

# VACCINES FOR LIFE

Knowing the facts provides  
the first step towards protecting  
oneself, one's family and the public



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# Introduction

**“Immunisation has been a great public health success story. The lives of millions of children have been saved, millions have the chance of a longer healthier life, a greater chance to learn, to play, to read and write, to move around freely without suffering.”**

**Nelson Mandela, Winner of the Nobel Peace Prize, 1993**

Vaccines have been used to protect people from what were once common and often fatal diseases such as smallpox, diphtheria, typhoid and the plague; and more recently polio, rubella, measles, mumps, hepatitis B and meningococcal B and C. Once a disease ‘disappears’, its burden can be quickly forgotten. Unfortunately, unless completely eradicated, infectious diseases have a tendency to return. Continued high vaccination uptake rates are vital to ensure the sustained protection of individuals and populations.

Vaccination is one of the most successful and cost-effective public health intervention available. According to the World Health Organisation, vaccines save up to three million lives annually and protect a further three-quarters of a million from the destructive consequences of disease. They estimate that a further one and a half million lives could be saved by increasing vaccination uptake rates globally <sup>1</sup>.

Facts save lives. Miscommunication and untruths can destroy them. Myths about vaccines have been proven to effect vaccination uptake rates. This can result in the unnecessary spread of vaccine-preventable disease, disability and even the loss of life. It is crucial that the facts are presented to the public in a clear and concise manner to encourage high vaccination uptake rates.

The Irish Pharmaceutical Healthcare Association (IPHA) represents the international research-based pharmaceutical industry in Ireland. Its members include the manufacturers of vaccines, some of which are manufactured here in Ireland.

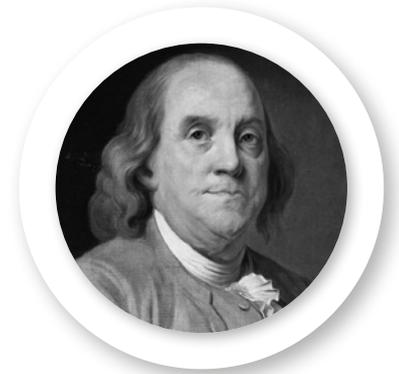
While immunisation programmes require support and adequate funding, the associated prevention of mortality and morbidity provides long-term cost savings, increased productivity and economic growth. Accordingly, the Irish healthcare system needs to continue to drive vaccination forward. The IPHA is committed to working with policy makers to ensure the timely access to and security of supply of new and existing vaccines to the public.

# Vaccines work

## History

**“In 1736 I lost one of my Sons, a fine Boy of 4 Years old, taken by the Small Pox in the common way. I long regretted that I had not given it to him by Inoculation, which I mention for the Sake of Parents, who omit that Operation on the Supposition that they should never forgive themselves if a Child died under it; my Example showing that the Regret may be the same either way, and that therefore the safer should be chosen.”**

Benjamin Franklin quoted in *Franklin on Franklin* by Paul Zall <sup>2</sup>



While Dr Edward Jenner is widely acknowledged as the father of modern vaccination with his discovery in 1796 that inoculating someone with tissue from a cowpox sore would protect them from smallpox, he was not the first to perform this practice. The use of inoculation by introducing the smallpox virus via tissue from a smallpox sore into the skin was widely used in ancient times <sup>3</sup>.

However, Jenner's use of cowpox material to create immunity from smallpox and the subsequent discovery of the smallpox vaccine was instrumental in the development of modern vaccines that continue to save lives today.

The story goes that Jenner inoculated eight year old James Phipps with tissue from a fresh cowpox sore on the hand of dairy maid Sarah Nelms. It was widely known that dairy maids infected with cowpox were somehow immune to smallpox. While James suffered a mild fever he quickly recovered. Nine days later, Jenner repeated the procedure using the tissue from a smallpox sore. The little boy did not contract smallpox which led Jenner to deduce that the concept of inoculation to protect against disease worked <sup>3</sup>.

Before his pioneering discovery, smallpox was a devastating condition that was fatal in 30% of cases <sup>4</sup>. It is thanks to Jenner's work, and his development of the smallpox vaccine, that the World Health Organisation now describes smallpox as “an ancient disease” which was officially declared eradicated in 1980 <sup>5</sup>.

Following on from the success of the smallpox vaccine the drive to develop other vaccines began. By 1900, four more vaccines were available. These were used to protect people against rabies, typhoid, cholera and the plague <sup>6</sup>.

During the 20th century additional vaccines against a number of common and fatal infections became available. These included measles, mumps, pertussis (whooping cough), diphtheria, tetanus, polio, rubella, TB and many more highly infectious diseases <sup>6</sup>.

# Polio: living inside an iron lung

**“In Cherry Orchard, the iron lung helped me to breathe. It was a long, airtight, coffin-shaped box with my head sticking out at one end, supported on a small ledge by a pillow. I lay there listening to the motor pumping a large bellows, which changed the air pressure inside. It created a partial vacuum to lift my ribcage to draw air into my lungs and then a positive pressure to partially compress my lungs, so I could breathe out.**

“I wasn’t scared going into this box. I was too ill and in too much pain to care. What really frightened me was when a nurse or a doctor wanted to open the iron lung. In the beginning I couldn’t breathe at all once it was open and this terrified the life out of me. I had severe pain throughout my whole body, especially in my arms and legs. Yet even severe pain can be coped with to some extent, but your next breath is very personal and something you cannot do without.” Jim Costello, founding member of Post Polio Support Group Ireland <sup>7</sup>.

Jim Costello was awarded the Louis Pasteur Polio Hero medal in Paris last year for his work with the Post Polio Support Group. He was just one of thousands of children around the world who spent a great deal of their childhood living inside an iron lung as a result of contracting polio.

According to the Health Protection Surveillance Centre, the last polio case was notified in Ireland in 1984. “The current absence of polio in Ireland is directly attributable to the national polio vaccination programme that was introduced in 1957 <sup>8</sup>.”

Iron lungs, leg callipers, disability and death... these are things that thanks to the development of the polio vaccine are now a distant memory. Vaccines help to protect people from disease.



## Vaccines: a victim of their own success?

Vaccination is arguably one of the top medical discoveries of all time. It has resulted in the prevention of millions of deaths and disabilities worldwide. For example, the measles vaccination resulted in a 79% reduction in measles deaths between 2000 and 2015, preventing an estimated 17 million deaths. The World Health Organisation has stated that the measles vaccine is “one of the best buys in public health”<sup>9</sup>.

### People are becoming immune to the success of immunisation

Has the success of vaccinations lulled people into a false sense of security that these diseases no longer exist?

**Measles still kills.** Coupled with the familiar red spots or rash, measles can cause chest infections, fits, ear infections, swelling on the brain, brain damage and even death. According to the World Health Organisation, in 2015 there were 134,200 measles deaths worldwide, approximately 367 deaths every day or 15 deaths every hour<sup>9</sup>.

