- Chickenpox
- Hand, Foot and Mouth Disease
- Influenza
- Measles
- Meningococcal Infection
- Mumps
- Rubella
- Viral Conjunctivitis

I
AIR-/DROPLET-BORNE DISEASES

Airborne transmission occurs by dissemination of droplet nuclei (small particle residue which are 5 micrometers or smaller in diameter) containing microorganisms that remain suspended in the air for long period of time. Droplets are generated from the source person primarily during coughing, sneezing, and talking. High risk of droplet transmission often occurs during administration of drugs via nebuliser or the performance of invasive procedures such as suctioning and bronchoscopy. Transmission occurs when droplets containing microorganisms generated from infected persons are propelled a short distance (within a meter) through air and deposited on the host's mucous membranes (such as conjunctiva, nasal mucosa, mouth or respiratory tract).

CHICKENPOX

Chickenpox is an acute, generalised viral disease characterised by fever, mild constitutional symptoms and a skin eruption of typical maculopapular, vesicular lesions. It is highly infectious and spreads from person to person by direct contact or through droplet spread from an infected person's coughing or sneezing. The causative agent is the Human (*alpha*) herpesvirus 3 (varicella-zoster virus VZV), a member of the Herpesvirus group. A person with chickenpox is contagious 1 - 2 days before the rash appears and until all blisters have formed scabs. The incubation period is 10 - 21 days from contact.

In children, chickenpox is very common and spreads readily; generally causing a relatively mild illness that lasts about 5 - 10 days. Severe illness may occur in adults and persons with depressed immunity due to existing chemotherapy treatment or illnesses such as leukaemia and AIDS.

Chickenpox being an exclusive human disease is one of the most readily communicable diseases and the most effective method of controlling the spread from person to person is via isolation and prior vaccination.

In 2005, there were 24,248 reported cases of chickenpox - an increase of 21% from 20,083 cases reported in 2004. The weekly distribution of reported cases for 2004 and 2005 is shown in Figure 1.1. Children less than 5 years old age group had the highest age-specific incidence rate (Table 1.1), while among the three major ethnic groups, Malays had the highest incidence rate, followed by Chinese and Indians (Table 1.2).

Figure 1.1
E-weekly distribution of reported chickenpox cases, 2004 – 2005

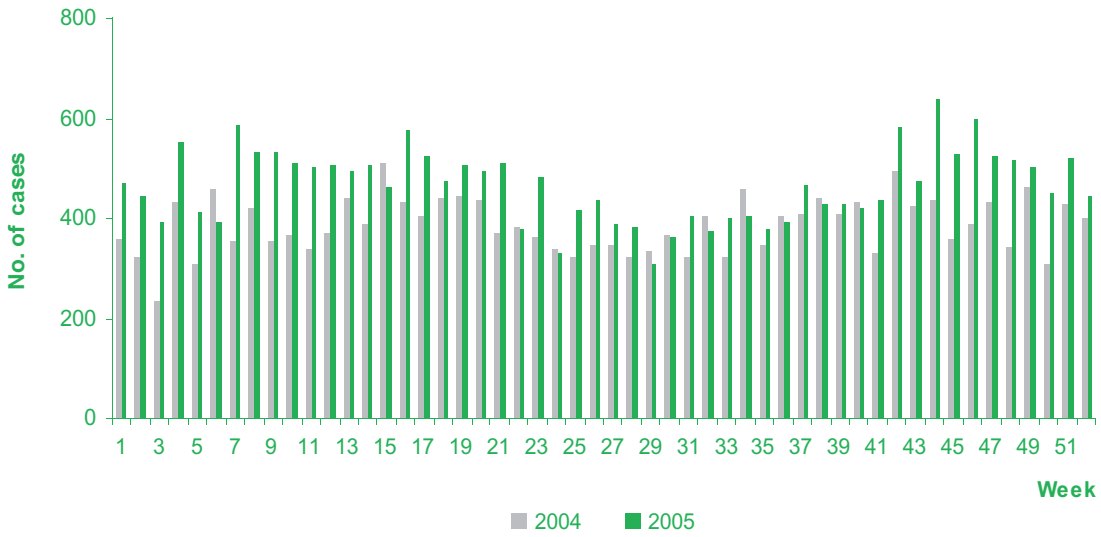


Table 1.1
Age-gender distribution and age-specific incidence rates of reported chickenpox cases, 2005

Age (Yrs)	Male	Female	Total (%)	Incidence rate per 100,000 population*
0 – 4	2,608	2,280	4,888 (20.2)	2,347.7
5 – 14	4,899	4,138	9,037 (37.3)	1,703.8
15 – 24	2,134	1,554	3,688 (15.2)	562.6
25 – 34	2,200	1,722	3,922 (16.2)	445.9
35 – 44	1,222	784	2,006 (8.3)	256.5
45 – 54	281	183	464 (1.9)	75.0
55+	144	99	243 (1.0)	35.9
Total	**13,488**	**10,760**	**24,248 (100.0)**	**557.2**

*Rates are based on 2005 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 1.2
Ethnic-gender distribution and ethnic-specific incidence rates of reported chickenpox cases, 2005

	Male	Female	Total (%)	Incidence rate per 100,000 population*
Singapore resident				
Chinese	8,032	6,905	14,937 (61.6)	556.3
Malay	2,675	2,306	4,981 (20.5)	1,027.9
Indian	694	506	1,200 (4.9)	388.0
Others	283	283	566 (2.3)	757.7
Foreigner	1,804	760	2,564 (10.6)	321.3
Total	**13,488**	**10,760**	**24,248 (100.0)**	**557.2**

*Rates are based on 2005 estimated mid-year population.
(Source: Singapore Department of Statistics)

Outbreak of Chickenpox in Childcare Centres

In 2005, a total of 313 institutional outbreaks of chickenpox each involving two or more cases were reported. The distribution of attack rates at childcare centres, kindergartens and primary schools are presented in Table 1.3. Two case studies are discussed below.

