Building vaccine confidence and communicating vaccine value

A toolkit for pharmacists

2021

FIP Development Goals

16 COMMUNICABLE DISEASES

7 ADVANCING INTEGRATED SERVICES

19 PATIENT SAFETY

fip International Pharmaceutical Federation

Colophon

International Pharmaceutical Federation (FIP)
Andries Bickerweg 5
2517 JP The Hague
The Netherlands
www.fip.org

Authors:
Irza Ahmed, Consultant, University of North Carolina Eshelman School of Pharmacy , USA
Holly Cook, Consultant, The University of Auckland, New Zealand
Amy Chan, Senior Clinical Research Fellow, and Lead of the Academic Practice Unit, School of Pharmacy, The University of Auckland, and Auckland District Health Board, New Zealand

Editors:
Gonçalo Sousa Pinto, FIP Lead for Practice Development and Transformation
Rúben Viegas, FIP Practice Development Projects Coordinator

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Foreword

According to the World Health Organization (WHO), vaccines are not only safe and effective, but they also contribute to the prevention of diseases and to the reduction of healthcare costs. It is estimated that immunisation prevents four to five million deaths every year.[1] Also, vaccines will help keep an estimated 24 million people from falling into poverty by 2030.[2] Immunisation is a key component of healthcare and access to immunisation for all is an indisputable human right. In addition, vaccination is a crucial strategy for fighting antimicrobial resistance as it reduces the need for antibiotics use.

However, vaccine hesitancy, the concerns related to vaccination or outright refusal to receive vaccines despite availability, is a major threat to global health and an important barrier to the success of vaccination strategies worldwide. As highlighted in this publication, barriers such as misinformation and distrust in vaccines can compromise not only the health of individuals but also public health as a whole.

In October 2018, FIP endorsed the WHO Astana Declaration on primary health care (PHC) and ''signed up'' pharmacy to deliver universal health coverage (UHC) by 2030. One of the main components of PHC is the provision of a comprehensive range of disease prevention and early screening services, including vaccination. In various parts of the world, pharmacists are the primary access point to PHC, offering advice and supporting the adoption of healthy lifestyles, performing point-of-care tests, referring patients to other healthcare professionals or levels of care, and administering vaccines.

FIP's work on vaccination started over a decade ago and is based on the conviction that improving vaccination coverage and promoting a life-course approach to vaccination are global imperatives to which pharmacists can greatly contribute. Of the 21 FIP Development Goals launched in September 2020, vaccination is closely aligned to 17 goals, which indicates the high priority vaccination holds not only for pharmacy and FIP but also for global health. In particular, FIP Development Goal 16, which is focussed on communicable diseases, is overtly linked to the prevention of this group of diseases, in which vaccination plays a prominent role.

Recent FIP publications in this area include: a handbook for pharmacists which focusses on the roles pharmacists can have in supporting vaccination; a members-only advocacy toolkit to support member organisations with advocacy for the implementation of pharmacy-based vaccination; a collection of evidence and guidelines for the development of vaccination services; a survey report on the roles of pharmacy in vaccination; and a regulatory self-evaluation assessment tool for advancing pharmacy services in this area.

From my own experiences in my daily community pharmacy practice, pharmacists' contacts with patients provide a precious moment to engage in meaningful conversations and tackle hesitancy when it comes to vaccination. We can play a crucial role in motivating and vaccinating people, and thereby contribute to increasing vaccination coverage rates. Collaborative efforts with other health professionals will be paramount to reach this goal.

With this new toolkit, FIP aims to support individual pharmacists with tools for effectively communicating the value, efficacy and safety of vaccines, and for addressing concerns about or the rejection of vaccines. It provides a background on vaccine hesitancy and the main reasons for it as well as ways to address vaccine hesitancy directly with individuals. It also includes examples of pharmacy-based campaigns and information, and guidance on advice for different types of vaccines is also provided. In order to address questions and concerns about vaccines in the community, pharmacists need to be equipped with the latest evidence-based tools.

I trust you will find this toolkit useful for your practice and encourage you to continue striving towards offering a better service to our patients and communities.

Dominique Jordan
FIP President

1 Introduction

1.1 Vaccine hesitancy and concerns: definitions and global situation

As is widely known, vaccination is one of the most successful and cost-effective public health measures to control and eliminate transmission of infectious diseases. It is estimated that immunisation prevents four to five million deaths every year.[1] For example, cases of poliomyelitis, a disease which can cause irreversible paralysis, have decreased over 99% since 1988 thanks to a robust international vaccine distribution programme.[3] Additionally, meningitis A, a potentially fatal brain infection, has been nearly eliminated from 26 African countries after introduction of immunisation to the meningitis belt.[4]

Despite the proven efficacy of vaccines, in 2018, an estimated 19.7 million children under one year of age did not receive recommended childhood vaccines.[5, 6] Additionally, global vaccine coverage against diphtheria, tetanus and pertussis has plateaued at around 86% since 2010.[5] On further analysis, a number of the children missing their immunisations reside in countries with resource insecurity, political conflict and poor access to healthcare.[6] Separately, there is growing concern surrounding the population that does not fall into those groups and should otherwise have ample access to immunisations.

The World Health Organization (WHO) listed vaccine hesitancy, the concerns related to vaccination or outright refusal to receive vaccines despite availability, as one of the top 10 threats to global health in 2019.[7] The increasing threat of vaccine hesitancy is evidenced by recent outbreaks of vaccine-preventable diseases in parts of the United States and Europe. Measles is often the first indicator of gaps in immunisation coverage due to its high transmissibility.[8] Measles was declared eradicated from the United States in 2000 after successful vaccination efforts, but 1,400 measles cases occurred in the country in the subsequent 15 years. Over half of those patients had no history of measles, mumps and rubella (MMR) vaccination despite eligibility and had declared non-medical exemptions.[8, 9] Similarly, there were over 41,000 measles cases in the European Union in the first six months of 2018, a record for this region. This outbreak was also due to inadequate vaccine coverage in certain countries.[10]

The WHO cites complacency, inconvenience and lack of confidence as the primary factors behind vaccine hesitancy.[7] Understanding vaccine hesitancy is complex because a patient's concerns with immunisation often exist on a spectrum. There is variance in the level of distrust towards vaccines across geographic location, patient demographics and type of vaccine in question.[6] Additionally, the new digitised age has made it easier than ever to share information which may not be based in scientific evidence, yet has just as much potential to shape public opinion.[11] This effect has been further exacerbated during periods of uncertainty such as the COVID-19 pandemic.

In February 2020, the WHO officially declared a concomitant "infodemic" in response to the massive amounts of misinformation shared regarding COVID-19.[12] Vulnerable patients turn toward the internet or friends and family for health information out of convenience and are met with content that may negatively impact their trust of healthcare providers and pharmaceuticals, including vaccines. This phenomenon has been evidenced in the past few months, as new vaccines were developed in record time against the novel SARS-CoV-2 virus. A study measuring the impact of COVID-19 vaccine misinformation on intent to accept COVID-19 vaccination found that exposure to misinformation decreased the respondents' desire to accept a vaccine, with minority ethnicities, lower-income and unemployed individuals being more susceptible to the effect.[11, 13] The WHO has been working with several social media platforms to develop systems for promoting evidence-based facts when users search for health information and flagging potentially misleading information.[12] While this will limit the circulation of new misinformation, many patients already harbour concerns regarding vaccines and will continue to hear myths from non-internet sources. As such, addressing vaccine hesitancy, building vaccine confidence and effectively communicating the value of vaccines for patients is a top priority for the pharmacy profession.

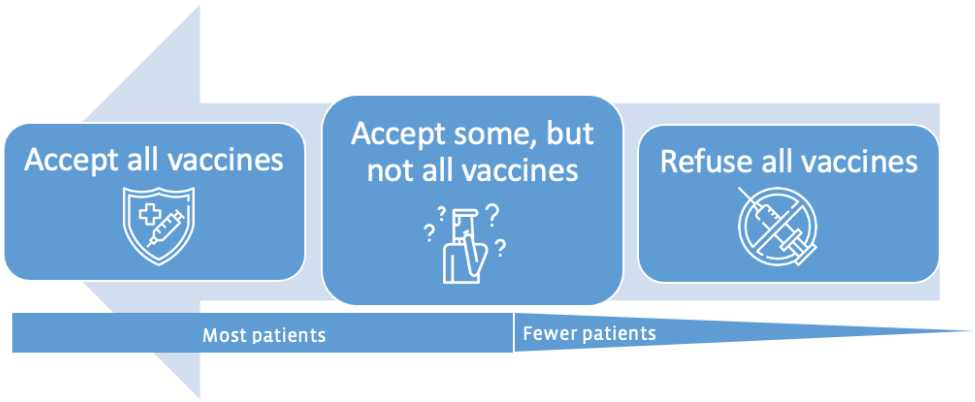
This publication will address common reasons why patients are hesitant to receive vaccines, essential vaccine knowledge that pharmacists should possess, communication approaches pharmacists can take to address a hesitant patient and strategies for developing successful pharmacy-led immunisation campaigns. This will support the profession in ways to tackle vaccine hesitancy through understanding the factors that impact hesitancy, and support the increased uptake of immunisation across all our communities.

2 Understanding and tackling vaccine hesitancy

2.1 Common reasons for hesitancy

The first step in building vaccine confidence is recognising which patients have concerns about vaccines and why those concerns exist. Among hesitant patients, the subset who actively refuse all immunisations represents only a small minority. In reality, there exists a broad spectrum of distrust among vaccine-hesitant patients, with most expressing reasonable concerns about the safety and efficacy of certain vaccines or ingredients (Figure 1).[14] For example, some parents will comply with routine vaccinations for their children but refuse to receive vaccines themselves against influenza or COVID-19, among others. While it may be challenging to educate that minority who harbour distrust of all healthcare interventions, pharmacists have real potential to reach the individuals who simply have unanswered questions or incorrect assumptions regarding immunisations.

Figure 1.. Vaccine information continuum[14]



Vaccine hesitancy can develop in a number of different ways but is often the result of patients hearing unverified health information during normal discourse. The widespread use of digital communication has also created an overabundance of information which the general public may not have the tools to assess for reliability.

Misinformation is the term given to information that is shared by individuals who are unaware that it is incorrect. On the other hand, disinformation is designed and shared with the intent to deceive others, often to serve an agenda. The perpetrator often benefits by receiving financial gain from each person clicking on a sensational headline. Alarmingly, a recent report by the Center for Countering Digital Hate found that 65% of anti-vaccine content across popular social media platforms is spread by just 12 individuals, aptly named the "disinformation dozen".[15] Because action against disinformation is developing slowly, it becomes more important for providers to be equipped with accurate health information to reinstate vaccine confidence among the public.

There are a number of models or taxonomies used to define causes for vaccine hesitancy.[16, 17] For simplicity, we have divided patient concerns into four broad categories: "safety concerns", "efficacy concerns", "moral/philosophical concerns" and "requiring more information". Each of the following subsections addresses common claims made against immunisations and evidence-based facts that healthcare providers should know in order to have a conversation about these claims. Special consideration has been given to vaccines against influenza and COVID-19.

2.1.1 Safety concerns

2.1.1.1 Vaccines contain harmful chemicals, preservatives and metals

While vaccines are formulated with a number of inactive ingredients, all ingredients and their safety are continuously monitored by national, regional and global agencies, such as the USA Food and Drug Administration (FDA), the European Medicines Agency (EMA) and the WHO. Adjuvants are substances that enhance the body's immune response to the antigens contained in vaccines.[18] Aluminium salts are the main adjuvant used in vaccines today, and they have been used in vaccine production for decades.[19, 20] However, some patients express concerns about the effects of aluminium exposure on neurological function in humans. While large amounts of aluminium exposure are known to be toxic, the amount found in vaccines is less than what naturally occurs in fruit juice and breast milk, among other foods.[6] Aluminium has been safely used in vaccines for 70 years, in patients of all ages.[18]

Preservatives are also added to vaccines to prevent microbial growth during the manufacturing and administration process. Thiomersal, a mercury-containing compound, is the preservative which faces the most scrutiny among vaccine-hesitant individuals because mercury is linked to neurodevelopmental delays such as autism in children.[21] Thiomersal has been used for decades in many drug products, as it kills a broad spectrum of pathogens.[22] Use has diminished in recent years because improvements in aseptic manufacturing techniques and utilisation of single-dose vials have decreased contamination risk.[18, 21] Additionally, all paediatric vaccines in the USA are available in formulations without thiomersal as a precautionary measure.[18] Regardless, a number of studies have found that ethylmercury, the type of mercury found in vaccines, does not accumulate in the body or pose health risks when administered multiple times in low doses.[18, 21] This is contrary to elemental or methylmercury, which is found in seafood and contaminated water supplies.[21]

Another additive which may cause vaccine hesitancy is gelatine, a stabiliser used to improve vaccine shelf life. This is a valid concern for some individuals because a rare risk of hypersensitivity exists following administration of vaccines containing porcine gelatine (i.e., the MMR vaccine).[18] Patients can be reassured that incidence is extremely rare (approximately one case out of every two million doses of MMR vaccine), and immunisation centres are equipped with medicines necessary to treat anaphylactic reactions.[18] Concern has also been raised regarding the transmissibility of "mad cow" disease to humans through bovine gelatine in vaccines. The prion proteins which cause "mad cow" disease are not found in the blood, connective tissue or bones of infected animals, so gelatine is unlikely to spread the disease. As such, no cases of "mad cow" disease have been linked to vaccinations.[23] Similarly, residual egg proteins are found in some vaccines (influenza and yellow fever) because fertilised hens' eggs are used to propagate viral particles in the vaccine-making process.[18, 24] Patients with severe egg allergies can receive egg-free formulations of the influenza vaccine or have their vaccines administered in a doctor's office.

The last ingredient which is a common cause for vaccine hesitancy is formaldehyde, an agent used to inactivate viruses and bacterial toxins for addition to influenza, polio, diphtheria and tetanus vaccines.[18] While high concentrations of formaldehyde can cause cancers, the levels present in vaccines are much too low to pose a health concern.[25] In fact, pears can contain up to 60mg/kg of formaldehyde versus a maximum of 0.1mg in any given vaccine.[24, 26]

2.1.1.2 Development of COVID-19 vaccines was too fast to be tested for long-term health risks

The COVID-19 vaccines could be researched, developed and distributed in record time because the novel coronavirus caused a public health emergency, requiring prompt action.[27] Government agencies, global health organisations and private entities provided funding to biopharmaceutical companies so they could shift focus toward COVID-19.[28] Furthermore, the groundwork for a vaccine against novel coronaviruses had been laid during the outbreaks of severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) of 2003 and 2012, respectively.[29] No corners were cut in vetting the safety of vaccine candidates, as each COVID-19 vaccine on the market was tested for safety and efficacy in phase 3 trials involving tens of thousands of participants.[30] The data were then reviewed by national health authorities such as the FDA in the USA, the EMA in the European Union, the Pharmaceutical and Medical Devices Agency (PMDA) in Japan, among many others, in order to approve each COVID-19 vaccine for use.

Furthermore, each vaccine on the market is being continuously monitored for long-term safety via reporting systems such as the Vaccine Adverse Event Reporting System (VAERS) in the USA and the Yellow Card scheme in

the United Kingdom.[30, 31] Newer, more accessible reporting systems such as the artificial-intelligence-based app 3Analytics will collect information in real time for all COVID-19 vaccines available worldwide to ensure no correlation exists between vaccination or vaccine manufacturer and serious adverse events.[32] For any immunisation, if a severe side effect were to occur, the event generally takes place within six weeks of receiving a dose.[33, 34] Even so, long-term or delayed side effects, while possible, are uncommon with vaccines. For example, the most severe side effect related to a COVID-19 vaccine is a rare blood clot called thrombosis with thrombocytopenia, but this event occurs within three weeks of vaccination at a rate of only four to seven cases per one million doses of the Janssen and AstraZeneca COVID-19 vaccines.[35, 36]

When patients overestimate the safety risks of vaccines, they are often underestimating the health risks of contracting the disease which the vaccine is preventing, too. It is true that COVID-19 vaccinations have not had the time to be studied long-term, but consideration should also be given to the long-term side effects of COVID-19 infection itself. Respiratory injury from COVID-19 pneumonia is connected to long-term fibrotic changes in lung tissue.[37, 38] The term "long COVID" has been coined to describe patients who experience brain-fog, fatigue and sensory deficits months after recovering from COVID-19.[39] Patients should be reminded of the risks vs benefits of receiving immunisation against SARS-CoV-2.

2.1.1.3 Vaccines containing DNA and mRNA can change the human genome

The recent approval of mRNA vaccines against the novel coronavirus has caused concern about the effects of exogenous genetic material on the human body. DNA and mRNA vaccines have only recently come to market, but this technology has been studied for decades.[40] This approach to stimulating an immune response provides a number of advantages over using inactivated pathogens or modified antigens in vaccines: DNA vaccines are more stable, they produce both B-cell and T-cell immune responses, can be manufactured on a large scale and contain no infective materials.[41]

The main concern vaccine-hesitant individuals have regarding these new vaccines is that plasmid DNA and mRNA may be integrated into the human genome, potentially causing genetic and germline alterations which can lead to cancers or infertility. Studies show that plasmid DNA does remain in the muscle several months after injection, but nearly all of the plasmid is extrachromosomal, with frequency of integration into the host genome being three times less than the natural spontaneous mutation rate of DNA.[42-44] Therefore, any effects of integration are unlikely and negligible. Furthermore, mRNA is quickly broken down by the body's cellular components soon after translation occurs and never enters the nucleus of the cell.[45] Patients should be reassured that mRNA vaccines cannot interact with the host genome in any way.

2.1.1.4 Vaccines can cause autism

The false notion that vaccines can cause autism is largely tied to the publication of an ill-founded study in 1998. The study titled "Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children" was published by *The Lancet*, a normally reputable scientific journal, and proposed a link between chronic enterocolitis and developmental disorders in children. The damaging part was the assertion that gastroenterological symptoms in the sampled children began after receiving the vaccine for measles, mumps and rubella (MMR). The publication's lead author, Dr Andrew Wakefield, gave this condition the name "autistic enterocolitis" and later suggested without evidence that the three components of the vaccine be administered separately to avoid causing ill effects.

A number of issues exist with the quality of Wakefield's study. First, only 12 children were included in the sample, too few to detect accurate, statistically significant correlations. Next, the children that participated in the study were hand-selected by Wakefield himself, creating concern for biased results. Much of the "data" included in the study was also reported by the parents of the children, which is not considered scientifically reliable. The concerns about the study were validated after it came to light that Wakefield received undisclosed funding by lawyer Richard Barr, who was working on an anti-vaccine lawsuit. Because Wakefield had a conflict of interest, he was manipulating data to create the appearance of a link between MMR vaccine and autism. Lastly, Wakefield was found to be patenting a formulation of the MMR vaccine with three separate components that he marketed to be "safer" than the existing vaccine.

The Lancet retracted Wakefield's publication in March 2004 after all of the scientific and ethical concerns were uncovered. Unfortunately, the damage to vaccine confidence had already been done.

2.1.2 Efficacy concerns

2.1.2.1 Vaccines are not necessary because diseases can be prevented by hygiene and immunity-boosting supplements

Micronutrients such as vitamins D and C and zinc are important for maintaining a healthy immune system, and patients should be encouraged to maintain sufficient levels of each. There is not yet enough data to suggest supplementation with micronutrients should be recommended to treat or prevent infections.[46] Furthermore, there is evidence that supplementation with vitamin D may protect against upper respiratory infections only for individuals who are starting from deficiency.[47, 48] The same is true for the benefits of zinc and vitamin E for preventing infectious disease in the elderly.[49, 50] Supplementing micronutrients in otherwise healthy individuals likely provides no protection against infections, and may even be harmful.[51]

Covering coughs and sneezes, avoiding touching the face, and washing hands with soap and water for at least 20 seconds are a few examples of good hygiene which can help slow the spread of disease. Unfortunately, highly infectious diseases persist regardless of these measures.[52] Vaccines may not be the only way to prevent infection, but vaccination combined with good hygiene and lifestyle practices provide the best chance of ending and preventing global health emergencies caused by infectious disease.

2.1.2.2 Natural immunity from infection is healthier

A commonly held belief among vaccine-hesitant individuals is that infection with a disease provides longer-lasting immunity than vaccinations. This belief stems from the fact that a single infection by diseases such as measles and chickenpox can provide lifelong immunity, but the immunisations for measles and chickenpox require multiple doses. There is not a clear answer as to why natural infection often results in longer lasting immunity. The viral or bacterial load is much higher when exposed to the pathogen naturally, which may provide a stronger immune response.[53] There is also evidence that viral antigens confer stronger immunity than bacterial antigens.[54] Interestingly, some vaccines do provide more robust and longer-lasting immunity than natural infection due to adjuvants and the highly purified nature of the proteins and toxoids contained in them.[55] These vaccines include the human papilloma virus (HPV), tetanus, Haemophilus influenza type b (Hib) and pneumococcal vaccine.[55] More recently, evidence suggests the the Moderna mRNA vaccine against COVID-19 produces antibodies that are more targeted to the receptor binding domain of the SARS-CoV-2 virus and bind with greater breadth to the binding domain than antibodies produced by natural infection.[56] This means that immunity by vaccination is more resistant to mutations in the virus and may last longer than immunity by natural infection.

