MINISTRY OF HEALTH
SINGAPORE

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13 July 2020

All Registered Medical Practitioners

CHANGES TO THE NATIONAL CHILDHOOD IMMUNISATION SCHEDULE

1. This circular informs all medical practitioners on the changes to the National Childhood Immunisation Schedule (NCIS), made in consultation with the Ministry's Expert Committee on Immunisation (ECI). The changes are as follows:

a. **new** addition of varicella-containing vaccines;
b. schedule- or vaccine type-related **changes** to combination vaccines (5-in-1 and 6-in-1), poliovirus vaccines and human papillomavirus (HPV) vaccines; and
c. incorporation of **existing** recommendations for influenza and pneumococcal polysaccharide vaccines.

Addition of varicella-containing vaccines

2. From **1 November 2020**, varicella-containing vaccines will be newly added into the NCIS. Two vaccine types are available: i) combined measles, mumps, rubella and varicella (MMRV) vaccine; and ii) monovalent varicella vaccine. MMRV given as dose 1 may have a higher risk of febrile seizures in young children, compared with separate MMR and varicella vaccines. Hence, the recommendation is to use separate MMR and varicella vaccines for dose 1, and use combined MMRV vaccine for dose 2 (**Table 1**).

Table 1: Recommended type and schedule for MMR- and varicella-containing vaccines

Dose sequence	Before 1 Nov 2020	From 1 Nov 2020
Dose 1	MMR vaccine at 12 months	Separate **MMR** vaccine and **varicella** vaccine at 12 months *(no change in timing of MMR)*
Dose 2	MMR vaccine at 15-18 months	Combined **MMRV** vaccine at **15 months**

Inclusion of 6-in-1 combination vaccine

3. Under the current schedule, four doses of 5-in-1 combination vaccine (DTaP-IPV-Hib) are recommended at 3, 4, 5 and 18 months of age. From **1 November 2020**, 6-in-1 combination vaccine (DTaP-IPV-Hib-HepB) will replace 5-in-1 vaccine for the

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specified doses of the recommended vaccination schedule listed in **Table 2**. With these changes, the schedule for pneumococcal conjugate vaccine (PCV) dose 1 and 2 will be shifted to 4 and 6 months of age, respectively; there is no change to the timing of PCV booster dose at age 12 months. Dose 2 and 3 of HepB vaccine will be given as part of 6-in-1 vaccine.

Table 2: Recommended vaccination schedule for 5-in-1 and 6-in-1 vaccines and changes to the timing of PCV and HepB

Dose sequence	Before 1 Nov 2020	From 1 Nov 2020
Dose 1	5-in-1 vaccine at 3 months (PCV dose 1) (HepB dose 2 at 1 month)	**6-in-1** vaccine at **2 months** (HepB dose 2 given as part of 6-in-1)
Dose 2	5-in-1 vaccine at 4 months	5-in-1 vaccine at 4 months *(no change)* (**PCV dose 1 at 4 months**)
Dose 3	5-in-1 vaccine at 5 months (PCV dose 2) (HepB dose 3 at 5-6 months)	**6-in-1** vaccine at **6 months** (**PCV dose 2 at 6 months**) (HepB dose 3 given as part of 6-in-1)
Dose 4 (booster 1)	5-in-1 vaccine at 18 months	5-in-1 vaccine at 18 months *(no change)*

Infants born to HBsAg positive mothers

4. Infants born to HBsAg positive mothers should continue to be vaccinated using monovalent HepB vaccine for the 2nd dose at age one month (4 weeks), to reduce the risk of vertical transmission of hepatitis B infection (see **Table 3** for details). The 3rd dose of HepB vaccine at age 6 months can be given using 6-in-1 vaccine. With this schedule, the 1st dose of 5-in-1 vaccine can be timed at age 2 months.

