

Wellcome Trust Monitor Wave 2

Tracking public views on science, biomedical
research and science education

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Wellcome Trust Monitor: Wave 2

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Ipsos MORI

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Foreword

The Wellcome Trust Monitor was initiated to build our understanding of the societal and educational context of the research that we fund. Through it, we hope to better comprehend and track over time the public's interest in, attitudes towards, and experience and knowledge of science, with a particular focus on biomedical topics. The Monitor uses a rigorous and robust methodology to achieve data representative of adults and young people across the UK. At the launch of this second survey, we now have our first longitudinal comparisons, with many of the questions asked in the 2009 survey repeated in 2012.

Our aspiration for the Wellcome Trust Monitor Reports and their accompanying datasets is to provide a rich resource for many audiences. We hope academics will further explore the data, examining, for instance, the impact of gender or level of science education on attitudes and behaviours, or identifying how different groups acquire information about medical science. Policy-makers can learn how citizens would like to be involved in science decision-making, or what people feel about personal versus public responsibility for decisions about vaccinations or weight and nutrition. Science journalists, engagers and communicators can learn, as can we at the Wellcome Trust, about engaging with the public; for instance, the data show how important it is to consider the accessibility of different media for different audiences, notably, how the predominance of online communication could exclude older or less-qualified groups.

The Monitor also serves as a reminder that we must not assume that specialist terms, like “human genome” and “genetic modification”, are widely understood by the public at large. We will use young people's responses about their experiences and perceptions of science education to shape our work, noting, for example, the need for greater access to information about science careers.

The full datasets of both Waves 1 and 2 are freely available through the UK Data Service, ukdataservice.ac.uk.

The Wellcome Trust website, at www.wellcome.ac.uk/monitor, hosts:

- the Monitor Reports for Waves 1 and 2
- a set of Excel tables presenting the core data from Wave 2 (which can be reached from the corresponding tables in the Report)
- infographic sheets illustrating findings of interest primarily from Wave 2
- links to publications related to Wave 1.

We greatly encourage others to use these resources and would appreciate any [feedback](#) on such usage to aid the evaluation of this work and planning for Wave 3.

The Wellcome Trust Monitor reveals a predominantly positive context for our work, with the majority of respondents being interested in science, enjoying science education, and feeling optimistic about the potential of biomedical research to improve our lives in the future. Nevertheless, it will not lead us to complacency, as it clearly highlights areas in which understanding, engagement or aspiration could be strengthened.

Clare Matterson

Director of Medical Humanities and Engagement

Wellcome Trust

May 2013

Summary of main findings

How interested are people in science and medical research?

- A majority of adults (75 per cent) and young people (58 per cent) say that they are fairly or very interested in medical research.
- Levels of interest in medical research have declined somewhat since 2009 among both adults and young people – by 16 percentage points among adults and 22 percentage points among young people.
- There has been a decline in the proportion of people who say that they can recall seeing information about medical research that they just happened to come across and had not been looking for.
- Mental health remains an area of particular interest to the public, with half of adults and four in ten young people saying they are interested in this area of medical research.
- Among young people, school science seems to drive information-seeking in medical research, with six in ten young people who looked for information saying they did so as a result of something they were studying.
- When purposefully seeking information about medical research, people are most likely to look for information about types of illness (half of adults and one-quarter of young people looked for this type of information)
- The internet remains the preferred source of information about medical research for the majority of people. There are, however, certain groups (such as those aged 65 or over and those with no qualifications) who are less likely to use this medium.

What do people know about science and medical research?

- Most adults and half of young people recognise the concept of controlled experimentation in science, although most cannot articulate why this process is effective. Among both groups, there is little consensus about what it means to study something scientifically. Many adults do not recall the breadth of organisations and sectors involved in carrying out medical research.
- Adults and young people have greater difficulty expressing how science and medical research are conducted than in 2009. Both groups are more likely now to say they do not know what scientific study means, or how clinical trials work. Adults are also more likely to say they do not know who carries out medical research.
- People often think about medical research in terms of its outcomes, rather than how it is conducted or who does it. Unsurprisingly, perhaps, adults and young people most commonly associate medical research with treatments and cures.
- The majority of people in the UK do not hold religious beliefs about the origins of life – five in ten adults and almost six in ten young people think that life evolved as a result of natural selection, with God playing no part in this process.

- Over four in ten adults and young people feel they have a good understanding of the ethical issues that are raised by genetic research. Self-reported understanding among young people has increased since 2009.
- Over four-fifths of adults and young people say they have read or heard at least a bit about genetic tests that predict the likelihood of developing certain genetic diseases. Those who say they have read or heard more about these tests are also more likely to feel they understand the ethical issues involved in genetic research.
- A clear majority of adults say they are familiar with the terms “DNA” and “genetically modified”, though people tend to be more confident in their understanding of DNA. By contrast, awareness and self-reported understanding of the term “human genome” is low, with half of all adults and young people saying they have not heard of it before.

Hopes and concerns about medical research

- Over 90 per cent of adults and young people think that medical research will lead to an improvement in the quality of life for people in the UK in the next 20 years.
- Levels of optimism about the potential for genetic research to improve healthcare are similar, with 80 per cent of all adults and 85 per cent of young people being very or somewhat optimistic.
- Adults are generally very positive about medical research, with the most common concerns expressed being that not enough money is being spent (40 per cent) and that research is not progressing fast enough (17 per cent). One in five say they do not have any concerns at all about medical research.
- Using a broad definition, 10 per cent of adults have taken part in medical research, 10 per cent have a family member who has taken part, and a further two per cent have both personally taken part and have a family member who has taken part. Overall, 22 per cent of adults live in a household in which someone has taken part in medical research.
- Forty-five per cent of those adults taking part in medical research had given a blood or tissue sample, 37 per cent had tested a new drug, 34 per cent had completed a survey, 22 per cent had given access to their health records and 21 per cent had had their health or behaviour monitored.
- Sixty per cent of adults say they would be willing to participate in a medical research project that would require giving access to their medical records. Sixteen per cent of this group had previously participated in a medical research project.
- Thirty-three per cent of adults say they do not have any specific concerns about taking part in medical research that would involve allowing access to their personal health information (on an anonymous basis). Twenty-three per cent are concerned about confidentiality even when provided with assurances that their personal health data would be held securely and anonymously. The level of concern about privacy is similar to 2009, when 28 per cent were concerned about access to medical records.

Trust and governance

- Doctors, nurses and other medical practitioners are the most trusted source of information about medical research. Sixty-seven per cent of adults place either complete trust or a great deal of trust in these groups to provide accurate and reliable information about medical research.
- Journalists are least trusted, with six in ten adults saying they have either very little trust or no trust at all in them. The government is second least trusted, with half of adults trusting it little or not at all.
- Trust in scientists varies according to the sector in which they work. Sixty-six per cent of adults have complete or a great deal of trust in scientists working in universities; this decreases to 34 per cent for scientists working for the government. Scientists working for private industry have similar trust ratings to scientists working in government – 32 per cent trust them either completely or a great deal, whilst 17 per cent have very little trust or no trust in them at all.
- Three-quarters of adults believe that members of the public should have at least some role in making decisions about the direction of medical research. However, a quarter believe that the public should never be involved.
- Half of adults believe that medical research charities (50 per cent) and scientists working in universities (52 per cent) should always be involved in decision-making on medical research. This drops to 26 per cent for scientists working for private companies – although only 9 per cent believe that these scientists should have no involvement at all. Only 19 per cent of adults believe that the government should always be involved in decision-making about the direction of medical research.

Vaccination, nutrition and obesity, and cognitive enhancement

- The majority of people regard vaccinations as safe, with eight in ten adults and seven in ten young people believing there to be little if any risk of serious side-effects.
- More than one in ten adults and one-quarter of young people, however, believe that vaccinations carry a fairly or very high risk of serious side-effects.
- Nine in ten adults and young people agree with the proposition that people have a personal responsibility to obtain the recommended vaccinations for themselves or their children to help stop the spread of disease.
- Fewer (69 per cent of adults and 80 per cent of young people) agree that children have a right to be vaccinated which overrides their parents' preference.
- While the majority believe that vaccination is a matter of personal responsibility, there is also support for the government providing the public with information and recommendations on how to stay healthy, with 86 per cent of adults and 88 per cent of young people holding this view.
- Although adults and young people recognise that a variety of factors can result in people being overweight, lack of exercise is most likely to be seen as the main cause.

- Adults and young people place greater emphasis on personal responsibility with regard to obesity than to vaccination. They are also more likely to say that the government should have a public advisory role on vaccination than on obesity.
- Adults and young people believe that a number of different approaches can be effective in improving cognitive function (such as completing puzzles, taking vitamins, etc). Puzzles are seen as most effective, with 87 per cent of adults and 86 per cent of young people saying that they are a very or fairly effective means of improving focus, memory or concentration.
- By contrast, only 53 per cent of adults and 45 per cent of young people think that medications normally used to treat conditions like ADHD and Alzheimer's disease are an effective means of improving focus, memory or concentration.
- The use of medications that can enhance cognitive performance through improved focus, memory or concentration is very rare (2 per cent of adults and 1 per cent of young people said they had used cognitive enhancers).
- Both adults and young people are split in their views as to whether it is acceptable to use medication for diseases like Alzheimer's to improve cognitive function. Only one-third of adults and young people believe that using medication to improve one's cognitive ability for an exam or interview is acceptable. In each case, a similar proportion hold the contrary view.

Science at school

- As in 2009, young people rate their experience of science at school highly. Eighty-two per cent think that school science lessons are interesting (compared with 81 per cent in 2009), and 58 per cent say science lessons are more interesting than maths and English lessons. Their impression of secondary school science is particularly positive, with 83 per cent saying they have become more interested in the subject after primary school.
- Both adults and young people agree that studying science helps a person in their career, regardless of the work they do. Seventy per cent of adults think that a good understanding of science will improve career prospects, while a similar proportion of young people (69 per cent) think science lessons provide useful skills for jobs unrelated to science. Adults are, however, somewhat less positive than in 2009 (when 79 per cent thought that a good understanding of science would help to improve career prospects), which may reflect a more general rise in concern over job prospects in the challenging economy of the preceding three years.
- Most young people (68 per cent) say they were able to choose all the science options they wanted to at school or college. Among the most common issues young people did face when choosing their options was a timetable clash, though even this only affected fewer than one in five.
- Of the various things that young people say encouraged or discouraged them when learning science, the quality of the teacher is the most commonly mentioned. Other important factors encouraging young people include the opportunity to conduct experiments, the chance to learn things relevant to real life, and science aiding future study or careers. Other factors commonly discouraging young people include science being too difficult or boring.

Future careers

- Most young people report that they know little or nothing about scientific careers (63 per cent) or STEM (science, technology, engineering and maths) careers (55 per cent).
- The majority of young people obtain information about possible careers from their family (67 per cent). Many use teachers (49 per cent), or career advisors at school (44 per cent). Thirty-nine per cent feel that family is the most useful source of careers information. This is followed by careers advisors (23 per cent) and teachers (18 per cent).
- Of the 61 per cent of young people who have done work experience, 28 per cent say that their work experience was in a STEM field. Fewer young women than young men have done STEM work experience.
- A large majority (82 per cent) of young people consider science to be a good area of employment to go into. The main reasons for this include good pay, interesting work, the wide variety of different jobs available and the ability to make interesting discoveries.
- One in eight (14 per cent) young people say they would be very interested in a scientific career, with a further 27 per cent fairly interested. The most popular choices of scientific career include medicine (appealing to 24 per cent of the young people who say they are interested in a career in science), biology (21 per cent), chemistry (13 per cent), forensic science (11 per cent) and engineering (9 per cent).
- Of the small proportion of young people (13 per cent) who do not think science is a good area of employment, four in ten (41 per cent) think there is only a limited number of jobs available in the field. The same proportion think the field requires too many qualifications and 29 per cent say it is too competitive to get into.
- Three-quarters (72 per cent) of young people feel that scientists can come from a wide range of backgrounds, and only one in four feel that there are not many female scientists. However, young women are more likely to be concerned about science not being a field for “people like me” than young men are.

1. About the study

This report sets out the results of the second Wellcome Trust Monitor, a survey of the UK public conducted by Ipsos MORI on behalf of the Wellcome Trust. The Wellcome Trust Monitor is designed to measure the public's awareness, interests, knowledge and attitudes in relation to science – in particular, biomedical research.

The survey comprises two samples: a representative sample of adults aged 18 and over and a representative sample of young people aged 14 to 18. Questions about a broad range of topics were asked of both samples, while some questions were only asked of adults or young people. For example, only adults were asked about their involvement in medical research and their views on science governance, and only young people were asked about their attitudes towards and their experiences of science education and their perceptions of careers in science.

The Wellcome Trust Monitor is repeated every three years in order to measure long-term trends in public attitudes. The first (baseline) wave was conducted in 2009 by the National Centre for Social Research (NatCen).¹

1.1. Background

For over 75 years the Wellcome Trust has worked to promote advances in the fields of animal and human health. Over this time the Trust has become the UK's largest charitable funder of biomedical research, aiming to improve health and wellbeing through new discoveries.

In addition to its support of scientific research, the Wellcome Trust has a long history of promoting public engagement with science and biomedical research. One of the Trust's key public engagement objectives is to listen to views and concerns raised by the public, and to track knowledge and attitudes about the social and ethical dimensions of biomedical research over time. In a modern economy, it is vital that current and future generations of workers and researchers are interested in and engaged with science and biomedical research. The objective is not to 'promote' scientific research to a sceptical public but to enable citizens to critically engage with and contribute to debates regarding the appropriate pace and direction of scientific and technological development, as well as make informed decisions where these developments affect their own lives.

The Wellcome Trust Monitor is an important study that will not only highlight interest in and attitudes towards biomedical science, but will also allow the Wellcome Trust and others to better direct their future public engagement work

A great deal has happened in biomedical research since the first Wellcome Trust Monitor in 2009, making it important to reassess the current state of public attitudes. For instance, in 2010 Dr Craig Venter created the world's first synthetic life form, while in 2012 the Encyclopedia of DNA Elements was published, building on the 12-year-old Human Genome Project.

The way science and biomedical research are reported has also evolved. 2012 marked the tenth anniversary of the Science Media Centre (a charity that aims to provide accurate and evidence-based information about science and engineering through the media, set up following the House of Lords Science and Technology Select Committee's third report on

¹ A Main Report and Technical Report for the first (2009) Wave are available on the Wellcome Trust website at www.wellcome.ac.uk/monitor.

Science and Society). The BBC has also expanded its science coverage since 2009 and labelled 2010 as its “Year of Science”. Earlier controversies in the media’s coverage of medical research have developed, for example Andrew Wakefield was struck off the medical register by the General Medical Council in 2010 over his research which erroneously linked the MMR vaccine with autism. This second Monitor will provide evidence as to how this changing environment has affected the public’s attitudes to science and biomedical research.

Outside the scientific sphere, there have been broader social, political and economic changes since 2009. The ongoing economic weakness may have influenced the public’s perception of the relative importance of other issues. The new coalition government, elected in 2010, has also introduced a number of important changes to public services, with an emphasis on decentralisation and local choices.

1.2. Methodology

As the Wellcome Trust Monitor was designed to track changes over time, great emphasis was placed on achieving comparability between surveys. Thus, in most respects the methodology used is the same as for the 2009 wave of the Wellcome Trust Monitor.

A Technical Report has been published², providing full details of the survey methodology, including sampling and weighting. The purpose of this section is to provide an overview of key aspects of the survey design to assist the reader in interpreting the results.

1.3. Sampling

The Wellcome Trust Monitor uses probability sampling. As is common in high-quality surveys of the general public, a multi-stage, stratified sample was used in order to maximise the precision of survey estimates for a fixed cost.

The first stage of the sampling was to select the clusters, or Primary Sampling Units (PSUs) from which addresses for interviewers to visit would be sampled. Postcode sectors were chosen to be used as PSUs.

A list of all UK postcode sectors was drawn from the most up-to-date small-user Postcode Address File (PAF), maintained by the Post Office. All sectors containing fewer than 1,000 delivery points were combined with adjacent sectors, so that each combined sector contained at least 1,000 delivery points.

² The Technical Report is available at: www.wellcome.ac.uk/monitor

Sample stratification

Prior to selection, the list of (combined) postcode sectors was stratified by Government Office Region, the proportion of the population with qualifications at A-level or higher, and the proportion of population living in owner-occupied dwellings. This was the same stratification scheme used in the first Wellcome Trust Monitor. Stratification is effective in increasing the precision of estimates to the extent that variables chosen as stratifiers correlate with key survey variables. Given the topics covered by the survey, educational achievement and housing tenure were considered appropriate choices.

PSUs were selected with probability proportional to population size by applying the method of random start and fixed interval to cumulative PAF totals. Within each sampled PSU, 25 addresses were randomly selected from the list of addresses in that PSU, sorted by postcode. Thus, every UK residential address had an equal probability of being sampled.

Core sample

An initial sample of 2,625 core addresses was selected from 105 selected PSUs. During fieldwork a further nine PSUs and 225 addresses were selected using the same method³. Thus, overall, 2,850 core addresses were issued to interviewers.

At each core address where more than one dwelling unit was found, the interviewer randomly selected one dwelling unit, and approached those living there to take part. At each dwelling unit, interviewers attempted to identify and interview one adult aged 18 years or above. Where there was more than one adult in the dwelling unit, one was randomly selected.

If there were young people aged 14–18 living in a dwelling unit, one was randomly selected and an interview attempted with him or her. If an 18-year-old had been randomly selected for the adult interview, they were excluded from the selection process for the young person interview.

Boost sample

The core sample methodology would yield only a small number of young people and this would be insufficient to produce robust population estimates for this group. To obtain additional interviews with young people, a boost sample was therefore also drawn. The second Wellcome Trust Monitor aimed to improve on the first by changing the boost sample methodology. The purpose of this change was to enable interviewers to be more effective at identifying young people, reducing the risk of non-response bias, while retaining probability sampling methods and comparability with the first Monitor.

Two or four boost addresses⁴ were selected alongside each core address and issued to interviewers. At each boost address, interviewers were required to make two calls to establish whether any young people aged 14–18 lived there. In addition, interviewers were instructed to ask at the core address or the selected neighbouring addresses whether young people aged 12–

³ These additional addresses were selected to replace interviews where audio information was lost – further information on the audio recording process is provided in the Technical Report.

⁴ Based on assumptions about deadwood addresses, the expected incidence of and response rate among young people, it was calculated that 5,906 boost addresses would need to be issued. This equates to 2.25 boost addresses for each core address. Hence seven in eight core addresses were assigned two boost addresses, with the eighth address being assigned four boost addresses. More information on sample selection is provided in the Technical Report.

20 lived at each boost address.⁵ Where interviewers established that young people were present, or where there was uncertainty, interviewers continued attempts to make contact with the residents of the boost addresses, beyond the initial two calls. Where contact was made, interviewers randomly selected and attempted to interview one young person aged 14–18.

An initial sample of 5,906 boost addresses was selected. During fieldwork a further 502 addresses were selected using the same method⁶. Thus, overall, 6,408 boost addresses were issued to interviewers.

1.4. Questionnaire development

Questionnaire topics

The second Wellcome Trust Monitor questionnaire built heavily on the first, and comprised questions on the following topics:

Adults and young people

- Media usage
- Awareness of and interest in medical research
- Knowledge of medical research
- Engagement with medical research
- Sources of information on medical research
- Expectations and concerns for medical research
- Scientific literacy⁷
- Attitudes towards vaccinations
- Attitudes towards environment, nutrition and behaviour change
- Awareness of and attitudes towards cognitive enhancing drugs
- Understand of and attitudes towards genetic research

Adults only

- Involvement in medical research
- Attitudes to science governance

Young people only

- Out-of-school science-related activities
- Current education and future career aspirations
- Experience of school science
- Friends' and parents' interest in science
- Attitudes to science as a career

In total, 47 per cent of the questions used in the second wave of the Wellcome Trust Monitor were carried over unchanged from the first wave. An additional 12 per cent were adapted versions of questions used in the first wave (for example with new answer codes added or being asked of different respondents). Forty-one per cent of the questions used in the second wave of the Wellcome Trust Monitor were entirely new.

⁵ The age-band was slightly wider (12-20) than the target population (14-18) to avoid under-identification, since those living at core addresses would not be likely to know the exact ages of young people living next door.

⁶ These additional addresses were selected to replace interviews where audio information was lost – further information on the audio recording process is provided in the Technical Report.

⁷ This was measured in the form of a knowledge quiz, with nine “true or false” questions.

Cognitive testing

A thorough review of the questionnaire used in the first wave was undertaken in preparation for the second. New questions developed for the second were tested using cognitive interviews in an iterative process. Cognitive interviewing is a type of in-depth interviewing that pays explicit attention to the mental processes respondents go through to answer survey questions. It allows the testing of question comprehension and validity, as well as the flow of the questionnaire and the positioning of specific questions.

In the first round of testing, cognitive interviews were carried out with four adults on 23 February 2012 in London. In the second round, interviews were carried out with ten adults and four young people on 28 and 29 February in London. In the third round, interviews were carried out with three adults and nine young people on 6 and 7 March in London. The fourth and final round of cognitive interviewing took place with five young people on 8 March in London.

Pilot survey

A pilot survey was undertaken in April 2012 to test the questionnaire and associated survey materials among both young people and adults, and to inform the development of the questionnaire. A quota sampling method was used, which allowed the questionnaire to be tested among a broad cross-section of the general public. Four sample points were selected and 50 respondents were interviewed between 3 and 15 April 2012.

Audio recording

An innovation for the second Wellcome Trust Monitor was introduced for three questions which required respondents to say, in their own words, what came to mind when they were presented with a biomedical term. Instead of interviewers typing responses into the questionnaire program on their laptop, respondents' answers were audio-recorded. The aim was to obtain fuller and richer data for these responses as well as to minimise interviewer variability in typing of responses, to ensure that full and standardised responses were obtained. The questions were as follows:

- What do you understand by the term DNA?

This question was randomised using a split-ballot design so that for half the sample responses were recorded by the interviewer using a microphone and for half the sample the responses were typed in to the interview program by the interviewer (as is standard practice for open-ended questions).

- What do you understand by the term human genome?
- What do you understand by the term GM, or genetically modified?

During fieldwork, some problems were experienced with the process of recording and transmitting audio files. Consequently, 18 per cent of audio responses were lost before or during transmission to Ipsos MORI's main office. Ipsos MORI conducted a telephone re-contact survey to re-contact as many respondents as possible whose audio responses were lost.

Overall, the following responses were generated from the three selected audio questions:

Figure 1.1 audio question response by type*Base: All adults**Wellcome Trust Monitor*

Total number of responses by type	
Audio	2,168
<i>Of which lost</i>	407
Typed	1,896
Telephone audio (re-contact)	194

1.5. Fieldwork

Interviewers were briefed between 4 and 10 May 2012. Fieldwork was carried out between 21 May and 22 October 2012 by Ipsos MORI, with a small proportion of addresses issued to interviewers from the Office for National Statistics to compensate for under-capacity in the Ipsos MORI field-force.⁸

An advance letter explaining the purpose of the survey was sent to all selected core addresses. For the boost sample a similar advance letter was either delivered personally by interviewers to boost addresses when they first approached the related core address, or was given to a resident on first contact. Different versions of the advance letter were prepared for the adult and young person interviews.

Both adults and young people were interviewed face-to-face using Computer-Assisted Personal Interviewing (CAPI). Interviews took, on average, 53 minutes to complete for adults and 45 minutes for young people.

An innovation for the second Wellcome Trust Monitor was the use of differing levels of monetary incentive at each address depending on the PSU the address was sampled from. A statistical model was developed to predict the first-issue cooperation rate in each PSU, using two years' worth of field performance data from an existing sample survey conducted in England and Wales. A threshold was set on the predicted response distribution and in PSUs where the response rate was predicted to be below the threshold, an incentive of £15 was offered to respondents. For those in PSUs where the response rate was predicted to be above the threshold, an incentive of £10 was offered. The same incentive was offered for core and boost addresses within each PSU.

The total achieved sample was 1,396 adults aged 18+ and 460 young people aged 14–18 (of whom 154 were interviewed as part of the core sample, and the remaining 306 as part of the boost sample).⁹ The response rate achieved among adults at the core addresses was 52.7 per cent (compared with 49.1 per cent in 2009). Among young people at the core addresses the response rate was 76.6 per cent (compared with 86.4 per cent in 2009). At the boost addresses, 67.3 per cent of young people identified agreed to take part (compared with 64.2 per cent in 2009).

1.6. Weighting

⁸ Fieldwork for Wave 1 of the Wellcome Trust Monitor took place between January and March 2009.

⁹ By comparison, Wave 1 of the Wellcome Trust Monitor achieved 1,179 interviews with adults and 374 with young people.

The estimates in this report have been weighted to make them representative of the two survey populations (adults aged 18+ and young people aged 14–18). Three stages of weighting were applied. The data were first weighted to account for differing probabilities of selection, in other words to take into account differing numbers of dwelling units at a small number of addresses, and household composition. The next (new in Wave 2) step was, for the adult sample only, to create a non-response weight to adjust for the propensities of people in different areas to respond (using logistic regression modelling). The final step was to apply calibration weighting, meaning both samples were adjusted to match UK population totals by age within gender, and by region.

1.7. About the sample

This section looks at the final achieved sample of the Wellcome Trust Monitor, and its comparability with the 2009 sample and with the general population.

Looking at adult respondents' employment status, there are no significant differences between the profile of respondents in the 2012 and 2009 Wellcome Trust Monitor samples (Figure 1.2).

Figure 1.2 adults' work status

	<i>Wellcome Trust Monitor</i>			
	Monitor wave 2 (2012)		Monitor wave 1 (2009)	
	Number of adults	% of adults	Number of adults	% of adults
In paid employment in last week	719	52	648	55
Not in paid employment in last week	677	48	531	45
<i>Unweighted base:</i>	<i>1,396</i>		<i>1,179</i>	
<i>Weighted base:</i>	<i>1,396</i>		<i>1,179</i>	
Working full time in current/previous job	895	70	776	70
Working part time in current/previous job	375	29	330	30
<i>Unweighted base:</i>	<i>1,282</i>		<i>1,110</i>	
<i>Weighted base:</i>	<i>1,274</i>		<i>1,107</i>	

Related to this, there are also no significant differences between the profile of adult respondents to the 2012 and 2009 Wellcome Trust Monitor surveys (Figure 1.3) based on NS-SEC groupings (National Statistics Socio-Economic Classification).

Figure 1.3 **Adults' NSSEC classification**

	<i>Wellcome Trust Monitor</i>			
	Monitor wave 2 (2012)		Monitor wave 1 (2009)	
	Number of adults	% of adults	Number of adults	% of adults
Managerial and professional occupations	475	38	410	38
Intermediate occupations	118	10	112	10
Small employers and own account workers	122	10	97	9
Lower supervisory and technical	124	10	90	8
Semi routine and routine occupations	395	32	374	35
<i>Unweighted base:</i>	<i>1,248</i>		<i>1,084</i>	
<i>Weighted base:</i>	<i>1,234</i>		<i>1,083</i>	

The proportion of adult respondents to the Wellcome Trust Monitor describing themselves as White English, Welsh, Scottish Northern Irish or British has fallen by four percentage points between the two waves of the Monitor (Figure 1.4). At 81.6 per cent, the proportion describing themselves as such in the 2012 Wellcome Trust Monitor is broadly in line with the 2011 Census (80.5 per cent) for England and Wales.

Given the lower incidence of respondents from minority ethnic backgrounds, it has not been possible to compare findings between ethnic groups.

Figure 1.4		UK adults by ethnicity	
<i>Base: All adults</i>		<i>Wellcome Trust Monitor</i>	
Ethnicity	2011 Census	Monitor w2	Monitor w1
	% of adult population	(2012)	(2009)
		% of adults	% of adults
White			
English/Welsh/Scottish/Northern Irish/British	80.5	81.6	85.9
Irish	0.9	0.9	2.2
Gypsy or Irish Traveller*	0.1	0.1	-
Any other White background	4.4	4.7	3.6
Mixed ethnic groups			
White and Black Caribbean	0.8	0.4	0.9
White and Black African	0.3	0.5	0.1
White and Asian	0.6	0.9	0.1
Other mixed background	0.5	0.4	0.5
Asian/Asian British			
Indian	2.5	2.1	1.8
Pakistani	2.0	3.1	0.7
Bangladeshi	0.8	1.0	0.3
Chinese	0.7	0.3	0.1
Any other Asian background	1.5	0.3	0.6
Black/African/Caribbean/Black British			
African	1.8	1.5	1.0
Caribbean	1.1	0.6	1.2
Any other Black background	0.5	0.4	0.0
Other ethnic group			
Arab*	0.4	0.3	-
Any other ethnic group	0.6	0.6	0.8
Don't know/Refused		0.3	0.2
<i>Unweighted base:</i>		<i>1,396</i>	<i>1,179</i>
<i>Weighted base:</i>		<i>1,396</i>	<i>1,179</i>

*Not included in 2009 questionnaire

The 2012 adult sample is more religious than that interviewed in the 2009 Wellcome Trust Monitor (Figure 1.5). The proportion of respondents saying that they do not regard themselves as belonging to any religion has fallen by four percentage points. There has been an increase of four percentage points in the proportion describing themselves as “Christian – no denomination”. This has, however, corresponded with a fall in the proportion who say that they belong to one of the major Christian denominations. In addition, the proportion of Wellcome Trust Monitor adult respondents describing themselves as Muslim has increased by five percentage points since 2009.

Compared with the 2011 Census, the 2012 adult sample is less religious (42.5 per cent say they have “no religion” compared with 25.1 per cent of UK adults in the Census). This, however, is likely to reflect differences in the wording of the two questions, as well as methodological differences.

Figure 1.5 UK adults by religion

Religion	Monitor wave 2 (2012)		Monitor wave 1 (2009)	
	Number of adults	% of adults	Number of adults	% of adults
No religion	593	42.5	545	46.3
Christian - no denomination	259	18.6	174	14.8
Roman Catholic	109	7.8	117	9.9
Church of England/Anglican	209	15.0	218	18.5
Baptist	7	0.5	8	0.7
Methodist	21	1.5	17	1.4
Presbyterian/Church of Scotland	41	2.9	29	2.5
Free Presbyterian	1	0.1	1	0.1
United Reform Church (URC)/Congregational	1	0.1	4	0.3
Protestant	3	0.2	13	1.1
Hindu	19	1.4	11	0.9
Jewish	4	0.3	2	0.2
Islam/Muslim	91	6.5	20	1.7
Sikh	9	0.6	8	0.7
Buddhist	4	0.3	2	0.2
Other	21	1.5	5	0.4
Don't know/Refused	4	0.3	3	0.3
<i>Unweighted base:</i>	<i>1,396</i>		<i>1,176</i>	
<i>Weighted base:</i>	<i>1,396</i>		<i>1,176</i>	

The questionnaire included a knowledge quiz intended to measure respondents' scientific literacy. This comprised nine "true or false" questions. When reporting the results of the quiz, respondents have been classified into three groups. Those who answered 0–4 questions correctly were classified as "low" scoring, those who answered 5–7 questions correctly were classified as "medium" scoring and those answering 8–9 questions correctly were classified as "high" scoring. This follows the classification employed on the first Wellcome Trust Monitor, to aid comparability.

Comparing results on the knowledge quiz across the two waves of the Monitor shows similar patterns of knowledge between the two waves of the survey (Figure 1.6). Some differences do emerge, however, noticeably with regard to questions on genetics. The proportion of adults who correctly identify that the cloning of living things produces genetically identical copies has fallen by seven percentage points since 2009, to 73 per cent. The proportion of adults who are aware that more than half of human genes are identical to those of mice has also fallen, by five percentage points, to 52 per cent. Finally, the proportion of adults who correctly say that it is not true that all radioactivity is man-made has fallen by four percentage points, to 65 per cent. There have been no significant changes in the proportion of young people correctly responding to any of the questions on the knowledge quiz.

Figure 1.6 answers provided to knowledge quiz

Base: All respondents

Wellcome Trust Monitor

Proportion providing correct answers	Adults		Young people	
	Monitor w2 2012 (%)	Monitor w1 2009 (%)	Monitor w2 2012 (%)	Monitor w1 2009 (%)
All plants and animals have DNA (<i>TRUE</i>)	89	89	90	89
The oxygen we breathe comes from plants (<i>TRUE</i>)	83	80	89	89
The cloning of living things produces genetically identical copies (<i>TRUE</i>)	73	80	70	75
By eating a genetically modified fruit, a person's genes could also become modified (<i>FALSE</i>)	71	74	68	68
All radioactivity is man-made (<i>FALSE</i>)	65	69	68	68
It is the mother's genes that determine the sex of the child (<i>FALSE</i>)	64	63	66	68
More than half of human genes are identical to those of mice (<i>TRUE</i>)	52	57	31	32
Electrons are smaller than atoms (<i>TRUE</i>)	46	43	66	62
<i>Unweighted base:</i>	1,396	1,179	460	374
<i>Weighted base:</i>	1,396	1,179	460	374

At points throughout this report, findings are broken down according to scores on the knowledge quiz, with respondents grouped by high, medium and low scores. Comparing the 2012 results to those seen in 2009 shows that there has been a slight increase in the proportion of adults recording low scores on the knowledge quiz (Figure 1.7). Scores among young people have remained largely unchanged.

Figure 1.7 knowledge quiz scores

<i>Base: All respondents</i>		<i>Wellcome Trust Monitor</i>			
Proportion providing correct answers	Adults		Young people		
	Monitor w2 2012 (%)	Monitor w1 2009 (%)	Monitor w2 2012 (%)	Monitor w1 2009 (%)	
High (8-9)	23	25	21	23	
Medium (5-7)	53	58	60	57	
Low (0-4)	24	16	19	20	
<i>Unweighted base:</i>	<i>1,396</i>	<i>1,179</i>	<i>460</i>	<i>374</i>	
<i>Weighted base:</i>	<i>1,396</i>	<i>1,179</i>	<i>460</i>	<i>374</i>	

1.8. Interpretation of between-group and over-time differences

Statistical significance

It should be remembered that the data are taken from a sample of UK adults, rather than the entire population. Therefore, results are subject to sampling variability. Some of the differences observed between groups in the sample, or between the 2009 and 2012 surveys, are simply due to sampling variability, so not all differences observed can be generalised to the population as a whole. Throughout this report, only differences that are statistically significant at the 95 per cent level of confidence are commented on, both in terms of sub-group findings and in terms of comparing findings against those from the first Wellcome Trust Monitor. The Technical Report provides a guide to statistical reliability.

Where reported survey results have differed by sub-group, the difference has been tested for significance using the complex samples module in SPSS 17.0 or SPSS 19.0, and found to be statistically significant at the 95 per cent confidence level or above. The complex samples module allows the taking into account of sample stratification, clustering and weighting to correct for non-response bias when conducting significance testing. This means that ‘false positive’ results to significance tests (interpreting a difference as real when it is not) are much less likely than if the standard formulae were used.

In this respect the approach used in the report of the first Wellcome Trust Monitor has been followed. The significance testing looks for an overall relationship between the question variable and the sub-group variable, and avoids testing each sub-group category’s results against all other categories, which risks detecting spurious differences. The sub-group differences described are what are considered to be the interesting information, given the knowledge that there is an underlying significant relationship with the question variable.

Comparisons to the first Wellcome Trust Monitor

This report comments on statistically significant differences between the findings of the first and second waves of the Wellcome Trust Monitor. This is not possible in all cases due to changes in the wording of questions or answer options. In these instances, reasons for not making comparisons are noted as footnotes.

When comparing the first Wellcome Trust Monitor with the second, the reader should bear in mind that there may have been a change in sample composition between the two survey years which could account for any observed changes. That is to say, it is possible that apparent change in attitudes is actually a result of differences in the profile of respondents. For the core sample, where fieldwork performance can be easily compared between the first and second Monitors (due to a comparable methodology), the refusal rate fell 8.6 percentage points in 2012 and the non-contact rate rose by 4.4 percentage points. Because participation in the survey is likely to be more appealing to those already interested in science, the fall in the refusal rate may have resulted in a number of people who were not as interested in science completing the survey, whereas similar individuals may have refused in 2009. Because the increase in non-contact rate and the fall in refusal rate were relatively small, and the achieved sample profile is very similar across the two surveys, undue emphasis should not be placed on this possibility, but the reader should note that it is a potential alternative explanation for differences that are observed.

Reporting conventions

Footnotes are used throughout the report to indicate which questions and variables are being discussed. The purpose of this is to allow the reader to cross-refer easily to the questionnaire documentation, topline results and the SPSS dataset, which has been deposited at the UK Data Archive.

Where percentages do not sum to 100 per cent or to net proportions (as explained below), this may be due to rounding, or when questions allow multiple answers. An asterisk (*) denotes values that are less than half a per cent but greater than zero.

Aggregate, or net, proportions are referred to throughout this report. These combine the top two or bottom two responses in a question scale. For example, if 10 per cent answer “strongly agree” and 15 per cent answer “agree”, the aggregate, or overall “agree” proportion is 25 per cent.

Differences between the views of men and women are noted throughout this report. This analysis is always conducted within the sub-groups of adults or young people. To distinguish between males and females in the adult and young people samples, this report uses the terms men and women when referring to adults and young men and young women when referring to young people.

A number of questions in the questionnaire asked respondents to provide a free response, without being shown a list of responses on a showcard.

Some questions asked respondents to state the extent to which they know or understand particular scientific terms or principles. It should be noted that responses to these questions do not reflect people’s actual knowledge, but instead people’s perceptions of their own

knowledge. Where ‘other’ codes are mentioned these show free-text responses which have been made by too few people to assign to a code¹⁰.

1.9. Acknowledgements

This report on the second wave of the Wellcome Trust Monitor has been compiled by Ipsos MORI, who are responsible for its contents.

Ipsos MORI would like to thank the 1,856 members of the public who took part in the survey. We also express our gratitude to the staff of the Office for National Statistics, who provided great assistance at an important stage of the project.

We would also like to thank Dr Hilary Leever, Hannah Baker and Emily Conradi from the Wellcome Trust, and the Principal Investigator, Professor Patrick Sturgis from the University of Southampton, for their input throughout the study. We would also like to thank the other reviewers who provided helpful feedback and comments on drafts of this report. Any errors or omissions are the responsibility of Ipsos MORI.

¹⁰ Further information about the coding of free-text responses is provided in the Technical Report.

2. What does the public know about science and medical research?

This chapter explores how people think science and medical research are conducted, including what medical research entails and who carries it out. It also deals specifically with people's views on genetic research, including the extent to which they feel aware of the ethical issues involved in this area, and how they interpret various scientific terms used in genetics. To contextualise these views, this chapter also looks at people's attitudes towards the origins of life.

Key findings:

- Most adults and half of all young people recognise the concept of controlled experimentation in science, although most cannot articulate why this process is effective. Among both groups, there is little consensus about what it means to study something scientifically. Many adults do not recall the breadth of organisations and sectors involved in carrying out medical research.
- Adults and young people have greater difficulty expressing how science and medical research are conducted than in 2009. Both groups are more likely now to say they do not know what scientific study means, or how clinical trials work. Adults are also more likely to say they do not know who carries out medical research.
- People often think about medical research in terms of its outcomes, rather than how it is conducted or who does it. Unsurprisingly, perhaps, adults and young people most commonly associate medical research with treatments and cures.
- The majority of people in the UK do not hold religious beliefs about the origins of life – five in ten adults and almost six in ten young people think that life evolved as a result of natural selection, with God playing no part in this process.
- Over four in ten adults and young people feel they have a good understanding of the ethical issues that are raised by genetic research.
- Self-reported understanding among young people has increased since 2009.
- Over four-fifths of adults and young people say they have read or heard at least a bit about genetic tests that predict the likelihood of developing certain genetic diseases. Those who say they have read or heard more about these tests are also more likely to feel they understand the ethical issues involved in genetic research.
- A clear majority of adults say they are familiar with the terms “DNA” and “genetically modified”, though people tend to be more confident in their understanding of DNA. By contrast, awareness and self-reported understanding of the term “human genome” is low, with half of all adults and young people saying they have not heard of it before.

