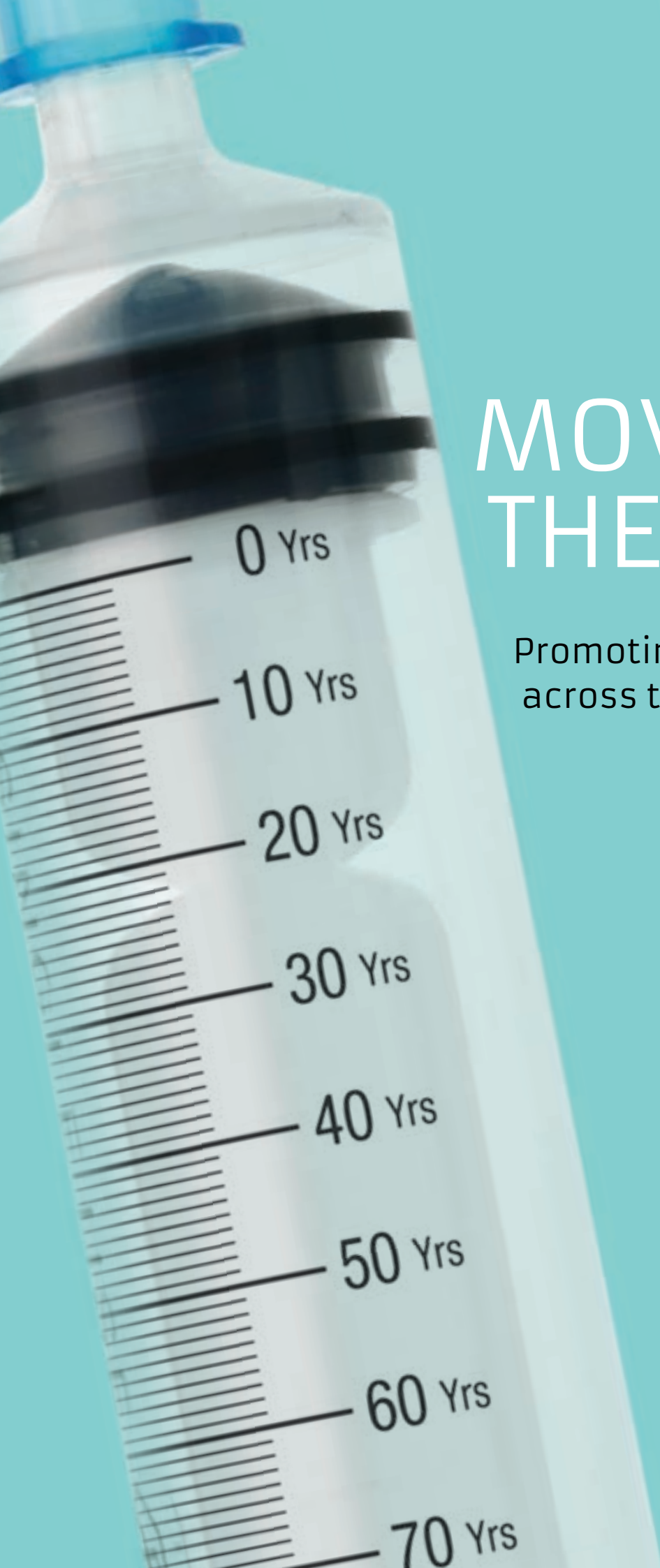


MOVING THE NEEDLE

Promoting vaccination uptake
across the life course



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Executive summary

Key points

- Vaccination as a public health intervention has had a positive impact on health and wellbeing that is almost unprecedented, drastically reducing the global burden of infectious disease.
- Vaccinating across the life course – not just in childhood – is becoming increasingly important as the population of the UK ages rapidly, and different issues are likely to affect uptake at each life course stage.
- Understanding the public's attitudes to vaccination is a valuable tool for increasing and maintaining uptake of vaccines, which remains high in the UK for most vaccines.

Findings

• Access

- The timing, availability and location of appointments were identified as barriers to vaccination across the life course by the public and by healthcare professionals, although the vast majority of people who chose not to vaccinate did not cite inconvenience as a key factor.
- Improving access to vaccinations remains crucial especially when tackling inequalities in uptake, for example relating to ethnicity or socioeconomic status.

• Attitudes

- Attitudes to vaccines are largely positive, especially for parents of whom 91% agreed vaccines are important for their children's health.
- Fear of side effects of vaccines was consistently found to be the primary reason for choosing not to vaccinate (except for the childhood flu vaccine, for which it was the second most common reason).
- Lack of confidence in the effectiveness of the vaccine was the number one reason for parents choosing not to vaccinate their children against flu.
- There was a fairly low understanding of herd protection, especially for working-age adults, and the myth of vaccine overload remains persistent, with just over a quarter (28%) of people believing incorrectly that 'you can have too many vaccinations'.

• Influences

- Trust in healthcare professionals remains very high, with doctors and nurses consistently identified as a valued source of information about vaccines.
- Social media was identified as propagating negative messages around vaccinations, especially for parents, with two in five (41%) saying they are often or sometimes exposed to negative messages about vaccines on social media. This increased to as many as one in two (50%) among parents with children under five years old.
- Traditional media continues to be influential, particularly seen in the ongoing ramifications of the Wakefield scandal, and was highlighted by healthcare professionals as impacting the public's views on vaccines.

Calls to action

• Tackling negative misconceptions of vaccines

- Efforts to limit health misinformation online and via social media should be increased, especially by social media platforms themselves.
- Responsibility of the press to share factual information about vaccines should be enforced by considering health impact when the IPSO Editor's Code is broken.
- Education on vaccines in schools should be increased and improved, especially in the PSHE curriculum.

• Improving access to vaccinations

- Vaccinations should be offered in a more diverse range of locations, including high street pop-ups, utilising the wider public health workforce.
- Health professionals to use the Making Every Contact Count (MECC) approach to ensure vaccine advice is delivered across the health system.
- Reminder services to be improved by using innovative methods such as social media pop-ups.





Foreword



Shirley Cramer CBE
Chief Executive, RSPH

A handwritten signature in blue ink, appearing to read 'Shirley'.

The discovery of our ability to immunise people against disease has had an almost unprecedented impact on human health. In the last 200 years, when the practice of vaccination has become widespread, millions of lives have been saved – in fact, the World Health Organization estimates two to three million lives are saved every year across the globe. The total eradication of smallpox, achieved through global vaccination programmes, is one of the greatest accomplishments of the 20th century.

In 2018, there have been a number of headlines about vaccines. In England we have seen small drops in uptake for many childhood vaccinations – a trend that has been seen for several years and continues to be concerning. Taking a wider view, Europe has seen record-high levels of measles following low uptake of the MMR (Measles, Mumps and Rubella) vaccine in some areas – with 41,000 cases by August. Globally, some populist politicians have fuelled anti-vaccination sentiment, with notable opposition to vaccines in Italy in particular. Against this backdrop, it is clear that we cannot be complacent about vaccinations: though the UK has world-leading levels of vaccination coverage, history (and current events) has shown that fear and misinformation about vaccines can cause significant damage to seemingly stable vaccination programmes.

With the dawn of social media, information – and misinformation – about vaccines can spread further and faster than ever before and one of the findings of this report is that this may, unfortunately, be advantageous for anti-vaccination groups. Finding new and innovative ways to counteract ‘fake news’ about vaccines is likely to be a major battle to be fought in the coming years.

This report aims to contribute to the conversation by exploring vaccination in the UK, investigating the role of and barriers to vaccination throughout life. Vaccines continue to be important for health long past childhood, and vaccinations in later life are likely to become increasingly significant as the UK population ages.

The findings suggest that taking a multi-pronged approach to improving and maintaining uptake will be essential: reducing mistrust in the safety and efficacy of vaccines, improving awareness of the value of vaccines, and improving access to vaccines. We have made a number of recommendations aimed at a range of stakeholders, including social media platforms, health services, schools, and the press. Healthcare professionals right across the health system, far beyond doctors and nurses, also have an important role in improving uptake of vaccinations and this should be acknowledged and encouraged.

There is no doubt that vaccinations are an incredible tool for improving and protecting health and wellbeing: we must ensure that we do not fail to utilise them, much less allow vaccine-preventable diseases to make a comeback.

Background

The history of vaccination

“I hope that someday the practice of producing cowpox in human beings will spread over the world – when that day comes, there will be no more smallpox.”
– Edward Jenner¹

The story of vaccination starts not in 1796 with Edward Jenner's smallpox inoculation but hundreds of years previously. The Brahmin caste of Hindus in India used something similar to vaccination to protect against smallpox from the 16th century² and there are reports of similar practices in the early 18th century in Turkey³. Nonetheless, Edward Jenner's inoculation of a small boy in 1796 with cowpox was unquestionably a landmark in the history of vaccination, and his discovery that cowpox protected against smallpox allowed the first large-scale inoculations.

There were various other key players, including Louis Pasteur, who contributed to the development of modern vaccination and by the end of the 19th century most of the fundamental principles underpinning vaccination were established. Indeed, five vaccines were already in use to protect against smallpox, rabies, typhoid, cholera and the plague².

The 20th century heralded the 'Golden Age' of vaccination, with a plethora of new vaccines developed to protect children against some of the world's most deadly diseases including diphtheria (introduced in the UK in 1942), polio (1956), measles (1968) and rubella (1970). Smallpox was declared officially eradicated worldwide in 1980⁴, marking one of the most remarkable achievements of modern medicine and the realisation of Edward Jenner's dream.

During the 21st century, several new vaccines have been developed and added to the UK's immunisation schedule, protecting against influenza, HPV, rotavirus and shingles, among others. Today in the UK, there are over twenty vaccinations offered routinely free of charge to the entire population over the life course (including boosters). The value of these vaccinations to the public's health can hardly be overstated.

Timeline of vaccinations introduced in the UK

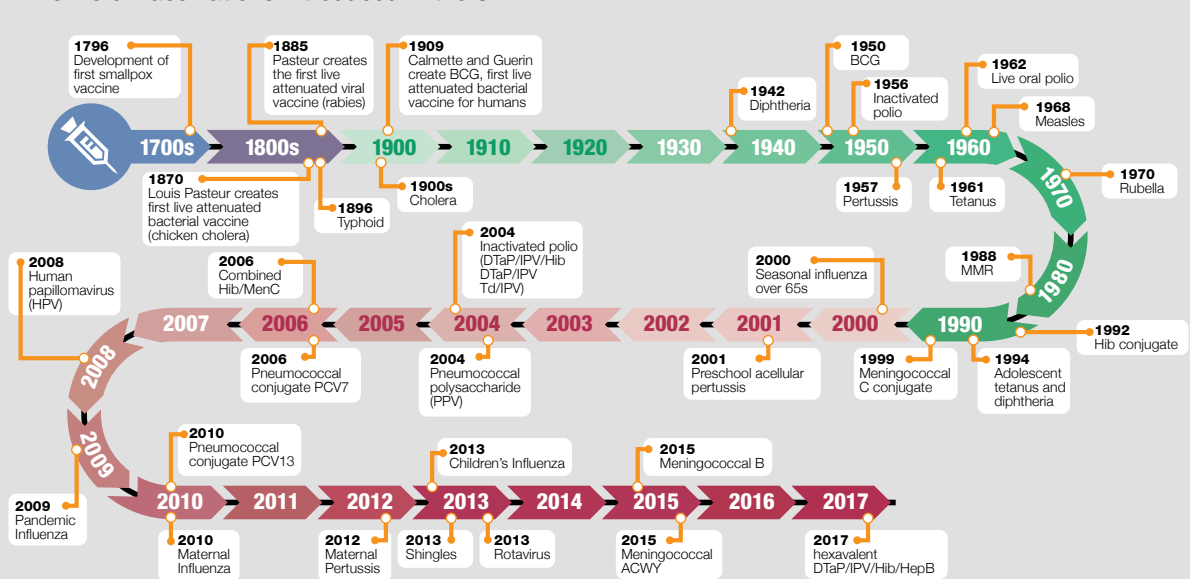


Figure sourced from PHE: Historical vaccine development and introduction of routine vaccine programmes in the UK, 2017.



