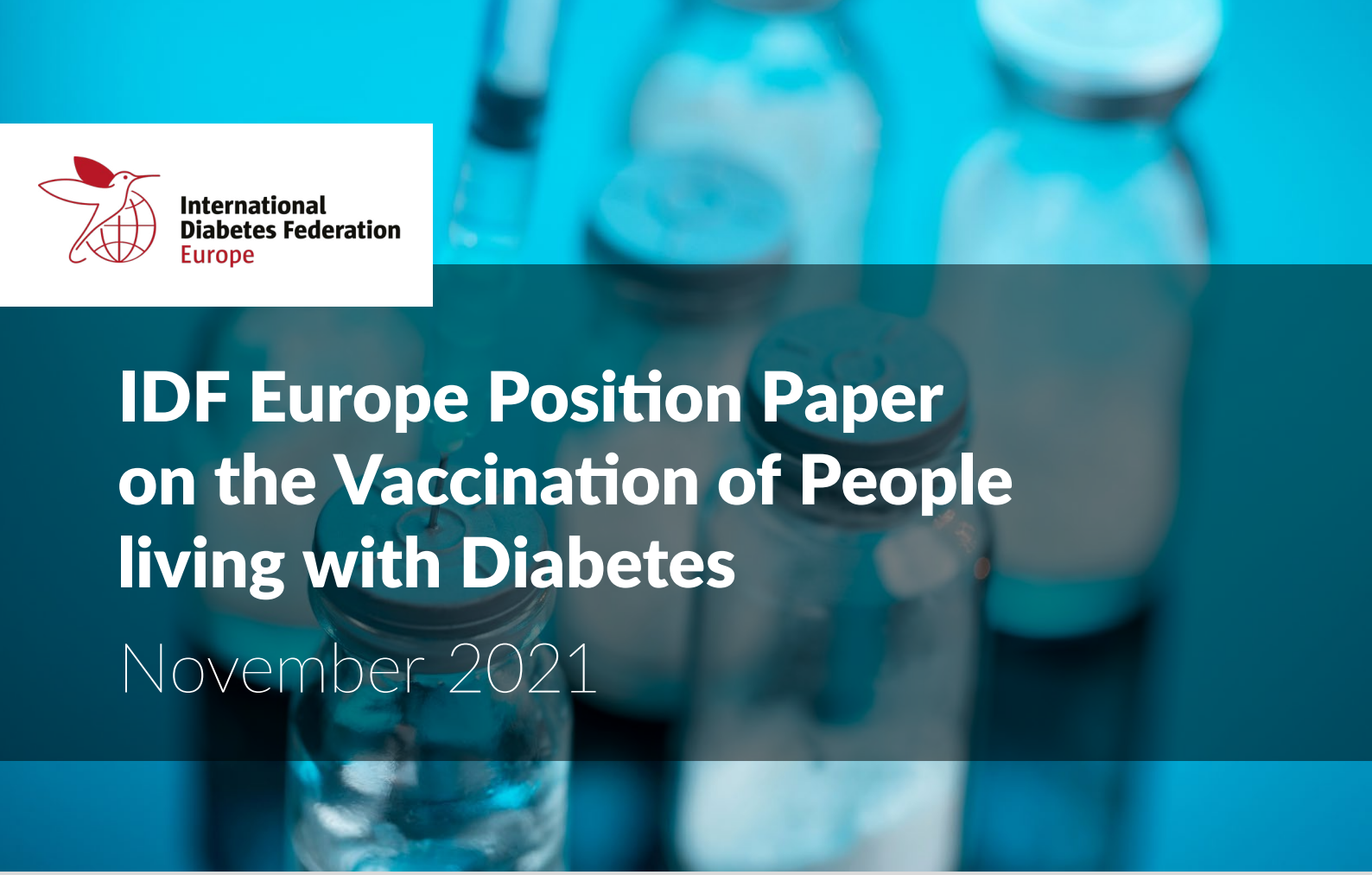


International Diabetes Federation Europe

IDF Europe Position Paper on the Vaccination of People living with Diabetes

November 2021

Introduction

People living with Diabetes (PwD) are at a higher risk of severe complications from many vaccine-preventable diseases than the general population. 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. Being sick can induce metabolic stress on the body that can raise blood glucose as well as lead to loss of appetite which can complicate blood glucose management even further. For example, people living with diabetes are three to six times more likely to be hospitalized with influenza during influenza outbreaks than the general population[i]. That is why vaccinations are also an important tool for PwD to maintain adequate glucose management.

