OVERVIEW OF THE IMMUNISATION PROGRAMMES IN SINGAPORE

The National Childhood Immunisation Schedule (NCIS) in Singapore comprises childhood vaccinations recommended as the standard of care for protection against vaccine preventable diseases that are of significant healthcare burden to Singapore or would be so without these vaccinations. In consultation with the Expert Committee on Immunisation (ECI), MOH regularly reviews vaccination policies and inclusion of vaccines into the schedule, taking into consideration local disease burden, vaccine safety, efficacy and cost effectiveness of vaccines. This ensures that the national recommendations for childhood vaccinations are up to date.

The NCIS covers vaccinations against tuberculosis (BCG); hepatitis B (HepB); diphtheria, pertussis and tetanus (DTaP/Tdap); poliomyelitis (IPV); *Haemophilus influenzae* type b (Hib); measles, mumps and rubella (MMR); pneumococcal disease (PCV); human papillomavirus (HPV); varicella (VAR) and influenza (INF) (Table 7.1). Vaccinations against diphtheria and measles are compulsory under the Infectious Diseases Act. In 2019 and 2020, the following changes were made to the NCIS: i) new addition of varicella-containing vaccines (monovalent and MMRV); ii) schedule- or vaccine type-changes to 5-in-1 (DTaP-IPV-Hib) and 6-in-1 (DTaP-IPV-Hib-HepB) combination vaccines, poliovirus and HPV vaccines; and iii) incorporation of existing recommendations for influenza and pneumococcal polysaccharide vaccines.

BCG vaccination began in 1957 as part of the National Childhood Immunisation Programme (NCIP) and newborns were vaccinated at birth. Although parental consent is required, acceptance has been high and close to 100% of newborns have been vaccinated in the last decade (Table 7.3). The introduction of BCG vaccination has contributed significantly to the elimination of TB meningitis in young children. Since July 2001, guidelines have been revised to discontinue BCG in Mantoux non-reactors as well as BCG booster doses, following the review of studies that did not show evidence of the effectiveness of repeated BCG vaccination in protecting against TB. The BCG dose at birth continues to be recommended for newborns for protection against TB meningitis and other serious forms of childhood TB.

Diphtheria vaccination was introduced in 1938, initially as a monovalent vaccine and later formulated together with pertussis and tetanus vaccines from 1959. Over the years, numerous changes were made to the diphtheria-tetanus-pertussis vaccinations following reviews of the latest evidence or vaccine availability, including the number of booster doses, switch in vaccine types and changes to the recommended age in the schedule. In June 2013, diphtheria, tetanus and acellular pertussis (DTaP) vaccine recommended for infants and pre-school children at three, four, five and 18 months of age was replaced with 5-in-1 vaccine containing IPV and Hib in addition to DTaP. In November 2020, 6-in-1 vaccine had replaced 5-in-1 vaccine for the first and third dose of the recommended schedule. In tandem with this change, the schedule for the first three doses was changed from three, four, and five months to two, four and six months of age; the fourth dose remained unchanged at 18 months of age. For the fifth (the last dose) of diphtheria-containing vaccine, Tdap vaccine continued to be recommended at 10-11 years of age (primary five). Since 2021, Tdap has been given in the form of Tdap-IPV vaccine (Table 7.1).

Another vaccine scheduled at the same timing as the diphtheria-containing vaccine is the polio vaccine. Oral polio vaccine (OPV) was first used on a mass scale in 1958 to control the 1958-1959 epidemic caused by poliovirus type one. Monovalent Sabin type two OPV was administered to 200,000 children aged between three months and 10 years on a voluntary basis in an attempt to abort the raging epidemic of 415 paralytic cases. Following another vaccination campaign in 1962, OPV was incorporated as part of routine immunisation programme in March 1963. Over the years, a number of changes were made to the schedule and vaccine types. Notable changes to polio vaccinations in the NCIS in the last decade include: i) the switch from a six-dose OPV schedule to a five-dose IPV-OPV schedule comprising four doses at three, four, five and 18 months of age using IPV-containing vaccine, and one OPV dose at 10-11 years of age (primary five) in June 2013 (the OPV dose at age six to seven years (primary one) was discontinued); ii) the replacement of trivalent OPV (tOPV, containing poliovirus types one, two and three) for the fifth dose with bivalent OPV (bOPV, containing poliovirus types one and three) in 2016 to meet the World Health Organization's (WHO) requirement to switch from tOPV to bOPV globally; and iii) replacement of bOPV for the fifth dose with an IPV-containing vaccine (Tdap-IPV) in 2021. With this latest change, IPV is recommended for all doses in the NCIS.

Hepatitis B vaccination for infants born to mothers who were hepatitis B carriers was incorporated into the NCIS in October 1985. Thereafter, it was extended to all newborns in September 1987. Three doses were recommended using monovalent HepB vaccine at birth, one month and five to six months of age. To protect those born before 1987 against hepatitis B, a four-year catch-up vaccination programme was implemented for students in secondary schools and tertiary institutions as well as full-time national servicemen (NSFs) from 2001 to 2004. With the introduction of the 6-in-1 vaccine in November 2020, the monovalent HepB vaccine for the second and third dose was replaced with the 6-in-1 vaccine. The timings for these doses were also changed to two months and six months of age, respectively. For infants born to mothers who were hepatitis B carriers, monovalent HepB vaccine continues to be recommended for the second dose and at age one month to reduce the risk of vertical transmission of hepatitis B infection.

Hib vaccination was introduced into the NCIS in June 2013 to reduce the risk of invasive disease such as meningitis and sepsis that may lead to long-term disabilities or death. A four-dose schedule was recommended using the 5-in-1 vaccine at three, four, and five months of age, and a single booster dose at 18 months of age. The timings for the first three doses were changed to two, four, six months of age in November 2020 with the 6-in-1 replacing the 5-in-1 vaccine for the dose at two and six months of age.