The benefits of vaccination

The most obvious benefits of vaccination are to the health and wellbeing of individuals and populations. As a public health intervention, vaccination has drastically reduced the burden of global infectious disease – a contribution only outstripped by that of clean water⁵. The World Health Organization has estimated that, globally, around two to three million deaths are prevented each year through vaccination programmes⁶.

As well as the global eradication of smallpox, vaccination has contributed to the near-eradication of polio, measles and hepatitis B in the UK⁷. For the individual, vaccination means protection before exposure to fatal or life-changing diseases. Vaccination also protects against complications or secondary infections of those diseases – vaccination against measles, for example, can reduce the incidence of pneumonia and diarrhoea⁸. Even if disease does occur, the severity is often reduced.

Beyond the individual level, vaccination has numerous benefits for society:

The ways in which vaccination positively impacts society are so numerous it is not possible to fully explore them in this report. Overall, vaccines have had an immensely positive impact on human health and society since the 19th century. Named as the eighth best invention in human history^{12,13} (beating the internet), vaccines are rightly regarded as a force for good. Here are some of the wider benefits to society:

- ‘Herd protection’ refers to a form of protection that arises when a high proportion of the population is vaccinated against a disease, making it difficult for the disease to spread because there are not enough susceptible people left to infect. This means that, if the uptake of a vaccine is high enough, even people that have weakened immune systems or cannot be vaccinated against a disease – such as very young infants – will be protected.
- Antibiotic resistance is a major public health concern, and is likely to be one of the greatest challenges to health of the 21st century. Vaccinating people is an effective solution because it prevents infection and the need for antibiotics. Even vaccinations against viruses – which are not treatable by antibiotics – have a role to play, because people often take antibiotics unnecessarily when they have a viral infection. Furthermore, viruses such as influenza can lead to secondary bacterial infections which may require the use of antibiotics. Therefore, vaccinations can both reduce the number of people who acquire harmful infections resistant to treatment and limit the spread of antibiotic resistance.
- It is widely acknowledged that vaccination programmes have an enormous positive economic impact⁹. Though vaccines require funding, they lead to long-term savings through reduction in health costs and avoidance of loss of productivity from the workforce. Estimates of the savings from vaccination are in the order of tens of billions of pounds¹⁰. Economists have recently argued that vaccination is in fact undervalued in economic terms, with further benefits to the economy including reduction of economic inequality, fertility decline, and promoted school attendance, among others¹¹.

Opposition to vaccination

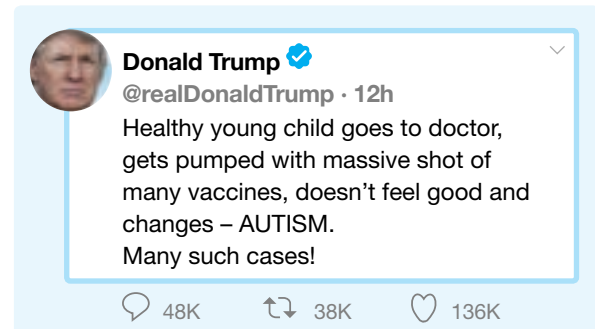
There has been opposition to vaccination since its discovery for a number of reasons.

- Vaccines were originally met with scepticism of science and fear of the loss of civil liberties. In England, the laws of 1853 making vaccination compulsory (later revoked) marked an unprecedented extension of the powers of the state and was regarded with horror by many in both the intellectual community and the general public. Parents who refused to vaccinate their children faced a fine or imprisonment until they complied. Many of these parents were recruited into anti-vaccination movements, arguing for the individual's right to choose what was best for themselves and their children. However, epidemics of smallpox in the 1890s quickly converted cities such as Gloucester, previously a hotspot of anti-vaccination sentiment, to be in favour of the life-saving vaccinations¹⁴.

- Another reason for opposition has been concerns around side-effects. The 1970s and 1980s saw a major vaccine scare in the UK surrounding the pertussis vaccine for infants, following the publication of a series of cases in 1974 suggesting an association between the vaccine and neurological complications. Widespread media publicity followed, and by 1977 coverage of the vaccine had declined from 77% to 33%¹⁵, leading to three major epidemics of whooping cough. The link between the vaccine and neurological harm was never proven and immunisation uptake returned to pre-1974 levels by the late 1980s¹⁶.

The most significant and harmful anti-vaccination influence in the UK arguably relates to the officially discredited 1998 study led by Andrew Wakefield in which he suggested a link between the Mumps, Measles and Rubella (MMR) vaccine and autism. The study caused widespread mistrust of the vaccine, largely due to media portrayal of Wakefield as a whistle-blower. In the context of extremely low incidence of measles, mumps and rubella – ironically because of high vaccine coverage – many parents felt the ‘risks’ of vaccination outweighed the benefits. In 2003-4 just 79.9% of children were vaccinated by their second birthday against MMR, whilst rates have also fallen in Scotland and Wales.¹⁷ We now face measles outbreaks in Europe – reaching a record high of 41,000 cases in August 2018 – directly attributable to low coverage following the Wakefield scandal^{18, 19, 20}.

The 1998 autism study had global consequences, reaching the ears of anti-vaccination groups across the world and fuelling modern anti-vaccination sentiment. Although it is hard to compare exactly how big the anti-vaccination movement is internationally, many countries in Europe and North America have seen declines in coverage over the last two decades and, correspondingly, increases in communicable disease. The USA, for example, saw a rise in the incidence of some communicable diseases in 2017 for the first time in a century²¹. In this context it is worrying that the anti-vaccination movement in the USA may have gained ground through the US President, Donald Trump, tweeting the belief that vaccination causes autism²².



- A further element of refusal to vaccinate may be that as incidence of disease declines, people feel less at risk from the disease, or fail to realise how serious the disease is, and so the incentive to vaccinate is reduced. Indeed, mathematical models of vaccine coverage assume this to be true and correspondingly assume it is impossible or near-impossible to eliminate disease²³. However, the very high uptake of routine childhood vaccines in the UK, despite extremely low incidence of disease, suggests a more complex picture: a recent study found that 90% of British parents said they automatically vaccinated their child when their vaccinations were due²⁴. It is suggested that social norms plays a large part in this through the threat of social ‘sanctions’ if parents fail to follow the norm²³.

It is clear that the reasons for complying or refusing to vaccinate are complex and influenced by external factors – health professionals, the media, peers, social norms – as well as internal values. The primary reasons for low uptake also vary from vaccine to vaccine and across the life course.

Taking a life course approach - our methodology

This report aims to take a snapshot of public and professional attitudes to vaccination across the life course.

Exploring attitudes at every life course stage is useful because, although vaccination is most often associated with childhood, vaccination at other life course stages is important for good health. Vaccinations during working-age adulthood and older age are becoming increasingly important as the UK population ages. Supporting healthy ageing must be high on the agenda for public health and vaccinations are a crucial tool: ageing increases vulnerability to infectious disease due to the natural decline of immune function²⁵ and the increase of other health conditions which can make it harder to fight off disease.

In addition, the reasons for an older person choosing to be vaccinated or not may be different from the reasons a parent may or may not vaccinate their child. Exploring these issues separately will help to tease out the cultural, social and structural issues at play in vaccination decisions. We have also conducted a deeper investigation into specific vaccines (vaccines with lower than ideal uptake and/or high levels of public discourse) at each lifecourse stage in order to explore how and why issues differ or remain consistent between vaccines.

Methodology

For the purpose of this report we have taken a lifecourse approach, investigating attitudes to and awareness of vaccinations with regards to childhood and adolescence, working-age adulthood, and older age. We carried out a narrative literature review of relevant articles, searching online databases.

We supplemented the literature review with information gathered from three public surveys:

1. Survey of UK adults aged 18 and over:

We carried out an online survey of a representative sample of 2,000 UK adults in May 2018 through Populus, an independent polling company. Around 500 of these adults were aged 65 and over.

Inclusion criteria: resident of the United Kingdom, aged 18 and above

Limitations: This survey is limited by the smaller sample sizes that were surveyed regarding their decisions not to be vaccinated. For specific vaccines, only a relatively small number of people said they had chosen not to receive that vaccine:

- Flu vaccine for working-age adults in at-risk groups: 111 people (out of 1,557)
- Shingles vaccine for older adults: 51 people (out of 521)
- Flu vaccine for older adults: 92 people (out of 521)

2. Survey of UK parents:

We carried out a survey of parents in May 2018 in order to explore their attitudes and views on vaccinating their child(ren). This survey was conducted through Survey Monkey and promoted through social media channels with a £200 incentive for one winner.

The survey was completed by 2,622 people that met the inclusion criteria, of whom 92.5% were female and 86.5% were white British.

Inclusion criteria: having at least one child under the age of 18, resident of the United Kingdom.

Limitations: This survey was also limited in sample size on some questions. When asked if they had ever chosen not to give a child a vaccine (this included those who had chosen not to vaccinate a child and later changed their mind):

- MMR vaccine: 249 people
- Childhood flu vaccine: 512 people
- Pertussis vaccine during pregnancy: 203
- HPV vaccine: 188 people

Another key limitation of this survey was that the majority of take up was by people identifying as White (95.3%), a greater proportion of the population than is representative (87.17% of the British population identifies as White according to the 2011 census), with sample sizes from other ethnicities too small to carry out meaningful analysis. As people from White British backgrounds tend to have higher uptake of vaccinations than those from minority ethnic backgrounds²⁶, our survey results may be skewed and unrepresentative of a diverse population – this is addressed in the report.

The vast majority of respondents to our survey of parents were female (92.5%) with just 7.1% of respondents male and 0.3% of respondents non-binary/third gender. This, again, limits the extent to which our survey is representative of the general population, although there is evidence to suggest that women tend to be the primary decision makers with regards to children's healthcare.

3. Survey of healthcare professionals:

We carried out a survey of healthcare professionals in May 2018 through Survey Monkey in order to explore their views on the barriers to vaccination in the UK. The survey was taken by 216 people who met the inclusion criteria. Of those who completed the survey, 71% were nurses, by far the largest group. Other occupations included general practitioners (3%), pharmacists (11%), and school nurses (4%).

Inclusion criteria: professionals currently involved in delivering immunisation programmes, working in the United Kingdom.

