8.16 c

(updated: November 2021)

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

Antigen		Age of 1st Dose	Doses in Primary Series	Interval Between Doses: 1st to 2nd	Interval Between Doses: 2nd to 3rd	Interval Between Doses: 3rd to 4th	Booster Dose	Considerations (see footnotes for details)
Recommendations for all children								
BCG [1]		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 [2]	**Option 1**	As soon as possible after birth (<24h)	3	4 weeks (min) with DTPCV1	4 weeks (min) with DTPCV2			Premature and low birth weight Co-administration and combination vaccine High risk groups
	Option 2	As soon as possible after birth (<24h)	4	4 weeks (min) with DTPCV1	4 weeks (min) with DTPCV2	4 weeks (min),with DTPCV3		
Polio [3]	**bOPV + IPV**	bOPV 6 weeks (min) IPV 14 weeks (min)	5 (3 bOPV and 2 IPV)	bOPV 4 weeks (min) with DTPCV2 IPV 4 months (min)	bOPV 4 weeks (min) with DTPCV3			bOPV birth dose Type of vaccine Fractional dose IPV Alternative early IPV schedule Transmission and importation risk
	IPV / bOPV Sequential	8 weeks (IPV 1st)	1-2 IPV 2 bOPV	4-8 weeks	4-8 weeks	4-8 weeks		
	IPV	8 weeks	3	4-8 weeks	4-8 weeks		(see footnote)	IPV booster needed for early schedule (i.e. first dose given <8 weeks)
DTP-containing vaccine [4]		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** [5]	**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) [6]	**Option 1 3p+0**	6 weeks (min)	3	4 weeks (min)	4 weeks			Schedule options (3p+0 vs 2p+1) Vaccine options HIV+ and preterm neonate booster Vaccination in older adults
	Option 2 2p+1	6 weeks (min)	2	8 weeks (min)			9-18 months	
Rotavirus [7]		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 [8]		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 [9]		9 or 12 months with measles containing vaccine	1					Achieve and sustain 80% coverage Co-administration and combination vaccine; Pregnancy
HPV [10]		As soon as possible from 9 years of age (females only)	2	6-12 months (min 5 months)				Target 9-14 year old girls; Temporary suspension of multi-age cohort vaccination; Off-label use of extended interval of 3-5 years; Pregnancy; Older age groups > 15 years 3 doses; HIV and immunocompromised

Refer to **https://www.who.int/teams/immunization-vaccines-and-biologicals/policies/position-papers** for table & position paper updates.

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.

Table 2: Summary of WHO Position Papers - Recommended Routine Immunizations for Children (updated November 2021)

Antigen		Age of 1st Dose	Doses in Primary Series	Interval Between Doses: 1st to 2nd	Interval Between Doses: 2nd to 3rd	Interval Between Doses: 3rd to 4th	Booster Dose	Considerations (see footnotes for details)
Recommendations for children residing in certain regions								
Japanese Encephalitis [11]	**Inactivated Vero cell-derived**	6 month	2 generally	4 weeks (generally)				Co-administration live vaccines; Vaccine options and manufacturer's recommendations; Pregnancy; Immunocompromised
	Live attentuated	8 months	1					
	Live recombinant	9 months	1					
Yellow Fever [12]		9-12 months with measles containing vaccine	1					Co-administration live vaccines
Tick-Borne Encephalitis [13]		≥ 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 [14]	**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 5 years (min) (see footnote)	3 or 4 (see footnote)	1 day	1 day	1 day	Every 3-7 years	Definition of high risk
Cholera [15]	**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 [16]	**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	9-23 months	2	12 weeks				Definition of high risk; Vaccine options
		≥2 years	1					
Hepatitis A [17]		1 year	At least 1					Level of endemicity; Vaccine options; Definition of high risk groups
Rabies [18]		As required	2	7 days			(see footnote)	PrEP vs PEP; Definition of high risk
Dengue (CYD-TDV) [19]		9 years (min)	3	6 months	6 months			Pre-vaccination screening
Recommendations for children receiving vaccinations from immunization programmes with certain characteristics								
Mumps [20]		12-18 months with measles containing vaccine	2	1 month (min) to school entry				Coverage criteria > 80%; Combination vaccine
Seasonal influenza (inactivated tri- and qudri-valent) [21]		6 months (min)	2 (<9 years) 1 (≥ 9 years)	4 weeks			Revaccinate annually: 1 dose only (see footnotes)	Priority risk groups, especially pregnant women Lower dosage for children 6-35 months
Varicella [22]		12-18 months	1-2	4 weeks to 3 months per manufacturer recommendations				Achieve & sustain ≥ 80% coverage Pregnancy Co-admin with other live vaccines

