

Vaccination of special-risk groups

A toolkit for pharmacists

2022



FIP Development Goals



International
Pharmaceutical
Federation

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This document is an updated version launched in June 2024 of the original document launched in 2022. This version replaces the previous one.

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Recommended citation

International Pharmaceutical Federation (FIP). Vaccination of special-risk groups: A toolkit for pharmacists. The Hague: International Pharmaceutical Federation; 2022

Cover image

Jacob Lund | [shutterstock.com](https://www.shutterstock.com)

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Acknowledgements

FIP thanks Cady Schleeper, University of Health Sciences and Pharmacy, St. Louis, USA, and Hayat Mansour, FIP remote volunteer for practice development and transformation for their collaboration on this publication.

FIP also thanks the Influenza Diabetes Community of the European Scientific Working Group on Influenza (ESWI) for their contributions to the chapter on people living with diabetes:

Salah Al Awaidy, Ministry of Public Health of the Sultanate of Oman, Oman
Sabine Dupont, International Diabetes Federation (IDF Europe), Belgium
Marco Goeijenbier, intensivist, Spaarne Gasthuis, Amsterdam, The Netherlands
Jean-Venable (Kelly) Goode, American Pharmacists Association (APhA), United States
Brigid Groves, American Pharmacists Association (APhA), United States
Arunima Himawan, International Longevity Centre-UK, United Kingdom
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Bernadette Viberti, Sanofi Pasteur, France

ESWI

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OTHER ACUTE
RESPIRATORY VIRUSES



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Influenza
Diabetes
Community

FIP is grateful to Sanofi for supporting this publication through unrestricted funds.

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Executive summary

Vaccination is one of the best ways to prevent disease because vaccines are safe and effective at providing immunity against a variety of infectious agents.¹

Pharmacists are one of the most easily accessible healthcare professionals, and they are increasingly engaged in primary healthcare strategies, including disease prevention. In a growing number of countries, they are taking on roles in administering several vaccines to a range of age groups, and have been granted prescribing authority for vaccines in several jurisdictions, thus simplifying the patient journey and contributing to increased vaccination coverage rates.^{2, 3}

In addition to these roles in vaccine prescribing and administration, pharmacists contribute to vaccination strategies by raising awareness and advising community members about the importance and the benefits of vaccines for individuals, their families and their communities, and by building vaccine confidence through effective and trust-based conversations.

While this advocacy and educational role is important for the whole community, it is especially critical for specific population groups who are more vulnerable to severe forms of vaccine-preventable diseases and have a higher risk of hospitalisation, loss of functional ability and even death. These special-risk groups must be the target of proactive and systematic actions by healthcare professionals to ensure they are vaccinated against all diseases that may impact their health in a severe and largely preventable way.

Furthermore, in line with the [Immunization Agenda 2030 of the World Health Organization](#), a life-course approach to vaccination should be adopted in all countries to ensure that each individual receives the vaccines that are suitable for their age and clinical situation, and enjoys the benefits of protection against disease-preventable diseases and the complications of those or other underlying diseases.

Pharmacists are equipped with the knowledge to understand the pathology and immunology behind the diseases as well as the vaccines, and they must understand also the importance and the efficacy of vaccines in special-risk populations.⁴ Also, they are uniquely positioned to identify individuals belonging to these groups through the medicines they are prescribed, and through their frequent interactions with patients and the community.

This toolkit not only serves the goal of highlighting the important role that pharmacists can play in improving vaccination coverage rates among special-risk groups, but also to summarise key information, practice guidelines and additional resources to support this role in a very practical manner. This includes a brief introduction of why each group has a higher risk of harm from vaccine-preventable diseases, which vaccines are particularly recommended for that group, what advice pharmacists may provide to individuals they identify from those groups and a practical case study that may support conversations.

Whilst not exhaustive, this toolkit focuses on special-risk groups and provides a good start to prioritisation and triage. For the purposes of this publication, these special-risk groups are listed below:

People living with chronic respiratory diseases are more susceptible to vaccine-preventable diseases due to a disruption in the cellular barrier, which normally protects the respiratory tract. Specifically, some of the vaccine-preventable diseases affect the respiratory tract. This can cause difficulty breathing and inability to fully recover from the illness. Administration of vaccines will prevent or lessen the effects of the illness. The vaccines indicated for people living with chronic respiratory diseases include influenza, pneumococcal, Tdap, COVID-19 and shingles.

People living with cardiovascular diseases are more susceptible to vaccine-preventable diseases due to the inflammatory cascade. This results in the body being unable to fully recover, resulting in cardiovascular events like a stroke. All of this results in stress on the body and the inability to recover fully. The vaccines indicated for people living with cardiovascular disease include influenza, pneumococcal, Tdap, COVID-19 and shingles.

People living with diabetes are more susceptible to vaccine-preventable diseases due to having hyperglycaemia and other immunological changes which can weaken a patient's immune system. The vaccines indicated for people living with diabetes include influenza, pneumococcal, Tdap, COVID-19, hepatitis B and shingles.

Older adults are more susceptible to vaccine-preventable diseases due to a weakened immune system. In addition, older adults may have additional comorbidities and overall poor health which can contribute to worsening of vaccine-

preventable diseases. The vaccines indicated for older adults include influenza, pneumococcal, Tdap, COVID-19, hepatitis B, and shingles.

Pregnant individuals are susceptible to vaccine-preventable diseases due to a change in the immune system since it is attempting to protect both the individual and fetus from infection. Also, the mother can pass on antibodies to the fetus, thus contributing to their immunity ahead of birth. The vaccines indicated for pregnant people include influenza, Tdap, and COVID-19.

Healthcare professionals and workers are more susceptible to vaccine-preventable diseases due to them being exposed to many different ill patients with communicable diseases. In addition, they are more likely to spread an infection to other patients, healthcare workers and family members. The vaccines indicated for healthcare workers include influenza, meningococcal, Tdap, COVID-19, MMR, hepatitis B and varicella.

This toolkit aims to provide the pharmacy workforce with relevant and concise guidance on immunisation practices. It discusses disease states, its effects on the populations, and the benefits of receiving the vaccines against each disease. In addition, it includes the most current immunisation recommendations according to the WHO as well as other reputable and pertinent organisations throughout the world. However, certain vaccination recommendations may vary from country to country, and within a country, so it is important to refer to the applicable national or local recommendations.

Foreword

Vaccines can be considered one of the most significant and successful medical advancements because they are the most effective way to prevent infectious diseases. Vaccines are a simple, yet safe and effective way to protect against many diseases. In addition, the WHO states that the vaccines we now have prevent more than 20 life-threatening diseases.⁵ To put it into perspective, diseases like measles and diphtheria have been reduced by up to 99% since their vaccines were introduced.⁴

Pharmacists are one of the most easily accessible healthcare professionals, and they are increasingly engaged in primary healthcare strategies, including disease prevention. In a growing number of countries, they are taking on roles in administering several vaccines to a range of age groups and have been granted prescribing authority for vaccines in several jurisdictions, thus simplifying the patient journey and contributing to increased vaccination coverage rates.^{2,3}

In addition to these roles in vaccine prescribing and administration, pharmacists contribute to vaccination strategies by raising awareness and advising community members about the importance and the benefits of vaccines for individuals, their families and their communities, and by building vaccine confidence through effective and trust-based conversations.

While this advocacy and educational role is important for the whole community, it is especially critical for specific population groups who are more vulnerable to severe forms of vaccine-preventable diseases and have a higher risk of hospitalisation, loss of functional ability and even death. These special-risk groups must be the target of proactive and systematic actions by healthcare professionals to ensure they are vaccinated against all diseases that may impact their health in a severe and largely preventable way.

Furthermore, in line with the [Immunization Agenda 2030 of the World Health Organization](#), a life-course approach to vaccination should be adopted in all countries, to ensure that each individual receives the vaccines that are suitable for their age and clinical situation, and enjoys the benefits of protection against disease-preventable diseases, and the complications of those or other underlying diseases. In addition, vaccination helps reducing the use of antibiotics, thus contributing to combatting antibiotic resistance.

The high-risk populations covered by this publication include those living with chronic respiratory diseases, cardiovascular diseases and diabetes, as well as older adults, pregnant individuals and healthcare workers. This toolkit not only serves the goal of highlighting the important role that pharmacists can play in improving vaccination coverage rates among special-risk groups, but also summarises key information, practice guidelines and additional resources to support this role in a very practical manner.

FIP has prioritised and advocated the role that pharmacists play in vaccination for well over a decade. Of the 21 FIP Development Goals that serve as a roadmap for the development of our profession over the coming decade, vaccination is linked to 17 goals, which clearly indicates the high priority vaccination holds not only for pharmacy and FIP, but also for global health. Development Goal 16, focusing on communicable diseases, is overtly linked to the prevention of this group of diseases, in which vaccination plays a prominent role.

In recent years, FIP publications in this area include a resource focusing on [vaccine coadministration](#), a summary of regional meetings about the [challenges and enablers to leveraging pharmacists as vaccinators](#), a [knowledge and skills reference guide in the area of vaccination](#) and an advocacy document in which FIP expresses its commitment to [leveraging pharmacists to build vaccine confidence and address vaccine hesitancy and complacency](#).

With this new publication, FIP aims to support individual pharmacists with understanding how they can contribute to improving vaccination coverage not only in special-risk groups, but also across the whole populations they serve.



Dominique Jordan
FIP President

1 Introduction

Vaccines are one of the most cost-effective ways of preventing diseases and promoting universal health coverage.⁶ While vaccines are recommended for almost everyone, there are specific population groups that can particularly benefit from vaccination, as their health conditions may increase the risk of developing complications, experiencing hospitalisation, and developing secondary illnesses or even dying.⁷

The accessibility, expertise and frequent interactions with the population pharmacists have play an important role in promoting and advising on vaccination, especially in these high risk groups.⁸ According to FIP data a from global survey on pharmacy's impact on immunisation coverage in 2020, 70% of pharmacists are actively educating the public on vaccine-preventable diseases and advocating vaccines.⁹

Those with long-term conditions are at an increased risk of developing complications, experiencing hospitalisation and developing secondary illness.

In addition to counselling on vaccines, pharmacy-based vaccination programmes implemented worldwide are increasing in number. In 2020, pharmacists were able to administer vaccines in at least 36 countries and territories, enabling 1.8 billion people access to vaccination services in community pharmacies.⁹ Following a survey conducted by FIP in 2022, we see this number increasing further.³ This increased growth of pharmacy-based vaccination will allow for increased access to vaccination services for those higher risk populations.