Table 1.3
Outbreaks of chickenpox in childcare centres/ kindergartens/ primary schools, 2005

Attack rate (%)	Childcare Centres	Kindergartens	Primary Schools
< 10	90	133	12
10 - 20	40	10	-
20 - 30	18	-	-
30 - 40	9	-	-
40 - 50	1	-	-
Total	**158**	**143**	**12**

Case Study 1: Childcare centre at Ang Mo Kio

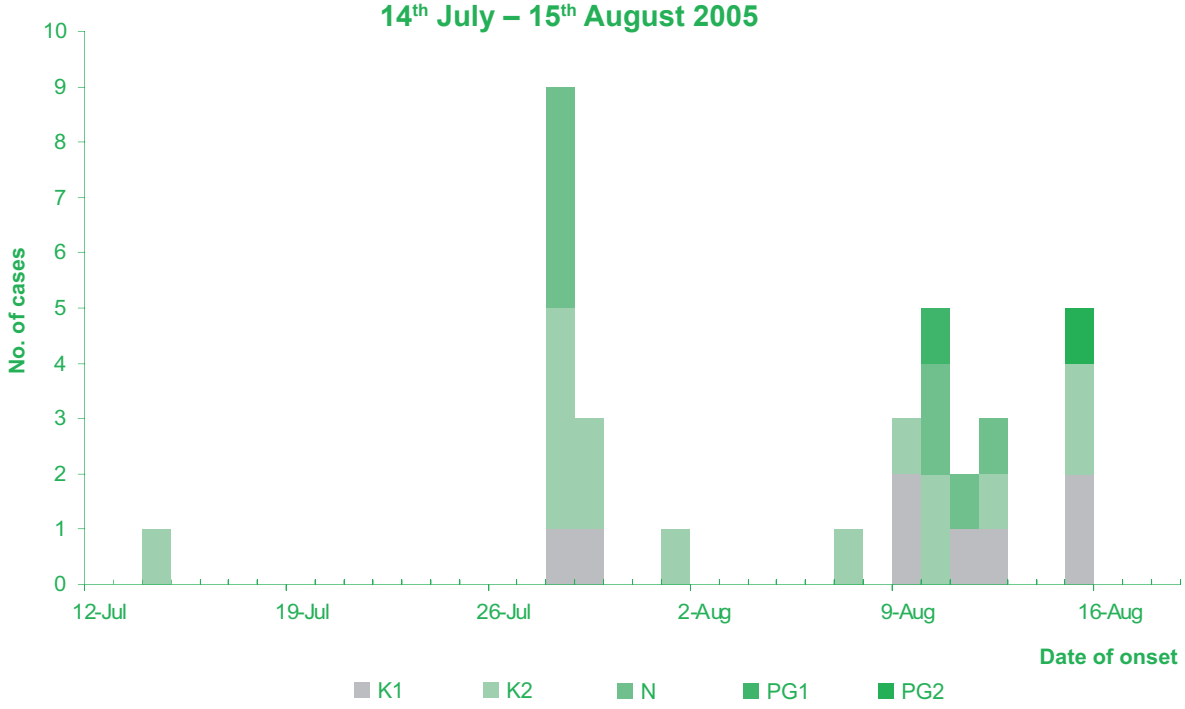
An outbreak of chickenpox involving 33 children aged 2 - 6 years was reported between 14th July and 15th August 2005 in a childcare centre at Ang Mo Kio. The centre had an enrolment of 88 children and 18 fulltime staff. The outbreak involved all five classes in the centre, namely Kindergarten 1, Kindergarten 2, Nursery, Playgroup 1 and Playgroup 2.

The index case, a girl from Kindergarten 2 developed fever and rash on 14th July 2005. There were intervals of approximately two weeks between the index case and the primary and secondary clusters in the centre. This finding was consistent with the known incubation period of the disease. The last reported case was on 15th August 2005 (Figure 1.2). The attack rate for the classes in this outbreak ranged from 5.9% to 65.2% with an overall attack rate of 37.5% (Table 1.4).

Table 1.4
Attack rates of chickenpox cases in a childcare centre at Ang Mo Kio, 2005

Class	No. of children			No. infected			Attack Rate (%)
	Male	Female	Total	Male	Female	Total	
Kindergarten 1	11	9	20	6	2	8	40.0
Kindergarten 2	17	6	23	11	4	15	65.2
Nursery	8	12	20	6	2	8	40.0
Playgroup 1	5	3	8	0	1	1	12.5
Playgroup 2	11	6	17	1	0	1	5.9
Total	**52**	**36**	**88**	**24**	**9**	**33**	**37.5**

Figure 1.2
Time distribution of 33 cases of chickenpox in a childcare centre at Ang Mo Kio, 14th July – 15th August 2005



Case Study 2: Childcare centre at Choa Chu Kang

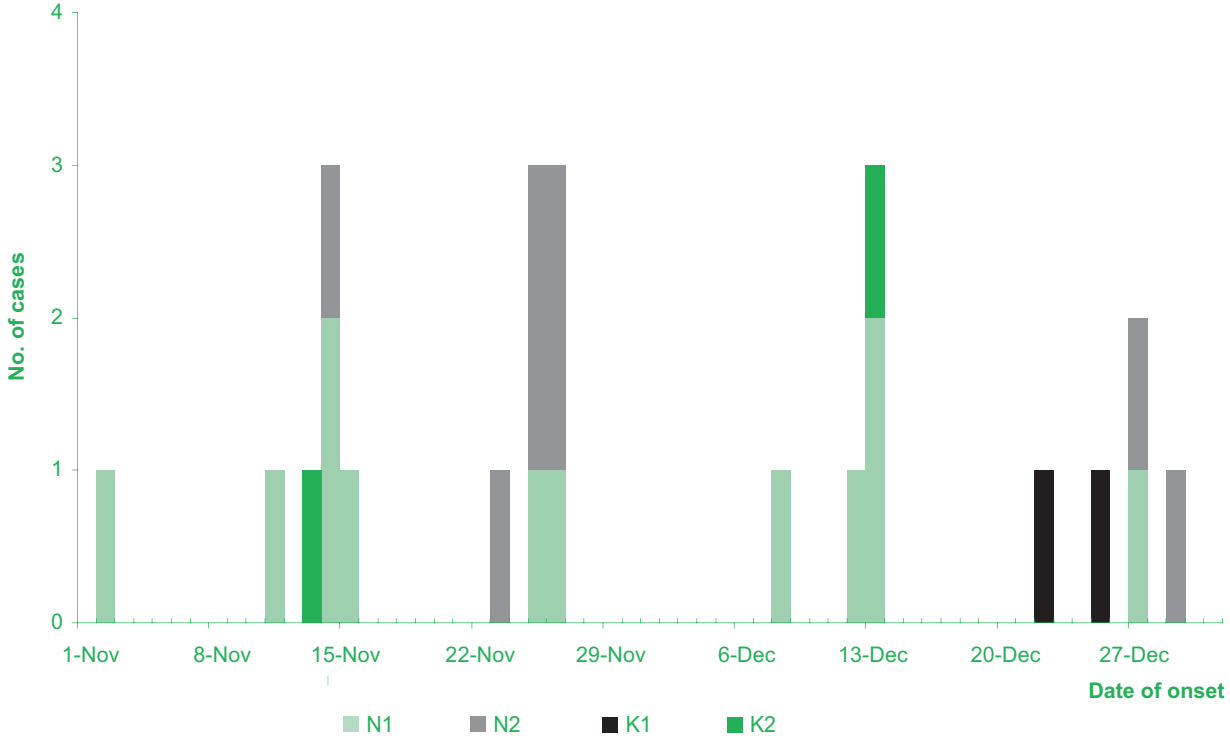
An outbreak in a childcare centre at Choa Chu Kang involving 24 children aged 3 to 6 years was reported during the period 2nd November to 31st December 2005. The centre had an enrolment of 91 children and 16 full-time staff. These children were housed in four classes, namely Kindergarten 1, Kindergarten 2, Nursery 1 and Nursery 2.