In May 2016, there was an outbreak of measles in Ireland and according to the HSE, most of those who were infected had not received the MMR (Measles-Mumps-Rubella) vaccine<sup>10</sup>. This gap in population immunity allowed the disease to spread quickly and freely. A Disease Surveillance Report of the Health Protection Surveillance Centre in Ireland reported that:

- 20% of the cases were infants under 12 months of age and therefore too young to have received the MMR vaccine
- 58% who were eligible for vaccination were unvaccinated
- 15% were unsure if they had been vaccinated
- 7% were unable to verify that they had completed their vaccination schedule

Of the 40 confirmed cases of measles, 48% were hospitalised (median 5 days) with the remaining 52% attending emergency departments or their GP. Luckily, there were no reported deaths from this outbreak<sup>11</sup>.

**The flu virus still kills.** According to research carried out by the Health Protection Surveillance Centre, over the past eight flu seasons between 200 and 500 people died in Ireland each year from flu related illness. In the current flu season, 2016/2017, there have been 79 deaths reported<sup>12</sup>. The Health Protection Surveillance Centre estimates that, in a particularly severe flu season, up to 1,000 people could lose their lives<sup>13</sup>. It is therefore recommended that all those in high-risk groups receive the annual flu vaccine. Those at risk include people aged 65 and older, pregnant women, people with long-term health conditions such as diabetes, chronic heart or lung conditions, asthma, liver or kidney disease and individuals with weakened immune systems. Healthcare workers and residents in long stay nursing homes are also among those who should receive the annual flu vaccine.

Vaccines have successfully reduced the incidence and burden of many, once common and often fatal, diseases. Once a disease ‘disappears’, its burden can be quickly forgotten. While memories fade, sadly disease and the threat of infection do not. Infectious diseases are still a real threat. It is vital that we do not allow complacency to creep in when it comes to vaccination. Falling vaccination uptake rates increase the incidences of diseases and the possibility of outbreaks.



## Vaccination: not just a personal choice

Despite the availability of free and effective vaccines, some people make the personal choice not to vaccinate themselves or their children in the belief that vaccines are unsafe or no longer necessary. Perhaps people may also be unaware of the potentially devastating effects of the diseases vaccines protect against.

However, a personal choice not to vaccinate has a wider public impact. Not only is it a decision that may put one's own life, and that of one's child, at risk, but it also puts those who come into contact with an unvaccinated person at risk. Such contact is particularly dangerous for people with a reduced immune system, pregnant women or small babies who have not yet completed all their vaccinations.

The 2016 measles outbreak in Ireland demonstrates just how rapidly infectious diseases can spread when there are immunity gaps in the population. It highlights the importance of high vaccination uptake rates to protect populations or for "herd protection".

# How your vaccination choice impacts the population

### How "herd protection" works



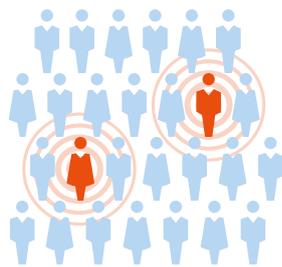
Not immunised but still healthy



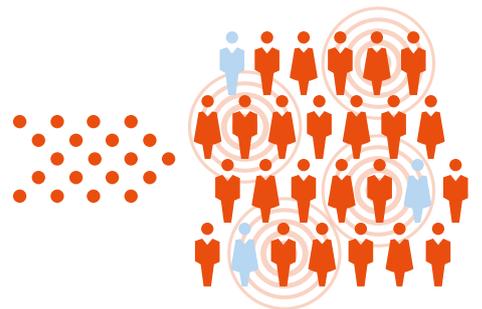
Immunised and healthy



Not immunised, sick and contagious



When no-one is immunised... disease spreads freely through the population



When some of the population is immunised... disease spreads to some of the population



When most of the population is immunised... it provides a disease barrier and limits the spread of disease



## What does this mean in an Irish context?

In its parents' guide on vaccines, the HSE National Immunisation Office states that in a school of 1,000 children who have not received the MMR vaccine, there will be 1,000 cases of measles, 40 children will get pneumonia, 50 will develop an ear infection, and between one and two children will die. However in a school of 1,000 children who have received the vaccine there will be 50 cases of measles, two children will get pneumonia and two to three will develop an ear infection<sup>14</sup>.



A population's protection decreases if vaccination uptake rates fall. For example, if a person develops measles, the chances of infecting others is reduced if everyone else (the herd) has been vaccinated. People who cannot be immunised depend on this herd protection for their own protection<sup>14</sup>.

While vaccination provides protection at a national level it also protects populations on a global basis. It is important that individuals recognise this cross border and wider impact of their vaccination choices.

## Vaccines provide benefits for health systems

In addition to the individual and population health benefits of vaccination there is a significant benefit for health systems. The success of vaccines has greatly reduced the burden on health systems in terms of pressures on human, financial and other resources as the number of cases and exposure to vaccine-preventable diseases is limited.

Vaccines provide one of the most cost-effective public health measures with an estimated **return on investment of 12 – 18%**<sup>15</sup>. High rates of vaccination uptake lead to increased population protection which in turn frees up healthcare resources so that they can be focused on other areas within the health system. The 2016 measles outbreak in Ireland provides a good example of the resource pressures experienced by the Irish healthcare system in terms of the number of hospitalisations, attendance at emergency departments and GP practices.

# Vaccines for life

## Vaccines save lives, from infancy to old age

Vaccines save millions of lives each year. However, they are not just beneficial for children. While vaccinating infants provides much needed immunity and protection in childhood they are also advised across each life stage from infancy to old age. Knowing when to be vaccinated provides the first step towards protecting one's self, one's family and the wider population.

## Childhood vaccinations

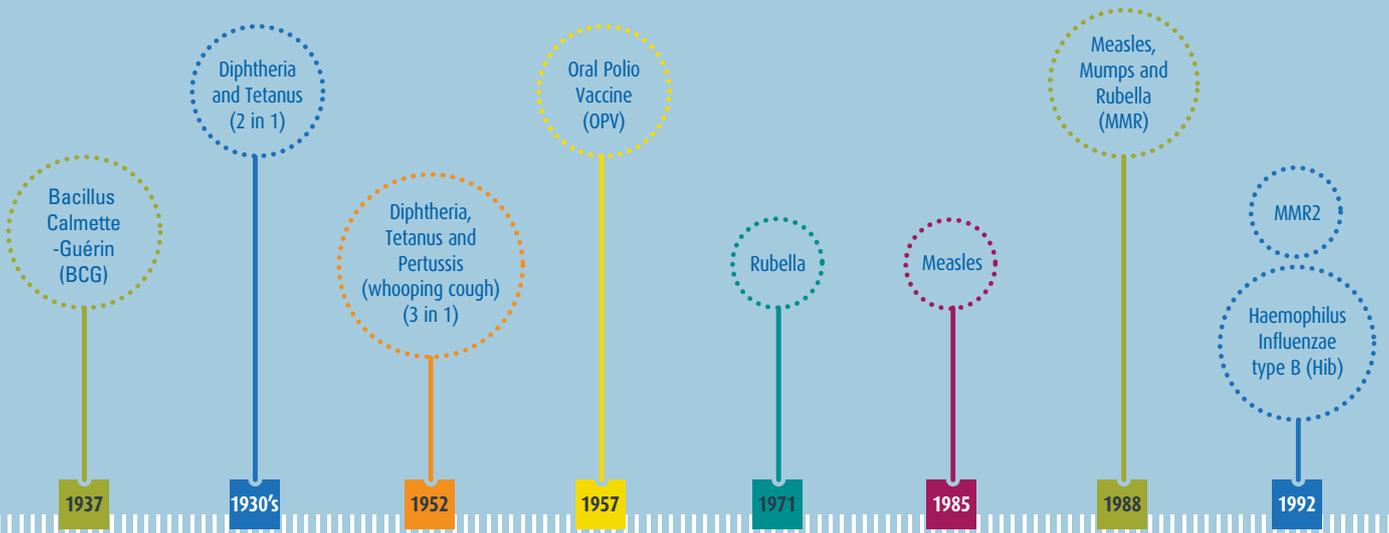
In some states in the USA, children cannot start school unless they have received all recommended vaccinations. Australia has adopted a 'No Jab, No Pay' policy which means that parents must ensure their children's vaccination history is up to date before they can receive child benefit and some other social welfare payments<sup>16</sup>.