Table 3: HepB vaccination schedule for infants born to HBsAg positive mothers

Dose sequence	Before 1 Nov 2020	From 1 Nov 2020
Dose 1 (birth dose)	Monovalent HepB vaccine at birth*	Monovalent HepB vaccine at birth* *(no change)*
Dose 2	Monovalent HepB vaccine at 1 month (4 weeks)	**Monovalent HepB** vaccine at **1 month (4 weeks)** ***(no change)*** (**5-in-1** vaccine at **2 months**)
Dose 3	Monovalent HepB vaccine at 5-6 months	HepB as part of **6-in-1** vaccine at **6 months**

** Infants born to HBsAg positive mothers should receive HepB vaccine and HepB immunoglobulin (HBIG)* ***within 12 hours of birth (or ASAP)***

Poliovirus vaccine (5th dose)

5. In the current schedule, bivalent oral polio vaccine (bOPV) is used for the 5th dose of polio vaccine for children age 10-11 years (Primary 5), given as part of Health Promotion Board's (HPB) school-based vaccination programme. With the current supplier for Singapore having discontinued the manufacturing of bOPV and the eventual global cessation of OPV-use in the future, the 5th dose will be replaced with an IPV-containing vaccine from January 2021 (**Table 4**).

Table 4: Changes to the 5th dose of poliovirus vaccine

Dose sequence	Up to December 2020	From January 2021
Dose 5 (2nd booster)	bOPV* at 10-11 years (Primary 5) (Tdap as dose 5)	Combined **Tdap-IPV**† vaccine at 10-11 years (Primary 5)

** Healthcare institutions and clinics may continue to use bOPV for other purposes while stocks are available.*
† Separate IPV and Tdap vaccines may be used if either of the component is not indicated.

HPV vaccination schedule

6. HPV vaccination is recommended in the NCIS and the National Adult Immunisation Schedule (NAIS) for females age 9-26 years for the prevention of cervical cancer. In April 2019, the national school-based HPV vaccination programme was rolled out for Secondary 1 female students (**Table 5**). The routine schedule for the school-based programme will be reflected in the NCIS. HPV vaccination will continue to be recommended in both NCIS and NAIS as a catch-up for females up to and through 26 years of age.

Table 5: HPV vaccination schedule with the introduction of school-based programme

School-based programme*	Settings outside of school-based programme
Dose 1: HPV2 at 12-13 years (Secondary 1) Dose 2: HPV2 at 13-14 years (Secondary 2) *Dose 3 is only recommended if dose 1 was given at 15 years of age or older.*	Outside of school-based programme, HPV vaccination continues to be recommended in NCIS and NAIS as a catch-up with age-appropriate doses for females up to and through 26 years of age†.

** HPB is also conducting a one-time catch-up HPV vaccination programme for the 2019 cohorts of female students in Secondary 2 to 4 (and Secondary 5 where applicable). More information on school-based programme is available on HealthHub website under Programme | Student immunisation and screening services (https://healthhub.sg/programmes).*

† HPV vaccine can be given as early as 9 years of age.

Incorporation of existing recommendations for influenza and pneumococcal polysaccharide vaccines

7. Recommendations for influenza and pneumococcal polysaccharide vaccines among children in high-risk groups currently exist as standalone recommendations. From **1 November 2020**, these recommendations will be incorporated into the NCIS. Please refer to **Annex A** for full details of the recommendations for influenza and pneumococcal polysaccharide vaccines among high-risk groups.

SUBSIDY FRAMEWORK FOR VACCINATIONS IN THE NCIS

8. Currently, Singaporean children receive full subsidies for existing NCIS vaccinations at polyclinics, except for PCV and HPV. From **1 November 2020**, Singaporean children will receive full subsidy for all NCIS vaccinations where the vaccine utilised is found on the Subsidised Vaccine List (SVL). These subsidies will be available at polyclinics and will be extended to all CHAS GP clinics. Please refer to MOH FCM No. 41/2020 ("Extension of Subsidies for Nationally Recommended Vaccinations and Childhood Developmental Screening (CDS) at All Community Health Assist Scheme (CHAS) GP Clinics") for more information.

USE OF MEDISAVE

9. The use of MediSave is already allowed for all vaccinations in the NCIS today. From **1 November 2020**, this will include the varicella-containing and Tdap-IPV vaccines that will be added to the NCIS. All claims for NCIS-related vaccinations administered in outpatient settings should be made under the MediSave500 scheme. The prevailing MediSave rules will continue to apply to any co-payments after the application of subsidies. As a reminder, MediSave cannot be used for vaccinations administered in the inpatient setting, other than for those administered to newborns as part of the delivery episode.