The index case, a girl from Nursery 1 developed fever and rash on 2nd November 2005. Two-week intervals were observed from the index case to four successive clusters in the centre. Transmission ceased after the last reported case on 31st December 2005 (Figure 1.3). The attack rate for the classes in this outbreak ranged from 10.0% to 48.0% with an overall attack rate of 26.4% (Table 1.5).

Table 1.5
Attack rates of chickenpox cases in a childcare centre at Choa Chu Kang, 2005

Class	No. of children			No. infected			Attack Rate (%)
	Male	Female	Total	Male	Female	Total	
Nursery 1	13	12	25	4	8	12	48.0
Nursery 2	19	7	26	6	2	8	30.8
Kindergarten 1	11	9	20	1	1	2	10.0
Kindergarten 2	12	8	20	1	1	2	10.0
Total	**55**	**36**	**91**	**12**	**12**	**24**	**26.4**

Figure 1.3
Time distribution of 24 cases of chickenpox in a childcare centre at Choa Chu Kang, 2nd November – 31st December 2005



HAND, FOOT AND MOUTH DISEASE (HFMD)

Hand, foot and mouth disease (HFMD) is a common childhood viral disease characterised by brief prodromal fever, followed by pharyngitis, mouth ulcers and rash on the hands and feet. Children may have reduced appetite due to painful oral ulcers erupting on the tongue, gums or inside of the cheeks. A non-pruritic vesicular rash

or red spots typically appears on the hands and feet, most commonly on the palms and soles. The common causative agents for HFMD are the *coxsackieviruses type A* (CA), *echovirus* (EC) and *enterovirus 71* (EV71). HFMD can be transmitted from person to person through the faecal-oral or respiratory route.

A total of 15,257 cases of HFMD were reported in 2005, an increase of 138% from 6,411 cases reported in 2004 (Figure 1.4). The incidence rate was highest in the 0 - 4 year-old age group, with a male to female ratio of 1.3:1 (Table 1.6). Among the three major ethnic groups, Chinese and Malays had the highest incidence followed by Indians (Table 1.7). No HFMD deaths were reported in 2005.

Viral isolation of *enterovirus* was carried out on selected HFMD cases at the KK Women's and Children's Hospital (KKH) and from children affected during community outbreaks in pre-school centres. Of the isolates that were tested positive, the majority were EV 71 (50.6%), followed by *coxsackieviruses type A* (CA) (48.1%) and *echovirus* (1.3%). The predominant coxsackievirus serotype identified was CA16 (94.7%), followed by CA10 (5.3%).

Figure 1.4
E-weekly distribution of reported hand, foot and mouth cases, 2004 – 2005

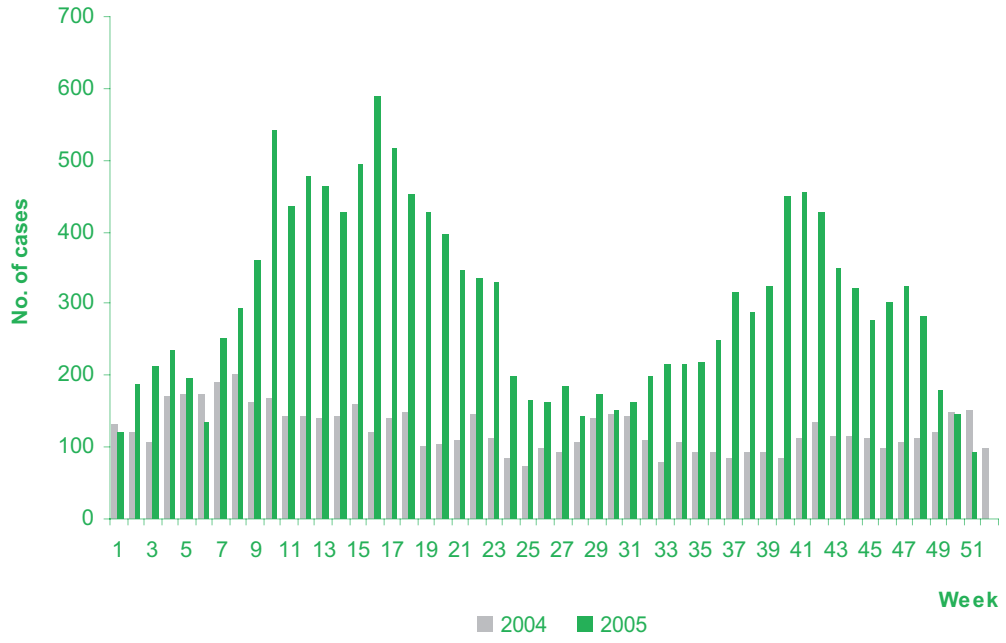


Table 1.6
Age-gender distribution and age-specific incidence rates of reported hand, foot and mouth cases, 2005^