Summary Table 2 - Notes

- Refer to http://www.who.int/immunization/documents/positionpapers 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] BCG

- Position paper reference: Weekly Epid. Record (2018, 93:73-96) [pdf 660KB]
- 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.

[2] Hepatitis B

- Position paper reference: Weekly Epid. Record (2017, 92:369-392) [pdf 2.4MB]
- 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.

[3] Polio

- *A revised Polio Vaccine Position Paper is forthcoming in 2022.* Position paper reference: Weekly Epid. Record (2016, 9:145-68)[pdf 611KB] and Meetings of the Strategic Advisory Group of Experts on immunization: Conclusions and Recommendations. Weekly Epid. Record (2021, 96:133-144) [pdf 448KB], Weekly Epid. Record (2020, 95: 585 - 607) [pdf 468.8Kb], Weekly Epid. Record (2020, 95: 241-256) [pdf 480.8Kb]

OPV plus IPV

- All countries that currently administer three bOPV and one IPV dose should add a 2nd IPV dose in their routine immunization schedule. *(Oct 2020 SAGE Meeting Report)*
- Regardless of the 2 dose IPV schedule used, introduction of the second IPV dose does not reduce the number of bOPV doses (three) used in the routine immunization schedule. *(Oct 2020 SAGE Meeting Report)*
- The preferred schedule is to administer the first IPV dose at 14 weeks of age (with DTPCV3/ Penta3), and to administer the second IPV dose 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 or fractional intradermal IPV (fIPV) without loss of immunogenicity. *(Oct SAGE 2020 Meeting Report)*. Sabin-IPV (sIPV) may be used interchangeably with wIPV, but sIPV is not recommended to be used as a fractional dose due to current lack of evidence. *(March 2021 SAGE Meeting Report)*

- Based on local epidemiology, programmatic implications and feasibility of delivery, countries may choose an alternative early IPV schedule starting with the first dose at 6 weeks of age (with DTP1/Penta1) and the second dose at 14 weeks (with DTPCV3/Penta3). This alternative schedule offers the advantage of providing early-in-life protection; however, there is a lower total immunogenicity achieved. If this schedule is chosen, full dose IPV (for both wIPV and sIPV) should be used rather than fIPV due to lower immunogenicity of fIPV at early ages. *(Oct 2020 SAGE Meeting Report)*
- In polio-endemic countries and in countries at high risk for importation and subsequent spread of poliovirus, WHO recommends a bOPV birth dose (zero dose) followed by a primary series of 3 bOPV doses and at least 2 IPV doses. *(2016 PP; adjusted for 2 IPV doses)*
- The zero dose of bOPV should be administered at birth, or as soon as possible after birth, to maximize seroconversion rates following subsequent doses and to induce mucosal protection. *(2016 PP)*
- Both OPV and IPV may be co-administered concurrently and both may be given with other infant vaccines. *(2016 PP)*
- For infants starting the routine immunization schedule late (age >3 months) the IPV dose should be administered at the first immunization contact along with bOPV and the other routinely recommended vaccines. *(2016 PP)*
- The implementation of 3 bOPV doses + 2 IPV doses does not replace the need for supplementary immunization activities (SIAs). *(2016 PP)*
- Countries that delayed the introduction of IPV or experience stock-outs should provide catch-up vaccination to all children who were missed as soon as the vaccine becomes available. *(2016 PP)*

