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SPANISH ASSOCIATION OF PAEDIATRICS

Immunisation schedule of the Pediatric Spanish Association: 2025 recommendations

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Abstract The AEP 2025 Vaccination and Immunization Schedule recommended for children, adolescents and pregnant women residing in Spain features the following novelties:

Due to the increase in measles cases and outbreaks in recent years, we recommend advancing the second dose of measles, mumps and rubella (MMR) vaccine to 2 years of age.

As a consequence of the above, since many autonomous communities (ACs) use the quadrivalent vaccine for the second dose of MMR and varicella vaccines, we recommend, for all ACs, advancing the second dose of varicella vaccine to 2 years of age.

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◊ Appendix A lists the members of the Advisory Committee on Vaccines of the Asociación Española de Pediatría.

Spanish immunisation schedule

Due to the very significant increase in cases of pertussis since late 2023 and especially in 2024, we recommend advancing the dose of Tdap given in adolescence to 10–12 years of age.

To complete protection against meningococcal disease in adolescence, we recommend vaccination against MenB at age 12 years.

We believe that vaccination against seasonal influenza should be routine up to age 18 years, but given the disappointing coverage in children aged 6–59 months, we currently consider that improving this coverage should be prioritised, extending vaccination to children and adolescents aged 5–18 years once this objective has been achieved.

Among other aspects, the routine immunization tables for healthy individuals and risk groups, the use of the new extended-valence conjugate vaccines against pneumococcal disease, routine vaccination at 4 months of age with MenACWY and vaccination against SARS-CoV-2 for individuals aged more than 6 months with risk factors remain unchanged with respect to the 2024 schedule.

PALABRAS CLAVE
Vacunas infantiles;
Lactante;
Niño;
Adolescente;
Embarazada;
Calendario de inmunización español

Calendario de vacunaciones e inmunizaciones de la Asociación Española de Pediatría: recomendaciones 2025

Resumen El Calendario de Vacunaciones e Inmunizaciones de la AEP 2025 recomendado para niños, adolescentes y embarazadas residentes en España, presenta las siguientes novedades:

Debido al aumento de casos y brotes de sarampión en los últimos años, recomendamos adelantar la segunda dosis de triple vírica a los dos años de edad.

Como consecuencia de lo anterior, debido a que muchas comunidades autónomas (CC. AA.) usan tetravírica para las segundas dosis de triple vírica y varicela, recomendamos, para todas las CC.AA., adelantar la segunda dosis de vacuna frente a varicela a los dos años.

Debido al muy importante aumento de casos de tosferina desde finales del 2023 y especialmente en 2024, recomendamos adelantar la dosis de Tdpa en la adolescencia a los 10-12 años.

Para completar la protección frente a los meningococos en la adolescencia, recomendamos la vacunación frente al MenB a los 12 años.

Consideramos que la vacunación frente a gripe debe ser sistemática hasta los 18 años, pero dadas las decepcionantes coberturas en los niños entre 6–59 meses, creemos prioritario actualmente aumentar dichas coberturas, y una vez conseguido este objetivo, ampliar la vacunación a niños y adolescentes entre 5–18 años.

Se mantienen respecto al calendario 2024, entre otras, las tablas de inmunización sistemática para personas sanas y la de grupos de riesgo, el uso de las nuevas vacunas conjugadas de valencia ampliada frente al neumococo, la vacunación sistemática a los 4 meses de edad con MenACWY, y la vacunación frente al SARS-CoV-2 para personas mayores de 6 meses con factores de riesgo.

Introduction

The Advisory Committee on Vaccines of the Asociación Española de Pediatría (CAV-AEP) presents the 2025 immunization Schedule recommended for children, adolescents and pregnant women residing in Spain (Figs. 1 and 2). The salient novelties are the modification of the recommendations for vaccination against meningococcal B disease (MenB), pertussis and measles, mumps rubella (MMR)/varicella.

On behalf of the CAV-AEP, we emphasize the need to engage in a concerted effort to increase vaccination coverage rates and propose the institution of a National Immunization Committee and the inclusion of expert pediatricians in decision-making committees, in addition to the implementation of alternative funding strategies for immunizations that are not currently included in the routine schedule.

Table 1 summarises the sources and literature search strategies used to develop the evidence-based recommendations presented in this document.

Vaccination of pregnant women

2025 recommendation: *Pertussis: dose of tetanus and reduced diphtheria and acellular pertussis toxoid vaccine (Tdap) in each pregnancy from 27 weeks of gestation,*