Age (Yrs)	Male	Female	Total (%)	Incidence rate per 100,000 population*
0 – 4	5,781	4,397	10,178 (66.7)	4,888.6
5 –14	2,452	1,796	4,248 (27.8)	800.9
15 – 24	97	120	217 (1.4)	33.1
25 – 34	142	236	378 (2.5)	43.0
35 – 44	118	87	205 (1.3)	26.2
45 – 54	14	9	23 (0.2)	3.7
55+	5	2	7 (0.0)	1.0
Total	**8,609**	**6,647**	**15,256 (100.0)**	**350.6**

^Excluding one foreigner seeking medical treatment in Singapore
*Rates are based on 2005 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 1.7
Ethnic-gender distribution and ethnic-specific incidence rates of reported hand, foot and mouth cases, 2005^

	Male	Female	Total (%)	Incidence rate per 100,000 population*
Singapore Resident				
Chinese	6,725	5,203	11,928 (78.2)	444.3
Malay	1,056	798	1,854 (12.2)	382.6
Indian	206	149	355 (2.3)	114.8
Others	292	223	515 (3.4)	689.4
Foreigner	330	274	604 (4.0)	75.7
Total	**8,609**	**6,647**	**15,256 (100.0)**	**350.6**

^Excluding one foreigner seeking medical treatment in Singapore
***Rates are based on 2005 estimated mid-year population.**
(Source: Singapore Department of Statistics)

Outbreak of HFMD in Childcare Centres

There were 945 reported outbreaks of HFMD involving two or more cases in 2005. Table 1.8 gives a breakdown of HFMD outbreaks at various children's educational institutions by attack rate. Two case studies are discussed below.

Table 1.8
Outbreaks of hand, foot and mouth disease in childcare centres/ kindergartens/ schools, 2005

Attack rate (%)	Childcare Centres	Kindergartens	Primary Schools	Other Schools	Enrichment Centres
< 10	329	251	112	4*	9
10 – 20	139	7	-		5
20 – 30	56	1	-		4
30 – 40	24	-	-		-
40 – 50	2	-	-		1
>50	1	-	-		-
Total	**551**	**259**	**112**	**4**	**19**

***Two from secondary schools, one from a junior college and one from an international school**

Case Study 1: Preschool at Jelapang Road

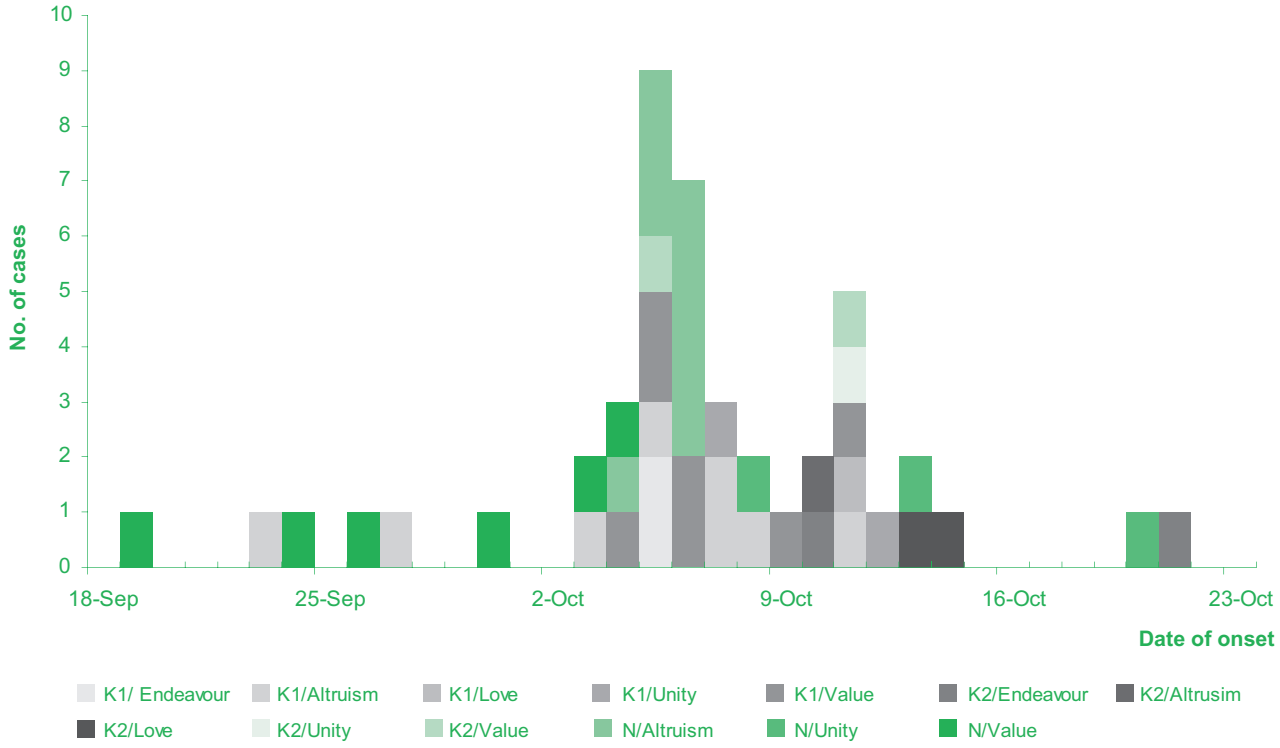
An outbreak of HFMD involving 46 children aged between 3 to 6 years was reported from 19th September to 21st October 2005 in a preschool at Jelapang Road. At the time of the outbreak, the centre had 14 full-time staff and 366 children in 16 Nursery, Kindergarten 1 and Kindergarten 2 classes.

The index case, a three-year-old from the Nursery/Value class presented with symptoms on 19th September 2005. The infection spread rapidly amongst other children in the nursery and kindergarten classes. The last reported case was on 21st October 2005 (Figure 1.5). The class-specific attack rates ranged from 0 - 56.3% with an overall attack rate of 12.6% (Table 1.9).