Educating the public is especially important as there has been a rise in anti-vaccination movements over the past few years.¹⁰ This trend has been associated with a larger prevalence of diseases like measles and whooping cough.¹⁰ Vulnerable populations like pregnant individuals, older adults or those with chronic conditions can be vaccine-hesitant; however, pharmacists can actively listen to their concerns and provide assurance of safety and effectiveness of vaccines, thus supporting the protection of these individuals against vaccine-preventable diseases.¹¹

Across special-risk groups, the main vaccine-preventable diseases include influenza, COVID-19, diphtheria, tetanus, pertussis, meningococcal and pneumococcal diseases, measles, mumps and rubella (MMR), hepatitis (A and B) and shingles (Table 1 and Figure 1). These are some of the most important vaccine preventable diseases, although there are more diseases that require vaccination as explained on the [WHO's vaccination schedule recommendations](#). These diseases affect most of the groups listed in this publication in different ways. Across the globe, coverage rates for these conditions vary but are often below the recommended national and global targets.¹²

Table 1 — Main vaccines and preventable diseases for special-risk population groups^{13, 14*}

Vaccine	Description of the disease	Recommendations	General considerations
Influenza	<p>Influenza (flu) is a contagious respiratory illness caused by influenza viruses that can infect the nose, throat and lungs. All age groups can be affected but there are groups that are more at risk than others (see below).</p> <p>Influenza can also lead to severe complications such as pneumonia, heart attack and stroke even for those living without an underlying illness.¹⁵ The risk for all adults of having a heart attack or stroke is elevated by up to 10 and 8 times, respectively, in the 10 days following influenza infection^{16, 17}.</p> <p>The most effective way to prevent flu is vaccination. Influenza vaccination can reduce the risk of heart attack by 15% to 45%, which is similar to the reductions estimated with high-cholesterol medication (19%–30%) or cutting out smoking (32%–43%).¹⁸</p> <ul style="list-style-type: none"> • Symptoms include fever, chills, cough, sore throat, runny or stuffy nose, muscle or body aches, headaches and fatigue. • Most people recover from fever and other symptoms within a week without requiring medical attention. But influenza can cause severe illness or death, especially in people at high risk including the very young, the elderly, pregnant women, health workers and those with serious medical conditions.¹⁹ • The four types of influenza viruses include types A, B, C, and D. However, the two types of concern that cause seasonal infections are types A and B.²⁰ According to the WHO, influenza A viruses can be classified into subtypes based on the proteins on the surface of the virus — haemagglutinin (HA) and neuraminidase (NA). Influenza B viruses can be classified into different lineages. • The WHO recommends the influenza vaccine composition twice a year, based on the advice of a group of experts who analyse virus surveillance data generated by WHO Global Influenza Surveillance and Response System (or GISRS).²¹ • Influenza spreads via respiratory droplets when a person coughs, sneezes or talks. The droplets can then be inhaled by another person into their respiratory tract.²⁰ • In temperate climates, seasonal epidemics occur mainly during winter, whereas in tropical regions, influenza can occur throughout the year, causing outbreaks more irregularly. • Vaccination is especially important for people at high risk of influenza complications, and for people who live with or care for the people at high risk. 	<p>Influenza vaccination aims primarily to protect high risk groups against severe influenza-associated disease and death. WHO²⁰ recommends that the following target groups should be considered for vaccination (no order of priority):</p> <ul style="list-style-type: none"> • Health workers; • Individuals with comorbidities and underlying conditions; • Older adults; and • Pregnant women. <p>Depending on national disease goals, capacity and resources, epidemiology, national policies and priorities, and disease burden, countries may consider additional (sub)populations for vaccination, such as children. (From WHO updated influenza vaccines position paper — May 2022)</p> <ul style="list-style-type: none"> • Older adults should receive tailored flu vaccines, when available, which have been developed specifically to address waning immunity, e.g., containing a higher dose of antigen, as they can develop more severe complications due to flu.²² • Co-administration: In its updated influenza vaccines position paper, the WHO states that co-administering seasonal inactivated influenza vaccines and any dose of a COVID-19 vaccines is acceptable and may increase programme efficiency.²³ 	<ul style="list-style-type: none"> • Flu vaccines can contain three or four researched strains of influenza for the upcoming season which are named trivalent or quadrivalent vaccines, respectively. • The vaccine can be made using chicken eggs. Caution should be taken in individuals with allergies to eggs.

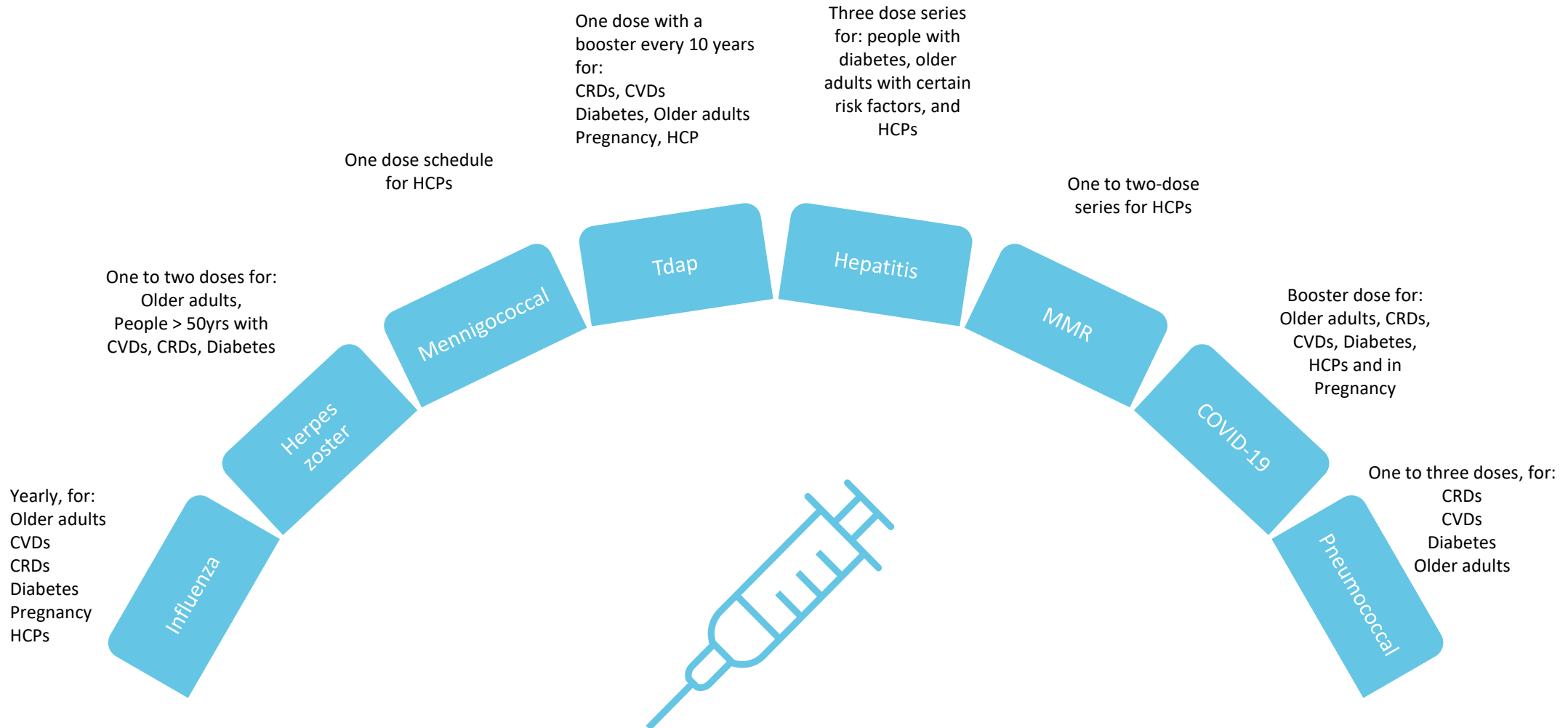
Vaccine	Description of the disease	Recommendations	General considerations
	<p>(see “Recommendations”). Healthcare workers are at high risk acquiring influenza virus infection due to increased exposure to patients and risk further spread, particularly to vulnerable individuals</p>		
Meningococcal	<p>Meningococcal disease is caused by <i>Neisseria meningitidis</i> bacteria. Infection can lead to severe consequences, which can be deadly. It is often characterised by meningitis, an infection of the meninges, which are the membranes that cover the spinal cord and brain, and also infection of the blood stream. These conditions are known as meningococcal meningitis and meningococcal septicaemia, respectively, and come under what is referred to as “invasive meningococcal disease.”</p> <p>The disease can be very rapid in onset and, with the risk of severe complications, it is critical to seek urgent medical attention if symptoms present or if meningitis is suspected. Most common symptoms include fever, headache and stiff or painful neck; additional symptoms often observed are nausea, vomiting, photophobia, confusion, convulsions, rash, joint pains and cold hands and feet.²⁴</p> <p>The bacteria are transmitted from person-to-person through droplets or secretions from infected individuals. The incubation period for the development of symptoms varies between two and 10 days.</p> <p>It is worth noting that meningitis can also be due to other pathogens, including <i>Streptococcus pneumoniae</i>, <i>Haemophilus influenzae</i> and <i>Neisseria meningitidis</i> bacteria.²⁵</p>	<ul style="list-style-type: none"> • Six serogroups (types) of <i>Neisseria meningitidis</i> — A, B, C, W, X and Y — cause most disease worldwide. However, the epidemiology varies across continents and vaccine recommendations reflect the prevalence and incidence by age and where vaccine implementation is most effective. Additionally, different vaccines exist — MenACWY, MenC, MenB, MenA. Therefore, recommendations vary according to the epidemiology and vaccines available. • It is essential to consult country specific recommendations for prevention and vaccination policy. • Routine meningococcal conjugate vaccine is recommended by the WHO, although recommendations may vary across countries and age groups. Overall, the WHO recommends a one-dose schedule, with vaccine administration by deep intramuscular injection, at nine to 18 months of age.²⁶ 	<ul style="list-style-type: none"> • Those at increased risk include microbiologists routinely exposed and those travelling or residing in countries where the disease is prevalent (e.g., some countries in Africa).
Pneumococcal	<p>Pneumococcal disease is caused by <i>Streptococcus pneumoniae</i>, which is an encapsulated bacterium. The polysaccharide capsule serves as a virulence factor. The bacterium is transmitted by direct contact with respiratory droplets and can cause pneumonia, bacteraemia, sinusitis, meningitis and otitis media.²⁷</p> <p>Symptoms of pneumonia include fever, chills, cough, rapid breathing, or difficulty breathing, and chest pain. Symptoms of the other infections may vary and can be found in this resource regarding pneumococcal disease.^{28, 29}</p>	<ul style="list-style-type: none"> • The WHO recommends children receive pneumococcal vaccine as part of the routine immunisation schedule that consists of three doses before 18 months of age.¹³ • In adults, using either pneumococcal polysaccharide vaccine or pneumococcal conjugate vaccine (PCV13 or PPSV23), should take into account the local disease burden and cost-effectiveness considerations.³⁰ • The WHO recommends that the introduction of PCV into national childhood immunisation programmes and measures to sustain high coverage in children should be prioritised over initiating a pneumococcal vaccination programme for older adults.³⁰ • The US CDC recommends pneumococcal vaccination for adults aged 19 to 64 years who have certain chronic medical conditions or other risk factors and for all adults aged 65 years or older.²⁸ 	<p>The US CDC recommends:</p> <ul style="list-style-type: none"> • Separate PPSV23 from PCV12 by eight weeks (PPSV=pneumococcal polysaccharide vaccine; PCV=pneumococcal conjugate vaccine) • Separate doses of PPSV23 by five years • Do not administer repeat doses of PCV15 or PCV20 • PCV15 and PCV20 are not indicated for