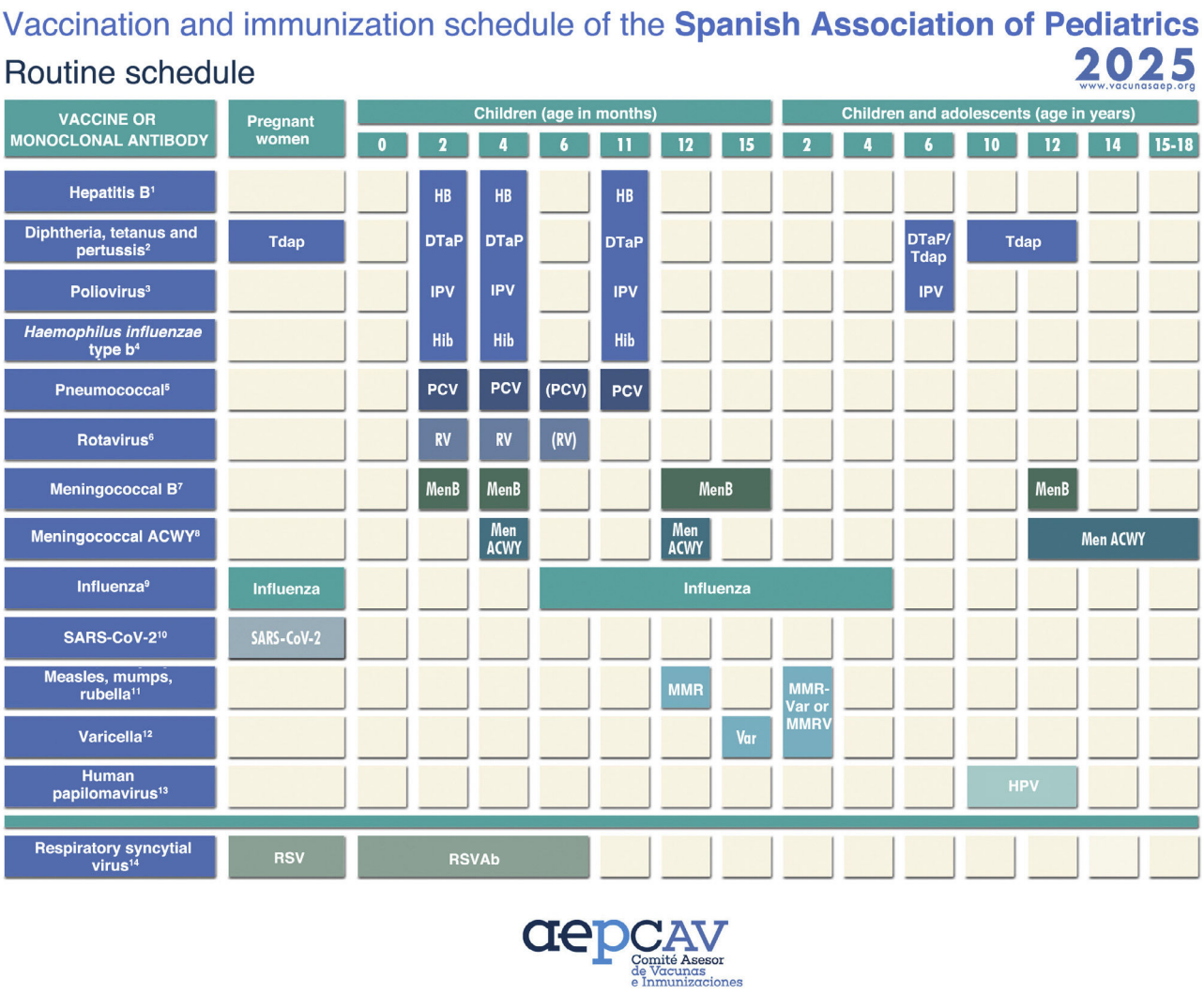

Figure 1 Vaccination and immunization schedule of the Spanish Association of Pediatrics: 2025 recommendations. Routine vaccination.

(1) Hepatitis B vaccine (HB). Three doses of hexavalent vaccine at 2, 4 and 11 months. Unvaccinated children and adolescents should be given 3 doses of monovalent vaccine on a 0, 1 and 6-month schedule.

(2) Diphtheria, tetanus and acellular pertussis vaccine (DTaP/Tdap). Five doses: primary vaccination with 2 doses (at 2 and 4 months) and booster at 11 months (third dose) with hexavalent vaccine: diphtheria, tetanus, pertussis, hepatitis B, *H. influenzae* and poliovirus vaccine (DTaP-HB-Hib-IPV); at 6 years (fourth dose) with the standard load vaccine (DTaP-IPV), preferable to the low diphtheria and pertussis antigen load vaccine (Tdap-IPV), and at 10–12 years (fifth dose) with Tdap. In children previously vaccinated with the 3 + 1 schedule (at 2, 4, 6 and 18 months), it is possible to use the Tdap for the booster at age 6 years, as they do not need additional doses of IPV. Administration of Tdap is recommended in each pregnancy between weeks 27 and 36 of gestation, preferably weeks 27—28. In the case of probable preterm labour, it can be administered from week 20, after performance of the high-resolution foetal ultrasound scan.

(3) Inactivated poliovirus vaccine (IPV). Four doses: primary vaccination with 2 doses, at 2 and 4 months, and booster doses at 11 months (with hexavalent vaccine) and 6 years (with DTaP-IPV or Tdap-IPV). Children previously vaccinated with the 3 + 1 schedule (at 2, 4, 6 and 18 months) require no additional doses of IPV. Children from countries that use the oral poliovirus vaccine (OPV) who have been vaccinated with 2 or 3 doses of the bivalent OPV vaccine exclusively (from April 2016, when the global switch from the trivalent OPV to the bivalent IPV started on the recommendation of the WHO) should be given at least 2 doses of IPV at least 6 months apart to guarantee protection against poliovirus type 2.

(4) *Haemophilus influenzae* type b conjugate vaccine (Hib). Three doses: primary vaccination at 2 and 4 months and booster dose at 11 months with hexavalent vaccine.

preferably on week 27—28. Influenza: vaccination during the flu season in any trimester of pregnancy or in the postpartum period in the first 6 months if not vaccinated during pregnancy. SARS-CoV-2: vaccination in any trimester or booster dose, as applicable. Respiratory syncytial virus (RSV): when indicated as part of a public health strategy, administer a dose between weeks 24 and 36 of gestation, preferably between weeks 32 and 36.

Vaccination with Tdap during pregnancy protects newborns and infants before the start of routine immunization.[1] Recommended in each pregnancy between 27 and 36 weeks of gestation, preferably on weeks 27—28. If preterm delivery is likely, it is possible to administer it from week 20, after performance of a high-resolution foetal ultrasound.

Pregnant women are at increased risk of complications and hospitalization due to influenza or SARS-CoV-2 infec-

(5) Pneumococcal conjugate vaccine (PCV). Three or four doses: 2 + 1 series with PCV15 (at 2, 4 and 11 months) or 3 + 1 series with PCV20 (at 2, 4, 6 and 11 months).

(6) Rotavirus vaccine (RV). Two or three doses of RV: at 2 and 3–4 months with the monovalent vaccine or at 2, 3 and 4 months or 2, 3–4 and 5–6 months with the pentavalent vaccine. To minimise the risk of intussusception, which is very low, vaccination must start between 6 and 12 weeks of life and be completed by 24 weeks for the monovalent vaccine and 33 weeks for the pentavalent vaccine. Doses must be given at least 4 weeks apart. Both vaccines may be given at the same time as any other vaccine (with the exception of the oral poliovirus vaccine, which is not currently distributed in Spain).