Table 1.9
Attack rates of hand, foot and mouth disease in a preschool at Jelapang Road, 2005

Class	No. of children			No. of infected			Attack Rate (%)
	Male	Female	Total	Male	Female	Total	
K2/Value	12	16	28	0	2	2	7.1
K2/Altruism	14	13	27	0	1	1	3.7
K2/Love	13	12	25	2	0	2	8.0
K2/Unity	13	15	28	1	0	1	3.6
K2/Endeavour	16	13	29	0	2	2	6.9
K1/Value	11	12	23	6	1	7	30.4
K1/Altruism	10	13	23	2	6	8	34.8
K1/Love	6	14	20	0	1	1	5.0
K1/Unity	11	11	22	1	1	2	9.1
K1/Endeavour	17	6	23	2	0	2	8.7
K1/Share	11	10	21	0	0	0	0.0
N/Value	10	8	18	3	3	6	33.3
N/Altruism	5	11	16	3	6	9	56.3
N/Love	12	10	22	0	0	0	0.0
N/Unity	9	11	20	2	1	3	15.0
N/Endeavour	15	6	21	0	0	0	0.0
Total	**185**	**181**	**366**	**22**	**24**	**46**	**12.6**

Figure 1.5
Outbreak of 46 cases of hand, foot and mouth disease in a preschool centre at Jelapang Road, 19th September – 21th October 2005



Case Study 2: Childcare centre at Toa Payoh

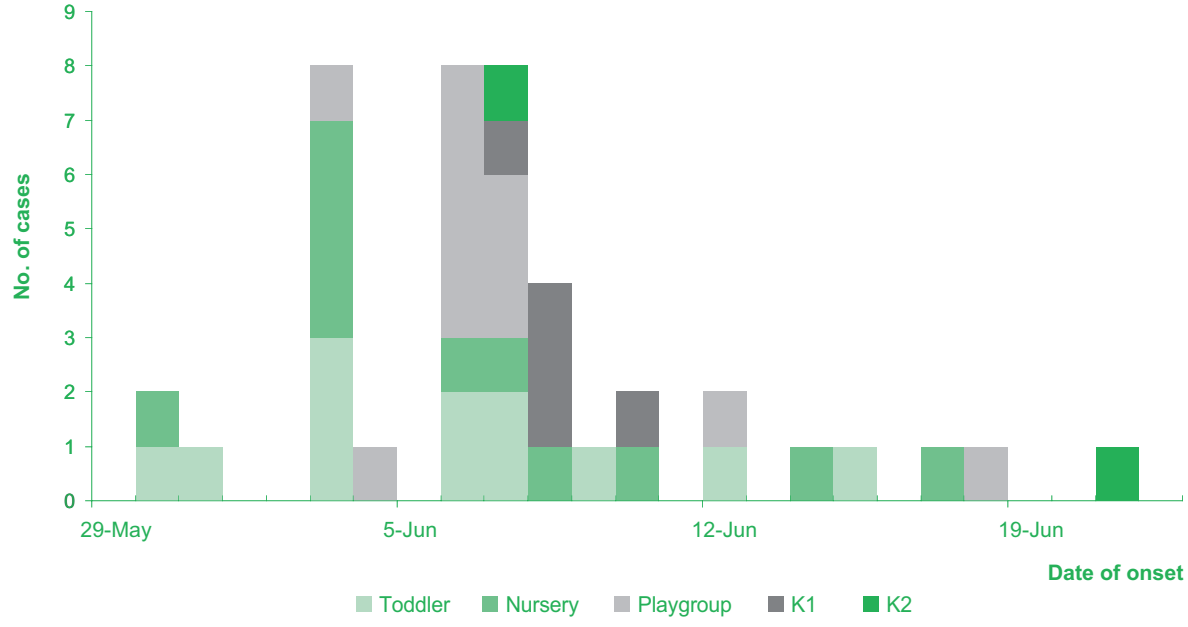
An outbreak in a childcare centre at Toa Payoh involving 42 children aged between 18 months to 6 years was reported from 30th May to 21st June 2005. At the time of the outbreak, the centre had 19 full-time staff and 184 children in 8 classes, namely Infant, Toddler, Playgroup, Nursery, Kindergarten 1, Kindergarten 2, Before & After School Care and Flexicare.

The index cases, a two-year-old from Toddler class and a four-year-old from Nursery class developed symptoms on 30th May 05. The infection spread rapidly amongst children in the Toddler, Playgroup, Nursery, Kindergarten 1 and Kindergarten 2 classes. The last reported case was on 21st June 2005 (Figure 1.6). The class-specific attack rate ranged from 0% - 60.0% with an overall attack rate of 22.8% (Table 1.10).

Table 1.10
Attack rates of hand, foot and mouth disease in a childcare centre at Toa Payoh, 2005

Class	No. of children			No. infected			Attack Rate (%)
	Male	Female	Total	Male	Female	Total	
Infant	10	1	1	0	0	0	0.0
Toddler	11	9	20	6	6	12	60.0
Playgroup	21	11	32	7	5	12	37.5
Nursery	19	15	34	6	5	11	32.4
Kindergarten 1	31	17	48	1	4	5	10.4
Kindergarten 2	17	19	36	1	1	2	5.6
Before & After School Care	4	5	9	0	0	0	0.0
Flexicare	3	1	4	0	0	0	0.0
Total	**107**	**77**	**184**	**21**	**21**	**42**	**22.8**

Figure 1.6
Outbreak of 42 cases of hand, foot and mouth disease in a childcare centre at Toa Payoh, 30th May – 21st June 2005



INFLUENZA

Influenza is an acute viral disease of the respiratory tract characterised by fever and one or more symptoms of sore throat, cough, coryza, headache and myalgia. It is spread from person to person mainly through infectious respiratory secretions released during coughing and sneezing.

The causative agent is the influenza virus and three types of influenza virus (influenza A, B and C) are recognized. The Influenza type A viruses include three subtypes (H1N1, H2N2 and H3N2) that infect humans and have been associated with pandemics and widespread epidemics. Influenza type B is occasionally associated with regional epidemics, and influenza type C is usually associated with sporadic cases and minor localised outbreaks. Diagnosis is based on the clinical recognition of influenza-like illness with or without laboratory confirmation and strain characterisation.