SYNCHRONISATION OF NCIS WITH CHILDHOOD DEVELOPMENTAL SCREENING (CDS) GUIDANCE

10. To facilitate compliance to scheduled child preventive health visits and for greater convenience for parents, the NCIS has been synchronised, where possible, with the upcoming clinical guidance to medical practitioners on Childhood Developmental Screening (CDS). A total of four CDS touchpoints will be aligned with NCIS vaccination-related visits at 4, 6, 12 and 18 months of age. Please refer to MOH Circular 183/2020 for more information on the recommended schedule for CDS.

UPDATED NATIONAL CHILDHOOD IMMUNISATION SCHEDULE

11. These changes to the NCIS will take effect from **1 November 2020** (unless otherwise stated), in conjunction with the extension of the subsidy framework to all vaccinations under the NCIS. The updated NCIS with the changes incorporated is available in **Annex A**. Detailed vaccine-specific information, types, doses and recommended groups will also be made available on MOH website closer to the implementation date.

12. A list of Frequently Asked Questions (FAQs) for medical practitioners is also attached with this Circular (see **Annex B**). The FAQs for the general public will be available at the MOH website by **1 November 2020**.

13. For clarification of this circular, please email moh_info@moh.gov.sg.

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ANNEX A

National Childhood Immunisation Schedule (NCIS)

(from birth to age 17 years, effective from 1 November 2020)

Vaccine	Birth	2 months	4 Months	6 months	12 months	15 months	18 months	2-4 years	5-9 years	10-11 years	12-13 years	13-14 years	15-17 years
Bacillus Calmette-Guérin (BCG)	D1												
Hepatitis B (HepB)	D1	D2		D3									
Diphtheria, tetanus and acellular pertussis (paediatric) (DTaP)		D1	D2	D3			B1						
Tetanus, reduced diphtheria and acellular pertussis (Tdap)										B2			
Inactivated poliovirus (IPV)		D1	D2	D3			B1			B2			
***Haemophilus influenzae* type b (Hib)**		D1	D2	D3			B1						
Pneumococcal conjugate (PCV10 or PCV13)			D1	D2	B1								
Pneumococcal polysaccharide (PPSV23)								One or two doses for children and adolescents age **2-17 years with specific medical condition or indication**.					
Measles, mumps and rubella (MMR)					D1	D2							
Varicella (VAR)					D1	D2							
Human papillomavirus (HPV2 or HPV4)											D1 **(Females)**	D2 **(Females)**	
Influenza (INF)				Annual vaccination or per season for <u>all children</u> age **6 months to <5 years (6-59 months)**.					Annual vaccination or per season for children and adolescents age **5-17 years with specific medical condition or indication**.				

Recommended ages and doses for all children

Recommended for persons with specific medical condition or indication

FOOTNOTES:

- **D1, D2, D3:** Dose 1, dose 2, dose 3
- **B1, B2:** Booster 1, booster 2
- **10-11, 12-13, 13-14 years:** Primary 5, Secondary 1, Secondary 2 (Tdap, IPV, HPV (for females) and MMR (as catch-up) vaccines are provided as part of Health Promotion Board's school-based vaccination programme)
- **HepB**: Doses 2 and 3 are recommended to be given as part of the 6-in-1 vaccine at 2 and 6 months, respectively
- **MMR**: Only the dose 2 is recommended to be given as part of the MMRV vaccine