(7) Meningococcal B vaccine (MenB). 4CMenB. Three doses: start at age 2 months, with a series of 2 doses 2 months apart and a booster starting from age 12 months and at least 6 months after the last dose in the primary series; administration of the 4CMenB at the same time as all other vaccines in the schedule is recommended. In adolescence, routine vaccination at age 12 years with either of the two vaccines in unvaccinated individuals and, in those who have completed childhood vaccination, a booster dose with 4CMenB (use of a different vaccine is not allowed, as meningococcal B vaccines are not interchangeable). For all other age groups, the indication of vaccination with either vaccine (4CMenB or MenB-fHbp) is determined on a case-by-case basis, always adhering to the minimum age authorised for each vaccine.

(8) Meningococcal ACWY conjugate vaccine (MenACWY). One dose of conjugate MenACWY conjugated with tetanus toxoid (MenACWY-TT) at age 4 months if the vaccine is included in the publicly funded immunization schedule of the autonomous community, and otherwise, the schedule found in the summary of product characteristics of the MenACWY-TT (Pfizer); booster dose at 12 months with MenACWY-TT (Pfizer) or MenACWY-TT (Sanofi). In adolescence (11–13 years), administration of 1 dose of MenACWY is recommended, in addition to catch-up vaccination through age 18 years. In autonomous communities where the MenACWY vaccine is not included in the routine immunization schedule at 4 and 12 months, if parents choose not to administer it, the MenC-TT vaccine funded by the regional government must be administered instead. For all other age groups, the decision to vaccinate must be made on a case-by-case basis.

(9) Influenza vaccine. Recommended in all children aged 6–59 months with administration of an inactivated vaccine via the intramuscular route (some can be administered via deep subcutaneous injection) or, from age 2 years, preferably with the intranasal live attenuated vaccine. Children and adolescents aged 5–18 years can also be vaccinated on a case-by-case basis. A single dose should be given from age 6 months, except in children aged less than 9 years in risk groups, who should be given 2 doses 4 weeks apart if it is the first time they are vaccinated against influenza. The dose is 0.5 mL delivered intramuscularly in the case of the inactivated vaccine and 0.1 mL in each nostril in the case of the attenuated vaccine. Vaccination against influenza is recommended in pregnant women in any trimester or in the postpartum period within 6 months of birth if not vaccinated during pregnancy.

(10) SARS-CoV-2 vaccine. One dose during pregnancy in any trimester. If pregnant women have been vaccinated before or had the infection, the vaccine should be given at least 3 months after the last exposure event. Vaccination in the postpartum period within 6 months of delivery is also indicated if not performed during the pregnancy. The vaccine can be given at the same time as the influenza or Tdap vaccines.

(11) Measles, mumps and rubella vaccine (MMR). Two doses of MMR vaccine. The first at age 12 months and the second at age 2 years. The quadrivalent MMRV vaccine may be administered for the second dose. In susceptible patients outside the specified ages, vaccination with 2 doses of MMR at least 1 month apart is recommended.

(12) Varicella vaccine (Var). Two doses: the first one at 15 months (although it is possible to administer from age 12 months) and the second at age 2 years. The quadrivalent vaccine (MMRV) may be used for the second dose. In susceptible patients outside the specified ages, vaccination with 2 doses of monovalent Var vaccine is recommended, at least 1 month apart, with a recommended 12-week interval between doses in children aged less than 13 years.

(13) Human papillomavirus vaccine (HPV). Routine vaccination against HPV of all children, male or female, at age 10–12 years with a single dose. The higher valency vaccine (HPV9) is recommended. From 2025, the Ministry of Health recommends a single dose given up to age 25 years (it is only publicly found until age 18 years). It can be administered at the same time as the MenACWY, hepatitis A and B and Tdap vaccines. There are no data for administration with the varicella vaccine, although it should not cause any problems.

(14) Respiratory syncytial virus (RSV). Pregnant women should receive the RSVPreF vaccine between 24 and 36 weeks of gestation, preferably between weeks 32 and 36. The public health system will not fund it in the 2024–2025 season, although it will be available at community pharmacies. Administration of 1 dose of nirsevimab (an anti-RSV antibody) is recommended in all neonates born during the RSV season (October-March) and infants aged less than 6 months (born between April and September) at the beginning of the season.

