV – programmes about new inventions	0.76		
Watch TV – programmes about advances in medicine	0.59		0.40
Watch TV – medical dramas		0.84	
Watch TV – police dramas		0.79	
Watch TV – programmes about unusual medical problems	0.40	0.56	
Read book – fiction			0.74
Read book – factual			0.82
% of variance explained	60.8		
Unweighted base: 373			

Scores below 0.4 not reported

Participation in out of school activities not included in young people analysis

Table 2-27 Exposure to science among adults, by sex, age, education and whether ever had scientific job: Mean score on factor

Base: All adults

Wellcome Trust Monitor

	Factor 1 TV documentaries		Factor 2 TV drama		Factor 3 Books			
	Mean score	Standard error	Mean score	Standard error	Mean score	Standard error	*Unwt base*	*Wtd base*
Male	0.23	0.04	-0.32	0.06	0.19	0.07	*472*	*568*
Female	-0.19	0.04	0.17	0.05	-0.04	0.03	*705*	*609*
18-34	-0.20	0.08	-0.03	0.09	0.29	0.09	*239*	*312*
35-49	0.12	0.05	-0.11	0.07	0.19	0.07	*322*	*354*
50-64	0.07	0.06	-0.02	0.06	0.00	0.06	*294*	*270*
65+	0.06	0.05	-0.09	0.06	-0.32	0.04	*324*	*244*
HE qualification	0.00	0.06	-0.36	0.07	0.59	0.08	*324*	*347*
A-level or equivalent	0.00	0.11	-0.09	0.09	0.25	0.09	*138*	*165*
GCSE or equivalent	0.14	0.06	0.08	0.06	0.06	0.08	*239*	*247*
CSE	0.06	0.09	0.21	0.08	-0.32	0.06	*123*	*125*
No qualifications	-0.10	0.06	0.07	0.07	-0.47	0.04	*344*	*285*
Respondent has had scientific job	0.05	0.08	-0.09	0.08	0.43	0.11	*185*	*175*
Respondent has never had scientific job	0.01	0.03	-0.06	0.04	0.00	0.05	*992*	*1002*

Each factor has an overall mean of 0 and standard deviation of 1.

Table 2-28 Exposure to science among young people, by sex, age, and intention to study science at Level 3 or above: Mean score on factor

Base: All young people

Wellcome Trust Monitor

	Factor 1 TV documentaries		Factor 2 TV drama		Factor 3 Books			
	Mean score	Standard error	Mean score	Standard error	Mean score	Standard error	*Unwt base*	*Wtd base*
Male	0.20	0.10	-0.24	0.08	-0.04	0.09	*182*	*192*
Female	-0.31	0.08	0.29	0.07	0.07	0.08	*191*	*181*
14-16	0.06	0.07	0.03	0.07	0.03	0.07	*258*	*222*
17-18	-0.20	0.11	-0.01	0.09	-0.02	0.12	*115*	*151*
Currently studying/intending to study science at Level 3 or above	0.14	0.09	-0.04	0.08	0.19	0.10	*172*	*168*
Not currently studying/intending to study science at Level 3 or above	-0.20	0.08	0.05	0.10	-0.17	0.09	*188*	*189*

Each factor has an overall mean of 0 and standard deviation of 1.

3 Public awareness and understanding of science and medical research

Elizabeth Clery

3.1 Summary

- Adults and young people had a similar profile of scores on our science 'knowledge quiz'; both groups answered an average (median) of 6 out of 9 items correctly.
- Age was related to adults' scientific knowledge; those aged 65+ had comparatively low knowledge levels, with only 15% attaining the highest scores of 8 or 9 on our quiz, compared to 32% of those aged 35-49.
- Educational background emerged as a key factor in understanding scientific knowledge levels. For adults, being male, having higher educational qualifications and having a qualification in biology or genetics remained significantly associated with levels of scientific knowledge, even when their interactions with other factors were controlled for. For young people, engagement (or intention to engage with) non-compulsory science education and parental qualification levels were relevant.
- When asked what it means to "study something scientifically", just 21% of adults and 24% of young people interviewed spontaneously identified theory construction or experiments and tests. Those with higher levels of scientific knowledge were much more likely to do so.
- 70% of adults and 55% of young people correctly identified that the scientific way to test the effectiveness of a drug was to give it to some patients but not others and compare their outcomes.
- Adults demonstrated a good understanding of probability in relation to science, with 63% answering four questions about genetic probabilities correctly and 37% answering one or more questions incorrectly. This understanding was lowest amongst low scorers on the more general scientific knowledge quiz and those aged over 65 (45% and 57% respectively answered one or more questions incorrectly).
- Spontaneous understandings of and associations with the term "medical research" varied, with cures and treatments (39%), illness and disease (25%) and cancer (23%) being the most common responses given by adults. Among young people, "medicine, drugs and tablets" was the most common response, mentioned by 30%.
- Understanding of common terms such as DNA and stem cells varied considerably. 49% of adults felt they had a very good or good understanding of DNA, compared to 63% of young people. But only 26% of adults and 31% of young people felt the same in relation to the term stem cells. Even among these respondents, considerable numbers were unable to provide more detail as to the meanings of these terms.

3.2 Introduction

This chapter explores the public's awareness and understanding of science in general and of medical research, in particular. It begins by assessing public knowledge of science, both as an objective body of knowledge or facts and as an academic discipline with a theoretical basis and a set of common assumptions and procedures. It then moves on to explore public understandings and awareness of medical research. Here, the focus is on perceptions of and associations with the term "medical research", understandings of some of the key terminology used in relation to this topic, and awareness of the individuals and organisations that are involved in carrying out this work.

A key aim of this chapter is to explore not just how much the public know and are aware of in relation to science and medical research, but the specific nuances in their understandings and perceptions. This will enable us to address a number of key questions of interest. Do the public have a good knowledge of the facts, concepts and terminology of science and medical research, but a limited understanding of the theory underpinning these disciplines? Are there particular aspects of science and medical research that the public are more or less aware of or knowledgeable about? How confident is the public in its knowledge of these areas and is this confidence justified?

In addition, the chapter will explore differences in the levels of knowledge and awareness of different sections of the public. This will allow us to identify the particular characteristics, be they demographic or relating to individual involvement in science, that are associated with and potentially determine particular levels of knowledge and awareness of science and medical research. By adding an understanding of public knowledge of science and medical research to the outline of adults' and young people's exposure to science in the previous chapter, we create a backdrop for the remainder of this report where we examine in more detail public attitudes and behaviour in relation to medical research.

3.3 General understanding of science

Knowledge and understanding of science is likely to be a key factor in explaining public attitudes and behaviour in relation to medical research. In designing the Wellcome Trust Monitor, it was recognised that an objective measure of scientific knowledge was needed, rather than simply asking respondents to subjectively assess their own knowledge of science, a technique which has been shown to be strongly influenced by personality traits and individual definitions of what constitutes 'good' knowledge (Wellcome Trust, 2006). In order to do this, the survey included a short knowledge quiz, where respondents were asked to indicate whether nine different statements about science were "definitely" or "probably" true or false, or if they did not know. The knowledge quiz was introduced to respondents as follows:

> Now for a quick quiz about science. For each of the following statements, please say whether you think it is definitely true, probably true, probably false or definitely false. If you don't know, just say so and we'll go on to the next one.

The knowledge quiz included a range of items, focussing on a variety of aspects of science and ranging from things which it was anticipated would be commonly known to more obscure ones. Table 3-1 lists the nine items that were included in the knowledge quiz and presents the proportions of adults and young people who answered each correctly.

As anticipated, the extent to which respondents were able to answer the different quiz questions varied dramatically across the items. It is interesting to note that two of the three items included in the quiz that relate to physical, rather than biological, science were particularly poorly understood ("Lasers work by focussing sound waves" and "Electrons are smaller than atoms"). It may be that adults and young people have a comparatively better knowledge of biological science, either because they find this area more interesting or because they find the information easier to retain. However, we should be cautious in drawing this conclusion, given some of the seven items dealing with biological science were also poorly understood (for instance, the fact that "More than half of human genes are identical to those of mice" was the least well understood item among young people).

With two notable exceptions, the proportions of adults and young people who answered each item correctly (either "definitely" or "probably") were very similar. However, while almost six in ten adults

correctly identified that "More than half of human genes are identical to those of mice", just over three in ten young people stated this. On the other hand, while four in ten adults correctly indicated that "Electrons are smaller than atoms", more than six in ten young people identified this was the case. The fact that these two items are less widely known in general than many of the others may suggest that this knowledge is acquired from specific sources rather than being commonly known; for instance, young people may have a better understanding of electrons and atoms as these topics are covered in compulsory science education.

Table 3-1 Proportions of adults and young people who answered items on knowledge quiz correctly

Base: All respondents *Wellcome Trust Monitor*

Individual items	Adults (aged 18+) % saying definitely or probably	Young people (aged 14-18) % saying definitely or probably
All plants and animals have DNA: TRUE	89	89
The cloning of living things produces genetically identical copies: TRUE	80	75
The oxygen we breathe comes from plants: TRUE	80	89
By eating a genetically modified fruit, a person's genes could also become modified: FALSE	74	68
All radioactivity is man-made: FALSE	69	68
It is the mother's genes that determine the sex of the child: FALSE	63	66
More than half of human genes are identical to those of mice: TRUE	57	32
Lasers work by focussing sound waves: FALSE	49	40
Electrons are smaller than atoms: TRUE	43	62
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Analysis of answers to the knowledge quiz yields information about the public's understanding of science that extends beyond their knowledge of a range of very precise facts. The two tables below present the full breakdown of answers for the knowledge quiz items for adults and young people who indicated that each item was "definitely true", "probably true", "probably false" and "definitely false", as well as the proportion who did not know the answer in each case. What these tables clearly show is that both adults and young people are relatively accurate in their confidence about their own levels of scientific knowledge. Items which attracted lower proportions of correct answers yielded larger numbers of "don't knows", with more respondents selecting answers which they thought were "probably" rather than "definitely" correct.

Among adults, "electrons are smaller than atoms" was the least well understood item; almost four in ten adults indicated that they did not know the answer to this question, compared to less than one in ten who stated this for some of the items which were better understood (Table 3-2).

Table 3-2 Answers provided by adults to knowledge quiz items

Base: All adults *Wellcome Trust Monitor*

	Answers to quiz items				
Individual items	**% saying definitely true**	**% saying probably true**	**% saying probably false**	**% saying definitely false**	**Don't know**
All plants and animals have DNA: TRUE	59	30	3	1	6
The cloning of living things produces genetically identical copies: TRUE	42	38	7	2	10
The oxygen we breathe comes from plants: TRUE	53	27	7	6	6
By eating a genetically modified fruit, a person's genes could also become modified: FALSE	1	8	26	47	18
All radioactivity is man-made: FALSE	4	13	22	46	14
It is the mother's genes that determine the sex of the child: FALSE	6	13	17	45	18
More than half of human genes are identical to those of mice: TRUE	16	41	12	5	26
Lasers work by focussing sound waves: FALSE	5	15	15	34	31
Electrons are smaller than atoms: TRUE	25	18	13	8	36
Unweighted base: 1179					
Weighted base: 1179					

Similarly, for the item answered correctly by the largest proportion of young people, that "all plants and animals have DNA", more than three-quarters of those who provided the correct answer stated that this was "definitely" the case, compared to just 8% of those who provided the correct answer to the least well-understood item, dealing with the genes of humans and mice (Table 3-3).

Table 3-3 Answers provided by young people to knowledge quiz items

Base: All young people *Wellcome Trust Monitor*

	Answers to quiz items				
Individual items	**% saying definitely true**	**% saying probably true**	**% saying probably false**	**% saying definitely false**	**Don't know**
All plants and animals have DNA: TRUE	69	20	6	3	2
The cloning of living things produces genetically identical copies: TRUE	48	27	8	3	14
The oxygen we breathe comes from plants: TRUE	69	20	5	3	2
By eating a genetically modified fruit, a person's genes could also become modified: FALSE	1	14	28	40	18
All radioactivity is man-made: FALSE	4	17	25	43	11
It is the mother's genes that determine the sex of the child: FALSE	10	12	17	50	12
More than half of human genes are identical to those of mice: TRUE	8	23	29	10	29
Lasers work by focussing sound waves: FALSE	7	23	19	21	30
Electrons are smaller than atoms: TRUE	36	26	13	8	17
Unweighted base: 374					
Weighted base: 374					

Answers have been re-ordered to reflect the proportion of young people that answered correctly.

Answers to the nine questions were combined to generate for each respondent a knowledge score ranging from zero to nine. Respondents who answered an item correctly (by either stating it was definitely or probably true or false) were allocated one point while those who answered it incorrectly or stated that they did not know the answer were not allocated any points. The proportions of respondents who obtained different scores on the knowledge quiz are presented in Table 3-4. Scores varied markedly across different respondents, suggesting it will serve as a useful measure to differentiate between the different levels of scientific knowledge that exist amongst adults and young people.

Table 3-4 Combined scores on knowledge quiz

Base: All respondents *Wellcome Trust Monitor*

Number of quiz questions answered correctly	Adults (aged 18+) %	Young people (aged 14-18) %
None	*	0
One	1	2
Two	2	1
Three	4	7
Four	9	10
Five	15	18
Six	21	22
Seven	22	17
Eight	15	16
Nine	10	7
Median score	**6.0**	**6.0**
Unweighted base:	*1176*	*373*
Weighted base:	*1178*	*373*

As can be seen, adults and young people had very similar distributions of scores, with the median scores being 6.0 for both adults and young people. It might have been expected that young people would have a better knowledge of science, due to the fact that they would have been receiving formal tuition in this area either at the time of the survey or in the very recent past; the fact that their levels of knowledge were broadly similar to those of adults clearly suggests that the immediacy of formal science education is unlikely to be the only factor associated with levels of scientific knowledge.

In order to explore differences in levels of scientific knowledge, respondents were divided into three groups – those who answered between zero and four items correctly (termed 'low scorers'), those who answered between five and seven items correctly (termed 'middle scorers') and those who answered eight or nine answers correctly (termed 'high scorers'). The decision not to create three evenly-sized groups was deliberate, as our interest was in exploring the characteristics of those with particularly high and low levels of scientific knowledge. It should be noted that, as respondents tended to answer more questions correctly than not, the division of the three groups is skewed towards the top end of our nine point scale. Among adults, 16% were low scorers, 58% were middle scorers and 25% were high scorers. The equivalent figures for young people were 19%, 57% and 23%.

The fact that adults and young people attained similar distributions of scores on the knowledge quiz and divided into three similarly-sized groups might suggest that age is not linked with levels of scientific knowledge. However, more detailed analysis indicates this assumption is incorrect. While the proportions of middle scorers in each age group were fairly similar, there is a clear curvilinear relationship between age and high and low levels of scientific knowledge (Table 3-5). Proportions of high scorers were lowest among those aged 65 years and over (15%). In comparison, the proportion of high scorers for the middle age groups was around three in ten (of those aged 35-49 and 50-64). For low scorers, the reverse pattern can be seen. For young people, 14-16 year olds were less likely to be high scorers than 17-18 year olds. Logically, we would not anticipate a high proportion of high scorers amongst those aged 14-16, due to their necessarily more limited educational development and the fact that many would not have yet covered some of the topics asked about through their formal science education. However, it is less clear how we can explain the even lower proportion of high scorers aged 65 years and over. It may

be that this age group have other characteristics that are associated with lower levels of scientific knowledge, such as a lower propensity to have studied the subject in the past or to have ever worked in a scientific job.

Table 3-5 Scores on knowledge quiz, by age

Base: All respondents *Wellcome Trust Monitor*

	Young people			Adults				
	14-16	17-18	Total	18-34	35-49	50-64	65+	Total
Score on knowledge quiz	%	%	%	%	%	%	%	%
Low score (0-4)	21	17	19	15	8	10	37	16
Middle score (5-7)	61	52	57	61	60	62	48	58
High score (8-9)	18	31	23	24	32	27	15	25
Unweighted base:	*258*	*115*	*373*	*238*	*322*	*294*	*324*	*1178*
Weighted base:	*222*	*151*	*373*	*309*	*354*	*270*	*244*	*1176*

Scores on the knowledge quiz were also related to a range of other demographic characteristics. As shown in Table 3-6, men had a greater knowledge of science than women: slightly more than three in ten men were high scorers, compared to two in ten women. The pattern was similar, but less strong amongst young men and young women, but did not attain the level of statistical significance, though this may be at least in part due to the smaller samples available. It may be that differences in knowledge levels increase between the two sexes in later life; alternatively, they could be explained by the fact that increasing proportions of young women are now studying science as part of their formal education, or choosing to study this subject beyond 16, compared to in the past.

Table 3-6 Scores on knowledge quiz, by sex

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)			Young people (14-18)		
	Male	Female	Total	Male	Female	Total
Score on knowledge quiz	%	%	%	%	%	%
Low score (0-4)	13	20	16	18	20	19
Middle score (5-7)	56	61	58	54	61	57
High score (8-9)	32	19	25	27	19	23
Unweighted base:	*471*	*707*	*1178*	*183*	*190*	*373*
Weighted base:	*565*	*611*	*1176*	*193*	*180*	*373*

For adults, knowledge of science was also associated with educational levels. Around four in ten (43%) of adults who had a higher education qualification were high scorers, compared to less than one in ten (7%) of those who had not obtained any qualifications. As achievement of higher-level educational qualifications is likely to directly relate to the acquisition and retention of knowledge, albeit not necessarily scientific, these differences are not surprising. Educational levels are also known to be strongly associated with employment levels, occupation and class, and it may be that these differences reflect the association of these demographic characteristics with levels of knowledge in general, and scientific knowledge in particular. This conclusion is lent support by the fact that, even for young people, there is an association between parental educational qualifications and levels of scientific knowledge. Twice as many of the young people whose highest qualified parent had a higher education qualification were high scorers, compared to those whose most highly qualified parent did not hold a qualification at A-level or above (39% compared to 18%).

Individuals could potentially be involved with science through a range of different spheres – through education, either compulsory or voluntary, through employment or through parental or family interests. Our analysis suggests being involved in science in these ways closely relates to levels of

scientific knowledge. Turning first to involvement with science through the sphere of education (Table 3-7), there were very marked differences between the levels of scientific knowledge of those who had studied for a qualification in biology or genetics[18] at university or college, at school, or not at all. Around five in ten adults who had studied for such a qualification at university or college attained a high score on the knowledge quiz (although it should be noted this group is small), compared to three in ten of those who had done this at school and two in ten of those who had never studied for such a qualification.

A comparable analysis for the young people is not possible as, given their different ages, not all would have had the same opportunities to acquire science qualifications. However, if we examine levels of knowledge against engagement in (or intention to engage in) non-compulsory study of science (beyond age 16), similar differences can be identified. 34% of young people who were studying or intending to study science beyond the compulsory level were high scorers on the knowledge quiz, compared to 17% of young people who were not doing, or were not intending to, do this. For low scorers, the proportions were 10% and 23% respectively.

Table 3-7 Adults' scores on knowledge test, by experience of studying for a qualification in biology or genetics

Base: All adults *Wellcome Trust Monitor*

	Qualification in biology/genetics			
	At university/college	At school	No qualification	Total
Score on knowledge quiz	%	%	%	%
Low score (0-4)	4	10	20	16
Middle score (5-7)	47	58	60	58
High score (8-9)	49	33	20	25
Unweighted base:	*69*	*265*	*844*	*1178*
Weighted base:	*82*	*286*	*808*	*1176*

An individual could also be involved in science through their work and career. In addition to indicating that levels of scientific knowledge tend to be higher for those who have had a job in this sphere, Table 3-8 also suggests that being close to an individual, whether a parent or someone in their household, who has had a job in a scientific field, also links with higher levels of scientific knowledge for the respondent themselves. 35% of adults who had ever had a scientific job were high scorers on the knowledge quiz, compared to 23% of those who had not and who were not living with anyone who had had such a job. Similar differences can be seen between those for whom one or more parent had ever had a scientific job, and for those for whom this was not the case. These higher knowledge levels could have prompted the selection of that area of employment in the first place, or could be the result of the exposure to science on a regular basis that resulted from this.

[18] Whilst the knowledge quiz covers aspects of science other than biology or genetics, respondents were asked about qualifications relating to these particular subjects, as these are the areas of science most likely to be of relevance to the specific topic of medical research.

Table 3-8 Adults' scores on knowledge quiz, by experience of scientific jobs

Base: All adults *Wellcome Trust Monitor*

	Employment in science			Parents' employment in science		
Score on knowledge quiz	Has had scientific job %	Someone in household has had scientific job %	No one has had scientific job %	At least one parent has had scientific job %	Neither parent has had scientific job %	All %
Low score (0-4)	8	13	18	10	17	16
Middle score (5-7)	57	60	59	58	59	58
High score (8-9)	35	28	23	33	24	25
Unweighted base:	*185*	*64*	*929*	*137*	*1041*	*1178*
Weighted base:	*173*	*83*	*921*	*149*	*1027*	*1176*

Inevitably, many of the factors considered above that have been shown to relate to levels of scientific knowledge will be linked. For instance, those who have had a scientific job are more likely to have scientific qualifications. And as we have seen in Chapter 2, adults who had worked in a scientific field were more likely to have had one or more parents who had also done this. For this reason, multivariate analysis was undertaken, to pinpoint the factors that determine the achievement of a "high" score on the knowledge quiz, even when their links with other factors are controlled for. The results of this regression analysis are presented in the appendix to this chapter.

For adults, age, sex and the achievement of qualifications (both in general and in the area of biology and genetics in particular) remain significantly associated with levels of scientific knowledge, even when their interactions with one another and other factors are controlled for. The experience of having a scientific job or having had a parent who had had such a job do not remain significantly associated, suggesting that, in terms of exposure to science, it is the process of attaining qualifications, rather than that of working in a scientific field, that primarily determines knowledge levels. The fact that sex and age remain significant suggests that the higher levels of scientific knowledge witnessed amongst men and those in the middle age groups are not simply a function of demographic trends in education and employment in science.

For young people, age, the experience of studying (or intending to study) science post-16 and parental qualifications all remain significantly associated with scientific knowledge levels, with sex being the only factor that does not. The latter point is interesting; it could imply that the impact of sex on levels of scientific knowledge exerts itself more strongly in later life; or that the impact of sex witnessed amongst older generations could be declining and may soon be a fact of the past.

There is a substantial literature on the measurement of knowledge through such objective "tests" as that reported above, which demonstrates that certain groups are more likely to state that they "don't know" an answer when this is the case, whilst other groups are more likely to take a "blind guess". Notably, men have been shown to have a greater propensity to guess at answers to multiple-choice quizzes than have women (Mondak and Anderson, 2003). As our knowledge score awards a point for a correct answer (however this was arrived at), whilst awarding no points for those respondents who stated "don't know", we could potentially be over-estimating the knowledge of those groups with a greater propensity to guess at answers who, due to chance, will arrive at the correct answer approximately half of the time. Analysis of the proportions of different groups of adults and young people answering "don't know" clearly demonstrates that those groups who scored lower on the knowledge quiz were more likely to respond in this way. Amongst the adults, an average of 16% of men indicated that they did not know the answer to an individual item, compared to 21% of women. However, the most marked differences were between groups defined by age and education levels, with averages of 17% of adults aged 18-34 and 29% of adults aged 65+, and 10% of adults with a higher education qualification and 30% of adults with no

qualifications, stating they did not know answers to individual quiz items. Amongst the young people, a similar difference was observed in relation to sex, with 12% of young men and 18% of young women on average stating that they did not know the answer to an individual quiz question. We can therefore tentatively suggest that the levels of difference between the scientific knowledge of different groups could be magnified by the fact that those with higher levels of knowledge may be more likely to guess at an answer, rather than to state they do not know it.

We have seen that knowledge of science, as measured by our knowledge quiz, differs markedly amongst different sections of the public, and is correlated to some degree with objective measures of scientific engagement such as qualifications. However, in addition to the objective "facts" of science, there was an interest in exploring levels of understanding of the theory or logic underpinning many of these facts. Science is a multi-faceted subject and it would be simplistic to regard it as only a collection of objective facts and theories. Indeed, in the academic literature on the measurement of scientific knowledge, a key distinction has been drawn between two underlying dimensions – the "content" of science and the "processes of scientific enquiry" (Wellcome Trust, 1996). Therefore, we now move on to address the second dimension – to explore public understanding of science as an academic discipline with a theoretical basis and sets of common assumptions and procedures.

3.4 Understanding of the scientific process

In the knowledge quiz, misconceptions about science were measured by the provision of a wrong answer to one or more of the quiz items. When exploring public understanding of the scientific process, there was also an interest in identifying misconceptions, as well as accurate knowledge, and in exploring the language and terminology the public use to think about science. For this reason, respondents were initially asked the following question:

> Some news stories talk about the results of a 'scientific study'. When you read or hear this term, can you tell me in your own words what you think it means to study something scientifically?

Interviewers recorded respondents' answers verbatim and detailed coding was undertaken to identify all of the different elements and terms associated with the idea of "studying something scientifically". 94% of adults and 89% of young people were able to provide answers to this question, with 6% of adults and 11% of young people saying they did not know what it meant. Many respondents provided several different answers and these fell into six broad categories, as shown in Table 3-9. These categories can be interpreted as signifying different levels of understanding of the scientific process, with an understanding of the idea that scientific study involves theory construction and testing representing the most advanced understanding, and the provision of various "other" answers, for instance referring to "new products" or "the work of scientists", representing the least advanced[19].

[19] The first five categories were developed when an identical question was fielded on the 1996 British Social Attitudes survey and have been replicated here, to enable comparison. Our sixth category "vague or irrelevant answer" is presented to indicate the proportion of respondents who provided some sort of answer to the question, of little relevance, but which they may have felt summed up to them what it means to "study something scientifically", for example "all children study science at school".

Specific answers identified by 5% or more of adults or young people have been presented individually in the table below, under each of these six categories[20]. What is most striking about the range of answers provided is that the idea of "studying something scientifically" was not associated with one specific concept or term for any large proportion of the public, either amongst the adults or the young people. In fact, the most popular answers, namely looking into a problem in detail (for adults) and experiments (for young people), were identified by less than two in ten of those who responded to this question in each case.

The three elements of studying something scientifically identified most frequently by adults – looking into a problem or issue in detail, tests and experiments – were also selected most often by young people. The prominence of tests and experiments in perceptions of what it means to study something scientifically may be a consequence of the major role of this technique in compulsory science education at school.

Table 3-9 Perceptions of what it means to 'study something scientifically'

Base: All respondents *Wellcome Trust Monitor*

Aspects of 'studying something scientifically'	Adults (aged 18+) %	Young People (aged 14-18) %
Theory construction and testing*	**4**	**3**
To undertake experiments/tests	**19**	**24**
Test	14	11
Experiment	10	16
Open-minded/rational/in-depth exploration of phenomenon/problem to be examined	**18**	**7**
Controls/controlled	8	3
Analysis/analytical	6	4
To measure or classify but no mention of any rigour in process	**24**	**19**
Look into problem/issue in depth/detail	14	13
Laboratories/working in a lab	8	3
Other answer	**44**	**40**
Discovering/finding something new	4	7
Vague or irrelevant answer	**20**	**21**
Don't know	**7**	**11**
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

* This category included any items that referred to theories, theory construction or testing, many of which overlapped and could not be clearly divided into sub-categories

Many respondents provided answers which were coded into more than one category in the table above. For example, a respondent might refer to hypothesis testing (coded under "Theory construction and testing") whilst also referring to the fact that scientific study results in new discoveries (coded under "Other answer"). To identify and explore further public levels of understanding of science, responses were priority coded, with each respondent being placed in the highest category for which they provided a response. Priority coded answers to this question are presented in Table 3-10.

As can be seen, adults and young people had a relatively similar profile of levels of scientific understanding, although young people were more likely to state that they did not know what it meant to study something scientifically or to provide an answer to the question that was wholly

[20] It should be noted that there was great diversity in the range of answers that were provided, with many

vague or irrelevant. Very similar proportions of adults (21%) and young people (24%) demonstrated the two highest levels of scientific understanding, by providing a response that related to experiments and tests or theory construction and testing.

Table 3-10 Priority-coded perceptions of what it means to 'study something scientifically'

Base: All respondents *Wellcome Trust Monitor*

Aspects of 'studying something scientifically'	Adults (aged 18+) %	Young people (aged 14-18) %
Theory construction and testing	4	2
To undertake experiments/tests	17	22
Open-minded/rational/in-depth exploration of phenomenon/problem to be examined	12	5
To measure or classify but no mention of any rigour in process	16	15
Other answer	27	26
Don't know	7	11
Wholly vague or irrelevant answer	20	21
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

As we might expect, knowledge of what scientific study involves was strongly correlated with scientific knowledge, as measured by our knowledge quiz. 11% of low scorers, 23% of middle scorers and 30% of high scorers provided a response reflecting the two highest levels of scientific understanding. This suggests that knowledge of the theory and the facts of science are strongly linked – likely to result from the fact these would be acquired through the same avenues, such as through studying for scientific qualifications.

In the last twenty years, the question of what it means to study something scientifically has been fielded on a range of social surveys, and it is of interest to compare the responses attained with those presented here, in order to detect whether and how levels of scientific knowledge among the public are changing. In 1988, Durrant et al reported that only 17% of the British public spontaneously referred to experimentation and/or theory testing when asked this question, whereas, in the 1996 British Social Attitudes survey the proportion remained statistically unchanged at 18% (Wellcome Trust, 1996). On the Wellcome Trust Monitor, 23% of adults and 24% of young people spontaneously referred to one of these elements, suggesting levels of scientific knowledge amongst the public have not increased markedly in the intervening decade[21]. Whilst we should remain cautious in comparing the results of questions fielded on two different surveys, this is slightly surprising, given the increasing proportion of the adult population who are now likely to hold a scientific qualification.

Spontaneous definitions of the scientific approach clearly tell us something about what comes to mind for the public when they think about the idea of studying something scientifically. However, we cannot conclude, for example, that the small proportion who mention experimentation in response to this question are the same proportion who understand that this is the usual scientific approach for testing a theory or establishing the effectiveness of a treatment. For this reason, the Wellcome Trust Monitor included a question to find out public perceptions of the standard scientific approach when presented with a typical scientific problem. Specifically, we asked respondents:

being identified by less than 5% of adults of young people.

[21] It should be noted, on the 1996 British Social Attitudes survey, that 24% of respondents stated that they did not know the answer to this question. It may be that we attained a lower proportion of "don't knows" because of the overall focus of the Wellcome Trust Monitor on science and medicine, meaning respondents would have been thinking about these issues for the duration of the survey, or the fact that we encouraged interviewers to probe, to encourage responses from as large a proportion as possible.

Suppose a drug used to treat high blood pressure is suspected of having no effect. On this card, there are 3 different ways scientists might use to investigate the problem. Which one do you think scientists would be likely to use?

Talk to those patients that have used the drug to get their opinion
Use their knowledge of medicine to decide how good the drug is
Give the drug to some patients, but not to others, then compare the results for each group

The majority of adults and young people accurately answered that the most effective way to test a drug is give it to some patients, but not to others, and then to compare the results of the two groups. Seven in ten adults stated this, although young people were less likely to answer the question correctly, with less than six in ten providing this answer. Respondents who answered the question incorrectly were fairly evenly divided between those thinking that the best approach would be to "Talk to those patients that have used the drug to get their opinions" (around two in ten in each case) and "Use their knowledge of medicine do decide how good the drug is" (slightly more than one in ten in each case).

Table 3-11 Perceptions of how scientists would test the effectiveness of a drug

Base: All respondents *Wellcome Trust Monitor*

Methods	Adults (aged 18+) %	Young people (aged 14-18) %
Give the drug to some patients, but not to others, then compare their results	70	55
Talk to those patients that have used the drug to get their opinions	16	24
Use their knowledge of medicine to decide how good the drug is	12	19
Don't know	2	2
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

It might be assumed that a good factual knowledge of science would be accompanied by a good knowledge of what is actually involved in the scientific process. To establish whether this is the case, we compared the answers provided to the above question with knowledge quiz scores. Among adults, 89% of high scorers provided the correct answer, compared to 70% of middle scorers and 40% of low scorers. A similar pattern was found amongst the young people, with 74% of high scorers, 55% of middle scorers and 33% of low scorers indicating that the correct approach would be to give the drug to some patients and not others, and to compare their results. This suggests that the two facets of scientific understanding – of the objective facts of science and of the scientific process – are highly associated.

In fact, all of the same factors that were significantly related to levels of scientific knowledge (with the exception of sex for the adults and age for the young people) were also significantly associated with understanding of the scientific process. Adults who were aged under 34 or who had had a scientific job or had studied science at school, college or university, who had higher education qualifications or whose parents had had a scientific job were more likely to answer this question correctly. Similarly, young people whose parents had higher educational qualifications and who were themselves studying or planning to study science post-16 also exhibited a greater knowledge of the scientific approach, as measured by this question. For instance, among adults, 84% of those who had attained higher education qualifications identified the correct approach to testing the effectiveness of a drug, compared to 51% of those with no qualifications. And, among the young people, 70% of those who were currently studying science beyond the compulsory level or were

planning to do so indicated this, compared to 46% of those who were not doing or planning to do so.

However, in asking respondents this question, it was recognised that choosing the right answer – that the standard scientific way to test the effectiveness of a drug was to undertake an experiment – could not be assumed to indicate an understanding of the theoretical reasons as to why this is the case. For this reason, each respondent who was able to provide an answer to this question was subsequently asked:

> Why do you think that [the response provided to the previous questions] would be the way scientists might investigate why a particular drug is suspected of having no effect?

This was an open-code question, as we were interested in the reasons for the public's misconceptions, as well as accurate understandings, of the theory behind the normal procedure for testing the effectiveness of a drug.

For those respondents who were able to justify their choice, the responses obtained are broken down by the particular answers provided to the question, in Table 3-12. 3% of adults and 5% of young people indicated that they did not know why the answer they selected would be the best scientific approach for testing a drug.

As we might expect, very different justifications were provided for the three different methods of testing the effectiveness of a drug. For those respondents who identified the correct procedure, of giving the drug to some patients but not others, the most popular reason given was the need to compare the results of the two groups, to see whether the drug produced an improved outcome; this reason was identified by around five in ten adults and six in ten young people who chose the correct method of scientific study at the previous question. Small minorities also referred to some of the key technical terms relevant to scientific experimentation – with 16% of adults and 7% of young people referring to the placebo effect and 9% of adults and 7% of young people alluding to the use of a control group.

Those respondents who wrongly concluded that the best approach would be to talk to the patients who had taken the drug tended to justify this on the basis that the actual process of taking a drug would give the individual special knowledge about its benefits and drawbacks. Specifically, around eight in ten of this group of adults and young people indicated that those taking the drug would know most about its effects, whilst around six in ten of these adults and young people highlighted the fact that those taking the drug would be best placed to know whether it worked. Finally, those respondents who concluded that scientists should use their own knowledge to decide how good the drug is justified this on the basis of the special position of doctors and scientists – with around four in ten of both samples indicating they would be best placed to know about the drug and five in ten of these adults and four in ten of these young people referring to their expert knowledge (though small bases for the young people mean some caution is required).

Table 3-12 Justifications for identification of particular approaches for testing a drug

Base: All respondents who identified particular approach for testing drug *Wellcome Trust Monitor*

% citing reasons for identifying particular approach as the way scientists would test for the effectiveness of a drug	Give drug to some patients		Talk to patients		Own knowledge	
	Adults	Young people	Adults	Young people	Adults	Young people
Comparing one group of patients with another, to see if outcome of one group improves	48	59	1	0	1	0
Those taking the drug would know most about its effects	2	3	78	81	2	3
Placebo effect	16	7	1	0	2	0
Users of the drug best placed to know if it worked	1	2	57	55	2	5
Expert knowledge of doctors/scientists	2	1	1	1	51	42
Control group	9	7	1	0	0	0
Doctors/scientists best placed to make a decision/would know/understand	2	1	1	1	42	41
Only/most accurate method	7	8	2	1	0	1
Testing	4	7	1	1	8	4
Personal opinion would affect results/have a role	2	2	13	18	2	2
Only/most scientific method	2	2	0	0	1	0
Best method	2	*	0	0	0	0
Usual method	2	1	0	0	0	0
Easiest method	*	*	0	0	0	0
Other answer	16	13	2	3	10	17
Vague or irrelevant answer	5	4	5	2	20	15
Don't know	2	2	9	7	12	12
Unweighted base:	*810*	*205*	*184*	*82*	*120*	*60*
Weighted base:	*810*	*203*	*186*	*85*	*126*	*62*

Percentages add up to more than 100% as respondents could give more than one answer.

Clearly then, there is considerable diversity amongst the public in their knowledge both of the facts and the processes or theory of science. While certain groups are considerably more likely to have a good knowledge of these matters, the main factor underpinning this appears to be the achievement of science qualifications, suggesting that trends in the numbers acquiring such outcomes are likely to closely relate to trends in levels of scientific knowledge in the public. Before moving on to consider specifically understandings of medical research, we finally turn to consider adults' understanding of the issue of probability, as it relates to science. [22]

3.5 Understanding of probability in science

In order to measure understanding of probability in relation to science, adult respondents to the survey were presented with a scenario as outlined below, and asked to identify whether four different statements relating to the actual implications of the diagnosis described were correct or not:

> Now think about this situation. A doctor tells a couple that their genetic makeup means that they've got a one in four chance of having a child with an inherited disease…
>
> Does this mean that if their first three children are healthy, the fourth will have the illness?
> Does this mean that if their first child has the illness, the next three will not?
> Does this mean that each of the couple's children will have the same risk of suffering from the illness?
> Does this mean that if they have only three children, none will have the illness?

[22] These questions were only asked of adult respondents, to enable sufficient time to focus on science education and careers more broadly in the young person questionnaire.

The proportions of adults answering each item correctly are presented in Table 3-13. Generally, adults showed a good understanding of the probabilities involved in science and, more specifically, genetics, with each item being answered correctly by between slightly less than eight in ten and nine in ten adults. In addition, the respondents had an accurate level of confidence in their own knowledge, with 4% of those who did not identify the correct answer in each case stating that they did not know whether the statement was true or not. In other words, in no case was an inaccurate answer identified by as many as two in ten adults.