RECOMMENDED VACCINE TYPES, DOSES AND GROUPS IN THE NCIS		
Vaccine	**Recommendations**	**Additional information**
HepB	**Recommended vaccine types and doses** • Dose 1: **Monovalent HepB** (birth dose, within 24 hours) • Dose 2: **6-in-1** vaccine at 2 months • Dose 3: **6-in-1** vaccine at 6 months	**Infants born to HBsAg +ve mothers** • Dose 1: **Monovalent HepB** (and HepB immunoglobulin (HBIG) as a birth dose within 12 hours or ASAP) • Dose 2: **Monovalent HepB** at **1 month** • (5-in-1 vaccine recommended at 2 months) • Dose 3: 6-in-1 vaccine at 6 months
5-in-1 (DTaP-IPV-Hib) **6-in-1 (DTaP-IPV-Hib-HepB)** **Tdap**	**Recommended vaccine types and doses** • Dose 1: **6-in-1** vaccine at 2 months • Dose 2: **5-in-1** vaccine at 4 months • Dose 3: **6-in-1** vaccine at 6 months • Dose 4: **5-in-1** vaccine at 18 months (booster 1) • Dose 5: **Tdap-IPV** at 10-11 years (booster 2)	• Tdap can be used instead of Tdap-IPV if IPV is not indicated
Inactivated poliovirus (IPV)	**Recommended vaccine types and doses** • Dose 1, 2, 3, 4: **5-in-1** or **6-in-1** vaccines (as per schedule for DTaP-containing vaccines) • Dose 5: **Tdap-IPV** (booster 2)	• IPV can be used instead of Tdap-IPV if Tdap is not indicated
Pneumococcal conjugate (PCV)	• PCV is recommended for all children age <5 years and persons age 2-17 years who are at increased risk of developing severe pneumococcal disease. Children who did not receive PCV as per routine schedule are recommended to receive age- or indication-appropriate doses. • Available vaccine types: PCV10 (Synflorix) and PCV13 (Prevenar 13). Only PCV13 is indicated beyond age 5 years.	**High-risk groups recommended for PCV13** **Persons age 2-17 years with** • Cochlear implant or cerebrospinal fluid leak • Anatomic or functional asplenia (including conditions such as homozygous sickle cell disease and coeliac syndrome that may lead to splenic dysfunction) • immunosuppression (including immunosuppression caused by medications, HIV or other immunodeficiencies)
Pneumococcal polysaccharide (PPSV23)	• PPSV23 is recommended for persons age 2-17 years at increased risk of developing severe pneumococcal disease. • One or two doses are recommended depending on high-risk condition. • If both PCV13 and PPSV23 are indicated, PCV13 should be given first, and PPSV23 administered at the appropriate interval later.	**High-risk groups recommended for PPSV23** **Persons age 2-17 years with** • Chronic pulmonary, cardiovascular, renal or liver disease, or diabetes mellitus • Cochlear implant or cerebrospinal fluid leak • Anatomic or functional asplenia (including conditions such as homozygous sickle cell disease and coeliac syndrome that may lead to splenic dysfunction) • immunosuppression (including immunosuppression caused by medications, HIV or other immunodeficiencies)

RECOMMENDED VACCINE TYPES, DOSES AND GROUPS IN THE NCIS		
Vaccine	**Recommendations**	**Additional information**
MMR and Varicella (VAR)	**Recommended vaccine types and doses** Dose 1: Separate **MMR** and **VAR** at 12 months Dose 2: **Combined MMRV** at 15 months **Catch-up MMR** • 2-dose series at least 4 weeks apart **Catch-up Varicella** Age <13 years • 2-dose series 3 months apart Age 13-17 years • 2-dose series 4-8 weeks apart	**Vaccine type:** • Separate MMR and VAR are recommended for dose 1. The use of MMRV as dose 1 in children age 12-47 months is associated with higher risk of febrile seizures, compared with separate MMR and VAR. • If MMRV is preferred for dose 1 in children age 12-47 months, appropriate clinical advice should be given to the parent and consent obtained. • MMRV is recommended as a catch-up for dose 1 in children age 48 months to 12 years and dose 2 at any age (i.e. 15 months to 12 years). • The maximum age for MMRV is 12 years. Separate MMR and/or VAR may be used as indicated for persons age 13-17 years.
HPV	**Recommended vaccine types** • HPV2 (Cervarix) and HPV4 (Gardasil) **Recommended doses for school-based programme** 2-dose series for secondary school female students • Dose 1: HPV2 at 12-13 years (Secondary 1) • Dose 2: HPV2 at 13-14 years (Secondary 2)	**Recommended doses for settings outside of school-based programme** **Females age 9 -14 years** • HPV2/HPV4: 2-dose series at 0, 6 months **Females age 15 -17 years** • HPV2: 3-dose series at 0, 1, 6 months • HPV4: 3-dose series at 0, 2, 6 months
Influenza (INF)	• Seasonal influenza vaccine is recommended for persons age 6 months to 17 years who are at increased risk of influenza-related complication. • Vaccination is recommended annually or per season, depending on the prevailing recommendations for that year. • Influvac Tetra and SKYCellflu are indicated from age 3 years. **Recommended doses** **Age 6 months to 8 years** • 2-dose series 4 weeks apart for children receiving influenza vaccination for the first time • 1 dose for all other children* **Age 9-17 years** • 1 dose* ** Annually or per season as recommended*	**High-risk groups recommended for seasonal influenza vaccine** **Children age 6 months to <5 years (6-59 months)** • Recommended for all children in this age range **Persons age 5-17 years** • who have chronic disorders of the pulmonary or cardiovascular systems, including asthma • who have required medical follow-up or hospitalisation due to chronic metabolic diseases (including diabetes mellitus), renal, neurologic, hepatic, or haematologic disorders, or immunosuppression (including immunosuppression caused by medications, HIV or other immunodeficiencies) • who are receiving long term aspirin therapy and therefore might be at risk for developing Reye syndrome after influenza infection