Vaccines are not mandatory in Ireland, however, parents are strongly advised to ensure their children receive all recommended vaccinations. Not only will this protect them and others from serious illness it will also give them long term immunity from infectious and life threatening diseases such as measles, meningococcal B and C, diphtheria, hepatitis B and polio.



Vaccines are for  
**all stages  
of life**

# The history of vaccines in Ireland

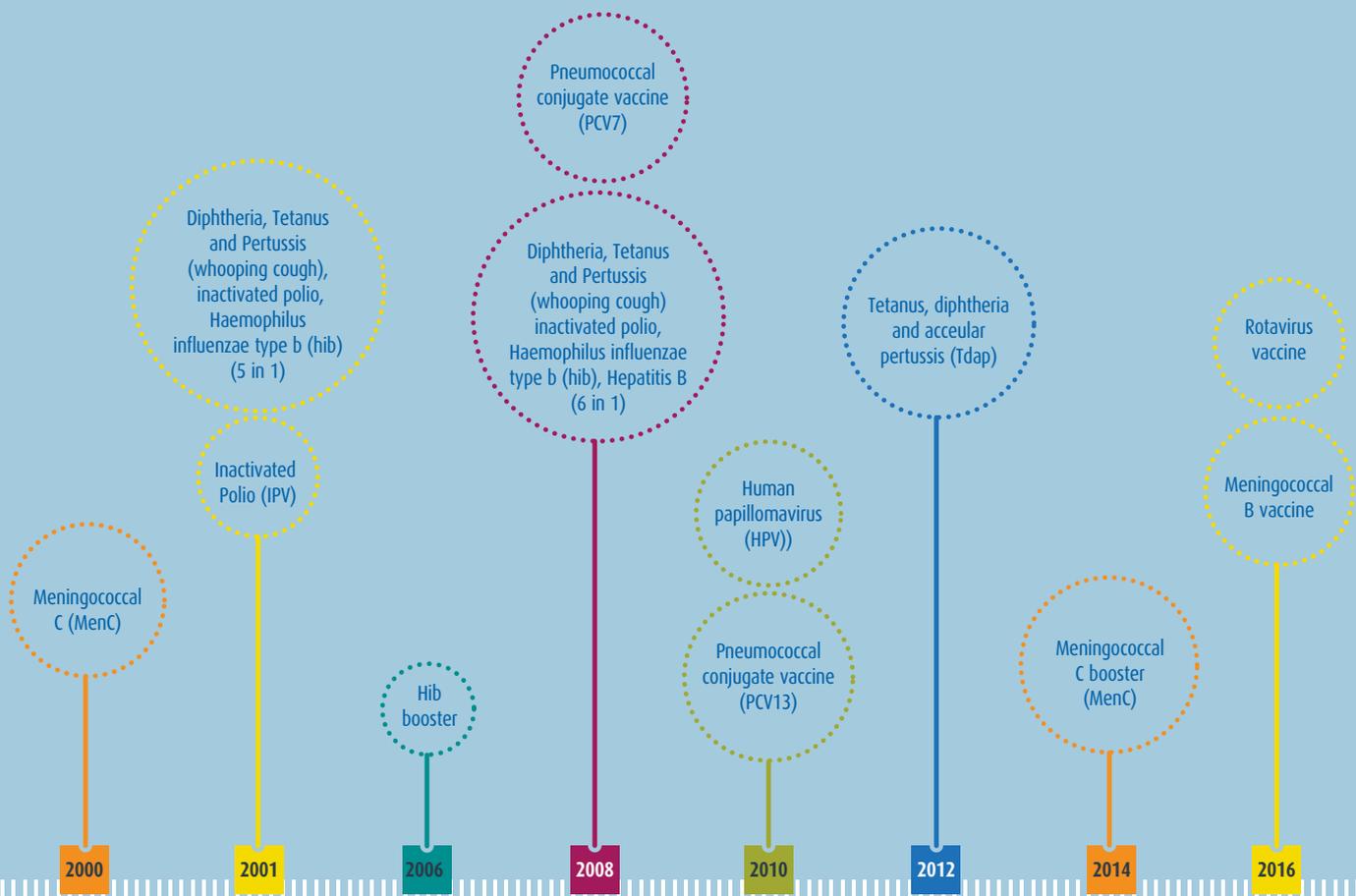


## 2017 Childhood Immunisation Schedule Ireland <sup>17</sup>

AGE	VACCINE DESCRIPTION
Birth	<b>BCG</b> – Tuberculosis Vaccine
2 Months	<b>6 in 1</b> – Diphtheria, Tetanus, Whooping Cough, Hib, Polio, Hepatitis B <b>PCV</b> – Pneumococcal Conjugate <b>MenB</b> – Meningococcal B <b>Rotavirus oral vaccine</b>
4 Months	<b>6 in 1</b> – Diphtheria, Tetanus, Whooping Cough, Hib, Polio, Hepatitis B <b>MenB</b> – Meningococcal B <b>Rotavirus oral vaccine</b>
6 Months	<b>6 in 1</b> – Diphtheria, Tetanus, Whooping Cough, Hib, Polio, Hepatitis B <b>PCV</b> – Pneumococcal Conjugate <b>MenC</b> – Meningococcal C
12 Months	<b>MMR</b> – Measles, Mumps, Rubella <b>MenB</b> – Meningococcal B
13 Months	<b>Hib/MenC</b> – Haemophilus Influenzae b, Meningococcal C <b>PCV</b> – Pneumococcal Conjugate

All vaccines listed are **free**

Children aged 4 to 5 years of age need to get booster doses of some vaccines to protect them against these diseases: the 4 in 1 booster to protect against diphtheria, polio, tetanus and whooping cough (pertussis) and a second dose of the MMR vaccine to protect against measles, mumps and rubella. These vaccines are usually given by a HSE doctor or nurse in primary schools.



## Adolescent vaccinations

All students in their first year of second level school are offered a tetanus and low-dose diphtheria and whooping cough (Tdap) booster vaccine. They are also offered a booster dose of the meningococcal C (MenC) vaccine to protect them, up to, and including early adulthood from contracting MenC disease<sup>17</sup>.

