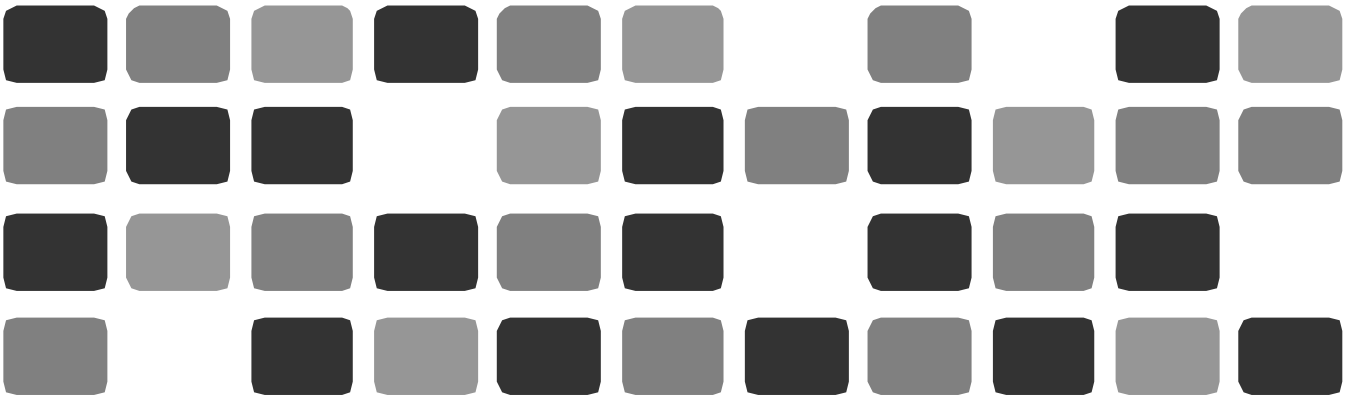
The Role of Scientists in Public Debate

Full Report



Research study conducted by

MORI

for The Wellcome Trust

December 1999 – March 2000

ISBN 1 84129 034 3

WC02-2275/02-2001/JM

The Wellcome Trust

This report presents the findings of a survey of scientists conducted by MORI (Market & Opinion Research International), commissioned and funded by The Wellcome Trust. An additional funding contribution was made by The Office of Science and Technology. This research was commissioned through a competitive tendering process.

Please direct any such requests to Ruth Birse at: r.birse@wellcome.ac.uk.

Executive summary

Introduction

Research into the field of 'public understanding of science' has tended to focus on identifying and understanding the views of the general public towards science. Little effort has been made to understand how scientists themselves perceive increasing calls for them to become more involved in communicating their research to the public, and to increase dialogue on the social and ethical implications of this research. For this reason, the Wellcome Trust commissioned MORI to undertake a large-scale nationwide survey of scientists who are funded by a range of academic, charity and industry sources.

The research aimed to investigate whether scientists consider themselves to be the people most responsible for and best equipped to communicate their scientific research and its implications to the public, what benefits and barriers they see to a greater public understanding of science, and what needs to change for scientists to take a greater role in science communication.

This survey is based on face-to-face interviews with a randomly selected sample of scientists working in Great Britain.

Key findings

- There is a large gap between the way that scientists perceive themselves, and the way they think the public perceives scientists. Scientists have a far more favourable image of themselves than they think the public has of them.
- Most scientists can see benefits to the non-specialist public having a greater understanding of science, but most can see barriers too. A lack of public knowledge, education and/or interest in science is regarded as a barrier by three in four scientists, and a third also perceive the media in this light.
- The main sources of information scientists think the public use for information about scientific research and its implications are national newspapers and television. Scientists think that the public primarily trusts the media, and those working for charities and campaigning groups, to provide accurate information about these areas, while they themselves are most inclined to trust those working in scientific circles.
- The vast majority of scientists believe it is their duty to communicate their research and its social and ethical implications to policy makers, and to the non-specialist public. A clear majority also feels that scientists should report on any social and ethical implications of their work when publishing their research findings. Many scientists feel constrained by the day-to-day requirements of their job, leaving them with too little time to communicate, or even to carry out their research.
- Scientists mention a variety of groups as being the most important with which to communicate – indicating a broad perceived potential audience overall. Most scientists feel that scientists themselves should have the main responsibility for communicating the social and ethical implications of scientific research to the non-specialist public. However, fewer feel that scientists are the people best equipped to do this.
- Just over half of scientists have participated in one or more of fifteen given forms of communications activity in the last year. Participation is related to scientists' skill and confidence: those who feel equipped to communicate the scientific facts and implications of their research, and scientists who have received training, are more likely to have participated. Similarly, scientists who teach, as well as conduct research, and who therefore have experience of communicating to non-specialists, are more likely to have communicated in the past year.
- Three-quarters of scientists feel equipped to communicate the scientific facts of their research, although only one in five feels very well equipped. Confidence declines when scientists are asked how they feel about communicating the social and ethical implications of their research. Among those whose work has social and ethical implications, 62% feel equipped, and one in ten feel very well equipped.
- The overwhelming majority of scientists have not been trained to liaise with the media, or to communicate with the non-specialist public. Most scientists are aware that their institution or department provides a range of communications services. In contrast, relatively few scientists are aware of any communications services provided by funders.

- A wide variety of stimuli to improve communications are mentioned by scientists. Incentives from funding authorities to encourage time spent on science communication are mentioned most frequently, followed by training in dealing with the media, and encouragement by institutions of time spent on science communication.

Implications

These findings provide a baseline of the current role of scientists in public debate. They complement recent studies which have mapped science communication activities and research which examines the attitudes and demographics of different non-specialist audiences. Together they provide a sound basis for developing a national strategy which moves beyond the public understanding of science towards genuine public dialogue.

Introduction

Increasingly over the past 15 years, government, academic and professional institutions, and industry have acknowledged the importance of public understanding of scientific developments and their applications, and the social impact of scientific advances.

Much of the debate about science communication has to date focused on the views of the general public. This survey on the role of scientists in public debate, probably the largest ever undertaken in Britain, examines the attitudes of scientists themselves towards communicating science issues. Social responsibility and accountability to society are implied outcomes from publicly funded science; as such, scientists arguably need to communicate, as well as to conduct their work. This study therefore examined the views of scientists towards communicating with the non-specialist public, and whether they feel a need to impart the outcome of their research and its implications beyond the scientific community. The research results are based on a nationally representative sample of scientists, and the report is aimed primarily at policy makers, funders of scientific research, and other scientists.

The Bodmer Report[1], a key document published in 1985, examined the state of public understanding of science and technology in the UK. It also looked at the mechanisms for bolstering public understanding. One of its conclusions was that scientists need to learn to communicate with the public, learn about the media and have training in these areas. Views on this were therefore sought in the current survey, to see whether scientists feel able to communicate effectively themselves – either directly or through the media, and whether they feel they are best placed to do so.

Fifteen years on, science communication issues are still on the agenda. The government's science White Paper 'Excellence and Opportunity' was published recently[2], reflecting the conclusions of The House of Lords Select Committee on Science and Technology report, 'Science and Society'[3]. The White Paper notes that the new emphasis in science communication should be on engagement between scientists and the public[4], rather than simply on education and public understanding.

Objectives

The overall aim of the research was to shed light on how scientists perceive public understanding of science and technology in general, and their own contribution in particular.

The detailed objectives were to determine scientists' views on whether:

- they recognize a need to communicate their research and its implications outside scientific circles;
- there are differences by type of scientist in the way science communication is regarded and pursued;
- they feel able to communicate effectively themselves – either directly with the public, or through the media;
- they consider that they are the people best placed to communicate about science to the public;
- they recognize the social and policy implications arising from their work.

Methodology

The research, which was quantitative, consisted of face-to-face interviews with a random sample of 1540 research scientists[5] at 41 Higher Education Institutions (HEIs), and 112 scientists at 42 Research Council-funded establishments in Great Britain. These establishments were funded by The Biotechnology and Biological Sciences Research Council (BBSRC), The Medical Research Council (MRC) and The Natural Environment Research Council (NERC).

---

1 Royal Society (1985) *The public understanding of science*, report of a Royal Society *ad hoc* Group endorsed by the Council of the Royal Society. London: Royal Society (ISBN 0854032576).

2 Published by The Office of Science and Technology, July 2000. Available at: www.dti.gov.uk/ost/aboutost/dtiwhite/

3 House of Lords Select Committee on Science and Technology, Third Report, published March 2000. Available at: www.parliament.the-stationery-office.co.uk/pa/ld199900/ldselect/ldsctech/38/3801.htm

4 Chapter 1, 'A Science Policy for the 21st Century'; paragraph 26.

5 Of whom 657 were wholly or principally funded by a Research Council.

A pilot study was conducted to examine: the methodology of obtaining a sampling frame of individual scientists; the comprehension and appropriateness of the questions; the flow and position of questions within the questionnaire; the language being used; and to measure the overall length of interview.

Fieldwork for the pilot study, comprising interviews with 17 scientists, took place from 12–24 August 1999. Mainstage fieldwork took place from 13 December 1999 – 24 March 2000.

For the main stage, a stratified random sample of individual scientists was selected. Scientists were assigned to one of three strata based on their cost centre allocation:

1. Clinical biomedical – i.e. clinical medicine and clinical dentistry
2. Non-clinical biomedical – all other biomedical cost centres

} Biomedical

3. Non-biomedical – all non-biomedical cost centres

The questionnaire included six open-ended questions, where respondents' answers were recorded verbatim. These responses were then coded into lists or 'code frames' to enable percentages to be placed next to answer categories. In addition, some verbatim comments have been used throughout the report to illustrate the full responses that were actually given.

Full technical details appear in the Appendices to this report.

Chapter 1: Scientists' understanding of the public

Summary

There is a large gap between the way that scientists perceive themselves, and the way they think the public perceives scientists. Scientists have a far more favourable image of themselves, than they think the public has of them.

Most scientists can see benefits to the non-specialist public having a greater understanding of science, but most can see barriers too.

'Public understanding of science' – a definition

The phrase 'public understanding of science' was first introduced formally in 1985, with the publication of the influential Bodmer Report.

The House of Lords Science and Society report published in 2000 defines 'public understanding of science' as the understanding of scientific matters by non-experts. But how do scientists themselves interpret the phrase – particularly at a time when it is being replaced by 'public dialogue', rather than 'public understanding'[6]?

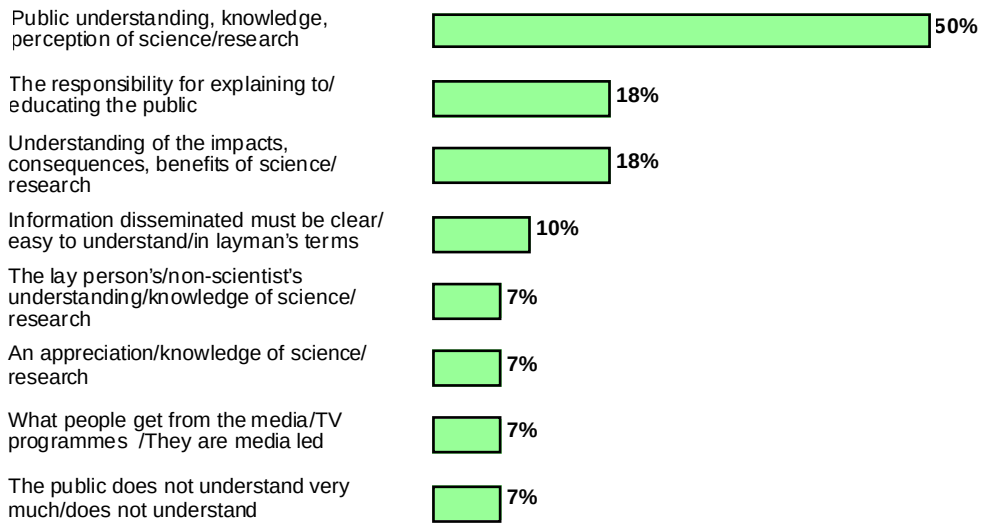
Almost all scientists (97%) responded to this open question[7]. Half understand the term to mean the public's knowledge or perception of science or research. Almost one in five said it refers to the 'responsibility for explaining to or educating the public' about science, and the same proportion focused on the outcome of scientific activity, saying it is an 'understanding of the impacts, benefits or consequences of science'.

Chart 1

Public understanding of science

Q2 What does the term 'public understanding of science' mean to you?

UNPROMPTED, RECORDED VERBATIM



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

6 House of Lords Select Committee on Science and Technology, Third Report, Chapter 5 'Engaging the Public', 5.1; www.parliament.the-stationery-office.co.uk/pa/ld199900/ldselect/ldsctech/38/3807.htm

7 Q2.

Below is a selection of verbatim comments on this question, indicating which of the quotes were coded into the headings above[8].

Q2 What does the term 'public understanding of science' mean to you?

The public's understanding, knowledge, perception of science/research (50%)

'The understanding by the public of how science works and the issues that science raises, and also what science tells us about life, the universe and everything'

Male, 35–44 years, senior researcher, Non-clinical biomedical

'The way in which the public understands how new ideas of science are impinging on their own lives'

Male, 45–54 years, professor, Non-clinical biomedical

'Making sense of scientific research findings'

Female, 35–44 years, researcher, Non-clinical biomedical

'The layman's level of knowledge about technical and scientific issues'

Male, 45–54 years, researcher, Non-biomedical

'How the public perceives scientists and what we do'

Female, 25–34 years, senior researcher, Non-clinical biomedical

Responsibility for explaining to/educating the public (18%)

'Trying to get across the significance of what scientists do'

Male, 25–34 years, researcher, Non-biomedical

'Informing the public in a way that they can understand about what we are doing. Letting the public know how their money is being spent and to counter-balance woeful ignorance of the press i.e. GM foods, BSE etc.'

Male, 35–44 years, researcher, Non-clinical biomedical

'Making sure that the public is made aware of current research and the ethical issues it raises'

Male, under 25 years, research assistant, Non-clinical biomedical

'It's conveying and presenting to the public the background and rationale of current research and particularly topical issues e.g. GM foods, BSE etc.'

Male 35–44 years, researcher, Non-clinical biomedical

8 For information on the detailed categories which fell into the main headings, please see the marked-up questionnaire in the Appendices, and the section headed 'Combinations' in the Appendices.

Understanding of the impacts, consequences or benefits of science/research (18%)

> 'Being able to understand the research in universities and industry, and how it may affect their lives'
>
> Female, 25–34 years, research assistant, Non-clinical biomedical

> 'A general awareness of the public, of what scientists do, i.e. impact it has on general life'
>
> Female, 25–34 years, researcher, Non-biomedical

Information disseminated must be clear/easy to understand/in layman's terms (10%)

> 'The successful dissemination of the reasons why, methods used, and the implications of scientific research to the widest groups of people. Policy in healthcare'
>
> Male, 45–54 years, professor, Research Council-funded establishment scientist

> 'It means disseminating the results of our research in the form that the layman will understand and appreciate'
>
> Male, 35–44 years, senior researcher, Non-biomedical

Image of scientists

Scientists were asked what characteristics they felt the non-specialist public attributes to scientists[9], and then how they themselves would describe scientists[10]. As chart 2 shows, there is a huge difference of twenty points or more[11] on a number of statements, between the way scientists perceive themselves and the way they think the public perceives scientists. Scientists have a far more favourable image of themselves than they think the public has of them.