The current pandemic adds an additional health burden as PwD are at a higher risk of severe forms of COVID-19 and death. It has been estimated that the risk of death after having severe illness and hospitalisation from COVID-19 are three and a half times higher for people with Type 1 Diabetes (T1D) and two times higher than the general population for people living with Type 2 Diabetes (T2D)[ii]. The cost of hospital admission to treat people living with T2D with good glycaemic management, who developed COVID-19 was estimated to stand at EUR25,108 and up to EUR 57,244 among people with T1D with sub-optimal glycaemic management[iii]. While PwD account for about 10% of the population in Europe[iv], the total direct costs of secondary care related to PwD and COVID-19 are estimated to account for 23.5% of the total costs[ii]. With the rise in the number of people diagnosed with diabetes, the stress on the healthcare systems will only increase unless it is managed in combination with an effective vaccination strategy.

Which vaccines for People living with Diabetes?

IDF Europe recommends that six vaccines should be made available free of charge to PwD, as a matter of course.

Influenza Vaccine

The flu is a contagious respiratory illness that is caused by several types of rapidly adapting influenza viruses[v]. PwD are at a higher risk of developing serious flu complications that can lead to pneumonia, bronchitis, sinus and ear infection which can, in turn, lead to hospitalisations and sometimes death[vi]. A report from the American Diabetes Association has shown that the effective coverage of influenza vaccination can decrease diabetes-related hospital admissions for influenza by as much as 79% over the course of a year[vii]. The annual influenza vaccine is thus the most effective way to prevent complications from the flu and keep healthcare systems afloat. The currently low levels of influenza circulating due to COVID-19-related measures and restrictions greatly increase the risk of a severe upsurge in cases in future influenza seasons that can have a devastating impact on healthcare systems[viii]. The early detections of the A (H3N2) subtype are an indication that the upcoming flu season can be severe. This subtype disproportionally affects older people and is associated with lower vaccine effectiveness. A steep rise in flu infections during the ongoing COVID-19 pandemic could have serious consequences for the elderly and those with weak immune systems, including PwD. From experience with the COVID-19 pandemic, there is further evidence that non-pharmaceutical interventions such as physical distancing and hygiene measures can effectively diminish the spread of influenza.

Pneumococcal Vaccine

Pneumococcal vaccine (PPV) helps protect from serious infections caused by streptococcus pneumoniae bacteria which can affect the blood (bacteraemia), the brain (meningitis) and the lungs (pneumonia)[ix]. Several epidemiological studies have concluded that PwD and in particular people with end organ complications of cardiac and renal disease are at a much higher risk of complications, hospitalisation, and death from pneumococcal disease[ix]. According to the Advisory Committee on Immunizations Practices (ACIP), PPV is indicated to reduce invasive disease in PwD. There are two distinct PPV vaccines which are the pneumococcal conjugate vaccine (PCV) and the 23-valent pneumococcal polysaccharide vaccine (PPSV23).

Hep B Vaccine

Hepatitis B is an infection that is caused by the hepatitis B virus (HBV). The HBV virus is concentrated mainly in blood and, to a lower extent, in other bodily fluids. Chronic infections occur in over 80% of persons infected during infancy whereas 95% of infections on immunocompetent adults are self limited with elimination of the virus from the blood[x]. A study from the US Centre for Disease Control (CDC) reported that adults living with diabetes were two times more likely to get an acute HBV infection and have a 60% higher prevalence of Hepatitis B infection compared to the general population[x]. This increased risk of infection partly reflects the risk of exposure that PwD may experience with the use of diabetes management devices. For example, previous Hepatitis B outbreaks in the diabetes community have occurred from the use of blood glucose meters for more than one PwD without thorough disinfection process between use, failure to consistently wear gloves and perform hand hygiene between fingerstick procedures and other types of cross contaminations from poor healthcare management[xi].