Limitations: Due to the specific respondent group, this survey is limited to some extent by a smaller sample size.

We also conducted ten semi-structured interviews with healthcare professionals, sourced from the survey above, in order to further explore their views, and quotes from these interviews are used throughout the report.

Childhood and adolescence

Background

Currently, the majority of vaccinations we receive in our lifetime occur in childhood. This helps to ensure children are protected as early as possible from serious diseases. Although protective antibodies are passed from mother to child during pregnancy, this protection is only partial and temporary. The immunisation schedule is designed to give the earliest and best possible protection to children, as well as ensuring those in the community who cannot be vaccinated are protected through herd protection.

In 2018, most children in the UK receive 10 or 11 different vaccinations as part of the routine immunisation schedule, with many of those vaccines requiring multiple doses²⁷. The European Region of the World Health Organisation (WHO) currently recommends that, nationally, at least 95% of children are immunised against diseases preventable by immunisation and targeted for elimination or control²⁸. The UK meets this target, or gets close to the target, for most routine immunisations, but there are specific vaccinations where uptake falls short of the ideal – coverage of the full course of the MMR vaccine, for instance, was 87.2% by age five years in 2017/18 in England²⁹. Moreover, coverage in England declined in nine of the twelve routine vaccinations measured at twelve months, 24 months or five years in 2017/18 compared to 2016/17³⁰. Coverage of childhood immunisations in Wales and Scotland remained high and mostly stable, although coverage of the MMR vaccine fell in both nations and coverage of three routine immunisations fell in Scotland^{31, 32}.

There are many reasons parents may not vaccinate their children, from difficulties accessing vaccinations to fear caused by stories in the media. While the high uptake seen in the UK is very encouraging, the dips seen in coverage in recent years and historical vaccine scares, such as the MMR scare which peaked in the late 1990s and early 2000s, are a reminder that we cannot be complacent about childhood vaccinations and understanding parents' views is as important as ever.

Access

Accessibility and convenience of vaccination services can be important determinants of vaccine uptake – this may be particularly true for parents who are not explicitly anti-vaccination but may be hesitant. In this case, difficulty accessing vaccinations may lead to the child not being vaccinated. Based on our survey of parents the most common barriers to vaccination were:

- timing of appointments (49%)
- availability of appointments (46%)
- childcare duties (29%)

Many healthcare workers who work in GP surgeries also acknowledged that parents, especially those in work, struggle with busy schedules. In response to this, many GP surgeries seemed to be keen to overcome this barrier, by offering additional and more flexible appointments. Those who offered more flexible appointments seemed to feel this was effective in overcoming the barrier for most parents:

“ We tend to do **immunisation appointments in the afternoon...** I do find this is quite **difficult for parents**, especially when clinics don't start until half past 2, and they have then got other children to pick up from school. **I think that is a massive barrier.** ”

– General practice nurse

“ I can only speak from my surgery – for my surgery, **I don't think there's problems for access.** For my surgery there's two walk in clinics, and if they can't make those, they're free to **book in with any of the practice nurses.** And we work later, we work until half 6, so they've got access if they work. ”

– General practice nurse

When we asked parents why they had not vaccinated their children only a very small proportion claimed that inconvenience was a factor. Only for the flu vaccine did any significant number of parents indicate that inconvenience of accessing the vaccine was a factor contributing to their decision not to vaccinate a child, with 24 of 496 parents (5%) agreeing this was the case.

Many more parents cited factors such as fear of side effects – explored later. However, our survey is limited in this regard as it is more likely to have been completed by those with strong opinions on or an interest in vaccinations, and therefore biased towards people for whom attitudes rather than access are a primary determinant of uptake.

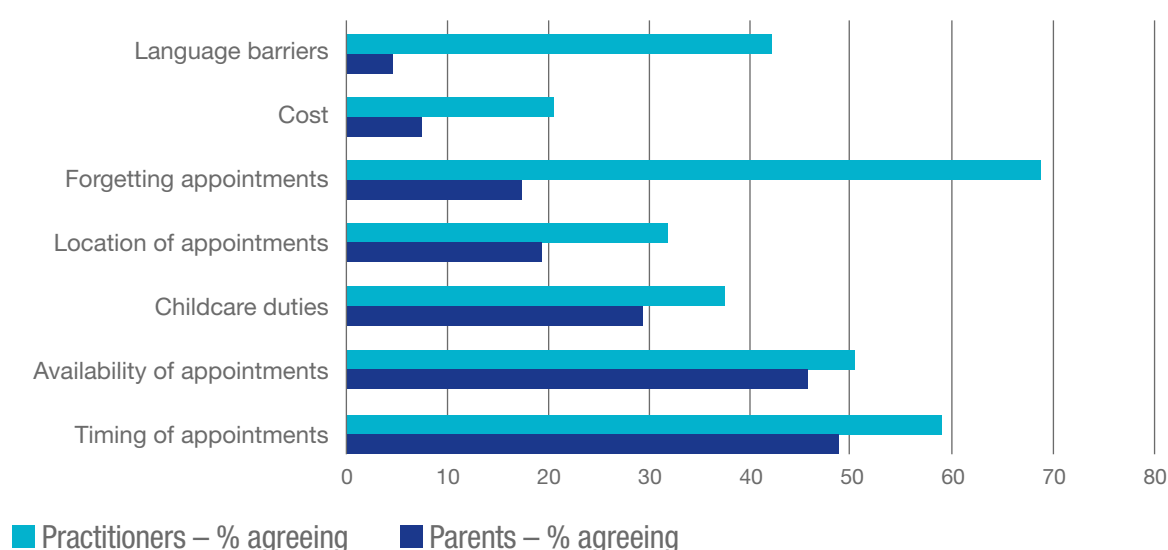
In addition, a key issue with vaccines in the UK, as well as in other high income countries, is differences in uptake of vaccines relating to ethnicity, geographic location, socioeconomic status, and religious beliefs – factors our survey was unable to sufficiently explore. Low coverage of vaccines is particularly seen in smaller ethnic communities³³, and reasons for low uptake can be complex and specific to local populations. For example, the Charedi community in North London has low vaccine uptake and this is thought to be primarily due to difficulty accessing services. Large average family sizes in the community mean that parents with more children have difficulty accessing vaccinations as they struggle to take a



number of small children to health services. Due to this, a child's birth order is inversely related to vaccination status³⁴.

The primary way of reducing inequalities in uptake is thought to be to facilitate access to immunisation for all, while also targeting at-risk groups³⁵ – for example by implementing call and recall services, checking immunisation status of children and conducting local needs assessments. Public Health England works extensively on reducing inequalities in uptake of vaccinations in the UK, and although there is not scope to fully explore these complex factors in this report, it is clear that continuing to do so to ensure appointments are universally available at a convenient time for all parents is a critical part of maintaining and improving coverage.

Barriers to accessing appointments for parents



Attitudes and awareness

Uptake for childhood vaccinations in the UK is very high, with studies finding that the vast majority of parents say they automatically vaccinate their children when due²⁴. Further, parents have been found to show very high trust in health professionals, with one study finding that only 4% of parents did not trust health professionals regarding vaccinations²⁴. Our survey of parents echoed these findings, with the vast majority of parents showing a positive attitude towards vaccinations. Ninety-one percent of parents agreed that vaccines are important for their child(ren)'s health and 86% of parents agreed vaccinations were mainly promoted for the good of the public's health.

Parents also demonstrated a high level of understanding of vaccinations, with 89% agreeing that vaccinations protect others around their children as well as their children themselves, demonstrating an understanding of herd protection, and only 15% feeling there were too many vaccinations on the current routine childhood immunisation schedule. These positive findings reflect the current state of play in the UK, which has world-leading levels of coverage.

Influences

While overall attitude to vaccinations was positive, there were also some worrying statistics. As many as two in five parents with children under the age of 18 said they are exposed to negative messages about vaccinations online 'often or sometimes': 41% on social media and 38% on online forums. This rose to one in two among parents with children under five years old (50% and 47% respectively). There were also reports of seeing positive messages about vaccines on social media, but these were always rarer than instances of negative exposure: a trend that held true across all age groups surveyed.

Although only one in ten (10%) parents claimed they would trust people on social media or on online forums, this substantial exposure to negative vaccination messages may influence attitudes to vaccinations over time: repetition of messages is often mistaken for accuracy, a phenomenon known as the Illusory Truth Effect. It has been found that even when people know a message is untrue, if it is repeated enough times they will begin to believe it³⁶.

Further, studies have indicated that negative messages on social media are likely to elicit more attention and longer viewing times than positive messages³⁷ as well as spreading more rapidly³⁸ – meaning both that there

are a greater quantity of negative messages and that they may have a greater impact. Indeed, healthcare professionals reported seeing social media impact parents' views of vaccines. They said:

“I think [social media] can have a **negative impact** – we had an example last year with a **big campaign that came over from the USA** stating that children shouldn't have the flu vaccine – **that spread like wildfire**, and it was because of social media that it spread like wildfire... and it did **affect** the uptake of **childhood immunisation** in certain areas.”

Community pharmacist

“Yes, I've seen the unfortunate impacts of **social media** – because you get people publicly saying ‘**I've had a reaction**’ – there will be people who **suffer side effects** and unfortunately attention will be on these rare cases rather than the **thousands of people** who have no side effects.”

Community pharmacist

“Overall, [social media] is **negative**, **although it can be positive**. People are less likely to say **positive things** so on the whole it's going to be negative.”

General practice nurse

While the role of social media is concerning, parents identified scientific experts and doctors and nurses as the most trusted sources of advice, with 94% and 92% respectively saying they were valued sources of information. This high level of trust is important in ensuring high uptake of vaccinations: France, for example, demonstrates the lowest confidence in vaccines in the world³⁹ as well as low trust in healthcare workers⁴⁰.

As well as doctors and nurses, other healthcare professionals have an important role to play in encouraging take-up of vaccinations. Midwives and health visitors work with parents during pregnancy and early childhood and have the chance to start conversations about immunisation at an early stage. School nurses also have important opportunities to interact with parents. These healthcare professionals are likely to be trusted by and accessible to parents and therefore be in a good position to provide valuable, targeted support⁴¹. Encouraging trusted professionals across the health system to advise opportunistically about vaccines – Making Every Contact Count (MECC)⁴² – may have an important influence on vaccine-hesitant parents.

The childhood flu vaccine

A national childhood influenza (flu) immunisation programme was first recommended by the Joint Committee on Vaccination and Immunisation (JCVI) in 2012, with the eventual aim of annually targeting all children aged two to seventeen years. As well as providing protection for those vaccinated, a key aim of the programme is to reduce transmission of flu virus and therefore protect vulnerable people in the population, including older people⁴³.