Vaccine-preventable diseases can range from mild to life-threatening, and there is not a clear way to determine how severe a single case may be. There is high risk associated with acquiring natural immunity from infections such as pneumonia, meningitis, measles and hepatitis. For example, even with treatment, 10–15% of individuals who contract meningitis will die from the disease in the USA, and those who recover may have lifelong disabilities such as brain damage and deafness.[57] Vaccines carry fewer risks and provide the same protection against infection when administered according to schedule.

2.1.2.3 The flu vaccine has low efficacy because it is formulated by prediction

It is true that the efficacy of influenza vaccines varies season by season depending on how closely the virus strains contained in the vaccine match those circulating around the globe. The influenza virus evolves rapidly, meaning the vaccine must be reformulated each year in advance of the upcoming flu season. The Global Influenza Surveillance Network (GISN) consists of 92 countries and collects almost 200,000 respiratory specimens each year to identify circulating strains, evolutions and antiviral susceptibilities of the influenza virus.[58] The data provided by the GISN are used by the WHO to provide well-informed recommendations regarding which three or four virus strains should be included in the development of trivalent and tetravalent influenza vaccines. In February and September of each year, the WHO publishes a formal recommendation for which strains to include in the influenza vaccines for the upcoming year in the northern and southern hemispheres, respectively.[59]

Even when the influenza vaccine strain match is accurate, there are variations in the efficacy of the vaccine depending on the characteristics of the person immunised and which type of flu vaccine is administered. The USA Flu Vaccine Efficacy Network estimates that from 2012 to 2017, the efficacy of influenza vaccine against laboratory-confirmed cases ranged from 19% to 52%. Regardless, a number of benefits exist for receiving a flu vaccine. The USA Centers for Disease Control and Prevention (CDC) estimates that during the 2019–2020 flu

season, vaccinations prevented over 7.5 million cases, 105,000 hospitalisations, and 6,300 deaths in the USA alone.[60] A New Zealand study showed that among patients hospitalised with flu, vaccination was associated with a 59% decrease in the odds of intensive care unit admission.[61] The flu vaccine decreases the likelihood of becoming sick, reduces the severity of illness in those who still become infected, and prevents complications in high-risk patient groups.

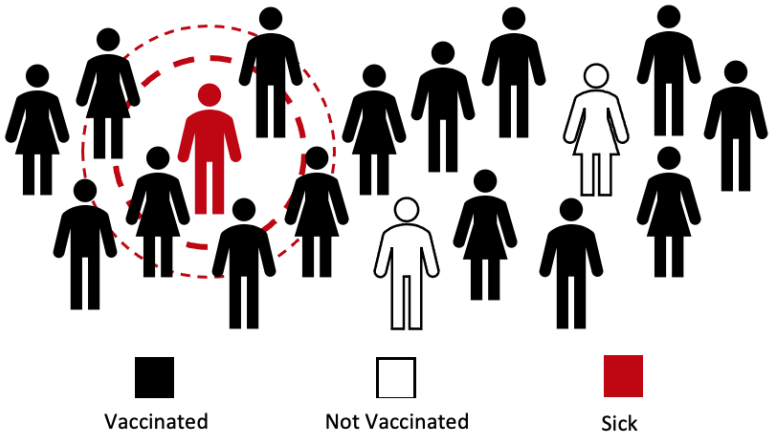
2.1.2.4 People get vaccinated and may still contract the disease they were supposedly protected against

Vaccines are the most effective measure for preventing infectious diseases, but their efficacy is never 100%. The strength and longevity of immunity wanes over time after both natural infection and vaccination. Generally, live vaccines provide longer-lasting protection than subunit and polysaccharide vaccines. Furthermore, immunity tends to be weaker among young children, the elderly and immunocompromised individuals.[62] Booster doses are recommended for some vaccines such as tetanus and pneumococcal pneumonia to combat the natural decline in antibodies over time and to provide additional protection for high-risk groups.

Among those individuals who do become sick with an infection they were vaccinated against, fewer will have severe cases compared with their non-vaccinated counterparts. For example, a study analysing the trends in varicella-associated complications found a marked decrease in febrile convulsions and encephalitis among children hospitalised with varicella during the seven years following universal vaccine recommendation in Germany.[63] Similarly, a study from Qatar following SARS-CoV-2 vaccine roll-out found that the Pfizer-BioNTech vaccine was 100% efficacious in preventing severe or fatal infection for over 265,000 individuals.[64]

Immunisation protects both individuals and the community at large. This concept is called herd immunity. Even when a vaccinated person does become sick from an infectious disease, the disease will not readily spread through the population if a large enough percentage of the population is immunised (Figure 2). Additionally, herd immunity protects the few individuals with severe allergies, HIV, cancers or other conditions, for whom vaccines are contraindicated.

Figure 2. Herd immunity effect protecting the unvaccinated[65]



2.1.3 Moral/philosophical concerns

2.1.3.1 Vaccination goes against religious or cultural beliefs

Pharmacists often serve a diverse community, so heeding a patient's religious or cultural views is incredibly important when providing healthcare advice. Additionally, religious views are one of the most common reasons given by parents to exempt their children from receiving recommended childhood vaccines.[51] Addressing religious concerns is complex because clinicians must not dismiss or attack a patient's values. Where possible, pharmacists can correct misconceptions, offer alternative vaccine manufacturers, provide statements from religious organisations, and emphasise the risks of forgoing immunisations.

Islam, Hinduism and Eastern Asian faiths have no widespread objection to vaccines. More hesitancy is seen with Christian and Orthodox Jewish populations.[66] Religious concerns about vaccines are typically about the animal or human origins of inactive ingredients found in them. During the vaccine-making process, viruses must be copied in large quantities to acquire antigens or genetic information. The vaccines for hepatitis A, varicella, rubella and rabies are all made using fetal fibroblast or retinal cells as the reservoir for viral replication.[67] The virus enters the fetal cell, replicates inside the host and lyses the cell to be released. No fetal cells are present in the actual vaccine. The fibroblast cells used in vaccines today are all derived from the elective termination, or abortion, of two pregnancies in the 1960s and 70s. The cell lines are named WI-38 and MRC-5.

Fetal cells are the preferred reservoir for viral replication because human cells are better hosts for viruses that infect humans, and fetal cells have a longer lifespan than other cell types.[68] Because of the longer lifespan, the same historical cell lines have been viable for decades. Some individuals may be more comfortable receiving these vaccines knowing that the terminated pregnancies were unrelated to the vaccine-making process, and no repeated abortions are needed for the purpose of creating vaccines. Researchers estimate that the WI-38 cell line has prevented nearly 11 million deaths.[67]

More recently, the issue of fetal cells has come to light because several new vaccines against COVID-19 rely on two other historical fetal cell lines, HEK293 and PER.C6, for production. Currently, viral vector-based COVID-19 vaccines are the only approved vaccines which use such technology, not mRNA-based vaccines.[69] Pharmacists may offer statements made by the following religious organisations to guide patients in the decision-making process (Table 1):[66, 70]

Table 1. Stances of different religious organisations on COVID-19 vaccines[66, 70]

Organisation	Date	Stance
The Vatican	21 December 2020	"When ethically irreproachable COVID-19 vaccines are not available, it is morally acceptable to receive COVID-19 vaccines that have used cell lines from aborted foetuses in their research and production process. (…) The moral duty to avoid such passive material cooperation is not obligatory if there is a grave danger, such as the otherwise uncontainable spread of a serious pathological event."
United States Conference of Catholic Bishops	January 2021	"Given that the COVID-19 virus can involve serious health risks, it can be morally acceptable to receive a vaccine that uses abortion-derived cell lines if there are no other available vaccines comparable in safety and efficacy with no connection to abortion. If it is possible to choose among a number of equally safe and effective COVID-19 vaccines, the vaccine with the least connection to abortion-derived cell lines should be chosen."
Jewish Orthodox Union and Rabbinical Council	15 December 2020	"The conclusion of our *poskim* is that, pursuant to the advice of your personal health care provider, the Torah obligation to preserve our lives and the lives of others requires us to vaccinate for COVID-19 as soon as a vaccine becomes available."

Another religious concern about vaccines is the potential use of porcine and animal products in the manufacturing process, which are forbidden in the Islamic and Jewish faiths. Gelatine is derived from porcine skin and connective tissue and is used as a stabiliser in the following vaccines: live attenuated influenza, MMR, rabies, typhoid oral, varicella and yellow fever.[71] Ultimately, the decision to accept these vaccines lies with the patient. Pharmacists should remind the patient of the risks of forgoing vaccines and offer statements from religious organisations (Table 2):[70]

Table 2. Stances of different religious organisations on porcine and animal products on vaccine production[70]

Organisation	Date	Stance
Islamic Organization for Medical Sciences	17 July 2001	"The gelatine formed as a result of the transformation of the bones, skin and tendons of a judicially impure animal is pure, and it is judicially permissible to eat it."
The Kashrut (via Public Health England)	August 2015	"It should be noted that according to Jewish laws, there is no problem with porcine or other animal derived ingredients in non-oral products. This includes vaccines, including those administered via the nose, injections, suppositories, creams and ointments."

Vaccination policies regarding exemptions vary regionally. For example, the USA mandates specific vaccines for children in the public school system, and most states allow exemptions for both medical and philosophical or religious reasons. On the contrary, the states of California, Connecticut, Maine, Mississippi, New York and West Virginia allow only medical exemptions.[72] In Australia, vaccination is not compulsory, but parents receive financial incentives for each child who meets the immunisation requirements of their age group, and unvaccinated children are excluded from school in the event of disease outbreaks.[73] Therefore, pharmacists must also inform patients of their options in addition to the risks of avoiding immunisations. Chapter 3.3 addresses conversation strategies for levelling with patients who hold strict religious beliefs.

2.1.3.2 The pharmaceutical industry has a questionable history, is only interested in making money and should not be supported

Some pharmaceutical companies may have a tarnished reputation due to practices such as price gouging, supply shortages, contribution to the opioid crisis, deceptive drug information reporting and influencing doctors' prescribing habits. Such practices have understandably caused many individuals to distrust the industry as a whole in some parts of the world. It seems to many that financial gains have surpassed public health as the industry's top priority. In fact, a 2019 Gallup poll found that the pharmaceutical industry is the least favoured by Americans among 25 other sectors.[74] Consumers are faced with the dilemma of withholding their support of pharmaceutical companies while acknowledging that these same companies provide life-saving products like vaccines.

While improving the reputation of the pharmaceutical industry is a task that involves collaborative effort from government regulatory bodies, industry stakeholders, and pharmaceutical company executives, pharmacists, as healthcare professionals, can emphasise and communicate the unquestionable immense value that vaccines have for public health.

Despite vaccines being a source of income for pharmaceutical companies, patients should be reminded that they are a proven, modern health marvel. Before the introduction of immunisation, infectious diseases were a real threat, with an estimated three in 10 children succumbing to disease and dying.[62] For those who survived, signs of disease were still evident through scars from smallpox, paralysed limbs from polio and blindness from measles. Table 3 highlights the burden of select vaccine-preventable diseases before and after the introduction of vaccination in the USA.[75]

Table 3. Burden of vaccine-preventable diseases before and after the introduction of vaccination in the USA[75]

Disease	Pre-vaccine cases per million per year	Post-vaccine cases per million per year
Measles	3,044	0.2
Pertussis	1,534	52
Acute poliomyelitis	141	0
Varicella	16,018	2,046
Tetanus	4	0.14
Smallpox	250	0
Pneumococcal disease	233	139

In order to maintain these trends, it is important that everyone who is eligible to receive vaccines does receive them. Vaccines not only save lives and eradicate disease, they also provide cost-savings to patients and the healthcare system. The Johns Hopkins Bloomberg School of Public Health conducted a study to find the potential return on investment of vaccines across 94 low- and middle-income countries. Compared with costs of treatment, immunisations save on average USD 44 for every USD 1 spent.[76]

In conclusion, vaccines are cost-effective, safe, help eradicate diseases and save lives. While pharmaceutical companies must be held accountable for their actions and collaborate in ensuring universal access to vaccines all around the world, we cannot deny the benefit they provide through vaccines.

2.1.3.3 Mandating immunisations is a breach of privacy and autonomy over one's health

Some governments consider policies that make immunisations mandatory because it is a public safety measure. When immunisations rates are 95%, vaccine-preventable diseases cannot readily spread through the population. In an ideal situation, everyone would be able to see the benefits of getting vaccinated and decide to follow through independently. Unfortunately, mandates are often necessary to achieve herd immunity.

When a large percentage of the population is vaccinated, many people begin to opt out of receiving vaccines because the perceived threat of illness has declined. Then, outbreaks occur. An example of the benefits of mandates is the 2017 outbreak of measles in Italy. Between January and August 2017, Italy saw over 4,400 cases of measles where 88% of patients were unvaccinated.[77] In response, Italy declared 10 childhood vaccines mandatory for admission to school and day care centres, combined with fees for parents who did not abide. Within the next two years, vaccine coverage increased between 3% and 7%.[78]

Failure to vaccinate not only puts an individual at risk, but also affects the health of everyone that individual comes into contact with. Furthermore, parents are not always equipped to make health decisions regarding their children. In this case, mandates prevent unnecessary spread of disease due to a handful of misinformed individuals. In these instances, there exists an ethical justification of interfering with those patients' health autonomy.

Some may argue that vaccine mandates cause further animosity in already vaccine-hesitant individuals, or that mandates will not fix the larger issue of vaccine hesitancy, and this is likely true. Legislation may be a quick fix in certain outbreak situations, but the larger issue of vaccine hesitancy must be tackled by educating the public. The greatest benefit for the population would be increasing confidence in immunisations such that every individual who can receive a vaccination chooses to do so. Even when electing to receive vaccines is a patient's choice, pharmacists can play a pivotal role in helping those patients make informed choices. Chapters 3 and 4 of this publication offer advice for pharmacists to successfully promote and communicate information about vaccines.

2.1.4 Requiring more information

2.1.4.1 The childhood immunisation schedule is too complex

A common concern among vaccine-hesitant individuals is that too many vaccines administered at once has the net effect of overwhelming the immune system, and lowering immune system performance over time.

The CDC estimates that each vaccine in the childhood immunisation schedule contains between 1 and 69 antigens. This would mean that a fully vaccinated child would have been exposed to 320 antigens by the age of two.[79] In comparison, the average person is exposed to hundreds of antigens per hour by eating food, touching objects and breathing air. Even so, advances in vaccine manufacturing mean that vaccines today contain considerably fewer antigens than they did decades ago.[80] It is not likely that the cumulative effect of vaccines causes any meaningful burden on the immune system.

The recommended vaccine schedule is designed accordingly to ensure children are best protected against illness throughout every stage of development. Any delay or attempt to spread out immunisations would put children at unnecessary risk of infection. Infants are at increased risk of complications or death from vaccine-preventable illnesses, so avoiding gaps in coverage is extremely important. National immunisation schedules are based on local epidemiological considerations and resource availability. Before making recommendations, organisations consider how safe and effective a vaccine is when given at a particular age, the burden of disease the vaccine

prevents, and how much immunity the vaccine offers. Parents should be reassured that when vaccines are tested for safety in the early stages of approval, they are administered alongside other recommended vaccines.[79]

Immunisation schedules can get complex, with some vaccines requiring multiple doses or boosters and varying degrees of spacing, and others needing to be administered only after a certain age. Health agencies such as the CDC provide easy-to-understand immunisation schedules, so that parents are less overwhelmed.

2.1.4.2 You can get sick after receiving vaccines

Vaccines are safe, but they do have side effects. The most common side effects include low grade fever, pain and redness at the injection site. These effects are normal and are due to the immune system mounting a response against the vaccine. They usually resolve on their own in a few days.

Inactivated vaccines are not able to cause infection by the pathogen they prevent, because there is no live infective agent contained in the vaccine. On the other hand, there is a small risk of acute infection caused by live-attenuated vaccines in patients who are pregnant or have weakened immune systems. Otherwise healthy patients should be reassured that vaccines are safe. Details about vaccine-specific contraindications and precautions are listed in Chapter 5.

Another, rare side effect that is associated with vaccination is Guillain Barre-Syndrome (GBS). GBS is an autoimmune condition where the body's immune system attacks healthy nerve cells, causing weakness and sometimes paralysis. GBS in often preceded by a viral or bacterial infection. An increased risk of GBS was detected among patients who received the 1976 swine flu vaccine, but no cause has been isolated. The seasonal influenza vaccine has a reported risk of one to two additional cases of GBS per million doses of the vaccine. It is likely that someone who contracts influenza has a higher likelihood of developing GBS than someone receiving the vaccine. itself Severe illness and death from flu itself are more common.[81]

2.1.4.3 Vaccines are bad for pregnant, breastfeeding or immunocompromised people

Live, attenuated vaccines should not be administered to pregnant or severely immunocompromised individuals due to a potential for acute infection caused by weakened virus in the vaccine.

According to the CDC's Advisory Committee on Immunization Practices, the only vaccines that should not be administered to a lactating woman are smallpox and yellow fever.

2.2 The role of pharmacists in promoting vaccination and building vaccine confidence

Pharmacists play a unique role in promoting immunisation due to their expertise, skills, trustworthiness and accessibility to the general population. FIP developed a publication for pharmacists entitled "FIP vaccination handbook for pharmacists: Procedures, safety aspects, common risk points and frequent questions" in which the different roles pharmacists can play in vaccination, ranging from education to administration, are highlighted and discussed.

Community pharmacies are widely distributed as suggested from data of a FIP survey that indicates there are over 1.6 million pharmacies in a sample of 76 countries and territories across the globe, with an average of 2.75 pharmacies and 5.14 community pharmacists per 10,000 population.[82] This becomes especially important for rural and resource-poor regions where vaccination clinics may be few and far between. Pharmacists are also in the unique position of being able to offer immediate support to patients through walk-in consultations. Patients do not require appointments to receive healthcare recommendations, and pharmacists have the competency and training to answer a host of health questions. Furthermore, where physicians or nurses may be in shortage to cover the needs of the population, or are limited in the time they can provide each patient due to the pressure on healthcare systems, pharmacists can provide a range of primary healthcare services and manage common ailments. They can also advise on appropriate vaccines for each individual and administer them, thus allowing other healthcare providers to care for more patients in need or allocate more time to those patients that require it. Lastly, pharmacies are often open on evenings, holidays and weekends, allowing patients to access services at their own convenience. A number of sources list pharmacists as the most trusted healthcare professional for these reasons.[83, 84]

As previously mentioned, the CDC cites three major reasons behind vaccine hesitancy: lack of confidence, complacency and lack of convenience. There exists a large body of research confirming that vaccines administration and immunisation advocacy by pharmacists results in increased vaccine coverage via each of these "3 Cs". A 2016 systematic review on the effects of pharmacists on immunisation rates globally[85] found that uptake was greater when a pharmacist was involved in the immunisation process, regardless of where the point of contact occurred. In other words, pharmacists are valuable as educators, facilitators and vaccine administrators.

Of course, the role that pharmacists play in immunisation varies by country. According to FIP data from 2020, pharmacy-based vaccination is available in at least 36 countries and territories, and vaccine administration by pharmacists is authorised in 26 countries and territories.[86] Countries including Australia, New Zealand, Canada, France, Denmark, Portugal, the USA and the UK have passed legislation which allows pharmacists to administer vaccines, provided the pharmacists have achieved all necessary training and the pharmacy is equipped to provide vaccination services.[87, 88] The number of countries which allow pharmacists to play an active role in immunisation is steadily increasing. There is also international and regional variability governing which vaccines pharmacists are allowed to administer and which age groups they are allowed to administer them to. Regardless, the convenience and knowledge of pharmacists worldwide make them an integral part of the effort to combat vaccine hesitancy.