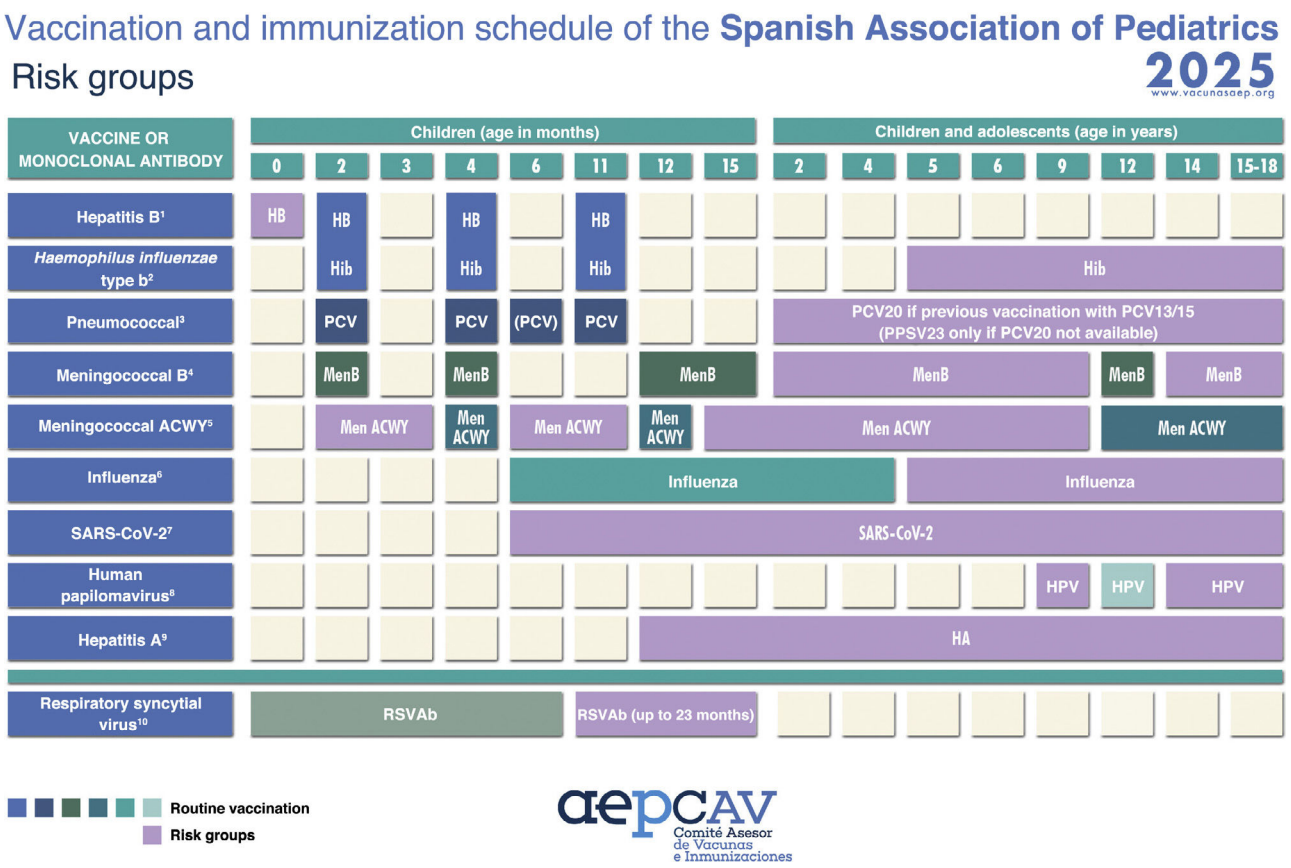

Figure 2 Immunization schedule of the Spanish Association of Pediatrics: 2025 recommendations. Risk groups.

(1) Hepatitis B vaccine (HB). Children of mothers positive for hepatitis B antigen (HBsAg+) will be given 1 dose of vaccine and 1 dose of hepatitis B immune globulin (HBIG) (0.5 mL) within 12 h of birth. In the case of unknown maternal serologic status, children will receive the vaccine within 12 h of birth and serological testing performed in the mother, followed by 0.5 mL of HBIG, preferably within 72 h of birth, if maternal HBsAg + status is confirmed. Infants vaccinated at birth will adhere to the routine schedule for the first year of life, and thus will receive 4 doses of HB vaccine. There are additional risk groups.

(2) *Haemophilus influenzae* type b vaccine (Hib). Vaccination in children aged more than 59 months is unnecessary, except in those belonging to risk groups: anatomic or functional asplenia, complement deficiency, treatment with eculizumab or ravulizumab, infection by HIV or history of invasive disease by *H influenzae*. In unvaccinated or partially vaccinated children younger than 59 months, vaccinate according to the accelerated or catch-up vaccination schedule of the Advisory Committee on Vaccines of the Asociación Española de Pediatría (CAV-AEP).

(3) Vaccination against pneumococcal disease. If the 20-valent pneumococcal polysaccharide vaccine (PCV20) is available, it should be administered preferentially instead of the 23-valent vaccine (PPSV23) in children previously vaccinated with PCV13 or PCV15. In children fully vaccinated with PCV20 (primary series and booster) or who have received a dose of PCV20 to complete vaccination initiated with PCV13 or PCV15, it is not necessary to administer the PPSV23 or additional doses of PCV20. The PPSV23 vaccine is only indicated in children aged more than 2 years with diseases that increase the risk of pneumococcal infection fully vaccinated with conjugated vaccine (PCV13 or PCV15), but only if the PCV20 vaccine is not available. The minimum interval required to administer the PCV20 or PPSV23 after the last dose of PCV in children previously vaccinated with PCV13 or PCV15 is 8 weeks.

(4) Meningococcal B vaccine (MenB). 4CMenB. Recommended in risk groups at any age from 1 year (infants under 1 year will be vaccinated according to the routine schedule): anatomic or functional asplenia, complement deficiency, treatment with eculizumab or ravulizumab, haematopoietic stem cell transplant recipients, infection by HIV, prior episode of invasive meningococcal disease (IMD) caused by any serogroup and contacts of an index case of IMD caused by serogroup B in the context of an outbreak. Subsequently, with the exception of children aged less than 2 years or with a history of IMD, 1 dose of MenB should be given one year after completion of the primary series and every 5 years thereafter. In the context of an outbreak of IMD caused by group B, patients in risk groups should be given a booster dose if at least 1 year has elapsed from completion of the primary vaccination series.

tion, in addition to adverse perinatal events such as preterm birth and low birth weight. Vaccination against both is recommended and can be performed in any trimester of the pregnancy and up to 6 months postpartum if vaccination was nor performed during the pregnancy, and both vaccines can be administered at the same time. The SARS-CoV-2 vaccine should be administered independently of the number of previously received doses and at least 3 months apart from the last dose or SARS-CoV-2 infection.[2,3]

Recently, the European Commission authorised the bivalent RSV prefusion F protein subunit vaccine (RSVPreF) for use in pregnant women between 24 and 36 weeks (the CAV-AEP considers administration between 32 and 36 weeks preferable) for passive immunization of newborns and infants against RSV in the first months of life.[4] This season, the RSVPreF will be available in pharmacies for dispensation with a physician's prescription, but it will not be publicly funded.

