Table 2: Summary of WHO Position Papers - Recommended Routine Immunizations for Children

Antigen		Age of 1st Dose (minimum)	Doses in Primary Series	Interval Between Doses			Booster Dose	Considerations (see footnotes for details)
				1st to 2nd	2nd to 3rd	3rd to 4th		
Recommendations for all children								
RSV [1]	**Option 1**	Maternal vaccination (third trimester)						Strategy options: maternal vaccination and/or long-acting monoclonal antibodies Co-administration; Seasonality
	Option 2	Monoclonal antibody – as soon as possible after birth (see footnotes)						
BCG [2]		As soon as possible after birth	1					Birth dose and HIV; Universal vs selective vaccination; Co-administration; Vaccination of older age groups; Pregnancy
Hepatitis B [3]		As soon as possible after birth (<24h)	3 or 4	4 weeks (min) with DTPcv1	4 weeks (min) with DTPcv2	4 weeks (min) with DTPcv3		Premature and low birth weight; Co-administration and combination vaccine; High risk groups
Polio [4]	**bOPV + IPV** "Preferred schedule" (fractional permitted)	bOPV 6 weeks IPV 14 weeks	5 (3 bOPV and 2 IPV)	bOPV 4 weeks (min) (e.g. with DTPcv2) IPV ≥ 4 months (min) (e.g. with MCV)	bOPV 4 weeks (min) (e.g. with DTPcv3)			
	bOPV + IPV "Early Option" (full dose IPV only)	bOPV 6 weeks IPV 6 weeks	5 (3 bOPV and 2 IPV)	bOPV 4 weeks (min) (e.g. with DTPcv2) IPV 8 weeks (min) (e.g. with DTPcv3)	bOPV 4 weeks (min) (e.g. with DTPcv3)			bOPV birth dose; Type of vaccine; Fractional dose IPV; Transmission and importation risk; Local epidemiology, programmatic implications and feasibility for "early" option; Post-certification schedules
	bOPV + IPV Hexavalent option (full dose IPV in combination with DTPcv)	bOPV 6 weeks IPV 6 weeks (as part of DTPcv1)	6 (3 bOPV and 3 IPV)	bOPV 4 weeks (min) (e.g. with DTPcv2) IPV 4 weeks (min) (as part of DTPcv2)	bOPV 4 weeks (min) (e.g. with DTPcv3) IPV 4 weeks (min) (as part of DTPcv3)			
	IPV / bOPV Sequential (fractional permitted)	8 weeks (IPV1) bOPV (4-8 weeks after IPV2)	4 (2 IPV followed by ≥ 2 bOPV)	IPV (4-8 weeks)	bOPV (4-8 weeks)	bOPV (4-8 weeks)		In countries with high vaccination coverage (e.g. 90–95%) and low importation risk, and VAPP becomes a concern
	IPV-only (3-dose)	6-8 weeks	3	4-8 weeks	4-8 weeks			Only for countries in polio-free regions with a very low risk of importation and sustained high routine immunization coverage (DTP3 > 90%) 2-dose alternative only recommended post-cessation
	Post-cessation option: **IPV-only** (2-dose) (fractional permitted)	≥14 weeks	2	≥ 4 months (e.g. with MCV)				

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Recommendations for all children								
DTP-containing vaccine [5]		6 weeks (min)	3	4 weeks (min) - 8 weeks	4 weeks (min) - 8 weeks		3 Boosters 12-23 months (DTP-containing vaccine); 4-7 years (Td/ DT containing vaccine), see footnotes; and 9-15 yrs (Td)	Delayed/ interrupted schedule; Combination vaccine; Maternal immunization
***Haemophilus influenzae* type b [6]**	**Option 1**	6 weeks (min) 59 months (max)	3	4 weeks (min) with DTPcv2	4 weeks (min) with DTPcv3		(see footnote)	Single dose if >12 months of age Not recommended for children > 5 yrs Delayed/ interrupted schedule Co-administration and combination vaccine
	Option 2		2-3	8 weeks (min) if only 2 doses 4 weeks (min) if 3 doses	4 weeks (min) if 3 doses		At least 6 months (min) after last dose	
Pneumococcal (Conjugate) [7]	**Option 1 3p+0**	6 weeks (min)	3	4 weeks (min)	4 weeks			Schedule options; Vaccine options; HIV+ and preterm neonate (additional booster); Vaccination in older adults
	Option 2 2p+1	6 weeks (min)	2	8 weeks (min)			9-18 months	
Rotavirus [8]		6 weeks (min) with DTP1	2 or 3 depending on product	4 weeks (min) with DTPCV2	For three dose series – 4 week (min) with DTPCV3			Not recommended if >24 months old
Measles [9]		9 or 12 months (6 months min, see footnote)	2	4 weeks (min) (see footnote)				Co-administration live vaccines; Combination vaccine; HIV early vaccination; Pregnancy
Rubella [10]		9 or 12 months with measles containing vaccine	1					Co-administration and combination vaccine; Pregnancy
HPV [11]		As soon as possible from 9 years of age (females only)	1-2	6-12 months				Target 9-14 year old girls; Off-label 1 dose schedule; MACs with intro; Pregnancy; HIV and immunocompromised

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Recommendations for children residing in certain regions								
Japanese Encephalitis [12]	**Inactivated Vero cell-derived**	6 month	2 generally	4 weeks (generally)				Co-administration live vaccines; Vaccine options and manufacturer's recommendations; Pregnancy; Immunocompromised
	Live attenuated	8 months	1					
	Live recombinant	9 months	1					
Yellow Fever [13]		9-12 months with measles containing vaccine	1					Co-administration live vaccines
Tick-Borne Encephalitis [14]		≥ 1 yr FSME-Immun and Encepur ≥ 3 yrs TBE_Moscow and EnceVir	3	1-3 months FSME-Immun and Encepur 1-7 months TBE-Moscow and EnceVir	5-12 months FSME-Immun and Encepur 12 months TBE-Moscow and EnceVir		At least 1 every 3 years (see notes)	Definition of high-risk; Vaccine options; Timing of booster
Recommendations for children in some high-risk populations								
Typhoid [15]	**TCV (Typbar)**	>6 months	1					Definition High Risk; Vaccine options
	Vi PS	2 years (min)	1				Every 3 years	Definition of high risk
	Ty21a	Capsules 6 years (min) (see footnote)	3 or 4 (see footnote)	1 day	1 day	1 day	Every 3-7 years	Definition of high risk
Cholera [16]	**Dukoral (WC- rBS)**	2 years (min)	3 (2-5 years) 2 (≥6 years)	≥ 7 days (min); < 6 weeks (max)	≥ 7 days (min); < 6 weeks (max)		Every 6 months Every 2 years	Minimum age Definition of high risk
	Shanchol, Euvchol, and mORCVAX	1 year (min)	2	14 days			After 2 years	
Meningococcal [17]	**MenA conjugate**	9-18 months (5µg)	1					Definition of high risk; Vaccine options; 2 doses if < 9 months with 8 week interval
	MenC conjugate	2-11 months	2	8 weeks			After 1 year	Definition of high risk; Vaccine options
		≥12 months	1					
	Quadrivalent conjugate	(See footnotes for schedule alternatives based on vaccine product options)						Definition of high risk; Vaccine options
	Pentavalent conjugate	9-18 months	1					Replaces MenA conjugate where used; adds protection for serogroup X One-off wide age range campaigns

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Hepatitis A [18]	**Inactivated**	> 12 months	1 or 2	6-18 months (max > 4-5 years)				Level of endemicity; Vaccine options; Definition of high risk groups
	Live attenuated	18 months	1					
Rabies [19]		As required	2	7 days			(see footnote)	PrEP vs PEP; Definition of high risk
Dengue (TAK-003) [20]		6 years (min)	2	3 months (min)				High transmission areas; Pregnancy and lactation; Comorbidities
Malaria [21]		5 months	4	4 weeks (min)	4 weeks (min)	6-18 months (min 4 weeks)		Moderate to high transmission; Seasonal strategy
Recommendations for children receiving vaccinations from immunization programmes with certain characteristics								
Mumps [22]		12-18 months with measles and rubella containing vaccine	2	1 month (min) to school entry				High coverage with MR vaccine; Combination vaccines
Seasonal influenza (inactivated tri- and quadri-valent) [23]		6 months (min)	2 (6 mos to 8 years) 1 (≥ 9 years)	4 weeks			Revaccinate annually: 1 dose only (see footnotes)	Priority risk groups
Varicella [24]		≥9 months (min)	2	4 weeks (min)				Coadministration; Countries should define their own minimal coverage targets
Pneumococcal (Conjugate) [7] (Alternative 1p + 1 schedule)		6 weeks (min)	1				≥9 months	Off-label alternative; Fractional dose option; (strict criteria for well-established population immunity and capacity for high coverage, see footnotes)

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This table summarizes the WHO vaccination recommendations for children. The ages/intervals cited are for the development of country specific schedules and are not for health workers.
National schedules should be based on local epidemiologic, programmatic, resource & policy considerations. While vaccines are universally recommended, some children may have contraindications to particular vaccines.