First introduced into the NCIS in October 1976, the monovalent measles vaccine given to one-year-old children was replaced by the trivalent MMR vaccine in January 1990. From January 1998, a second dose of MMR vaccine was introduced into the programme for primary six students (11-12 years of age). This replaced the monovalent rubella vaccine earlier introduced for primary six female students in November 1976 (extended to males in 1982). The timing of second MMR dose was subsequently brought forward to primary one (six to seven years of age) in 2008. The MMR vaccination schedule was further reviewed and the revised schedule was implemented in December 2011. With these changes, the two doses of MMR vaccine were brought forward to 12 months and 15-18 months of age. The timing of the second dose was changed from 15-18 months to 15 months in November 2020 with the replacement of MMR with MMRV. The Health Promotion Board (HPB) continues to provide MMR vaccination as a catch-up for primary one students (six to seven years of age) who did not receive the second dose in their pre-school years.

Varicella vaccination was introduced into the NCIS in November 2020 to decrease the incidence of the disease and its complications. The first dose at 12 months of age is recommended using a monovalent formulation, i.e. separate from MMR vaccine but both vaccines can be given at the same visit. The second dose is recommended at 15 months using the combined MMR and varicella (MMRV) vaccine.

Pneumococcal conjugate vaccine (PCV) was incorporated into the NCIS in November 2009 to reduce the morbidity and mortality of invasive pneumococcal disease (IPD) in Singapore. At the point of introduction, a three-dose schedule was recommended with two doses for the primary series at age three and five months, and one booster dose at age 12 months (2+1 schedule). As part of the schedule changes in November 2020, the timings for the first two doses were changed to four and six months of age with no change to the timing of booster dose. Another change involved the incorporation of existing recommendations for the 23-valent pneumococcal polysaccharide vaccine (PPSV23), for children aged two to 17 years with specific medical condition or indication and therefore at increased risk of developing severe pneumococcal disease. These recommendations hitherto existed as standalone recommendations and have been incorporated into the NCIS since November 2020.

Similar to PPSV23, the recommendations for influenza vaccination for children in high-risk groups had existed as standalone recommendations prior to November 2020. Henceforth, the recommendations for influenza vaccination in children, including all children aged six months to <5 years (i.e. six to 59 months) and those aged five to 17 years with specific medical condition or indication have been incorporated into the NCIS.

Human papillomavirus (HPV) vaccination was first introduced into the NCIS in November 2010 and recommended for females aged 9 to 26 years old for the prevention of cervical cancer. The HPV vaccination for adult females (aged 18 to 26 years) was subsumed into the National Adult Immunisation Schedule (NAIS) upon its establishment in 2017 together with other recommended vaccination for adults.

In April 2019, HPV vaccination was rolled out as a national school-based programme for secondary one female students. The routine schedule for the school-based programme consists of two doses, with the first dose at 12-13 years of age (secondary one) and the second dose at 13-14 years of age (secondary two); the third dose is recommended only if the first dose was given at 15 years of age or older. Outside of the school-based programme, HPV vaccination continues to be recommended in both NCIS and NAIS as a catch-up with age-appropriate doses for females up to and through 26 years of age.

Table 7.1
Singapore's National Childhood Immunisation Schedule (NCIS), 2024
(from birth to age 17 years)

Vaccine	Birth	2 mths	4 mths	6 mths	12 mths	15 mths	18 mths	2-4 yrs	5-9 yrs	10-11 yrs	12-13 yrs	13-14 yrs	15-17 yrs
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 all children 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	**10-11 years**:	Primary 5
B1, B2:	Booster 1, booster 2	**12-13 years**:	Secondary 1
-	-	**13-14 years**:	Secondary 2

- **HepB:** recommended vaccine types and doses
  - Dose 1: Monovalent HepB (birth dose, within 24 hours)
  - Dose 2: 6-in-1 vaccine at 2 months (DTaP-IPV-Hib-HepB)
  - Dose 3: 6-in-1 vaccine at 6 months
- **5-in-1 (DTaP-IPV-Hib), 6-in-1 and Tdap:** recommended vaccine type 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)
- **MMR and varicella:** recommended vaccine type and doses
  - Dose 1: Separate **MMR** and **VAR** at 12 months
  - Dose 2: Combined **MMRV** at 15 months
- **Tdap, IPV, HPV (for females)** and **MMR (as catch-up)** vaccines are provided as part of Health Promotion Board's school-based vaccination programme

The National Adult Immunisation Schedule (NAIS) was established in November 2017 to provide guidance on vaccines recommended for persons aged 18 years and above and increase awareness of the importance of adult vaccinations for personal protection (Table 7.2). The NAIS was developed based on international best practices and the recommendations of the ECI. The considerations include:

(a) local disease burden;
(b) age, pre-existing medical conditions, vaccination history; and
(c) vaccine safety, clinical efficacy and cost effectiveness of the vaccines in preventing infections among susceptible individuals and reducing complications, morbidity and mortality.

The vaccines in the NAIS protect against 11 diseases: influenza, pneumococcal disease, human papillomavirus, tetanus, diphtheria, pertussis, measles, mumps, rubella, hepatitis B, and varicella (chickenpox). The recommendations in the NAIS are categorised as follows: i) adults who meet age requirement; ii) adults with specific medical condition(s) or indication(s); and iii) adults who have not been previously vaccinated, or lack evidence of past infection or immunity.

Table 7.2
Singapore's National Adult Immunisation Schedule (NAIS), 2024
(for age 18 years or older)

Vaccine	18-26 years	27-64 years	≥ 65 years
Influenza (INF)	1 dose annually or per season		1 dose annually or per season
Pneumococcal conjugate (PCV13)	1 dose		
Pneumococcal polysaccharide (PPSV23)	1 or 2 doses (depending on indication)		1 dose
Tetanus, reduced diphtheria and acellular pertussis (Tdap)	1 dose during each pregnancy		
Human papillomavirus (HPV2 or HPV4)	3 doses (Females)		
Hepatitis B (HepB)	3 doses		
Measles, mumps and rubella (MMR)	2 doses		
Varicella (VAR)	2 doses		

Recommended for adults who meet age requirement

Recommended for adults with specific medical condition or indication

Recommended for adults who have not been previously vaccinated, or lack evidence of past infection or immunity

IMPLEMENTATION OF THE IMMUNISATION PROGRAMMES

The NCIS and NAIS are implemented through the following:

(a) Public and private hospitals with neonatal immunisation services;
(b) National Healthcare Group Polyclinics (NHGP), National University Polyclinics (NUP) and SingHealth Polyclinics (SHP);
(c) Private general practitioner (GP) clinics;
(d) Paediatric clinics in the private sector, and at KK Women's and Children's Hospital (KKH) and National University Hospital (NUH); and
(e) Youth Preventive Services Division (YPSD), Health Promotion Board (HPB).