Vaccination against diphtheria, tetanus, pertussis, hepatitis b, *Haemophilus influenzae* type b and poliomyelitis

2025 recommendation: *2 + 1 series with hexavalent diphtheria, tetanus and acellular pertussis (DTaP), hepatitis B (HB) Haemophilus influenzae type B (Hib) and inactivated poliovirus (IPV) (DTaP-HB-Hib-IPV) vaccine (at 2, 4 and 11 months); DTaP-IPV at 6 years and Tdap at 10–12 years.*

Vaccination with hexavalent vaccine in a 2 + 1 series (at 2, 4 and 11 meses) is very effective in countries with a high vaccination coverage and can be initiated from 6 weeks post birth with 2 doses at least 8 weeks apart and a booster dose, at least 6 weeks apart from the primary series, from age 11 months.

Vaccination against diphtheria, tetanus, pertussis and poliomyelitis is completed with a 4th dose at 6 years of age with DTaP-IPV vaccine. In adolescence, with the adminis-

From age 10 years, it is possible to use either of the two vaccines, always taking into account that they are not interchangeable.

(5) Meningococcal ACWY conjugate vaccine (MenACWY). The MenACWY continues to be particularly recommended for children and adolescents who are going to move to countries where this vaccine is indicated at the corresponding age (Canada, USA, Argentina, Brazil, Chile, Saudi Arabia, Australia, Andorra, Austria, Belgium, Cyprus, Slovakia, Greece, Ireland, Italy, Malta, Netherlands, United Kingdom, Czech Republic, San Marino and Switzerland) and children with risk factors for invasive meningococcal disease (IMD): anatomic or functional asplenia, complement deficiency, treatment with eculizumab or ravulizumab, haematopoietic stem cell transplant recipients, infection by HIV, prior episode of IMD caused by any serogroup and contacts of an index case of IMD caused by serogroup A, C, W or Y in the context of an outbreak. Primary vaccination at any age with 2 doses at least 2 months apart. If the risk persists, administration of a booster dose is recommended every 3 years in children aged less than 7 years and every 5 years in older children. Travellers to Mecca for pilgrimage or the African meningitis belt in the dry season must also be vaccinated with MenACWY.

(6) Influenza vaccine. Recommended for all risk groups and household contacts from age 6 months. The risk groups relevant to this vaccine can be found in the document outlining the recommendations of the CAV-AEP for the 2024–2025 season.

(7) SARS-CoV-2 vaccine. According to the recommendations of the Public Health Commission of Spain concerning vaccination against COVID-19 for the 2024–2025 season, vaccination is indicated from age 6 months in individuals with diseases considered a high or very high risk, receiving immunosuppressive treatment or who are household contacts of at-risk individuals as well as individuals aged 5 years or older living in residential facilities or institutionalised for prolonged periods. Monovalent vaccines against the JN.1 or KP.2 variant should be used: Comirnaty (preparations containing 3 μg [age 6 months–4 years], 10 μg [age 5—11 years] or 30 μg [age ≥ 12 years]) or Spikevax (available as 0.1 mg/mL multidose vial to deliver 10 doses of 0.25 mL/25 μg [age 6 months–11 years] or 5 doses of 0.5 mL/50 μg [age ≥ 11 years]). Primary vaccination in individuals aged more than 6 months who have had the infection: single dose, at least 3 months after the infection, except in severely immunosuppressed patients who should receive a second dose at least 3 months after the first one. Primary vaccination in individuals with no history of infection: for those aged 5 years or older, a single dose; for children aged 6 months to 4 years, 3 doses (first and second dose at least 3 weeks apart and second and third dose at least 8 weeks apart) of Comirnaty 3 μg, or 2 doses of Spikevax (0.25 mL/25 μg) at 0 and 28 days. In children aged 6 months to 4 years who are partially vaccinated, complete the series with one of the new monovalent vaccines. Seasonal dose (autumn-winter 2024–2025) in risk groups: single dose, independently of the number of doses received in the past or the past history of infection, at least 3 months after the last dose of vaccine or episode of infection. The risk groups can be consulted in the recommendations published by the Ministry of Health and the online Immunizations Manual of the CAV-AEP.

(8) Human papillomavirus vaccine (HPV). Vaccination is indicated from age 9 years, always with 3 doses, in immunosuppressed individuals. Consult the Manual of immunizations for other risk groups.

(9) Hepatitis A vaccine. The pre-exposure and post-exposure risk groups are detailed in our Manual. Infants aged 6–11 months traveling to risk areas can be given the vaccine, but it will not count as a valid dose toward the routine vaccination series, which will have to start over from age 12 months.

(10) Respiratory syncytial virus antibody (RSV). Administration of nirsevimab (anti-VRS antibody) is recommended annually (for 2 seasons) in children aged less than 2 years with underlying diseases that increase the risk of severe RSV infection, preferably just before the usual start of the RSV season (October). In the second season, provided they weigh 10 or more kg, the dose will be 200 mg (if they weigh less than 10 kg, 100 mg will be given), administered in two 100 mg injections. Preterm infants born before 35 weeks (including those with gestational age < 29 weeks) will receive one dose of antibody before age 12 months (if they received a dose in the previous season they may receive an additional dose of 100 mg [200 mg if they weigh 10 kg or more] at the start of the 2024–2025 season if they have not yet reached 12 months of age).

Table 1 Bibliographic sources and literature search strategies (CAV-AEP).

- TripDatabase: Advanced search: *(disease) (vaccine) (vaccination)*
- Cochrane Library: *Disease AND vaccine*
- MEDLINE/PubMed: *(''disease/microorganism'' [MeSH Terms]) AND (''vaccine'' [MeSH Terms] OR ''vaccination'' [MeSH Terms]). Filters activated: childbirth-18 years, human (Sort by: Best Match)*
- EMBASE: *''disease''/exp AND ''vaccine''/exp*
- Official websites of the Ministry of Health and the Instituto de Salud Carlos III (ISCIII)
- Websites of medicines regulatory authorities: Agencia Española de Medicamentos y Productos Sanitarios (AEMPS) and European Medicines Agency (EMA)
- CAV-AEP. Summaries of product characteristics
- Government agencies or international advisory bodies involved in vaccine policy: Advisory Committee on Immunization Practices (ACIP) (USA), Joint Committee on Vaccination and Immunisation (JCVI) (United Kingdom), Standing Committee on Vaccination (STIKO) (Germany), Public Health Agency of Canada (Canada), Australian Department of Health (Australia)
- Communications and presentations in national and international congresses
- Primary sources (textbooks, references of articles selected in the search)
- Data obtained directly from authors (unpublished)
- Publications not indexed in databases
- Information obtained from the pharmaceutical industry