In 2010, Ireland introduced the HPV vaccination programme for young girls in the first year of secondary school. The vaccine protects against 7 out of 10 cervical cancers and protects young girls from developing these cervical cancers as adults<sup>18</sup>. Two doses of the vaccine are given six months apart. Girls over the age of 15 years receiving the HPV vaccine require three doses<sup>17</sup>.

HPV vaccines have also been shown to be effective in preventing infection in men and protecting them against HPV related cancers later in life. Australia and the United States currently recommend routine vaccination for boys. While boys in Ireland do not receive the vaccination as part of the school programme, they can get it privately<sup>19</sup>.

## Adult vaccinations

The National Immunisation Guidelines for Ireland recommend that certain groups of adults should receive specific vaccines. These include women of childbearing age, pregnant women, people with certain conditions, those in high-risk groups, people travelling abroad and people aged 65 and older<sup>17</sup>.

It is recommended that all women of childbearing age who test negative for the rubella virus should receive the MMR vaccine, unless there is documented evidence that they have received one previous MMR vaccine. They should also receive the varicella (chickenpox) vaccine if they test negative for it. This is to protect these women from developing rubella or chickenpox in pregnancy as these infections can be detrimental to the developing foetus, particularly in the first 20 weeks of pregnancy<sup>17</sup>.

The guidelines also recommend that all pregnant women receive the pertussis (whooping cough) vaccine as early as possible after 16 weeks and before 36 weeks of pregnancy to protect them and their infant who is too young to be fully vaccinated. They should also receive the flu vaccine, which can be given at any stage in pregnancy<sup>17</sup>. All of the recommended vaccines are safe to receive during pregnancy.

According to the guidelines, adults in specific high-risk groups should receive the following vaccines<sup>17</sup>: BCG, Hepatitis A, Hepatitis B, Hib, Influenza, MenACWY, MenB, MMR, Pneumococcal Conjugate, Pneumococcal Polysaccharide and Varicella.

People aged 65 and older should receive the pneumococcal polysaccharide vaccine (PPSV23) to protect them against pneumococcal infection. Pneumococcal disease is a major cause of illness and death, particularly amongst the very young, the very old and those with no spleen or impaired immunity. It is a major cause of pneumonia in the community. Pneumococcal disease also causes meningitis, sinusitis, osteomyelitis (inflammation of the bone), bronchitis, ear infection and blood stream infection (bacteraemia)<sup>20</sup>.

## Other vaccines

According to the latest information from the Health Products Regulatory Authority (HPRA), January 2017, there are a total of 41 vaccines currently licensed for use in Ireland<sup>21</sup>.

Apart from the vaccines mentioned above there are a number of others available that members of the public may avail of privately. These include vaccines against chickenpox, meningococcal disease and shingles. The chickenpox vaccine is not part of the National Childhood Immunisation Schedule, however, parents can access it privately through their GP. Also, as the immunisation schedule was changed recently to include the rotavirus and meningococcal B vaccines, this only applied to children born on or after 1 October 2016. Infants born before this date may still avail of the meningococcal B vaccine, but it must be paid for privately<sup>21</sup>.

Anyone travelling abroad is advised to check the vaccinations recommended for the countries they are travelling to. It is important that they follow these recommendations to protect themselves and others from the cross border spread of disease.

## Vaccine programmes across Europe

Every country across Europe is responsible for developing and implementing its own immunisation schedule. Ireland was the second country in Europe to introduce the meningococcal B vaccine to its childhood immunisation schedule and provides one of the more comprehensive childhood schedules in Europe.

Immunisation programmes change on a regular basis and it is difficult to present an exact comparison of all programmes and vaccination uptake rates across Europe. However the European Centre for Disease Prevention and Control (ECDC) has a very helpful website where one can compare the immunisation schedules between EU countries or by disease. It is available at <http://vaccine-schedule.ecdc.europa.eu/Pages/Scheduler.aspx>.

## Vaccination uptake rates in Ireland

### Healthy Ireland

Healthy Ireland is Ireland's national public health policy providing a Framework for Improved Health and Wellbeing 2013-2025. It sets out a wide framework of actions that will be undertaken by Government Departments, public sector organisations, businesses, communities and individuals to improve health and wellbeing<sup>22</sup>.

One of the goals of Healthy Ireland is to "Protect the public from threats to health and wellbeing." Under this goal, the Healthy Ireland document points to the need to increase vaccination uptake rates for children, vulnerable adults and healthcare workers. For example, it has a target 95% uptake rate for childhood immunisation and 80% for the HPV vaccine<sup>22</sup>.

## Childhood schedule

According to the Health Protection Surveillance Centre, the latest national data, Q3 2016, shows that at 12 months of age, 91% of children had received the recommended three doses of the 6 in 1 vaccine. At 24 months of age, the national vaccination target uptake rate of 95% was achieved. However, the uptake rates for MMR<sub>1</sub> (92%), MenC<sub>3</sub> (87%), Hib<sub>b</sub> (91%) and PCV<sub>3</sub> (91%) were all lower than the target uptake rate of 95%<sup>23</sup>. Supporting healthcare professionals and continuing to improve communications about the significant benefits of vaccines will help increase these uptake rates to meet the targets set by Healthy Ireland.

## HPV vaccine

In relation to the HPV vaccine, figures from the Health Protection Surveillance Centre show that, for the 2015-2016 academic year, the national vaccination uptake rate of at least HPV stage 2 was 72.3% (girls with at least stage 2 are considered to have completed a course of vaccination). The data showed that there was some regional variation in uptake rates across the Community Healthcare Organisations (CHOs) ranging from 66.3% to 77.6%. However, none of the nine CHOs reached the Healthy Ireland's target uptake rate of 80%<sup>24</sup>. Preliminary results for the 2016-2017 academic year suggest that uptake rates of the first dose have reduced to a worrying 50%.

Cervical cancer is the second most common female cancer in Europe. In Ireland, approximately 300 women are diagnosed each year<sup>17</sup>. Approximately 90 women die every year in Ireland from cervical cancer and it is the second most common cause of death due to cancer in women aged 25 to 39 years<sup>25</sup>. The recent trends show an alarming decrease in the uptake rates of the HPV vaccine (87% uptake in 2014-2015 Vs 50% 2016-2017) and can be directly attributed to the spread of misinformation about the HPV vaccine. The Irish Cancer Society state that, based on national cancer statistics, this drop in the uptake rate to 50%, just for the 2016-2017 academic year, will have the following devastating impact in the future<sup>26</sup>:

- the death of at least 40 girls who didn't receive the HPV vaccine
- a further 100 girls will develop cervical cancer and require life-altering treatment
- an additional 1,000 girls will require invasive therapy to prevent the precancerous form of HPV

The current 2016-2017 uptake rates are very worrying as it leaves young girls exposed to the very real and unnecessary risk of developing cervical cancer at a later stage in life.

Healthcare professionals and relevant stakeholders must work together to help increase the public's confidence and corresponding uptake rates in the HPV vaccination programme. This can be achieved by communicating the facts around the safety and lifesaving impact of this vaccine.