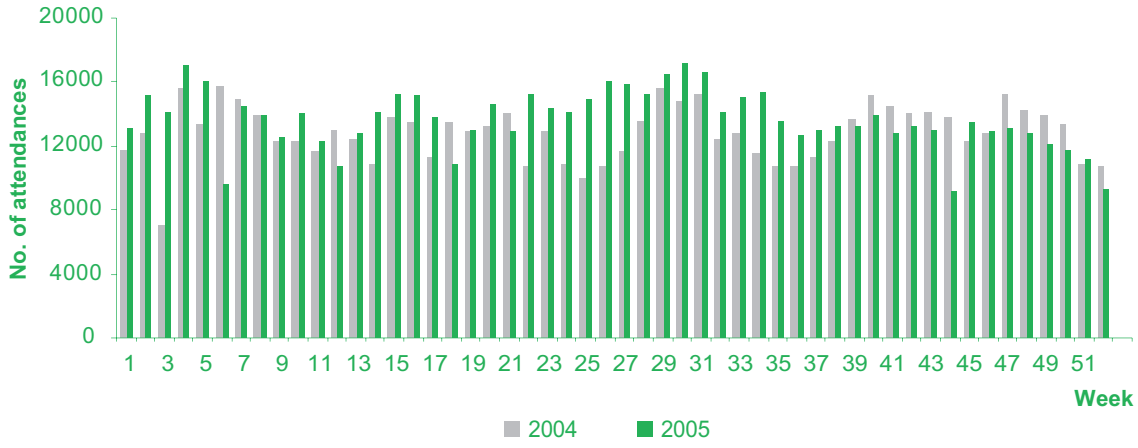
In the temperate and cold climates, influenza reaches peak incidence in winter. As the Northern and Southern Hemispheres have winter at different times of the year, there are two flu seasons each year: December-March in the Northern Hemisphere; June - September in the Southern Hemisphere[1].

In tropical and subtropical areas, influenza epidemics can occur either twice a year or even throughout the year. In Singapore, influenza viruses circulate year round, with a bimodal increase in incidence observed in April–July and November–January.

During 2005, the weekly attendance for acute respiratory infections (ARI) at the polyclinics and hospital emergency departments (ED) was monitored as a proxy indicator for influenza activity. (Note: ARI represents a mixture of respiratory illnesses and the proportion of influenza cases presenting with ARI varies with the level of influenza activity.) The weekly number of admissions due to ARI at restructured hospitals was also monitored.

There were a total of 710,013 attendances at polyclinics for ARI in 2005, an increase of 6.7% over the 665,662 seen in 2004. No clear seasonal pattern for ARI was observed although higher weekly ARI incidences were observed in E-week 4 - 5 and E-week 26 - 31 (Figure 1.7).

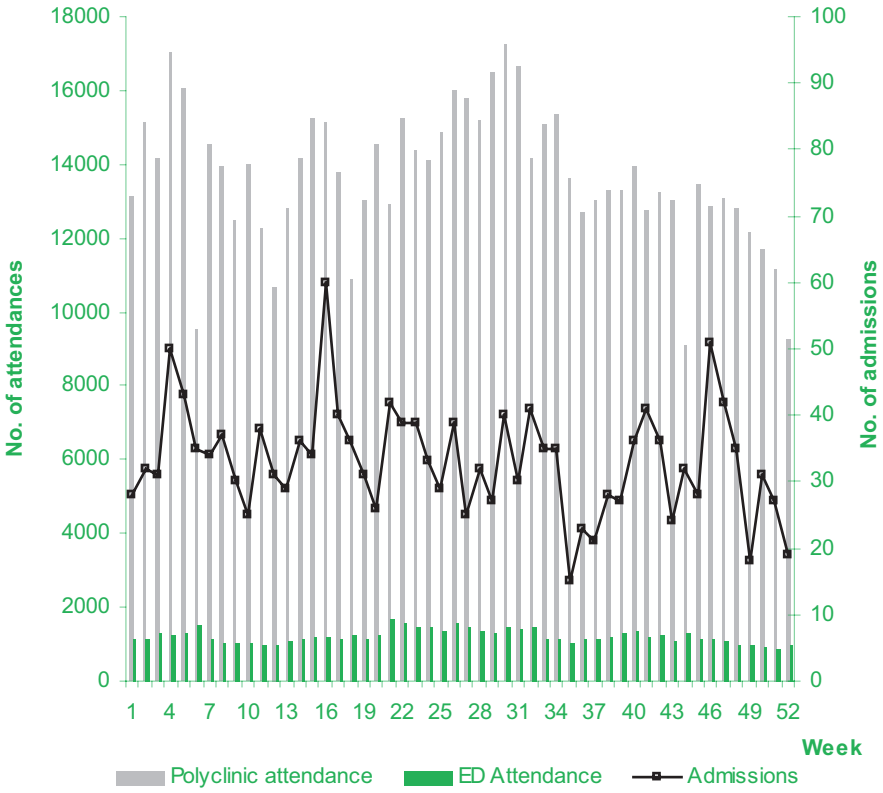
Figure 1.7
E-weekly distribution of acute respiratory infection attendances at polyclinics, 2004 – 2005



Annual total of 63,243 ARI cases were seen at the emergency departments (ED) in 2005 and it has declined by 4.3% compared to 2004. The average weekly ARI attendance at ED was 1,216 and higher attendances were observed in E-weeks 6 and 21 to 32 (Figure 1.8).

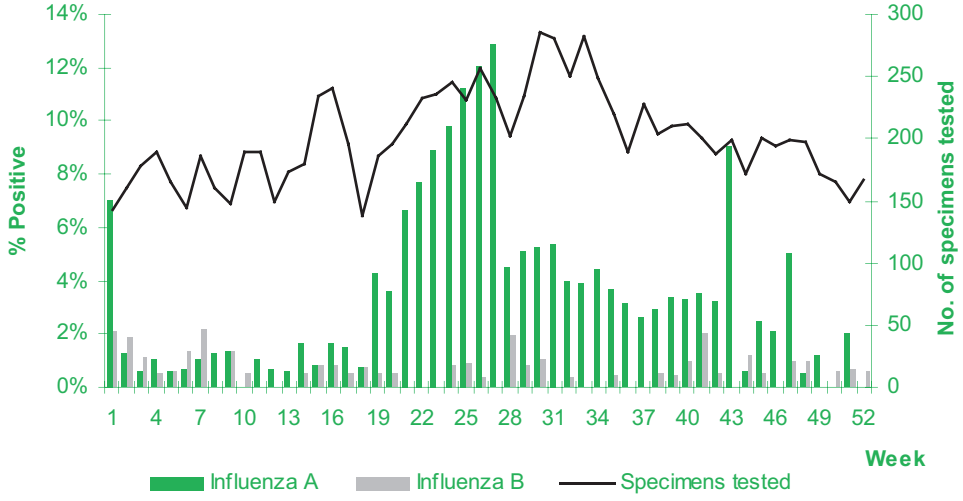
[1]*Epidemiological Bulletin, Vol. 22 No. 3, September 2001*

