

## 1.9 CATCH-UP VACCINATION

### Introduction

Not infrequently, children who present for immunisation have missed out on previously scheduled vaccines. To ensure that these 'overdue' children can be protected as quickly as possible, 'catch-up' vaccination schedules, based on the ASVS, are available.

Every opportunity should be taken to check vaccination status and to provide missing doses. When infants and children have missed scheduled vaccine doses, a catch-up schedule should be commenced. The information and tables below are designed to assist in planning a catch-up program based on the ASVS.

If the vaccine provider is uncertain about how to plan the catch-up schedule, contact either a public health professional or a paediatrician with vaccination expertise.

An on-line 'catch-up calculator' is available at [www.health.sa.gov.au/immunisationcalculator](http://www.health.sa.gov.au/immunisationcalculator).

### Vaccination with incomplete vaccination records

The most important requirement for assessment of vaccination status is to have written documentation of vaccination. In children 7 years of age and under, vaccination status should be available from the Australian Childhood Immunisation Register (ACIR), unless the course of vaccines was commenced overseas. In persons over this age, the approach of providers to the problem of inadequate records should be based on the age of the individual, whether the vaccines in question have been given in Australia or overseas and the vaccines being considered for catch-up.

#### (i) Children 8 years of age or less

In this age group, the primary reference point should be the ACIR. If the parent states that vaccines not recorded on the ACIR have been given, every effort should be made to contact the provider. If confirmation from the nominated provider or the ACIR cannot be obtained, unless other convincing evidence of vaccination such as written records is available, children should be offered a catch-up course of vaccination appropriate for age.

#### (ii) Children and adolescents 9 to 17 years

In children over the age of 8 years and adolescents, alternative sources of documentation to the ACIR such as personal health records will be needed, but are less likely to be available with increasing age. The relevant vaccines for catch-up in this age group are hepatitis B, measles, mumps, rubella (MMR), meningococcal C conjugate (MenCCV), varicella-zoster (VZV), inactivated poliomyelitis (IPV), diphtheria, tetanus and pertussis vaccines. For hepatitis B, MenCCV, VZV, IPV and MMR vaccines there are no adverse effects associated with additional doses in immune individuals. In the case of diphtheria and tetanus, additional doses are associated with a significant increase in local and systemic reactions in immune individuals. This means that if catch-up vaccination requiring more than one diphtheria or tetanus containing vaccine is considered because of lack of documentation, particular attention should be paid to the occurrence of local or systemic reactions before proceeding with a second or third catch-up dose.

### **(iii) Adults (18 years and over)**

In adults, written documentation of previous vaccination history may not be available. The main antigens where past history is important because of the potential for adverse reactions in immune individuals are diphtheria and tetanus.

Pneumococcal polysaccharide vaccine history in the previous 5 years is also an issue. Additional doses of MMR, VZV, IPV or hepatitis B vaccine are rarely associated with significant adverse reactions in adults. If a tetanus-prone wound is the reason for considering additional tetanus vaccine, NHMRC recommends giving additional tetanus-containing vaccines if there is any uncertainty (see Table 3.24.1).

### **Interrupted vaccine doses**

If the recommended intervals between doses are exceeded, there is no need to recommence the schedule or give additional doses, because the immune response is not impaired by such delay. If the process of administration of vaccine is interrupted (eg. by syringe-needle disconnection or vomiting of OPV within 10 minutes of administration) the whole dose should be repeated as soon as practicable.

### **Issues to be considered when planning catch-up vaccination**

- Plan the catch-up on the basis of the available, and preferably documented, evidence of previous vaccination.
- Vaccine doses should not be administered at less than the minimal intervals or less than the minimum age (see Table 1.9.1).<sup>2</sup>
- Doses administered earlier than the minimum interval or age should not be counted as valid doses and should be repeated as age-appropriate using the minimum interval table (see Table 1.9.1).
- When commencing the recommended catch-up vaccination schedule the interval between doses may be reduced or extended and the numbers of doses required may reduce with age. For example from 15 months of age, only one dose of (any) Hib vaccine is required.
- As a child gets older the recommended vaccines change or they might need to be omitted from the schedule.
- For incomplete vaccination or overdue vaccinations, build on previous documented doses. Never start the schedule again, regardless of the interval (unless there are no written vaccination records).
- If more than one vaccine is overdue, it will often be appropriate to give all the vaccines at one visit. In such cases, the next visit should be scheduled for a time after the appropriate minimal interval (eg. normally one to two months between first and second dose, and second and third doses of DTPa-containing vaccines).
- Check rules on interchangeability of vaccines. Some vaccines and vaccine brands are not interchangeable.
- The optimal intervals recommended in the ASVS should be used once the child or adult is back to the recommended vaccine and dose number for their age.