## Flu vaccine

The average vaccination uptake rate for the flu vaccine nationally between September 2016 and January 2017 in those aged 65 years and older with medical or GP visit cards was 54.1%. This means that almost half of these older people in Ireland did not receive the flu vaccine putting themselves at an increased risk of developing this severe illness and spreading it to others<sup>27</sup>.

The uptake rate of the flu vaccine among healthcare workers in hospitals and long-term care facilities such as nursing homes was also low. The flu vaccine is offered to healthcare workers each year to help prevent the spread of the virus to immunocompromised patients, older persons who respond less well to the vaccine and other staff. According to the latest data available, in 48 out of 61 hospitals that returned data (including 12 private hospitals), the overall flu vaccine uptake rate among healthcare workers was 30.8%<sup>26</sup>. In long-term care facilities, for 81 out of 252 facilities that returned data, the overall uptake rate among healthcare professionals was 27.1%<sup>28</sup>.

The low uptake rates of the flu vaccine by these high-risk groups is disappointing and presents an unnecessary risk of exposure to the virus. The vaccine helps to protect individuals, their families and the wider population from contracting the virus. Increased awareness of the HSE's recommendations and the importance of the flu vaccine may help increase uptake rates to limit the future incidence of the flu virus in Ireland.

# Vaccine safety and monitoring

All vaccines in Ireland are licensed by the European Medicines Agency (EMA) and the Health Products Regulatory Authority (HPRA).

The European Medicines Agency (EMA) was established in 1995 and is an EU agency currently based in London. The agency is responsible for the scientific evaluation, supervision and safety monitoring of medicines including vaccines developed by pharmaceutical companies for use in the EU<sup>29</sup>.

The HPRA (formerly the Irish Medicines Board) was established in 1996 and is the Irish body responsible for ensuring that all medicines and health products licensed for use in Ireland are as safe as possible and do what they are intended to do<sup>30</sup>.

Under its remit to approve and regulate the licensing of human medicines the HPRA is responsible for ensuring the safety of human vaccines.

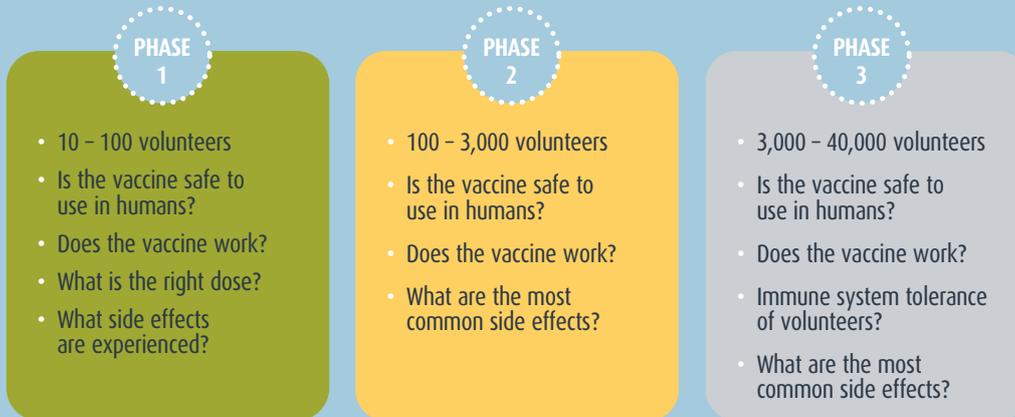
Coupled with the HPRA and the EMA, the World Health Organisation's Global Advisory Committee for Vaccine Safety (GACVS), which was established in 1999, has a role in overseeing the global safety of all vaccines.

Before a vaccine is licensed for use in Ireland it must be regulated by both the HPRA and the EMA. Once vaccines are licensed both agencies and the vaccine manufacturers continue to monitor and supervise their safety.



# A vaccine's journey to the Irish immunisation schedule

## VACCINES DEVELOPMENT CYCLE



Before a vaccine is licensed for use in Ireland it must be regulated by both the European Medicines Agency (EMA) and the Health Products Regulatory Authority (HPRA). A license will only be given if the vaccine is safe and effective.

## HOW A VACCINE IS ADDED TO THE IRISH IMMUNISATION SCHEDULE

The National Immunisation Advisory Committee (NIAC) is a group of medical and public health experts who carefully review safety and efficacy evidence of vaccines and their corresponding disease burden in Ireland. Following their review of available data, they provide advice to the Department of Health (DoH) on recommended immunisation policies.

The DoH make immunisation policy decisions based on the recommendations received from NIAC. These policy decisions are passed to the Health Service Executive (HSE) for implementation and inclusion on the official Irish Immunisation Schedule.

In parallel to the DoH's review, pharmacoeconomic analysis is conducted by the National Centre for Pharmacoeconomics (NCPE) who assess clinical and scientific evidence to facilitate healthcare decisions in Ireland. They provide recommendations on the comparative- and cost-effectiveness of vaccines.

## CONTINUOUS SAFETY MONITORING

A vaccine's safety continues to be monitored by the **HPRA**, **EMA** and vaccine manufacturers after it has been added to the immunisation schedule



Collect & review data



Monitor side effects



Identify & understand risks



Communicate & manage risks appropriately

Sources: <http://www.hpra.ie/homepage/medicines/safety-information>  
<https://www.cdc.gov/vaccines/parents/infographics/journey-of-child-vaccine.html>  
[http://www.ema.europa.eu/ema/index.jsp?curl=pages/regulation/general/general\\_content\\_000407.jsp&mid=WC0b01ac058002958b](http://www.ema.europa.eu/ema/index.jsp?curl=pages/regulation/general/general_content_000407.jsp&mid=WC0b01ac058002958b)

## Myths and facts

**Facts save lives, myths can destroy them.** The story of vaccines would not be complete without mentioning one of its greatest threats – miscommunication and falsehoods – which have been proven to affect vaccination uptake rates. It is incumbent on public health systems to present the facts about vaccination in a clear and concise manner.

**The fact is... vaccines save lives.** According to the World Health Organisation, immunisation “prevents illness, disability and death from vaccine-preventable diseases including cervical cancer, diphtheria, hepatitis B, measles, mumps, pertussis (whooping cough), pneumonia, polio, rotavirus, diarrhoea, rubella and tetanus<sup>1</sup>.”

**Myth: Vaccines cause autism**

**Fact: There is no evidence that links the MMR vaccine and autism**

In 1998, a paper was published which suggested there was a link between the MMR vaccine and autism. This claim was later proven to be seriously flawed and misleading and was retracted by the journal that published it. There are now numerous studies that show there is no link between autism and the MMR vaccine. (Gillberg and Heijbel, 1998; Taylor et al., 1999; Davis et al., 2001; DeWilde et al., 2001; Taylor et al., 2002)<sup>31</sup>. Unfortunately, the damage done by the MMR controversy had a significant impact on the uptake rates of the MMR vaccine and it has taken time for falling MMR immunisation rates to recover.

**Myth: Vaccine-preventable diseases are not common in my country so there's no need for me or my children to be vaccinated**

**Fact: Vaccine-preventable diseases still exist. Vaccination is the best way to protect you, your children and those around you**

High vaccination uptake rates are important for population protection or “herd protection”. A population’s protection decreases if vaccination rates fall. Vaccine-preventable diseases can spread quickly and lead to outbreaks<sup>32</sup>.