ANNEX B

Frequently Asked Questions (FAQs) on changes to the National Childhood Immunisation Schedule (NCIS) for medical practitioners (June 2020)

Varicella-containing vaccines

1. What are the changes to the vaccination schedule with the inclusion of varicella-containing vaccines?

From **1 November 2020**, varicella vaccination will be incorporated into the NCIS, which may be administered as a standalone varicella vaccine or a combined measles, mumps, rubella and varicella (MMRV) vaccine.

2. Why is the standalone varicella vaccine recommended for dose 1, as opposed to MMRV? Can MMRV be given as dose 1?

The use of MMRV when given as dose 1 at age 12-47 months may have a higher risk febrile seizures, as compared with separate MMR and varicella vaccines. Hence, separate MMR and varicella vaccines are recommended for dose 1 at age 12 months.

If MMRV is preferred for dose 1, doctors should provide appropriate clinical advice and obtain consent from the parent on the increased risk of febrile seizure.

3. Is there a higher risk of febrile seizures when MMRV is given as dose 2, or as dose 1 in older children?

Pre- and post-licensure studies do not suggest an increased risk of febrile seizure when MMRV was given as dose 2 at any age (i.e. 15 months to 12 years). MMRV is also recommended when given as dose 1 at age 48 months or older.

4. Is varicella vaccination recommended for older children who have not previously been vaccinated or infected?

Older children who have not previously been vaccinated against varicella or had infection are recommended to receive varicella-containing vaccine. Please refer to **Annex A** for more details. The extension of subsidies and MediSave use also applies to older children as above.

Combination vaccines

5. What are the types of DTaP-containing combination vaccines in the NCIS? Can I use 6-in-1 vaccine for all of the first three doses?

Both the 5-in-1 (DTaP-IPV-Hib) and 6-in-1 (DTaP-IPV-Hib-HepB) combination vaccines are in the NCIS, as per recommended sequence in Table 2 of the circular and in **Annex A**.

Doctors may choose to give 6-in-1 vaccine for dose 2 at age 4 months, in addition to dose 1 (age 2 months) and dose 3 (age 6 months). However, only two doses of 6-in-

1 vaccine will be subsidised in the NCIS from **1 November 2020**. MediSave-use is allowed for the additional dose of 6-in-1 vaccine. Regardless of the preference on the dosing schedule for 6-in-1 vaccine, dose 1 of HepB vaccine should be given as a birth dose using the monovalent vaccine.

6. Is it mandatory to use combination vaccines as recommended in the NCIS? Can I use separate component vaccines if necessary?

The 1 November 2020 changes to the NCIS include addition of new combination vaccines such as 6-in-1, MMRV and Tdap-IPV. The recommendations on the use of combination vaccines and the schedule changes have been made in consultation with the Ministry's Expert Committee on Immunisation; it reduces the number of injections and clinic visits, which provides convenience to parents and encourages compliance to the schedule.