In locations where pharmacists have not yet been granted authority to administer vaccines or are unable to have the necessary facilities to store them, they may still fill other roles. First, pharmacists can identify patients in need of immunisation during routine patient encounters. Patients who are of advanced age, have just been discharged from hospital, or have been prescribed medicines known to treat conditions that increase the risk of vaccine-preventable illnesses should be flagged for screening. If a patient is found to have a gap in immunisation coverage, the pharmacist can arrange for administration of the vaccines elsewhere. Alternatively, pharmacists can offer questionnaires to new patients to determine where gaps in immunisation exist.[85]

An especially valuable application of patient screening at pharmacies is the identification of adults with immunisation needs. Childhood vaccinations will always be essential, but advances in medicine and an ageing population means that later-in-life immunisations against such diseases as influenza, shingles, and pneumonia need particular attention. Working-age adults are also more likely to skip routine doctor's visits than children and senior adults.[89] Furthermore, the COVID-19 pandemic has caused major disruptions in healthcare, as adults are forgoing routine visits due to fear of infection.[90] Now more than ever, pharmacists must embrace their role as major primary healthcare providers.

Next, pharmacists have the opportunity to provide vaccine counselling during patient encounters such as comprehensive medication reviews. At this time, pharmacists can recommend vaccines to patients and inform them of infection risk should they refuse. If patients have any concerns or hesitancies related to vaccines, the pharmacist can also address them. These one-on-one meetings are especially important for clearing up misinformation and disinformation about vaccines through open conversations. Vaccine counselling can take place remotely through phone calls, videoconferences, email or other means.

Pharmacists can also be indirectly involved with immunisation delivery by dispensing vaccines and maintaining an extensive vaccine formulary. Pharmacies often have freezers and refrigerators that are suitable to maintain the cold chain during transportation and storage of vaccines. If a physician's office or clinic does not have the facilities to store vaccines, they can rely on their local pharmacy to dispense them. Furthermore, a pharmacy can keep a supply of vaccines on hand that best suits the epidemiological needs of the community.

Lastly, pharmacists can play a large role in immunisation advocacy for the community. Advocacy can include speaking on behalf of the profession to legislative bodies, such that pharmacists are granted greater authority when it comes to the immunisation process, as pharmacist involvement improves public health. Other examples of vaccine advocacy include participating in events such as the WHO's Immunization Week, speaking at seminars to explain the risk of vaccine-preventable illnesses and benefits of vaccines, or collaborating with local health departments to post advertisements for local vaccination clinics and immunisation information. In these instances, pharmacists are increasing public awareness of which adult vaccines are available and who should get them. Pharmacists may also engage other members of the profession to increase the momentum of change.

3 Effective approaches to addressing vaccine hesitancy with individuals

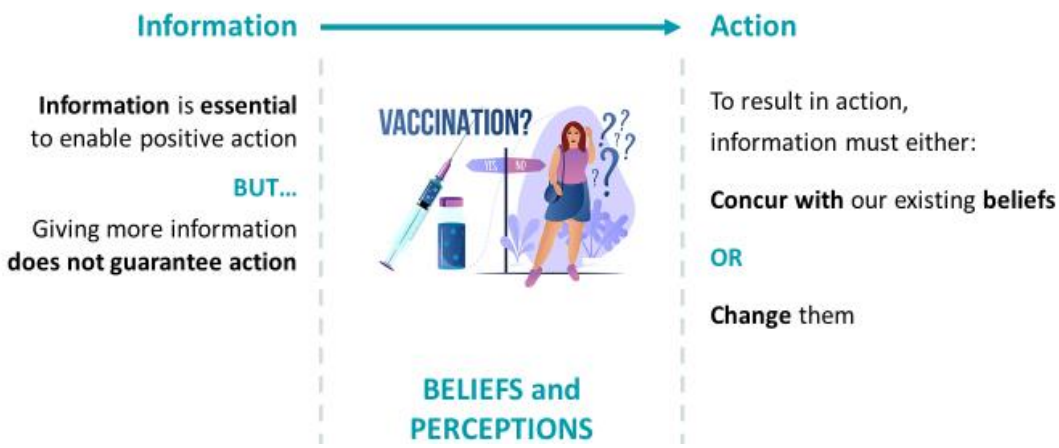
3.1 The issue of hesitancy

As explained in previous chapters, research shows that the reasons for vaccine hesitancy vary widely between individuals, but generally fall into the following categories: complacency, inconvenience and lack of confidence or trust, which may include the rational calculation of pros and cons.[91] International recommendations (e.g., from the WHO Tailoring Immunization Programmes (TIP) approach, which was developed by the WHO Regional Office for Europe to support countries to integrate people-centred research and behavioural insights into immunisation programme planning and policy[92]) for the development of interventions to promote vaccine uptake highlight the need for interventions to be carefully targeted to the individual's reasons for hesitancy towards vaccination or non-vaccination.[93] A comprehensive review of research on vaccination behaviour by Brewer *et al.* shows that the most effective interventions focus on shaping behaviour rather than simply providing information or focusing on changing opinions and attitudes.[94]

In particular, the researchers found that the most effective interventions build on an individual's baseline perceptions and vaccine intentions, and adopt behavioural strategies to facilitate action (e.g., reminders), reduce barriers (e.g., addressing concerns) and shape behaviour (e.g., providing incentives). Evidence also consistently highlights the importance of a tailored approach to achieve sustained behaviour change. Mass communication campaigns have a role in information dissemination, but they may be less effective when the aim is to shift an individual's specific barriers or perceptions towards vaccination and vaccination intentions. In these cases, a tailored, personalised approach to information communication, particularly for individuals who are uncertain or unaccepting of vaccination, is likely to be more effective.

Figure 3 illustrates that information alone does not lead to action or behaviour change, highlighting the importance of selecting and targeting information to the individual's beliefs and not just delivering large amounts of information. Achieving positive action towards vaccination will depend on an individual's beliefs and perceptions. Action will occur if the information provided concurs with existing beliefs or if the beliefs can be shifted or changed by information provided by the healthcare professional, in a way that supports positive action.

Figure 3. Beliefs as a key mediator bridging information into action (adapted from Prof. Rob Horne)



3.1.1 Adopting a systematic stepped approach to vaccine hesitancy

Effective communication should take on a stepped approach:[95]

1. Identify an individual's baseline vaccine perceptions and reasons for vaccine hesitancy; then

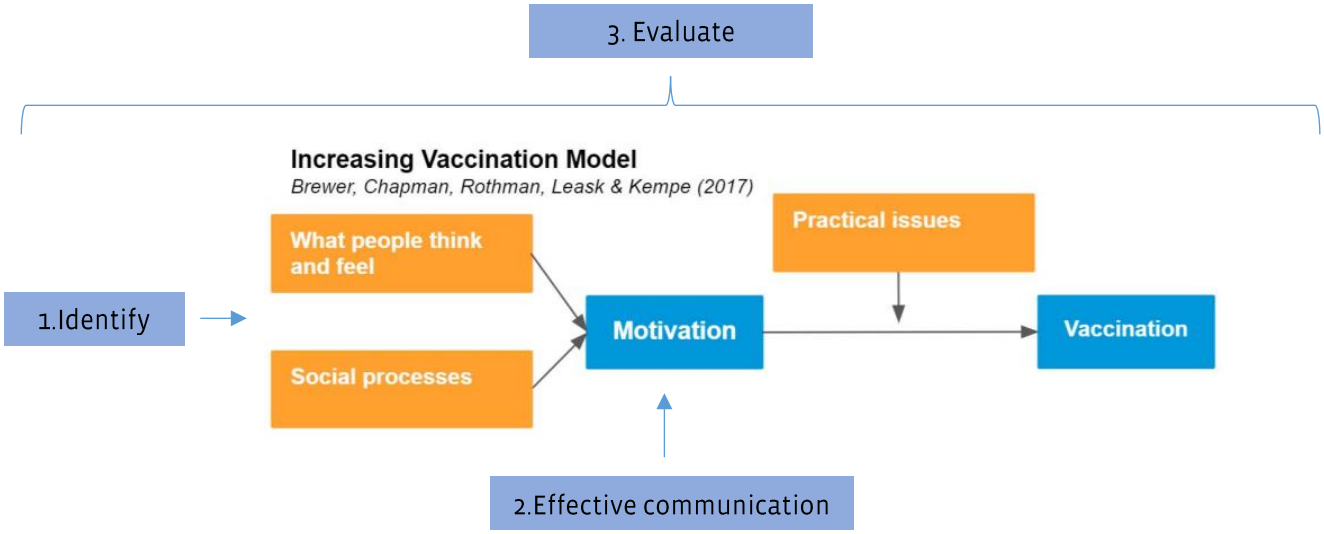
2. Deliver effective messaging to build on the positive perceptions and vaccine intentions the individual already has, and address the individual's specific barriers to vaccination in a way that is personalised to their perceptions and needs; then
3. Evaluate the effectiveness of the approach taken.

There needs to be a global collaborative approach to tackling this problem through identifying an individual's perceptions and barriers to vaccination and using behavioural strategies and effective communication to provide the individual with information to facilitate vaccine uptake. Betsch *et al.* (lead on WHO/Europe Behavioural Insights Summer School, co-organised with University of Erfurt)[96] recommend that interventions that are effective for complacent, convenient and calculating individuals differ and should be tailored according to the individual's reasons for non-vaccination. This can be done by motivating the complacent, removing barriers for those whose key barrier is inconvenience, and using incentives and principles from the Necessity-Concerns Framework[97] for medicines decision-making for those who are calculating pros and cons.

This chapter covers key guiding principles for effective communication to reduce vaccine hesitancy both for the general public and for groups who are likely to have a higher risk of poor vaccine uptake. In general, for communication to be effective, the process needs to involve meaningful engagement with the individual, whether it is a brief or more prolonged interaction and conversation. This can best be visualised as a cycle of communication with the three steps outlined above: (Figure 4)

1. Identification;
2. Communication; and
3. Evaluation

Figure 4. Identification, communication and evaluation framework[98] (adapted)



3.2 Identification of barriers to vaccine uptake

In line with many improvements in science and behaviour change principles, the first step of effective communication within an interaction is to identify an individual's barriers to vaccine uptake.[99] Chapters 1 and 2 have outlined the history behind vaccine hesitancy, and the barriers to vaccine uptake that can exist to a greater or lesser extent in different people.

To effectively address low levels of uptake in a specific individual or group, we need to understand to what extent the various barriers are influencing decisions and what other barriers might exist. To explore what these barriers might be, engaging with key stakeholders within a group or key thought leader can help to gain specific insights into the needs, values and beliefs of the particular community that you are interacting with.[100] The same

principles apply for individuals, and whether the community is large or small — these approaches can be effective even for a family unit or friends with shared cultural values and beliefs. Understanding their beliefs and unique barriers to vaccination can inform the development of tailored messages that address any concerns and highlight the associated benefits of vaccination.

3.2.1 Normalise and invite conversations about vaccination

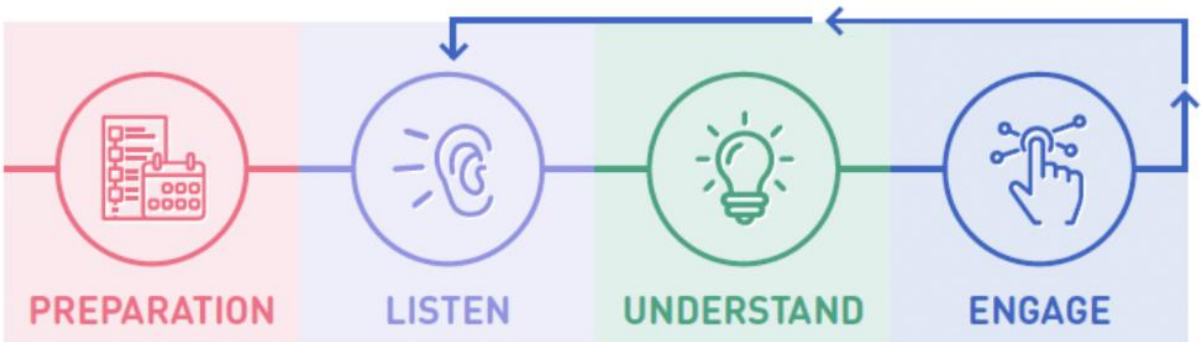
To identify the barriers facing an individual or community, begin first with normalisation statements to open conversations about vaccination. It is important to have an open, non-judgemental approach, and to normalise the fact that they may have doubts or fears about vaccination. This can be done by making a general statement about the issue to take the focus off the person (e.g., "many people feel . . ." or "often this is caused by . . ."). These normalisation statements will help support an individual to open up about their beliefs and concerns. This is particularly important because being a health professional will often place you in a state of power relative to the patient, and patients and the public may provide you with answers that they think will please you rather than sharing their honest thoughts and opinions. Sharing a personal narrative can also help to open the conversation. For example, talk about your own personal experience of vaccination or injections, and any fears or concerns that you might have had. Engagement with individuals and groups should be participatory, iterative and respectful of their sensitivities.

3.2.2 Seek to listen and understand

Once the individual is willing to open up and discuss vaccination, the key step is to seek to understand, and to listen, rather than offering any judgement. Engagement needs to focus on listening to, understanding and eliciting the individual's unique perspectives, beliefs and concerns regarding vaccination. Any fears, concerns, issues and apprehensions that you may have identified during engagement should be acknowledged and not invalidated, nor judged. Figure 5 presents key steps to identify possible barriers to vaccine uptake. The key part is to be prepared for questions, to listen non-judgementally and with an open-mind, understand what the individual's barriers and enablers might be to achieving vaccination, and then working to engage with them. Note this is an iterative cycle, where the person engages with the health provider, then the provider needs to listen, then re-engage with the individual according to their response.

Ensure positive and welcoming body language, and use of minimal encouragers (small signals that let the speaker know that you are still listening and understanding to encourage them to continue talking — these can be brief words like "uh-huh", "yes", "no", "mmm", or positive body language such as head nods), to encourage ongoing dialogue about the vaccine. The aim of this interaction is to explore their current levels of understanding about vaccination and to identify any gaps in information and any misinformation or disinformation they might have been exposed to. Find out from where they have obtained their information and what sources of information they use and are likely to trust — what are their reasons for using that information source? Do they have links to other groups or communities where this information may have spread or been shared?

Figure 5. Steps to increase engagement and identify barriers for vaccine uptake (adapted from Public Health Collaborative, Vaccine misinformation guide)



3.3 Communicating for change

Communicating for change is the most crucial part of changing behaviour and any identified misplaced beliefs about vaccination. Once an opportunity has been identified to understand the various influences a person might have been exposed to and their barriers to vaccine uptake, key messages need to be shared to address the identified barriers.

3.3.1 Communication style — How

To help messages have more impact consider the following communication principles:[101]

1. **Capture attention**

Use visuals, strategies that evoke emotions or personalised messages to appeal to people. Information that can attract attention can help information retention and simplify information processing. Likewise, information that is linked with strong emotions such as urgency or surprise can support recall, although messages that invoke fear alone may backfire.

2. **Easy = true**

The human mind is much more likely to retain information and view information positively if it is easy to understand. Keep information clear — information that is easy to remember and familiar will help individuals recall it more easily and also increase their trust in the information. Repeating information consistently helps improve this familiarity and supports uptake.

3. **Be credible**

Information that you provide must be credible to help build rapport and trust between yourself and the individual. Ensuring that the information is relevant is just as important — providing information that may be credible but not relevant to your local context (e.g., vaccination advice from the USA for a strain that may not be present in your area) may add to confusion and mistrust.

4. **Motivate**

Avoid negative framing of messages (e.g., linking vaccines to pain and needles). If producing content to support vaccination, consider using happy, healthy images. Social norms are powerful mechanisms for supporting intentions to act. Explaining that most people within the community that the individual lives in have taken the vaccine, and that others in the community will expect the same action from them, can increase the likelihood of vaccination. Lastly, helping people to cope with concerns and the threat at hand, by empowering them and making vaccination the easy choice, can support vaccination.

5. **Stories**

Human beings are evolutionarily adapted to remember information better through story-telling approaches. Using narratives can help engage your audience (e.g, stories from others who have received the vaccine before, or from parents of children to support vaccination).

Below you can find a few case examples on situations regarding vaccination, where some of these principles are applied. These five conversation guides are shown below, and aim to reflect a conversation between a customer (C) and a pharmacist (P).

3.3.1.1 Conversation example 1: A parent with teenage children — HPV vaccine

C: Hello. This pandemic has made me realise that we haven't really been keeping up with regular vaccines for our teenagers. I want to keep them protected and I was wondering what vaccines I should be getting them. I have teenage kids and I want to keep them protected. Could I find out some more information?

P: Absolutely, how do you currently feel about vaccines? *(use of open questions)*

C: Well, I have heard about the human papilloma virus (HPV) injections. I remember a brochure we received from their school when they were around 11 or 12, but I think we decided against it because we didn't think they would be having sex yet.

P: Okay, would it be alright with you if we discussed a little more about the HPV vaccine and how you feel about this? *(asking for permission, open-questioning)*

C: That's fine. I'd like to know more.

P: I've had a lot of people ask me about the vaccine so it's completely normal to have questions about it. I wasn't so sure of it myself initially but learnt that the human papilloma virus causes several cancers that can affect anyone. These include cancers of different reproductive organs in women and in men, and possibly throat cancers for both men and women. The good news is that this vaccine can help protect against the virus and protect your children from getting these cancers and this vaccine *(normalisation, social norms, factual information)* should provide lifelong protection, even preventing genital warts. Now it's easy to think that this isn't relevant now if your children aren't having sex. The important thing is that the vaccine will protect them in the future if they do decide to.

C: Okay, yeah that makes sense. But what are their benefits of getting it now rather than waiting?

P: Many parents find that the earlier their children are protected the better, as it gives both you and them peace of mind and you don't have to worry about it as they grow up. Also, the age you are when you get the vaccine determines how many shots you need. If you are 9–14 for example, then you only need to get two doses, if you are 15–16 then you should receive three.

I used to think of this vaccine as something to prevent a sexually transmitted disease and be a bit uncertain, but then realised it's really about preventing cancer. Almost everyone can get this virus, so I think it's important for everyone. Almost all of my patients are now getting this vaccine, which is great. That said, this is a decision only you can make. What do you think? *(social norms, addressing concerns, personal experience, open-questioning)*

3.3.1.2 Conversation example 2: Older person — Tdap (diphtheria, tetanus and pertussis vaccine)

C: Hi there. I'm here today because I'm about to turn 65 and my daughter keeps pestering me about getting vaccinated. I am aware that I'm not as fighting fit as I once was, but do I really need these vaccines? And if so, what vaccines should I be getting?"

P: It's great that you have come in here today, I am more than happy to talk to you about the recommended vaccines. You're actually pretty fit and the thing is, these vaccines don't have anything to do with whether you're fit or not. In fact, many healthy people get vaccinated everyday — and people find being vaccinated actually keeps them fit and healthy. Also, while she may be pestering you, your daughter is on the right track. Now is a good time to be thinking about what vaccines can give you extra protection as you get a little bit older. *(positive reinforcement, addressing concerns, social norms)*

C: Oh that's good to know. I was starting to think it was just because I was getting old!

P: Not at all — people get vaccines at all ages. Though I'm sure it can be hard sometimes with the reminders, while your daughter may be pestering you, I'm sure she's making sure you get extra protection so you can continue to do the things you enjoy. *(identifying motivators, validation, social norms, normalisation)*

C: Yeah, I know she's just trying to look out for me.

P: Yeah, It's really nice to have someone looking out for us — and how lucky are you to have someone who sounds like she really cares about you. Would I be able to give you some information about the vaccines? *(positive framing, permission to provide information)*

C: Okay, right and so what other vaccines should I be getting?

P: An important vaccine often forgotten at your age is the DTaP vaccine which provides protection for diphtheria, tetanus and pertussis (whooping cough). Have you heard of this ? We've had many people come in for this vaccine. *(tailoring, personalisation, personal experience, social norms)*

C: I've had a tetanus shot after stepping on a rusty nail. Why should I get it again?

P: It's easy to think that you don't need to have the vaccine again after the tetanus shot. The bad news is that tetanus, also known as lockjaw, is more likely to cause deaths in older people. It is a serious disease caused by bacteria found in dust, dirt, soil and manure that enters the body through a cut or wound. This infection causes muscle stiffness, painful spasms, fever and difficulty chewing or swallowing, and the risk of harm is higher in older people.

The good news is that vaccination is the best protection from this illness. People receive three immunisation doses as a baby, two booster doses as children, and two more booster doses at 45 and 65. Getting your booster dose once you turn 65 is important, even though you have had a shot in the past, as these immunisations wear off over time. If you have had chickenpox in the past, the virus will stay dormant in your body until you are older. *(normalisation, bad news/good news, personal relevance, rationale)*

C: So do you think I should get the vaccine?

P: I believe routine immunisation is important and everyone should have the vaccines they need for their age. What do you think? Perhaps you can discuss it with your daughter and make an appointment? All you have to do is call us or drop in and we can arrange that for you. *(making it easy increasing convenience, personal relevance)*

C: Yes, I think that's it, I think I've got it pretty sorted.