Sequential IPV–OPV schedule

- In countries with high vaccination coverage (e.g. 90%–95%) and low importation risk (neighbouring countries and major population movement all having similarly high coverage) an IPV–bOPV sequential schedule can be used when VAPP is a significant concern. *(2016 PP)*
- The initial administration of 1 or 2 doses of IPV should be followed by ≥2 doses of bOPV to ensure both sufficient levels of protection in the intestinal mucosa and a decrease in the burden of VAPP. *(2016 PP)*
- For sequential IPV–bOPV schedules, WHO recommends that IPV be given at 2 months of age (e.g. a 3-dose IPV–bOPV–bOPV schedule), or at 2 months and 3–4 months of age (e.g. a 4-dose IPV–IPV–bOPV–bOPV schedule) followed by at least 2 doses of bOPV. Each of the doses in the primary series should be separated by 4–8 weeks depending on the risk of exposure to poliovirus in early childhood. *(2016 PP)*

IPV-only schedule

- In the current epidemiological context and as a general principle, SAGE expressed the need for regions or countries to be cautious about moving from a bOPV + IPV schedule to an IPV-only schedule in their routine immunization programmes and recommended that instead they take a gradual approach, by first introducing a second dose of IPV into their routine immunization schedules. *(March 2020 SAGE Meeting Report)*
- An IPV-only schedule may be considered in countries with sustained high vaccination coverage and very low risk of both WPV importation and transmission. *(2016 PP)*
- A primary series of 3 doses of IPV should be administered beginning at 2 months of age. If the primary series begins earlier (e.g. with a 6, 10 and 14-week schedule) then a booster dose should be given after an interval of ≥6 months (for a 4-dose schedule). *(2016 PP)*

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

- Position paper reference: Diphtheria - Weekly Epid. Record (2017, 92:417-436) [pdf 526KB]; Tetanus - Weekly Epid. Record (2017, 92: 53-76) [pdf 636KB]; Pertussis - Weekly Epid. Record (2015, 90: 433-460) [pdf 667KB]
- 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. Link
- 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, which has not yet been implemented in many countries despite the negligible price differential between TT and DT/Td vaccines. Countries and partners are urged to take steps to accelerate this shift.
- 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.

[5] *Haemophilus influenzae* type b (Hib)

- Position paper reference: Weekly Epid. Record (2013, 88: 413-428) [pdf 209KB]
- 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.

[6] Pneumococcal (Conjugate)

- Position Paper Reference: Weekly Epid. Record (2019, 94: 85-104) [pdf 444KB]
- 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 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.
- 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. [pdf 373KB]
- For considerations for pneumococcal vaccination in older adults see concept note: Weekly Epid. Record (2021, 96 (23), 217 – 228) [pdf 373KB]
- 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.

[7] Rotavirus

- Position paper reference: Weekly Epid. Record (2021, 96: 301-320) [pdf 515KB]
- 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.

[8] Measles

- Position paper reference: Weekly Epid. Record (2017, 92:205-228) [pdf 600KB].
- 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.

[9] Rubella

- Position paper reference: Weekly Epid. Record (2020, 95: 301-324) [pdf 772KB]
- Countries that have not yet introduced RCV into their immunization programmes should do so if they can achieve a coverage level of 80% or greater, through either routine immunization or campaigns. While opportunities should not be missed, the decision to introduce rubella vaccine in combination with MCV needs careful consideration related to the sustainability of maintaining high RCV coverage into the future.
- Introduction of RCV into childhood immunization programmes implies a long-term commitment to achieving and maintaining sufficient immunization coverage to ensure sustained population immunity.
- The age-specific incidence decreases in all age groups when vaccination coverage is high enough (generally estimated to be ≥80%).
- It is recommended that RCV be provided in combination with measles vaccine, and 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.

[10] Human Papillomavirus (HPV)