Summary Table 2 - Notes

- Refer to https://www.who.int/teams/immunization-vaccines-and-biologicals/policies/position-papers for the most recent version of the tables and position papers.
- The attached table summarizes the recommendations for vaccine administration found in the WHO position papers which are published in the Weekly Epidemiological Review. Its purpose is to assist planners to develop an appropriate immunization schedule. Health care workers should refer to their national immunization schedules. While vaccines are universally recommended, some children may have contraindications to particular vaccines.
- Vaccines can generally be co-administered (i.e. more than one vaccine given at different sites during the same visit). Recommendations that explicitly endorse co-administration are indicated in the table, however, lack of an explicit co-administration recommendation does not imply that the vaccine cannot be co-administered; further, there are no recommendations against co-administration.
- Doses administered by campaign may or may not contribute to a child's routine immunization schedule depending on type and purpose of campaign (e.g. supplemental versus routine/pulse campaign for access reasons).
- For some antigens, recommendations for the age of initiation of primary immunization series and/or booster doses are not available. Instead, the criteria for age at first dose must be determined from local epidemiologic data.
- If a catch-up schedule for interrupted immunization is available, it is noted in the footnotes.
- Other vaccines, such as varicella and pneumococcal polysaccharide vaccines, may be of individual benefit but have not been generally recommended for routine immunization. See the specific position papers for more details.
- For further background on immunization schedules refer to "Immunological Basis for Immunization" series which is available at http://www.who.int/immunization/documents/immunological_basis_series/en/index.html

[1]Respiratory Syncytial Virus (RSV)

- Position paper reference: Weekly Epid. Record (2025, 22:193–218)
- Given the global burden of severe RSV disease among young infants, WHO recommends that all countries introduce products for the prevention of severe RSV disease in this population.
- Decisions to use maternal RSV vaccination and/or a long-acting RSV monoclonal antibody (mAb) should consider factors such as cost, cost-effectiveness, financing, supply, anticipated coverage and feasibility of implementation within the existing health system.
- WHO recommends the use of either the maternal RSV vaccine or a long-acting mAb, but not both, for the same mother-infant pair. An exception to this recommendation is the option to offer a long-acting mAb to babies whose mothers were vaccinated <14 days before delivery and to infants of vaccinated mothers who are still at high risk of severe RSV disease upon entering their first RSV season after the age of 6 months, when antibodies from maternal vaccination are likely to have waned.
- A year-round approach to RSV immunization is likely to be preferable for both products in most countries in tropical and subtropical regions where RSV circulates for much of the calendar year and/or seasonality patterns are not well-described.

Maternal RSV vaccine

- For countries using maternal RSV vaccine , WHO recommends a single dose in the third trimester of pregnancy, as defined in the local context (≥28 weeks gestation in most settings).
- Ideally vaccination should occur more than 2 weeks before delivery to ensure adequate transfer of antibodies to protect the baby. However, even when administered in the weeks immediately before delivery, some protection is likely. Therefore no upper limit of week of gestation is recommended, except for women in active labour who should not receive the RSV vaccine.
- Current maternal vaccines can be administered along with other vaccines recommended during pregnancy, including simultaneous vaccination at different anatomical sites on the same day. However, other vaccines that can be given earlier in pregnancy (e.g. tetanus vaccine) should not be delayed or deferred for co-administration with RSVpreF.
- RSV vaccine can be given in subsequent pregnancies as there is potential benefit and no expected harm from revaccination. However, no data are currently available on the efficacy or safety of additional vaccine doses in subsequent pregnancies.

Long-acting monoclonal antibody (mAb)

- For countries deciding to use RSV mAb to protect young infants, WHO recommends a single dose at birth, or at the earliest opportunity thereafter if year-round administration is adopted.
- In a seasonal approach, administration of a single dose of RSV mAb is recommended for infants and should begin shortly before the start of the RSV season, as well as at birth or earliest opportunity thereafter for infants born during the RSV season.
- The greatest impact in preventing severe RSV disease will be achieved by administering the mAb to infants aged under 6 months; however there is still potential benefit among infants up to 12 months of age.
- The currently available formulation of nirsevimab is a single dose recommended to be given in 2 dosages: 50mg for infants weighing <5kg, or 100mg for infants ≥5kg.
- RSV mAbs can be co-administered with vaccines (e.g. BCG, Hepatitis B, DTP)
- RSV mAbs can be given to newborns of mothers who have been given maternal RSV in a prior pregnancy.

[2] BCG

- Position paper reference: Weekly Epid. Record (2018, 93:73-96).
- Universal BCG vaccination at birth is recommended in countries or settings with a high incidence of TB and/or high leprosy burden. A single dose of BCG vaccine should be given to all healthy neonates at birth, ideally together with Hepatitis B birth dose.
- Countries with low TB incidence or leprosy burden may choose to selectively vaccinate neonates in high-risk groups.
- BCG vaccination is also recommended for unvaccinated TST- or IGRA-negative older children, adolescents and adults from settings with high incidence of TB and/or high leprosy burden, those moving from low to high TB incidence/ leprosy burden settings and persons at risk of occupational exposure in low and high TB incidence areas (e.g. health-care workers, laboratory workers, medical students, prison workers, other individuals with occupational exposure).
- BCG vaccination is not recommended during pregnancy.
- If HIV-infected individuals, including children, are receiving ART, are clinically well and immunologically stable (CD4% >25% for children aged <5 years or CD4 count ≥200 if aged >5 years) they should be vaccinated with BCG. Neonates born to women of unknown HIV status should be vaccinated as the benefits of BCG vaccination outweigh the risks. Neonates of unknown HIV status born to HIV infected women should be vaccinated if they have no clinical evidence suggestive of HIV infection, regardless of whether the mother is receiving ART. For neonates with HIV infection confirmed by early virological testing, BCG vaccination should be delayed until ART has been started and the infant confirmed to be immunologically stable (CD4 >25%).
- Moderate-to-late preterm infants (gestational age > 31 weeks) and low birth weight infants (< 2500 g) who are healthy and clinically stable can receive BCG vaccination at birth, or at the latest, upon discharge.

[3]Hepatitis B

- Position paper reference: Weekly Epid. Record (2017, 92:369-392).
- Hepatitis B vaccination is recommended for all children worldwide. Reaching all children with at least 3 doses of hepatitis B vaccine should be the standard for all national immunization programmes. Since perinatal or early postnatal transmission is the most important source of chronic HBV infection globally, all infants (including low birth weight and premature infants) should receive their first dose of hepatitis B vaccine as soon as possible after birth, ideally within 24 hours.
- The birth dose should be followed by 2 or 3 additional doses to complete the primary series.
- Both of the following options are considered appropriate: (i) a 3-dose schedule with the first dose (monovalent) being given at birth and the second and third (monovalent or as part of a combined vaccine) given at the same time as the first and third doses of DTP-containing vaccine; or (ii) 4 doses, where a monovalent birth dose is followed by 3 (monovalent or combined vaccine) doses, usually given with other routine infant vaccines; the additional dose does not cause any harm. The interval between doses should be at least 4 weeks.
- A birth dose of hepatitis B vaccine can be given to low birth weight (<2000g) and premature infants. For these infants, the birth dose should not count as part of the primary 3-dose series; the 3 doses of the standard primary series should be given according to the national vaccination schedule.
- For catch-up of unvaccinated individuals, priority should be given to younger age groups since the risk of chronic infection is highest in these cohorts. Catch-up vaccination is a time-limited opportunity for prevention and should be considered based on available resources and priority.
- Unvaccinated individuals should be vaccinated with a 0, 1, 6 month schedule.
- Vaccination of groups at highest risk of acquiring HBV is recommended. These include patients who frequently require blood or blood products, dialysis patients, diabetes patients, recipients of solid organ transplantation, person with chronic liver disease including those with Hepatitis C, person with HIV infection, men who have sex with men, persons with multiple sexual partners, as well as health care workers and others who may be exposed to blood, blood products or other potentially infectious body fluids during their work.