Vaccinations of newborns for birth doses are carried out at public and private hospitals with neonatal immunisation services. Vaccinations of infants and children are carried out at polyclinics, private GP clinics and paediatric clinics in the private sector and public hospitals. The target population is based on notification of births obtained from the Registry of Births and Deaths.

Vaccination of primary and secondary school children is mainly carried out by HPB, with the rest of the public and private healthcare sectors playing a complementary role. The target population is based on student population data from the Ministry of Education.

Vaccination for adults are offered by GP clinics, polyclinics, and some specialist clinics in public and private sectors.

Notification of vaccination

The data utilised in this report was based on the following:

(a) Notification of all vaccinations carried out in infants, children and adults by healthcare institutions in both the public and private healthcare sectors to the National Immunisation Registry (NIR). Notification of diphtheria and measles vaccinations are compulsory by law.
(b) Vaccination records maintained by YPSD for vaccinations administered in schools and at the Immunisation Clinic, Student Health Centre, HPB.

All data are updated annually, including figures for the preceding years.

Vaccination against TB

In 2024, BCG vaccination was given to 28,809 infants, with a coverage of 95.0% (30,846 infants were vaccinated with 98.3% coverage in 2023) (Table 7.3).

Table 7.3
BCG vaccination of infants, 2015-2024

Year	Public hospitals (%)	Polyclinics(%)	Private clinics & hospitals (%)	Total	Coverage for children at 2 years of age* (%)
2015	12,529 (40.4)	54 (0.2)	18,413 (59.4)	30,996	99.4
2016	14,075 (41.6)	74 (0.2)	19,671 (58.2)	33,820	99.3
2017	14,347 (42.9)	66 (0.2)	19,020 (56.9)	33,433	99.0
2018	14,880 (44.8)	4 (0)	18,317 (55.2)	33,201	99.0
2019	15,054 (47.4)	1 (0)	16,681 (52.6)	31,736	98.9
2020	15,412 (49.2)	9 (0)	15,900 (50.8)	31,321	98.5
2021	15,129 (47.4)	1 (0)	16,784 (52.6)	31,914	98.3
2022	15,365 (50.4)	1 (0)	15,137 (49.6)	30,503	98.2
2023	15,857 (51.4)	1 (0)	14,988 (48.6)	30,846	98.3
2024	15,026 (52.2)	7 (0)	13,776 (47.8)	28,809	95.0

* Coverage refers to vaccination given to Singaporean and Singapore Permanent Resident (PR) children.

Vaccination against diphtheria, pertussis and tetanus

Infants and pre-school children

In 2024, the primary course of vaccination was given to 29,332 children, with a coverage of 96.7% (30,673 children were vaccinated with 97.7% coverage in 2023). The first booster dose was given to 27,020 children by two years of age with a coverage of 89.1% in 2024 (28,175 children were vaccinated with 89.8% coverage in 2023) (Table 7.4).

Table 7.4
Diphtheria, pertussis and tetanus vaccination (DTaP) of infants and pre-school children, 2015-2024

Year	Coverage for children at 2 years of age*			
	Completed primary course		1st booster dose given	
	No.	Coverage (%)	No.	Coverage (%)
2015	30,382	97.4	28,628	91.8
2016	33,280	97.7	31,526	92.6
2017	32,940	97.5	31,342	92.8
2018	32,818	97.8	30,884	92.1
2019	31,208	97.2	29,437	91.7
2020	31,144	97.9	29,711	93.4
2021	31,814	98.0	30,100	92.7
2022	30,231	97.4	28,087	90.5
2023	30,673	97.7	28,175	89.8
2024	29,332	96.7	27,020	89.1

* Coverage refers to vaccinations given to Singaporean and Singapore PR children.

School children

In 2024, the second booster dose (using Tdap) was given to 37,105 primary five students with a coverage of 95.4% (39,541 students were vaccinated with 94.3% coverage in 2023) (Table 7.5).

Table 7.5
Diphtheria, tetanus and pertussis vaccination (Tdap) of primary five students (10-11 years of age), 2015 - 2024

Year	Total no. of primary 5 students	2nd booster dose given*	
		No.	Coverage (%)
2015	39,838	36,866	92.5
2016	39,953	36,719	91.9
2017	40,686	37,417	92.0
2018	41,243	38,093	92.4
2019	40,805	37,495	91.9
2020	39,916	37,767	94.6
2021	38,435	36,225	94.3
2022	39,053	36,893	94.5
2023	41,944	39,541	94.3
2024	38,893	37,105	95.4

* Coverage refers to vaccinations given to primary five students in national schools, comprising resident and non-resident students. It is inclusive of vaccinations given outside of HPB's programme, e.g. at polyclinics and private GP clinics.

Vaccination against *Haemophilus influenzae* type b

In 2024, the primary course of *Haemophilus influenzae* type b (Hib) vaccination was given to 29,333 children, with a coverage of 96.7% (30,676 children were vaccinated with 97.7% coverage in 2023). The booster dose was given to 27,002 children by two years of age with a coverage of 89.0% in 2024 (28,167 children were vaccinated with 89.7% coverage in 2023) (Table 7.6).

Table 7.6
Haemophilus influenzae* type b vaccination of infants and pre-school children, 2015-2024

Year	Coverage for children at 2 years of age†			
	Completed primary course		Booster dose given	
	No.	Coverage (%)	No.	Coverage (%)
2015	30,171	96.8	28,272	90.7
2016	33,206	97.5	31,438	92.3
2017	32,870	97.3	31,270	92.6
2018	32,774	97.7	30,687	91.5
2019	30,995	96.6	29,394	91.6
2020	31,124	97.9	29,676	93.3
2021	31,804	98.0	30,076	92.7
2022	30,233	97.4	28,082	90.4
2023	30,676	97.7	28,167	89.7
2024	29,333	96.7	27,002	89.0

* Hib vaccination was introduced into the NCIS in 2013.
† Coverage refers to vaccinations given to Singaporean and Singapore PR children.