3.3.1.3 Conversation example 3: A vegan person — Flu vaccine

C: I have some concerns about the eggs in flu vaccines, as I am vegan and do not want to take any products that have animal components.

P: That's a very important concern that we can discuss. We are entering flu season so this protection can be an asset for your health and also to protect your loved ones that are close to you. Should we discuss the options available that might suit you? *(validation, permission seeking, motivational interviewing)*

C: Yes please. But why do they use eggs in the first place?

P: Some vaccines might need a living organism with functional cells to be produced and that is why some use this method instead of cell lines or another. The important thing is that all the different methods are approved and result in vaccines that are safe to use. *(addressing concerns, personalisation)*

C: So, you say there are some vaccines that are egg free?

P: There are some vaccines available in the market, such as the quadrivalent cell-based influenza vaccine and a recombinant quadrivalent influenza vaccine, that are egg free. How does this make you feel about getting a vaccine? *(open questions, non-judgemental, factual advice)*

C: Are you sure no animal is involved in the process?

P: There are no animal products in those vaccines. Most of the vaccines are also well tested and do not require further animal testing. The important thing is that you have an option available and can be protected during the flu season. *(addressing concerns, factual information)*

C: I will think about it. I am not sure yet.

P: It can be hard to decide without knowing enough information. The good news is that many vegan people are getting vaccines as there are a lot of alternatives already available in the market. The more people who get flu vaccines, the bigger the group immunity, which will help protect yourself and your loved ones too. Would you like some information to take away to read and think about. It's important you decide for yourself but I will be available anytime if you need any help. *(validation, social norms, community and personal relevance, open-questioning, respecting autonomy)*

C: Thank you for that. Yes that would be great. I'll have a read through and think about it.

3.3.1.4 Conversation example 4: A person living with HIV — COVID-19 vaccine

C: Hello, I am feeling a bit unwell in the last couple of days. No fever, just feeling like a cold.

P: Sorry to hear that. Tell me a bit more about how you feel. What self-care measures have you taken? *(open question)*

C: I am taking some over-the-counter medicines and it is improving a little.

P: Great to hear that your symptoms are getting better, if you need any further advice to manage your symptoms you can let me know. What about any other medicines? How about the COVID-19 vaccine?

C: I am not vaccinated, but because I am HIV-positive, I thought it would not be a good idea to get vaccinated.

P: What are some of your thoughts about the vaccine?

C: Will I get sick if I take the vaccine? I'm worried it will make me sick, especially with my HIV.

P: It is understandable that you are worried. The vaccine, though, is really important for you as it reduces the risk of severe disease and death and is believed to be safe for most people, including people living with HIV.

The vaccine might cause some common side effects such as soreness, redness, and/or swelling where the shot was given, headache (low grade), fever, nausea, muscle aches, and fatigue but these are generally very mild and the benefit of being protected against the disease is huge. In fact, protection is even more important if you have HIV. *(normalisation, validation, personalised information)*

C: So, if I take the vaccine I will never get the COVID virus?

P: The vaccine reduces the probability of getting infected, but no vaccine is 100% effective. You should continue to take preventive measures against the virus (physical distancing, regular hand washing, wearing face coverings), even after vaccination, but the vaccine reduces your risk of severe illness by a very large amount. *(personalisation, factual information)*

C: Well, I might consider it then.

P: People living with HIV who take their medicines have the disease under control and will benefit from their vaccines just like everyone else. Do you think you have enough information to decide on what you want to do? I think it will be good for you and I will be here to support you whenever needed. *(open invitation for more information)*

3.3.1.5 Conversation example 5: Pregnant woman — Flu and COVID-19

C: I've heard that I'm meant to get some vaccines because I'm pregnant, but I'm not sure, I really don't want to harm the baby.

P: That's a fair concern, and it is a concern we hear from a lot of pregnant women. Pregnancy can be a really confusing time as everyone offers up opinions and there is a lot of misinformation — all of a sudden you are responsible for someone else and that can be really scary. Getting advice is a great step and I am glad you reached out. I am happy to talk through the different vaccines that would be beneficial for you, if you would like? *(validation, normalisation, positive reinforcement, open-questioning)*

C: Sure, that would be helpful.

P: I hear that you want to do what is the best for the baby. What we know is that there are certain illnesses such as the flu, pertussis and COVID-19 that can be harmful to you and your baby. Thankfully we have vaccines against these illnesses and getting vaccinated is the best way to help protect you and your baby.

The vaccines that we would advise you to get during your pregnancy are the flu vaccine, Tdap vaccine (against tetanus, diphtheria and pertussis, or whooping cough) and COVID-19 vaccine. Would you like me to tell you more about them? *(validation, factual advice, clear path to action, personalised advice, permission seeking)*

C: Yes, please.

P: Firstly, let's talk about the influenza vaccine — or flu shot. Flu vaccines have been given to millions of pregnant women over the years, and scientific evidence shows that they are safe. Getting the flu vaccine during pregnancy is one of the best ways to protect yourself and your baby for up to 6 months after birth from flu and related complications.

The second vaccine that I would recommend, especially now, is the COVID-19 vaccine. Pregnant women are more likely to get severely ill with COVID-19 compared with non-pregnant women. This means they are more likely to be hospitalised, need intensive care, a ventilator, special equipment to breathe or have had illness that has resulted in death. There are also negative impacts on the baby. *(social norms, scientific facts, personalisation of advice to concerns/motivators)*

C: Will the vaccines harm the baby?

P: No, flu and COVID-19 vaccines do not cause an infection, including in pregnant people or their babies. None of the vaccines contain the live virus that causes the disease. By getting the vaccines you are protecting both yourself and your baby, both during your pregnancy and after your baby is born. *(clarification, clear advice)*

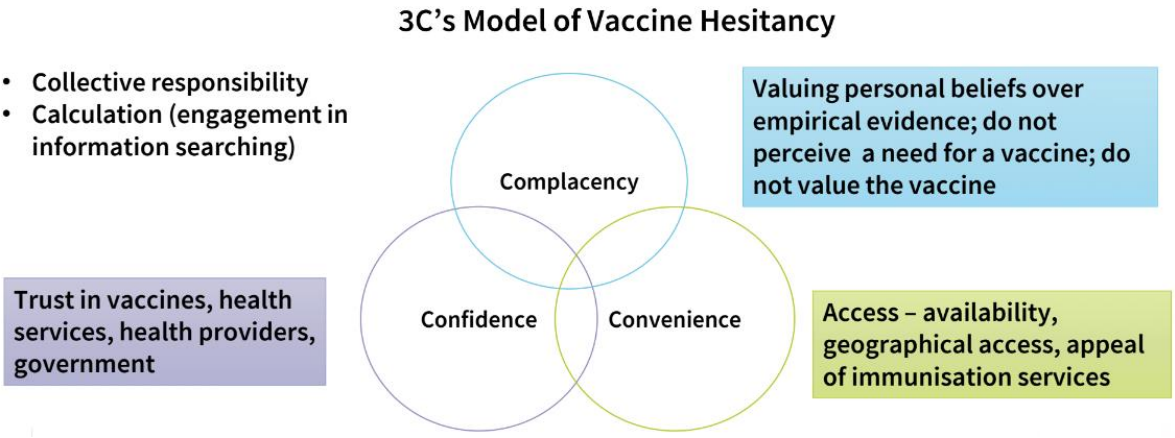
C: So, everything will be fine if I get those vaccines?

P: Most pregnant women are having these vaccines with positive effects on their own health and also on their infants' health. I believe this is important for you and your baby. Please let me know if you need any more information and I will be happy to provide it. *(social norms, personal relevance of motivators, open communication)*

3.3.2 Communication content — What

The Hertfordshire Behaviour Change Unit has produced examples of messages that can be used to address vaccine uptake barriers depending on which of the "3 Cs" the barrier falls under[102] (Figure 6). The examples and recommendations below are adapted from the unit's document "COVID-19 vaccination: Increasing uptake (2021)" with the permission of Hertfordshire County Council:[103]

Figure 6. WHO model of the 3 Cs in relation to vaccine hesitancy [93]



3.3.2.1 Complacency

When an individual makes a decision about whether or not to get vaccinated against an infectious disease, a key factor they consider is their personal risk of contracting it and the health consequences if it is contracted. This perception of personal risk is central to their decision making, and is supported by research into the uptake of vaccinations such as the H1N1 influenza vaccine.[104] Perception of the severity of a pandemic or disease is also related to intentions to be vaccinated.[103] Globally, data show that people are more likely to express willingness to be vaccinated based on their perceived degree of threat experienced, and whether they perceive vaccination as an effective coping strategy to reduce that threat (i.e., how effective they perceive the vaccine to be).[105] When designing a strategy to improve vaccine uptake, relating the vaccine to the perceived threat is likely to be an effective approach (Table 4).

Table 4. Strategies to improve vaccine uptake focusing on complacency

Strategy	Recommendation	Example
Increase perceptions of personal risk of contracting the disease. If people perceive there is a personal risk of contracting the disease, they are more likely to be vaccinated to protect themselves.	Increase knowledge of the risks of contracting the disease for the general population and specific groups where uptake is likely to be lower. Personalising this information to the individual and their personal circumstances can increase message effectiveness	To identify key groups to focus on and their unique needs and specific risks, you may wish to use audience segmentation data. This can be achieved through working with communities to understand any gaps in knowledge and to develop messages that speak directly to the target population. For example, for the general population "Even if you are fit and healthy, you are still at risk of getting sick [with influenza, COVID-19, etc]" or for a specific group such as "Members of the [indigenous] community are at a greater risk of getting sick with [influenza /COVID-19/etc]".

Strategy	Recommendation	Example
Increase perceptions of the severity of the disease. If people perceive that there are potentially significant implications to their health from contracting the disease, they are more likely to be vaccinated to protect themselves and others.	Increase knowledge of the severity of the disease for the general population and for specific groups where uptake is likely to be lower. Focus on risk-reducing messages over health benefit messages.	Develop messaging that includes some of the health consequences of contracting the infection and that being vaccinated reduces their risk. This applies to influenza, COVID-19 and other vaccine-preventable diseases. For the general population, for example, for COVID-19: "Getting COVID-19 can affect your heart health, breathing and cause long-term fatigue; protect yourself, get vaccinated". For people with long term conditions: "People with diabetes are at increased risk of developing complications from coronavirus". For young people: "Young people are twice as likely to suffer from long-COVID". Accompany this with calls to action such as "Get vaccinated and reduce your risk".
Increase understanding of the importance of the vaccine. If people perceive that the vaccine is important for ending the pandemic and returning to a sense of normality, they are more likely to be vaccinated. It is important to cover a range of motivations as different things will motivate different people. For influenza or COVID-19, motivations may include the possibility of being with family and friends, travelling, attending events, etc.	Emphasise the importance of individual vaccination in achieving herd immunity for protecting the most vulnerable, protecting the health system, strengthening the economy and relaxing public health restrictions.	Consider messaging such as: "Get vaccinated to show your loved ones you care"; "Get vaccinated and let's get back to normal"; "Play your part and get vaccinated!"; and "Play your part in protecting your community and get vaccinated!".
	Build a social norm within the community that vaccination uptake is widespread, and the majority of people are doing their part for the benefit of the community/society.	Focus on the positives. Consider presenting the number of people being vaccinated within specific groups (age/community) in terms of percentage changes (e.g., percentage increases from the previous week or month). Present information in a visual form, including statistics in a graph, to illustrate increased uptake, and support with case studies, stories or testimonials from community members who have been vaccinated to reinforce this. Making people aware of low uptake can reinforce the belief that not many people are getting vaccinated, thus decreasing the likelihood of people coming forward to receive the vaccine — so this should be avoided where uptake is low. Use national data to communicate intentions, for example "XX% of people intend to have the vaccination".

3.3.2.2 Confidence

Confidence is a key part of vaccine uptake. As described above under "complacency", vaccine effectiveness is integral to vaccination decisions — vaccines need to be seen as effective for addressing the disease threat for

individuals to take up the vaccine. Conversely, individuals with concerns about the safety of the vaccine, for example, whether or not it has been tested properly, can reduce intentions to be vaccinated.[103, 106] This has been seen with vaccines such as H1N1 influenza vaccines.[107] A key factor in how safe and effective a vaccine was perceived to be was the development and testing it had been subjected to prior to market launch. Strategies and recommendations focusing on increasing vaccine confidence can be found in Table 5.

Table 5. Strategies to improve vaccine uptake focusing on confidence

Strategy	Recommendation	Example
Increase trust and confidence in the safety and effectiveness of the vaccine. If people believe that the vaccine is safe and effective, then they are more likely to be vaccinated. It is important to address these concerns throughout the roll-out of the vaccine as concerns may change over time.	Highlight that the vaccine has undergone rigorous development and testing.	Provide details of how vaccines are developed and tested, highlighting the way in which rigour has been applied, similar to any drug development. Present the information in an accessible form, such as an infographic, using formal language (e.g., using vaccine, rather than jab), while avoiding complex technical terms.
	Acknowledge the uncertainties and fears held by the general public and by specific groups — do not dismiss or ignore them. Provide information to address these concerns and make it easy to understand.	Identify any broadly held uncertainties and address these within population-wide communications. For groups where uptake is likely to be lower, engage with that community to understand and address specific safety and effectiveness concerns by co-producing messaging. Use trusted channels and messengers within the different communities to promote communications (e.g., church or religious leaders, elders and community champions).
	Ensure transparency regarding vaccine effectiveness and potential side effects, taking care to avoid drawing attention to side effects that are classified as rare.	Acknowledge that some people may experience side effects and build links to safety and effectiveness information in messaging promoting the vaccine. This could be by guiding people to a list of frequently asked questions on a trusted website such as a local authority or government health website. Be clear about what we do and do not know about the vaccine, rather than hiding gaps in knowledge. Where there are gaps in current understanding, be honest about this (e.g., whether the vaccine will protect against different virus strains, the length of time the vaccine will protect people for).

Strategy	Recommendation	Example
Increase trust in the local authority and medical/scientific institutions. The more trust an individual has in their local authority, and the more trust they have in the medical and scientific institutions that have been involved in the development and deployment of the vaccine, the more likely they are to be vaccinated. A lack of trust is an even greater barrier to vaccination where concerns around the safety and effectiveness of the vaccine are also held.[108]	Local authorities can increase public trust in them by co-creating open and transparent communications that acknowledge their concerns and don't attempt to invalidate or ignore them.	Engagement is key to building trust and is a principle that runs throughout the development of any vaccine communications. Working with established networks and community groups to understand the barriers to vaccination uptake is important and to identify local trusted sources of information. Engage with a range of people across the community, including those who hold differing views regarding vaccination. Collaborate in producing materials and resources to ensure that any information provided is relevant and culturally sensitive.
	Engage with thought leaders and respected voices within communities to build trust and support.	Use the influence of thought leaders and respected voices to promote messaging through sources of information trusted by the community (e.g., interviews on a local radio station or posts on a community Facebook group). Avoid excluding people who are not digitally connected by providing information through other sources (e.g. in the local paper or through leaflet drops).
	Link being vaccinated to the personal (e.g., people's values, such as being a caring or responsible member of society) and social identities (e.g., linked to the behaviours expected of people according to their roles as members of professional, faith or community groups) of the target group.	Provide case studies and testimonials of people who are being vaccinated (locally and nationally), particularly with examples of thought leaders within the target community (e.g., faith leaders).
	Take all reasonable steps to ensure that people being vaccinated have a positive experience, particularly for their first dose, as this will have an influence on the likelihood that they will return for their second dose or other vaccines in the future. People talk to others about their experience, so providing a positive experience may increase the likelihood of their friends and family having theirs. It is important that proper safety measures are followed at vaccination sites to alleviate any fears held by visitors.	Discuss and establish agreed ways of working among staff at vaccination sites, including how visitors will be greeted, how different factors (e.g., religious beliefs) will be addressed sensitively, and how individuals who express concerns over the safety and effectiveness of vaccines can be reassured. Staff should be seen to be visibly following safety measures such as maintaining physical distancing (between themselves and patients), wearing face masks and facilitating hand hygiene.

3.3.2.3 Convenience

From the behavioural sciences, we know that people are more likely to engage with a behaviour if it is perceived to be easy to achieve. This is the same for vaccination. Ensuring that getting a vaccine is as easy as possible will improve uptake, for example, by locating vaccination sites near public transport routes, providing free public transport for people getting their vaccination, extending clinic operating hours and making vaccination available through community pharmacies. For children, school-based programmes where children receive the

vaccine at school can help with uptake. Table 6 provides strategies and recommendations to improve vaccine uptake focusing on improving convenience.

Table 6. Strategies to improve vaccine uptake focusing on convenience

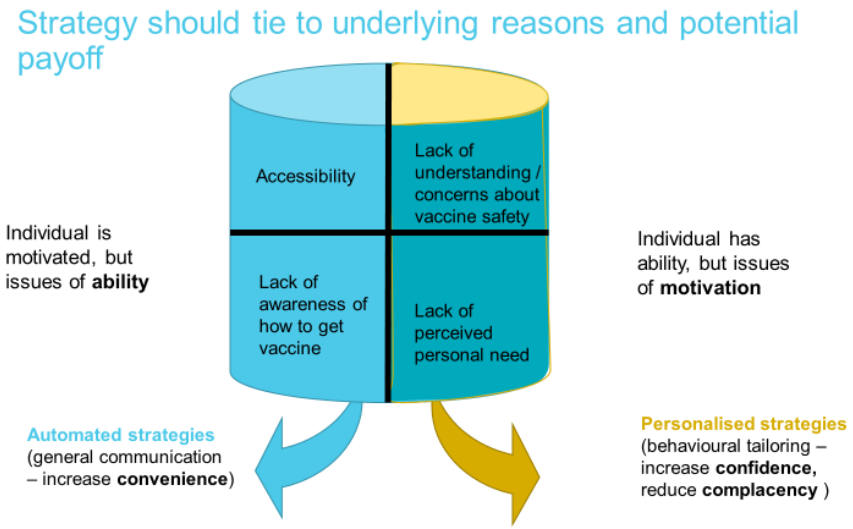
Strategy	Recommendation	Example
Increase the convenience of being vaccinated. The easier it is for people to be vaccinated, the more likely they are to be so. Practical and logistical aspects will influence the degree of uptake (e.g., time, place, cost).	Ensure that vaccine invitations provide clear and specific information, so people know where to go, when to go, and how to get there.	Work with partners to ensure that any correspondence includes a clear call to action, provides relevant information on the venue (including a map), what to bring to the appointment (e.g., face coverings) and links to directions and public transport information to reduce barriers to attendance.
	Provide support with planning to increase the likelihood of people attending their second or future vaccination appointments.	Planning increases the likelihood that someone will attend the appointment for their second dose of the vaccine or future vaccinations (e.g., the following year's influenza vaccination). Examples of support could include: booking the second appointment at the same time as the first; providing an appointment card and asking them to note the date and time of the second dose or future vaccinations; entering the appointment date/time into their diary. Sending reminders via email/text message/post a couple of days before the following appointment, and where possible on the morning of the appointment, increases likelihood of attendance. Emphasise on the appointment card and in signage that the second dose is essential for the most effective protection.
	Ensure that vaccination sites are located in areas which are accessible by various modes of transportation and inform the public of this in communications such as invitation letters.	For those who are taking private transport, provide clear directions on how to reach the venue and details of parking arrangements. For people travelling by public transport, signpost to personal travelling plans/public transport sites so that they can plan their journey to vaccination sites.
	Where possible use vaccination locations that are already part of people's routines and are therefore familiar to them and convenient to visit.	Ensure that the vaccine is accessible at multiple locations (e.g., GP surgeries, pharmacies, schools, places of work and community halls) and offer a variety of convenient opening times such as lunchtime and after work. Avoid long commuting times to vaccination centres and build on existing infrastructures which have been proven to work already (e.g., childhood or emergency vaccination programmes). Create outreach services for hard-to-reach groups (e.g., care home residents).

Strategy	Recommendation	Example
	Minimise barriers which may act as deterrents for receiving the vaccination (e.g., needing to take unpaid time off work). Ensure that available support and resources are communicated clearly to the public and in a timely manner.	Employers should be encouraged to reassure staff that they will be compensated for any time they need to take out of work in order to receive the vaccine and that there will be no additional time or financial implications for them as a result. Consideration should be given to support staff who may need to take time off work if they experience side effects so that no penalties are incurred, as this will reduce the likelihood of employees attending their second or future vaccination appointments.

Considering the 3Cs as applied to vaccine uptake, the strategy that is used should focus on what the underlying reasons are for vaccine hesitancy and non-vaccination. For some individuals, the key driver for hesitancy may be related to issues of ability, such as lack of awareness of how to get the vaccine or accessibility issues related vaccination (e.g. transport issues). In these cases, automated strategies that help increase convenience are likely to be most effective. Having posters within the pharmacy providing information on how to access the vaccine or sending automated text messages or reminders about vaccination can be helpful.