2.1. How do people think science works?

In their review of research investigating the public's understanding of science, Bauer, Allum and Miller (2007) note that many studies measuring scientific literacy fail to include people's knowledge and understanding of how science works, focusing instead on de-contextualised scientific 'facts'. The Wellcome Trust Monitor addresses this by including questions that specifically explore people's understanding of the principles and processes of scientific investigation. This section covers what people associate with scientific study and what they understand about the concept of controlled experimentation.

What is scientific study?

Scientific study remains a challenging concept for most people. When asked what it means to study something scientifically, people tend not to give well-defined answers. More than two in ten (26 per cent) adults and three in ten (32 per cent) young people define it with only a single term or phrase, despite interviewers being asked to probe further in these cases.¹¹ Two in ten adults (19 per cent) and young people (19 per cent) say they do not know or give no definition at all.

Moreover, people seem to have greater difficulty expressing what it means to study something scientifically than they did in 2009 (Figure 2.1)¹². The proportion of adults saying they do not know has risen by nine percentage points to 15 per cent since 2009.¹³

Figure 2.1 perceptions of what it means to “study something scientifically”

Base: All respondents

Wellcome Trust Monitor

Some aspects of “studying something scientifically”	Adults		Young people	
	Monitor w2 2012 (%)	Monitor w1 2009 (%)	Monitor w2 2012 (%)	Monitor w1 2009 (%)
Involving experiments/methods/testing/controls				
Test	8	13	6	10
Experiment	7	9	16	15
Controls/controlled	4	7	2	2
Control groups	2	1	*	0
Methodical	2	1	0	*
Survey	1	*	*	0
Systematic	1	1	0	0
Involving hypothesis/theory construction				
Hypothesis	2	2	2	2
Theory	1	2	1	1
Objective/removing bias/rational				
Unbiased	2	2	1	1
Objective	1	2	0	0
Non-subjective	*	*	0	0
Dispassionate	*	*	0	0

¹¹ This is based on the respondent's answer being coded to a single answer category. The number of categories a respondent's answer is coded to can be considered an approximate indicator of the complexity of their answer.

¹² Figure 2.1 shows data from [SciStud](#) (press CTRL and click on question name to access data table)

¹³ A further four per cent of answers are coded to “nothing” and “not stated” categories in 2012, but these categories were not used in 2009 so cannot be compared.

Open-minded	0	*	0	0
Don't know	15	6	15	9
<i>Unweighted base:</i>	<i>1,396</i>	<i>1,179</i>	<i>460</i>	<i>374</i>
<i>Weighted base:</i>	<i>1,396</i>	<i>1,179</i>	<i>460</i>	<i>374</i>

* indicates a percentage less than 0.5%, but greater than 0.

As in 2009, there is a lack of consensus among the public on how to define scientific study. The most common answers among adults and young people in both 2012 and 2009 relate to experiments or testing, but just 14 per cent of adults and 21 per cent of young people mention either of these terms in 2012 (compared with 21 per cent of adults and 23 per cent of young people in 2009). Just 3 per cent of adults and 3 per cent of young people mention hypotheses or theories as part of their answer, which is similar to 2009. Among young people, this comes despite a learning strand on How Science Works having been introduced to GCSE and A-level science curriculums in 2006.

Even among adults who have worked or have qualifications in science-related fields, there is little consensus on the meaning of scientific study. The spread of answers for these two sub-groups is generally close to the figures observed among all respondents, although they are somewhat less likely to say they do not know what it means (4 per cent of those who have worked in science, compared with 17 per cent of those who live in households where no-one is employed in science; and 6 per cent of those who have studied it beyond school, compared with 21 per cent of those with no qualifications in science).

There is no significant difference in the proportion not knowing what it means to study something scientifically by gender. However, there are significant differences by age. The oldest age group (65 or over) are most likely to say they don't know (19 per cent). This compares with 11 per cent of those aged 50–64 who say that they don't know what it means.

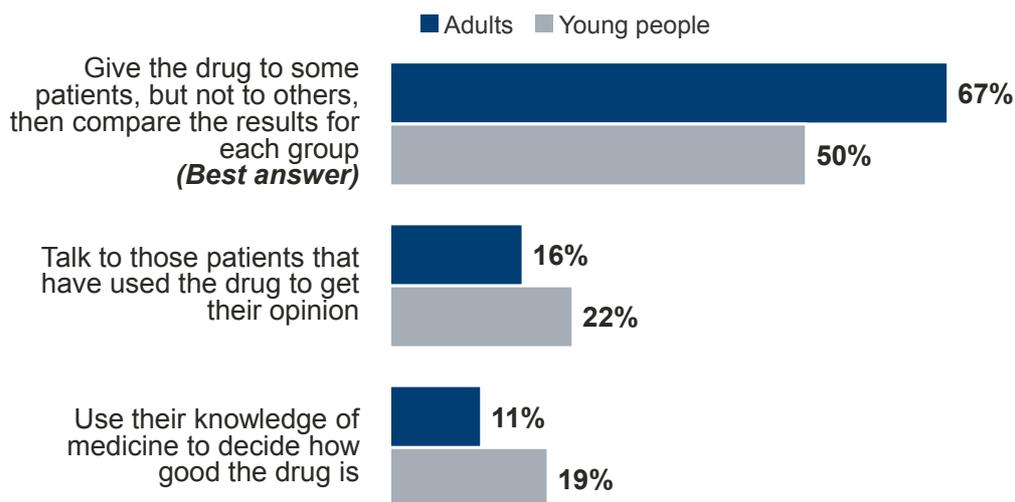
How do people think clinical trials work?

Large proportions of adults and young people are aware of the concept of controlled experimentation in clinical trials. As Figure 2.2¹⁴ highlights, almost seven in ten (67 per cent) adults and five in ten (50 per cent) young people say scientists would test the effect of a drug by giving it to some patients but not to others, then comparing the results between groups. Fewer think scientists would use a different method, such as talking to patients to get their opinions on the drug (16 per cent of adults and 22 per cent of young people think this) or simply using their existing knowledge to make a decision (11 per cent of adults and 19 per cent of young people think this).

However, people seem less certain about this than in 2009. Though the spread of answers is otherwise unchanged, slightly more adults (6 per cent, compared with 2 per cent in 2009) and young people (8 per cent compared with 2 per cent in 2009) say they do not know.

Figure 2.2: how people think clinical trials work

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



Ipsos MORI
Social Research Institute

Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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People who are more exposed to science in their lives, even if indirectly, have a greater awareness of how trials work. As might be expected, adults who have worked in science are more likely to pick the controlled experimentation option (81 per cent of adults who have worked in science, compared with 65 per cent of those who have not). Those adults who live with someone who works in science are more likely to pick the controlled experimentation option (82 per cent) compared with 63 per cent of adults who live in households where no one has a scientific job. In addition, adults with a parent who has worked in science (83 per cent) are more likely to pick the controlled experimentation option than those whose parents have not (65 per cent). Lastly, young people with a parent who is interested in science are more likely to pick this option (55 per cent, compared with 44 per cent of those whose parents are not interested in science).

¹⁴ Figure 2.2 shows data from [DrugEff](#) (press CTRL and click on question name to access data table).

Those who obtain a high score on the science quiz are also more likely to choose the controlled experimentation option (88 per cent of high-scoring adults, compared with 69 per cent of adults with medium scores and 42 per cent of low-scoring adults; 72 per cent of high-scoring young people, compared with 49 per cent of young people with medium scores and 31 per cent of low-scoring young people), highlighting a link between understanding of scientific facts and understanding of how science works. These answers do not differ significantly by gender or age.

Why do people think this is how clinical trials work?

When people who choose the controlled experimentation option were asked why they think scientists would test a drug's effects in a certain way, most people give a specific reason why¹⁵ (Figure 2.3¹⁶). Few mention specific terms that suggest a deeper understanding of the process. Two in ten (21 per cent) adults and one in ten (11 per cent) young people use the term "placebo effect", while under one in ten adults (8 per cent) and young people (5 per cent) specifically mention "control groups". This highlights that, while many are aware of the concept of a trial, fewer can clearly explain how and why controlled experimentation works.

The people who say scientists would test a drug by talking to patients often justify this approach by saying that patients would know best if the drug was working. Those who say scientists would use their own knowledge to decide if a drug worked are less likely to give a justification at all, with 15 per cent of adults and 22 per cent of young people in this group saying they do not know why this would work. When people who choose this option do give a reason, they often say that being an expert is enough in itself to understand the drug.

Figure 2.3 justification for identification of particular approaches for testing a drug

Base: All respondents who identified particular method of testing drugs *Wellcome Trust Monitor*

Mentioned by 5% or more	Give drug to some patients		Talk to patients		Use own knowledge	
	Adults	Young people	Adults	Young people	Adults	Young people
	(%)	(%)	(%)	(%)	(%)	(%)
Comparing one group of patients with another, to see if outcome of one group improves	32	38	3	4	1	0
Placebo effect	21	11	1	0	1	1
Every patient is different/drugs react differently on different people	9	7	5	4	2	7
Doctors/scientists best placed to make a decision/would know/understand	3	6	4	3	33	18
Those taking the drug would know most about its effects	1	*	27	30	3	9
Control group	8	5	0	0	0	0
Users of the drug best placed to know if it worked	*	0	29	22	1	0
Only/most accurate method	6	8	3	5	0	0
To learn more/to find out if the drug works or doesn't work	5	9	4	2	3	2
Don't know	5	6	5	9	15	22
<i>Unweighted base:</i>	<i>914</i>	<i>242</i>	<i>239</i>	<i>103</i>	<i>151</i>	<i>77</i>
<i>Weighted base:</i>	<i>930</i>	<i>232</i>	<i>222</i>	<i>102</i>	<i>153</i>	<i>87</i>

* indicates a percentage less than 0.5%, but greater than 0.

¹⁵ For this question, changes to the coding approach since 2009 mean that direct wave-on-wave comparisons of individual answer categories are not possible. However, we can still make general comparisons looking at how the spread of answers has changed, if at all.

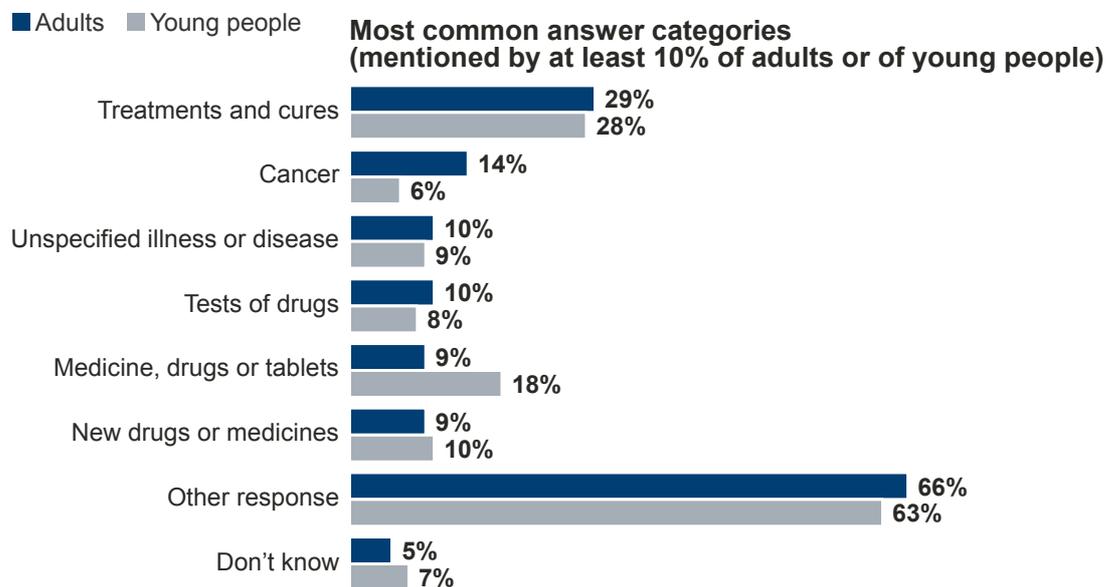
¹⁶ Figure 2.3 shows data from [DEWhy](#) (press CTRL and click on question name to access data table).

2.2. What is medical research?

As well as assessing respondents' knowledge of how science works, the Wellcome Trust Monitor also sought to establish what they understand, in their own words, by the term "medical research". As can be seen in Figure 2.4¹⁷, people mainly think about medical research in terms of its outcomes, rather than thinking about how it is conducted or who does it. When asked to say in their own words what comes to mind when thinking about medical research, the most common answers among adults relate to treatments and cures (29 per cent), cancer (14 per cent), unspecified illnesses or diseases (10 per cent) and testing of drugs (10 per cent)¹⁸. Among young people, the most frequent answers are about treatments and cures (28 per cent), medicine or drugs (18 per cent) and new medicines or drugs specifically (10 per cent).

Figure 2.4: words or phrases associated with medical research

Q. What comes to mind when you think about the term medical research?



Ipsos MORI
Social Research Institute

Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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That people think more about the outcomes of research than about how it is conducted was also something found in relation to scientific research more generally in the Public Attitudes to Science (BIS, 2011) study. The qualitative element of that study found that people often only want to know about the results of scientific research and how it will affect them, so do not necessarily feel they need to think about the research process.

¹⁷ Figure 2.4 shows data from [MedRes](#) (press CTRL and click on question name to access data table).

¹⁸ This question was asked before giving respondents a uniform definition of medical research to use throughout the rest of the interview. It was also asked before other questions about scientific study to avoid leading respondents to any particular answers.

As in 2009, cancer is the most commonly mentioned disease (by 14 per cent of adults and 6 per cent of young people) that comes to people's minds when thinking about medical research, probably reflecting its general prevalence and its prominence in news stories relating to medical research. Other diseases such as diabetes, Alzheimer's disease and Parkinson's disease are only mentioned by 1 per cent of adults and less than 1 per cent of young people.

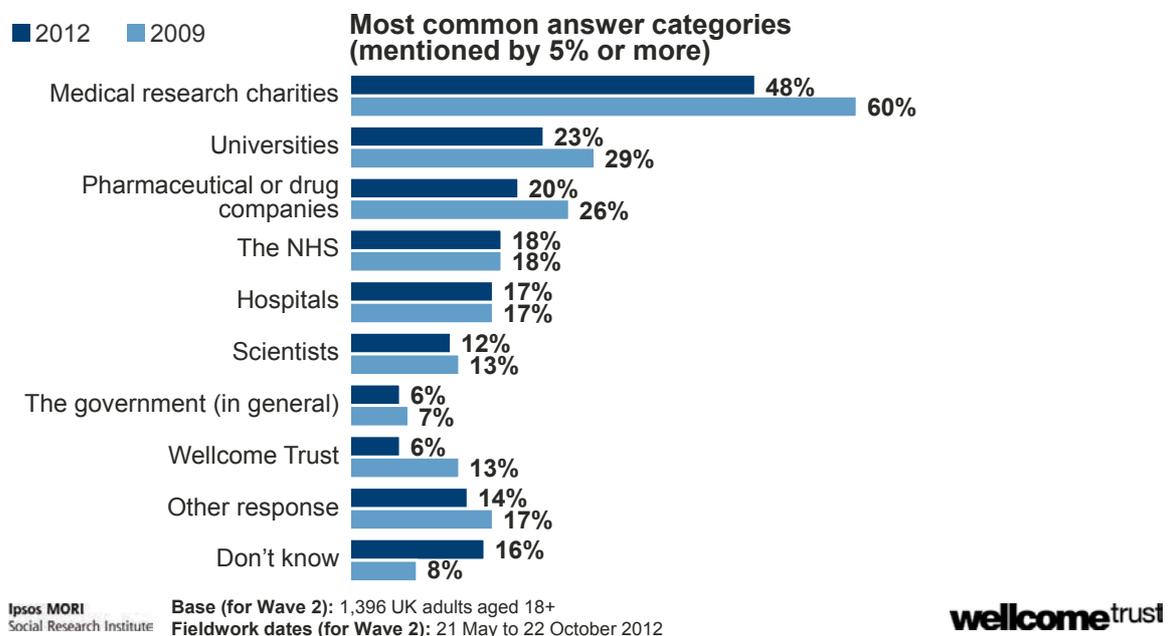
2.3. Who carries out medical research?

When adults are asked who carries out medical research in the UK, they mention organisations or sectors that both fund and undertake the research, as Figure 2.5¹⁹ shows. The most common mentions are medical research charities (48 per cent), universities (23 per cent), pharmaceutical companies (20 per cent) and various public sector organisations.

Six per cent mention the Wellcome Trust. However, it should be noted that respondents were told the survey was being carried out for the Wellcome Trust at the beginning of the interview and were also provided with a Wellcome Trust branded survey leaflet. Were it not for this, recall of the Trust would have been likely to be lower.²⁰

Figure 2.5: adults' perceptions of who carries out medical research

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



Although people think of a wide range of sectors, it is worth noting that just under four in ten (37 per cent) mention just one organisation or sector. This suggests that many are not aware of the breadth of organisations and sectors that are involved in carrying out medical research.

¹⁹ Figure 2.5 shows data from [CarryOut](#) (press CTRL and click on question name to access data table).

²⁰ While every effort was made to ensure that the survey was communicated in a similar way to the first wave of the Monitor, it is possible that minor changes to the survey materials or to the way in which the survey was introduced to respondents may have had an impact on people's likelihood to spontaneously mention the Wellcome Trust as an organisation that carries out medical research.

The proportion saying they do not know who carries out medical research has risen since 2009 (by eight percentage points to 16 per cent), while the top three answers are less commonly mentioned than they were in 2009. This once again indicates the possibility of an increase in uncertainty about how science and medical research are carried out.

Women are somewhat more likely than men to say they do not know who carries out medical research in the UK (18 per cent compared with 13 per cent). Other than this, there are no significant differences by sub-group.

2.4. The origins of life

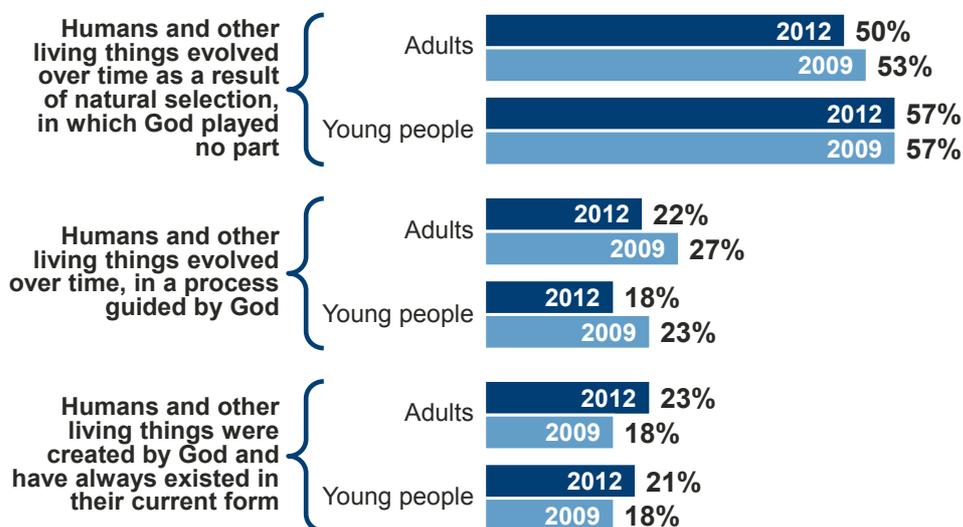
Analysis of the 2009 data suggested that people with strong religious beliefs tend to have more negative views of genetic research – a subject explored later in this chapter, and in Chapter 4 – regardless of how knowledgeable they are about the science involved (Allum et al., 2012). This makes it important to understand how religious beliefs develop over time, as well as where the UK public stands in relation to other countries.

As Figure 2.6²¹ shows, five in ten (50 per cent) adults and almost six in ten (57 per cent) young people think that life evolved as a result of natural selection, with God playing no part in this process. Around two in ten adults (21 per cent) and young people (18 per cent) believe that humans and other living things evolved over time, in a process guided by God. A similar proportion take a ‘creationist’ view, believing that humans and other living things were created by God in their current form (23 per cent of adults and 21 per cent of young people).

Broadly, these results are consistent with those found in 2009. There has been a small increase in the proportion of adults saying that life in its current form was created by God (by five percentage points to 23 per cent), with small, but not statistically significant decreases in the proportion saying life evolved either in a process guided by God or which God played no part.

Figure 2.6: perceived origins of life

Q. Which of the following comes closest to your view about the origin and development of life on earth?



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Social Research Institute

Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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In fact, evidence suggests beliefs of this nature tend to remain static over time. Although not directly comparable to this research, a 2006 Ipsos MORI/BBC survey also found that half (48 per cent) of UK adults agreed that “human kind has developed over millions of years from less advanced forms of life, and god had no part in this process”. In the USA, views on this have also tended to be stable – the USA Today/Gallup Values and Beliefs survey, which has

²¹ Figure 2.6 shows data from [LifeEart](#) (press CTRL and click on question name to access data table).

polled the US public on attitudes to the origins of life for over 30 years, has observed little change in attitudes (although the significance of changes is not indicated in the survey data) over this period (Newport, 2012).

Among adults, men appear to be less religious than women, with 58 per cent of men thinking that God played no part in the origins of life, compared with 43 per cent of women. Similarly, among young people, 62 per cent of young men think God played no part, compared with 51 per cent of young women.

People aged 65 or over are more likely to believe that God was responsible for the origins of life in some way – 28 per cent think life as God created it has always existed in its current form (compared with only 16 per cent of those aged 50 to 64), and 28 per cent think God guided the evolution of life (compared with only 19 per cent of those aged 18 to 34). This perhaps reflects the fact that this age group grew up at a time when religion was a much stronger presence in people's everyday lives. Indeed, over seven in ten (72 per cent) of those aged 65 or over identify themselves as Christians, compared with only 25 per cent of adults aged 18 to 34.

Among religious groups, Muslims are particularly likely to take a creationist view on the origins of life. More than eight in ten (83 per cent) Muslim adults think God created life as it currently exists. By contrast, fewer than three in ten Christian adults (27 per cent) and fewer than one in ten adults who do not identify with any religion (6 per cent) hold this view. Although the number of respondents who identified themselves as Muslim in this survey is relatively small (65 adults and 39 young people), this sub-group difference is consistent with previous surveys of Muslims in other countries (see Hameed, 2008). Of course, it is important to note that there is no single Islamic theological position on evolution and that opinions among Muslims may be tied to their local cultural and political contexts, rather than due to religion.²²

²² See, for example, Hameed (2012), which discusses the complexity of attitudes to the origins of life among Muslims.

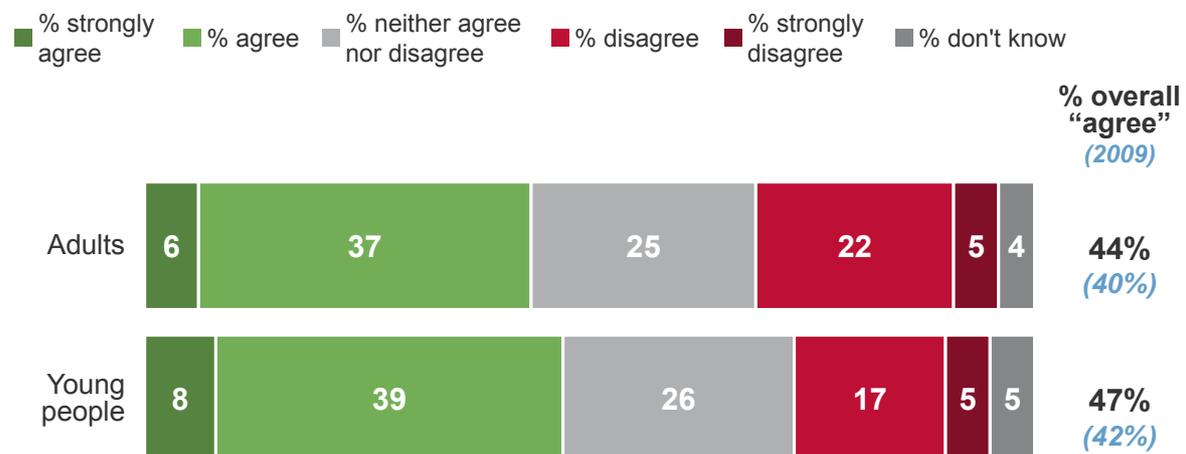
2.5. Awareness and understanding of issues relating to genetic research

People's self-reported understanding of the ethical issues

As Figure 2.7²³ illustrates, over four in ten adults (44 per cent) and young people (47 per cent) feel they have a good understanding of the ethical issues raised by genetic research. The proportion of young people who do not feel they have a good understanding is lower than it was in 2009 (22 per cent, compared with 30 per cent in 2009), but among adults the proportion is statistically unchanged (27 per cent, compared with 29 per cent in 2009). Since September 2008, changes made to the A-level and Key Stage 3 science curricula have included a greater focus on bioethics (Willmott and Willis, 2008).

Figure 2.7: self-reported understanding of ethical issues involved in genetic research

Q. How much do you agree or disagree with the following statement ... "I feel I have a good understanding of the ethical issues raised by genetic research"?



Ipsos MORI
Social Research Institute

Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

wellcome trust

There is a gender difference among both adults and young people. Women are less likely than men to feel that they have a good understanding of the ethical issues (39 per cent compared with 49 per cent), and young women are also less likely than young men to think this (38 per cent compared with 55 per cent). It is important to note that this is a self-assessment of understanding, and therefore reflects the extent to which people are confident in their knowledge – not necessarily actual knowledge.

²³ Figure 2.7 shows data from [GenEth](#) (press CTRL and click on question name to access data table).

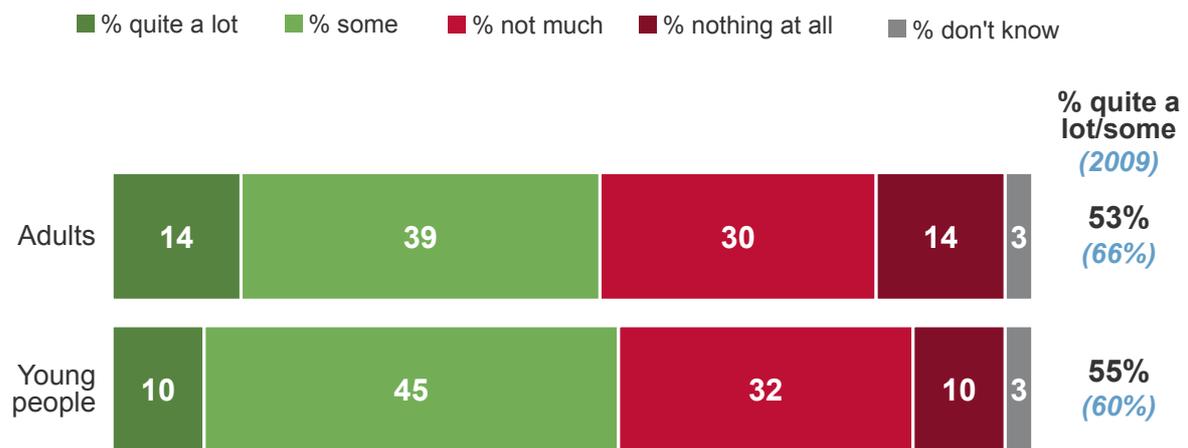
People's awareness of genetic tests

Figure 2.8²⁴ shows that over four-fifths of adults (83 per cent) and young people (87 per cent) say they have read or heard at least a bit, if not much, about genetic tests that predict the likelihood of developing certain genetic diseases. One in seven (14 per cent) adults and just one in ten (10 per cent) young people say they have not heard or read anything at all on this subject.

Exposure to this information appears to have fallen among both adults and young people since 2009. Just 14 per cent of adults say they have read or heard quite a lot about genetic tests, compared with 22 per cent in 2009, and just 10 per cent of young people say this, compared with 17 per cent in 2009, suggesting genetic testing may now be a less salient issue among the public.

Figure 2.8: self-reported awareness of genetic testing

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



Ipsos MORI
Social Research Institute

Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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Older people are somewhat less aware of reading or hearing about any information on this area. One in five (21 per cent) of those aged 65 or over have read or heard nothing at all about genetic tests, compared with 12 per cent of adults aged 18 to 49.

One might expect those who are interested in medical research generally, as well as those who have a long-term illness or medical condition (and therefore might have greater direct exposure to this subject), to have read or heard more about genetic tests. However, responses among both these sub-groups are in line with the average.

²⁴ Figure 2.8 shows data from [GenTest](#) (press CTRL and click on question name to access data table).

Looking at these two questions together, people who have read or heard more about genetic tests are also more likely to feel they understand the ethical issues involved in genetic research. Among those who have read or heard quite a lot or some about genetic tests, almost six in ten adults (58 per cent) and young people (57 per cent) agree overall that they have a good understanding of the ethical issues. By contrast, under three in ten adults (29 per cent) and under four in ten young people (36 per cent) who have read or heard not much or nothing about genetic tests feel that they have a good understanding of the associated ethical issues.

2.6. Open responses about key terms in genetics

Media coverage of medical research frequently uses genetics-related terms that may not always be understood by the general public. While other surveys have explored self-reported understanding of these terms, the Wellcome Trust Monitor goes further, not only looking at the self-reported level of understanding of the terms “DNA”, “genetically modified” and “human genome”, but also asking respondents to explain what they understand by these terms.²⁵ As Stoneman, Sturgis and Allum (2012) note, this approach allows respondents to use their own frames of reference when giving a response, allowing for a fuller analysis of people’s understanding of these terms.

Respondents were first asked to rate their understanding of the three terms and were only asked to provide a definition later in the questionnaire. This meant that respondents would not say that they did not understand a term in order to avoid the follow-up questions as they would not have foreseen that these questions were coming. Separating the initial and follow-up questions also helped avoid potential embarrassment among respondents if they were unable to define a term of which they had just claimed to have a good understanding.

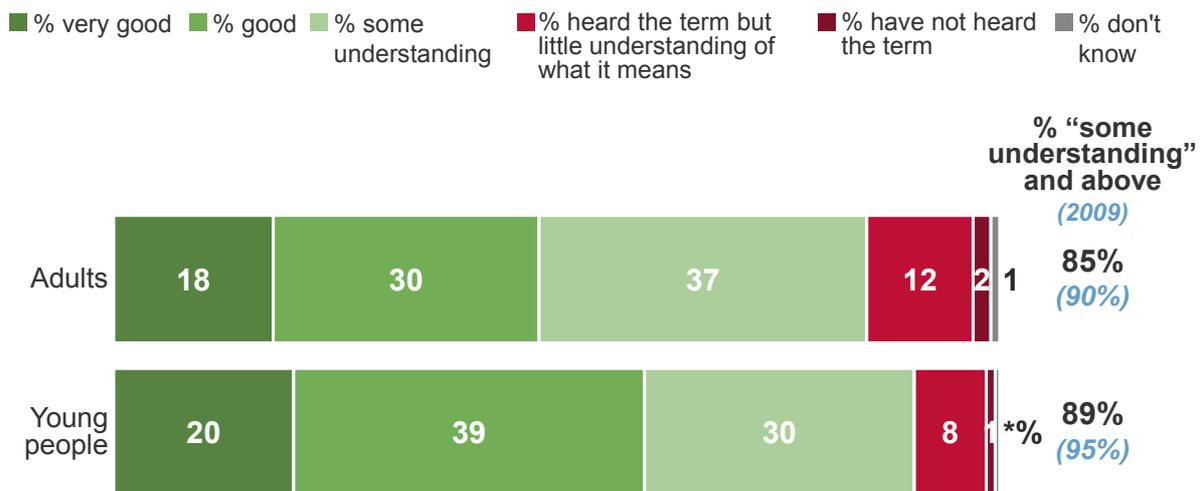
²⁵ The first Wellcome Trust Monitor asked respondents what they understood by the terms “DNA” and “stem cell”, with the latter being omitted for 2012, and new terms added.

DNA

Nearly all adults (97 per cent) and young people (98 per cent) have heard of DNA, as Figure 2.9²⁶ illustrates. Half (48 per cent) of all adults and three-fifths (60 per cent) of young people say they have a very good or good understanding of the term, which is in line with the findings from 2009. That young people are more confident than adults in their understanding of DNA is likely to reflect that this specific term is taught as part of GCSE biology.

Figure 2.9: self-reported understanding of DNA

Q. When you hear the term DNA, how would you rate your understanding of what the term means?



*% indicates a percentage less than 0.5%, but greater than 0%

Ipsos MORI
Social Research Institute

Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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Those aged 65 or over are more likely to say they have heard of DNA but have little understanding of what it means (21 per cent, compared with 10 per cent of adults in all other age groups). Among adults, women are also somewhat more likely to say this than men (15 per cent compared with 9 per cent).

²⁶ Figure 2.9 shows data from [KnowDNA](#) (press CTRL and click on question name to access data table).

Most people are able to articulate some understanding of the term DNA (Figure 2.12³¹). Fewer than one in ten adults (7 per cent) and young people (8 per cent) who say they are aware of the term go on to say that they do not know what it means. People most frequently associate DNA with being what makes us and what provides an individual with a unique identity.

Figure 2.12 what people understand by the term DNA

<i>Base: Respondents who have heard of the term DNA</i>	<i>Wellcome Trust Monitor</i>	
	Adults	Young people
Mentioned by five per cent or more	(%)	(%)
What we are made of/what makes us	24	19
Individual's unique identity	21	16
Genes/genetics	10	17
Determines what we are like/our characteristics and features	8	14
Cells	8	8
Practical use – to identify people (general)	7	4
Blood	7	5
Everyone has it/all living things have DNA/basis of life	7	7
Passed on from one generation to the next	4	11
Genetic makeup	6	3
Building blocks of living organisms	6	2
Practical use – to solve crimes/identify criminals	6	2
Deoxyribonucleic acid	5	5
Fingerprint	5	2
Chromosomes	2	8
Nothing	1	2
Don't know	7	8
<i>Unweighted base:</i>	<i>1,351</i>	<i>450</i>
<i>Weighted base:</i>	<i>1,353</i>	<i>452</i>

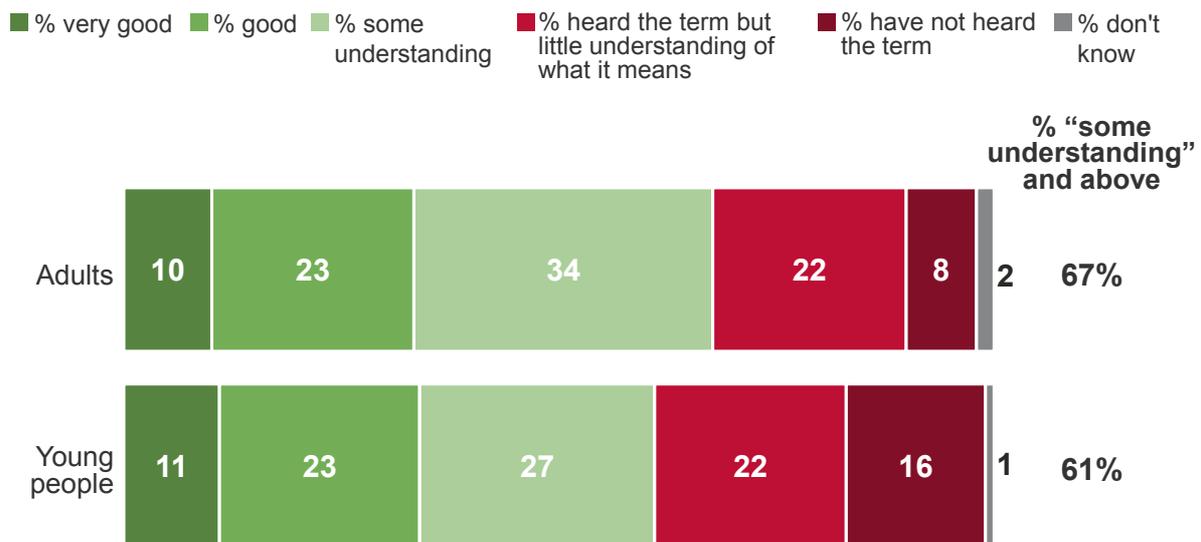
³¹ Figure 2.12 shows data from [DNAMean](#) (press CTRL and click on question name to access data table).

Genetic modification

While the vast majority of adults (90 per cent) and young people (83 per cent) have heard of the term “GM” or “genetically modified”, only one-third (34 per cent) of both adults and young people think they have a very good or good understanding of it, as Figure 2.13³² shows. Over half (56 per cent) of all adults and half (49 per cent) of young people feel they have just some or little understanding of the term.

Figure 2.13: self-reported understanding of genetic modification

Q. When you hear the term GM or “genetically modified”, how would you rate your understanding of what the term means?



Ipsos MORI
Social Research Institute

Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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Once more, older people, aged 65 or over, are more likely to say they have little understanding of what GM means despite having heard the term (28 per cent, compared with 19 per cent of those aged 50 to 64). Among adults, women are again more likely than men to say they have little understanding of what it means (26 per cent compared with 19 per cent). Of course, this does not necessarily mean that men have a more accurate understanding of the term, but may simply mean that they are more confident that their understanding is correct.

³² Figure 2.13 shows data from [KnowGM](#) (press CTRL and click on question name to access data table).

Among those who are aware of the term, people commonly mention that genetic modification involves “changing” things in some way, whether animals or crops, and that this is done to change or improve the physical characteristics of that organism (Figure 2.16³⁶). However, people rarely offer a clear explanation of what this involves.

Figure 2.16 what people understand by the term GM

Base: Respondents who have heard of the term GM, or “genetically modified”

Wellcome Trust Monitor

Mentioned by five per cent or more	Adults	Young people
	(%)	(%)
Genes that are changed/altere d/modified	12	19
Crops/plants that have been changed/altere d/modified	10	4
Scientific intervention/change d by scientists	9	8
Makes crops/plants disease resistant/immune to pests	8	1
Makes crops/plants grow bigger/stronger/better/improved	8	4
DNA altere d/modified/change d	7	12
Something that has been modified/altere d/change d	7	7
Makes things bigger/better/improved	6	3
Relating to crops/plants	5	3
Not natural	5	1
Changes characteristics/features	3	5
Nothing	3	6
Don't know	13	19
<i>Unweighted base:</i>	<i>1,254</i>	<i>383</i>
<i>Weighted base:</i>	<i>1,260</i>	<i>381</i>

³⁶ Figure 2.16 shows data from [GMMean](#) (press CTRL and click on question name to access data table).