Zoster Vaccine

Herpes Zoster occurs due to the reactivation of a previous infection of the varicella zoster virus which causes chickenpox. After a latency of several years, this virus can travel to the sensory nerves of the skin and can cause a painful rash[xii]. Complications from the disease can arise and affect the central nervous system or cause post-herpetic neuralgia which is pain in the area of the rash that can persist for years. Increasing

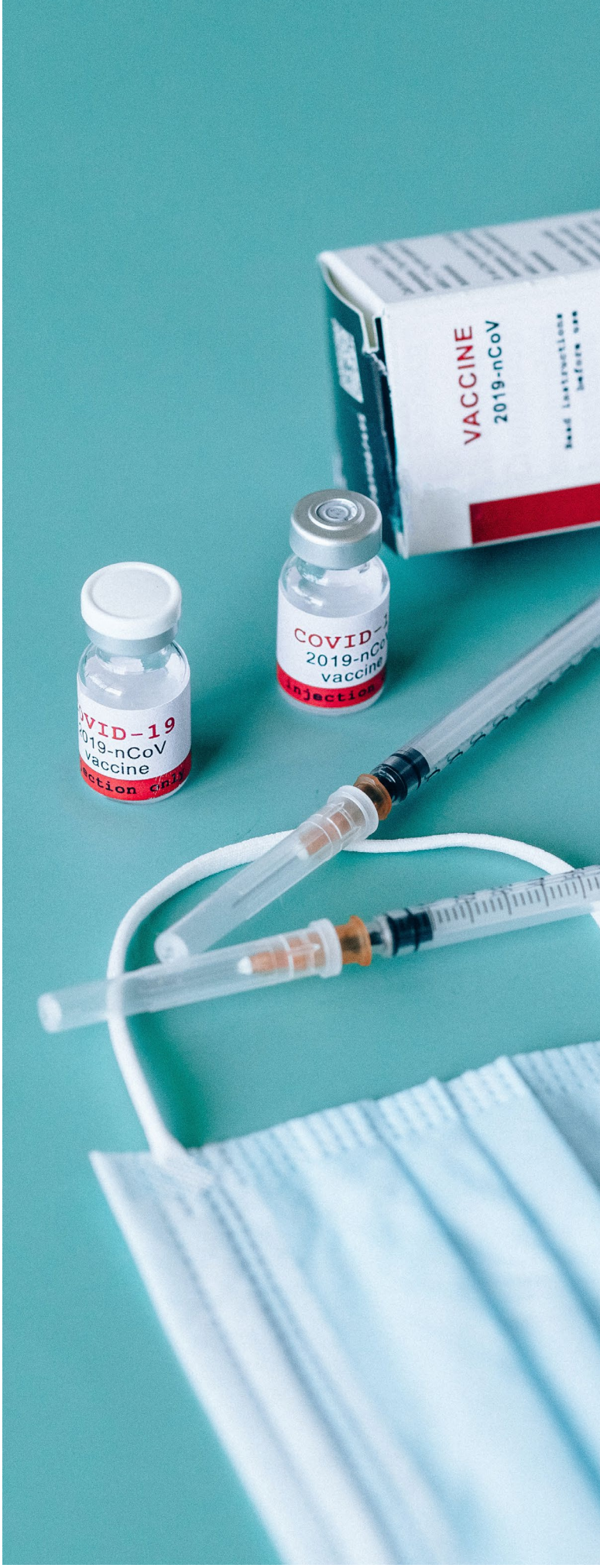
evidence suggests that diabetes represents an important risk factor for herpes zoster. In a large study conducted with 420,515 cases of zoster infection, it was found that T2D increased the risk for post-zoster pain by 18%[xii]. Taking into account this increased risk and severity of herpes zoster infection in people living with diabetes, this vaccine is highly recommended for all PwD[xii].

Tdap Vaccine

The Tdap vaccine is administered to protect against three different diseases caused by tetanus, diphtheria and pertussis[xiii]. Tetanus is a dangerous disease which kills 1 in 10 people infected and causes painful muscle tightening and stiffness. Diphtheria is also a dangerous disease which causes a coating to form in the back of the throat which can lead to breathing problems, heart failure, paralysis and death. Pertussis causes severe coughs that inherently lead to difficult breathing, vomiting and disturbed sleep[xiii]. As with other diseases, PwD's impaired cell-mediated immunity means that they are at a higher risk of tetanus, diphtheria, and pertussis infection.