Table 3-13 Proportion of adults who answered each genetics question correctly

Base: All adults *Wellcome Trust Monitor*

Statement about scenario	% giving correct answer
If their first three children are healthy, the fourth will have the illness (FALSE)	85
If their first child has the illness, the next three will not (FALSE)	90
Each of the couple's children will have the same risk of suffering from the illness (TRUE)	77
If they have only three children, none will have the illness (FALSE)	90
Unweighted base:	*1179*
Weighted base:	*1179*

In order to analyse the characteristics of those with a better understanding of the probabilities involved in science, a binary measure was generated, identifying those adults who answered all four items correctly and those who did not (this was considered more appropriate than an individual score, given the high levels of accuracy with which each of these questions was answered). In total, 63% of adults answered all four questions correctly, whilst 37% did not. When this question was previously fielded in the United States, on the 'Survey of public attitudes towards and understanding of science' in 2001, only 57% of adults answered all four questions correctly, a difference which would certainly attain the level of statistical significance (National Science Foundation, 2002). This may indicate a higher level of understanding of probability in the United Kingdom, although we should remain cautious in drawing any firm conclusions from this data, due to the distinct methodologies employed on the two surveys[23].

Focussing on the minority of adults on the Wellcome Trust Monitor who did not answer all of these items correctly, it is interesting to note that this group shares the same characteristics as the group who scored poorly on our science knowledge quiz, reported above. Specifically, 45% of those who were low scorers on the knowledge quiz answered one or more of these items incorrectly, compared to 20% of those who were middle scorers and 8% of those who were high scorers. This suggests that a *general* knowledge of the "facts" of science can relate very strongly to knowledge of a particular theory or logic relating to science. 6% of the adults who had studied for a qualification in biology or genetics at university answered one or more of the questions incorrectly, compared to 15% of those who had studied for such a qualification at school and 24% of those who had never done this. Similar differences between those with different knowledge and education levels were observed when this question was asked in the United States in 2001 (National Science Foundation, 2002).

However, it was not just levels of scientific knowledge and education that related to understanding of probability; as with scientific knowledge in general, we found that age and sex were both associated. As shown in Table 3-14, understanding of probability declined markedly for the oldest age group: three in ten of those aged between 18 and 34 failed to answer all four questions

[23] For example, the 'Survey of public attitudes towards and understanding of science' was conducted over the telephone, an approach that can often result in a poorer response to factual questions.

correctly, compared to almost six in ten of those aged over 65 years. It is interesting to note that the shift in knowledge levels appears to occur between the 50-64 years and 65 years and over age groups, a trend that was also noted in relation to levels of general scientific knowledge. In terms of sex, differences in levels of understanding of probability were less marked; however, significantly more women (23%) than men (18%) answered one or more of the questions incorrectly.

Table 3-14 Understanding of genetic theory, by age

Base: All adults *Wellcome Trust Monitor*

	Adults				
	18-34	35-49	50-64	65+	Total
Whether all four questions answered correctly	%	%	%	%	%
Not all questions answered correctly	30	31	34	57	37
All questions answered correctly	70	69	66	43	62
Unweighted base:	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*312*	*354*	*270*	*244*	*1179*

It seems plausible that knowledge of probability in relation to genetics might be influenced by an individual's own interests and concerns, in addition to their knowledge of science. However, there were no notable differences between those who had been advised, either themselves or for a family member, in relation to a serious genetic condition and those who had not, which we might have expected would relate to a greater knowledge of genetic probability.

3.6 Awareness and understanding of medical research

We next move on to explore public knowledge and understanding of the branch of science that is the particular focus of this report – that is, medical research. One key interest was in establishing exactly what the public think of and associate with the term 'medical research'. For this reason, respondents were asked near the start of the survey:

> We are interested in what people think about when they hear the term **medical research**. For this question rather than picking your answer from a list of options, please just tell me, in your own words, what comes to mind when you think about the term medical research?

The answers provided by respondents, which have been divided into a number of broad categories, are presented in Table 3-15. Any specific answer identified by more than 5% of respondents is presented separately. Quite clearly, there were greater shared public understandings of medical research compared to understandings of what it means to study something scientifically, where no individual aspect was identified by as many as two in ten adults or young people. Among adults, the specific aspects of medical research identified most frequently were treatments and cures, illnesses or diseases (in general or unspecified) and cancer; these answers were provided by four in ten, one in four, slightly more than two in ten and slightly more than two in ten adults respectively. The aspects of medical research most frequently identified by the young people were treatments and cures (mentioned by five in ten), illnesses or diseases (general or unspecified) and medicine, drugs or tablets (the latter answers were identified by around three in ten young people in each case).

The prominent position of cancer in perceptions of and associations with the term 'medical research' is interesting; no other individual illness or group of illnesses received such attention, with Alzheimer's being the next most frequently mentioned (identified by just 2% of adults but no young people). This may result from the high occurrence of the various types of cancer in the adult

population, meaning many respondents would have known someone who had experienced this illness. The existence of high profile cancer charities, such as Cancer Research UK, which make their research function explicit in their titles, is also likely to have heightened public awareness. Charities such as these rely on public donations and therefore have a fundamental interest in raising awareness of their work and existence, often having highly prominent marketing campaigns.

A similar question was fielded on the 'Uses of animals in medical research study', undertaken with adults in 2005 (Coalition for Medical Progress, 2005). Here, the most common perceptions of medical research that were identified were cancer research, identified by 24%, animal testing or vivisection, cited by 15% and animal experimentation issues, identified by 17%. While we should be cautious in comparing the results of the two surveys, due to differences to the wording of their respective questions and their different overall focuses[24], it is interesting to note that the proportions who identified cancer and issues relating to animal testing were very similar in 2005 and 2009. This suggests that public perceptions of medical research may be relatively constant and resilient to the impact of particular news or media coverage.

Table 3-15 Spontaneous perceptions of medical research

Base: All respondents *Wellcome Trust Monitor*

Aspect of medical research	Adults (aged 18+) %	Young people (aged 14-18) %
Types of Illness/disease	48	38
Cancer	23	11
Other illness or disease	8	4
Illness or disease – general or unspecified	25	31
Aspects of illness/disease	46	52
Treatments and cures	39	50
Causes	8	5
Prevention	8	4
Trials and tests	21	9
Tests on animals	13	3
Medical trials	3	1
Characteristics e.g. expensive/saves lives	15	10
Tools/machinery of work	7	2
Work in laboratories	5	1
Impacts/outcomes of illnesses	1	3
Other	32	48
Medicine, drugs or tablets	17	30
Vague or irrelevant answer	6	8
Don't know	1	4
Unweighted base:	*1178*	*374*
Weighted base:	*1179*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

As well as public perceptions of the term 'medical research', we were interested in exploring public knowledge of how and where this work operates in practice. It was envisaged that public attitudes to medical research could be influenced by knowledge of the individuals and organisations involved in this work (for instance, public perceptions might be more favourable if it was thought that medical

[24] The 'Uses of Animals in Medical Research' study asked respondents to think about medical research over the past 2-3 years and also requested that they consider its "social and ethical implications". These elements of the question were removed for the 'Wellcome Trust Monitor', as our interest was in identifying general, rather than time-limited or prompted, perceptions of medical research.

research was primarily conducted by the charitable sector). For this reason, we asked respondents:

> Please tell me which groups or organisations you are aware of that **carry out** medical research in the United Kingdom?

Rather than being presented with a list of individuals and organisations, respondents were asked to spontaneously identify any groups or organisations that they were aware of being involved in carrying out medical research, in order to identify whether there were any particular groups whose involvement is widely or little known about. Inevitably, many respondents identified highly specific and local groups and organisations, which were subsequently coded back into a set of general categories, as presented in the table below.

8% of adults and 16% of young people did not know which individuals and organisations carry out medical research in the United Kingdom. By some margin, the public were most aware of the role of medical research charities, such as Cancer Research UK, Macmillan or the British Heart Foundation, in carrying out medical research; 65% of adults independently identified these organisations compared to 51% of young people. The high prominence of this sector in public awareness may result from the significant publicity these organisations generate through fund-raising and campaigning. Other organisations that carry out medical research of which more than two in ten adults were aware were universities, pharmaceutical or drug companies and the NHS, identified by slightly more than three in ten, three in ten and two in ten adults respectively. Among young people, however, the only other organisation that carries out medical research identified by more than two in ten was the NHS, which three in ten young people referred to. Slightly more than one in ten adults identified the Wellcome Trust as an organisation that carries out medical research, a fact likely to result at least in part from the fact they were taking part in a study undertaken by that organisation and would have received information about this organisation prior to beginning their interview[25]. Nevertheless, the identification of the Wellcome Trust as a funder of medical research by a minority of adults at least indicates that they either were aware of this fact in advance, or had absorbed and retained this information from their introduction to the study.

[25] All participants in the Wellcome Trust Monitor received a letter explaining the purpose of the survey, identifying its funder as the Wellcome Trust (which was described as a major funder of medical research in the UK) and seeking to answer any questions they might have.

Table 3-16 Awareness of groups and organisations which undertake medical research

Base: All respondents *Wellcome Trust Monitor*

Groups and organisations	Adults (aged 18+) %	Young people (aged 14-18) %
Medical research charities	65	51
Universities	32	13
Pharmaceutical or drug companies	29	11
The NHS	20	32
Hospitals	18	15
The Wellcome Trust	14	1
Scientists	14	15
Medical Research Council	8	4
The Government (in general)	8	3
Department of Health	6	3
Business or industry	6	2
Health and Safety Executive	1	1
Vague or irrelevant answer	1	12
Other	3	4
No groups/organisations do this	8	0
Don't know	8	*16*
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

3.7 Understanding of key terms in medical research

Many specialist and technical terms are used when medical research is reported in the media. In attempting to measure public understandings of medical research, one question relates to the extent to which these terms have been absorbed and are understood. In exploring this issue, the survey focussed on two specific terms – "DNA" and "stem cells"[26]. Despite the prominent usage of these terms, have they been absorbed and accurately understood by the public?

We initially asked respondents to rate their own understanding of each term. For instance, in relation to DNA, respondents were asked:

> I'd now like to ask you about your understanding of different scientific terms that are used in news stories dealing with medical research.
> First, when you hear the term **DNA**, how would you rate your understanding of what the term means?

Almost all adults and young people (99% in each case) had either at least some understanding, or had heard of the term DNA. Half (49%) of adults indicated they had a "very good" or "good" understanding of this term, whilst this was the case for 63% of young people. It is interesting that young people are more confident in their understanding of this term than are adults, and this may be because the area of genetics receives considerable attention in the national curriculum on science. Around one in ten adults and fewer young people who had heard of the term DNA stated that they had "little understanding" of what it meant.

[26] Both received considerable publicity around the time that fieldwork was undertaken for this survey; in the United States, Barack Obama had publicly endorsed stem cell research, while DNA and genetics were receiving attention in relation to a number of media stories, including that of a woman giving birth to a baby whose embryo had been selected to ensure she would not inherit breast cancer (for an example of press coverage, see http://news.bbc.co.uk/1/hi/health/7792318.stm).

Self-assessed understanding of the term "stem cell" was less strong; indeed, approaching one in ten adults and young people indicated that they had never heard of the term. Levels of understanding reported by adults and young people were more similar, with 26% of adults and 31% of young people indicating that their level of understanding was "very good" or "good". This suggests that the term "stem cell" has been less well understood by the public, in their own eyes at least, than that of DNA; for young people, this may result from the fact that this area receives considerably less attention in formal science education.

Table 3-17 Self-rated understanding of "DNA" and "Stem cell"

Base: All respondents *Wellcome Trust Monitor*

	Understanding of "DNA"		Understanding of "Stem cell"	
	Adults (aged 18+)	Young people (aged 14-18)	Adults (aged 18+)	Young people (aged 14-18)
Level of understanding	%	%	%	%
Very good	20	20	10	8
Good	29	43	16	23
Some understanding	41	30	36	37
Have heard of the term but have little understanding of it	9	6	30	23
Have not heard of the term	1	1	7	9
Unweighted base:	*1179*	*374*	*1179*	*374*
Weighted base:	*1179*	*374*	*1179*	*374*

As we would expect, levels of scientific knowledge and self-assessed understanding of the terms DNA and stem cell were highly correlated. For the adults, 8% of those who attained a low score on the knowledge quiz indicated that they had a "very good" understanding of the term DNA, compared to 36% of those who achieved a high score. Similarly, 2% of the adults who attained a low score on the quiz rated their knowledge of the term "stem cell" as "very good", compared to 24% of those who achieved high scores. Similar differences were evident between groups of high and low scorers amongst the young people.

Moreover, many of the characteristics which were previously identified as being associated with levels of scientific knowledge were linked with self-assessed understandings of these terms, most markedly involvement in science through the educational sphere. 83% of the adults who had studied for a qualification in biology or genetics at university indicated they had a "very good understanding" or "good understanding" of the term DNA, compared to 57% of those who had studied for such a qualification at school and 43% of those who had not studied for any such qualification. Similarly, 81% of the young people who were studying science post-16 or intended to do so rated their understanding at these levels, compared to 51% of those who were not or did not intend to engage in non-compulsory science education. This suggests that levels of scientific knowledge and knowledge of the key scientific terms used in medical research are strongly linked, as we might expect.

We went on to ask those respondents who had some understanding or better to tell us in their own words:

> What do you understand by the term **DNA/stem cells**?

However, without the provision of a show card or any additional information, not all were able to do so. 4% of the adults and 8% of the young people who stated they had at least "some understanding" of DNA now stated they did not know what was meant by this term; this was also the case for 11% of adults and 20% of young people in relation to the term stem cells. This suggests that, particularly in relation to a relatively new term such as stem cells, self-assessed

knowledge may considerably over-rate the public's level of understanding, and should not necessarily be taken at face-value. It might also be that these types of terms are understood in a vague way, which individuals find difficult to articulate spontaneously, but which they could accurately identify, were they provided with a specific list of answer codes on a show card for example.

It should be borne in mind that the data presented in the two tables below, illustrating specific understanding of the terms DNA and stem cells, therefore do not relate to the entire samples of adults and young people. The data on understanding of DNA relates to 77% of adults and 86% of young people whereas that relating to stem cells was obtained from 55% of adults and 54% of young people. In other words, the understandings of these terms reported here are likely to be significantly greater than those evident amongst adults and young people as a whole.

Adults and young people reported a wide diversity of understandings of the term DNA, which fell into a number of broad categories (Table 3-18). Specific answers identified by more than 5% of adults or young people are identified separately. Most common amongst adults were references to genes and genetics and what we are made of (both by around two in ten), the individual's unique identity and what makes you different (both by around one in ten). A similar profile of responses was provided by the young people, with two in ten referring to genes and genetics or what we are made of, and with one in ten referring to what makes you different and the fact DNA determines what we are like and our characteristics. Interestingly, a considerable minority of responses (14% of adults and 9% of young people) relate to what DNA is used for (rather than what it actually is), with the identification of people in general, and criminals in particular being mentioned by around 5% of adults and young people. These understandings of DNA could have been gleaned from a range of sources, in addition to news stories, including programmes on forensics, police dramas and so on. Whilst 77% of adults were able to provide some information on what they understood by the term DNA, as indicated in the table below, many were only able to identify an aspect or aspects of this topic that represent little beyond a very vague understanding of this term. It is interesting to note that, when this question was asked in the United States in 2001, only 45% of adults were regarded as providing an 'acceptable' definition of DNA (National Science Foundation, 2002).

Table 3-18 Understanding of the term DNA

Base: All respondents who claimed at least some understanding of "DNA" *Wellcome Trust Monitor*

Aspect of term	Adults (aged 18+) %	Young people (aged 14-18) %
Genes/genetics	27	27
Genes/genetics	17	22
Genetic make-up	8	3
Characteristics and identity	36	43
Individual's unique identity	16	9
What makes you different	10	12
Determines what we are like/our characteristics	5	12
Personal characteristics	6	9
Inherited/hereditary characteristics	3	6
Practical uses of DNA	14	9
Practical use – to identify people	7	3
Practical use – to solve crimes/identify criminals	6	3
Practical use – to establish parentage	5	4
Individual parts of the body	28	23
What we are made of	16	18
Cells	9	7
Blood	4	5
Building blocks of living organisms	6	*
Other specific answer	31	18
Fingerprint	8	3
Deoxyribonucleic acid	6	3
Vague or irrelevant answer	5	9
Don't know	4	8
Unweighted base:	*1030*	*356*
Weighted base:	*1057*	*353*

Percentages add up to more than 100% as respondents could give more than one answer.

Approximately half of the adults and young people who claimed to have at least some understanding of the term provided information on their understanding of the term "stem cells" and their answers are presented in Table 3-19. Amongst adults, the most commonly reported understanding of the term "stem cell" is that this is a cell (one in three adults), that it can be used for growing new cells or repairing cells (around two in ten) and that it is a cell that can be altered (one in ten). Amongst young people, three in ten referred to cells, two in ten referred to plants, and one in ten specified the idea of cells that can be altered. The fact that many respondents were unable to provide any definition of stem cells beyond the word "cell" implies that public knowledge of this term, despite respondents' own ratings is, in fact, very limited. Moreover, the fact that a considerable minority of young people referred to plants, whereas the adults did not, suggests a possible confusion between the concepts of a 'stem' and a 'plant' in their minds.

The concept of DNA has received considerable coverage in media and popular entertainment such as television dramas for some time, whereas that of stem cells is relatively new. What we may be seeing here is the lag between a medical research term acquiring popular currency and the public acquiring a good understanding of and confidence in its specific meaning.

Table 3-19 Understanding of the term stem cell

Base: All respondents who claimed at least some understanding of "stem cell" *Wellcome Trust Monitor*

Aspect of term	Adults (aged 18+) %	Young people (aged 14-18) %
Parts of the body	22	12
Cells	34	27
Umbilical cord	8	1
General/unspecialised cells	5	7
Brain	3	1
Uses	25	13
Used for growing new cells/reproducing cells	19	8
Cells that can be altered	10	11
New treatment/cure – general	7	5
Used for repairing cells	3	3
Other answer	40	35
Plants	1	15
Vague or irrelevant answer	16	26
Don't know	12	21
Unweighted base:	*708*	*255*
Weighted base:	*732*	*263*

Percentages add up to more than 100% as respondents could give more than one answer.

3.8 Conclusions

In this chapter, we have seen that the measurement of knowledge of science in general and medical research in particular is not a simple process; self-perceptions of knowledge are not always justified by objective testing and the provision of a correct answer does not mean that the theory underpinning it has necessarily been well understood. Nevertheless, what is clear is that knowledge of the 'facts' of science, of science as a theoretical discipline and of some of the common terminology used in medical research are closely linked – not least because they tend to relate to a set of characteristics, most prominently involvement in science education but additionally involvement in science through other spheres, that tend to relate to one and other. Moreover, we have seen that perceptions of science, medical research and some of its key terminology are highly nuanced, and particularly in the case of scientific study, there were no generally accepted perceptions, terms or language that are commonly used by the public to refer to these areas. As we now move forward to examine attitudes and behaviour in relation to medical research, levels of scientific knowledge will be a key factor which will need to be considered in explaining the differences that emerge, whilst bearing in mind the considerable complexity by which they are underpinned, which we have just explored.

Appendix

Regression tables

Table 3-20 Logistic regression of high knowledge score by demographic characteristics (adults)

Base: All adults *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Sex (male)	-0.76**	0.15	0.000
Age (18-24)			
35-49	0.45*	0.19	0.018
50-64	0.49*	0.21	*0.020*
65+	0.19	0.26	*0.472*
Scientific job (Respondent has)			
Someone in household has	-0.29	0.32	*0.367*
No one has	0.01	0.21	*0.976*
Scientific qualification (university or college)			
School	-0.58*	0.28	*0.036*
None	-0.92**	0.27	*0.001*
Highest education qualification (higher education)			
A-level	-0.57**	0.21	*0.008*
GCSE	-0.93**	0.20	*0.000*
CSE	-1.23**	0.27	*0.000*
None	-2.11**	0.28	*0.000*
Whether parent had scientific job (one parent had)			
No parents had	-0.21	0.21	*0.317*

Unweighted base: 1178

*=significant at 95% level **=significant at 99% level

Table 3-21 Logistic regression of high knowledge score by demographic characteristics (young people)

Base: All young people *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Sex (male)	-0.40**	0.29	0.001
Age (14-16)			
17-18	0.99**	0.30	0.001
Studying/intending to study science post-16 (yes)			
No	-1.07**	0.31	0.001
Highest parental qualification (below A-level)			
At least A-level	0.18	0.39	0.637
Higher education qualification	0.80*	0.34	0.019

Unweighted base: 289

*=significant at 95% level **=significant at 99% level

4 Engagement with medical research

Sarah Butt

4.1 Summary

- A third (34%) of adults and just over a fifth (22%) of young people said they were very interested in medical research.
- Among adults, women and those who were older, who had a disability or long term limiting illness or who had worked in a scientific job were more likely to be interested in medical research. Among young people, young women and those who expressed a willingness to study for non-compulsory science qualifications were more likely to be interested.
- The development of new drugs, vaccines and treatments and how the body works were the two aspects of medical research most commonly identified as areas of interest.
- 39% of adults and 51% of young people said they had actively tried to find information about medical research in the past 12 months.
- Most frequently, adults who said they had tried to find information had done so because they or someone they knew had an illness or disease they wanted to find out more about. Young people had most frequently tried to find information because it was connected with their studies.
- The Internet was the most common method used to try to find information about medical research (88% of adults and 93% of young people who said they had tried to find information had used the Internet).
- People were generally very positive about their experiences of trying to find information. 90% of adults said they had managed to find the information they were looking for and 96% of this group said the information they found had been very or fairly useful.
- As well as information they had sought, a substantial minority of respondents were able to recall at least some details of information they had come across relating to medical research (43% of adults and 34% of young people). Most commonly, this was information they had come across on television or in the newspapers.
- A minority of adults (27%) and young people (14%) who said they were very interested in medical research had nevertheless not tried to find information about this and could not recall details of any information they had come across. Adults who were older, who had no educational qualifications and who did not have access to the Internet were particularly likely to fall into this group.

4.2 Introduction

This chapter examines the extent to which the public are interested in medical research and engage with information about this topic in their day to day lives. Previous research suggests that the public have generally tended to have little interest in or engagement with medical research. Using an index of engagement based on awareness, biology knowledge and intended behaviour, Gaskell et al found that in 2002 only around a quarter of UK citizens could be classified as an "engaged public" (Gaskell, 2003). However, there is some evidence, from the Public Attitudes to Science survey series, that the public's overall interest in science as a whole may have increased in recent years (DIUS, 2008). This chapter provides an opportunity to look at the most up to date evidence focussing specifically on the public's engagement with medical research. The figures presented here will provide a valuable baseline against which to compare the findings from future waves of the Wellcome Trust Monitor and assess whether and how levels of interest in and engagement with medical research may have increased.

In the first part of the chapter, we use a measure of self-reported interest in medical research to explore who is interested in this topic and what it is about medical research that interests them. We seek to identify if and to what degree interest in medical research is related to individuals' personal circumstances including, for example, their family medical history or, in the case of young people, their studies. In the second part of the chapter, we move beyond expressed interest in medical research and consider the extent to which people engage in behaviour which actually brings them into contact with information about this topic. This behaviour may be either passive (in terms of remembering information they happened to come across) or more active (in terms of deliberately seeking out information). Finally, we turn to examine the association between the two areas explored, namely interest and behaviour. Are these two facets of engagement with medical research closely linked? Or are there some groups within the population who express interest in medical research but do not engage with this topic in their day to day lives?

4.3 Interest in medical research

To obtain a measure of self-reported interest in medical research, we presented a definition of this topic to respondents and asked them to rate their interest in it using the following question:

> Medical research is about how the body works, the causes of illnesses and diseases and developing and testing new treatments. How interested, if at all, would you say you are in medical research?

Overall, 91% of adults and 80% of young people indicated they were very or fairly interested in medical research. It should be borne in mind that people tend to overstate their interest in a topic when responding to survey questions and it is likely that, for a proportion of those who stated they were fairly interested, interest was, in fact, fairly minimal. However, around a third of adults and just over a fifth of young people claimed to be very interested in medical research. The remainder of this chapter focuses primarily on this group. As will be discussed below, the proportions of adults and young people stating they were very interested in medical research vary in ways we might expect, relating to characteristics such as health, occupation and education. This suggests that our measure of self-reported interest is successfully picking up on genuine interest. In addition, even if there is a tendency for people to over-report their interest, the levels of interest reported here will provide a baseline against which levels of interest reported in future waves of the Wellcome Trust Monitor can be compared.

Table 4-1 Self-reported interest in medical research

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)	Young people (aged 14-18)
Interest	%	%
Very interested	34	22
Fairly interested	57	58
Not very interested	7	17
Not at all interested	2	3
Don't know	+	0
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Table 4-2 shows that women and young women were significantly more likely to express an interest in medical research – and more likely to say they were very interested – compared with men and young men. This finding, which is particularly pronounced among young people, is in contrast to evidence from other studies of interest in science in general, which tend to show that

men are generally more interested in science than are women (DIUS, 2008). This suggests that medical research may be an area of science which particularly interests women.

Table 4-2 Self-reported interest in medical research, by sex

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)			Young people (14-18)		
	Male	Female	Total	Male	Female	Total
How interested in medical research	%	%	%	%	%	%
Very interested	30	37	34	11	34	22
Fairly interested	58	56	57	66	49	58
Not very/at all interested	12	7	9	24	17	20
Unweighted base:	*472*	*707*	*1179*	*183*	*191*	*374*
Weighted base:	*568*	*611*	*1179*	*193*	*181*	*374*

Among adults, self-reported interest in medical research varied significantly with age, with older age groups more likely than younger age groups to say they were very interested (Table 4-3). This relationship between interest and age may reflect the fact that older people are more likely to suffer from poor health and so to have a personal interest in medicine and medical research. The evidence also shows that 14-16 year olds were more likely than 17-18 year olds to be very interested in medical research.

Table 4-3 Self-reported interest in medical research, by age

Base: All respondents *Wellcome Trust Monitor*

	Young people (14-18)			Adults (aged 18+)				
	14-16	17-18	Total	18-34	35-49	50-64	65+	Total
How interested in medical research	%	%	%	%	%	%	%	%
Very interested	26	17	22	25	25	41	49	34
Fairly interested	53	64	58	62	64	53	44	57
Not very/at all interested	21	19	20	13	10	6	7	9
Unweighted base:	*259*	*115*	*374*	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*223*	*151*	*374*	*312*	*354*	*270*	*244*	*1179*

People's interest in a subject is often related to their personal circumstances. An important factor to consider in relation to medical research is whether the respondent has, or knows someone with, health problems and could therefore directly benefit from advances in medical research. Among adults, there is clear evidence of a relationship between expressing interest in medical research and health (Table 4-4), with adults who themselves had a disability or long term limiting illness being the most likely to say they were very interested. However, there is no evidence of a similar relationship between health and interest among young people.

Table 4-4 Self-reported interest in medical research, by whether respondent has a disability or long-term limiting illness

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)				Young people (14-18)		
	Whether respondent has disability						
How interested in medical research	Yes – respondent %	Yes – friend or family member (not respondent) %	No %	Total %	Yes- respondent, friend or family member %	No %	Total %
Very interested	48	34	27	34	23	21	22
Fairly interested	46	57	62	57	55	60	58
Not very/at all interested	5	9	11	9	22	18	20
Unweighted base:	*297*	*341*	*538*	*1179*	*150*	*223*	*374*
Weighted base:	*262*	*358*	*557*	*1179*	*162*	*210*	*374*

Respondents' self-reported level of interest in medical research was also associated with interest in and/or involvement with science more generally. Among adults, for example, around five in ten of those who had ever had a scientific job (52%) said that they were very interested in medical research compared with just three in ten (31%) of those adults who had not.

Among young people, self-reported interest in medical research varied significantly depending on whether the individual expressed a willingness to study for non-compulsory science qualifications (Table 4-5). 32% of those who did express willingness indicated they were very interested in medical research compared with 15% of other young people.

Table 4-5 Self-reported interest in medical research, by whether young person expressed a willingness to study science at level 3

Base: All young people *Wellcome Trust Monitor*

	Willing to study science at level 3		
	Yes	No	Total
How interested in medical research	%	%	%
Very interested	32	15	22
Fairly interested	53	62	58
Not very/at all interested	15	23	20
Unweighted base:	*155*	*200*	*374*
Weighted base:	*157*	*199*	*374*

There is also evidence of an association between claiming an interest in medical research and claiming to have found science lessons at school interesting (Table 4-6). It is however worth noting that a majority of both adults and young people who stated they were not interested in science lessons at school, nevertheless said they were at least fairly interested in medical research. We discuss young people's interest in school science in more detail in Chapter 9.

Table 4-6 Self-reported interest in medical research, by whether respondent found school science lessons interesting

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)				Young people (14-18)			
	How interesting found school science lessons							
How interested in medical research	Very interesting %	Fairly interesting %	Not very/at all interesting %	Total %	Very interesting %	Fairly interesting %	Not very/at all interesting %	Total %
Very interested	48	27	30	34	38	19	11	22
Fairly interested	48	62	57	57	54	64	46	58
Not very/at all interested	4	11	12	9	8	18	43	20
Unweighted base:	*308*	*461*	*338*	*1179*	*80*	*221*	*68*	*374*
Weighted base:	*315*	*499*	*311*	*1179*	*87*	*217*	*66*	*374*

For adults, this table reports answers to the question "Overall, how interesting did you find science lessons at school?" For young people, it reports answers to the question "Overall, how interesting, if at all, [do/did] you find science lessons at school?"

As has already been discussed, it is likely that many of the different factors shown to be associated with interest in medical research are themselves inter-related. For example, health status is likely to be associated with age, with older age groups being more likely to experience poor health. Multivariate analysis allows us to isolate the independent effect of individual characteristics on levels of self-reported interest, controlling for their interactions with other relevant factors. In this instance, logistic regression analysis demonstrates that, for adults, claiming an interest in medical research was more likely among women, those with a disability or long-term limiting illness and those who had worked in a scientific job. Even after controlling for the fact that older people are more likely to suffer from ill health, age continues to exert an independent effect with older age groups being more likely to express an interest in medical research than younger age groups. However, knowledge of science (as measured by our knowledge quiz, reported in Chapter 3) is not significantly associated with levels of interest in medical research. For young people, self-reported interest in medical research was higher among young women and among those who expressed a willingness to study for non-compulsory science qualifications. Those young people with greater scientific knowledge were also more likely to claim an interest in medical research. Full details of this analysis are presented in the appendix to this chapter.

4.4 Broad and specific areas of interest

To identify the particular aspects of medical research that interest the public, we presented respondents with two cards, the first listing a number of broad areas of medical research (including how the body works, developing new treatments and policy issues) and the second listing more specific topic areas (including obesity, ageing and stem cell research). Respondents to the survey were shown each card in turn and asked to identify all of the areas and topics that interested them.

Over three-quarters of adults (77%) identified the development of new drugs, vaccines or treatments as a broad area of medical research that interested them (Table 4-7). This was also one of the most frequent choices among young people, chosen by 57%. Other frequent choices (particularly among young people) were how the body works and how the brain works. It is perhaps not surprising that the public would be most likely to pick those topics which most directly suggest the advancement of knowledge and its application to medical problems, developments which would clearly be of benefit to society. Nevertheless, there was also a reasonably high level of interest in broad areas of medical research with less clear practical applications or benefits. Notably, 44% of adults and 39% of young people expressed an interest in treatments in different times and cultures.

Table 4-7 Proportions of public expressing interest in different broad areas of medical research

Base: All respondents *Wellcome Trust Monitor*

Broad area of medical research	Adults (aged 18+) %	Young people (aged 14-18) %
Development of new drugs	77	57
How body works	52	61
How brain works	50	54
Research currently undertaken	45	28
Treatments in different times/cultures	44	39
Social and ethical issues	34	23
How research conducted	33	21
Regulation	28	14
Science education	26	16
Policy issues	18	7
Other areas	1	1
None	5	1
Don't know	+	7
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

There was considerable consistency across different age groups and between men and women in terms of the broad areas of medical research they expressed interest in. Among adults, for example, the development of new drugs, vaccines and treatments was by far the most popular choice for each age group and for both men and women. However, there were also some differences on the basis of age and sex. For example, among adults, younger age groups were more likely than older age groups to express an interest in the broad areas of human biology (how the body and the brain work). Among young people the older respondents, aged 17 or 18, were more likely than those aged 16 and under to express an interest in the social and ethical issues connected with medical research (36% compared with 14%). The latter is a complex area, and one that may have appeared too complex to interest the younger respondents.

Among adults, women were more likely than men to express an interest in social and ethical issues (38% compared with 29%) and in the ways in which diseases have been treated in different times and cultures (48% compared with 40%). This might suggest that women's interests in medical research tend to relate more to its societal impacts, than the hard science that underpins it. Among young people, young men were much more likely than young women to express an interest in how the brain works (61% compared with 47%). However, young women were more likely than young men to express interest in what medical research is currently being undertaken (37% compared with 21%).

Turning to consider the more specific set of topics which respondents were asked about, the three most commonly mentioned by both adults and young people as being of interest were mental health, genes and their effect on health, and the risk of disease (Table 4-8). Topics which were more frequently identified by adults than young people included mental health and stem cells. The latter topic was selected by 33% of adults compared with only 15% of young people. As we saw in Chapter 3, young people had a comparatively poor understanding of this area, a factor likely to be underpinning the low level of interest expressed. Perhaps unsurprisingly, ageing was a more frequently chosen topic among adults (45%) than among young people (15%). Cloning was one topic more frequently chosen by young people; 40% of young people picked this topic compared with only 25% of adults. Compared with adults, young people were more likely to respond "don't know" when asked to pick either broad ore more specific areas of interest in medical research.

Table 4-8 Proportions of public expressing interest in different specific medical research topics

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)	Young people (aged 14-18)
Medical research topics of interest	%	%
Mental health issues	58	42
How genes work and how they affect health and diseases	57	47
Risk of disease	52	44
Ageing	45	15
Disease which affect the developing world	36	38
Stem cells	33	15
Obesity	33	22
The health implications of climate change	26	20
Cloning	25	40
Other topic	2	+
None	5	2
Don't know	0	6
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

As well as differences between adults and young people, there were also differences between adults in different age groups. Older adults were more likely to mention ageing as a topic of interest whilst younger adults were more likely to mention cloning. 61% of adults aged 65 years and over identified ageing as a topic of interest, compared with just 32% of those adults aged between 18 and 34. On the other hand, 37% of adults aged between 18 and 34 selected cloning, compared with 16% of adults aged 65 and over.

Men and women were also interested in different specific topics (Table 4-9). Young women were more likely than young men to express an interest in obesity and mental health issues and the same trend occurred among adults. Conversely, young men were more likely than young women to express an interest in cloning. Compared with young men, young women were also more likely to express an interest in diseases which affect the developing world.

Table 4-9 Interest in specific medical research topics, by sex

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)			Young people (14-18)		
	Male	Female	Total	Male	Female	Total
Specific medical research topics	%	%	%	%	%	%
Mental health issues	54	63	58	31	54	42
How genes work and how they affect health and diseases	57	57	57	45	50	47
Risk of disease	49	54	52	40	48	44
Ageing	40	49	45	15	16	15
Disease which affect the developing world	36	35	36	30	47	38
Obesity	28	38	33	14	30	22
Stem cells	38	29	33	16	14	15
The health implications of climate change	25	27	26	22	19	20
Cloning	29	23	25	48	32	40
Other topic	2	3	2	+	+	+
None	5	4	5	2	2	2
Don't know	0	0	0	7	5	6
Unweighted base:	*472*	*707*	*1179*	*183*	*191*	*374*
Weighted base:	*568*	*611*	*1179*	*193*	*181*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

It is possible that the public's levels of interests in particular topics may be limited by a lack of understanding of what they involve. Interest in some of the more technical medical research topics such as genes, stem cells and cloning varied on the basis of levels of scientific knowledge, as shown in the table below. For both adults and young people, interest in these topics was significantly higher among those respondents who scored highly on the science quiz.

Table 4-10 Interest in specific medical research topics, by score on knowledge quiz

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)				Young people (14-18)			
	Score on science quiz							
	Low score (0-4)	Middle score (5-7)	High score (8-9)	Total	Low score (0-4)	Middle score (5-7)	High score (8-9)	Total
Specific medical research topics	%	%	%	%	%	%	%	%
Mental health issues	52	58	62	58	42	45	35	42
How genes work and how they affect health and diseases	37	57	70	57	34	46	61	47
Risk of disease	38	53	56	52	50	47	31	44
Ageing	44	42	52	45	19	15	12	15
Disease which affect the developing world	24	36	44	36	24	45	33	38
Obesity	25	33	39	33	23	21	21	22
Stem cells	12	29	56	33	3	11	34	15
The health implications of climate change	15	25	34	26	8	22	26	20
Cloning	9	26	34	25	26	44	41	40
Other topic	3	2	2	2	0	1	0	+
None	10	4	1	5	1	1	4	2
Don't know	0	0	0	0	19	4	1	6
Unweighted base:	*239*	*668*	*271*	*1179*	*62*	*228*	*83*	*374*
Weighted base:	*193*	*687*	*296*	*1179*	*72*	*214*	*87*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

Clearly then, levels of interest in medical research in general and in some of the specific topics which this subject comprises vary substantially between adults and young people and depending on characteristics such as sex. It cannot simply be assumed that those groups who are broadly interested in medical research, or who have a particular interest in one area, will necessarily be interested in other areas of medical research.

4.5 Active engagement with medical research information

Although people may express interest in medical research, this need not necessarily mean that they act on this interest or engage with the subject in their day to day lives. The rest of the chapter explores public behaviour in relation to information on medical research. We first examine the extent to which the pubic choose to actively seek out information about medical research. To examine this, we asked respondents:

> In the past year, have you tried to find out any information about medical research. This might have been about how the body works, the causes of illnesses and diseases or the testing or development of new treatments?

Over a third of adults said they had tried to find out such information (Table 4-11). This proportion was even higher among young people, with just over half reporting that they had tried to find out information about medical research. As we will see, in many cases, information-seeking among young people is likely to have been prompted by their studies. However, even among young people not currently studying science, 46% said they had tried to find out information about medical research in the past year.

Table 4-11 Proportion who said they had tried to find out information about medical research in past year

Base: All respondents *Wellcome Trust Monitor*

Whether had tried to find information	Adults (aged 18+) %	Young people (aged 14-18) %
Had tried to find information	39	51
Had not tried to find information	61	49
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

We need to bear in mind that many of those who said they had tried to find information about medical research may primarily have been seeking specific medical advice or solutions, rather than engaging with the subject of medical research more generally. We therefore asked respondents who said they had sought information a series of follow up questions to gauge the type of information they had been looking for and their reasons for doing so. The first of these questions asked respondents what type of information they had been looking for.

The majority of adults who said they had sought information (74%) had been looking for medical advice (Table 4-12). Although this proportion was lower among young people, just over half of young people said they had also been looking for medical advice. Nevertheless, in most of these cases medical advice was not the only information that was being sought. Many respondents also sought other types of information including information on medical trials and data or statistics. Overall, 66% of adults and 75% of young people said they had looked for information about medical research other than just medical advice.