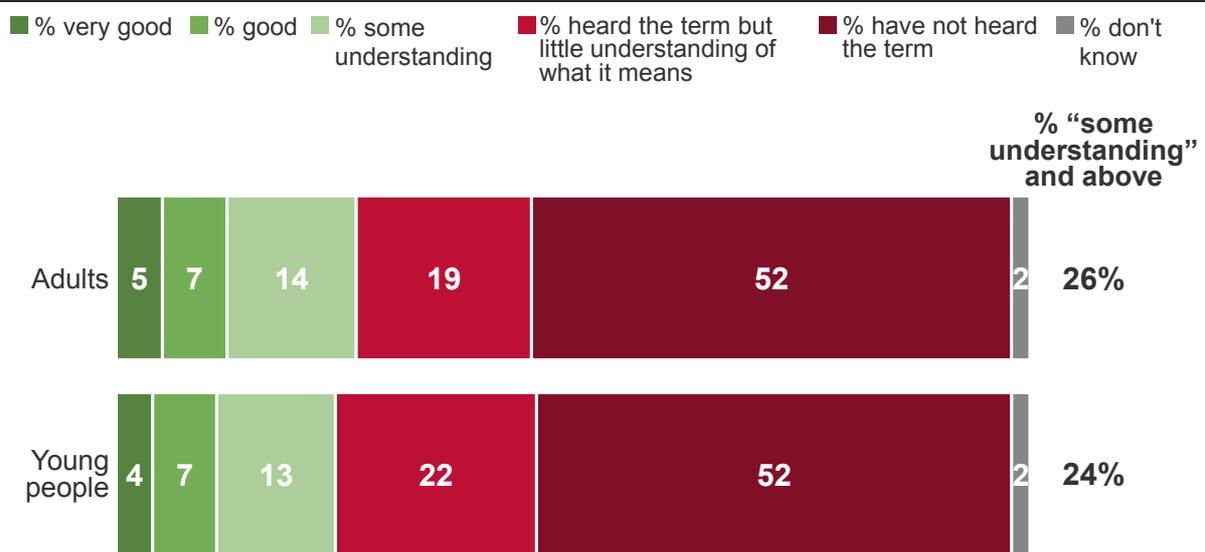
The human genome

Of the three genetics terms asked about in the Wellcome Trust Monitor, people tend to be least familiar with the term “human genome”, with five in ten (52 per cent) of all adults and of young people saying they have not heard of it before (Figure 2.17³⁷). Moreover, a further two in ten adults (19 per cent) and young people (22 per cent) have heard of the term but say they have little understanding of what it means.

There was considerable media coverage of the human genome in 2010 to coincide with the tenth anniversary of the draft human genome sequence, including a BBC *Horizon* programme dedicated to the subject in October 2010. More recently, during fieldwork for the second Wellcome Trust Monitor, there were several media stories about the Encyclopedia of DNA Elements project to study how the human genome works, which may have helped to raise the profile of the human genome. However, that people still have a relatively low awareness of the term is perhaps not surprising given that it is a relatively specific topic among the wide range of news stories about medical research that people will have come across. Indeed, the Public Attitudes to Science (BIS, 2011) survey found that large proportions of the UK public have not heard of whole areas of science, such as synthetic biology (33 per cent have not heard of it) and nanotechnology (29 per cent).

Figure 2.17: self-reported understanding of the human genome

Q. When you hear the term “human genome”, how would you rate your understanding of what the term means?



Ipsos MORI
Social Research Institute

Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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Among adults, those more likely to say they have not heard of the human genome before include older people aged 65 or over (62 per cent, compared with 47 per cent of adults aged 50 to 64) and women (58 per cent, compared with 45 per cent of men) are. Among young people, young women are also more likely to say they have not heard of it before (59 per cent, compared with 45 per cent of young men).

³⁷ Figure 2.17 shows data from [KnowGen](#) (press CTRL and click on question name to access data table).

3. How interested are people in science and medical research?

As can be observed throughout this report, people's views on science and medical research are shaped to a large degree by their personal circumstances. This chapter looks to provide an understanding of how people interact with science in their everyday lives. It also addresses the question of how interested people are in medical research specifically and how they find out about medical research.

Key findings:

- A majority of adults (75 per cent) and young people (58 per cent) say that they are fairly or very interested in medical research.
- Levels of interest in medical research have declined somewhat since 2009 among both adults and young people – by 16 percentage points among adults and 22 percentage points among young people.
- There has been a decline in the proportion of people who say that they can recall seeing information about medical research that they just happened to come across and had not been looking for.
- Mental health remains an area of particular interest to the public, with half of adults and four in ten young people saying they are interested in this area of medical research.
- Among young people, school science seems to drive information-seeking in medical research, with six in ten young people who looked for information saying they did so as a result of something they were studying.
- When purposefully seeking information about medical research, people are most likely to look for information about types of illness (half of adults and one-quarter of young people looked for this type of information).
- The internet remains the preferred source of information about medical research for the majority of people. There are, however, certain groups (such as those aged 65 or over and those with no qualifications) who are less likely to use this medium.

3.1. Science in everyday life

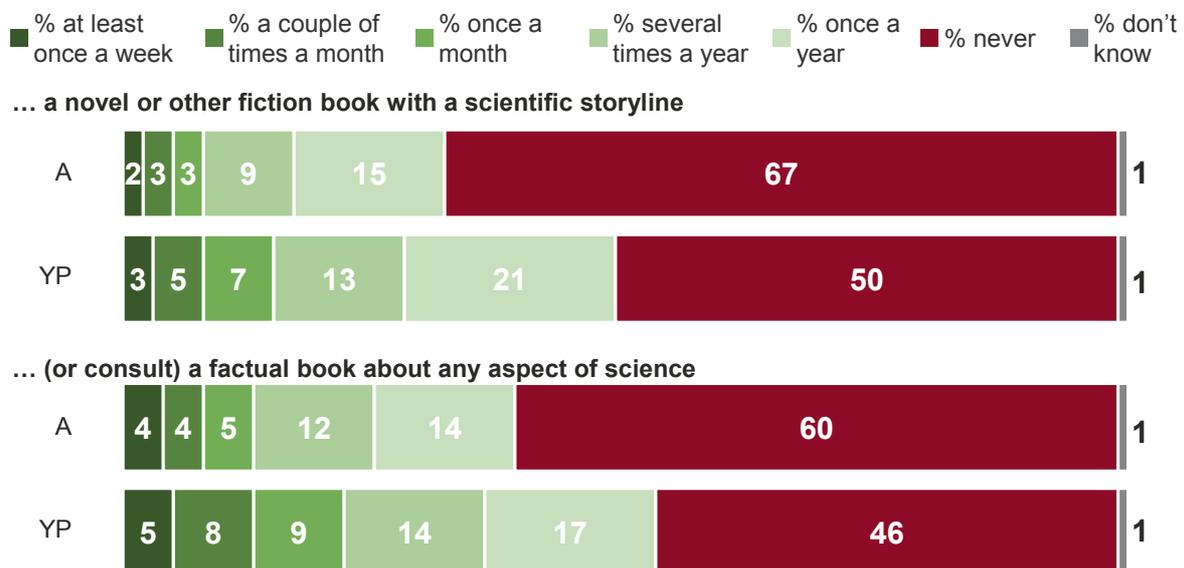
Reading books about science

Adults' and young people's interaction with science in leisure settings can have a considerable impact on their overall opinions and understanding of science. For example, the 2009 ASPIRES survey has shown that children's aspirations to work in science can be strongly influenced by their exposure to science outside of school, through books and leisure activities (see DeWitt et al., 2011). The Wellcome Trust's own review of informal science learning highlights that informal science activities contribute highly to adults' and young people's science knowledge, and moreover that these activities encourage a broader way of thinking about science, based on general principles rather than specific contexts (see Falk et al., 2012).

Respondents were asked how often they read novels or other fiction books with a scientific storyline, and how often they read or consult a factual book about any aspect of science. As Figure 3.1⁴² shows, almost seven in ten adults (67 per cent) and five in ten young people (50 per cent) never read fictional books about science, while similar proportions (60 per cent of adults and 46 per cent of young people) have not consulted a factual book about any aspect of science.

Figure 3.1: how often people read books with science in them, as shown by Adults (A) and Young People (YP)

Q. How often do you read ... ?



Ipsos MORI
Social Research Institute

Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

wellcome trust

The finding that high proportions of young people have not engaged with science in this way mirrors results from the recent online ASPIRES survey of children in England. This found in

⁴² Figure 3.1 shows data from [ReadBSci](#), [RFactSci](#) (press CTRL and click on question name to access data table).

2011 that almost half (47 per cent) of all children aged 12–13 never read books or magazines about science outside of school (see Archer, 2013).

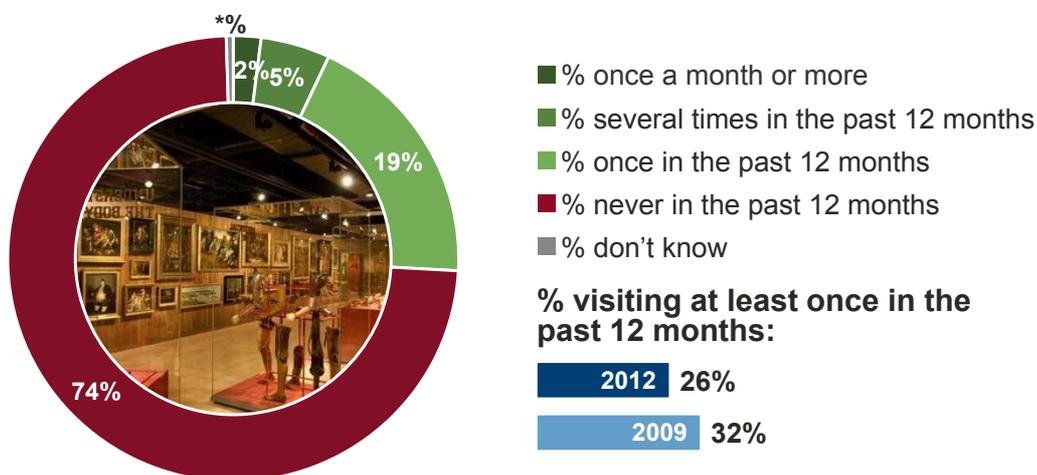
Young people’s interaction with science in leisure settings can have an impact on their overall opinions of science as a subject area and as a career. The fact that almost half of young people read novels or fiction books with a scientific storyline at least once a year is therefore a promising finding.

In 2009, roughly the same proportion of young people and adults said that they had read a science novel or referred to a factual book about science in the last year. This picture is different in 2012. While there has been an increase of four percentage points in the number of young people who say that they read fictional books with a scientific storyline at least once a year, the proportion of adults who say this has fallen by six percentage points. Similarly, while the proportion of young people who say they have consulted a factual book about science has increased by eight percentage points, the proportion of adults who say this has fallen by the same amount.

Mirroring their slightly reduced engagement with books on science, adults are also less likely to say that they have visited a science centre or museum in the last 12 months (see Figure 3.2⁴³). In 2009, 32 per cent of adults said that they had visited one of these attractions in the last 12 months. This has fallen by six percentage points to only 26 per cent of adults in 2012.

Figure 3.2: how often adults have visited science museums and science centres

Q. In the last 12 months, how often, if at all, have you visited a science museum or science centre?



Ipsos MORI
Social Research Institute

Base (for Wave 2): 1,396 UK adults aged 18+
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

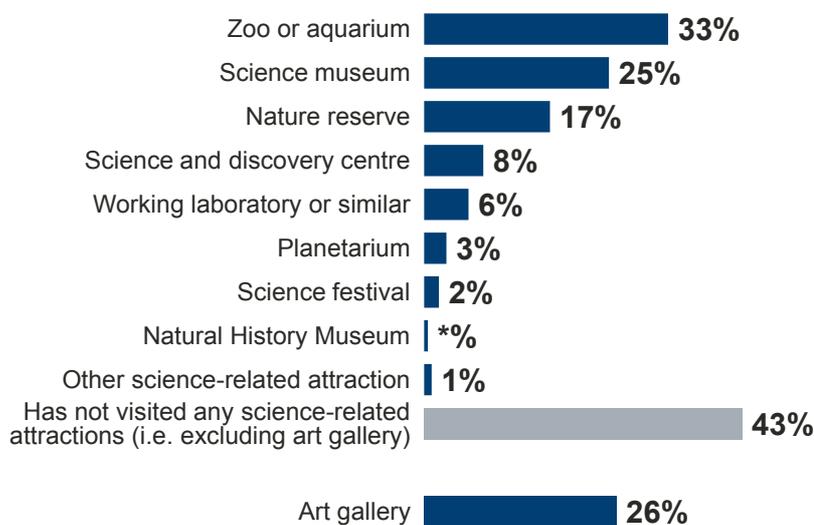
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⁴³ Figure 3.2 shows data from [SciCent](#) (press CTRL and click on question name to access data table).

Young people were also asked whether they had visited a range of different science-related attractions in the last year. As a point of comparison, they were also asked whether they had visited an art gallery in the last year. As shown in Figure 3.3⁴⁴, over half of young people (57 per cent) say they have visited at least one science-related attraction (excluding an art gallery). Young people are most likely to say they have visited a zoo or aquarium (33 per cent) or a science museum (25 per cent). Young men and young women are equally likely to have visited each of these attractions, and the overall proportion visiting each of them is in line with that observed in the 2009 survey.

Figure 3.3: young people's visits to science-related attractions

Q. Which of the places on this card, if any, have you visited in the past 12 months?



*% indicates a percentage less than 0.5%, but greater than 0%

Ipsos MORI
Social Research Institute

Base: 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

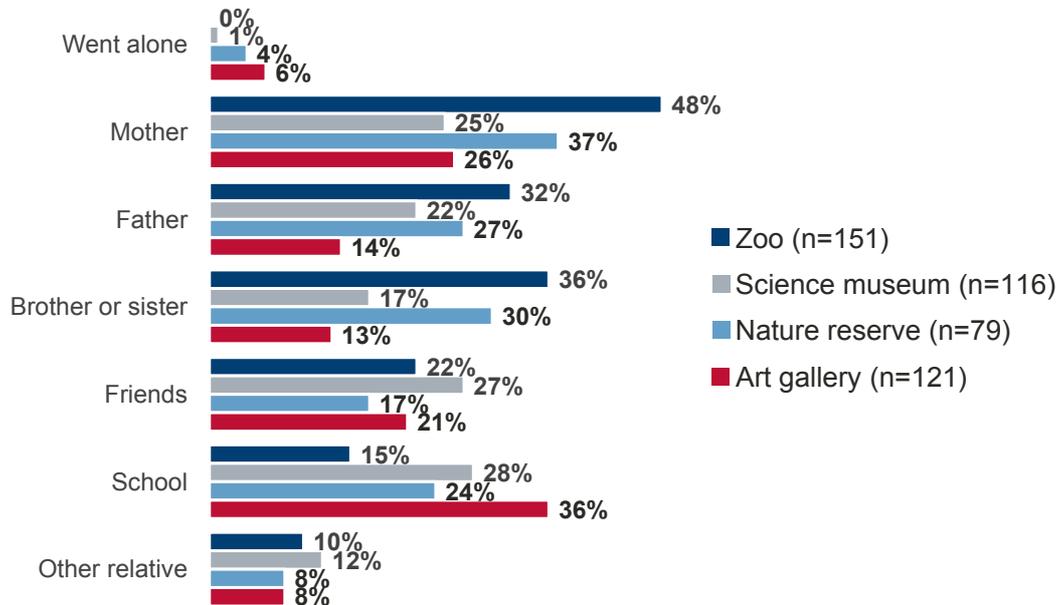
wellcome trust

⁴⁴ Figure 3.3 shows data from [OutSAC](#) (press CTRL and click on question name to access data table).

Young people were also asked with whom they visited the science attractions that they attended. As Figure 3.4⁴⁵ shows, a pattern emerges whereby young people are more likely to visit outdoor attractions with their immediate family, while visits to indoor attractions are more likely to be as part of a school trip.

Figure 3.4: who accompanies young people visiting science-related attractions

Q. And on your last visit to ... who, if anyone, did you go with?



Ipsos MORI
Social Research Institute

Bases: as stated for each attraction
Fieldwork dates: 21 May to 22 October 2012

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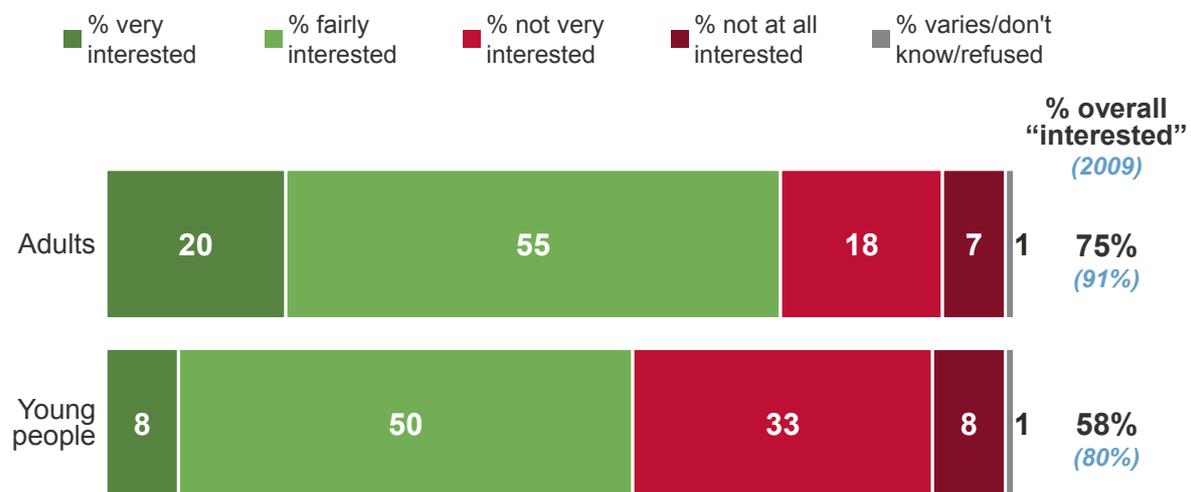
⁴⁵ Figure 3.4 shows data from [GoSciMus](#), [GoArt](#), [GoZoo](#), [GoNat](#) (press CTRL and click on question name to access data table).

3.2. How interested are people in medical research?

As well as gauging people's engagement with science in their everyday lives, the Wellcome Trust Monitor also sought to establish the extent to which they are interested in medical research (Figure 3.5⁴⁶). Before being asked this question respondents were provided with a definition of medical research in order to ensure that their responses were not based on different interpretations of this somewhat ambiguous term.⁴⁷ The majority of adults and young people say they are at least fairly interested in medical research, defined in this way (75 per cent and 58 per cent respectively).

Figure 3.5: interest in medical research

Q. How interested, if at all, would you say you are in medical research?



Ipsos MORI
Social Research Institute

Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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Among the adult population, interest in medical research is higher among those aged 50 or over. Whereas almost seven in ten of those aged 18–34 (67 per cent) express an interest, this rises to around eight in ten among those aged 50–64 (83 per cent) and 65 or over (78 per cent). This trend may reflect the fact that older people are more likely to suffer from ill-health and therefore more likely to be interested in research which might lead to remedies and cures. A link between experience of ill-health and interest in medical research is also implied by the fact that those adults who report that they or a family member have a serious long-term illness or medical condition show greater levels of interest than those without direct experience of a serious long-term illness or medical condition. (Seventy-nine per cent of adults who have a serious long-term illness or medical condition are interested in medical research, compared with 83 per cent of adults who have a family member with a such a condition and 70 per cent of adults with no family experience of such a condition.) As in 2009, this link is only observed among adults.

⁴⁶ Figure 3.5 shows data from [Interest](#) (press CTRL and click on question name to access data table).

⁴⁷ For the purposes of this survey, medical research was defined in the following terms: "Medical research is about how the body works, the causes of illnesses and diseases and developing and testing new treatments."

Among young people, young women are more likely than young men to express an interest in medical research (65 per cent, compared with 52 per cent), continuing the trend observed in 2009.

Perhaps unsurprisingly, adults are more likely to say they are interested in medical research if they have a scientific job (93 per cent), or if they live in a household where someone has a scientific job (84 per cent), than if they live in a household where this is not the case (71 per cent).

Interest in medical research has declined since 2009 (shown in Figure 3.5). The proportion saying that they are interested has fallen by 16 percentage points among adults and 22 percentage points among young people.

It is difficult to assess whether this represents a genuine decrease in interest in medical research, or whether it might, at least in part, be due to changes in sample composition across the two surveys. Outside the scientific sphere, there have been broader social, political and economic changes since 2009, which may have influenced the public's perception of the relative importance of other issues. This may suggest that medical research is simply a lower priority to people in 2012 than it was in 2009.

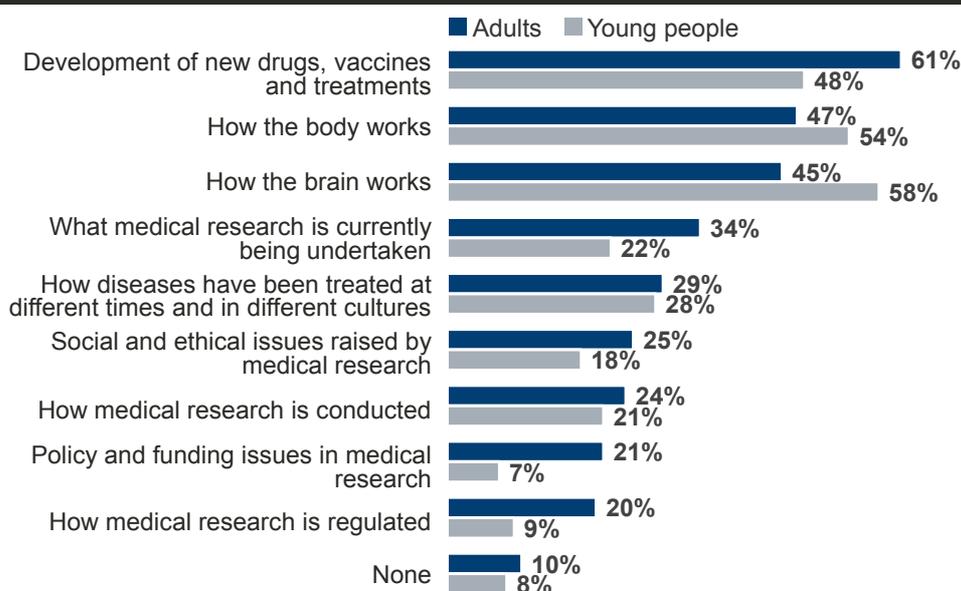
The next section investigates the areas of medical research which provoke greatest interest among the public, and this suggests that there are specific areas where public interest has also fallen. However, methodological factors relating to the structure of the questionnaire may also be a factor. It should be noted that in the 2009 Wellcome Trust Monitor, the interest question was preceded by one asking respondents to select from a list three particular areas of research that they felt should be supported and encouraged. It is possible that in 2009 respondents were primed to think positively about medical research prior to being asked about their level of interest. Nonetheless, it is worth noting that this decline in interest follows the same pattern seen a recent Eurobarometer survey (European Commission, 2012), which found that interest in "scientific discoveries and technological developments" had decreased among UK adults between 2010 and 2012, as it had among EU adults as a whole.

3.3. Which areas of medical research interest people?

While overall interest in medical research has declined since 2009, both adults and young people say that they are interested in a number of different areas of medical research when presented with a range of options of interest to the Wellcome Trust (Figure 3.6⁴⁸). On average, adults mention three areas of medical research that they are interested in, while young people mention 2.6. Even those adults who say they are not interested in medical research go on to mention an average of 1.3 particular areas of medical research that interest them. While there are some differences in levels of interest shown in each area by different groups of the population, three areas emerge as being of particular interest regardless of age or gender: the development of new drugs, vaccines and treatments; how the body works; and how the brain works. There is some difference in the ranking of these three areas, however. Whereas adults are more likely to say they are interested in the development of new drugs, vaccines and treatments (61 per cent, compared with 48 per cent of young people), young people are more interested in how the body works (54 per cent, compared with 47 per cent of adults) and how the brain works (58 per cent, compared with 45 per cent of adults). Interest in how the body and brain work seems to be related to school science. The proportion of young people who say that they are interested in how the brain works broadly reflects findings from Flash Eurobarometer 239 (European Commission, 2008), which found that 53 per cent of young people aged 15–25 in the United Kingdom said that they had heard about innovations in the field of brain research and were interested in it. One in ten adults (10 per cent) and young people (8 per cent) say that they are not interested in any of these areas of medical research.

Figure 3.6: the broad areas of medical research which interest people

Q. This card lists a number of broad areas of medical research. Which, if any, of these are you interested in?



Ipsos MORI Social Research Institute Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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⁴⁸ Figure 3.6 shows data from [K1/2MR](#) (press CTRL and click on question name to access data table).

There are many differences between the levels of interest shown in particular areas of medical research by sub-groups within the adult population. Women are more likely than men to say that they are interested in the development of new drugs (67 per cent, compared with 55 per cent for men).

Personal circumstances also have an impact on people's likelihood of expressing an interest in areas of medical research. Those adults who have a disability or have a friend or family member with a serious long-term illness or medical condition are more likely to say that they are interested in the development of new drugs and treatments (67 per cent and 70 per cent respectively, compared with 55 per cent of adults with no experience of serious illness or disability). They are also more likely to be interested in what medical research is currently being undertaken (39 per cent and 40 per cent respectively, compared with 29 per cent of adults with no experience of serious illness or disability), in how medical research is conducted (30 per cent and 28 per cent respectively, compared with 20 per cent of those with no experience of serious illness or disability), and how medical research is regulated (26 per cent and 25 per cent respectively, compared with 16 per cent of adults with no experience of serious illness or disability).

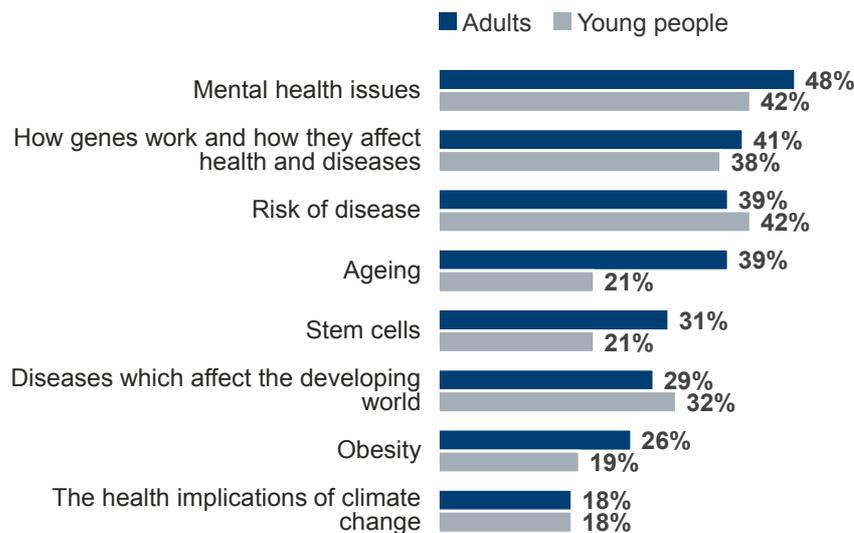
Since 2009 there has been a fall in the proportion of adults and young people saying they are interested in many of the broad areas of medical research, just as the overall proportion of adults and young people who say they are interested in medical research has also fallen⁴⁹.

⁴⁹ 2009 data has not been compared at this question as some answer codes were amended for the second wave of the Monitor.

Adults and young people share an interest in a number of specific areas of medical research (Figure 3.7⁵⁰). The three areas of research most frequently mentioned by both groups as being of interest are mental health (mentioned by 48 per cent of adults and 42 per cent of young people), how genes work and how they affect health and diseases (41 per cent of adults, 38 per cent of young people), and risk of disease (39 per cent of adults, 42 per cent of young people). Among adults, ageing was also frequently mentioned as an area of interest (39 per cent, compared with 21 per cent of young people).

Figure 3.7: the specific areas of medical research which interest people

Q. This card lists a number of specific areas of medical research. Which, if any, of these are you interested in?



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Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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When looking at specific areas of medical research, some differences emerge between sub-groups. Obesity is more interesting to women and young women than to men and young men (30 per cent of women and 27 per cent of young women, compared with 23 per cent of men and 11 per cent of young men). Mental health issues are more likely to be cited as an area of interest by women (53 per cent, compared with 43 per cent of adult men). Adults are also more likely to say that they are interested in research into mental health issues if they have a serious long-term illness or medical condition (55 per cent) or a friend or family member with one (60 per cent) than those with no experience of this (40 per cent).

⁵⁰ Figure 3.7 shows data from [K3/4SP](#) (press CTRL and click on question name to access data table).

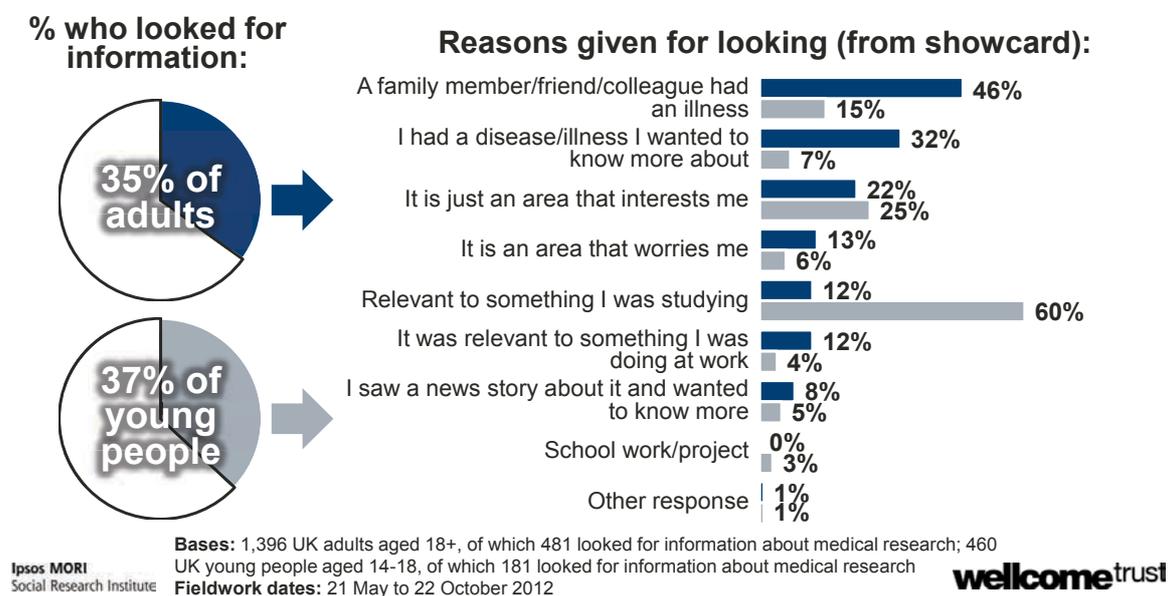
3.4. How do people find out about medical research?

Approximately one-third of adults (35 per cent) and young people (37 per cent) say that they have tried to find out information about medical research in the last year (Figure 3.8⁵¹). The figure for adults is broadly in line with that recorded in 2009 (39 per cent). However, there has been a 14 percentage point drop (from 51 per cent) in the number of young people who say that they have tried to access information about medical research.

Figure 3.8: why people have looked for information about medical research

Q. In the past year, have you tried to find out any information about medical research?

Q. Why were you looking for this information about medical research?



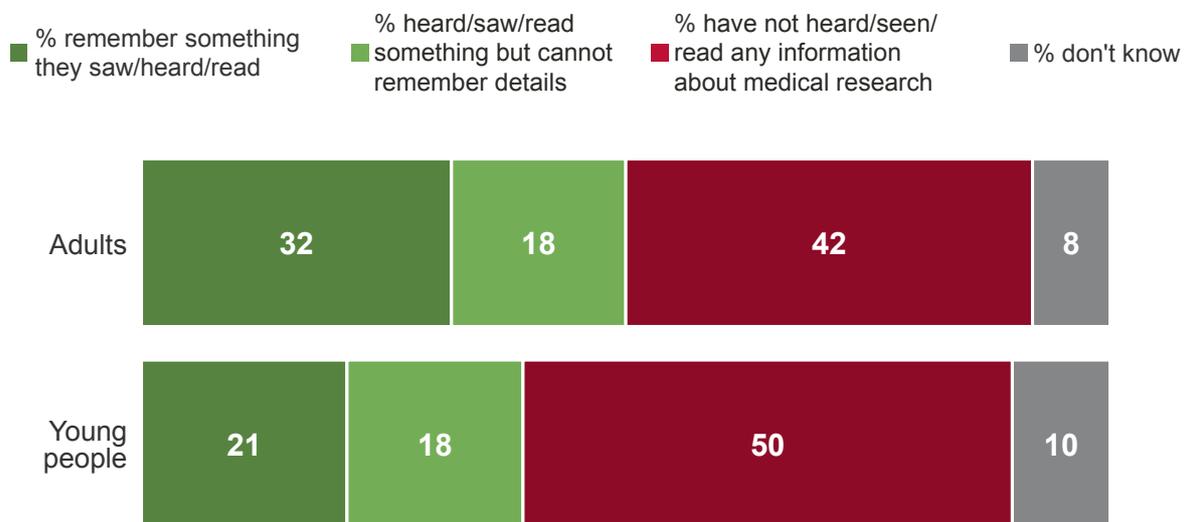
It should be noted that those trying to find out information about medical research includes people who are looking for specific information on health conditions and cures. This is particularly the case for adults, many of whom wanted to find out more about an illness/symptom suffered by a friend or family member (46 per cent of adults who looked for information) or themselves (32 per cent of adults who looked for information). In contrast to adults, young people are more likely to say that they were trying to find information relevant to something they were studying (60 per cent, compared with 12 per cent of adults). The reasons for looking for information are consistent with those provided by adults and young people in 2009, with adults looking for information because of concerns about illnesses, and young people being motivated to search for information related to their studies.

⁵¹ Figure 3.8 shows data from [MRInfo](#), [InfoWhy](#) (press CTRL and click on question name to access data table).

Even if they do not actively look for information about medical research, people may still come across it in their everyday lives, for example in a news article, on the television, or in a blog. As shown in Figure 3.9⁵², one-third of adults (32 per cent) and one in five young people (21 per cent) say they can remember something about medical research that they just came across without trying to find. A further one in five (18 per cent) of both adults and young people say that they remember coming across information, but do not remember any details. This represents a decrease since 2009 in the proportion who can recall information that they have come across (11 percentage points among adults, 13 percentage points among young people). This finding is in line with the fall in the proportion of adults and young people who say that they are interested in medical research.

Figure 3.9: recall of passively received information about medical research

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



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Fieldwork dates: 21 May to 22 October 2012

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⁵² Figure 3.9 shows data from [Pinfo](#) (press CTRL and click on question name to access data table).

3.5. What do people find out about medical research?

People are exposed to information covering a wide range of areas within medical research. This section looks at the type of information about medical research that people encounter either when actively looking for information or simply by coming across it. As shown in the previous section, most adults who look for information about medical research do so because they themselves are ill, or a friend or family member is ill. In light of this, respondents who say they have looked for information about medical research are most likely to say that they were trying to find information about particular illnesses or diseases (Figure 3.10a⁵³ and Figure 3.10b⁵⁴). Both adults (55 per cent) and young people (24 per cent) are most likely to say that they were looking for information on types of illnesses. Next most frequently mentioned is information about aspects of illnesses (16 per cent of adults and 9 per cent of young people). Reflecting the fact that they are more likely to look for information concerning subjects they are studying, young people are more likely than adults to look for information about how the body works (22 per cent, compared with 4 per cent).

Figure 3.10a fields of medical research actively looked for or passively received

Base: Respondents who have tried to find information about medical research (Active); Respondents who remember information they have seen or seen about medical research (Passive)

Wellcome Trust Monitor

	Active		Passive	
	Adults (%)	Young people (%)	Adults (%)	Young people (%)
Types of illnesses	55	24	30	9
Aspects of illnesses	16	0	6	0
Mental health issues	8	5	3	2
Medicine, drugs, tablets	8	0	5	2
How the body works	4	22	1	3
Stem cell research	3	10	8	10
How the brain works	3	5	0	0
Obesity	3	2	3	4
Genetics	2	7	3	3
Cloning	2	2	2	2
<i>Unweighted base:</i>	<i>481</i>	<i>181</i>	<i>443</i>	<i>96</i>
<i>Weighted base:</i>	<i>492</i>	<i>171</i>	<i>446</i>	<i>98</i>

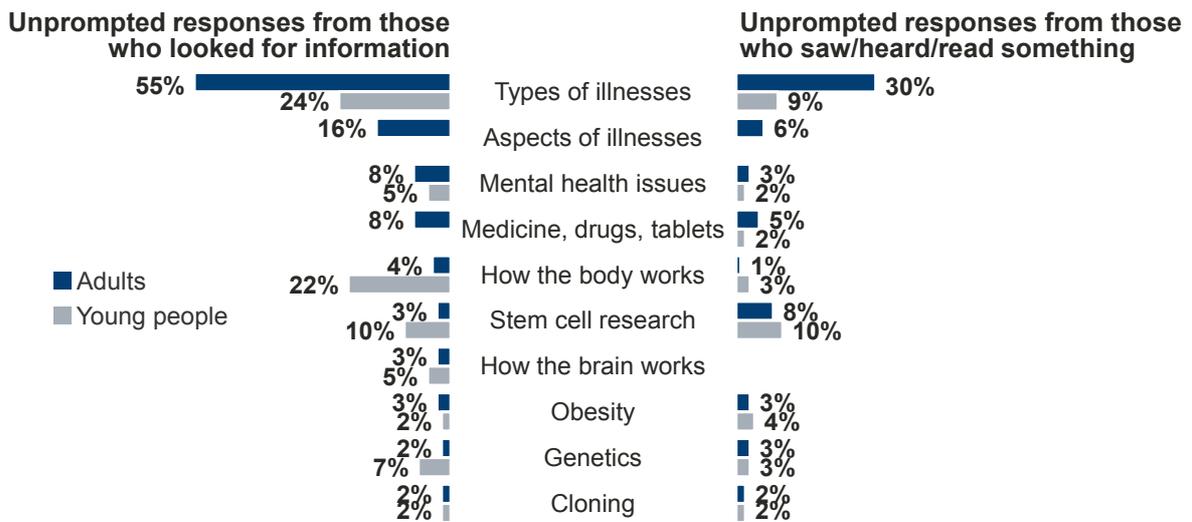
⁵³ Figure 3.10a shows data from [FindWhat](#), [PMRInfo](#) (press CTRL and click on question name to access data table).

⁵⁴ Figure 3.10b shows data from [FindWhat](#), [PMRInfo](#) (press CTRL and click on question name to access data table).

A similar pattern emerges regarding information that is encountered without actively being sought out. People are most likely to come across information about types of illnesses (30 per cent of adults and 9 per cent of young people who recall having seen information about medical research). Around one in ten adults (8 per cent) and young people (10 per cent) who recall seeing information about medical research say that this information was about stem cell research.

