

<https://doi.org/10.1038/s41541-025-01242-6>

# Overview of vaccines for adults authorized, recommended, and implemented in the European Union

Jade Pattyn, Odile Launay, Robert Steffen, Birgit Weinberger, Giovanni Gabutti, Alojz Ihan, Thomas Weinke, Ligita Jancoriene, Paolo Bonanni & Pierre Van Damme



An increasing number of vaccines for adults are being implemented in vaccination programs, reflecting the growing recognition of immunization as a lifelong public health strategy. However, no comprehensive overview of all vaccines for adults authorized, recommended, and implemented in the EU currently exists. To address this, the Adult Immunization Board developed a “vaccines for adults tracker and landscape” to map the range of vaccines for adults approved across the EU.

## Background

Since the creation of the Expanded Program on Immunization (EPI) in 1974 to reduce global infant mortality, the scope of immunization has evolved to include lifelong immunization strategies. The life course approach to immunization states that people should receive all recommended doses of vaccines throughout their lives to achieve maximum prevention benefits against vaccine-preventable diseases at all ages, across generations and in their communities. Moreover, more and more vaccines are coming to market that are specifically designed, approved, recommended and ultimately implemented in adult vaccination programs, reflecting the increasing recognition of immunization as a lifelong public health strategy and investment.

Most vaccines used in the European Union (EU) undergo an evaluation and marketing authorization by the European Medicines Agency (EMA)/Committee for Medicinal Products for Human Use (CHMP) before they are approved and recommended at the (sub) national level (=the centralized procedure (CP) laid down in Regulation No 726/2004). The CP involves a single evaluation process, resulting in an EU-wide marketing authorization granted by the European Commission (EC), which is valid across all EU Member States, as well as Iceland, Norway, and Liechtenstein. Nevertheless, exceptions exist and vaccines that were introduced prior to the formation of EMA in 1995 were exclusively approved by regulators at the (sub)national level in EU countries (=the mutual recognition

(MRP)/decentralized procedure (DCP) laid down in Directives 2001/83/EC and 2004/27/EC). As of now, no comprehensive overview exists of all vaccines for adults authorized, recommended and implemented within the EU.

## The EU vaccines for adults tracker and landscape

To fill this gap, the Adult Immunization Board (AIB, [www.adultimmunizationboard.org](http://www.adultimmunizationboard.org)) created a “vaccines for adults tracker and landscape” that aims to provide an overview of the current different vaccines for adults implemented in the EU, approved by EMA and/or national authorities. It serves as a valuable resource for researchers, health care providers and policy makers to understand the range of vaccines currently authorized and implemented for adults across the EU for different infectious diseases. It includes information on key attributes of each vaccine. The AIB tracker also allows users to search for vaccines for adults through various criteria such as pathogen type, manufacture, vaccine platform, route of administration, antigen, adjuvant, classification etc. This tracker does not rank or make specific recommendations regarding these vaccines for adults. Vaccine types and the recommendations for them differ between and/or within EU countries. Country-specific recommended vaccines can be found at official (sub)national public health websites<sup>1</sup> and the European Centre for Disease Control (ECDC) vaccine scheduler provides a general European overview (<https://vaccine-schedule.ecdc.europa.eu/>).

For the tracker and landscape, vaccines for adults are defined as vaccines authorized for individuals who are 18 years of age or older. To ensure a comprehensive overview of vaccines for adults including vaccines authorized by the centralized or the mutual recognition/decentralized procedure the following data sources were investigated up to April 2025: EMA database (European public assessment reports (EPAR) and product information), the World Health Organization (WHO) Market information for access to vaccines (MI4A/V3P), Heads of Medicines agencies (HMA) - Mutual Recognition Information (MRI) product index, national registers of authorized medicines, and pertinent literature on vaccines for adults. We included only established vaccines for adults in our dataset. Established vaccines were defined as those that had already achieved authorization and had a currently functional production facility or licensed facilities on standby for the production of vaccine. Data from the various sources were compared and analyzed in order to establish a reliable list of vaccines authorized,

recommended and implemented in the EU. A standardized form was used to collect data about the vaccines for adults. Anthrax, Pandemic Influenza, Hepatitis E, Leptospirosis, Adenovirus and Q-fever vaccines are not included, as these vaccines are not licensed or only available under specific circumstances in the EU. We directly contacted our AIB advisors and Vaccines Europe, an association that represents vaccine companies operating in Europe, to review the list of vaccines for adults.