In the autumn/winter of 2017/18, live attenuated flu vaccine (LAIV) was made available to all children aged in England between two and four, all children in reception, and Years 1-4, as well as to all those with chronic health conditions older than Year 4, and to all primary school-aged children in some pilot areas. The uptake of the vaccine in England in 2017/18 was 58.3% for children in reception to Year 4, and 61.3% for children in reception to Year 6 in pilot areas⁴⁴. The vaccine was offered to all children in Wales aged two to eight years, with uptake 50.2% for two and three year olds and 68.3% in four to eight

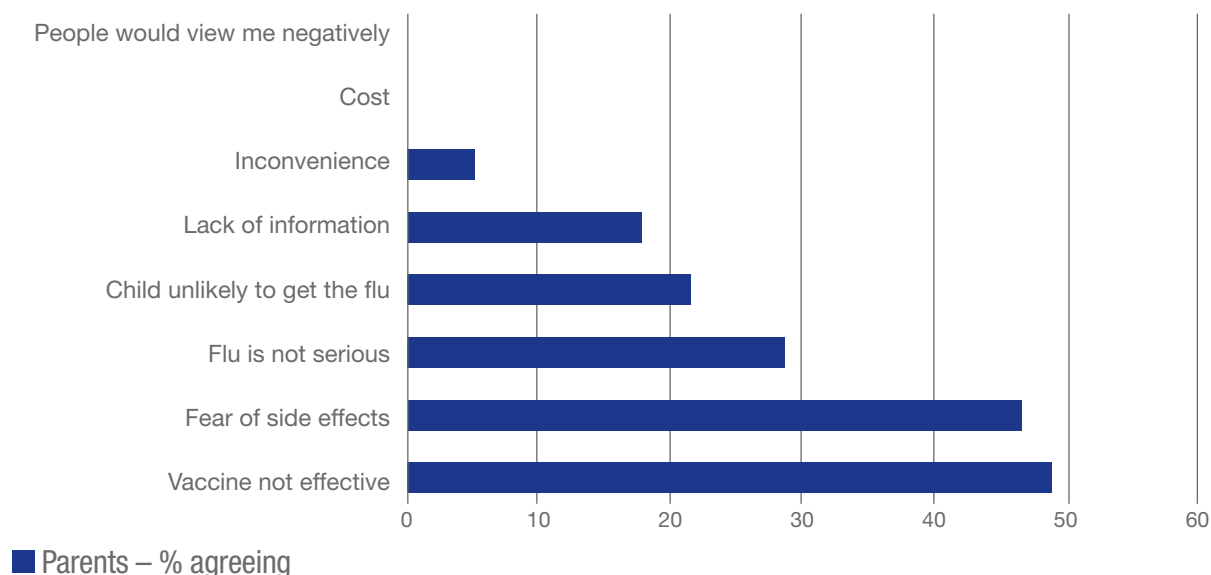
year olds⁴⁵. In Scotland, uptake for two to five year olds was estimated at 56.9% and uptake for primary school children was estimated at 73.0% in 2017/18⁴⁶. In Northern Ireland, uptake in 2017/18 was 76.5% in primary school children and 50.6% in pre-school children⁴⁷.

The Flu Plan for winter 2017/18 aimed to meet a 40-65% national uptake level – a level which was, overall, reached⁴⁸. However, there was considerable variation in uptake across the country and clear room for improvement in coverage levels.

Of our survey of over 2,600 parents, one in five (20%) said they had chosen not to give a child the flu vaccine. Of those (512 people) the most common reasons for refusing the flu vaccine were that they did not think the vaccine would be effective (48%) and they were worried about side effects (47%).



Reasons for not vaccinating child against flu



These figures imply that the main barriers to uptake may have to do with perceptions of the effectiveness or safety of the vaccine itself. Concerns around the vaccine were also seen among parents who did give their children the flu vaccine, with around one in five (21%) of all parents agreeing the flu vaccine was likely to give unwanted side effects and only under two-thirds (63%) believing the vaccine was effective. Parents have also expressed these concerns in other studies⁴⁹.



When we interviewed healthcare professionals, many believed that the media influenced parents' concerns and the uptake of the flu vaccine, implying that the media did not give a balanced portrayal of the effectiveness of the vaccine and possible side effects:

Concerns over effectiveness of the vaccine are not baseless: in 2017/18, the overall end-of-season vaccine effectiveness for all ages was only 15%, and the effectiveness of the vaccine varies year on year. However, for 2-17 year olds receiving the vaccine in 2017/18, effectiveness was much higher, estimated at 90.3% against H1N1, and 60.8% against influenza B⁵⁰. Therefore, there are clear benefits to the vaccine, especially for children.

“I think **some years with the flu vaccination**, word gets around that it didn't work so well or **lots of people had a bad reaction**, and then the following year we get a bit of a dip.”

General practice nurse

“Some of the **negative press** we get about the flu vaccination not being very good this year [impacts uptake], and when I meet people or talk to patients I say **'it's not 100%'**. It is a **shame that the media doesn't present that** – the media presents 'oh, this person had the flu jab and they still died'.”

Community pharmacist



“ For the flu vaccine, it is both **convincing people** that the **flu is serious** but also that the vaccine is useful – each year it gets bad publicity, and some of the **publicity is not totally unjustified.**”

Paediatrician

In order to improve uptake of the childhood flu vaccine, tackling perceptions of the vaccine as ineffective and unsafe are likely to be key, and the media has an important part to play in this.

One limitation of our survey is a low representation of minority ethnic groups. Analyses of the uptake of the 2017/18 childhood flu programme suggest that low uptake of the vaccine is strongly and independently associated with deprivation and ethnicity, with areas with 6% or more of the population identifying as Muslim demonstrating significantly lower uptake⁴⁴. This has also been found for previous flu seasons⁴³. Analyses of the pilot areas vaccinating all primary school children showed similar results, with lowest uptakes in the most deprived areas or areas with larger minority ethnic populations⁴⁴. Exploring these factors in depth is beyond the scope of our report but efforts to improve uptake should be targeted to these groups.

The MMR vaccine

One of the biggest vaccine scares the UK has experienced was the MMR controversy which began in the late 1990s. The controversy was sparked by a research paper written by the now-discredited Andrew Wakefield – published in the *Lancet* and subsequently retracted, the paper suggested links between the MMR vaccine and the development of autism. Following the publication of the paper, the press published a plethora of negative stories about the MMR vaccine: in 2002 alone, there were 1,257 stories published regarding the MMR vaccine⁵¹.

**Doctors link autism to MMR
vaccination**

The Independent, February 1998⁵²

**New evidence ‘shows MMR
link to autism’**

Daily Mail, August 2002⁵³

MMR safe? Baloney.
This is one scandal that’s getting worse.

Daily Mail, October 2005⁵⁴

The result of the MMR scare – and the huge public furore surrounding the controversy – was a drop in uptake of the vaccine, with a low of 79.9% of children in England receiving their first dose of the MMR vaccine by their second birthday in 2003-04, and low uptake rates elsewhere in the UK⁵⁵. As a result, there was an increase in cases of measles: in 2008, cases of measles exceeded 1,000 for the first time in a decade. As recently as 2013, a measles outbreak occurred in South Wales – with 1,217 notifications of measles – in an area with low MMR coverage, linked to an intense campaign by the *South Wales Evening Post* against the vaccine⁵⁶. Across Europe, the Wakefield scandal also had ramifications, with subsequent drops in uptake leading to a record-high number of cases in 2018 – 41,000 cases and 37 deaths by August²⁰.

In 2017/18, coverage for the first dose of the vaccine was 91.2% in England - a small drop from the previous year (91.6%) and at a similar level to 2011/12³⁰. Uptake levels elsewhere in the UK were slightly higher, with coverage of the first dose by two years at 94.7% in Wales, 94.3% in Scotland and 94.9% in Northern Ireland^{57, 31, 32}.

While coverage levels have returned to around the level before the Wakefield controversy, they have still not reached the 95% level that WHO recommends for herd protection and, further, there remains a number of people in the UK who remain unprotected from the diseases because their parents opted out at the time the controversy reached its peak.

The damage of the Wakefield controversy is still felt. When we talked to healthcare professionals, the MMR vaccine was frequently mentioned as presenting problems for uptake:

“ There's been a **change with regards to MMR** – it's better now than it was but there's still some people who are adamant, you know, **mumsnet are fabulous** at that kind of stuff [negative messages regarding MMR]. ”

– General practice nurse

“ The fear is [about] the **MMR** – out of all the vaccines I find that the **MMR vaccine** is the one most commonly refused, even when they're **happy with all the others**. ”

– General practitioner

Of the 2,600 parents we surveyed, one in ten (10%) said they had chosen not to give a child the MMR vaccine. Of these (249 people), the most common reason, by far, was fear of side effects (70% stated this was a reason). This was followed by not thinking the vaccine was effective (34%) and thinking the disease was not very serious (25%). Indeed, more than one in five (21%) of all parents thought that the MMR vaccine was likely to cause unwanted side effects. This indicates there is still significant concern around side effects, despite positive views otherwise: around 90% of all parents agreed that the vaccine was important, that it protects against serious diseases, that it is effective and that, otherwise, their child would be at risk.

These results highlight that the Wakefield controversy has had long-lasting consequences and, even almost two decades later, the ramifications are still being felt: misconceptions still remain around the safety of the MMR vaccine⁵⁸. This clearly stresses the danger of negative press around vaccinations and the vulnerability of vaccination programmes to fear and misunderstanding.

Teenager died in her sleep weeks after being given the HPV vaccine as experts reveal the lives of thousands of girls have been destroyed by the controversial jab

Daily Mail - 27th September 2017⁶²

The HPV vaccine

The human papillomavirus (HPV) vaccine was first introduced in the UK national immunisation schedule in 2008. HPV is a group of viruses that are transmitted primarily through genital-to-genital contact. There are over 200 strains of HPV and particular strains are high-risk: although the majority of people who contract these strains have no lasting health effects, in a minority of cases they can lead to cancer or genital warts. Given to girls aged 12 to 13, the vaccine protects against four of the most high-risk strains, protecting against both cancer and genital warts.

Uptake of the vaccine in the UK is good, but not as high as other routine vaccinations: in 2016/17, 83.1% of Year 9 females completed the two-dose HPV vaccination course in England – a slight drop since both 2015/16 and 2013/14 (85.1% and 86.7%, respectively⁵⁹). Coverage of both doses in Wales also fell in 2017/18, down to 83.0% from 85.8%³¹ and in Northern Ireland, down from 90.7% to 89.6%⁵⁷, but increased in Scotland to 88.8% from 86.5%⁶⁰.

In July 2018, it was announced that the HPV immunisation programme would be extended to include boys in England, Wales and Scotland. This was following advice from the Joint Committee on Vaccination and Immunisation and several expert groups, including RSPH, of the need to protect boys from HPV-related diseases, which the girls' programme did not fully do. The boys' vaccination programme is expected to be rolled out from September 2019, and understanding the factors behind low uptake is imperative to ensuring the universal programme is successful.

In recent times, anti-vaccination movements have particularly focused on the HPV vaccine, claiming that the vaccine has led to severe side effects and death in 'thousands' of girls. For instance, a video published on YouTube in September 2017 has over 92,000 views and states that there have been 'hundreds of documented deaths following the HPV vaccine' and 'thousands around the world have suffered severe adverse reactions to the vaccine'⁶¹. There has also been media coverage around the issue, focusing on specific cases of possible reactions to the vaccine.