Figure 3.10b: fields of research to which people are exposed

Q. What were you trying to find information about? (Active)
Q. Please tell me what you remember seeing, hearing or reading (Passive)



Bases: 481 UK adults who looked for information about medical research, and 443 who remember something they saw/heard/read; 181 UK young people who looked for information about medical research and 96 who remember something they saw/heard/read
Fieldwork dates: 21 May to 22 October 2012

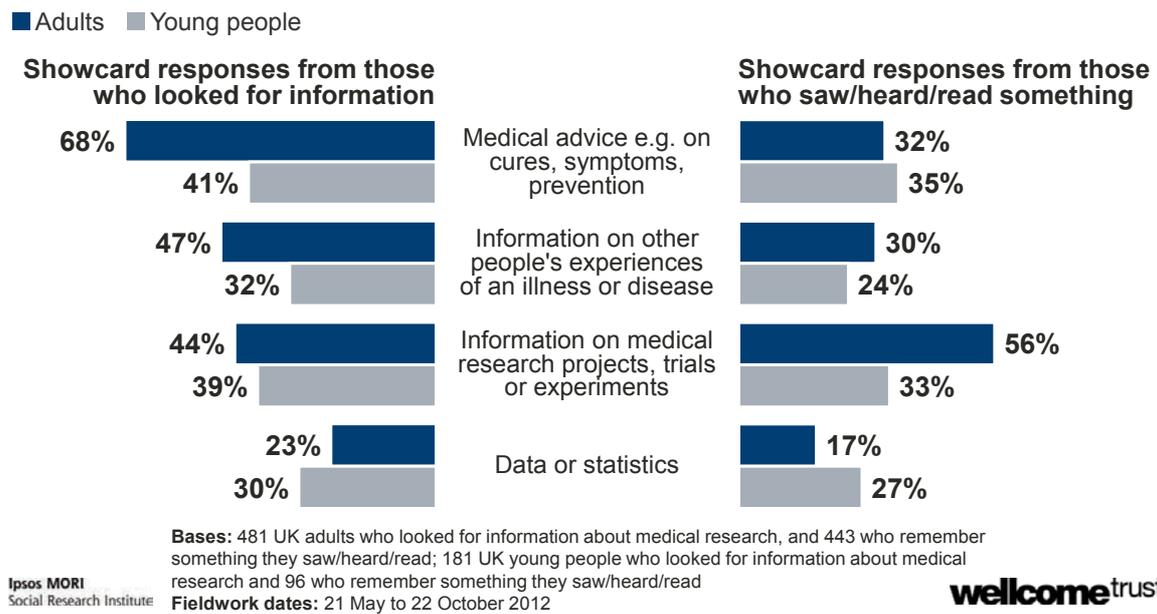
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People were also asked what *type* of information they were looking for or came across (Figure 3.11⁵⁵). Two-thirds of adults (68 per cent) and four in ten young people (41 per cent) say they were looking for medical advice. Just under half of adults (47 per cent) and one-third of young people (32 per cent) were also looking for information on other people's experiences of an illness. A further four in ten adults (44 per cent) and young people (39 per cent) say that they wanted to find information on medical research projects.

Figure 3.11: types of information to which people are exposed

Q. What type of information were you looking for? (Active)
Q. What type of information did you come across? (Passive)



In contrast to those types of information that they actively seek out, the public are most likely to come across information about medical research trials. More than half of adults (56 per cent) and one-third of young people (33 per cent) who recall details of information they came across say it was related to this.

⁵⁵ Figure 3.11 shows data from [InfType](#), [PlnType](#) (press CTRL and click on question name to access data table).

3.6. Where do people find information about medical research?

The majority of adults who have looked for information about medical research in the last year say that they found what they were looking for (90 per cent).

People interact with information about medical research through a variety of channels. When actively searching for information, a range of resources are used (Figure 3.12a⁵⁶ and Figure 3.12b⁵⁷), and there are significant differences in the ways in which different groups try to find the information they are seeking. Adults are more likely than young people to talk to another person (44 per cent, compared with 25 per cent of young people), visit a hospital or doctor's surgery (30 per cent, compared with 4 per cent), look at a newsletter from a medical organisation (17 per cent, compared with 4 per cent) and attend a lecture or talk (17 per cent, compared with 3 per cent). Young people adopt less personal approaches than adults and are more likely to say that they looked in a book to find the information they were looking for (44 per cent, compared with 22 per cent of adults). This is likely, however, to reflect the fact that their purposes in looking for information differ and different resources may therefore be appropriate.

Figure 3.12a active sources of information on medical research

<i>Base: Respondents who looked for information about medical research</i>		<i>Wellcome Trust Monitor</i>	
	Adults	Young people	
	(%)	(%)	
<i>What did you do to find this information?</i>			
Used the internet	87	86	
Talked to another person	44	25	
Visited a hospital or doctor's surgery	30	4	
Looked in a book	22	44	
Attended a discussion with experts	17	3	
Looked at a newsletter from a medical organisation	17	4	
Attended a lecture or talk	14	17	
Visited a library	9	12	
Phoned a helpline or other information service	8	3	
Watched a TV programme	0	1	
<i>Unweighted base:</i>	<i>481</i>	<i>181</i>	
<i>Weighted base:</i>	<i>492</i>	<i>171</i>	

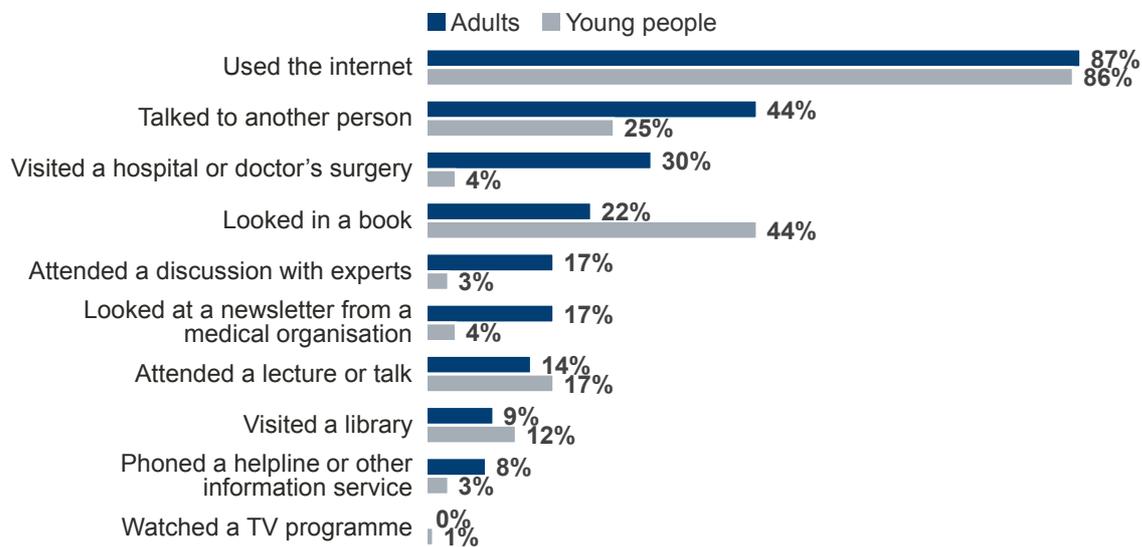
⁵⁶ Figure 3.12a shows data from [MRInfHow](#) (press CTRL and click on question name to access data table).

⁵⁷ Figure 3.12b shows data from [MRInfHow](#) (press CTRL and click on question name to access data table).

Use of the internet to find information about medical research is common among both adults (87 per cent) and young people (86 per cent). Those aged 65 or over, however, are less likely to look for information in this way, with only 60 per cent adopting this approach⁵⁸ (by contrast, 94 per cent of adults aged 18 to 34 say they looked for information in this way). Instead, adults aged 65 and over are more likely to look for information about medical research by visiting a hospital or doctor's surgery (41 per cent, compared with 16 per cent of adults aged 18 to 34), or by looking in a book (35 per cent, compared with 17 per cent of adults aged 50 to 64). Among those who used the internet, most (86 per cent of adults and 84 per cent of young people) say that they used a search engine to help them find the information they needed.

Figure 3.12b: active sources of information on medical research

Q. Which of the things on this card, if any, did you do to try to find this information [on medical research]?



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Bases: 481 UK adults and 181 UK young people who looked for information about medical research

Fieldwork dates: 21 May to 22 October 2012

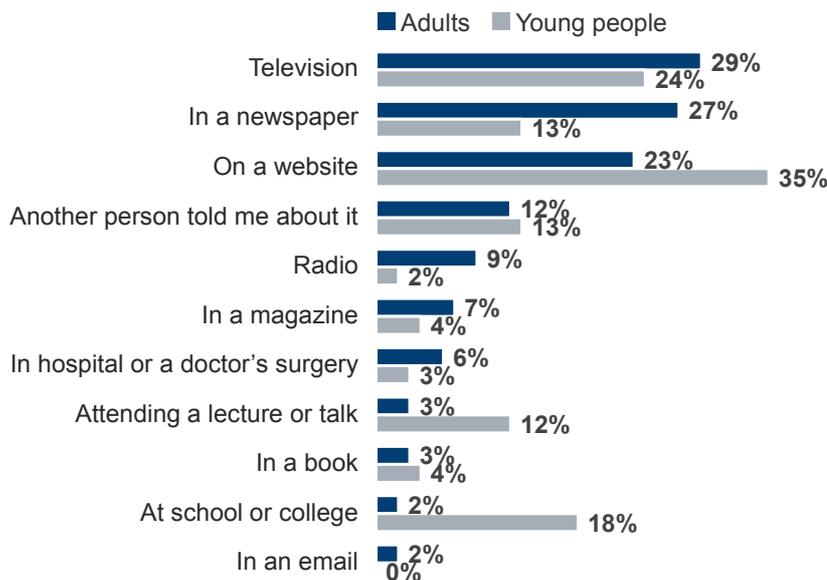
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⁵⁸ The latest figures from Ofcom (2012) suggest that only 44 per cent of the UK population aged 65 or over use the internet.

The most common way of coming across information about medical research unintentionally is by seeing it in the media (Figure 3.13⁵⁹). Television (29 per cent of adults and 24 per cent of young people) and websites (23 per cent of adults and 35 per cent of young people) were commonly mentioned by both adults and young people as places in which they had seen information about medical research. Newspapers were more commonly mentioned as sources of passively gathered information by adults. Young people also mention finding information through school or college (18 per cent, compared with 2 per cent of adults) and through attendance at lectures (12 per cent, compared with 3 per cent of adults).

Figure 3.13: passive sources of information about medical research

Q. Where, from the places on this card, did you come across this information?



Ipsos MORI
Social Research Institute

Bases: 443 UK adults and 96 young people who remember something they saw/heard/read about medical research
Fieldwork dates: 21 May to 22 October 2012

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Of those adults⁶⁰ who have seen medical research information on television, more than four in ten mention documentaries and news programmes.

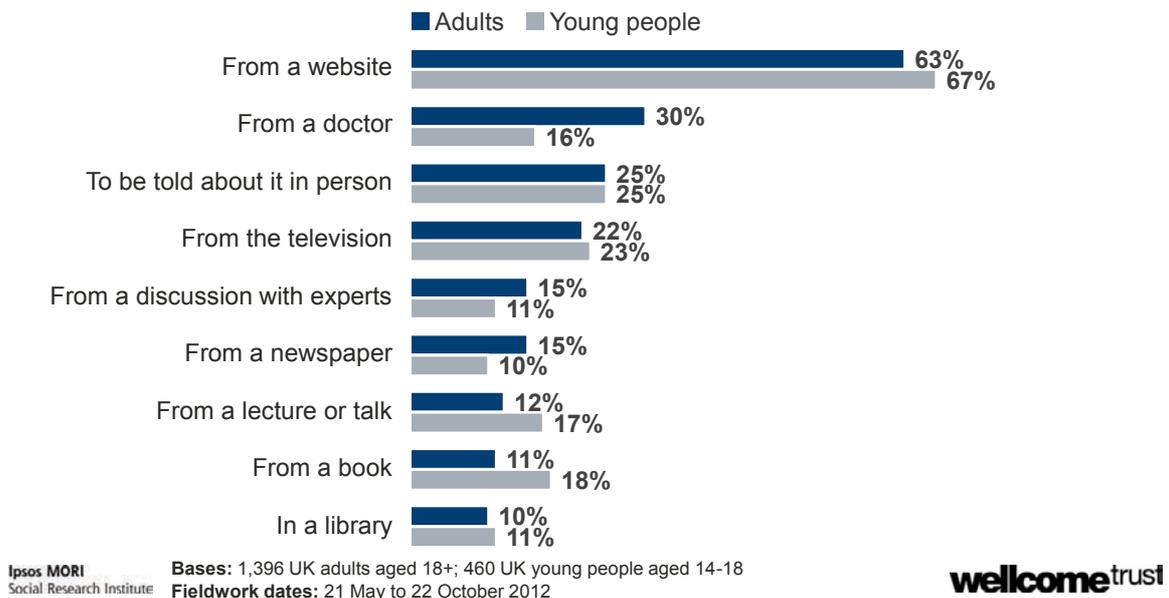
⁵⁹ Figure 3.13 shows data from [PIWhere](#) (press CTRL and click on question name to access data table).

⁶⁰ The base size (26 respondents) is too small to analyse the responses of young people.

After identifying how they *have* sought out and come across information, people were asked how they would *prefer* to access information about medical research (Figure 3.14⁶¹). The most popular source selected from options on the card among both adults and young people is a website, mentioned by two-thirds of adults (63 per cent) and young people (67 per cent). After this, the next most favoured methods of accessing information were to be told about it in person (25 per cent of adults and young people) and to find out from the television (22 per cent of adults and 23 per cent of young people).

Figure 3.14: preferred source of information about medical research

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



Some groups are less likely to name websites as preferred sources of information. Only 29 per cent of those aged 65 or over say they would like to get information in this way, compared with 77 per cent of those aged 35 to 49. It also becomes less popular as educational levels fall. Whereas three-quarters (76 per cent) of adults who have received higher education would choose to gather information from a website, this falls to two-thirds (67 per cent) of those whose highest qualifications are GCSEs grade A-C, and one-third (34 per cent) of people with no formal qualifications. This suggests that while the internet may be the best way of disseminating information to as broad an audience as possible, it clearly risks marginalising certain groups.

⁶¹ Figure 3.14 shows data from [Access1](#) (press CTRL and click on question name to access data table).

4. Hopes and concerns about medical research

This chapter looks in more detail at views about medical research, primarily among adults. It looks first at people's hopes and fears for medical research, including their levels of optimism for the future and their concerns. It then looks at public participation in medical research, and any concerns adults may have about it.

Key findings:

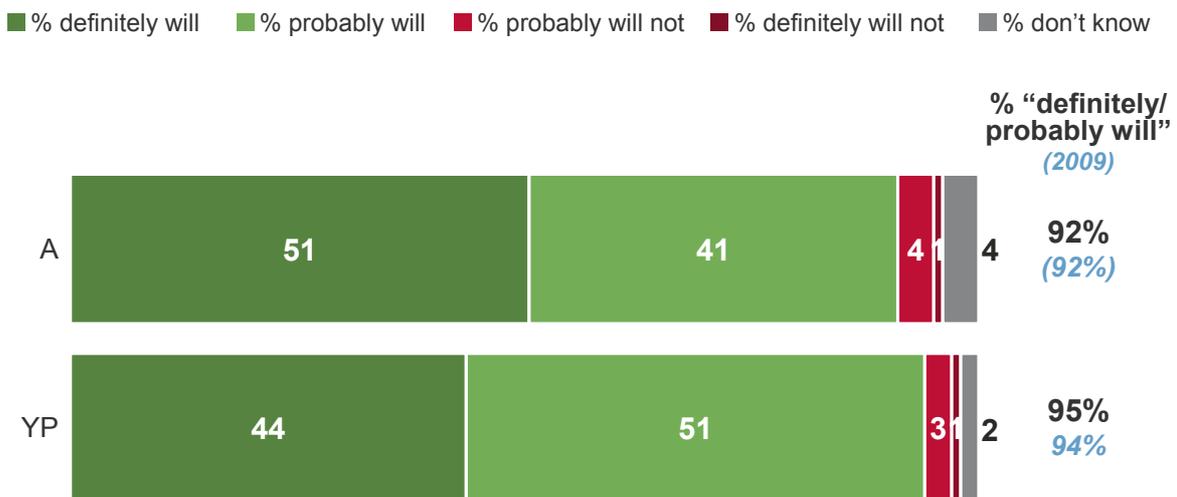
- Over 90 per cent of adults and young people think that medical research will lead to an improvement in the quality of life for people in the UK in the next 20 years.
- Levels of optimism about the potential for genetic research to improve healthcare are similar, with 80 per cent of all adults and 85 per cent of all young people being very or somewhat optimistic.
- Adults are generally very positive about medical research, with the most frequent concerns expressed being that not enough money is being spent (40 per cent) and that research is not progressing fast enough (17 per cent). One in five say they do not have any concerns at all about medical research.
- Using a broad definition, 10 per cent of adults have taken part in medical research, 10 per cent have a family member who has taken part, and a further two per cent have both personally taken part and have a family member who has taken part. Overall, 22 per cent of adults live in a household in which someone has taken part in medical research.
- Forty-five per cent of adults who had taken part in medical research gave a blood/tissue sample, 37 per cent tested a new drug, 34 per cent completed a survey, 22 per cent gave access to their health records and 21 per cent had their health/behaviour monitored.
- Sixty per cent of adults say they would be willing to participate in a medical research project that would require giving access to their medical records. Sixteen per cent of this group had previously participated in a medical research project.
- Thirty-three per cent of adults say they do not have any specific concerns about taking part in medical research that involves allowing access to their personal health information (on an anonymous basis). Twenty-three per cent are concerned about confidentiality even when provided with assurances that their personal health data would be held securely and anonymously. The level of concern about privacy is similar to 2009, when 28 per cent were concerned about access to medical records.

4.1. People's hopes and fears for medical research

Ninety-two per cent of adults and 95 per cent of young people feel that medical research will lead to an improvement in the quality of life for people in the UK in the next 20 years, as shown in Figure 4.1⁶². This is in line with the results from the 2009 survey (92 per cent of adults and 94 per cent of young people).

Figure 4.1: optimism about medical research, as shown by adults (A) and young people (YP)

Q. Please say whether you think medical research will or will not lead to an improvement in the quality of life for people in the UK in the next 20 years?



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Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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Those who have higher levels of education are particularly likely to say that medical research will definitely improve quality of life in the next 20 years (58 per cent of those with higher education, compared with 39 per cent of those who have no qualifications and 37 per cent of those with GCSEs grade D-G or equivalent), as are those who work in a scientific field (62 per cent, compared with 49 per cent of those who do not work in science). Those who know more about science (as measured by the factual knowledge quiz) are also more optimistic – 64 per cent of adults with high scores on the knowledge quiz think it definitely will, compared to 52 per cent of adults with medium scores and 37 per cent of those with low scores.

Adults who have participated in medical research previously are more likely than those who have not to say that research will definitely improve quality of life (70 per cent of those who have taken part, and 59 per cent of those whose family members have taken part say this, compared to 47 per cent of those who have never participated).

Adults are more certain of their optimism than young people (51 per cent believe medical research definitely will improve quality of life, compared with 44 per cent of young people). Optimism increases with age – 48 per cent of those aged 18 to 34 and 47 per cent of those

⁶² Figure 4.1 shows data from [MRIImprov](#) (press CTRL and click on question name to access data table).

aged 35 to 49 believe medical research will definitely lead to an improvement in quality of life, while 55 per cent of those aged 50 or over believe this.

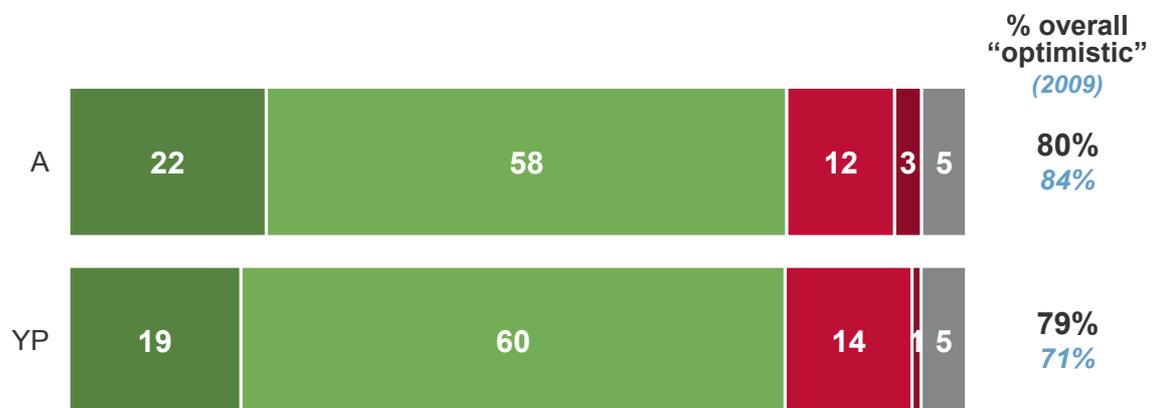
People are optimistic about the impact genetic research may have on healthcare. Eighty per cent of adults and 79 per cent of young people say that they are optimistic that healthcare will be improved by genetic research, as Figure 4.2⁶³ shows. One in five adults and young people (22 per cent and 19 per cent respectively) feel very optimistic that this will happen. This is in line with the 2009 survey, although a larger proportion of young people are optimistic now – 79 per cent compared with 71 per cent in 2009.

In this area, the Monitor's findings support much previous research showing that the UK public is typically open to developments in genetic research. For example, Finegold et al. (2008) report results from a 2006 survey showing UK public support for using genetics to develop personalised medicines. Stewart-Knox et al. (2009) found in a 2005 survey that people from Great Britain were more willing than those from other major European nations to undergo genetic testing for the purpose of personalised nutrition. Earlier research for the Wellcome Trust, conducted from 1999 to 2000 (NatCen, 2005) has also shown broad public acceptance for the medical uses of gene therapy.

Figure 4.2: optimism about genetic research, as shown by adults (A) and young people (YP)

Q. How optimistic are you about the possibility of improved healthcare as a result of genetic research?

■ % very optimistic ■ % fairly optimistic ■ % not too optimistic ■ % not at all optimistic ■ % don't know



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Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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Again, levels of education and exposure to science are related to people's views on this issue. Those who have higher levels of education are more likely to be very optimistic about potential healthcare benefits arising from genetic research (26 per cent of those with higher education and 31 per cent of those with A levels, compared with 13 per cent with no formal qualifications). Similarly, those with scientific qualifications are more optimistic than those without (31 per cent who have studied science at university level are very optimistic, compared with 22 per cent who have school qualifications in science and 18 per cent of those

⁶³ Figure 4.2 shows data from [Gadvance](#) (press CTRL and click on question name to access data table).

with no qualifications in science). Those who work in scientific fields are also more likely to be optimistic than those who do not (35 per cent compared with 20 per cent respectively are very optimistic). Twenty-nine per cent of those who have taken part in medical research are very optimistic about the possibility of genetic research improving healthcare, compared with 21 per cent of those who have a family member who has taken part and 21 per cent of those who have neither taken part personally nor have a family member who has done so.

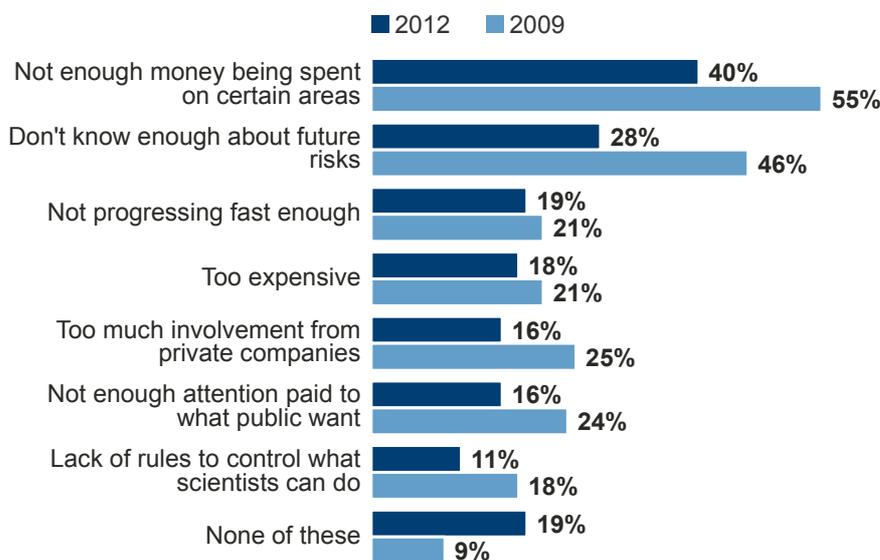
Self-reported understanding and awareness of genetic research affects how confident people are that improvements in quality of life will be realised. Ninety per cent of those who feel they know a lot about genetic research are optimistic about seeing improved healthcare, compared with 65 per cent of those who feel they know very little.

Adults express a range of concerns associated with medical research. However, their concerns are not necessarily negative; the main concern, raised by 40 per cent, is that not enough money is being spent on particular areas of research (Figure 4.3⁶⁴). It is noticeable that the proportion of adults raising this as a concern has fallen by 15 percentage points since 2009. This may be because overall interest in medical research has fallen, given that a lack of money being spent in certain areas is more likely to be seen as a concern by those who are interested in medical research (45 per cent of adults who are interested in medical research, compared with 26 per cent of adults who are not interested). However, the political and economic changes since 2009, with an increased focus on government spending cuts, may also be a factor. Two in ten (19 per cent) think medical research is not progressing fast enough. However, a further two in ten adults (19 per cent) say they are not concerned about any of the issues they were presented with. The proportion not concerned about any issues in medical research is 10 percentage points higher than in 2009.

More negative concerns about medical research cited by adults include not knowing enough about the future risks (28 per cent), that medical research is too expensive (18 per cent), that not enough attention is paid to what the public want (16 per cent), that there is too much involvement from private companies in medical research (16 per cent) and that there are insufficient rules controlling what scientists can and cannot do (11 per cent).

Figure 4.3: adults' concerns about medical research

Q. Thinking about medical research, are you concerned about any of the things listed on this card?



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Social Research Institute

Base (for Wave 2): 1,396 UK adults aged 18+
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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Differences in opinion are evident between sub-groups. Adults with no scientific qualifications are more likely to be concerned that not enough attention is being paid to what the public want from medical research (20 per cent, compared with 10 per cent of those with university-level qualifications in science). By contrast, those adults who have or have had jobs in the sciences are more likely than those who have not to be concerned that medical research is too closely regulated (9 per cent compared with 3 per cent) and that not enough

⁶⁴ Figure 4.3 shows data from [MRC Conc](#) (press CTRL and click on question name to access data table).

money is being spent on certain areas (52 per cent compared with 38 per cent). This is perhaps a natural reflection of people valuing their own endeavours as important.

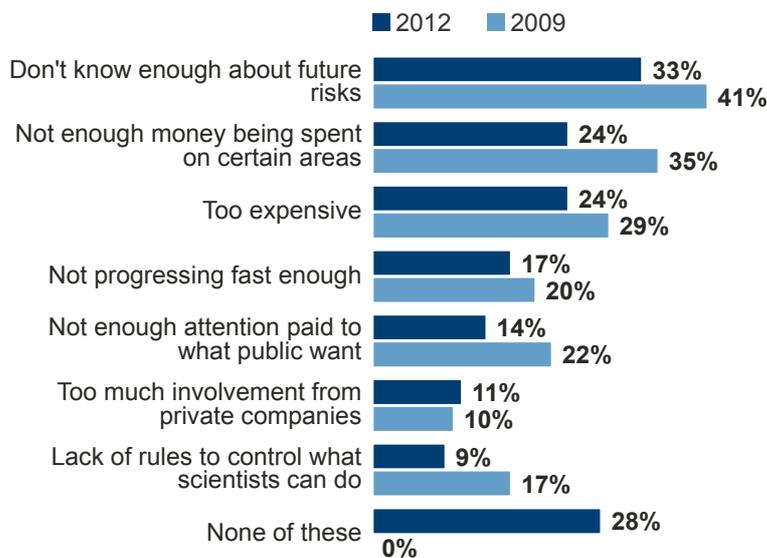
Those who say they are interested in medical research are consistently more likely to mention concerns about it (whether these represent positive or negative perceptions of medical research). This suggests that concern is a function of knowledge about or engagement with medical research. Furthermore, those who have taken part in medical research themselves have a slightly different perspective on the issues relating to it. They are more likely to mention not enough money being spent on medical research (63 per cent, compared with 41 per cent of those with a family member who has taken part and 36 per cent of those where no one in the household has taken part). They are also more likely to mention too much involvement from private companies (27 per cent, compared with 17 per cent of those with a family member who has taken part and 14 per cent of those where no one in the household has taken part), and to raise ethical issues (3 per cent, compared with 0 per cent of those with a family member who has taken part and less than 1 per cent of those where no one in the household has taken part).

There are also differences in the concerns raised by adults which are related to levels of scientific knowledge. Adults who record high scores on the knowledge quiz are more likely to say that they feel that medical research is too closely regulated (9 per cent, compared with 4 per cent of adults who record medium scores and 1 per cent of those who record low scores). Concern over levels of investment also increases among more scientifically informed adults. Adults with high scores in the knowledge quiz are more likely to say that insufficient money is being spent on certain areas (45 per cent of those where no one in the household has taken part of adults with high scores and 43 per cent of adults with medium scores cite this as a concern, compared with 30 per cent of those with low scores). By contrast, there are no areas where adults who record low scores on the knowledge quiz have greater concern.

As shown in Figure 4.4⁶⁵, young people generally have similar views to adults on this question, though they are even more likely than adults to say they do not have any concerns (28 per cent of young people as compared to 19 per cent of adults). This may be a function of younger adults being more trusting of scientists (see Chapter 5). However, young people are slightly more likely than adults to be concerned about future risks (33 per cent compared with 24 per cent) and scientific research being expensive (24 per cent compared with 18 per cent). In 2009, 9 per cent of adults and less than 1 per cent of young people said they did not have any concerns.

Figure 4.4: young people's concerns about medical research

Q. Thinking about medical research, are you concerned about any of the things listed on this card?



Ipsos MORI
Social Research Institute

Base (for Wave 2): 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

wellcome trust

⁶⁵ Figure 4.4 shows data from [MRC Conc](#) (press CTRL and click on question name to access data table).

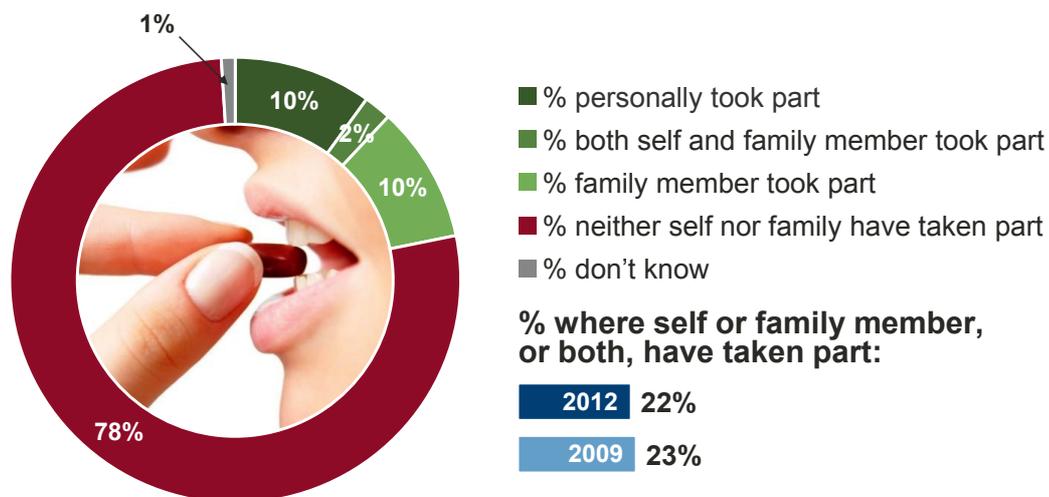
4.2. Public participation in medical research

As shown in Figure 4.5⁶⁶, one in ten adults (10 per cent) report having taken part in a medical research project, while one in ten have not taken part themselves but have a family member who has participated (10 per cent). A further 2 per cent of adults have taken part themselves and have a family member who has participated. These figures are broadly in line with the 2009 survey where 13 per cent of people said that they had previously taken part in a medical research project, and 10 per cent had a family member who had taken part. As a comparison, this is broadly in line with the findings of a University of Michigan study looking at participation rates among the US public (Davis et al., 2013). That study found that 11 per cent of US adults and 5 per cent of US children had participated in medical research.

The under-50s are less likely than those aged 50 or over to have taken part in medical research; only 4 per cent of the under-35s have participated, compared to 9 per cent of those aged 35-49, 14 per cent of those aged 50-64 and 16 per cent of those aged 65 or over. These age differences were also observed in the 2009 survey.

Figure 4.5: adults' participation in medical research

Q. Have you, or a member of your family ever taken part in a medical research project?



Ipsos MORI
Social Research Institute

Base (for Wave 2): 1,396 UK adults aged 18+
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

wellcome trust

Knowledge of science also appears to be linked to participation in medical research projects. Those adults with high scores on the science knowledge quiz are more likely to have taken part (12 per cent, compared with 11 per cent of medium-scoring and 5 per cent of low-scoring adults). One in five (21 per cent) of those with a scientific job have taken part in research compared to 8 per cent of those who have never had a scientific job.

Further differences emerge between sub-groups. Adults with a serious long-term illness or medical condition are more likely than those without to have taken part (19 per cent,

⁶⁶ Figure 4.5 shows data from [PartProj](#) (press CTRL and click on question name to access data table).

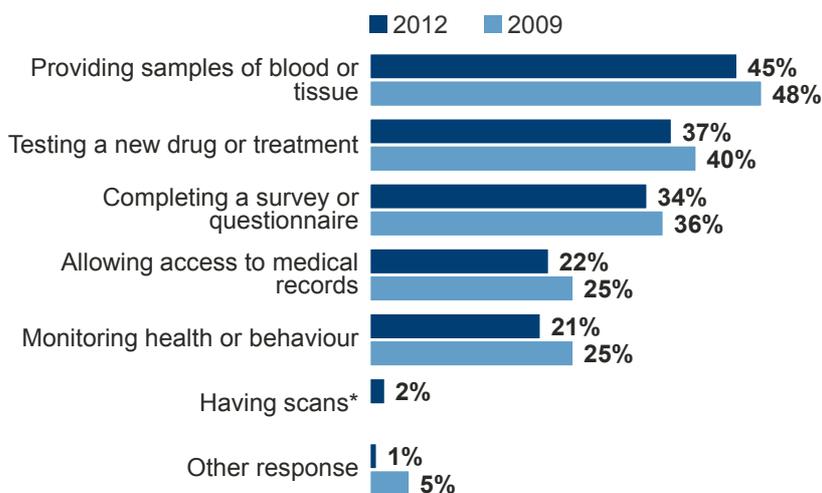
compared with 11 per cent of those with a family member with a serious illness, and 7 per cent of those where no one in the household has a serious long-term illness). This is likely to reflect the fact that illnesses are often part of the eligibility criteria for participating in medical research. This relationship was also observed in the 2009 survey.

Types of medical research participated in

People have participated in a variety of different types of medical research projects (Figure 4.6⁶⁷). Of the 22 per cent who have personally participated in a medical research project, or who have a relative who participated, or both, approximately half (45 per cent) say that they gave a blood or tissue sample. Thirty-seven per cent were involved in a study to test a new medication or treatment, one in three (34 per cent) completed a survey, and one in five (22 per cent) gave researchers access to their medical information/records. A further one in five (21 per cent) have taken part in a study which involved researchers monitoring their behaviour. While the percentage of people who say they have taken part in each of these different types of medical research is slightly lower in 2012 than in 2009, none of these changes are statistically significant.

Figure 4.6: what medical research activities adults have participated in

Q. Thinking about the last time you or a family member participated in a research project, which of the following activities did this medical research project involve?



Base: 306 UK adults who have participated in medical research or have a family member who has, or both

Fieldwork dates: 21 May to 22 October 2012

Ipsos MORI
Social Research Institute

* "Having scans" was not included in the list of responses in 2009

wellcome trust

Unlike in the 2009 survey, there are no differences according to age or serious long-term illness/medical condition in terms of the types of medical research participated in. However, there is a gender difference – men (27 per cent) are more likely than women (16 per cent) to have participated in research monitoring their health or behaviour.

⁶⁷ Figure 4.6 shows data from [TypeProj](#) (press CTRL and click on question name to access data table).

4.3. Willingness to participate in medical research projects that involve access to anonymised personal data

The introduction of electronic patient records has focused attention on the principle of anonymised patient data being used for research purposes. In the first wave of the Wellcome Trust Monitor, people were asked about their willingness to participate in a number of different types of medical research projects, with one example being projects that involve granting access to personal data. To further explore public attitudes to this type of research project, the second wave of the Monitor also asked people what concerns they might have about participating in this type of project.

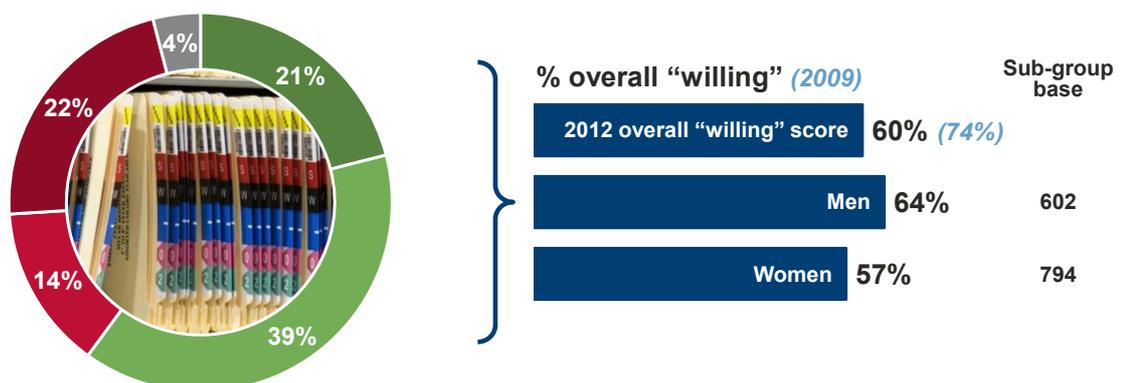
When asked whether they were willing to take part in medical research which involved giving researchers access to their medical records (on an anonymous basis), the public are divided in their opinions (Figure 4.7⁶⁸). Sixty per cent of adults are willing to do so, while 36 per cent are unwilling. One in five (21 per cent) are very willing, and a further one in five (22 per cent) are very unwilling.

The proportion of adults who would be willing to participate in a medical research project if it involved allowing access to their personal health information has declined by 14 percentage points since the 2009 survey, from 74 per cent to 60 per cent.

Figure 4.7: adults' willingness to give access to medical records

Q. How willing or unwilling would you be to take part in a medical research project which involved allowing access to your personal health information, that is, your medical records, on an anonymous basis?

■ % very willing ■ % fairly willing ■ % fairly unwilling ■ % very unwilling ■ % don't know



Ipsos MORI
Social Research Institute

Base (for Wave 2): 1,396 UK adults aged 18+, unless otherwise stated
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

wellcome trust

While the results indicate that willingness to participate has declined since 2009, this should be interpreted with caution. This is because the difference may reflect a methodological change made in the second Wellcome Trust Monitor. In 2009 this question was asked as part of a longer battery of questions about willingness to participate in various types of medical

⁶⁸ Figure 4.7 shows data from [WillAcc](#) (press CTRL and click on question name to access data table).

research (including giving tissue, and taking part in a trial of a new drug). By contrast, in 2012 this question was asked as an individual question in its own right. It is possible that the different way in which this question was framed in the 2012 survey changed the way in which respondents understood what they were being asked. This speculation is supported by some of the concerns that people raise about participating in medical research projects that involve allowing access to personal data, some of which bear no particular relation to data access but apply to medical research projects in general.

However, it is certainly possible that there has been a shift in attitudes: the issue of data security has received widespread coverage in the media in the last few years (e.g. relating to the loss of government databases), and this may have influenced people's willingness to allow access to personal data.

Cognitive testing of the questionnaire showed that people express significant concerns about allowing access to their data, even when provided with assurances that it would be held securely and anonymously. Furthermore, confidentiality emerges as the greatest concern that people would have in participating in a medical research project which involves access to medical records. With the introduction of electronic patient records, other recent studies, such as Paterson and Grant (2010), have looked at the issue of access to medical records for research purposes. While most of these studies have found that people would be willing to provide access to their medical records for research purposes, this willingness is frequently accompanied by caveats as to who has access to the data, and under what conditions. A 2011 survey found that 80 per cent of people over the age of 15 would like their doctor to tell them about research projects that they could participate in, which would involve allowing a researcher confidential access to their medical records but no other involvement⁶⁹.