As with any overview, the search method used for this review strikes a balance between completeness and feasibility. It is inevitable that we missed some vaccines and that the EU adult vaccine landscape will evolve over time. A recent publication anticipated over the next 10 years potentially 100 risk-adjusted products (risk-adjusted using probability of technical and regulatory success [PTRS] values by stage of development) designed to protect against 40 different disease areas<sup>2,3</sup>. Some established vaccines will also disappear from the European market, as we saw in 2023–2024 for example for COVID-19 (Vaxzevria from AstraZeneca, Jcovden from Janssen and VidPrevtyn Beta from Sanofi), hepatitis B (PreHevri, VBI Vaccines), MenABCWY (Penbraya from Pfizer) and at many national levels for Herpes zoster (Zostavax, MSD).

### Adult immunization board

The adult vaccine tracker and landscape is made by the AIB. The AIB is an independent, European, multidisciplinary group of recognized experts in the field of adult immunization established with the aim of contributing to the reduction of mortality and morbidity from vaccine-preventable infections and diseases in European adults<sup>4</sup>. The primary goal of the AIB is to provide evidence-based guidance on fundamental, technical and strategic issues, while monitoring the progress of adult immunization programs at European and (sub)national levels.

### Trends observed in the first version of the vaccines for adults tracker and landscape

Table 1 shows the first version of the EU vaccines for adults tracker and landscape. In April 2025, we identified 87 vaccines for adults authorized in the EU against 30 infectious diseases (21 are viral and 9 are bacterial). These include vaccines used in routine adult vaccination programs or to catch-up missed childhood or adolescent vaccinations, other personal risk-based vaccines (e.g., vaccines indicated in pregnancy to protect the newborn and/or the mother, for specific medical conditions or lifestyles), travel-related vaccines and occupational-activity related vaccines. An overview of the vaccines per category is presented in Table 2<sup>5</sup>. This table represents an updated version of the one originally included in the first technical meeting report of the AIB. 66% ( $N = 57/87$ ) of the vaccines protect against viruses, while 30% ( $N = 26/87$ ) protect against bacteria. Three diphtheria, tetanus, (pertussis), polio vaccines (3% ( $N = 3/86$ ) protect against both, bacteria and virus. No fungal or parasitic vaccines for adults are currently authorized in the EU.

The current vaccine products are using different approaches and technologies. The most common type of vaccines for adults are subunit vaccines ( $N = 39$ ), followed by inactivated vaccines ( $N = 30$ ), live-attenuated vaccines ( $N = 17$ ), and messenger nucleic acid vaccines ( $N = 6$ )<sup>6</sup>. Most vaccine products are available for seasonal influenza ( $N = 14$ ), followed by Td(ap)-(IPV) ( $N = 9$ ) and SARS-CoV-2 ( $N = 5$ ).

Most vaccines are given intramuscularly ( $N = 78$ ), only 3 vaccines are given via oral administration (Vivotif/Typhoral for Salmonella Typhi, Dukoral for Cholera, and Vaxchora for Cholera), 2 are most commonly administered subcutaneously (Imvanex<sup>®</sup> for Mpox, and Stamaril<sup>®</sup> for Yellow Fever), and the 4 BCG vaccines against Tuberculosis are administered intradermally. No intranasal vaccines for adults are currently authorized in the EU.

Most adult vaccines are used before exposure, but some vaccines such as rabies, varicella, hepatitis B, hepatitis A, Mpox and MMR vaccines are also used as post-exposure prophylaxis in adults under certain circumstances. The *Zaire ebola* vaccine, Zabdeno/Mvabea, is currently the only heterogenous vaccine regimen authorized under conditional marketing in adults in the EU; nevertheless off-label heterogeneous vaccine regimens are used as well (e.g. SARS-CoV-2 vaccines). Currently four combination vaccines are available for adults (Td(ap)-(IPV), HepA/B, MMR-(V), MenACWY) although logistically more combination vaccines might be highly valuable (e.g. RSV/Influenza/SARS-CoV-2)<sup>7,8</sup>. The production of a combined vaccine used for immunisation against Hepatitis A and typhoid has discontinued in 2021, and it is no longer available (Viatim<sup>®</sup>, Sanofi). 38 out of 87 vaccines for adults contain an adjuvant, most adjuvants are alum-based.

New versions of vaccines for adults are being released with updated or additional antigens compared to previous formulations. These updates are designed to account for periodic changes (e.g. SARS-CoV-2, seasonal influenza) and/or to improve protection against type replacement or enhancement (e.g. *Streptococcus pneumoniae*). In Europe, from 2025/2026 (Northern Hemisphere), influenza vaccines will move from quadrivalent vaccines back to trivalent vaccines, containing two A strains and only one B strain, as influenza B/Yamagata virus has no longer been consistently detected since early 2020<sup>9</sup>.