COVID-19 Vaccine

As mentioned earlier in this paper, PwD have proved at grave risk of developing serious forms of the disease, or even dying from it. The risk factors and the populations at risk of developing serious forms of COVID-19 and influenza overlap[ix]. *The Lancet* reported that up to 50% of the people who have died from COVID-19 had metabolic and vascular disorders which includes diabetes[xiv]. There is also increasing evidence that metabolic dysfunction not only increases the risk of developing severe forms of COVID-19 but can also lead to "new-onset diabetes or aggravation of pre-existing metabolic disorders"[xv]. Four COVID-19 vaccines have currently been approved for COVID-19 in the EU – Pfizer BioNTech, Moderna, Janssen and AstraZeneca[xv]. The WHO has a broader list of approved vaccines which are, however, not fully recognised in several regions.



The vaccination situation in Europe

While the benefits of vaccination no longer need to be demonstrated, vaccination rates in Europe vary widely by country and vaccine type.

Influenza Vaccine (Annual Booster Shot)

Despite its potential severity, influenza vaccination remains at low levels in many European countries. WHO Europe reported that in half the countries in the region, influenza vaccine coverage among high-risk groups was less than 1 in 3 people[xvi]. According to the European Centre for Disease Control (ECDC), only the Netherlands and the UK reached the target coverage of 75% of the risk groups in some influenza seasons between 2014 and 2015[xvii].

WHO recommendations for flu vaccination include prioritising pregnant women, as well as the elderly, individuals at high risk based on specific chronic conditions as well as children aged 6-59 months and healthcare workers[xvi].

The ECDC, meanwhile, recommends that all individuals over six months of age with a chronic illness that constitutes a risk factor for influenza should be vaccinated[xviii].

According to a 2019 study across 42 countries in Europe published in *Vaccines*, all had influenza vaccination policies although the target population and frame of implementation varied broadly. All had vaccination policies for adults that are in a high-risk group. The vaccination of high risks groups was mandatory only in Serbia and Slovakia and is recommended in the remaining countries[xix].

All countries in the region except for Moldova recommend vaccination for adults of a certain age[xix].

- **Adults>18 years:** Austria, Slovenia and Serbia
- **Adults>50 years:** Ireland
- **Adults>55 years:** Malta and Poland
- **Adults>59 years:** Slovakia
- **Adults>60 years:** Albania, Germany, Greece, Hungary, Iceland, Netherlands, Russia, and Ukraine
- **Adults>65 years:** Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Moldova, Monaco, Norway, Portugal, Romania, Spain, Sweden, Switzerland, and the United Kingdom.

Source: *Vaccines* [viii]

Pneumococcal Vaccine

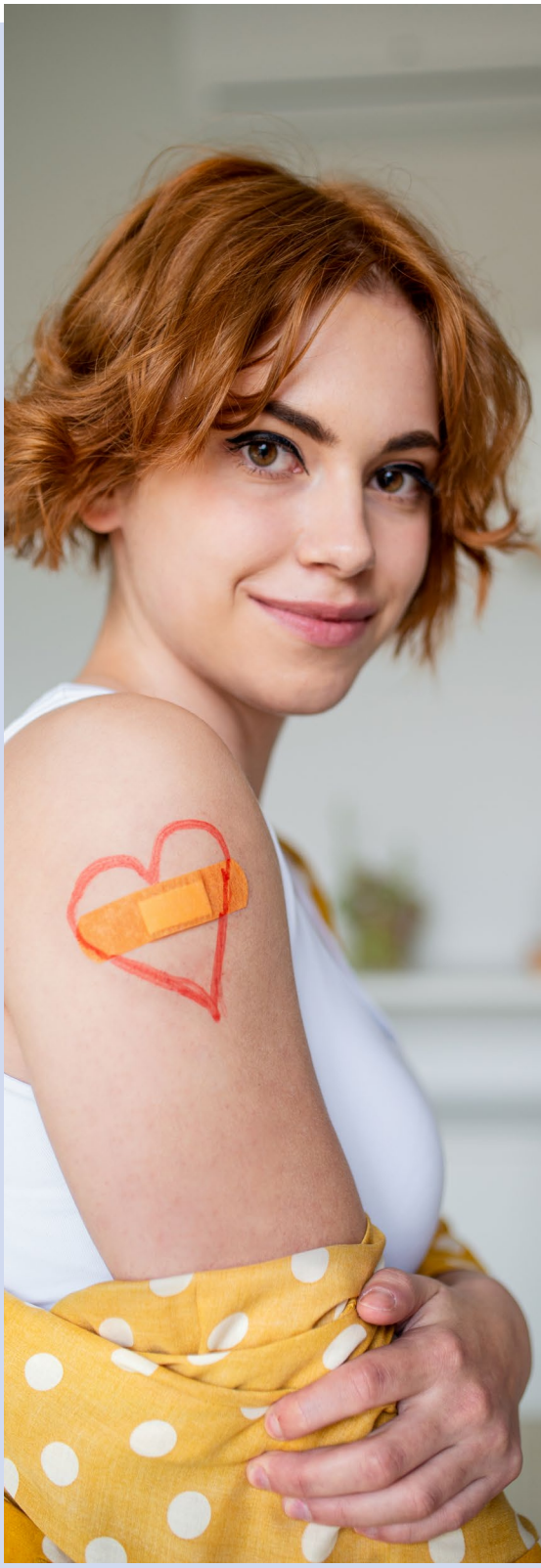
In Europe, the data for population-based pneumococcal vaccination coverage among adults is scarce. The current estimated intake of PPSV23 for adults in western Europe varies between 8% and 69%, with a higher coverage in countries with formal age-based recommendations from their governments[xx]. A study surveying primary care physicians and a representative sample of local socio-demographic structure in 13 western European countries estimated that only between 20% to 30% of adults aged 65 years and over are currently vaccinated with the PPV vaccines[xxi]. Again, the low level of vaccine coverage reflects low awareness of its existence and benefits even though national recommendations exist[xxi].