Daily Mail - 26th January 2018⁶³

Student, 17, claims she was left PARALYSED after being given the controversial HPV jab which is offered to all teenage girls

Teenage girl dies five days after receiving HPV vaccine jab

The Daily Telegraph - 10th May 2016⁶⁴

Investigating the harms and benefits of the HPV vaccine, a Cochrane Review of the vaccine 'did not find an increased risk of serious adverse effects' with 'the deaths reported in the studies [...] judged not to be related to the vaccine'⁶⁵. Although noting that adverse pregnancy outcomes following the vaccination could not be excluded, they found no evidence that the vaccine led to miscarriage or termination.

While, therefore, there is good evidence for the safety of the vaccine, misconceptions proliferated online and in the media have led to concern among parents. Of over 2600 parents we surveyed, 180 people said they had chosen not to give a child this vaccine and, of those, two-thirds (67%) stated concern over side effects as a reason for this choice – the most common reason by a distance. Further, among all parents only 41% disagreed that the HPV vaccine was likely to give unwanted side effects, suggesting a lack of confidence in the safety of the vaccine. This has also been found in other studies: one study found that primary issues were concern about side effects, as well as the vaccine being deemed 'non-essential', concerns the vaccine would promote promiscuity, and the effectiveness of the vaccine⁶⁶.

Questions over the effectiveness of the vaccine were also found in our survey – a third (33%) of the parents we surveyed who had chosen not to give a child the HPV vaccine stated doubts over the effectiveness of

the vaccine as a reason (the second most common). Only 60% of all parents believed that the HPV vaccine was effective. This is contrary to firm evidence that the vaccine works: the Cochrane review of the vaccine concluded 'there is high-certainty evidence that HPV vaccines protect against cervical pre-cancer in adolescent girls and young women aged 15 to 26'⁶⁶. Doubts surrounding the effectiveness of the vaccine may be due to the lag between delivering the vaccine and reductions in rates of HPV-related diseases, especially cancer, which may not be seen for several years.

As discussed previously, a limitation of our survey is a low representation of minority ethnic groups. Research has suggested that girls from ethnic minority backgrounds may be less likely to receive the HPV vaccination than white British girls, with white girls in all cohorts more likely to have one or more doses of the vaccine than girls of black or Asian ethnicity⁶⁷. Reasons for low uptake may be culturally specific – for example, one study of African parents in the north of England found that religious values and cultural norms played a large part in vaccine decision-making, with HPV vaccination considered unacceptable by parents, with fear of promoting promiscuity⁶⁸. Fully exploring these factors is beyond the scope of our report but are crucial to understanding why there may be pockets of low uptake in specific population groups.

Working-age adulthood

Background

Although vaccination programmes are typically associated with childhood immunisation they continue to be important throughout working and later life. Most notably, the seasonal flu vaccine is available on the NHS and recommended for those in clinical risk groups, pregnant women and those over 65 years of age who are at increased risk from complications of flu.

Understanding the views of working-age adults is important because their attitudes towards vaccines may have a significant impact on the future of vaccination in the UK. Adults of current working-age are future recipients of vaccines given in older age, may be current or future parents, and have significant influence on the public rhetoric surrounding vaccines. It has also been suggested that, in the future, vaccinations given to protect people in older age may be more effective if given at an earlier stage, at a point when immune senescence (the process of susceptibility to infection increasing with age) has not reduced the immune system's response to the vaccine.

Unlike childhood vaccines, which are decided by parents for their children, the decision to get vaccinated in adulthood is up to the individual themselves. Parents are usually more risk-averse regarding their children's health than people are regarding their own health and so the factors affecting uptake are likely to be different.

Access

We carried out a national survey of 237 healthcare professionals who work to deliver vaccination programmes in the UK, including nurses, GPs and pharmacists. The survey respondents identified what they had experienced to be the biggest barriers to uptake of vaccinations for working age adults. Healthcare professionals believed that the main barrier for adults getting vaccinated was forgetting appointments (71%) - this was higher than for any other factor.

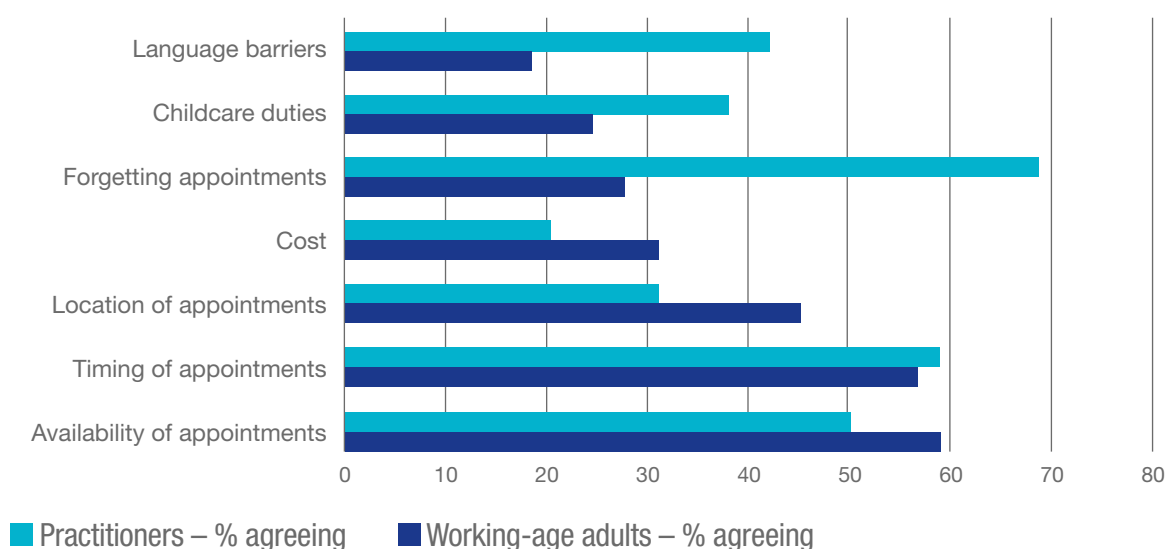
Other barriers included the timing (59%) and availability (52%) of appointments. When it came to adults giving us their views on the main barriers only around one in four (28%) said that forgetting appointments was a barrier to receiving vaccinations. This may reflect bias in answering the question: people may be less likely than practitioners to remember times they have forgotten appointments, or response bias may have led to underreporting on the tendency to forget appointments as it is seen as undesirable. This discrepancy was also seen among parents, for whom practitioners also identified forgetting appointments as the greatest barrier to accessing vaccinations.

Aside from differences between healthcare professionals and the public over the importance of forgetting appointments, both groups generally agreed that availability of appointments and timing of appointments were barriers to receiving vaccinations – with 58% and 56% respectively.

Location of appointments also posed a barrier for just under half (46%) of adults. This suggests that having more conveniently available appointments may be crucial for overcoming access barriers for working adults who are likely to find it difficult to attend appointments during the working day – a strong argument for having appointments available in the community, such as at pharmacies.

As with childhood vaccinations, improving access to vaccinations may reduce inequalities in uptake – for example, a study of travelling and gypsy communities in the UK found that there was widespread acceptance of vaccines but that there were barriers to uptake of vaccinations, including language barriers⁶⁹. A study of homeless people in London also found that there was high eligibility for the seasonal flu vaccine and very high willingness to accept the vaccine but low uptake due to difficulties with access⁷⁰.

Barriers to accessing appointments for working-age adults



Attitudes and awareness

Attitudes towards vaccinations from the adults we surveyed were, on the whole, positive – although there were some concerning findings. Most adults (85%) agreed that vaccines are important for health, with some variation across age groups. Concerningly, a quarter (24%) of people agreed that vaccinations were mainly promoted by the healthcare system for pharmaceutical company profit, with almost a third (32%) of 25-34 year olds believing this to be the case.

Understanding of vaccinations was fairly low: almost a third of adults (30.5%) believed that you can have too many vaccinations. The myth of vaccine overload – that you can overload an immune system with too many vaccines – is prevalent, especially in the United States, where some doctors have even published ‘alternative’ vaccination schedules for children⁷¹, despite there being no evidence that children’s immune systems need vaccinations to be spread out. On the contrary, spreading vaccinations out means children are exposed to dangerous diseases for longer periods of time and parents are less likely to complete the full vaccination course.

There was also a fairly low understanding of the important concept of herd protection, whereby unvaccinated people in the population (the ‘herd’) are protected from infectious diseases because a large proportion of the population are vaccinated. Only two thirds (68%) of people we surveyed agreed with the statement ‘vaccinations can protect people around me as well as myself’, suggesting a significant proportion of people may not fully understand the power and importance of vaccinations.

Influences

All age groups that we surveyed valued the opinion of doctors and nurses, and then scientific experts, most highly. After that, pharmacy teams and friends and family were rated as the most valued sources of information regarding vaccinations. As with the parents we surveyed, this emphasises the high level of trust and value the public place on healthcare workers – this was also reflected in our survey of practitioners, where 82% agreed there is a high degree of trust in their profession from the public regarding vaccinations. The importance and influence of social networks is also clear, with 60% of people surveyed agreeing the opinions of friends and family were trusted and valued.

The opinions of people online regarding vaccinations were trusted by around one in five millennials, with 17% of 18-24 year olds and 21% of 25-34 year olds agreeing they trusted the opinion of people online through social media or forums. This was much higher than in older age groups (4% in those 55 and over). Given the likely influence that social media has on people’s perceptions of vaccinations⁷², the fact that some young people explicitly value the opinions of people online is important. Further, these age groups were more likely to see negative than positive messages online with around one in three (35%) saying they saw positive messages on social media often or sometimes, compared to almost half (45%) for negative messages. A similar gap was seen for online forums.



The flu vaccine for at-risk groups

In the UK, one of the vaccinations with the lowest uptake rates is the flu vaccination for those who belong to an “at-risk” group. This vaccination is offered on the NHS for those with long term health conditions, including asthma, cardiovascular issues and chronic liver and kidney disease, because people with these conditions are more vulnerable to developing severe disease if infected with flu.

For the winter of 2017/18, less than half (48.9%) of those aged six months to under 65 years in a clinical risk group (excluding pregnant women without other risk factors) were vaccinated against the flu in England⁷³, with similar coverage in Wales (48.5%)⁴⁵ and Scotland (44.8%)⁴⁶, and slightly higher coverage in Northern Ireland (56.0%)⁴⁷.

Most regions of the UK, therefore, fell short of the WHO target of 55%. There was also considerable variation between risk groups, with less than 10% of those with chronic kidney or liver disease receiving the vaccination, while the uptake rate for those with chronic respiratory disease was around 50%.

There is limited evidence about how to effectively increase flu vaccination uptake among most eligible groups⁷⁴ and, therefore, further understanding the views and barriers underpinning vaccination decisions are needed to devise more effective strategies.

We surveyed adults (111 people) with clinical risk factors for flu and asked them if they had received the flu jab. 55% of survey respondents said they had got the jab, slightly more than the general population. 26% said they chose not to get the jab and 18% said

they had not been offered the jab (the remaining 1% were unsure). When we asked those who had chosen not to get the flu jab why they made that choice, the most common reason was fear of side effects (36%), followed by the belief that they were not at risk of getting the flu (19%). Low on the list was that people did not feel the flu was very serious (3%) and that it was too inconvenient (4%).