[4]Polio

- Position paper reference: Weekly Epid. Record (2022, 97:277-300).
- All children worldwide should be fully vaccinated against polio, and every country should seek to achieve and maintain high levels of coverage with polio vaccines in support of the global commitment to eradicate polio.

bOPV plus IPV

- For all countries using OPV in their national immunization programme, WHO recommends 3 doses of bOPV and 2 doses of IPV.
- The preferred schedule is to administer the 3 doses of bOPV starting from a minimum age of 6 weeks, with at least a 4-week interval between doses. The first IPV dose should be administered at a minimum of 14 weeks of age (with DTP3/Penta3), with the second IPV dose being given at least 4 months later (possibly coinciding with other vaccines administered at 9 months of age).
- This schedule provides the highest immunogenicity and may be carried out using full dose IPV (for both Salk IPV and Sabin-IPV (s-IPV)) or ID fIPV (using only Salk IPV, not sIPV) without loss of immunogenicity.
- Based on local epidemiology, programmatic implications, and feasibility of delivery, countries may choose an alternative "early IPV schedule" starting with the first IPV dose at 6 weeks of age (with DTP1/Penta1), and the second IPV dose at 14 weeks (with DTP3/Penta3).
- This alternative schedule offers the advantage of providing early-in-life protection; however, a lower total immunogenicity is achieved. If this schedule is chosen, full dose IPV (for both Salk IPV and sIPV) should be used rather than fIPV due to lower immunogenicity of fIPV at early ages. This schedule will not be compliant post-certification and countries will have to switch to the preferred schedule starting at 14 weeks.
- In polio-endemic countries and in countries at high risk for poliovirus importation and subsequent spread, WHO recommends a bOPV birth dose (zero dose) followed by the primary series of 3 bOPV doses and 2 IPV doses. The zero dose of bOPV should be administered at birth, or within the first week of life, to maximize seroconversion rates from subsequent doses and to establish early mucosal immunity before enteric pathogens may interfere with the immune response. Additionally, a birth dose of bOPV administered while infants are still protected by maternal antibodies (up to 6 months) may help prevent vaccine-associated paralytic polio VAPP by priming the immune system.
- For infants late in starting the routine immunization schedule (age >3 months) the first IPV dose should be administered at the first immunization contact along with bOPV and the other routinely recommended vaccines.
- Implementation of the infant schedule (3 bOPV doses plus 2 IPV doses) does not replace the need for SIAs. Countries with insufficient routine vaccination coverage that rely on SIAs to increase population immunity should continue using bOPV in SIAs until routine coverage improves or until the globally coordinated withdrawal of bOPV.
- A whole-cell pertussis (wP) hexavalent IPV-containing vaccine has now been prequalified by WHO. Countries adopting this vaccine should follow the same immunization schedules currently recommended for the pentavalent vaccine (i.e., at 6, 10, and 14 weeks or 8, 12, and 16 weeks,) depending on national policy.
- As of March 2025, based on updated immunogenicity data, WHO no longer recommends a booster dose of IPV following a 3-dose primary series beginning at ≥6 weeks of age. This component of the Polio Position Paper will be amended in the next update; in the meantime, the new policy recommendation can be found in the Meeting of the Strategic Advisory Group of Experts on Immunization, March 2025: conclusions and recommendations.

Sequential IPV–bOPV

- In countries with high vaccination coverage (e.g., 90–95%) and low risk of poliovirus importation (where neighbouring countries and/or countries that share substantial population movement have a similarly high coverage), an IPV–bOPV sequential schedule can be used when concerns about vaccine-associated paralytic polio (VAPP) outweigh the small reduction in mucosal immunity that results from delaying bOPV administration. It provides strong systemic protection from IPV while reducing VAPP risk by deferring exposure to live virus until after initial IPV priming.
- Where a sequential IPV–bOPV schedule is used, the initial administration of 2 doses of IPV should be followed by ≥2 doses of bOPV to ensure sufficient levels of protection in the intestinal mucosa as well as a decrease in the burden of VAPP.
- For sequential IPV– bOPV schedules, WHO recommends that the first dose of IPV be given starting from 8 weeks of age with an interval of 4–8 weeks before administration of the second IPV dose. This should be followed by at least 2 doses of bOPV separated by 4–8 weeks, depending on the risk of exposure to poliovirus in early childhood.

IPV-only

- An IPV-only schedule may be considered in countries in polio-free regions with a very low risk of importation and sustained high routine immunization coverage (DTP3 >90%).
- Upon request from SAGE, WHO has developed a risk-grading framework to assess a country's readiness to safely transition to an IPV-only schedule ahead of synchronized global bOPV cessation. WHO will support countries in considering the most appropriate polio vaccination schedule.
- A primary 3-dose series of IPV administered beginning at 6 or 8 weeks of age, with a minimum 4 week interval between doses, is recommended.
- Alternatively, a 2-dose or fractional dose IPV schedule, starting at 14 weeks of age or older, with a second dose 4 months or more later, can be considered. This schedule is currently only recommended for use after OPV cessation.
- While both options provide high immunogenicity (>90%), the 3 dose primary series provides protection in early infancy.

[5] DTP-containing vaccine (Diphtheria, Tetanus, Pertussis)

- Position paper reference: Diphtheria – Weekly Epid. Record (2017, 92:417-436); Tetanus - Weekly Epid. Record (2017, 92: 53-76); Pertussis - Weekly Epid. Record (2015, 90: 433-460).
- The need for early infant vaccination with DTP-containing vaccine (DTPCV) is principally to ensure rapid protection against pertussis, because severe disease and death from pertussis is almost entirely limited to the first weeks and months of life.
- A primary series of 3 doses of DTP-containing vaccine is recommended, with the first dose administered as early as 6 weeks of age. Subsequent doses should be given with an interval of at least 4 weeks between doses. The third dose of the primary series should be completed by 6 months of age if possible.
- If either the start or the completion of the primary series has been delayed, the missing doses should be given at the earliest opportunity with an interval of at least 4 weeks between doses.
- 3 booster doses of diphtheria toxoid-containing vaccine should be provided during childhood and adolescence. The diphtheria booster doses should be given in combination with tetanus toxoid using the same schedule, i.e. at 12–23 months of age, 4–7 years of age, and 9–15 years of age, using age-appropriate vaccine formulations. Ideally, there should be at least 4 years between booster doses.
- Tetanus - To ensure lifelong protection against tetanus in all people should receive 6 doses (3 primary plus 3 booster doses) of tetanus toxoid-containing vaccine (TTCV) through routine childhood immunization schedules.
- The 3 TTCV booster doses should be given at: 12–23 months of age; 4–7 years of age; and 9–15 years of age. Ideally, there should be at least 4 years between booster doses.
- National vaccination schedules can be adjusted within the age limits specified above to enable programmes to tailor their schedules based on local epidemiology, the objectives of the immunization programme, any particular programmatic issues and to better align tetanus vaccination with the immunological requirements of other vaccines (particularly for pertussis and diphtheria).
- Opportunities for tetanus vaccination may be taken at the second year of life contacts for alternative PCV schedule 2 +1, MCV second dose, and meningococcal A-containing vaccines, as well as pre-adolescence and adolescence contacts including for HPV vaccination.
- To provide and sustain both tetanus and diphtheria immunity throughout the life course and for both sexes, age-appropriate combinations of tetanus and diphtheria toxoids should be used. For children <7 years of age DTwP or DTaP combinations may be used. For children aged 4 years and older Td containing vaccine may be used and is preferred.
- From 7 years of age only Td combinations should be used. Age-appropriate combinations containing pertussis vaccine with low-dose diphtheria antigen are also available.
- If tetanus vaccination is started during adolescence or adulthood, a total of only 5 appropriately spaced doses are required to obtain lifelong protection.
- Pregnant women and their newborn infants are protected from birth-associated tetanus if the mother received either 6 TTCV doses during childhood or 5 doses if first vaccinated during adolescence/adulthood (documented by card, immunization registry and/or history) before the time of reproductive age. Vaccination history should be verified in order to determine whether a dose of TTCV is needed in the current pregnancy.
- WHO confirms its earlier recommendation to shift from the use of single-antigen TT to combinations containing diphtheria toxoid, i.e. DT or Td vaccines.
- TTCVs can be used in immunocompromised persons including HIV-infected individuals, but the immune response may be lower than in fully immunocompetent persons. All HIV-infected children should be vaccinated against tetanus following the vaccine recommendations for the general population.
- Pertussis vaccine: Both aP-containing and wP-containing vaccines have excellent safety records.
- Available evidence indicates that licensed aP and wP vaccines have equivalent initial effectiveness in preventing disease in the first year of life, but that there is more rapid waning of immunity, and possibly a reduced impact on transmission, with aP relative to wP vaccines.
- National programmes currently administering wP vaccination should continue to use wP vaccines for primary vaccination series. Surveillance and modelling data suggest that the use of aP vaccines may result in a resurgence of pertussis after a number of years.
- National programmes currently using aP vaccine may continue using this vaccine but should consider the need for additional booster doses and strategies to prevent early childhood mortality such as maternal immunization in case of resurgence of pertussis.
- Only aP-containing vaccines should be used for vaccination of persons aged ≥7 years.
- Pertussis containing booster - A booster dose is recommended for children aged 1–6 years, preferably during the second year of life (≥6 months after last primary dose), unless otherwise indicated by local epidemiology; the contact could also be used to catch up on any missed doses of other vaccines. This schedule should provide protection for at least 6 years for countries using wP vaccine. For countries using aP vaccine, protection may decline appreciably before 6 years of age.
- Vaccinating pregnant women and household contacts - Vaccination of pregnant women is likely to be the most cost-effective additional strategy for preventing disease in infants too young to be vaccinated and appears to be more effective and favourable than cocooning.
- National programmes may consider the vaccination of pregnant women with 1 dose of Tdap (in the 2nd or 3rd trimester and preferably at least 15 days before the end of pregnancy) as a strategy additional to routine primary infant pertussis vaccination in countries or settings with high or increasing infant morbidity/ mortality from pertussis.
- Delayed or interrupted DTP-containing series - For children whose vaccination series has been interrupted, the series should be resumed without repeating previous doses. Children aged 1 to < 7 years who have not previously been vaccinated should receive 3 doses of vaccine following a 0, 1, 6 month schedule. Two subsequent booster doses using Td or Tdap combination vaccines are needed with an interval of at least 1 year between doses.
- Health-care workers should be prioritized as a group to receive pertussis vaccine.