CAV-AEP: Advisory Committee on Vaccines and Immunizations of the Asociación Española de Pediatría.

tration of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap), a 5th dose against tetanus and diphtheria is administered, completing the recommended schedule until age 60–65 years, reinforcing the protection against pertussis in adolescents, who are particularly affected in the current epidemiological context.[5]

The full vaccination series induces a lasting seroprotective response (antiHB antibodies > 10 mIU/mL) in more than 95% of vaccinated individuals. Although antibody levels wane over time, the protection is long-lasting thanks to the induced immunological memory. Unvaccinated individuals should receive, at any age, 3 doses of monovalent vaccine (or combined with hepatitis A if indicated) at 0, 1 and six months. Post-vaccination serologic testing is only indicated in patients who belong to risk groups.

Children of HBsAg-positive mothers will be given 1 dose of vaccine and 1 dose of hepatitis B immune globulin (HBIG) (0.5 mL) within 12 h of birth. This will be followed by administration of the standard hexavalent vaccine series (2 + 1 schedule). Post-vaccination serologic testing should be performed 1–2 months after the fourth dose.

Vaccination against pneumococcal disease

***2025 recommendation**: routine vaccination against pneumococcal disease in children aged less than 5 years and at any age in risk groups. Either of the following schedules is recommended for routine vaccination of healthy infants: 2 + 1 doses (at ages 2, 4 and 11 months) of 15-valent pneumococcal conjugate vaccine (PCV15) or 3 + 1 doses (at ages 2, 4, 6 and 11 months) of 20-valent pneumococcal conjugate vaccine (PCV20).*

There is ample evidence of the effectiveness of PCV vaccines since they were introduced in vaccination schedules in Europe.[6] During the COVID pandemic, there was a decrease in the incidence of invasive pneumococcal disease (IPD) as well as non-invasive disease,[7] but his was followed by a resurgence up to or even exceeding prepandemic values in spite of adequate vaccination coverage rates.[8,9]

The IPD cases registered in Spain are caused by nonvaccine serotypes (24F, 8, 33F), but also to vaccine serotypes included in the PCV13 vaccine (3, 19A), and we are also witnessing an alarming emergence of drug resistance in serotypes such as 11A, 24F and 23B.[10] To increase protection against emerging serotypes and curb the growing incidence of IPD, new expanded valence vaccines (PCV15 or PCV20) have been progressively replacing the PCV13 vaccine.

Vaccination against rotavirus

***2025 recommendation**: the rotavirus vaccine should be included in the routine immunization schedule for all infants.*

Rotaviruses (RVs) are the leading cause of acute gastroenteritis in infants worldwide. No risk groups have been identified, with the exception of preterm infants, who may develop more severe forms of disease compared to their full-term peers. Hygiene and disinfection measures have a limited impact on the control of RV, so vaccination is the best prevention strategy currently available.[11]

As regards preterm infants, in 2019 the Sociedad Española de Neonatología (Spanish Society of Neonatology, SENEO) and the CAV-AEP, followed by the Interterritorial Council of Vaccines of the National Health System of Spain (CISNS),[12] recommended vaccination. The efficacy and safety profiles in this group are similar to those in term infants.

At present, vaccination against RV is included in the immunization schedules of 125 countries.

The CISNS recommends vaccination for all infants from 6 weeks post birth and its inclusion in the routine immunization schedule of every autonomous community (AC) in Spain by the end of 2025.[13]

There has been no evidence of serotype replacement in countries that have been implementing routine immunization against RV for several years.[14]

Vaccination against meningococcal disease

2025 recommendation: *routine vaccination against group B meningococcus (MenB) starting at age 2 months with a 2 + 1 series and at 12 years depending on previous vaccination, and against groups A, C, W and Y (MenACWY) (at ages 4 months, 12 months and 12 years, with catch-up vaccination of adolescents between ages 13 and 18 years). For all other age groups, the recomendation is individual.*

In Spain, invasive meningococcal disease (IMD) is associated with groups B, C, W and Y. The incidence is highest in the first 2 years of life, with a second peak in adolescence. Group B is currently the most prevalent in every age group.[15,16]

We maintain the recommendation of replacing the dose of MenC given at ages 4 and 12 months by a dose of MenACWY, a measure that has already been implemented in some ACs, maintaining the dose at 12 years and catch-up vaccination through age 18 years. Outside these ages, decisions regarding vaccination and the choice of vaccine will be made on a case-by-case basis, although some ACs allow administration of this vaccine for catch-up in previously unvaccinated individuals.

Vaccination of infants with MenB is now included in the schedule of every AC with a 2 + 1 series starting at age 2 months to ensure maximum protection.

This year, the AEP introduces a new recommendation for the protection of adolescents against not only groups A, C, W and Y but also group B, which continues to be the causative agent in most confirmed cases of IMD. Vaccination of adolescents and their direct protection against group B meningococcus would complete the prevention strategy in the age at which the incidence of IMD has its second peak against the serogroups currently circulating in Spain, preparing this population not only for the emergence of this group and its unpredictable epidemiology, but also for the increasingly frequent outbreaks in adolescents observed in neighboring countries, such as France or the United Kingdom, which required regional vaccination campaigns and caused considerable alarm in the community and the health care system.

The aim of this new recommendation for routine vaccination of adolescents would be to provide direct protection both for those who reach this stage without previous vaccination against MenB, who will require two doses of either of the two vaccines, and for those vaccinated in previous years with the quadrivalent meningococcal B vaccine (4CMenB), who will need a dose of 4CMenB (MenB vaccines are not interchangeable) to boost their immunity, which will have waned as a function of the number of years elapsed from the last dose, regardless of the age at which they were vaccinated.[17–19] In addition to the primary goal of prevention against MenB, the potential secondary benefit of protection against gonococcus should be taken into account.[20]

The CAV-AEP considers that, at the individual level, children and adolescents who have not been previously vaccinated against MenB can be vaccinated with any of the vaccines available for their age.