Most vaccines have a EU brand name, however, it's important to mention that some vaccine preparations are sold under multiple brand names in different countries and regions. Currently, most vaccines that are implemented in the EU have a manufacturing step in the EU.

### Next steps of the vaccines for adults tracker and landscape

Next versions of the AIB tracker and landscape will be published on the AIB website ([www.adultimmunizationboard.org](http://www.adultimmunizationboard.org)) and will be updated on an annual basis. The AIB is exploring opportunities to enhance the tracker's scope and functionality through partnerships and potential integration with related initiatives (e.g., International Federation on Ageing (IFA) Global Atlas for Adult Vaccination, WHO Overview of National Immunization Schedules (work in progress), and the ECDC vaccine scheduler).

### Conclusion

In the EU, multiple vaccines are used to protect adults against a variety of infectious diseases. Sustained efforts to advance research, implementation, public awareness, accessibility, and uptake of adult vaccination are essential to ensure optimal protection and to reduce the burden of current and emerging infectious diseases. These actions are critical for enhancing protection against vaccine-preventable infections across all age groups, generations, and communities, thereby reinforcing a life-course approach to immunization.

**Table 1 | EU vaccines for adults tracker and landscape (last update April 2025)**

Pathogen	Pathogen type	Manufacturer	Brand name	Platform	(Most common) route of administration	Antigen	Adjuvant
Avian influenza	Virus	CSL Seqirus	Zoonotic Influenza Vaccine Seqirus	Inactivated	Intramuscular	A/Astrakhan/3212/2020 (H5N8)-like strain (CBER-FG8A) (clade 2.3.4.4b)	MF59
Chikungunya	Virus	Bavarian Nordic	Vimkungya	Subunit (virus-like-particle)	Intramuscular	CHIKV capsid protein (C) and envelope proteins E1 and E2 derived from CHIKV Senegal strain 37997	Alum-based
Chikungunya	Virus	Valneva	Ixchiq	Live attenuated	Intramuscular	CHIKV Δ5nsP3 strain	None
Dengue	Virus	Sanofi	Dengvaxia	Live attenuated	Intramuscular	Yellow Fever (YF) 17D backbone with DENV-1-4	None
Dengue	Virus	Takeda	Qdenga	Live attenuated	Intramuscular	DENV-2 backbone with DENV-1-4	None
Diphtheria, Tetanus (Td)	Bacteria	AJ Vaccines	dITeBooster	Subunit (toxoid)	Intramuscular	Tetanus toxoid, Diphtheria toxoid	Alum-based
Diphtheria, Tetanus (Td)	Bacteria	Astro Pharma	Td-pur/DIFTEFALL	Subunit (toxoid)	Intramuscular	Tetanus toxoid, Diphtheria toxoid	Alum-based
Diphtheria, Tetanus (Td)	Bacteria	Sanofi	Tenivac/dT-reduct "Merieux"	Subunit (toxoid)	Intramuscular	Tetanus toxoid, Diphtheria toxoid	Alum-based
Diphtheria, Tetanus, Pertussis (Tdap)	Bacteria	GSK	Boostrix	Subunit (toxoid)	Intramuscular	Diphtheria toxoid, Pertussis toxoid, and Tetanus toxoid	Alum-based
Diphtheria, Tetanus, Pertussis (Tdap)	Bacteria	AJ Vaccines	dITekiBooster	Subunit (toxoid)	Intramuscular	Diphtheria toxoid, Pertussis toxoid, and Tetanus toxoid	Alum-based
Diphtheria, Tetanus, Pertussis (Tdap)	Bacteria	Sanofi	Triaxis/Covaxis/Adacel	Subunit (toxoid)	Intramuscular	Diphtheria toxoid, Pertussis toxoid, and Tetanus toxoid	Alum-based
Diphtheria, Tetanus, Polio (Tdap-IPV)	Bacteria/Virus	Sanofi	Adacel-Polio/Repevax	Inactivated/subunit (toxoid)	Intramuscular	Diphtheria toxoid, Pertussis toxoid, and Tetanus toxoid, Combined with Inactivated Polio	Alum-based
Diphtheria, Tetanus, Polio (Tdap-IPV)	Bacteria/Virus	GSK	Boostrix Polio	Inactivated/subunit (toxoid)	Intramuscular	Diphtheria toxoid, Pertussis toxoid, and Tetanus toxoid, Combined with Inactivated Polio	Alum-based
Diphtheria, Tetanus, Polio (Tdap-IPV)	Bacteria/Virus	Sanofi	Revaxis	Inactivated/subunit (toxoid)	Intramuscular	Diphtheria toxoid and Tetanus toxoid, Combined with Inactivated Polio	Alum-based
Haemophilus influenzae type b (Hib)	Bacteria	Sanofi	Act-HIB	Subunit (conjugate)	Intramuscular	Hib polysaccharide conjugated to tetanus toxoid	None
Haemophilus influenzae type b (Hib)	Bacteria	GSK	Hiberix	Subunit (conjugate)	Intramuscular	Hib polysaccharide conjugated to tetanus toxoid	None
Hepatitis A (HepA)	Virus	Sanofi	Avaxim	Inactivated	Intramuscular	HepA (GBM strain)	Alum-based
Hepatitis A (HepA)	Virus	GSK	Havrix	Inactivated	Intramuscular	HepA (HM175 hepatitis A virus strain)	Alum-based
Hepatitis A (HepA)	Virus	MSD	Vaqta Adult	Inactivated	Intramuscular	HepA (Strain CR:326F)	Alum-based
Hepatitis A/B (HepA/B)	Virus	GSK	Twinrix Adult	Inactivated/subunit (recombinant protein)	Intramuscular	HepA inactivated, Hepatitis B surface antigen (HBsAg)	Alum-based
Hepatitis B (HepB)	Virus	GSK	Engerix B	Subunit (recombinant protein)	Intramuscular	HepB surface antigen (HBsAg)	Alum-based