[6] Haemophilus influenzae type b (Hib)

- Position paper reference: Weekly Epid. Record (2013, 88: 413-428).
- The use of Hib vaccines should be part of a comprehensive strategy to control pneumonia including exclusive breastfeeding for six months, hand washing with soap, improved water supply and sanitation, reduction of household air pollution, and improved case management at community and health facility levels.
- WHO recommends that any one of the following Hib immunization schedules may be followed: 3 primary doses without a booster (3p); 2 primary doses plus a booster (2p+1); and 3 primary doses with a booster (3p+1).
- Because serious Hib disease occurs most commonly in children aged between 4 months and 18 months, immunization should start from 6 weeks of age, or as early as possible thereafter.
- The number of primary doses should be set after consideration of the local epidemiology, vaccine presentation (Hib conjugate monovalent vaccine versus Hib conjugate vaccine in combination with other antigens) and how this fits into the overall routine immunization schedule.
- In countries where the peak burden of severe Hib disease occurs in young infants, providing 3 doses of vaccine early in life may confer a greater benefit.
- In some settings (e.g. where the greatest disease morbidity and mortality occur later, or where rate reductions of disease are not fully sustained after the routine use of Hib vaccine), it might be advantageous to give a booster dose by following either a 2p+1 or 3p+1 schedule.
- The interval between doses should be at least 4 weeks if 3 primary doses are given, and at least 8 weeks if 2 primary doses are given. Booster doses should be administered at least six months after completion of the primary series.

- If the vaccination course has been interrupted, the schedule should be resumed without repeating the previous dose. Children who start vaccination late, but are aged under 12 months, should complete the vaccination schedule (e.g. have 3 primary doses or 2 primary doses plus a booster).
- When a first dose is given to a child older than 12 months of age, only one dose is recommended.
- Hib vaccine is not required for healthy children after 5 years of age.
- The Hib conjugate vaccine is contraindicated in people with known allergies to any component of the vaccine. There are no other known contraindications or precautions.

[7] Pneumococcal (Conjugate)

- Position paper reference: Weekly Epid. Record (2025, 39: 411-437).
- Currently available PCVs are safe and effective and are therefore recommended for the inclusion in childhood immunization programmes worldwide.
- Use of pneumococcal vaccine should be complementary to other disease prevention and control measures, such as appropriate case management, promotion of exclusive breastfeeding for the first 6 months of life and reducing known risk factors such as indoor air pollution and tobacco smoke.
- For administration of PCV to infants, WHO recommends a 3-dose schedule administered either as 2p+1 or as 3p+0, starting as early as 6 weeks of age.
- If the 2p+1 schedule is selected, an interval of ≥8 weeks is recommended between the 2 primary doses; the interval may be shortened if there is a compelling reason to do so, such as improving timeliness of the second dose and/or achieving higher coverage with a 4-week interval. The booster dose should be given at 9–18 months of age, according to programmatic considerations; there is no defined minimum or maximum interval between the primary series and the booster dose.
- If the 3p+0 schedule is used, a minimum interval of 4 weeks should be maintained between doses.
- Countries wishing to reduce the cost of their PCV programme or reduce the number of injections in the infant immunization schedule may switch to a 1p+1 schedule as an off-label alternative to a 3-dose schedule, provided that both of the following criteria are met: well-established population immunity among children aged <5 years, AND evidence of capacity to administer vaccination between the age of 9-18 months, with average coverage of ≥80% during the 5 preceding years. **See position paper**.
- The first dose of the 1p+1 schedule can be given at ≥6 weeks of age, and the booster can be given at ≥9 months of age.
- Countries wishing to reduce costs could implement the off-label use of ≥40% fractional doses of PCV13-PFZ, using a 3-dose schedule. A fractional dose schedule should be considered only in countries that meet the criterion for well-established population immunity among children <5 years. **See position paper**.
- Previously unvaccinated or incompletely vaccinated children who recover from invasive pneumococcal disease (IPD) should be vaccinated according to the recommended age-appropriate regimens. Interrupted schedules should be resumed without repeating the previous dose.
- Both PCV10 and PCV13 have substantial impacts against pneumonia, vaccine-type IPD and NP carriage. The choice of product to be used in a country should be based on programmatic characteristics, vaccine supply, vaccine price, the local and regional prevalence of vaccine serotypes and antimicrobial resistance patterns.
- Once a PCV vaccination programme has been initiated, product switching is not recommended unless there are substantial changes in the epidemiological or programmatic factors that determined the original choice of product, e.g. an increasing burden of serotype 19A. If a series cannot be completed with the same type of vaccine, the available PCV product should be used. Restarting a series is not recommended, even for the primary series.
- Wherever possible, catch-up vaccination at the time of introduction of PCV should be used to accelerate its impact on disease in children aged 1–5 years, particularly in settings with a high disease burden and mortality. If there is limited availability of vaccine or of financial resources for catch-up vaccination, the youngest children (e.g. <2 years of age) should be prioritized to receive catch-up doses of PCV because of their higher risk for pneumococcal disease.
- Catch-up vaccination can be done with a single dose of vaccine for children ≥24 months.
- Unvaccinated children aged 1–5 years who are at high risk for pneumococcal infection because of underlying medical conditions, such as HIV infection or sickle-cell disease, should receive at least 2 doses separated by at least 8 weeks.
- HIV-positive infants and pre-term neonates who have received their 3 primary vaccine doses before 12 months of age may benefit from a booster dose in the second year of life.
- Co-administration for programmatic reasons appears to be acceptable.
- WHO does not currently have recommendations on the use of PCV in individuals over 5 years of age. For considerations for pneumococcal vaccination in older adults see concept note: Weekly Epid. Record (2021, 96 (23), 217 – 228).
- Introduction of PCV into national childhood immunization programmes and measures to sustain high coverage in children should be prioritized over initiating a pneumococcal vaccination programme for older adults.
- In countries that have a mature childhood pneumococcal immunization programme, decisions about initiating such a programme in adults, using either PPV23 or PCV13, should take into account the local disease burden and cost-effectiveness considerations.

[8] Rotavirus

- Position paper reference: Weekly Epid. Record (2021, 96: 301-320).
- Rotavirus vaccines should be included in all national immunization programmes.
- The use of rotavirus vaccines should be part of a comprehensive strategy to control diarrhoeal diseases with the scaling up of both prevention (promotion of early and exclusive breastfeeding, handwashing, improved water supply, and sanitation) and treatment packages (low osmolarity ORS and zinc).
- The first dose of rotavirus vaccine be administered as soon as possible after 6 weeks of age.
- If a child <24 months of age misses a rotavirus dose or series for any reason, WHO recommends rotavirus vaccination for that child. Because of the typical age distribution of RVGE, rotavirus vaccination of children >24 months of age is not recommended.
- The rotavirus vaccination series for each child should be completed with the same product whenever feasible. However, if the product used for a prior dose is unavailable or unknown, the series should be completed with any available licensed product.
- For a mixed series or a series with any unknown vaccine products, a total of 3 doses of rotavirus vaccine should be administered for a complete vaccination series.
- Rotavirus vaccinations may be administered simultaneously with other vaccines of the childhood immunization programme.
- WHO prequalified rotavirus vaccines are safe and well tolerated. A small potential risk of intussusception after rotavirus vaccination remains.
- Rotavirus vaccine should not be given to children with prior history of intussusception, severe allergic reaction (e.g. anaphylaxis) after a previous dose, or severe immunodeficiency, including severe combined immunodeficiency.
- Precautions include altered immunocompetence other than severe combined immunodeficiency, chronic gastrointestinal disease, and spina bifida or bladder exstrophy. Vaccination may be postponed in case of ongoing acute gastroenteritis or fever with moderate to severe illness.