The WHO does not have a position on the vaccination of adults against pneumococcal disease other than acknowledging that children living with diabetes are at a higher risk of pneumonia and thus recommends routine vaccination against pneumococcus for all children under 5 years of age[xxii].

Existing national recommendations for vaccination in the region[xix]:

PPV recommendations exist in 29 European countries but differ in their targeted groups and in the administered vaccine – PCV vs PPSV 23.

- **PPSV 23 Recommended for specific age groups:**
  - Germany (adults>60 years)
  - Ireland, Norway, Portugal and Sweden (adults>65 years)
  - UK and Greece, for adults>65years and all adults from high-risk groups
- **PPSV 23 Recommended for high-risk groups, irrespective of age:**
  - Bosnia and Herzegovina, Cyprus, Monaco, Montenegro and North Macedonia
- **Recommendations for mixed administration of PCV followed by PPSV 23 with a minimum of 8 weeks apart:**
  - Adults>85 years and all high-risk adults: Belgium
  - Adults>65 years and high-risk groups 18-64 years: Denmark, Greece, Italy, Finland, Luxembourg, Russia, Slovenia and Spain
  - All adults from high-risk groups: Portugal
  - Specific high-risk groups: France
  - Adults>60 years and high-risk groups regardless of age: Iceland
  - Adults>50 years and high-risk groups 18-49 years: Austria and Hungary
  - Every five years for immunocompromised adults in high-risk groups: Portugal
- **Mandatory vaccinations of high-risk groups aged 18-64 with recommended vaccination for adults>65 years:**
  - Czech Republic (PPV only) and Serbia
- **Booster vaccine recommendation with PCV:**
  - Germany (every 6 years)
  - France (once after 5 years in high-risk groups)
  - Belgium, Luxembourg and Russia (every 5 years)
  - Hungary (two doses at an interval of 5 to 10 years)
  - Montenegro and Serbia (single dose after 5 years)
- **Recommendations for PCV as a standalone vaccine:**
  - High-risk groups: Lithuania
  - Adults>65 years: Malta
  - Adults>50 years: Poland



Source: *Vaccines* [viii]

Hep B Vaccine

As of 2017, 47 out of the 53 countries in the WHO Europe region implemented a universal infant Hep B vaccination programme nationally. The remaining six countries – Denmark, Finland, Iceland, Norway, Sweden and the UK – only adopt risk group targeted vaccination programmes which includes PwD[xxiii]. There is a coverage of 90% or more for the three doses of the Hep B vaccine in most countries although great disparities exist with for example only a 21% and 51% coverage in Ukraine and France respectively[xxiv].