**Myth: The HPV vaccine causes chronic fatigue**

**Fact: There is no evidence that links the HPV vaccine to chronic fatigue or any other long-term medical condition**

Some people have expressed concerns that the HPV vaccine causes side effects such as chronic fatigue. These concerns were reviewed by a number of international expert bodies such as the World Health Organisation, the Centres for Disease Control and Prevention in the US and the European Medicines Agency. All of these expert bodies concluded that the concerns about HPV vaccination were unfounded<sup>33</sup>.

**Myth: Vaccines are only for children**

**Fact: Vaccines are important for each life stage**

While vaccinating infants provides much needed immunity and protection in childhood they are also advised across each life stage from infancy, childhood, adolescence and adulthood. Following recommended vaccination guidelines protects individuals and those around them from developing vaccine-preventable diseases.

**Myth: Multiple vaccinations weaken the immune system**

**Fact: Multiple or combined vaccinations do not have an adverse effect on the immune system**

Scientific evidence has shown that giving multiple or combined vaccinations does not weaken the immune system or cause increased adverse effects<sup>34</sup>. People are exposed to much higher levels of ingredients through their diet on a daily basis that trigger immune responses. All vaccines used in Ireland are licensed by the HPRA and EMA. These agencies have strict procedures for the licensing and monitoring of all vaccines and their ingredients to ensure their safety and effectiveness.

**Myth: Vaccines contain mercury which is dangerous**

**Fact: There is no mercury in any vaccines used in the Irish National Immunisation Schedules**

Some vaccines used to contain mercury in minute concentrations. However, the levels included were far below the toxicology threshold. There is no evidence that the use of mercury in these vaccines posed a health risk<sup>35</sup>.

## Vaccine confidence

The 2016 State of Vaccine Confidence survey contained some good news for vaccines with the finding that overall confidence was positive across the 67 countries examined. However, the findings also revealed some worrying results in relation to vaccine confidence in Europe, underlining the importance of dispelling myths and improving communication about the benefits of vaccination<sup>36</sup>.

The survey examined the views of 65,819 people in 67 countries on confidence in vaccine safety and effectiveness, as well as perceptions of vaccine importance and compatibility with religious beliefs. The analysis, published in EBioMedicine, was conducted in collaboration with Imperial College London and the National University of Singapore, and the data was collected by WIN/Gallup International Association<sup>36</sup>.

The findings for Ireland were positive with more than 80% of Irish people agreeing that vaccines were safe. In response to the statement "overall I think vaccines are safe" 44.36% said they "strongly agreed" and 40.50% "tended to agree." Just 4.26% responded that they "didn't know", 7.62% "tended to disagree" and 3.27% "strongly disagreed"<sup>36</sup>.

In addition, 61.49% of Irish people strongly agreed with the statement that "vaccines are important for children to have." A further 29.7% said they "tended to agree" with this statement while 3.4% said they "didn't know", 3.07% "tended to disagree" and 2.28% "strongly disagreed." The survey further revealed that Irish people were also confident in the effectiveness of vaccines with 51.39% strongly agreeing to the statement "overall I think vaccines are effective" and 38.61% "tended to agree". Just 3.66% of people in Ireland surveyed said that they "didn't know" and 4.16% and 2.18% "tended to disagree" and "strongly disagreed" respectively<sup>36</sup>.

# The future

## Vaccines in development

Continued investment by biopharmaceutical companies in R&D, coupled with technological developments, have made it possible for vaccines to be developed, not only to prevent infectious disease, but also to treat disease. Unlike more traditional vaccines, these aim to focus the immune system on attacking established disease, rather than offering protection against infections.

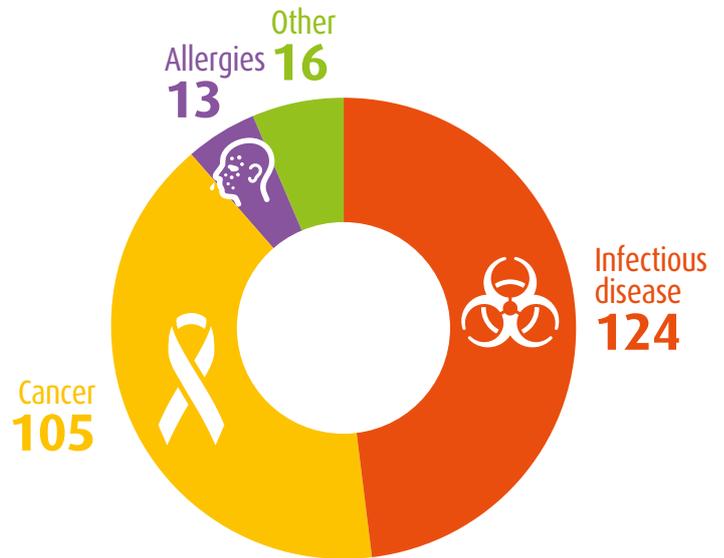
In addition, companies have developed novel ways of delivering vaccines so that the traditional needle may soon be a thing of the past.

In 2016, there were over 250 vaccines in development creating significant opportunities to prevent and treat disease in the future<sup>37</sup>.

However, as the development of vaccines progresses, so too does the complexity of the development and manufacturing of these vaccines. The process of researching, testing, gaining regulatory approval and manufacturing vaccines is costly, complex and lengthy (an average of twelve years). The manufacturing process alone can take up to two and a half years with up to 70% of this time dedicated to quality control.

Unlike traditional medicines, vaccines are biological medicines that are made from living organisms. They must meet specific, extensive regulatory requirements throughout their development, production and distribution cycles. This complexity poses a considerable challenge to companies and health systems.

Increasingly public health policies in Europe recognise the importance and value of vaccination. To ensure continued stability and provide a supportive environment for ongoing investment in innovative new vaccines, long-term partnership and collaboration between policy makers, public health authorities and industry is crucial.



1,700  
people



678  
quality tests



2.5+  
years



1  
vaccine dose

## Role of vaccines in the fight against antimicrobial resistance

According to the World Health Organisation, antimicrobial resistance is “an increasingly serious threat to global public health that requires action across all government sectors and society<sup>38</sup>.”

Antimicrobial resistance occurs when a disease develops a resistance to the drugs used to treat it. This can lead to treatment failure and a significant increase in the burden of disease. Some examples of diseases and bacteria that are developing resistance around the world today include HIV, malaria, TB and staphylococcus aureus<sup>38</sup>.

One of the key factors driving antimicrobial resistance today is our tendency to misuse or overuse antibiotics. The World Health Organisation goes so far as to say that “antibiotic resistance is putting the achievements of modern medicine at risk. Organ transplantations, chemotherapy and surgeries such as caesarean sections become much more dangerous without effective antibiotics for the prevention and treatment of infections<sup>39</sup>.”

### Can one of medicine’s greatest advances help in the fight against one of its greatest threats?

One of the key recommendations of the WHO Global Strategy for Containment of Antimicrobial Resistance (2001) is to encourage the development of new drugs and vaccines<sup>40</sup>. Vaccines can help in reducing antimicrobial resistance by protecting people against developing infectious diseases in the first place. This helps reduce the need for antibiotics and therefore the speed of antimicrobial resistance development. Researchers are also currently working on new vaccines which they hope will further help protect against antimicrobial resistance.