This suggests that people may feel that being vaccinated against the flu would be desirable to protect against a serious disease but that the trust in the safety of the vaccine is low – this was also seen when we surveyed parents regarding the childhood flu vaccination. Given that a significant proportion of people felt that they were not at risk of catching the flu, promoting the understanding that there is a risk worth mitigating is crucial for people to take the step to get vaccinated. Even though people did not seem to think it was inconvenient to get the vaccination, making it as easy as possible is likely to be helpful for encouraging people who do not feel getting the vaccine is vital. Similar findings were seen among the total population of working-age adults that we surveyed: 31% of people agreed the flu vaccination is likely to give unwanted side effects, only 49% agreed they were likely to catch the flu, though 77% agreed flu is a serious disease (increasing with age).

Tackling low uptake of the flu vaccine for working age adults may therefore require a multi-pronged approach: dispelling fears of side effects, promoting better understanding of the risk for the individual, and making access to the vaccine as easy as possible.

The ‘whooping cough’ (Pertussis) vaccine for pregnant women

A vaccine for pregnant women to protect their babies against pertussis (whooping cough) was introduced in the UK in October 2012 following a national outbreak earlier that year which claimed the lives of fourteen infants⁷⁵. The vaccine aims to protect infants from the disease by transfer of protective antibodies from the mother to the baby while it is in utero. At eight weeks old, the infant can themselves receive the pertussis vaccination as part of the national immunisation schedule.

Coverage of the vaccine is above 70% in all parts of the UK ^{76, 57, 77, 78} and has demonstrated a positive impact: following the 2012 outbreak, incidence of pertussis has remained high in all age groups except in the young infants targeted by the new vaccination programme, in which cases of pertussis fell back to pre-outbreak levels. Although uptake is above 70%, a significant proportion of infants are still left unprotected.

We surveyed more than 1,800 women who had been eligible for the vaccine since it was introduced in 2012. 11% responded saying they had been offered the vaccine but had chosen not to take it up. Of these (203 people), the most common reason was fear of side effects (61%), followed by not thinking the vaccine was effective (28%) and not having enough information about the vaccine (24%). 21 people also mentioned the words ‘test or trial’ and 15 people

mentioned the words ‘safe or safety’, suggesting some people may worry the vaccine has not been sufficiently tested.

One study found that, in an interview of 42 mothers in London, five main themes were identified when discussing the pertussis vaccine: lack of discussion about the disease and vaccine; desire to protect the baby; trust in health professionals; convenience of vaccination; and help navigating the complicated demands of pregnancy⁷⁹. Another qualitative study found that uptake could be significantly enhanced if vaccination was recommended by a familiar healthcare professional⁸⁰.

For the pertussis vaccine, therefore, it appears that some women who do not receive the vaccination might not refuse it, but would want more information, discussion and/or easier access to the vaccine beforehand. This may be because the vaccine is a fairly recent addition to the immunisation schedule for pregnant women and there may be a sense that it is less familiar than other vaccines. Increasing awareness of why the vaccine is important in pregnancy and improving access to the vaccine may, therefore, be a priority. Encouraging trusted healthcare professionals, such as midwives, to reassure women that the vaccine is safe, effective and important may help to tackle concerns around side effects and effectiveness.



Older adults

Background

As the life expectancy for people in the UK increases, the health and wellbeing of older people is becoming an increasingly important issue for the sustainability of the health system. Older people can spend many years in poor health and require the use of health services. With an ageing population, the ability for older people to maintain their independence and retain quality of life will become one of the crucial health issues of the 21st century. Vaccines have an important role to play.

Infection is one of the leading causes of disability in older age, which can mean a loss of independence. While strokes and chronic heart failure are the top causes, pneumonia and flu follow closely behind⁸¹. Vaccines can help to prevent older people, who may cope less well with infection, from falling ill. Key vaccines for older people include seasonal flu vaccine, the shingles vaccine and the pneumococcal vaccine, and future vaccines are already being developed⁸². The goal of vaccination in older people is not only to avoid disease but to increase their ability to age healthily and increase their functional ability⁸³.

With increasing age comes increased susceptibility to infection – known as immune senescence. This is because ageing results in alterations to the immune system, such as the production of fewer new T cells (cells that play an important role in the immune system), and therefore leads to a decreased ability to respond effectively to new pathogens introduced into the body. This makes vaccines more important than ever – however, senescence also leads to a decreased response to vaccines. This does not, however, mean vaccinations are ineffective at older ages – just less effective in some people.

The combination of increased susceptibility to infection, greater severity of impact of infection and ageing populations means vaccinations for older adults are an important public health intervention. Gaining an understanding of the factors affecting the uptake of vaccinations in older people is therefore essential.

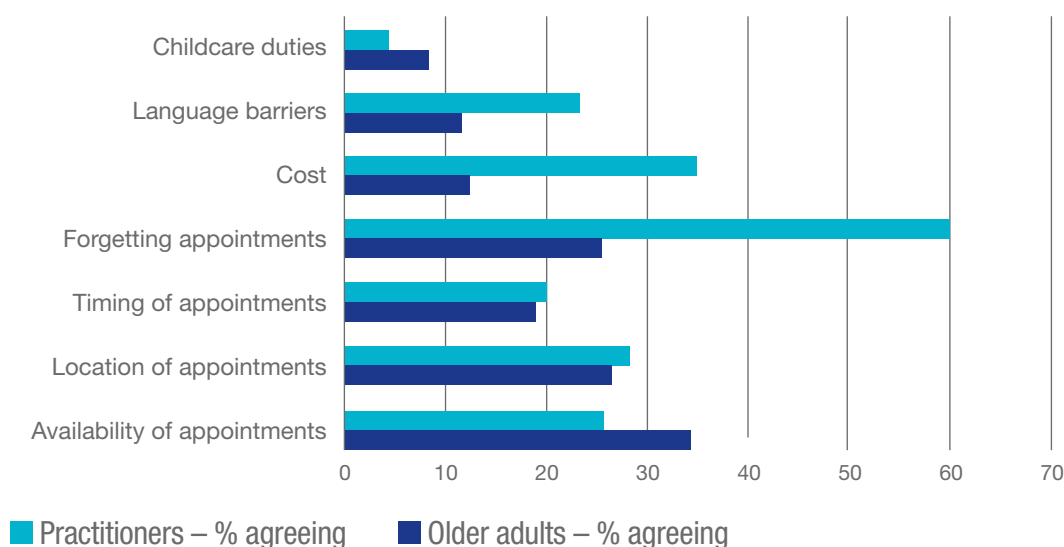
Access

One of the key barriers to vaccination is poor access. A review that investigated equality of access to healthcare found that older people – along with those in lower socioeconomic groups and those living in rural areas – had poorer access to healthcare⁸⁴. In our national survey, we asked older adults to what extent different factors posed a barrier to them getting vaccinated. We then also asked professionals who help deliver vaccinations to older people what they thought the key barriers were to older people accessing vaccinations.

Older adults believed the key barriers were the availability of appointments (34% agreed) and the location of appointments (27%). A sizeable proportion of healthcare professionals agreed with this, with 26% saying that availability of appointments, in their experience, posed a barrier to uptake, and 28% agreeing that the location of appointments was a problem. As with the findings for adults, this suggests that traditional healthcare settings for vaccinating the population may be insufficient to meet the needs of the older population. Expanding the settings of vaccination delivery may increase their ability to access vaccinations – especially as ability to travel may be hindered in older age.

Interestingly, the two barriers that healthcare professionals identified as having the greatest impact did not match those of older adults themselves. The majority (60%) of healthcare professionals said that patients forgetting appointments was a barrier while only 15% of older adults themselves agreed with this. This discrepancy was also found with working-age adults and, as discussed earlier, may be due in part to response bias. Similarly, professionals were almost three times as likely to agree that cost, for example of travelling to appointments, posed a barrier to older adults getting vaccinated (34% compared to 12%).

Barriers to accessing vaccinations for older adults



Attitudes and awareness

The attitudes towards vaccinations from older people were, in general, slightly more positive than those of younger adults. Only 12% of survey respondents over the age of 65 agreed that vaccinations were mainly promoted by the healthcare system for pharmaceutical company profit – this figure was almost double (23.6%) for adults younger than 65. In addition, 85% of those older than 65 agreed that vaccinations were mainly promoted for the good of the public's health compared to 77.4% of younger adults.

Older adults' awareness and understanding of vaccinations was similar to that of younger adults. Around a third (34%) of older adults correctly identified vaccines as the second most important global health intervention after clean water (30% in working age adults), demonstrating a significant awareness of the important role vaccines have played in improving global health. In addition, around two-thirds of older adults agreed that being vaccinated against a disease can protect others as well as the individual being vaccinated – a figure that was consistent across age groups. Older adults had a slightly better understanding that the myth of vaccine overload is not true – only 19% of those over the age of 65 agreed that you can have too many vaccines compared to 30.5% of younger adults.

Influences

One of the reasons there may be variation in older and younger adults' views on vaccination is the different ways in which people get information about vaccines. Older adults were found to highly value the opinion of

doctors and nurses, scientific experts and pharmacy teams. While this mirrored younger generations, older adults placed low value on the opinions they read online on social media or through forums – only 4% of those aged over 65 agreed they trusted these opinions, compared to 17% of those aged 18-24 and 21% of those aged 25-34 – more than a fivefold difference.

Linked to this, older adults were less likely than younger generations to see or hear negative messages about vaccinations online compared to younger adults. Just 18% of those aged 65 and over said they saw negative messages about vaccinations on social media often or sometimes, compared to 45% of working-age adults, with a similar disparity for online forums. Further, older people may be less likely than younger generations to use social media extensively. This may suggest that the online environment could have a negative impact on the attitudes of younger people towards vaccinations, with people both seeing more negative messages online and placing more value in them.

Older adults were more likely than any other age group to say that they see or hear positive messages in more traditional healthcare promotion settings, including at the GP practice, through healthcare professionals and through national campaigns. Those aged over 65 were overall less likely to see and hear negative messages in general. This evidence suggests that more traditional methods of communication, and through healthcare settings, may be the most appropriate for improving uptake in older adults, where the online environment is of less significance.

The flu vaccine for older adults

Influenza (flu) is a common respiratory disease with a high morbidity and mortality burden: the WHO has estimated that over 44,000 people in Europe die annually from flu (out of around 650,000 total deaths) with over 75% of these deaths occurring in those aged 65 and above⁸⁵. Annual flu epidemics in the northern hemisphere are associated with increases in all-cause mortality, significant economic costs and increased demand on the healthcare service⁸⁶. Tackling the burden of flu is crucial and vaccination is the most effective preventative measure.

Although flu is preventable through vaccination, the effectiveness of the flu vaccine varies year on year. This is because flu viruses mutate, and therefore change year on year. Each year WHO monitors flu viruses around the world and then makes recommendations on which strains are likely to be circulating in the forthcoming flu season, and vaccines against flu are developed accordingly⁸⁷. In the 2017/18 flu season, for example, the overall effectiveness of the flu vaccine was 12.2% in 18-64 year olds and 10.1% in over 65 year olds, but the effectiveness was not statistically significant for either group⁸⁸. Nonetheless, the vaccine remains the most effective preventative measure for flu despite its annual variation in effectiveness.