WHO recognises hepatitis related diseases as a global public health problem that must be answered through the inclusion of the Hep B vaccine in national immunization programmes[xxv]. Hep B vaccination is recommended for all children worldwide. Reaching three doses of the vaccine should be a standard priority for all national immunization programmes. It also recommends Hep B vaccination for persons at high risk of HBV infection and in older age groups. PwD are amongst the groups at highest risk of acquiring HBV infection according to the WHO[xxviii].

Existing national recommendations for vaccination in the region[xix]:

- **All adults in case of no vaccination in childhood:** Cyprus and Czech Republic
- **Catch up dose depending on vaccination history:** Austria and Greece
- **Recommended for specific risk groups:** Belgium, Finland, Greece, Iceland, Italy, Latvia, Netherlands, Poland, Portugal, Serbia, Slovenia and Spain
- **Mandatory vaccination of adults:** Russia (If not vaccinated in childhood), Bosnia and Herzegovina, Czech Republic, North Macedonia, Montenegro (in the latter three, for specific groups only)
- **For all other countries, no recommendations are in place "specifically" for adults but there is a universal infant Hep B vaccination programme.**

Zoster Vaccine

In 2019, only nine countries in Europe had vaccination policies concerning the zoster vaccine[xix]. Again, there is little to no report on the vaccination coverage of the zoster vaccine in Europe. This lack of information calls for a collective action in systematic and harmonised data gathering to make evidence-based policies.

The WHO does not have any position to date on the Zoster vaccine.

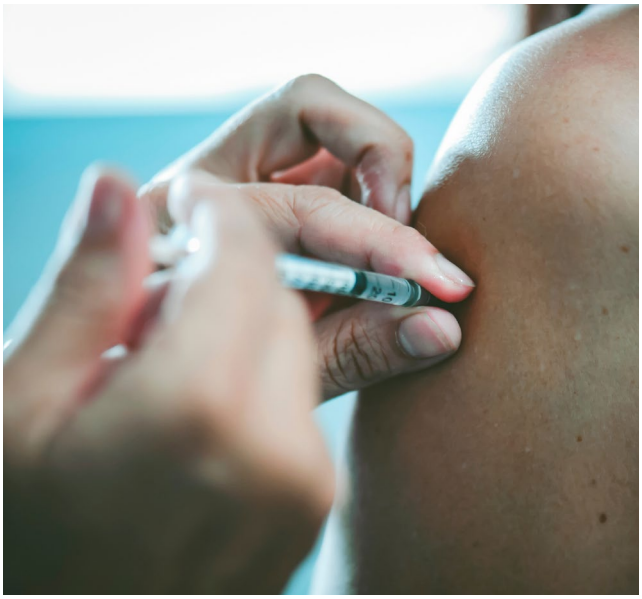
Existing national recommendations for vaccination in the region:

Recommended for adults:

- **aged >50 years:** Austria and Czech Republic
- **aged >60 years:** Germany, Greece and Spain
- **aged >65 years:** France and Italy
- **aged >70 years:** UK

Source: *Vaccines* [viii]

Specific recommendations for high-risk groups are in place in Czech Republic (≥18 years), Italy (50–65 years) and Serbia[xix].



Tdap Vaccine

In the WHO Europe region, 94% of children were estimated to have received the third dose of the vaccine in 2017[xxvi].

The WHO recommends routine vaccination of infants with the pertussis vaccine with the provision of booster doses to children aged 1 to 6 years[xxvii]. Concerning adults, the WHO recommends that each country should decide on their national recommendations based on local epidemiology and cost-effectiveness data[xxvii].

Existing national recommendations for vaccination in the region:

- **Recommended for all adults:** Austria, Croatia, Czech Republic, Finland, Germany, Greece, Latvia, Liechtenstein, Portugal and Switzerland
- **Recommended for pregnant women:** Belgium, Czech Republic, France, Greece, Ireland, Italy, Portugal, Serbia and the United Kingdom
- **Recommended only for high-risk:** Iceland, Ireland, Serbia and UK
- **Mandatory vaccination for all adults:** Italy and Slovenia
- **Recommendation for Tetanus and Diphtheria but not Pertussis:** Albania, Belgium, Cyprus, France, Portugal, Slovakia and Spain
- **Mandatory vaccination for Tetanus and Diphtheria but not Pertussis:** Belarus, Bosnia and Herzegovina, Bulgaria, Moldova, Montenegro, Poland, Russia and Ukraine
- **For Infants and Children, Tdap Vaccine or components of it are either mandatory or recommended in all countries across Europe**[xix]

Additional specific recommendations also exist in some of these countries.