Some groups are more likely than others to say they would allow access to their medical records as part of a medical research project. Men are slightly more likely than women to be willing to take part (64 per cent, compared with 57 per cent). Adults whose parents were employed (at some point) in the sciences are more likely to be willing (76 per cent) than those with no parent who had been employed in science (58 per cent); those who are themselves employed in the sciences are more likely to be willing (70 per cent) than those who are not (59 per cent); and those who have a university qualification in the sciences are more likely to be willing (71 per cent) than those with school-level science qualifications (63 per cent) and those with no science qualifications (53 per cent). Adults who score highly on the knowledge quiz are more likely to be willing (75 per cent) than those with medium scores (61 per cent) and of those with low scores (45 per cent), and those who expressed interest in science lessons when at school are more likely to be willing (65 per cent) than those with no interest in school science lessons (52 per cent).

Once their willingness to engage in medical research projects that involve providing access to the personal data had been identified, respondents were then asked what concerns they might have about projects of this type.

One-third (33 per cent) say they do not have any specific concerns (Figure 4.8). Those who have previously taken part in medical research are more likely to feel this way than those who have not (45 per cent compared with 35 per cent with a family member who has participated, and 32 per cent where no one in the household has participated).

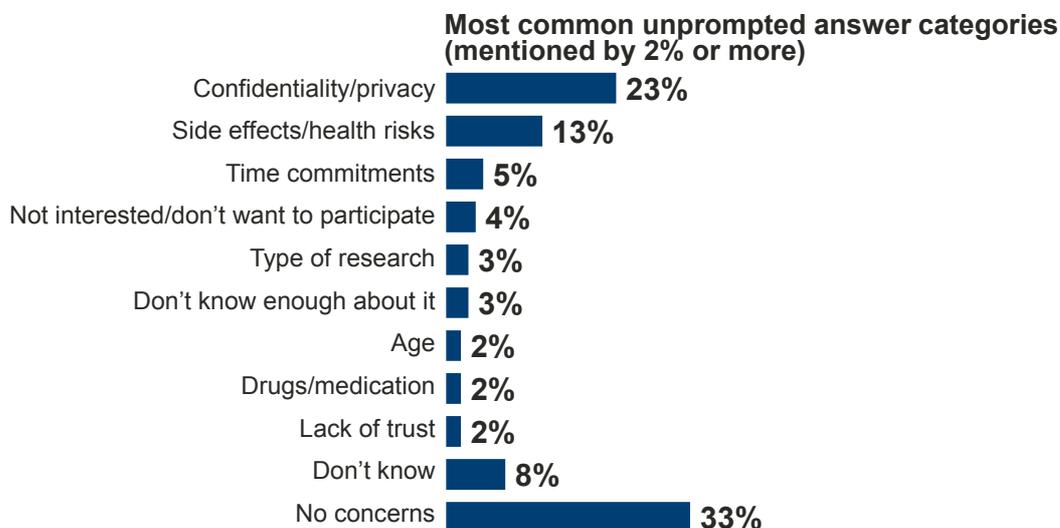
⁶⁹ Association of Medical Research Charities (2011).

Greater levels of education in science do not make people more comfortable about allowing access to their medical research records. Those who do not have science qualifications are more likely than those who do to say they have no concerns about participating in a medical research project that involved allowing access to personal health information (37 per cent of those with no qualifications, compared with 30 per cent of those with a university qualification in science and 31 per cent of those with a school qualification in science). As highlighted above, methodological changes to the Monitor from the first wave may have affected how people thought about this question.

People mention a variety of concerns about participating in a medical research project that involves allowing access to medical records (Figure 4.8⁷⁰). One quarter (23 per cent) are concerned about privacy/confidentiality, and one in eight (13 per cent) are concerned about potential health risks. All other issues are mentioned by fewer than 5 per cent of respondents, with some of these responses focusing on issues that might not be directly relevant to data access. This pattern of responses suggests that some people find this question difficult to answer, and focus on a preconceived idea of what participating in a medical research project would involve, rather than thinking about the implications of allowing access to their medical health records.

Figure 4.8: adults' concerns about participating in medical research

Q. What concerns, if any, would you have about taking part in a medical research project which involved allowing access to your personal health information, on an anonymous basis?



Ipsos MORI Social Research Institute
Base: 1,396 UK adults aged 18+
Fieldwork dates : 21 May to 22 October 2012

wellcome trust

Younger adults are more likely than older people to be concerned about the health risks of taking part in medical research (18 per cent of those aged 18-34 are concerned compared to 9 per cent of those aged 50 or over). Those with higher levels of education are more likely to be concerned about issues of confidentiality (28 per cent of those who are university educated and 27 per cent of those with A-levels, compared with 16 per cent of those with no qualifications).

⁷⁰ Figure 4.8 shows data from [AccessCo](#) (press CTRL and click on question name to access data table).

5. Trust and governance

This chapter examines adults' perceptions of, and trust in, the professions and institutions involved in the production and dissemination of scientific and medical research, including the government, journalists, medical research charities, and scientists working in a variety of sectors. It also covers how far adults think the general public should be involved in the governance of science and medical research.

Key findings:

- Doctors, nurses and other medical practitioners are the most trusted source of information about medical research. Sixty-seven per cent of adults place either complete trust or a great deal of trust in these groups to provide accurate and reliable information about medical research.
- Journalists are least trusted, with six in ten adults saying they have either very little trust or no trust at all in them. The government is second least trusted, with half of adults questioned trusting it little or not at all.
- Trust in scientists varies according to the sector in which they work. Sixty-six per cent of adults have complete or a great deal of trust in scientists working in universities; this decreases to 34 per cent for scientists working for the government. Scientists working for private industry have similar trust ratings to scientists working in government – 32 per cent trust them either completely or a great deal, whilst 17 per cent have very little trust or no trust at all.
- Three-quarters of adults believe that members of the public should have at least some role in making decisions about the direction of medical research. However, a quarter believe that the public should never be involved.
- Half of adults believe that medical research charities (50 per cent) and scientists working in universities (52 per cent) should always be involved in decision-making on medical research. This drops to 26 per cent for scientists working for private companies – although only 9 per cent believe that these scientists should have no involvement at all. Only 19 per cent of adults believe that the government should always be involved in decision-making about the direction of medical research.

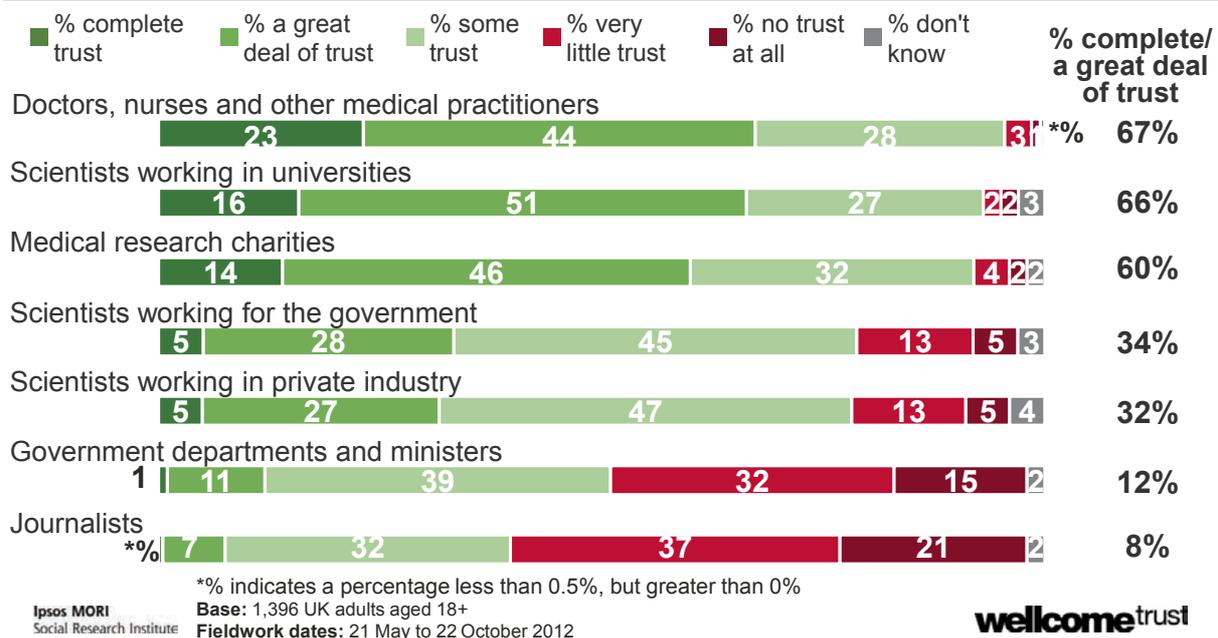
5.1. Who do people trust to give them accurate information about medical research?

A 2012 BBC Radio 4 *Analysis* programme highlighted that public trust in science and medical research is often predicated on who presents the research, as opposed to the content and quality of the research itself.⁷¹ This makes it especially important to understand people's trust in the range of different organisations and actors that present medical research to the public. This Wellcome Trust Monitor repeats questions from the first Monitor asking how much trust adults have in various professionals to “provide accurate and reliable information about medical research”.

Looking at Figure 5.1a⁷² and Figure 5.1b⁷³, doctors, nurses and other medical practitioners, and scientists working for universities emerge as the most trusted from the list of professions asked about, with two-thirds (67 per cent and 66 per cent respectively) of adults saying they have complete or a great deal of trust in these groups. Medical research charities are also highly trusted to provide accurate information, with six in ten (60 per cent) saying they trust them completely or a great deal.

Figure 5.1a: adults' levels of trust in different groups providing information about medical research

Q. Please tell me how much trust you have in each of the following to provide accurate and reliable information about medical research



⁷¹ A transcript for the “Political Prejudice” episode of BBC Radio 4 *Analysis* is available on the BBC website at: [news.bbc.co.uk/1/shared/spl/hi/programmes/analysis/transcripts/17.09.12.pdf](https://www.bbc.com/news/health-170912).

⁷² Figure 5.1a shows data from [TrDoc](#), [TrGovt](#), [TrMed](#), [TrJourn](#), [TrSciUn](#), [TrGovSc](#), [TrPrIn](#) (press CTRL and click on question name to access data table).

⁷³ Figure 5.1b shows data from [TrDoc](#), [TrGovt](#), [TrMed](#), [TrJourn](#), [TrSciUn](#), [TrGovSc](#), [TrPrIn](#) (press CTRL and click on question name to access data table).

The public's trust in scientists depends on who employs the scientist. Whereas 66 per cent of adults trust scientists working in universities completely or a great deal, just one-third trust scientists working for the government (34 per cent) and scientists working for private companies (32 per cent) to this extent. This reflects findings from many previous studies of trust in scientists, regardless of the phrasing of the question. Most recently, the Public Attitudes to Science (BIS, 2011) study found that scientists and researchers working for universities were more trusted than those working for government or industry to "follow any rules and regulations which apply to their profession". This highlights the strong link between trust and institutions, and the perceived conflicts of interest within the private and government sectors.

Government departments and ministers, as well as journalists, are trusted least, with around one in ten adults (12 per cent and 8 per cent respectively) saying they have complete or a great deal of trust in these groups. Distrust of these two groups is also high, with 59 per cent saying they have either very little or no trust in journalists and 47 per cent saying this about government departments and ministers. It is worth noting that low levels of trust in journalists are evident despite newspapers being among the most common places adults find information on medical research (as noted in Chapter 3).

Figure 5.1b adults' levels of trust in different groups providing information about medical research

Base: All adults (1,396) *Wellcome Trust Monitor*

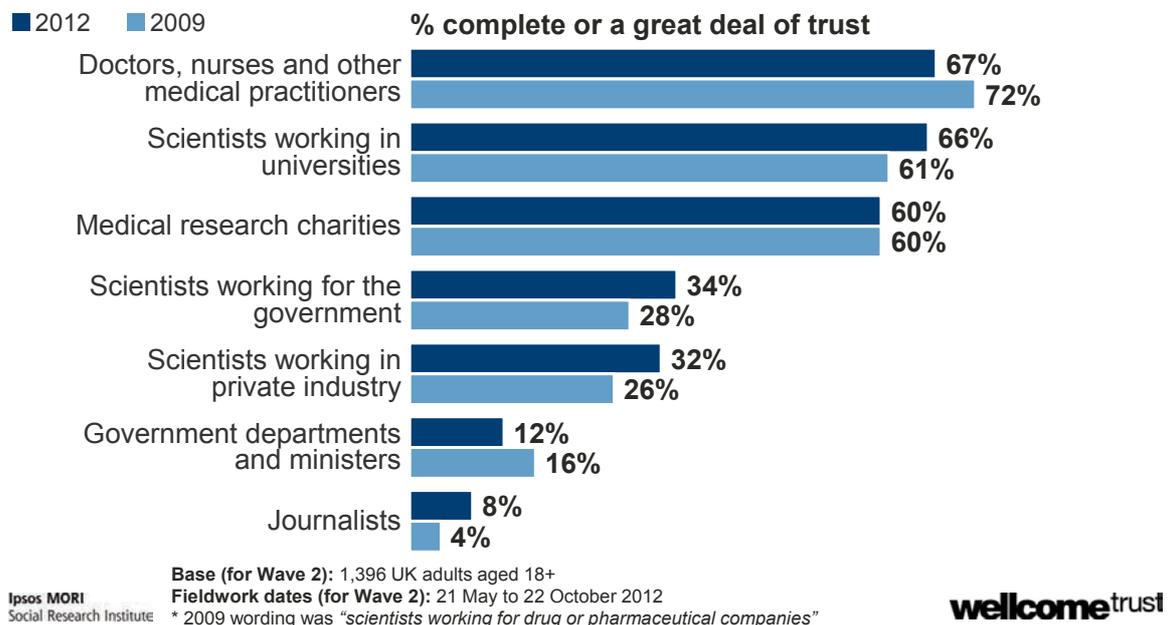
		Com- plete trust	A great deal of trust	Some trust	Very little trust	No trust at all	Don't know
Doctors, nurses and other medical practitioners	(%)	23	44	28	3	1	*
Scientists working in universities	(%)	16	51	27	2	2	3
Medical research charities	(%)	14	46	32	4	2	2
Scientists working for the government	(%)	5	28	45	13	5	3
Scientists working in private industry	(%)	5	27	47	13	5	4
Government departments and ministers	(%)	1	11	39	32	15	2
Journalists	(%)	*	7	32	37	21	2

Has trust changed over time?

Levels of trust in each of these groups has remained more or less stable in the three years since the first Wellcome Trust Monitor, as Figure 5.2⁷⁴ shows. Indeed, trust in all these groups tends to follow well-established patterns of trust in professions more generally. Ipsos MORI's regular Trust in Professions survey has found doctors to be at the top of the scale since it was first conducted in 1983. Scientists are also regularly among the most trusted, with politicians, civil servants and journalists usually occupying the lowest positions.⁷⁵

Figure 5.2: how adults' levels of trust in different groups has changed over time

Q. Please tell me how much trust you have in each of the following to provide accurate and reliable information about medical research.



However, there have been small but significant changes in trust since 2009. Doctors, nurses and other medical practitioners, and government departments and ministers, are somewhat less trusted (completely or a great deal) than in 2009, by five percentage points and four percentage points respectively. Trust in journalists has increased, but from a very low base. Trust in scientists across each of the institutions asked about has increased. This is consistent with Ipsos MORI's Trust in Professions survey, which found on balance that people were more trusting of scientists in 2013 (when the last survey was undertaken) than in 2009.

Changes in trust should be seen in the context of major news stories that have unfolded since the 2009 Wellcome Trust Monitor. These include the MPs' expenses scandal, which may have had an impact on trust in government departments and ministers.

⁷⁴ Figure 5.2 shows data from [TrDoc](#), [TrGovt](#), [TrMed](#), [TrJourn](#), [TrSciUn](#), [TrGovSc](#), [TrPrIn](#) (press CTRL and click on question name to access data table).

⁷⁵ Findings from every Trust in Professions survey are available on the Ipsos MORI website, with the latest survey (conducted in 2013) available at: <http://bit.ly/XJj2d4>. Scientists were added to the list of professions from 1997 onwards.

Trust by sub-group

Men are more trusting than women of four of the seven professions asked about (doctors, nurses and other medical practitioners, scientists working in universities, scientists working for the government, and government ministers and departments). There are also differences in trust by age group. Younger adults, aged 18-34, tend to be most trusting of each of the professions asked about, while those aged 65 or over tend to be least trusting. The one exception is doctors, nurses and other medical practitioners, who garner an equally high level of trust across all age groups. Across the remaining six professions, 56 per cent of those aged 18-34 show at least a great deal of trust on average, compared with an average of 24 per cent of those aged 65 or over.

Trust in doctors, nurses and other medical practitioners, medical research charities, university scientists and government scientists varies by level of education. Those with no formal qualifications are least likely to trust medical research charities, university scientists and government scientists. These differences may partly explain lower levels of trust among older people: adults aged 65 or over tend to be less well educated than younger groups (49 per cent have no qualifications, compared with 10 per cent of those aged 18-34).

Those who are more knowledgeable about science (according to the knowledge quiz) also tend to have more trust in scientists working for universities (79 per cent of those who score highly on the quiz trust them a great deal or more, compared with 65 per cent of those with medium scores and 56 per cent of those with low scores) and in scientists working for the government (44 per cent of those with high scores, compared with 31 per cent of those with medium scores and 30 per cent of those with low scores).

However, when it comes to scientists working in private industry, people's levels of education or scientific knowledge are unrelated to trust. People are generally sceptical that this group of scientists provide accurate and reliable information on medical research.

Why do people not trust certain professions to provide information on medical research?

Respondents who said they had very little or no trust in a particular profession were asked their reasons for lack of trust. The small numbers involved mean that it is not possible to produce robust estimates for those who do not trust doctors, nurses or other medical practitioners, medical research charities or scientists working for universities.⁷⁶ The most frequent reasons given for not trusting the remaining four professions asked about are explored below:

- The most common concerns leading to lack of trust in government departments and ministers are around government “spin”. Among those who lack trust in them, four in ten (43 per cent) feel that government departments and ministers would try to use information about medical research to present themselves in the most positive light: over one-third (36 per cent) think they would not be honest about the results.
- Among those who lack trust in journalists, the most common concern is that they would exaggerate information relating to medical research (47 per cent). One-third (32 per cent) also say that journalists lack training or knowledge around medical research. The top reason reflects a wider concern among the UK public that “the media sensationalises

⁷⁶ Fewer than 100 respondents answered for each of these professions.

science”, which 70 per cent of people thought, according to the Public Attitudes to Science (BIS, 2011) study.

- There are three main concerns among adults who do not trust government scientists, each mentioned by around three in ten adults. These relate to government scientists not being honest about the findings (29 per cent), exaggerating information relating to medical research (29 per cent), and trying to present themselves in the most positive light (28 per cent). These are similar to the main concerns people have about government departments and ministers, again indicating that trust and drivers of trust are often linked to the institutions that professionals are associated with. One-quarter (23 per cent) also express a concern that government scientists are generally corrupt and therefore cannot be trusted.
- Among those who do not trust scientists in private industry, the chief reasons for not trusting them are the same as reasons for not trusting government scientists. Concerns that they would try to present themselves in the most positive light are paramount – 35 per cent give this as a reason. One in three think that they would not be honest about findings (30 per cent) or exaggerate information (28 per cent). One in five (19 per cent) are concerned that private industry scientists are generally corrupt so cannot be trusted.

5.2. How should future directions for medical research be determined?

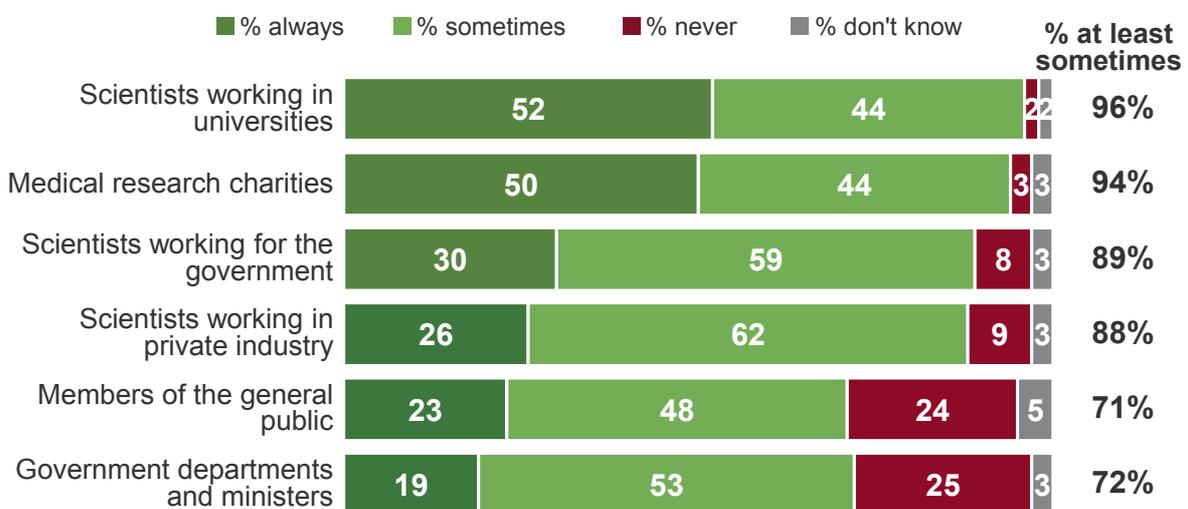
There is often public unease or uncertainty over which areas of science and medical research should be invested in, as previous public dialogues on issues such as stem cell research (see Bhattachary, 2008) and synthetic biology (Bhattachary, Calitz and Hunter, 2010; King and Webster, 2009) have shown. The issue of who the public thinks should be involved in decisions about medical research priorities was introduced into the second Wellcome Trust Monitor.

Which groups should be involved?

As Figure 5.3⁷⁷ indicates, scientists working in universities (52 per cent) and medical research charities (50 per cent) top the list of groups that adults think should always be involved in making decisions around future medical research. People are more cautious about the involvement of members of the general public (24 per cent think they should never be involved) and that of government departments and ministers (25 per cent think they should never be involved).

Figure 5.3: which groups adults think should be involved in decision-making about medical research

Q. To what extent do you think each of the following groups should or should not be involved in decisions about which illnesses should be targeted and which sorts of treatments should be developed?



Ipsos MORI Social Research Institute Base: 1,396 UK adults aged 18+ Fieldwork dates: 21 May to 22 October 2012

wellcome trust

Support for the involvement of different groups of scientists in decision-making around medical research mirrors trust in each of these groups (as discussed earlier in this chapter). Adults are most likely to want scientists working in universities to always be involved (52 per cent), while support for government scientists (30 per cent) and private industry scientists (26 per cent) always being involved is less strong. Nevertheless, looking across all three groups of

⁷⁷ Figure 5.3 shows data from [DecGov](#), [DecSciUn](#), [DecSciGo](#), [DecSciPr](#), [DecSciCh](#), [DecSciPu](#) (press CTRL and click on question name to access data table).

scientists explored, around six in ten (60 per cent) think that scientists of some sort should always be involved in these decisions.

Older people are more likely to oppose any involvement in decision-making around medical research for government departments and ministers and government scientists. Thirty-two per cent of adults aged 65 or over say that government departments and ministers should never be involved in these decisions (compared with 21 per cent of adults aged 18-34), and 13 per cent of adults aged 65 or over say government scientists should never be involved (compared with only 4 per cent of those aged 18-34).

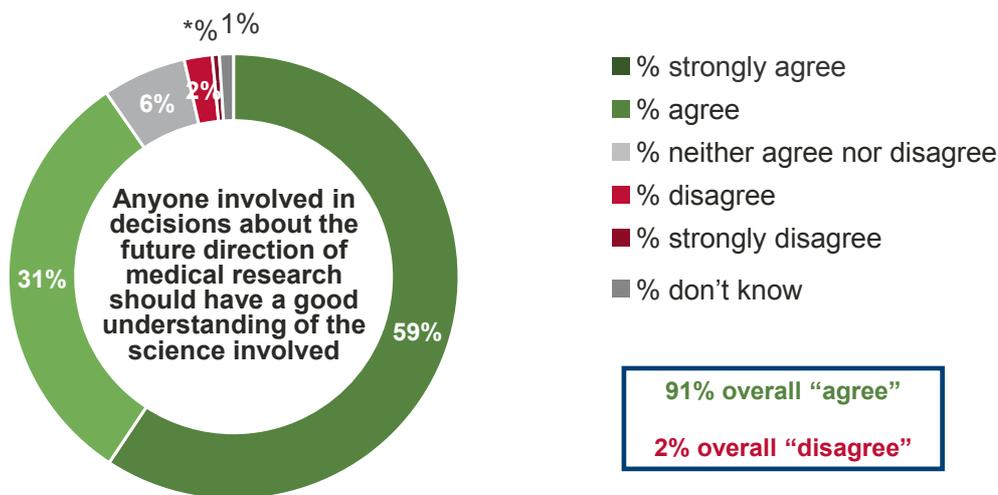
Those with no formal education are also somewhat more likely to object to the involvement of government departments and ministers (34 per cent of adults without qualifications think they should never be involved in this decision-making, compared with 9 per cent of those with A levels and 21 per cent of those educated to university level) and of government scientists (15 per cent think they should never be involved, compared with 3 per cent of those with A levels and 6 per cent of those with university education). Those with GCSEs grades D-G or equivalent qualifications are most likely to say that university scientists (5 per cent, compared with 0 per cent of those with A levels and 2 per cent of those with university education) and medical research charities (9 per cent, compared with 0 per cent of those with A levels and 2 per cent of those with university education) should never be involved in decision-making about medical research.

How knowledgeable should people have to be to get involved?

Adults overwhelmingly endorse the statement that those involved in decisions about the future of medical research “should have a good understanding of the science involved”, which Figure 5.4⁷⁸ illustrates. Nine in ten (91 per cent) agree overall, while six in ten (59 per cent) strongly agree. Just 2 per cent disagree overall.

Figure 5.4: how knowledgeable adults think you have to be to get involved in decisions about medical research

Q. How much do you agree or disagree with the following statement?



Ipsos MORI
Social Research Institute

Base: 1,396 UK adults aged 18+
Fieldwork dates: 21 May to 22 October 2012

*% indicates a percentage less than 0.5%, but greater than 0%

wellcome trust

Those aged 65 or over are more likely to strongly agree that the people making these decisions should have a good understanding of the science involved (64 per cent, compared with 54 per cent of those aged 35 to 49).

⁷⁸ Figure 5.4 shows data from [MedResDe](#) (press CTRL and click on question name to access data table).

5.3. Should the public have a role in decision-making?

As noted in the previous section, adults are generally supportive of the involvement of scientists in decisions about medical research priorities, but they are more divided over the extent to which members of the general public should be involved in these decisions. Equal proportions feel that the public should never (24 per cent) and always (23 per cent) be involved. Almost half (48 per cent) say that the general public should sometimes be involved.

Women are more likely than men to want the public to be involved (27 per cent think the public should always be involved, compared with 20 per cent of men). Men, conversely, are more likely to say the public should never be involved (28 per cent, compared with 21 per cent of women).

Those without science qualifications are more likely to say that the general public should always be involved in decision-making over medical research priorities (29 per cent, compared with 21 per cent of adults with a university education and 18 per cent of those with A levels). This initially seems to run counter to the fact that a large proportion (63 per cent) of this sub-group also strongly agrees that those making decisions should have a good understanding of the science involved. However, as this chapter explores later, this may simply reflect the fact that those without science qualifications often seem to exclude themselves when referring to “members of the general public” who should be involved.

Conversely, those with university or college-level science qualifications are more likely to say that the public should only sometimes be involved (54 per cent, compared with 52 per cent of those with school-level science qualifications and 41 per cent of those with no science qualifications). Importantly, however, those with university or college-level science qualifications are no more likely to think the public should never be involved – they are more concerned with limiting, rather than entirely removing, general public involvement.

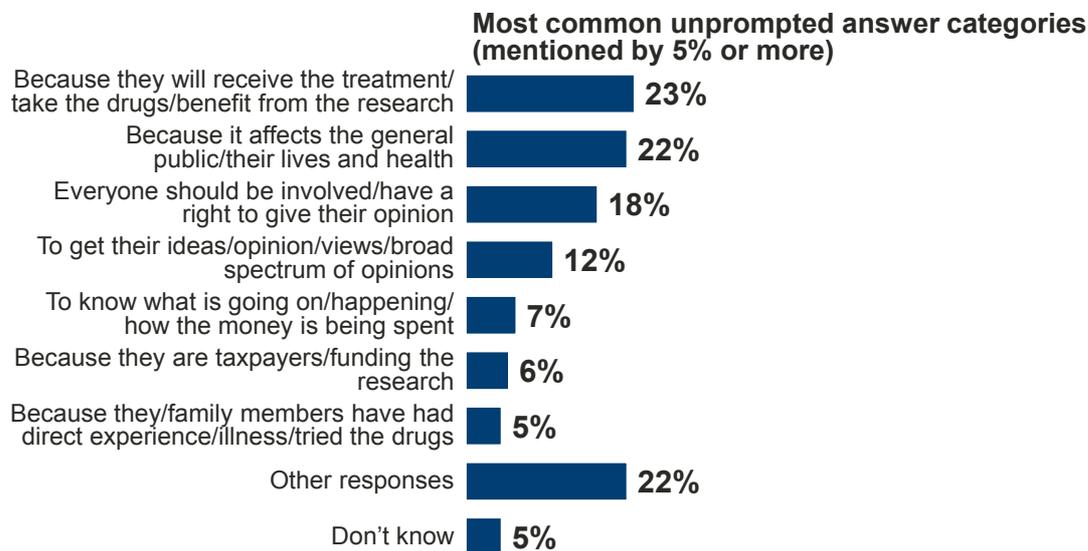
Reasons for and against public involvement in decision-making

As well as asking adults whether they think the public should be involved in decisions about the future of medical research or not, the Wellcome Trust Monitor explored why people give a particular answer. Explanations were given as free responses, rather than being chosen from a list of potential answers.

For the seven in ten adults (71 per cent) who feel that the general public should have some role in decisions about medical research priorities, the most commonly mentioned reasons focus on the duty of members of the public to get involved, since they will ultimately benefit from or be affected by the research, and also on the right of ordinary people to get involved and give their opinion (Figure 5.5⁷⁹).

Figure 5.5: reasons adults give for involving the general public in decision-making

Q. For what reasons do you think the general public should be involved in decision-making?



Ipsos MORI
Social Research Institute

Base: 1,017 UK adults who think the general public should be involved in decision-making about medical research

Fieldwork dates: 21 May to 22 October 2012

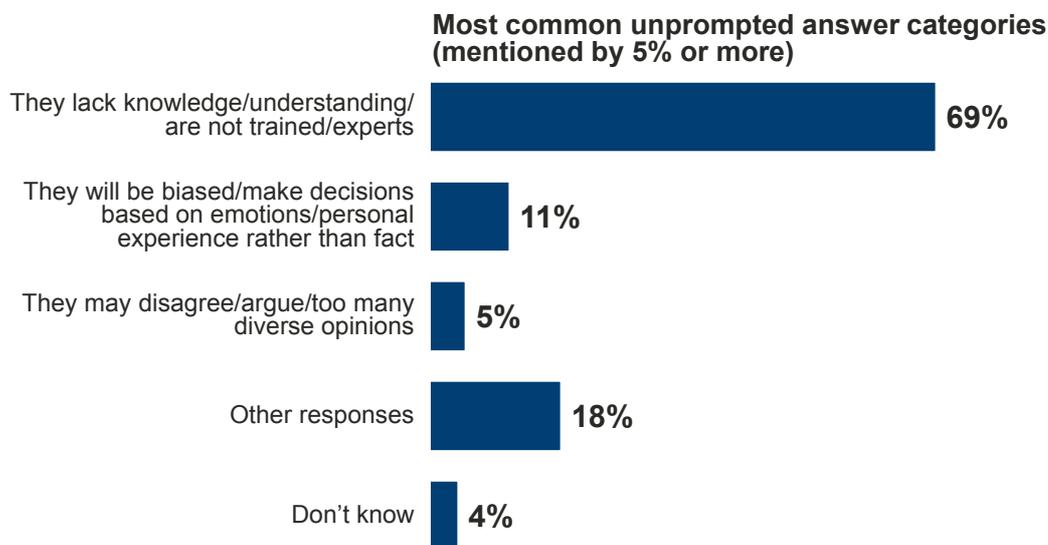
wellcome trust

⁷⁹ Figure 5.5 shows data from [WhyInv](#) (press CTRL and click on question name to access data table).

Of the quarter (23 per cent) of adults who feel that the general public should never be involved in these decisions, a large majority (69 per cent) give the same reason for their opinion (Figure 5.6⁸⁰), saying that the public lack knowledge and understanding of medical research and so should be excluded from decision-making. One in ten (11 per cent) also say that the public should be excluded as they would make biased or emotional decisions, rather than ones based on fact. This reflects findings from Public Attitudes to Science (BIS, 2011), in which people cited a lack of understanding of science and scientific processes as the major barrier to public involvement in science decision-making.

Figure 5.6: reasons adults give for not involving the general public in medical research decision-making

Q. For what reasons do you think the general public should not be involved in decision-making?



Ipsos MORI
Social Research Institute

Base: 316 UK adults who think the general public should not be involved in decision-making about medical research
Fieldwork dates: 21 May to 22 October 2012

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⁸⁰ Figure 5.6 shows data from [WhyNotIn](#) (press CTRL and click on question name to access data table).

Getting personally involved in public consultations

While seven in ten adults think the public should be involved, at least sometimes, in decisions about medical research, this does not always reflect a personal desire to get involved. Nearly six in ten adults (57 per cent) say that they do not personally want to be involved in public consultations about medical research, as Figure 5.7⁸¹ shows. In fact, even among adults who think that the public should always be involved in decisions about medical research priorities, half (52 per cent) do not want to be involved in public consultations themselves.

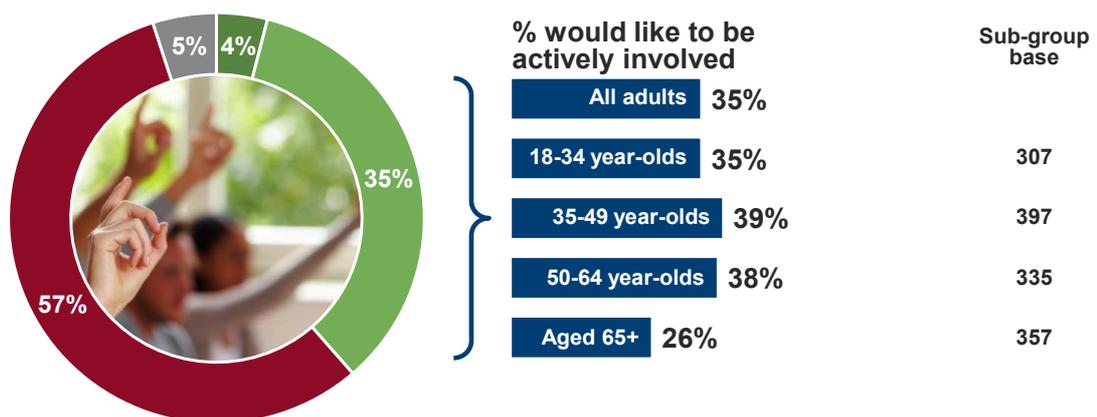
These findings are in line with existing research on public involvement in public policy. For instance, the ninth Audit of Political Engagement (Hansard Society, 2012) found that just 38 per cent of the public are willing to become actively involved in local decision-making. The Public Attitudes to Science (BIS, 2011) study also found a similar result with regard to involvement in public consultations on “science issues”. This indicates that medical research, despite most people being highly interested in it, is not treated differently from other areas of public life when it comes to getting involved.

Nonetheless, there is still a substantial minority (35 per cent) who say they would like to become actively involved, while a further 4 per cent of adults say they are already actively involved. This proportion amounts to 16.8 million adults aged 20 or over in the UK, according to 2011 Census data.⁸²

Figure 5.7: whether adults want to be personally involved in public consultations on medical research

Q. Which of these statements, if any, comes closest to your attitude to being involved in public consultations on medical research?

- % “I am already actively involved in public consultations on decisions about medical research”
- % “I would like to become actively involved in public consultations on decisions about medical research”
- % “I don’t want to be involved personally in public consultations on decisions about medical research”
- % Don’t know



Ipsos MORI
Social Research Institute

Base (unless otherwise stated): 1,396 UK adults aged 18+
Fieldwork dates: 21 May to 22 October 2012

wellcome trust

⁸¹ Figure 5.7 shows data from PubCons (press CTRL and click on question name to access data table).

⁸² 2011 Census population estimates by age (KS102EW) are available on the Office for National Statistics website at www.ons.gov.uk/ons/dcp171778_292378.pdf and www.ons.gov.uk/ons/rel/census/2011-census/key-statistics-for-local-authorities-in-england-and-wales/index.html. Detailed population information for adults aged 18 or over in the UK as a whole has not been released at the time of publication.

People aged 65 or over are somewhat less willing to get involved in consultations on medical research than younger age groups (just 26 per cent want active involvement, compared with 39 per cent of those aged 35 to 49). This again mirrors findings from the Public Attitudes to Science (BIS, 2011) work, which found that older people tended to belong to an “Indifferent” segment of the public, who were less interested in getting involved in public consultations.

Reasons for not wanting to get personally involved in public consultations

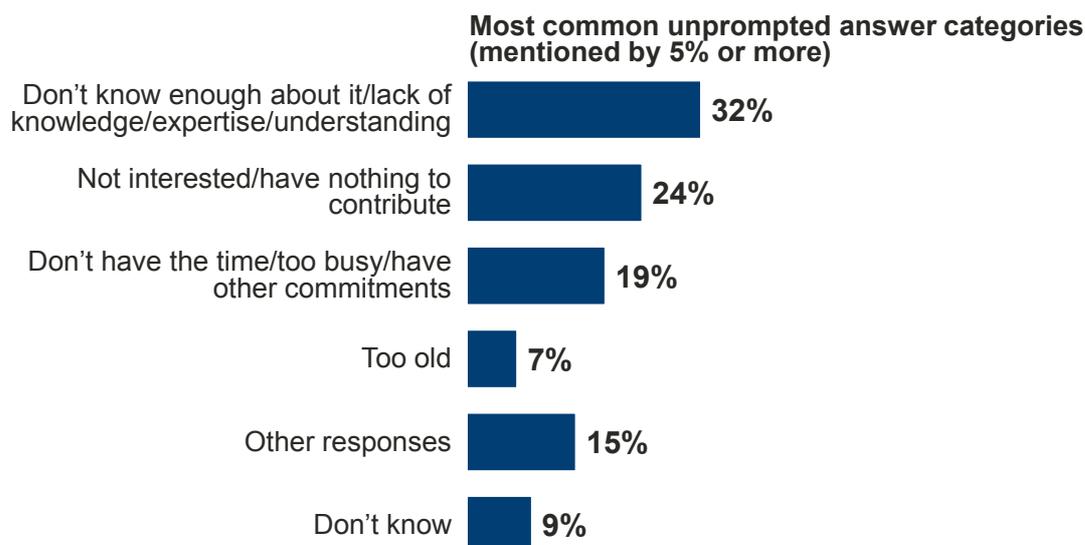
Respondents who said they did not want to be personally involved in public consultations about medical research were asked why they felt this way. Among the 57 per cent of adults who do not want any involvement, the most commonly given reason was not knowing enough about the topic (32 per cent), which Figure 5.8⁸³ highlights. Even among those with science-related qualifications from university or college, two in ten (19 per cent) give this as a reason (although it is important to note that this is based on a small number of respondents).

Other reasons given indicate that people are not sufficiently motivated, or simply prioritise other activities. One-quarter (24 per cent) of adults who do not want to get involved say they are not interested or would have nothing to contribute. One in five (19 per cent) say they are too busy or have other commitments.