The largest 'image gap' exists for being poorly paid (+43); 66%[12] of scientists say they are poorly paid, but just 23% feel the public would assign this description to them. Another large 'image gap' can be seen for being detached (-42); 16% of scientists feel scientists are detached, but 58% of scientists think the public would describe them this way. Other large differences can be seen for: being responsible (+35), enquiring (+32) and honest (+32); and for secretive (-36) and uncommunicative (-33). This last pair of figures indicates that scientists think that the public believes scientists are disinclined to communicate.

In just one positive area, being 'intelligent', do a majority of scientists believe the public holds the same favourable perception that they hold of themselves.

Scientists are most likely to view themselves as being enquiring, intelligent, poorly paid and methodical. They are, however, most likely to say that the non-specialist public regards them as being detached, poor at public relations, secretive and uncommunicative. In contrast, few scientists assign three of these four[13] descriptions to themselves, indicating that they feel the public holds misconceptions about their profession.

9 From a list of 27.

10 Using the same list.

11 13 of the 27 statements had gaps of 20 points or more; in eight cases this is because scientists are more likely to assign characteristics to themselves than to think the public would describe them thus; in five cases this is because scientists feel the public would be more likely to assign characteristics to scientists, than scientists would themselves.

12 Table 1 indicates the actual percentage findings for each of the 27 statements.

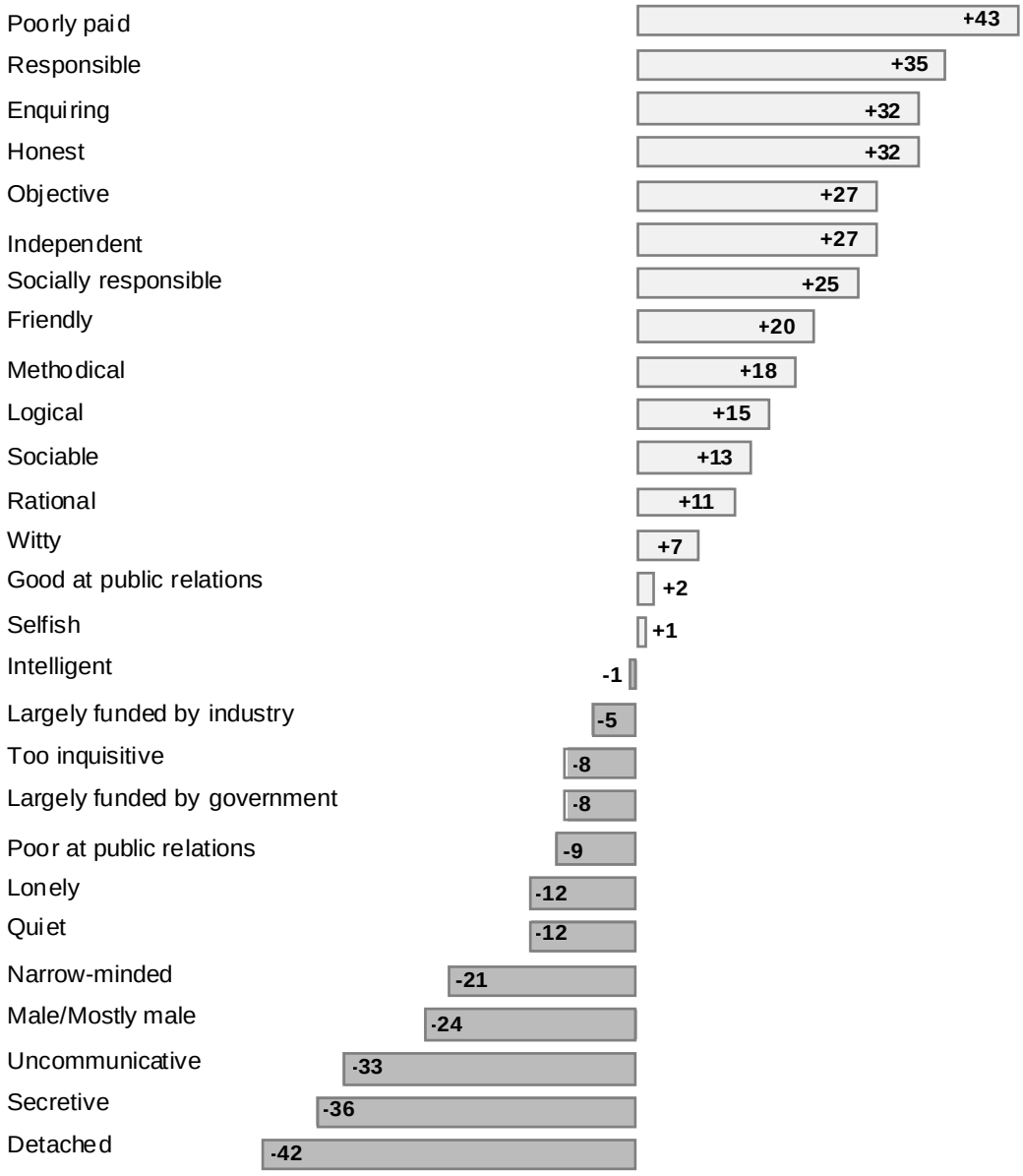
13 The exception is 'poor at public relations', which 39% of scientists believe about themselves, and 48% of scientists say they think the non-specialist public would think this of scientists.

Chart 2

Image of scientists

Q34a Which, if any, of the following characteristics would you say the non-specialist public attributes to scientists?

Q34b And how would you describe scientists?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540

Source: MORI

A plus (+) score indicates that scientists were more likely to assign that characteristic to themselves, than to think the public would describe them thus. A minus (-) score indicates the reverse.

TABLE 1

Image of scientists			
	Non-specialist public %	Scientists %	±%
Poorly paid	23	66	+43
Responsible	9	44	+35
Enquiring	34	66	+32
Honest	11	43	+32
Objective	19	46	+27
Independent	15	42	+27
Socially responsible	4	29	+25
Friendly	2	22	+20
Methodical	33	51	+18
Logical	31	46	+15
Sociable	1	14	+13
Rational	38	49	+11
Witty	1	8	+7
Good at public relations	*	2	+2
Selfish	7	8	+1
Intelligent	67	66	-1
Largely funded by industry	15	10	-5
Too inquisitive	10	2	-8
Largely funded by government	29	21	-8
Poor at public relations	48	39	-9
Lonely	16	4	-12
Quiet	17	5	-12
Narrow-minded	31	10	-21
Male/mostly male	53	29	-24
Uncommunicative	44	11	-33
Secretive	46	10	-36
Detached	58	16	-42

Base: All respondents (excluding scientists at Research Council-funded Establishments), 1540 Source: MORI

Perceived benefits and barriers to improved public understanding of science

Most scientists (97%) can see benefits to the non-specialist public having a greater understanding of science.

Scientists were asked without being prompted what main benefits, if any, there are to the public having a greater understanding of science. Public ability to understand and judge science issues[14], or to make more informed decisions about their lives; increased understanding of what scientists do; and the possibility of more funding for science are the main benefits perceived.

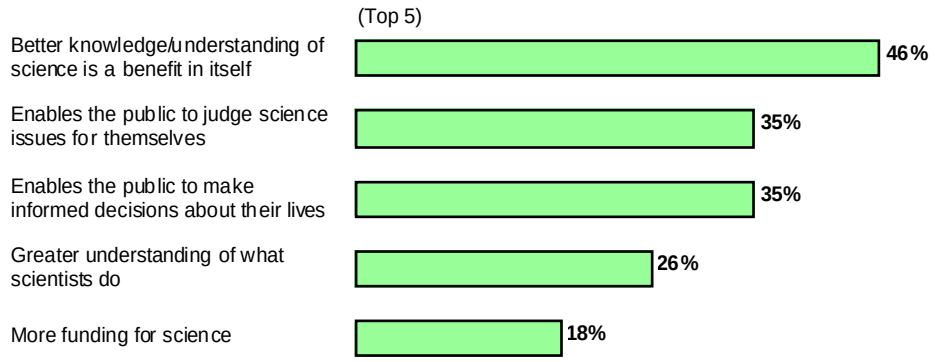
14 This includes scientists who said ‘A better knowledge/understanding of science is a benefit in itself’, and/or ‘It enables the public to judge science issues for themselves’.

Chart 3

Main benefits to greater understanding

Q9 And what, if any, would you say are the main benefits to greater understanding of science among the non-specialist public?

UNPROMPTED, WITH PRE-CODES



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

Two rather different groups of scientist are more likely to say that a better knowledge or understanding of science is a benefit in itself: scientists who say their research carries no social or ethical implications[15] (54%, cf. 43% for those who say their work does carry such implications); and scientists who hold a licence for animal research[16] (52%, cf. 44% for those who do not hold a licence).

Biomedical scientists[17], and in particular those who hold a licence for animal research (32%, cf. 24% of those without a licence), are more likely to say that a benefit to greater understanding is that it helps the public understand what scientists do.[18]

Several groups of scientists are more likely to say that greater public understanding brings more funding to science, including biomedical scientists[19]; Wellcome Trust-funded scientists[20]; those funded by charities[21]; and scientists who hold a licence for animal research.[22]

Respondents were also asked to consider what barriers they felt existed to a greater public understanding of science: 99% mentioned at least one. A lack of public knowledge and/or education is seen as the main barrier (53%).

Other barriers mentioned include the media (35%); little public understanding of what scientists do (26%); public disinterest or indifference towards science (22%); poor communication skills among scientists themselves (20%); and low awareness or disinterest among scientists about the public's understanding of science (11%).

Biomedical scientists are more likely to view the media as being a barrier to greater understanding than are non-biomedical scientists[23].

Our understanding of the proportion of scientists who consider the media to be a barrier to greater understanding can

15 At Q26. 26% said their work did not carry social and ethical implications, and 70% said their work did carry such implications.

16 At QH. 21% said that they, or a colleague in their research team held a Home Office licence to conduct animal research in connection with their current research; 76% said they did not, and 3% did not know.

17 The profile of biomedical and non-biomedical scientists can be found in the Appendices, as can the profile for scientists at Research Council-funded establishments.

18 29% for biomedical scientists, cf. 22% for non-biomedical scientists; and 32% for those who hold an animal licence, cf. 24% for those who do not.

19 20%, cf. 16% for non-biomedical scientists.

20 28%, cf. 18% on average.

21 29%, cf. 18% on average. This group does not include those funded by The Wellcome Trust, which were analysed separately.

22 23%, cf. 17% for those who do not hold a licence.

23 40%, cf. 30%.

be expanded in light of results from subsequent questions[24]. These reveal that scientists have relatively little trust in most of the media (i.e. newspapers and television) to provide accurate information about scientific research facts, and their social and ethical implications[25]. However, the majority of scientists feel that the public places trust in these media sources. This may therefore be creating a barrier to dialogue between scientists and the general public – in that scientists feel the public relies on sources of information in which they themselves have little faith.

Biomedical scientists who deal with patients are the most likely to say that little public understanding of what scientists do, or of scientific processes, is a barrier (35%, cf. 26% of those who do not deal with patients).

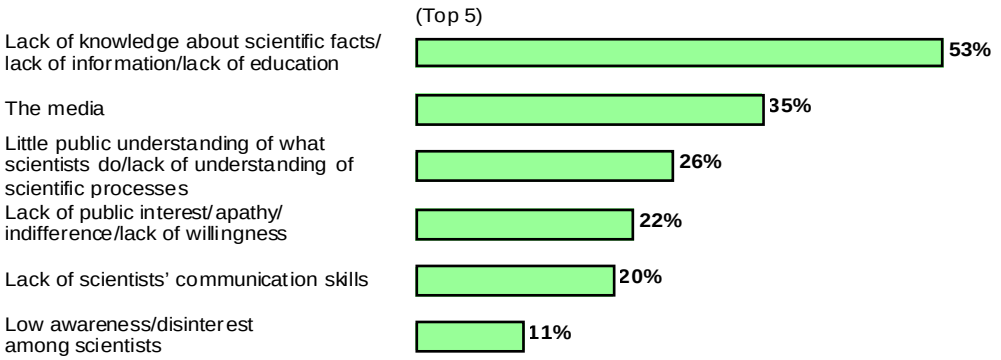
Chart 4 below illustrates the main groupings of results.

CHART 4

Main barriers to greater understanding

Q8 What, if any, would you say are the main barriers to greater understanding of science in general among the non-specialist public?

UNPROMPTED, WITH PRECODES



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

24 Q36 and Q37. See Chapter 3.

25 Scientists place greater trust in the popular scientific press, e.g. *New Scientist*, than TV or national newspapers, to provide accurate information about scientific research facts and their implications.

Chapter 2: Informing public debate

Summary

The main sources of information which scientists think the public use for information about scientific research and its implications are national newspapers and television. Scientists think that the public primarily trusts the media, and those working for charities and campaigning groups, to provide accurate information about these areas, while they themselves are most inclined to trust those working in scientific circles.

Most scientists say the recent media coverage of scientific issues has made no difference to their communication of their research to the non-specialist public. However, scientists tend to say that the recent media coverage of three specific scientific issues (BSE, GM foods, and human genetic modifications or animal cloning), has made the public more wary about science, or confused them.

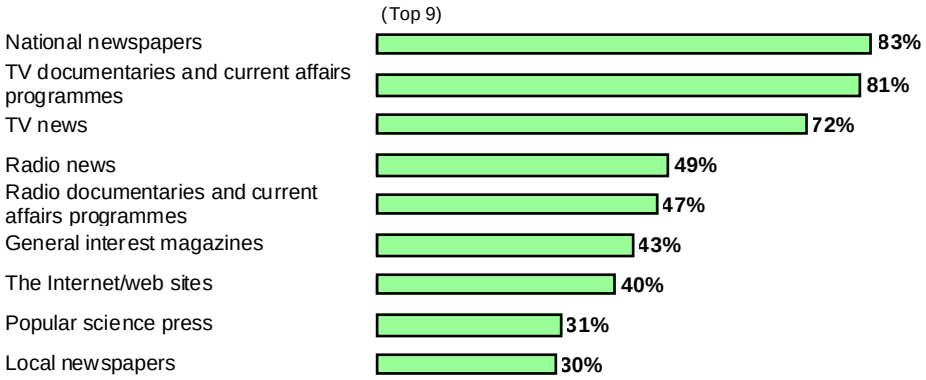
Sources of information

National newspapers, TV documentaries and current affairs programmes, and TV news are the main sources of information which scientists think the public use to get information about scientific research and its implications. This perspective of the public's main sources of information is supported by research among the public themselves[26].

CHART 5

Sources of information

Q7 Which, if any, would you say the non-specialist public uses to obtain information about scientific research and its social and ethical implications?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

As Chart 6 highlights, biomedical scientists[27] are more likely to think the public relies on the mainstream media (TV and radio news and general interest magazines) for their scientific information, while non-biomedical scientists are more likely to mention the popular scientific press. This may indicate that respondents have been influenced in their answers by their own field of scientific expertise and experience[28] – general interest magazines, for example, are increasingly interested in health issues, while *New Scientist* and much of the popular scientific press have a greater focus on non-biomedical stories.