Vaccination against influenza

2025 recommendation: *routine yearly vaccination of children aged 6–59 months, children and adolescents in risk groups and household contacts of individuals in risk groups or infants aged less than 6 months. Vaccination on a case-by-case basis between ages 5 and 18 years. The intranasal vaccine is preferred in children aged more than 2 years.*

Influenza is associated with a high burden of disease in children, who in turn lay a key role in the transmission of the virus to the rest of the community.[21] Since 2022, the Ministry of Health recommends universal vaccination against influenza in children aged 6–59 months,[22] a strategy that has been implemented nationwide in Spain since the 2023–2024 season.

The CAV-AEP considers that routine vaccination should be extended to children and adolescents aged 5–18 years, but given the disappointing vaccination coverage in the 6–59 months age group, we consider that the immediate priority is to implement every possible measure to increase vaccination coverage in this group to then, once this has been achieved, expand routine vaccination to cover the pediatric population through age 18 years.

Five vaccines are currently available for pediatric use: four intramuscular inactivated quadrivalent vaccines (three egg-based and one cell-based) and one intranasal trivalent vaccine.

Vaccination against SARS-CoV-2

2025 recommendation: *vaccination with the new vaccines adapted to the omicron JN.1 or KP.2 variant in children aged more than 6 months at risk of developing severe COVID.*

Once the World Health Organization (WHO) declared that COVID was no longer a global health crisis, preventive strategies against SARS-CoV-2 shifted to focus on the protection of the most vulnerable groups.

In agreement with the WHO,[23] the European Centre for Disease Prevention and Control (ECDC)[24] and the CISNS,[25] the AEP recommends vaccination of children from age 6 months with underlying disease or other factors that increase the risk for severe COVID, in addition to healthy children living with individuals with such risk factors: history of hematopoietic stem cell transplantation, primary or acquired immunodeficiency, immunosuppressive treatment, chronic cardiovascular, hepatic, renal, or respiratory disease (including severe asthma and cystic fibrosis), metabolic or mitochondrial disease, severe neurological or neuromuscular disease, Down syndrome.[26] For the 2024–2025 season, the available mRNA vaccines will be those adapted to the new omicron JN.1 or KP.2 variant.[3] They can be given at the same time as any other vaccine.

In patients with risk factors aged 6–59 months in whom there is no evidence of a history of natural infection and who have never been vaccinated, the schedule with the new Comirnaty formulation consists of three doses (3 μg each): the first two administered three weeks apart, and the third one at least 8 weeks after the second dose. With Spike-

vax, the regimen consists of two doses (25 μg each) four weeks apart. For children aged 5 years or older with risk factors, administration of a single dose of mRNA vaccine is recommended, regardless of vaccination history, unless they are at extremely high risk (hematopoietic stem cell transplant recipients, solid organ transplant recipients, chronic kidney disease, human immunodeficiency virus [HIV] infection with low CD4 count [<200 cells/mL], some primary immunodeficiencies, and patients currently receiving certain immunosuppressive drugs), in which case an additional dose should be administered at least 12 weeks apart.

Vaccination against measles, mumps and rubella (MMR)

2025 recommendation: *1st dose at age 12 months using MMR vaccine, 2nd dose at two years with the combined measles, mumps, rubella and varicella vaccine (MMRV).*

Since 2022, there has been an increase in the number of cases and outbreaks of measles, both globally and in the European Union, a trend that has continued in 2024. Spain has been striving to eliminate measles since 2016, and the vaccination coverage nationwide is 95% for the first dose and 90% for the second one. Still, in the past year, there were 21 outbreaks reported in 11 ACs.[27]

In this context, efforts must be made to achieve and maintain a vaccination coverage greater than 95% for each of the two doses. To this end, and given that coverage has decreased in some ACs, especially for the second dose, we recommend administration of the first dose at age 12 months and the second at age 24 months to reduce the risk of transmission in unvaccinated or partially vaccinated children.

A first dose of MMR administered erroneously or for other reasons between 11 and 12 months is considered valid, as there is evidence that maternal antibodies are present in lower titres and are metabolised faster in the offspring of vaccinated women, and therefore blunting of the infant's immune response is unlikely.

In select cases, for epidemiological reasons or due to travel to endemic or outbreak areas, the MMR vaccine can be administered in children aged 6–10 months. However, it will still be necessary to administer 2 additional doses from age 12 months at least 4 weeks apart.

Vaccination against varicella

2025 recommendation: *routine vaccination with 2 doses (at 15 months and 2 years). The MMRV can be administered for the second dose. In unvaccinated children and adolescents without a history of varicella, catch-up vaccination with two doses is recommended.*

The vaccines currently available are two monovalent vaccines and the MMRV, all of which are live attenuated vaccines and are highly effective (92%–97%).

We continue recommending separate administration of the MMR and varicella vaccines for the first dose of the series in children aged less than 2 years due to the increased risk of febrile seizures. The MMRV vaccine is already administered for the second dose in 12 ACs

Based on the findings of several studies, the incidence of herpes zoster is lower in individuals vaccinated against varicella compared to individuals who had the natural infection.[28]

Vaccination against human papillomavirus (HPV)

2025 recommendation: *routine vaccination at age 10–12 years with one dose of 9-valent vaccine (HPV9).*

The recommended timing for vaccination is prior to sexual debut, with the aim of improving efficacy and vaccination coverage. Catch-up vaccination and vaccination of individuals in risk groups are also vitally important.

While most HPV infections are transient and resolve spontaneously, they persist in up to 10% of cases, significantly increasing the risk of cervical cancer as well as other types of malignant disease, such as anal or head and neck cancers.