[9] Measles

- Position paper reference: Weekly Epid. Record (2017, 92: 205-228).
- Reaching all children with 2 doses of measles vaccine should be the standard for all national immunization programmes. In addition to the first routine dose of MCV1, all countries should add a second routine dose of MCV2 to their national immunization schedules regardless of the level of MCV1 coverage.
- In countries with ongoing transmission in which the risk of measles mortality remains high, MCV1 should be given at age 9 months. MCV2 should be given between 15-18 months, as providing MCV2 in the 2nd year of life reduces the rate of accumulation of susceptible children and the risk of an outbreak. The minimum interval between MCV1 and MCV2 is 4 weeks.
- Because many cases of measles occur in children aged >12 months who have not been vaccinated, routine delivery of MCV1 should not be limited to infants aged 9–12 months and routine delivery of MCV2 should not be limited to infants 15 to 18 months of age. Every opportunity (e.g. when children come into contact with health services) should be taken to vaccinate all children that missed one or both MCV routine doses, particularly those under 15 years of age. Policies which prohibit use of vaccine in children >1 year of age, older children and teenagers should be changed to allow these individuals to be vaccinated.
- In countries with low levels of measles transmission (i.e. those that are near elimination or verified as having eliminated endemic measles virus transmission) and therefore the risk of measles virus infection among infants is low, MCV1 may be administered at 12 months of age to take advantage of the higher seroconversion rates achieved at this age. In these countries, the optimal age for delivering MCV2 is based on programmatic considerations to achieve the highest coverage of MCV2 and, hence, the highest population immunity. Administration of MCV2 at 15-18 months of age ensures early protection of the individual, slows accumulation of susceptible young children, and may correspond to the schedule for other routine immunizations (for example, a DTP-containing booster, PCV, or meningococcal vaccines). This measure also supports the establishment of a policy on immunization and other health interventions in the second year of life. If MCV1 coverage is high (>90%) and school enrolment is high (>95%), administration of routine MCV2 at school entry may prove an effective strategy for achieving high coverage and preventing outbreaks in schools.
- For programmatic reasons (e.g. to reduce cold storage needs and vaccine wastage), it is recommended that the same vaccine formulation is used for both routine doses of MCV.
- In the following situations, a supplementary dose of MCV should be given to infants from 6 months of age: (1) during a measles outbreak as part of intensified service delivery; (2) during campaigns in settings where the risk of measles among infants < 9 months of age remains high (e.g. in endemic countries experiencing regular outbreaks); (3) for internally displaced populations and refugees, and populations in conflict zones; (4) for individual infants at high risk of contracting measles (e.g. contacts of known measles cases or in settings with increased risk of exposure during outbreaks such as day-care facilities); (5) for infants travelling to countries experiencing measles outbreaks; (6) for infants known to be HIV-infected or exposed (i.e. born to an HIV-infected woman).
- MCV administered before 9 months of age should be considered a supplementary dose and recorded on the child's vaccination record as "MCV0". Children who receive MCV0 should also receive MCV1 and MCV2 at the recommended ages according to the national schedule.
- Given the severe course of measles in patients with AIDS, measles vaccination should be routinely administered to potentially susceptible, asymptomatic HIV infected children and adults. Vaccination may even be considered for those with symptomatic HIV infection if they are not severely immunosuppressed according to conventional definitions. In areas where there is a high incidence of both HIV infection and measles, an initial dose of MCV may be offered as early as age 6 months (recorded as MCV0). The 2 routine doses of MCV (MCV1 and MCV2) should then be administered to these children according to the national immunization schedule.
- An additional dose of MCV should be administered to HIV-infected children receiving HAART following immune reconstitution If CD4+ T lymphocyte counts are monitored, an additional dose of MCV should be administered when immune reconstitution has been achieved, e.g. when the CD4+ T lymphocyte count reaches 20–25%. Where CD4+ T lymphocyte monitoring is not available, children should receive an additional dose of MCV 6–12 months after initiation of HAART.
- A supplementary dose of MCV (recorded as MCV0) should be considered for infants known to be exposed (i.e. born to an HIV-infected woman) or soon after diagnosis of HIV infection in children older than 6 months who are not receiving HAART and for whom the risk of measles is high, with the aim of providing partial protection until they are revaccinated after immune reconstitution with HAART.
- Mild concurrent infections are not a contraindication to vaccination. As a precautionary measure, measles vaccine – alone or in combination with other vaccines – should be avoided during pregnancy. MCVs should not be given to individuals with a history of anaphylactic reactions or severe allergic reactions to any component of the vaccine (e.g. neomycin or gelatin) or those with any form of severe immunosuppression.
- As a general rule, live vaccines should be given either simultaneously or at intervals of 4 weeks. An exception to this rule is OPV, which can be given at any time before or after measles vaccination without interference in the response to either vaccine.

[10] Rubella

- Position paper reference: Weekly Epid. Record (2020, 95: 301-324).
- As of September 2024, the requirement that countries attain 80% MCV coverage in routine immunization or campaigns before RCV introduction has been lifted. This component of the Rubella Position Paper will be amended in the next update; in the meantime, the new policy recommendation can be found in the Meeting of the Strategic Advisory Group of Experts on Immunization, September 2024: conclusions and recommendations.
- All countries that have not yet introduced RCV should plan to do so.
- It is recommended that RCV be provided in combination with measles vaccine, and combined measles and rubella vaccine should be used for all immunization activities once RCV is introduced, including routine immunization, supplementary immunization activities (SIAs) and outbreak response.
- Since measles elimination requires ≥95% coverage, the goal for rubella vaccination coverage should also be ≥95%.
- The recommended vaccination strategy is to begin with an MR vaccination campaign targeting both sexes and a wide age range (e.g. 9 months–15 years), based on the susceptibility profile by birth cohort when possible, followed immediately by introduction of MR or MMR vaccine into the routine immunization programme. The campaign should target males as well as females in order to reduce the likelihood of creating immunity gaps.
- The first dose of RCV can be delivered at 9 or 12 months, depending on the level of measles virus transmission. RCV should be used in all subsequent follow-up campaigns.
- RCV's can be administered concurrently with inactivated vaccines.
- Live vaccines should be given either simultaneously with RCV's, or at least 4 weeks apart. An exception to this is oral polio vaccine, which can be given at any time before or after RCV's without interfering in the response to either vaccine. WHO recommends co-administration of RCV and YF vaccines.
- Rubella vaccination should be avoided in pregnancy because of a theoretical (but never demonstrated) risk of teratogenic outcomes. Women planning a pregnancy are advised to avoid pregnancy for 1 month after rubella vaccination.
- WHO recommends that people who receive blood products wait at least 3 months before vaccination with RCV, and, if possible, avoid administration of blood products for 2 weeks after vaccination.

[11] Human Papillomavirus (HPV)

- Position paper reference: Weekly Epid. Record (2022, 97: 645-672).
- HPV vaccines should be introduced as part of a coordinated and comprehensive strategy to prevent cervical cancer and other diseases caused by HPV. This strategy should include education about reducing behaviours that increase the risk of acquiring HPV infection, and information about screening, diagnosis and treatment of precancerous lesions, cancer and risk factors. Access to quality screening and treatment services should be improved.
- The priority purpose of HPV immunization is the prevention of cervical cancer, which accounts for 82% of all HPV-related cancers. The 2020 WHO Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem WHO recommends that HPV vaccines should be included in all national immunization programmes and should reach 90% of all girls by age 15 by 2030. Prevention of cervical cancer is best achieved through the immunization of girls before they become sexually active.
- The WHO-recommended primary target population for HPV vaccination is girls aged 9–14 years Prevention of cervical cancer is best achieved through the immunization of girls before they become sexually active.
- Catch-up vaccination of multi-aged cohorts (MACs) of girls aged between 9 and 18 years at the time of introducing the HPV vaccine results in faster and greater population impact, as a result of increased direct and herd protection. This approach is cost-effective, offers opportunities for economies of scale in delivery and makes programmes more resilient to any interruptions in vaccination.
- Vaccination of secondary target populations, e.g. females aged ≥15 years, boys, older males or MSM, is recommended only if this is feasible and affordable, and does not divert resources from vaccination of the primary target population or effective cervical cancer screening programmes.
- All currently licensed bivalent, quadrivalent and nonavalent HPV vaccines have excellent safety profiles and are highly efficacious or have met immunobridging standards.
- The current evidence supports the recommendation that a 2-dose schedule be used in the primary target group from 9 years of age and for all older age groups for which HPV vaccines are licensed.
- The minimum interval between first and second dose is 6 months. A 12-month schedule results in higher GMTs and is suggested for programmatic and efficiency reasons.
- There is no maximum recommended interval between doses and longer intervals – up to 3 or 5 years – can be considered if useful from a programme perspective.
- Alternative single-dose schedule: As an off-label option, a single-dose schedule can be used in girls and boys aged 9–20 years. Current evidence suggests that a single dose has comparable efficacy and duration of protection as a 2-dose schedule and may offer programme advantages, be more efficient and affordable, and contribute to improved coverage. From a public health perspective, the use of a single dose schedule can offer substantial benefits that outweigh the potential risk of a lower level of protection if efficacy wanes over time, although there is no current evidence of this.
- Individuals known to be immunocompromised or HIV-infected (regardless of age or antiretroviral therapy status) should receive at least two HPV vaccine doses (minimum 6 months interval) and, where possible, three doses.
- HPV vaccines can be co-administered with other non-live and live vaccines using separate syringes and different injection sites. Co-administration of a booster dose of tetanus-diphtheria (Td) vaccination should be considered to improve programme efficiency and avoid missed opportunities to receive needed vaccinations.
- As a precaution HPV vaccine is not recommended in pregnancy. If pregnancy occurs following the first dose of vaccination, the subsequent dose should be delayed until after the pregnancy. Termination of pregnancy is not indicated if vaccination was carried out inadvertently during pregnancy. Breastfeeding is not a contraindication for HPV vaccination.