For example, the flu vaccine will protect an individual from developing the flu. If someone in a high-risk group is unvaccinated and contracts the flu they are also vulnerable to its potential complications, such as a bacterial chest infection or pneumonia which would require treatment with antibiotics.

### MRSA

Also known as a “super bug”, Methicillin-Resistant Staphylococcus Aureus (MRSA) is one such bacteria that is resistant to a number of antibiotics. MRSA can cause a number of serious, and sometimes fatal, conditions such as skin infections, sepsis and pneumonia<sup>41</sup>.

The good news is that some of the ground-breaking work in developing vaccines to combat MRSA is being done here in Ireland. In 2015, immunologists from Trinity College Dublin unearthed a key piece of the MRSA vaccine puzzle by identifying specific ‘helper’ cells whose role in the immune response is critical in affecting infection outcomes. They developed a model vaccine, which targeted these ‘T-helper type 1’ cells, and they showed experimentally that its use led to improved infection outcomes<sup>42</sup>.

The research was supported by funding from the Health Research Board and the Wellcome Trust and was published in the journal PLOS Pathogens.

## Conclusion

With the exception of clean, safe drinking water, no human endeavour rivals immunisation in combating infectious diseases and reducing mortality rates. Disease prevention is one of the most cost-effective healthcare interventions available. Because immunisation helps to inhibit the spread of disease, many people can be protected from illness and death. This protection limits the prevalence of vaccine-preventable diseases and the burden that these place on healthcare resources. These valuable resources can be allocated to other vital areas within health systems.

By providing people with the facts about vaccines we can improve uptake rates and increase the protection of individuals and global populations. Continued investment and the effective introduction of new technologies will further enhance the global impact of vaccines. The Irish Pharmaceutical Healthcare Association (IPHA) is committed to working with policy makers to ensure the timely access to and security of supply of new and existing vaccines to the public.

# Vaccines for Life



- + The benefits of vaccines far outweigh the risks
- + Falling vaccination uptake rates can lead to unnecessary illness, disability and even death
- + All vaccines available for use in Ireland are licenced by the EMA and HPRA
  - Vaccine safety continues to be monitored by these agencies and vaccine manufactures after they are added to immunisation schedules



*Miscommunication and falsehoods have been proven to affect vaccination uptake rates*

**Facts save lives; myths can destroy them**



**Partnership industry and public is crucial to ensure access of new vaccines to**



- + Vaccination supports good health across all stages of life, from infancy to old age <sup>1</sup>
- + Ireland provides a comprehensive immunisation schedule for the population
- + Continued communications to the public are required to ensure high uptake rates for all schedules and recommendations



*Knowing when to be vaccinated provides the first step towards protecting one's self, one's family and the wider population*

**Vaccines are for life, not just for childhood**



1. The Economic and Social Impact of Vaccines. <http://www.abpi.org.uk/our-work/vaccinesgroup/Documents/Affordability.pdf> [accessed 26 March 2017]  
 2. World Health Organisation. Media Centre. Immunisation Coverage Fact Sheet. Reviewed March 2017. <http://www.who.int/mediacentre/factsheets/fs378/en/> [accessed 25 March 2017]

Vaccination is one of the most successful and cost-effective public health interventions available



Vaccination is one of the most successful and cost-effective public health interventions available



between policy makers and the public

Developing vaccines is complex and requires a supportive environment for ongoing investment and innovation



Future success requires a balance between access to vaccines today with investment in new vaccines for tomorrow



**+ Vaccines work**

- Vaccines save up to 3 million lives and prevent millions of disabilities each year<sup>2</sup>



**+ Infectious diseases still exist**

- Complacency can lead to outbreaks



**+ Vaccination choices matter**

- High uptake rates are needed for herd protection

**+ Vaccines reduce the burden on health systems**

- Human, financial and other resources can be allocated to other critical areas within health systems
- Yearly return on investment of 12-18%<sup>3</sup>



**+ There are over 250 vaccines in development to prevent and treat disease<sup>4</sup>**

**+ It takes an average of 12 years to develop and manufacture a vaccine**

**+ The manufacturing process can take up to two and a half years**

**+ Vaccines play a key role in reducing antimicrobial resistance<sup>5</sup>**



3. Andre, FE et al: Bulletin of the World Health Organisation, Volume 8, Number 2, February 2008: 81-160:

WHO bulletin: <http://www.who.int/bulletin/volumes/86/2/07-040089/en/#R47%23R47>, [accessed 25 March 2017]

4. PhRMA. 2016 Update: Vaccines in Development. <http://phrma-docs.phrma.org/sites/default/files/pdf/medicines-in-development-drug-list-vaccines.pdf> [accessed 25 March 2017]

5. World Health Organisation. Antimicrobial resistance fact sheet. Updated September 2016. <http://www.who.int/mediacentre/factsheets/fs194/en/> [accessed 31 March 2017]