Vaccine	Description of the disease	Recommendations	General considerations
<p>Tdap (tetanus, diphtheria, and pertussis)</p>	<p>According to the WHO, <i>Clostridium tetani</i>, <i>Corynebacterium diphtheriae</i>, and <i>Bordetella pertussis</i> are the causative bacteria of tetanus, diphtheria and pertussis, respectively. The bacteria that cause diphtheria and pertussis are transmissible from person to person through respiratory droplets. However, the bacterium that causes tetanus is transmissible through the introduction of tetanus spores through a contaminated wound.^{31, 32}</p> <p>Diphtheria can lead to difficulty breathing, heart failure, paralysis or death.³³</p> <p>Tetanus and diphtheria are well-known diseases whereas pertussis is under-diagnosed.</p> <p>Pertussis is one of the most contagious diseases: one person with pertussis can infect up to 17 other individuals.</p> <p>Adults with chronic respiratory conditions such as asthma or COPD are at greater risk of getting pertussis and suffering from severe consequences (compared with people without asthma or COPD):</p> <ul style="list-style-type: none"> • People with asthma or COPD are up to 4 and 3.5 times, respectively, more likely to get pertussis. • People with asthma or COPD are up to 40 and 75%, respectively, more likely to be hospitalised when they are infected with pertussis. 	<ul style="list-style-type: none"> • The WHO recommends three doses for children - Diphtheria, tetanus and pertussis (DTaP) or Diphtheria, tetanus (DT) vaccines - starting at six weeks separated by four to eight weeks. Three booster doses are also recommended.¹⁴ • The US CDC recommends a Tdap shot with each pregnancy and a Tdap shot every 10 years.³¹ 	<p>anyone younger than 19 years</p> <ul style="list-style-type: none"> • Use DT if patient developed encephalopathy within seven days of previous DTaP • Tdap is preferred in older adults. • Pertussis is not only a childhood disease; it affects adults too.
<p>COVID-19</p>	<p>COVID-19 is caused by the SARS-CoV-2 virus and is part of the coronavirus family. Other viruses from the coronavirus family include severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). The word “corona” means crown and refers to the appearance that coronaviruses have due to their spike proteins. The spike protein is the part of the virus that attaches to the human cell to infect it, which then allows replication inside of the cell.³⁴</p> <p>This disease is transmissible from person to person through respiratory particles when an infected person speaks, coughs, sneezes or breathes. The most common symptoms include fever, cough, tiredness and loss of taste or smell.^{35, 36}</p>	<p>WHO recommends that:³⁷</p> <ul style="list-style-type: none"> • COVID-19 vaccines with WHO Emergency Use Listing are safe for most people 18 years and older, including those with pre-existing conditions, such as auto-immune disorders, hypertension, diabetes, asthma, pulmonary, liver and kidney disease, as well as chronic infections that are stable and controlled. • People who are pregnant, want to get pregnant in the future or are currently breastfeeding, should be vaccinated to protect them and their current or future family. • People who are immunocompromised should be prioritised for an additional dose of COVID-19 vaccine after 1 to 3 months. 	<ul style="list-style-type: none"> • Some COVID-19 vaccines might still require more studies in special-risk populations.

Vaccine	Description of the disease	Recommendations	General considerations
		<ul style="list-style-type: none"> Children should be vaccinated against COVID-19. Older adults should be offered booster doses after their scheduled vaccines. It is safe for most people to get vaccinated against COVID-19. <p>The average requirement is two doses from three weeks to six months apart. Additional booster doses may be required for at-risk populations.³⁷</p>	
Herpes zoster (shingles)	Herpes zoster, known as shingles, is caused by the reactivation of the varicella-zoster virus, which is the same virus that causes varicella (chickenpox). ³⁸ Once varicella resolves, the virus remains dormant in the dorsal root ganglia and can reactivate later in life. The reactivation causes a painful, maculopapular rash referred to as herpes zoster. The rash may present on one side of the face or body and can be painful, itchy or tingly. The most common complication of shingles is long-term nerve pain (postherpetic neuralgia). There are two vaccines that are approved for shingles worldwide (Zostavax and Shingrix); however, some countries may use one over the other. ^{39, 40}	<ul style="list-style-type: none"> The US CDC recommends one dose of Zostavax or two doses of Shingrix separated by six months.³⁹ 	<ul style="list-style-type: none"> All vaccines may not be available in all countries.
Measles, mumps and rubella (MMR)	Measles, mumps and rubella (MMR) are all highly contagious viral infections that are transmitted by respiratory secretions. ^{41, 42} Measles presents with cough, red eyes, fever, rhinorrhoea and a rash. ⁴³ Mumps manifests as pain, tenderness, and swelling in one or both parotid salivary glands. As swelling worsens, the tissue pushes the ear up and out resulting in the jawbone no longer being visible. ⁴⁴ Rubella can result in fever, headache, swollen or enlarged lymph nodes, cough, rhinorrhoea and mild pink eye. ⁴⁵	<ul style="list-style-type: none"> The US CDC recommends a two-dose series, given 4 weeks apart, for healthcare personnel (HCP) born in 1957 or later without serologic evidence of immunity or prior vaccination.^{46, 47} 	<ul style="list-style-type: none"> The MMR vaccine is recommended for people prior to conceiving or after the birth of the child.
Hepatitis A and B	Hepatitis is inflammation of the liver caused by a variety of viruses or non-infectious agents. There are five main strains of the hepatitis virus, referred to as types A, B, C, D and E. ⁴⁸ The different types have different transmission modes, severity of symptoms, and distribution around the world. Some types are preventable by vaccination, for strains A and B. ^{49, 50} Vaccination against hepatitis B also offers protection against hepatitis D since it requires co-infection with the B strain for its replication. ^{48, 51}	<ul style="list-style-type: none"> The WHO recommends at least one dose of Hep A vaccine and three or four doses of Hep B vaccines. Children can receive two or three doses separated by four weeks to six months. Older adults should receive two or three doses up to six months apart.¹³ 	<ul style="list-style-type: none"> Due to the multiple doses required, it can be important to provide reminders for people to ensure they get all the needed doses.

*Vaccination schedules and available vaccines may vary from country to country. Therefore, it is important to refer to your national or local recommendations. This table presents WHO recommendations when available and some recommendations from the US Centers for Disease Prevention and Control (CDC) where no specific WHO recommendations are available. US CDC recommendations may not be applicable in all countries or jurisdictions.

Figure 1 — Main recommended vaccines for special risk groups *



*Vaccination recommendations and schedules may vary therefore it is important to refer to your national or local recommendations. This figure presents general recommendations that might not be applicable in all countries/jurisdictions.

Some online tools are available for healthcare professionals and patients to check their vaccination needs. The results obtained in online resources may not always be applicable to your country or jurisdiction, but they provide some useful guidance. One example is the [Adult Vaccine Assessment Tool](#) from the Centers for Disease Control and Prevention.

Wherever possible, the administration of different vaccines in the same session should be promoted. This can be a valuable way of increasing vaccine uptake and providing a convenient solution for patients to get their vaccines up to date. FIP has developed guidelines on [“Optimising vaccination through coadministration of influenza and COVID-19 vaccines”](#).

To support the vaccination of vulnerable individuals, this toolkit was developed to provide information on six special-risk population groups. They include people living with chronic respiratory diseases, people living with cardiovascular diseases, people living with diabetes (types I or II), older adults, Pregnant individuals, and healthcare professionals and healthcare workers. Each chapter will focus on what factors increase their susceptibility to vaccine-preventable diseases and the benefits of receiving the vaccines. In addition, this resource includes the main recommended vaccines for each group and information for pharmacists and patients.

2 People living with chronic respiratory diseases

2.1 What makes people living with chronic respiratory diseases vulnerable?

Chronic respiratory diseases (CRDs) are often characterised by narrowed airways and increased mucus secretion, which makes breathing difficult. Respiratory infections often cause similar symptoms which can lead to exacerbations of diseases like asthma and chronic obstructive pulmonary disease (COPD). In addition, these infections may cause further damage to the lungs and lead to disease progression. It is imperative that people diagnosed with CRDs receive appropriate vaccines to minimise the risk of disease exacerbation and progression. Unfortunately, there is no cure for asthma or COPD and treatment is focused on reducing symptoms, preventing progression and improving quality of life.⁵² Immunisation provides the best protection against vaccine-preventable diseases. To highlight the important role that pharmacists can play in the management of CRDs, FIP developed the resource "[Chronic respiratory diseases: A handbook for pharmacists](#)".

According to the WHO, asthma, COPD, pulmonary hypertension and occupation-associated lung diseases are the most common CRDs.⁵² While asthma is the most prevalent of the CRDs, COPD is associated with a higher number of deaths, with over three million deaths in 2019. The majority of these deaths occur in low- and lower-middle income countries where access to healthcare is limited resulting in under-diagnosis and under-treatment.⁵³ Individuals with CRDs are at higher risk of developing severe flu complications, including severe illness and possibly death.¹⁹

Respiratory viruses, including influenza, rhinovirus, respiratory syncytial virus, and SARS-CoV-2 have been shown to increase the risk of asthma exacerbations.⁵²

Individuals with chronic respiratory diseases are at higher risk of developing severe flu complications, including severe illness and possibly death.

Individuals with chronic respiratory diseases are more likely to develop severe lung infections due to the reduced lung function at baseline.

Being fully vaccinated is very important in individuals with CRDs. Since they already have diminished lung function, they have a difficult time recovering from illnesses. Respiratory illnesses are exceptionally troublesome, as they tend to exacerbate symptoms associated with their chronic disease. Vaccination has shown to reduce severity of illnesses and prevent the number of cases.⁵² Severe lung infections like tuberculosis, whooping cough, pneumonia or measles may lead to permanent lung damage. This lung damage can lead to more frequent illnesses and disease progression.⁵⁴

2.2 Vaccines recommended for people with chronic respiratory conditions

The vaccines recommended for people living with CRDs include influenza, pneumococcal, Tdap, COVID-19 and the herpes zoster vaccine (for people aged 50 years and older) (**Error! Not a valid bookmark self-reference.**). However, you should refer to your national recommendations as this may not be the case everywhere.

Annual immunisation against influenza is recommended by the WHO.⁵⁵ Vaccines that are either killed or live inactivated viruses are recommended since they are most effective in the elderly population with COPD.⁵⁶ On the same note, receiving the vaccine for pneumococcal disease reduces the chances of COPD exacerbations.⁵⁷ Individuals with asthma and COPD should be up to date with the COVID-19 vaccine, including booster doses, in line with their national recommendations. Another important vaccine to consider is the Tdap vaccine in patients with COPD or asthma who were not vaccinated in adolescence. Lastly, the zoster vaccine is recommended in adults with COPD aged over 50 years to protect against shingles.⁵⁶

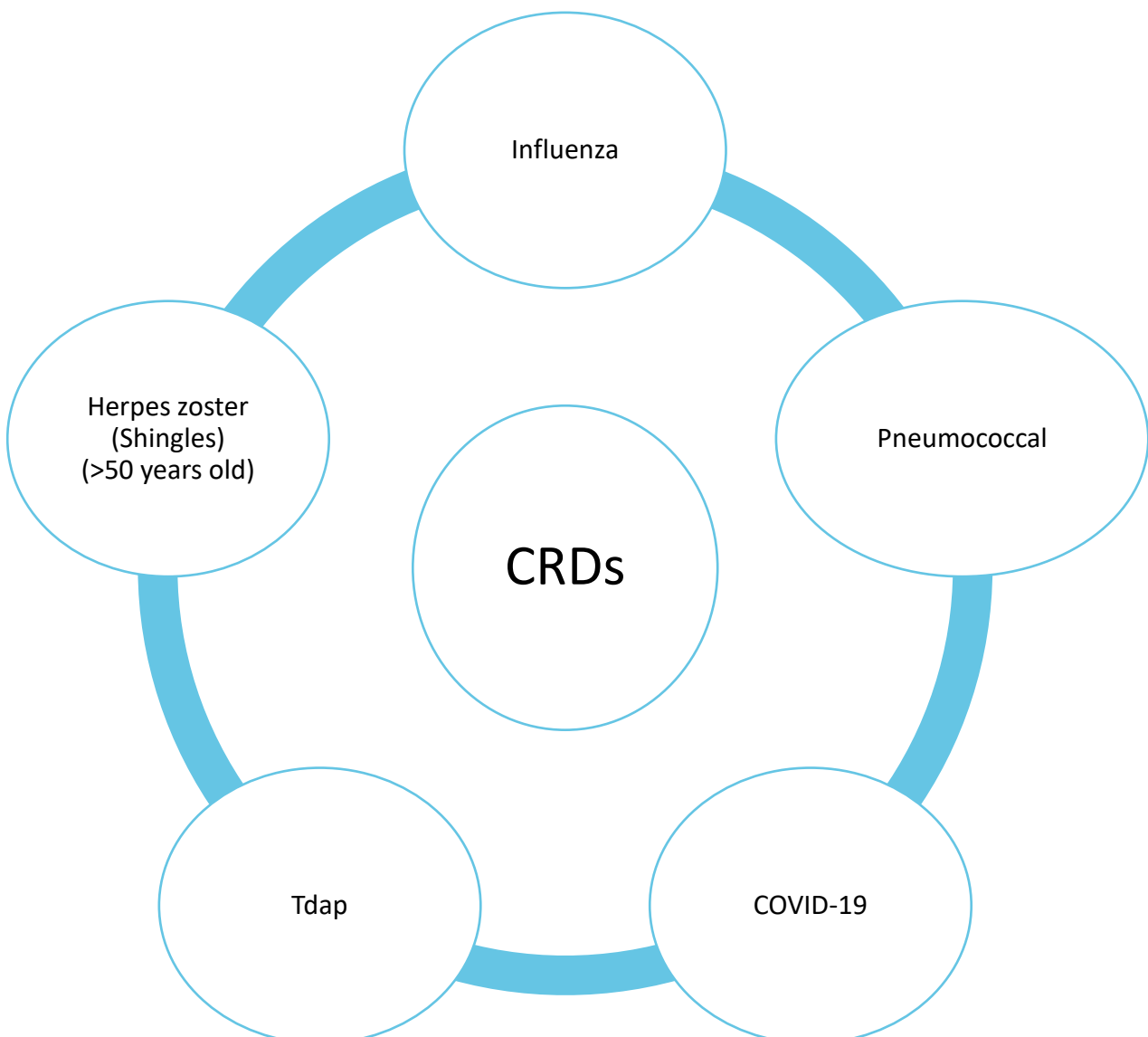
Table 2 — Vaccines recommended for people living with chronic respiratory conditions