Table 4-12 Type of information sought about medical research

Base: Respondents who had tried to find information about medical research in past year *Wellcome Trust Monitor*

Type of information sought	Adults (aged 18+) %	Young people (aged 14-18) %
Medical advice e.g. on cures, symptoms, prevention	74	51
Information on other people's experiences of an illness or disease	44	32
Information on medical research projects, trials or experiments	41	36
Data or statistics	25	39
Other	6	7
Unweighted base:	*437*	*201*
Weighted base:	*464*	*191*

Percentages add up to more than 100% as respondents could give more than one answer.

Motivations for seeking information

Respondents were subsequently asked why they were looking for information about medical research (Table 4-13). As might be expected, people were often motivated to seek information as a result of personal circumstances (ill health, their work or study) rather than out of general interest. Young people most commonly looked for information because it was relevant to something they were studying. Around two-thirds of young people looking for information had done so for this reason. Among adults the most common reasons for looking for information were because either the respondent themselves or someone they knew had an illness they wanted to know more about. Overall, a noticeably higher proportion of adults who had or who knew someone with a disability or

long-term limiting illness had tried to find information about medical research compared with other adults (44% compared with 34%).[27]

Nevertheless, a substantial minority of those who had looked for information stated they had done so because the topic was an area that interested them. This was the case for 20% of adults and a similar proportion (19%) of young people. 13% of adults said they had looked for information because a particular topic was an area that worried them. This reason was less common among young people but still given by 7% of those who had sought information.

Table 4-13 Reasons for looking for information about medical research

Base: Respondents who had tried to find information about medical research in past year *Wellcome Trust Monitor*

Reason for trying to find information	Adults (aged 18+) %	Young people (aged 14-18) %
A family member/friend/colleague had a disease/illness I wanted to know more about	53	16
I had a disease/illness I wanted to know more about	35	12
It was relevant to something I was studying	10	66
It was relevant to something I was doing at work	10	5
It is just an area that interests me	20	19
It is an area that worries me	13	7
Other reason	2	4
Unweighted base:	*437*	*201*
Weighted base:	*464*	*191*

Percentages add up to more than 100% as respondents could give more than one answer.

Topics on which information sought

Respondents who said they had looked for information on medical research were asked to describe in their own words what they had been trying to find out information about. The answers provided were recorded verbatim and grouped together into a series of broad categories as shown in Table 4-14. In many cases, answers were highly individualistic and were given by too few respondents to warrant an individual separate category; such answers have been grouped together under "other". Reflecting the fact that the majority of adults who looked for information were motivated to do so by illness (either their own or that of someone they knew), two-thirds (67%) of adults looking for information said they had been looking for information about particular illnesses or diseases. The proportion of young people looking for information about a specific illness or disease was smaller. However, even among young people, this was still the most common topic on which information was sought, identified by nearly half (45%). Young people were more likely than adults to have been looking for information about how the body works (18% compared with 6%). This may reflect the fact that, for young people, information seeking was often linked to what they were studying and the latter topic is a key focus of science education.

[27] Among young people, the proportion of people who said they had looked for information about medical research did not vary significantly on the basis of disability. 53% of young people who had or who knew someone with a disability or long term limiting illness had looked for information compared with 50% of other young people.

Table 4-14 Medical research topics on which information was sought

Base: Respondents who had tried to find information about medical research in past year *Wellcome Trust Monitor*

Topic	Adults (aged 18+) %	Young people (aged 14-18) %
Types of Illness/disease	67	45
Cancer	15	7
Alzheimer's	6	*
Diabetes	3	4
Parkinson's	1	0
Other illness or disease	48	29
Illness or disease – unspecified	4	9
Aspects of illness/disease	23	16
Treatments and cures	11	8
Causes	5	6
Impact	3	2
Prevention	2	2
Identifying and diagnosis	2	1
Medicine, drugs, tablets	8	8
Stem cell research	6	9
How the body works	6	18
Genetics	4	2
The effects of lifestyle on health	4	3
Mental health issues	3	*
Fertility, pregnancy or childbirth	3	0
Personal accounts	3	0
Cloning	1	9
Obesity	1	2
Stress and anxiety	1	0
Surgery	1	1
Other	10	19
Vague or irrelevant answer	3	5
Unweighted base:	*437*	*201*
Weighted base:	*464*	*191*

Percentages add up to more than 100% as respondents could give more than one answer.

Methods for finding information

Those respondents who said they had tried to find information about medical research were next asked what they did to try to find this information. This could have major implications for our understanding of public behaviour in this area and, hence, attempts to increase public engagement in the future. For instance, it could be that only a small number of information outlets are perceived as potential sources of information on medical research and that only those with access to these outlets have therefore elected to try to find information on this topic. By far the most common way in which people had tried to find information about medical research was via the Internet (Table 4-15). 88% of adults and 93% of young people said that they had used this source. Other common sources of information, among both adults and young people, were talking to another person and reading a book.[28]

[28] Respondents were not asked who the person they talked to was – for instance, whether it was a medical professional, a friend or family member, or someone else.

Table 4-15 What did to try and find information about medical research

Base: All respondents who had tried to find information about medical research — *Wellcome Trust Monitor*

How tried to find information	Adults (aged 18+) %	Young people (aged 14-18) %
Used the Internet	88	93
Talked to another person	47	43
Read a book	26	34
Watched the television	18	18
Read a magazine	18	6
Attended a discussion with experts	16	5
Read a newspaper	14	11
Attended a lecture or talk	12	14
Phoned a helpline or other information service	11	*
Sent an email	6	2
Listened to the radio	8	0
Attended an exhibition	1	2
Visited a laboratory open day	1	4
Went to see a play about medical research issues	0	*
Other sources	3	1
Unweighted base:	*437*	*201*
Weighted base:	*464*	*191*

Percentages add up to more than 100% as respondents could give more than one answer.

Among those who said they had used the Internet, their most common route to finding information was via a search engine (Table 4-16). The majority of adults and young people who said they visited a specific website also stated that they had used a search engine; this was the case for 70% of adults and 69% of young people who had visited a specific website.

Table 4-16 Ways in which Internet was used to find information about medical research

Base: All respondents who used the Internet to try and find information about medical research — *Wellcome Trust Monitor*

How used internet to find information	Adults (aged 18+) %	Young people (aged 14-18) %
I used a search engine	83	85
I accessed a specific website	55	47
I read a blog	5	4
I used a chat room or discussion forum	4	5
I listened to a Podcast	1	1
Other	*	0
Unweighted base:	*377*	*187*
Weighted base:	*410*	*177*

Percentages add up to more than 100% as respondents could give more than one answer.

Effectiveness of approaches to finding information

We next turn to examine the outcomes of attempts by the public to find information on medical research. Of those adults who said that they had tried to find information, the vast majority (90%) indicated they had managed to find the information they were looking for.[29] Adults were generally very positive about the information they had managed to find. Most adults (82%) stated that it was either very easy or fairly easy to find the information they had been looking for while nearly all of those who had been able to find information (96%) claimed that this had been very or fairly useful.

[29] The follow up questions on information seeking were not asked of young people.

We asked those adults who said they had managed to find information which person or organisation had produced the information that they found. The most common providers were medical practitioners, medical research charities and/or the Department of Health or other government department (Table 4-17). Relatively few people had found information from more informal sources such as family members and friends.

Table 4-17 Person or organisation who produced information about medical research found by adults

Base: All adults who had found information about medical research *Wellcome Trust Monitor*

Producer of information on medical research	Total %
A medical research charity	32
A doctor, nurse or other medical practitioner	32
The Department of Health or another government department or minister	29
A patient group	15
A scientist	14
A family member, friend or colleague	13
A journalist or news organisation	13
Other	8
Can't remember	8
Unweighted base:	*393*
Weighted base:	*418*

Percentages add up to more than 100% as respondents could give more than one answer.

In assessing experiences of seeking information about medical research, it should be borne in mind that only a minority of adults (39%) said that they had tried to find information. Their experiences of information gathering may be more positive than those of the wider population. This may be either because those who choose to actively seek information have different capacities for accessing, interpreting and absorbing information compared with those who tend not to seek information. It is also possible that the public are more likely to remember successful attempts to find information than to remember less successful attempts.

Chapter 5 examines the preferences the public in general hold for becoming informed about medical research, to create a picture that incorporates the views and perceptions of those who do not commonly seek information on this topic.

4.6 Passive receipt of information on medical research

Even if certain sections of the public do not actively seek out information about medical research, they may come across such information in the course of their day to day lives, for example through reading newspapers or watching television. To gauge the prevalence of this passive accessing and receipt of information, respondents were asked to:

> Please think of the last time, before this interview, that you heard, saw or read something about medical research that you just happened to come across and had not been trying to find. Can you remember what that was?

Adults were more likely than young people to say they remembered coming across information about medical research in this way (Table 4-18). 43% of adults could recall at least some details of the last piece of information about medical research they had come across compared with 34% of young people. A further 23% of adults and 18% of young people claimed they had come across information about medical research but could not remember details of what it was about. The fact that adults were more likely than young people to come across information passively is consistent

with adults being more likely than young people to watch television or read newspapers (see Chapter 2). As Table 4-21 shows, these were two common sources of passive information receipt.

Table 4-18 Recall of the last time information on medical research was encountered (without being sought)

Base: All respondents *Wellcome Trust Monitor*

Extent of recall	Adults (aged 18+) %	Young people (aged 14-18) %
Remembers coming across information and at least some details of what it was	43	34
Remembers coming across information but cannot recall any details	23	18
No recall of information on medical research being encountered (but not sought)	33	46
Don't know	1	2
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

In some instances, those who were able to recall information they had come across about medical research were the same people who had also actively sought information about this topic (Table 4-19). However, this was not always the case. Around a fifth of both adults and young people claimed to have both actively and passively engaged with information on medical research. At the other end of the spectrum, just over a third of adults and young people had not engaged either actively or passively with information on this topic. Among the remaining group, active information seeking was more common among young people compared with adults whilst passive information recall was higher among adults.

Table 4-19 Active and passive engagement with information about medical research

Base: All respondents *Wellcome Trust Monitor*

How respondent engaged with information about medical research	Adults (aged 18+) %	Young people (aged 14-18) %
Actively sought information and remembered last time came across information[30]	21	21
Actively sought information but could not remember last time came across information	18	28
Remembered coming across information but had not actively sought information	22	13
Neither	38	36
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Respondents who indicated that they could remember the information they had come across were asked to describe in their own words, what it was they remembered. Often people gave only quite general or brief details of what it was they claimed to have remembered, perhaps suggesting that the extent of any engagement may have been limited.[31] However, the fact that they could recall coming across some relevant information suggests that people are at least aware of medical research as an issue being discussed in the public sphere. The aspects of medical research which people were able to recall coming across information about were grouped together into a set of broad categories as shown in Table 4-20. The two most common individual topics mentioned by both adults and young people who remembered coming across information were stem cells and cancer. The topics that people remember coming across will of course be heavily dependent on the medical research stories that were around in the media at the time fieldwork for the study was

[30] "remembers last time came across information" includes only those people who could recall at least some details of what they came across.

[31] It may equally reflect limitations in respondents' powers of recall or description more generally.

conducted. During fieldwork for the Wellcome Trust Monitor prevalent news stories included the decision by US President Barack Obama to allow the public funding of stem cell research in the USA and the birth of a baby whose embryo had been selected to make sure she was not carrying the gene for breast cancer. Cervical cancer was also frequently in the news following the illness and death of reality TV star Jade Goody. We saw, when examining public understanding of the term 'medical research' in Chapter 3 that cancer had a very prominent position in public perceptions; the fact that this was one of the most common topics on which information was encountered provides a further reason as to why this might have been the case.

Table 4-20 Aspect of medical research recalled in information that had been encountered (but not sought)

Base: Respondents who remembered at least some details of last piece of information about medical research they came across

Wellcome Trust Monitor

Topic covered by information respondent came across	Adults (aged 18+) %	Young people (aged 14-18) %
Types of illness/diseases	46	38
Cancer	16	24
Alzheimer's	8	2
Diabetes	3	0
Other illness	20	11
Illness/disease – unspecified	1	1
Stem cell research	19	14
Aspects of illness	14	14
Treatments and cures	7	9
Prevention	4	3
Screening	2	1
Causes	1	2
Cloning	8	8
Medicine, drugs	8	11
Genetics	6	7
The effect of lifestyle on health	5	4
Personal experience	4	6
Medical trials	3	2
Animal research (including testing on animals)	2	4
Diet	2	0
Fertility, pregnancy or childbirth	2	0
Surgery	1	2
How the body works	1	4
Obesity	1	5
Tests – general	1	2
Other	18	20
Vague or irrelevant answer	2	2
Unweighted base:	*498*	*130*
Weighted base:	*512*	*128*

Percentages add up to more than 100% as respondents could give more than one answer.

The most common way in which both adults and young people came across information about medical research was through television (Table 4-21). Newspapers were the second most common source of passive information gathering among both adults and young people. Young people were more likely than adults to have come across information on the Internet whilst adults were more likely than young people to have come across information on the radio. Young people were more likely to mention having come across information by phoning a helpline. Chapter 5 looks in more detail at the ways in which people would like to receive information about medical research, to see whether these experiences of receiving information tally with public preferences.

Table 4-21 Where information about medical research passively encountered

Base: Respondents who remembered at least some details of last piece of information about medical research they came across

Wellcome Trust Monitor

Where information on medical research encountered	Adults (aged 18+) %	Young people (aged 14-18) %
Television	41	36
A newspaper	28	24
The Internet	16	21
Radio	12	2
A magazine	10	6
Another person told me about it	9	11
Phoned a helpline or other information service	2	9
A book	2	6
Email	1	1
Other	6	7
Unweighted base:	*494*	*129*
Weighted base:	*504*	*127*

Percentages add up to more than 100% as respondents could give more than one answer.

4.7 Public engagement with information about medical research

The final section of this chapter looks in more detail at the types of people who currently tend to engage with information about medical research, either actively or passively, in their day to day lives.

As we would expect, engagement with information about medical research (both active and passive) was strongly associated with self-reported interest in medical research (Table 4-22). Adults and young people who claimed to be very interested in medical research were the most likely to have actively sought information in relation to this topic and to have remembered information they had come across. Those who said they were not interested in medical research were the least likely to have done either of these things. Among adults for example, 53% of those who said they were very interested in medical research had actively sought information compared with just 16% of those who were not very or not at all interested. Similarly, 50% of adults who said they were very interested in medical research remembered the last piece of information they came across, compared with 38% of those who were not very or not at all interested. Nevertheless, a significant minority of those who claimed an interest in medical research had nevertheless not engaged with information about medical research, either actively or passively. This was the case, for example, for 14% of young people who said they were very interested in medical research and an even higher proportion of adults (27%). This finding may of course reflect the fact that people can spontaneously express an interest in a topic in response to a survey question without actually having a genuine interest. However, it may also reflect the fact that some groups find it harder than others to obtain or retain information, regardless of their potential for interest.

Table 4-22 Active and passive engagement with information about medical research, by interest in medical research

Base: All respondents *Wellcome Trust Monitor*

	Interest in medical research							
	Adults (aged 18+)				Young people (14-18)			
How respondent engaged with information about medical research	Very interested %	Fairly interested %	Not very/at all interested %	Total %	Very interested %	Fairly interested %	Not very/at all interested %	Total %
Actively sought information	53	35	16	39	75	47	33	50
Remembers last piece of information about medical research encountered passively	50	40	38	43	52	34	16	34
Neither	27	42	53	38	14	36	59	36
Unweighted base:	*418*	*656*	*103*	*1179*	*86*	*213*	*75*	*374*
Weighted base:	*397*	*671*	*110*	*1179*	*83*	*216*	*75*	*374*

Column percentages may sum to more than 100% as respondent may have both actively sought information and remember information they came across.

Bearing in mind that patterns of media consumption and information gathering more generally tend to vary on the basis of characteristics such as age and education, it may be that some groups are currently less likely to seek out or come across information about medical research, regardless of their potential level of interest in this topic, simply because of the information sources they can, or choose to, access. We used multivariate analysis (logistic regression) to isolate the independent effect of characteristics such as age and education on engagement, after controlling for differences in interest. Full details of this analysis can be found in the appendix to this chapter. The factors discussed below remain significant, even after controlling for the respondents' interest in medical research.

The extent to which adults actively tried to find information about medical research varied on the basis of age (Table 4-23). Older adults were less likely than younger ones to have actively engaged with information about medical research. This is despite the fact that (as we saw in Table 4-3) older adults were more likely than younger adults to say that they were interested in medical research. However, after controlling for differences in interest there is no evidence that the extent to which adults were able to recall coming across information about medical research varied significantly on the basis of age.

Table 4-23 Active and passive engagement with information about medical research among adults, by age

Base: All adults *Wellcome Trust Monitor*

	Age				
How respondent engaged with information about medical research	18-34 %	35-49 %	50-64 %	65+ %	Total %
Actively sought information	48	41	46	18	39
Remembers last piece of information about medical research encountered passively	43	47	45	37	43
Neither	32	34	34	55	38
Unweighted base:	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*312*	*354*	*270*	*244*	*1179*

Column percentages may sum to more than 100% as respondent may have both actively sought information and remember information they came across.

The extent to which adults actively tried to find information or claimed to remember information they had come across also varied on the basis of education (Table 4-24). The proportion of adults looking for information about medical research and the proportion who were able to recall at least some details of information they had come across was lowest among those adults with no

educational qualifications and highest among those who had obtained higher education qualifications. This is despite the fact that interest in medical research was not found to vary significantly on the basis of educational qualifications.

Table 4-24 Active and passive engagement with information about medical research among adults, by highest educational qualification obtained

Base: All adults *Wellcome Trust Monitor*

	Highest educational qualification obtained					
How respondent engaged with information about medical research	Higher education	A level or equivalent	GCSE or equivalent	CSE or equivalent	No qualifications	Total
	%	%	%	%	%	%
Actively sought information	56	48	40	26	20	39
Remembers last piece of information about medical research encountered passively	60	52	40	32	28	43
Neither	18	31	38	50	60	38
Unweighted base:	*325*	*138*	*240*	*123*	*344*	*1179*
Weighted base:	*348*	*165*	*248*	*125*	*285*	*1179*

Column percentages may sum to more than 100% as respondent may have both actively sought information and remember information they came across.

There was also a strong link between Internet use and choosing to seek information about medical research, consistent with the fact that 88% of adults who said they had tried to find information about medical research did so via the Internet (Table 4-15). For example, 49% of adults who used the Internet for reasons other than work stated that they had tried to find out information about medical research in the past year, compared with only 16% of adults who did not use the Internet for reasons other than work (Table 4-25). Internet users were also more likely than non-users to recall information about medical research that they had just happened to come across.[32] On the basis of this survey alone, it is not possible to determine the extent to which people were encouraged to try and find information about medical research by virtue of having access to a ready source of information via the Internet. It is also possible, for example, that people who are more likely to be active seekers of information on any topic are more likely to be Internet users. Nevertheless, the association between Internet use and actively seeking information about medical research remains significant even after controlling for general characteristics such as age and education.

Table 4-25 Active and passive engagement with information about medical research among adult respondents, by whether respondent uses the Internet

Base: All adults *Wellcome Trust Monitor*

	Uses the Internet (other than for work)		
How respondent engaged with information about medical research	Yes	No	Total
	%	%	%
Actively sought information	49	16	39
Remembers last piece of information about medical research encountered passively	49	31	43
Neither	28	61	38
Unweighted base:	*754*	*425*	*1179*
Weighted base:	*831*	*348*	*1179*

Column percentages may sum to more than 100% as respondent may have both actively sought information and remember information they came across.

[32] Multivariate analysis did not however identify any significant associations between TV watching/newspaper readership and the passive receipt of information about medical research.

Adults who had had a scientific job were also more likely to have actively engaged with information about medical research, whilst men were more likely to remember having come across information about medical research compared with women. Adults with a disability or long term limiting illness were more likely than those without these circumstances to have engaged with information about medical research either actively or passively. This was the case even after controlling for the higher level of interest in medical research among this group.

In contrast to the findings for adults, there is no evidence[33] that (once interest in medical research is taken into account) the extent to which young people engage, either actively or passively, with information about medical research varies further on the basis of other characteristics, specifically age, sex, disability, parental education, or whether the young person was studying or intending to study science. However, there is some evidence that, even after controlling for interest, young people with greater scientific knowledge (as measured by their scores the knowledge quiz) may be more likely to engage with information about medical research both actively and passively (see the appendix to this chapter for further details).

4.8 Conclusions

Levels of interest in and engagement with medical research vary substantially. Public engagement with this topic is clearly often prompted by personal circumstances and interests, such as the involvement of young people in science education and adult concerns about illnesses and conditions that they, and those close to them, have encountered. For adults at least, there is also some evidence to suggest that particular groups are less likely to engage with information about medical research regardless of their potential level of interest, particularly older adults, those with no educational qualifications and those without Internet access. This is likely to reflect differences in the way these groups tend to access and engage with information more generally. Taking the levels of engagement reported in this chapter as a baseline measure, it will be interesting to see whether future waves of the Wellcome Trust Monitor are able to demonstrate increasing public engagement with medical research and, if so, how and amongst whom this increase in engagement takes place.

[33] This was true at least on the basis of the relatively small number of cases available for analysis.

Appendix

Table 4-26 Self-reported interest in medical research among adults, logistic regression (very interested=1, other=0)

Base: All adults *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Sex (Male)			
Female	0.37*	0.14	0.012
Age (16-34)			
35-49	-0.03	0.19	0.866
50-64	*0.64**	*0.20*	*0.002*
65+	1.12**	0.21	0.000
Highest educational qualification (HE qualification)			
A level or equivalent	-0.19	0.20	0.346
GCSE or equivalent	-0.13	0.21	0.556
CSE or equivalent	0.02	0.30	0.953
None	-0.19	0.21	0.362
Whether have disability (No)			
Yes - respondent	0.75**	0.18	0.000
Yes - close friend or family member	0.31*	0.15	0.046
Ever had scientific job (No)			
Yes	0.60*	0.19	0.002
Score on science quiz (Low 0-4)			
Middle (5-7)	0.13	0.21	0.528
High (8-9)	0.45	0.24	0.071

Unweighted base: 1130

*=significant at 95% level **=significant at 99% level

Table 4-27 Self-reported interest in medical research among young people, logistic regression (very interested=1, other=0)

Base: All young people *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Sex (male)			
Female	1.52**	0.27	0.000
Age (14-16)			
17-18	0.61	0.35	0.085
Whether have disability (No)			
Yes - respondent or family member/close friend	0.37	0.33	0.271
Parents' education (below A level)			
A level or above	0.08	0.37	0.828
Willing to study non-compulsory science			
Yes	0.92*	0.31	0.005
Score on science quiz (Low 0-4)			
Middle (5-7)	1.03	0.66	0.123
High (8-9)	1.39*	0.49	0.006

Unweighted base: 284

*=significant at 95% level **=significant at 99% level

Table 4-28 Whether adult tried to find information about medical research, logistic regression (Yes=1, No=0)

Base: All adults *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Interested in medical research (Not very/at all)			
Fairly	1.15*	0.35	0.002
Very	2.17**	0.36	0.000
Sex (Male)			
Female	-0.06	0.13	0.646
Age (16-34)			
35-49	-0.28	0.21	0.195
50-64	-0.14	0.21	0.487
65+	-1.09**	0.29	0.000
Highest educational qualification (HE qualification)			
A level or equivalent	-0.19	0.24	0.435
GCSE or equivalent	-0.42	0.21	0.052
CSE or equivalent	-1.03*	0.29	0.001
None	-0.86*	0.26	0.001
Whether have disability (No)			
Yes - respondent	0.36	0.20	0.082
Yes - close friend or family member	0.48*	0.18	0.009
Ever had scientific job (No)			
Yes	0.53*	0.24	0.032
Score on science quiz (Low 0-4)			
Middle (5-7)	0.26	0.28	0.362
High (8-9)	0.23	0.34	0.495
Use Internet (No)			
Yes	1.02**	0.21	0.000

Unweighted base: 1130

*=significant at 95% level **=significant at 99% level

Table 4-29 Whether young person tried to find information about medical research, logistic regression (Yes=1, No=0)

Base: All young people *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Interested in medical research (Not very/at all)			
Fairly	0.54	0.30	0.073
Very	1.68**	0.42	0.000
Sex (male)			
Female	0.12	0.31	0.708
Age (14-16)			
17-18	0.36	0.31	0.255
Whether have disability (No)			
Yes - respondent or family member/close friend	0.20	0.27	0.463
Parents' education (below A level)			
A level or above	0.27	0.31	0.392
Willing to study non-compulsory science (No)			
Yes	0.51	0.33	0.123
Score on science quiz (Low 0-4)			
Middle (5-7)	0.75	0.48	0.127
High (8-9)	0.82	0.53	0.127

Unweighted base: 284

*=significant at 95% level **=significant at 99% level

Table 4-30 Whether adult remembers last time came across information about medical research, logistic regression (Yes=1, No=0)

Base: All adults *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Interested in medical research (Not very/at all)			
Fairly	0.18	0.24	0.465
Very	0.56*	0.28	0.049
Sex (Male)			
Female	-0.42*	0.13	0.002
Age (16-34)			
35-49	0.08	0.18	0.669
50-64	0.03	0.21	0.896
65+	0.14	0.22	0.524
Highest educational qualification (HE qualification)			
A level or equivalent	-0.22	0.24	0.367
GCSE or equivalent	-0.70*	0.23	0.003
CSE or equivalent	-0.92*	0.28	0.001
None	-1.12**	0.22	0.000
Whether have disability (No)			
Yes - respondent	0.47*	0.18	0.012
Yes - close friend or family member	0.48*	0.17	0.005
Ever had scientific job (No)			
Yes	0.27	0.19	0.144
Score on science quiz (Low 0-4)			
Middle (5-7)	-0.04	0.19	0.847
High (8-9)	0.10	0.26	0.715
Use Internet (No)			
Yes	0.47*	0.17	0.008

Unweighted base: 1130

*=significant at 95% level **=significant at 99% level

Table 4-31 Whether young person remembers last time came across information about medical research, logistic regression (Yes=1, No=0)

Base: All young people *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Interested in medical research (Not very/at all)			
Fairly	0.90	0.49	0.070
Very	1.64*	0.53	0.003
Sex (male)			
Female	-0.10	0.29	0.735
Age (14-16)			
17-18	0.20	0.32	0.526
Whether have disability (No)			
Yes - respondent or family member/close friend	0.81*	0.38	0.037
Parents' education (below A level)			
A level or above	1.11	1.10	0.320
Willing to study non-compulsory science (No)			
Yes	0.62	0.35	0.079
Score on science quiz (Low 0-4)			
Middle (5-7)	1.73*	0.70	0.016
High (8-9)	2.10*	0.80	0.012

Unweighted base: 284

*=significant at 95% level **=significant at 99% level

5 Becoming informed about medical research: the public's preferences

Sarah Butt

5.1 Summary

- 47% of adults and 52% of young people felt they saw or heard too little or much too little information about medical research.
- The Internet would be the public's preferred method for finding or accessing information about medical research, selected by 65% of adults and 82% of young people.
- Around 6 in 10 adults or young people would prefer to find or access information about medical research that had been produced by a doctor, nurse or other medical practitioner.
- Around 3 in 10 adults and young people believe that the media exaggerates what medical research is likely to achieve.
- 72% of adults had a great deal of or complete trust in doctors, nurses and other medical practitioners to provide accurate and reliable information about medical research.
- Around 6 in 10 adults said they had a great deal or complete trust in scientists working in universities. This was a higher proportion than said they had trust in scientists working for the government or for drug or pharmaceutical companies.

5.2 Introduction

In this chapter we examine public preferences for receiving information about medical research. Whereas the previous chapter focussed primarily on the minorities of adults and young people who had actually tried to find information on this topic, here we look more broadly at the preferences of all sections of the public for receiving information. In the first part of the chapter we explore whether the public feel they receive too much or too little information about medical research. We then move on to examine how people would prefer to receive information about medical research and who they would like to produce this. In the final part of the chapter, we look in more detail at attitudes towards different information providers, including medical professionals, the government and the media. We examine the extent to which people would trust these different groups to provide them with information about medical research and, where applicable, the reasons for any lack of trust.

5.3 Quantity of information received about medical research

To explore whether the public felt the quantity of information they received about medical research was sufficient, we asked respondents for their opinion about the amount of information about medical research to which they were exposed. Specifically we asked them whether they felt that these days they heard and saw far too much, too much, about the right amount, too little or far too little information about medical research.

47% of adults and 52% of young people indicated that they saw and heard too little or much too little information about medical research (Table 5-1). Young people were slightly more likely than adults to think that this was the case although the difference was not statistically significant. Very few adults or young people felt that they heard and saw too much information. It is possible that this may partly reflect an unwillingness to express such an opinion whilst taking part in a survey about medical research. However, the fact that a substantial proportion of respondents said there was too little information, rather than simply saying there was the right amount, suggests that there may well be a genuine demand for more information about medical research.

Table 5-1 Perception of quantity of information received about medical research

Base: Al respondents *Wellcome Trust Monitor*

	Adults (aged 18+)	Young people (aged 14-18)
These days see and hear…[34]	%	%
Far too little information	8	4
Too little information	39	48
The right amount of information	45	40
Too much information	4	4
Far too much information	2	2
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Are there particular groups who feel that they currently receive too little information about medical research? For example, Chapter 4 found that, whilst interest in medical research was higher among older adults compared with younger ones, younger adults were more likely to have actively tried to find or remembered coming across information about medical research. We might therefore expect that older people would be more likely to be dissatisfied with the amount of information they currently received. However, on the basis of responses to this question, there is no evidence that this was the case (Table 5-2). In fact, adults aged between 18 and 34 were the most likely group (amongst adults) to state that they saw or heard too little or much too little information about medical research, despite the fact that this age group were also the most likely already to be engaging with information about medical research (See Chapter 4).

Table 5-2 Perception of quantity of information received about medical research, by age

Base: All respondents *Wellcome Trust Monitor*

	Young people (14-18)			Adults (aged 18+)				
	14-16	17-18	Total	18-34	35-49	40-64	65+	Total
These days see and hear…	%	%	%	%	%	%	%	%
Far too little/too little information	45	62	52	56	47	46	37	47
The right amount of information	48	29	40	34	47	47	54	45
Too much/far too much information	6	7	6	6	5	5	7	6
Unweighted base:	*259*	*115*	*374*	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*223*	*151*	*374*	*312*	*354*	*270*	*244*	*1179*

Table 5-3 shows that those adults who had a disability or long term limiting illness were the most likely to say that they saw or heard too little information about medical research.[35] Again, this is despite the fact that adults who had a disability or long term limiting illness were already more likely to have engaged with information about this topic (see Chapter 4) and suggests that, possibly as a result of their personal circumstances, there is a particular demand for information amongst this group.

[34] On the showcard provided to respondents during the interview the answer options were listed in the reverse order to that shown in the table i.e. starting with "far too much information".

[35] The relationship between disability and attitudes to the amount of information received was not significant for young people.

Table 5-3 Perception of quantity of information about medical research received among adult respondents, by disability

Base: All adults *Wellcome Trust Monitor*

	Whether respondent has disability			
	Yes – respondent	Yes – friend or family member (not respondent)	No	Total
These days see and hear…	%	%	%	%
Far too little/too little information	54	48	43	47
The right amount of information	40	45	47	45
Too much/far too much information	3	4	8	6
Unweighted base:	*297*	*341*	*538*	*1179*
Weighted base:	*262*	*358*	*557*	*1179*

More generally, the attitudes of adults towards the amount of information on medical research received did not appear to vary on the basis of their levels of engagement with information about this topic. As Table 5-4 and Table 5-5 show, similar proportions of adults felt that they received too little or much too little information about medical research regardless of whether or not they had tried to find out information about medical research, and regardless of whether or not they remembered information on this topic they just happened to come across. [36] It may be that those adults who had sought or remembered coming across information on medical research were also the group who attach most importance to and have the greatest demand for information. However, it perhaps also suggests that our question is not necessarily very effective at identifying those groups who would like to be more informed but who do not feel confident about taking the steps necessary to do so.

Table 5-4 Perception of quantity of information about medical research received, by whether tried to find information about medical research in past 12 months

Base: All respondents *Wellcome Trust Monitor*

	Whether tried to find information					
	Adults (aged 18+)			Young people (14-18)		
	Yes	No	Total	Yes	No	Total
These days see and hear…	%	%	%	%	%	%
Far too little/too little information	49	46	47	54	49	52
The right amount of information	45	45	45	41	40	40
Too much/far too much information	5	6	6	6	7	6
Unweighted base:	*437*	*742*	*1179*	*201*	*173*	*374*
Weighted base:	*464*	*715*	*1179*	*191*	*183*	*374*

[36] Perceptions of the quantity of information received also did not vary significantly on the basis of self-expressed interest in medical research.

Table 5-5 Perception of quantity of information about medical research received, by whether remembered information encountered about medical research

Base: All respondents *Wellcome Trust Monitor*

	Whether remember information came across							
	Adults (aged 18+)				Young people (14-18)			
These days see and hear…	Yes, and can remember details %	Yes, but cannot remember details %	No %	Total %	Yes, and can remember details %	Yes, but cannot remember details %	No %	Total %
Far too little/too little information	45	52	46	47	44	53	56	52
The right amount of information	48	41	45	45	52	31	34	40
Too much/far too much information	6	6	5	6	3	13	7	6
Unweighted base:	*498*	*267*	*407*	*1179*	*130*	*69*	*169*	*374*
Weighted base:	*512*	*269*	*389*	*1179*	*128*	*66*	*174*	*374*

Among young people, 17 and 18 year olds were more likely than 14 to 16 year olds to say that they saw or heard too little information about medical research (Table 5-2). This may reflect the fact that, following the end of compulsory schooling, 17 and 18 year olds are less likely than younger teenagers to be studying science. Table 5-6 shows that young people studying science were less likely to say they saw or heard too little information compared with those not studying science.

Table 5-6 Perception of quantity of information about medical research received, by whether young person currently studying science

Base: All young people *Wellcome Trust Monitor*

	Whether currently studying science		
	Yes	No	Total
These days see and hear…	%	%	%
Far too little/too little information	47	60	52
The right amount of information	47	29	40
Too much/far too much information	5	8	6
Unweighted base:	*233*	*135*	*374*
Weighted base:	*216*	*152*	*374*

5.4 Preferences for information sources

All adults and young people who took part in the survey were asked how they would prefer to find or access information about medical research. Specifically, we asked respondents the following question:

> Imagine there was an area of medical research that you wanted to find out more about. How would you prefer to find out or access information on this area of medical research?

Respondents were presented with a list of possible answers and told to pick as many as were applicable. By far the most common preferred information source was the Internet (Table 5-7). This was a particularly common choice among young people, being chosen by 82% of 14 to 18 year olds and 65% of adults. This reflects current practice in term of information seeking on medical research; as shown in Chapter 4, the Internet was by far the most common source used for locating information on this topic. The second most common preferred information source identified, chosen by over a third of both adults and young people, was the television.

Table 5-7 Preferred information sources to find or access information about medical research

Base: all respondents *Wellcome Trust Monitor*

Preferred source of information	Adults (aged 18+) %	Young people (aged 14-18) %
From the Internet	65	82
From the television	38	35
To be told about it in person	24	31
From a newspaper	22	17
From a book	20	18
From a discussion with experts	19	21
From a lecture or talk	17	24
From a magazine	16	13
By phoning a helpline or other information service	15	4
From the radio	12	8
From an exhibition	10	12
From a laboratory open day	6	8
By email	5	3
From a play about medical research issues	2	3
Other	1	*
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

One group for whom the Internet was not the most popular choice was older adults (Table 5-8). Among adults aged 65 years and over, just under a quarter (24%) chose the Internet as their preferred source of information about medical research. This is not surprising; we know that Internet use and access generally tends to be lower among older age groups (see Chapter 2). Older adults were more likely than adults in younger age groups to pick television and newspapers as a preferred source of information, again consistent with evidence from Chapter 2 which shows that TV watching and newspaper readership increases with age. Television was the most commonly chosen information source among the 65 and over age group; 45% of respondents in this age group chose this option.

Table 5-8 Preferences for finding or accessing information about medical research among adults, by age

Base: All adults *Wellcome Trust Monitor*

	Age				
	18-34	35-49	50-64	65+	Total
Preferred source of information	%	%	%	%	%
From the Internet	79	78	70	24	65
From the television	33	36	38	45	38
To be told about it in person	23	22	23	26	24
From a newspaper	21	17	22	31	22
From a book	15	17	29	21	20
From a discussion with experts	20	21	20	16	19
From a lecture or talk	19	13	16	20	17
From a magazine	17	12	17	18	16
By phoning a helpline or other information service	12	16	18	15	15
From the radio	8	12	15	14	12
From an exhibition	10	12	11	8	10
From a laboratory open day	6	7	7	6	6
By email	6	7	4	3	5
From a play about medical research issues	*	*	3	4	2
Other	*	0	1	2	1
Unweighted base:	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*312*	*354*	*270*	*244*	*1179*

Percentages add up to more than 100% as respondents could give more than one answer.

The relative popularity of the Internet over television as a source of information also varied among adults depending on their level of education (Table 5-9). Whereas 81% of adults with a higher education qualification mentioned the Internet as a preferred source of information about medical research, only 33% of those with no qualifications did so. The most common response among adults with no educational qualifications was television, mentioned by 48%.

Table 5-9 Preferences for finding or accessing information about medical research among adults, by highest educational qualification obtained

Base: All adults *Wellcome Trust Monitor*

	Highest educational qualification obtained					
	Higher education	A level or equivalent	GCSE or equivalent	CSE or equivalent	No qualifications	Total
Preferred source of information	%	%	%	%	%	%
From the Internet	81	79	74	59	33	65
From the television	33	32	33	41	48	38
To be told about it in person	23	19	23	21	28	24
From a newspaper	18	21	24	21	25	22
From a book	24	19	20	20	16	20
From a discussion with experts	25	18	20	18	13	19
From a lecture or talk	23	18	17	11	9	17
From a magazine	19	17	9	18	16	16
By phoning a helpline or other information service	15	17	19	16	10	15
From the radio	14	14	12	7	12	12
From an exhibition	12	12	12	15	4	10
From a laboratory open day	8	7	6	4	6	6
By email	6	7	9	1	2	5
From a play about medical research issues	1	1	2	2	2	2
Other	1	0	0	0	2	1
Unweighted base:	*325*	*138*	*240*	*123*	*344*	*1179*
Weighted base:	*348*	*165*	*248*	*125*	*285*	*1179*

Percentages add up to more than 100% as respondents could give more than one answer.