**Table 1 (continued) | EU vaccines for adults tracker and landscape (last update April 2025)**

Pathogen	Pathogen type	Manufacturer	Brand name	Platform	(Most common) route of administration	Antigen	Adjuvant
Hepatitis B (HepB)	Virus	MSD	HBVaxPro	Subunit (recombinant protein)	Intramuscular	HepB surface antigen (HBsAg)	Alum-based
Hepatitis B (HepB)	Virus	GSK	Fendrix	Subunit (recombinant protein)	Intramuscular	HepB surface antigen (HBsAg)	AS04C
Hepatitis B (HepB)	Virus	Dynavax Technologies	HepIsav B	Subunit (recombinant protein)	Intramuscular	HepB surface antigen (HBsAg)	CpG 1018 (TLR9)
Human papillomavirus (HPV)	Virus	MSD	Gardasil	Subunit (virus-like-particle)	Intramuscular	L1 - HPV 6-11-16-18	Alum-based
Human papillomavirus (HPV)	Virus	MSD	Gardasil9	Subunit (virus-like-particle)	Intramuscular	L1 - HPV 6-11-16-18-31-33-45-52-58	Alum-based
Human papillomavirus (HPV)	Virus	GSK	Cervarix	Subunit (virus-like-particle)	Intramuscular	L1 - HPV 16-18	AS04
Japanese encephalitis (JE)	Virus	Valneva	Ixiaro	Inactivated	Intramuscular	JE virus (strain SA14-14-2)	Alum-based
Measles, mumps, rubella (MMR)	Virus	MSD	M-M-R vax Pro	Live attenuated	Intramuscular	Measles virus - Enders' Edmonston strain, Mumps virus - Jeryl Lynn [Level B] strain, Rubella virus - Wistar RA 27/3 strain	None
Measles, mumps, rubella (MMR)	Virus	GSK	Priorix	Live attenuated	Intramuscular	Schwarz measles, the RIT 4385 mumps (derived from the Jeryl Lynn mumps strain) and the Wistar RA 27/3 rubella strains	None
Measles, mumps, rubella, varicella (MMR-V)	Virus	GSK	Priorix tetra	Live attenuated	Intramuscular	Measles virus (Schwarz strain), mumps virus (RIT 4385 strain, derived from Jeryl Lynn strain), rubella virus (Wistar RA 27/3 strain), varicella virus (Oka strain)	None
Measles, mumps, rubella, varicella (MMR-V)	Virus	MSD	ProQuad	Live attenuated	Intramuscular	Measles virus Enders' Edmonston strain, Mumps virus Jeryl Lynn (Level B) strain, Rubella virus Wistar RA 27/3 strain, Varicella virus Oka/Merck strain	None
Meningococcal ACWY	Bacteria	GSK	Menveo	Subunit (conjugate)	Intramuscular	Lyophilized meningococcal serogroup A (MenA) capsular polysaccharide conjugated to CRM197, capsular polysaccharide of serogroup C, W, and Y (MenCWY) conjugated to CRM197	None
Meningococcal ACWY	Bacteria	Sanofi	MenQuadfi	Subunit (conjugate)	Intramuscular	Neisseria meningitidis A, C, W, Y conjugated to tetanus toxoid carrier protein	None
Meningococcal ACWY	Bacteria	Pfizer	Nimenrix	Subunit (conjugate)	Intramuscular	Neisseria meningitidis A, C, W-135, Y conjugated to tetanus toxoid carrier protein	None
Meningococcal B	Bacteria	GSK	Bexsero	Subunit (recombinant protein)	Intramuscular	Neisseria meningitidis serogroup B surface proteins (NHBA, Nada, fHbp and PorA P1-4)	Alum-based
Meningococcal B	Bacteria	Pfizer	Trumenba	Subunit (recombinant protein)	Intramuscular	Neisseria meningitidis serogroup B fHbp (Recombinant lipidated fHbp (factor H binding protein) subfamily A-B	Alum-based
Meningococcal C	Bacteria	Pfizer	Naisvac-C	Subunit (conjugate)	Intramuscular	Meningococcal group C polysaccharide conjugated to tetanus toxoid carrier protein	Alum-based
Mycobacterium tuberculosis (TB)	Bacteria	Biomed Lublin	BCG vaccine	Live attenuated	Intradermal	BCG (Moreau strain)	None
Mycobacterium tuberculosis (TB)	Bacteria	BuBio-NCIPD	BCG vaccine	Live attenuated	Intradermal	BCG Russia seed strain (1950s)	None