26 For example, on biological developments and their regulations. Source: MORI/OST 'The Public Consultation on Developments in the Biosciences' 1998/1999, available from www.dti.gov.uk/ost/ostbusiness/index.htm. Another example is on information about the European Union (Q. Which sources do people use when they look for information about the European Union?) Source: Eurobarometer 'Public Opinion in The European Union' (European Commission) 53.0, Page 66, Fig 5.1, Fieldwork April – May 2000. Results released October 2000. Available from: Tel: 0032 2 296 54 50; Fax: 0032 2 299 45 77; E-mail:eurobarometer@cec.eu.int; http://europa.eu.int/comm/dg10/epo/eb/eb53/eb53_en.pdf

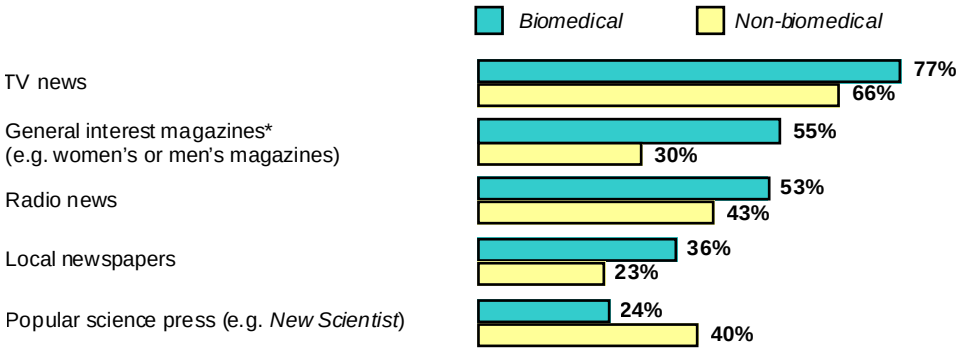
27 Particularly clinical scientists.

28 e.g. of being contacted to contribute to articles, or for comment by each of these types of magazines.

CHART 6

Sources of information – by type of scientist

Q7 On this card is a list of sources of information. Which, if any, would you say the non-specialist public uses to obtain information about scientific research and its social and ethical implications? By 'non-specialist' we mean people with no specialist knowledge of, or training in, science.



*62% of clinical biomedical vs 49% of non-clinical biomedical scientists

Base: All biomedical scientists (1025) and non-biomedical scientists (515)
(excluding scientists at Research Council-funded establishments)

Source: MORI

Trustworthiness of information sources

Public trust in various groups is one area that MORI has been measuring for almost two decades[29]. We know, for example, that doctors, teachers and nurses[30] have received high ratings from the public on trust since our measurements began in 1983, and continue to be highly rated[31]. In contrast, journalists have received a consistently low rating. The government – of any persuasion – fares only slightly better than journalists, and views about scientists vary depending on whether they work for environmental groups, industry or government. Scientists working for environmental groups are by far the most positively rated by the public. Between 75% and 85% of the public say[32] they have 'a great deal' or 'a fair amount' of confidence in them. In contrast, industry and government receive ratings of only about 48%.

But who do scientists trust, and who do they think the public trusts, to provide accurate information about scientific research facts, and the social and ethical implications of scientific research?

Charts 7 and 8 show that scientists are most inclined to trust those working in scientific circles[33], but think that the public primarily trusts the media, and those working for charities and campaigning groups, such as on environment and health. In fact, public trust in the media is probably lower than scientists' estimation of it, as discussed above. However, MORI's previous work does highlight that public trust in charities and campaigning groups is generally high, although it can vary depending on the campaigning group[34].

29 In surveys for *The Sunday Times*, 1983; *The Times*, 1993 and 1997; The BMA, January 1999 and February 2000; Cancer Research Campaign, May 1997; The OST 'Public Consultation on Developments in the Biosciences', March/April 1999; The MRC 'Attitudes Towards Animal Experimentation', September 1999; and MORI's annual general public survey since 1989 'Business & the Environment' – conducted in July/August each year. Results are available on MORI's Polls Archive at: www.mori.com

30 Nurses were added to the list after 1983.

31 MORI/The BMA, February 2000. Press Release: 'Public Still Regards Doctors as The Most Trustworthy Group'. Available from: www.bma.org.uk or MORI's Polls Archive (February 2000): www.mori.com

32 When measurements have been taken. These began in 1989 and continued annually until 1999.

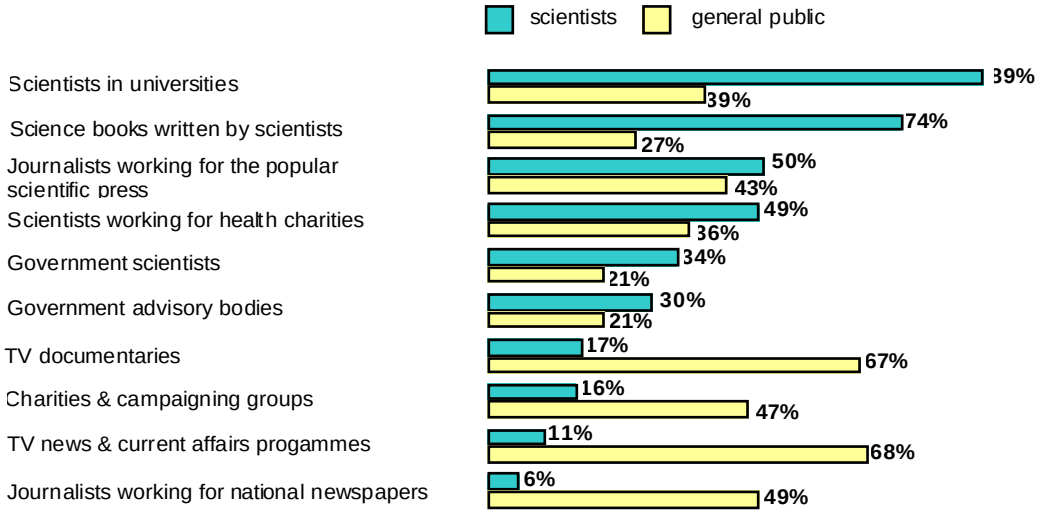
33 That is, scientists in universities, science books written by scientists, journalists working for the popular scientific press, and scientists working for health charities.

34 For example, animal welfare groups are more trusted than anti-vivisection campaign groups for providing honest and balanced information about animal experimentation. Source: MORI/MRC 'Animals in Medicine and Science' June–September 1999. The full report can be obtained from the MRC (Tel. 020 7636 5422) or downloaded from: www.mori.com/polls/1999/mrc99.htm

CHART 7

Trust – Scientific facts

Q36/38 Which would …trust to provide accurate information about scientific facts?

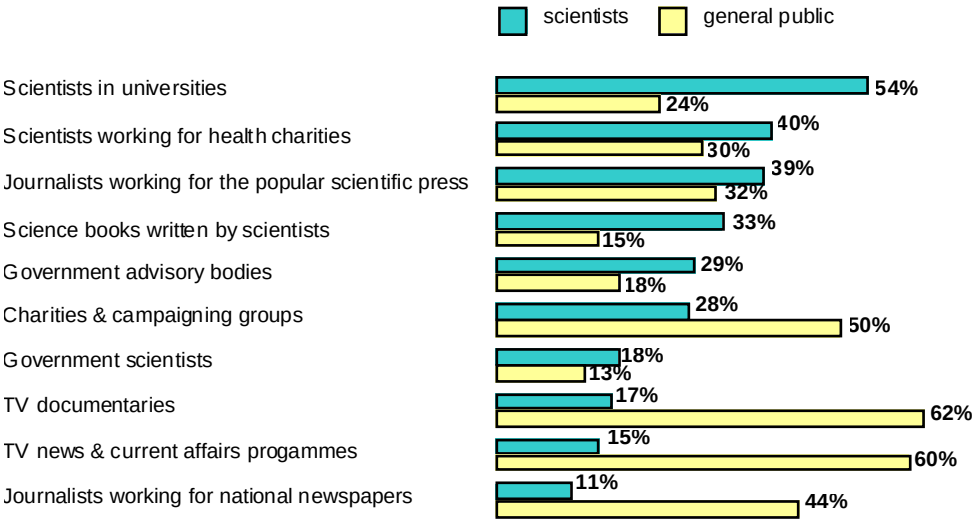


Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

CHART 8

Trust – Social and ethical implications

Q37/39 Which would…trust to provide information about the social & ethical implications?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

Scientists themselves are least inclined to trust national newspaper journalists and then those working in television news and current affairs, and television documentary journalists to provide accurate scientific information. They are also disinclined to trust scientists working for pharmaceutical companies and (for scientific research facts) charities and campaigning groups. In contrast, half of scientists would generally trust journalists working for the popular scientific press for scientific fact, and 39% generally trust them for the social and ethical implications.

A third trust government scientists to provide scientific fact (34%), but only 18% trust them on social and ethical implications. It is noteworthy that no single source is trusted by more than 54% of scientists to provide accurate information on the social and ethical implications of scientific research – scientists in universities are attributed this highest score.

The lower levels of trust concerning information on social and ethical issues may be because these issues: embrace the viewpoints of many different and diametrically opposed groups; and involve debates that are less factually based, and the full implications of which may not be known for some time. Biotechnological developments such as the Human Genome Project and the proposed UK Population Biomedical Collection will bring more social and ethical issues into debates about science and it is therefore likely that the figures on trust[35] could shift quite markedly in the future.

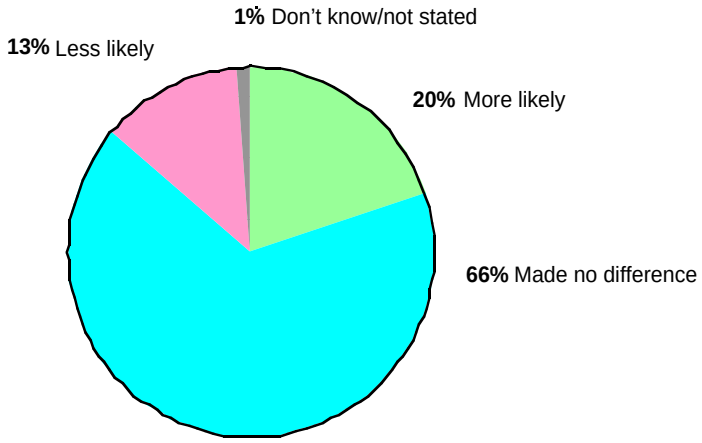
Attitudes to media reporting

Scientists were asked to consider whether recent media coverage of scientific issues[36] had affected their likelihood to communicate with the non-specialist public. Two-thirds (66%) say that it has made no difference to their communication of their research to the non-specialist public, whereas one in five is now more likely to communicate.

CHART 9

Recent media coverage

Q32 Would you say the recent media coverage of scientific issues has made you…to communicate your research to the non-specialist public?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

35 – both for scientists themselves, and their views of the public.

36 There was considerable media coverage about GM foods from February to July 1999; coverage about cloning from December 1998 to 2000; and coverage about BSE and CJD from 1990–2000.

TABLE 2

Recent media coverage – sub groups (Q32)			
	All %	Biomedical %	Non-biomedical %
More likely	20	24	16
No difference	16	59	74
Less likely	13	17	9

Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

Biomedical scientists are more likely than non-biomedical scientists to have changed their behaviour as a result of the recent media coverage, as can be seen in Table 2. Nearly a quarter of them are now *more* likely to communicate – yet nearly one in five is now *less* likely.

It is difficult to know precisely which groups of biomedical scientists are now more inclined to communicate because of the recent media coverage, and which have become more cautious. There is **some** suggestion that those who do not deal with patients are now more likely to communicate than those who do[37], and conversely, that those whose research team holds an animal licence are now less likely to communicate than those without a licence[38]. We say 'some suggestion' because most of each group says there has been no difference to their communication (58% of those not dealing with patients, and 58% of those whose research team holds an animal licence).

Confidence and previous participation in communications activities also appear to influence scientists' current willingness to communicate. Those who have spoken to the media in the past year, or participated in any non-scientific presentations[39], are more inclined to say they are now more likely to communicate, compared with those who have not participated in any communications activities with the public[40].

Scientists at Research Council-funded establishments are also considerably more likely than average to say they are now more likely to communicate (32%).

Non-biomedical scientists, biomedical scientists who deal with patients, and scientists who do not hold a licence to conduct animal research mostly say that the recent media coverage has made no difference to their communication (70%). Respondents were next asked whether recent media coverage of three specific scientific issues had clarified or confused the public's understanding of these issues, and/or made the public more wary about science. The issues were BSE[41], GM foods, and human genetic modifications or animal cloning.

Scientists tend to say that the recent media coverage of these issues has made the public more wary about science, or confused them. Relatively few feel the media coverage has clarified these issues or made no difference to public understanding. Scientists are most likely to think that coverage of GM foods and human genetic modifications/animal cloning has made the public more wary; while the issues which scientists think have most confused the public's understanding are BSE and GM foods. Only around one in ten scientists think that the recent media coverage has clarified the general public's understanding of science – reflecting scientists' low level of trust in the media to portray science accurately.

37 26% of those not dealing with patients said they are now more likely to communicate, cf. 17% of those dealing with patients. [The figures for 'less likely' are 17% for those not dealing with patients, and 12% for those dealing with them – but these differences are not significant].

38 19% of those whose research team holds an animal licence say they are now less likely to communicate, cf. 11% of those whose research team does not hold a licence. [The figures for 'more likely' are 23% for those whose research team holds a licence, and 19% for those whose research team does not hold a licence – but these differences are not significant].

39 These two groups are based on All (excluding those in Research Council-funded establishments) because sub-group sizes are too small to permit analysis by Biomedical scientists only.

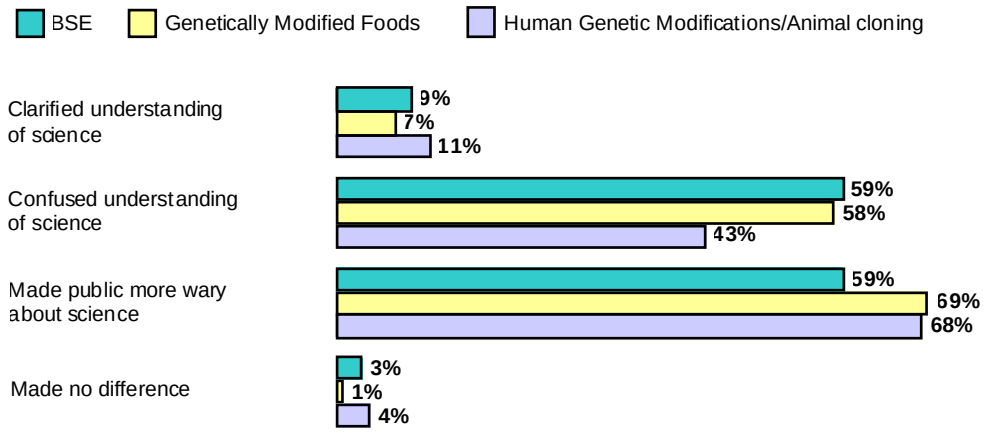
40 24% for 'any speaking to the media', and 23% for 'any non-scientific presentations', cf. 17% for those who have not done any.