As might be expected, the 7 per cent who say they are too old to get involved are all aged 65 or over (cited as a reason by 27 per cent of this group). The other reasons given each comprise just 1 or 2 per cent of all responses.

Figure 5.8: reasons adults do not want to be personally involved in public consultations on medical research

Q. Why don't you want to be involved in public consultations on medical research?



Ipsos MORI
Social Research Institute

Base: 799 UK adults who do not want to be involved personally in public consultation on decisions about medical research
Fieldwork dates: 21 May to 22 October 2012

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⁸³ Figure 5.8 shows data from [WhyNoCon](#) (press CTRL and click on question name to access data table).

6. Vaccination, nutrition and obesity, and cognitive enhancement

The second wave of the Wellcome Trust Monitor introduced new questions about vaccination, nutrition and weight management, and cognitive enhancement. The questions about vaccination and nutrition also explore who has responsibility for maintaining a person's health (the individual, parents or government). The questions about cognitive enhancement look at the methods people use to improve their focus, memory and concentration. These new questions relate to three of the Trust's current major research challenges.⁸⁴

Key findings:

- The majority of adults and young people regard vaccinations as safe, with eight in ten adults and seven in ten young people believing there to be little if any risk of serious side-effects.
- More than one in ten adults and one-quarter of young people, however, believe that vaccinations carry a fairly or very high risk of serious side-effects.
- Nine in ten adults and young people agree with the proposition that people have a personal responsibility to obtain the recommended vaccinations for themselves or their children to help stop the spread of disease.
- Fewer (69 per cent of adults and 80 per cent of young people) agree that children have a right to be vaccinated which overrides their parents' preference.
- While the majority believe that vaccination is a matter of personal responsibility, there is also support for the government providing the public with information and recommendations on how to stay healthy, with 86 per cent of adults and 88 per cent of young people holding this view.
- Although adults and young people recognise that a variety of factors can result in people being overweight, lack of exercise is most likely to be seen as the main cause.
- Adults and young people place greater emphasis on personal responsibility with regard to obesity than vaccination. People are also more likely to say that the government should have a public advisory role on vaccination than on obesity.
- Adults and young people believe that a number of different approaches can be effective in improving cognitive function (such as completing puzzles, taking vitamins, etc.). Puzzles are seen as most effective, with 87 per cent of adults and 86 per cent of young people saying that they are a very or fairly effective means of improving focus, memory or concentration.
- By contrast, only 53 per cent of adults and 45 per cent of young people think that medications normally used to treat conditions like ADHD and Alzheimer's disease are an effective means of improving focus, memory or concentration.

⁸⁴ These are: combating infectious diseases; connecting environment, nutrition and health; and understanding the brain. The full list of the Wellcome Trust's current major research challenges is available on the Trust's website, at: www.wellcome.ac.uk/Our-vision/Research-challenges/index.htm.

- The use of medications that can enhance cognitive performance through improved focus, memory or concentration is very rare (2 per cent of adults and 1 per cent of young people said they had used cognitive enhancers).
- Both adults and young people are split in their views as to whether it is acceptable to use medication for diseases like Alzheimer's to improve cognitive function. Only one-third of adults and young people believe that using medication to improve one's cognitive ability for an exam or interview is acceptable. In each case, a similar proportion hold the contrary view.

6.1. What are the perceived risks of vaccination?

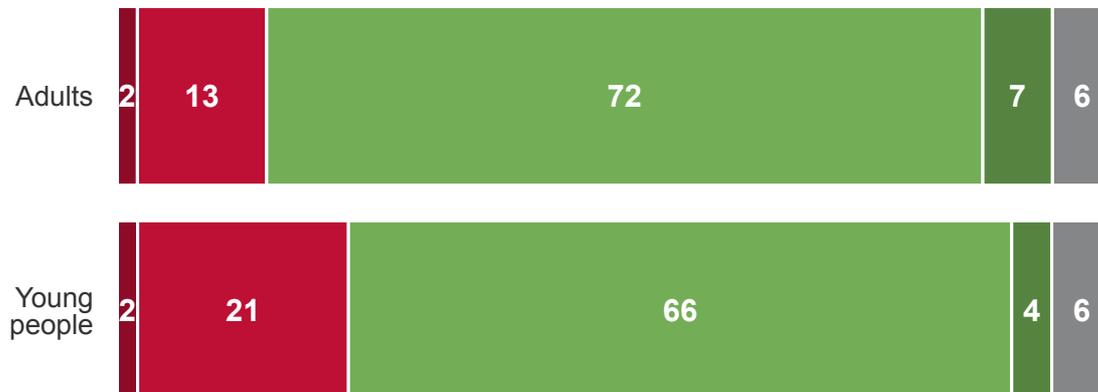
Since the publication of the 2009 Wellcome Trust Monitor, the issue of vaccination has received a great deal of media coverage. Inoculation levels for MMR have increased across the UK following the retraction and widespread condemnation of the 1998 Andrew Wakefield paper which erroneously linked the MMR vaccine with autism and bowel disorders. Despite this, localised outbreaks of measles demonstrate the impact that lower levels of vaccination can have⁸⁵.

The second Wellcome Trust Monitor finds that vaccinations are generally perceived as safe by the public (Figure 6.1⁸⁶). Despite this, a significant minority believe that vaccinations carry a risk of serious side-effects. Eight in ten adults (79 per cent) and seven in ten young people (70 per cent) say that vaccinations carry a fairly low risk or no risk at all of serious side-effects. However, more than one in ten adults (15 per cent) and almost one-quarter of young people (24 per cent) believe that vaccinations do carry some risk.

Figure 6.1: perceived risk of vaccination

Q. On average, how high, if at all, would you say the risks of serious side-effects are from a recommended vaccination?

■ % very high ■ % fairly high ■ % fairly low ■ % no risk at all ■ % don't know



Ipsos MORI Social Research Institute Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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Exposure to science is related to perception of the risk of vaccinations. Adults who have, or who live with someone who has, a career in a scientific field are more likely to say that vaccinations carry a fairly low or no risk of side-effects (87 per cent and 89 per cent respectively, compared with 76 per cent of those who live in a household where no one is employed in science). This is also reflected among young people. Those young people who have at least one parent employed in science are less likely to believe that vaccinations carry a

⁸⁵ See, for example, this May 2012 BBC News story covering the largest outbreak of measles in Merseyside since 1988: www.bbc.co.uk/news/uk-england-merseyside-17912457.

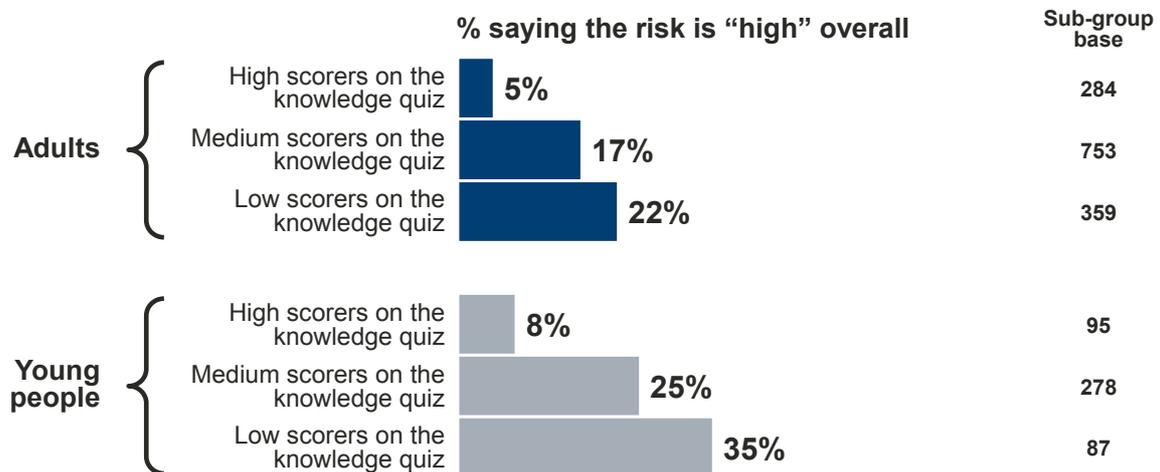
⁸⁶ Figure 6.1 shows data from RiskVacc (press CTRL and click on question name to access data table).

very high or fairly high risk of serious side effects (8 per cent, compared with 16 per cent of young people who do not have a parent with a scientific job).

Attitudes toward the safety of vaccinations also vary according to levels of factual scientific knowledge, as shown in Figure 6.2⁸⁷. Adults who have low and medium scores on the knowledge quiz are more likely to say that vaccinations carry a high or fairly high risk than those who record high scores (22 per cent, 17 per cent and 5 per cent respectively). This difference is even more pronounced among young people, among whom 35 per cent with a low score on the knowledge quiz and 25 per cent with a medium score perceive vaccinations as carrying high or fairly high risks of side-effects, compared with 8 per cent of those with a high score.

Figure 6.2: how the perceived risk of vaccination differs depending on knowledge of science

Q. On average, how high, if at all, would you say the risks of serious side-effects are from a recommended vaccination?



Ipsos MORI
Social Research Institute

Bases: as stated for UK adults and young people
Fieldwork dates: 21 May to 22 October 2012

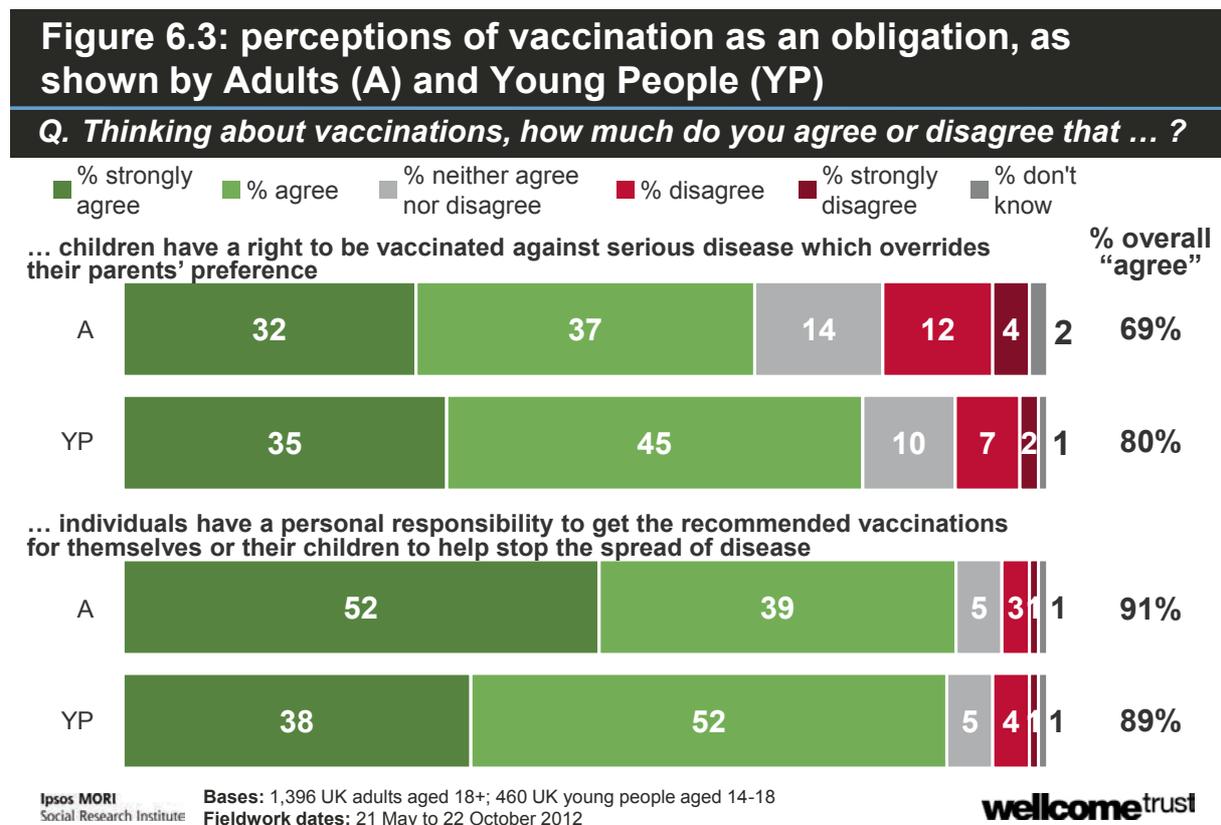
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⁸⁷ Figure 6.2 shows data from [RiskVacc](#) (press CTRL and click on question name to access data table).

6.2. Vaccination: where does the responsibility lie?

Recent outbreaks of childhood illnesses such as measles have led to renewed public debate over whether vaccinations should be compulsory.⁸⁸ Results from the Wellcome Trust Monitor suggest that, while there is strong support for vaccination, some adults and young people are uneasy about parents' preferences being overridden.

As shown in Figure 6.3⁸⁹, almost all adults and young people believe that individuals have a personal responsibility to get the recommended vaccinations for themselves or their children to help stop the spread of disease. Around nine out of ten adults (91 per cent) and young people (89 per cent) hold this view. Acceptance for this proposition is widespread, and there are no sub-groups who are more likely to disagree with this view.



There is also majority support for the idea that children have a right to be vaccinated against serious disease which overrides their parents' preference, although this is less strongly supported than the idea that people have a personal responsibility to get the recommended vaccinations. In particular, young people (80 per cent) are more likely than adults (69 per cent) to believe that children have a right to vaccination which overrides parents' preference. Adults who have a science qualification at university or college level (76 per cent) are also more likely to support this view than those who have school-level science qualifications only (67 per cent) or no science qualifications at all (68 per cent).

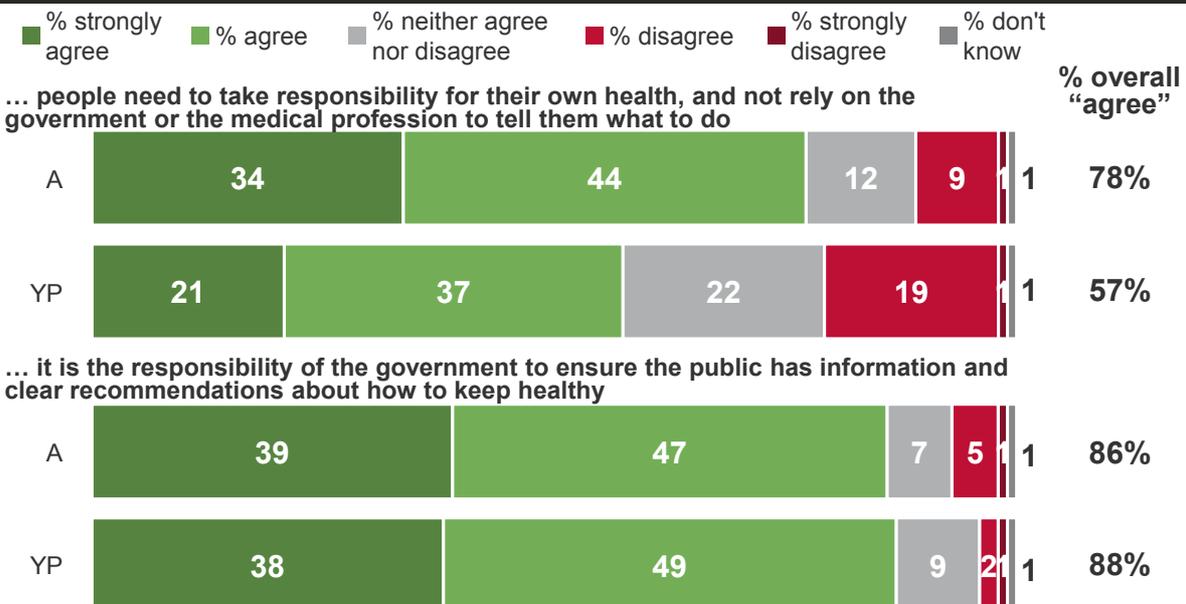
⁸⁸ See, for example, *British Medical Journal* (2012).

⁸⁹ Figure 6.3 shows data from [ChildVacc](#), [PerResp](#) (press CTRL and click on question name to access data table).

A majority of the public agree that individuals need to take responsibility for their own health, and not rely on the government or the medical profession to tell them what to do (Figure 6.4⁹⁰). This attitude is more prevalent among adults (78 per cent, compared with 57 per cent of young people).

Figure 6.4: perceived responsibility for vaccination, as shown by Adults (A) and Young People (YP)

Q. Thinking about vaccinations, how much do you agree or disagree that ... ?



Ipsos MORI Social Research Institute Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18 Fieldwork dates: 21 May to 22 October 2012

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Despite high levels of agreement with the principle of personal responsibility, people also believe that it is the responsibility of the government to ensure the public has information and clear recommendations about how to keep healthy. Almost nine in ten adults (86 per cent) and a similar proportion of young people (88 per cent) hold this view.

Levels of education and exposure to science are related to people's likelihood of seeing the government as having an educating role. Adults with A levels or higher education qualifications are more likely to hold this view, with nine in ten of those with higher education qualifications (89 per cent), and almost all of those with A levels (99 per cent) agreeing. By contrast, only three-quarters (76 per cent) of those educated with GCSEs grade A-C and eight in ten (80 per cent) of those with no qualifications believe it is the government's place to provide the public with health guidelines. People with a scientific job (91 per cent), or who live with someone with a scientific job (98 per cent), are also more likely to think that the government should provide recommendations on how to keep healthy with regard to vaccinations than those who live in a household where no one has a scientific job (84 per cent).

⁹⁰ Figure 6.4 shows data from [RespVacc](#), [GovtVacc](#) (press CTRL and click on question name to access data table).

6.3. Beliefs about what makes people overweight

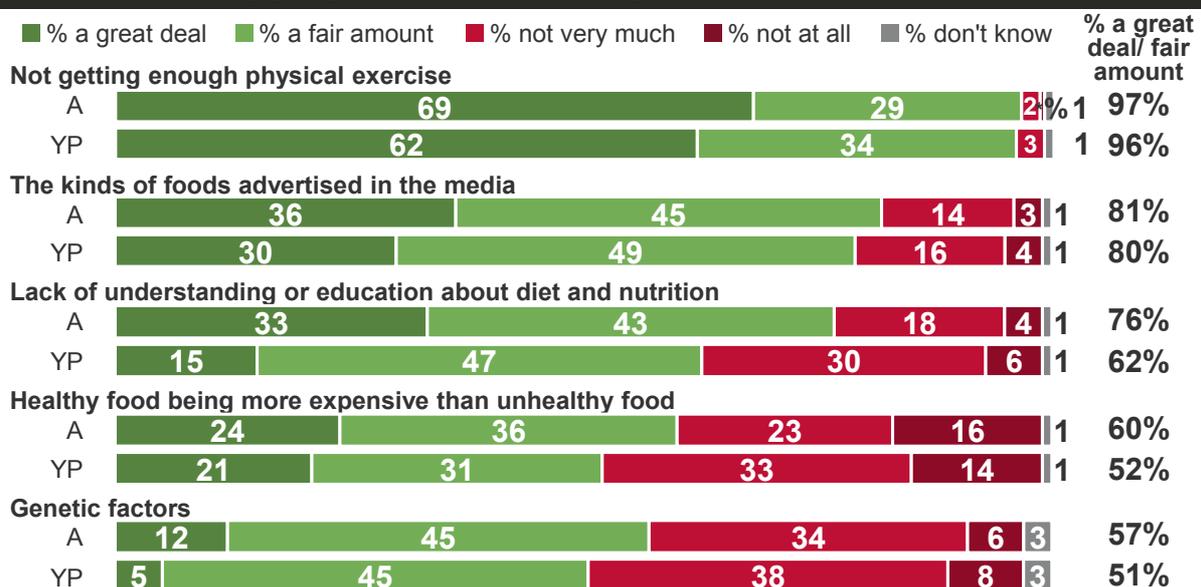
Like vaccination, the issue of obesity has also received significant political and media attention in recent years. In particular, debate has focused on the potential long-term costs to the NHS of an increase in the rate of obesity and the fact that obese patients can have worse outcomes from certain medical interventions. A March 2012 article in *Pulse* magazine noted that 19 Primary Care Trusts had restricted access to certain medical procedures (such as in vitro fertilisation and hip or knee replacements) for obese people until they met weight-loss targets (Pulse, 2012).

Within this section of the questionnaire, respondents were asked to state the extent to which they believed that different factors affect the likelihood of someone becoming overweight. The questionnaire then moved on to look at responsibility for obesity as a public health issue.

As Figure 6.5⁹¹ shows, the public believes that a wide range of causes – genetic, personal and social structural factors – increase the risk of becoming overweight. In the public mind, becoming overweight is almost universally associated with insufficient exercise (97 per cent of adults and 96 per cent of young people say this contributes a great deal or a fair amount to people being overweight).

Figure 6.5: perceived reasons for why people become overweight, as shown by Adults (A) and Young People (YP)

Q. For each of the following items, please tell me how much you believe this is a reason why people become overweight.



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*% indicates a percentage less than 0.5%, but greater than 0%
Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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⁹¹ Figure 6.5 shows data from [GenFact](#), [FoodMark](#), [HealthyF](#), [LackEduc](#), [PhyEd](#) (press CTRL and click on question name to access data table).

The kinds of foods advertised in the media (judged to contribute at least a fair amount to people being overweight by 81 per cent of adults and 80 per cent of young people) and a lack of understanding or education about diet and nutrition (judged to contribute at least a fair amount to people being overweight by 76 per cent of adults and 62 per cent of young people) are also seen as causal factors by a high proportion of people.

Genetic factors (judged to contribute at least a fair amount by 57 per cent of adults and 51 per cent of young people), and healthy food being more expensive than unhealthy food (judged to contribute at least a fair amount by 60 per cent of adults, 52 per cent of young people) are less likely to be seen as reasons people become overweight than the other factors listed. However, they are still seen as contributing at least a fair amount by more than half of adults and young people.

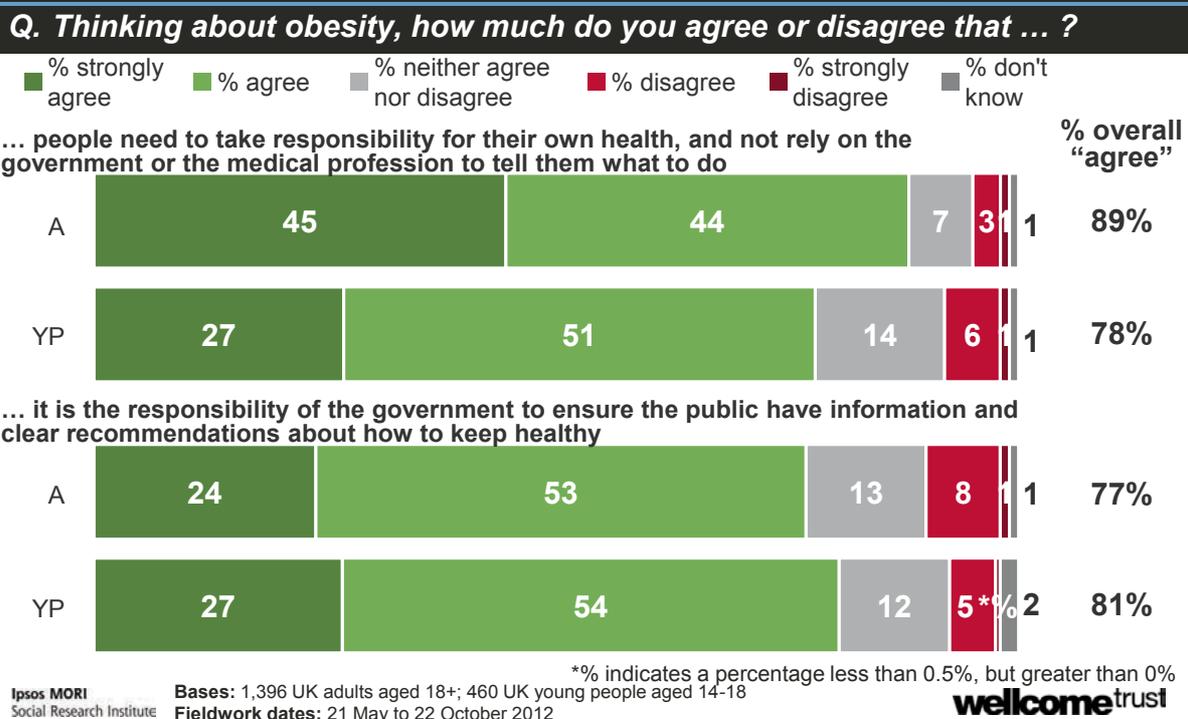
Overall, there are few differences between adults and young people in their perceptions of which factors contribute to people being overweight. However, adults are more likely than young people to say that a lack of education about diet and nutrition (76 per cent of adults, 62 per cent of young people), the relative cost of healthy and unhealthy foods (60 per cent of adults, 52 per cent of young people) and genetic factors (57 per cent of adults, 51 per cent of young people) contribute at least a fair amount to people being overweight.

Differences are evident by gender, with both women and young women more likely than men and young men to say that the relative cost of healthy and unhealthy foods contributes to weight problems (66 per cent of women, compared with 53 per cent of adult men, and 62 per cent of young women, compared with 43 per cent of young men).

6.4. Obesity: where does the responsibility lie for keeping healthy?

With regard to obesity, adults assign greater importance to individual responsibility than government or medical advice. As shown in Figure 6.6⁹², nine in ten adults (89 per cent agree, 45 per cent strongly) and eight in ten young people (78 per cent agree, 27 per cent strongly) say that people need to take responsibility for their own health, rather than relying on the government or medical profession to tell them what to do. This suggests that this view is more strongly held by adults than young people. Supporting the idea that age influences views on the importance of personal responsibility, adults aged 18-34 are less likely than older adults to agree that people need to take responsibility for their own health (84 per cent of this group agree that people should take personal responsibility for their health, compared with 89 per cent of those aged 50-64 and 93 per cent of those aged 35-49 or 65 or over).

Figure 6.6: perceived responsibility for obesity, as shown by Adults (A) and Young People (YP)



This question contrasts with a similar question about responsibility for vaccination. Comparing results from the two questions shows that people are more likely to emphasise the need for personal responsibility on the issue of obesity than vaccination. Whereas nine in ten adults (89 per cent) and eight in ten young people (78 per cent) agree with the principle of individual responsibility over reliance on government advice with regard to obesity, this figure drops to eight in ten adults (78 per cent) and just under six in ten young people (57 per cent) when discussing vaccination.

There is also widespread agreement that it is the responsibility of the government to ensure the public have information and clear recommendations about how to keep healthy (77 per cent of adults and 81 per cent of young people agree). Comparing overall levels of agreement with the two statements shown in Figure 6.6 suggests that adults want to be advised as to the

⁹² Figure 6.6 shows data from [RespOb](#), [GovtOb](#) (press CTRL and click on question name to access data table).

best course of action, but ultimately feel that individuals should be responsible for their own health.

For adults, men (82 per cent) are more likely than women (73 per cent) to say that the government should provide the public with information.

Again, this question contrasts with a similar question about vaccination. Comparing findings across the two questions shows that people are more likely to believe that the government has a responsibility to provide the public with information about vaccinations than about obesity. Overall, 77 per cent of adults and 81 per cent of young people say that the government should provide information and recommendations about how to keep healthy when discussing obesity. This contrasts with 86 per cent of adults and 88 per cent of young people who say the same when discussing vaccinations.

It is notable that people emphasise personal responsibility over government education and intervention more when discussing obesity than when discussing vaccination.

6.5. Cognitive enhancement

Respondents were asked a series of questions about cognitive enhancement. These began by asking respondents to assess the efficacy of different ways in which people may try to improve their memory, focus and concentration. Respondents were then asked about their awareness and use of cognitive enhancing techniques. Finally, respondents were asked how acceptable they found the use of different cognitive enhancing medications, or dietary supplements and stimulants, to improve cognitive function.

Since the late 1990s, the use of drugs that improve memory, focus and concentration, normally prescribed for conditions such as attention deficit hyperactivity disorder (ADHD) and dementia, has grown on university campuses, particularly in the USA. While studies have been conducted to better understand this phenomenon in the USA (see for example DeSantis and Hane, 2010), little is understood of what the UK public thinks about this issue.

The need to explore public awareness and understanding of this area is of growing importance. A recent report by the North West Public Health Observatory and Liverpool John Moores University Centre for Public Health highlighted the growing concern about the use of “smart drugs” in the UK (see Evans-Brown et al., 2012), and various newspaper stories⁹³ have suggested an increasing awareness of these drugs among the UK public, albeit with little hard evidence. A 2012 stakeholder workshop on human enhancement carried out jointly by the Academy of Medical Sciences, the British Academy, the Royal Academy of Engineering and the Royal Society also identified the need to engage with the wider public on this emerging issue (Academy of Medical Sciences, 2012).

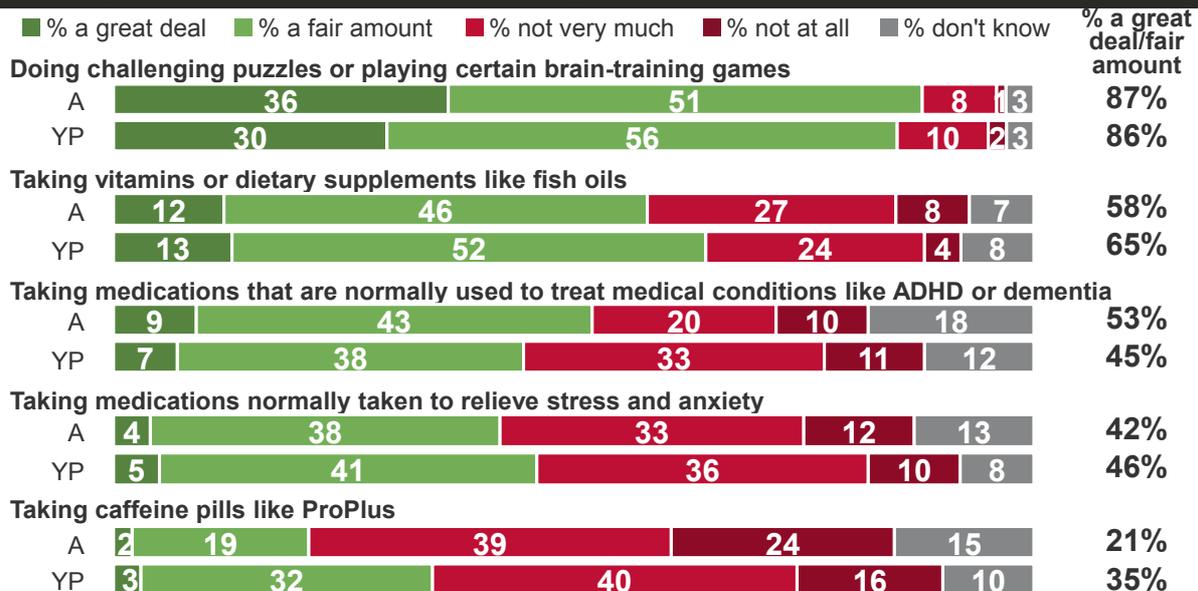
The 2012 Wellcome Trust Monitor therefore sought to generate an understanding of people’s views on cognitive enhancement, including establishing a baseline measure of usage of such cognitive enhancing medications from which any changes could be gauged.

⁹³ See, for example, Clay (2012) in the *Daily Telegraph* and Howard (2013) in the *Daily Mail*

Respondents were first asked to rate the extent to which they think various activities, supplements and medications are effective in improving cognitive performance. Overall, the use of crosswords or puzzles is seen as the most effective way of improving one's memory, focus or concentration. As shown in Figure 6.7⁹⁴, almost nine in ten adults (87 per cent) and a similar proportion of young people (86 per cent) say that this is at least a fairly effective way of improving cognitive function.

Figure 6.7: perceived effectiveness of methods of improving cognitive function, as shown by Adults (A) and Young People (YP)

Q. To what extent do you think that each of the following is an effective way to improve someone's focus, memory or concentration?



Ipsos MORI
Social Research Institute

Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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Taking vitamins is seen as the next most effective way of improving cognitive ability. Over half of adults (58 per cent) and two-thirds of young people (65 per cent) say that this is an effective way of improving focus, memory and concentration. The perceived benefit of vitamins varies with knowledge of science. Those with high or medium scores on the knowledge quiz are more likely to think vitamins improve cognitive ability than those with low scores. Among adults, women (62 per cent) are more likely than men (55 per cent) to say that vitamins are effective. There are no differences among adults relating to level of education or employment in science.

Taking medications normally used to treat conditions like ADHD or dementia and taking medications normally used to relieve stress and anxiety are seen as being effective ways to improve mental performance by around half of adults and young people. Adults are more likely than young people to believe that medications for ADHD or dementia are effective as cognitive enhancers (53 per cent, compared with 45 per cent). A similar proportion of adults (42 per cent) and young people (46 per cent) say that medications normally taken for stress and anxiety can help improve cognitive function. Among young people, young women are more likely to hold this view than young men (52 per cent, compared with 41 per cent).

⁹⁴ Figure 6.7 shows data from [Challeng](#), [Vitamins](#), [Medic](#), [Caffeine](#), [AnxMed](#) (press CTRL and click on question name to access data table).

During cognitive testing of the questionnaire, it was found that some people felt that taking medication for conditions which one does not suffer from would not provide any benefits, and could be dangerous. This suggests that people do not necessarily understand that many medications work by treating the symptoms of disease rather than the disease itself. This also perhaps helps to explain why a large proportion of people feel that cognitive enhancing medication would not be an effective way of improving focus, memory or concentration.

Caffeine supplements, such as ProPlus, are least likely to be seen as effective means of improving cognitive performance, by both adults and young people. Young people are more likely to see them as effective, however, with one in three (35 per cent) saying this, compared to one in five adults (21 per cent).

6.6. How acceptable is it to take supplements to improve focus, memory and concentration?

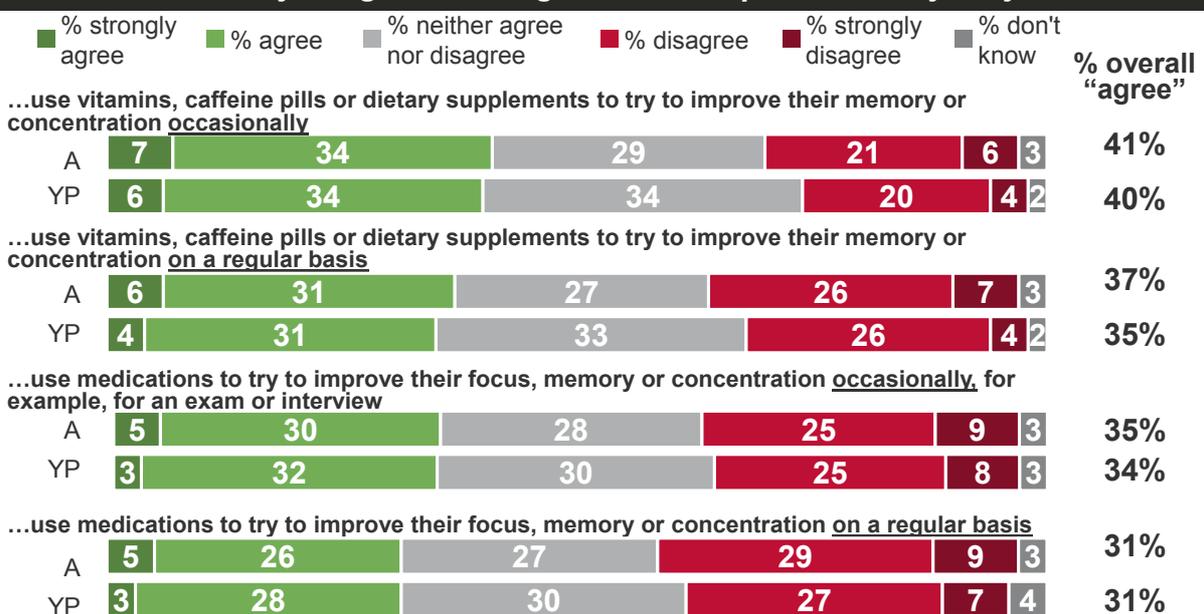
Greely et al. (2008) have argued that cognitive enhancement medicines may be useful for improving quality of life and extending work productivity, as well as to stave off natural decline in brain function. Despite this, some people feel that the use of such drugs in order to help one study for an exam, for instance, is “cheating” and akin to doping in sports. The 2012 Wellcome Trust Monitor sought to better understand people’s views on this issue.

Respondents were asked whether they found the use of cognitive enhancing drugs acceptable for both ongoing and one-off use (for example to help improve exam performance). To provide context, respondents were also asked the same questions regarding the use of vitamins, caffeine or dietary supplements.

As shown in Figure 6.8⁹⁵, opinion is divided on the issue of cognitive enhancement. Adults and young people hold similar views on this issue overall, with opinions split within each group. Three in ten adults and young people (31 per cent of each) say that the use of medication to improve focus, memory or concentration on a regular basis is acceptable, while 38 per cent of adults and 35 per cent of young people say this behaviour is unacceptable. A similar picture emerges when discussing occasional use of cognitive enhancing medications (for example for exams). In this case, one-third of both adults and young people view this as acceptable (35 per cent and 34 per cent respectively), while the same proportion of each group view it as unacceptable (34 per cent and 33 per cent respectively).

Figure 6.8: the acceptability of ongoing or one-off use of cognitive enhancing medication, as shown by Adults (A) and Young People (YP)

Q. How much do you agree or disagree it is acceptable for anybody to ... ?



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Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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⁹⁵ Figure 6.8 shows data from [CogReg](#), [CogRare](#), [CafReg](#), [CafRare](#) (press CTRL and click on question name to access data table).

Both adults and young people are more likely to see the use of caffeine or vitamins as acceptable. Here, the balance of opinion shifts to be marginally positive overall. Almost four in ten adults (37 per cent) and over one-third of young people (35 per cent) say it is acceptable for anybody to use vitamins or dietary supplements to improve their cognitive function on a regular basis. Meanwhile, one-third of adults (33 per cent) and three in ten young people (30 per cent) say this is unacceptable. As with medication, the use of vitamins and supplements to improve performance is seen as slightly more acceptable in a one-off context. Four in ten adults (41 per cent) and young people (40 per cent) say this is acceptable, while around one-quarter of each group believe this to be unacceptable (27 per cent of adults, 23 per cent of young people).

6.7. Use of medication for improving memory, focus and concentration

Very little research has been conducted to understand the level of use of cognitive enhancing medications (beyond prescribed uses). Previous surveys reported on this topic, such as those conducted by *Nature* (Maher, 2008) and by BBC *Newsnight* and *New Scientist* magazine in (Watts, 2011), have used online readership surveys, which are not representative of the general public.

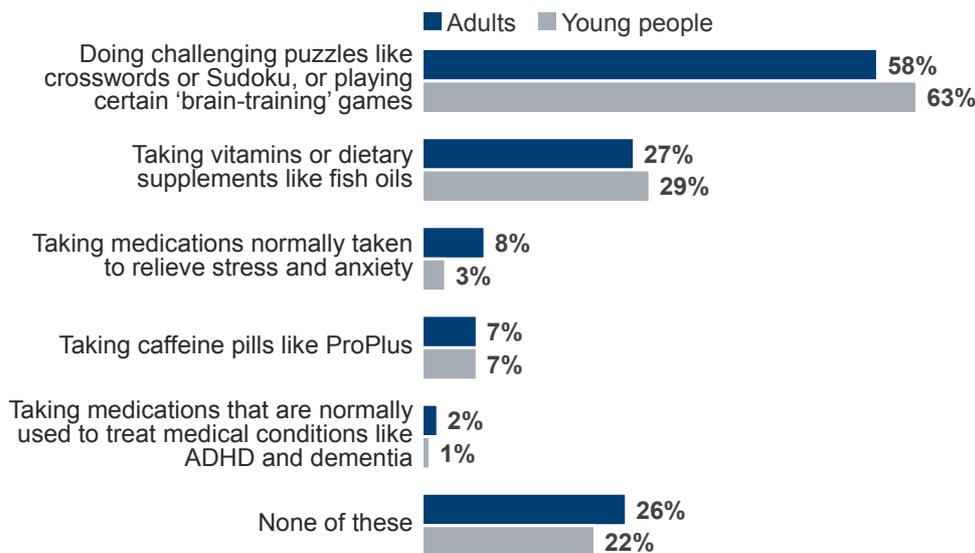
This Wellcome Trust Monitor is the first representative survey to be conducted on this topic. To establish a benchmark for usage in the UK, respondents were asked to say whether they were aware of and whether they had used specific cognitive enhancing medication.