Figure 1.8
Weekly polyclinic attendance, emergency department (ED) attendance and admissions for ARI, 2005



Virological surveillance of influenza viruses was carried out on throat and nasopharyngeal specimens obtained from polyclinics and hospitals throughout the year. The isolation and typing of influenza viruses was carried out at the National Influenza Centre (NIC) in the Department of Pathology, Singapore General Hospital. Moderate influenza activity was observed in E-week 1 with 7% of respiratory specimens tested positive for influenza viruses. It was followed by a period of low level activity until E-week 18. A rapid surge in influenza activity was detected in E-week 19 which continued until E-week 27. Influenza activity peaked in E-week 27 with 12.9% of specimens tested positive for influenza viruses (Figure 1.9).

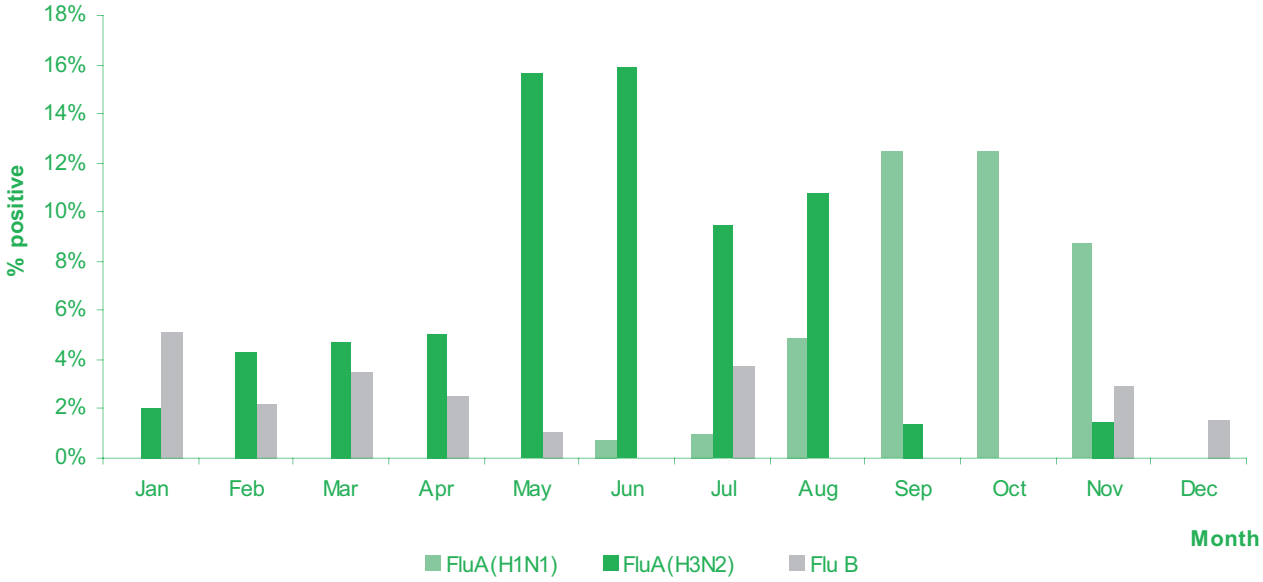
Figure 1.9
Virological surveillance of influenza A & B, 2005



As in other years, influenza A predominated over influenza B. Of the 97 influenza A isolates, 78.4% belonged to the H3N2 subtype. Another 65 cases of influenza A were not typed as they were identified by

antigen detection. Most of the influenza A H3N2 viruses were characterised as A/California/7/2004(H3N2)-like or as low reactors to the latter. Low numbers of A/New York/55/2004-like isolates were detected in July and August. H1N1 activity was due to A/New Caledonia/20/99-like strains as in the previous year. B/Hong Kong/330/2001-like strains continued to circulate from 2004 into 2005 although towards the end of the year, B/Ohio/1/05 made its appearance. No H5N1 virus was detected from suspected avian influenza cases.

Figure 1.10
Influenza virus isolates, 2005

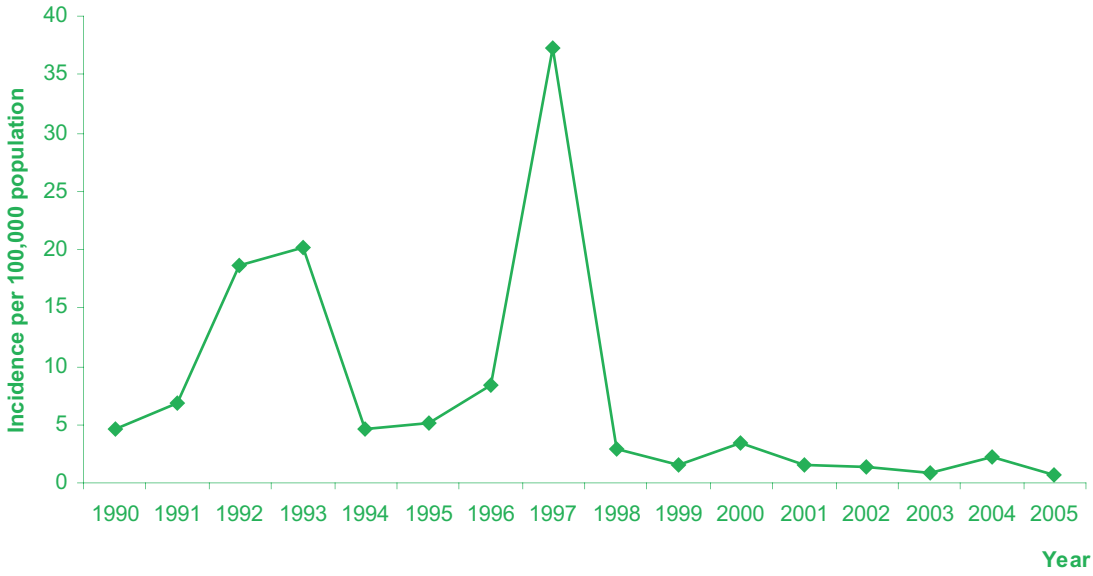


MEASLES

Measles is an acute, highly communicable viral disease caused by the measles virus, a member of the genus *Morbillivirus* of the family Paramyxoviridae. The mode of transmission is airborne by droplet spread, direct contact with nasal or throat secretions of an infected person.