41 Bovine Spongiform Encephalopathy.

CHART 10

Media coverage of scientific issues – views of scientists

Q33a, b, c What effect would you say the recent media coverage of three scientific issues has had on the general public's understanding of science? Would you say it has…



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

The same question was asked of environment correspondents and editors, in MORI's Annual Survey of Environment Journalists[42]. As Table 3 indicates, these journalists, like scientists, are most likely to think the public has become more wary or confused (mentioned by fewer than 'wary'). Fewer environment journalists say the media coverage has clarified the public's understanding of science, than made them wary or confused. However, environment journalists are less likely than scientists to mention public caution or confusion, but are more inclined than scientists to say that public understanding has been clarified by the media coverage.

TABLE 3

Media coverage of scientific issues – scientists versus environment journalists				
		Scientists %	Environment journalists %	±%
Clarified	BSE	9	20	+11
	GMFs	7	16	+9
	HGMs/Animal cloning	11	16	+5
Confused	BSE	59	32	-27
	GMFs	58	32	-26
	HGMs/Animal cloning	43	36	-7
Made public more wary	BSE	59	48	-11
	GMFs	69	60	-9
	HGMs/Animal cloning	68	56	-12
No difference	BSE	3	4	+1
	GMFs	1	4	+3
	HGMs/Animal cloning	4	8	+4

Base (1st column of figures) : All respondents (excluding scientists at Research Council-funded establishments), 1540
Base (2nd column of figures): Environment correspondents and editors (22) Source: MORI

42 A survey conducted almost every year since 1990, comprising the main environment correspondents and editors from the press and broadcast media. 22 such journalists were interviewed face-to-face in September/October 1999.

Chapter 3: Attitudes towards communicating

Summary

The vast majority of scientists believe it is their duty to communicate their research and its social and ethical implications to policy makers, and to the non-specialist public. A clear majority also feels that scientists should report on any social and ethical implications of their work when publishing their research findings.

Many scientists feel constrained by the day-to-day requirements of their job, leaving them with too little time to communicate, or even to carry out their research.

Scientists mention a variety of groups as being the most important with which to communicate – indicating a broad perceived potential audience overall. Most scientists feel that scientists themselves should have the main responsibility for communicating the social and ethical implications of scientific research to the non-specialist public. However, fewer feel that scientists are the people best equipped to do this.

Do scientists regard it as their duty to communicate?

The vast majority of scientists agree that it is their duty to communicate their research and its social and ethical implications – both to policy makers, and to the non-specialist public (see chart overleaf).

Biomedical scientists are more likely than non-biomedical scientists to agree that scientists have a duty to communicate their research and its implications to the non-specialist public (88%, cf. 79%), and just 6% of them disagree. This may be because biomedical scientists are more likely to say that there are social and ethical implications to science than are non-biomedical scientists (79%, cf. 60%). Clinical scientists and those who deal with patients are the most likely to agree with this statement (91% and 96%, respectively).

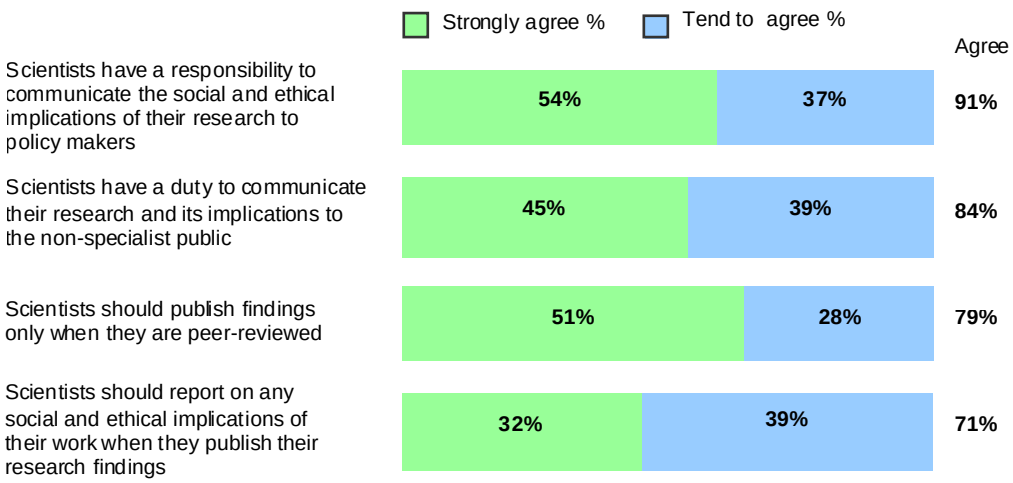
Scientists funded by the Wellcome Trust are the least likely to agree that scientists have a responsibility to communicate the social and ethical implications of their research to policy makers (82%, cf. 91% on average). In contrast, those funded by other charities display a similar result to the average.

A clear majority also believes that scientists should report on any social and ethical implications of their work when publishing their research findings, and support peer-reviewed publication only.

CHART 11

Duty to communicate

Q11 How strongly do you agree or disagree with the following statements…?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

Do scientists have the time to communicate?

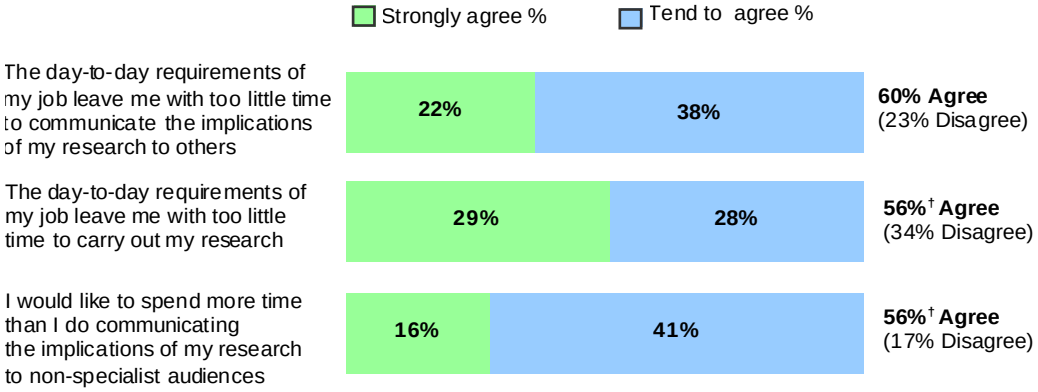
Many scientists feel constrained by the day-to-day requirements of their job, leaving them with too little time to communicate (60%), or even to carry out their research (56%).

However, almost six in ten say they would like to spend more time communicating the implications of their research to non-specialist audiences.

CHART 12

Time to communicate

Q11 How strongly do you agree or disagree with the following statements …?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

† The total 'agree' figure comes to 56%, not 57% because numbers of respondents, rather than percentages, have been added together for 'strongly agree' and 'tend to agree' to give the percentage who 'agree' overall.

Those who have communicated with the public in the last year are more likely to say they want to spend more time doing so (61%). However, half of those who have not would also like to participate more. This suggests that the active group wants to be even more active, but that many of the inactive group are also eager to participate. As one might expect, those who feel equipped to communicate the scientific facts, and the implications of their research, are more inclined to want to spend more time communicating research implications to non-specialist audiences (60% and 61% agree, respectively). However, those who have received training in communicating with the public are not significantly more likely to agree with either statement.

Those who have not participated in communications activities, but who want to spend time doing so[43], differ from those who have not participated and do not want to do so. The former are more likely to say that there are social and ethical implications for the public in their field of research – suggesting that a perceived relevance increases the willingness to communicate. Those who have not communicated but want to are also more likely to: feel equipped to communicate the scientific facts, as well as the social and ethical implications of their research; be aged under 35; and receive research funds from industry. In contrast, those who do not want to spend time doing so (and have not) are more likely to be aged 45+, and on a permanent contract.

Those least likely to want to spend more time communicating are those who do not have experience of communicating with the public (50%) and those funded by higher education funding councils (43%). While most scientists working in Research Council-funded establishments want to spend more time communicating their research implications with non-specialist audiences (49%), they are also the most likely group to disagree with this statement (29%).

43 That is, they agreed that they wanted to spend more time than they do communicating the implications of their research to non-specialist audiences.

Those who agree that the day-to-day requirements of their job do not leave them with enough time to communicate the implications of their research[44] are more likely to: be on permanent contracts (68%); be teaching as well as conducting research (66%); feel ill-equipped to communicate the scientific facts (68%); and feel ill-equipped to communicate the implications of their research (65%). Scientists funded by industry are less likely to say they do not have enough time to communicate (49%).

Help to communicate?

The majority of scientists believe that scientists should receive help from both funders of scientific research, and professional communicators to convey research findings and their implications to the non-specialist public. Eight in ten (84%) mention help from funders of scientific research, and almost three-quarters (73%) mention help from professional communicators.

Communicating social and ethical implications

One of the objectives of this research was to see how scientists perceive the social and ethical implications arising from their work. Seven in ten say there **are** social and ethical implications for the public in their field of research.

Biomedical scientists are considerably more likely to say their work has social and ethical implications (79%, cf. 60% of non-biomedical scientists), and those who deal with patients are the most likely to agree with this (94%).

Scientists who are principally funded by a charity, and scientists who conduct animal research, are also more likely than average to say that their research has implications for the public (86% and 82%, respectively).

Those who say there are no social and ethical implications to their research (29%) are more likely to be non-biomedical scientists (62%) than biomedical scientists (38%). (The 29% 'No' figure splits into 18% non-biomedical, 7% non-clinical biomedical, and 4% clinical biomedical).

Most scientists say their research has 'some' social and ethical implications (56%), rather than 'many' (34%) or 'hardly any' (9%). Again, biomedical scientists are more likely to say their research has **many** implications than are non-biomedical scientists (39%, cf. 27%), as are clinical scientists (44%, compared to 34% on average).

The main reasons scientists give for their research having social and ethical implications are that their research: is trying to cure, treat or understand human illnesses (22%)[45]; is looking at environmental impacts (17%)[46]; and is involved with biotechnology (13%)[47].

The following is a selection of verbatim responses to this question, illustrating the breadth of fields in which scientists are working, and highlighting the many and varied social and ethical implications.

Q28 And why would you say that your work has… (many/some/hardly any/no) social and ethical implications?

We are trying to cure/treat/understand illness or disease; involved in human health issues (22%)[48]

> 'The work I do will eventually lead to screening methods for cancer and give people choices for treatments, and also if they should have children or not'
>
> Male, 45–54 years, senior researcher, Non-clinical biomedical, Some implications

> 'The main implication would be an improved survival rate in intensive care. We are modifying treatments that patients receive and some people may object to change of treatment'
>
> Male, 25–34 years, researcher, Non-biomedical, Some implications

44 This group is less likely to be of research assistant grade. Other than this, there are few differences by sub-group.

45 Mentioned by more biomedical scientists (30%).

46 Mentioned by more non-biomedical scientists (27%).

47 Cloning, genetic modification or gene therapy. This was mentioned by more biomedical scientists (19%).

48 This heading, and other such headings in the report, refer to the way respondents' answers were coded. The percentage indicates the proportion of respondents (minus those in Research Council-funded establishments) whose answer at Q28 was coded into this category.

‘There are health implications for local populations – dealing with cancer-causing chemicals on contaminated sites’

Female, 25–34 years, researcher, Non-biomedical, Some implications

‘Because it is basic medical research and it has the potential to affect a lot of people’s lives e.g. a scientific breakthrough for cancer research. There are many facets to that basic issue’

Female, 25–34 years, research assistant, Non-clinical biomedical, Many implications

Environmental impact/pollution control (15%)

‘No ethical [implications], but socially my work involves using hazardous chemicals that could cause problems if not disposed of properly’

Male, 25–34 years, researcher, Non-biomedical, Hardly any implications

‘People need to be aware of environmental change and the effects of flooding. To prepare for any problems in the future, they need to understand the environment and how the earth responds’

Male, 25–34 years, researcher, Non-clinical biomedical, Some implications

‘The results of my research could influence how public money is spent on dealing with local pollution issues’

Male, 25–34 years, senior researcher, Research Council-funded establishment scientist, Some implications

Use of animals/vivisection (8%), and involved with GM food/gene manipulation/genetic modification (9%)

‘The use of animals in research is the obvious one as it is a very emotive issue; genetic engineering of organisms where there is a huge level of misunderstanding has led to the trashing of GM crops and media misinterpretations…’

Male, 35–44 years, researcher, Non-clinical biomedical, Many implications

Involves health and safety/trying to prevent accidents or loss of life (4%)

‘Because it’s about driving and falling asleep at the wheel. Death on the roads…[has] serious social implications’

Female, 25–34 years, researcher, Non-clinical biomedical, Many implications

Implications for employment (3%)

‘There could be jobs for people…if I can harness methane gas from disused coal mines'

Male, 35–44 years, researcher, Non-clinical biomedical, Some implications

Influenced by litigation/politics/policies (2%)

‘Because it has policy implications, I suppose. Findings from my research could lead to policy changes which may impinge upon the public’

Male, 35–44 years, researcher, Non-clinical biomedical, Many implications

Involved with nuclear weapons/nuclear energy (1%)

> 'The field I'm involved in has some short and long-term implications to society. The decisions are not simple e.g. nuclear energy is a proven viable source of energy but the implications are very controversial'
>
> Male, 45–54 years, senior researcher, Non-clinical biomedical, Many implications

Nearly all scientists (93%) agree that the non-specialist public needs to know about the social and ethical implications of scientific research, and just over half (53%) agree strongly with this statement. Just 2% of scientists disagree. Biomedical scientists who deal with patients, and professors/directors/heads of departments are the most inclined to agree strongly (67% and 63%, respectively).

Who has responsibility for communicating the social and ethical implications of research?

Respondents were presented with a list of 14 professions and organizations, and asked which, if any, should have the main responsibility for communicating the social and ethical implications of scientific research to the non-specialist public. They were then asked which[49] they regarded as being the best equipped to do this.

Most scientists (69%) feel that scientists themselves should bear the main responsibility for such communication. However, only four in ten feel that scientists are the best equipped people to do this. No single group is considered by a majority to be best equipped for the job. Chart 13 illustrates this.

Significantly more scientists who have participated in public open days at institutions (75%), and who feel equipped to communicate the scientific facts (73%) and the social and ethical implications of their work (74%), say scientists should have the main responsibility for communicating.

Funders of scientific research are mentioned by nearly half as a group that should have the main responsibility for communicating the social and ethical implications. Funders, however, are not seen by many scientists to be well equipped to do so (25%). Wellcome Trust-funded scientists are more likely than average to say that funders of scientific research should have the main responsibility for communicating the research implications (59%, cf. 46%).

Specialist science communicators[50] are rated by around four in ten as the group that should have the main responsibility for communicating the implications of research, and as being the best equipped to do so. Scientists who have participated in writing or publishing articles in the press (51%), and scientists funded by higher education funding councils (54%) are more likely to think specialist science communicators should have the main responsibility. Those who have written or published articles in the press are also more likely to rate specialist science communicators as being the best equipped (55%).

Journalists in the popular science press are not regarded as a group which should have the main responsibility to communicate to the public, or as being the best equipped to do so (just 14% and 20%, respectively). This is despite the fact that they are the media representatives most trusted to provide accurate information about scientific research facts.

The government is ranked fourth as the group which should have the main responsibility (40%), but is rated as being the best equipped by fewer than one in five (17%).