Vaccine	Impact on chronic respiratory conditions
Influenza	According to the WHO, individuals with chronic medical conditions, including those affecting the respiratory system, should be prioritised when administering flu vaccines. ⁵⁵ Severe illnesses are more likely to require hospitalisation in this population since flu can worsen airway inflammation. ⁵⁸ Flu vaccines can reduce the severity of illness, as shown in a 2021 study where the flu vaccine was associated with reduced ICU admission by 26% and reduced risk of death by 31%. ⁵⁹
Pneumococcal	In addition to the influenza vaccine, the US CDC recommends that people suffering from CRDs receive the pneumococcal vaccine. ⁵⁸ Pneumococcal pneumonia is a potential complication of influenza that can lead to death and patients suffering from it may have a more difficult time recovering from the illness due to their reduced lung function. ⁵⁸
Tdap	Diphtheria is a respiratory infection that is characterised by a thick grey or white patch caused by diphtheriae toxins in the back of the throat that may block the airways, decreasing an individual's ability to swallow or breathe properly. ⁶⁰ In patients with CRDs, this could potentially be deadly as they may already have diminished breathing capability. Pertussis is a highly contagious respiratory infection also known as whooping cough. The most common symptoms include a running nose and cough that gradually worsens into a hacking cough that can last as long as eight weeks. The coughing spells can trigger exacerbations of asthma or COPD. Additionally, pertussis infections can lead to pneumonia. ³²
COVID-19	The symptoms of COVID-19 may trigger exacerbations of pre-existing CRDs. However, the symptoms of COVID-19 can linger for months after contracting the illness and 20% of individuals may develop post COVID-19 syndrome. These individuals continue to have symptoms like persistent cough and shortness of breath severe enough to impact their ability to perform daily activities. ⁶¹ Since COVID-19 vaccines have been shown to reduce the severity of illness, vaccination is one way to reduce the impact of the disease. The WHO recommends prioritising patients with underlying chronic conditions, like CRDs, if there is a limited supply of vaccines. ⁶²
Herpes zoster (Shingles)	Shingles vaccination is not specifically recommended to people with chronic respiratory diseases by any major international organisation. However, this vaccine is recommended for people aged 50 years and older as they are at risk of developing herpes zoster. In addition, people aged 19 years and older with certain immunocompromising medical conditions should also receive it. There is some evidence that those with COPD are at an even greater risk of developing herpes zoster, at 50% to 200%, with most people (74.7%) being unaware of this increased risk. ⁶³

2.3 Key messages and pharmacists' advice

- Individuals with CRDs are at higher risk of severe complications and death from vaccine-preventable illnesses due to their narrowed, mucus-filled airways.
- Vaccine-preventable diseases may lead to damage of the airways that leads to disease progression, thus increasing patients' susceptibility of contracting illnesses.
- Non-vaccination increases the risk of developing secondary infections that may lead to permanent lung damage, worsening the pre-existing CRDs.
- Remember to ask patients with CRDs if they have had the following vaccines (Figure 2): influenza, pneumococcal, COVID-19 Tdap and herpes zoster (for people aged 50 years and older).
- Every encounter with someone living with CRDs is an opportunity to ask about their vaccination status, recommend the vaccines listed in this chapter and administer them where possible or refer the person to other healthcare professionals to get vaccinated, as appropriate.

Figure 2 - Recommended vaccines for people with chronic respiratory conditions



2.4 Additional information for patients

- Do you have all the vaccines? Let's check using the [Vaccinations for Adults with Lung Disease checklist from Immunize.org](#).
- For further information, you can consult the [CDC's "What You Need to Know About COPD, Asthma, and Adult Vaccines Factsheet"](#).
- More information in a simple animated video from the [American Lung Association](#), and you can consult the [American Lung Association's "Vaccines that Protect Against Infectious Respiratory Diseases"](#).
- Check the webpage: [Asthma and Allergy network](#)
- Consult [COPD support Ireland](#)
- [Asthma and Lung UK webpage](#) on COVID-19 vaccines
- [European Lung Foundation](#) information about vaccination

3 People living with cardiovascular diseases

3.1 What makes people living with cardiovascular diseases vulnerable?

Cardiovascular diseases (CVDs) are characterised by a group of disorders that affect the heart and the blood vessels. This can include acute ischaemic syndromes, such as myocardial infarction, stroke and peripheral arterial disease and heart failure, atrial fibrillation and valvular diseases.⁶⁴ the world. In addition to being widespread, CVDs are the number one cause of death worldwide and made up 32% of deaths in 2019.⁶⁴

Additionally, certain vaccine-preventable diseases increase the likelihood of experiencing a cardiovascular event, such as a myocardial infarction.⁶⁵ Vaccine-preventable infections contributed significantly to the development of cardiovascular complications.¹² People living with CVDs are therefore at risk and represent a population that could benefit the most from vaccination.⁶⁶ To highlight the important role that pharmacists can play in the management of CVDs, FIP developed the resource "[Cardiovascular diseases: A handbook for pharmacists](#)".

Severe cases of influenza not only increase the rate of hospitalisation but can increase the likelihood of stroke in people living with CVDs. In 2020, a study found that one in eight patients hospitalised with influenza experienced a sudden heart complication.

According to the WHO, individuals with chronic medical conditions, including those with CVDs, should be prioritised when administering flu vaccines.⁵³ Individuals with CVDs are at a higher risk of developing severe flu complications, including severe illness and possibly death. In fact, roughly 50% of adults hospitalised with flu had heart disease listed as a chronic condition.⁶⁶ Cardiovascular complications such as heart failure, myocardial infarction, arrhythmia and stroke can also develop during acute viral infections or years after recovery.⁶⁷ Severe cases of influenza not only increase the rate of hospitalisation but can increase the likelihood of stroke. In 2020, a study found that one in eight patients hospitalised with influenza experienced a sudden heart complication.⁶⁸

Adequate vaccination is very important in individuals with CVDs. Since individuals may have decreased heart function at baseline, it is imperative to prevent further damage. Furthermore, their bodies are already operating under a constant level of stress, which means they will experience more severe cases as they have less energy to overcome the illness.⁶⁹ Vaccines have been shown to reduce severity of illnesses and prevent several cases.⁷⁰ In this population group, reducing severity often means reducing the risk of hospitalisation and reducing disease progression, both of which can save the patient and healthcare systems money and maintain patients' quality of life.⁷¹

Vaccination has been shown to reduce severity of illnesses and prevent several cases. In this population group, reducing severity often means reducing the risk of hospitalisation and disease progression.

Individuals with CVDs are more likely to develop severe infections due to their reduced heart function. Some vaccine-preventable diseases, like influenza and COVID-19, can further damage the heart and lead to complications like heart attack and stroke.⁷² Heart damage can lead to more frequent illnesses and disease progression, and COVID-19 infection can worsen long-term cardiovascular or respiratory complications, with dyspnoea being most commonly reported and the prevalence of chest pain ranging from 13% to 21%.⁷³

3.2 Vaccines recommended for people with cardiovascular diseases

The vaccines recommended for people living with CVDs include influenza, pneumococcal, Tdap, COVID-19 and the herpes zoster vaccine for people aged 50 years and older (Table 3). However, you should refer to your national recommendations as this may not be the case everywhere.

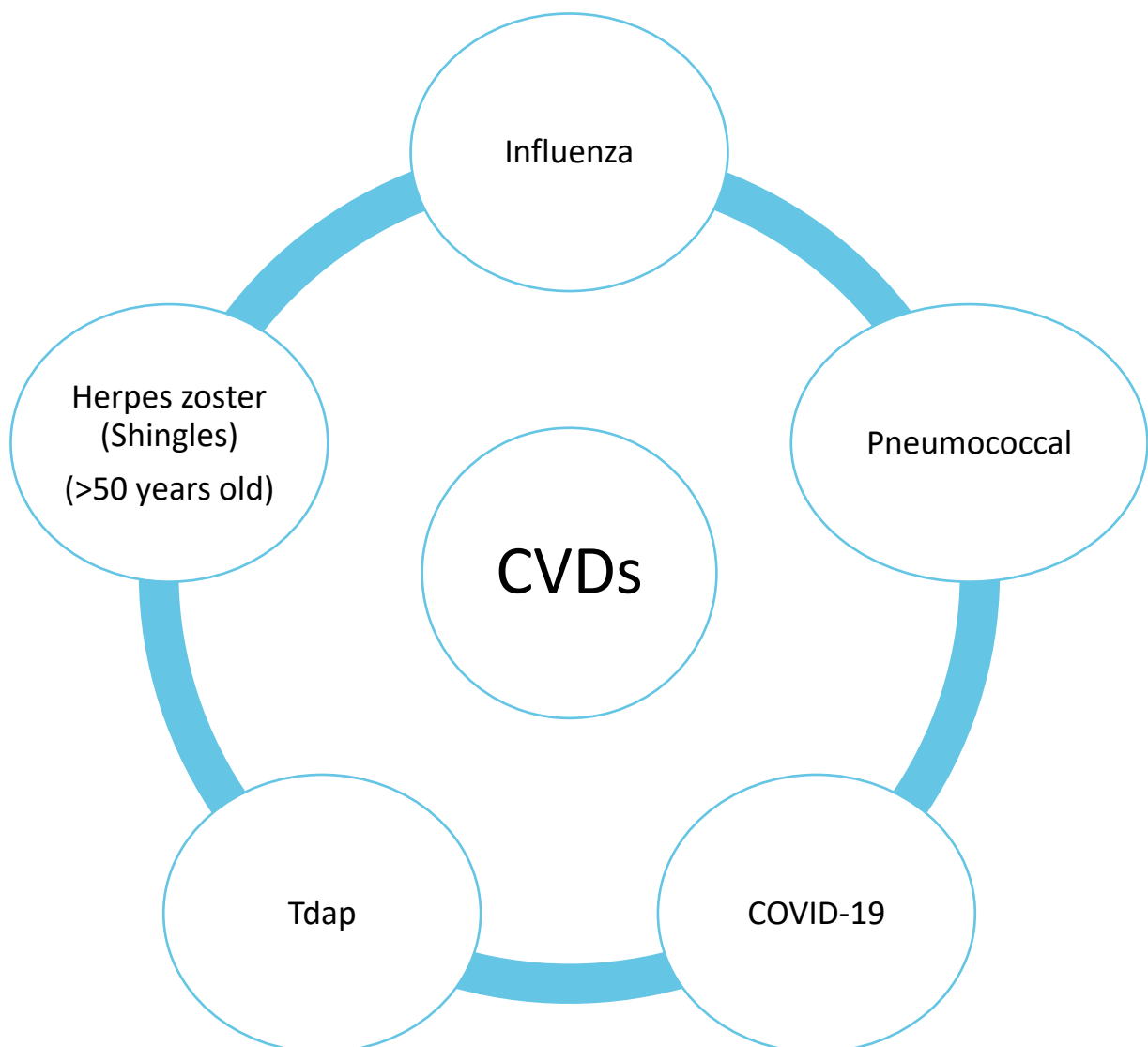
Table 3 — Vaccines recommended for people living with cardiovascular diseases