Adults who had, or who knew someone with, a disability or long term limiting illness were more likely than those for whom this was not the case to state that they would prefer to receive

information by being told about it in person. 27% of adults who either had or knew someone with a disability chose this option compared with just 20% of other adult respondents.[37]

5.5 Preferences for information providers

In addition to how the public would prefer to receive information about medical research, we were interested in exploring preferences regarding who the public would prefer to produce this information. To examine this issue, respondents were asked the following question:

> Different people and organisations produce information about medical research. Which people or organisations would you prefer to produce information on an area of medical research that you wanted to find out more about?

Both adults and young people were most likely to pick doctors, nurses or other medical practitioners as their preferred producer of information. As Table 5-10 shows, this option was chosen by over six in ten adults and young people. Otherwise, there were some notable differences in terms of the preferences of adults and young people. Adults were more likely than young people to choose the Department of Health or another government department or minister and also more likely to choose medical research charities. Young people, on the other hand, were more likely than adults to choose a scientist as a preferred producer of information.

Table 5-10 People or organisations preferred to produce information about medical research

Base: all respondents *Wellcome Trust Monitor*

Preferred producer of information	Adults (aged 18+) %	Young people (aged 14-18) %
A doctor, nurse or other medical practitioner	64	62
A medical research charity	46	29
The Department of Health or another government department or minister	40	26
A scientist	29	43
A patient group	19	6
A family member, friend or colleague	15	26
A journalist or news organisation	10	5
Other	1	*
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

A doctor, nurse or other medical practitioner was the most commonly preferred producer of information on medical research for adults in all age groups. However, there was some variation on the basis of age in terms of how frequently other information producers were mentioned (Table 5-11). Adults aged between 18 and 34 were the most likely to mention scientists whilst adults aged 65 years and over were the least likely to do so. Adults aged 65 years and over were also the age group least likely to mention the Department of Health or a medical research charity as a preferred producer of information on medical research.

[37] There were no significant differences on the basis of disability in the responses to this question given by young people.

Table 5-11 Preferred producers of information about medical research among adults, by age

Base: All adults *Wellcome Trust Monitor*

	Age				
	18-34	35-49	50-64	65+	Total
Preferred producer of information	%	%	%	%	%
A doctor, nurse or other medical practitioner	65	58	64	70	64
A medical research charity	45	50	54	31	46
The Department of Health or another government department or minister	44	45	41	25	40
A scientist	40	29	25	19	29
A patient group	16	20	24	17	19
A family member, friend or colleague	17	12	12	20	15
A journalist or news organisation	9	12	12	7	10
Other	0	1	*	1	1
Unweighted base:	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*312*	*354*	*270*	*244*	*1179*

Percentages add up to more than 100% as respondents could give more than one answer.

Among young people, those aged between 14 and 16 were more likely than 17 and 18 year olds to mention a family member, friend or colleague as a preferred producer of information. This response was provided by 31% of 14 to 16 year olds compared with 20% of 17 to 18 year olds. This may be because younger teenagers are more used to receiving such information from their family and friends, than seeking information from an alternative source.

Although a doctor, nurse or other medical practitioner was the most commonly mentioned producer of information by all groups of adults regardless of their level of education, adults with lower or no educational qualifications were particularly likely to mention a medical practitioner as a preferred producer of information (Table 5-12). Adults with no qualifications were also the group most likely to mention a family member, friend or colleague as a preferred producer. Conversely, adults with higher education qualifications were the most likely to mention a medical research charity, a patient group, or a scientist as a preferred producer.

Table 5-12 Preferred producers of information about medical research among adults, by highest educational qualification obtained

Base: All adults *Wellcome Trust Monitor*

	Highest educational qualification obtained					
	Higher education	A level or equivalent	GCSE or equivalent	CSE or equivalent	No qualifications	Total
Preferred producer of information	%	%	%	%	%	%
A doctor, nurse or other medical practitioner	58	54	70	66	71	64
A medical research charity	58	52	49	42	27	46
The Department of Health or another government department or minister	51	37	39	48	24	40
A scientist	40	39	28	21	13	29
A patient group	26	24	16	16	12	19
A family member, friend or colleague	10	11	16	13	23	15
A journalist or news organisation	15	9	10	7	6	10
Other	1	0	*	0	1	1
Unweighted base:	*325*	*138*	*240*	*123*	*344*	*1179*
Weighted base:	*348*	*165*	*248*	*125*	*285*	*1179*

Adults who had a disability or long term limiting illness were the most likely to mention medical practitioners as a preferred producer of information about medical research (Table 5-13). It is likely that this group will have had more contact with medical practitioners and thus be accustomed to receiving information from this source. Adults who had a friend or close family member with a disability or long term illness were the group most likely to mention medical research charities or

patient groups as preferred producers of information; again, perhaps because they have already had a positive experience of being provided with information by such a group.[38]

Table 5-13 Preferred producers of information about medical research among adults, by whether respondent has a disability or long-term limiting illness

Base: All adults *Wellcome Trust Monitor*

	Whether respondent has disability			
Preferred producer of information	Yes – respondent %	Yes – friend or family member (not respondent) %	No %	Total %
A doctor, nurse or other medical practitioner	71	65	60	64
A medical research charity	44	53	42	46
The Department of Health or another government department or minister	34	44	40	40
A scientist	24	37	26	29
A patient group	20	24	16	19
A family member, friend or colleague	20	13	14	15
A journalist or news organisation	7	11	11	10
Other	1	0	1	1
Unweighted base:	*297*	341	538	*1179*
Weighted base:	*262*	358	557	*1179*

Although over a third (38%) of adults mentioned television and over a fifth (22%) identified newspapers as ways in which they would prefer to receive information about medical research (Table 5-7), a considerably smaller proportion – only 10% – said they would prefer any information to be produced by a journalist or other news organisation. This might suggest that their favourable response about television and newspapers was encouraged by perceptions of the ease of accessing these information sources, rather than particular confidence in the information being produced by journalists or other media providers. The public's attitude towards the media as a reliable source of information about medical research is explored more fully below.

5.6 Perceptions of media coverage of medical research

Clearly the media is an important source of information about medical research for many people. We saw in Chapter 4 that the most common ways in which people tended to come across information about medical research (i.e. encounter information without deliberately looking for it) was through television and newspapers. Furthermore, as we saw in Table 5-7 above, television and newspapers were frequently mentioned as being a preferred source of information. However, do people necessarily believe the information that they come across in the media? To gauge the extent to which the public have faith in media coverage of medical research we asked all respondents the following question:

> There is a lot of discussion in the news and media about what may be achieved by medical research in the future. Using this card, please say how accurate you think this media coverage is?

Only around a third of adults felt that the media gives the right impression about medical research is likely to achieve. The figure was higher among young people, although still only around four in ten of the young people interviewed believed the media gives the right impression. People were more likely to think that the media exaggerated the likely achievements of medical research rather than underestimating them. Around three in ten of both adults and young people felt that

[38] There were no significant differences on the basis of disability in the responses to this question given by young people.

achievements were exaggerated by the media. Almost one in five adults felt that the media did not make it clear what medical research is likely to achieve.

Table 5-14 Accuracy of media coverage about medical research

Base: All respondents *Wellcome Trust Monitor*

Views about media coverage	Adults (aged 18+) %	Young people (aged 14-18) %
It exaggerates what medical research is likely to achieve	30	27
It gives about the right impression of what medical research is likely to achieve	35	43
It under-estimates what medical research is likely to achieve	14	16
It doesn't make it clear what medical research is likely to achieve	19	12
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Even among those people who mentioned television or newspapers as one of their preferred sources of information, there was nevertheless some scepticism about the accuracy of media coverage of medical research. For example, 30% of adults who mentioned television as a preferred source and 23% of adults who mentioned newspapers nevertheless said they thought media coverage exaggerated what medical research is likely to achieve.

Among adults, men were more likely than women to feel that the media exaggerated what medical research was likely to achieve (34% compared to 26%). Perceptions also varied on the basis of education; adults with higher education qualifications were the most likely to think the media would exaggerate whilst those with no qualifications were the least likely to think this (Table 5-15

Perceptions of accuracy of media information about medical research among adults, by highest educational qualification obtained). There was no significant relationship between age and people's view of the media's portrayal of medical research's future achievements.

Table 5-15 Perceptions of accuracy of media information about medical research among adults, by highest educational qualification obtained

Base: All adults *Wellcome Trust Monitor*

	Highest educational qualification obtained					
Accuracy of media	Higher education %	A level or equivalent %	GCSE or equivalent %	CSE or equivalent %	No qualifications %	Total %
It exaggerates what medical research is likely to achieve	38	36	27	28	20	30
It gives about the right impression of what medical research is likely to achieve	25	24	39	41	44	35
It under-estimates what medical research is likely to achieve	11	17	15	12	15	14
It doesn't make it clear what medical research is likely to achieve	23	19	17	15	17	19
Unweighted base:	*325*	*138*	*240*	*123*	*344*	*1179*
Weighted base:	*348*	*165*	*248*	*125*	*285*	*1179*

The next section further explores the extent to which the public trust journalists and other news organisations to provide accurate and reliable information about medical research and compares this with their levels of trust in other people and organisations.

5.7 Trust in different providers of information on medical research

Adult respondents were asked to state how much trust they had in a range of different individuals and organisations to provide them with accurate and reliable information about medical research. Where an adult stated that s/he had very little or no trust in a person or organisation to provide such information, they were asked to identify the reasons for this, by picking from a list of possible options shown on a card. Adults exhibited much higher levels of trust in certain individuals and

organisations, compared to others (Table 5-16). Generally speaking, those individuals and organisations more directly involved in the fields of medicine and research were more likely to be trusted than those that were not directly involved.[39] Around seven in ten adults (72%) stated they had a great deal or complete trust in doctors, nurses and other medical practitioners while six in ten (60%) expressed this level of trust in medical research charities. These high levels of trust may help to explain why adults were particularly likely to choose medical professionals and medical research charities as preferred producers of information on medical research (Table 5-10). For example, whilst the vast majority of adults had at least some trust in medical practitioners, those who had chosen a medical practitioner as one of their preferred producers of information were more likely to say they had a great deal or complete trust in medical practitioners than were other adult respondents (77% compared with 62%).

Around six in ten adults (61%) said they had a great deal or complete trust in scientists working in universities to provide them with accurate and reliable information about medical research. A far higher proportion had trust in scientists working in universities than had trust in scientists working for the government or scientists working for drug companies, suggesting that these levels of trust were mediated, to some extent, by not just the role of a scientist, but the identity of their employer.

Journalists and news organisations were the least trusted source of information. More than half of adult respondents said they had very little or no trust in journalists, perhaps helping to explain why only 10% of adults mentioned a journalist or other news provider as a preferred producer of information. Nearly four in ten adults said they had very little or no trust in government departments and ministers to provide them with accurate and reliable information about medical research.[40] Only 16% of adults said that they had a great deal or complete trust in government departments and ministers despite the fact that 40% of adults mentioned the Department of Health or another government department or minister as a preferred producer of information about medical research.

[39] It should be noted that differences in the levels of trust shown to different people and organisations have not been formally tested for statistical significance.

[40] Only 16% of adults said that they had a great deal or complete trust in government departments and ministers despite the fact that 40% of adults mentioned the Department of Health or another government department or minister as a preferred producer of information about medical research. This apparent inconsistency may have occurred because whilst the question on preferred information sources specifically mentioned the Department of Health, the trust question just mentioned "Government departments and ministries" in general. As is discussed below, it is likely that people's responses to the latter question are likely to be influenced by their attitudes to politicians more generally.

Table 5-16 Levels of trust in individuals and organisations to provide accurate and reliable information about medical research

Base: All adults *Wellcome Trust Monitor*

	Person or organisation								
How much trust	Family members, friends and colleagues %	Doctors, nurses and other medical practitioners %	Government departments and ministers %	Medical research charities %	Patients groups %	Journalists and news organisations %	Scientists working in universities %	Scientists working for the government %	Scientists working for drug or pharmaceutical companies %
Complete trust	14	23	2	12	5	*	9	4	5
A great deal of trust	21	49	14	48	31	4	52	24	21
Some trust	45	25	43	34	45	40	33	52	50
Very little trust	15	2	28	4	8	38	3	14	17
No trust at all	4	1	11	1	3	17	1	5	5
Unweighted base:	*1179*	*1179*	*1179*	*1179*	*1179*	*1179*	*1179*	*1179*	*1179*
Weighted base:	*1179*	*1179*	*1179*	*1179*	*1179*	*1179*	*1179*	*1179*	*1179*

When adults were asked why they had very little or no trust in particular individuals and organisations, some interesting – if not altogether unexpected – patterns emerged (Table 5-17). A common reason for lack of trust in many people or organisations was their lack of training or knowledge about medical research. This reason was chosen by a substantial majority (86%) of those adults who indicated they had very little or no trust in family members, friends and colleagues. It was also chosen by over four in ten (42%) adults as a reason for having very little or no trust in patient groups. The most common reasons for having little or no trust in government ministers or departments were that they would try to present themselves in the most positive light and that they would not be honest about the findings of medical research. These reasons were chosen by 52% and 47% of adults with little or no trust in these organisations respectively.

Another relatively common reason given to justify a lack of trust was the fact that respondents did not feel they knew enough about the provider to know whether or not they would provide accurate and reliable information about medical research. This was the case, for example, for 41% of those who said they had very little or no trust in scientists working in universities, 37% of those who said they had very little or no trust in patient groups, and 32% of those saying they had very little or no trust in medical research charities. This may stem from the fact that, in practice, only a minority of the public would have had any direct contact with each of these groups.

We have already seen evidence that a significant minority of respondents believe the media is likely to exaggerate what medical research is likely to achieve (Table 5-14). Consistent with this, over half (56%) of those adults who said they had very little or no trust in journalists said this was because they would exaggerate information relating to medical research.

Table 5-17 Reasons for having little or no trust in individuals and organisations to provide accurate and reliable information about medical research

Base: all adult respondents with "very little trust" or "no trust at all" in person/organisation *Wellcome Trust Monitor*

	Person or organisation								
Why very little or no trust	Family members, friends and colleagues %	Doctors, nurses and other medical practitioners %	Governme nt depart-ments and ministers %	Medical research charities %	Patients groups %	Journalists and news organ-isations %	Scientists working in uni-versities %	Scientists working for the govern-ment %	Scientists working for drug or pharma-ceutical companies %
They don't have training or knowledge about medical research	86	15	30	1	42	37	1	5	2
They would not be honest about the findings of medical research	1	10	47	23	9	31	9	34	31
They would not have access to all available information about medical research	27	7	15	13	18	27	19	5	5
They would try to present themselves in the most positive light	4	19	52	19	9	20	20	39	48
They would exaggerate information relating to medical research	9	14	36	27	12	56	18	30	38
They are generally corrupt, so I couldn't trust them to provide accurate information	0	12	28	17	2	23	4	20	17
I don't know enough about them to know whether they would provide accurate and reliable information	4	22	23	32	37	19	41	19	18
Other reason	7	32	3	6	3	4	11	7	7
Don't know	6	8	1	2	3	*	6	1	1
Unweighted base:	*151*	*28*	*495*	*61*	*153*	*656*	*59*	*246*	*280*
Weighted base:	*145*	*32*	*458*	*54*	*137*	*644*	*50*	*222*	*256*

Variations in levels of trust in different individuals and organisations are likely to reflect general attitudes towards certain people and groups, in addition to specific considerations regarding their role as providers of information about medical research. For example, MORI's long running poll monitoring trust in professionals consistently shows that trust in people "generally to tell the truth" is highest for doctors and lowest for journalists and politicians (Ipsos MORI, 2008). To some degree, we can see these general perceptions of different organisations reflected in the levels of trust reported above. When considering the provision of information about medical research, this issue cannot be considered in a vacuum but is likely to be influenced by people's attitudes and experiences regarding information providers more generally.

5.8 Conclusions

This chapter has highlighted a desire for more information about medical research to be made available to the public, with around half of adults and young people currently saying that they see or hear too little information about medical research. But how could more extensive information about medical research best be presented to the public? If public preferences are to be taken on board, the Internet and television are clearly going to be key sources of information. It should be borne in mind that a proportion of the public believe that the media is likely to exaggerate the possible achievements of medical research. Individuals and organisations directly connected with medicine or research, such as medical practitioners, medical research charities and university scientists, will need to be involved as providers of this information. The public's greater trust in these organisations to provide reliable and accurate information partly reflects their obvious expertise in this area. However, it also needs to be borne in mind that people's attitudes towards

information provided about medical research may be tainted by a general lack of trust in and cynicism towards other providers such as journalists and politicians.

6 Medical research: public support, expectations and concerns

Varunie Abeywardana

6.1 Summary

- Virtually all respondents thought that medical research should be supported and encouraged, even if a lot of public money would need to be invested (95% of adults; 93% of 14-18 year olds).
- Levels of support for funding medical research varied according to the type of research in question: 84% of adults and 77% of young people said it was very important to fund clinical research (tests of new treatments and methods); compared with 60% of adults and 41% of young people who said the same in relation to basic research (which could increase our understanding of the human body).
- A high proportion of both adults (92%) and young people (94%) felt medical research would improve the life of people in the UK in the future.
- Expectations that medical research would produce cures varied considerably depending on the illness. Over half of adults (56%) and over two thirds of young people (67%) said that they thought medical research would definitely or probably produce a cure for cancer in the future. This compares to 65% of both groups who said this about HIV/AIDS, and 31% of adults and 44% of young people who felt this about schizophrenia.
- Expectations about finding a cure for cancer were higher among young people than adults. Among adults, these expectations were higher among men and older people.
- The two main concerns adults and young people had about medical research were the lack of investment in some areas (55% of adults and 35% of young people) and not knowing what the future risks would be (46% of adults and 41% of young people).
- Around half (52%) of adults felt there was the right amount of regulation of the medical industry.

6.2 Introduction

This chapter explores a wide range of attitudes about medical research. The initial research question we seek to address is the extent to which the public support funding for medical research. This is then complemented by assessing related attitudes such as expectations about the possible benefits of such research, and concerns about this type of research. This chapter ties in with earlier chapters about understanding of, and engagement with, medical research (Chapters 3 and 4), and provides a useful context for our next chapter on public participation in medical research projects.

The first part of the chapter looks at the priority the public assign to medical research in comparison to other types of research. We also examine whether public support varies for different types of medical research. In particular we look at how support for funding is related to people's personal circumstances. The second part of the chapter considers people's expectations about what medical research might achieve in the future. Initially we examine whether the public feel medical research can improve the quality of life for people in the future. We then turn to look at a more specific objective for medical research, by asking about people's views on whether medical research will produce cures for certain diseases (and the likely timeframe for this happening). The chapter concludes with an examination of people's concerns about medical research, including views about the regulation of medical research.

6.3 Support for the funding of medical research

We were interested not just in the level of support for medical research among the public, but in how important it is seen to be in comparison to other avenues for research funding. In order to assess this, we asked respondents to select three different types of research from a show card[41] that they thought "should be supported and encouraged, even if a lot of public money would need to be invested". 95% of adults and 93% of young people interviewed said they felt that medical research, in its broadest sense, should be given such support. It is possible that the topic content of the survey may have encouraged respondents to select medical research as an answer, so the true response may be somewhat lower than this suggests.

Support for medical research was consistently high for both adults and young people, suggesting that it is seen as an important research method across age groups (Table 6-1). Support for medical research was followed closely by environmental research (a research area that was also popular for both adults and young people). Adults were more likely to support research into social problems than young people (69% compared to 51%), whereas young people were more likely to choose research into IT and communications and research about the universe (Table 6-1). These differences are likely to reflect the different interests that adults and young people have in these areas.

There were a few notable differences according to sex – though this was not the case in relation to support for medical research. Women were more likely to support research into social problems than men (76% and 62% respectively) and a similar pattern was found for young women and young men (60% and 42%). Sex was also related to support for IT and communications research – this was particular marked for young people, with 37% of young men choosing this category compared to 16% of young women. Respondents' religious beliefs and practices were not related to support for funding medical research, neither were their views about the efficacy of homeopathy.

Table 6-1 Research that should be supported

Base: All respondents *Wellcome Trust Monitor*

Research that should be supported	Adults (aged 18+) %	Young people (aged 14-18) %
Medical research	95	93
Environmental research	80	75
Research into social problems	69	51
IT and communications research	15	27
Research exploring how the universe works	13	23
Historical research	12	16
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Although it is clear that there is broad based support for medical research as a whole, there are many different types of medical research which may not be equally popular. In order to gauge support for different types of medical research, respondents were asked to say how important they felt it was to fund two different types of medical research: clinical research that tests new methods and treatments; and basic research that furthers our understanding of the human body. We put this to respondents as follows, starting with a question that described *clinical* research:

[41] Choices were listed on a show card in the following order: environmental research, historical research, medical research, research into social problems, IT and communications, research exploring how the universe works.

A range of different types of medical research studies are carried out. Please say how important, if at all, you think it is that each of the following **types** of medical research study is funded...

…First, research undertaken with people to test methods of identifying, preventing and treating diseases and illnesses, to see whether they are effective and safe. For example: testing a new treatment for TB or a new method of identifying cancers.

A clear majority of adults (84%) and young people (77%) felt it was very important to fund such clinical research; the remainder said it was fairly important to do so. Significantly more adults felt it was very important to fund such research than young people, though as just 1% of young people and fewer adults said it was not important at all, the variation between the two samples was all in the proportions saying this was "very" or "fairly" important.

The importance people gave funding for such research was related to their overall interest in medical research. Among adults, those who said they were very interested in medical research were more likely than those who were not interested to say that funding for new medical methods was very important (91% compared to 77%). A similar pattern was evident among young people, though small bases require some caution here (Table 6-2).

Table 6-2 Importance of funding clinical medical research, by interest in medical research

Base: All respondents *Wellcome Trust Monitor*

	Interest in medical research							
	Adults (aged 18+)				Young people (aged 14-18)			
Importance of funding clinical medical research	Very interested %	Fairly interested %	Not very/ not at all interested %	Total %	Very interested %	Fairly interested %	Not very/ not at all interested %	Total %
Very important	91	81	77	84	86	78	65	77
Fairly important	9	18	16	15	14	21	31	21
Not important	+	+	2	+	0	1	1	1
Don't know	0	+	5	1	0	+	3	1
Unweighted base:	*418*	*656*	*103*	*1177*	*86*	*213*	*75*	*374*
Weighted base:	*397*	*671*	*110*	*1178*	*83*	*216*	*75*	*374*

Among young people, age was associated with support for funding: there was more strong support for funding this kind of research among 17-18 year olds than 14-16 year olds (85% compared to 71% said it was very important). However there was very little variation by age for adults, with support being consistently high across all age groups.

It seems plausible that people's support for funding of clinical research could be motivated by their own poor health (or that of a close family or friend). Yet health (measured by whether the respondent or someone close to them has a disability or long term illness) was only correlated with young people's support, with those that had a disability (or a close family or friend) being more likely to say that this kind of funding was very important than those who had no such connection (84% compared to 72%). As with overall support for medical research, neither religiosity, nor views on homeopathy were related to support for funding clinical research.

After this question about funding clinical research, we then asked respondents how important they thought it was to fund *basic* medical research, described as follows:

…research which increases our understanding of the human body, diseases and illnesses but which may not lead directly to new treatments. For example, research to understand how cells work or how the nervous system operates.

Three fifths of adults (60%) and two fifths of young people (41%) said it was very important to fund basic research of this kind. Significantly more adults said they thought it was very important that such research was funded than young people. Indeed, for young people, the more common response to this question was that this funding was *fairly* important (52%, whereas 37% of adults gave this answer). Clearly funding for this kind of research was not seen as important as funding clinical research, where levels of strong support were much higher. Having said that, it was still the case that only very small proportions said that funding this kind of research was not important (3% and 6% for adults and young people respectively).

Analysis by sub-groups reveals similar patterns to those found for support for clinical research. Support for funding was again correlated with interest in medical research where those adults and young people who said they were very interested in medical research were more likely to say that funding research into the human body was very important (Table 6-3). For instance, among adults, 72% of those who were very interested in medical research thought it was very important to fund research about the human body, compared to just 38% of those who were not interested in medical research.

Table 6-3 Importance of funding basic medical research, by interest in medical research

Base: All respondents *Wellcome Trust Monitor*

	Interest in medical research							
	Adults (aged 18+)				Young people (aged 14-18)			
Importance of funding basic medical research	Very interested %	Fairly interested %	Not very/ not at all interested %	Total %	Very interested %	Fairly interested %	Not very/ not at all interested %	Total %
Very important	72	56	38	60	52	41	30	41
Fairly important	27	41	55	37	43	53	58	52
Not important	1	3	4	3	4	6	10	6
Unweighted base:	*418*	*656*	*103*	*1177*	*86*	*213*	*75*	*374*
Weighted base:	*397*	*671*	*110*	*1178*	*83*	*216*	*75*	*374*

Among young people, support was higher among the 17-18 year olds – 54% of this group said funding was very important, compared to 32% of 14-16 year olds. For adults, age was not significantly related to views about this issue, though we see a similar (but non-significant pattern) in that the 18-34 age group were less likely to say funding was very important than all other age groups (54% compared to 60%-63%). There were no significant relationships between views about the importance of funding new basic medical research and sex or disability status. Similarly, neither religiosity, nor views on homeopathy were related to views on this subject.

6.4 Expectations for what medical research could achieve in the future

Having established that there is high public support, in principle, for funding medical research, we turn now to consider more specific attitudes towards medical research. This section examines people's expectations about what they feel medical research can achieve in the future. We start by assessing a broad question about whether people feel medical research can improve the quality of people's lives. We then consider more detailed questions about whether people feel medical research can produce a cure for certain illnesses such as cancer, HIV/AIDS and schizophrenia and if so, when they feel a cure is likely.

We start with a general measure of people's expectations about medical research: whether it is felt that medical research can improve the quality of people's life in the future. Specifically, we asked respondents whether they thought that "medical research will or will not lead to **an improvement in the quality of life** for people in the United Kingdom in the next twenty years". A very high proportion of both adults (92%) and young people (94%) said that they felt medical research would

definitely or probably lead to an improvement (Table 6-4); four in ten of both samples said they thought this was *definitely* the case. There was very little variation between adults and young people, nor were there significant variations in expectations according to sex or age.

Table 6-4 Can medical research improve quality of life for people in the next 20 years

Base: All respondents *Wellcome Trust Monitor*

Improve quality of life	Adults (aged 18+) %	Young people (aged 14-18) %
Definitely will lead to an improvement	41	40
Probably will lead to an improvement	51	54
Probably will not lead to an improvement	6	5
Definitely will not lead to an improvement	1	0
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Although people have high general expectations about medical research, we wanted to gain a clearer idea of precisely what it was they felt medical research could achieve in the future. In order to assess this, we asked respondents whether they felt medical research could ever produce a cure for "all types of cancer", HIV/AIDS and schizophrenia.

Overall, the majority of people felt that medical research would definitely or probably find a cure for all types of cancer (56% of adults and 67% of young people) and HIV/AIDS (65% of both groups) (Table 6-5). In contrast, fewer than half felt medical research would find a cure for schizophrenia (31% of adults and 44% of young people). The difference between the three diseases and illnesses is notable, and is hard to explain here. It might be the case that there is less certainty about schizophrenia as the public have a lower level of understanding about what causes mental illness and what the symptoms are. However, this is not something we can look at in our data.

In all cases, the proportions saying they thought that a cure would "definitely" be found was a very small proportion - around one in ten or less for each illness and for each sample type. This lack of certainty is unsurprising, as we are asking people to predict future outcomes of complicated scientific processes.

For two of the illnesses and diseases considered – cancer and schizophrenia – it is apparent that young people had significantly higher expectations than adults. However, when asked about HIV AIDS, the overall percentage saying that a cure would be found was the same for both groups, and adults were twice as likely to say they thought this was "definitely" the case than young people (10% compared to 5%). So while in general, it seems that young people are more optimistic about the likelihood of medical research producing cures than adults, we need to be cautious about over-generalising the relationship in this way.

Table 6-5 Whether medical research will ever produce a cure for different diseases

Base: All respondents *Wellcome Trust Monitor*

	Diseases					
	All cancers		HIV/AIDS		Schizophrenia	
Produce cure	Adults (aged 18+) %	Young people (14-18) %	Adults (aged 18+) %	Young people (14-18) %	Adults (aged 18+) %	Young people (14-18) %
Definitely/probably would	56	67	65	65	31	44
Probably would not	36	30	25	29	48	41
Definitely would not	7	2	6	3	13	6
Unweighted base:	*1179*	*374*	*1179*	*374*	*1179*	*374*
Weighted base:	*1179*	*374*	*1179*	*374*	*1179*	*374*

We now examine each disease separately in terms of how expectations vary according to personal characteristics, before considering people's anticipated timescale for finding a cure. In relation to finding a cure for cancers, both sex and age were significant for adults, but not for young people. Men were significantly more likely (61%) to believe that medical research would definitely or probably produce a cure for all types of cancer in the future compared to women (52%). Younger adults (aged 18-34) were less likely to think medical research would definitely find a cure for all types of cancer than those in the 65+ age group (7% compared to 15%). However, the relationship is not linear, as 50-64 year olds were less likely to say this than 35-49 year olds (9% and 13% respectively). Note also that when the "definitely" and "probably" would categories are combined, differences are no longer significant.

In terms of HIV/AIDS, we find a similar pattern to that seen for views about cancer. Both sex and age were relevant to views for adults but not for young people. Men (70%) were more likely to think that medical research could produce a cure for HIV/AIDS than women (61%). Among adults, age was correlated with expectation, with the proportion saying they thought medical research would definitely or probably produce a cure for HIV/AIDS increasing with age and then dropping back a little for the 65+ age group (Table 6-6). No such pattern was evident for young people.

Turning to expectations about schizophrenia (where overall expectations about the ability of medical research to produce a cure were lower – see Table 6-5) the patterns are not the same as for cancer and HIV/AIDS. Neither sex nor age were related to positive expectations about a cure for schizophrenia – among both adults and young people.

Table 6-6 Whether medical research will ever produce a cure for HIV/AIDS, by age

Base: All respondents *Wellcome Trust Monitor*

	Young people (14-18)			Adults (aged 18+)				
	14-16	17-18	Total	18-34	35-49	50-64	65+	Total
Produce cure for HIV/AIDS	%	%	%	%	%	%	%	%
Definitely would	7	3	5	8	11	11	9	10
Probably would	59	61	59	48	58	63	54	56
Probably would not	30	28	29	28	25	19	26	25
Definitely would not	3	4	3	11	4	4	6	6
Unweighted base:	*259*	*115*	*374*	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*223*	*151*	*374*	*312*	*354*	*270*	*244*	*1179*

Respondents who said medical research would definitely or probably produce a cure for each type of illness or disease in the future were asked when they thought this might happen. For all of the illnesses and diseases considered, a large majority expected a cure to be produced within the next fifty years (Table 6-7). For cancers, around half of both groups felt it would happen within twenty years, while 84% of adults and 82% of young people thought a cure would be possible within the next fifty years.

Table 6-7 When medical research will produce a cure for different diseases

Base: All who thought medical research would 'definitely' or 'probably' produce a cure for cancer / HIV/AIDS / schizophrenia *Wellcome Trust Monitor*

	Diseases					
	All cancers		HIV AIDS		Schizophrenia	
When produce cure for disease	Adults (aged 18+) %	Young people (14-18) %	Adults (aged 18+) %	Young people (14-18) %	Adults (aged 18+) %	Young people (14-18) %
Within the next 5 years	5	8	4	8	3	7
Between 5 and 20 years time	44	49	52	36	43	39
Between 20 and 50 years time	35	25	33	37	39	33
Between 50 and 100 years time	13	14	10	14	12	15
In more than 100 years time	2	3	1	5	2	5
Unweighted base:	*663*	*259*	*744*	*244*	*371*	*165*
Weighted base:	*661*	*252*	*770*	*242*	*367*	*163*

In terms of when people felt a cure for HIV/AIDS was possible, among those that said a cure was definitely or probably likely in the future, significantly more adults (56%) said they felt a cure was possible within the next twenty years than young people (44%). As with the equivalent question about cancer, the majority of adults (89%) and young people (81%) believed a cure was possible within fifty years time. For schizophrenia, the proportions of adults and young people that said a cure was possible within the next twenty years were the same (46%). The majority of adults (85%) and young people (79%) believed a cure was possible within fifty years time.

6.5 Concerns about medical research

The final section of the chapter expands our focus by exploring people's concerns about medical research, including their attitudes towards regulation. Understanding this is important in order to give an overall picture of public attitudes towards medical research. In particular, this factor can be seen to add to our earlier findings of support for medical research, as we cannot assume that high levels of support for funding such research implies that the public do not have any concerns about it.

We showed respondents a list of possible concerns about medical research, and asked if they had concerns about any of these things. For both adults and young people, the two most common concerns mentioned were that not enough money was being spent on certain areas of medical research, and that they didn't know enough about future risks (Table 6-8). Adults were significantly more concerned about the lack of investment in certain areas than young people (55% compared to 35%). Not all of the 'concerns' shown in the table suggest that people are opposed to medical research. In fact, as one of the main concerns cited by both adults and young people was about a lack of investment, this indicates support for what medical research does and that people want more work to be done. A similar point could be made about the fifth of adults and young people who said that a concern was that medical research was not progressing fast enough. Among adults and young people there were no differences according to sex and age[42].

[42] Because such large majorities of respondents supported funding for medical research, we cannot examine whether such support was related to the concerns people had (as base sizes for the "not important" group are too small) – see 'total' column Table 6-2 and Table 6-3.

Table 6-8 Concerns about medical research

Base: All respondents *Wellcome Trust Monitor*

Concerns about medical research	Adults (aged 18+) %	Young people (aged 14-18) %
Not enough money being spent on certain areas	55	35
Don't know enough about future risks	46	41
Too expensive	21	29
Not enough attention paid to what public want	24	22
Not progressing fast enough	21	20
Too much involvement from private companies	25	10
Lack of rules to control what scientists can do	18	17
None of these	9	+
Developments are taking place too fast	6	6
Too closely regulated	6	3
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

Having looked at concerns in general, we asked adult respondents some specific questions on their attitudes to the regulation of the medical industry in the UK, as this is one potential area for concern about research. Regulation was described as "rules (that) are developed and enforced which apply to the types of research studies that can be undertaken and how and when these are carried out."

Around half of adults (52%) said they felt that the right amount of regulation was applied to the industry while similarly sized groups felt there was too much or too little regulation (14% and 17% respectively). 16% did not have a view (saying "Don't know"). There were no relationships according to sex and age[43].

However, we do find that the respondents' health (or that of a close family member or friend) was related to views about the regulation of the medical industry. The proportion of adults with a disability or long term illness that felt that there was too little regulation of the medical industry was higher (21%) than those that had no health problem (14%). Potentially, those with a disability or health problem or who had a family member in this situation would be more likely to have indirect contact with the medical industry, in terms of being prescribed medication or being informed about new developments in relation to their condition; it may be that this enhanced level of experience and information, and the greater likelihood of having negative experiences, generated the view that the current amount of regulation is not sufficient.

[43] Again, we cannot examine whether support for funding medical research was related to views about regulation (due to small base sizes) – see previous footnote for details.

Table 6-9 Regulation of medical industry, by health

Base: All adults *Wellcome Trust Monitor*

	Whether respondent has disability			
Regulation	**Yes – respondent** %	**Yes – family member or close friend (but not respondent)** %	**No** %	**Total** %
Too much regulation of medical research	17	14	13	14
The right amount of regulation	49	52	55	52
Too little regulation of medical research	21	20	14	17
Don't know	14	15	18	16
Unweighted base:	*297*	*341*	*538*	*1179*
Weighted base:	*262*	*358*	*557*	*1179*

6.6 Conclusions

The findings in this chapter suggest that public support for funding medical research is high. The public also values specific types of medical research, with particular priority given to clinical medical research (research that tests new methods and treatments). Having an interest in medical research is clearly related to high levels of support for funding different types of medical research among both adults and young people. The public are also resoundingly positive in their future expectations for medical research; both in terms of it improving the lives of people in the future, and with regard to its ability to produce cures for certain diseases (on the latter, there was also evidence that the public are aware that such research takes time to produce a cure).

However, alongside this support, we have also found some concerns about medical research, notably the lack of investment in certain areas of research and the unknown future risks to people. This latter is something that we examine in more detail in the next chapter (Chapter 7) where we look at participation in medical research, and any concerns about taking part in such projects. Lastly, it appears that regulation of the medical research industry is not a cause of particular concern for the public, with only minorities of adults feeling that there is too much or too little regulation.

7 Participation in medical research

Varunie Abeywardana

7.1 Summary

- Just under a quarter of adult respondents or a family member (23%) had taken part in medical research; for this group, the most common activities were providing a blood or tissue sample (48%) and testing a new drug or treatment (40%).
- Participation in medical research was higher among the 65+ age group, those with a disability or long term illness and those who said they were very interested in medical research.
- Willingness to take part in medical research varied according to the type of project: 70% would be very or fairly willing to give a blood or tissue sample; 74% to allow access to their medical records; while only 30% would be willing to test a new drug or treatment.
- Willingness to take part was related to age, health and past participation in medical research.
- Three-quarters (75%) said they would have concerns about testing a new drug or treatment for medical research. Amongst this group, the most common concern was the possible risk to one's health (93%).
- Around a third said they would have concerns about allowing access to their medical records (28%) or giving blood (32%).
- The vast majority of the public thought that medical research in the UK is carried out in a way that protects privacy and confidentiality (63% said this was "probably" the case, and a further 19% thought it "definitely" was).

7.2 Introduction

This chapter moves away from primarily attitudinal data and turns to look at direct involvement by the public in medical research projects. We include in this a wide range of projects, from those that require physical interventions (such as testing a new drug or treatment in a clinical trial or giving blood or tissue samples) to less 'involved' studies (for example, giving access to medical records or taking part in a survey about an illness or treatment). The previous chapter provided a useful backdrop to this topic area, as it looked at views about medical research including levels of support for funding, and hopes and concerns about medical research in general.

In doing so there are a number of questions that we seek to answer. We want to establish the extent to which the public have participated in research projects, and whether participation varied according to personal characteristics. In addition to past involvement, we are also interested in whether there is a willingness amongst the public to take part in projects in future – and if this varies depending on the type of project or activities involved. People's willingness to participate in clinical medical research projects is likely to depend on weighing up the potential benefits and risks, and so we explore this, including whether there are any concerns about taking part in such research.

The chapter starts (section 7.3) by examining the levels of public participation in medical research to date. In particular, we consider whether involvement in such research is related to personal characteristics such as sex, age and family medical background. We then look in more detail at the specific types of medical research respondents have participated in.

The second part of the chapter then goes on to look at people's willingness to participate in different forms of medical research in future. We also examine the main concerns adults have about certain types of medical research. The chapter concludes by examining people's attitudes to current procedures in medical research, such as dealing with data confidentiality and the impact of ethical approval on participation. Note that this chapter includes findings about adults only, as young people were not asked about this topic area.