49 From the same list.

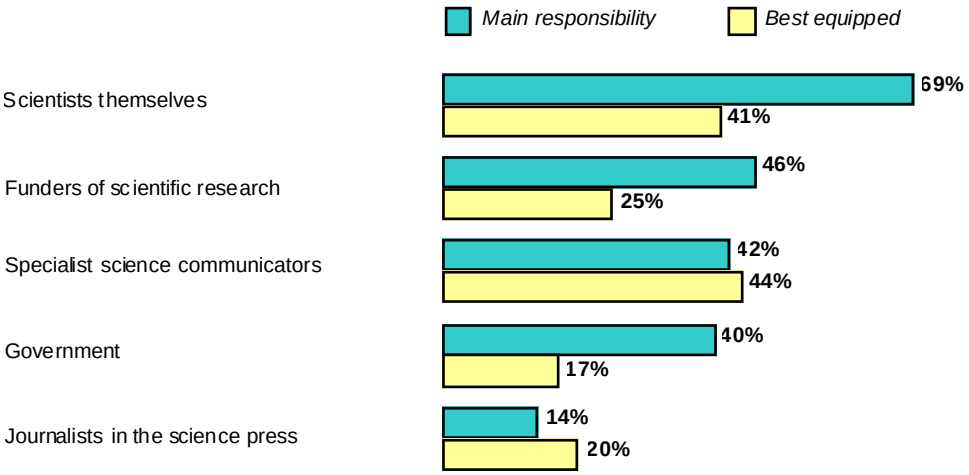
50 For an explanation of 'specialist science communicators', please refer to footnote 13, in the summary. (This explanation was not provided during the interview.)

CHART 13

Communicating social and ethical implications – responsibility

Q30a Who,if any, of the following should have the main responsibility for communicating the social and ethical implications of scientific research to the non-specialist public?

Q30b …who would you say is best equipped?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

Scientists nominating specialist science communicators as being best equipped give as their reasons: they have knowledge, skills or experience (43%); they are better at communicating (34%); and they have a better understanding of research and its implications (26%). One in six say that specialist science communicators would be less inclined to misrepresent or would be accurate when conveying information. Both national press and broadcast journalists receive lower ratings for having knowledge, skills and experience (33% and 34%). They also receive fewer mentions for having been trained to communicate[51], for understanding research and its implications[52], and for being less inclined to misrepresent or to be accurate when conveying information.[53].

Those who think scientists themselves are best equipped to communicate research findings to the public say this is because: they have a better understanding of the research and its implications (48%) and they have the knowledge, skills and experience (34%). Only one in five think they are best equipped because they are better at communicating.

Q31 And why do you say that…is best equipped to communicate the social and ethical implications of scientific research findings to the non-specialist public?

Specialist science communicators (44%)[54]

> 'They should understand the science and be able to interpret it'
>
> Female, 25–34 years, senior researcher, Non-clinical biomedical

> 'Because they've got the best understanding of the research going on, and what the implications are'
>
> Female, 25–34 years, senior researcher, Non-clinical biomedical

51 26% and 25% respectively.

52 13% and 11% respectively.

53 7% and 9% respectively.

54 This percentage indicates the proportion who said 'specialist science communicators' at Q30b. The quotation indicates the response at Q31.

Scientists themselves (41%), specialist science communicators (44%) and government (17%).

> 'Scientists clearly have a responsibility as they most intimately know the work and its implications'. Secondly, the communicators would know how to be the bridge to the public, they'd know the language for both sides. And the government is important as they put over a more coherent view…attract media attention and are most recognizable to the public'
>
> Male, 45–54 years, professor, Non-clinical biomedical

Scientists themselves (41%), journalists in the popular science press, e.g. *New Scientist* (20%), and government (17%)

> 'Scientists know what they are talking about, journalists know how to present it and the government has the PR to do it'
>
> Female, 25–34 years, research assistant, Non-biomedical

Funders of scientific research (25%)

> 'Hopefully, they have an overview of the work in the field. Scientists can get too close to it'
>
> Male, 45–54 years, senior researcher, Non-clinical biomedical

Charities and campaigning groups (13%), and funders of scientific research (25%)[55]

> 'Because they have a greater interest and ability in getting it right. They understand issues better than general journalists and the government'
>
> Male, 35–44 years, senior researcher, Non-clinical biomedical

> 'Well, they are the best equipped to communicate with the public, not scientists who do the research. We have no communication skills'
>
> Male, 35–44 years, researcher, Non-clinical biomedical

> 'I think that no-one in isolation is best equipped – they should do it in concert'
>
> Male, 65+, professor, Non-clinical biomedical

Journalists in the popular science press (20%)

> 'Journalists are trained to present balanced arguments using a wider range of perspectives than scientists; scientists alone are able to give the level of technical competence required'
>
> Male, 55–59 years, professor, Non-biomedical

Audiences for communicating scientific research

Scientists were asked[56] with which group or groups they felt it most important to communicate their research and its social and ethical implications. They mention a number of groups[57], as shown in Chart 14. This indicates the breadth of audiences with which scientists as a whole feel they should be communicating.

The group mentioned most frequently, although by only around one in four scientists, is the scientific community (peers, colleagues, fellow scientists, academics). Approaching one in five thinks the public is the most important.

There is very little overlap between those saying that their peers are a key group to communicate with, and that the public are. Therefore the two most mentioned groups are generally being cited by different scientists.

---

55 Respondents whose quotes appear under this heading gave both these responses at Q30b: 'charities and campaigning groups', and 'funders of scientific research'.

56 At Question 3.

57 At this open-ended question.

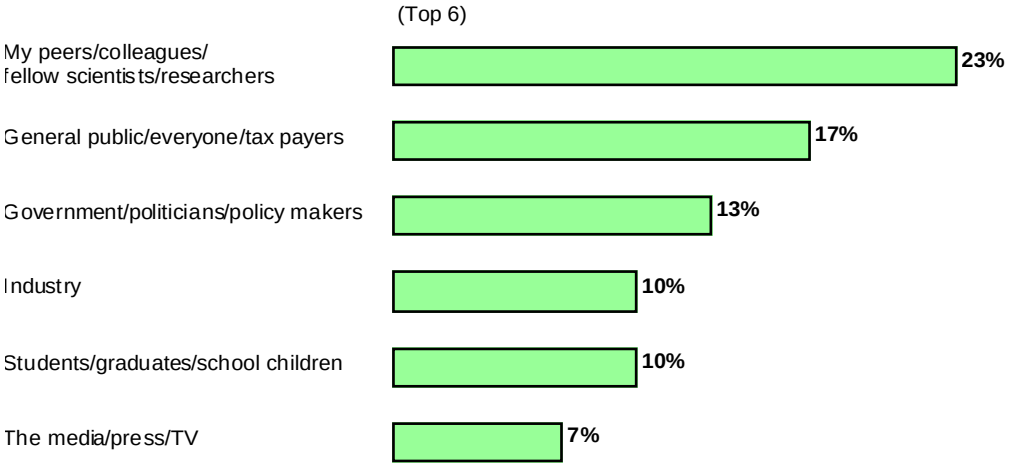
Around one in ten think that government, industry and students are their main priorities. Fewer than one in ten think the media should be their main focus for communication, which may reflect scientists' low level of trust in most of the media to report scientific facts accurately.

CHART 14

Communicating – most important audiences

Q3 If you had to communicate your research and its social and ethical implications, who do you think would be the most important group to communicate with?

(UNPROMPTED, RECORDED VERBATIM)



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

The only group more likely than average to mention the scientific community as their main priority are those who do not feel equipped to communicate the scientific facts of their research to the public (28%) – though they are no less likely to mention the public. It may be that those who feel ill-equipped to communicate scientific fact to the public focus more on liaising with the scientific community.

Scientists who have experience of speaking to the media, and scientists who say their research does have social and ethical implications, are more likely to say the public is the most important target group to communicate with (23% and 19%, respectively). These groups are also more likely to be older (aged 45+).

It is interesting that for those who have received training in communicating with the public, the public comes ahead of the scientific community as an important group with which to communicate (23%, cf. 15%).

Scientists based at Research Council-funded establishments appear to place greater value than average on communicating with the public and with government (32%, cf. 17% on average[58], and 22%, cf. 13% on average[24]).

Most of the scientists who said communicating with the public is key, also said that the public is not knowledgeable about the science in their research area (85%), or has little or no awareness of its social and ethical implications (59%). Given that most scientists have not received training in communicating with the non-specialist public or the media[59], this poses a double challenge – communicating science issues and their implications, and doing so to an audience perceived to have little current knowledge.

This is backed up by findings discussed in Chapter 1, when scientists were asked directly what they perceive to be the main barriers to a greater public understanding of science. More than half (53%) spontaneously mentioned a lack of knowledge of scientific facts or of information, and/or a lack of knowledge on the part of the public. A fifth also commented that scientists lack communication skills to enable a greater public understanding of science.

58 'Average' refers to the 1540 scientists at HEIs, which does not include the 112 scientists at Research Council-funded establishments.

59 Discussed later on in this report.

The main reasons given by scientists who say the scientific community is the most important group to communicate with are: they will understand the research (25%); for the exchange of ideas, collaboration or critical analysis (23%); for peer approval or appreciation (10%); and because they provide the funding or pay their salary (10%).

A selection of verbatim comments from these questions appears below:

Q4 Why do you say that…would be the most important group to communicate your research and its social and ethical implications with?

My peers/colleagues/fellow scientists/researchers

'The type of research is not relevant or of interest to [the] general public. It is basic research'

Female, 25–34 years, research assistant, Non-clinical biomedical

'Because of the technical specification etc. They would understand it, whereas the man-in-the-street wouldn't necessarily know what I meant'

Male, under 25, research assistant, Non-biomedical

The public or tax payers are primarily mentioned by scientists as the most important target group because: of the need to raise awareness or improve people's knowledge of science (22%); they provide the funding/pay their salary (17%); and their research has implications for everyone (13%).

General public/everyone/tax payers

'They are the ones who use the products we are researching'

Male, 25–34 years, researcher, Non-biomedical

'They are funding my research'

Male, 25–34 years, research assistant, Non-clinical biomedical

'The public…needs to see what they are getting for their money. It is our responsibility to tell them what we achieve with our research'

Female, 25–34 years, research assistant, Non-biomedical

'…they could pass this [information] on to children'

Female, 35–44 years, researcher, Non-clinical biomedical

'I think it is important to get knowledge spread around as widely as possible'

Female, 25–34 years, research assistant, Non-clinical biomedical

'Scientific research is not described well enough to the public. They don't get a good enough description that they can understand'

Female, 25-34 years, research assistant, Non-biomedical

'It affects everybody. Everybody needs to understand what is going on'

Male, 25–34 years, researcher, Non-clinical biomedical

Government, politicians and policy makers are thought by 13% of respondents to be the most important group with which to communicate because: they provide the funding or pay scientists' salary (25%); they formulate laws, initiate change or make decisions (24%); and they can pass information on to the general public or to a wider audience (14%).

Government/politicians/policy makers and financiers/funding bodies

> 'Because we want more funds! The funders are given government money to continue research. If our research is "good science", they will continue to fund it, or alternatively, we will develop practical applications and seek funding elsewhere'
>
> Male, 45–54 years, professor, Non-clinical biomedical

> 'They are the ones with more direct access to the general public'
>
> Male, 45–54 years, senior researcher, Clinical biomedical

The majority of scientists (89%) who say that fellow scientists or colleagues, not just those in the same research team, are the most important group with which to communicate think that their colleagues are knowledgeable about the science in their research area, but fewer (73%) believe they are aware of the social and ethical implications of their research. Comparatively, only 15% of those scientists who say that the public is the most important group with which to communicate think that they are knowledgeable about the science in their research area. However, twice as many think they are aware of the social and ethical implications of their research (32%).

Government and politicians are perceived by those scientists who think they are the most important group with which to communicate as not being very knowledgeable about the science in their research area, but are perceived as being more aware of the social and ethical implications of their research than they are knowledgeable about the science (56% think they are aware, compared with 40% who think they are knowledgeable about the science).

Seven in ten scientists say industry is knowledgeable about the science in their research area, a figure which places industry second, after the scientific community. However, fewer than half believe that industry has good awareness of the social and ethical implications of their research[25].

There has been much debate about young people and science: for example, the need to promote a broader understanding of science among school pupils, and to encourage more women to enter science. It is interesting therefore to note that the majority of scientists (75%) say students and school children are not knowledgeable about science in their research area. However, 34% say they **are** aware of the social and ethical implications. Perhaps then, one way of engaging young people in science might be to debate the social and ethical implications with them?

Personal benefits and barriers to communicating scientific research and its implications to the public

Respondents were asked to name any perceived personal benefits to communicating their research and its implications to the public[60].

These they cited as: helping their career e.g. through their name or research being publicized, advancing their career, providing opportunities for collaboration, offering job security, and/or providing support for or appreciation of their work (32%); attracting possible funding (29%); and personal satisfaction or enjoyment (22%). One in seven say 'advancing the role of science' (15%), and 11% that it gives them experience in communicating. One in seven (14%) say there are no personal benefits to communicating with the public.

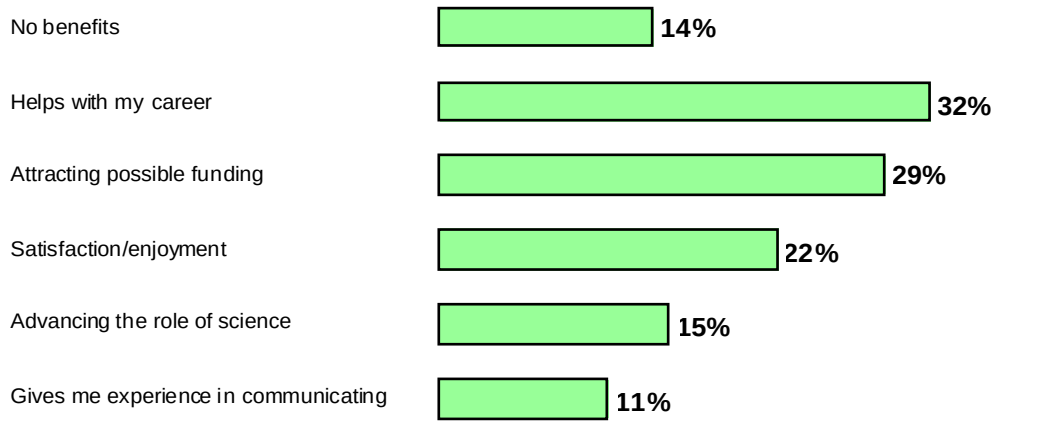
60 This question (Q10) was unprompted, with pre-coded categories for the interviewers' benefit.

CHART 15

Personal benefits of communicating research

Q10a What personal benefits, if any, do you see in communicating your research and its implications to the public?