Vaccine	Impact on cardiovascular diseases
Influenza	People with heart disease and a previous history of stroke are at higher risk of developing serious flu complications. A 2018 study concluded that the risk of having a heart attack was six times higher within a week of confirmed flu infection. ⁶⁶ In addition, around 12% of patients would have serious heart complications if admitted to hospital with influenza. ⁶⁶ The flu vaccine has been shown to reduce severity of illness in people who are vaccinated. ⁶⁸
Pneumococcal	A flu-related complication can be due to pneumococcal pneumonia, which can cause death. People who have heart disease should receive the pneumococcal vaccine to protect pneumococcal-associated diseases such as pneumonia, meningitis and bloodstream infections. Around 30% of patients admitted to hospital with pneumococcal disease will experience a major adverse cardiovascular event, including new or worsening heart failure, new or worsening arrhythmia, or myocardial infarction. ⁷⁴
Tdap	Complications from respiratory diphtheria can result in airway blockage, myocarditis, polyneuropathy and kidney failure. People with CVDs should receive the Tdap vaccine to prevent the inflammatory cascade, which could result in myocarditis or death. ⁷⁵
COVID-19	Respiratory infections, and infections in general, cause an inflammatory cascade which can precipitate a cardiovascular event that can be detrimental in a patient with existing CVDs. People with CVDs are at an increased risk of developing a severe form of COVID-19 which could result in death. Being vaccinated against COVID-19 is advantageous for people with CVDs because they will acquire immunity, minimising the risk of infection, and reducing disease transmission and viral replication in the body. ⁷⁶
Herpes zoster (Shingles)	Shingles vaccination is not specifically recommended to people with cardiovascular diseases by any major international organisation. However, this vaccine is recommended for people aged 50 years and older as they are at risk of developing herpes zoster. In addition, people aged 19 years and older with certain immunocompromising medical conditions should also receive it. ^{77, 78} There is some evidence that people who develop herpes zoster may be at risk for cerebrovascular and cardiac events. Those who receive the shingles vaccine lower their risk of stroke by 16% according to a 2017 study. ⁷⁹

3.3 Key messages and pharmacists' advice

- Individuals with CVDs are at higher risk of severe complications and death from vaccine-preventable illnesses.
- Vaccine-preventable diseases may lead to damage of the heart and thromboembolisms, leading to disease progression.
- Non-vaccination increases the risk of developing secondary infections that may lead to permanent heart damage.
- Remember to ask patients with CVDs if they have had the following vaccines (Figure 3): influenza, pneumococcal, COVID-19, Tdap and herpes zoster (for people aged 50 years and older).
- Every encounter with someone living with CVD is an opportunity to ask them about their vaccination status, recommend the vaccines listed in this chapter and administer the vaccines where possible or refer the person to other healthcare professionals to get vaccinated, as appropriate.

Figure 3 - Recommended vaccines for people with cardiovascular diseases



3.4 Information for patients

- For further information, you can consult the [CDC's What You Need to Know about Heart Disease and Adult Vaccines](#)
- Immunize.org contains a [checklist for vaccinations for people living with cardiovascular disease](#)
- National Foundation for Infectious Disease (US) provides [a Flu and Chronic Health Conditions Toolkit](#).
- The American Heart Association gives further detail about [what Doctors know about immunizations right now: You still need them.](#)
- Health Canada information for [COVID-19 and heart conditions](#)
- Check the webpage of the [European Society of Cardiology](#)
- British Heart Foundation link about [myocarditis and COVID-19](#)

4 People living with diabetes

4.1 What makes people living with diabetes vulnerable?

In 2021, there were approximately 537 million adults living with diabetes, a number that is likely to increase to 783 million by 2045.⁸⁰ Also in 2021, 6.7 million deaths could be attributed to diabetes and the condition accounted for 9% of total health expenditure worldwide.⁸⁰ Low physical activity, poor nutrition, high body mass index and air pollution are all risk factors for diabetes.⁸¹ Complications that can occur due to uncontrolled glycaemic levels include stroke, heart attack, peripheral arterial disease, kidney disease, blindness and neuropathy.⁸² Severe illness is more likely to require hospitalisation in this population group, as the physiological response often leads to states of hyperglycaemia or hypoglycaemia, or lead to loss of appetite, which can complicate blood glucose management even further.⁸³ Hyperglycaemia may lead to acute episodes of diabetic ketoacidosis and cause long-term complications.⁸⁴

Even when a person's diabetes is well managed, some physiological factors such as inflammation or blood pressure can create an environment in the body that makes it harder for the immune system to effectively fight infections.

Patients suffering with complications are more likely to be hospitalised and this can have a big impact on the overall healthcare costs associated with diabetes care. Even when a person's diabetes is well managed, some physiological factors such as inflammation or blood pressure can create an environment in the body that makes it harder for the immune system to effectively fight infections. In addition, outbreaks of hepatitis B associated with blood glucose monitoring procedures have happened among people with diabetes.⁸⁵

Pharmacists have an important role in approaching people living with diabetes because they visit the pharmacy often for medicines, insulin and other self-management tools and materials. The role of pharmacists in diabetes management includes patient identification, assessment, education, referral and monitoring.⁸⁶ To highlight the important role that pharmacists can play in the management of diabetes, FIP developed the resource "[Diabetes prevention, screening, and management: A handbook for pharmacists](#)".

The International Diabetes Federation Europe recommends that awareness and education should be reinforced for healthcare professionals and people living with diabetes on the benefits of vaccination and the risks of non-vaccination in relation to the management of their condition, and encourage healthcare professionals to discuss and offer vaccination.⁸⁷ Digital channels and interventions can be an important factor to increase vaccine uptake, as it will allow more healthcare professionals to engage in broader campaigns but also in more closer interactions with patients.⁸⁸

People living with diabetes can especially benefit from being vaccinated as some diseases will have a direct impact on blood sugar levels, and a sustained status of uncontrolled glycaemia can worsen the condition.

For some time, it has been clear that people living with diabetes can especially benefit from being vaccinated as some diseases will have a direct impact on blood sugar levels, and a sustained status of uncontrolled glycaemia can worsen the condition.⁸⁹

4.2 Vaccines recommended for people living with diabetes

The vaccines recommended for people living with diabetes are influenza, COVID-19, pneumococcal, Tdap, hepatitis B (in specific population groups – see below), and herpes zoster for people aged 50 years and older (Table 4).⁸⁵ However, you should refer to your national recommendations as this may not be the case everywhere.

Table 4 — Vaccines recommended for people living with diabetes

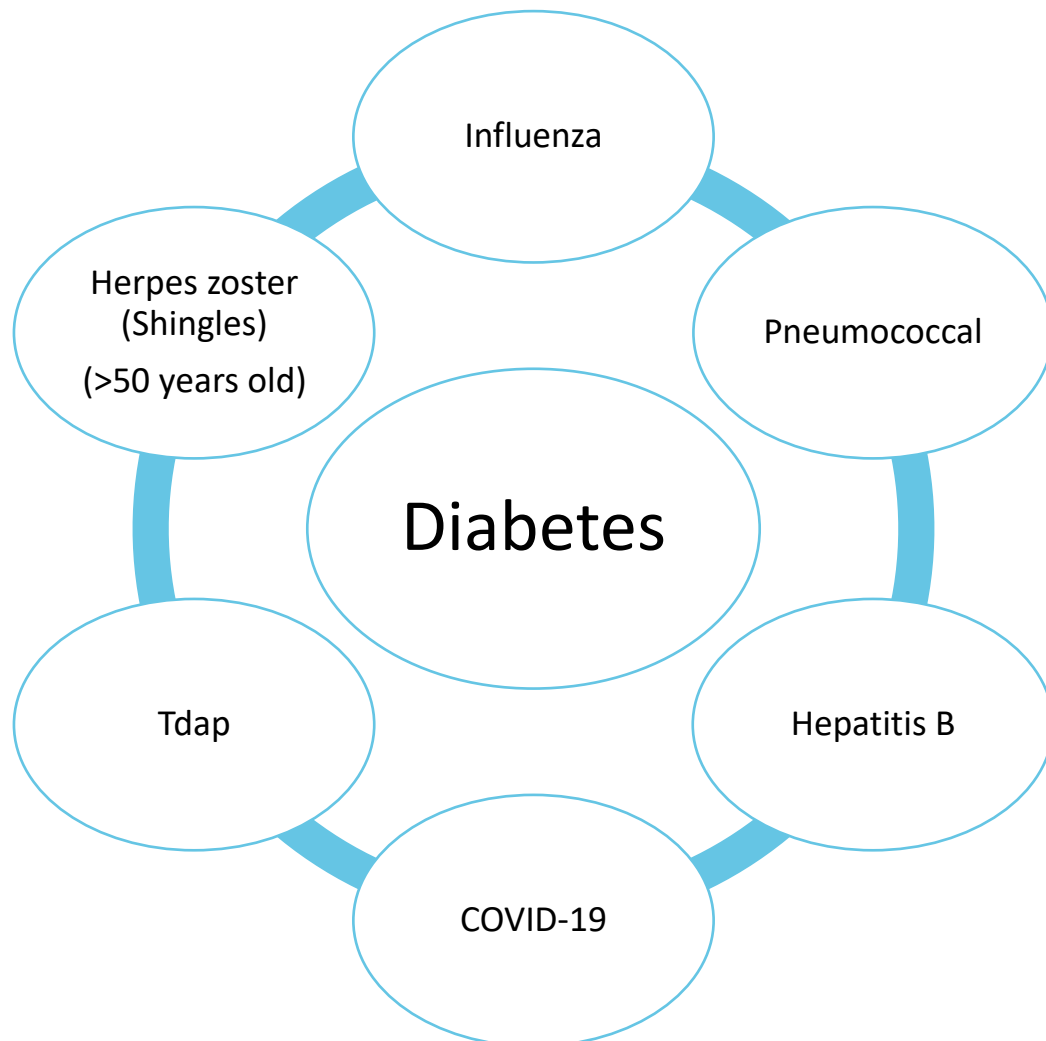
Vaccine	Impact on diabetes
Influenza	People living with diabetes are twice as likely to die from influenza than people with no underlying medical condition and this seems to be closely linked to the fluctuation of blood sugar levels associated with severe influenza cases. ⁹⁰ A report has shown a 75% increase in abnormal glycaemic events in adults with type 2 diabetes during the influenza period. ⁹¹ Annual administration of the influenza vaccine has been shown to decrease diabetes-related hospital admissions for influenza during flu epidemics by as much as 79%. ⁹² Vaccinating people at high risk every year is the most effective measure for reducing the impact of influenza. ⁹³
Pneumococcal	Diabetes increases the risk of acquiring pneumonia and invasive pneumococcal disease, and increases the risk for morbidity and mortality from pneumococcal infection. ⁹⁴ Individuals with diabetes are six times more likely to be hospitalised and three times more likely to die from complications of influenza or pneumonia than those in the general population. ⁹⁵
Tdap	Patients with diabetes who have a foot ulcer can be more prone to tetanus, especially older patients without a record of having received the Tdap vaccine. ⁹⁶ Regarding diphtheria, some patients can be more prone to cutaneous infection caused by the diphtheria bacteria. ⁹⁷ On pertussis, it seems that immunisation can be especially important in protecting children against the development of type 1 diabetes. ⁹⁸ Work done regarding vaccination in hospitals following patient admission could increase Tdap vaccination coverage rates by 26%. ⁹⁹
COVID-19	COVID-19 can have an impact on people living with diabetes, as some data shows a 33% mortality rate for people with diabetes, with a strong correlation with sliding scale insulin and mortality. ¹⁰⁰ Some limited research outlines the action of metformin inhibiting an inflammatory response in COVID-19 cases. ¹⁰¹ Regarding COVID-19 vaccination, some work still needs to be done so people living with diabetes can overcome their hesitancy in getting vaccinated. ¹⁰²
Hepatitis B (HBV)	Higher concentrations of HBV are found in blood, while lower concentrations are found in other bodily fluids. Adults with diabetes are twice as likely to acquire an acute HBV infection and have a 60% higher prevalence of HBV infection compared with adults without diabetes. ¹⁰³ Insufficient persistence with infection control measures using blood glucose monitoring increases the risk of acquiring HBV among adults with diabetes, and vaccination is likely to substantially reduce that risk. ¹⁰⁴ Interventions led by pharmacists focused on motivational interviewing could increase the uptake of HBV, which requires more than one dose. ¹⁰⁵ The US CDC recommends vaccination against HBV for all persons with diabetes age 19 through 59 years; and for persons with diabetes aged 60 years or older at the discretion of the treating clinician. ¹⁰⁶
Shingles (herpes zoster)	Shingles vaccination is not specifically recommended to people with diabetes by any major international organisation. However, this vaccine is recommended for people aged 50 years and older as they are at risk of developing herpes zoster. In addition, people aged 19 years and older with certain immunocompromising medical conditions should also receive it. ^{77, 78} There is evidence that shingles vaccination can be important for people who suffer from neuropathy related to diabetes, as postherpetic neuralgia is the most common complication of shingles. ¹⁰⁷ In addition, diabetes seems to