7.3 Participation in medical research projects

We start by assessing how many people have already taken part in medical research projects. We asked respondents:

> Have you or a member of your family ever taken part in a medical research project. This might have involved testing a new drug as part of a clinical trial, providing samples of blood or tissue for a project tracking the development of a particular illness, or completing a survey about your experiences of a particular illness or drug?

13% of adults said they had participated in medical research at one time in their life. A further 10%[44] of respondents had not taken part themselves, but said that a family member had done so (see the 'Total' column of Table 7-1).

Participation in medical research varied significantly according to certain personal characteristics, including age. For example, past participation was higher among older people (65+) and lower among younger adults (18-34) (Table 7-1). This could be related to the fact that older respondents tend to have more health problems than younger people (Table 1.17), and that participation in some medical research is only possible for people with certain health conditions.

Table 7-1 Ever participated in medical research, by age

Base: All adults *Wellcome Trust Monitor*

	Age				
Ever participated in medical research	**18-34** %	**35-49** %	**50-64** %	**65+** %	**Total** %
Yes – respondent	8	13	14	17	13
Yes – family member only	7	14	12	6	10
No – neither	85	72	74	77	77
Unweighted base:	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*312*	*354*	*270*	*244*	*1179*

Indeed, when we look at health and disability, we find that this is linked to levels of participation in medical research. Table 7-2 shows that those that had a disability or long term illness were twice as likely to have taken part in medical research than those with none (21% compared to 10%). Participation was not related to sex or educational qualifications.

[44] This category excludes adult respondents who had themselves participated in medical research and who *also* had a family member who had participated (those respondents are in the "Yes – respondent" category). Note that this means the category "Yes – family member only" understates the proportion of respondents with a family member who has participated.

Table 7-2 Ever participated in medical research, by whether have disability or long term limiting illness

Base: All adults *Wellcome Trust Monitor*

	Whether respondent has disability			
Ever participated in medical research	Yes – respondent %	Yes – family member or close friend (but not respondent) %	No %	Total %
Yes – respondent	21	12	10	13
Yes – family member only	10	14	7	10
No – neither	69	73	83	77
Unweighted base:	*297*	*341*	*538*	*1176*
Weighted base:	*262*	*358*	*557*	*1176*

There was also a correlation between participation and self expressed interest in medical research. People who said they were very interested in medical research were more likely to have participated in medical research: 17% of this group had done so, compared to 11% of those who were 'fairly interested' and 7% of those who were 'not interested' in medical research. This relationship may reflect the fact that taking part encourages an interest in medical research – or it may be that those who are interested in the first place are more likely to participate in such studies.

Different types of medical research projects

In order to identify the different types of medical research projects people had participated in, we asked for more details about the most recent project they (or a family member) had been involved with. Of this group, the most common activities were providing samples of blood/tissue (48%), testing new drugs or treatments (40%) and completing survey questionnaires (36%) (Table 7-3).

Table 7-3 Recent types of medical research involved in

Base: All adults and family members who have participated in medical research *Wellcome Trust Monitor*

Type of medical research project	Total %
Providing samples of blood or tissue	48
Testing a new drug or treatment	40
Completing a survey or questionnaire	36
Allowing access to my personal health information or medical records	25
Monitoring health or behaviour e.g. wearing a pedometer to record levels of physical activity, taking part in a sleep study, keeping a diary of diet	25
Other	5
Unweighted base:	*271*
Weighted base:	*269*

Percentages add up to more than 100% as respondents could give more than one answer.

When we consider the relationship between different types of medical research and personal characteristics, some caution is required because respondents whose family members had taken part in a research project, even if they themselves had not done so, are included in order to give a large enough base for sub-group analysis. This clouds the picture for personal characteristics as the characteristics are those for the respondent, not for family members.

The types of research activities that men and women had participated in did not differ greatly, apart from completing a questionnaire, where sex was significant: women were more likely (43%) to have done so than men (30%). This is a pattern of response seen on many surveys – not just those related to medical research projects (Groves and Couper, 1998:136). There was little variation according to age.

Whether the respondent or a family member had a disability was significantly related to allowing access to personal medical records. Those who had a disability, and those with a family member with a disability were more likely to allow access to their records than people who had no such

connection (28%, 32% and 15% respectively). The pattern was similar (though less marked) for most other types of medical research, but in these cases the differences were not significant.

7.4 Willingness to participate in medical research

Although people may not have participated in medical research before, this may simply be a reflection of varying opportunities to take part in such projects – it does not necessarily mean that they have no interest in doing so in the future. We were interested in finding out whether there is a general willingness to participate in different forms of medical research. To do so, we asked respondents the following questions:

> How willing or unwilling would you be to take part [AGAIN] in a medical research project which involved…
> …providing samples of blood or body tissue?
> …allowing access to your personal health information, that is, your medical records, on an anonymous basis?
> …testing a new drug or treatment?

Overall, a large majority said they would be very or fairly willing to give a blood or tissue sample or to allow access to their medical records: 70% and 74% (Table 7-4). Around a quarter of all adults felt this strongly, saying they would be very willing to take part: 23% for giving a blood or tissue sample; and 28% for allowing access to their medical records. However, potential participation in projects that involve testing a new drug or treatment – arguably the most involved type of project we asked about – was much lower, at 30% (and just 6% saying they would be very willing to take part in this). Rather, the majority said they would be unwilling to take part – two-thirds (64%[45]) felt this, and over half of these (35% overall) were very unwilling.

Table 7-4 Willingness to take part in different types of medical research project

Base: All adults *Wellcome Trust Monitor*

	Type of medical project		
Willingness to take part	**Samples of blood/body tissue** %	**Access to personal medical records** %	**Testing a new drug or treatment** %
Very willing	23	28	6
Fairly willing	47	46	24
Fairly unwilling	14	12	30
Very unwilling	13	13	35
Unweighted base:	*1179*	*1179*	*1179*
Weighted base:	*1179*	*1179*	*1179*

Willingness and respondents' personal characteristics

Willingness to participate in a future medical research project was related to different personal characteristics, and the relationships were very similar across the three different types of research projects we asked about. Age was significantly related to willingness across all the types of medical research. For taking part in projects involving blood or tissues samples (Table 7-5) or allowing access to medical records, the relationship with age is not straightforward or linear. For example, if we focus on the group who said they would be very willing to give blood or tissue samples, willingness was lowest amongst the 18-34 age group, and it increased for the middle age groups, and then decreased again for the 65+ group (though still remaining higher than for the youngest age group). The 65+ age group were also twice as likely to say they would be very unwilling compared to all other age groups. This is interesting, as the pattern does not mirror the pattern we found for actual participation in medical research, where those in the 65+ were just as

[45] This percentage is different to the sum of percentages in the table due to rounding.

likely to participate in medical research as the middle age groups, with participation lowest amongst the youngest age group (18-34) (Table 7-1).

Table 7-5 Willingness to give samples of blood or body tissue for medical research, by age

Base: All adults *Wellcome Trust Monitor*

	Age				
Willingness to give samples	**18-34** %	**35-49** %	**50-64** %	**65+** %	**Total** %
Very willing	18	22	31	25	23
Fairly willing	49	51	46	42	47
Fairly unwilling	19	16	10	9	14
Very unwilling	11	11	10	21	13
(SPONTANEOUS: Only if I was already ill and the drug might help)	1	1	2	3	1
Unweighted base:	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*312*	*354*	*270*	*244*	*1179*

Age had a more straightforward relationship with willingness to test a new drug or treatment than that seen with the other examples of medical research. For instance, there was no variation according to age for those saying they would be very willing to test a new drug. However, those in the 65+ age group remained the most reluctant compared to the other age groups – being most likely to say they would be very unwilling (Table 7-6). There was no variation in willingness to participate in any of the three types of project according to sex.

Table 7-6 Willingness to test new drug for medical research, by age

Base: All adults *Wellcome Trust Monitor*

	Age				
Willingness to test new drug	**18-34** %	**35-49** %	**50-64** %	**65+** %	**Total** %
Very willing	6	6	5	5	6
Fairly willing	26	23	29	21	24
Fairly unwilling	36	35	25	20	30
Very unwilling	30	32	34	45	35
(SPONTANEOUS: Only if I was already ill and the drug might help)	2	4	6	9	5
Unweighted base:	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*312*	*354*	*270*	*244*	*1179*

Willingness to take part in all these types of medical research projects was related to a person's health or disability status. For example, respondents with a disability or who had a close connection with someone with a disability were more likely to say they were very willing to give blood or tissue samples than people who had no disability (28% of respondents with a disability and 26% of respondents who had a family member/close friend with a disability compared to 20% of those with no disability). A similar relationship is seen for allowing access to medical records, where 31% of those with a disability would be very willing to take part, compared to 24% of those without a disability (nor a close family member/friend).

Although overall levels of willingness to test a new drug were much lower, we find the same correlation between this and a person's disability status. Those with a disability or health condition (14%) were much more likely to say they were very willing to test a new drug or treatment than those with no disability (2%) or those who had a family member/close friend with a disability (5%). This seems plausible, as people with a disability may have felt greater motivation to take part in such trials in an effort to find a treatment for their own illness/disability.

Willingness to take part in medical research projects was also strongly correlated to previous participation in medical research, and this relationship was found across all three types of research

project that we asked about. For example, willingness (looking at the very willing group) was highest amongst those that had participated in medical research before and lowest amongst those that had never participated (Table 7-7). A very similar pattern is found for willingness to allow access to medical records; and the same pattern (though different levels of willingness) is seen for testing new drugs or treatment (the figures are 21% of those with previous experience and 3% of those with none). This finding suggests that taking part may increase the likelihood that people will appreciate the possible benefits of taking part – or may reassure people about the potential drawbacks or risks of medical research. We can look at this latter point in our data, as we also asked a question about concerns relating to medical research (discussed in more detail in Section 7.5.). This shows that our assumption is right, though the relationship is not particularly marked: 69% of those who have taken part in medical research said they had concerns about research testing a new drug or treatment, compared to 75% of those who had no experience of previous research.

For each of the three types of medical research we asked about, neither religious beliefs/practices, nor views about the efficacy of homeopathy were related to willingness to take part in these types of research projects.

Table 7-7 Willingness to give samples of blood or body tissue for medical research, by whether participated in medical research

Base: All adults *Wellcome Trust Monitor*

	Participated in medical research			
Willingness to give samples	**Yes – respondent** %	**Yes – family member only** %	**No – neither** %	**Total** %
Very willing	28	26	20	23
Fairly willing	44	49	48	47
Fairly unwilling	13	12	16	14
Very unwilling	11	11	15	13
(SPONTANEOUS: Only if I was already ill and the drug might help)	3	1	1	1
Unweighted base:	297	341	538	1176
Weighted base:	262	358	557	1176

The impact of potential personal benefits on willingness

The extent to which one is willing to be involved in medical research is likely to be affected by the perceived relative balance of potential advantages and disadvantages that could result from taking part. In fact, we can already see this to some extent, as a small minority of people spontaneously said that they would be willing to take part in the different medical projects if they were already ill and the research could help them (Table 7-8 Willingness to test new drug (if already ill) for medical research, by age).

To explore this further, we focussed in on taking part in testing a new drug or treatment (the type of project that people were more wary about), and asked all respondents, apart from those that had said they were very willing to test a new drug or treatment, the following question:

> And what about if you were already suffering from the illness the new drug was designed to test. How willing or unwilling would you be to take part in a medical research project which involved testing a new drug or treatment in this circumstance?

Overall, just under a third of the adults asked this question now said they would be very willing to test a new drug in a research project (previously none of them had said they would be very willing).

This suggests that one's personal health, and perceived benefits to it, can influence willingness to take part in medical research.

Age was related to willingness to test a new drug if already ill, with the 65+ age group being least likely to say they would be very willing and most likely to say they would be very unwilling (Table 7-8).

Table 7-8 Willingness to test new drug (if already ill) for medical research, by age

Base: All adults, apart from those that were very willing to test a new drug for medical research *Wellcome Trust Monitor*

	Age				
Willingness to test new drug if already ill	**18-34** %	**35-49** %	**50-64** %	**65+** %	**Total** %
Very willing	34	37	32	24	32
Fairly willing	48	47	54	45	49
Fairly unwilling	11	7	9	17	11
Very unwilling	6	6	5	12	7
Unweighted base:	*215*	*288*	*258*	*277*	*1038*
Weighted base:	*284*	*319*	*237*	*208*	*1049*

Sex was also related to the responses to this question, with men being more willing (both "very" and "fairly") and less unwilling (both "very" and "fairly") than women, though the only significant difference is in the proportion saying they were *very* unwilling (Table 7-9).

Table 7-9 Willingness to test new drug (if already ill) for medical research, by sex

Base: All adults, apart from those that were very willing to test a new drug for medical research *Wellcome Trust Monitor*

	Sex		
Willingness to test new drug if already ill	**Male** %	**Female** %	**Total** %
Very willing	34	31	32
Fairly willing	52	45	49
Fairly unwilling	8	13	11
Very unwilling	5	9	7
Unweighted base:	*419*	*619*	*1038*
Weighted base:	*514*	*535*	*1049*

7.5 Concerns about participating in medical research

We have seen that there is a relatively high level of willingness to participate in medical research (albeit lower for projects involving testing drugs or treatments), but we cannot take this as a proxy for telling us about whether or not the public have concerns about medical research projects. It is possible that people may be willing to take part in a project, but have some concerns about doing so – or that there are overriding concerns which lead to the respondent saying they would be unwilling to take part in medical research. This section explores this issue further, examining the level of, and type of concerns that people have about particular types of medical research project. In the previous chapter we explored public concerns about medical research in general.

First we asked respondents whether they would have "any particular concerns" about taking part in different types of research: giving a sample of their blood/tissue, allowing access to medical records and testing a new drug. Overall, respondents showed the greatest concern for testing a new drug than any other type of medical research project – 75% said they would have concerns about doing this, compared to less than half that proportion for the other two types of research project (Table 7-10). As we go on to see later (in Table 7-12), this is related to the fact that it was the type of medical research that fewest people expressed a willingness to participate in (Table 7-6).

Table 7-10 Whether concerned about different types of medical research

Base: All adults *Wellcome Trust Monitor*

	Types of medical research		
Whether concerned	Giving samples of blood/body tissue %	Access to personal medical records %	Testing a new drug or treatment %
Yes	32	28	75
No	58	62	14
Maybe	10	9	11
Unweighted base:	*1179*	*1179*	*1179*
Weighted base:	*1179*	*1179*	*1179*

For those who said they would have concerns, we then asked them to say what those would be (choosing from a list on a show card). As Table 7-11 shows, concerns vary according to what is involved in the project. The most common concern for two types of project was concern about possible risks to one's own health – this answer was given by 93% in relation to testing a new drug and 59% for giving blood or tissue samples. The proportion dropped sharply to 19% for giving access to medical records. For this type of research project, the top concern was over data confidentiality worries (72%), an answer that was only chosen by under a fifth for the other two types of project.

Two other concerns were mentioned by at least a fifth of respondents for all three types of project: being unsure about the benefit or purpose of the study, and concerns about whether the study was genuine or well regulated.

Table 7-11 Concerns about taking part in different types of medical research

Base: All adults who would have concerns about each type of medical research project *Wellcome Trust Monitor*

	Type of medical project		
Concerns about taking part	Giving samples of blood/body tissue %	Access to personal medical records %	Testing a new drug or treatment %
Possible risks to own health	59	19	93
Worried about data confidentiality	19	72	16
Concerns about whether study was genuine or well regulated	27	31	39
Unsure what benefit/purpose would be	27	26	20
Too much time/effort involved	12	6	10
Would not want to answer personal questions about own health	5	15	6
Other concern	11	2	2
Unweighted base:	*490*	*447*	*1011*
Weighted base:	*493*	*444*	*1016*

Whether concerns relate to willingness and personal characteristics

We are interested in exploring the links between concerns and willingness to take part in projects, and also whether concerns are related to different personal characteristics. In our examination of this we focus on concerns about testing a new drug or treatment (as three-quarters of adults had concerns about this type of project); notable differences for the other two types of research projects are noted in the text.

There is a clear relationship between people's willingness to participate in medical research to test new drugs and their concern about such projects; those that said they were very unwilling to test a new drug were most likely to have concerns while those who were very willing were least likely (Table 7-12). The differences are very marked: 87% for those who were very unwilling to participate, compared to 42% for those who were very willing. While the base of the latter group is rather small, meaning some caution is required, the pattern is clear across all four answer categories.

Despite this marked relationship, there was little variation by willingness for most of the specific concerns respondents mentioned about this type of research project.

Table 7-12 Whether concerned about testing a new drug, by willingness to test new drugs

Base: All adults *Wellcome Trust Monitor*

	Willingness to test new drugs					
Whether concerned	Very willing %	Fairly willing %	Fairly unwilling %	Very unwilling %	SPONTANEOUS: Only if I was already ill and the drug might help %	Total %
Yes	42	64	77	87	74	75
No	38	20	13	7	6	13
Maybe	20	17	10	6	21	11
Unweighted base:	*71*	*289*	*328*	*421*	*62*	*1171*
Weighted base:	*67*	*289*	*352*	*407*	*57*	*1173*

Having concerns about testing a new drug or treatment was also related to some personal characteristics, including sex. Women were more likely than men to say they had particular concerns about this (79% and 71% respectively). However, when asked about what specific concerns those were, there was little variation in the reasons cited according to sex.

Curiously there was little variation between age and overall concerns about testing new drugs. This was in contrast to the relationship we have already seen between age and willingness to test new drugs where reluctance was highest among the 65+ age group (Table 7-6). For both of these characteristics, while there was no relationship with the overall question about having any concerns, there were significant differences for some of the specific concerns mentioned. For example, those in the 65+ age group were less likely to cite concerns about the possible risk to their own health and more likely to mention concerns about being unsure of the purpose of the study than other age groups (Table 7-13).

Table 7-13 What concerns respondents have about testing a new drug, by age

Base: All adults who are concerned about testing new drugs for medical research *Wellcome Trust Monitor*

	Age				
Concerns	**18-34** %	**35-49** %	**50-64** %	**65+** %	**Total** %
Possible risks to own health	95	95	93	86	93
Concerns about whether study was genuine or well regulated	37	43	43	34	39
Unsure what benefit/purpose would be	20	13	21	32	20
Worried about data confidentiality	14	17	16	15	16
Too much time/effort involved	11	12	10	6	10
Would not want to answer personal questions about own health	5	7	6	7	6
Other concern	2	2	2	2	2
Unweighted base:	*198*	*289*	*249*	*275*	*1011*
Weighted base:	*260*	*316*	*231*	*209*	*1016*

In a similar pattern to the one just described for age, there was no relationship between overall concerns about testing new drugs and the respondent's disability status – yet disability was related to willingness to test a new drug (people with a disability were more willing to participate than those that had no disability). In terms of the specific concerns mentioned, respondents with a disability were less concerned about the time and effort involved in testing a new drug (7% said this) than those with no disability (13%). None of the other concerns varied significantly according to disability.

Turning to consider concerns about allowing access to medical records for research purposes, as we saw for testing new drugs, willingness to allow access to one's medical records was strongly related, with concerns most likely among those that were the least willing to participate and lowest

amongst those that were very willing to participate (Table 7-14). There was no relationship between willingness and specific concerns mentioned by respondents.

Table 7-14 Concerned about allowing access to medical records for medical research, by willingness to allow access to medical records

Base: All adults *Wellcome Trust Monitor*

	Willingness to allow access to medical records				
Whether concerned	Very willing %	Fairly willing %	Fairly unwilling %	Very unwilling %	Total %
Yes	6	22	61	65	28
No	90	65	26	29	62
Maybe	4	13	13	5	10
Unweighted base:	*336*	*519*	*134*	*183*	*1172*
Weighted base:	*332*	*546*	*141*	*153*	*1173*

However, the other relationships with concern about allowing access to medical records were somewhat different to those seen for projects which involve testing drugs. Sex was not significantly related to overall levels of concern, while disability was related: those with a disability were less likely to say they had concerns (22%) than those with no disability[46] (30%). When we asked about specific concerns, men were more likely than women to mention being unsure about the benefits of allowing access to their medical records (31% compared to 21%) and the time and effort required than women (9% compared to 3%). his is in contrast to specific concerns about testing new drugs, where sex was not related. In relation to disability, those with a disability were less likely to be worried about data confidentiality than those with no disability (or no family member/friend with a disability) (60% compared to 73%).

Age was related to concerns about this type of research, though only in relation to having no concerns (differences in the proportion saying they had concerns were not significant). Young people (aged 18-34) were the least likely to say they had no concerns about allowing access to their records (55%, compared to 62% of 35-49 year olds, 69% of 50-64 year olds and 63% of those aged 65 and over). Age was also related to one specific concern: older adults (in the 65+ age group) were less likely to mention concerns about the confidentiality of their data than the younger age groups (57% compared to 74-77% across the other age groups). In contrast, concerns about data confidentiality were not related to age for the question about research into new drugs.

Finally, looking at concerns about giving blood or tissue samples, again we find a strong correlation between concerns and willingness to take part in a project involving this activity. Those that were very unwilling to give blood for medical research were most likely to express concern about such research (76% did so), while those who were very willing to participate were much less likely to do so (9%). There were no clear differences in specific concerns by willingness to take part.

There was no difference in overall concerns about giving blood or tissue samples by sex or disability. However, sex was significantly related to specific concerns about data confidentiality and how much time would be involved in giving blood and tissue samples: in both cases men were more likely to cite this as a concern than women (25% compared to 15% and 17% compared to 7% respectively).

The level of overall concern with giving blood and tissue samples varied significantly by age, with concern most likely among the 18-34 year olds (38%) and lower amongst the other age groups (28%-31%). Age was also related to certain specific concerns (Table 7-15), such as the time and effort required and data confidentiality, though the relationship was not linear for either of these.

[46] Or had no family members/friends with a disability.

Table 7-15 What concerns respondents have about providing blood/tissue samples for medical research, by age

Base: All adults who are concerned providing blood/tissue samples for medical research *Wellcome Trust Monitor*

	Age				
Concerns	18-34 %	35-49 %	50-64 %	65+ %	Total %
Possible risks to own health	61	58	59	56	59
Unsure what benefit/purpose would be	24	27	37	26	27
Concerns about whether study was genuine or well regulated	28	29	27	24	27
Worried about data confidentiality	17	20	30	13	19
Other concern	12	9	16	10	11
Too much time/effort involved	11	19	7	7	12
Would not want to answer personal questions about own health	2	6	7	6	5
Unweighted base:	*119*	*134*	*100*	*137*	*490*
Weighted base:	*160*	*144*	*91*	*99*	*493*

Inevitably, many of the factors that have been shown to relate to a lack of willingness to participate in particular types of medical research projects will be linked. For instance, age and disability were both shown to make a difference, and are known to be related, with older sections of the public being more likely to have disabilities or to have family members or close friends in this situation. Therefore, multivariate analysis (logistic regression) was undertaken, to determine the factors that remain significantly associated with willingness to take part in medical research projects, even when their links with one another are controlled for. As only a minority of the public were willing to take part in a project to test a new drug or treatment, our analysis focussed on this type of project, as it is likely that there will be a particular interest in changing public attitudes in this area.

The results of the regression analysis are presented in the appendix to this chapter. All four characteristics that were initially shown to be significantly linked with willingness to take part in a project to test a new drug or treatment (age, disability, previous participation in medical research in general, and concerns about taking part in this specific type of project) remained significantly associated with willingness to participate, even once their interactions with one and other were controlled for. Clearly then, in order to increase public willingness to participate in such projects, the medical research community needs to not only attempt to reduce concerns about participation, but to consider what makes participation more or less attractive to particular groups defined by age, disability and previous involvement.

7.6 Views about current medical research governance

We have seen that the public have a range of concerns about taking part in medical research, and that these concerns are strongly correlated with willingness to take part. It is also clear that perceived potential benefits to the individual involved (i.e. possible improvement in a pre-existing health condition) are associated with willingness to participate. In addition to these concerns and benefits, as we saw in Chapter 6, regulation of the industry is not a particular concern for most adults, but we want to assess whether this is the case in relation to feelings about participating in medical research projects. To explore this we focussed on two aspects of medical research practice that we have already seen were relevant concerns for respondents: protection of privacy and confidentiality, and regulation (in terms of ethical approval). First we asked respondents:

> Do you think that medical research projects in the United Kingdom are generally carried out in ways that protect the privacy and confidentiality of the members of the public who take part, or not?

Overall, the vast majority of respondents thought that medical research projects do protect people's privacy and confidentiality, though many more said this was "probably" the case than "definitely"

(63% compared to 19%). The uncertainty is not too surprising when we consider that only a minority have had experience of participating in medical research. At the other end of the scale, fewer than one in ten said they thought this was not the case (7% said "probably not" and 1% "definitely not"), while a further 8% did not know. There was little variation according to sex or disability status. There was some variation by age, but the overall picture was unclear.

We went on to ask a question about ethical approval that explicitly related the issue to willingness to take part in medical research:

> If you knew that the research had been approved as safe and ethical by an independent committee of experts, that is people who are not personally involved in the project, would this make you more willing to take part in a medical research project to test a new drug or treatment, or not?

Overall, a majority said that such ethical approval would make them more likely to participate (see the 'total' column in Table 7-16): around half thought it would "probably" make them more likely to take part, while just under a quarter said they would "definitely" be more likely to participate.

Both sex and age were significantly related to responses to this question. Those in the 65+ age group were the least likely to say that independent ethical approval would make them more likely participate (Table 7-16). Men were more likely to say they would definitely participate under such circumstances than women (25% compared to 18%). There was no significant difference according to disability.

Table 7-16 Would ethical approval for medical research make you more likely to participate in research that tested new drugs or treatments, by age

Base: All adults *Wellcome Trust Monitor*

Whether ethical approval would affect participation	Age 18-34 %	35-49 %	50-64 %	65+ %	Total %
Yes, definitely	23	20	27	16	22
Yes, probably	50	50	47	46	49
No, probably not	19	23	18	22	20
No, definitely not	8	5	8	12	8
Unweighted base:	*239*	*322*	*294*	*324*	*1179*
Weighted base:	*312*	*354*	*270*	*244*	*1179*

7.7 Conclusions

A sizeable minority of people had some experience of participation in medical research – either through their own participation or through a family member taking part. Age and disability were related to participation rates, with older people and adults with a disability or long term illness being more likely to have participated in medical research. When it came to future participation, there was considerable variation in willingness according to the types of research project involved: people were generally far more willing to allow access to their medical records or to provide a blood or tissue sample for medical research than they were to test a new drug or treatment. Although people showed a relatively high level of willingness to participate in certain forms of medical research, they also expressed concern about taking part. The greatest level of concern was found in relation to participating in research designed to test new drugs and treatments. This was unsurprising, considering the fact that it was also the least popular type of research in terms of willingness to participate. Despite these concerns, the vast majority thought that medical research in the UK was generally carried out in a way that protects people's privacy and confidentiality.

Appendix

Regression tables

Table 7-17 Logistic regression of willingness to take part in project to test new drug or treatment

Base: All adults *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Age (18-24)			
35-49	-0.39	0.21	0.060
50-64	-0.20	0.20	0.321
65+	-0.42*	0.21	0.042
Disability (neither respondent nor family member/friend has disability)			
Respondent has disability	0.37*	0.16	0.017
Family member/friend (but not respondent) has disability	-0.03	0.19	0.859
Previous participation in medical research (respondent or family member has taken part)			
Neither respondent nor family member has taken part	-0.78**	0.15	0.000
Concerned about taking part in project testing new drug or treatment (respondent would have concerns)			
Respondent would not have concerns	1.02**	0.20	0.000
Respondent may have concerns	-0.25	0.24	0.313

Unweighted base: 1179

*=significant at 95% level **=significant at 99% level

8 Attitudes towards genetics

Elizabeth Clery

8.1 Summary

- 2 in 10 adults and 14-18 year olds had seen or heard “a great deal” or “quite a lot” about genes and genetics in recent months, while 5 in 10 reported that they had encountered “not very much” information, or “none at all”.
- Self-assessed understanding of the ethical issues relating to genetic research varied widely, with 4 in 10 adults and young people agreeing they had a good knowledge and 3 in 10 of each group disagreeing. Understanding of ethical issues was strongly linked to recent exposure to information on this topic and scientific knowledge in general.
- Adults were more optimistic than 14-18 year olds about medical advances as a result of genetic research (with 85% compared to 72% stating they were at least “somewhat optimistic”). Levels of optimism were strongly linked with levels of scientific knowledge and education.
- Public support for genetic tests varied, depending on the outcome of the disease being detected. 80% of adults and 81% of young people interviewed thought it was at least “quite likely” they would take such a test, if there were ways of reducing the likelihood of any disease detected.
- Attitudes to direct-to-public genetic tests were mixed, with 36% of adults and 56% of young people thinking such tests were a good idea.
- Family doctors or GPs and the NHS were the only organisations trusted by more than half of adults and young people to use genetic information held on a medical database responsibly.

8.2 Introduction

In this chapter, we move away from the general topic of medical research to focus specifically on genetics and, in particular, genetic research, genetic tests and the uses of genetic information. This is a particular area of interest for the first Wellcome Trust Monitor and the intention has been to set up a coherent question set that can be fielded at regular intervals on the survey, in order to track knowledge, awareness and attitudes in relation to this topic.

The chapter begins by examining public awareness and knowledge of genetic research, with the aim of identifying the extent to which the public are exposed to information on this topic in their daily lives and how much they understand about it. As we have seen previously, levels of public knowledge of a topic can be important when interpreting related attitudes and behaviour.

We then consider whether the public are positive about future developments in genetic research; here, a key interest is in establishing whether those with a greater knowledge and understanding of this area are more likely to support or oppose its further development (in other words, are attitudes to genetic research simply a function of knowledge levels, or do other factors come into play?). Finally, we turn to examine two topical areas of development in genetics – the recent availability of direct-to-public genetic tests and the expanding potential uses of genetic information. Do the public consider these to be positive developments, both within their own lives and for society as a whole? Where do the public think the boundaries should lie in terms of the uses of genetics-related information? In a time of rapid change in relation to genetic science, this chapter will paint a picture of how current developments tie in with, or are at odds with, public expectations and priorities.

8.3 Awareness of genetic research

We begin by examining public attitudes to genetic research, which underpins any of the practical developments that take place in terms of genetic testing and the usage of genetic information. In order to best understand these attitudes, we also wanted to find out the extent to which the public are exposed to and are knowledgeable about this topic. We therefore asked respondents to the survey:

> Over the past few months, how much, if anything, have you heard or read about issues to do with genes and genetics?

The answers are presented in Table 8-1. What is most striking is the fact that there is considerable variation in levels of exposure to information on genes and genetics. Around two in ten adults and young people had seen or heard "a great deal" or "quite a lot" about this, with around five in ten in each case reporting that they had encountered "not very much" information, or "none at all". It is interesting to note that the experiences of adults and young people were very similar, suggesting that genes and genetics are not issues on which information is disseminated to or aimed at one particular section of the population. However, it may be that adults and young people have acquired information on genes and genetics from different sources, and it should be borne in mind that this information could either have been actively sought, or come across coincidentally (a question we examine in Chapter 4). For young people, genetics forms a key component of the compulsory science curriculum, so it may be that a considerable proportion of the young people had read or heard about this topic in that context. This possibility is given weight by the fact that, amongst those young people who have completed their compulsory science education, 30% who had continued to study science had heard "a great deal" or "a lot" about genetic research in the previous months, compared to 15% of those who were no longer studying science.

Table 8-1 Level of exposure to genetic research

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)	Young people (aged 14-18)
Level of exposure	%	%
A great deal	4	5
Quite a lot	14	15
Some	29	29
Not very much	33	32
None at all	18	19
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

During the period in which fieldwork for the Wellcome Trust Monitor was undertaken, genes and genetics received particular attention in the media, most notably in the coverage of the case of a baby whose embryo had been selected so she was not liable to get breast cancer. It is therefore interesting to note that, when this question was previously fielded on the 2003 British Social Attitudes survey, the public reported a significantly higher level of exposure to genes and genetics, with 36% indicating that they had heard "a great deal" or "quite a lot", compared to 18% of adults who responded to the Wellcome Trust Monitor in this way. This may reflect the fact that these issues received more sustained coverage in the media during 2003 or that, because coverage of them was relatively new, this had a greater impact in capturing the public's attention.

Perhaps surprisingly, there were no differences in the levels of information about genes and genetics encountered by exposure to news media. Very similar profiles of responses were found

for respondents who read or did not read a daily morning newspaper at least three times a week, and who watched news programmes on the television or listened to news programmes on the radio more or less frequently. Another source of information on genes and genetics could be popular entertainment. In Chapter 2, we explored the extent to which adults and young people were exposed to science through various types of television programs and leisure activities. In particular, it was envisaged that programmes about advances in medicine, medical dramas set in hospitals or doctors' surgeries, police dramas and programmes examining the experiences of those who had an unusual medical problem or had received an unusual treatment, could all potentially include content relating to genes and genetics. In fact, levels of exposure to information on genes and genetics only appeared to relate to the frequency of viewing programmes about advances in medicine. Amongst adults, 42% of those who had watched such a programme at least once a week stated they had seen "a great deal" or "quite a lot" of information about genetics in the past few months, compared with 14% of those who watched such a programme "once a year" and 6% of those who never watched such programmes.

In addition to popular entertainment, it seems likely that certain individuals would have a particular interest in the area of genes and genetics, especially those who had a genetic condition themselves or knew someone else for whom this was the case. Respondents to the survey were asked if they or anyone in their immediate family had ever been advised of a serious genetic condition. Despite the small numbers for whom this was the case, detailed in Chapter 2, it is perhaps surprising that there was no significant difference between their level of recent exposure to information on this issue, and those of the majority for whom this was not the case.

8.4 Knowledge and understanding of genetic research

Quite clearly, the public have varying levels of exposure to information on genes and genetics. But do their levels of knowledge of these areas vary similarly?

Much of the media coverage and public discussion of genetics focuses on what is possible and desirable in terms of human interventions to address medical and societal problems, whether that means the modification of genes to reduce the probability of particular diseases occurring or the sharing of genetic information to enable the identification of criminals. The desirability and morality of such interventions are hotly debated and there was therefore an interest in identifying the extent to which the public feel they understand and can engage with these debates. We therefore asked respondents the extent to which they agreed or disagreed with the following statement:

> I feel I have a good understanding of the ethical issues raised by genetic research

Reactions to this statement were diverse. Around four in ten adults and young people agreed, while around three in ten in each case disagreed (Table 8-2). Around three in ten adults and young people stated that they neither agreed or disagreed with this statement and this high level of ambivalence, coupled with the low proportions who expressed a strong opinion, suggests that the issue of ethics in relation to genetics is not one with which the public engages or responds to strongly. As with levels of awareness of genes and genetics, it is interesting to note that the adults and young people had very similar responses, suggesting that comprehension of the ethical issues associated with genetic research is not limited by age or life experience. This question was previously fielded on a survey of public understanding and support for genetic research, conducted in 2007 with residents of Indiana in the United States by the Indiana University Centre for Bioethics. 69% of the adult respondents to that survey agreed that they had a good understanding of the ethical issues raised by genetic research, with 20% strongly agreeing (Wolf, 2008). However, we should be cautious in interpreting this difference as indicative of substantial differences in knowledge levels of ethical issues relating to genetics between the United Kingdom and the United

States, especially as the former survey was undertaken in one small geographic region, where knowledge levels might be distinct[47].

Table 8-2 Whether has a good understanding of the ethical issues raised by genetic research

Base: All respondents *Wellcome Trust Monitor*

Level of agreement that has a good understanding	Adults (aged 18+) %	Young people (aged 14-18) %
Strongly agree	5	5
Agree	35	37
Neither agree nor disagree	30	25
Disagree	23	24
Strongly disagree	6	6
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

We saw in Chapter 3 how knowledge of different facets of science, namely theory, terminology and objective facts, are strongly linked, and these aspects were also found to be linked with self-assessed knowledge of the ethical issues raised by genetics research. Among adults, 44% of those who answered all of the questions on probability correctly, stated that they had a good understanding of the ethical issues raised by genetic research, compared to 28% of those who answered one or more of these questions incorrectly. Among adults, those who had attained a qualification in biology or genetics, who had a high level of scientific knowledge and who were male were more positive in assessing their personal understanding of the ethical issues raised by genetic research. For instance, 64% of the adults who had attained a qualification in biology or genetics at university or college agreed that they had a good understanding of the ethical issues relating to genetic research, compared to 35% of those who had not obtained a qualification in this area.

Among young people, age and sex appeared to make little difference, with only the decision (or intention) to study non-compulsory science being linked with higher levels of understanding of the ethical issues associated with genetic research. Although the numbers are smaller, differences are stark, with 70% of those who were studying science post-16 agreeing that they had a good understanding, compared with 34% of those who had elected not to do this. We can therefore conclude that the same factors that appeared to relate to levels of scientific knowledge, also link with self-assessed understanding of the ethical issues raised by genetics research.

For both adults and young people, higher levels of recent exposure to information on genes and genetics also link with levels of understanding of the associated ethical issues, as was similarly the case with knowledge of the theory of genetic research. Seven in ten (73%) adults who had seen or heard “a great deal” or “quite a lot” of information on these topics in recent months agreed that they had a good knowledge of the associated ethical issues, compared to three in ten (32%) of those who had encountered less information than this. And differences among young people with varying levels of exposure were very similar, with 75% of those who had encountered at least “quite a lot” of information and 33% of those who had not, agreeing that they had a good understanding of the ethical issues raised by genetic research. Clearly then, exposure to information on genetics and understanding of the related ethical issues are strongly linked – but we cannot necessarily conclude that this is a causal relationship, nor that increasing levels of exposure to information on genetics across the board would have such an impact for all sections of the population. It may be that those with a greater propensity to understand and absorb information on genetics are more

[47] In addition, the survey undertaking in Indiana was conducted by telephone and the use of two different modes may have resulted in differences in the types of response elicited.

likely to encounter it in the first place, due to their individual interests and preferences. It should also be borne in mind that our measure of understanding of the ethical issues raised by genetic research is self-assessed, and may be capturing levels of confidence (known to be higher amongst those with higher levels of education), in addition to objective knowledge levels.

8.5 Optimism about genetic research

We now turn to examine public attitudes towards the future development of genetic research and whether these relate to the vastly differing levels of knowledge and awareness of this topic that we have witnessed. To find out, we asked respondents:

> How optimistic are you about the possibility of medical advances as a result of genetic research?