(UNPROMPTED, WITH PRECODES)



Base: All respondents (excluding research council-funded scientists), 1540

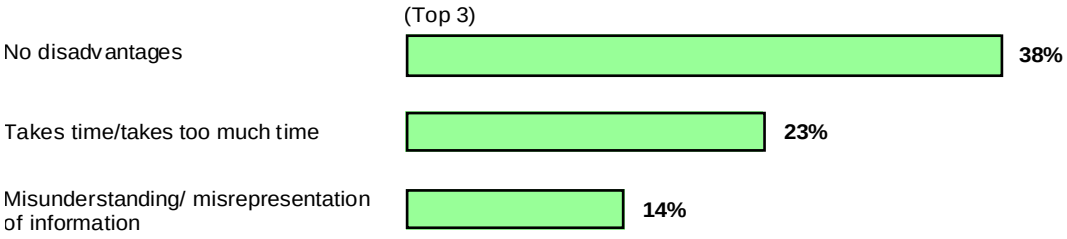
Source: MORI

CHART 16

Personal disadvantages of communicating research

Q10b What personal disadvantages, if any, do you see in communicating your research and its implications to the public?

(UNPROMPTED, WITH PRE-CODES)



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540

Source: MORI

Many scientists (38%) do not see any personal disadvantages to communicating scientific research and its implications to the public. However, a quarter say it takes too much time or energy, and one in seven that it can lead to misunderstanding or misrepresentation of information.

Non-biomedical scientists are considerably more likely than biomedical scientists to say there are no personal disadvantages (47%, cf. 30%). Clinical scientists and those who deal with patients are the most likely to say there are personal disadvantages. It may be that they are more concerned than other scientists about possible misunderstandings occurring, or misrepresentation of their research. Clinical scientists and biomedical scientists in general are more likely to view misunderstanding and misrepresentation of information as a disadvantage of communicating their research to the public (21% and 18%, cf. 14% on average).

Scientists whose research team holds a licence to conduct research on animals face particular disadvantages in attempting to communicate their research to the wider public – 28% spontaneously mentioned the risk they may face from animal rights or extremist groups. Perhaps consequently, these scientists are less likely to participate in communicating their research (46%, cf. 60% of those whose work does not involve research on animals), and more than four in ten of them feel ill-equipped to discuss the social and ethical implications with the wider public (43%)[61].

61 This result is based on all excluding: scientists who would not present at Q17; those who do not feel there are any social and ethical implications to their research; and scientists at Research Council-funded establishments

Chapter 4: Participation in communications activities

Summary

Just over half of scientists have participated in one or more of 15 given forms of communications activity in the last year. Participation is related to scientists' skill and confidence: those who feel equipped to communicate the scientific facts and implications of their research, and scientists who have received training, are more likely to have participated. Similarly, scientists who teach, as well as conduct research, and who therefore have experience of communicating to non-specialists, are more likely to have communicated in the past year.

Among the methods considered effective for communicating their research are: talking at schools and colleges (73%) and speaking on television and radio (66%). However, when asked which methods they think are **most** effective, speaking on television and radio comes top, mentioned by almost half. Three-quarters of scientists feel equipped to communicate the scientific facts of their research, although only one in five feels very well equipped. Confidence declines further when scientists are asked how they feel about communicating the social and ethical implications of their research. Among those whose work has social and ethical implications, 62% feel equipped, and one in ten feel very well equipped.

Two types of questions were used to gauge the degree of scientists' participation in communication activities. Scientists were shown a list of 15 activities and asked in which, if any, they had participated in the last year. Scientists were then asked directly, how many times, if any, they had participated in particular activities in the past year, namely: presentations to non-specialist audiences, writing for non-specialist audiences and talking to the media[62].

Fifty-six per cent of scientists have participated in at least one of the 15 given communications activities in the last year. This can be broken down into:

- 32% who have given non-scientific presentations[63];
- 29% who have spoken to the media[64];
- 24% who have participated in open days at their institutions; and
- 13% who have written or published work[65].

The more direct questions (Q14, Q19 and Q15) yield 'ever' figures of:

- 42% for presentations to non-specialist audiences;
- 34% for speaking to the media; and
- 26% for writing/publishing for non-specialist audiences.
- One quarter of scientists (27%) have presented more than once in the previous year. Similarly, 22% have spoken to the media and 13% have written for non-specialist audiences more than once.

62 The more direct form of questioning consistently yields higher figures (of 5 to 13 percentage points) for participation. Much of the difference is probably due to the different question wording. Also, in the case of Q14 and Q15, the questions referred to 'non-specialist audiences', while Q12c followed Q12a and b and asked about the 'non-specialist public'. It is possible then that in response to Q15, scientists were giving a broader response (e.g. including writing at the request of the Dean, administrative departments, applications for funding, and so on).

63 This includes: talking at schools and colleges (21%); presenting at public conferences – other than scientific conferences for scientific professionals (11%); speaking at public meetings (9%); speaking at non-scientific academic conferences (8%); and talking to the public (*).

64 This includes: talking to TV or radio journalists (15%); talking to journalists at national newspapers (14%); speaking on TV/radio (13%); talking to journalists at local newspapers (12%); talking to journalists in the popular science press, e.g. *New Scientist* (8%); talking to journalists in the computer press, e.g. *Computer Weekly* (1%), and; 'other' – television/popular television programmes (*).

65 This includes: publishing articles in the popular science press (7%); writing for the national press (4%); writing for the local press (4%); publishing articles in the computer press, e.g. *Computer Weekly* (1%); and 'other' – specialist magazines (*) and consumer magazines (*).

As mentioned earlier, just over half of scientists (56%) say they have participated in any kind of communications activities in the last year. The table below shows the proportions of various groups of scientists who have done this.

TABLE 4

Participated in any communications activity: Average = 56%
Significantly higher figures are in italics. Significantly lower figures are in bold.

	%		%
Department type		**Function**	
Clinical biomedical	52	Teaching and research	*64*
Non-clinical biomedical	56	Research only	41
Biomedical patients	*78*		
All biomedical	54		
Non-biomedical	58		
Gender		**Animal research**	
Male	*59*	Yes	46
Female	48	No	*60*
Grade		**Communicating facts**	
Professor/director/head	*76*	Equipped	*62*
Senior researcher	63	Not equipped	43
Research assistant	**34**		
Principal funder		**Communicating social/ethical implications**	
Research Council	59	Equipped	*63*
H.E.F.C.	54	Not equipped	49
The Wellcome Trust	**33**		
Industry	**45**		
Contract		**Received training**	
Permanent	**68**	Yes	*66*
Fixed	43	No	54
Age		**Research has social/ethical implications**	
Under 35	*44*	Yes	*59*
35–44	55	No	48
45–54	*68*		
55+	*70*		

Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

By type of research, biomedical scientists are slightly less likely to have participated in communicating their research, but biomedical scientists who deal with patients are considerably more likely to. Senior scientists (professors/directors/heads of departments and senior researchers) are also more likely to have participated. Those on permanent contracts are also more likely to have participated; this is probably associated with seniority. By type of funding, scientists funded by the Wellcome Trust and by industry are less likely to have communicated the results of their research and its implications.

Participation is related to scientists' skills and confidence: those who feel equipped to communicate the scientific facts and implications of their research, and scientists who have received training, are more likely to have participated. Similarly, scientists whose job it is to teach as well as to conduct research and who therefore have experience of communicating to non-specialists, are more likely to have participated in communications activities in the last year.

Scientists who say that their research does have social and ethical implications are also more likely to have participated.

Of the specific activities listed (see Chart 17), scientists are most likely in the last year to have given talks to schools or colleges (21%), or participated in open days for the general public at their institutions (24%). There is a greater overlap between these two activities than any other[66]; and unlike other activities, a number of younger scientists, aged under 45, have been involved in them[67]. Furthermore, many scientists who have been involved with the media, or presented at public or non-scientific academic conferences, have also talked at schools or participated in open days. However, fewer of those who have talked at schools, or participated in open days have been involved with the media, or presented at conferences. The data therefore suggest that some scientists may have 'cut their teeth' giving talks to schools or colleges, or at open days.

Scientists aged under 45 are more likely to have participated in school or college talks, or open days, than any other activities, and most of those aged 45+ have not participated in either. This suggests that participation in these activities may have recently become more commonplace.

In summary then, of all the communications activities undertaken with non-specialist audiences, scientists are most likely to engage in participating in open days, and talking at schools and colleges. This is followed by speaking to the media, and then presenting, speaking, writing or publishing. While the majority of scientists (73%) say talking to national press journalists and broadcast journalists is among the most effective ways of communicating their research, they also have little trust in most of the media. This could explain why only a minority have actually spoken to the media themselves (in the last year), along with the usual constraints on their time.

A minority of scientists[68] (26%) have also contributed to public policy communications, the most common activity being contributing to a response by their institution to a government advisory body, or a parliamentary select committee (24%). Just a few (3%) have given oral evidence to a parliamentary select committee.

66 49% of those who have talked at schools and colleges have also participated in open days; and 42% of those who have participated in open days have also talked at schools and colleges.

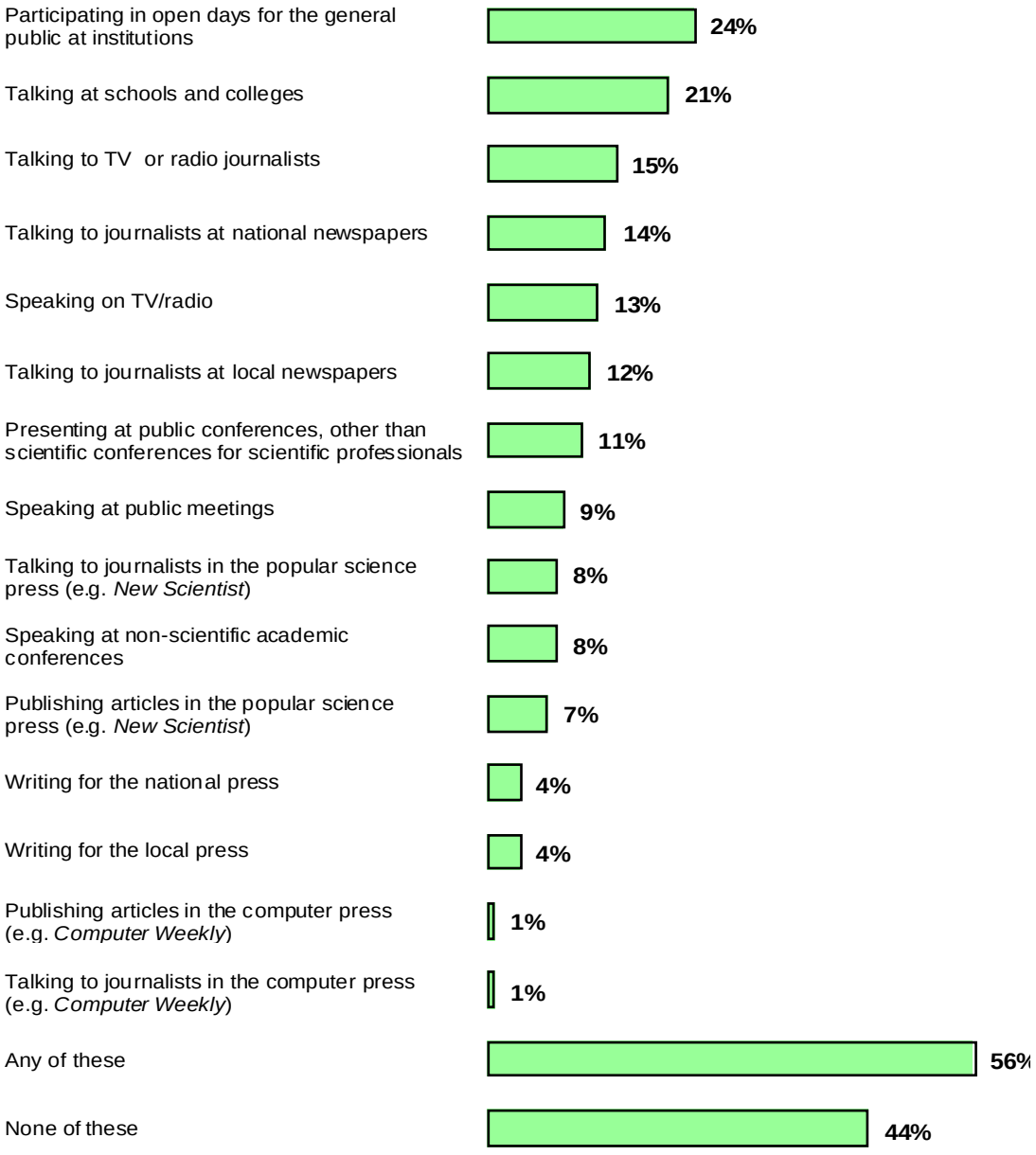
67 Though those aged 45+ are still more likely than the under 45s to have given talks to schools or colleges (28% and 16% respectively), or at open days (27% and 22% respectively).

68 At Q13.

CHART 17

Participation in communications activities

Q12c Which, if any, of the following have you participated in in the last year?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540

Source: MORI

Effective methods of communicating with the public

Scientists were asked which methods they considered effective for communicating their research and its social and ethical implications to the non-specialist public. Talking at schools and colleges (73%); speaking on television and radio (66%); participating in open days for the public at institutions (60%); and talking to television or radio journalists (60%) were mentioned most frequently.

However, when asked which methods they think are **most** effective, speaking on television and radio comes top, mentioned by almost half. Presumably this reflects the greater reach achievable via these media. When other methods of oral communications via the media are included (e.g. talking to journalists), nearly three-quarters consider the media to be the most effective method. Writing for the national press is slightly more favoured by scientists (30%) than talking to journalists at national newspapers or to broadcast journalists (26% each).

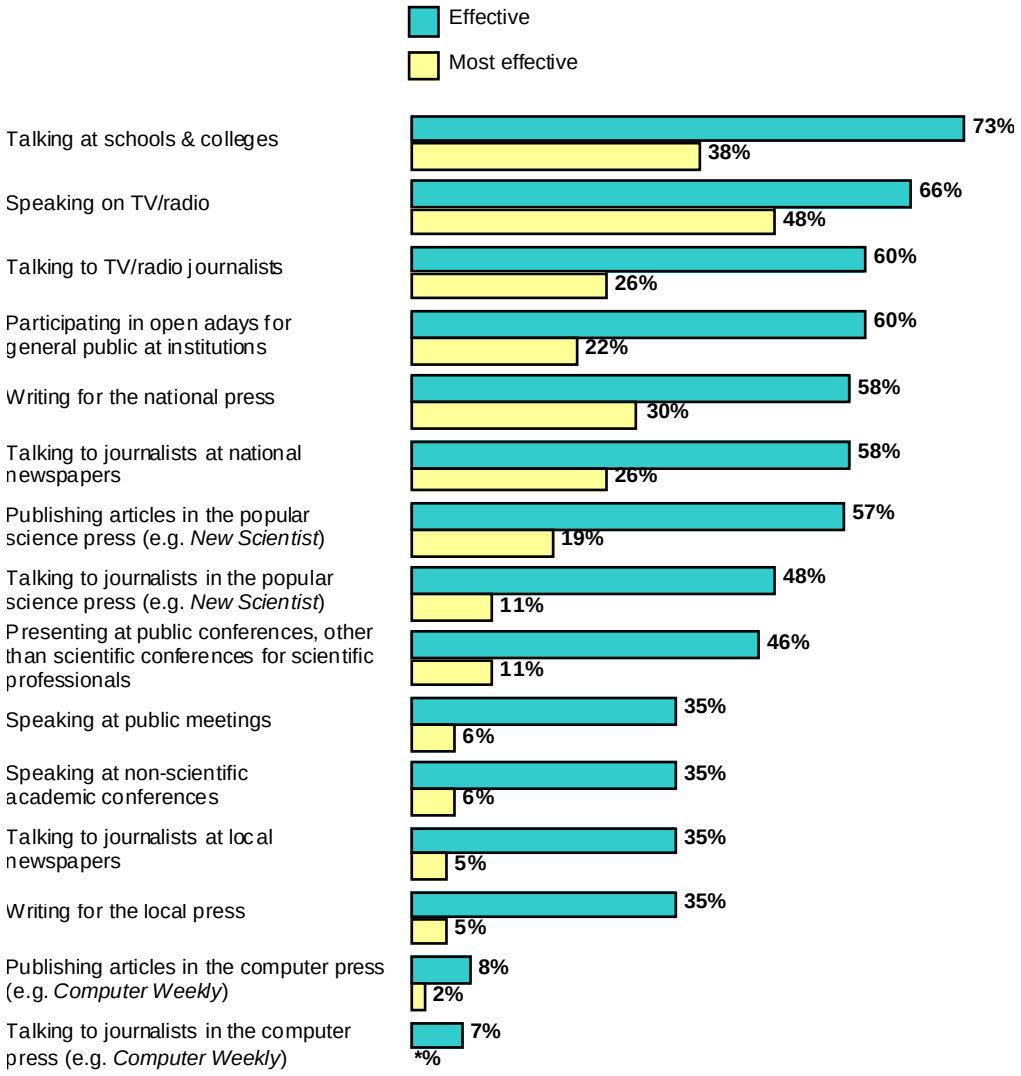
While most scientists rate talking at schools and colleges as the most effective method, only 38% think it effective. Presentations to non-scientific audiences as a whole (speaking at schools, open days and/or conferences) are thought by just over half to be most effective, while just under half consider that writing or publishing their work is the most effective method.