- Position paper reference : Weekly Epid. Record (2017, 92:241-268) [pdf 2.9MB] and SAGE Meeting, October 2019: conclusions and recommendations: Weekly Epid. Record (2019, 94: 541-560) [pdf 484KB]
- Recommended target population for the prevention of cervical cancer: females aged 9–14 years, prior to becoming sexually active.
- HPV vaccines should be introduced as part of a coordinated strategy to prevent cervical cancer.
- A 2-dose schedule with a 6-12 month interval between doses is recommended for individuals receiving the first dose before 15 years of age. Those aged ≥15 years at the time of the second dose are also adequately covered by 2 doses.
- The initial vaccination of multiple cohorts of girls aged 9-14 is recommended when the vaccine is first introduced.
- If the interval between doses is shorter than 5 months, then a third dose should be given at least 6 months after the first dose.
- A 3-dose schedule (0, 1-2, 6 months) should be used for all vaccinations initiated ≥15 years of age, including in those younger than 15 years know to be immunocompromised and/or HIV infected (regardless of whether they are receiving antiretroviral therapy). It is not necessary to screen for HPV infection or HIV infection prior to HPV vaccination.
- These schedule recommendations apply to all bivalent, quadrivalent, and nonavalent vaccines.
- All three HPV vaccines can be co-administered with other live and non-live vaccines using separate syringes and different injection sites.
- Data on the safety of HPV vaccination in pregnancy are limited, and HPV vaccination of pregnant women should be avoided.
- Vaccination of secondary target populations, e.g. females aged ≥15 years or males, is recommended only if this is feasible, affordable, cost-effective, and does not divert resources from vaccination of the primary target population or from effective cervical cancer screening programmes.
- In the context of limited global supply of HPV vaccine, in 2019 SAGE recommended the following additional strategies:
  - All countries should temporarily pause implementation of boy, older age group (>15 years) and multi-age cohort (MAC) HPV vaccination strategies until vaccine supply allows equitable access to HPV vaccine by all countries.
  - Countries can adopt an extended interval of 3-5 years between the 2 doses. This strategy constitutes off-label use of the vaccine.

[11] Japanese Encephalitis (JE)

- Position paper reference: Weekly Epid. Record (2015, 90: 69-88) [pdf 950 KB].
- 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.

[12] Yellow Fever

- Position paper reference: Weekly Epid. Record (2013, 88: 269-284) [pdf 1.24MB]
- 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.

[13] Tick-Borne Encephalitis (TBE)

- Position paper reference: Weekly Epid. Record (2011, 86: 241-256) [pdf 318KB]
- 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 prevaccination 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 prevaccination 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.

[14] Typhoid

- Position paper reference: Weekly Epid. Record (2018, 93: 153-172) [pdf 297KB].
- 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.

[15] Cholera

- Position paper reference: Weekly Epid. Record (2017, 92:477-500) [pdf 676KB]
- 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.

[16] Meningococcal

- Position paper reference: Weekly Epid. Record (2011, 86: 521-540) [pdf 1.1MB] and Update for MenA conjugate Weekly Epid Record (2015, 90: 57-68) [pdf 852KB]
- Conjugate vaccines are preferred over polysaccharide vaccines due to their potential for herd protection and their increased immunogenicity, particularly in children <2 years of age.
- Both conjugate and polysaccharide vaccines are efficacious and safe when used in pregnant women.
- 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 vaccines (A,C,W135,Y-D and A,C,W135,Y-CRM) should be administered as one single intramuscular dose to individuals ≥ 2 years. A,C,W135,Y-D is also licensed for children 9-23 months of age, and given as a 2-dose series, 3 months apart beginning at age 9 months. If the primary series is interrupted, vaccination should be resumed without repeating the previous dose.
- 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.

[17] Hepatitis A

- Position paper reference: Weekly Epid. Record (2012, 87: 261-276) [pdf 1.24 MB]
- Hepatitis A vaccination is recommended for inclusion in the national immunization schedule for children ≥ 1 year if indicated on the basis of incidence of acute hepatitis A, change in the endemicity from high to intermediate, and consideration of cost-effectiveness.
- In highly endemic countries almost all persons are asymptomatically infected with HAV in childhood, which effectively prevents clinical hepatitis A in adolescents and adults. In these countries, large-scale vaccination programmes are not recommended.
- Countries with improving socioeconomic status may rapidly move from high to intermediate endemicity. In these countries, a relatively large proportion of the adult population is susceptible to HAV and large-scale hepatitis A vaccination is likely to be cost-effective and therefore is encouraged.
- For individual health benefit targeted vaccination of high-risk groups should be considered in low and very low endemicity settings. Those at increased risk of hepatitis A include travelers to areas of intermediate or high endemicity, those requiring life-long treatment with blood products, men who have sex with men, workers in contact with non-human primates, and injection drug users. In addition, patients with chronic liver disease are at increased risk for fulminant hepatitis A and should be vaccinated.
- Inactivated HAV vaccine is licensed for intramuscular administration in a 2-dose schedule with the first dose given at the age of 1 year or older. The interval between the first and second dose is flexible (from 6 months up to 4-5 years) but is usually 6-18 months. Countries may consider a 1-dose schedule as this option seems comparable in terms of effectiveness, and is less expensive and easier to implement. However, in individuals at substantial risk of contracting hepatitis A and in immunocompromised individuals, a 2-dose schedule is preferred. Inactivated HAV vaccines produced by different manufacturers, including combined hepatitis A vaccines, are interchangeable. Apart from severe allergic reaction to the previous dose, there is no contraindication to their use. These vaccines can be co-administered simultaneously with other routine childhood vaccines, and should be considered for use in pregnant women at definite risk of HAV infection.
- Live attenuated HAV vaccine is administered as a single subcutaneous dose to those ≥ 1 year of age. Severe allergy to components included in the live attenuated hepatitis A vaccine is a contraindication to their use. As a rule, live vaccines should not be used in pregnancy or in severely immunocompromised patients. There is no information available on co-administration of live attenuated hepatitis A vaccines with other routinely used vaccines.
- Vaccination against hepatitis A should be part of a comprehensive plan for the prevention and control of viral hepatitis, including measures to improve hygiene and sanitation and measures for outbreak control.