Vaccine	Impact on diabetes
	increase the clinical severity and development of herpes zoster, highlighting the importance of this vaccine in this group. ¹⁰⁸

4.3 Key messages and pharmacists' advice

- Individuals with diabetes are at higher risk of severe complications and death from vaccine-preventable illnesses, as these conditions can lead to uncontrolled blood sugar levels.
- Remember to ask patients living with diabetes if they have had the following vaccines: influenza, pneumococcal, hepatitis B, COVID-19, Tdap and herpes zoster (shingles).
- Every encounter with someone living with diabetes is an opportunity to ask them about their vaccination status, recommend the vaccines listed in this chapter and administer the vaccines where possible or refer the person to other healthcare professionals to get vaccinated, as appropriate.
- You can deliver a health promotion campaign on the topic of vaccination for people living with diabetes. There is a [guidance checklist](#) as well as information on the [FIP toolkit on vaccine hesitancy](#) available to aim for a structured and impactful campaign. It is important when confronted with vaccine hesitancy to keep the door open for a continued conversation at the next encounter.
- Further information on how to tackle hesitancy can be found in the vaccine hesitancy toolkit. It is important to hear what patients have to say and make sure pharmacists understand their concerns about vaccines.

Figure 4 - Recommended vaccines for people with diabetes



4.4 Information for patients

- For further information, you can consult the [CDC's What You Need to Know about Diabetes and Adult Vaccines](#)
Error! Reference source not found..
- Immunize.org contains a [checklist for the recommended vaccines for people living with diabetes](#).
- **Error! Reference source not found.** Further information from the CDC: [Healthy Living with Diabetes: Getting the Vaccines You Need](#).
- The Association for Professionals in Infection Control and Epidemiology provides information on [Diabetes, Infections, and You](#).
- [The National Foundation for Infectious Diseases](#) (US) provides information regarding vaccinations in diabetics.
- [Diabetes UK information about vaccines](#)
- [National Centre for Immunisation Research and Surveillance diabetes fact sheet](#) (Australia)

5 Older adults

5.1 What makes older adults vulnerable?

As individuals age, their immune systems weaken. As a result, people in advanced age tend to become ill more often and have more severe disease.¹⁰⁹ In fact, vaccine-preventable diseases like influenza, pneumococcal disease, herpes zoster and pertussis are associated with high levels of morbidity and mortality.¹⁰⁹ Additionally, the likelihood of living with at least one chronic condition is higher in older adults, increasing the likelihood of complications from vaccine-preventable diseases.¹⁰⁹ The quality of health experienced by ageing adults relies heavily upon their physical and social environment. Therefore, healthy behaviours, like routine vaccination, is imperative to maintain health and functional ability.¹¹⁰

As the number of ageing adults increases, it is likely that the demand for primary healthcare and long-term care services will increase.

According to the WHO, in 2019 there were one billion people aged 60 years old or older. This number is projected to reach 1.4 billion in 2030 and 2.1 billion in 2050.¹¹⁰ As the number of older adults increases, it is likely that the demand for primary healthcare and long-term care services will increase.

Many deaths in this population are attributed to vaccine-preventable illnesses. For example, respiratory infections caused 1,626.44 per 100,000 deaths in 2019 in the USA.¹¹¹ Also in the USA, hospitalisation rates due to influenza among older adults, specifically, those aged 75–84 years and 85 years and over, were three and six times greater, respectively.¹¹² Regarding the recent COVID-19 pandemic, people aged 65 years and over who received two doses of COVID-19 vaccines showed a 94% reduced risk of COVID-19-related hospitalisations.¹¹³ This shows the importance of vaccinating older adults.

Hospitalisation rates due to influenza among older adults, specifically, those aged 75–84 years and 85 years and over, were three and six times greater, respectively.

Vaccinations are also key to maintaining a high quality of life. Older patients may never fully recover from vaccine-preventable diseases. In many cases, the illness may require hospitalisation. We know vaccinations reduce disease severity and therefore can reduce the number of hospitalisations experienced by a patient, which in turn saves on healthcare costs.¹⁹ By not receiving a vaccine, patients may experience a notable decline in their health and functional ability. Illnesses like flu and shingles are commonly responsible for this phenomenon.¹⁹

5.2 Vaccines recommended for older adults

The vaccines recommended for older adults include influenza, pneumococcal, Tdap, COVID-19, herpes zoster, and hepatitis B (for people with specific risk factors – see below) (Table 5). However, you should refer to your national recommendations as this may not be the case everywhere.

Table 5 — Vaccines recommended vaccines for older adults

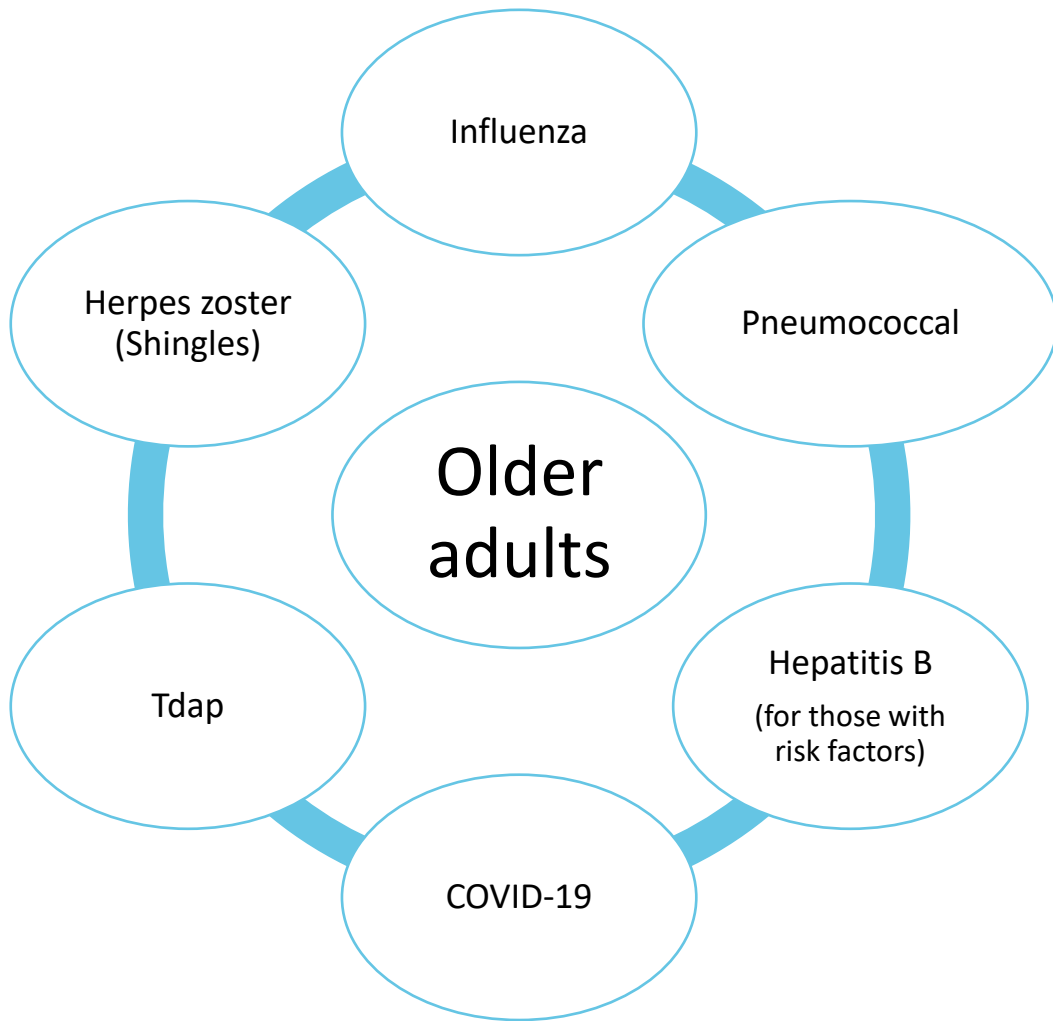
Vaccine	Impact on older adults
Influenza	Seasonal influenza makes a substantial contribution to mortality rates, particularly among older adults aged 65 years and older. ¹¹⁴ Deaths among older adults with comorbidities accounted for 89.4% of the overall average influenza-associated deaths in the United States from 1976 to 2007. ¹¹⁵ On the other hand, the influenza vaccine significantly reduces pneumonia- and influenza-related hospitalisations, with an effectiveness of 25–53%. ¹¹⁶
Pneumococcal	Pneumococcal diseases have a detrimental effect on the elderly due to decreased immune response. Pneumonia disproportionately affects individuals older than 65 years and those with underlying medical conditions, who often endure high rates of hospitalisations and mortality. Infections due to pneumonia have been reported as high as 20% in the older population. The pneumococcal vaccine did not alter the risk of hospitalisation from pneumonia but was associated with a reduction in the death risk from pneumonia. ¹¹⁷
Tdap	The risk of both tetanus disease and mortality is higher among persons aged 65 years or over than in younger people due to a significant reduction in immunity. By age 70, only 45% of men and 21% of women have a protective level of antibodies against tetanus. In addition, immunity declines progressively with age relating to diphtheria, to approximately 30% of those vaccinated aged 60–69 years. Lastly, the economic and epidemiologic impact of Tdap vaccination in adults aged 65 years or over demonstrated that a dose of Tdap administered to older adults resulted in a modest decrease in the number of cases of pertussis and other outcomes (e.g., outpatient visits, hospitalisations and deaths). ¹¹⁸
COVID-19	Older adults are three times as likely to die from COVID-19 than young adults. ¹¹⁹ COVID-19 has had a significant impact on older adults because it has led to isolation and loneliness, which results in physical inactivity and depression. Older adults who are isolated are at a higher risk of COVID-19 hospitalisation, ICU admission, and mortality due to comorbidities, poor nutrition, depressed immunity and lower organ function. ¹²⁰
Herpes zoster (shingles)	Adults greater than 50 years old are at an increased risk of developing shingles due to the immunosenescence. In addition, shingles and its complications are associated with substantial morbidity among older adults. Specifically, the incidence of shingles increases with age among persons aged 80 years or older. A common complication of shingles is postherpetic neuralgia, which can produce intense and debilitating pain and loss of quality of life. ¹⁰⁷ The herpes zoster vaccine is 89.8% effective in reducing the risk of shingles among adults aged 70 years or older. ¹²¹
Hepatitis B (HBV)	Hepatitis B vaccination is not specifically recommended for all older adults. However, the US CDC and Immunize.org do recommend vaccination of adults aged 60 years or older who have never completed a HepB vaccination series, and have risk factors, such as: ^{122, 123} <ul style="list-style-type: none"> - Being a sex partner of someone who has hepatitis B virus infection - Being sexually active but not in a long-term, mutually monogamous relationship - Being evaluated or treated for a sexually transmitted disease - Being a man who has sex with men - Being an injection drug user - Being a household contact of someone who has chronic hepatitis B virus infection - Working or living in a facility for developmentally disabled persons