CHART 18

Effective methods of communicating

Q12a Which, if any, of the following would you say are effective methods of communicating your research and its social and ethical implications to the non-specialist public?

Q12b And looking at this card again, which methods, if any, would you rate as the most effective for communicating your research and its social and ethical implications to the non-specialist public? Please select up to three



Base: All (excluding scientists at Research Council-funded establishments), 1540

Source: MORI

Feeling equipped to communicate

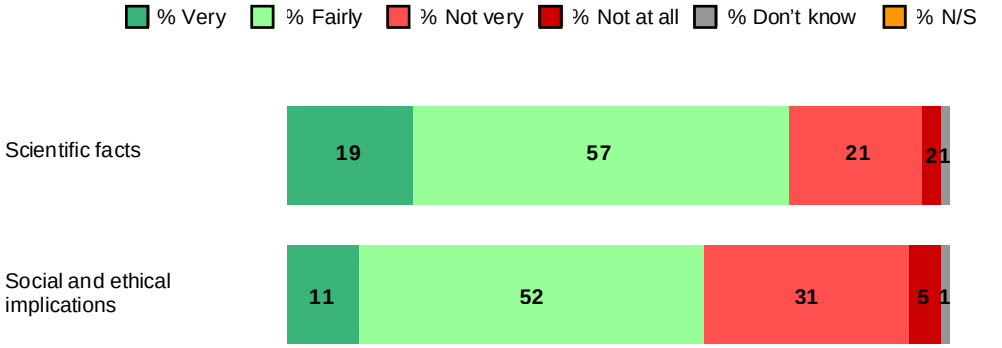
Three-quarters of scientists[69] feel equipped to communicate the scientific facts of their research, although only one in five feels very well equipped. Nearly one-quarter do not feel equipped to do so. Most scientists (57%) say they would feel fairly well equipped.

CHART 19

Communicating – feeling equipped

Q16 How well equipped do you personally feel to communicate the scientific facts of your research to the non-specialist public?

Q17 How well equipped do you personally feel to communicate the social and ethical implications of your research to the non-specialist public?



Q16 Base: All respondents (excluding those who wouldn't personally do this, and excluding scientists at Research Council-funded establishments), 1523

Q17 Base: All respondents (excluding those who wouldn't present, and excluding those whose work does not have social/ethical implications, and excluding scientists at Research Council-funded establishments), 1088

Source: MORI

Confidence declines when scientists are asked how they feel about communicating the social and ethical implications of their work. Among those whose work has social and ethical implications[70], one in ten feels very well equipped and just over half feel fairly well equipped (52%). More than a third, however, do not feel equipped (36%).

Scientists who feel equipped to communicate scientific facts also tend to feel equipped to communicate the social and ethical implications of their research[71]. This suggests that factors such as confidence or training are responsible for feeling able to communicate. Those scientists who feel more equipped to communicate both the scientific facts and the implications of their research are more likely to be: aged 45+; and senior members of staff (professors, directors and heads of departments); to teach as well as conduct research; to be on permanent rather than fixed contracts; to have received training to communicate with the public; and to have communicated with the public.

Scientists who deal with patients, compared with those who do not, are also more likely to feel equipped to communicate both the scientific facts of their research and the social and ethical implications.

69 Figures for this question (Q16) have been calculated to exclude the small percentage (2%) who said they would not personally present.

70 And excluding those who would not personally present.

71 The analysis is based on all scientists, excluding those in Research Council-funded establishments. Scientists who said they felt 'very equipped' to communicate scientific fact, tended to say they felt 'very equipped' to communicate the social and ethical implications of their research. Similarly, those saying 'fairly equipped' tended to do so at both questions. Those saying 'not very equipped' at one question tended to say 'not very' or 'not at all equipped' at the other question and thus, those saying 'not at all equipped' at one question tended to say 'not very' or 'not at all equipped' at the other question.

Chapter 5: Supporting scientists in public debate

Summary

The overwhelming majority of scientists have not been trained to liaise with the media, or to communicate with the non-specialist public. Most, though, agree that oral communication is generally the most effective method for communication, as well as writing for the national press. There are indications from the results that having training is linked to increased confidence and participation in communications activities. However, other factors, such as age, seniority and teaching experience, also contribute. Most scientists are aware that their institution or department provides a range of communications services. In contrast, relatively few scientists are aware of any communications services provided by funders. This suggests a number of conclusions: a possible under-use of funders' resources; that some scientists may prefer to work with local contracts; and that perhaps some funders are not providing adequate resources to scientists.

A wide variety of stimuli to improve communications are mentioned by scientists. Incentives from funding authorities to encourage time spent on science communication are mentioned most frequently (60%), followed by training in dealing with the media (54%), and encouragement by institutions of time spent on science communication (53%).

Level of training

While most agree that oral communication is generally the most effective method, as well as writing for the national press, the vast majority of scientists have not been trained to undertake these sorts of activities. More than eight in ten have received no training in communicating their research and its implications to the non-specialist public, and nine in ten have never had any training in dealing with the media (84% and 90%, respectively).

TABLE 5

	Trained in communicating with non-specialist public % Average = 16%	Trained in dealing with the media % Average = 10%
Significantly higher figures are in italics. Significantly lower figures are in bold.		
Deal with		
Patients	*25*	*25*
Research Council-funded establishments	*29*	*21*
Participation		
Speaking to media	*23*	*19*
Writing/publishing	*27*	*26*
Any non-scientific presentation	*24*	*16*
Public open days	*21*	14
Equipped		
To communicate scientific facts	*20*	12
To communicate social & ethical implications	*20*	13
Age		
Under 35	16	**6**
35–44	16	11
45–44	14	*16*
55+	17	11
Grade		
Prof/dir/head	20	*22*
Senior researcher	14	9
Researcher	17	9
Research assistant	14	6
Scientists		
Biomedical	17	*13*
Non-biomedical	14	7

Lack of training in communication with the public is fairly consistent across all demographic groups. The 45–54 age group, however, are more inclined to have had media training, as are biomedical scientists, and those in senior academic positions (professors, directors and heads of department). Those aged under 35 are least likely to have received media training.

Other groups more likely to have had training in communicating with the public are: those who deal with patients; those at Research Council-funded establishments; those who have spoken to the media, written, published or given non-scientific presentations or been involved in open days; and those who feel equipped to communicate both scientific facts and their social/ethical implications.

Those more likely to have had training in dealing with the media are those who: deal with patients; work at Research Council-funded establishments; have spoken to the media; written or published, or given non-scientific presentations; and biomedical scientists.

Scientists who have had media training are more likely to have participated in communications activities in the past year[72], and to feel equipped to communicate their research with the public. This indicates that training is linked to increased confidence and participation in communications activities (though other factors could be playing a part). An observed exception to this may be scientists at Research Council-funded establishments, who are considerably more likely to have received training in both dealing with the media and communicating with the public, but are no more likely to feel equipped to communicate.

In summary, the results indicate that training is a factor in increased participation in communications activities. They also suggest that training and communication experiences are key factors in how confident scientists feel about communicating the scientific facts of their research with the public. However, there are indications from the data that other factors, such as age, seniority, and teaching experience, also contribute to a confidence to communicate.

Awareness of mechanisms for communication

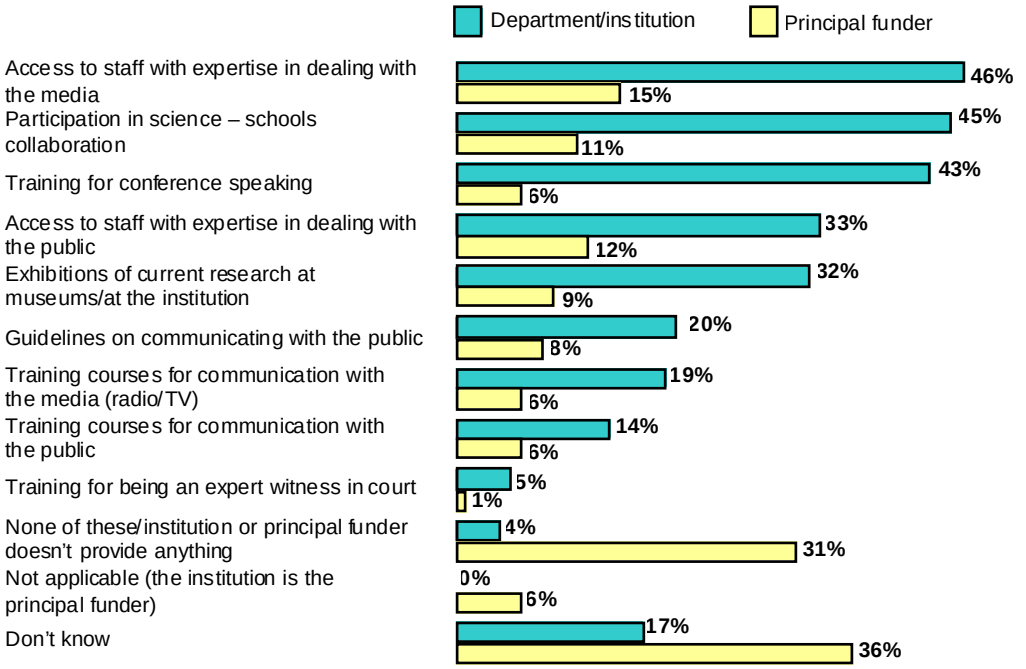
Over three-quarters of scientists (79%) are aware that their institution or department provides a range of communications services – including access to specialist staff and communications training. As Chart 18 shows, the most common services provided by departments or institutions are: access to staff with expertise in dealing with the media (46%); participation in science–schools collaboration (45%); and training for conference speaking (43%). One in three scientists say their department or institution provides access to staff with expertise in dealing with the public or research exhibitions at museums. Almost one in five, however, do not know what is available, indicating that communications within HEIs could be improved. On average, institutions/departments provide two or three types of communications service, according to scientists (mean score = 2.79), with the largest proportion of scientists (34%) saying that their institution/department provides just one service. A minority (5%) are said to offer seven or more services.

72 For a list of these activities, see Chapter 4.

CHART 20

Access to communications services

Q25 Which, if any, of the following mechanisms for communicating with the non-specialist public does your…provide?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

Biomedical scientists (74%) are less likely than non-biomedical scientists (84%) to say they have access to any kind of communications service within their institution or department. Non-biomedical staff are also far more likely to have access to participation in schools–science collaborations (57%, cf. 34% biomedical scientists). Clinical scientists say they have the least access to any services – with only 69% saying that their department or institution provides any services.

Awareness of communications services available is higher amongst those who have participated in some form of public communication[73] or who have received training in communicating with the public[74]. It may be that the availability of communications services encourages public communication among scientists or, perhaps more likely, that those who participate are more aware of the relevant facilities.

In contrast to the relatively high levels of awareness of services provided by institutions and departments, funders of research are thought to be far less likely to provide communications services. More than one in three scientists does not know what their principal funder provides; and a further one in three say that their principal funder does not provide anything[75]. This suggests a number of different conclusions: that there is a possible under-use of funders' resources; that some scientists may prefer to work with local contacts; and that perhaps some funders are not providing adequate resources to scientists.

The most commonly mentioned facility provided by funders is access to staff with expertise in dealing with the media (15%). Around one in ten say their principal funder provides access to staff with expertise in dealing with the public (12%), science–schools collaboration (11%), and exhibitions of current research (9%). As was the case with institutions, awareness of services available is higher among those who have participated in communicating with the public.

73 Writing/publishing, speaking to the media, giving presentations, or being involved in open days: between 86%–88%, cf. 79% on average.

74 85% are more likely to.

75 A further 6% said the question was not applicable because their institution was their principal funder.

Scientists with Research Council funding are more likely than other types of scientist to state that their funder provides any kind of service. A third of those at universities but funded by Research Councils, and over half of those[76] based at Research Council-funded establishments say they have access to some form of communications services from their funder.

Nearly nine in ten scientists (87%) are aware that their HEI has a public relations department or press office. One in three (32%) say that their institution has produced press releases or briefings in connection with their research. Those who have received training in communication and those who have experience of communicating research to the public and the media are significantly more likely to have had a press release issued. Likelihood is also heavily weighted towards older, more senior members of staff, scientists funded by charities, and biomedical scientists who have contact with patients.

Four in ten of those scientists who have had a press release or briefing about their research, did not personally contribute to it. Those who have contributed to press releases are more likely to be teaching as well as conducting research, (70%, cf. 40% for those only conducting research). Those more likely to have participated in communicating research, and to feel equipped to communicate the scientific facts and social implications of their research are also more likely to have contributed personally. As might be expected, likelihood of contributing increases steadily with age and seniority, to 76% among those aged 55+, and 78% among professors, directors and heads of departments.

The results show that many scientists do not get directly involved with the communication of their work through press releases or press briefings (although they may contribute indirectly, through their department head). They also highlight that institutions and funders could further promote and encourage use of communications services available to their scientists.

Improving communications between scientists and the public

Scientists were shown a list of items and asked which, if any, they believed could improve communications between the general public and scientists[77]. A wide variety of stimuli are mentioned, which provides a considerable amount of information about what scientists want. Incentives from funding authorities to encourage time spent on science communication are mentioned most frequently (60%), followed by training in dealing with the media (54%), encouragement by institutions of time spent on science communication (53%) and financial support from institutions (47%). These findings indicate that scientists perceive the main barriers to science communication to be a lack of encouragement, time, skills and financial support. Overall[78], the results indicate that 78% of scientists mention a ‘time’ factor.