Vaccination against poliomyelitis

Infants and pre-school children

In 2024, the primary course of polio vaccination was given to 29,331 children, with a coverage of 96.7% (30,682 children were vaccinated with 97.8% coverage in 2023). The first booster dose was given to 26,995 children by two years of age with a coverage of 89.0% in 2024 (28,133 children were vaccinated with 89.6% coverage in 2023) (Table 7.7).

School children

In 2024, the second booster dose was given to 36,453 primary five students with a coverage of 93.7% (38,771 students were vaccinated with 92.4% coverage in 2023) (Table 7.8).

Table 7.7
Polio vaccination of infants and pre-school children, 2015-2024

Year	Coverage for children at 2 years of age*			
	Completed primary course		1st booster dose given	
	No.	Coverage (%)	No.	Coverage (%)
2015	30,372	97.4	28,506	91.4
2016	33,269	97.7	31,467	92.4
2017	32,931	97.5	31,266	92.5
2018	32,813	97.8	30,830	91.9
2019	31,201	97.2	29,392	91.6
2020	31,145	97.9	29,678	93.3
2021	31,818	98.0	30,077	92.7
2022	30,235	97.4	28,072	90.4
2023	30,682	97.8	28,133	89.6
2024	29,331	96.7	26,995	89.0

* Coverage refers to vaccinations given to Singaporean and Singapore PR children.

Table 7.8
Polio vaccination of primary five students (10-11 years of age), 2015-2024

Year	Total no. of primary 5 students	Booster dose given*	
		No.	Coverage (%)
2015	39,838	38,677	97.1
2016	39,953	38,753	97.0
2017	40,686	39,444	96.9
2018	41,243	39,039	94.7
2019	40,805	39,207	96.1
2020	39,916	38,622	96.8
2021	38,435	36,576	95.2
2022	39,053	36,374	93.1
2023	41,944	38,771	92.4
2024	38,893	36,453	93.7

* Coverage refers to vaccinations given to primary five students in national schools, comprising resident and non-resident students. It is inclusive of vaccinations given outside of HPB's programme, e.g. at polyclinics and private GP clinics.

Vaccination against measles, mumps and rubella

In 2024, the first dose of measles, mumps and rubella vaccination was given to 29,401 children, with a coverage of 97.0% (30,519 children were vaccinated with 97.2% coverage in 2023). The second dose was given to 28,036 children by two years of age with a coverage of 92.5% in 2024 (29,118 children were vaccinated with 92.8% coverage in 2023) (Table 7.9).

Table 7.9
Measles, mumps and rubella vaccination of pre-school children, 2015-2024

Year	Coverage for children at 2 years of age*			
	Dose 1		Dose 2	
	No.	Coverage (%)	No.	Coverage (%)
2015	29,963	96.1	28,461	91.3
2016	32,872	96.5	31,417	92.3
2017	32,652	96.6	31,404	93.0
2018	32,515	96.9	30,903	92.1
2019	31,049	96.7	29,769	92.8
2020	30,884	97.1	29,912	94.0
2021	31,370	96.7	30,467	93.9
2022	30,066	96.8	28,958	93.3
2023	30,519	97.2	29,118	92.8
2024	29,401	97.0	28,036	92.5

* Coverage refers to vaccinations given to Singaporean and Singapore PR children.

Vaccination against hepatitis B

In 2024, the primary course of hepatitis B vaccination was given to 29,216 children, with a coverage of 96.3% (30,479 children were vaccinated with 97.1% coverage in 2023) (Table 7.10).

Table 7.10
Hepatitis B vaccination of infants and pre-school children, 2015-2024

Year	Coverage for children at 2 years of age who completed primary course*	
	No.	Coverage (%)
2015	30,295	97.1
2016	33,143	97.3
2017	32,838	97.2
2018	32,707	97.5
2019	31,114	96.9
2020	31,004	97.5
2021	31,707	97.7
2022	30,116	97.0
2023	30,479	97.1
2024	29,216	96.3

* Coverage refers to vaccinations given to Singaporean and Singapore PR children.

Vaccination against pneumococcal disease

In 2024, the primary course of pneumococcal vaccination was given to 29,464 children, with a coverage of 97.2% (30,535 children were vaccinated with 97.3% coverage in 2023). The booster dose was given to 27,719 children by two years of age with a coverage of 91.4% in 2024 (28,836 children were vaccinated with 91.9% coverage in 2023) (Table 7.11).

Table 7.11
Pneumococcal vaccination of infants and pre-school children, 2015-2024

Year	Coverage for children at 2 years of age*			
	Completed two-dose primary course†		Booster (3rd) dose given	
	No.	Coverage (%)	No.	Coverage (%)
2015	25,929	83.1	23,706	76.0
2016	29,218	85.8	26,937	79.1
2017	29,843	88.3	27,988	82.8
2018	29,886	89.1	28,308	84.4
2019	28,765	89.6	27,125	84.5
2020	29,058	91.4	27,675	87.0
2021	30,264	93.3	28,656	88.3
2022	29,825	96.1	28,124	90.6
2023	30,535	97.3	28,836	91.9
2024	29,464	97.2	27,719	91.4

* Coverage refers to vaccinations given to Singaporean and Singapore PR children.
† Starting from 2017 publication, the coverage for the completion of primary course is reported at 2 years of age, instead of 1 year as reported in previous publications up to 2016.

Vaccination against varicella disease

In 2024, the first dose of varicella vaccination was given to 28,808 children, with a coverage of 95.0% (29,762 children were vaccinated with 94.8% coverage in 2023). The second dose was given to 27,346 children by two years of age with a coverage of 90.2% in 2024 (28,291 children were vaccinated with 90.1% coverage in 2023) (Table 7.12).

Table 7.12
Varicella vaccination of pre-school children, 2015 - 2024*

Year	Coverage for children at 2 years of age†			
	Dose 1		Dose 2	
	No.	Coverage (%)	No.	Coverage (%)
2015	16,544	53.1	12,694	40.7
2016	19,496	57.3	17,344	50.9
2017	21,604	63.9	19,855	58.8
2018	21,895	65.3	20,323	60.6
2019	21,423	66.8	19,930	62.1
2020	22,621	71.1	20,955	65.9
2021	27,968	86.2	26,316	81.1
2022	29,168	93.9	27,852	89.7
2023	29,762	94.8	28,291	90.1
2024	28,808	95.0	27,346	90.2

* Varicella vaccination was introduced into the NCIS in 2020.
† Coverage refers to vaccinations given to Singaporean and Singapore PR children.