However, there may be instances where separate vaccines are preferred by parents or are necessary, as in the case of HepB vaccination for children born to HBsAg positive mothers. Other scenarios may involve stock-out situation or when part of the component is not indicated.

Poliovirus vaccine

7. What are the changes to poliovirus vaccination in the NCIS?

Currently, bivalent oral polio vaccine (bOPV) is used for the 5th dose (2nd booster) of polio vaccine for children age 10-11 years (Primary 5), provided as part of Health Promotion Board's school-based vaccination programme. From January 2021, this dose will be replaced with an inactivated polio vaccine (IPV) in the form of combined Tdap-IPV. With this change, the polio vaccination schedule in the NCIS will become a full-IPV schedule.

8. What if an individual is only indicated for IPV?

If an individual is indicated for IPV but not Tdap, a standalone IPV may be used. However, IPV is not on the Subsidised Vaccine List (SVL) and hence not subsidised. MediSave-use will continue to be allowed for IPV.

9. Can I continue using bOPV in my clinic?

The current supplier for bOPV has discontinued the manufacturing of bOPV. If you are using bOPV for purposes outside of the NCIS, e.g. for travellers, you can continue using the vaccine while stocks are available

Human papillomavirus vaccine

10. Why was HPV vaccination introduced as a school-based programme? Is HPV vaccination still recommended for females up to age 26 years?

HPV vaccination was included in the NCIS in November 2010 for females age 9-26 years for prevention against cervical cancer, and incorporated into the National Adult Immunisation Schedule (NAIS) when it was established in November 2017. HPV

vaccination was rolled-out as a school-based programme in April 2019 to increase access and improve vaccine uptake among female students. Outside of the school-based programme, HPV vaccination continues to be recommended as a catch-up for females up to and through 26 years of age.

11. What are the HPV vaccines available in Singapore and which HPV vaccine is subsidised and/or MediSave use allowed?

There are three HPV vaccines available in Singapore – Cervarix (HPV2), Gardasil (HPV4), and Gardasil 9 (HPV9). Since 2010, HPV2 and HPV4 have been nationally recommended for females age 9-26 years for prevention against cervical cancer.

From **1 November 2020**, subsidies will be extended to HPV2 at polyclinics and CHAS GP clinics as recommended in the NCIS and NAIS. MediSave use will continue to be allowed for both HPV2 and HPV4 as per NCIS/NAIS recommendations.

12. Why is HPV4 or HPV9 not subsidised? Why is MediSave use not allowed for HPV9?

The vaccine manufacturer did not submit a proposal for consideration for HPV4 to be included in the Subsidised Vaccine List. MediSave can continue to be used to pay for HPV4.

For HPV9, at the price proposed by the manufacturer, the vaccine is not cost-effective compared to alternative HPV vaccines. Hence, HPV9 is not included in the nationally-recommended schedules and not eligible for subsidy or MediSave-use.

Influenza and pneumococcal polysaccharide vaccines

13. Who are recommended to receive pneumococcal polysaccharide vaccine (PPSV23) in addition to pneumococcal conjugate vaccine (PCV)?

PPSV23 is recommended in the NCIS for children age 2-17 years with chronic or rare medical conditions who are at increased risk of developing severe pneumococcal disease. Detailed information on the high-risk groups recommended for PPSV23 is available in **Annex A**.

14. Who are recommended to receive seasonal influenza vaccine?

Seasonal influenza vaccine is recommended in the NCIS for children age 6 months to 17 years who are at increased risk of developing influenza-related complications. Detailed information on the high-risk groups recommended for influenza vaccine is available in **Annex A**.

15. What is the financing framework for influenza and pneumococcal polysaccharide vaccinations?

MediSave use is already allowed today for persons in high-risk groups recommended for influenza and pneumococcal polysaccharide vaccines. From **1 November 2020**, Singaporean children in high-risk groups will receive full subsidy for influenza and pneumococcal polysaccharide vaccinations where the vaccine utilised is found on the Subsidised Vaccine List (SVL).