Questions in this section were answered by respondents using Computer Aided Self Interviewing (CASI). This meant that respondents were not asked questions directly by the interviewer, but instead took control of the interviewer's laptop and read and inputted the answers themselves. By conducting the interview in this way, respondents should feel less pressure to report falsely not having indulged in socially undesirable behaviour. Despite this, social desirability bias may still affect the answers respondents give. Furthermore, it should be noted that respondents were shown the clinical names of drugs and, as they were completing this section of the survey without the help of an interviewer, they were not able to ask for advice if they needed clarification on what any terms meant. This may have meant that respondents were not asked follow-up questions if they had taken a particular drug but did not recognise it by its clinical name, or if they did not fully understand what it is normally used for, but simply viewed it as a pill to improve concentration.

People adopt a variety of means to improve their cognitive function (Figure 6.9⁹⁶). Over half of adults (58 per cent) and two-thirds of young people (63 per cent) have completed puzzles or ‘brain-training’ games to try to improve their cognitive performance. This activity is more popular among adult women (63 per cent) than adult men (53 per cent). Among young people, this approach is more common among those who record high or medium scores on the knowledge quiz than those who record low scores (74 per cent, 64 per cent and 48 per cent respectively).

Figure 6.9: people’s previous use of methods to improve cognitive function

Q. To improve your focus, memory or concentration, have you ever tried any of following?



Ipsos MORI
Social Research Institute

Bases: 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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Taking vitamins or dietary supplements is the second most widely adopted means of trying to improve focus, memory or concentration. Over one-quarter of adults (27 per cent) and young people (29 per cent) say that they have tried this.

The use of caffeine pills and anxiety medication is uncommon. Fewer than one in ten adults and young people have taken caffeine pills to improve their cognitive function (7 per cent of each). Likewise, fewer than one in ten adults (8 per cent) and one in twenty young people (3 per cent) say they have taken anxiety or stress medication to improve their mental performance. There are no differences between sub-groups of adults or young people.

Reported use of cognitive enhancing medication taken normally for conditions such as ADHD and dementia is very rare among both adults and young people. One-quarter of adults (26 per cent) and one in five young people (22 per cent) say they have not tried any of these methods to improve their focus, memory or concentration.

Reported use of cognitive enhancers is very low. In total only 38 respondents⁹⁷ say that they have ever taken medications normally used to treat conditions like ADHD or dementia to

⁹⁶ Figure 6.9 shows data from CASII (press CTRL and click on question name to access data table).

⁹⁷ Given the small base size (38 respondents), numbers using cognitive enhancing drugs have been reported using unweighted numbers.

improve their focus, memory or concentration (whether with or without a prescription). This consisted of 29 adults (2 per cent) and nine young people (1 per cent).

A 2008 article in the *Health Service Journal* found that the average dispensing rate for Ritalin across England is one prescription for every 23 children under 16 (Gainsbury, 2008). While this figure is higher than findings from the Wellcome Trust Monitor suggest, it is important to note that it reflects dispensing levels, and not the number of children taking the drug, and could include repeat prescriptions for the same child. Furthermore, the *Health Service Journal* finding reflects Primary Care Trust records of prescribed use, while the Wellcome Trust Monitor looks at self-reported usage (with the implication that it is for a purpose other than treating the condition for which it is prescribed), which may be subject to under-identification, as outlined above.

Of the 29 adults and nine young people who say they have taken medication usually prescribed to treat conditions like ADHD or dementia, only five adults and two young people say that they have ever taken Ritalin, Donepezil, Provigil or Aderall. By contrast, 22 adults and seven young people say that they have taken cognitive enhancing medications, but not any of the named drugs. This may be because they could not recall the name of the medication they had taken, or because they had thought they had taken enhancers, but had not.

7. Science at school

This chapter explores young people's attitudes towards school science, comparing these where possible with the views of adults. In particular, it covers interest in science lessons, the perceived usefulness of school science for future careers, the issues faced when choosing science options at school, and what encourages or discourages the learning of science.

Key findings:

- As in 2009, young people rate their experience of science at school highly. Eighty-two per cent think that school science lessons are interesting (compared with 81 per cent in 2009), and 58 per cent say science lessons are more interesting than maths and English lessons. Their impression of secondary school science is particularly positive, with 83 per cent saying they have become more interested in the subject after primary school.
- Both adults and young people agree that studying science helps your career, regardless of the work you do. Seventy per cent of adults think that a good understanding of science will improve career prospects, while a similar proportion of young people (69 per cent) think science lessons provide useful skills for jobs unrelated to science. Adults are, however, somewhat less positive than in 2009 (when 79 per cent thought that a good understanding of science would help to improve career prospects), which may reflect a more general rise in concern over job prospects in the challenging economy of the preceding three years.
- Most young people (68 per cent) say they were able to choose all the science options they wanted to at school or college. Among the most common issues young people did face when choosing their options was a timetable clash, though even this only affected fewer than one in five.
- Of the various things that young people say encouraged or discouraged them when learning science, the quality of the teacher is the most commonly mentioned. Other important factors encouraging young people include the opportunity to conduct experiments, the chance to learn things relevant to real life, and science aiding future study or careers. Other factors commonly discouraging young people include science being too difficult or boring.

7.1. How interesting is school science?

Adults' and young people's experiences of school science

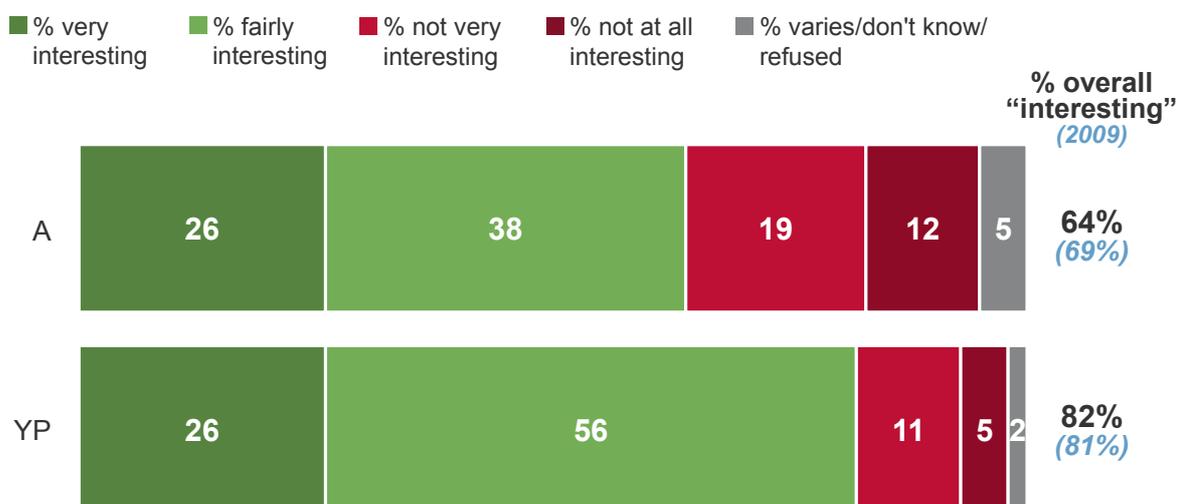
Both adults and young people think that the science lessons they had at school were interesting, as Figure 7.1⁹⁸ shows. As in the 2009 survey, those who have studied school science more recently tend to be more positive about their experience, with 82 per cent of young people saying school science lessons were very or fairly interesting, compared with 64 per cent of adults.

The proportion of young people who are positive (82 per cent) in the 2012 Wellcome Trust Monitor is consistent with that found in 2009 (81 per cent).

Young people's highly favourable view of school science lessons has also been corroborated by the online ASPIRES survey, countering the widely held perception that young people find science to be a boring subject. That survey found in 2011 that three-quarters (73 per cent) of 12-to-13-year-olds in secondary school in England felt they "learn interesting things in science" (Archer, 2013).

Figure 7.1: people's experiences of school science lessons, as shown by Adults (A) and Young People (YP)

Q. Overall, how interesting did/do you find science lessons at school?



Ipsos MORI
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Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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Within the adult population, the younger age groups are more likely to think science lessons at school were interesting. Seven in ten (71 per cent) of those aged 18-34 say school science lessons were interesting, compared with six in ten (61 per cent) of those aged 50-64 and five in ten (51 per cent) people aged 65 or over.

⁹⁸ Figure 7.1 shows data from [SciInt](#), [SchIntSc](#) (press CTRL and click on question name to access data table).

Among those aged 14-18, there is no difference in interest ratings between young men and young women. By contrast, among adults, women are less likely than men to say they found science lessons interesting (59 per cent compared with 69 per cent). Again, this corresponds with the 2009 survey, which found a difference by gender among adults, but not among young people who were currently studying or had recently studied school science. This could suggest that science lessons have become more engaging over successive generations, or it could reflect the fact that people find it harder to recall their positive feelings about school science lessons as they age. Meanwhile the lower level of interest observed among adult women, but not young women, could perhaps imply that teaching methods have changed to make young women more engaged with school science lessons, or that women's recollection of school science lessons is less favourable in hindsight.

The finding that young men and young women are equally likely to think school science lessons are interesting comes despite a real gender gap in school science in Years 12 and 13, with fewer young women than young men choosing chemistry, computing, maths and physics at A level, although young women do outnumber young men in biology.⁹⁹ The survey results suggest it is not lack of interest in school science but other issues (explored later in this chapter) which lead to this gender gap.

This finding supports much previous research. Haste (2004) that found young women were generally just as interested in science as young men, but often interested in different aspects of the subject. The Relevance of Science Education (ROSE) study, an international survey of 15-year-olds conducted in 2004, also found that young women in the UK were interested in different science topics to young men: while young men were more interested in things such as explosive chemicals, young women tended to prefer topics involving health and wellbeing (see Jenkins and Pell, 2006).

Moreover, the findings of the Wellcome Trust Monitor are similar to other research showing that it is not necessarily the subject itself that deters more young women than young men. Qualitative research by National Foundation for Education Research (NFER, 2011) for the Wellcome Trust has suggested that the male-dominated setting of science classrooms can put young women off studying science. The Institute of Physics (2012) has also highlighted research showing that what happens outside of the classroom, in terms of gender stereotyping and shortage of female role models, also plays an important part.

⁹⁹ A breakdown of 2012 A-level entrants is available on the Joint Council for Qualifications website: www.jcq.org.uk/examination-results/a-levels.

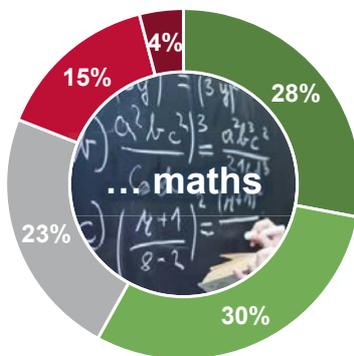
How do science lessons compare to other subjects?

Figure 7.2¹⁰⁰ shows that three in five young people find school science lessons more interesting than lessons in the other core subjects of maths (58 per cent) and English (58 per cent). Again, these figures are in line with those from 2009. The findings also match a recent BIS/Opinion Panel (2011) survey of an online panel of 14-to-16-year-olds, which found that young people were most likely to rate science as their favourite subject from a list of school subjects.¹⁰¹

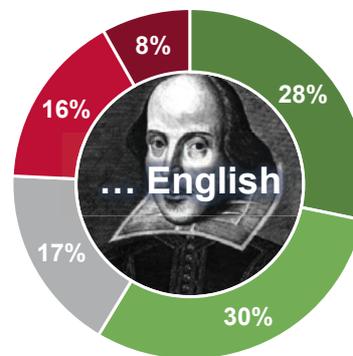
Figure 7.2: young people's interest in school science compared with other subjects

Q. In general, how interesting do/did you find studying science compared with studying ... ?

■ % a lot more interesting ■ % a little more interesting ■ % about the same ■ % a little less interesting ■ % a lot less interesting



58% find science "more interesting" in 2012
(58% in 2009)



58% find science "more interesting" in 2012
(55% in 2009)

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Social Research Institute

Base (for Wave 2): 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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Young women are more likely than young men to say they find science lessons less interesting than English lessons (32 per cent compared with 18 per cent). This may help to explain the gender gap among young people noted earlier. Although both young women and young men find science interesting in equal numbers, young women more often find it less interesting than other subjects, such as English. However, it is important to note that half (51 per cent) of young women still say that studying science is more interesting than studying English. This gender difference is not new, and is not unique to the UK. The ROSE study of 15-year-olds across many European countries also found that young women were more likely than young men to find science less interesting than other subjects (see Sjøberg and Schreiner, 2010).

¹⁰⁰ Figure 7.2 shows data from [SchIntMa](#), [SchIntEn](#) (press CTRL and click on question name to access data table).

¹⁰¹ It should be noted, however, that order effects may have had a large bearing on the BIS/Opinion Panel (2011) survey, as respondents answered other questions about science before being asked what their favourite subject was. Other surveys, such as the 2011 ASPIRES survey of 12-to-13-year-olds, found that science was rated behind English and maths in terms of favourite subjects.

Primary versus secondary school science

Over four-fifths (83 per cent) of young people say they have become more interested in learning about science since finishing primary school, with half (49 per cent) saying they have become a lot more interested (Figure 7.3¹⁰²). Once again, these findings are consistent with those found in 2009 (when 84 per cent said they became more interested).

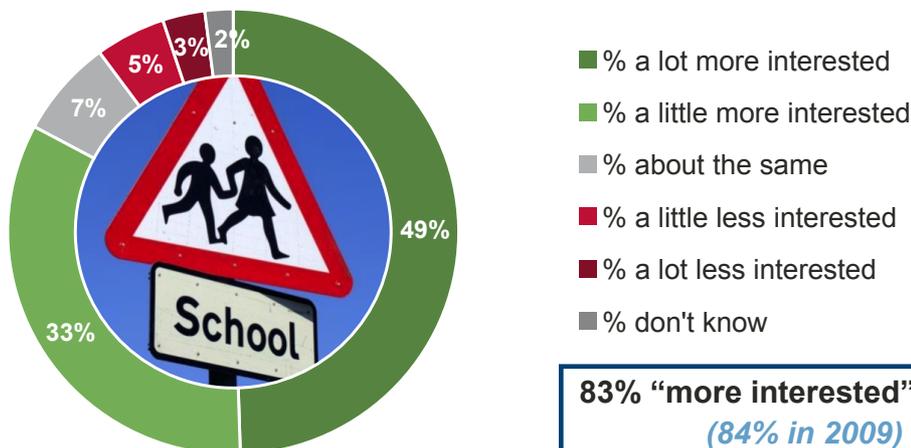
Of course, it is worth noting that the 14-to-18-year-olds surveyed may not accurately remember how they felt about science while they were in primary school. Previous longitudinal studies asking children and young people to rate science lessons first in primary school, then again in secondary school, present a mixed picture. Older studies, such as Galton (2009), have found that attitudes to science become less positive when moving from primary school to secondary school. Studies by Barmby, Kind and Jones (2008) and Reiss (2004) have also suggested that UK pupils' attitudes to school science continue to decline throughout secondary school¹⁰³.

On the other hand, the more recent ASPIRES survey – undertaken in 2009 and 2011 – suggests that young people's interest in school science lessons stays largely unchanged between Year 6 in primary school and Year 8 in secondary school (see Archer, 2013).

The results of the Wellcome Trust Monitor show at the very least that most young people view their secondary school science lessons in a highly positive light.

Figure 7.3: young people's perceptions of primary compared with secondary school science lessons

Q. Did you become more or less interested in learning science at secondary school compared with primary school?



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Social Research Institute

Base (for Wave 2): 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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¹⁰² Figure 7.3 shows data from [SchPrSec](#) (press CTRL and click on question name to access data table).

¹⁰³ The studies covered in Galton (2009) and Reiss (2004) were longitudinal, while the data analysed in Barmby, Kind and Jones (2008) was from a cross-sectional study of Year 7, 8 and 9 pupils.

Previous research has found that young women's attitudes to school science decline more sharply than those of young men when transitioning from primary to secondary education (Galton, 2009). However, the Wellcome Trust Monitor finds no evident difference between young men's and young women's perceptions of secondary compared with primary school science.

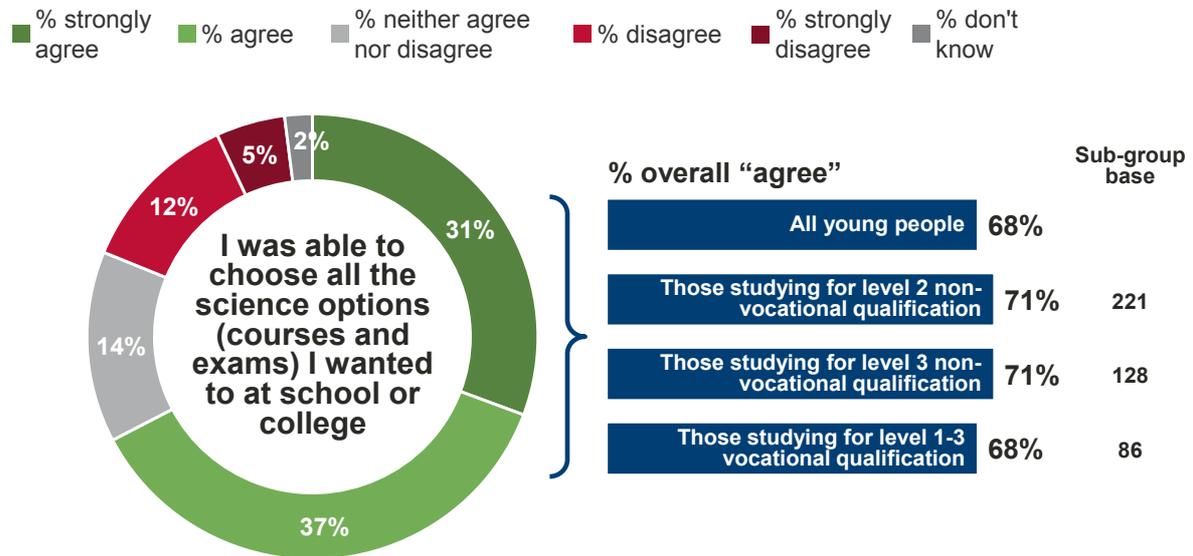
7.2. Young people's experience when choosing science options

Qualitative research by NFER (2011) for the Wellcome Trust has shown that for some young people, getting a guaranteed place on school science courses has been difficult, which has put them off studying science. However, the 2012 Wellcome Trust Monitor shows that this tends to affect a minority of young people. Around two-thirds (68 per cent) of young people agree that they were able to choose all the science options they wanted to at school or college. Just 16 per cent disagree, with 5 per cent strongly disagreeing, as Figure 7.4¹⁰⁴ shows.

These proportions are broadly constant regardless of whether someone is studying for level 2 qualifications such as GCSEs (71 per cent agree), level 3 qualifications such as A levels (71 per cent), or vocational qualifications such as NVQs (68 per cent).

Figure 7.4: whether young people feel able to choose preferred science options

Q. How much do you agree or disagree with the following statement?



Ipsos MORI Social Research Institute Base (unless otherwise stated): 460 UK young people aged 14-18 Fieldwork dates: 21 May to 22 October 2012

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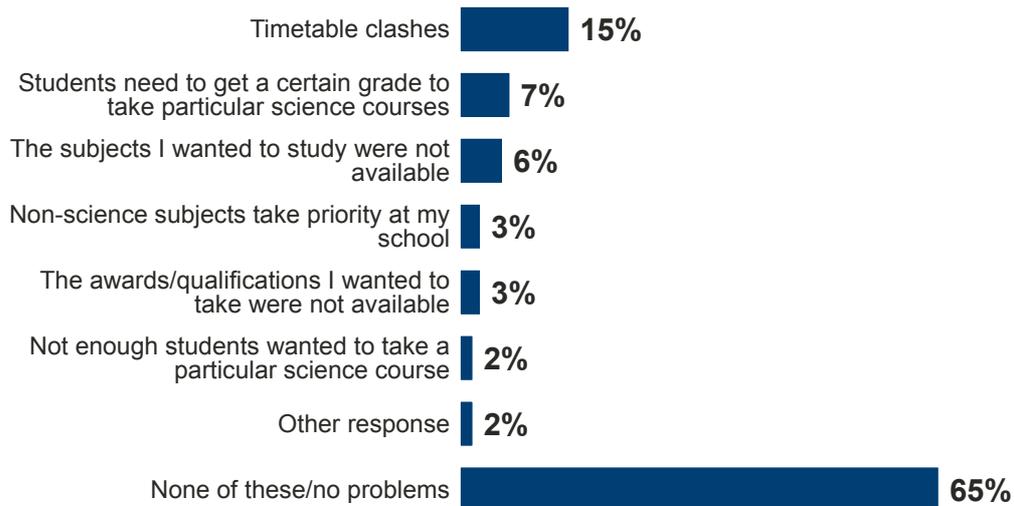
Once more, views do differ by gender, with young women less likely to agree overall than young men that they were able to choose the science options they wanted (59 per cent, compared with 76 per cent). However, young women are not more likely to disagree that they were able to choose the science options they wanted to. Instead, they are more likely to show no strong feelings (18 per cent say that they neither agree nor disagree, compared with 10 per cent of young men).

¹⁰⁴ Figure 7.4 shows data from [SciOptio](#) (press CTRL and click on question name to access data table).

Figure 7.5¹⁰⁵ shows that timetable clashes are one of the most common problems young people face when selecting science options, although even this only affects 15 per cent of the young people choosing their options. Other issues tend to affect only a very small minority of young people, such as requiring a particular grade to do the course (7 per cent) or preferred science courses not being available (6 per cent).

Figure 7.5: problems young people faced when choosing science options

Q. Which, if any, of the problems on this card did you face when selecting your science options at school or college?



Ipsos MORI
Social Research Institute

Base: 438 UK young people who have chosen their science options
Fieldwork dates: 21 May to 22 October 2012

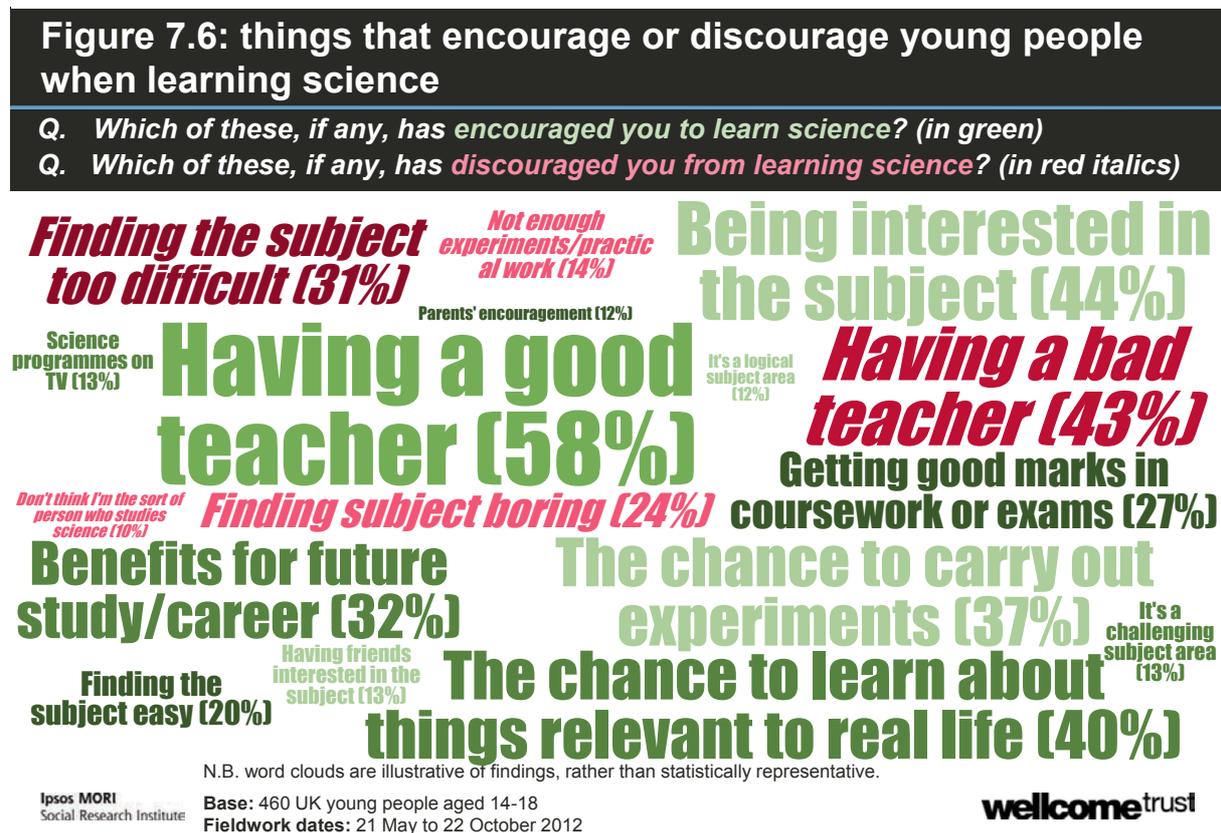
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There are no significant differences between young men and young women in terms of the problems they face in selecting science options.

¹⁰⁵ Figure 7.5 shows data from [OptioWhy](#) (press CTRL and click on question name to access data table).

7.3. What encourages or discourages young people learning school science?

Figure 7.6¹⁰⁶ displays the things that have encouraged and discouraged young people when learning science at school in the form of a word cloud. The statements in green show the answers people gave for what encouraged them personally, while statements in red show what has discouraged them. The font size of the text is broadly proportional to the percentage of young people choosing each statement.



In particular, these data highlight the important role of science teachers, with six in ten (58 per cent) saying having a good teacher encouraged them to study science, and over four in ten (43 per cent) saying that having a bad teacher discouraged them. This also mirrors the results of the Public Attitudes to Science (BIS, 2011) study, which found in qualitative general public workshops that science teachers were also influential in shaping people's outlook on science later in life.

Other important factors encouraging young people to learn science, and which might make science stand out from other subjects, include the chance to learn things relevant to real life (40 per cent), the chance to do experiments (37 per cent) and the benefits science offers for future study or careers (32 per cent). Other factors that have commonly put young people off science include it being too difficult (31 per cent) or it being too boring (24 per cent).

These questions are not directly comparable to their counterparts in the 2009 survey, due to the addition of new answer options in 2012. However, it is worth noting that in both surveys, the top three answers for what has encouraged and what has discouraged people to learn science have remained the same. In 2009, half (52 per cent) said that having a good teacher

¹⁰⁶ Figure 7.6 shows data from [SchEnc](#), [SchDis](#) (press CTRL and click on question name to access data table).

encouraged them while just under half (47 per cent) said a bad teacher discouraged them. This further emphasises the value of having a good science teacher, and the importance that young people attach to doing experiments and practical work in science lessons.

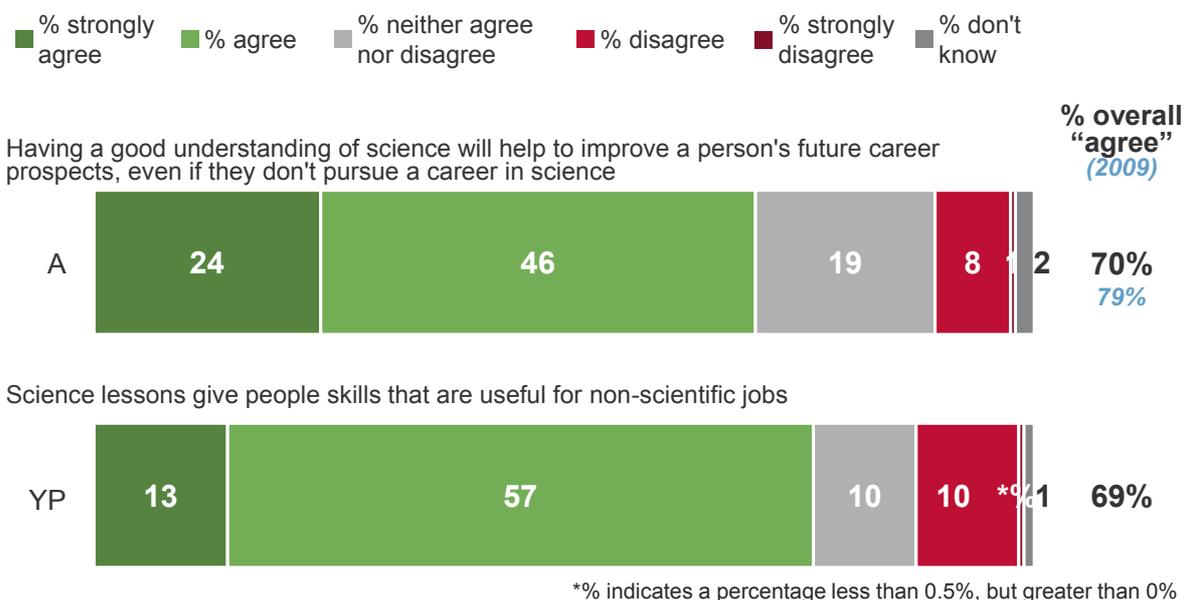
Young men are somewhat more likely than young women to say that they have been encouraged to study science because it is a logical subject area (16 per cent, compared with 7 per cent) and because it complements other subjects they are taking (9 per cent, compared with 3 per cent). However, other than this, there are no discernible differences by gender, with the factors that have most commonly encouraged young women to study science being the same as those that have encouraged young men.

7.4. How useful is studying science for future job prospects?

Figure 7.7¹⁰⁷ shows that both adults and young people think that studying science will help someone's career prospects, regardless of the sort of job they do. Seven in ten (70 per cent) adults agree that "having a good understanding of science will help to improve a person's future career prospects, even if they don't pursue a career in science", and a similar proportion (69 per cent) of young people agree that "science lessons give people skills that are useful for non-scientific jobs".

Figure 7.7: perceived usefulness of studying science for future job prospects, as shown by Adults (A) and Young People (YP)

Q. How much do you agree or disagree with the following statement?



Ipsos MORI Social Research Institute Bases (for Wave 2): 1,396 UK adults aged 18+; 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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However, adults are also less convinced than they were previously about the usefulness of science for future career prospects, with the proportion agreeing declining by nine percentage points since 2009. In part, this change may again be due to the poor economic situation, and a more general concern about future job prospects.

The more someone has studied science, the more likely they are to agree that the subject helps to improve career prospects. Adults who have studied a science subject at university are most likely to agree (85 per cent), followed by those who have a science-related qualification from school or college (67 per cent), and those who have never studied for a science-related qualification (66 per cent).

Furthermore, greater exposure to science from others seems to influence how useful people think it would be for future careers. Adults who live with someone else working in a scientific or medical field are more likely to agree that science helps to improve career prospects than those who do not have this exposure (81 per cent compared with 67 per cent).

¹⁰⁷ Figure 7.7 shows data from [SciCaree](#), [SciSkill](#) (press CTRL and click on question name to access data table).

8. Future careers

This chapter is concerned with young people's attitudes towards future careers in science. It starts by looking at how knowledgeable young people feel they are about these types of careers. It then looks at where young people find out about careers in science, their perceptions of such careers, and their overall impressions of scientists.

Key findings:

- Most young people report that they know little or nothing about scientific careers (63 per cent) or STEM (science, technology, engineering and maths) careers (55 per cent).
- The majority of young people obtain information about possible careers from their family (67 per cent), teachers (49 per cent), or career advisors at school (44 per cent). Thirty-nine per cent feel that family is the most useful source of careers information. This is followed by careers advisors (23 per cent) and teachers (18 per cent).
- Of the 61 per cent of young people who have done work experience, 28 per cent say that their work experience was in a STEM field. Fewer young women than young men say that they have done STEM-related work experience.
- A large majority (82 per cent) of young people consider science to be a good area of employment to go into. The main reasons for this include good pay, interesting work, the wide variety of different jobs available and the ability to make interesting discoveries.
- When asked if they would be interested in a scientific career, one in eight (14 per cent) young people say they are very interested, with a further 27 per cent fairly interested. The most popular choices of scientific career include medicine (24 per cent of young people interested in a career in science), biology (21 per cent), chemistry (13 per cent), forensic science (11 per cent) and engineering (9 per cent).
- Of the small proportion (13 per cent) of young people who do not think science is a good area of employment, four in ten (41 per cent) think there is only a limited number of jobs available in the field. The same proportion think the field requires too many qualifications and 29 per cent say it is too competitive to get into.
- Three-quarters (72 per cent) of young people feel that scientists can come from a wide range of backgrounds, and only one in four feels that there are not many female scientists. However, young women are more likely to be concerned about science not being a field for "people like me" than young men are.

8.1. How much do young people feel they know about careers?

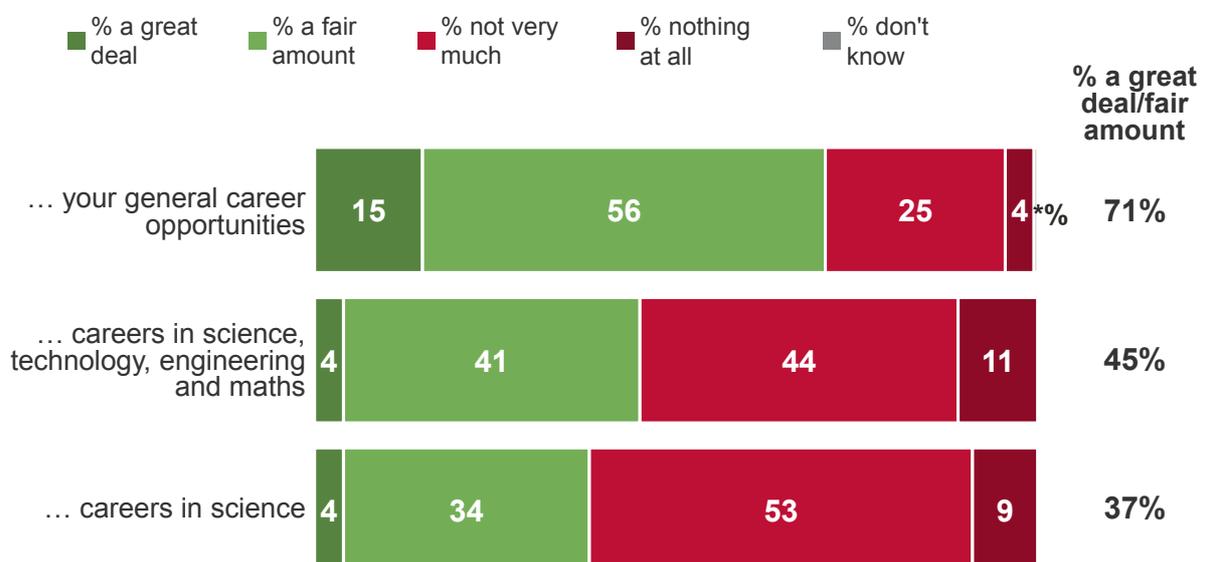
The National Audit Office (2010) has noted that improving careers information and guidance is one of the critical factors in improving take-up and achievement in science and maths. In its 2008 survey of young people post-GCSE through to graduate level, it found that only 18 per cent were satisfied with the careers advice they had received for STEM subjects (science, technology, engineering and maths). This Wellcome Trust Monitor therefore asked new questions exploring how knowledgeable young people feel about careers in science, relative to other careers.

As Figure 8.1¹⁰⁸ shows, over six in ten (63 per cent) of young people say they know little or nothing about careers in science, while only 4 per cent say they know a great deal. Perceived knowledge of the broader range of careers related to STEM subjects is little better, with over five in ten (55 per cent) saying they know little or nothing about these careers. Even among those who are personally interested in a career in science (something explored later in this chapter), four in ten (41 per cent) feel they know little or nothing about science careers, and almost five in ten (47 per cent) say this about STEM careers.

While the proportion saying they know little or nothing is high, it should be borne in mind that a substantial proportion (29 per cent) of young people also say they know little or nothing about careers in general.

Figure 8.1: young people's relative knowledge of science careers

Q. How much, if anything, do you know about ... ?



Ipsos MORI
Social Research Institute

Base: 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

*% indicates a percentage less than 0.5%, but greater than 0%

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As might be expected, those who have passed the current UK minimum school leaving age of 16 tend to feel more knowledgeable about careers generally, with 78 per cent of those aged

¹⁰⁸ Figure 8.1 shows data from [CarGen](#), [CarSci](#), [CarSTEM](#) (press CTRL and click on question name to access data table).

17-18 saying they know a great deal or a fair amount about careers, compared with 65 per cent of those aged 14-16.

Young men and young women tend to feel equally knowledgeable about careers in general and about careers in science specifically. However, there is a marked difference when it comes to perceived knowledge of broader STEM careers, with young women more likely than young men to say they know little or nothing about these careers (64 per cent, compared with 47 per cent). This reflects the fact that the gender gap is particularly acute when it comes to careers centred on technology, engineering and maths. As noted in Chapter 7, uptake of subjects that allow entry into these kinds of careers (such as A levels in computing, maths and physics) tends to be far lower among young women than young men.

8.2. Where do young people find out about careers in science?

Given the relatively low levels of awareness about science-related careers discussed in the previous section, it is important to explore how young people might find out about these careers. This Wellcome Trust Monitor asked new questions about where people get careers advice generally and, more specifically, whether they have done any STEM-related work experience.

Where do young people get careers advice?

Most young people have received information, advice and guidance about careers from various sources. When asked which of a list of sources they have used, three-quarters (74 per cent) of young people note at least two sources, while over half (54 per cent) mention at least three.

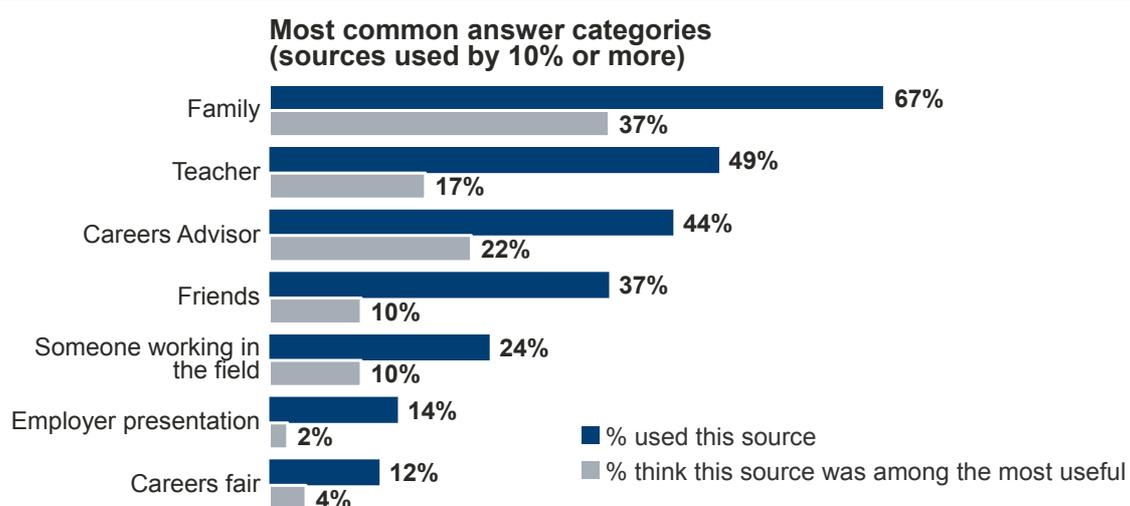
Figure 8.2¹⁰⁹ shows that young people have received careers advice from various sources outside of a school setting, with family (67 per cent) being the most common. Outside of this, they most commonly get careers advice from teachers (49 per cent), career advisors at school or college (44 per cent) and friends (37 per cent). Use of online sources, such as a Careers Advisory Service website (8 per cent), the Directgov website (5 per cent) or other websites (8 per cent), is particularly low.