Importantly, the flu vaccine is also a key weapon in the fight against antimicrobial resistance. Antibiotics are often prescribed inappropriately in influenza cases: in managed care settings, one study found that antibiotics were prescribed inappropriately in 79% of influenza cases; in an outpatient setting this was

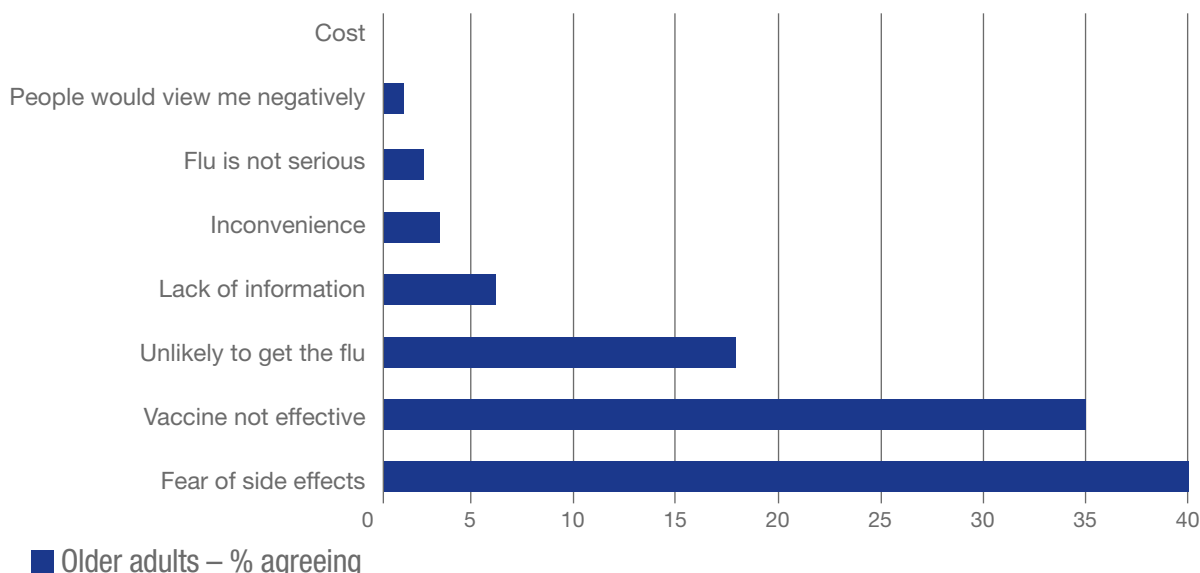
found to occur 38% of the time. The introduction of a flu immunisation programme has shown to reduce the extent to which this occurs as there are fewer infections requiring antibiotics, with one study finding that antibiotic prescriptions associated with flu decreased by 64% after the implementation of the immunisation programme⁸⁹.

The uptake of the vaccine for patients aged 65 years and over was 72.6% in the flu season of 2017-18 in England, with a range of 66.9% in London to 75.5% in Cheshire and Merseyside⁷³. Uptake was similar elsewhere in the UK: 71.8% in Northern Ireland⁴⁷, 73.7% in Scotland⁴⁶, and 68.8% in Wales⁴⁵. This falls short of the WHO target of 75% and above for this age group, although uptake rates have been increasing across the UK. The fairly consistent uptake shown by this group of around 70% is significantly higher than most other countries: the only countries to ever have reached the WHO target are the Netherlands and the UK. However, given the importance of the flu vaccine, improving uptake for older people in the UK remains a priority.

In our survey of over **500 people** aged 65 and over, around **four in five (78%)** people said they have received the flu vaccine, with **20%** saying they had never had the flu vaccine. Of the one in five people (**a total of 92 people**) who had chosen not to be vaccinated, the most common reasons for doing so were:

- 1. Concern regarding side effects of vaccine (40%)**
- 2. Inefficiency of vaccine (35%)**
- 3. Perceived low risk of getting the flu (18%)**

Reasons for not getting the flu vaccination



In older adults in general – including those who did get the flu jab – over one in five believed that the vaccine was likely to give unwanted side effects and less than three-quarters (72%) agreed that the flu jab is effective.

These key concerns regarding the efficacy and safety of the vaccine may be due in part to media attention on these issues. **Media headlines have included:**

Mother-of-two, 34, claims she was left blind, diagnosed with multiple sclerosis and covered in a rash ‘after having the FLU JAB’ and fears she may never recover

Daily Mail - December 2017⁹⁰

Mercury in flu vaccine is linked to autism

Daily Mail - January 2003⁹¹

Flu vaccine ‘next to useless’ says expert who urges use of hygiene measures and face masks as far more effective measures to escape the virus

Daily Mail - June 2018⁹²



While the efficacy of the vaccine varies, it is still the best prevention available and maintaining high uptake year on year is important to sustain momentum of the flu immunisation programme. Moreover, the efficacy of the vaccine is likely to improve with the introduction of the adjuvanted trivalent vaccine for older people in 2018⁹³. The high level of concern regarding the side effects of the flu vaccine are less valid: the flu vaccine for older adults does not contain live vaccine and the belief that the flu vaccine can give you the flu is unfounded.

As well as a perceived risk of the vaccine – namely the concern over side effects – survey respondents did not perceive flu to pose a very high risk. Although 89% of people agreed flu is a serious disease only 52% of older people agreed they were at risk of catching the flu, with 18% of those who rejected the vaccine citing this low risk as a reason for not getting the vaccine. Understanding these risk perceptions is informative for how to promote uptake of the flu vaccine: the public already seem to understand that the flu is a dangerous disease but more work should be done to promote the understanding that everyone is at risk of catching it.



The shingles vaccine

Shingles is caused by the reactivation of the varicella zoster virus (chickenpox) in the body which lies dormant once an individual is infected with chickenpox. The virus is more likely to reactivate in older people, when the immune system becomes weaker, and presents as a painful rash on one side of the body and/or face. The symptoms are also more severe in older adults and are likely to last longer, and serious complications are more likely to arise. Over 50,000 cases of shingles occur in people aged 70 years and over each year in England and Wales, with around 50 associated deaths⁹⁴.

The vaccine programme against shingles began in 2013/14 in the UK and is estimated to reduce cases by 38% for adults over 70 years. In those that do develop shingles, the severity of the illness and chance of complications is reduced significantly⁹⁵. The delivery of the immunisation programme has been slightly complicated, with the vaccine being offered to those aged 70 and those aged 78 or 79 as a catch up programme.

Uptake of the shingles vaccine has not been very high, with uptake in those 70 years old in England only 48.3% in 2016/17, representing a 13.5% decline since the start of the programme in 2013/14⁹⁶. There was also a decrease in coverage for the catch-up cohort of those aged 78 years, with 49.4% uptake down from a high of 57.8% in 2014/15. Similar levels of uptake, and similar patterns of decline, can also be seen elsewhere in the UK^{57 97}.

Of those who were offered the shingles vaccine and declined (51 people), the most common reason was concern over side effects (28%) and lack of information (21%). Other than small local reactions and headaches, side effects are very rare with fewer than one in 10,000 people experiencing a chickenpox-like illness following vaccination. There has not been significant media coverage reporting side effects of the shingles vaccine so it is likely that the fear is related to concern over side effects of vaccinations in general.

The finding that many felt there was a lack of information regarding the shingles vaccination may be related to the complex delivery of the vaccine, as well as a low awareness of the shingles vaccine and shingles itself. In the general population, only 19% believed they were at risk of developing shingles – even in the oldest age group of 70+ this was only 27%, despite the fact that most people have had chickenpox and therefore are at risk of developing shingles. Only 30% of people agreed the shingles vaccine was effective (55% in those aged over 70). There was also considerable hesitancy around the vaccine, with 60% of those under 70 disagreeing with the statement ‘I would not hesitate to get the shingles vaccination’.

Therefore, raising awareness of the shingles vaccination may be the primary way of improving uptake: fear over side effects, doubts over effectiveness and a lack of information all point towards a low awareness and understanding of this important vaccine.

Conclusions

Vaccinations across the lifespan are an invaluable tool for improving and protecting the public's health. The UK is fortunate to have a world-class immunisation programme, with world-leading uptake rates. Preserving and building on this will become increasingly important as our population ages and as we face new health challenges, such as antibiotic resistance.

We have found through our research that the public's view of vaccinations tends to be positive: the vast majority of people, across all age groups, believe that vaccines are important for their health. Taking a broad view, the outlook is very optimistic for the future of vaccinations in the UK. However, there are areas where uptake of vaccinations could be improved – whether for specific vaccinations or groups of people. Understanding the reasons behind lower uptake is illuminating – both for tackling the specific problem, and gaining an understanding of general trends behind vaccine hesitancy or refusal.

Some of the common threads we found through our research included:

• Concerns over side effects of vaccination

For every vaccine we explored, with the exception of the childhood flu vaccination, the number one reason for not getting the vaccination was fear of side effects.

For some vaccinations – for instance the MMR vaccine, or the HPV vaccine – these fears are particularly fanned by anti-vaccination campaigners or media scares that have led to widespread and often misleading discussion around the possible side effects of the vaccines – despite very good evidence that those fears are ill founded. This could undermine confidence in vaccines in general, which may help to explain why we found concern about side effects to be a prevalent concern.

Other vaccines – the flu vaccine, the shingles vaccine, and the pertussis vaccine, for example – have been added to the immunisation programme in recent years and it is likely that increased awareness and information will have a positive impact on uptake to counteract fear of the unknown.

We also found a lack of trust that vaccines were effective for some respondents. This highlights the need for communication and information over time as the benefits of new additions to the immunisation schedule start to become more apparent – as with the HPV vaccine. Effectively communicating the benefits of vaccination, as well as historical achievements, is important to convey the value and power of vaccines.

Vaccine side effects

Some perceived side effects are genuine 'urban myths'. For example, the belief that a flu vaccine can sometimes itself cause the flu, the alleged link between the pertussis vaccine and neurological disorders, and the now notorious MMR-autism myth – all of these have no basis in fact.

On the other hand, there are also genuine potential side effects to all vaccines. However, in reality these only affect some people, and are comparatively mild [NHS, 2019]. They are typically short-lived effects that go away of their own accord, and are far outweighed by the benefits of immunisation. Some common side effects include swelling and redness on the injection site, fatigue, headache, and muscle pain [NHS, 2019].

More dangerous side effects can also occur, such as an anaphylactic reaction (an allergic reaction), which can be life-threatening and should be taken seriously. However, these reactions are reversible if treated promptly and – at an incidence rate of less than one in a million cases [NHS, 2019] – are roughly five times rarer than giving birth to conjoined twins [Carnevale et al., 2006].

The potential side effects will vary between vaccines, more detail on which can be found at www.nhs.uk/conditions/vaccinations/. More broadly, it is important to remember that not all changes to one's health following a vaccination are side effects. In a population where millions are vaccinated every year, it is to be expected that some will become ill shortly afterwards even though this has nothing to do with the vaccination.