Conversely, other individuals may have no issues with ability, but rather have issues with motivation, such as concerns about safety or lack of perceived need for vaccination. For example, if there is a low number of cases in the community, an individual may not see a reason for vaccination. In this case, personalised strategies that are tailored according to their concerns and personal needs are likely to be most effective to improve both confidence and complacency. Personalised strategies are likely to require more one-on-one time with the individual as part of a personalised consultation, using the principles of behaviour changed outlined above. Together, all three factors are important to consider as part of a toolkit to engage and communicate clearly about the need for and importance of getting vaccinated, and making the decision to be vaccinated as easy as possible. Figure 7 illustrates how these two factors of motivation and ability might interplay .

Figure 7. Importance of tailoring communication according to an individual's reasons for vaccine hesitancy using the 3 C's model



3.4 Addressing misinformation and disinformation

As described in the previous chapters, vaccine misinformation and disinformation can be major barriers to vaccine uptake. Understanding the types of information circulating is important because the strategies to address misinformation and disinformation may need to be different from simply ensuring effective education and communication (as described in chapter 3.3 . The approach to vaccine misinformation needs to be driven by a careful strategic approach. The WHO has called for "Member States to develop and implement action plans to manage the infodemic by promoting the timely dissemination of accurate information, based on science and evidence, to all communities, and in particular high-risk groups; and preventing the spread, and combating, mis- and disinformation while respecting freedom of expression".[109]

The responsibility of fighting misinformation and disinformation should also be a common practice for all the communication channels, media platforms and other sources that provide information. Recently, the video platform YouTube pledged to remove all antivaccine misinformation, including removing all content that might provide incorrect information about vaccines and also banning profiles of individuals who promote this type of content.[110]

The steps described below can help provide guidance on how to assess misinformation, and address and manage it at an individual level as part of an effective consultation.

3.4.1 Assessing the information

The first step to addressing misinformation, similar to addressing vaccine hesitancy, is to identify it. Not all rumours are false; many started from a truth that has been altered so it is no longer 100% true. It can be difficult to determine whether something is truthful or not. The Five Pillars of Verification have been suggested as an approach to determine whether something is true or not:

1. Provenance: Are you looking at the original account, article or piece of content?
2. Source: Who created the account or article, or captured the original piece of content?
3. Date: When was it created?
4. Location: Where was the account established, the website created or the piece of content captured?
5. Motivation: Why was the account established, the website created or the piece of content captured?

3.4.2 Addressing misinformation

Once you have identified misinformation, the next step is to limit its impact. Misinformation spreads fastest when individuals become biased towards hearing or listening only to information that reinforces their cognitive biases.

A key role that you can play to break this cycle is to ensure that individuals who come to you with questions and information needs are guided to accessible, credible, accurate, up-to-date and relevant information in their own language. Ideally, information should be presented in a way that will resonate with them, for example, as a podcast, or video or stories from other people in similar situations to themselves. To help limit the spread of misinformation, ensure that trusted sources (e.g., from UNICEF, WHO and public health agencies) are highlighted and shared. For example, the content from these trusted sources may be disseminated and referenced within your pharmacy or clinic; or you may wish to join forces with other health professionals in your area or youth leaders to support the sharing of credible sources of information.

3.4.3 Preventing misinformation

Preventing misinformation from influencing people's decisions in the first place is an effective strategy to limit its impact on vaccine hesitancy. There are different ways to achieve this:

3.4.3.1 Warnings

Warning labels that flag sources of misinformation can help individuals recognise when they have been exposed to potentially inaccurate information. Simply providing a warning or alert may help get people thinking about or questioning the information. This approach, supported by cues or processes that can help redirect people to credible sources, and approaches which make it harder for the misinformation to be shared, can limit the consequences of the misinformation.[111, 112]

3.4.3.2 Empowering individuals

Empowering people to be able to critically evaluate information sources and accuracy can reduce and stop the spread of misinformation. Mass media and journalists, for example, can help with educating the public as well as their colleagues so they can recognise misinformation before it is shared. There are short courses online that can support health and media literacy. Approaches such as innovative text-message systems or other online messaging platforms (e.g. The UNICEF RapidPro based U-Report system) can be used to respond in real time to questions from the public, as well as analysing rumours and perceptions. For example, a United Nations Verified initiative has developed the "Pause. Take care before you share" campaign which encourages people to stop and verify sources before deciding whether to share any content online, that is available in multiple languages. Another free course called "Protection from Deception" is a two-week text message course from First Draft that teaches people how to protect themselves and their communities from misinformation, currently available in English and Spanish . A second course, "Too much information" is available online.

3.4.3.3 Inoculation ("prebunking")

There is a phenomenon called "inoculation" that the social sciences have increasingly used as an approach to preventing the effects of misinformation and disinformation. This approach involves pre-emptively debunking (i.e., "prebunking") misinformation and disinformation before it takes hold.[113] People can be "inoculated" against misinformation and disinformation by being exposed to weakened versions of the misinformation and disinformation, highlighting the hidden motives of the authors, then providing the "truth".[114]

Using this inoculation approach can help equip people with counter-arguments that they can access themselves so that when they are exposed to the misinformation or disinformation again, they may have "resistance" to it, even if the misinformation or disinformation claims may align with their pre-existing beliefs. Inoculations may also provide some protection against other misinformation or disinformation about other health topics, beyond vaccination.

3.4.3.4 Debunking

Careful debunking may help highlight the falseness of information, as well as providing an explanation of why it is false, and what may have led people to believe or share the false information in the first place. It is important to focus on the facts and on why the misinformation is wrong, rather than repeating the misinformation, as continuously exposing individuals to the misinformation may only help the spread and retention of false information and worsen vaccine hesitancy.

A suggested approach to inoculation and debunking follows:[101]

1. Fact: Lead with the truth, state the facts clearly. Do not try to refute the misinformation, just state what is true. Make it clear, relevant, and easy to remember.
2. Warning: Alert individuals to the misinformation and the tactics used. Provide an explicit warning that misinformation is coming, which may contain a weakened version of the misinformation. Only repeat the misinformation once.
3. Fallacy: Flag what tactics are being used to deceive individuals which can help undermine trust and confidence in the misinformation or disinformation and the source. Explain why the misinformation or disinformation is wrong and, as with "prebunking", explain the specific misleading tactics being employed, or highlight the hidden motives or agenda of the authors of the misinformation or disinformation.
4. Fact: Repeat the truth. Provide alternative correct information to replace the misinformation, so that a knowledge gap is not left. This is crucial because the alternative correct information needs to fill the mental "gap" generated by the correction. Make the facts easier to remember than the misinformation using the effective communication styles detailed previously.

3.5 Evaluation of interventions

Following on any intervention to address vaccine hesitancy, it is important to have a system in place for continually monitoring and evaluating the situation. The information that becomes available to the public is changing day-to-day, hour-by-hour, particularly in an evolving pandemic situation. It is important that your

response and communication style as a health professional is adaptable and reflects the changing situation. For example, there may be a new rumour or misinformation source that starts in your community that becomes a common reason for vaccine hesitancy within it. There may be new adverse events that occur or are cited in the media that are associated with vaccination. In this case, a proactive approach to assess the misinformation and address it may be needed. Conversely, there may be a new outbreak of disease that heightens fear and leads to increased vaccination intentions. While this may seem to be a positive change with more people being willing to be vaccinated, there may be increased anxieties and questions from people who want to find out more about the vaccine and how to get it. In this case, providing people with the necessary information they need to make informed choices and helping make it easy and convenient for them will be important.

4 Pharmacy-led campaigns

4.1 Guidelines for FIP member organisations to develop effective vaccination campaigns

Given the increasing threat of vaccine hesitancy, it has become more important for pharmacists to improve their strategies of promoting immunisation through widespread dissemination and effective communication of vaccine value. Plateauing immunisation rates and prevalence of vaccine-preventable diseases globally indicate that current public health campaigns are not effective enough in mobilising populations to receive vaccines.

In 2020, The International Federation on Aging (IFA) released a first-of-its-kind publication titled "Messages matter: A spotlight on influenza vaccination campaigns".[115] IFA's publication includes seven key components to organising a successful immunisation campaign based on a review of campaign data from 10 different countries during the 2018–2019 flu season. While IFA's guidelines are specific to improving flu vaccination coverage for older adults and individuals with underlying health conditions, they have a broader application. We have extrapolated the seven components to include information specific to the field of pharmacy.

4.1.1 Strong regulatory framework and policies supporting pharmacist interventions

To lay the foundation for a successful immunisation campaign, leaders must understand the scope of pharmacy practice as it pertains to immunisation administration and handling, as regulations vary by country and province or state. Vaccination policies must be supportive of pharmacist interventions. Unfortunately, there exist a number of logistical barriers for the profession to overcome. The course of action for a campaign will ultimately depend on how much authority pharmacists are granted. This information can be found by contacting national or regional boards of pharmacy, local pharmacists' associations, ministries of health or government agency websites.

Potential conditions that might pose barriers for pharmacists' involvement with immunisation administration include:

1. The prescription for the vaccine must be written by a traditional prescriber (i.e., physician, nurse practitioner, physician's assistant) before a pharmacist can administer it;
2. A standing order must be in place for the specific vaccine to be independently dispensed and administered by a pharmacist;
3. A "traditional" immuniser must be present to oversee a pharmacist immuniser;
4. Vaccines can only be administered by pharmacists to limited patient groups (i.e., elderly, pregnant women, children, immunocompromised);
5. Only specific vaccines can be administered by pharmacists, most commonly influenza and pneumococcal vaccines;
6. Pharmacists can only immunise during emergency outbreak situations;
7. Pharmacists can only immunise in limited healthcare settings, such as long-term care facilities, hospitals or clinics;
8. Pharmacists do not have access to viewing or editing immunisation records;
9. Pharmacists can dispense vaccines, but they must be transported by the patient to a physician's office for administration;
10. Vaccine administration training/certification must be completed separately from typical pharmacy education;
11. Any vaccine administered in a pharmacy must be reported to the national or regional immunisation registry; and
12. No government remuneration exists for vaccines administered in a pharmacy.

In countries that have yet to permit pharmacists to independently prescribe, administer and document vaccines, the first step of the campaign would be to advocate expanding privileges that ultimately improve patient outcomes. Government immunisation policies should be patient-centred.. Supportive policies include up-to-date recommendations for life-course vaccination and funding to make vaccines more acceptable and accessible to at-risk or disadvantaged populations. Pharmacists can advocate such policies through grassroots efforts, meetings with local legislators, or through partnerships with professional pharmacy advocacy organisations.

Alternatively, the campaign can focus on other aspects of pharmacy-led immunisation promotion, such as patient screening, counselling efforts and referrals to other immunisers.

4.1.2 Clearly defined campaign goal, priorities, recipients, roles of members and logistics

To gain traction and support from larger organisations, the immunisation campaign should be published in a detailed and easily accessible plan. According to IFA, campaigns from countries without an overarching strategy see less contribution from patient and advocacy organisations.[115] The plan should include a measurable and realistic immunisation goal based on the current state of affairs and gaps in vaccine coverage. Many organisations or federal governments have target percentages for immunisation rates which can serve as a guideline for the pharmacy-led campaign. For example, the New Zealand Immunisation Strategy against influenza has the following targets: vaccinate 80% of healthcare workers against influenza annually, and vaccinate 75% of the population aged 65 years or older against influenza annually.[116]

After the goal, the plan should detail the exact pharmacist intervention being provided. If any additional members are participating in the campaign, their roles should be detailed in the plan. Physicians may be useful collaborators, because sending patients with immunisation needs to the local pharmacy allows physicians to spend more time with patients with complex health needs. Hospitals and long-term care facilities are other potential sites with which pharmacists may establish relationships. Additionally, the origin and quantity of resources essential to the campaign, such as funding and vaccine supply, are important to include.

Once the campaign leaders have come to understand the legislative restrictions within which to operate, a logical next step is assessing the operational limitations and infrastructure of the pharmacy itself. First, what is the staff's skill level? All pharmacists and supportive staff involved should undergo an immunisation training programme for safe implementation of the campaign including, but not limited to, the following:

1. Ensuring a baseline knowledge of vaccine information;
2. Assessing immunisation status based on age and health;
3. Dealing with emergency complications;
4. Perfecting reconstitution and injection techniques;
5. Addressing patient concerns;
6. Reporting adverse events; and
7. Documenting immunisations.

Next, pharmacies need to consider their storage capabilities. Vaccines for MMR, live attenuated influenza, rotavirus and SARS-CoV-2 have strict refrigeration requirements that some facilities cannot support. Other necessities include privacy screens or immunisation rooms, adrenaline/epinephrine pens, adhesive bandages, alcohol wipes, vaccine fact sheets and sharps disposal containers.

Lastly, there should be a measure in place to track progress and success of the campaign. Many pharmacies do not have access to patient vaccine records, so it may be necessary to create a pharmacy-specific database and ensure that this information can be compiled from all pharmacies in the country or state. Improvements for international immunisation reporting are being made. For example, PATH is a team of innovators who work with governments to design electronic immunisation registries tailored to a country's needs. So far, PATH has created registries for Tanzania, Vietnam and Zambia. While there is work to be done, these efforts represent a shift towards total health equity and efficiency in healthcare delivery. Until electronic immunisation registries become universal, inputs such as billing claims and reimbursement records are other useful metrics for pharmacies to track their efforts and reach. Success can also be measured by long-term outcomes such as curve flattening, and reducing hospitalisations and deaths associated with vaccine-preventable illness in the area.[117]

4.1.3 Well-defined audience

In order to have the greatest reach, campaigns should give particular attention to patient populations at risk of vaccine-preventable diseases. Research should be done to identify where gaps in immunisation coverage exist in the population. The audience should also be receptive to the intervention. For example, targeting conspiracy theorists who deny the existence of the COVID-19 pandemic may not be the best use of time or resources. The following are common populations of interest:

1. Disadvantaged groups: low socioeconomic status and ethnic minorities;
2. Those at high risk of complications: age above 65, comorbidities, immunocompromised;

3. Those at high risk of exposure: frontline workers, long-term care residents, frequent travellers;
4. Rural communities; and
5. Vaccine-hesitant parents.

Universal messaging, while common in immunisation campaigns, is not efficacious in mobilising the most at-risk patients. Alternatively, separate communication approaches should be used for the general population vs specific patient groups. This method is called "audience segmenting". Ultimately, mass or group-targeting campaigns should be combined with individually tailored communication approaches, as described in chapter 4.1.2.

4.1.4 Multiple tools and channels

The best way to ensure the target audience is being reached is by adopting a multi-channel approach. The widespread use of social media combined with the shareability of content makes it a successful channel for reaching the general population. Content graphics and charts are best suited for this application. Partnerships with digital influencers and local businesses may increase reach to young adults. The pharmacy website, if available, can make information about vaccines and appointment scheduling streamlined and easily accessible.

Digital media may be an efficient way to distribute information to a large group of people, but it may not be accessible to some of the most vulnerable groups regarding immunisations and vaccine hesitancy. Telephone hotlines and printed materials may be beneficial for rural communities or where internet access is not widespread. Other traditional methods of communication such as walking rounds, expert panels and face-to-face interactions at the counter are useful for reaching audiences. According to IFA, interactive approaches involving conversation and anecdotes are more successful in reaching patients than passive communication methods.

See Chapter 3.3 for UNICEF's methods to communicate for change verbally and visually. Consider, too, these additional principles for messaging from IFA:

- **Integrate multiple elements and statement patterns:** repeating word structures across communication channels helps messages stick.
- **Assemble facts and figures:** statistics and clear facts from reputable sources are a good way to boost confidence in messaging.
- **Use charts and graphs:** visual depictions of immunisation rates vs hospitalisations, or percentages of certain demographics who get complications, etc. may be easier to understand than lengthy paragraphs.
- **Keep messages simple:** appeal to patients of all health literacies, and take into account how much or little time patients will spend engaging with the message.
- **Tailor messages for a particular audience:**
  - For younger people, explain the concept of herd immunity to protect vulnerable populations;
  - For low socioeconomic status, inform them of free or subsidised vaccinations;
  - For pregnant women, share that antibodies from vaccines can protect the infant;
  - For healthcare workers, define the risks of contracting and spreading communicable diseases during patient care; and
  - For older adults, explain their increased chance of developing complications from illness.
- **Share personal narratives:** building connections with the audience makes issues feel closer to home.
- **Use time-sensitive messages:** communicating a sense of urgency prompts action.
- **Outreach:** reflect diversity in the campaign structure and delivery with regards to language and literacy levels.
- **Audience-driven messages:** address the cultural and social needs of the community through messaging choices.

4.1.5 Realistic timeline

In order to have a stronger impact, the launch of a campaign should begin well before a season of infection (flu season, meningitis vaccines prior to the start of a school year, outbreak situation). Coordinating with the scheduling of national or regional immunisation events allows pharmacists to take advantage of existing interest in vaccines.

4.1.6 Regular updates of information

An important and challenging aspect of promoting immunisation is that the global infectious disease burden is constantly changing. As a result, information must be continuously updated to reflect the most recent developments and recommendations by public health organisations. When applicable, make vaccine fact sheets available to patients. Individuals are more likely to trust a campaign if resources are clearly provided.

Furthermore, data regarding safety and efficacy of vaccines should be reported as information becomes available. Flexibility should be demonstrated in order to update messaging and vaccine administration as necessary. For example, it may be necessary to temporarily halt administration of a vaccine or begin administration of a new vaccine during the campaign period. Transparency in reporting statistics related to safety and efficacy of vaccines is imperative, as accurate reporting during the early stages of a campaign will improve confidence for later participants.

4.1.7 Engagement and support of civil society

Partnerships are pivotal for the success of improving public health. According to the Washington State Department of Health, partners for a vaccine campaign can be divided into four categories:[118]

1. Trusted messengers: physicians, scientific researchers, faith-based community leaders;
2. Systems and institutions: universities, hospital systems, large businesses, non-profit organisations, school districts, immunisation advocacy organisations;
3. Advertising: media partners, micro social media influencers, local newspapers; and
4. Earned media: peer reviewed journals, larger publishing outlets.

Furthermore, pharmacists involved in the campaign can negotiate with national or local governments, health systems, local entities, or stakeholders for funding or partnering in the campaign. Funding may be needed for pharmacist reimbursement, obtaining supplies and promotion efforts.

Forming relationships with hospitals, long-term care facilities, schools, and other community organisations that can benefit from the campaign can also be important. Having connections across disciplines allows the campaign to reach a broader audience.

4.2 Examples of successful immunisation campaigns

4.2.1 Canada — Canadian Pharmacists Association best vaccination practices for community pharmacy

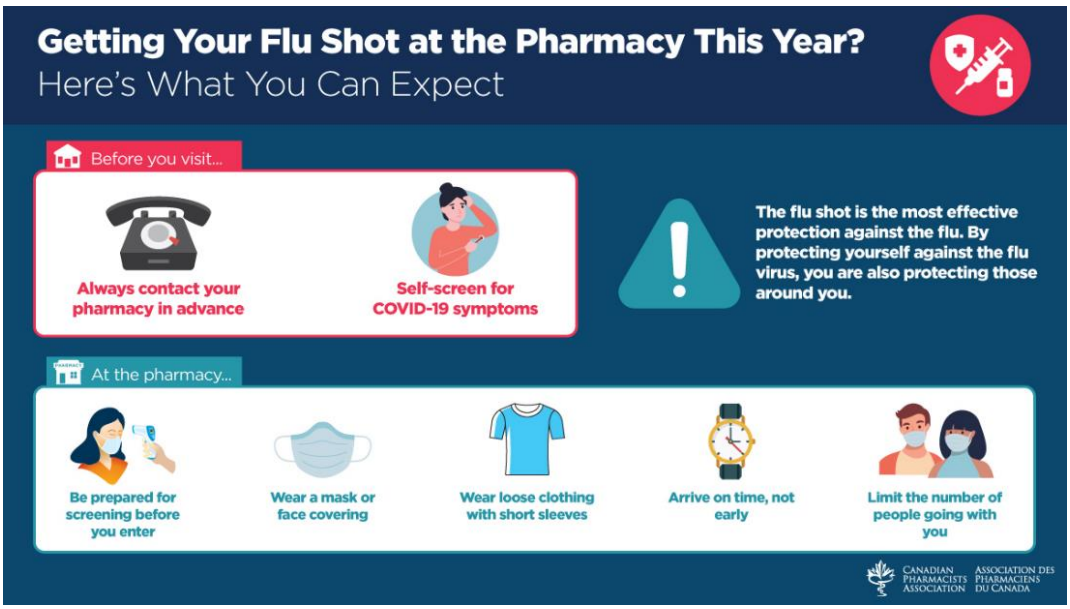
In 2020, pharmacists in Canada administered 48% of all flu vaccines in the country, making pharmacies the most likely vaccination site. Just 28% of flu vaccines were administered in a doctor's office. A recent survey of almost 1,200 adult Canadians found that 27% of those who did not get their flu vaccine in 2019 planned to do so in 2020 because of COVID-19.[119] In anticipation of the increased vaccine demand in the 2020 influenza season, the Canadian Pharmacists Association (CPhA) released a document outlining suggested practices for delivering influenza vaccines in the community pharmacy during the COVID-19 pandemic.[120] A summary of these practices is provided below:

- Workflow
    - Consider what immunisation scheduling system works best for the pharmacy, depending on available space, staff, patient population characteristics and jurisdictional regulations.
    - Options include all day walk-ins, walk-in periods, appointments only, designated hours for seniors and high-risk patients, off-site immunisations and temporary structures outside of the pharmacy.
- Risk reduction
    - Maintain physical distance using barriers and signs and provide personal protection equipment.
    - Minimise the number of staff in direct patient contact.
    - Limit the duration of time patients are able to be in the pharmacy.
    - Incorporate paperless documentation and information gathering/sharing.
    - Pre-screen patients for COVID-19.