Vaccination against human papillomavirus

In 2024, HPV vaccination was given to 13,553 females aged 15 years, with a coverage of 87.8% (14,244 females aged 15 years were vaccinated with 88.7% coverage in 2023) (Table 7.13).

Table 7.13
HPV vaccination of females aged 15 years, 2019 - 2024*

Year	Coverage for females at 15 years of age who completed 2 doses†	
	No.	Coverage (%)
2019	8,505	58.1
2020	12,540	79.6
2021	13,990	88.3
2022	14,463	89.4
2023	14,244	88.7
2024	13,553	87.8

* HPV vaccination was introduced into the NCIS in 2010. School-based HPV vaccination programme began in 2019.
† Coverage refers to vaccinations given to Singaporean and Singapore PR.

Vaccination against influenza

In 2024, influenza vaccination coverage for adults aged 65 years and above was 42.2% compared to 18.2% coverage in 2020 (Table 7.14).

Table 7.14
Influenza vaccination of adults aged 65 years and above, 2020 - 2024

Year	Coverage for adults aged 65 years and above (%)*
2020	18.2
2021	19.4
2022	30.0
2023	42.1
2024	42.2

*Coverage refers to vaccinations given to Singaporean and Singapore PR.
It includes those who received at least one influenza dose in the calendar year.

Vaccination against pneumococcal disease

In 2024, pneumococcal vaccination coverage for adults aged 65 years and above was 61.3%, compared to 22.6% coverage in 2020 (Table 7.15).

Table 7.15
Pneumococcal vaccination of adults aged 65 years and above, 2020 - 2024

Year	Coverage for adults aged 65 years and above (%)*
2020	22.6
2021	29.3
2022	41.8
2023	54.6
2024	61.3

* Coverage refers to vaccinations given to Singaporean and Singapore PR.
It includes those who have ever received at least one dose of any pneumococcal vaccination.

EFFECTIVENESS OF THE IMMUNISATION PROGRAMME

The effectiveness of the childhood immunisation programme against poliomyelitis and diphtheria are shown in Figures 7.1 and 7.2, respectively. In 2023-2024, no indigenous case of poliomyelitis or neonatal tetanus was reported.

Figure 7.1
Incidence of reported poliomyelitis cases and vaccination coverage in Singapore, 1946-2024