**Table 1 (continued) | EU vaccines for adults tracker and landscape (last update April 2025)**

Pathogen	Pathogen type	Manufacturer	Brand name	Platform	(Most common) route of administration	Antigen	Adjuvant
Mycobacterium tuberculosis (TB)	Bacteria	AJ Vaccines	BCG Vaccine "AJ Vaccines"	Live attenuated	Intradermal	Mycobacterium bovis BCG (Bacillus Calmette-Guérin), Danish strain 1331	None
Mycobacterium tuberculosis (TB)	Bacteria	MSD	BCG TICE vaccine	Live attenuated	Intradermal	Strain developed at the University of Illinois from a strain originated at the Pasteur Institute.	None
Polio	Virus	LG Chem Ltd	Eupolio	Inactivated	Intramuscular	Poliovirus types 1, 2 and 3 (Sabin strain)	None
Polio	Virus	Sanofi	Imovax Polio	Inactivated	Intramuscular	Poliovirus Type 1 Mahoney, Type 2 MEF1, Type 3 Saukett	None
Polio	Virus	Bilthoven Biologicals B.V	Poliomyelitis vaccine	Inactivated	Intramuscular	Poliovirus Type 1 Mahoney, Type 2 MEF1, Type 3 Saukett	None
Rabies	Virus	Sanofi	Rabies Mérieux/Imovax Rabies/Verorab	Inactivated	Intramuscular	Rabies virus (strain PM-1503-3M)	None
Rabies	Virus	Bavarian Nordic	Rabipur	Inactivated	Intramuscular	Rabies virus (strain Flury LEP)	None
Respiratory syncytial virus (RSV)	virus	GSK	Arexvy	Subunit (recombinant protein)	Intramuscular	F protein: RSVpreF (RSV A)	AS01E
Respiratory syncytial virus (RSV)	virus	Moderna	mRESVIA (mRNA-1345)	Nucleic acid (mRNA)	Intramuscular	Single-stranded 5' capped mRNA encoding the RSV-A glycoprotein F	None
Respiratory syncytial virus (RSV)	virus	Pfizer	Abrysvo	Subunit (recombinant protein)	Intramuscular	F protein: RSVpreF (RSV A) and RSVpreF (RSV B)	None
Salmonella Typhi	Bacteria	Emergent Biosolutions	Vivotif/Typhoral	Live attenuated	Oral	Salmonella typhi Ty21a	None
Salmonella Typhi	Bacteria	Sanofi	Typhim Vi	Subunit (polysaccharide)	Intramuscular	Purified Vi polysaccharide from Salmonella Typhi (Ty2 strain)	None
Seasonal Influenza	Virus	Fluarix Innovative Vaccines	3Fluarix	Inactivated (egg-based)	Intramuscular	TIVs contain two A lineages (H1N1 and H3N2) and only one B lineage	Alum-based
Seasonal Influenza	Virus	CSL Seqirus	Fluad/Chiromas	Inactivated (egg-based)	Intramuscular	TIVs contain two A lineages (H1N1 and H3N2) and only one B lineage	MF59
Seasonal Influenza	Virus	CSL Seqirus	Fluad Tetra/Quad /Quadrivalent	Inactivated (egg-based)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses	MF59
Seasonal Influenza	Virus	CSL Seqirus	Flucevax Tetra/Quadrivalent/Quad	Inactivated (cell-based)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses	None
Seasonal Influenza	Virus	CSL Seqirus	Afluria Quadrivalent/Quad/Tetra	Inactivated (egg-based)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses	None
Seasonal Influenza	Virus	CSL Seqirus	Agrippal/Begripal/Fluazur/Sandovac/Agriflu/Chiroflu	Inactivated (egg-based)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses	None
Seasonal Influenza	Virus	Sanofi	Efluida	Inactivated (egg-based)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses (High-dose)	None
Seasonal Influenza	Virus	GSK	Fluarix Tetra/Quadrivalent	Inactivated (egg-based)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses	None
Seasonal Influenza	Virus	GSK	Fluival Quadrivalent	Inactivated (egg-based)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses	None