[12] Japanese Encephalitis

- Position paper reference: Weekly Epid. Record (2015, 90: 69-88).
- JE vaccination should be integrated into national immunization schedules in all areas where JE is recognized as a public health priority.
- The most effective immunization strategy in JE endemic settings is a one-time campaign in the primary target population, as defined by local epidemiology (typically children aged <15 years), followed by incorporation of JE vaccine into the routine childhood immunization programme.
- The following vaccine dosing schedules and age of administration are recommended. The need for a booster dose in endemic settings has not been clearly established for any of the vaccines listed below:
  - *Inactivated Vero cell-derived vaccine*: Primary series according to manufacturer's recommendations (these vary by product), generally 2 doses at 4-week intervals starting the primary series at ≥6 months of age in endemic settings
  - *Live attenuated vaccine*: Single dose administered at ≥8 months of age
  - *Live recombinant vaccine*: Single dose administered at ≥9 months of age
- Preferably, inactivated mouse brain-derived vaccines should be replaced by the newer generation JE vaccines discussed in this position paper. Inactivated mouse brain-derived vaccines may continue to play a role in combatting JE in some countries, but overall these products have a less favourable safety profile due to their increased reactogenicity compared to newer JE vaccines. Other disadvantages include the variability of manufacturing, the cost, the higher number of doses required and the need for boosters.
- Despite a lack of comprehensive immunogenicity/effectiveness and safety data for all possible combinations of JE and other routine vaccines, co-administration for programmatic reasons seems acceptable, even in the context of mass campaigns. As a general rule, any live vaccine may be given either simultaneously or at an interval of 4 weeks.
- Inactivated JE vaccine can be used in immunocompromised persons including HIV-infected individuals, but the immune response may be lower than in fully immunocompetent persons. Inactivated Vero cell-derived vaccines should be used preferentially over live attenuated or live recombinant vaccines in immunocompromised persons. HIV testing is not a prerequisite for vaccination.
- If the JE risk is sufficient to warrant vaccination of pregnant women, inactivated Vero cell-derived vaccines should be used preferentially over live attenuated or live recombinant vaccines based on the general precautionary principle against using live vaccines in pregnant women especially if alternative types of vaccines are available. Pregnancy testing is not a prerequisite for JE vaccination. Inadvertent administration of live attenuated or live recombinant JE vaccine to a pregnant woman is not an indication for termination of the pregnancy.

[13] Yellow Fever

- Position paper reference: Weekly Epid. Record (2013, 88: 269-284).
- WHO recommends that all endemic countries should introduce YF vaccine into their routine immunization programmes.
- A single dose of YF vaccine is sufficient to confer sustained life-long protective immunity against YF disease; a booster dose is not necessary.
- It is recommended that YF vaccine be given to children at age 9-12 months at the same time as the measles vaccine.
- The vaccine is contraindicated in children aged <6 months and is not recommended for those aged 6-8 months, except during epidemics when the risk of infection with the YF virus is very high. Other contraindications for YF vaccination are severe hyper-sensitivity to egg antigens and severe immunodeficiency.
- Preventive mass vaccination campaigns are recommended for inhabitants of areas at risk of YF where there is low vaccination coverage. Vaccination should be provided to everyone aged ≥ 9

months, in any area with reported cases. Noting that YF is a live vaccine, a risk-benefit assessment should be undertaken for all pregnant and lactating women.

- Vaccine should be offered to all unvaccinated travelers aged ≥ 9 months, travelling to and from at-risk areas, unless they belong to the group of individuals for whom YF vaccination is contraindicated.
- YF vaccine may be administered simultaneously with other vaccines. As a general rule, any live vaccine may be given either simultaneously or at an interval of 4 weeks. Oral polio vaccine may be given at any time in relation to YF vaccination.

[14] Tick-Borne Encephalitis (TBE)

- Position paper reference: Weekly Epid. Record (2011, 86: 241-256).
- Since the incidence of tick-borne encephalitis may vary considerably between and even within geographical regions, public immunization strategies should be based on risk assessments conducted at country, regional or district level, and they should be appropriate to the local endemic situation. Therefore, establishing case reporting of the disease is essential before deciding on the most appropriate preventive measures to be taken.
- In areas where the disease is highly endemic (that is, where the average pre-vaccination incidence of clinical disease is ≥5 cases/100 000 population per year), implying that there is a high individual risk of infection, WHO recommends that vaccination be offered to all age groups, including children.
- Because the disease tends to be more serious in individuals aged >50–60 years this age group constitutes an important target for immunization.
- Where the pre-vaccination incidence of the disease is moderate or low (that is, the annual average during a 5-year period is <5/100 000) or is limited to particular geographical locations or certain outdoor activities, immunization should target individuals in the most severely affected cohorts.
- People travelling from non-endemic areas to endemic areas should be offered vaccination if their visits will include extensive outdoor activities.
- Vaccination against the disease requires a primary series of 3 doses; those who will continue to be at risk should probably have ≥1 booster doses.
- Within the considerable range of acceptable dose intervals, the relevant national authorities should select the most rational primary schedule for their national, regional or district immunization programmes.
- Although there is a strong indication that the spacing of boosters could be expanded considerably from the intervals currently recommended by the manufacturers (every 3-5 years), the evidence is still insufficient for a definitive recommendation on the optimal frequency and number of booster doses. Countries should therefore continue to recommend the use of vaccines in accordance with local disease epidemiology and current schedules until more definitive information becomes available.
- For the vaccines manufactured in Austria and Germany (FSME-Immun and Encepur;) that can be given starting from > 1year of age an interval of 1–3 months is recommended between the first 2 doses, and 5–12 months between the second and third doses. When rapid protection is required, for example for people who will be travelling to endemic areas, the interval between the first 2 doses may be reduced to 1–2 weeks.
- With the vaccines manufactured in the Russian Federation (TBE-Moscow and EnceVir) the recommended intervals are 1–7 months between the first 2 doses, and 12 months between the second and third doses. Booster doses are recommended every 3 years for those at continued risk of exposure.
- The currently recommended booster interval should be maintained until more data have been obtained on the duration of protection induced by the Russian vaccines.
- Regardless of the duration of the delay, interrupted schedules should be resumed without repeating previous doses.

[15] Typhoid

- Position paper reference: Weekly Epid. Record (2018, 93: 153-172)
- Typhoid vaccination programmes should be implemented in the context of other efforts to control the disease, including health education, water quality and sanitation improvements, and training of health professionals in diagnosis and treatment.
- Among the available typhoid vaccines, TCV is preferred at all ages in view of its improved immunological properties, use in younger children and expected duration of protection. Countries may consider the routine use of ViPS vaccine in individuals 2 years and older, and Ty21a vaccine for individuals more than 6 years of age.
- TCV - for infants and children from 6 months of age and in adults up to 45 years. Administration of TCV at the same time as other vaccine visits at 9 month of age or in the second year of life is encouraged. ViPS – single dose from 2 years of age. Ty21a – 3-doses to be administered orally every second day from 6 years of age.
- Catch-up vaccination with TCV up to 15 years of age is recommended when feasible and supported by epidemiological data.
- Typhoid vaccination is recommended in response to confirmed outbreaks of typhoid fever and may be considered in humanitarian emergency settings depending on the risk assessment in the local setting.
- The potential need for revaccination with TCV is currently unclear. Revaccination is recommended every 3 years for ViPS, and every 3-7 years for Ty21a.
- Use of the live attenuated Ty21a vaccine during pregnancy should be avoided because of theoretical safety concerns about potential adverse effects.