The public were generally optimistic about medical advances as a result of genetic research. More than eight in ten adults described themselves as "very optimistic" or "somewhat optimistic", with slightly more than seven in ten young people stating that this was the case for them (Table 8-3). The significantly higher levels of optimism exhibited by adults are interesting as, thus far, we have seen few differences between adults and young people in terms of their knowledge and awareness of genetic research. Moreover, levels of optimism do not appear to increase with age, with the youngest and oldest age groups amongst the adults having very similar responses to this question.

Table 8-3 Optimism about medical advances as a result of genetic research

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)	Young people (aged 14-18)
Level of optimism	%	%
Very optimistic	26	16
Somewhat optimistic	59	56
Not too optimistic	10	16
Not at all optimistic	4	10
Don't know	2	3
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Those adults with greater levels of knowledge of genetics and science, and who had attained qualifications in the area of biology or genetics, were more likely to be optimistic about the medical advances that might take place as a result of genetic research. 94% of the adults who had a higher education qualification were at least "somewhat optimistic", compared to 71% of those who had no qualifications. Similarly, 94% of adult high scorers on the science knowledge quiz expressed this level of optimism, compared to just 65% of adult low scorers. And, in terms of genetic-specific knowledge, 87% of those who answered all four questions about genetic probability correctly were at least "somewhat optimistic", compared to 73% of those who answered at least one of these questions incorrectly. A similar relationship between levels of scientific education and knowledge, and optimism about genetic research, can be identified for the young people. 83% of those who were studying non-compulsory science and 82% of those who intended to do so were at least "somewhat optimistic" about medical advances as a result of genetic research; however, this was only the case for 73% of those aged 16 and over who had not elected to study non-compulsory science and 55% of those aged under 16 who did not intend to do so.

A number of additional differences emerged, that are likely to be a function of the relationship between science education and knowledge levels and optimism about genetic research. For instance, among adults, men were more optimistic than women (88% were at least "somewhat

optimistic", compared to 80% of women) – likely to relate to the fact that men have been shown to have higher levels of knowledge of science in general, and genetics in particular.

The correlation between scientific knowledge and education levels on the one hand and optimism in relation to genetic research on the other raises the question of whether simply knowing and understanding more about this area encourages a more positive reaction to it (it could be that concerns about future developments are prompted by inaccurate or limited understanding of what this research involves and is trying to achieve). For this reason, we examined levels of optimism by levels of exposure to information on genes and genetics, to ascertain whether those who had received more information on this issue were subsequently more optimistic about it. For both adults and young people, this turned out to be the case, as shown in Table 8-4. Among adults, those who had seen at least "quite a lot" of information about genetics in recent months were significantly more likely to be "very optimistic" than those who had only seen "some" information or less than this – almost five in ten adults, compared to two in ten. Similarly, among young people, around three in ten of those who had encountered at least "quite a lot" of information were very optimistic, compared to around one in ten of those who had received "some" information, or less than this.

Table 8-4 Optimism about medical advances as a result of genetic research, by level of exposure to information on genetics

Base: All respondents *Wellcome Trust Monitor*

	Information encountered on genetics in recent months					
	Adults (aged 18+)			Young people (14-18)		
Level of optimism	"A great deal" or "quite a lot" %	"Some" information or less %	Total %	"A great deal" or "quite a lot" %	"Some" information or less %	Total %
Very optimistic	46	21	26	29	12	16
Somewhat optimistic	49	61	59	52	57	56
Not too optimistic	4	11	10	13	16	16
Not at all optimistic	1	4	4	4	12	10
Don't Know	1	2	2	2	3	3
Unweighted base:	*212*	*963*	*1179*	*78*	*296*	*374*
Weighted base:	*222*	*954*	*1179*	*76*	*298*	*374*

This suggests that increased levels of optimism about and support for genetic research might be achieved by increasing levels of knowledge about this topic, and that one way of doing this might be to ensure that a larger proportion of the public regularly receive information on this topic. Inevitably though, all of the factors shown to be linked with optimism about genetic research could be linked – for instance, those with greater levels of scientific knowledge might actively seek information on this topic, ensuring they would also have a greater level of exposure to it. Multivariate analysis was undertaken for both the adults and young people to identify which of the factors explored above remain significantly associated with optimism about the development of genetic research, when their relationships with one and other are controlled for. The results of these analyses are presented in the appendix to this chapter.

For the adults, only scores on the science knowledge quiz and self-assessed understanding of the ethical issues associated with genetic research remained significantly associated with levels of optimism in relation to this area. For the young people, scores on the science knowledge quiz also remained significant, with the only other factor that did so being engagement (or intention to engage with) non-compulsory science education. This suggests that general knowledge in relation to science is likely to encourage optimism in relation to genetic research in particular and that it is this factor, rather than significant exposure to information on this topic, that generates optimism in

relation to future developments in this area. For policy-makers, this suggests that addressing the concerns or knowledge gaps held by those with lower levels of scientific knowledge in relation to developments in genetic research, may be key in achieving more universal support.

8.6 Attitudes towards genetic testing

Having examined awareness, knowledge and attitudes to genetic research in general, we now turn to focus on two of the practical developments arising from work in this area – the increasing availability of genetic tests and the expanding potential uses of genetic information as a source of data. To find out the extent to which the first development is widely known about, we asked respondents:

> How much have you read or heard about genetic tests that predict the likelihood that a person will develop certain genetically influenced diseases or conditions, such as heart disease, cancer and Alzheimer's?

Adults had encountered more information than young people, with 22% reporting having seen "quite a lot" of information, compared to 17% of young people (Table 8-5). (It should be noted that this difference only just attains the level of statistical significance). It is interesting that only around one in ten adults and young people had read or heard "nothing at all" in relation to genetic tests, suggesting widespread awareness of this area amongst the majority of the public.

Table 8-5 Exposure to information about genetic tests

Base: All respondents *Wellcome Trust Monitor*

Level of information read or heard about genetic tests	Adults (aged 18+) %	Young people (aged 14-18) %
Quite a lot	*22*	*17*
Some	*44*	*43*
Not much	*25*	*29*
Nothing at all	*9*	*11*
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

As we might expect, there was a strong correlation between exposure to information on genes and genetics in general and to information on genetic tests in particular. Among adults, 57% of those who had seen "a great deal" or "quite a lot" of information about genes and genetics in recent months had also read or heard "quite a lot" about genetic tests, compared to 14% of those who had encountered lower levels of information about genes and genetics. Similar differences occurred among the young people. Inevitably, it seems likely that information about genetic tests will constitute a key element of the general information about genes and genetics encountered by the public, explaining why exposure to the two types of information are related.

General support for genetic testing

It was envisaged that public attitudes to genetic tests could relate to both the benefits and drawbacks that these would present to the individual and to society as a whole. To explore the latter, we asked adult respondents to think about one of the consequences of genetic testing which has already been realised in the United Kingdom and which has been hotly debated. Specifically, we asked adult respondents to indicate whether they agreed or disagreed with the following statement:

> I would support the genetic testing of unborn babies for any serious diseases they might get in the future, even if the discovery of a serious disease could lead to a decision to terminate a pregnancy.

As can be seen from Table 8-6, adults had mixed views about the desirability of pre-natal genetic tests, if one of the possible outcomes was for the mother to have a termination. 55% agreed that they would support the use of genetic tests in this circumstance, whilst 24% disagreed. Expectant mothers in the United Kingdom already have the option of pre-natal genetic tests, to test for a range of conditions such as Down's syndrome – but the data obtained here suggest that a considerable minority do not support or indeed actively oppose the logical implications of this development.

Table 8-6 Support for the genetic testing of unborn babies

Base: All adults	*Wellcome Trust Monitor*
Whether supports genetic testing of unborn babies, even if the discovery of a serious disease could lead to termination	%
Strongly agree	17
Agree	38
Neither agree nor disagree	19
Disagree	15
Strongly disagree	9
Don't know	2
Unweighted base:	*1179*
Weighted base:	*1179*

Inevitably, responses to this question are likely to tap public attitudes to concepts other than genetic testing, most obviously abortion. Attitudes to abortion have been shown to be strongly associated with a range of demographic factors, most notably levels of religiosity, (Scott, 1998), and it is therefore not surprising to find that those who attend religious services less regularly are much more likely to support the genetic testing of unborn babies in the circumstances outlined above. 60% of adults who never attend a religious service agreed that they would support the genetic testing of unborn babies, even if this might lead to a termination, compared to 35% of those who attend such a service once a week or more. However, while we might expect support for this proposition to decline with age, given older age groups are known to be more religious, it is interesting to note that the reverse pattern is true; adults aged between 18 and 34 are significantly less likely to support genetic testing in these circumstances than those aged 65 years and over (48% compared to 60%). Support is fairly constant for adults aged over 35 so it may be that support for this proportion increases at the age at which most respondents would have become parents, and have had to actively consider some of the issues involved.

Willingness to take genetic tests

We next turn to respondents' own willingness to take genetic tests. Genetic tests are becoming increasingly widely available, but are they a development that will interest and potentially be utilised by much of the public, or are they of minority interest for a number of specific groups, such as those with particular genetic histories? Are the public genuinely interested in finding out which genetic conditions they will develop in the future, or would they only want to do this if preventative or preparatory steps existed? To explore these issues, we asked respondents how likely they would be to take a genetic test to detect any serious illness they might get in the future in two different circumstances:

> ...If there were treatments or other ways of greatly reducing the risks of developing any diseases detected, or

...If there were no treatments or other ways of reducing the risks of developing any diseases detected

Both adults and young people thought that they would be more likely to take a genetic test if there were treatments or other ways of reducing the risks of developing any disease detected, than if this were not the case. In these circumstances, around eight in ten adults and young people indicated that it was very likely or quite likely that they would take a genetic test (Table 8-7). However, when no action could be taken as a result of the test, around half this proportion of adults and young people (around four in ten in each case) said they would be very or quite likely to take a genetic test. This data suggests that there would be demand from the majority of the public to take a genetic test, were remedial action available if any disease were detected, but that a sizable minority would still want to do this, even if no preventative action could subsequently be taken. The higher proportion of adults who express support for genetic testing when this might lead to a disease being prevented, rather than the termination of a pregnancy, suggests that the data reported previously on the testing of unborn babies should be interpreted to some degree as a response to the prospect of abortion, as well as to the prospect of widely-available genetic testing.

Table 8-7 Likelihood of adults and young people taking genetic tests in different situations

Base: All respondents *Wellcome Trust Monitor*

Likelihood of respondent taking genetic test in particular circumstance	Adults (aged 18+) %	Young people (aged 14-18) %
If there were treatments or other ways of greatly reducing the risks of developing any diseases detected		
Very likely	37	33
Quite likely	43	48
Not very likely	14	15
Not at all likely	5	3
Don't know	1	1
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*
If there were no treatments or other ways of reducing the risks of developing any diseases detected	%	%
Very likely	13	15
Quite likely	29	28
Not very likely	33	41
Not at all likely	22	14
Don't know	2	2
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Why would considerable minorities of adults and young people still wish to take a genetic test, even if there were no treatments or other ways of reducing the risks of developing any diseases detected? To explore this issue further, we asked those respondents who stated that they would be "very likely" or "quite likely" to do this, to identify from a list of factors, which would have prompted them to take such a test.

The most popular motivation for taking a genetic test, even if no treatment were available, was to allow the individual more time to find out about any disease detected; this was identified by slightly more than five in ten adults and young people who thought they would take a genetic test in these circumstances (Table 8-8). A similar proportion of adults indicated that they would take a test to give them time to prepare for the onset of any disease detected; this option was slightly less popular with the young people (selected by around four in ten) – a difference that might be due to

the fact that many of the diseases the respondents were thinking about traditionally develop in old age, a period which would be much more remote to the young people.

Around three in ten adults and young people indicated that they would take a genetic test to re-assure themselves about the likelihood of getting a particular disease – in other words, to confirm their positive expectations for the future, rather than to give them advance notice of any negative results. Around one in ten adults and young people stated they would take a genetic test because there was a particular disease they were worried about getting. To summarise, it appears that a considerable minority of the public would be inclined to take a genetic test to detect any diseases they might get in the future, even if no preventative action were available, primarily to be better prepared for the onset of a disease and, secondarily, in the hope of allaying or eliminating worries about developing particular diseases.

Table 8-8 Reasons for undertaking a genetic test, even if no treatment available

Base: All respondents who would take genetic test even if no treatment available *Wellcome Trust Monitor*

	Adults (aged 18+)	Young people (aged 14-18)
Reason for taking genetic test	%	%
To give me time to find out more information about any disease detected	53	54
To give me time to prepare for the onset of any disease detected	51	42
To re-assure myself that I am unlikely to get a particular disease in the future	33	35
Because there is a particular disease that I am worried about getting	12	11
Other reason	7	6
Unweighted base:	*492*	*167*
Weighted base:	*501*	*161*

Support for direct-to-public genetic tests

Genetic tests have been available through the National Health Service and private healthcare for a variety of conditions and illnesses for several decades. However, a very recent development is the emergence of direct-to-public genetic tests, administered by individuals and organisations other than health professionals and frequently not requiring a face-to-face consultation, for example being obtained over the Internet. Having identified that the majority of adults and young people would, in principle, be in favour of the idea of taking a genetic test, if they could take remedial action against any disease identified, we now move on to examine whether they favour the expansion of genetic tests so that these become directly available to the public. To explore this issue, we described the current situation pertaining to genetic tests to respondents in the following way:

> Genetic tests are now available directly to the public, without having to go through a doctor or other medical practitioner. This might be done, for example, by ordering a test from a website, taking a swab and sending if off in the post and then receiving results directly by post or in an email.

We then asked respondents whether they thought making genetic tests available to the public in this way was a good or bad idea. Their responses are presented in Table 8-9. What is immediately apparent is that views on this issue are very mixed. 36% of adults thought that making genetic tests available to the public was a good idea whilst 61% thought that it would be a bad idea. Young people were significantly more positive, with 56% stating this would be a good idea and 41% indicating it would be a bad idea. The greater support for publicly available genetic tests among young people is interesting, particularly as young people were significantly less optimistic than adults about medical advances as a result of developments in genetic research, as seen

previously. The trend of younger respondents being more favourable towards direct-to-public genetic tests is one that spreads right across the age range, with 45% of those aged between 18 and 34 thinking such tests are a good idea, compared to 32% of those aged 65 years and over.

Table 8-9 Perceptions of direct-to-public genetic tests

Base: All respondents *Wellcome Trust Monitor*

View of making genetic tests directly available to the public	Adults (aged 18+) %	Young people (aged 14-18) %
Definitely a good idea	11	17
Probably a good idea	25	39
Probably a bad idea	33	28
Definitely a bad idea	28	13
Don't know	2	2
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

It was noted earlier that those sections of the population which were more educated and knowledgeable, in terms of science and genetics, were more likely to be optimistic about medical advances that might take place as a result of genetic research. It is therefore interesting to note that none of these differences can be observed in relation to making direct-to-public genetic tests available, with adults and young people with different levels of involvement in science education, qualification levels and so on exhibiting very similar levels of support for this idea. Clearly then, what we are seeing here is the distinction between support for genetic advances in general and support for the ways in which these are implemented and made available to the public in practice.

To explore further the reasons why respondents viewed direct-to-public genetic tests as a good or a bad idea, respondents were asked to identify, without prompting, the reasons why they had selected a particular answer at the previous question. The answers provided were recorded verbatim and later re-coded into a number of general categories, as presented in the two tables below.

What is particularly striking is the diverse range of reasons given; no justification is identified by more than three in ten adults or young people either in relation to this being a good or a bad idea. The most common reason identified by adults for viewing direct-to-public genetic tests as a positive development is the fact that these would eliminate the need to see a doctor, an advantage cited by around two in ten adults (Table 8-10). Amongst the young people, the fact that genetic tests would be easier to access and available to all was identified as an advantage by almost three in ten of those who thought such tests were a good idea. Key to all of the answers provided is the view that such tests would be easier to undertake, in terms of taking less time, money, effort and requiring less consultation with others.

Table 8-10 Reasons why publicly available genetic tests regarded as a good idea

Base: All respondents who thought publicly available genetics tests were a good idea *Wellcome Trust Monitor*

Reasons	Adults (aged 18+) %	Young people (aged 14-18) %
Would avoid need to go to a doctor	20	22
Tests would be easier to access/available to all	17	28
There would be greater privacy and less embarrassment	13	14
Tests could be done and results obtained more quickly	11	8
People have a right to know this information	8	7
Tests would be more convenient	5	6
More people would be encouraged to take a test	3	3
Tests would be cheaper	2	2
Other	36	23
Vague or irrelevant answer	8	7
Don't know	3	7
Unweighted base:	*411*	*214*
Weighted base:	*427*	*208*

Percentages add up to more than 100% as respondents could give more than one answer.

While the largest proportion of adults who thought direct-to-public genetic tests were a good idea justified this on the basis of the removal of the need for doctors' involvement, those who viewed such tests as a negative development frequently justified this conclusion on the actual absence of the involvement of medical staff. Table 8-11 shows that one in four adults and three in ten young people made this judgement because they felt that people with medical knowledge should be involved, the most popular justification provided by both groups of respondent. Other concerns related to the elements traditionally associated with genetic testing that would be absent from the direct-to-public tests – most notably, support and counselling for dealing with the test results, identified by slightly more than one in ten adults and one in ten young people. Safety also emerged as a key concern, with the possibility of tests results getting mixed up, going missing or being misused being identified by between one in ten adults and one in four young people in each case. Clearly, while those who favour the development of direct-to-public genetic tests appreciate the greater accessibility and convenience involved, those who oppose this development tend to focus on the implications of these factors for the service that is provided – in terms of the involvement of fewer staff and issues of safety and security.

Table 8-11 Reasons why publicly available genetic tests regarded as a bad idea

Base: All respondents who thought publicly available genetic tests were a bad idea *Wellcome Trust Monitor*

Reasons	Adults (aged 18+) %	Young people (aged 14-18) %
People with medical knowledge should be involved	25	27
Lack of regulation would mean it would be unclear who was a valid provider	20	10
No support/counselling for dealing with test results	16	11
Public have no medical knowledge, to help interpret results	16	8
Tests could get mixed up/people could get the wrong results	14	25
Less safety than if test was done through a doctor	9	11
Tests/results could go missing	5	11
Data/test results could be misused	5	4
People only interested in making money would offer tests	4	1
People with the wrong motives might offer tests	3	*
Other	26	29
Vague or irrelevant answer	3	6
Don't know	1	1
Unweighted base:	*740*	*152*
Weighted base:	*726*	*156*

Percentages add up to more than 100% as respondents could give more than one answer.

8.7 Use of human genetic information

In addition to genetic tests, a second development attracting considerable news coverage and debate is the increasing availability of genetic information and the different applications for which this can be used; in recent years, these have included the identification of criminals using DNA, while the use of genetic information by insurance companies is a more recent and highly contentious development. To explore public views on developments in this area, respondents to the survey were presented with a list of individuals and organisations and asked:

> On this card are a number of different types of people and institutions. Please tell me which, if any, you trust to use the human genetic information held on medical databases responsibly?

Levels of trust varied considerably for the range of individuals and organisations asked about (Table 8-12), though the answers for adults and young people tended to be similar. The highest levels of trust were for GPs or family doctors; eight in ten adults and young people thought they could be trusted to use genetic information responsibly. The only other organisation trusted by more than a majority of adults and young people was the National Health Service, identified by around six in ten in each case. Clearly then, most of the public only trust those working within the medical profession to use medical databases holding genetic information responsibly. Very low levels of trust were apparent for government or associated bodies; of these, an expert government scientific advisory committee attracted the highest level of trust from just two in ten adults and young people. The least trusted organisations were employers and insurance companies, identified by less than one in ten adults and young people; this suggests that recent discussions around the use of genetic information by employers and insurance companies would be unlikely to attract public approval. The tendency to exhibit higher levels of trust in medical practitioners reflects the tendency identified in Chapter 5, in relation to preferences for receiving information about medical research. This suggests that the fact respondents were considering genetic information in particular, rather than information on medical research more generally, appears to make little differences to levels of trust.

Table 8-12 Trust to have genetic information

Base: All respondents *Wellcome Trust Monitor*

Type of organisation	Adults (aged 18+) % trusted	Young people (aged 14-18) % trusted
GP/Family Doctor	82	83
National Health Service (NHS)	61	69
Medical charities	34	23
University scientists	35	18
Police	25	35
An Expert Government Scientific Advisory committee	22	24
Health and Pharmaceutical companies	18	27
Patients' groups	15	3
An advisory body to the Government, composed of people representing different viewpoints	13	6
People tracing a family tree	7	7
Government	6	13
Industrial scientists	6	9
None of these	6	*
Employers	4	7
Insurance companies	4	7
Vague or irrelevant answer	*	4
Unweighted base:	*1168*	*370*
Weighted base:	*1179*	*374*

This question was previously fielded on the People's Panel, undertaken by the Human Genetics Commission in 2000. At that time, the three organisations which adults identified could be trusted to use human genetic information responsibly were GPs and family doctors (87%), the NHS (74%) and the police (59%) (Human Genetics Commission, 2001). The considerably lower levels of trust in the police highlighted by the Wellcome Trust Monitor could result from developments in the intervening period in levels of trust in this organisation in general; however, we should be cautious in reading too much into this difference, due to the different methodologies and contents of the two surveys we are comparing[48].

8.8 Conclusions

Levels of awareness and knowledge of genetics and genetic research have been shown to be highly diverse and to relate strongly to levels of scientific knowledge and understanding of the specific subject area. In general, those who are most positive about developments in this area are those with higher levels of knowledge of this topic and of science in general, suggesting that opposition to genetics research may be founded upon inaccurate understandings of what this area involves or is seeking to achieve. However, when we focus on specific developments arising from developments in genetics research, such as genetic testing and the sharing of genetic information, attitudes are more nuanced, with attitudes to related issues, such as abortion, access to medical information and trust in various organisations, clearly coming into play. For some sections of the public, it appears that applications arising from genetic research have already gone far enough, though, for others, there is considerable potential that is yet to be realised. As developments in genetic research and its practical implementations move forward over the coming years, a key interest will be in identifying whether public attitudes also shift accordingly and whether these become more uniform.

[48] Further details on this study are provided in Appendix B. Particular points of note are that the People's Panel included a longer list of organisations and fielded other questions on police uses of genetic information, which may have encouraged respondents to regard their possible use of a medical database more favourably.

Appendix

Regression tables

Table 8-13 Logistic regression of adults being at least "somewhat optimistic" about medical advances as a result of genetic research

Base: All adults *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Sex (male)	-0.35	0.19	0.069
Scientific qualification (university or college)			
School	-0.94	0.72	0.195
None	-1.24	0.70	0.076
Knowledge of genetic research (one or more questions answered incorrectly)			
All four questions answered correctly	0.23	0.21	0.274
Self-assessed knowledge of ethical issues relating to genetic research (respondent strongly agrees they have a good knowledge)			
Agrees	0.10	0.88	0.910
Neither agrees nor disagrees	-0.99	0.86	0.251
Disagrees	*-1.94	0.85	0.023
Strongly disagrees	**-2.33	0.88	0.008
Score on knowledge quiz (low score)			
Average score	*0.51	0.22	0.021
High score	**0.92	0.33	0.005
Unweighted base: 1143			

*=significant at 95% level **=significant at 99% level

Table 8-14 Logistic regression of young people being at least "somewhat optimistic" about medical advances as a result of genetic research

Base: All young people *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Engaging/intending to engage with post-16 science education			
Not engaged with/intending to engage with post-16 science education	**-0.80	0.30	0.01
Self-assessed knowledge of ethical issues relating to genetic research (respondent strongly agrees they have a good knowledge)			
Agrees	-0.39	0.78	0.61
Neither agrees nor disagrees	-0.25	0.80	0.76
Disagrees	-0.37	0.81	0.65
Strongly disagrees	-0.86	0.90	0.34
Score on knowledge quiz (low score)			
Average score	**0.95	0.33	0.00
High score	**2.65	0.58	0.00
Unweighted base: 339			

*=significant at 95% level **=significant at 99% level

9 Experiences and perceptions of science education

Sarah Butt

9.1 Summary

- Young people aged 14 to 18 were generally positive about their experiences of learning science at school. 81% found science lessons interesting, with 23% finding them very interesting. 58% rated science lessons as more interesting than maths lessons whilst a similar proportion (55%) thought they were more interesting than English lessons.
- Around half (51%) of the young people aged 14 to 18 agreed science was a popular subject among young people in general.
- Young women held less positive attitudes towards school science lessons than young men and were less likely to agree science was a popular subject among young people.
- A majority of 14 to 18 year olds (84%) found science more interesting at secondary school then primary school.
- There was widespread agreement that a good understanding of science would improve a person's career prospects and that doing well in science at school was important for people wanting to go to university.
- Nearly all young people aged 14 to 18 (95%) thought it was important for science to be taught in schools up to the age of 16. However, only just over half (54%) thought it was very important.
- Nearly all young people felt it was very important to their parents for them to do well in science at school. However, when asked to pick which subjects their parents would think were most important, they were less likely to pick science than maths and English.
- The quality of teaching was a particularly important factor in encouraging or putting off young people from learning science at school. Just over half (52%) said having a good teacher encouraged them to learn science whilst just under half (47%) identified a bad teacher as something that had put them off.
- Around 4 in 10 young people were put off learning science because they found the subject too difficult (40%) or boring (41%). Young women were especially likely to be put off because they found the subject difficult.
- Just over half of young people (52%) mentioned the chance to do experiments as a factor which had encouraged them to learn science.

9.2 Introduction

The final two chapters in this report move away from medical research to focus specifically on young people and their attitudes towards science more generally. In this chapter we explore young people's attitudes towards learning science at school. Currently, the UK is experiencing a 'crisis' in science education. Although pupil attainment for science in primary schools is good, the situation at GCSE level is less encouraging, with only 50% of students getting a good grade (A*-C) at GCSE. This compares to 57% of 15 year olds achieving grade A*-C in GCSE English and 52% in GCSE mathematics. Between 1994 and 2004, the number of 16-18 year olds taking biology A level increased by 7%, but chemistry entries fell by 8%, and physics entries by 20%. Declining science A level entries have repercussions for the numbers studying science at higher education. For example, those graduating with an undergraduate degree in chemistry fell by 27% between 1994/95 and 2001/02, and by a further 7% between 2002/03 and 2004/05 (HMSO, 2006). In response to this situation, the Government has recently introduced a number of initiatives to try and

increase the take-up of school science. These include revisions to the science curriculum and the introduction of new GCSE and A level subjects such as Applied Science and Science in Society. In January 2008, the Government announced a new strategy, with a budget of £140 million, aimed at recruiting and training more science and maths teachers, improving GCSE results in science, and increasing the number of young people going on to study science post-16 (DCSF, 2008). The potential importance of young people learning science at school is highlighted by findings in this report which have demonstrated that, among adult respondents, holding a qualification in biology or genetics influences future understanding of science (both facts and the nature of the scientific method) as well as attitudes towards issues such as genetics.

For policy makers trying to increase the take-up of school science, it is important to understand young people's attitudes towards learning science at school. In the first part of this chapter we examine the extent to which young people are interested in science. We look at how this compares to their interest in other school subjects and whether young people became more or less interested in science at secondary school compared with primary school. In the second part of the chapter we look at the factors which may encourage or discourage young people from learning science at school, including the quality of teaching, content of lessons and possible benefits for future careers and study plans. We also consider whether young people think learning science at school is important and useful in their day to day lives and whether their parents encourage them to do well in this subject. Use is made of multivariate analysis to try and identify the different individual factors which may mean young people are willing to study for non-compulsory science qualifications. Existing evidence suggests that boys are generally more positive about many aspects of science compared with girls (Collins et al, 2006); we therefore present separate findings for young men and young women throughout the chapter.

Based as it is on interviews with a relatively small sample of 14 to 18 year olds, this chapter is not intended to measure the current and intended take-up of science subjects among young people. Rather, its purpose is to explore young people's attitudes towards school science to try and gain a better sense of how and why young people might be encouraged to learn science (Chapter 2 gives some background information on the take-up of science subjects among our sample). This evidence will provide a baseline against which possible strategies by which to increase the popularity and take-up of school science can be considered and monitored in future waves of the Wellcome Trust Monitor. The focus throughout is on attitudes towards school science in general. Although it is likely attitudes may vary between different science subjects, limitations on questionnaire length precluded us from asking about and comparing attitudes towards specific science subjects.[49] All the young people interviewed were asked about their attitudes towards learning science at school, with those young people no longer studying science asked to think back to when they were doing so.[50]

9.3 Interest in learning science at school

Chapter 2 reported that a majority of 14 to 18 year olds found science lessons at school either very or fairly interesting. In this chapter we explore the extent of this interest in more detail, looking at how interest in school science compares with interest in other school subjects, whether science is perceived as a popular school subject among young people, and if and how interest in school science changes between primary and secondary school.

[49] If a respondent spontaneously said their answer to a particular question would depend on the science subject being considered, this was recorded. However, there were only a few cases where this occurred.

[50] As shown in Chapter 2, 58% of the young people were currently studying science at school or college. It is possible attitudes may differ between current and past students, as a result of differences in recall for example. However, because of the small number of cases available, this is not something we attempt to explore here.

There is evidence, at least among the young people interviewed for this study, that science is a not unpopular school subject. 81% of the young people claimed to find school science lessons interesting. Nearly six in ten (58%) said lessons were only fairly interesting. However, almost a quarter of respondents (23%) said they found science lessons very interesting. The overall level of self-reported interest in science lessons was similar for young men and young women (Table 9-1). However, it is likely that differences in attitudes on the basis of sex would become apparent if we had been able to consider specific science subjects (separating out the physical sciences for example) rather than just asking questions about science in general.[51]

Table 9-1 Interest in school science lessons, by sex

Base: All young people *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Level of interest	%	%	%
Very interesting	24	22	23
Fairly interesting	59	57	58
Not very interesting	12	12	12
Not at all interesting	4	7	6
(SPONTANEOUS: Depends on science subject)	*	2	1
Unweighted base:	*183*	*191*	*374*
Weighted base:	*193*	*181*	*374*

The extent to which interest in science lessons is sustained and young people consider pursuing science beyond the level demanded by compulsory education will be explored in more detail at the end of this chapter. However, it is perhaps worth pointing out that whilst three-quarters (75%) of young people who stated they found science lessons very interesting were either currently studying or intending to go on and study non-compulsory science, this was true of only around four in ten (39%) of those who said they found science lessons fairly interesting.

Interest in science lessons compared with other subjects

Answers to questions about interest in lessons may pick up on respondents' general attitudes towards school as much as their attitudes towards science lessons per se. In order to gain a fuller picture of young people's interest in science lessons specifically, we therefore also asked respondents how interesting they found science lessons compared to lessons in other core subjects.[52] Science fared relatively well when compared against other subjects. Overall, half of the young people (58%)[53] said they found science lessons more interesting than maths lessons, with just under a third (30%) stating they found science lessons a lot more interesting. Less than a fifth of young people (17%) said they found science lessons less interesting. Similar responses were obtained when young people were asked to compare science and English lessons; 55% found science lessons more interesting than English, with 34% finding science a lot more interesting. These findings may of course be a reflection of the unpopularity of maths and English rather than the popularity of science. However, they do at least suggest that science does not suffer unduly as a result of being seen as less interesting than other core subjects.

[51] This chapter contains relatively little analysis by age as the relatively small numbers of young people available prevent a detailed breakdown. Furthermore, age is likely to be strongly correlated with other variables of interest such as studying non-compulsory science. With regard to finding science lessons interesting, there was no difference between 14 to 16 and 17 to 18 year olds in the proportion that said they found them very interesting (23%).

[52] It should also be noted that even if our measures are imperfect indicators of the absolute level of interest in science lessons specifically, they still provide a useful baseline against which to monitor any change (or lack of change) in attitudes towards school science.

[53] Figures reported in the text differ slightly from those in Table 9-2 because of rounding.

Although the proportion of young women who claimed to find science lessons very or fairly interesting was not significantly different from the proportion of young men for whom this was the case, significant differences on the basis of sex did emerge when we asked young people to compare their interest in science with other subjects. As Table 9-2 shows, over a third of young women (37%) said that they found science a lot or a little less interesting than English. This compares with less than a quarter (22%) of young men. However, this finding may of course be a reflection of young men's relative lack of interest in English as much as a sign of young women's relative lack of interest in science.

Table 9-2 Interest in science lessons compared with lessons in other core subjects, by sex

Base: All young people *Wellcome Trust Monitor*

	Sex		
Interest in science lesson…	**Male**	**Female**	**Total**
…compared with maths lessons	%	%	%
Science a lot more interesting	29	32	30
Science a little more interesting	29	27	28
About the same	25	23	24
Science a little less interesting	14	15	14
Science lot less interesting	3	3	3
…compared with English lessons	%	%	%
Science a lot more interesting	42	26	34
Science a little more interesting	24	17	21
About the same	12	21	16
Science a little less interesting	13	24	18
Science lot less interesting	9	13	11
Unweighted base:	*183*	*191*	*374*
Weighted base:	*193*	*181*	*374*

Popularity of science among young people in general

As well as asking young people about their own interest in science, we asked them how much they agreed or disagreed that science was a popular subject among young people in general (Table 9-3). Only around half (51%) of young people agreed with the idea that science was a popular subject among young people. However, less than a quarter (24%) of young people disagreed that science was a popular subject among young people. The remainder found it hard to generalise and did not hold a definite view. Young women were more likely to disagree that science was a popular subject among young people than young men (30% compared with 19%)[54].

Table 9-3 Agreement with the view that science is a popular school subject among young people, by sex

Base: All young people *Wellcome Trust Monitor*

	Sex		
Science is a popular school subject among young people	**Male** %	**Female** %	**Total** %
Strongly agree	5	5	5
Agree	50	41	46
Neither agree nor disagree	25	24	25
Disagree	19	28	23
Strongly disagree	0	2	1
Unweighted base:	*183*	*191*	*374*
Weighted base:	*193*	*181*	*374*

[54] The figures reported in the text differ slightly from those in Table 9-3 because of rounding.

Young people's attitudes towards the popularity of science lessons among young people generally were closely linked to whether or not they themselves found science lessons interesting (Table 9-4). 69% of young people who said that they themselves found science lessons interesting also agreed that science was a popular subject among young people generally. In contrast, only 27% of those who found science lessons not very or not at all interesting agreed that science was a popular subject among young people[55]. It may be that young people generalise about other young people on the basis of their own preferences (or tend to have friends with similar attitudes towards school as themselves). Alternatively, it may be that a young person's own attitudes towards science are coloured by whether they think it is a popular subject among other young people. Later sections of this chapter look further at the extent to which the attitudes of the young person's peers may or may not encourage them to learn science at school.

Table 9-4 Agreement with view that science is a popular school subject among young people, by respondent's own interest in science lessons

Base: All young people *Wellcome Trust Monitor*

	How interesting respondent finds school science lessons			
Science is a popular school subject among young people	**Very interesting** %	**Fairly interesting** %	**Not very/at all interesting** %	**Total** %
Strongly agree	7	5	4	5
Agree	61	46	25	46
Neither agree nor disagree	16	27	25	25
Disagree	14	22	42	23
Strongly disagree	2	0	4	1
Unweighted base:	*80*	*221*	*68*	*374*
Weighted base:	*87*	*217*	*66*	*374*

As well as asking young people whether they felt science was a popular school subject among young people, we also asked whether they thought young people were interested in science in general. 5% strongly agreed that science was a popular school subject among young people whilst 5% said they thought young people were very interested in science in general. Similarly, 25% disagreed that science was a popular school subject among young people whilst 30% said they thought that young people were not very or not at all interested in science in general (Table 9-5).[56]

Table 9-5 Perceptions of young people's interest in science in general

Base: All young people *Wellcome Trust Monitor*

Level of in science	Total %
Very interested	5
Fairly interested	64
Not very interested	29
Not at all interested	1
Unweighted base	*374*
Weighted base	*374*

Comparing science in primary school and secondary school

One particular concern among groups keen to promote the take-up of school science is the fact that interest in the subject among young people appears to decline as they move through the school system, into secondary school and beyond (Collins et al, 2006). It was intended that the

[55] Figures reported in the text differ slightly from those in Table 9-4 because of rounding.

[56] These comparisons are indicative only. Answers to the two questions are not directly comparable given that the popularity of science as a school subject was measured on a five point agree/disagree scale and interest in science in general was measured on a four point scale.

Wellcome Trust Monitor should be designed to shed some light on how young people's attitudes changed between primary and secondary school. We therefore asked the young people that we interviewed the following question:

> I'd now like you to compare your experience of learning science in primary and secondary schools. Did you become more or less interested in learning science at secondary school compared with primary school?

The young people overwhelmingly indicated that they found science lessons more interesting at secondary school compared with primary school (Table 9-6). When asked why this was the case, the two most common reasons given were that they studied more interesting topics at secondary school and because there were more chance to do experiments at secondary school. A number of the respondents giving "other" answers said that they had not really studied science at primary school (Table 9-7).

Although over three-quarters (77%)[57] of young women said that they were more interested in science at secondary school compared with primary school, young women were less likely than young men to state that they found science more interesting at secondary school compared with primary school. Unfortunately, given the relatively small samples available for analysis, it is not possible, using this study, to say why it should be the case that young women are more likely to express less interest in science at secondary school. However, a later section of this chapter does explore the factors which might discourage young people from learning science at school, and it could be that certain of these factors particularly apply to young women at secondary school.

Table 9-6 Interest in science at secondary school compared with primary school, by sex

Base: All young people — *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Whether more interested at primary or secondary school	%	%	%
A lot more interested at secondary school	59	52	56
A little more interested at secondary school	31	25	28
About the same	2	9	5
A little more interested at primary school	6	11	8
A lot more interested at primary school	2	2	2
Unweighted base:	*183*	*191*	*374*
Weighted base:	*193*	*181*	*374*

Table 9-7 Reasons for increased interest in science at secondary school, by sex

Base: Young people who found science more interesting at secondary school — *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Reasons for increased interest	%	%	%
More interesting topics covered at secondary school	69	64	67
More chance to do experiments at secondary school	66	59	63
Better teachers at secondary school	27	33	30
Other reason	5	6	6
Unweighted base:	*160*	*147*	*307*
Weighted base:	*172*	*141*	*313*

One possible reason why, in contrast to other studies, the findings from the Wellcome Trust Monitor point to largely positive attitudes towards secondary school science may be because our

[57] Figures reported in the text differ slightly from those in Table 9-6 because of rounding.

findings are based on a survey of 14 to 18 year olds, that is, young people of secondary school age. It is perhaps not surprising that secondary school age children hold more positive attitudes towards their more recent educational activities compared with primary school lessons which they may either not recall or are likely to have outgrown. In contrast, other studies comparing attitudes towards science lessons at different stages of school have tended to do so by directly comparing the attitudes of respondents of different ages. In order to fully understand how young people's attitudes towards science change as they move through the school system, further research needs to be conducted using longitudinal data, where the same respondents are interviewed at multiple time points and their responses at different stages of their school career compared.