There is evidence that vaccination protects against persistent infection, genital warts and premalignant cervical and anal lesions and reduces the risk of cervical cancer in women[29] as well as the risk of anal cancer in men.[30] Multiple studies have confirmed have demonstrated the safety of HPV vaccines in different age groups.[31]

Vaccination strategies have been modified over the years due to emerging evidence of the effectiveness and immunogenicity achieved with fewer doses,[32] improving the efficiency of the immunization program, but ongoing surveillance is still needed to gain robust evidence on the protection against HPV-related preneoplastic and neoplastic lesions achieved with single-dose schedules.[33]

Immunization against respiratory syncytial virus

2025 recommendation: *administration during the season of 1 dose of nirsevimab to all infants under 6 months, preterm infants delivered before 35 weeks up to age 12 months and one dose each season in children aged less than 2 years with risk factors.*

Following the immunization campaign with nirsevimab carried out in Spain in the 2023–2024 season, there was a 75% reduction in hospital admissions due to lower respiratory tract infection (LRTI) caused by RSV in infants under 12 months, which corresponded to the prevention of nearly 10 000 admissions.[34] In a nationwide, population-based case-control study, the per-protocol effectiveness in preventing RSV-related hospital admissions was 83.8% in infants born during the season and 80.9% in infants born before the start of the season, while the intention-to-treat effectiveness was 80.1% and 71.4%, respectively. The effectiveness was similar in both groups in relation to the admission to the intensive care unit (ICU), need of mechanical ventilation and RSV subgroup. In infants born preterm or with low birth weight, the effectiveness was lower, of approximately 70%.[35]

In Galicia, the effectiveness in preventing hospital admission was 82.0%, increasing to 86.9% for severe cases requiring oxygen therapy, and of 69.2% for hospitalization due to LRTI of any cause, achieving an overall reduction of 89.8% in hospital admissions.[36] In a multicenter study carried out in three ACs, the effectiveness in the combined analysis was of 84.4% (Community of Valencia, 69.3%; Region of

Murcia, 86.9%; Valladolid, 97.0%).[37] In Catalonia, hospital admissions due to RSV decreased by 87.6%, ICU admissions by 90.1%, the cases of bronchiolitis treated in primary care by 48.1% and the cases of bronchiolitis managed in the emergency department by 55.4%.[38] In the Chartered Community of Navarre, the estimated efficacy was 88.7%.[39] In the Community of Madrid, the adjusted efficacy in preventing hospital admission was 93.6% at 30 days after nirsevimab administration and 87.6% at 150 days, while the adjusted efficacy in preventing admission to the ICU it was 94.4% at 30 days and 92.1% at 90 days.[40]

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Declaration of competing interest

(Last five years)

FJAG has collaborated in educational activities funded by Alter, AstraZeneca, GlaxoSmithKline, MSD, Pfizer and Sanofi and as a consultant in GlaxoSmithKline, MSD, Pfizer and Sanofi advisory boards.

AIA has collaborated in educational activities funded by AstraZeneca and and as a consultant in GlaxoSmithKline and Pfizer advisory boards. He has also received funding from GlaxoSmithKline, MSD and Pfizer o attend domestic educational activities.

JAA has collaborated in educational activities funded by AstraZeneca, GlaxoSmithKline, MSD, Pfizer, Sanofi and Seqirus, as a researcher in clinical trials for GlaxoSmithKline and Sanofi and as a consultant in AstraZeneca, GlaxoSmithKline, MSD, Pfizer and Sanofi advisory boards.

EGL has received funding to attend domestic educational activities and has participated in educational activities funded by GlaxoSmithKline, MSD, Pfizer and Sanofi, as a researcher in clinical trials for GlaxoSmithKline and MSD and as an advisory board consultant for GlaxoSmithKline.

LLG has collaborated in educational activities funded by AstraZeneca, GlaxoSmithKline, MSD, Moderna and Sanofi and as an advisory board consultant for MSD. She has also received funding from Pfizer and Sanofi to attend educational activities in Spain and abroad, and received grants sponsored by GlaxoSmithKline.

MLNG has collaborated in educational activities funded by Gilead, GlaxoSmithKline, Janssen, MSD, Pfizer and ViiV, as a consultant in Abbott, AstraZeneca, Novartis and ViiV advisory boards and as a researcher in clinical trials sponsored by GlaxoSmithKline, Pfizer, Roche and Sanofi.

VPS has received funding from MSD, Pfizer and Sanofi to attend educational activities in Spain and abroad, has collaborated in educational activities funded by AstraZeneca, GlaxoSmithKline, MSD, Pfizer and Sanofi and as a consultant in GlaxoSmithKline, Pfizer and Sanofi advisory boards.

IRC has collaborated in educational activities funded by GlaxoSmithKline, MSD, Pfizer and Sanofi, as a researcher in vaccine clinical trials for Abbot, AstraZeneca, Enanta, Gilead, GlaxoSmithKline, HIPRA, Janssen, Medimmune, Merck, Moderna, MSD, Novavax, Pfizer, Reviral, Roche, Sanofi and Seqirus and as a consultant in GlaxoSmithKline, MSD, Pfizer and Sanofi advisory boards.

JRC has collaborated in educational activities funded by GlaxoSmithKline, MSD, Pfizer and Sanofi and as a researcher in clinical trials for GlaxoSmithKline and Pfizer.

ISC has collaborated in educational activities funded by GlaxoSmithKline, MSD, Moderna, Novavax, Pfizer, Sanofi and Seqirus, as a researcher in vaccine clinical trials for Ablynx, Abbot, Almirall, Allergan, Astra Zeneca, Biomedal, GlaxoSmithKline, Janssen, Lilly, Medimmune, Merck, MSD, Moderna, Nestlé, Novavax, Novartis, Nutricia, Pfizer, Roche, Regeneron, Sanofi, Seqirus and Wyeth and as a consultant in Astra Zeneca, GSK, MSD, Moderna, Novavax, Pfizer and Sanofi advisory boards.

PSM has collaborated in educational activities as a researcher in vaccine clinical trials for Sanofi and as a consultant in GlaxoSmithKline and Sanofi. He has also received funding from GlaxoSmithKline, MSD and Pfizer to attend educational activities in Spain and abroad, and received grants sponsored by GlaxoSmithKline.

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