Vaccine	Impact on older adults
	<ul style="list-style-type: none"> - Being a healthcare or public safety worker who might be exposed to blood or blood-contaminated body fluids - Currently receiving dialysis (or having the possibility of receiving it in the future) - Living with a Human immunodeficiency virus (HIV) infection - Living with diabetes - Planning to travel in an area of the world where hepatitis B is common - Living with a hepatitis C infection - Living with chronic liver disease - Having been recently in prison or being currently incarcerated. <p>More than 400 million people world-wide are seropositive for the hepatitis B surface antigen.¹²⁴ The development of the HBV vaccine in 2006 led to a decrease in the incidence of infection.¹²⁵ HBV produces changes in the liver and older adults are at increased risk of complications linked to the virus, like hepatocellular carcinoma. Adults aged 60 years or over with risk factors for hepatitis B, like decreased liver mass and hepatocytes and reduced portal blood flow which results in an alteration of metabolism, should receive the HBV vaccine.</p>

5.3 Key messages and pharmacists' advice

- The immune system weakens with age, making individuals vulnerable to more frequent and more severe infectious illnesses.
- Older adults struggle to recover from illnesses than younger individuals do.
- The number of ageing adults is increasing at an exponential rate.
- The only way to prevent shingles is through vaccination.
- Remember to ask older adults if they have had the following vaccines: influenza, pneumococcal, hepatitis B (if one of the risk factors listed above are present), COVID-19, Tdap and herpes zoster (shingles).
- Every encounter with an older adult is an opportunity to ask them about their vaccination status, recommend the vaccines listed in this chapter and administer the vaccines where possible or refer the person to other healthcare professionals to get vaccinated, as appropriate.

Figure 5 - Recommended vaccines for older adults



5.4 Information for patients

- For further information, you can consult the [CDC's Our Best Shot: The Importance of Vaccines for Older Adults](#)
- Immunize.org contains a [checklist for the recommended vaccines for adults](#).
- More information regarding vaccines in older adults (US) can be found on the [NIH's National Institute on Aging website](#).
- The World Health Organization provides a video regarding [Older adults and COVID-19 vaccines](#).
- The Mayo Clinic (US) provides an informational video on [Healthy aging and vaccines](#).
- [Immunisation for old adults in Europe: scientific and social strategies report](#) from the Federation of European Academies of Medicine
- [Older adult vaccination hub](#) information (Australia)

6 Pregnant individuals

6.1 What makes pregnant individuals vulnerable?

Pregnant individuals experience physiological changes to their immune response during pregnancy. As a result, they tend to be more prone to infectious illnesses. This may lead to severe complications like inadequate fetus size for gestational age, premature birth and increased mortality risk for both the pregnant person and the neonate. In 2019 there were 71.2 million premature births.¹²⁶

Additionally, neonates have poor immune responses after birth and rely on antibodies obtained from the mother. Often, this immunity will protect infants until they are old enough to receive vaccines themselves.¹²⁷ Therefore, it is imperative that pregnant individuals receive appropriate vaccines.¹²⁷

Additionally, neonates have poor immune responses after birth and rely on antibodies obtained from the mother. Often, this immunity will protect infants until they are old enough to receive vaccines themselves

Physiological changes associated with pregnancy may lead to severe complications like inadequate fetus size for gestational age, premature birth, and increased mortality risk for both the pregnant person and the neonate.

Being unvaccinated puts infants at risk of contracting potentially deadly infectious diseases like pertussis (whooping cough).¹²⁷ About half of babies under one year old who get whooping cough will need to be hospitalised for treatment.¹²⁸ Whooping cough can have a detrimental effect on a baby that can result in inability to breathe. In addition to the pregnant person being vaccinated against whooping cough, it is recommended to vaccinate any household contacts.

6.2 Vaccines recommended for pregnant individuals

The vaccines recommended for pregnant individuals include influenza, Tdap and COVID-19 (Table 6). However, you should refer to your national recommendations as this may not be the case everywhere.

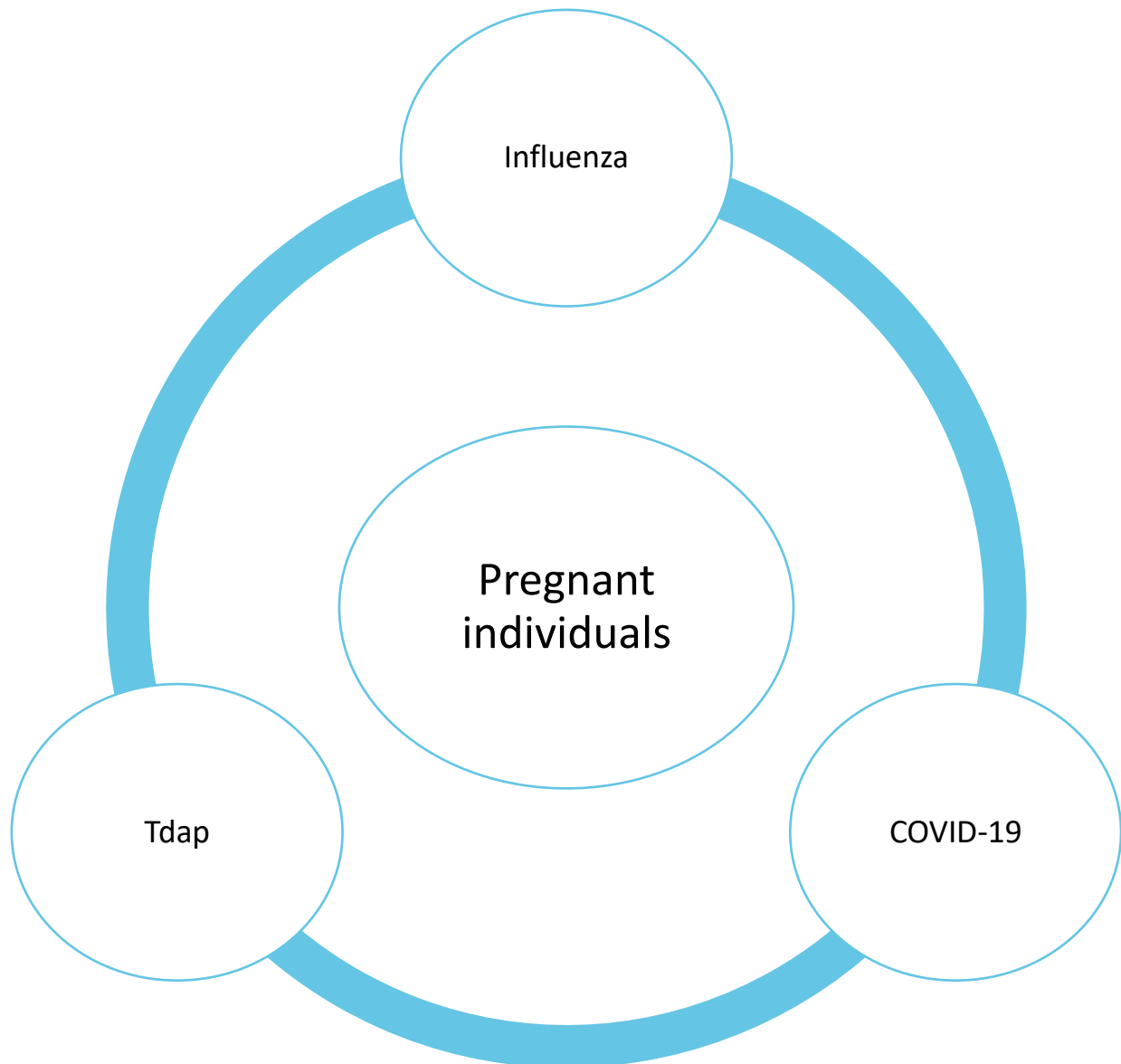
Table 6 — Vaccines recommended for pregnant individuals

Vaccine	Impact on pregnancy
Influenza	Pregnant individuals are more likely to experience severe illness from the influenza virus due to changes in immune, heart and lung functions during pregnancy. Severe illness can lead to hospitalisation and complications such as preterm labour and preterm birth. One of the common flu symptoms, fever, can be associated with neural tube defects and other adverse outcomes for the baby. Overall, influenza virus infection is associated with an increased risk of stillbirth. ¹²⁸ However, receiving a flu vaccine during pregnancy has been shown to halve the risk of flu-associated respiratory infections in pregnant people. ¹²⁹
Tdap	Pertussis (whooping cough) is a serious infection for anyone, but for a newborn it can be life-threatening. According to the US CDC, seven in 10 deaths from pertussis are among babies younger than two months old. Babies under two months old are unable to receive the pertussis vaccine and therefore need to be hospitalised for treatment. It is recommended that a pregnant individual receives the Tdap vaccine between the 27 th and 36 th week of each pregnancy. A US CDC evaluation found that vaccination in pregnant individuals is 90% effective at preventing infant hospitalisations from pertussis. ¹⁹ In addition, a USA study showed that when individuals received the Tdap vaccine during pregnancy, infants had a significantly lower risk of hospitalisation and intensive care admission, as well as shorter hospital stays.
COVID-19	Due to changes in immunity during pregnancy, it is important for pregnant individuals to receive the COVID-19 vaccine because they are more likely to get severely ill if infected. There is a known increased risk of complications from COVID-19, which include the risk of preterm delivery and stillbirth. According to the ACOG, it is recommended that pregnant people receive a bivalent mRNA COVID-19 vaccine followed by an appropriate booster. In addition, vaccination may occur during any trimester. Lastly, the ACOG states that there is no evidence of maternal or fetal effects from vaccinating pregnant individuals against COVID-19. ¹³⁰

6.3 Key messages and pharmacists' advice

- Vaccination reduces the risk of mortality in infants and pregnant individuals.
- Vaccines reduce the risk of preterm birth.
- Vaccination of pregnant individuals often provides the infant with immunity until they are old enough to receive vaccines themselves.
- Avoid live attenuated viruses in pregnant individuals.
- Encourage household contacts to stay up to date with their vaccinations as well.
- Remember to ask pregnant individuals if they have had the following vaccines: influenza, COVID-19, and Tdap.
- Every encounter with a pregnant individual is an opportunity to ask them about their vaccination status, recommend the vaccines listed in this chapter and administer the vaccines where possible or refer the person to other healthcare professionals to get vaccinated, as appropriate.