9.4 Perceptions of importance of learning science at school

As well as asking about their interest in school science, we also asked young people how important they felt it was that science should be taught up until the age of 16. Nearly all of the young people interviewed (95%) said that it was at least fairly important for young people to be taught science up until the age of 16. However, only just over half (54%) thought that this was very important.

To enable comparison, we also asked adult respondents to the Wellcome Trust Monitor how important they felt it was that young people should learn science up until the age of 16. Adults were notably more likely than young people to say that it was very important for young people to learn science up until the age of 16 (Table 9-8). This answer was provided by 79% of adult respondents. The lower proportion of young people saying it is very important to learn science up until the age of 16 may be a result of dissatisfaction among 14 to 16 year olds with having to learn science and not finding it interesting.[58] It may also be the case that the young people were not yet old enough to fully appreciate the value that learning science might have for them in later life, which the adults might have realised.

Table 9-8 How important that science taught in schools to the age of 16

Base: All respondents *Wellcome Trust Monitor*

	Adults (aged 18+)	Young people (14-18)
How important	%	%
Very important	79	54
Fairly important	19	41
Not very important	2	4
Not at all important	*	*
Unweighted base:	*1179*	*374*
Weighted base:	*1179*	*374*

Attitudes towards the importance of science being taught up until 16 did not vary between young men and young women. However, perhaps unsurprisingly, there were differences depending on how interesting the young people themselves found school science lessons (Table 9-9). Among young people who said they found science lessons not very or not at all interesting, only 35% nevertheless felt that it was very important that science was taught up until the age of 16.

[58] Among young people, 17 and 18 year olds were slightly more likely than 14 to 16 year olds to say it was very important to learn science up until the age of 16 (59% compared with 51%). However, the difference was not statistically significant.

Table 9-9 How important that science taught in schools to the age of 16, by level of interest in science lessons

Base: All young people *Wellcome Trust Monitor*

	How interesting school science lessons			
	Very important	Fairly important	Not very/at all important	Total
How important science taught	%	%	%	%
Very important	74	53	35	54
Fairly important	24	45	51	41
Not very/at all important	2	3	12	4
Unweighted base:	*80*	*221*	*68*	*374*
Weighted base :	*87*	*217*	*66*	*374*

We were interested in what young people saw as being the future uses of the science learnt at school. We therefore asked them how much they agreed or disagreed with the following statements:

> In day to day life I rarely use the science I learn at school
>
> Having a good understanding of science will help to improve a person's future career prospects, even if they don't go on to have a career in science
>
> Doing well in science at school is important if someone wants to go on to study at university

One factor which may explain why young people do not see science as an important subject to learn is their inability to see how what they learn applies to their day to day lives (Table 9-10). Just under half (45%)[59] of all young people agreed that they rarely used the science they learnt at school in their day to day lives. This figure rose to over half (54%) of those young people who were no longer studying science and so not using it in an educational context. However, as we will see, when asked to identify which factors put them off learning science at school, only 16% of young people specifically identified the fact that they were not taught about things relevant to the real world, while a far greater proportion mentioned the chance to lean about things relevant to real life as a factor which had encouraged them to learn science (see Table 9-16 and Table 9-19 below). It will be interesting to see whether the recent introduction of more applied science courses helps to increase the proportion of young people who feel that they can use the science they learnt at school in everyday lives.

There was evidence that young people felt that learning science at school was important for their future prospects, either in terms of their career or going on to study at university. 77% of respondents agreed that a good understanding of science would improve a person's career prospects, with 17% agreeing strongly. A similar proportion (79%) agreed that doing well in science at school was important if a person wanted to go on to university, with 32% agreeing strongly.

[59] Figures reported in the text differ slightly from those in Table 9-10 because of rounding.

Table 9-10 Attitudes towards usefulness of learning science at school

Base: All young people	*Wellcome Trust Monitor*
	Total
In day to day life rarely use science learnt at school	%
Strongly agree	8
Agree	37
Neither agree nor disagree	20
Disagree	32
Strongly disagree	3
Having a good understanding of science will help to improve a person's future career prospects, even if they don't go on to have a career in science	%
Strongly agree	17
Agree	60
Neither agree nor disagree	13
Disagree	9
Strongly disagree	*
Doing well in science at school is important if someone wants to go on to study at university	%
Strongly agree	32
Agree	47
Neither agree nor disagree	10
Disagree	9
Strongly disagree	1
Unweighted base:	*374*
Weighted base:	*374*

These questions were specifically designed to ask about the usefulness of studying science for a person's career or university prospects, regardless of whether their career or further study was in a scientific field. The high levels of agreement with these two statements might raise suspicions that respondents had not necessarily taken this fact on board and were, in fact, thinking of careers or further study specifically related to science. It is therefore worth noting that, even among young people who had little or no interest in a career in a scientific field, 70% agreed that studying science at school would be beneficial to a person's career prospects.[60] Similarly, even among people not interested in going on to study science in higher education, 75% agreed that doing well in science at school was important if someone wished to go on and study at university.

There were no significant differences between young men and young women in terms of their answers to questions about the potential benefits of learning science. The extent to which future benefits in terms of a career may have encouraged young people to learn science is discussed in more detail below.

9.5 Importance attached by parents to learning science at school

One factor which may encourage or discourage young people from learning science at school is the influence of their parents. To explore this issue, we asked the young people aged 14 to 18 about their parents' levels of interest in science. Evidence emerged that young people's interest in school science lessons varied according to their parents' perceived interest in science. Those who thought that their parents were interested in science were also more likely to claim that they found school science lessons interesting (Table 9-11). [61]

[60] For comparison, we also asked adults how much they agreed or disagreed that having a good understanding of science would help to improve a person's future career prospects. Overall, 78% agreed with 37% strongly agreeing. Again, adults were more likely than young people to agree about the value of learning science at school.

[61] Young people were not asked about their own level of interest in science in general, so their interest in school science lessons is used as a proxy for their overall interest in science. In terms of parental interest in

Table 9-11 Interest in school science lessons, by perceived parental interest in science

Base: All young people *Wellcome Trust Monitor*

	Young person thinks parents interested in science[62]		
	Yes	No	Total
Interest in school science lessons	%	%	%
Very interesting	30	14	23
Fairly interesting	57	60	58
Not very interesting	7	19	12
Not at all interesting	6	5	6
(SPONTANEOUS: Depends on science subject)	1	2	1
Unweighted base:	*222*	*149*	*374*
Weighted base:	*224*	*148*	*374*

The association between parental interest in science and young people's own interest in school science lessons was particularly strong in the case of young women (Table 9-12). Only 9% of young women who thought neither of their parents were interested in science said they themselves found science lessons very interesting compared to 19% of young men who thought that neither of their parents was interested. Based on the relatively small number of cases available for analysis it is not possible to draw any definitive conclusions regarding how the relationship between parental interest and the interest of young people in science varies by sex. However, it may be the case that parental encouragement is particularly important in encouraging young women to pursue what has traditionally been seen as a male subject.

Table 9-12 Interest in school science lessons, by sex and perceived parental interest in science

Base: All young people *Wellcome Trust Monitor*

	Male			Female		
	Young person thinks parent(s) interested in science	Young person thinks parent(s) not interested in science	Total	Young person thinks parent(s) interested in science	Young person thinks parent(s) not interested in science	Total
Interest in school science lessons	%	%	%	%	%	%
Very interesting	28	19	24	31	9	22
Fairly interesting	59	60	59	55	60	57
Not very interesting	7	19	12	7	20	12
Not at all interesting	6	1	4	6	9	7
(SPONTANEOUS: Depends on science subject)	0	1	*	1	2	2
Unweighted base:	*111*	*71*	*183*	*111*	*78*	*191*
Weighted base:	*116*	*76*	*193*	*108*	*72*	*181*

We also asked young people how important they thought their parents felt it was for them to do well in science at school. To take account of the fact that parents may vary in the extent to which they see doing well at school in any subject as important, we first asked young people how important their parents thought it was for them to do well at school or college in general. The figures in Table 9-13 are based on the majority of young people (84%) who said that their parents thought that it was very important for them to do well overall. Of these young people, nearly all (92%) said their

science, 31% identified both parents as being interested, 40% claimed neither parent was interested, and 19% and 11% respectively stated that their mother only or their father only was interested.

[62] During the interview, if the young person said their parents were interested in science they were asked whether it was their mother, father or both parents who were interested. Given the relatively small number of cases it was however necessary to combine answers into a simple yes/no distinction for the purpose of analysis.

parents thought it was important for them to do well in science at school, with just under half (47%) saying it was very important.

Table 9-13 Parental views of importance of doing well in science at school (according to young person)

Base: All young people thinking it was very important to their parents for them to do well at school *Wellcome Trust Monitor*

How important that young person does well in science at school	Total %
Very important	47
Fairly important	45
Not very important	4
Not at all important	3
Unweighted base:	*317*
Weighted base:	*316*

However, there is some evidence that parents may attach less importance to science compared with other core subjects such as maths and English (or at least be perceived by their children as doing so). We asked young people to pick from a list of subjects which they thought their parents would think it was most important for them to do well in. Young people were allowed to select up to three subjects. The top three subjects chosen were maths, English and science. These subjects were each chosen by a majority of young people whilst no other subject was chosen by more than 9% of respondents. However, whereas 88% of young people picked maths and 86% picked English as the subjects their parents considered most important, only 54% identified science.

Table 9-14 Top three subjects parents considered it important to do well in (according to young person)

Base: All young people *Wellcome Trust Monitor*

Subject	Total %
Maths	88
English	86
Science	54
Information technology/computing	9
Modern foreign languages (e.g. French, German)	7
Geography and history	6
Art	6
Business studies	5
Physical Education (PE)	4
Other subject	3
(SPONTANEOUS: Whatever subjects I want to do/am good at)	1
Unweighted base:	*374*
Weighted base:	*374*

Percentages add up to more than 100% as respondents could give more than three answers.

As will be seen in the following sections, only a minority of young people specifically identified parental encouragement (or the lack of it) as a factor which had encouraged or put them off learning science (Table 9-16 and Table 9-19). However, there is evidence that parental attitudes towards science (or at least their children's perceptions of these attitudes) may influence the young people's own attitudes towards learning science at school (Table 9-15). Young people who felt their parents thought it was important for them to do well in science at school were more likely than other young people to themselves say that it was very important for science to be taught in schools up until the age of 16.

Table 9-15 Perceived importance of science being taught to the age of 16, by parental view of importance of doing well in science

Base: All young people thinking it was very important to their parents for them to do well at school *Wellcome Trust Monitor*

	How important parents think it is to do well in science at school			
	Very important	Fairly important	Not very/at all important	Total
How important that science taught up to 16	%	%	%	%
Very important	73	46	21	57
Fairly important	26	52	46	39
Not very/at all important	1	2	33	4
Unweighted base:	*145*	*147*	*24*	*316*
Weighted base:	*149*	*143*	*23*	*315*

9.6 Factors that discourage young people from learning science

In order to try and find out more about what it is about school science lessons that might put young people off the subject, we presented respondents with a list of options and asked them the following question:

> This card lists some of the things which might put people off learning science at school. Which of them, if any, has discouraged you personally from learning science?

Young people could pick as many factors as they thought applied to them.

As Table 9-16 shows, the most common factor identified as putting young people off learning science was poor teaching; having a bad teacher was chosen by 47% of respondents as a factor that had put them off learning science. Unfortunately, on the basis of this study alone, it is not possible to identify what it was about the teaching that meant it was perceived to be bad and consequently put young people off the subject. The other main factors putting young people off science were finding the subject boring (chosen by 41%) and finding the subject difficult (chosen by 40%). Young women were particularly likely to say that finding the subject difficult had put them off learning science. This option was chosen by 47% of young women compared with 35% of young men.

Table 9-16 Factors that discouraged young people from learning science, by sex

Base: All young people *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Discouraging factor	%	%	%
Having a bad teacher	43	51	47
Finding the subject boring	40	42	41
Finding subject too difficult	35	47	40
Not taught about things relevant to real life	18	13	16
Not being able to do experiments	14	7	11
Not a popular subject with friends/classmates	11	9	10
Won't lead to a well paid career	7	4	5
Bad image, not cool	4	3	3
Other	3	1	2
(SPONTANEOUS: None of these/Nothing discouraged me)	16	11	13
Unweighted base:	*183*	*191*	*374*
Weighted base:	*193*	*181*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

In terms of encouraging the further take-up of science subjects, it is particularly important to try and identify what it is that may be putting off those young people who are not interested in studying

non-compulsory science. Table 9-17 presents the factors identified as off-putting, broken down by whether or not the young person expressed a willingness to study for non-compulsory science qualifications. Perhaps unsurprisingly, those who said they were willing to study non-compulsory science were more likely to say that nothing had put them off from learning science (23% compared with 8% of those who were not studying or planning to study non-compulsory science). Young people who had not engaged or were not planning to engage with non-compulsory science were particularly likely to identify finding the subject difficult or boring as factors which put them off learning science.

Table 9-17 Factors that discouraged young people from learning science, by willingness to study non-compulsory science

Base: All young people *Wellcome Trust Monitor*

	Willing to study non-compulsory science		
	Yes	No	Total
Discouraging factor	%	%	%
Having a bad teacher	44	51	47
Finding the subject boring	32	47	41
Finding subject too difficult	29	48	40
Not taught about things relevant to real life	16	15	16
Not being able to do experiments	9	12	11
Not a popular subject with friends/classmates	10	10	10
Won't lead to a well paid career	6	4	5
Bad image, not cool	2	3	3
Other	3	2	2
(SPONTANEOUS: None of these/Nothing discouraged me)	23	8	13
Unweighted base:	*157*	*199*	*374*
Weighted base:	*155*	*200*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

We might expect that the extent to which science is seen as difficult or boring may vary depending on the respondent's own aptitude for science. The Wellcome Trust Monitor did not contain a direct measure of scientific ability; however, the scores obtained by young people on the knowledge quiz (reported in Chapter 3) can be used as a proxy for scientific knowledge. Levels of interest in school science lessons were positively correlated wit scores on this quiz. For example, 30% of high scorers on the quiz said they found science lessons very interesting compared with just 12% of low scorers. Moreover, Table 9-18 shows that young people who scored badly on the quiz (in other words, those with lower levels of scientific knowledge) were particularly likely to mention the fact that science was difficult or boring as factors that had put them off. This finding perhaps suggests that science teaching needs to be adapted to better meet the needs of young people who do not necessarily find the subject intuitively easy or interesting.[63]

[63] However, it should be noted that, on the basis of cross-sectional evidence alone, it is of course not possible to ascertain whether it is aptitude or knowledge which increases enjoyment of science lessons or whether it is interest and enjoyment which encourages learning and the acquisition of knowledge. Furthermore, given the relatively small numbers of young people appearing in the high and low scoring categories we need to be cautious about overstating any findings based on differences in quiz score.

Table 9-18 Factors that discouraged young people from learning science, by score on science quiz

Base: All young people *Wellcome Trust Monitor*

	Score on science quiz (0–9)			
	Low (0–4)	Middle (5–7)	High (8–9)	Total
Discouraging factor	%	%	%	%
Having a bad teacher	37	47	54	47
Finding the subject boring	52	39	36	41
Finding subject too difficult	62	37	31	40
Not taught about things relevant to real life	9	18	16	16
Not being able to do experiments	8	11	12	11
Not a popular subject with friends/classmates	13	9	10	10
Won't lead to a well paid career	5	4	8	5
Bad image, not cool	6	3	2	3
Other	0	3	1	0
(SPONTANEOUS: None of these/Nothing discouraged me)	10	12	21	14
Unweighted base:	*62*	*228*	*83*	*373*
Weighted base:	*72*	*214*	*83*	*373*

Percentages add up to more than 100% as respondents could give more than one answer.

Overall, relatively few young people identified the subject's bad image (3%) or lack of popularity among their friends or classmates (10%) as factors that had put them off learning science (Table 9-18 Factors that discouraged young people from learning science, by score on science quiz). Once again, this perhaps suggests that attempts to increase the take-up of school science should focus on making lessons more accessible and applicable to those who find the subject difficult, rather than needing to re-brand the image of school science more generally.

9.7 Factors that encourage young people to learn science

We took a similar approach to exploring the factors which had encouraged young people to learn science at school, by presenting respondents with a list of possible options and asking them to pick as many as applied. Here too we specifically asked young people to choose those factors which had encouraged *them personally* to learn science.

Very few young people were unable to identify any factors which had encouraged them to learn science. Once again, the quality of teaching and the young person's own level of interest in science were found to be important in influencing young people's attitudes towards learning science (Table 9-19). Around half of the young people (52% in each case) identified having a good teacher and finding the subject interesting as factors which had encouraged them to learn science. The only other factor chosen by more than half of young people was the chance to do experiments. The importance attached to doing experiments is consistent with the most commonly given reason for why people said they enjoyed science more at secondary school compared with primary school (see Table 9-7).

Generally speaking, young men and young women tended to identify similar factors as having encouraged them to learn science. However, one significant difference on the basis of sex was that young women were more likely than young men to identify benefits to their future career as a reason for learning science.

Table 9-19 Factors that encouraged young people to learn science, by sex

Base: All young people *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Encouraging factor	%	%	%
Having a good teacher	52	52	52
The chance to carry out experiments	53	51	52
Being interested in the subject	50	53	52
The chance to learn about things relevant to real life	43	47	45
Getting good marks in coursework or exams	41	40	40
Benefits for future study/career	33	43	38
Finding the subject easy	25	20	23
Having friends interested in the subject	12	10	11
Parents' encouragement	9	11	10
Other	3	1	2
(None of these/Nothing encouraged me)	2	1	2
Unweighted base:	*183*	*191*	*374*
Weighted base:	*193*	*181*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

Table 9-20 presents responses to this question broken down by the young people's willingness to study for non-compulsory science qualifications. Perhaps not surprisingly those young people willing to study for non-compulsory science qualifications were significantly more likely than other young people to identify interest in the subject, benefits to their future career and finding the subject easy as factors which encouraged them. The one factor which stands out as having been more likely to be chosen by those young people who were not interested in studying non-compulsory science was the chance to do experiments (although the difference was not statistically significant). This again suggests the importance of experiments as a way of broadening the appeal of school science lessons, beyond those groups with a natural aptitude for or interest in this subject.

Table 9-20 Factors that encouraged young people to learn science, by willingness to study non-compulsory science

Base: All young people *Wellcome Trust Monitor*

	Willing to study non-compulsory science		
	Yes	No	Total
Encouraging factor	%	%	%
Having a good teacher	57	50	52
The chance to carry out experiments	46	57	52
Being interested in the subject	64	44	52
The chance to learn about things relevant to real life	53	41	45
Getting good marks in coursework or exams	47	36	40
Benefits for future study/career	56	27	38
Finding the subject easy	30	17	23
Having friends interested in the subject	12	10	11
Parents' encouragement	11	8	10
Other	2	2	2
(None of these/Nothing encouraged me)	1	2	2
Unweighted base:	*157*	*199*	*374*
Weighted base:	*155*	*200*	*374*

Percentages add up to more than 100% as respondents could give more than one answer.

This chapter has considered a range of factors which might influence young people's attitudes towards learning science at school, many of which are likely to be interconnected. For example, we have found evidence of overlap between parental interest in science and the young person's own level of interest. In order to isolate the individual factors associated with a young person expressing willingness to study for non-compulsory science qualifications, we used multivariate

analysis and ran a logistic regression, to identify the factors which continued to be independently associated with the decision to study non-compulsory science after controlling for all other relevant factors. In order to identify those factors associated with the decision to study non-compulsory science specifically, rather than to engage in non-compulsory education in any subject, our analysis is restricted to a comparison of those young people who were currently studying (or thinking about studying) non-compulsory science and those who were currently studying (or thinking about studying) only non-science subjects, as part of their non-compulsory education.[64] Young people were more likely to consider pursuing science (rather than non-science subjects) as part of their non-compulsory education if they found science lessons interesting, if they had an aptitude for science (as measured by scores on the knowledge science quiz), if they agreed that science was a popular subject among young people and if they disagreed with the proportion that they rarely used the science they learnt at school. Full details of the multivariate analysis can be found in the appendix to this chapter.

9.8 Conclusions

Young people's attitudes towards school science as measured in this baseline study were generally positive, with the majority indicating that they found science lessons at least fairly interesting and the potential benefits of learning science at school, in terms of future educational and career prospects, broadly recognised. While parental encouragement and personal interest in science were clearly important in encouraging enthusiasm for this subject, the quality of teaching and the content of lessons also made a difference. This suggests that, to improve perceptions of science education, resources need to be devoted to making this subject, and the ways in which it is taught, more appealing and accessible to those groups who might otherwise perceive it to be boring or difficult.

[64] As has been the case throughout this report, given the small number of cases available for analysis, it is not possible to separate out those young people who are already studying science at a non-compulsory level from younger respondents who have merely expressed an interest in doing so.

Appendix

Table 9-21 Willingness to study non-compulsory science (Yes=1 No=0)

Base: All young people interested in studying for a qualification at Level 3 or above *Wellcome Trust Monitor*

	co-efficient	standard error	p value
Sex (male)			
Female	-0.34	0.39	0.390
Age (14-16)			
17-18	-0.74*	0.36	0.047
Parents' education (below A level)			
A level or above	0.56	0.31	0.072
How interesting school science lessons (not very/at all)			
Fairly	0.21	0.42	0.619
Very	1.84**	0.60	0.004
Parents thought to be interested in science (no)			
Yes	0.08	0.29	0.797
Score on science quiz (Low 0-4)			
Middle (5-7)	0.67	0.50	0.183
High (8-9)	1.51*	0.56	0.010
Agree science a popular subject among young people	-0.54**	0.19	0.008
Agree rarely use science learn at school in day to day life	0.36*	0.15	0.021
Agree science will improve future career prospects	0.05	0.26	0.858
Agree science important if want to go on to university	0.03	0.15	0.857

Unweighted base: 244

*=significant at 95% level **=significant at 99% level

10 Attitudes towards science as a career

Sarah Butt

10.1 Summary

- A majority of young people aged 14 to 18 (81%) said they thought science was a good area of employment for young people to go into. This was even true for those (71%) who did not personally express interest in a career in science.
- The main reasons why science was considered a good choice of career were because it was interesting and because there were lots of different types of job available.
- A majority of young people aged 14 to 18 (82%) agreed scientists have a wide range of jobs to choose from, whilst 73% agreed scientists can find jobs anywhere in the world.
- The vast majority of young people aged 14 to 18 (93%) agreed that scientists make a valuable contribution to society, with 36% agreeing strongly.
- Only a minority of young people aged 14 to 18 thought scientists were poorly paid compared with other jobs (11%) or came from a limited range of social backgrounds (7%). Even among young people who themselves came from lower social backgrounds (whose parents did not have post-16 qualifications), only a minority (5%) disagreed with the view that scientists come from a wide range of social backgrounds.
- 44% of young people aged 14 to 18 said they were very or fairly interested in having a career in science. When asked about the sort of science career they might be interested in careers in medicine and forensic science were commonly mentioned.
- Young people aged 14 to 18 were more likely to express interest in a scientific career if they thought their parents were interested in science or if they found science lessons interesting at school.

10.2 Introduction

In addition to increasing the take-up and enjoyment of science subjects at school, policy makers have an interest in increasing the number of young people who choose to go into scientific careers. In this chapter we explore young people's attitudes towards a career in science. In the first half of the chapter we consider young people's general attitudes towards science as a career including whether they consider science to be a good area of employment for young people to go into and the reasons why this may or may not be the case. We also examine levels of agreement with a range of statements about scientists and their work, to explore young people's perceptions of scientists and scientific careers. In the second half of the chapter, we examine whether young people are themselves interested in pursuing a career in science and compare the characteristics of those who say they would be interested in such a career with those who say they would not. Finally, in order to establish whether there are any particular perceptions of scientists which may be discouraging young people from pursuing a career in science, we examine whether perceptions of scientists differ on the basis of whether the young person themselves claims to be interested in a scientific career or not.

10.3 Views of science as a career choice for young people

To explore perceptions of science as a career choice for young people in general, we asked 14 to 18 year old respondents to the survey the following question:

> Thinking about young people in general, do you think that science is a good area of employment for young people to go into?

Young people generally viewed science as a good career choice for young people. Overall, 81% of the young people stated that science was a good area of employment for young people to go into. The proportions of positive answers to this question were consistently high among both men and women and across age groups. The proportion of positive answers was higher among those young people who personally expressed interest in a scientific career (as explored in the following section). Nevertheless, even among those young people who said they were not very or not at all interested in a career in science, 71% stated that they thought this was a good area of employment for young people in general. Based on a simple yes or no response it is of course not possible to tell how strongly the young people felt that science was a good career choice. However, the very high incidence of positive responses is at least indicative that young people recognise the potential merits of a career in science.

We asked those young people who responded positively to the above question why they thought science was a good area of employment for young people to go into. Respondents were asked to pick as many reasons as they thought applied from a list of options on a show card. Table 10-1 below shows that the most commonly selected reasons related to the perceptions of science as an interesting, exciting or varied career. 62% thought science was a good area of employment because it was interesting, whilst other frequently chosen reasons were the wide range of different jobs available (55%) and the opportunities available for making exciting new discoveries (53%). The relatively low proportions of young people identifying a good work-life balance or security as reasons that made a scientific career a good choice for young people are perhaps not surprising; we would not necessarily expect these features of a job to be seen as a priority by young people aged between 14 and 18, most of whom will have had no experience of full-time employment and the practical considerations involved.

Table 10-1 Reasons why science identified as a good area of employment for young people

Base: All young people who think science is a good area of employment *Wellcome Trust Monitor*

	Total
Why science a good area of employment	%
Interesting	62
Lots of different types of job available	55
Opportunities to make exciting new discoveries	53
Well paid	47
Opportunity to make a useful contribution to society	44
Well respected/high status	31
Personally satisfying	24
Good work/life balance	15
Secure	13
Other reason	*
Unweighted base:	*304*
Weighted base:	*302*

Among both young men and young women, the most commonly chosen reason for thinking science was a good area of employment to go into was because it was interesting (Table 10-2). There were however some differences on the basis of sex with, for example, young men more likely than young women to choose the fact that they though science was well paid. Young women were more likely than young men to choose the opportunity to make a useful contribution for society as a reason for thinking science was a good area of employment (although in this instance the difference was not statistically significant). These differences may reflect general differences in what young men and young women see as being priorities for a good career. However, as will be discussed later in this chapter, there is also some evidence that young men and young women differ in their perceptions of scientists and their work, including levels of pay, which may have influenced their answers to this question.

Table 10-2 Reasons why science identified as a good area of employment for young people, by sex

Base: All young people who think science is a good area of employment *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Why science a good area of employment	%	%	%
Interesting	62	62	62
Lots of different types of job available	48	61	55
Opportunities to make exciting new discoveries	49	57	53
Well paid	55	39	47
Opportunity to make a useful contribution to society	39	49	44
Well respected/high status	35	26	31
Personally satisfying	26	23	24
Good work/life balance	13	16	15
Secure	15	10	13
Other reason	1	0	*
Unweighted base:	*142*	*162*	*304*
Weighted base:	*152*	*152*	*302*

Those young people who stated that they did not think science was a good area of employment to go into were also given the opportunity to say why they thought that this was the case. Given the highly positive perceptions of science as an area of employment reported above, relatively few respondents were actually asked this question. Nevertheless, whilst we do need to be cautious about drawing conclusions based on a small number of responses, we can at least gain some idea as to why young people may be put off by the idea of a scientific career. Table 10-3 shows that the most common reason for thinking that science was not a good area of employment for young people was the belief that there were only a limited range of job opportunities available.

Table 10-3 Reasons why science not identified as a good area of employment for young people

Base: All young people who think science is not a good area of employment *Wellcome Trust Monitor*

	Total
Why science not a good area of employment	%
Limited range of job opportunities available	55
Boring	32
Need too many qualifications	30
Difficult area for people of my background to get into	22
Too competitive, hard to get in to	18
No real chance of making a difference	16
Long hours	12
Poorly paid	11
Bad image, uncool	6
Other reason	1
Unweighted base:	*55*
Weighted base:	*56*

10.4 Perceptions of a scientific career

In order to gain a better idea of what young people thought about some key aspects of a career in science, we presented respondents with a list of statements about scientists and their work and asked them how much they agreed or disagreed with each one. The statements all related to the work that scientists do and the job opportunities available to them rather than the personal characteristics of people working in the area of science. Responses to these questions further suggest that young people generally hold positive attitudes towards science as a career choice.

The range of job opportunities available

Table 10-1 highlighted young people's positive perceptions regarding the range of job opportunities available to scientists with this one of the most commonly given reasons as to why science was a good area of employment for young people to go into. To explore this issue further we asked respondents how much they agreed or disagreed with three statements regarding the range of job opportunities available to scientists, as set out below.

Scientists have a wide range of jobs to choose from

Scientists can find jobs anywhere in the world

There are few jobs available for scientists in private companies

A majority of the young people interviewed agreed that scientists have a wide range of jobs to choose from, with a quarter strongly agreeing that this was the case (Table 10-4). In addition, almost three-quarters (73%)[65] either agreed or strongly agreed that scientists could find jobs anywhere in the world. Responses to the idea that there were job opportunities available for scientists in private companies were more mixed, with a relatively high proportion of young people neither agreeing nor disagreeing with this statement or indicating that they did not know if this was the case. This perhaps suggests that, whilst there is a general perception that there is a wide range of scientific jobs available, awareness of what sorts of opportunities these might entail and where these positions might be based is more limited.

The level of agreement with these three statements was consistently high regardless of the age or sex of the young person interviewed.[66] The next section of this chapter looks in more detail at how perceptions of scientists and their career opportunities varied depending on whether the young person themselves expressed an interest in a scientific career.

[65] Figures reported in the text differ slightly from those in Table 10-4 because of rounding.

[66] The one significant finding identified was that those aged between 14 and 16 were less likely than 17 and 18 year olds to agree that scientists could find jobs anywhere in the world.

Table 10-4 Perceptions of the range of job opportunities available to scientists

Base: All young people *Wellcome Trust Monitor*

	Total %
Scientists have a wide range of jobs to choose from	
Strongly agree	25
Agree	57
Neither agree nor disagree	10
Disagree	6
Strongly disagree	1
Don't know	1
Scientists can find jobs anywhere in the world	
Strongly agree	15
Agree	58
Neither agree nor disagree	12
Disagree	11
Strongly disagree	1
Don't know	2
There are few jobs available for scientists in private companies	
Strongly agree	2
Agree	24
Neither agree nor disagree	37
Disagree	27
Strongly disagree	3
Don't know	8
Unweighted base:	*374*
Weighted base:	*374*

The contribution that scientists make to society

We also asked respondents how much they agreed or disagreed with the idea that scientists make a valuable contribution to society. There was almost universal agreement with this statement, with over a third of respondents (36%) strongly agreeing that this was the case and only 1% disagreeing (Table 10-5).

Overall, there was no difference in the proportion of young men and young women agreeing that scientists make a valuable contribution to society. However, young men (41%) were more likely than young women (30%) to strongly agree with this statement. This is despite the fact that young women were more likely than young men to mention the opportunity to make a contribution to society as a reason why science was a good area of employment to go into (Table 10-2).

Table 10-5 Perceptions of the contribution scientists make to society, by sex

Base: All young people *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Scientists make a valuable contribution to society	%	%	%
Strongly agree	41	30	36
Agree	53	60	57
Neither agree nor disagree	5	5	5
Disagree	*	2	1
Strongly disagree	0	0	0
Don't know	0	3	1
Unweighted base:	*183*	*191*	*374*
Weighted base:	*193*	*181*	*374*

How well paid scientists are

The young people we interviewed did not appear to have concerns about how well paid (or otherwise) scientists are. As Table 10-1 demonstrated, a significant proportion of young people mentioned being well paid as one of the reasons why science was a good area of employment for young people to go into. When specifically asked how much they agreed or disagreed that scientists are poorly paid, compared with other jobs, just over half of respondents (53%) disagreed with this negative statement. Only a small minority agreed that scientists were poorly paid. Very few respondents had strong views on this issue and almost a third (31%) said that they neither agreed nor disagreed, possibly suggesting a lack of knowledge about this issue (Table 10-6).

Young men were more likely than young women to disagree that scientists were poorly paid. This difference in perception may have contributed to young men being more likely than young women to mention the fact that scientists are well paid as a reason why science was a good area of employment for young people to go into.

Table 10-6 Perceptions of whether scientists poorly paid, by sex

Base: All young people *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Compared with other jobs, scientists are poorly paid	%	%	%
Strongly agree	1	1	1
Agree	9	12	10
Neither agree nor disagree	29	33	31
Disagree	47	42	45
Strongly disagree	12	3	8
Don't know	3	10	6
Unweighted base:	*183*	*191*	*374*
Weighted base:	*193*	*181*	*374*

Whether scientists come from a range of different backgrounds

One factor which might potentially put young people off pursuing a career in science would be a perception that scientists only come from particular social backgrounds; a young person who felt that they came from a different social background might consequently conclude that science was not a suitable career for them. However, it appears that the perception that scientists only come from specific social backgrounds was not one which was commonly held by the young people we interviewed. The majority of young people (72%) agreed that scientists come from a wide range of social backgrounds. Perhaps more importantly only 7% disagreed, with no one disagreeing strongly (Table 10-7).

Table 10-7 Perceptions of whether scientists come from a wide range of social backgrounds

Base: All young people *Wellcome Trust Monitor*

Scientists come from a wide range of social backgrounds	Total %
Strongly agree	14
Agree	58
Neither agree nor disagree	19
Disagree	7
Strongly disagree	0
Don't know	3
Unweighted base:	*374*
Weighted base:	*374*

We used parental education as a measure of the young people's own social backgrounds, to explore whether perceptions of scientists varied on this basis.[67] Those young people whose parents had not obtained any qualifications at A level or above were less likely to strongly agree that scientists come from a wide range of social backgrounds compared with young people whose parents were educated to A level standard or above. However, the overall level of agreement was similar across the two groups and, among the group with less educated parents, only 5% disagreed that scientists came from a wide range of social backgrounds (Table 10-8).

Table 10-8 Perceptions of whether scientists come from a wide range of social backgrounds, by parental education

Base: All young people *Wellcome Trust Monitor*

	Parents' highest educational qualification		
	Below A level	A level or above	Total
Scientists come from a wide range of social backgrounds	%	%	%
Strongly agree	8	21	15
Agree	64	57	60
Neither agree nor disagree	22	14	18
Disagree	5	7	6
Strongly disagree	0	0	0
Don't know	1	1	1
Unweighted base:	*158*	*147*	*305*
Weighted base:	*154*	*147*	*302*

The data reported above suggests that young people do generally hold positive views about scientists and their work. However, the high level of agreement with many of the positive statements shown may also partly reflect acquiescence bias among respondents (a tendency to agree with whatever statement they are presented with), especially if the topics being discussed do not relate to issues the respondent has given much previous thought to or holds strong views about. It should be borne in mind that a relatively small proportion of respondents strongly agreed with any of the positive statements about scientists and their work (although over a third – 36% - did strongly agree that scientists make a valuable contribution to society). Nevertheless, even if the figures presented above do over-represent the true extent of positive feeling towards science as a career, they do at least suggest that young people do not hold negative attitudes towards science which may be putting them off from pursuing this as a career option.

[67] We collected information about parents' occupations alongside their education. However, given that this information was often provided by the young person rather than a parent directly, it was felt that the information on education (being simpler) was likely to be more reliable. This measure relates to the highest educational qualification obtained by any resident parent.

10.5 Interest in a scientific career

Despite the widely held perception that science is a good area of employment for young people generally, inevitably not all young people will themselves be interested in pursuing a scientific career. In the final section of this chapter we compare the characteristics of young people who said they were and were not interested in a career in science. We also examine how the perceptions of scientists held by these two groups differ, in order to ascertain whether there are particular perceptions which may be putting young people off a career in science (or encouraging them to pursue science as a career).

Overall, 44% of the young people interviewed claimed to be personally interested in a career in science, with 18% saying they were very interested (Table 10-9). Those young people who expressed interest in a scientific career were asked an open ended question regarding which scientific careers they might be interested in. Their responses are presented in Table 10-10 below. A wide range of careers were mentioned with careers in medicine, forensic science and engineering being the most popular. The apparent popularity of medicine as a career may partly reflect the fact that, through taking part in a survey about medical research, medicine was likely to be at the forefront of respondents' minds. In a recent study of 11-21 year olds, 33% of respondents indicated that they were interested in a career in science (Haste, 2004); this might reflect the fact that younger teenagers, not questioned as part of the Wellcome Trust Monitor, are less clear about their career aspirations or are less likely to be interested in a career in science, although it should be noted that the survey was also completed by young people aged between 19 and 21 years, a group which did not take part in this section of the Wellcome Trust Monitor.

Table 10-9 Self-reported interest in a scientific career

Base: All young people *Wellcome Trust Monitor*

Level of interest in a scientific career	Total %
Very interested	18
Fairly interested	26
Not very interested	36
Not at all interested	20
Unweighted base:	*374*
Weighted base:	*374*

Table 10-10 Proportions interested in different scientific careers

Base: All young people interested in a scientific career — *Wellcome Trust Monitor*

Career	Total %
Medicine (All)	27
Medicine – specific career (other than nursing)	10
Medicine – general	10
Dentistry	3
Nursing/midwifery	8
Forensics (including any aspect of police work)	13
Engineering	10
Research	7
Vet	5
Teacher	5
Conservation (including any career involving environment)	4
Animal science – other (e.g. zoologist)	4
Sports science/physiotherapy	4
Computing/IT/programming	4
Psychiatry/psychology	3
Space explorer/astronomer	3
Armed Forces	2
Technical or craft occupations	2
Chemist	2
Mentioned career in particular subject	
Physics	6
Biology	3
Chemistry	3
Other career	18
Vague or irrelevant answer	8
Unweighted base:	*166*
Weighted base:	*173*

Overall, young men and young women were equally likely to express personal interest in a scientific career. 45% of young men and 44% of young women said that they were very or fairly interested in a career in science. However, there was some differences in the types of career that young men and young women appear to have been thinking about when answering this question. In particular, young women were significantly more likely than young men to express interest in a career in medicine. 45% of young women expressed interest in some type of medical career (including dentistry) compared with only 10% of young men.