76 Interviewed.

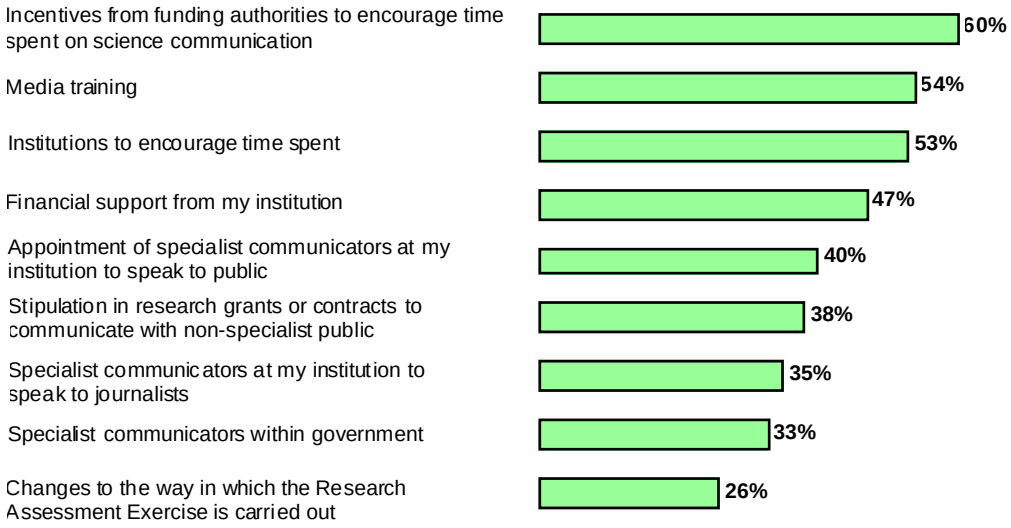
77 They could choose as many or as few as they liked.

78 Namely, ‘incentives from funding authorities to encourage time spent on science communication’, and ‘encouragement by institutions of time spent on science communication.’

CHART 21

Improving communications

Q35 Which, if any, would you say could improve communications between the general public and scientists?



Base: All respondents (excluding scientists at Research Council-funded establishments), 1540 Source: MORI

The appointment of specialist science communicators is also a frequent suggestion for improving communications[79]. The popularity of such specialist communicators was a theme throughout this research, particularly among younger scientists. They are considered by many to be useful in communicating with the public and journalists, and a third would like to see them appointed within government.

One in four say that changes to the way the Research Assessment Exercise is carried out could improve communications. This is possibly to enable effort in communicating to be recognized in the assessment.

Biomedical scientists are significantly more in favour than non-biomedical scientists of: training in dealing with the media (62%); institutions encouraging time spent on communication (55%); and the appointment of specialist science communicators to talk with journalists, the public and government. This indicates that biomedical scientists feel they need more help in communicating their research to the public.

Similarly, scientists whose team holds an animal licence are also more likely than most to support media training, and the appointment of specialist science communicators to talk to journalists and the public, and to represent them in government.

Those who feel ill-equipped to communicate their research and its implications tend to favour the use of specialist science communicators – they are also somewhat less keen on training, or on incentives from funding authorities to encourage time spent on communication, indicating a desire to avoid personally having to communicate with the public.

Scientists who have experience of speaking to the media are more likely to think that communications could be improved by: training for dealing with the media (65%); and by having incentives from funding authorities to encourage time spent on communication (65%). Scientists who have participated in any kind of communication of their research to the public[80] are more likely to think that changes to the way in which the Research Assessment Exercise is carried out could improve communication.

79 Specialist science communicators were cited by scientists at Q30b as being the best equipped to communicate the social and ethical implications of research because of their 'knowledge and skills' and their 'ability to communicate'. 'Knowledge and skills' was mentioned more often for specialist science communicators (43%) than for scientists (34%).

80 Speaking to the media, writing or publishing, giving presentations and participating in open days.

Chapter 6: Building a new dialogue: discussion

This has been a large, systematic study of scientists in Great Britain, involving interviews with a random sample of pre-selected individuals. Based on face-to-face interviews with over 1600 scientists, the study is perhaps the most authoritative research of its kind undertaken in the country. This section will briefly re-cap on some of the key findings, raise points of discussion, and explore possible future avenues of action.

A positive attitude towards communication with the public

Most scientists have highlighted that social and ethical implications exist in their research, agree that the public needs to know about them, and believe that scientists themselves have a duty, as well as the primary responsibility, for communicating their research and its implications to the non-specialist public.

Over half also agree that they 'would like to spend more time than I do communicating the implications of my research to non-specialist audiences' (56%). This includes half of those scientists who have not participated in communication activities with non-specialist audiences in the previous year.

Duty and a certain degree of interest are therefore clearly apparent. Furthermore, there are perceived to be numerous benefits – both personal and for society generally – to better communication. These include greater public ability to make informed decisions and opinions about science, its implications and its relationship to their lives, and an improved understanding of what scientists do. Some believe this could lead to less opposition to scientific research and greater support for scientists' work. Involvement in science communication is also cited by many as something they would like to devote more time to.

However, this study has also highlighted that several significant barriers to communication co-exist alongside such positive sentiments. These do not necessarily outweigh or override the advantages and attitudes discussed above, yet they are undoubtedly hindering the creation of a more positive environment conducive to two-way dialogue and mutual understanding. These barriers include lack of: time; faith in the media; training; support and encouragement to communicate with the public; and money or incentives.

Creation of a positive communication environment

More than half of scientists already agree that the day-to-day requirements of their jobs leave them with too little time to carry out their research (56%), and six in ten feel they have too little time to communicate the implications of their research to others. When linked to evidence that scientists feel a lack of encouragement from institutions and funders to spend time communicating[81], these results suggest that a culture of communication with non-specialists is not yet widespread. Such issues were not explored further in this survey. However, anecdotal evidence from scientists who have raised their public profile suggests that those who do, may be considered by their peers and managers to be neglecting serious scientific research in favour of populist reach. Communication efforts need to be seen to be valued by institutions and research funders, and this needs to be reflected in increased time set aside for this purpose, and the existence of positive role models at all levels.

Also important in encouraging involvement is to ensure that the skills required to do so confidently are acquired. This survey has found that very few scientists have had any training in dealing with the media (10%) or the general public (16%). Statistics which argue for widespread training of scientists can be found within the data: 92% of those who have had training in dealing with the public feel equipped to communicate the scientific facts of their research, and 84% of these scientists feel equipped to communicate the social and ethical implications which arise. Two-thirds of those who have been trained have participated in communicating to non-specialist specialist audiences in the previous year. And more than half of scientists also believe that media training would help to improve communication between the public and scientists (54%).

However, analysis also shows that 81% of those who have participated in conveying their research to the public in the past year have had no training to do so. This shows that training is certainly not the only or even predominant factor

81 When asked which things would improve communications between scientists and the general public, 60% mentioned having incentives from funding authorities to encourage time spent on science communication, and 53% called for institutions to encourage time spent on science communication.

in participation. Other factors such as age, seniority and teaching experience also play a part in contributing to a confidence to communicate. The skills training builds will need to be combined with a more encouraging environment in order to produce confident communicators.

Institutions and funders also have a responsibility to provide support as well as opportunities for scientists to forge links with the public. It could be assumed from the results that institutions, in comparison to funders of research, generally do provide services designed to help scientists communicate (on the basis that only 21% of respondents did not know which services their institution or department provided, or thought that none were)[82]. Certainly scientists are more likely to believe that institutions do. However, there has never been a comprehensive comparison of what communication services various institutions and departments provide – now provide. Now may be the time to conduct one.

The most frequently mentioned services or mechanisms provided by institutions were access to staff with expertise in dealing with the media (46%), participation in science–schools collaborations (45%), and training for conference speaking (43%). However, fewer than one in five say their institution or department provides training courses for communication with the media department (19%), or (19%), training courses for communication with the public (14%). Institutions might consider how established resources are publicized, and examine the potential of meeting the apparent wider demand.

It has been noted that scientists are often not involved in the production of press releases about their research[83]. Analysis shows that those who do contribute are considerably more likely to be professors, directors, heads of department or senior researchers. This finding suggests that research leaders may be contributing to press briefings without consulting other members of their research teams. However, it is increasingly seen as desirable to encourage scientists at all levels to communicate with non-specialists – involvement in the publication of their own research may be a positive starting point.

In contrast to institutions, funders have an apparent lack of support services and/or poor communication systems for informing scientists of existing ones. Thirty-six per cent of respondents were unaware whether their funder provided any such mechanisms, and a further 31% believe their funder provides none[84]. Scientists funded by the Wellcome Trust are the least likely to be aware of any services on offer from their funder, while industry scientists are the most likely to believe they have no access to such services.

Very little is known about the impact of individual training and other science communication schemes, and evaluation of courses and follow-up of their progress should be a key priority for those committed to improving dialogue. Consideration may also be given to collaborative efforts between funders and institutions, whereby resources, funds and services are shared.

Approaching the audience with enthusiasm

High-level support and encouragement is necessary to improve the quantity and quality of communication with the public. It also seems that attitudinal change from scientists themselves may be important. There are signs that mistrust of the media and a feeling that the public has a low opinion of scientists are prevalent, and one of the key requirements is the development of more comfortable relationships with these groups.

Scientists feel that members of the public view them in a negative and inaccurate light, considering them to be detached, poor at public relations, secretive and uncommunicative. Some believe that a barrier to understanding is that the public is not even interested in science. The majority also feel there is a gap of knowledge between scientists and the public. This may be creating a potentially insurmountable hurdle to a greater public understanding of science.

Scientists need to be aware that the great majority of the non-specialist public is indeed ‘amazed’ and fascinated by science, and that only a relatively small proportion is truly uninterested[85]. Public consultation initiatives by MORI,

82 Compared with 71% who said this of funders (after excluding those for whom the institution is the principal funder)

83 39% of those scientists whose institution has produced a press release or briefing issued in connection with their research in the past year did not contribute to it.

84 These figures increase to 39% and 32% respectively when the 6% of scientists whose institution is their principal source of funding, are excluded.

85 OST and The Wellcome Trust, *Science and The Public: A Review of Science Communication and Public Attitudes to Science in Britain*, 2000. Available at: www.wellcome.ac.uk

the Wellcome Trust and others have also repeatedly demonstrated that the non-scientist needs little technical detail to engage in sophisticated discussion about the social and ethical implications of scientific research. Ultimately, it is widespread understanding and discussion of these implications which is the desired outcome of efforts at greater public dialogue.

To engage the public at this level however will require scientists to become comfortable with explaining science in everyday language. In its guidelines for scientists working with the media, the Royal Society encourages scientists to 'explain...work in simple everyday language and avoid using jargon – imagine you are trying to explain it to a friend over a drink'[86]. Similar measures are required when scientists discuss their research and its implications with public groups, however this may be less likely to happen if scientists feel this means diluting research findings in any way.

The relationship between scientists and the media also poses a challenge. Scientists are well aware of the need to harness the power of the media to create a widespread public debate. However, they also express their distrust of most popular media. They feel the media's coverage of recent high-profile scientific stories such as BSE, GM foods and animal cloning has confused the public and made them more wary about science. Scientists are less likely to consider the media to be the best equipped body to communicate the social and ethical implications of research, than they are specialist science communicators or scientists themselves.

Several organizations have made efforts to help develop a closer working relationship between these two groups. For example, the Royal Society's guidelines discussed above aim to help scientists to understand the demands and pressures on journalists, and provide advice on how accurate and effective communication of science stories through the media can best be achieved[87]. Other positive efforts to enhance working relationships include Alphagalileo[88], an Internet-based news agency jointly funded by several funding bodies, that provides online access to current press releases and spokespeople on a range of scientific issues. This has recently been evaluated and has proven to be an effective service linking scientists and their work with journalists looking for interesting science stories.

Grassroots participation

Another major finding from the research has been that some groups of scientists are less likely to be involved in science communication. While more than half of scientists surveyed have been involved in the past year with communicating their research and its implications to the public, analysis shows that certain groups – in particular, younger scientists and those in less senior academic positions – are less likely to communicate. We have also seen that these scientists are less likely to have contributed to the issuing of press releases or briefings by their institutions about research they are involved in.

There have been recent calls for individual and joint efforts by funders and science bodies to increase involvement and input from scientists at all levels, and to ensure that level, adequate time is devoted to it, so that speaking to non-specialists will become a core component of a scientist's job description.

The survey suggests that such moves will not be unwelcome – it found that half of those who have not communicated to non-specialist audiences in the past year would like to spend more time doing so, and these scientists are significantly more likely to be aged under 35 years.

The research has also highlighted the issues faced by scientists whose work involves animals[89]. Only 46% of scientists whose research team holds a licence to conduct animal research have communicated with the public in the past year, compared to 60% of those who do not. More than four in ten of those whose team holds an animal licence do not feel equipped to communicate the social and ethical implications of their research (43%)[90]. And 28% spontaneously cite the risk from animal rights or extremist groups when asked to mention any personal disadvantages to communicating their research and its implications to the public. The difficulties faced by these scientists have been

---

86 The Royal Society, 2000 'Scientists and the Media: Guidelines for scientists working with the media and comments in a Press Code of Practice'.

87 *ibid 83*

88 www.alphagalileo.org

89 Respondents were asked whether they, or a colleague in their research team, hold a Home Office licence to conduct animal research in connection with their current research – 21% answered Yes .

90 cf. 34% of those whose work does not involve animal research

known for many years, yet it seems little has been done to tackle them. This research provides no simple solutions, but recommends that attention be given to this area.

The way forward?

There has been much discussion over the past fifteen years about how to increase communication between scientists and the public, whether through 'public understanding' initiatives or through the more participatory public engagement and dialogue. The clear message from this research has been that moving forward will require two things. Firstly, institutions and funders must commit to efforts at public dialogue, and this attitude needs to filter through all levels of an organization and down to individual scientists. Secondly, practical initiatives are needed, both at a national level, combining the resources and experience of interested organizations, and particularly at the institutional and individual level.

This process will require science organizations to become communicating organizations, where public consultation is built into and informs the research process from the beginning. This means the allocation of time to communication, the provision of training and incentives, and encouragement and support of scientists by their institutions and funders. The development of a new generation of capable communicators will also require institutions and funders to encourage young scientists to consider science communication and the development of links with the community as an integral part of a scientific career.

The day-to-day realities are that scientists are busy people. They not only have to attend to their research commitments but also to their administrative responsibilities and their requests for funding. It is therefore critical that they are fully supported in their efforts to communicate, and that they receive adequate recognition for this.

The development of a legitimate culture of dialogue will be a long-term process, yet the rewards could be considerable. The next generation of scientists ought to be able as well as willing communicators, which will benefit not only the public, but also scientists themselves, and science and scientific research as a whole.

MORI	Michele Corrado
February 2001	Kam Pooni
London	Yvette Hartfree

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

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

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

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

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

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

The Wellcome Trust

183 Euston Road

London

NW1 2BE

Tel: +44 (0)20 7611 8888

Fax: +44 (0)20 7611 8545

E-mail: contact@wellcome.ac.uk

Web: www.wellcome.ac.uk

Registered charity, no. 210183. Registered in England, no. 2711000. Trustee: The Wellcome Trust Limited.

Registered office: 183 Euston Road, London NW1 2BE.