- Premises preparation
    - One-way traffic flow with a separate entrance and exit.
    - Seating for patients two metres apart which can be easily sanitised.
    - Designate staff to specific tasks: check in, check out, documenting.
    - Ensure vaccinator is beside, not in front of the patient.

An example of an information card targeting patients and explaining access to the vaccination service at the pharmacy can be seen in Figure 8.

Figure 8. Canadian Pharmacists' Association patient information card



4.2.2 Costa Rica — Pharmacists raise awareness of immunisation

Pharmacists in Costa Rica generally have a close relationship with the community, making pharmacists an ideal outlet for engaging in vaccine myth busting. The College of Pharmacists of Costa Rica implemented a campaign from January 2021 to June 2022 to improve vaccine confidence by giving accurate information to the population and providing training to pharmacists. Ways of reaching the public include flyers, information cards to be shared on social media and via mobile phone instant messaging apps, interviews on TV and radio programmes, webinars and training seminars. All COVID-19 campaign materials contain the key message to "get vaccinated" while all influenza materials contain the key messages that "influenza kills" and the vaccine is "reliable, safe, and effective" (Figure 9). All materials are accessible through the campaign website and available to share on social media.[121]

Figure 9. College of Pharmacists of Costa Rica's posters about influenza and COVID-19 vaccines in Spanish and English

4.2.3 France — Supporting pharmacy-based influenza vaccination

The influenza vaccination campaign in France usually runs from October to November and prioritises vaccination of the most vulnerable groups, including those at higher risk of complications and healthcare professionals. Since March 2019, community pharmacists in France have been authorised to administer flu vaccines to high-risk groups. Patients can receive the vaccine at a pharmacies at no cost to them if they had a voucher sent to them by their health insurance programme. Due to the COVID-19 pandemic, and especially before COVID-19 vaccines were widely available, it was difficult to predict transmission patterns for influenza, and it was important to avoid additional pressure of influenza on already overstretched health systems due to COVID-19 cases. As such, the 2020/2021 campaign was extended until February 2021 and pharmacists could vaccinate the general public as well. It is yet to be determined what impact increased pharmacist-led immunisations have played during the 2020/2021 influenza season.[122]

In order to increase support for pharmacist-administered vaccines, the French Pharmacies' Health and Social Education Committee, Cespharm, also released several resources, including a poster to be displayed at pharmacies offering flu vaccination (Figure 10), a brochure containing information about influenza for healthcare professionals, a checklist to identify at-need patients and a template registry sheet for vaccinations by community pharmacies (Figure 11).[122]

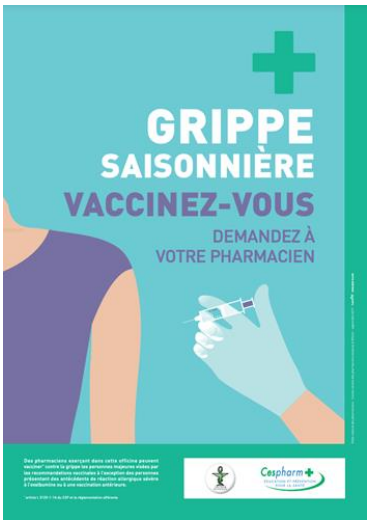
The brochure contains the following information:

- Epidemiology and complications of influenza;
- Current vaccine recommendations;
- Types of available vaccines and their characteristics;
- Communication strategies to address fears and misconceptions;
- Conditions that put patients at high-risk;

- Injection technique;
- Waste management;
- Managing anaphylaxis and finger sticks;
- Proper recording of vaccine administration; and
- Billing/reimbursement information.

Figure 10 (left). Cespharm poster to be displayed at pharmacies administering influenza vaccines

Figure 11 (right). Template registry sheet for vaccination by community pharmacies



"Seasonal flu."

"Get vaccinated."

"Ask your pharmacist."

EXEMPLE DE REGISTRE DE TRACABILITE DES VACCINATIONS DANS L'OFFICINE

N° D'ORDRE	PHARMACIEN VACCINATEUR	PRESCRIPTEUR	PATIENT	VACCIN			
	Nom et prénom d'exercice	Nom et adresse	Nom et adresse	Dénomination	Date de délivrance	Date d'administration	N° lot

Recently, French pharmacists also started administering vaccines against COVID-19 in community pharmacies. This development is supported by the effectiveness and value of the flu vaccination campaigns, demonstrating to health authorities the possibilities to increase vaccination coverage through pharmacists.[123]

4.2.4 Portugal — Expanding flu vaccination through community pharmacies

Pharmacists in Portugal have been authorised to vaccinate since the 2008–2009 flu season, but their role was initially seen as supplementary to the national vaccination plan. Pharmacists could only administer vaccines not included in the NVP and provided at healthcare centres, or vaccinate population groups not covered through the NVP. These vaccines include influenza, pneumococcal and human papilloma virus. Furthermore, for being vaccinated at a pharmacy, patients require a medical prescription and have to pay an administration fee, which is not reimbursed.[86]

In 2018, however, the Ministry of Health, the Directorate-General for Health, and the National Association of Pharmacies came together to launch a pilot project to assess the impact on vaccination coverage of administering vaccines to vulnerable populations at community pharmacies under the same conditions as in primary health centres — i.e., with no need for a medical prescription and without any out-of-pocket payment by the individuals receiving the vaccine. The pilot was initiated in the Loures municipality (Lisbon) and ran from 15 October to 31 December 2018. Free flu vaccines were available to people over 65 years of age at 36 community pharmacies without a prescription. In addition to increasing access to influenza vaccines in pharmacies, the pilot also included an advertising campaign where posters, videos and leaflets were distributed to the public, as illustrated in Figure 12 and Figure 13.[124]

The results of the pilot demonstrated an increase of 31.8% in vaccination coverage in Loures. Now, this pilot is being applied across 37 municipalities in Portugal to ensure flu vaccines are available to the nation's most vulnerable populations.[125]

Figure 12. "Loures Tem + Saúde" (Loures is healthier) Flu vaccination information poster

"I'm protected against flu. I got vaccinated at the pharmacy."
Luísa Mota, pensioner

"Free vaccine.
Free vaccination at participating pharmacies in Loures for people aged 65 or over."

"No prescription required"

Figure 13. Portuguese pharmacies' animation video *"Mrs Flu is out there. Get vaccinated here before she comes to see you."*

Press Ctrl and click on the picture to watch the video.

4.2.5 United Kingdom — The Pharmacists' Defence Association #GetVaccinated campaign

The Pharmacists' Defence Association (PDA) launched a #GetVaccinated social media campaign to boost confidence in COVID-19 vaccines. The target population of the campaign is the black, Asian and minority ethnic (BAME) populations. Campaign materials include video testimonies from pharmacists across the UK in a variety of languages across many social media platforms. The goal of the campaign is that hesitant patient populations will prefer to take advice from their trusted local healthcare professionals rather than from unattributed misinformation circulating online. Supplementary materials for patients include posters in various languages, including English, Twi, Welsh, Bengali and Gujrati (Figure 14). The PDA has also provided a FAQ pamphlet for pharmacists to address common patient concerns.[126]

Figure 14. PDA posters for patients in Twi and Welsh

4.2.6 United States — American Pharmacists Association's campaign on COVID-19 vaccine confidence

In 2021, the American Pharmacists Association (APhA) launched its Vaccine Confident campaign, aiming to inform, educate, influence, and motivate pharmacists and pharmacy personnel to develop vaccine confidence not only among the general public, but also among pharmacists themselves. [127]

The campaign includes a dedicated website and a range of resources for the pharmacy workforce and for the public. This includes the Vaccine Confident Playbook, a resource to inform pharmacist-patient conversations on different topics linked to COVID-19 vaccines, with the goal of reducing vaccine hesitancy, bolstering vaccine confidence and increasing vaccine uptake.[127] This allows pharmacists to have a base to support conversations with patients and address specific COVID-19 vaccine concerns or hesitations that might be relevant for the questions patients might pose (Figure 15).

Figure 15. APhA vaccine confidence conversation topics

4.2.7 United States — National Association of Chain Drug Stores influenza vaccination campaign

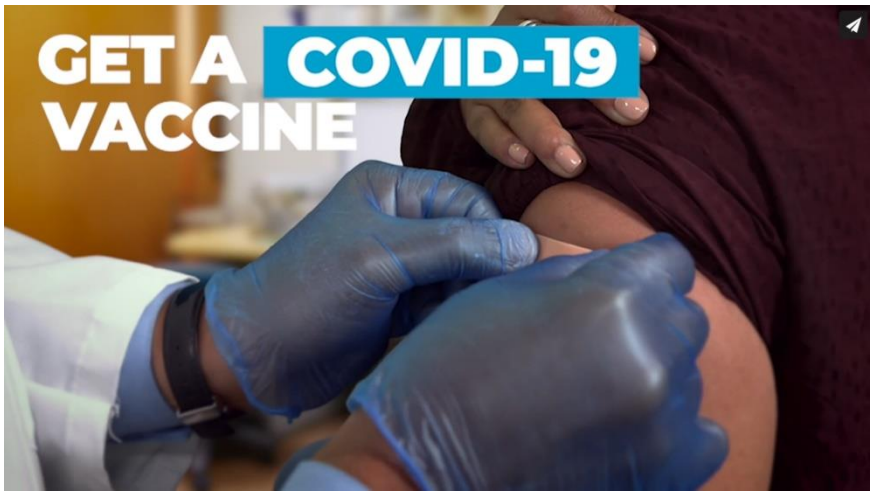
The National Association of Chain Drug Stores (NACDS) represents pharmacies in traditional, supermarket and mass retail settings in the United States. In light of the COVID-19 pandemic, in August 2021, during National Immunization Awareness Month, the NACDS launched a campaign to remind the American public of the crucial importance of getting vaccinated against COVID-19 and seasonal flu to help protect public health and prevent severe disease and related emergency care, using video advertisements in English and Spanish. The advertisements spread the message of the benefit of receiving the flu vaccine in both 60 second and 30 second easy-to-understand clips to reach a broad audience. Additionally, NACDS launched an online toolkit to curate a selection of social media resources which may be of aid to the general public, businesses and partners. Figure 16 presents a promotional video focusing on COVID-19 vaccination services.

With the increased volume of patients entering pharmacies, a number of policies and procedures are being implemented, too. For example, The Save Mart Companies have launched a new immunisation consent screening form which patients must complete either online or in person to assess their infection status prior to getting a vaccine in a pharmacy. Additionally, all patients must wear a mask and all pharmacists must wear a face shield with a mask underneath.

Wegmans pharmacies are allowing patients to drop in for immunisations with no prior appointment, prescription or fees. They have also blocked out special times to cater to the vulnerable senior population. Other methods to increase accessibility at Wegmans include drive through flu clinics and community flu vaccine events in collaboration with county offices. Lastly, the Wegmans Pharmacy Business Partnership Program allows employers to receive on-site immunisation services and health screenings for their workforce under convenient scheduling.[128]

Figure 16. National Association of Chain Drug Stores COVID-19 vaccination campaign

Press Ctrl and click on the picture to watch the video.



5 Vaccine information for pharmacists

Chapter 5 presents a summary of some of the most commonly available vaccines and information about which types of vaccines there are, their target populations in general terms, their potential side effects and any observations that pharmacists should consider and advice they may give to the public. The following vaccines are included:

- Influenza vaccines
- COVID-19 vaccines
- Shingles (herpes zoster) vaccines
- Pneumococcal vaccines
- Meningococcal vaccines
- Human papilloma virus vaccine
- Hepatitis vaccines
- Tetanus, diphtheria and pertussis vaccines

The tables of vaccines and information included in each subchapter aim to be as exhaustive as possible, including the most commonly available products at the time of publication. Where different product names exist, the authors have endeavoured to include them, but this list may not include all vaccines and product names available around the world.

5.1 Influenza vaccines

The influenza vaccine is the vaccine most commonly administered by pharmacists.[129] Because of this, it is important that pharmacists have a good understanding of the different vaccines available, the differences between them and why different vaccines may be more suitable for particular population groups.

What is in the vaccine?

The flu vaccine is a combination vaccine of different strains of the influenza virus and is created seasonally. Strains are selected based on research that predicts which will be the most common for the upcoming flu season, and recommended by the WHO Global Influenza Program. Flu vaccines can contain three or four different researched strains of influenza for the upcoming season, named trivalent or quadrivalent vaccines, respectively.

Who should get the vaccine?

The influenza vaccine is recommended seasonally for anyone above six months old, with rare exceptions. While it is encouraged that as much of the population as possible be vaccinated, it is particularly important for people who are at higher risk of developing serious flu complications, including older adults, immunocompromised individuals and those with chronic health conditions, pregnant people, health care workers and those in contact with people with vulnerable immune systems.[130]

Potential side effects and precautions

Common side effects from a flu vaccine include soreness, redness and/or swelling at the injection site, headache (low grade), fever, nausea, muscle aches and fatigue.

Life-threatening allergic reactions to flu vaccines are very rare. Signs of serious allergic reaction can include respiratory issues, hoarseness or wheezing, hives, paleness, weakness, tachycardia and dizziness. If they do occur, it is usually within a few minutes to a few hours after a patient receives their vaccine. These reactions can occur among persons who are allergic to something that is in the vaccine, such as egg protein or other ingredients. Make sure you take a detailed history from your patient and make them stay in a monitored area for 20 minutes after receiving their vaccination, remind them upon leaving to call a doctor straight away if they experience any troubling symptoms.

There is a small possibility that flu vaccine could be associated with Guillain-Barré syndrome, generally no more than one or two cases per million people vaccinated. This is much lower than the risk of severe complications from flu, which can be prevented by flu vaccine.[131]

Important points to note

1. **Use of eggs to make influenza vaccines** As can be seen in the tables below, flu vaccines are commonly made using eggs, but there are alternatives available, such as the Flucelvax Quadrivalent and Flublok Quadrivalent. Be sure to inform your patients about this and make sure to include available alternative options, as this can be important for certain population groups such as vegans or persons with allergies to egg products. Patients who have a history of severe egg allergy (those who have had any symptom other than hives after exposure to egg) should be vaccinated in a medical setting and supervised by a health care provider who is able to recognise and manage severe allergic reactions.

2. **Adjuvant and higher antigen load vaccines for over 65s** This is to help generate a stronger immune response or counter a decline in immune system effectiveness (immunosenescence) in older, vulnerable populations. Where possible, encourage this option for older patients and explain that it has the potential to provide them with more immunity in comparison with the standard flu vaccine.

How effective is the flu vaccine?

Recent studies show that flu vaccination reduces the risk of flu illness by between 40% and 60% among the overall population during seasons when most circulating flu viruses are well-matched to those used to make flu vaccines.[132]

Flu vaccination prevents millions of illnesses and flu-related doctor visits each year. For example, recent studies showed that, in America, during the 2019–20 flu season, flu vaccination prevented an estimated 7.5 million influenza illnesses, 3.7 million influenza-associated medical visits, 105,000 influenza-associated hospitalisations, and 6,300 influenza-associated deaths.[133]

Patients report having the vaccine in the past but are still getting sick?

First, start by empathising with your patient (e.g., "I'm sorry to hear that") and follow by ensuring that the "sick" the patient is referring to was an actual flu and not just a cold. You may ask "what was it like, were you in bed for a few days?" and reinforce that this vaccine will not protect against the common cold. Another thing to remember is that these vaccines are made via probability predictions of what will be the most common circulating strains. There are still other strains out there and the patient may have encountered one of these.

Another possibility is that the patient may have been exposed to the flu strain in the period between getting vaccinated and developing immunity to the virus.

If they did catch the flu, which can happen becasue everyone's immune system is different, reassure them that this vaccination is the best protection against catching the flu again and several studies have shown that, even if they do get sick, the vaccine has been shown to reduce the severity of illness.[134] Always be honest and kind in your approach, but also advocate the benefits.

What types of flu vaccines are there?

There are a few different types of flu vaccine, depending on the number of virus strains they offer protection against or the technology used in their development. The type of vaccine to be administered will depend on the patient's age, preference, allergy or aversions to egg products and immunocompromised or pregnant status. Different influenza vaccines are licensed for different age groups. Two completely egg-free (ovalbumin-free) flu vaccine options are available: quadrivalent recombinant vaccine and quadrivalent cell-based vaccine.[24] Most influenza vaccines are given by intramuscular injection in the deltoid muscle of the upper arm with a fine-gauge needle.

The different types of flu vaccines are indicated below, grouped into quadrivalent vaccines (

Table 7) and trivalent vaccines (Table 8).

Quadrivalent vaccines

Quadrivalent vaccines contain four different research-indicated prominent strains of influenza for the upcoming season. These include one influenza A (H1N1) virus, one influenza A (H3N2) virus and two influenza B viruses (Victoria and Yamagata lineages).

Table 7. Quadrivalent influenza vaccines

Vaccine category	Brand names	Observations	Further information
Standard-dose, egg-based quadrivalent flu vaccines	Afluria Quadrivalent (Seqirus Inc).	Can be given either with a needle (for people aged 6 months and older) or with a jet injector (for people aged 18 through 64 years only).	Afluria Pre-Book: Seqirus US. Seqirus. Available here.
	Fluarix Quadrivalent (GSK)		Fluarix Tetra. NPS MedicineWise. Available here.
	FluLaval Quadrivalent (GSK)		FluLaval Quadrivalent package insert (FDA). Available here.
	Flucelvax (Seqirus Inc)		Flucelvax Quadrivalent. A cell-based vaccine for prevention of seasonal influenza. Seqirus. Available here.
	Fluzone Quadrivalent (Sanofi Pasteur Inc)		Fluzone, Package Insert (FDA). Available here.
	Fluarix (GSK)		Fluarix Quadrivalent highlights of prescribing information. 2021. Available here.
	Vaxigrip Tetra (Sanofi Pasteur Inc)		Sanofi-Aventis New Zealand limited, Sanofi. Vaxigrip Inactivated Influenza Vaccine (Split Virion) Consumer Medicine Information. Available here.
Quadrivalent vaccine with an adjuvant for >65 years	Fluad Quadrivalent (Seqirus Ltd)	Adding an adjuvant to an influenza vaccine is designed to strengthen, broaden and lengthen the duration of the immune response.	Fluad Pre-Book: Seqirus US . Seqirus. Available here.
Quadrivalent high-dose influenza vaccine for >65 years	Fluzone High-Dose (Sanofi Pasteur Inc)	Contains a higher dose of antigen to help create a stronger immune response.	High Dose Influenza Shots: Fluzone High Dose. Available here.
Cell-based (egg-free) quadrivalent influenza vaccine	Flucelvax Quadrivalent (Seqirus Inc)	Containing virus grown in cell culture, which is licensed for people four years and older.	Flucelvax Quadrivalent. A cell-based vaccine for prevention of seasonal influenza. Available here.
Recombinant quadrivalent influenza vaccine	Flublok Quadrivalent (Sanofi Pasteur)	Approved for people 18 years and older.	Flublok. Recombinant Influenza Vaccine. Centers for Disease Control and Prevention; 2021. Available here.

Vaccine category	Brand names	Observations	Further information
Live attenuated intranasal vaccine influenza vaccine	Flumist Quadrivalent (in the USA) or Fluenz Tetra (in Europe) (AstraZeneca, MedImmune, Inc)	This vaccine is given intranasally. It is approved for people aged two to 49 years. Live attenuated influenza vaccine should not be given to people who are pregnant, immunocompromised persons, people with asthma and some other groups.	Fluenz Tetra nasal spray suspension Influenza vaccine (live attenuated, nasal). Patient Information Leaflet. Available here. 2020/2021 AAP influenza vaccine recommendations. Storage and Handling | FluMist Quadrivalent. Available here. Live Attenuated Influenza Vaccine [LAIV] (The Nasal Spray Flu Vaccine). Centers for Disease Control and Prevention. Available here.