**Table 1.9.1: Minimum intervals between vaccine doses – a guide for planning catch-up schedules**

Vaccine	Minimum interval between doses			
	Dose 1–2	Doses 2–3	Doses 3–4	Doses 4–5
DTPa (1) DTPa-IPV	1 month	1 month	6 months (6)	NA
DTPa-IPV-Hib DTPa-IPV/Hib	1 month	1 month	6 months (2)	NA
dT (ADT)	1 month	1 month	10 years	10 years (3)
DT (CDT) (4)	1 month	6 months	NA	NA
PRP-OMP Hib (PRP-OMP)- hepB	1 month	2 months (5)	NA	NA
HbOC	1 month	1 month	2 months (5)	NA
PRP-T	1 month	1 month	2 months (5)	NA
OPV	1 month	1 month	NA (6)	NA
IPV	1 month	1 month	NA (6)	NA
MMR	1 month	NA	NA	NA
Hepatitis B DTPa-hepB DTPa-hepB-IPV DTPa-hepB-IPV- Hib	1 month	2 months (7)	NA	NA

NA = not applicable

(1) If possible, the same brand of DTPa-containing vaccine should be used for the first 3 doses. If this is not possible, vaccination should be completed with the available brand. DTPa-IPV vaccines can be interchanged for the fourth (booster) dose. Administer all 4 doses of DTPa at the recommended intervals in children under 8 years of age.

(2) The minimum interval between the third and fourth doses is based on the DTPa requirements. Follow the recommendations below (5) for Hib vaccines.

(3) All people should be offered a dose of either dT or adult/adolescent formulation dTpa at 50 years of age unless a dose of either has been administered within 10 years.

(4) Use DTPa or CDT until the eighth birthday.

(5) Booster doses (third dose for PRP-OMP or fourth doses for HbOC or PRP-T) are given no earlier than the first birthday and at least 2 months after a previous dose. If the child is aged 15 months or more, only one dose of any brand of Hib vaccine is required.

(6) Preferably administer (fourth) booster dose as DTPa-IPV at 4 years of age if required.

(7) A one-month interval between doses 2 and 3 is appropriate, but only if a birth dose of hepatitis B vaccine was given; otherwise the minimum interval between doses 2 and 3 should be 2 months.

## Catch-up using acellular pertussis-containing vaccines and dT for children and adults

Monovalent pertussis vaccine is not available in Australia. Therefore any necessary pertussis catch-up vaccination can only be undertaken with either DTPa or DTPa-containing combination vaccines.

### Catch-up for DTPa vaccines in children under 8 years of age

If a child has received previous doses of DT, then DTPa or DTPa combinations can be used for catch-up *provided that* no more than 6 doses of diphtheria and tetanus toxoids are given in total. An excessive number of total doses may increase the risk of severe local reactions.

With the introduction of a 4-dose DTPa schedule on the ASVS:

- children under 8 years of age require 3 doses of DTPa, or DTPa-combination vaccines that do not contain hepatitis B, at a minimum interval of 4 weeks between doses to complete the primary series (see Table 1.9.1).
- if children under 8 years of age are given a DTPa-combination vaccine that contains hepatitis B for catch-up then there should be a minimum interval of 2 months between doses 2 and 3 if no birth dose of hepatitis B vaccine was given (Table 1.9.1).
- a fourth (booster) dose, usually given as DTPa-IPV, should be given at 4 years of age or 6 months after the third dose, whichever is later.

## Catch-up using dT (ADT) in those 8 years of age and over, and the use of adult/adolescent formulation dTpa vaccine for boosters

### Using dT (ADT) vaccine

The minimum age for using dT (ADT) or tetanus toxoid (TT) is 8 years of age. Those aged 8 years and older who do *not* have a documented history of a primary series (ie at least 3 doses of DTP, DTPa or DTPa-combination vaccine) should be given the missing doses as dT (ADT) with a minimum interval of one month between the doses.

Adults over 17 years of age who have only received 3 doses of DTP or dT-containing vaccines require a further two booster doses at a minimum interval of 10 years.

All people should be offered the routine booster dose of dT (ADT) vaccine at 50 years of age unless a dose has been administered within the previous 10 years. The adult/adolescent formulation dTpa (Boostrix) can be used at 50 years of age instead of ADT, provided that no prior doses of dTpa have been administered (see Part 3.16, 'Pertussis').