**Table 1 (continued) | EU vaccines for adults tracker and landscape (last update April 2025)**

Pathogen	Pathogen type	Manufacturer	Brand name	Platform	(Most common) route of administration	Antigen	Adjuvant
				Inactivated (egg-based)			
Seasonal Influenza	Virus	Abbott Biologicals B.V./Mylan	Influvac/Fluvaccinol/ Grippe-Impfstoff STADA N/Vacciflu/ Inuvac	Inactivated (egg-based)	Intramuscular	TIVs contain two A lineages (H1N1 and H3N2) and only one B lineage	None
Seasonal Influenza	Virus	Abbott Biologicals B.V./Mylan	Influvac Tetra	Inactivated (egg-based)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses	None
Seasonal Influenza	Virus	Sanofi	Vaxigrip	Inactivated (egg-based)	Intramuscular	TIVs contain two A lineages (H1N1 and H3N2) and only one B lineage	None
Seasonal Influenza	Virus	Sanofi	Vaxigrip Tetra	Inactivated (egg-based)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses	None
Seasonal Influenza	Virus	Sanofi	Supemtek Tetra	Subunit (recombinant protein)	Intramuscular	QIVs contain two A lineages (H1N1 and H3N2) and two influenza B viruses, high dose	None
Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)	Virus	Novavax	Nuvaxovid	Subunit (recombinant protein)	Intramuscular	Monovalent and Bivalent original and Omicron	Matrix-M
Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)	Virus	Pfizer/BioNTech	Comirnaty	Nucleic acid (mRNA)	Intramuscular	Monovalent and Bivalent original and Omicron in LNPs	None
Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)	Virus	Moderna	Spikevax	Nucleic acid (mRNA)	Intramuscular	Monovalent and Bivalent original and Omicron (50 or 100 µg depending on dose) encapsulated in LNPs	None
Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)	Virus	Arcturus Therapeutics Europe B.V	Kostaive	Nucleic acid (self-amplifying mRNA)	Intramuscular	Zapomeran, sa-mRNA, encapsulated in lipid nanoparticles	None
Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)	Virus	Hipra Human Health	Bimervax	Subunit (recombinant protein)	Intramuscular	Monovalent and bivalent, alpha, beta, omicron	SQBA
Smallpox/ Mpox	Virus	Bavarian Nordic	Imvanex	Live attenuated (non-replicating)	Subcutaneous	Live, attenuated orthopoxvirus, Modified Vaccinia Ankara (MVA)	None
Streptococcus pneumoniae	Bacteria	Pfizer	Prevenar 20	Subunit (conjugate)	Intramuscular	Pneumococcal capsular polysaccharides 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 22F, 23F, 33F, 8, 10A, 11A, 12F, 15B,	Alum-based
Streptococcus pneumoniae	Bacteria	Pfizer	Prevenar 13	Subunit (conjugate)	Intramuscular	Pneumococcal capsular polysaccharides 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F	Alum-based
Streptococcus pneumoniae	Bacteria	MSD	Vaxneuvance	Subunit (conjugate)	Intramuscular	Pneumococcal capsular polysaccharides 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 22F, 23F, 33F	Alum-based
Streptococcus pneumoniae	Bacteria	MSD	Pneumovax 23	Subunit (polysaccharide)	Intramuscular	Polysaccharide antigen from 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22F, 23F, and 33F	None
Bacteria	Bacteria	MSD	Capvaxie (PCV21)		Intramuscular		None