Source: *Vaccines* [viii]

COVID-19 Vaccine

To date, COVID-19 vaccine coverage across Europe is greatly contrasted between the European Union and the rest of Europe. Whereas a key milestone of 76% of fully vaccinated adults was achieved in the EU according to the ECDC by November 12, 2021, only 58.5% of the population in the WHO Europe region are fully vaccinated[xxviii]. Whereas Portugal and Ireland have one of the highest vaccination coverages across Europe, with 92% of their adult population vaccinated, countries such as Bulgaria, Armenia, Moldova and Kazakhstan are on the other side of the spectrum with a vaccination coverage ranging from 11% to 37% according to WHO Europe and the ECDC[xxviii].

There is now growing concern on the decreasing effectiveness of the vaccine to prevent mild illness due to the circulation of new variants such as the highly contagious Delta variant. To answer these concerns, the CDC, ECDC and EMA have all set recommendations on the safety and effectiveness of COVID booster shots.

In the EU, the EMA published its findings on COVID-19 booster shots and gave regulators its approval in October. Countries such as Germany, Greece, Italy, France, Portugal and several others have already started the administration of extra doses to the "at risk" population[xxix].

The EMA concluded that the booster shots "may be considered at least six months after the second dose in people from 18 to 55 years old" for Comirnaty (Pfizer BioNTech) and Spikevax (Moderna) but has not yet formulated an official recommendation[xxx]. This contrasts with the US, where the Centre for Disease Control has recommended that all adults aged 65 years and older, residents in long-term care settings, and people aged 50-64 years with underlying medical conditions (including diabetes) should receive a booster shot of Pfizer-BioNTech´s COVID-19 vaccine at least six months after their Pfizer-BioNTech primary series[xxxi].

Combined Flu and COVID-19 Vaccination

The flu and COVID-19 are closely interlinked. As most of the western hemisphere imposed lock-downs, social distancing and strict restrictions on travelling, an unprecedented decrease in the number of influenza cases was observed[ix]. As most countries in Europe started relaxing their COVID-19 related measures, a rise in cases is expected during the winter. An increase in both COVID-19 and influenza hospitalizations will threaten the healthcare systems of many countries in the region if not managed adequately. PwD are at risk from both diseases.

As the flu season is approaching, an increasing number of studies on the simultaneous administration of the COVID-19 vaccine with the flu shot has been reported although no formal recommendation has been given by the EMA.

The ComFluCOV vaccine study conducted by the University of Bristol, the University Hospitals Bristol and the University of Oxford in Collaboration with the UK National Health Service (NHS) looked into the effectiveness and safety of the simultaneous administration of the two vaccines[xxxii]. The study reported that the co-administration of the influenza and COVID-19 is well tolerated and does not lead to any reduction in the immune response to either vaccine[xxxi]. The study led the British Government to allow the co-administration of influenza and COVID-19 vaccines[xxxiii]. The Advisory Committee on Immunizations Practices (ACIP) in the US offered a formal recommendation mentioning that these vaccines can be safely administered at the same visit as it has been proven that the benefits outweigh the risks by reducing the illness, hospitalisations and deaths[xxxiv].

In the EU, countries such as Italy, the UK, Belgium, and Portugal have given the green light for simultaneous administration but with caution advised for the youth[xxxv].

Policy Recommendations:

To ensure that PwD are fully protected from vaccine-preventable diseases, IDF Europe recommends that healthcare systems and governments should urgently implement the following actions:

- **Raise awareness among, and educate, PwD and healthcare professionals (HCPs) on the benefits and risks of vaccination in relation to the management of their condition, and encourage HCPs to discuss and offer vaccination as a matter of course to PwD**
- **Make all relevant vaccines available and easily accessible free of charge to all PwD, including for hard-to-reach, marginalized and disadvantaged groups**
- **Ensure PwD get prioritised to receive COVID-19 booster injections as soon as possible, and as appropriate, organise concomitant vaccination for flu and COVID-19 boosters**
- **Set up more effective monitoring systems for vaccination coverage to inform future policy making**
- **Implement WHO/Europe's Tailoring Immunization Programmes to develop solutions "to support, motivate and enable people to be vaccinated"**

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