Figure 6 - Recommended vaccines for pregnant individuals



6.4 Information for patients

- For further information you can consult the [CDC's Vaccine and Pregnancy: 8 Things You Need to Know](#)
- Immunize.org contains a [checklist for the recommended vaccines for pregnant people](#)
- The National Health Service (UK) provides information regarding [vaccinations in pregnancy](#).
- March of Dimes (US) provides an informational video about [vaccination and pregnancy](#).
- [Vaccines needed during pregnancy](#) from the Health Services Executive (UK)
- The Society of Obstetricians and Gynecologists of Canada [vaccination page](#)
- [Pregnancy, Birth and Baby page](#) from the Australian Department of Health
- Public Health Association of British Columbia (Canada) [vaccination information](#)

7 Healthcare professionals and workers

7.1 What makes healthcare professionals and workers vulnerable?

Healthcare professionals and workers include pharmacists, physicians, nurses, emergency medical personnel, and many other support personnel that come into contact with patients on a daily basis.

People in this group are continually exposed to a multitude of ill patients. Furthermore, they may come into contact with patients' bodily fluids, particularly when collecting samples (including accidental needle sticks and spills) or handling those samples, which increases their risk of becoming infected. In addition to potentially contracting an illness themselves, they may also spread diseases from patient to patient, representing a threat to patient safety.

This could have detrimental effects on patients, especially if they have underlying conditions that make them particularly vulnerable. It is therefore imperative for healthcare professionals and workers to protect themselves, so that they can protect patients, other colleagues and family members from any avoidable illnesses.

Healthcare professionals and workers include pharmacists, physicians, nurses, emergency medical personnel, and many other support personnel that come into contact with patients on a daily basis.

Individuals who work in the healthcare field may be at risk of being infected with several diseases and, if unvaccinated, may spread them from person to person.

Also, infected healthcare professionals and workers may be required to miss large periods of work to protect patients and colleagues. This could have significant impacts for healthcare organisations and teams.

Finally, by being vaccinated themselves, healthcare professionals lead by example when recommending vaccination to patients, and provide reassurance about the safety and effectiveness of vaccines to vaccine-hesitant individuals.

7.2 Vaccines recommended for healthcare professionals and workers

The vaccines recommended for healthcare professionals and workers include influenza, meningococcal, Tdap, COVID-19, MMR, hepatitis B and varicella vaccine (Table 7). However, you should refer to your national recommendations as this may not be the case everywhere.

Table 7 — Vaccines recommended for healthcare professionals and workers

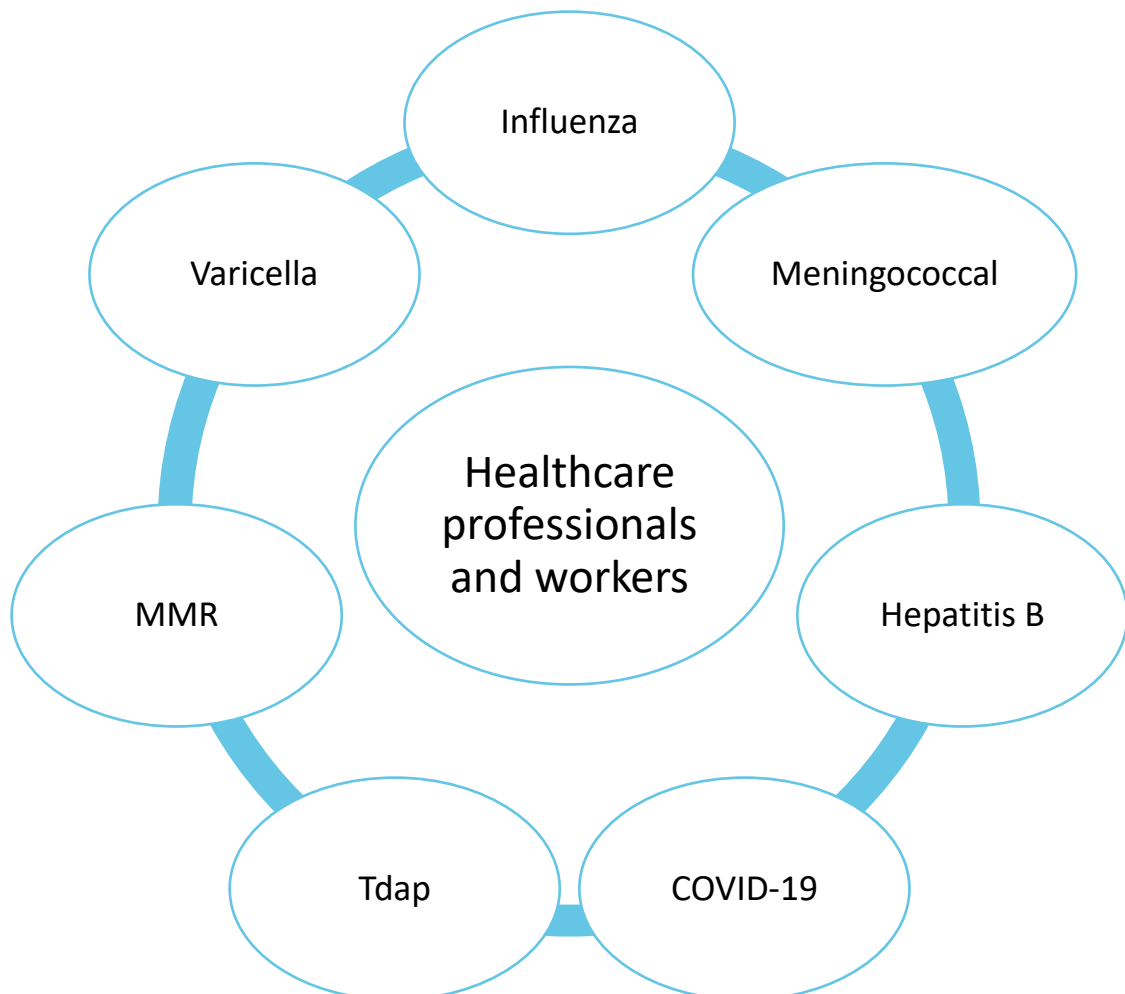
Vaccine	Impact on healthcare professionals and workers
Influenza	According to the WHO, healthcare workers should be prioritised when administering flu vaccines. ⁵⁵ This is because healthcare workers have high exposure rates to influenza. In addition to potentially contracting the illness themselves, they are also at greater risk of spreading it from patient to patient. In fact, healthcare workers may not even realise that they are ill: evidence suggests that as much as 50% of influenza cases in healthcare workers go unrecognised or are asymptomatic. ¹³¹
Meningococcal	Transmission of meningococcal disease in a healthcare setting is rare; however, healthcare workers have become infected after direct contact with respiratory secretions of infected persons and in laboratory settings. The US CDC recommends two quadrivalent conjugate meningococcal vaccines (MCV4), which will protect against 75% of disease in adults in the US. At a global level, the WHO also recommends the administration of meningococcal vaccines to all healthcare professionals and workers. ¹³² Specifically, it is recommended that microbiologists who are routinely exposed to <i>Neisseria meningitidis</i> should get the meningococcal conjugate vaccine and serogroup B meningococcal vaccine. ²⁴
Tdap	The US CDC recommends all healthcare workers remain up to date on their Tdap vaccine. A booster of Tdap or Td should be given every 10 years after the initial dose. Tdap is preferred if the healthcare professional or worker has never been vaccinated or is older than 65 years. ¹³³ However, in the event of suspected healthcare-associated transmission of pertussis, it may be advisable to revaccinate personnel. This largely depends on the type of people the healthcare worker is interacting with, as children, pregnant individuals and those with respiratory diseases may be at higher risk of developing a severe pertussis infection. ¹³³
COVID-19	Healthcare professionals and workers who are unvaccinated against COVID-19 are more likely to transmit the virus. It is estimated that there is a 20-fold reduction in risk of contracting COVID when in contact with a vaccinated person compared with an unvaccinated person. ¹³⁴
MMR	Healthcare-associated cases of measles are a public health concern. People infected with measles attend healthcare settings, so healthcare workers are at higher risk of being infected. A 1996 study concluded that healthcare workers were 19 times more likely to develop measles than other adults. As for mumps, healthcare-associated transmission is infrequent and is underreported due to a high percentage of asymptomatic adults. In Italy, a systematic review found that the prevalence of rubella-susceptible healthcare workers was 9%. ¹³⁵ The MMR vaccine is highly effective in preventing measles with one-dose effectiveness of 95% and a two-dose vaccine effectiveness of 99%. ¹³⁶
Hepatitis B	The risk of healthcare professionals and workers acquiring hepatitis B virus is significant since it is transmitted through percutaneous or mucosal exposure to infectious blood or bodily fluids. The hepatitis B vaccine was first recommended by the Advisory Committee on Immunization Practices for healthcare workers in 1982, when it was estimated that 10,000 infections occurred in healthcare settings in the USA. By 2004, the number of HBV infections in healthcare settings in the USA had decreased to an estimated 304 infections. After completion of the three-dose series, the protective antibody response is approximately 90%. ¹³⁶
Varicella	Nosocomial transmission of varicella zoster virus (VZV) can be life-threatening to certain patients. A study regarding VZV exposure in healthcare settings has documented that one provider with unrecognised varicella can result in the exposure of more than 30 patients and more than 30 employees.

Vaccine	Impact on healthcare professionals and workers
	Regarding the efficacy of the varicella vaccine, a study of adults who received two doses estimated an 80% reduction in the expected number of cases. ¹³⁶

7.3 Key messages and pharmacists' advice

- Healthcare professionals and workers are frequently exposed to several infectious diseases, which puts them at risk of contracting an illness.
- Adequate vaccination protects healthcare workers as well as their patients, colleagues and family members.
- Certain vaccines are important for healthcare professionals and workers who are in contact with population groups that are particularly vulnerable to vaccine-preventable diseases.
- Healthcare professionals and workers should receive the following vaccines: influenza, meningococcal, hepatitis B, COVID-19, Tdap, MMR and varicella.
- Every healthcare professional or worker should be fully aware of the vaccines that are appropriate to protect them and others from vaccine-preventable diseases. They should also discuss this with colleagues and co-workers to raise awareness and increase vaccine uptake in healthcare settings. They should also lead by example when recommending vaccination to patients, and provide reassurance about the safety and effectiveness of vaccines to vaccine-hesitant individuals.

Figure 7 - Recommended vaccines for healthcare professionals and workers



7.4 Information for healthcare professionals and workers

- Further information can be found in [WHO's Vaccination Schedule for Healthcare Workers](#)
- For further information you can consult the [CDC's Vaccine Information for Healthcare Workers](#)
- Immunize.org provides a brief [recommendation for healthcare personnel](#)
- [Recommendations of the Advisory Committee on Immunization Practices](#): Immunization of Health-Care Personnel (US)
- Immunisation of healthcare and laboratory staff (UK) [guidance book chapter](#)
- Australian Government Department of Health and Aged Care [Immunisations for healthcare workers page](#)
- Immunisation Unit of Department of Health of Victoria, Australia, [page on Vaccination for healthcare workers](#)

8 Conclusions

Vaccination is an important prevention measure to protect lives and good health, retain functional ability and productivity, and lower the impact of vaccine-preventable diseases on individuals, healthcare teams and healthcare systems. This is particularly important in specific population groups who are at higher risk of contracting these diseases or suffering from severe forms of disease that may have dangerous consequences in terms of hospitalisations, disease complications or even death.

Pharmacists have a crucial role to play in starting conversations about vaccination and raising awareness about the appropriate vaccines among each of the special-risk population groups described in this publication. The identification of patients who need vaccination can be a first important step to improve vaccine uptake in the communities pharmacists serve. In countries where pharmacy-based vaccination is allowed, pharmacists can directly support vaccination efforts by providing and administering vaccines, contributing even more to better vaccination coverage rates and better health for all.

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