### Using adult/adolescent formulation dTpa vaccine for boosters

The adult/adolescent formulation dTpa (Boostrix) is available for use in Australia in those 8 years of age and older. However dTpa should not be used for the primary immunisation of adolescents/adults against pertussis, and therefore is not appropriate for catch-up immunisation.

A booster dose of adult/adolescent formulation dTpa on a single occasion is recommended for the following groups. Once a booster dose of dTpa has been given, subsequent booster doses to the same individual should not be administered even if he/she qualifies for another of these groups:

- routine use at 15 to 17 years of age, replacing the dose of ADT at 15 to 19 years of age in the ASVS;
- adults planning a pregnancy, or for both parents as soon as possible after delivery of an infant;
- adults working with young children, in particular health-care and child-care workers;
- adults at 50 years of age, as an alternative to the recommended ADT.

(For further details on these recommendations, and on adult/adolescent formulation dTpa see Part 3.16, 'Pertussis'). NB: Because data on the duration of immunity to pertussis following adult/adolescent formulation dTpa are limited, no recommendations on further doses of dTpa following an initial booster can be given at this time.

### Catch-up for Hib vaccines (for children under 5 years of age)

Hib vaccines should not be administered before 6 weeks of age. Hib vaccines are not necessary after the fifth birthday, except for patients with asplenia. Tables 1.9.2 and 1.9.3 should be read together when determining the correct schedule.

**Table 1.9.2: Recommended catch-up schedule when start of Hib vaccination has been delayed**

Vaccine	Trade name	Age now			
		3-6 months	7-11 months	12-14 months	15-59 months
PRP-OMP (1), (2)	PedvaxHIB	2 doses, 1-2 months apart	2 doses, 1-2 months apart <i>and</i> booster at least 12 months	1 dose, and booster at least 2 months after previous dose	Single dose (3) (4)
Hib (PRP-OMP)-hepB	Comvax	<i>and</i> booster at 12 months	booster at least 2 months later, at 12-15 months	2 months after previous dose (4)	
HbOC (3) PRP-T (3)	HibTITER Hiberix ActHIB	3 doses, 2 months apart, <i>and</i> booster at 12 months	2 doses, 2 months apart, <i>and</i> booster at 12 months and at least 2 months after previous dose	1 dose, and booster at 18 months	Single dose (3) (4)

(1) Extremely preterm babies (<28 weeks or <1500 grams) who commence catch-up Hib vaccination with PRP-OMP between 3-11 months of age require a 3-dose primary series (not 2 doses). The third dose should be given 1-2 months after the second dose of PRP-OMP. The booster dose should be given at 12 months as usual.

(2) Where possible, use the same brand of Hib vaccine throughout the primary course.

(3) When a booster is given after the age of 15 months, any of the 3 available conjugate Hib vaccines can be used.

(4) Depending on the combination used, further doses of hepatitis B or IPV are required.

**Table 1.9.3: Recommendations for Hib catch-up vaccination when doses have been delayed or missed**

Age at presentation (months)	Previous vaccination history	Recommended regimen
7 – 11	1 dose	1 dose of Hib vaccine at 7 to 11 months, and booster at least 2 months later, at 12-15 months (1)
7 – 11	2 doses of PRP-OMP	Give third dose of PRP-OMP at 12 months and at least 2 months after previous dose
7 – 14	2 doses of HbOC, PRP-T, unknown brand or mixture of vaccine brands	Give third dose 1 or more months after second dose, and fourth dose at 18 months (1)
12 – 14	1 dose before 12 months	2 additional doses of any registered Hib vaccine, separated by 2 months
15 – 59	Any incomplete schedule	A single dose of any Hib vaccine

(1) Where possible, the same brand of vaccine should be given for all doses.

### Catch-up for hepatitis B vaccines

The first dose of hepatitis B vaccine can be given as soon as possible after birth (within 24 hours) and should be given within 7 days of birth. The first dose should *not* be counted as a valid dose if given after 7 days and before 8 weeks of age. Following the birth dose, a total of 3 doses is required to achieve optimum protection in infants and young children. Provided that the birth dose was administered catch up doses of hepatitis B vaccine can be given one month apart. Otherwise, ensure each child has a minimum interval of 4 weeks between the first and second doses, and 2 months between the second and third doses (Table 1.9.1). A catch-up schedule may be completed with hepatitis B containing combination vaccines or monovalent vaccines.