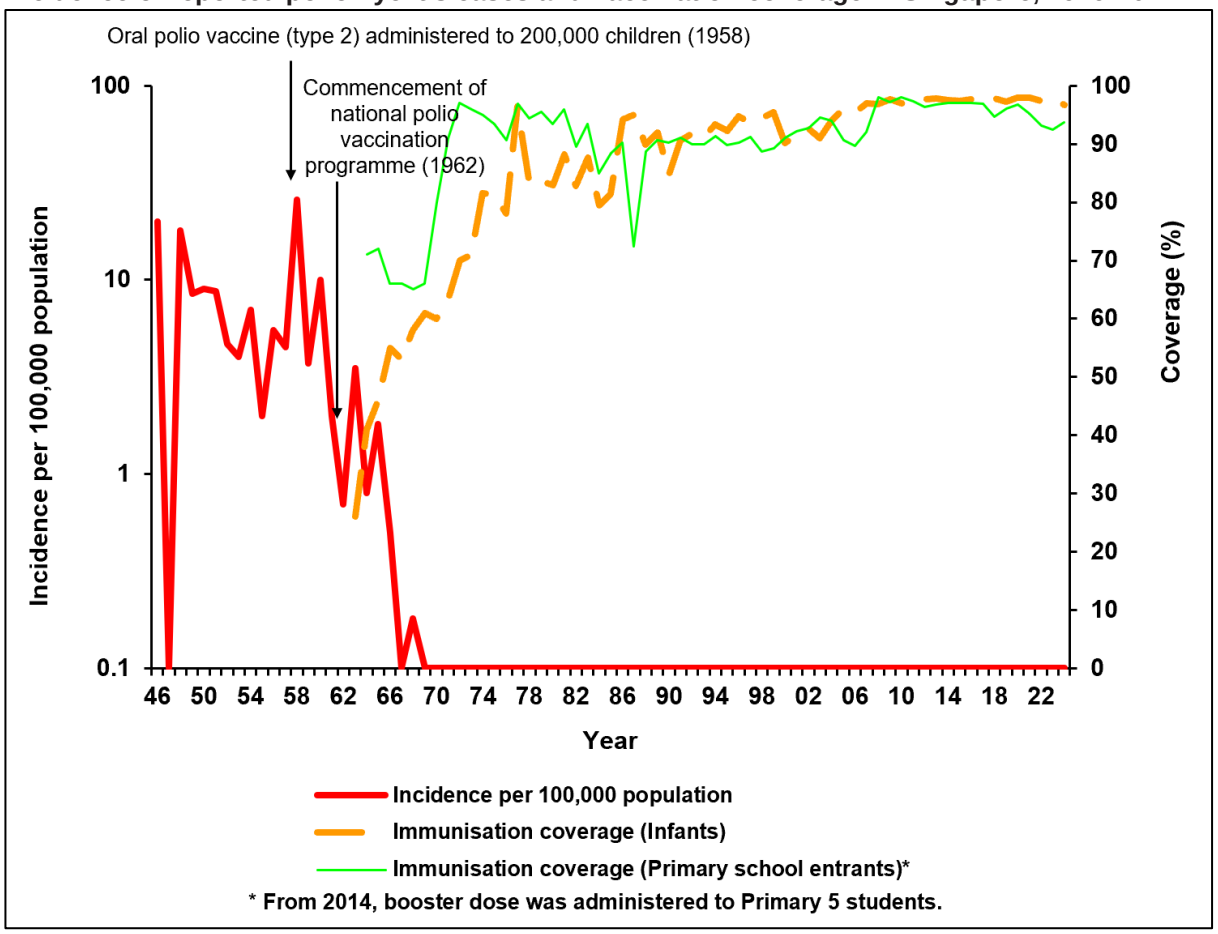
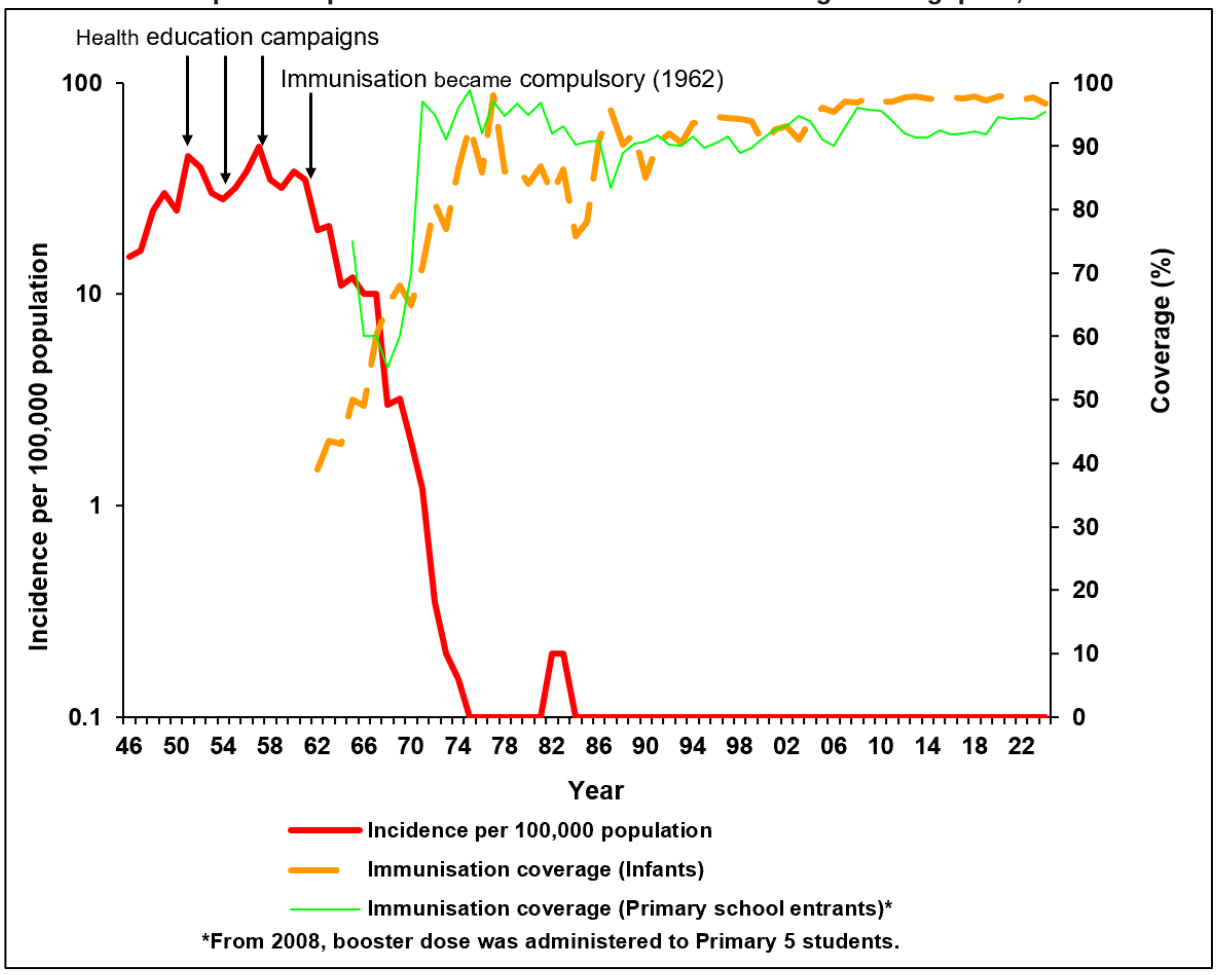
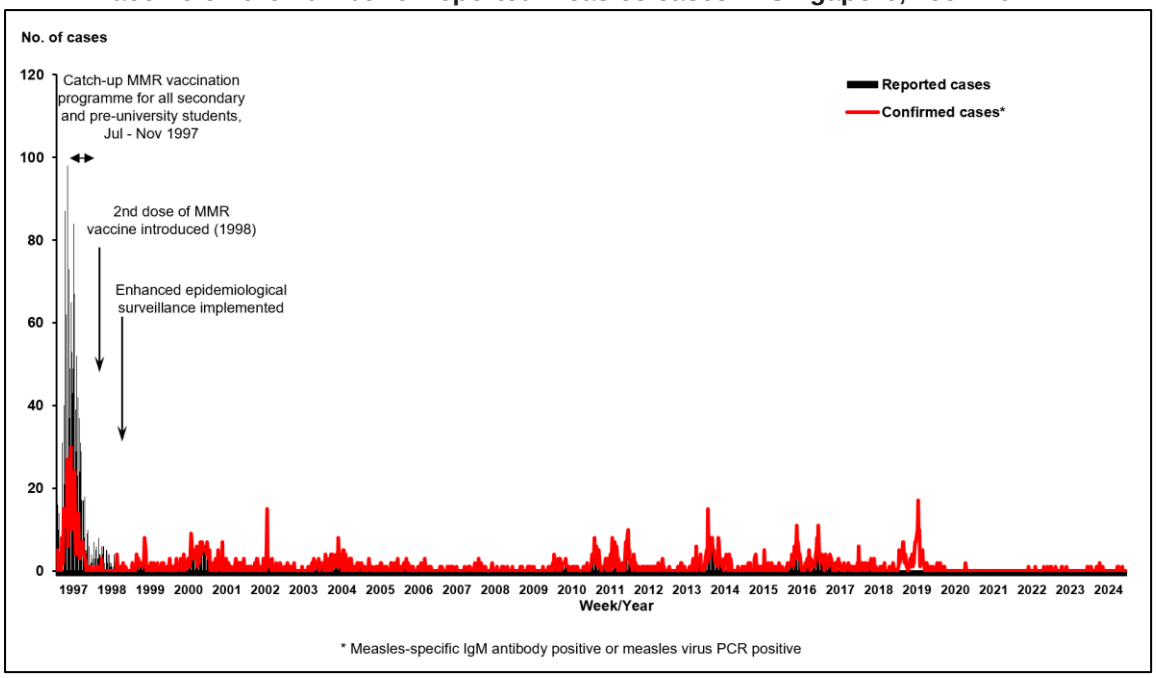


Figure 7.2
Incidence of reported diphtheria cases and vaccination coverage in Singapore, 1946-2024



With the implementation of 'catch-up' measles vaccination programme using the MMR vaccine in 1997, introduction of its second dose to all primary six school children (11-12 years of age) in 1998 and subsequent changes to the immunisation schedule for the second, the number of reported cases of measles decreased from 1,413 cases in 1997 to 0 and 4 in 2021 and 2022, respectively. In 2023 and 2024, the number of reported measles cases remained low at 8 and 11, respectively (Figure 7.3).