When considering which of these sources was most useful, the most common answer given is again family (mentioned by 37 per cent of all young people). This is followed by careers advisors (23 per cent) and teachers (17 per cent). Friends and people already working in the relevant field are each mentioned by 10 per cent of young people.

Figure 8.2: young people's sources of information about careers

Q. Have you ever received information, advice or guidance about what you may do for a career from any of the sources on this card?

Q. Which of the following have been most useful in helping you think about what you want to do as a career?



Ipsos MORI Social Research Institute
Base: 460 UK young people aged 14-18
Fieldwork dates: 21 May to 22 October 2012

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¹⁰⁹ Figure 8.2 shows data from [CarAdv](#), [CarAdUse](#) (press CTRL and click on question name to access data table).

It is worth noting that teachers and careers advisors are more common sources of careers advice among young people who are personally interested in careers in science. Over half (56 per cent, compared with 45 per cent of those not interested in a career in science) have received advice from teachers, and half (51 per cent, compared with 38 per cent of those not interested in a career in science) have received advice from careers advisors.

Those personally interested in science-related careers are also somewhat more likely to rate talking to someone working in the relevant field as being among the most useful sources of careers advice they have received (15 per cent, compared with 8 per cent of those not interested).

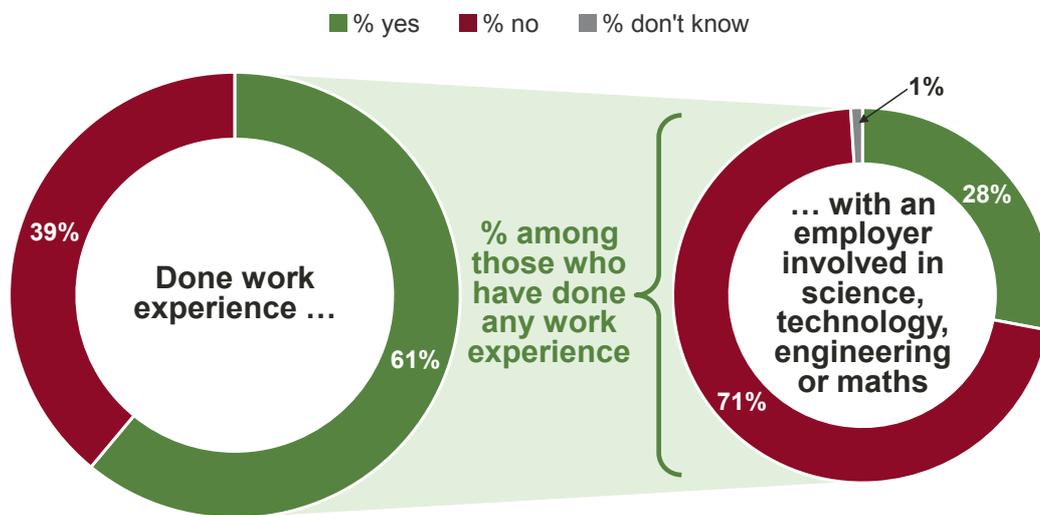
Work experience in STEM

As Figure 8.3¹¹⁰ shows, six in ten young people (61 per cent) have had some kind of work experience. Of these, around three in ten (28 per cent) say that their work experience was with an employer working in a STEM-related field. Thus, overall, 17 per cent of all young people have had STEM work experience. This seems proportionate, given that a recent report for the Science Council (TBR, 2010) found that around 20 per cent of the UK workforce is employed in science-related roles.

Figure 8.3: whether young people have had STEM-related work experience

Q. Have you ever done any work experience?

Q. Was your work experience with an employer involved in science, technology, engineering or maths?



Ipsos MORI
Social Research Institute

Bases: 460 UK young people aged 14-18; 265 who have done work experience
Fieldwork dates : 21 May to 22 October 2012

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Fewer young women than young men say that they did work experience in a STEM field (21 per cent compared with 35 per cent). As discussed later in this chapter, young men and women are equally interested in pursuing a career in science, so rather than indicating a lack of enthusiasm among young women to work in science, this finding potentially highlights that they are getting fewer opportunities to do so.

¹¹⁰ Figure 8.3 shows data from [WorkExp](#), [WorkExSc](#) (press CTRL and click on question name to access data table).

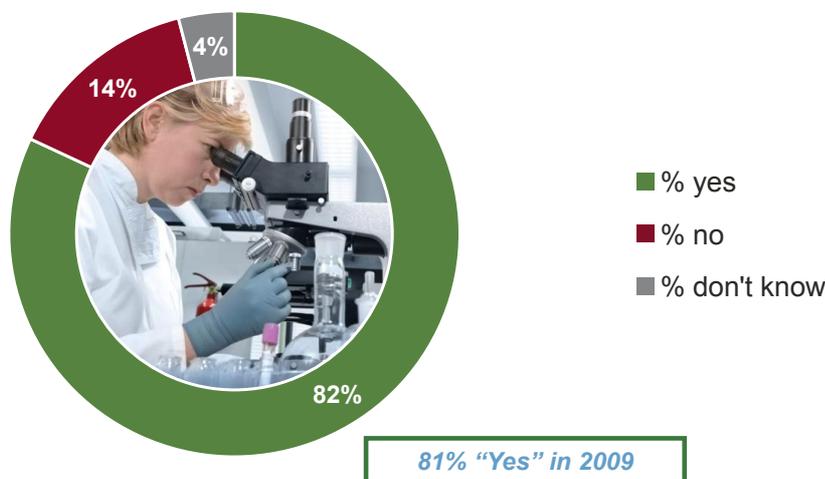
8.3. What do young people think about careers in science?

Is science a good area to work in?

Young people tend to think highly of a career in science. Four-fifths (82 per cent) of young people consider science to be a good area of employment and only one in eight (14 per cent) do not, as Figure 8.4¹¹¹ shows. This is comparable to the 2009 figures.

Figure 8.4: young people's views of science as a career

Q. Thinking about young people in general, do you think that science is a good area of employment for young people to go into?



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Social Research Institute

Base (for Wave 2): 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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This positive view of careers in science is consistent across gender and age groups. Even among those who are not personally interested in working in science, the vast majority (74 per cent) think it is a good area to work in.

While the Wellcome Trust Monitor finds that young men and young women have the same positive view of a career in science, this may not be the case among adults. The Public Attitudes to Science (BIS, 2011) survey found that men were more likely than women to think that jobs in science were interesting. This suggests that, as with views on school science (covered in Chapter 7), differences in attitudes to science by gender are more marked among adults than among young people.

Those who find science lessons at school interesting are also more likely than those who do not to feel that science is a good area of employment (84 per cent, compared with 71 per cent). This suggests that impressions of science at school do end up influencing young people's views of the world of science more generally.

¹¹¹ Figure 8.4 shows data from [CarGood](#) (press CTRL and click on question name to access data table).

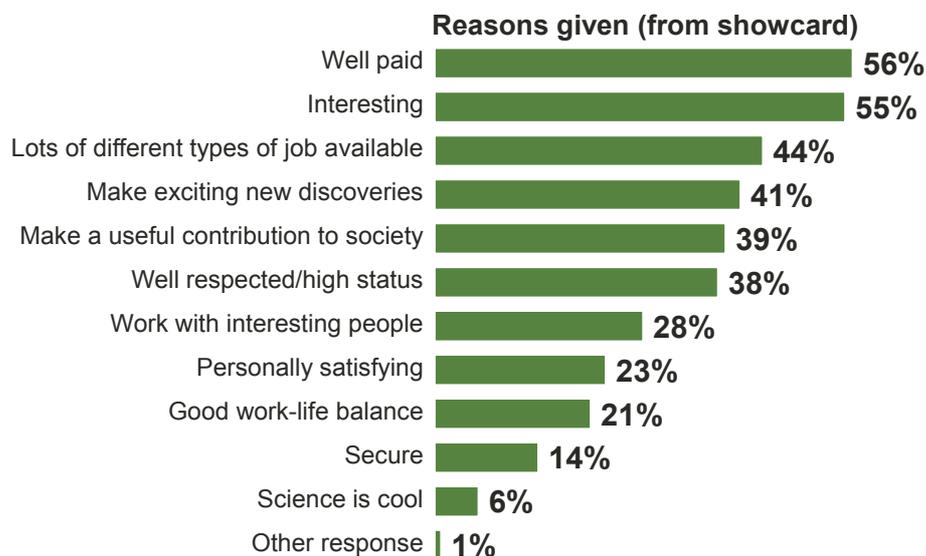
What makes science a good or bad area to work in?

Young respondents who said that science is or is not a good area of employment were asked why they said this, choosing their answers from a predefined list of reasons. Figures 8.5¹¹² and 8.6¹¹³ display the responses.

Among the 82 per cent of young people who think science is a good area to work in, the most common reasons they give for this are that it is well-paid (56 per cent) and interesting work (55 per cent). Other specific aspects of working in science that stand out to young people include the range of opportunities (44 per cent), the ability to discover new things (41 per cent), the chance to make a useful contribution to society (39 per cent) and scientists being highly regarded (38 per cent). On the other hand, few young people pick out science as being a “cool” career (6 per cent).

Figure 8.5: reasons behind young people’s positive views of science as a career

Q. Why do you think that science is a good area of employment for young people to go into?



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Social Research Institute

Base: 380 UK young people who think science is a good area of employment
Fieldwork dates: 21 May to 22 October 2012

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Among the 14 per cent who think science is not a good area of employment, a perceived limited range of opportunities features as a strongly negative aspect of a career in science (41 per cent select this), although a far greater number of young people overall consider the range of opportunities a strongly positive aspect of employment in science. This highlights a potential lack of awareness, among those who view science-related careers negatively, of the actual range of career opportunities available within science.

Other common reasons for thinking science is not a good area of employment relate to it being a particularly challenging area. Of those who think it is not a good career, 41 per cent say too many qualifications are needed to work in science, and 29 per cent say it is too hard to get into.

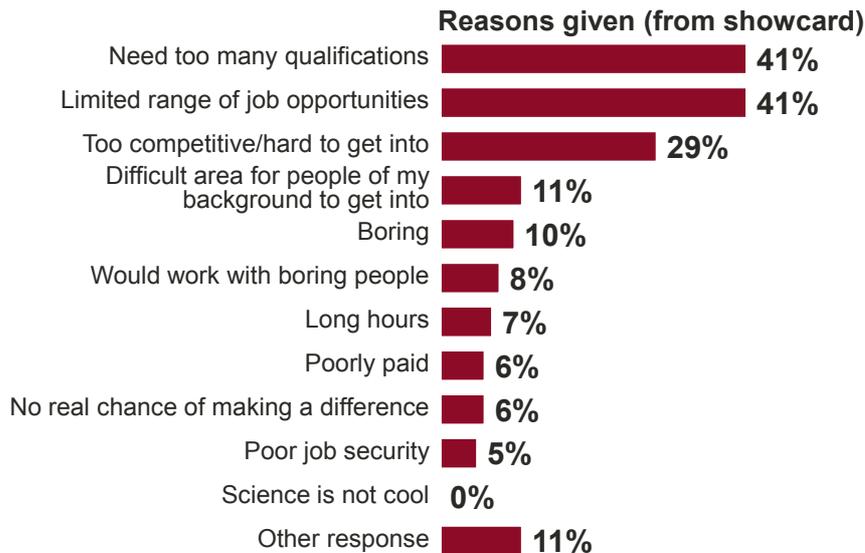
¹¹² Figure 8.5 shows data from [CarGdW](#) (press CTRL and click on question name to access data table).

¹¹³ Figure 8.6 shows data from [CarBdW](#) (press CTRL and click on question name to access data table).

These questions are not directly comparable to similar questions asked in the 2009 survey, due to the addition of new answer options in 2012. However, the ranking of the answer options that were featured on both surveys is broadly consistent, indicating that the aspects of careers in science that young people regarded as favourable in 2009 are still the standout aspects in 2012.

Figure 8.6: reasons behind young people's negative views of science as a career

Q. Why do you think that science is not a good area of employment for young people to go into?



Ipsos MORI
Social Research Institute

Base: 60 UK young people who think science is not a good area of employment
Fieldwork dates: 21 May to 22 October 2012

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In terms of sub-groups, there is very little difference by gender or age. However, among the young people who think of science as a good area of employment, young women are more likely than young men to pick out the many different types of jobs available as an important factor (51 per cent compared with 38 per cent). Young men are more likely than young women to think that a scientific career offers no real chance to make a difference (13 per cent, compared with 0 per cent).

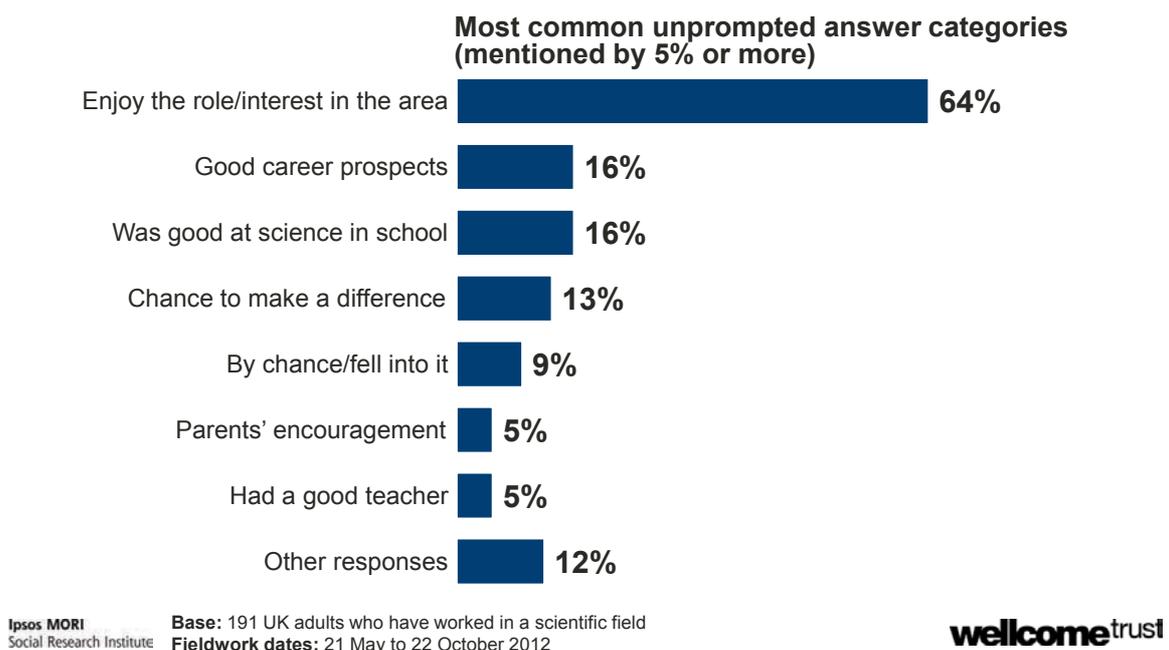
What made adults pursue a career in science or medicine?

The Wellcome Trust Monitor also asked adult respondents whether they had worked in a science or medical field, and why they had chosen to do so (responses to this question were unprompted). Reflecting on this helps to provide a better understanding of the possible ways in which scientific careers can be made more attractive to young people.

Thirteen per cent of adults have had a job in a scientific or medical field, and their reasons for choosing this are shown in Figure 8.7¹¹⁴. Of these, two-thirds (64 per cent) give their reason as personal interest in the area or that they enjoyed this type of role. Other responses are generally similar to those noted by young people as reasons for why science is a good area of employment (see earlier in this section), including good career prospects and the chance to make a difference. This indicates that the factors that attract people to working in science have largely remained consistent across generations. Outside of this, the responses again highlight the importance of good science teachers and of parents in shaping attitudes towards science (as discussed in Chapter 7).

Figure 8.7: adults' reasons for choosing a career in science

Q. Why did you pursue a job in a scientific or medical field?



¹¹⁴ Figure 8.7 shows data from [YesSciJb](#) (press CTRL and click on question name to access data table).

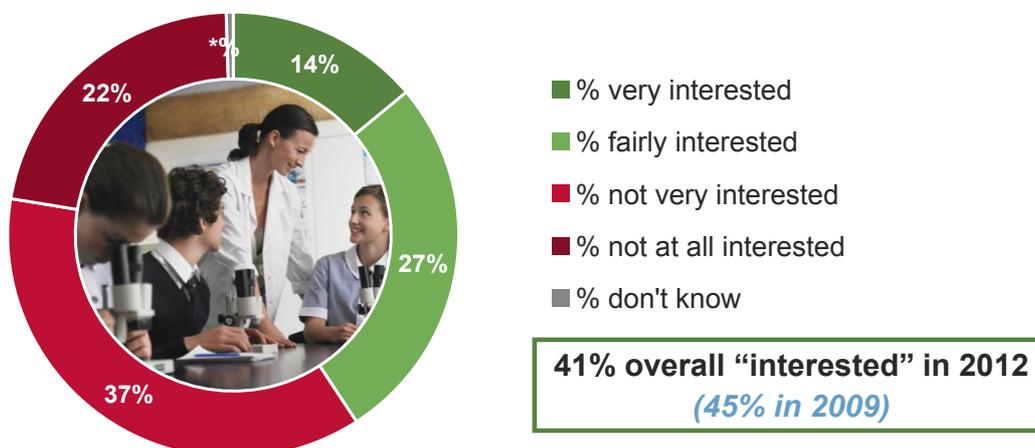
Personal interest in science-related careers among young people

Four in ten young people (41 per cent) are personally interested in pursuing a career in science, with one in seven (14 per cent) saying they are very interested (Figure 8.8¹¹⁵). These figures are not significantly different from the 2009 findings.

A small majority (59 per cent), therefore, are not personally interested in a career in science. This provides a stark contrast with the overwhelming majority (82 per cent, as noted earlier in this section) who see science as a good area of employment in general. The large gap between these figures suggests that there is a sizable group of young people who see science as a good area of employment, but not for people like them. This is something that Archer et al. (2010) have previously noted from qualitative research among children who enjoyed doing science, but still rejected the possibility of being a scientist because of the negative stereotypes associated with scientists. The findings of the Monitor suggest that the high entry requirements are more significant than image factors in deterring young people from showing an interest in scientific careers: only 11 per cent of young people who think that science is not a good area of employment for young people say that it is difficult for people from their background to be a scientist; only 8 per cent say that a career in science would mean working with boring people. By contrast, 41 per cent of young people who think that science is not a good area of employment for young people believe that scientific careers require too many qualifications, while 29 per cent say that scientific careers are too competitive.

Figure 8.8: personal interest in a career in science among young people

Q. How interested are you personally in a future career in science?



*% indicates a percentage less than 0.5%, but greater than 0%

Ipsos MORI
Social Research Institute

Base (for Wave 2): 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

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There are no discernible differences between young women and young men, or between different age groups, in terms of level of interest in scientific careers. The similar levels of

¹¹⁵ Figure 8.8 shows data from [CarInt](#) (press CTRL and click on question name to access data table).

interest across genders comes despite the fact that, among young people who have done some kind of work experience, only one in five young women (21 per cent) did so in a STEM-related field, compared with one in three young men (35 per cent).

The data also suggest that parental influence is important in whether or not young people aspire to a scientific career. Among young people who say at least one of their parents is interested in science, 47 per cent are themselves interested in a future career in science, compared to 35 per cent who say their parents are not interested in science. The importance of parental attitudes to science for young people's career aspirations has also been found both qualitatively and quantitatively as part of the ASPIRES study (see Archer et al., 2012, and DeWitt et al., 2011)

Again, there is also a link between how young people see science at school and how they see science as a career: 47 per cent of those who say they find school science lessons interesting are also interested in a future career in science, compared with 11 per cent of young people who are not interested in school science. Nonetheless, even among the young people who are interested in science at school, half (53 per cent) are not personally interested in pursuing a career in the subject – this once more reflects the distinction found in Archer et al. (2010) between attitudes to doing science at school and to being a scientist.

What science-related careers are young people interested in?

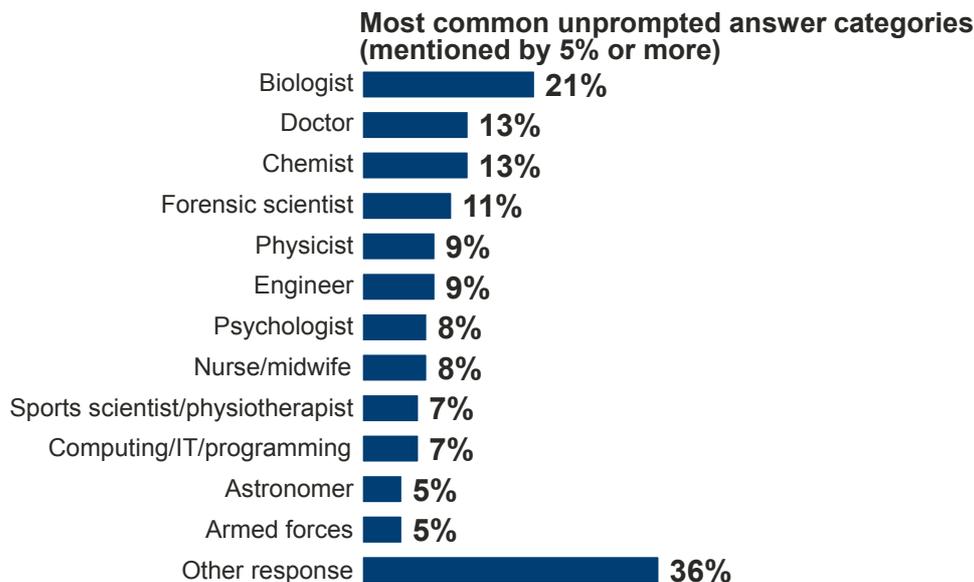
Young people who said they were interested in a future career in science were asked to specify what type of career they meant. Most of these young people (66 per cent) only mention one career, with just one third (34 per cent) having more than one career in mind. This limited range of scientific jobs that young people are interested in has also been noted in previous qualitative work conducted by NFER (2011) for the Wellcome Trust.

Figure 8.9¹¹⁶ shows the most common unprompted responses. As might be expected, given young people's familiarity with school science, working in the core sciences as a biologist (21 per cent), chemist (13 per cent) or physicist (9 per cent) are among the more popular choices. There are common aspirations to work in medical careers, with a quarter (24 per cent) selecting a related career.¹¹⁷ Medicine also featured highly when this question was asked in 2009, with 27 per cent saying they were interested in working in this area.¹¹⁸

The relatively high figure for forensic science (11 per cent), despite it being a very niche science-related career, is possibly explained by the prominence of television programmes about these professions, such as *CSI* and *Silent Witness*.

Figure 8.9: the types of scientific careers young people are interested in

Q. What scientific careers would you be interested in?



Ipsos MORI
Social Research Institute

Base: 196 UK young people interested in a future career in science
Fieldwork dates: 21 May to 22 October 2012

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The 2009 survey found that, among those who were interested in a career in science, young women were more likely than young men to say they were interested in a medical career. This

¹¹⁶ Figure 8.9 shows data from [CarWht](#) (press CTRL and click on question name to access data table).

¹¹⁷ This includes respondents who selected doctors, nurses and midwives, dentists or pharmacists. Questions related specifically to medical research were asked after the questions on science-related careers, in order to avoid the question order affecting responses to this question.

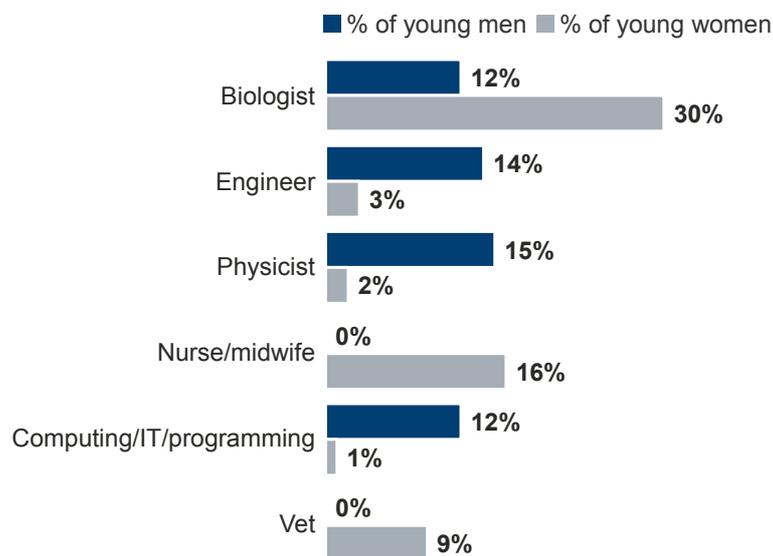
¹¹⁸ For this question, changes to the coding approach since 2009 mean that direct wave-on-wave comparisons of individual answer categories are not possible. However, we can still make general comparisons.

difference persists in 2012, with 34 per cent of young women expressing interest in working in a medical career, compared with 14 per cent per cent of young men¹¹⁹.

The 2012 data also suggest further differences between genders, which typically reflect stereotypes around masculine and feminine professions. Figure 8.10¹²⁰ shows all the categories in which there were significant differences. Young women are more likely than young men to be interested in careers as a biologist (30 per cent, compared with 12 per cent), as a nurse or midwife (16 per cent, compared with no young men giving this response), or as a vet (9 per cent, compared with no young men saying this). Conversely, young men are more likely than young women to express an interest in careers as a physicist (15 per cent, compared with 2 per cent), in engineering (14 per cent, compared with 3 per cent) or in IT (12 per cent, compared with 1 per cent). These differences are again similar to those found in 2009.

Figure 8.10: differences between the types of scientific careers young men and young women are interested in

Q. What scientific careers would you be interested in?



Ipsos MORI
Social Research Institute

Base: 98 UK young men aged 14-18 and 98 UK young women aged 14-18 interested in a future career in science
Fieldwork dates: 21 May to 22 October 2012

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It is possible that young people's career aspirations evolve as they get older, and that the aspirations of the 17-18 age group – who will be closer to making choices on whether they study STEM subjects further – are more reflective of the paths they will eventually take. However, the Monitor finds no significant differences by age (though base sizes are small).

¹¹⁹ Again, this includes respondents who selected doctors, nurses and midwives, dentists or pharmacists.

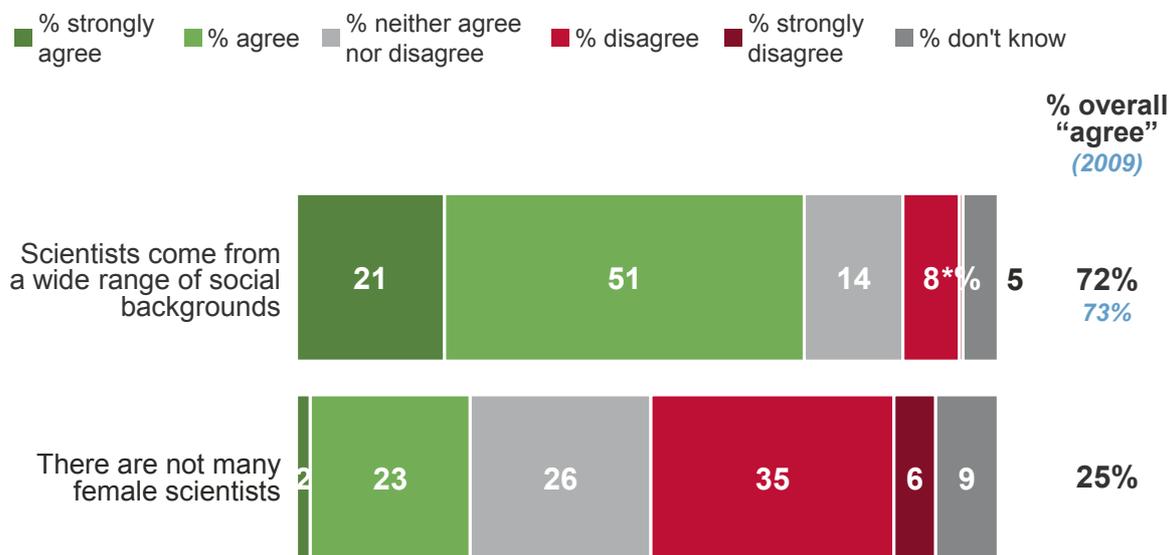
¹²⁰ Figure 8.10 shows data from [CarWht](#) (press CTRL and click on question name to access data table).

8.4. Young people's perceptions of scientists

Previous research has consistently highlighted that children and young people tend to have stereotypical views of scientists, making them less keen to consider a career in science for themselves. Archer et al. (2010) found that children tended to think of scientists as eccentrics, and typically as white males. Potter and Parvin (2008) similarly found that children aged 9-14 saw scientists as cut off from the rest of the world, working in a job that did not require communication skills. To further explore the extent to which young people think science is something carried out by people like them, the Wellcome Trust Monitor asked young respondents how much they agree with a pair of statements about scientists, shown in Figure 8.11¹²¹.

Figure 8.11: young people's views of scientists

Q. How much do you agree or disagree with the following statement?



Ipsos MORI
Social Research Institute

Base (for Wave 2): 460 UK young people aged 14-18
Fieldwork dates (for Wave 2): 21 May to 22 October 2012

*% indicates a percentage less than 0.5%, but greater than 0%

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Seven in ten young people (72 per cent) agree overall that “scientists come from a wide range of social backgrounds”, with one in five (21 per cent) strongly agreeing. Only 8 per cent disagree with this statement. Although the overall proportion agreeing is identical to the 2009 result, the proportion strongly agreeing has increased since 2009, by seven percentage points (from 14 per cent), which perhaps suggests that the stereotype of white male scientists is less strong than before.

When asked more specifically whether “there are not many female scientists”, young people tend to have far more mixed views, with one-quarter (25 per cent) agreeing that there are not many, four in ten (41 per cent) disagreeing, and a further quarter (23 per cent) saying they neither agree nor disagree. Those who feel they know at least a fair amount about careers in science do not give significantly different responses to this question. This suggests that the

¹²¹ Figure 8.11 shows data from [CarSci6](#), [CarSci7](#) (press CTRL and click on question name to access data table).

issue of a lack of female role models in science is still a salient one, despite most young people thinking on the whole that scientists are a diverse group of people.

Young women are less likely than young men to strongly agree that scientists come from a wide range of backgrounds (16 per cent, compared with 26 per cent). However, there is no statistically significant difference between the proportion of young men and young women agreeing that there are not many female scientists. Instead, young women are more likely to say that they don't know whether they agree with this statement (13 per cent, compared with 5 per cent of young men). If young women are more likely to be unable to say whether or not women are well-represented in science, that may partly help to explain the lower numbers of young women choosing to study science in Year 12 and 13 (even though as many young women as young men aspire to work in science, as noted in the previous section).

With both statements, there is a strong association between young people personally wanting to work in science and thinking scientists are a diverse group of people. Those who are personally interested in a future career in science are more likely to think that scientists come from a wide range of backgrounds (83 per cent, compared with 65 per cent of young people who are not interested in a future career in science) and to disagree that there are not many female scientists (51 per cent, compared with 34 per cent of young people who are not interested in a future career in science). This highlights the importance of promoting a diverse image of scientists to young people.

Bibliography

Academy of Medical Sciences, British Academy, Royal Academy of Engineering and Royal Society. Human enhancement and the future of work. Royal Society; 2012.

Allum N, Sibley E, Sturgis P, Stoneman P. Religious beliefs, knowledge about science and attitudes towards medical genetics. In World Association for Public Opinion Research 65th Annual Conference, June 14-16, 2012, Hong Kong. 2012.

Archer L What shapes children's science and career aspirations age 10-13? London: King's College London; 2013.

Archer L, DeWitt J, Osborne J, Dillon J, Willis B, Wong B. Doing science vs. being a scientist. *Science Education* 2010;94(4):617-39.

Archer L, DeWitt J, Osborne J, Dillon J, Willis B, Wong B. Science aspirations and family habitus: how families shape children's engagement and identification with science'. *American Educational Research Journal* 2012;49(5):881-908.

Association of Medical Research Charities. Public support for research in the NHS. AMRC; 2011. www.amrc.org.uk/news_2011_uk-public-want-nhs-to-support-research

Barmby P, Kind P, Jones K. Examining changing attitudes in secondary school science. *International Journal of Science Education* 2008;30(8):1075-93.

Bauer MW, Allum N, Miller S. What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda. *Public Understanding of Science* 2007;16:79-95.

Bhattachary D. Stem Cell Dialogue. Biotechnology and Biological Sciences Research Council and Medical Research Council; 2008.

Bhattachary D, Calitz JP, Hunter A. Synthetic Biology Dialogue. Biotechnology and Biological Sciences Research Council and Economic and Social Research Council; 2010.

Clay X. Drug-taking: think what we'd achieve if we never slept a wink. *Telegraph* 2012 28 August. www.telegraph.co.uk/health/9503763/Drug-taking-think-what-wed-achieve-if-we-never-slept-a-wink.html

BIS. Public Attitudes to Science 2011: Main Report. BIS; 2011.

BIS/Opinion Panel. Attitudes to Science: Survey of 14-16 year olds. BIS; 2011.

British Medical Journal Should childhood vaccination be mandatory? *BMJ* 2012 14 May. Press release. www.bmj.com/press-releases/2012/05/14/should-childhood-vaccination-be-mandatory

Davis M, Clark SJ, Butchart AT, Singer DC, Shanley TP, Gipson DS. Public participation in, and awareness about, medical research opportunities in the era of clinical and translational research. *Clinical and Translational Science* 2013;6(2):88-93.

DeSantis AD, Hane A. Adderall is definitely not a drug: Justifications for the illegal use of ADHD stimulants. *Substance Use & Misuse* 2010;45(1-2):31-46.

DeWitt J, Osborne J, Archer L, Dillon J, Willis B, Wong B. Young children's aspiration in science: the unequivocal, the uncertain and the unthinkable. *International Journal of Science Education* 2011 August:1-27.

European Commission. Public Attitudes towards Robots. European Commission Special Eurobarometer 382. EC; 2012.

European Commission. Young people and science: analytical report. European Commission Flash Eurobarometer 239. EC; 2008.

Evans-Brown M, McVeigh J, Perkins C, Bellis M. Human Enhancement Drugs: The Emerging Challenges to Public Health. Centre for Public Health, Liverpool John Moores University; 2012.

Falk J, Osborne J, Dierking L, Dawson E, Wenger M, Wong B. Analysing the UK science education community: the contribution of informal providers. Wellcome Trust; 2012.

Finegold P, Mathieson K, Holmes L, Boon M, Cottle M, Donnai D, Middleton-Price H. Is the UK public ready for genetic medicine?' *Personalized Medicine* 2008;5(1):65-76.

Gainsbury SE. Massive variation in Ritalin prescribing. *Health Service Journal* 2008 17 July. www.hsj.co.uk/news/massive-variation-in-ritalin-prescribing/1732568.article

Galton M. Moving to secondary school: initial encounters and their effects. Wellcome Trust; 2009.

Greely H, Sahakian B, Harris J, Kessler RC, Gazzaniga M, Campbell P, Farah MJ. Towards responsible use of cognitive-enhancing drugs by the healthy. *Nature* 2008;456:702-5.

Hameed S. Bracing for Islamic creationism. *Science* 2008;322:1637-8.

Hameed S. Muslims and creationism. *People & Science* 2012 December. www.britishecienceassociation.org/people-science-magazine/december-2012/muslims-and-creationism

Hansard Society. Audit of Political Engagement 9: Part One. Hansard Society; 2012.

Haste H. Science in My Future: A study of values and beliefs in relation to science and technology amongst 11-21 year-olds. Nestlé Social Research Programme; 2004

Howard S. Would you take the 'Super Woman' pill? *Daily Mail* 2013 7 January. www.dailymail.co.uk/femail/article-2258099/Would-super-woman-pill-Stressed-work-overwhelmed-home-generation-women-turning-brain-boosting-drugs-help-cope.html

Institute of Physics. It's Different for Girls. IOP; 2012.

Ipsos MORI (1983-2013) Trust in Professions survey [online] Available at: <http://bit.ly/H76fdV>

Jenkins EW, Pell RG. The Relevance of Science Education Project (ROSE) in England: a summary of findings. Centre for Studies in Science and Mathematics Education, University of Leeds; 2006.

- King S, Webster T. Synthetic Biology: Public Dialogue on Synthetic Biology. Royal Academy of Engineering; 2009.
- Maher B. Poll results: look who's doping. Nature 2008;452:674-5.
www.nature.com/news/2008/080409/full/452674a.html
- NatCen. What do people think about gene therapy? Wellcome Trust; 2005.
- National Audit Office. Educating the next generation of scientists. London: The Stationary Office; 2010.
- National Foundation for Education Research. Exploring young people's views on science education. Wellcome Trust; 2011.
- Newport F. In U.S., 46% hold creationist views of human origins. Gallup; 2012.
www.gallup.com/poll/155003/hold-creationist-view-human-origins.aspx
- Ofcom. Internet Use and Attitudes: 2012 Metrics Bulletin. Ofcom; 2012.
stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/2012_metrics_bulletin.pdf
- Paterson L, Grant L. Privacy and Prejudice: Young people's views on the development and use of electronic patient records. Royal Academy of Engineering; 2010.
www.raeng.org.uk/news/publications/list/reports/Privacy_and_Prejudice_EPR_views.pdf
- Potter C, Parvin J. Learning to Love Science: Harnessing children's scientific imagination. Shell Education Service; 2008.
- Pulse. Should GPs ration by lifestyle? No - this is rationing dressed up as science. Pulse 2012 March. www.pulsetoday.co.uk/should-gps-ration-by-lifestyle-no-this-is-rationing-dressed-up-as-science/13640846.article
- Reiss M. Students' attitudes towards science: a long-term perspective. Canadian Journal of Science, Mathematics and Technology Education 2004;4(1):97-109.
- Sense about Science. Making sense of GM: what is the genetic modification of plants and why are scientists doing it? Sense about Science; 2009.
www.senseaboutscience.org/data/files/resources/9/MSoGM2011.pdf
- Sjøberg S, Schreiner C. The ROSE project: an overview and key findings. University of Oslo; 2010.
- Stewart-Knox BJ, Bunting BP, Gilpin S, Parr HJ, Pinhao S, Strain JJ, de Almeida MDV, Gibney M. Attitudes toward genetic testing and personalised nutrition in a representative sample of European consumers. British Journal of Nutrition 2009;101(7):982-9.
- Stoneman P, Sturgis P, Allum N. Exploring public discourses about emerging technologies through statistical clustering of open-ended survey questions. Public Understanding of Science 2012.
- TBR. The current and future UK science workforce. Science Council; 2011.
www.sciencecouncil.org/sites/default/files/UK_Science_Workforce_FinalReport_TBR_2011.pdf

Watts S. The dope on mental enhancement', New Scientist 2011 11 November.
www.newscientist.com/article/dn21157-the-dope-on-mental-enhancement.html

Willmott C, Willis D. The increasing significance of ethics in the bioscience curriculum.
Journal of Biological Education 2008;42:53-6.

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