Different brands of hepatitis B vaccine, including the hepatitis B component of multivalent vaccines such as DTPa-hepB and Hib (PRP-OMP)-hepB can be used interchangeably throughout the schedule.

If using two dose schedules (see Table 3.9.1), the minimum interval between doses of H-B-Vax II 10 µg for 11 to 15 year olds is 4 months, but is 6 months for 1 to 15 year olds when using Twinrix (720/20).

**Table 1.9.4: Hepatitis B vaccine catch-up schedule for adolescents aged 11 to 15 years**

Hepatitis B vaccine history	Recommended catch-up schedule*
No previous doses	Complete with 2 adult doses of H-B-Vax II, 4 to 6 months apart.
1 dose of paediatric hepatitis B vaccine (any brand)	Complete with 2 doses of paediatric hepatitis B vaccine (any brand). There should be a minimum interval of one month between the first and second doses, and 2 months between the second and third.
2 doses of paediatric hepatitis B vaccine (any brand)	Complete with 1 dose of paediatric hepatitis B vaccine (any brand) at least 2 months after the previous dose.
1 dose of adult formulation of adult H-B-Vax II	Complete with 1 dose of adult H-B-Vax II at 4 to 6 months after previous dose.
2 doses of adult H-B-Vax II BUT with interval of less than 4 months between doses	Complete with 1 adult dose of H-B-Vax II but at least 2 months after the previous dose.

\*Only one monovalent hepatitis B vaccine (H-B-Vax II 10 mg formulation) is approved for use in Australia in a 2-dose schedule and only for adolescents aged 11-15 years. Catch-up for people aged 16-19 years must be administered using a 3-dose paediatric formulation.

**Table 1.9.5: Hepatitis B vaccine catch-up schedule for adolescents aged 16 to 19 years\***

Hepatitis B vaccine history	Recommended catch-up schedule*
No previous doses	Start a 3-dose hepatitis B vaccine schedule using paediatric formulation (any brand). Administer at intervals of 0, 1 and 2-6 months
1 dose of paediatric hepatitis B vaccine (any brand)	Complete with 2 doses of paediatric hepatitis B vaccine (any brand). There should be a minimum interval of one month between the first and second doses and 2 months between the second and third doses.
2 doses of paediatric hepatitis B vaccine (any brand)	Complete with 1 dose of paediatric hepatitis B vaccine (any brand) at least 2 months after the previous dose.
1 dose of adult formulation of adult H-B-Vax II given before the 16th birthday	Give either 1 dose of adult H-B-Vax II at least 4 months after the previous dose, or two doses of any paediatric hepatitis B vaccine at the recommended minimum intervals.

\*Only one monovalent hepatitis B vaccine (H-B-Vax II 10 mg formulation) is approved for use in Australia in a 2-dose schedule and only for adolescents aged 11-15 years. Catch-up for people aged 16-19 years must be administered using a 3-dose paediatric formulation.

### **Catch-up for OPV or IPV**

If no previous documented doses of polio vaccine have been given, commence a catch-up program preferably using IPV. Give 3 doses of IPV at least 4 weeks apart. Although IPV and OPV can be used interchangeably, IPV is now the preferred vaccine for all doses for catch-up. If the child is less than 4 years of age, give the fourth booster dose at the fourth birthday preferably as DTPa-IPV and ensure that it is administered at least 4 weeks after the third dose of polio vaccine.

Any unimmunised person at increased risk of the disease (eg. those travelling to a country where wild polio disease is circulating) should be informed that it takes 2 to 3 months before vaccines produce adequate protection against all 3 polioviruses.

### **Catch-up for MMR vaccine**

If no previous documented doses have been given, catch-up for MMR consists of 2 doses, at least 4 weeks apart. If a single dose has been given more than a month earlier, give one dose.

### **Catch-up for meningococcal C conjugate vaccine**

Infants 2-3 months of age require 3 doses of meningococcal C conjugate vaccine, with a minimum interval of 4 weeks between doses. Infants aged 4–11 months require 2 doses with a minimum interval of 4 weeks between doses. Children aged 12 months and over, adolescents and adults, require a single dose only.

### **Catch-up for pneumococcal conjugate vaccine**

See Part 3.18 'Pneumococcal infections'.

### **Catch-up for varicella-zoster vaccine**

Children between 12 months and 13 years of age require one dose of varicella-zoster vaccine. Adolescents 14 years and over, and adults require 2 doses of varicella-zoster vaccine, administered one to 2 months apart.