Trivalent vaccines

Trivalent vaccines contain three different research-indicated strains of influenza: one influenza A (H1N1) virus, one influenza A (H3N2) virus and one influenza B virus. Trivalent vaccines have in most parts of the world been replaced by quadrivalent vaccines that can offer broader protection.[135] However, there are still supplies of trivalent vaccines used and this is still an important resource to make use of as they do provide protection. They will most likely be replaced, with only quadrivalent vaccines being offered over the coming years. However while they are still in use pharmacists should be acquainted with them.

Table 8. Trivalent influenza vaccines

Vaccine category	Brand names	Observations	Further information
Standard trivalent influenza vaccines	Agriflu (Seqirus Canada Inc)		Agriflu, Influenza Vaccine, Surface Antigen, Inactivated. Available here.
	Influvac (Mylan Laboratories)		Influvac, suspension for injection in prefilled syringe Influenza vaccine. Available here.
	FluLaval/Fluviral/GripLaval (ID Biomedical Corporation of Quebec, a subsidiary of GSK)	Vaccine can be administered to three-year-olds and older.	FluLaval Trivalent Safety and Utilization Review. 2016. Available here.
	Fluvirin (Seqirus Inc)	Can be administered to four-year-olds and older.	Fluvirin (Influenza Virus Vaccine). Available here.

5.2 COVID-19 vaccines

While many countries have different protocols, vaccination procedures and vaccines in use against COVID-19, it is important that pharmacists understand the different vaccines as they will often be a first source of information for patients and may also administer the vaccines where regulations permit. Likewise, they are a valuable resource in encouraging individuals to get vaccinated and in managing misinformation.

Who should get the vaccine?

Different governments worldwide have different policies on the target age groups for vaccination, and this is also changing by the day — so it is important to check for updated local policies issued by health authorities. This will also be largely influenced by the vaccines available in the country, with important differences in terms of access to vaccines being observed between high-income countries and lower-income countries.

For example, Germany, New Zealand, the USA and other countries offer vaccines to all children over the age of 12 years. However, in the UK and Sweden, only children over 12 who are clinically vulnerable to COVID-19 or live with adults who are at increased risk of serious illness from the virus are eligible.[136]

What is apparent is that, with the arrival of the delta strain, children are now more likely to contract COVID-19, although early data show that they still may not experience the same severity of symptoms as those who are older or immunocompromised.[137] Solid data on how much the delta strain will affect young children are unavailable. It should be noted that some vaccines on the market have been neither made for children nor tested on children. This is an area that will continue to develop, and pharmacists should watch for updates in guidelines in this area. Trials are also under way for individuals as young as six months to get a COVID-19 vaccine.

Vaccine administration and storage requirements

Vaccination should be postponed in individuals who are experiencing a fever over 38°C (100°F). The COVID-19 vaccine is administered by intramuscular injection in the deltoid muscle of the upper arm. Individual vaccine storage requirements are presented in Table 9.

Important points to note

1. **Single dose vaccines** The Johnson & Johnson/Janssen vaccine is a single dose vaccine and may be more appropriate for patients who are older, have mobility limitations or might be more unlikely to attend a follow up appointment for a second vaccine for other reasons.
2. **Storage and transport** Different storage conditions may also determine which types of vaccine are available locally. The Johnson & Johnson, AstraZeneca and BIBP Sinovac-CoronaVac Vaccines may be more suitable for vaccination in rural areas, or areas where very cold storage or transport is not available.[138]

Potential side effects and precautions

Common side effects from a COVID-19 vaccine include soreness, redness, and/or swelling at the site of injection, headache (low grade), fever, nausea, muscle aches and fatigue. Additional side effects to be aware of are that both the Johnson & Johnson/Janssen vaccine and Vaxzevria (AstraZeneca) vaccine show a risk of thromboembolic events (blood clots) and thrombocytopenia (low platelets) which are estimated to occur in one in 100,000 vaccinated people. Some guidelines suggest that, because of this, these vaccines should only be used for people aged 50 years and over, and be offered on an opt-in basis for those who are younger.[139]

Available vaccines

The currently available COVID-19 vaccines are detailed in Table 9. This is the confirmed list of vaccines approved by the WHO at the time of publication. However, this list may continue to grow as different vaccines are developed.

Table 9. COVID-19 vaccines

Vaccine category	Brand names	Observations	Further information
Messenger RNA (mRNA) vaccines mRNA vaccines contain sequences of mRNA that code for the spike (S) protein on the	Comirnaty (Pfizer/BioNtech)	This vaccine requires two doses 28 days apart. It can be administered to patients aged 12 years old or over. The Pfizer vaccine requires storage at –70°C (–94°F).	The Advisory Committee on Immunization Practices Interim Recommendation for Use of Pfizer-BioNTech COVID-19 Vaccine in Adolescents Aged 12–15 Years — United States, May 2021. Available here. Pfizer-BioNTech COVID-19 Vaccine Overview and Safety. Centers for Disease Control and Prevention. Available here.

Vaccine category	Brand names	Observations	Further information
surface of the SARS-CoV-2 virus.	Moderna mRNA-1273 (Moderna)	This vaccine requires two doses 28 days apart. It can be administered to patients aged 18 years or over. The Moderna vaccine requires storage at –20°C (–4°F).	Moderna COVID-19 Vaccine Overview and Safety. Available here. The Moderna COVID-19 (mRNA-1273) vaccine: what you need to know . World Health Organization. Available here.
Viral vector vaccines These vaccines use a modified version of a different (harmless) virus as a carrier of the genetic information for cells to produce the SARS-CoV-2 spike protein and thus induce an immune response (production of antibodies).	Johnson & Johnson Janssen/Ad26.COV 2.S (Johnson & Johnson)	This vaccine requires one 0.5ml dose. It can be administered to patients aged 18 years or older on an opt-in basis. It is generally targeted at those aged 50 years or older. Note potential side effects. Stored via cold chain recommendations +2°C (35°F) to +8°C (46° F). Keep out of sunlight.	The Janssen Ad26.COV2.S COVID-19 vaccine: What you need to know. Available here. Statement of the COVID-19 subcommittee of the WHO Global Advisory Committee on Vaccine Safety (GACVS) on safety signals related to the Johnson & Johnson/Janssen COVID-19 vaccine. Available here.
	SII/Covishield & Vaxzevira AstraZeneca/AZD12 22 (AstraZeneca/ Oxford and manufactured by the Serum Institute of India and SK Bio, respectively)	This vaccine requires wo doses 8 to 12 weeks apart. It can be administered to patients aged 18 years or older on an opt-in basis. It is generally targeted at those aged 50 years or older. Note potential side effects. Stored via cold chain recommendations +2°C (35°F) to +8°C (46°F). Keep out of sunlight.	The Oxford/AstraZeneca COVID-19 vaccine: what you need to know. Available here.
Inactivated vaccines These vaccines contain an inactivated (non-replicating) version of the SARS-CoV-2 virus.	BIBP Sinovac-CoronaVac Vaccine (Sinopharm/Beijing Bio-Institute of Biological Products Co Ltd, subsidiary of China National Biotec Group)	This vaccine requires two doses 28 days apart. It can be administered to patients ages 18 years or older. There are limited data for persons above 60 years of age. Store between +2°C (35°F) and +8°C (46°F).	The Sinopharm COVID-19 vaccine: What you need to know. Available here.

5.3 Shingles (herpes zoster) vaccines

Shingles is a painful rash that develops on one side of the face or body. It results from the reactivation of the varicella zoster virus, which causes chickenpox. Anyone who has had chickenpox can get shingles, and the probability of this happening increases with age. The most common complication of shingles is long-term nerve pain called postherpetic neuralgia (PHN).[140]

Who should get the vaccine?

Children should receive the measles, mumps, rubella and varicella (MMRV) vaccine as part of their childhood immunisations. Later, individuals over 50 should receive an additional varicella zoster vaccine dose as the risk of

shingles and PHN increases. However, it is important to note that the varicella and shingles vaccines are different and are not interchangeable.[140]

Vaccine administration and storage requirements

Table 10 provides an overview of the different shingles (herpes zoster) vaccines and some specifications for each of them.

Potential side effects and precautions

Common side effects include redness, soreness, swelling, or itching at the site of injection (about one person in three) and headache (about one person in 70).[141] As with all vaccines, there is the risk of anaphylaxis, which should be monitored for.

Table 10. Shingles (herpes zoster) vaccines

Vaccine category	Brand names	Observations	Further information
Recombinant inactivated herpes zoster vaccine	Shingrix (GSK)	Shingrix is recommended for those 50 years or older as it is an inactivated vaccine. It is also suitable for younger at-risk adults who have a weakened immune system. Administration is by intramuscular injection in the deltoid muscle of the upper arm and should be split into two doses with six months in between the first dose and second dose. Shingrix is supplied as two components: A single-dose vial of lyophilised gE antigen component (powder) and a single-dose vial of adjuvant suspension component (liquid) (packaged without syringes or needles). Both types of vials should be stored between +2° and +8°C (36° and 46°F). Protect vials from light. Do not freeze. Discard if any of the vials have been frozen. Shingrix is licensed for use in the EU, US, Canada, Japan and Australia.	Shingles Vaccine. Shingrix. Accessed 13 September 2021. Available here. Package insert for Shingrix, US Food and Drug Administration. Available here. European Medicines Agency, Shingrix information. Available here.
Live attenuated herpes zoster virus vaccine	Zostavax (Merck Sharp & Dohme)	Zostavax is no longer available for use in the United States, as of 18 November 2020. Instead, Shingrix is offered. In the European Union, Zostavax is still authorised for use. Zostavax is given as a single dose injected under the skin or into the muscle, preferably around the	Merck & Co. Patient Information about Zostavax. Merck & Co, 2018. Available here. European Medicines Agency, Zostavax information. Available here.

Vaccine category	Brand names	Observations	Further information
		shoulder. In patients who have bleeding problems, the vaccine should be given under the skin. Zostavax is administered as a single 0.65ml subcutaneous injection. The vaccine should be stored frozen at a temperature between –50°C and –15°C (–58°F and +5°F) until it is reconstituted for injection. Zostavax is contraindicated for use in pregnant women because the vaccine contains live, attenuated varicella zoster virus, and it is known that wild-type varicella zoster virus, if acquired during pregnancy, can cause congenital varicella syndrome (see Merck patient information file).	

5.4 Pneumococcal vaccines

According to the WHO, pneumococcal disease has a bimodal distribution, with a high burden among children under five years of age and in adults ≥50 years of age, and a lower incidence of cases and deaths in the age groups in between.[142] Pneumococcal disease is an important cause of morbidity and mortality in older adults, especially due to pneumococcal pneumonia and invasive pneumococcal disease. Many high-income countries recommend pneumococcal vaccination in older adults but, even where policies are in place, coverage is often low.[142]

Two classes of pneumococcal vaccines are currently available, one based on polysaccharides and the other based on polysaccharides conjugated to a carrier protein. The polysaccharide vaccine consists of purified capsular polysaccharides from the 23 serotypes causing about 90% of invasive pneumococcal infection in industrialised countries. Responses are age-dependent and serotype-dependent.[143]

Who should get the vaccine?
Two types of pneumococcal vaccines are recommended for adults: the 13-valent pneumococcal conjugate vaccine (PCV13, Prevnar 13) and the 23-valent pneumococcal polysaccharide vaccine (PPSV23, Pneumovax 23). The vaccines used (PCV13 or PPSV23), and the age of vaccination vary between countries. Very few low- and middle-income countries currently provide pneumococcal vaccination to older adults as a part of a routine programme.[144] Here, we will focus on these two types of pneumococcal vaccines used in older adults.

In the USA, one dose of the PCV13 vaccine is recommended for persons aged 19 years or older with certain medical conditions and who have not previously received PCV13, and adults aged 65 years or older, who should discuss and decide with their clinician whether to receive PCV13 if they have not previously received a dose (shared clinical decision-making).

One dose of PPSV23 is recommended for adults aged 65 years or older, regardless of previous history of vaccination with pneumococcal vaccines. Once a dose of PPSV23 is given at age 65 years or older, no additional doses of PPSV23 should be administered. The vaccine is also recommended for adults aged 19 to 64 years with certain medical conditions. In this group, a second dose may be indicated depending on the medical condition.[144] Adults aged 19 to 64 years who smoke tobacco should also be encouraged to get the vaccine. The different pneumococcal vaccines are listed in Table 11.

Vaccine administration and storage requirements

Administration should be postponed in individuals suffering from a fever over 38°C (100°F). Pneumococcal vaccines are administered intramuscularly. The vaccines should be stored between +2°C (35°F) and +8°C (46°F) and protected from light.

Potential side effects and precautions

Mild problems following PCV13 can include reactions at the site of injection, including redness, swelling, pain or tenderness, as well as fever, loss of appetite, irritability, feeling tired, headache and chills.

Mild problems following PPSV23 can include reactions at the site of injection, including redness, swelling or pain, as well as fever and muscle aches. If these problems occur, they usually disappear within about two days.[143]

Important points to note

1. **Allergy (PPSV23)** Anyone who has had a life-threatening allergic reaction to PPSV23 should not get another vaccine. Anyone with a severe allergy to any part of either of these vaccines should not get the vaccine.
2. **Allergy (PCV13)** The PCV13 vaccination should be withheld if the individual has had a life-threatening allergic reaction to an injection of this vaccine, an earlier pneumococcal conjugate vaccine, or any vaccine containing diphtheria toxoid (for example, DTaP).[145]

Table 11. Pneumococcal vaccines used in older adults

Vaccine category	Brand names	Observations	Further information
PCV13 vaccine 13-valent pneumococcal conjugate vaccine	Prevenar 13 (Pfizer Ltd)	One dose of the PCV13 vaccine is recommended for persons aged 19 years or older with certain medical conditions and who have not previously received PCV13, and adults 65 years or older, who should discuss and decide with their clinician whether to receive PCV13 if they have not previously received a dose (shared clinical decision-making).	Prevenar 13 package insert (USA). Food and Drug Administration. Available here. Prevenar 13 information. European Medicines Agency. Available here. Plosker GL.13-valent pneumococcal conjugate vaccine: a review of its use in infants, children, and adolescents. Available here. Safety and immunogenicity of a 13-valent pneumococcal conjugate vaccine. Available here.
PPSV23 vaccine 23-valent pneumococcal polysaccharide vaccine .	Pneumovax 23 (Merck Sharp & Dohme)	One dose of PPSV23 is recommended for adults aged 65 years or older, regardless of previous history of vaccination with pneumococcal vaccines. Once a dose of PPSV23 is given at age 65 years or older, no additional doses of PPSV23 should be administered. The vaccine is also recommended for adults aged 19 to 64 years with certain medical conditions.	Pneumovax 23 Pneumococcal Vaccine. Medsafe. Available here. Pneumovax 23 package insert (USA). Food and Drug Administration. Available here.

5.5 Meningococcal vaccines

Meningococcal disease refers to the disease characterised by the infection of the meninges, that are the membranes that cover the spinal cord and brain. This condition can be transmitted from person-to-person through droplets or secretions from infected individuals. The incubation period for the development of symptoms varies between 2 and 10 days.[146]

Who should get the vaccine?

The meningococcal conjugate vaccine is recommended for all preteens and teens at 11 to 12 years old with a booster dose at 16 years old. It is also recommended for children and adults at increased risk of meningococcal disease. This includes young adults moving into close living quarters such as college halls, microbiologists who are routinely exposed to *Neisseria meningitidis,* and individuals traveling to or residing in countries in which the disease is common or has had an outbreak. It is particularly recommended for individuals who have a complement component deficiency or are immunosuppressed.[147] Information on the different meningococcal vaccines is outlined in Table 12.

Vaccine administration and storage requirements

Meningococcal vaccines are administered intramuscularly, however subcutaneous administration may be appropriate for those with bleeding disorders. Administration should be postponed in individuals suffering from a fever over 38°C (100°F) and withheld for anyone with history of anaphylaxis to a previous dose of a meningococcal vaccine or a component of the vaccine.

The vaccine is recommended as part of childhood immunisation schedules and for those who need it. Some examples of when an additional vaccine should be given include:

- One dose for a close contact of meningococcal disease case;
- One dose for adolescents and young adults aged 13–25 years who are entering within the next three months, or in their first year of living in a boarding school hostel, tertiary education halls of residence, military barracks or prison;
- Two doses for individuals who have had post-haematopoietic stem cell transplantation, or following immunosuppression;
- Up to three doses plus booster doses (as appropriate) for individuals pre- or post-splenectomy, pre- or post-solid organ transplantation, who have functional asplenia or complement deficiency (acquired or inherited), or who are HIV-positive.

Conjugated meningococcal vaccine is also recommended for laboratory workers regularly handling meningococcal cultures and individuals who are travelling to high-risk countries or before the annual hadj pilgrimage.

The vaccines should be stored between +2°C (35°F) and +8 °C (46°F).

Potential side effects and precautions

Monitor for signs of anaphylaxis. Mild problems following vaccination against meningococcal strains A, C, W and Y (MenACWY) can include reactions at the sire of injection, such as redness or pain, as well as fever, muscle or joint pain, headache and fatigue. These symptoms usually last for no more than one or two days.[148]

Mild problems following a B strain meningococcal (MenB) vaccination can include reactions at the site of injection, such as redness or pain, as well as fever, muscle or joint pain, headache, fatigue, fever or chills and nausea or diarrhoea. If these occur they can last three to five days. A rare side effect of the meningococcal vaccine is skin rash and, in some adults, urticaria (hives).[149] It should be noted that Nimenrix has a rare side effect of extensive limb swelling, Tumenba is associated with fainting, and Bexsero has been shown to cause fever over 38°C in children aged under two years.

Table 12. Meningococcal vaccines

Vaccine category	Brand names	Observations	Further information
MenACWY-D, quadrivalent meningococcal conjugate vaccine	Menactra (Sanofi Pasteur)	MenACWY-D vaccine protects against meningococcal disease caused by *Neisseria meningitidis* groups A, C, Y and W. Menactra can be administered to patients aged from nine months to 55 years.	Ask the Experts: Meningococcal ACWY Vaccines. Available here. Meningococcal Vaccination . Centers for Disease Control and Prevention. Available here.
	Menveo (GSK)	Menveo can be administered to patients aged from two months to 55 years.	
	MenQuadfi (Sanofi Pasteur)	MenQuadfi can be administered to patients ages two years or older.	
MenACWY-T, quadrivalent meningococcal conjugate vaccine	Nimenrix (Pfizer Ltd)	MenACWY-T protects against meningococcal disease caused by *Neisseria meningitidis* groups A, C, Y and W (previously called W-135). Nimenrix must be reconstituted. For infants aged between six weeks and six months it should be given as two doses eight weeks apart followed by a booster dose aged 12 months or a minimum of six months after the second dose, whichever is later. For infants aged six months and up to 12 months, one dose should be administered followed by a booster dose aged 12 months or a minimum of eight weeks after first dose, whichever is later. For children aged 12 month or older, adolescents and adults, one dose should be administered. A booster dose may be indicated for some individuals.	MenACWY vaccine overview. NHS Choices. Available here.
Meningococcal C only conjugate vaccine When available, use of meningococcal vaccine against the groups A, C, Y and W (Menactra or Nimenrix) is preferred over the group C only (NeisVac-C)	NeisVac-C (Pfizer)	This vaccine is for children aged under nine months with a medical condition that increases their risk of meningococcal disease. Two doses are indicated for a close contact of meningococcal C disease case, post-haematopoietic stem cell transplantation, or following immunosuppression due to steroid or other immunosuppressive therapy longer than 28 days.	Prevention of meningococcal serogroup C disease by NeisVac-C. Available here. NeisVac-C Consumer Medicine Information. Available here.

Vaccine category	Brand names	Observations	Further information
4CMenB, meningococcal B vaccine	Bexsero (GSK)	This vaccine is for individuals over eight weeks old who are at increased risk of infection with or exposure to group B meningococcal bacteria. The recommended number of Bexsero doses is determined by the age of the individual when they receive their first vaccination.	Immunisation Advisory Centre. Available here. Meningococcal vaccines for Australians. Sydney: National Centre for Immunisation Research and Surveillance. Available here.
	Trumenba (Pfizer Ltd)	Individuals 10 through to 25 years of age with immune deficiency or immunosuppression. Has both a three and two dose schedule.	Trumenba® (Meningococcal Group B Vaccine) Available here.
Hib/MenC vaccine Hib-MenC Combination *Haemophilus influenzae* type b and meningococcal serogroup C–tetanus toxoid.	Menitorix (GSK)	One dose for individuals aged six weeks to 12 months. It is usually offered for infants after their first birthday. A booster dose can be delivered for adults who are at greater risk of complications from Hib disease and meningococcal disease.	Hib/MenC vaccine. Vaccine Knowledge. Available here. The Australian Immunisation Handbook. Available here.