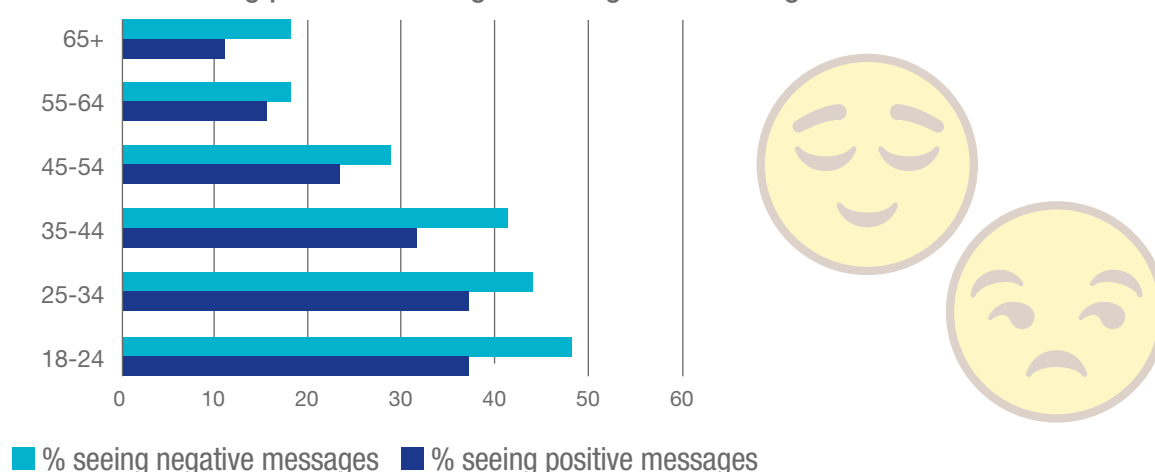
• Social media

We found that, across the board, people were more likely to see negative messages on social media than they were to see positive messages. Overall, two in five parents with children under the age of 18 said they are 'often or sometimes' exposed to negative messages about vaccinations on social media.

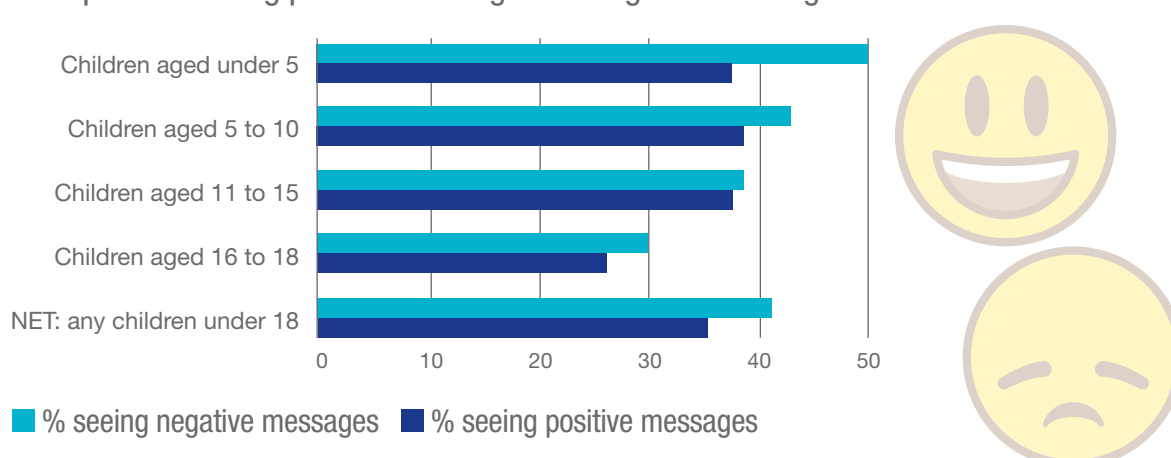
A significant proportion of young people said they valued the opinion of those online or through social media, though we did not see this for young parents.

Health misinformation on social media is concerning, spreading misleading and dangerous information about vaccination to the public. Misinformation can have dangerous consequences, as seen with the MMR controversy, and, at present, it seems that the powerful tool of social media is being utilised more prominently by those looking to spread negative information and 'fake news' about vaccinations.

% of adults seeing positive messages vs. negative messages on social media



% of parents seeing positive messages vs. negative messages on social media



- The role of the media

The power of the media was mentioned consistently by the healthcare professionals we interviewed, and many said they had directly experienced fluctuations in uptake according to stories in the media. MMR was highlighted by healthcare professionals as a vaccination parents still have concerns about, and parents who had chosen not to give their child the MMR vaccine overwhelmingly cited fear of side effects as the reason.

This highlights the long-lasting power of the media to impact the public's view on vaccinations – even two decades later, the discredited link between MMR and autism is not forgotten.

However, we recognise that in recent times there has been positive reporting on vaccinations in the media – for example, the campaign by the Daily Mail to extend the HPV vaccination programme to boys^{98, 99}. Utilising the power of the media in this way to promote the value of vaccinations, while guarding against vaccine scares, will be important, especially as new vaccinations are developed and included in the immunisation schedule.

- Access to appointments

Timing and availability of appointments were the most commonly cited barriers to accessing vaccinations for working-age adults and parents, while older adults cited availability and location of appointments as the key barriers.

Although inconvenience was very rarely cited as a reason for not getting vaccinated, it is clear that ensuring vaccinations are as easily and readily available as possible can only be beneficial. We found that healthcare professionals often indicated that their place of work made steps to ensure flexibility of appointments. Encouraging this, as far as possible, as well as increasing the availability of appointments in less traditional locations may positively impact access to vaccinations.

It is also important to note that healthcare workers cited patients forgetting appointments, for working-age adults, older adults, and parents, as the biggest barrier to vaccination. Tackling this would have a two-fold benefit, as it would both ensure people were more likely to attend vaccination appointments, and ensure a greater availability of appointments by reducing time wasted. Call and recall systems were frequently mentioned by healthcare professionals as an effective intervention for tackling this problem.



What is RSPH calling for?

More convenient locations for vaccination

In recent years, pharmacies have begun to offer some vaccinations – including the seasonal flu vaccination and travel vaccinations. Although there is mixed evidence regarding how effective this has been in increasing uptake, this may in part be due to issues with loss of data between pharmacies and GPs which should now be improved.

We also asked the public whether other locations would be convenient to receive vaccinations – although the GP surgery and pharmacy were by far the most convenient places (95% and 90%), more than half of people we surveyed agreed that a hospital, community centre or high-street pop-up facility would be convenient. Utilising the wider public health workforce to signpost to and offer vaccinations in a more diverse range of locations – especially in areas with particularly low uptake or difficult access to healthcare settings – may be beneficial to increasing uptake. Ensuring efficient data capture and flow will be key to monitoring uptake.

Counteracting health misinformation online and via social media

The online environment, and social media in particular, has become increasingly influential in the 21st century. The influence of social media over the public's view on vaccinations is likely to increase – particularly as younger generations become parents. We have found that the impact of social media is likely to be negative – it is a breeding ground for misleading information and negative messaging around vaccination.

To tackle this, we are calling for the NHS England Information Standard to be applied to social media platforms to certify whether information is from reputable sources. This is particularly important for health information. Follow-up work from this report will focus on collaborating with social media platforms to investigate how this might work in practice.

Social media platforms and message boards could also clamp down on 'fake news' spread on their sites by prioritising health information from reputable

sources – currently, on Facebook for example, suggested groups or pages are ordered by popularity rather than credibility of the information. Google already prioritises organisations such as the NHS or the British Medical Association, and this should be enforced across social media platforms. We surveyed 2,000 UK adults and over four in five (82%) agreed that social media platforms should take steps to limit 'fake news' regarding vaccinations.

Public health bodies should consider investing in positive social media campaigns regarding vaccinations to improve the chances of people seeing positive, accurate messages on vaccinations. This could be targeted to population groups with lower uptake. More than half (55%) of the 2,000 UK adults we surveyed agreed that they would like to see more information about vaccines on social media from health organisations such as the NHS – with more than two-thirds (69%) of 18-24 year olds agreeing.

Better education on popular myths around vaccinations

Despite mostly positive attitudes towards vaccinations, our surveys demonstrated that some myths around vaccines still persisted. In particular, the myth of vaccine overload – that too many vaccinations can 'overload' the immune system and be dangerous – was found in all age groups: only 31% of people disagreed that 'you can have too many vaccinations', with 28% agreeing. This was fairly consistent across social class, age, gender and location.

The myth of vaccine overload may be particularly dangerous if more vaccinations continue to be added to the immunisation schedule, and therefore better education in schools on the safety and value of vaccinations is imperative. We are therefore calling for education on the value and importance of vaccinations to be included in the PSHE curriculum for schools, or potentially in core curriculum subjects such as Science. Three-quarters (74%) of UK adults we surveyed agreed that there should be more education in secondary schools about the value of vaccination.

There is also a role for the wider public health workforce – almost one in five (19%) of 25-34 year olds and one in ten (10%) of 18-24 year olds said they valued the opinion of religious leaders, for example, who may be underutilised as a source of information about the value of vaccinations. There could therefore be a potential role for educating figures of influence, such as faith leaders and social media influencers.

Responsibility of the press

The media has a large influence over public knowledge and opinion of vaccinations – particularly demonstrated through the MMR controversy. Indeed, almost one in four (22%) adults said they valued the media as a source of information about vaccines.

The press, therefore, has a responsibility to share accurate, evidence-based information about vaccinations, given the vital role vaccinations play in improving and maintaining the health of the population.

The Independent Press Standards Organisation (IPSO) should enforce the Accuracy clause in the Editor's Code with special attention paid to health information and misinformation that may jeopardise the public's safety. The potential health impact of misinformation should be considered when sanctions are applied.

The health community should work with the press to provide accurate messages – for example through the Science Media Centre. Likewise, journalists should make use of the Science Media Centre to ensure they have access to the best evidence. Social media 'influencers' also have a responsibility to make sure they are not sharing health misinformation and organisations such as the Science Media Centre should consider working with key influencers who may discuss vaccinations online.

Improving call and recall services

Call and recall for appointments have been found to be effective interventions for increasing uptake of vaccinations¹⁰⁰. However, sending letters can be very time-consuming for surgeries, a fact that was expressed in our interviews with healthcare workers.

Raising awareness and reminding people to attend vaccination appointments – especially for older people and for vaccinations more recently added to the immunisation schedule – may be effective in increasing uptake. Four in five (80%) of the UK adults we surveyed agreed that reminders when they are due for vaccination would be useful. New ways to do this could include utilising local press to print reminders, signposting in libraries, sending reminder 'birthday cards' as people turn 65, or creating pop-up reminders on social media platforms such as Facebook.

Implementing MECC across the health system

Maximising the use of the wider public health workforce is also key. The wider workforce, including health visitors, midwives and school nurses, all play an important role in providing information about vaccinations, especially to parents. Around three-quarters of parents we surveyed said that they valued the advice of health visitors and midwives regarding vaccinations (72% and 70% respectively) and over half agreed they valued the advice of school nurses regarding vaccinations (59%). A report by Public Health England indicated that, over time, significantly fewer parents have reported that health visitors are discussing immunisations with them¹⁰¹. Encouraging healthcare professionals across the system to opportunistically promote uptake of vaccinations, using the Making Every Contact Count (MECC) guidelines, may help to improve coverage.

It is also important that healthcare professionals have sufficient training to be able to respond to the public's questions regarding vaccinations: Public Health England have developed National Minimum Standards for the training of both healthcare practitioners and healthcare support workers which should be fully implemented.



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