[18] Rabies

- Position paper reference: Weekly Epid. Record (2018, 93: 201-220) [pdf 370 KB].
- 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 travellers 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.

[19] Dengue (CYD-TDV)

- Position paper reference: Weekly Epid. Record (2108, 93, 457-76) [pdf 513KB]. This paper is currently under revision.
- Vaccination should be considered as part of an integrated dengue prevention and control strategy.
- Countries should consider introduction of the dengue vaccine CYD-TDV only if the minimization of risk among seronegative individuals can be assured.
- For countries considering vaccination as part of their dengue control programme, pre-vaccination screening is the recommended strategy.
- If pre-vaccination screening is not feasible, vaccination without individual screening could be considered in areas with recent documentation of seroprevalence rates of at least 80% by age 9 years.
- Decisions about implementing a seroprevalence criterion based vaccination strategy without individual screening will require serosurveys at high resolution, i.e. at district and sub-district level.
- Screening tests would need to be highly specific to avoid vaccinating truly seronegative persons

[20] Mumps

- Position paper reference: Weekly Epid. Record (2007, 82: 49-60) [pdf 311KB]
- Recommended for use in high performing immunization programmes with the capacity to maintain coverage over 80% and where mumps reduction is a public health priority.
- If implemented, a combination vaccine of measles, mumps and rubella is recommended.

[21] Seasonal Influenza (Inactivated Vaccine)

- Position paper reference: Weekly Epid. Record (2012, 87: 461-476) [pdf 1.9 MB]
- For countries considering the initiation or expansion of programmes for seasonal influenza vaccination, WHO recommends that pregnant women should have the highest priority. Children aged < 6 months are not eligible to receive currently licensed influenza vaccines and should be protected against influenza through vaccination of their mothers during pregnancy and through ensuring vaccination of close contacts.
- Additional risk groups to be considered are children aged 6-59 months, elderly persons ≥ 65 years of age, individuals with specific chronic medical conditions, and health-care workers. Countries with existing influenza vaccination programmes targeting any of these additional groups should continue to do so and should incorporate immunization of pregnant women into such programmes.
- A single dose is appropriate for those ≥ 9 years of age, including pregnant women. Inactivated influenza vaccine is safe to give throughout pregnancy.
- Children aged 6-59 months should receive 2 doses at least 4 weeks apart. Children aged 6-35 months should receive a pediatric dosage.
- Annual vaccination (or re-vaccination, if the vaccine strains are identical) is recommended. Previously vaccinated children 6-59 months require only one-dose.

[22] Varicella

- Position paper reference: Weekly Epid. Record (2014, 89: 265-288) [pdf 889KB]
- Countries where varicella is an important public health burden could consider introducing varicella vaccination in the routine childhood immunization programme. However, resources should be sufficient to ensure reaching and sustaining vaccine coverage ≥ 80%. Decision-making on childhood varicella vaccination should also include consideration of the possible impact on herpes zoster.
- Depending on the goal of the vaccination programme, 1-2 doses should be given with the first dose administered at 12-18 months of age. The minimum interval between doses should be as recommended by the manufacturer, ranging from 4 weeks to 3 months.
- 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.