**Table 1 (continued) | EU vaccines for adults tracker and landscape (last update April 2025)**

Pathogen	Pathogen type	Manufacturer	Brand name	Platform	(Most common route of administration)	Antigen	Adjuvant
Streptococcus pneumoniae				Subunit (conjugate)		Polysaccharide antigen from 3, 6A, 7F, 8, 9N, 10A, 11A, 12F, 15A, 15B (de-O-acetylated prior to conjugation), 16F, 17F, 19A, 20A, 22F, 23A, 23B, 24F, 31, 33F, and 35B individually conjugated to CRM1197 carrier protein.	
Tick-borne encephalitis (TBE)	Virus	Bavarian Nordic	Encepur	Inactivated	Intramuscular	TBE virus (strain K23)	Alum-based
Tick-borne encephalitis (TBE)	Virus	Pfizer	FSME-Immun/Ticovac	Inactivated	Intramuscular	TBE virus (strain Neudörf)	Alum-based
Varicella-zoster virus (VZV) - Herpes Zoster	Virus	GSK	Shingrix	Subunit (recombinant protein)	Intramuscular	Varicella Zoster Virus glycoprotein E antigen	AS01B
Varicella-zoster virus (VZV) - Varicella	Virus	GSK	Varilrix	Live attenuated	Intramuscular	VZV strain Oka	None
Varicella-zoster virus (VZV) - Varicella	Virus	MSD	Varivax	Live attenuated	Intramuscular	VZV strain Oka/Merck	None
Vibrio cholerae O1	Bacteria	Valvea	Dukoral	Inactivated/subunit (toxoid)	Oral	Inactivated Vibrio cholerae O1 (classical Inaba, El Tor Inaba, Ogawa) and Recombinant cholera toxin B subunit	None
Vibrio cholerae O1	Bacteria	Emergent BioSolutions	Vaxchora	Live attenuated	Oral	Vibrio cholerae live, attenuated strain CVD 103-HgR	None
Yellow Fever (YF)	Virus	Sanofi	Stamaril	Live attenuated	Subcutaneous	YF virus 17D-204 strain	None
Zaire ebolavirus	Virus	MSD	Ervebo	Viral vector	Intramuscular	Recombinant Vesicular Stomatitis Virus (rVSV) strain Indiana with a deletion of the VSV envelope glycoprotein (G) replaced with the Zaire Ebola Virus (ZEBOV) Kikwit 1995 strain surface glycoprotein (GP)	None
Zaire ebolavirus	Virus	Janssen-Cilag International NV	Zabdeno/Mvabea	Viral vector	Intramuscular	Modified Vaccinia Ankara Bavarian Nordic Virus encoding the Zaire ebolavirus (EBOV) Mayinga variant glycoprotein (GP), Sudan ebolavirus Gulu variant GP, Tai Forest ebolavirus nucleoprotein, Marburg marburgvirus Musoke variant GP	None

Next versions of the AIB tracker and landscape will be published on the AIB website ([www.adultimmunizationboard.org](http://www.adultimmunizationboard.org)) and will be updated on an annual basis.

**Table 2 | Overview of current vaccines for adults landscape in Europe (>18-year-old)**

Overview of current adult vaccines used in Europe (>18-year-old)					
Vaccine	(Age-dependent) routine vaccines	Catch-up missed child/ adolescence vaccines	Individual risk-based vaccines (e.g pregnancy, lifestyle, medical condition, etc.)	Travel-related vaccines	Occupational activity-related vaccines (e.g. HCP, CCW, people who work with animals, etc.) <sup>b</sup>
Avian influenza			x		x
Cholera				x	
COVID-19	x		x	x	x
Dengue				x	
Ebola					x
Hepatitis A		x <sup>a</sup>	x	x	x
Hepatitis B		x	x	x	x
Hib		x	x		
HPV		x	x		
HZ	x		x		
S. Influenza	x		x	x	x
Pneumococcus	x	x	x		
JE				x	
MenACWY		x	x	x	
MenB		x	x	x	
MMR(V)		x			
Mpox			x		
Polio		x		x	
Rabies				x	x
RSV	x		x		
TB			x		x
TBE	x	x <sup>a</sup>	x	x	x
Tdap	x	x	x		
Typhoid fever				x	
Yellow fever				x	

The list covers vaccines for adults up to April 2025.

CCW child care workers, HCP health care providers, Hib Haemophilus influenzae b, HPV Human Papilloma Virus, HZ Herpes Zoster, S. Influenza Seasonal Influenza, JE Japanese Encephalitis, Men Meningococcal, MMR(V) Measles Mumps Rubella Varicella, RSV Respiratory Syncytial Virus, TB tuberculosis, TBE Tick-Borne Encephalitis, Tdap Tetanus diphtheria acellular Pertussis.

<sup>a</sup>Depends whether there is universal childhood vaccination at (sub)national level.

<sup>b</sup>All vaccines can be given to lab workers working with these pathogens

## Data availability

No datasets were generated or analyzed during the current study.