# References

1. World Health Organisation. Media Centre. Immunisation Coverage Fact Sheet. Reviewed March 2017. [online] <http://www.who.int/mediacentre/factsheets/fs378/en/> [accessed 25 March 2017]
2. College of Physicians of Philadelphia, USA. The History of Vaccines. [online] <http://www.historyofvaccines.org/content/franklin-loses-son> [accessed 23 March 2017]
3. Riedel S. Edward Jenner and the history of smallpox and vaccination. *Proceedings (Baylor University Medical Center)*. 2005; 18(1):21-25.
4. World Health Organisation. Frequently asked questions and answers on smallpox. [online] <http://www.who.int/csr/disease/smallpox/faq/en/> [accessed 23 March 2017]
5. F. Fenner et al., Smallpox and its Eradication, World Health Organisation, Geneva, 1988. The Smallpox Eradication Programme - SEP (1966-1980) May 2010.
6. World Health Organisation. [online] <http://vaccine-safety-training.org/history-of-vaccine-development.html> [accessed 23 March 2017]
7. The Journal.ie. 'Living in an Iron Lung: 'It was a long, airtight coffin-shaped box with my head sticking out at one end.' December 11th 2016. [online] <http://www.thejournal.ie/readme/what-is-life-like-for-a-polio-survivor-3128107-Dec2016/> [accessed 23 March 2017]
8. HSE Health Protection Surveillance Centre (HPSC). News Release. European Immunisation Week, April 20-24, 2015. Polio free - let's keep it that way! (24 April 2015)
9. World Health Organisation. Media Centre: Measles. Factsheet Reviewed March 2017 [online] <http://www.who.int/mediacentre/factsheets/fs286/en/> [accessed 23 March 2017]
10. HSE. Measles Outbreak, Ireland 2016. [online] <http://www.hse.ie/eng/health/immunisation/news/measlesoutbreak.html> [accessed 23 March 2017]
11. Epi-Insight. Disease Surveillance Report of HPSC, Ireland. December 2016. Vol 17, Issue 12. [online] <http://ndsc.newsweaver.ie/epiinsight/y461qge49cz?a=1&p=51143038&t=17517774> [accessed 27 March 2017]
12. HSE Health Protection Surveillance Centre (HPSC). Influenza Surveillance in Ireland. Weekly Report Influenza Week 2, 2017 (9-15 January 2017).
13. HSE Health Protection Surveillance Centre (HPSC). Influenza: Frequently Asked Questions. Publication Date: September 22 2016. [online] <http://www.hpsc.ie/A-Z/Respiratory/Influenza/SeasonalInfluenza/Factsheets/File,12960,en.pdf> [accessed 05 April 2017]
14. HSE National Immunisation Office. 'Your child's immunisation; A guide for parents for children born on or after the 1st July 2016.'
15. Andre, FE et al: Bulletin of the World Health Organisation, Volume 8, Number 2, February 2008: 81-160: WHO bulletin: [online] <http://www.who.int/bulletin/volumes/86/2/07-040089/en/#R47%23R47>, [accessed 25 March 2017]
16. Government of Western Australia. No Jab No Pay. [online] [http://ww2.health.wa.gov.au/Articles/N\\_R/No-Jab-No-Pay-Changes-to-childhood-immunisation-requirements](http://ww2.health.wa.gov.au/Articles/N_R/No-Jab-No-Pay-Changes-to-childhood-immunisation-requirements) [accessed 23 March 2017]
17. HSE. National Immunisation Guidelines for Ireland. [online] <http://hse.ie/eng/health/immunisation/hcpinfo/guidelines/immunisationguidelines.html> [accessed 23 March 2017]
18. Irish Cancer Society. About Cervical Cancer. [online] <https://www.cancer.ie/cancer-information/cervical-cancer/about#sthash.99bwZiWw.dpb> [accessed 25 March 2017]
19. HSE National Immunisation Office. HPV Vaccine January 2017. [online] <http://www.hse.ie/eng/health/immunisation/pubinfo/schoolprog/HPV/HPV/> (accessed 25 March 2017)
20. HSE National Immunisation Office. Pneumococcal Disease. Updated on 19/04/2016. [online] <http://www.hse.ie/eng/health/immunisation/pubinfo/adult/pneumo/#What%20is%20pneumococcal%20disease> [accessed 25 March 2017]
21. Health Products Regulatory Authority (HPRA). Vaccines Authorised and Marketed in Ireland as of October 2016. [online] <https://www.hpra.ie/homepage/medicines/medicines-information/vaccines> [accessed 25 March 2017]

22. Department of Health. 'Healthy Ireland – A Framework for Improved Health and Wellbeing 2013 – 2025.' Published 03 June 2013
23. HSE Health Protection Surveillance Centre (HPSC). Immunisation Uptake report for Ireland, Q3 2016. [online] <http://www.hpsc.ie/A-Z/VaccinePreventable/Vaccination/ImmunisationUptakeStatistics/Immunisationuptakestatisticsat12and24monthsofage/QuarterlyReports/2016/File,16035,en.pdf> [accessed 01 April 2017]
24. HSE Health Protection Surveillance Centre (HPSC). HPV vaccine uptake in Ireland: 2015/2016. [online] <http://www.hpsc.ie/A-Z/VaccinePreventable/Vaccination/ImmunisationUptakeStatistics/HPVImmunisationUptakeStatistics/File,16039,en.pdf> [accessed 25 March 2017]
25. HSE. HPV and Cervical Cancer. [online] <http://www.hse.ie/eng/health/immunisation/pubinfo/schoolprog/hpv/about/> [accessed 25 March 2017]
26. O'Connor, Robert. HPV Vaccine: A Call to Pharmacists. IPU Review. April 2017.
27. HSE Health Protection Surveillance Centre (HPSC). Seasonal influenza vaccine uptake in older people in Ireland, September 2016 - January 2017. [online] <http://www.hpsc.ie/A-Z/Respiratory/Influenza/SeasonalInfluenza/Influenzaandadults65yearsandolder/File,16190,en.pdf> [accessed 26 March 2017]
28. HSE Health Protection Surveillance Centre (HPSC). 2016-2017 Mid-season Influenza Vaccine Uptake in HSE funded Hospitals and Long Term Care Facilities in Ireland. Provisional data 16/02/2016. An interim report produced by HSE/HPSC.
29. EMA Website. About Us. [online] [http://www.ema.europa.eu/ema/index.jsp?curl=pages/about\\_us/document\\_listing/document\\_listing\\_000426.jsp&mid=](http://www.ema.europa.eu/ema/index.jsp?curl=pages/about_us/document_listing/document_listing_000426.jsp&mid=) [accessed 01 April 2017]
30. HPRA Website. About Us. [online] <http://www.hpra.ie/homepage/about-us> [accessed 01 April 2017]
31. HSE Health Protection Surveillance Centre (HPSC). TOP 10 MYTHS ABOUT MMR. [online] <https://www.hpsc.ie/A-Z/VaccinePreventable/MMR-Protectionagainstmeaslesmumpsrubella/Factsheets/File,608,en.pdf> [accessed 31 March 2017]
32. Vaccines.gov. Community Immunity ("Herd Immunity"). [online] <https://www.vaccines.gov/basics/protection/> [accessed 26 March 2017]
33. HSE National Immunisation Office. HPV Vaccine Safety Review. Updated on 06/07/2016. [online] <http://www.hse.ie/eng/health/immunisation/news/hpvsafetyreview.html> (accessed 01 April 2017)
34. Centre for Disease Control and Prevention. Multiple Vaccines and the Immune System. [online] <https://www.cdc.gov/vaccinesafety/concerns/multiple-vaccines-immunity.html> [accessed 01 April 2017]
35. World Health Organisation. Myths and facts about immunization. [online] [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0004/281524/Myths-Facts\\_about\\_Imm.pdf?ua=1](http://www.euro.who.int/__data/assets/pdf_file/0004/281524/Myths-Facts_about_Imm.pdf?ua=1) [accessed 01 April 2017]
36. Larson, Heidi J. et al. The State of Vaccine Confidence 2016: Global Insights Through a 67 Country Survey. EBioMedicine, Volume 12, 295 - 301
37. PhRMA. 2016 Update: Vaccines in Development. [online] <http://phrma-docs.phrma.org/sites/default/files/pdf/medicines-in-development-drug-list-vaccines.pdf> [accessed 25 March 2017]
38. World Health Organisation. Antimicrobial resistance fact sheet. Updated September 2016. [online] <http://www.who.int/mediacentre/factsheets/fs194/en/> [accessed 31 March 2017]
39. World Health Organisation. Antibiotic resistance fact sheet October 2016. [online] <http://www.who.int/mediacentre/factsheets/antibiotic-resistance/en/> [accessed 31 March 2017]
40. The World Health Organisation. Global Strategy for Containment of Antimicrobial Resistance (2001)
41. Irish Health. MRSA. [online] <http://www.irishhealth.com/article.html?con=592> [accessed 04 April 2017]
42. Brown AF, Murphy AG, Lalor SJ, Leech JM, O'Keeffe KM, Mac Aogáin M, et al. (2015) Memory Th1 Cells Are Protective in Invasive Staphylococcus aureus Infection. PLoS Pathog 11(11): e1005226. doi:10.1371/journal.ppat.1005226



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