Table 10-11 Proportions interested in different scientific careers, by sex

Base: All young people interested in a scientific career — *Wellcome Trust Monitor*

	Sex		
	Male	Female	Total
Career	%	%	%
Medicine (All)	10	45	27
Medicine – specific career (other than nursing)	5	16	10
Medicine – general	5	16	10
Nursing/midwifery	1	16	8
Dentistry	1	5	3
Forensics (including any aspect of police work)	14	11	13
Engineering	14	6	10
Research	6	8	7
Vet	2	9	5
Teacher	3	6	5
Conservation (including any career involving environment)	4	4	4
Animal science – other (e.g. zoologist)	0	8	4
Sports science/physiotherapy	7	1	4
Computing/IT/programming	7	0	4
Psychiatry/psychology	2	5	3
Space explorer/astronomer	5	2	3
Armed Forces	4	0	2
Technical or craft occupations	3	0	2
Chemist	3	1	2
Mentioned career in particular subject			
Physics	6	5	6
Biology	5	2	3
Chemistry	2	3	3
Other career	18	18	18
Vague or irrelevant answer	10	6	8
Don't know	6	3	4
Unweighted base:	*86*	*80*	*166*
Weighted base:	*88*	*85*	*173*

In assessing the extent of respondents' interest in a scientific career we should bear in mind that many young people may not yet have started to think seriously about their future career plans. Comparing interest on the basis of age we find that 14 to 16 year olds were more likely than 17 to 18 year olds to express interest in a scientific career and in particular to say that they were "fairly" interested (although, the differences were not statistically significant). The younger age group may have been especially unprepared to definitely rule in or rule out certain careers at this stage, especially as they were not being asked to make a choice between a career in science and an alternative. Nevertheless, our measure does at least provide a useful indication of the current willingness of young people to consider a scientific career.

Table 10-12 Interest in a scientific career, by age

Base: All young people — *Wellcome Trust Monitor*

	Age		
	14-16	17-18	Total
How interested in scientific career	%	%	%
Very interested	18	20	18
Fairly interested	31	19	26
Not very interested	37	33	36
Not at all interested	14	28	20
Unweighted base:	*259*	*115*	*374*
Weighted base:	*223*	*151*	*374*

Using parental education as a proxy for social background, we can see some evidence of an association between social background and interest in a science career. Young people with at least one resident parent with a qualification at A level or above were more likely to say they were very or fairly interested in a scientific career compared with young people whose parents did not have a qualification at this level (Table 10-13). This association may perhaps partly be explained by the fact that young people whose parents had higher level qualifications were also more likely to say that they thought their parents were interested in science. Table 10-14 shows that young people who thought their parents were interested in science were more likely to say that they themselves were interested in a scientific career.[68]

Table 10-13 Interest in a scientific career, by parental education

Base: All young people *Wellcome Trust Monitor*

	Parents' highest educational qualification		
	Below A level	A level or above	Total
How interested in scientific career	%	%	%
Very interested	16	24	20
Fairly interested	18	33	25
Not very interested	46	32	39
Not at all interested	20	11	15
Unweighted base:	*158*	*147*	*305*
Weighted base:	*154*	*147*	*302*

Table 10-14 Young people's interest in a scientific career, by perceived parental interest in science

Base: All young people *Wellcome Trust Monitor*

	Young person thinks parents interested in science		
	Yes	No	Total
How interested in scientific career	%	%	%
Very interested	22	12	18
Fairly interested	32	16	26
Not very interested	29	46	36
Not at all interested	16	25	20
Unweighted base:	*222*	*149*	*371*
Weighted base:	*224*	*148*	*372*

Having an interest in science is clearly likely to be an important consideration when deciding whether to pursue a scientific career. As we would expect, there was a strong association between young people finding school science lessons interesting and expressing interest in a scientific career (Table 10-15).

[68] Unlike adult respondents, young people were not asked whether their parents had (or had ever had) a scientific career.

Table 10-15 Interest in a scientific career, by interest in school science lessons

Base: All young people *Wellcome Trust Monitor*

	How interesting respondent found school science lessons			
	Very interesting	Fairly interesting	Not very/at all interesting	Total
How interested in a scientific career	%	%	%	%
Very interested	45	12	6	18
Fairly interested	29	29	10	26
Not very interested	19	45	30	36
Not at all interested	6	14	54	19
Unweighted base:	*80*	*221*	*68*	*369*
Weighted base:	*87*	*217*	*66*	*370*

Further evidence of the importance of having an interest in science can be found by comparing the reasons why young people thought science was a good area of employment to go into, depending on whether they themselves expressed interest in a scientific career. One of the main differences apparent from Table 10-16 is that those young people who expressed interest in a scientific career were more likely to mention the fact that such careers are interesting as a reason why science would be a good area of employment. Young people claiming interest in a scientific career were also more likely than those not interested to mention the fact that there were lots of different types of job available. It is possible that those young people with an interest in a career in science might have sought information about the range of jobs available, and thus be better informed about this issue.

Table 10-16 Reasons why science is a good area of employment for young people, by personal interest in a scientific career

Base: All young people *Wellcome Trust Monitor*

	How interested in a scientific career		
	Very/fairly interested	Not very/at all interested	Total
Why science is a good area of employment	%	%	%
Interesting	75	49	62
Lots of different types of job available	61	48	55
Opportunities to make exciting new discoveries	49	56	53
Well paid	51	42	47
Opportunity to make a useful contribution to society	42	46	44
Well respected/high status	32	29	31
Personally satisfying	25	24	24
Good work/life balance	17	13	15
Secure	17	9	13
Other reason	0	1	*
Unweighted base:	*160*	*144*	*304*
Weighted base:	*154*	*148*	*302*

Young people were not specifically asked why they themselves were not interested in a scientific career and the number of young people who did not think science was a good career for young people in general is too small to allow further analysis of the reasons given for this judgement. However, we can explore whether perceptions of scientists differ on the basis of whether the young people themselves are interested in a scientific career and hence consider whether negative perceptions of what the job of a scientist does or does not involve may have put some people off a career in science (Table 10-17).

In fact the evidence suggests that even those young people who said they were not themselves interested in a career in science nevertheless hold positive attitudes towards scientists and what they do (although it is of course possible that young people may feel negatively towards other

aspects of scientists and their work not covered by this study). There were no significant differences between those claiming to be interested in a scientific career or not in terms of their attitudes towards whether scientists are poorly paid. Although young people expressing an interest in a science career were more likely to strongly agree that scientists came from a wide range of social backgrounds (21% compared with 8%), there was no difference between the two groups in the proportion of young people disagreeing with this statement and thus holding a negative view. Young people interested in a career in science were more likely to agree that scientists had a wide range of jobs to choose from, could work all over the world, and make a valuable contribution to society.[69] However, it remains the case that even among those young people who said they were not interested in a scientific career, a majority nevertheless agreed with each of these positive statements about science.

Table 10-17 Perceptions of scientists, by whether respondent personally interested in a scientific career

Base: All young people *Wellcome Trust Monitor*

	How interested in a scientific career		
	Very/fairly interested	Not very/at all interested	Total
% agreeing…	%	%	%
Scientists have a wide range of jobs to choose from	95	72	82
Compared with other jobs, scientists are poorly paid	8	13	11
Scientists make a valuable contribution to society	98	88	93
There are few jobs available for scientists in private companies	23	28	26
Scientists can find jobs anywhere in the world	78	71	74
Scientists come from a wide range of social backgrounds	77	68	72
Unweighted base:	*173*	*201*	*374*
Weighted base:	*166*	*208*	*374*

10.6 Conclusions

Young people aged 14 to 18 held a broadly positive view of science as a career choice. Perceptions of scientists and the work that they do were particularly positive among young people who themselves expressed interest in having a career in science. However, even among young people who were not personally interested in such a career, there was widespread recognition that science could be a good area of employment for young people to go into.

Inevitably, not all young people will ever be interested in personally pursuing a scientific career. As we might expect, one key factor which was associated with being interested in a scientific career was the individual's level of interest in science more generally. This interest may have resulted from having parents who are interested in science or finding science lessons at school interesting. Fostering and then maintaining an interest in science among young people is therefore likely to be crucial in encouraging young people to consider a scientific career and improving take-up of such careers.

[69] Young people were asked for their perceptions of scientists before having to say whether they themselves were interested in a scientific career, thus helping to reduce the possibility that respondents simply expressed perceptions consistent with their own career aspirations and self-image.

Appendix A

Technical details of the survey

Sarah Butt

This appendix summarises key details about the methodology, questionnaire design, sampling and weighting used for the Wellcome Trust Monitor. Full details, including all fieldwork documents and the interview questionnaire can be found in the separate Technical Report (Clery et al, 2011).

A.1 Sample

The Wellcome Trust Monitor survey was made up of two samples – one of adults aged 18 years and over, and one of young people aged between 14-18 years. Sampling of both populations was undertaken at designated "core" addresses, while focussed enumeration was employed to obtain additional young people.

The sample for the Wellcome Trust Monitor survey covered England, Wales, Scotland (south of the Caledonian Canal) and Northern Ireland. The sample was drawn from the Postcode Address File (PAF) sample. At each sampled "core" address the interviewer listed all adults aged 18 and over and selected one adult respondent using a computer-generated random selection procedure. Where there were two or more "dwelling units" at the selected address, interviewers first had to select one dwelling unit using the same random procedure. They then selected one adult aged 18 or over to interview at the selected dwelling unit. If an interview was achieved with the selected adult respondent, the interviewer then selected (if available) one young person aged between 14-18 years, at random, to complete the young person interview[70]. Interviews were only carried out with the selected 14-18 year old respondent at core addresses if a productive adult interview was obtained. The core samples were designed to be representative of the general adult population aged 18+ and the population of young people aged between 14-18 years, living in private households in the United Kingdom.

The core sample

The sample of 2,650 core addresses was drawn from the 'small user' Postcode Address File (PAF)[71], a list of all addresses (delivery points) in the United Kingdom that receive less than 25 items of mail per day.

The sample was drawn in two stages: at the first stage the Primary Sampling Units (PSUs) were selected, at the second stage addresses were selected within the sampled PSUs. Each PSU was defined as a postcode sector or group of sectors. Postcode sectors containing fewer than 1,000 addresses were grouped with neighbouring sectors to ensure selected addresses were not too close to one another. The grouped sectors were treated as a single PSU.

The sample file was sorted prior to sample selection. The stratifiers used were Government Office Region (GOR), the proportion of the population with qualifications at A-level and above and the proportion of the population in owner occupied households. The latter two stratifiers were based on 2001 census data.

[70] An 18 year old at a core address was initially classified as an adult. If they were not selected as the adult respondent they became eligible for the young person sample.
[71] The version of the PAF used was Royal Mail postcode update 45.

The first stratifier was region; the PSUs were first sorted into 13 regions (nine GORs in England, plus Scotland, Wales and Northern Ireland). Postcode sectors that spanned regional boundaries were allocated to the region containing the most addresses. Within each of the 13 regions the PSUs were then listed in increasing order of the proportion of the population with qualifications at A-level and above. Cut-off points were drawn to create three equal sized bands (in terms of addresses). Within each of the 39 bands the PSUs were listed in increasing order of the proportion of the population in owner-occupied accommodation.

Once the sampling frame had been stratified, 106 PSUs were selected with probability proportional to the number of addresses within them[72]. Twenty-five addresses were then selected systematically from each sampled PSU, giving a total of 2,650 core addresses.

Focussed enumeration

To obtain the required sample of young people aged between 14-18 years, either two or four focussed enumeration (FE) addresses were selected for each core address. The selection was based on those addresses listed either directly before or after the core address on the PAF. In 50% of cases, four FE addresses were designated and in the other 50% two FE addresses were designated, meaning that a total of 7,950 FE addresses were specified. At each core address, interviewers were instructed to ask about the presence of young people aged 14-18 at the associated FE addresses. If the core address confirmed that there were no young people of the required age at the FE address, or the FE address was too far to be seen from the core, or the FE address could be identified as deadwood then interviewers did not need to follow up at the FE address. In all other cases interviewers were asked to visit the FE address to further screen for the presence of young people aged 14-18 years and, where available, to select one at random to undertake the young person interview. If the core address was deadwood or otherwise unproductive interviewers were still asked to visit the associated FE addresses.

Historical database

The sampling contractor flags any addresses previously sampled for any NatCen general population surveys. These addresses are then excluded from subsequent surveys for a period of three years. This is to prevent respondents from being sampled too often. Any addresses flagged on the NatCen historical database were excluded before sampling addresses for both the core and FE samples. The selected addresses for the core and FE samples were both added to the NatCen historical database.

A.2 The questionnaire

The questionnaire was designed to be administered face to face using Computer Assisted Personal Interviewing (CAPI). Two different questionnaires were designed, one for adults and one for young people. The two questionnaires contained a large number of common questions enabling us to compare the attitudes of adults and young people. However, the adults were asked some topics or questions which were not included on the young person questionnaire whilst the young person questionnaire contained some additional questions about their attitudes towards science in general which were not included on the adult questionnaire. All of the questions were designed with repetition in mind, as it was intended that this would be a baseline survey, to be repeated every three years.

The main topics covered in both the adult and young person interview were:

[72] Expanded by the Multiple Occupancy Indictor (MOI) in Scotland.

- Introduction to medical research – this module explored the concept of medical research and gauged people's general awareness and knowledge of and interest in medical research.
- Knowledge of medical research – this module explored in more detail knowledge and perceptions of how medical research operates in Britain, including who is involved and how it is regulated.
- Engagement with medical research – this module explored the extent to which people engage with medical research in their daily lives and in what ways. It asked about interest in particular areas of medical research, whether respondents had sought or received any information about medical research and if so, from what sources and for what reason. There were some questions about people's engagement in cultural activities with a medical or scientific focus (watching TV programmes, reading books etc.)
- Information sources – preferences and trust – this module explored how people would like to receive information about medical research, which sources they would trust to provide accurate information and the reasons for this.[73]
- Support for medical research – this module aimed to assess how much respondents would support different types of medical research.
- Expectations, hopes and concerns – this module explored expectations for future developments in science and medicine, including what medical research will deliver in terms of particular illnesses and diseases, and concerns about future developments.
- Scientific literacy – this module explored people's understanding of what it means to study something scientifically and contained a quiz to measure respondents' scientific knowledge.
- Genetics – this module explored attitudes towards genetics including the issue of genetic testing. Attitudes towards genetics was a particular focus of this baseline wave of the Wellcome Trust Monitor.

In addition, three topics were asked just of adult respondents:

- Value of science education – this module asked adult respondents a couple of questions to explore their attitudes to science education in schools.
- Involvement in medical research – this module asked respondents whether they had ever taken part in a medical research project, whether they would consider taking part in a range of projects in the future and the types of concerns about this they might have.
- Pseudoscience – this module asked whether the respondent has used a range of alternative and complementary medicines including homeopathy, and their perceptions of the effectiveness of homeopathy. It also asked respondents about their views about another pseudoscientific practice – horoscopes.

The modules asked only of young people were:

- Out of school activities – this module asked young people about how often they engaged in science related activities such as visiting science museums.
- Current/future study plans – this module collected background information about the young person's education so far, as well as asking about any future plans to study science.
- Experience of learning science at school – this module asked young people how interested they are/were in science at school and about the factors which either encouraged or discouraged them from learning science.
- Peer pressure – this module was designed to gauge how interested the young person's friends and family are in science. This may in turn influence young people's own attitudes.

[73] The trust questions were asked of adult respondents only.

- Science as a career – this section asked young people for their views on the advantages and disadvantages of a scientific career and whether they would be interested in pursuing a career in science.

In addition to questions on medical research we collected information about respondents' education, occupation and income (adults only), religion, ethnicity, health, family status, newspaper readership and Internet use. We also collected background information about parents' occupation and education for any young person interviewed. The latter information was either collected from the young person or, if they were willing, directly from a parent or guardian,

The average interview length for adult respondents was 53 minutes. The average interview length for young people was 39 minutes.

A.3 Piloting

The questions for the survey were primarily new, having been designed specifically for this study.[74] These questions therefore underwent an extensive and iterative process of development and testing.

A cognitive pilot took place in June 2008. The primary aim was to test how well the new questions worked in terms of: the respondents' understanding of the terms or concepts used in the questions; questions meaning the same thing to all respondents; questions being clear; and questions being easy for respondents to answer. Interviewers were asked to recruit participants on the basis of specific age and sex quotas and then to administer a paper questionnaire, probing for respondent feedback on each question. Interviewing took place in a mix of urban and rural areas and interviewers were asked to try and obtain interviews in both high income and low income areas.

A full scale CAPI dress rehearsal pilot took place in September 2008. This allowed us to test the full range of survey procedures (including focussed enumeration) as well as providing a further opportunity to test new questions. It also provided us with a reliable estimate of the questionnaire length. Following the dress rehearsal, substantial cuts were made to the questionnaire in order to achieve an estimated interview length of 45 minutes. We also made improvements in the way we chose to present the survey to potential respondents (see Section A.4 below). As with the cognitive pilot, all interviewers working on the dress rehearsal attended a face to face briefing before starting work and a face to face debrief at which to feed back to researchers.

A.4 Fieldwork

Fieldwork was carried out between January and March 2009. Fieldwork took place in England, Wales, Scotland and Northern Ireland, with the Northern Ireland Statistics and Research Agency (NISRA) undertaking the fieldwork in Northern Ireland. All interviewers received a face to face briefing from researchers and were given comprehensive project instructions.

An advance letter explaining the purpose of the survey was sent to all selected core addresses. A modified advance letter was posted through the letter boxes of FE addresses if it became apparent that contact needed to be made at the address. There was also an introductory letter aimed specifically at the sample of young people, which was provided to them once they had been identified. It was decided not to produce a respondent leaflet for use on this survey as it was felt that providing respondents with additional background information about medical research or the Wellcome Trust could influence some of the answers they gave during the interview.

[74] Although see Appendix B for details of some questions from previous studies which were included as part of the Wellcome Trust Monitor.

In order to make the survey more appealing to respondents, the survey was introduced to adults as "Health and medicine: now and the future". It was introduced to young people as "Science and medicine: now and the future". We decided to use two different survey names following feedback from the dress rehearsal which suggested that mentioning science was appealing to young people but off-putting for adults.

All respondents who took part, adults and young people, were sent a £10 high street voucher and a thank you letter after taking part.

A.5 Response rates

In total we achieved 1179 productive interviews with adult respondents aged 18 and over. We also obtained 374 productive interviews with young people aged 14 to 18, 121 at core addresses and 240 via focussed enumeration.

Table A.1 below presents a breakdown of the fieldwork outcomes for adults in our sample. Response is calculated as a range from a lower limit where all unknown eligibility cases (for example, address inaccessible, or unknown whether address is residential) are assumed to be eligible and therefore included in the unproductive outcomes, to an upper limit where all these cases are assumed to be ineligible (and are therefore excluded from the response calculation). The upper limit of our response rate was 50%. The main reason for unproductive outcomes was refusal – 40% of eligible addresses. Non-contacts accounted for 4% of the eligible addresses, with a further 5% covered by other unproductives, such as being away or ill during fieldwork.

We collected some further information about reasons for refusal from selected respondents. The majority of the reasons given were not specific to this particular survey and included reasons such as "never takes part in surveys", "can't be bothered" and "inconvenient time". However, a significant minority (13% of those giving reasons) said that they refused to take part because the subject matter was not interesting or relevant to them. Some people were also put off because they or someone they knew had recently had health problems.

Table A.1 Fieldwork outcomes for adult sample

Wellcome Trust Monitor

	Number	% of issued sample	Lower limit of response rate (%)	Upper limit of response rate (%)
Addresses issued	2650	100		
Definitely out of scope	251	9.5		
Upper limit of eligible cases	2399	90.5	100	
Uncertain eligibility	56	2.1	2.3	
Lower limit of eligible cases	2343	88.4	97.7	100
Interview achieved	1179		49.1	50.3
Interview not achieved	1164		48.5	49.7
Refused[1]	940		39.2	40.1
Not contacted[2]	97		4.0	4.1
Other non-response[3]	127		5.3	5.4

[1] 'Refused' comprises refusals before selection of an individual at the address, refusals to the office, refusal by the selected person, 'proxy' refusals (on behalf of the selected respondent) and broken appointments after which the selected person could not be recontacted.

[2] 'Non-contacted' comprises households where no one was contacted and those where the selected person could not be contacted.

[3] 'Other non-response' includes people who were ill or away during the entire fieldwork period, otherwise physically or mentally incapable, or who had language difficulties.

Table A.2 and Table A.3 below show breakdowns of the fieldwork outcomes for the young people (14-18) in our sample. Separate figures are presented for core and focussed enumeration (FE) addresses. It is not possible to calculate meaningful response rates for FE addresses in the same way as for core addresses. This is because we cannot be certain of the status of those addresses which were not visited by the interviewer. For instance, informants at core addresses may have wrongly stated that there were no young people available at FE addresses (when in fact there were eligible respondents present). We therefore focus on those young people who were identified as being eligible to take part and calculate a "response rate" based on the proportion of these eligible young people who agreed to take part.

At core addresses 86% of those young people who were eligible agreed to be interviewed. At FE addresses 64% of the young people identified agreed to be interviewed. In both cases, the proportion of eligible young people agreeing to take part was higher than anticipated. We expected to achieve different levels of response at core and FE addresses; it was felt that the young people identified at core addresses would be more likely to participate given that (in order for the young person to be eligible) an adult at the address would have already agreed to do the interview. However, the overall number of young person interviews obtained was slightly lower than our original target of 400 because FE identified fewer eligible young people than anticipated.

Table A.2 Fieldwork outcomes for 14-18 year olds (core addresses)

Wellcome Trust Monitor

	Number	% of issued sample	% of eligible young people
Addresses issued	2650	100	
Address out of scope[1]	251	9.5	
14-18 year old identified as resident at address	239	9.0	
14-18 year old not eligible for interview as no productive adult interview[2]	99	3.7	
14-18 year old eligible for interview	140	5.3	100
Interview achieved	121		86.4
Interview not achieved	19		13.6
Refused	18		12.9
Not contacted	1		0.7
Other non-response	0		0

[1] Addresses identified as deadwood i.e. unoccupied and/or non-residential.

[2] We only attempted to interview 14 to 18 year olds at core addresses if a productive interview was obtained with an adult aged 18+.

Table A.3 Fieldwork outcomes for 14-18 year olds (FE addresses)

Wellcome Trust Monitor

	Number	% of issued sample	% of eligible young people
Addresses issued	7950	100	
Addresses identified for direct screening[1]	1621	20.4	
Address out of scope[1]	17		
No eligible respondent 14-18	1162		
Unknown whether eligible respondent 14-18	48		
Eligible respondent (14-18) identified	394	5.0	100
Interview achieved	253		64.2
Interview not achieved	141		35.8
Refused			32.3
Not contacted			1.3
Other non-response			2.0

[1] Interviewers did not follow up at FE address if a) they were able to identify it as deadwood b) it was too far away from the core address c) the core address confirmed that there were no eligible respondents living at the FE address.

A.6 Weighting

Two separate weights were created, an adult weight for use when analysing adult respondents and a young person weight for use when analysing young person respondents. The weights were not set up to allow analysis of all respondents together.

Adult weight

The adult weight:

- Adjusts for differential selection probabilities resulting from the selection of one dwelling unit per address and one adult per dwelling unit.

- Calibrates the achieved sample by region and, separately, by age and sex thereby making the sample representative of the population on these variables.

One dwelling unit (DU) was selected at each address. Dwelling units at addresses comprising more than one DU therefore had a lower chance of selection than those at addresses comprising a single DU. To correct for this, a dwelling unit selection weight was created. This was equal to the number of DUs found at the address. The weight was trimmed at three to avoid a small number of very high weights. These would inflate the standard errors and reduce the precision of the survey estimates, causing the weighted sample to be less efficient.

One adult aged 18 or over was interviewed at each selected dwelling unit; adults living in DUs with one or more other adults therefore had a lower chance of selection than those in DUs containing only one adult. To correct for this, an adult selection weight was created. This was equal to the number of adults in the DU. The weight was trimmed at four. The dwelling unit selection weight and the adult selection weight were combined (multiplied together) to create one selection weight for each adult in the sample.

The next step was to take the weighted sample and to 'calibrate' the totals in each region (GOR), and each of twelve age/sex categories, to population totals derived from the latest (mid-2007) population estimates for the UK. Calibration adjusts a set of input weights to sum to the totals specified in each category. This step adjusts for differential non-response by region and (separately) by age and sex.

After calibration, the total numbers in the weighted sample equated to those in the UK population as shown in Table and Table below.

Table A.4 UK adults (18 and over), by region

Wellcome Trust Monitor

Region	Number of adults 18+	% of adult population
North East	2,032,197	4.2
North West	5,365,559	11.2
Yorkshire and the Humber	4,064,484	8.5
East Midlands	3,464,506	7.2
West Midlands	4,181,848	8.7
East	4,434,413	9.3
London	5,929,173	12.4
South East	6,503,973	13.6
South West	4,121,091	8.6
Wales	2,343,014	4.9
Scotland	4,096,793	8.6
Northern Ireland	1,327,281	2.8
Total	47,864,332	100

Table A.5 UK adults (18 and over), by age and sex

Wellcome Trust Monitor

	Male		Female	
Age group	Number of adults 18+	% of population	Number of adults 18+	% of population
18-29	4,953,979	10.4	4,778,574	10.0
30-39	4,189,763	8.8	4,237,511	8.9
40-49	4,430,899	9.3	4,533,361	9.5
50-59	3,687,295	7.7	3,790,694	7.9
60-69	2,997,125	6.3	3,183,298	6.7
70+	2,936,250	6.1	4,145,583	8.7
Total	23,195,311	48.5	24,669,021	51.5

The final step was to re-scale the weights so that the weighted total for the whole sample is equal to the unweighted total (1179); this results in weights with an average of one. As part of this process, some extreme weights were trimmed to be equal to the next highest weight (approx 3.67).

Young person weight

The young person weight:

- Adjusts for differential selection probabilities resulting from the selection of one child aged 14-18 in each selected dwelling unit

- Calibrates by region and, separately, by age and sex thereby making the sample representative of the population on these variables.

All young people interviewed were found in addresses comprising a single dwelling unit. There was therefore no need for a dwelling unit selection weight. At both core and focussed enumeration (FE) addresses, one young person aged 14-18 was interviewed. Those young people living with other 14-18 year olds therefore had a lower chance of selection than those living at addresses containing only themselves and one or more adults aged 19 or over. To correct for this, a young person selection weight was created.

The calculation of these weights had to take into account the fact that, at a core address, one young person aged 14-18 was picked *after* the selection of one adult aged 18 or over. Prior to selection therefore, an 18 year had a chance of being picked either for the adult sample or for the young persons' sample. The weights for 18 year olds were therefore calculated differently from the weights for those aged 14-17. In both cases the calculation took into account the relative

probabilities of the address having been picked either as a core address or as a FE address, and the ages of other household members.

The next step was to take the weighted sample and to 'calibrate' the totals in each of six regions (based on GOR), and each of ten age/sex categories, to population totals derived from the latest (mid-2007) population estimates for the UK. Calibration adjusts a set of input weights to sum to the totals specified in each category. This step adjusts for differential non-response by region and (separately) by age and sex. Some regions were collapsed into the following groups due to small numbers:

North = North East + North West + Yorkshire & Humber
Midlands = East Midlands + West Midlands
South = East of England + South East + South West

After calibration, the total numbers in the weighted sample equated to those in the UK population as shown in Table and Table below.

Table A.6 UK 14-18 year olds, by region

Wellcome Trust Monitor

Region	Number of 14-18 year olds	% of 14-18 population
North	977,023	24.7
Midlands	654,510	16.6
South	1,239,023	31.4
London	427,989	10.8
Wales	199,850	5.1
Scotland	323,963	8.2
Northern Ireland	127,416	3.2
Total	3,949,774	100

Table A.7 UK 14-18 year olds, by age and sex

Wellcome Trust Monitor

	Male		Female	
Age group	Number of 14-18 year olds	% of 14-18 population	Number of 14-18 year olds	% of 14-18 population
14	390,132	9.9	369,852	9.4
15	404,902	10.3	383,424	9.7
16	415,336	10.5	389,480	9.9
17	410,939	10.4	385,903	9.8
18	412,009	10.4	387,797	9.8
Total	2,033,318	51.5	1,916,456	48.5

The final step was to re-scale the weights so that the weighted total for the whole sample is equal to the unweighted total (374); this results in weights with an average of 1.

Comparison with other studies

As a further check on how far our achieved sample could be taken as representative of the general population and/or whether it contained any potential bias, our achieved adult sample was compared against the achieved sample on some other well-established general population surveys with relatively good response rates (Health Survey for England, National Travel Survey). Comparisons were made with regard to several key demographic indicators with the potential to influence attitudes to medical research, namely education and health status. Reassuringly, analysis indicates that respondents to the Wellcome Trust Monitor were broadly similar to the

respondents to these other studies, suggesting that we need not be unduly worried about possible bias in the data (Clery et al, 2009).

A.7 Sampling errors

No sample precisely reflects the characteristics of the population it represents, because of both sampling and non-sampling errors. If a sample were designed as a random sample (if every individual had an equal and independent chance of inclusion in the sample), then we could calculate the sampling error of any percentage, *p*, using the formula:

$$s.e.\ (p) = \sqrt{\frac{p(100 - p)}{n}}$$

where *n* is the number of respondents on which the percentage is based. Once the sampling error had been calculated, it would be a straightforward exercise to calculate a confidence interval for the true population percentage. For example, a 95% confidence interval would be given by the formula:

$$p \pm 1.96 \text{ x } s.e.\ (p)$$

Clearly, for a simple random sample (srs), the sampling error depends only on the values of *p* and *n*. However, simple random sampling is almost never used in practice because of its inefficiency in terms of time and cost.

As noted above, the Wellcome Trust Monitor sample, like that drawn for most large-scale surveys, was clustered according to a stratified multi-stage design into 106 postcode sectors (or combinations of sectors). With a complex design like this, the sampling error of a percentage giving a particular response is not simply a function of the number of respondents in the sample and the size of the percentage; it also depends on how that percentage response is spread within and between sample points.

The complex design may be assessed relative to simple random sampling by calculating a range of design factors (DEFTs) associated with it, where:

$$\text{DEFT} = \frac{\text{Variance of estimator with complex design, sample size n}}{\text{Variance of estimator with srs design, sample size n}}$$

and represents the multiplying factor to be applied to the simple random sampling error to produce its complex equivalent. A design factor of one means that the complex sample has achieved the same precision as a simple random sample of the same size. A design factor greater than one means the complex sample is less precise than its simple random sample equivalent. If the DEFT for a particular characteristic is known, a 95% confidence interval for a percentage may be calculated using the formula:

$$p \pm 1.96 \text{ x } complex\ sampling\ error\ (p)$$

$$= p \pm 1.96 \text{ x DEFT x } \sqrt{\frac{p(100 - p)}{n}}$$

Calculations of sampling errors and design effects were made using the statistical analysis package STATA.

A.8 Editing and coding

A number of checks were included in the CAPI programme and carried out by the interviewer when prompted during the interview. Some post-interviewing editing was done by researchers to remove minor inconsistencies between certain factual variables. However, given that most of questions asked as part of this study relate to the respondents' own attitudes and it is perfectly possible that one individual may hold a variety of inconsistent attitudes, these have not been subject to editing and any inconsistencies in the respondents' answers remain as given during the interview.

Post interview coding was undertaken by members of NatCen's coder panel using an adapted version of the CAPI program. Coders were briefed by researchers and provided with full instructions. For "other - specify" questions coders were asked to check the "other "answers to see whether any could be backcoded into any of the pre-existing codes. Researchers also considered whether any additional codes needed to be added to the code frame, based on the data received from the first 500 interviews.

Open code questions

The interviews contained several open code questions, mainly designed to measure respondents' awareness and knowledge of medical research.[75] Open code questions were used in order to get a more accurate picture of what the respondent did or did not know about medical research without giving them any prompts. They also enabled us to obtain a picture of the sorts of language and terms people use when talking about medical research. Finally, using open code questions allowed us to collect detailed information about the precise nature of any contact respondents had had with information about medical research.

Based on the data received from the first 500 interviews researchers developed code frames for all open code questions. The code frames were deliberately designed to be very detailed because the Wellcome Trust had a particular interest in the specific words of phrases which respondents used to talk about medical research. Several steps were taken to ensure that verbatim answers to these open code questions were coded consistently. Coders completed a short coding exercise during the coder briefing, with researchers checking and discussing all answers. The first batch of 50 interviews coded by each interviewer was fully checked by the operations team. Researchers checked all of the answers coded as "other" to see whether any could be coded to more specific codes or whether additional codes were necessary. Several additional codes were added at this stage.

Occupation coding

The adult respondents' job details were coded to the Standard Industrial and Standard Occupational classifications – SIC (2007) and SOC (2000). Industry was classified to a 2-digit level and Occupation to a 4 digit-level.

Where parents' job details were collected as part of the young person interview, this was done using a simplified set of questions which allowed researchers to code parents' occupation to the 5 category NS-SEC classification. At core addresses where one of the young person's parents had been interviewed as the adult respondent, their NS-SEC classification was carried over from the adult interview.

[75] The adult interview contained eight open code questions and the young person interview contained nine.

Appendix B Details of repeat questions

Table B.1 Questions included in the Wellcome Trust Monitor which were originally asked on other surveys

Wellcome Monitor wording	Original wording	Reasons for changing wording	Questionnaire Source	Survey details	Report chapter
SciCent In the last 12 months, how often, if at all, have you visited a science museum or science centre?	In the last 12 months, how many times have you done each of the following ... visited a science, technology or natural history museum or science centre?	For the Wellcome Monitor, we wanted to focus specifically on museums and centres dealing with science.	British Social Attitudes survey 2006	Face to face survey of representative sample of British population.	Exposure to science
Horoscp1 Do you read a horoscope or personal astrology report ... READ OUT ... …often, fairly often, rarely, or never?	Identical wording		British Social Attitudes survey 1996	As above	Exposure to science
MedRes Please tell me, in your own words, what comes to mind when you think about the term “medical research”? (Open code)	What springs to mind when you think about ‘medical research or its social and ethical implications over the past 2 – 3 years’?	We thought “social and ethical implications” would not be widely understood, and did not want to limit respondents to recent events.	Animals in Medicine and Science, 2002 and 2005	Question on the MORI Omnibus, regular survey among general public. Nationally representative quota sample of (956) adults (aged 15+) interviewed throughout G Britain in 195 different sampling points. Interviews conducted face-to-face in respondents’ homes, using	Public understanding of medical research

Table B.1 Questions included in the Wellcome Trust Monitor which were originally asked on other surveys

Wellcome Monitor wording	Original wording	Reasons for changing wording	Questionnaire Source	Survey details	Report chapter
Now think about this situation. A doctor tells a couple that their genetic makeup means that they've got one in four chances of having a child with an inherited disease. **CourTh** Does this mean that if their first three children are healthy, the fourth will have the illness? **CoupFir** Does this mean that if their first child has the illness, the next three will not? **CoupEach** Does this mean that each of the couple's children will have the same risk of suffering from the illness? **CoupNone** Does this mean that if they have only three children, none will have the illness?	Identical wording		National Science Foundation Survey 2001	National Science Foundation Surveys of Public Attitudes Toward and Understanding of Science and Technology, 1979-2001: Since 1979, administered at regular intervals (occurring every two or three years), producing 11 cross-sectional surveys. Data collected through a disproportionate stratified sampling frame utilizing a list-assisted random-digital dial (RDD) design within strata. Respondents within households were selected using the most recent birthday selection method. Respondents were interviewed in person for the 1979 wave and via telephone for subsequent waves.	Genetics

Table B.1 Questions included in the Wellcome Trust Monitor which were originally asked on other surveys

Wellcome Monitor wording	Original wording	Reasons for changing wording	Questionnaire Source	Survey details	Report chapter
SciStud Some news stories talk about the results of a 'scientific study'. When you read or hear this term, can you tell me in your own words what you think it means to study something scientifically? (Open code) INTERVIEWER RECORD VERBATIM. IF THE RESPONDENT GIVES AN ANSWER CONTAINING JUST A FEW WORDS, ASK "COULD YOU EXPLAIN MORE ABOUT THAT?"	Interviewer instruction - IF THE RESPONDENT GIVES AN ANSWER CONTAINING JUST A FEW WORDS, ASK "COULD YOU EXPLAIN MORE ABOUT THAT?" - added.	Interviewer instruction added as many respondents in the pilot were giving very brief answers.	British Social Attitudes, 2006		Public understanding of medical research

Table B.1 Questions included in the Wellcome Trust Monitor which were originally asked on other surveys

Wellcome Monitor wording	Original wording	Reasons for changing wording	Questionnaire Source	Survey details	Report chapter
DrugEff Suppose a drug used to treat high blood pressure is suspected of having no effect. There are 3 different ways scientists might use to investigate the problem, which one do you think scientists would be likely to use? CODE ONE ONLY Talk to those patients that have used the drug to get their opinion? Use their own knowledge of medicine to decide how good the drug is? Give the drug to some patients, but not to others, then compare the results for each group?	Same wording		National Science Foundation Survey	As above	Public understanding of medical research

Table B.1 Questions included in the Wellcome Trust Monitor which were originally asked on other surveys

Wellcome Monitor wording	Original wording	Reasons for changing wording	Questionnaire Source	Survey details	Report chapter
PrivEth If you knew that the research had been approved as safe and ethical by an independent committee of experts, that is people who are not personally involved in the project, would this make you more willing to take part in a medical research project to test a new drug or treatment, or not?	Identical wording		Indiana Survey	Conducted by Survey Research Centre, University of Indiana. See paper for presentation of findings.	Participation in medical research
SeeHeard CARD S1 Over the past few months, how much, if anything, have you heard or read about issues to do with genes and genetics?	Identical wording		BSA 2003	As above	Genetics

Table B.1 Questions included in the Wellcome Trust Monitor which were originally asked on other surveys

Wellcome Monitor wording	Original wording	Reasons for changing wording	Questionnaire Source	Survey details	Report chapter
GenEth CARD S2 Please say whether you agree or disagree with the following statement. I feel I have a good understanding of the ethical issues raised by genetic research?	On this card are a number of different types of people and institutions. Please tell me which, if any, you trust to use the human genetic information held on medical databases responsibly? CODE ALL THAT APPLY	A number of the answer options have been amended. "University" has been added to the term "scientists" and "Consumer groups" and "the general public" have been removed.	To make the question more straightforward and make it clearer what we mean by scientists.	HGC People's Panel Study Quantitative survey of a representative sample from the People's Panel conducted by MORI Social Research on behalf of the Human Genetics Commission. It is a randomly recruited panel of the general public, aged 16 and over, that is representative of the UK population.	Genetics
GRAdvance How optimistic are you about advances as a result of genetic research?	Are you very optimistic about the possibility of medical advances as a result of genetic research, somewhat optimistic, not too optimistic, or not at all optimistic?	Wording reduced slightly to reduce question length and to guide respondents less.	PEW Research Centre News Interest Index, 2003		Genetics

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