[16] Cholera

- Position paper reference: Weekly Epid. Record (2017, 92:477-500).
- Appropriate case management, WaSH interventions, surveillance and community mobilization remain the cornerstones of cholera control. Vaccination should be implemented in relevant settings as part of comprehensive cholera control strategies or while other activities are being developed.
- WC vaccines (Shanchol, Euvchol, and mORCVAX) 2 doses should be given 14 days apart to individuals ≥1 year of age. For WC-rBS vaccine (Dukoral) 3 doses should be given to children 2-5 years of age, and 2 doses to children aged ≥6 years and adults, with an interval of 1-6 weeks between doses in both groups.
- Revaccination is recommended where there is continued risk of V. cholerae infection. For WC vaccines revaccination is recommended after 3 years. For WC-rBS vaccine: children age 2-5 years revaccination is recommended within 6 months. If less than 6 months have passed, 1 dose for revaccination. If more than 6 months have passed, the primary series of 3 doses should be repeated. For those aged ≥6 years of age, if less than 2 years have passed, 1 dose for revaccination. If more than 2 years have passed, the primary series of 2 doses should be repeated.
- In cholera-endemic countries, vaccination of the entire population (throughout a country regardless of risk) is usually not warranted. Vaccination policies and strategies should be guided by an assessment of the risk of cholera and targeted to cholera hotspots. Strategies targeting specific age groups at higher risk of disease may be considered.
- For control of cholera outbreaks vaccination should be considered to help prevent the spread to new areas. For vaccination campaigns, a single-dose strategy using WC vaccines (Shanchol, Euvchol or mORCVAX) could be considered in areas experiencing cholera outbreaks.
- During humanitarian emergencies with a risk of cholera, but without a current cholera outbreak, vaccination with OCV should be considered as an additional preparedness measure for outbreak prevention, depending on the local infrastructure (capacity to organize a vaccination campaign).
- Pregnant and lactating women and HIV infected individuals should be included in OCV campaigns since there is a high potential benefit and minimal risks.

[17] Meningococcal

- Position paper references: Weekly Epid. Record (2011, 86: 521-540); Updated guidance for MenA conjugate - Weekly Epid. Record (2015, 90: 57-68); Updated guidance for multivalent meningococcal vaccines – Weekly Epid. Record (2023, 98: 599-620); and Weekly Epid. Record (2024, 99: 1-10).
- Conjugate vaccines are preferred over polysaccharide vaccines due to their potential for herd protection, immune memory and an enhanced and longer-lasting immune response, particularly in children.
- Both conjugate and polysaccharide vaccines are efficacious and safe when used in pregnant women.
- WHO now recommends the use of **Men5CV (pentavalent meningococcal conjugate vaccine)** as a single-dose schedule beginning at 9 months of age, in alignment with routine immunization schedules. The vaccine may be safely and effectively co-administered with other vaccines included in the Expanded Programme on Immunization (EPI). The need for a booster dose is currently under review, based on accumulating programmatic experience.
- For countries still using **MenA conjugate vaccine**, MenA conjugate vaccine (5µg) a 1-dose schedule is recommended at 9-18 months of age based on local programmatic and epidemiologic considerations. The vaccine should be administered by deep intramuscular injection, preferably in the anterolateral aspect of the thigh. There is no reason to expect interference when co-administered with other vaccines. The need for a booster dose has not been established. If in a specific context there is a compelling reason to vaccinate infants younger than 9 months, a 2-dose schedule should be used starting at 3 months of age, with an interval of at least 8 weeks between doses.
- For **monovalent MenC conjugate vaccine** one single intramuscular dose is recommended for children aged ≥12 months, teenagers and adults. Children 2-11 months require 2 doses administered at an interval of a least 2 months and a booster about 1 year after. If the primary series is interrupted, vaccination should be resumed without repeating the previous dose.
- **Quadrivalent conjugate vaccine** (ACWY-D, ACWY-CRM and ACWY-TT) schedules differ by product licensure. WHO prequalifies multiple conjugate vaccines and recommends countries select based on programmatic suitability, following product-specific guidance.
- Meningococcal **polysaccharide vaccines** are less, or not, immunogenic in children under 2 years of age.
- Meningococcal polysaccharide vaccines can be used for those ≥ 2 years of age to control outbreaks in countries where limited economic resources or insufficient supply restrict the use of meningococcal conjugate vaccines. Polysaccharide vaccines should be administered to individuals ≥ 2 years old as one single dose. One booster 3-5 years after the primary dose may be given to persons considered to be a continued high risk of exposure, including some health workers. See position paper for details.

[18] Hepatitis A

- Position paper reference: Weekly Epid. Record (2022, 97: 493-512).
- Vaccination against hepatitis A should be part of a comprehensive plan for the prevention and control of viral hepatitis, including measures to improve safe drinking-water, sanitation and hygiene (such as hand washing) and measures for outbreak control.
- WHO recommends that vaccination against hepatitis A virus be introduced into national immunization schedules for individuals aged ≥12 months, if indicated on the basis of: i) an increasing trend over time of acute hepatitis A disease, including severe disease, among older children, adolescents or adults; ii) changes in the endemicity from high to intermediate; and iii) considerations of cost– effectiveness.
- In highly endemic countries, most individuals are asymptomatically infected with HAV in childhood, which prevents clinical hepatitis A in adolescence and adulthood. In these countries, large-scale hepatitis A vaccination programmes are not routinely recommended, because they carry a risk of a paradoxical increase in disease incidence in unvaccinated people. If a highly endemic country nevertheless wishes to consider largescale vaccination, it is essential to undertake a thorough prior analysis of risks vs benefits and ensure a high vaccination coverage to avoid this risk.
- Groups at higher risk of hepatitis A should be vaccinated. Such groups include travelers from low-endemic countries to areas of intermediate or high endemicity, men who have sex with men, at-risk occupational groups (such as sewage workers or laboratory personnel handling hepatitis A virus specimens), people who inject drugs, people who experience homelessness, migrants, refugees, incarcerated persons; and patients with chronic liver disease or people living with HIV, particularly in countries with low and very low endemicity.
- Countries with improving socioeconomic status may rapidly move from high to intermediate hepatitis A endemicity, rendering a larger proportion of the adolescent and/or young adult population susceptible to HAV infection. In such countries, large-scale hepatitis A vaccination in early childhood is likely to be cost–effective and is therefore recommended. When introducing the vaccine, these countries should consider the need for catch-up immunization based on age- specific seroprevalence rates or other markers of susceptibility.

Inactivated vaccine:

- For children, inactivated hepatitis A vaccines can be given as a single- or 2-dose schedule, and administered intramuscularly. With a 2-dose schedule, the first dose should be given starting from age ≥12 months. The interval between doses is flexible, from 6 months up to 4–5 years or more, but is usually 6–18 months. Data on vaccine effectiveness, antibody persistence, and modelling on long-term seroprotection indicate that an off-label, single dose schedule is equivalent to the two-dose schedule in children, in addition to being less costly and easier to implement.
- For adults aged >40 years, vaccination with inactivated vaccines using the 2-dose schedule is preferred since there is insufficient evidence on the immunogenicity and long-term protection from a single dose in this age group.
- Inactivated hepatitis A vaccines produced by different manufacturers, including combined hepatitis A vaccines, are interchangeable.
- For immunocompromised individuals, until further experience has been obtained with a single-dose schedule, a 2-dose schedule of inactivated vaccine is recommended. Inactivated hepatitis A vaccines should also be considered for use in pregnant women at risk of HAV infection.

Live attenuated vaccine:

- Live attenuated vaccines are licensed for individuals aged ≥18 months and are administered as a single subcutaneous dose.
- Hepatitis A vaccines can be administered simultaneously with any of the vaccines routinely used in childhood immunization programmes.

[19] Rabies

- Position paper reference: Weekly Epid. Record (2018, 93: 201-220).
- Production and use of nerve-tissue vaccines should be discontinued and replaced by vaccines based on RABV grown in cell culture or embryonated eggs (CCEEVs).
- There are two main immunization strategies for the prevention of human rabies: (i) PEP which includes extensive and thorough wound washing at the RABV-exposure site, together with RIG administration if indicated, and the administration of a course of several doses of rabies vaccine; (ii) PrEP which is the administration of several doses of rabies vaccine before exposure to RABV. PrEP is recommended for individuals at high risk of RABV exposure. These include sub-populations in highly endemic settings with limited access to timely and adequate PEP, individuals at occupational risk, and travelers who may be at risk of exposure.
- For both PEP and PrEP, vaccines can be administered by either the ID or IM route. One ID dose is 0.1 mL of vaccine; one IM dose is 0.5 mL or 1.0 mL depending on the product.
- The indication and procedure for PEP depend on the type of contact with the suspected rabid animal and immunization status of the patient. For category I exposures, no PEP is required; for

category II, immediate vaccination is recommended; for category III, immediate vaccination is recommended, and administration of RIG, if indicated.

- PrEP schedule: 2-site ID vaccine administered on days 0 and 7. If IM administration is used, WHO recommends a 1-site IM vaccine administration on days 0 and 7.
- If any doses are delayed, vaccination should be resumed, not restarted. A change in the route of administration or in vaccine product during a PEP or PrEP course is acceptable if such a change is unavoidable.
- No further PrEP booster doses following a primary series of PrEP or PEP are required for individuals living in, or travelling to, high-risk areas.
- Professionals who are at continual or frequent risk of exposure through their activities should have regular serological monitoring. If VNA levels fall to <0.5 IU/mL, a 1-site ID or a 1-site IM PrEP booster vaccination is recommended. If serological testing is not available for those at continual or frequent occupational risk, a periodic 1-dose (ID or IM) PrEP booster vaccination can be considered based on the assessment of relative risk.