5.6 Human papilloma virus vaccine

Human papilloma virus (HPV) is a group of common viruses, some of which can cause cancer. Cervical cancer is by far the most common HPV-related disease. Nearly all cases of cervical cancer can be attributable to HPV infection. HPV is mainly transmitted by sexual contact, both with penetration or skin-to-skin genital contact. The non-cancer types of HPV can cause genital warts or respiratory papillomatosis and the more aggressive types can lead to cancers of the anus, vulva, vagina, penis or oropharynx.[150]

Who should get the vaccine?

Girls and women from nine to 45 years of age are a particular focus group to receive the human papilloma virus (HPV) vaccine because it is the best tool for reducing rates of cervical cancer.[151] Research has also shown that it is important for males aged nine to 26 years of age to receive the vaccine as well as it can help to reduce transmission of the HPV virus as well as prevent their own infection, which could result in genital warts and genital cancers.[152] Details of the different HPV vaccines are outlined in Table 13.

Vaccine administration and storage requirements

HPV vaccines are administered intramuscularly, however subcutaneous administration may be appropriate for those with bleeding disorders. The vaccines should be stored between +2°C (35°F) to +8°C (46°F) and protected, from light.

Potential side effects and precautions

Common side effects from HPV vaccines include mild pain, redness and swelling around the injection site, headache and fatigue. Fainting, with associated falling, has been observed following HPV immunisation and is particularly associated with adolescent females and vaccinating in large groups. Consideration may need to be

given to lying vaccine recipients down for immunisation and to ensuring appropriate seclusion of the individual while they are being vaccinated.[153] Recipients should be monitored for signs of anaphylaxis.

Table 13. Human papilloma virus vaccines

Vaccine category	Brand names	Observations	Further information
Nonavalent vaccine, HPV9	Gardasil 9 (Merck)	This is a recombinant subunit vaccine containing HPV types 6, 11, 16, 18, 31, 33, 45, 52 and 58. It should be administered to females aged from nine to 45 years of age and males from nine to 26 years of age.	Recombinant human papilloma virus nonavalent vaccine in the prevention of cancers caused by human papilloma virus. Available here. Merck Ltd. Gardasil 9. Immunisation Advisory Centre. Available here.
Quadrivalent vaccine, HPV4	Gardasil (Merck)	This is for vaccination against serotypes 6, 11, 16 and 18. It should be administered to females aged from nine to 45 years of age and males from nine to 26 years of age. Males and females aged nine to 14 years should receive two HPV vaccine doses. If two doses are given at least five months apart, no further doses are required even if the second dose is given when the individual is aged 15 years or older. Males and females aged 15 to 26 years and HIV-positive, post-solid organ or stem cell transplantation patients should receive three doses.	Patient information leaflet. Merck. Available here.
Bivalent vaccine	Cervarix (GSK)	This is for vaccination against HPV types 16 and 18 only. It should be administered to males and females from the age of nine years.	Summary of product characteristics. Cervarix. Available here.

5.7 Hepatitis vaccines

Hepatitis is an inflammation of the liver caused by a variety of viruses and non-infectious agents. There are five main strains of the hepatitis virus, referred to as types A, B, C, D and E. The different types have different transmission modes, severity of symptoms and distribution around the world. Some types are preventable by vaccination, as seen below in vaccines available for strains A and B. Vaccination against hepatitis B also offers protections against hepatitis D, as the D strain requires co-infection with the B strain for its replication [154]

Who should get the vaccine?

It is most common for individuals to be vaccinated against hepatitis in their infancy. This is done by receiving a hepatitis A vaccine and a separate hepatitis B vaccine. These are typically both two-dose vaccines, six months apart and are given as part of a routine childhood vaccination schedule. Individuals over the age of 18 years who have not had this vaccine should also get vaccinated. However, there is a combination vaccine of hepatitis A and hepatitis B in a series of three doses over six months. All three injections are needed for long-term protection for both hepatitis A and hepatitis B.[155] It may be important that at-risk individuals also receive a booster dose of either the hepatitis they may be more exposed to, or the combination vaccine.[156] The available vaccines for hepatitis are described in Table 14.

The combined inactivated HAV-recombinant HBsAg protein vaccine is recommended for:[157]

- Nursing staff and healthcare workers;
- Day-care centre staff;
- Residents of homes or institutions;
- Sewerage workers;
- Food handlers;
- Men who have sex with men;
- People in contact with an infected person;
- People with chronic liver disease or liver transplants, or people who receive certain blood products; and
- Some travellers to areas where the incidence of hepatitis A is high.

The monovalent hepatitis B vaccine is recommended for:[158]

- Babies of HBsAg-positive mothers, who require a birth dose plus the three-dose primary series (HBIG is also given to these babies at birth);
- Household or sexual contacts of HBsAg-positive patients;
- Children and adolescents aged under 18 years who are considered not to have achieved a positive serology by one month after vaccination and require additional vaccination or require a primary course of vaccinations;
- Individuals who are HIV-positive;
- Individuals who are hepatitis C-positive;
- Individuals following non-consensual sexual intercourse;
- Individuals prior to or following immunosuppression;
- Individuals prior to or following solid organ transplant;
- Individuals post- Hematopoietic Stem Cell Transplantation (HSCTb)
- Individuals. following needle-stick injury; and
- Patients on dialysis.

Vaccine administration and storage requirements

Vaccination should be postponed in individuals suffering from a fever over 38°C (100°F). Vaccination should be withheld in anyone with severe allergy (anaphylaxis) to a previous dose of this vaccine or other hepatitis A- or hepatitis B-containing vaccine, or a component of the vaccine, e.g., baker's yeast. Hepatitis vaccines are administered intramuscularly. Storage should be as per the cold chain between +2°C (35°F) to +8°C (46°F).

Potential side effects and precautions

Common side effects from the hepatitis vaccine include mild pain, redness and swelling around the injection site, fatigue, muscle aches and pains, headache, fever, nausea, vomitingloss of appetite and irritability. A rare effect is urticaria (hives). It is important to monitor for anaphylaxis.

Table 14. Hepatitis vaccines

Vaccine category	Brand names	Observations	Further information
Monovalent inactivated hepatitis A virus vaccine	Havrix and Havrix Junior (GSK)	Havrix is recommended from 16 years of age. Havrix Junior is for children between one and 15 years of age.	Ministry of Health. Immunisation handbook . Available here.
	Vaqta (Merk)	Vaqta is indicated for everyone aged one year old or above.	Official Site for Vaqta (Hepatitis A Vaccine, Inactivated). Available here.

Vaccine category	Brand names	Observations	Further information
	Avaxim (Sanofi Pasteur)	Avaxim is indicated for everyone aged two years old or above.	Hepatitis A Q&As for Health Professionals. Available here.
Combined inactivated HAV-recombinant HBsAg protein vaccine .	Twinrix and Twinrix Junior (GSK)	Twinrix is recommended from 16 years of age. Twinrix Junior is for children between one and 15 years of age.	GlaxoSmithKline Australia Pty Ltd. Twinrix (720/20) and Twinrix Junior (360/10). Available here.
HAV-purified Salmonella typhi Vi polysaccharide vaccine	Vivaxim (Sanofi Pasteur)	Vivaxim is indicated for individuals aged over 16 years. It is administered as a booster vaccine for travellers at least 14 days before departure. For long-lasting protection against hepatitis A virus a booster vaccination with a hepatitis A vaccine will be required 6 to 36 months after vaccination. The safety and effectiveness of Vivaxim in persons under 16 years have not been established.	Vivaxim. NPS MedicineWise. Available here.
Hexavalent vaccines See Table 15. Tetanus, diphtheria and pertussis vaccines	DTPa-HepB-IPV-Hib Hexavac, Hexaxim, Hexyon Vaxelis (Sanofi Pasteur)		
	DTaP-IPV-HepB/Hib Infanrix-hexa (GSK)		
Monovalent Hepatitis B vaccine Single-antigen hepatitis B vaccines.	Engerix-B 10mcg and Engerix-B 20mcg (GSK)	Engerix-B is safe to give during pregnancy if the pregnant person is non-immune to hepatitis B and has had sexual or household contact with a hepatitis B infected person. It can safely be given when breastfeeding.	Medsafe. New Zealand data sheet: Engerix-B. Available here. New Zealand data sheet: Engerix-B. Available here.
	Recombivax HB (Merck)		Official Site for Recombivax HB [Hepatitis B Vaccine (Recombinant)]. Available here.
	Heplisav-B (Dynavax)		European Medicines Agency. Available here.

5.8 Tetanus, diphtheria and pertussis vaccines

There are different types of tetanus, diphtheria and pertussis vaccines: those that include tetanus, diphtheria and pertussis (whooping cough) — DTaP or DTP and Tdap — and those that provide immunisation against diphtheria and tetanus but not pertussis — DT and Td.[159]

Upper-case letters in the abbreviations mean the vaccine has full-strength doses of that part of the vaccine. The lower-case "d" and "p" in Td and Tdap means these vaccines use smaller doses of diphtheria and pertussis. The "a" in DTaP and Tdap stands for "acellular," meaning that the pertussis component contains only parts of the bacterium instead of the whole bacterium.[160]

Who should get the vaccine?

DTaP and DT vaccines are administered to children under the age of seven years, following childhood vaccination schedules. They contain full doses of the immunogenic components, and their goal is to build immunity against these three bacterial infections. Tdap and Td are used to boost immunity against the same diseases and contain lower doses of the immunogenic components. The latter are administered to older children and adults. The different vaccines for tetanus, diphtheria and pertussis are described in Table 15.

Preteens should get one injection of Tdap between the ages of 11 and 12 years to boost their immunity. Pregnant individuals should get Tdap during the early part of the third trimester of the pregnancy. All adults who have never received one should get a dose of Tdap. This can be given at any time, regardless of when they last got Td. This should be followed by either a Td or Tdap dose every 10 years.[161]

Vaccine administration and storage requirements

DT and DTaP should not be administered to individuals over seven years old. All tetanus, diphtheria and pertussis vaccines should also be withheld if the individual has had a life-threatening allergic reaction or has had a severe allergy to a previous dose of the vaccine or a component of the vaccine.

Care should also be taken and medical advice sought if the individual has a history of seizures or other nervous system problems, severe pain or swelling after any vaccine containing tetanus or diphtheria, or if they have ever had Guillian-Barré Syndrome.

Administration should be postponed in individuals suffering from a fever over 38°C (100°F). Tetanus, diphtheria and pertussis vaccines are administered intramuscularly. The vaccines should be stored between +2°C (35°F) and +8°C (46°F) and protected from light.

Potential side effects and precautions

Always monitor for signs of anaphylaxis.

DT and DTaP Vaccine

Mild problems following DT and DTaP vaccinations can include reactions at the site of the injection, including redness, swelling, soreness or tenderness, as well as fever, loss of appetite and vomiting. The DTaP vaccine may also cause a child to be irritable, and be associated with fatigue. A rare side effect of DTaP can be extensive limb swelling. This occurs more commonly after increasing number of doses of DTaP (i.e., after the fourth or fifth dose). It affects less than 2% of children, is typically painless and resolves spontaneously, lasting between one and seven days.[162]

Td and TdaP Vaccine

Mild problems following Td vaccination can include reactions at the injection site, including redness and swelling, as well as fever, headache and fatigue. The TdaP vaccine may also be associated with nausea, vomiting, diarrhoea, stomach ache, chills, body aches or sore joints, and a rash or swollen glands.

Table 15. Tetanus, diphtheria and pertussis vaccines

Vaccine category	Brand names	Observations	Further information
DTaP vaccines **Hexavalent vaccines — DTaP-HepB-IPV-Hib or DTPa-HepB-IPV-Hib.** These protect against diphtheria, tetanus, pertussis, poliomyelitis, haemophilus influenza type B, and hepatitis B. Also called "6-in-1" vaccines, they are predominantly for children. They are used in 90 countries around the world, including America, Europe, Canada, Australia, and New Zealand.	Infanrix-hexa (GSK)	Infrarix-hexa is given as a vaccine schedule to infants at six weeks, three months and five months. There should be an interval of at least one month between primary doses. It can be used for all five injections in the DTaP vaccine series in babies and children from six weeks to six years of age. Infanrix-hexa is contraindicated if the child has experienced an encephalopathy of unknown cause, occurring within seven days following previous vaccination with pertussis-containing vaccine.	GlaxoSmithKline NZ Ltd. New Zealand Consumer Medicine Information Infanrix-IPV. Available here.
	Hexaxim, Hexyon, Hexacima (Sanofi Pasteur)	These are available as a liquid suspension in a pre-filled syringe (ready to use)	Hexacima. European Medicines Agency, 25 March 2021. Available here.
	Vaxelis (MCM Vaccine Company)	Vaxelis can be the first three injections in the DTaP vaccine series in babies and children aged from six weeks to under one year old. It also gives protection against polio, hepatitis B, and invasive disease caused by Haemophilus influenzae type b.	When 6 Work Together as 1, You Can Experience the Benefits of Fewer Shots with Vaxelis. Available here.
Pentavalent vaccines These contain diphtheria, tetanu and pertussis PLUS either polio and haemophilus influenza type b OR polio and hepatitis B.	Pentacel (Sanofi Pasteur)	Pentacel contains diphtheria and tetanus toxoids and acellular pertussis adsorbed, inactivated poliovirus and Haemophilus b conjugate vaccine. It can be used for the first four injections in the DTaP vaccine series in babies and children aged six weeks to four years old. The combination also gives protection against polio and invasive disease caused by Haemophilus influenzae type b.	Center for Biologics Evaluation and Research. Pentacel Lead Page. US Food and Drug Administration. Available here.
	Pediarix (GSK)	Three doses of Pediarix are administered. It can be used for the first three injections in the DTaP vaccine series in babies and children aged from six weeks to four years old. It also gives protection against polio and hepatitis B.	FDA licensure of diphtheria and tetanus toxoids and acellular pertussis adsorbed, hepatitis B (recombinant), and poliovirus vaccine combined (Pediarix) for use in infants. Available here.

Vaccine category	Brand names	Observations	Further information
Quadrivalent vaccines, DTaP-IPV These contain diphtheria, tetanus, acellular pertussis and inactivated polio. .	Quadracel (Sanofi Pasteur)	Three doses of Quadracel are administered, given at two, four and six months of age. A booster dose may be given at 15 months to six years of age. It can also be given as the fifth injection in the DTaP vaccine series in children aged four to six years old. It also gives protection against polio.	Quadracel: vaccination against diphtheria, tetanus, pertussis, and poliomyelitis in children. Available here.
	Daptacel (Sanofi Pasteur)	Daptacel can be used for the five injections in the DTaP vaccine series in babies and children aged six weeks to six years old.	Center for Biologics Evaluation and Research. Daptacel Lead Page. Available here.
	Infanrix-IPV (GSK)	Infanrix-IPV is given as a single dose to children before school at the age of four to six years. A booster dose can be delivered to adults who are at greater risk of complications from contracting one of the diseases.	GlaxoSmithKline NZ Ltd. New Zealand Consumer Medicine Information Infanrix-IPV. Available here.
	Repevax (Sanofi Pasteur)	Repevax is given as a single dose to children before school at the age of four to six years. A booster dose can be delivered to adults who are at greater risk of complications from contracting one of the diseases.	Repevax. Summary of Product Characteristics. Available here.
	Kinrix (GSK)	Kinrix is a single dose vaccine. It can be used for the fifth dose in the DTaP vaccine series and the fourth dose in the IPV series for children aged four to six years whose previous DTaP vaccine doses have been with Infanrix and/or Pediarix for the first three doses and Infanrix for the fourth dose.	GlaxoSmithKline. KINRIX (Diphtheria and Tetanus Toxoids and Acellular Pertussis Adsorbed and Inactivated Poliovirus Vaccine). Available here.
Tdap vaccines These are usually administered to older children and adults as a booster vaccination. They contain diphtheria toxoid and pertussis antigens together with tetanus toxoid.	Boostrix (GSK)	Children under 18 require a booster vaccine, which is usually given at 11 years old. Boostrix can also be used for pregnant individuals and is recommended from 16 weeks' gestation of every pregnancy, preferably in the second trimester. There is also a Boostrix-Polio vaccine which has an inactivated polio component. This vaccine is not for routine immunisation and is instead used for high-risk individuals.	Immunisation handbook . Wellington: Ministry of Health; Available here. Petousis-Harris H, Walls T, Watson D et al. Safety of Tdap vaccine in pregnant women: an observational study. BMJ Open 2016;6(4):e010911. Available here.
	Adacel (Sanofi Pasteur)	Adacel is used as a booster for: people aged over 45 years who have not received four tetanus vaccinations; people aged 65 years and over; parents or primary	Sanofi Pasteur. Package Insert - Adacel. Available here.

Vaccine category	Brand names	Observations	Further information
		caregivers of infants admitted to neonatal intensive or special care baby units for more than three days and whose mothers had not received Tdap at least 14 days prior to birth; and people intending to travel to areas with a risk of diphtheria infection if more than 10 years have passed since the previous injection. Adacel can be used for people aged 10 to 64 years. It is not for use in pregnant women, unless necessary. There is also an Adacel-Polio vaccine which has an inactivated polio component. This vaccine is not for routine immunisation and is instead used for high-risk individuals.	
DT vaccines These contain diphtheria toxoid (D) and tetanus toxoid (T) in high doses.	Diphtheria and Tetanus Toxoids Adsorbed (Sanofi Pasteur).	DT can be used for the five-injection series for babies and children aged six weeks to six years old. This vaccine should be used in instances where the pertussis vaccine component is contraindicated.	DT (Sanofi Pasteur). Patient information leaflet. Available here.
Td vaccines These contain tetanus (T) in higher dose and diphtheria toxoids (d) in lower dose.	Tetanus and Diphtheria toxoids adsorbed (MassBiologics)	Td vaccines are given every 10 years as a booster to people aged seven years or older. They can also be used as part of a three-vaccination series to people aged seven years or older who have not previously had any tetanus and diphtheria vaccines. They can also be used to complete the childhood vaccination series for tetanus and diphtheria in people aged seven years or older.	Center for Biologics Evaluation and Research. "Tdvax." US Food and Drug Administration. Available here. Td (MassBiologics) Patient information leaflet. Available here .
	Tenivac® (Sanofi Pasteur)		Tenivac. US Food and Drug Administration. Available here.

6 Conclusion

Pharmacists play a variety of important and essential roles to improve vaccine uptake and contribute to higher vaccination coverage rates. In many countries, these roles include the administration of at least 36 vaccine types.[86] However, even in jurisdictions where this is not yet possible, pharmacists play an important role in building confidence in vaccines through effective conversations and communication strategies, including campaigns. As trusted healthcare professionals and community members, pharmacists can translate scientific evidence into lay language that can be understood by the various members of the community. Pharmacists can adapt the content and format of their advice to address specific concerns, beliefs and outright refusal of vaccines that may exist among the community they serve.

Vaccine hesitancy is a growing concern for public health, boosted by the use of different communication channels to spread inaccurate or false information about the safety and effectiveness of vaccines, or other rumours or myths related to vaccination.

There exists a broad spectrum of trust among vaccine-hesitant patients, ranging from refusal of all vaccines to the acceptance of all vaccines. In this range, the main concerns are normally related to safety, efficacy, moral or philosophical concerns, and needing more information about specific topics. Pharmacists can play the role of educators and communicators to assure the safety and efficacy of vaccines and modify behaviours connected to the refusal of vaccination.

In order to overcome these barriers, there exists a variety of tools and communication techniques as described in this publication. A key point is that it is important to identify, communicate and evaluate our messages, keeping this cycle in permanent motion. The role of misinformation and disinformation in the spread of negative messages around vaccination is important and pharmacists should be ready to tackle them.

Pharmacists working in the community are in a privileged position to engage in different activities related to the promotion of vaccination, including campaigns. There are still many barriers to the implementation of such campaigns that need to be considered on a case-by-case basis. With the evolution of social media and online communication, it is important for pharmacists to be present and make use of these platforms to disseminate clear, truthful and informative messages that can lead to positive behaviours.

This publication aims to support this role and advocates the widespread utilisation of pharmacists to overcome vaccine hesitancy, complacency, misinformation and disinformation around the world. In this way, pharmacists can fulfil their role as advisors, supporters and implementers of public health strategies globally.

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International
Pharmaceutical
Federation

Fédération
Internationale
Pharmaceutique

Andries Bickerweg 5
2517 JP The Hague
The Netherlands
-
T +31 (0)70 302 19 70
F +31 (0)70 302 19 99
fip@fip.org
-
www.fip.org