Figure 7.3
Impact of catch-up MMR vaccination programme and introduction of second dose of MMR vaccine on the number of reported measles cases in Singapore, 1997-2024



The number of reported cases of rubella decreased from 15 cases in 2015 to no reported rubella case since 2021. There was also no reported indigenous congenital rubella case since 2014. There was no termination of pregnancy due to rubella infection since 2020 (Table 7.16).

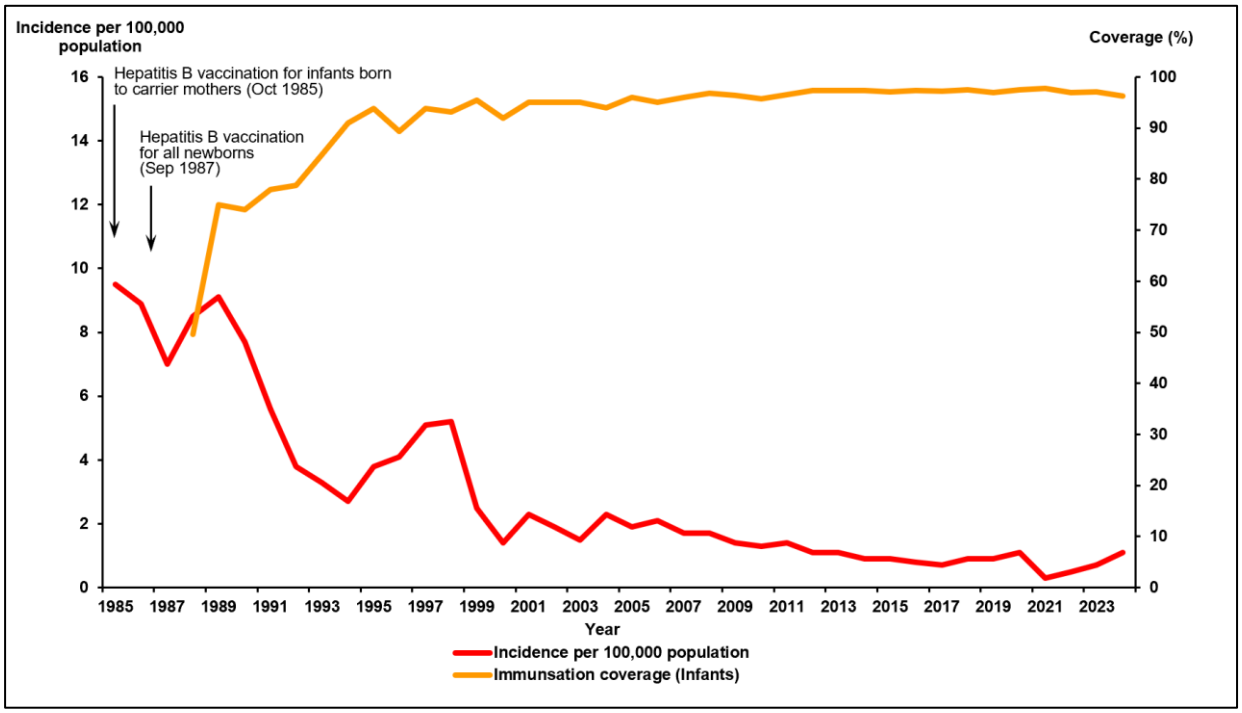
Table 7.16
No. of therapeutic abortions performed for rubella infection, 2015-2024

Year	Total no. of abortions	No. of therapeutic abortions performed for rubella infections
2015	7,942	1
2016	7,237	0
2017	6,834	2
2018	6,413	2
2019	6,067	2
2020	6,648	0
2021	7,056	0
2022	6,582	0
2023	6,331	0
2024	5,352	0

The resurgence of mumps which began in 1998 continued till 2002. The resurgence was due to poor protection conferred by the Rubini strain of the MMR vaccine that was subsequently de-registered in 1999. The number of reported mumps cases has decreased in recent years; from 422 cases in 2019 to 182 and 233 in 2023 and 2024 respectively (Table 7.17).

The incidence of reported acute hepatitis B cases for all age groups declined from 9.5 per 100,000 population in 1985 to 0.7 and 1.1 per 100,000 population in 2023 and 2024, respectively (Figure 7.4). There has been no indigenous case among children <15 years since 1997 (Table 7.17).

Figure 7.4
Incidence of reported acute hepatitis B cases and vaccination coverage in Singapore, 1985-2024



National Seroprevalence Survey

A national seroprevalence survey was conducted in 2018 to determine the prevalence of antibodies against vaccine preventable diseases and other diseases of public health importance in the adult Singapore resident population aged 18-74 years. Residual sera collected from the National Population Health Survey 2017 were used for this survey.

The seroprevalence of measles and rubella among adult residents in Singapore was 99.4% and 90.8% respectively. While 100% of females aged 18 to 29 years were seropositive against rubella, 4.4% of females in the 30-49 age group remained susceptible to rubella infection.

For diphtheria, the seroprevalence of diphtheria antitoxin levels (basic protection, ≥0.01 IU/mL) was 96.7%. The 60-74 age group had the lowest diphtheria antitoxin levels conferring basic protection at 93.0%. The seroprevalence of protective level of tetanus antitoxin (≥ 0.1 IU/mL) was 79.3%. The seroprevalence of tetanus antitoxin levels (≥ 0.1 IU/mL) declined significantly with increased age from 97.2% in 18-29 age group to 58.2% in those aged 60-74 years. The seroprevalence in males (90.4%) was significantly higher than in females (68.4%).