[20] Dengue (TAK-003)

- Position paper reference: Weekly Epid. Record (2024, 99: 203-224)
- Vaccination against dengue should be viewed as part of an integrated strategy to control the disease, including vector control, proper case management, community education, and community engagement. TAK-003 does not prevent all cases of dengue.
- WHO recommends that countries consider introducing TAK-003 into their routine immunization programmes in geographical locations where high transmission intensity of dengue poses a significant public health problem. Many countries may have a heterogeneous geographical distribution of dengue transmission intensity and could consider targeted subnational introduction.
- The use of a pre-vaccination screening strategy to limit vaccination to seropositive persons is not recommended in settings with high dengue transmission as this would substantially reduce the public health impact of vaccination and increase programmatic costs.
- WHO recommends the use of TAK-003 in children aged 6–16 years in settings with high dengue transmission intensity. Within this age range, the vaccine should optimally be initiated about 1–2 years prior to the age specific peak incidence of dengue-related hospital admissions, although programmatic alignment with the administration of other school-based vaccination and health interventions is also an important consideration.
- Catch-up vaccination can also be considered for other age groups within the 6–16 year age range at the time of vaccine introduction.
- WHO does not currently recommend use of TAK-003 in children aged <6 years because of the low efficacy in this age group. Furthermore, the dengue seropositivity rate in this age group is generally low, even in high dengue transmission settings.
- The vaccine is recommended as a 2-dose schedule with a minimum interval of 3 months between doses. It is not advised to reduce the interval between doses.
- If the second dose is delayed for any reason, it is not necessary to restart the series and the second dose should be administered at the first available opportunity.
- A booster dose is not recommended.
- TAK-003 may be co-administered with other inactivated, subunit, or mRNA vaccines, except for live vaccines, for which more data are required.
- TAK-003 is not recommended during pregnancy and pregnancy should be avoided for at least 1 month following vaccination. Inadvertent vaccination of a pregnant person is not a reason to terminate the pregnancy.
- The vaccine is contraindicated for mothers during breastfeeding. TAK-003 is contraindicated in persons with congenital or acquired immune deficiency, including those receiving immunosuppressive therapies such as chemotherapy or high doses of systemic corticosteroids within 4 weeks prior to vaccination, as with other live attenuated vaccines. The vaccine is also contraindicated in individuals with symptomatic HIV infection or with asymptomatic HIV infection associated with evidence of impaired immune function.
- Persons with comorbidities, such as sickle cell anaemia, diabetes, hypertension, or underlying comorbidities that may result in bleeding tendencies (e.g. ulcerative colitis), are at higher risk of more severe disease outcomes when infected with dengue virus. Persons with such comorbidities are generally older. Persons with comorbidities who live in dengue-endemic countries could be offered vaccination, even if they fall outside the recommended age range for programmatic use (i.e. 6–16 years), provided that a substantial country-specific burden of severe dengue outcomes in these subpopulations has been documented. Until more data on efficacy-safety profiles become available, WHO recommends the lower age limit of 6 years, and the upper limit of 60 years for vaccination.

[21] Malaria

- Position paper reference: Weekly Epid. Record (2024, 99: 225-248)
- Malaria vaccines should be provided as part of a comprehensive malaria control strategy.
- WHO recommends the use of malaria vaccines for the prevention of P. falciparum malaria in children living in malaria endemic areas, prioritizing areas of moderate and high transmission. However, countries may also consider providing the vaccine in low transmission settings.
- Malaria vaccines should be provided in a 4-dose schedule in children from 5 months of age.
- The minimum interval between any doses is 4 weeks; however, to achieve prolonged protection, the fourth dose should be given 6–18 months after the third dose.
- To improve coverage, there can be flexibility in the timing of the fourth dose, including by aligning it with vaccines given in the second year of life. Alternatively, because vaccine efficacy is highest in the first months after vaccination, the fourth dose can be given just prior to seasonal peaks in malaria transmission to optimize vaccine efficacy.
- A fifth dose, given one year after the fourth dose, may be provided in areas of highly seasonal transmission and may be considered in other areas – depending on a local assessment of feasibility and cost-effectiveness – where a significant malaria risk remains for children.
- At the time of vaccine introduction, catch-up vaccination can be considered in children up to 5 years of age, subject to local epidemiology and age of high risk, feasibility, affordability and vaccine availability.
- In areas with highly seasonal malaria transmission or perennial malaria transmission with seasonal peaks, countries may consider providing the vaccine using an age-based or seasonal approach. Alternatively, countries could consider a hybrid of these approaches, giving the first 3 doses through age-based administration and subsequent annual doses seasonally.
- The vaccination series should be completed with the same product whenever feasible. If the product used for a prior dose is unavailable or unknown, the series should be completed with either of the available WHO-recommended malaria vaccines.
- Malaria vaccines may be administered simultaneously with other childhood vaccines.
- Malaria vaccines should not be given to anyone who has experienced a severe allergic reaction after a previous hepatitis B vaccination or malaria vaccine dose or vaccine component.
- Malaria vaccines are not recommended for use in adults (including health workers and pregnant persons). The vaccine is not indicated for travelers, who should use chemoprophylaxis and vector control methods to prevent malaria when travelling to endemic settings.

[22] Mumps

- Position paper reference: Weekly Epid. Record (2024, 82: 49-60).
- Recommended for use in countries who are able to achieve sustained high coverage of MR vaccination, and attain measles and rubella control and/or elimination levels.
- If implemented, mumps vaccine should be administered with measles and rubella as MMR or MMRV combination vaccine and follow the same schedule.

[23] Seasonal Influenza (Inactivated Vaccine)

- Position paper reference: Weekly Epid. Record (2022, 97: 185-208).
- WHO recommends that all countries should consider implementing seasonal influenza immunization programmes. Having a strong influenza programme in place has been shown to be beneficial for the response to an influenza pandemic.
- For countries considering the initiation or expansion of programmes for seasonal influenza vaccination, WHO recommends that the following target groups should be considered for vaccination (not in order of priority): health workers, individuals with comorbidities and underlying conditions, older adults and pregnant women.
- Depending on national disease goals, capacity and resources, epidemiology, national policies and priorities, and disease burden, countries may consider additional (sub)populations for vaccination, such as children. Other groups to be considered for vaccination include people at high risk of severe influenza living in congregate-living settings, such as prisons, refugee camps and group homes. Programmes should pay particular attention to vaccine equity by considering disadvantaged populations and indigenous populations with a high burden of disease.
- A single dose is appropriate for those ≥ 9 years of age and healthy adults.
- Children aged 6 months -8 years should receive 2 doses at least 4 weeks apart.
- Those who have previously been vaccinated at least once should subsequently receive 1 annual dose, as should children and adolescents aged 9 years or over and healthy adults.
- Live attenuated influenza vaccines (LAIVs) are currently not recommended for children under 2 years of age and adults, including older adults and those with comorbidities, because VE has not been consistently demonstrated in these age groups. Because LAIV is a live-virus vaccine and data on its administration to pregnant women and the associated maternal and fetal risks are limited, LAIV is also not recommended during pregnancy.
- Inactivated influenza vaccine is safe to give throughout pregnancy.
- Co-administration of influenza vaccine, including with COVID-19 or live vaccines is acceptable. When 2 vaccines are administered at the same visit, the contralateral limb should be used.

[24] Varicella

- Position paper reference: Weekly Epid. Record (2025, 47: 567-590).
- WHO recommends the use of varicella vaccines for the prevention of varicella in children in populations where varicella is considered an important public health problem
- In general, countries introducing the varicella vaccine should aim to achieve high coverage levels with varicella vaccination both nationally and subnationally. Countries should define their own minimal coverage targets, guided by criteria that include national and subnational disease burden, affordability, cost-effectiveness, seroprevalence rates and the age of acquiring infection
- WHO recommends the use of either single-antigen varicella or MMRV combination vaccines.
- The number of doses recommended depends on the goal of the vaccination programme. For effective prevention of varicella, WHO recommends a 2-dose schedule of a varicella-containing vaccine given the higher effectiveness of 2 doses versus a single dose. Countries may choose to use a one-dose schedule but if they do, they should note that, while such a programme may be sufficient to reduce mortality and severe morbidity from varicella, it is less effective than a 2-dose schedule in preventing virus circulation and occasional outbreaks.
- For catch-up vaccination in adolescents and adults, a 2-dose schedule of varicella vaccine should also be used.
- Countries with a high average age (≥ 15 years) of acquisition of infection could consider alternative vaccination strategies such as vaccination of adolescents and adults without evidence of varicella immunity. This strategy requires a 2-dose schedule.
- Varicella vaccination is contraindicated during pregnancy and pregnancy should be delayed for 4 weeks after vaccination. Termination of pregnancy is not indicated if vaccination was carried out inadvertently during pregnancy.
- Varicella vaccine can be administered concomitantly with other vaccines. Unless given together with other live viral vaccines (measles, MR, MMR), it should be administered at a minimum interval of 28 days.
- Countries should consider vaccination of potentially susceptible health-care workers (i.e. unvaccinated and with no history of varicella) with 2 doses of varicella vaccine.