**Jade Pattyn**<sup>1</sup> ✉, **Odile Launay**<sup>2</sup>, **Robert Steffen**<sup>3</sup>, **Birgit Weinberger**<sup>4</sup>, **Giovanni Gabutti**<sup>5</sup>, **Alojz Ihan**<sup>6</sup>, **Thomas Weinke**<sup>7</sup>, **Ligita Jancoriene**<sup>8</sup>, **Paolo Bonanni**<sup>9</sup> & **Pierre Van Damme**<sup>1</sup>

<sup>1</sup>Centre for the Evaluation of Vaccination (CEV), University of Antwerp, Antwerp, Belgium. <sup>2</sup>Université Paris Cité; Inserm, CIC1417, F-CRIN, I-REIVAC; Assistance-Publique-Hopitaux de Paris, Hôpital Cochin, Paris, France. <sup>3</sup>Epidemiology, Biostatistics and Prevention Institute, Department of Public and Global Health, Division of Infectious Diseases, World Health Organization Collaborating Centre for Travelers' Health, University of Zurich, Zurich, Switzerland. <sup>4</sup>Institute for Biomedical Aging Research, Universität Innsbruck, Innsbruck, Austria. <sup>5</sup>Working Group Vaccines and Immunization Policies, Italian Society of Hygiene, Preventive Medicine and Public Health, Cogorno, Italy. <sup>6</sup>Institute of Microbiology and Immunology, Medical faculty, University Ljubljana, Ljubljana, Slovenia.

<sup>7</sup>Ernst von Bergmann Hospital, Potsdam, Germany. <sup>8</sup>Clinic of Infectious Diseases and Dermatovenerology, Institute of Clinical Medicine, Medical Faculty, Vilnius University, Vilnius, Lithuania. <sup>9</sup>Department of Health Sciences; University of Florence, Florence, Italy.

✉ e-mail: [Jade.Pattyn@uantwerpen.be](mailto:Jade.Pattyn@uantwerpen.be); [adultimmunizationboard@uantwerpen.be](mailto:adultimmunizationboard@uantwerpen.be)

Received: 16 May 2025; Accepted: 20 July 2025;

Published online: 04 August 2025

## References

- Cassimos, D. C. et al. Vaccination programs for adults in Europe, 2019. *Vaccines* **8**, 34 (2020).
- Jones, C. H. et al. Exploring the future adult vaccine landscape-crowded schedules and new dynamics. *NPJ Vaccines* **9**, 27 (2024).
- World Health Organization. *Global vaccine market report 2024*. (WHO, 2024).
- Pattyn, J. et al. The Adult Immunization Board (AIB): a new platform to provide multidisciplinary guidelines for the implementation and optimization of adult immunization in Europe. *Vaccine* **42**, 1–3 (2024).

- Pattyn, J. & Bonanni, P. Assessing the health burden of vaccine-preventable infections in European adults: challenges and opportunities translated into action. *Eur. Surveill.* **28**, 2300791 (2023).
- Pollard, A. J. & Bijker, E. M. A guide to vaccinology: from basic principles to new developments. *Nat. Rev. Immunol.* **21**, 83–100 (2021).
- Hausdorff, W. P. et al. Facilitating the development of urgently required combination vaccines. *Lancet Glob. Health* **12**, e1059–e1067 (2024).
- McGuinness, S. L. et al. Re-imagining combination vaccines for travel medicine. *J. Travel Med.* **32**, taaf033 32, taaf033 (2025).
- Monto, A. S., Zambon, M. & Weir, J. P. The end of B/Yamagata influenza transmission - transitioning from quadrivalent vaccines. *N. Engl. J. Med.* **390**, 1256–1258 (2024).

### Acknowledgements

We want to thank the AIB advisors, AIB secretariat and Vaccines Europe for their input and/or review. A complete list of all AIB advisors and the AIB secretariat can be found on the AIB website [www.adultimmunizationboard.org](http://www.adultimmunizationboard.org).

### Author contributions

J.P.: Conceptualization, Methodology, Investigation, Formal Analysis, Data Curation, Writing – Original Draft, Writing – Main Manuscript. P.V.D. and P.B.: Conceptualization, Methodology, Writing – Main Manuscript, Writing – Review & Editing, Funding Acquisition. O.L., R.S., B.W., G.G., A.I., T.W., and L.J.: Writing – Review & Editing.

### Competing interests

The authors declare no competing interests.

### Additional information

**Correspondence** and requests for materials should be addressed to Jade Pattyn.

**Reprints and permissions information** is available at

<http://www.nature.com/reprints>

**Publisher's note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

**Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

© The Author(s) 2025, corrected publication 2025