For hepatitis B, the prevalence of anti-HBs (≥10 mIU/mL) was 46.0%. The overall HBsAg prevalence was 2.1%.

Table 7.17
Reported cases of diphtheria, poliomyelitis, measles, mumps, rubella, acute hepatitis B, neonatal tetanus, pertussis, congenital rubella, and childhood tuberculous meningitis in Singapore, 1995-2024

Year	Diphtheria	Poliomyelitis	Measles	Mumps*	Rubella*	Acute hepatitis B[†]	Neonatal tetanus[‡]	Pertussis[§]	Congenital rubella[¶]	Childhood tuberculous meningitis[#]
1995	0	0	185	786	326	0	0	1[††]	2[‡]	2[‡]
1996	1(1)	0	308	765	487	3	0	4(1)[‡‡]	2[‡]	2[‡]
1997	0	0	1,413	674	360	0	0	2[††]	0[‡]	2[‡]
1998	0	0	114	1,183	179	0	0	1**	0[‡]	0
1999	0	0	65[††]	6,384(28)	432	0	0	1[††]	2[‡]	1[‡]
2000	0	0	141[††]	5,981**	312**	0	0	2(1)[‡‡]	0	1[‡]
2001	0	0	61[††]	1,399**	242**	0	0	1**	2[‡]	0
2002	0	0	57[††]	1,090**	152**	0	0	0	1	1
2003	0	0	33[††]	878**	88**	0	0	1[‡‡]	0	0
2004	0	0	96[††]	1,003**	141**	0	0	1[‡‡]	0	0
2005	0	0	33[††]	1,004**	139**	0	0	2[††]	1	0
2006	0	1(1)[§§]	28[††]	844**	90**	0	0	3[‡‡]	0	0
2007	0	0	15[††]	780**	83**	0	0	38[††]	0	0
2008	0	0	18[††]	801**	180**	0	0	33[††]	2	0
2009	0	0	13[††]	631**	178**	0	0	13	0	0
2010	0	0	49[††]	452[‡‡]	158[‡‡]	0	0	8[††]	2[§§]	2
2011	0	0	148[††]	501[‡‡]	110[‡‡]	0	0	29[††]	2	0
2012	0	0	38[††]	521[‡‡]	64[‡‡]	0	0	24[††]	2[§§]	0
2013	0	0	46[††]	495[‡‡]	48[‡‡]	0	0	17[††]	1[§§]	0
2014	0	0	148[††]	478[‡‡]	17[‡‡]	0	0	21[††]	0	0
2015	0	0	42[††]	473[‡‡]	15[‡‡]	0	0	57[††]	0	0
2016	0	0	126[††]	540[‡‡]	10[‡‡]	0	0	82[††]	0	0
2017	1	0	70[††]	524[‡‡]	15[††]	0	0	79[††]	0	0
2018	0	0	34[††]	474[‡‡]	10[††]	0	0	108[††]	0	0
2019	0	0	152[††]	422[‡‡]	2[††]	0	0	62[††]	0	0
2020	0	0	12[††]	285[‡‡]	1[††]	0	0	11[††]	0	0
2021	0	0	0[††]	191[‡‡]	0[††]	0	0	0[††]	0	0
2022	0	0	4[††]	168[‡‡]	0[††]	0	0	2[††]	0	1
2023	0	0	8[††]	182[‡‡]	0[††]	0	0	20[††]	0	0
2024	0	0	11[††]	233[‡‡]	0[††]	0	0	123[††]	0	0

( ) Imported cases.
* Notifiable with effect from April 1990.
† Indigenous cases below 15 years of age.
‡ Source: Central Claims Processing System, Ministry of Health.
§ All pertussis cases reported prior to 1986 were based on clinically diagnosed cases seen at the Communicable Disease Centre.
¶ Cases diagnosed in KK Women's and Children's Hospital, Singapore General Hospital and National University Hospital.
# Below 10 years of age.
** Based on clinically diagnosed cases.
†† Based on laboratory confirmed cases.
‡‡ Based on laboratory confirmed and clinically diagnosed cases.
§§ Foreign resident who came for treatment

PUBLIC EDUCATION

The Health Promotion Board (HPB) educates the public on the importance of vaccinations through various efforts.

In 2023, HPB implemented the immunisation campaign 'Protect the Simple Joys of Life' to encourage seniors aged 65 and above to receive pneumococcal vaccinations. Following the launch of Healthier SG in July 2023, the campaign also highlighted that seniors could enjoy fully subsidised vaccinations at their enrolled Healthier SG clinic.

Building on this momentum, the 2024 campaign 'Don't Risk the Simple Joys of Life' reinforced the importance of pneumococcal vaccination while addressing common misconceptions. The campaign emphasised that relying solely on natural immunity and healthy lifestyle practices may put seniors at unnecessary health risks.

In both 2023 and 2024 campaigns, free-to-air TV channels were utilised for their mass reach to educate seniors on pneumococcal vaccination and the protection it confers. This was a strategic decision based on the media habits of seniors. To keep things simple, relatable and engaging for seniors, HPB developed educational videos acted out by TV celebrities who resonated deeply with the senior audience, and doctors to lend authority and credibility to the health messages being conveyed. To further maximise reach, HPB tapped into the audience's daily commute points like bus-stop shelters, bus wraps and digital display panels at HDB estates. To drive the last mile action, online ads such as Google search directed seniors who had a genuine interest in HPB's message to the Health Appointment System for ease of appointment booking. To augment campaign efforts, letters and SMS nudges were sent to eligible seniors, prompting them to book their pneumococcal vaccination appointment via the Health Appointment System.

In a separate effort to boost human papillomavirus (HPV) vaccination rates for females aged 18 to 26 in the catch-up cohort, SMS were sent to them to encourage them to get their subsidised HPV vaccines.

The National Immunisation Registry (NIR) continues to send reminder letters to parents of children who have missed vaccinations, along with additional information about childhood vaccinations. In addition, HPB runs social posts on immunisation during the World Immunisation Week which falls on the last week of April every year. These social posts remind the public to get the recommended vaccination.