In Singapore, the number of reported measles cases has rapidly declined with the introduction of compulsory measles vaccination in August 1985. In 1992 and 1997, there was an increase in the number of reported cases (Figure 1.11). All age groups were affected and as a result, the "catch-up" immunisation initiative was implemented in July - November 1997 and the two-dose MMR vaccination regime was implemented in January 1998. The incidence of measles has remained at a low level since then.

Figure 1.11
Incidence of reported measles cases, 1990 – 2005



A total of 33 laboratory confirmed cases of measles were reported in 2005 compared to 96 in 2004 (Figure 1.12). The highest incidence rate was observed in children under the age of 4 years old. Among the three major ethnic groups, Chinese had the highest incidence rate followed by Malays and Indians (Tables 1.11 and 1.12). Of the 33 cases reported, only one (3.0%) had documented history of MMR vaccination (Source: National Immunisation Registry).

Figure 1.12
E-weekly distribution of reported lab confirmed measles cases, 2004 – 2005

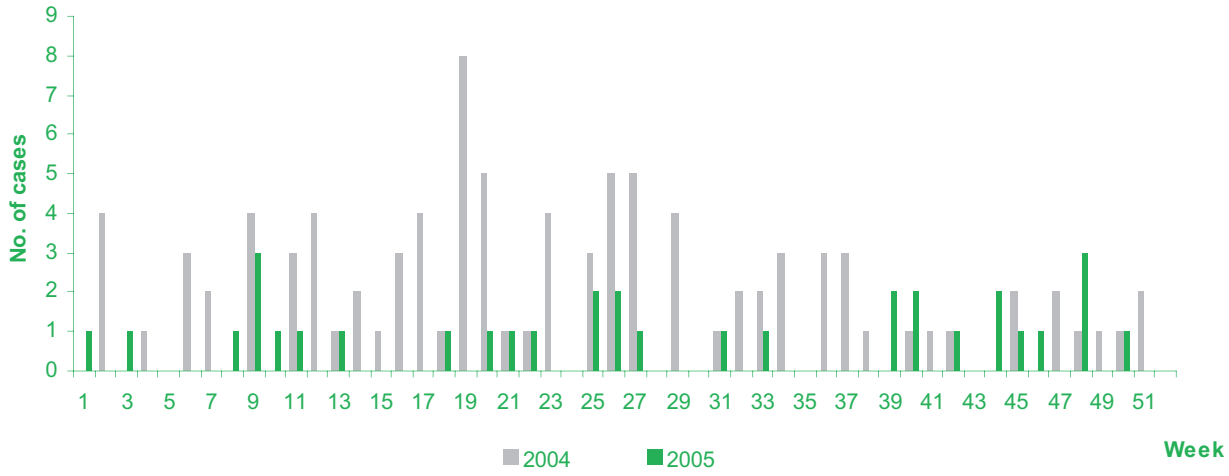


Table 1.11
Age-gender distribution and age-specific incidence rates of reported measles cases, 2005

Age (Yrs)	Male	Female	Total (%)	Incidence rate per 100,000 population*
0 – 6 mths	2	1	3 (9.1)	16.1
7 – 11 mths	4	0	4 (12.1)	21.4
1 – 4 yrs	8	3	11 (33.3)	6.4
5 – 9 yrs	1	3	4 (12.1)	1.6
10 – 14 yrs	1	2	3 (9.1)	1.1
15 – 24 yrs	2	3	5 (15.2)	0.8
25 – 34 yrs	1	1	2 (6.1)	0.2
35 – 44 yrs	0	1	1 (3.0)	0.1
45 – 54 yrs	0	0	0 (0.0)	0.0
55+	0	0	0 (0.0)	0.0
Total	**19**	**14**	**33 (100.0)**	**0.8**

***Rates are based on 2005 estimated mid-year population.**
(Source: Singapore Department of Statistics)

Table 1.12
Ethnic-gender distribution and ethnic-specific incidence rates of reported measles cases, 2005

	Male	Female	Total (%)	Incidence rate per 100,000 population*
Singapore Resident				
Chinese	5	5	10 (30.3)	0.4
Malay	1	0	1 (3.0)	0.2
Indian	0	0	0 (0.0)	0.0
Others	1	1	2 (6.1)	2.7
Foreigner	12	8	20 (60.6)	2.5
Total	**19**	**14**	**33 (100.0)**	**0.8**

*Rates are based on 2005 estimated mid-year population.
(Source: Singapore Department of Statistics)

MENINGOCOCCAL INFECTION

Meningococcal meningitis is an acute bacterial disease, characterised by sudden onset of fever, intense headache, nausea and often vomiting and stiff neck. Frequently there is a petechial rash with pink macules or very rarely, vesicles. The causative agent is *Neisseria meningitidis* with serotype groups, namely, A, B, C, Y, W-135, X and Z. The mode of transmission is via direct contact, including respiratory droplets from nose and throat of infected persons.

In 2005, there were five reported cases of meningococcal infection compared with seven cases in 2004 (Table 1.13). Three cases were confirmed by positive blood culture, one by cerebral spinal fluid and one by corneal swab for *Neisseria meningitides*. Of these confirmed cases, three were due to serogroup B, one was untyped, and one (a foreigner seeking treatment in Singapore) was due to serogroup A. (Table 1.14).

Table 1.13
Age-gender distribution and age-specific incidence rates of reported meningococcal infection cases, 2005^

Age (Yrs)	Male	Female	Total (%)	Incidence rate per 100,000 population*
0 – 4	0	0	0 (0.0)	0.0
5 – 14	0	0	0 (0.0)	0.0
15 – 24	2	0	2 (50.0)	0.3
25 – 34	0	0	0 (0.0)	0.0
35 – 44	0	0	0 (0.0)	0.0
45 – 54	1	0	1 (25.0)	0.2
55+	1	0	1 (25.0)	0.1
Total	**4**	**0**	**4 (100.0)**	**0.1**

^Excluding one foreigner seeking treatment in Singapore
*Rates are based on 2005 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 1.14
Epidemiological data of five reported cases of meningococcaemia, 2005

Case particulars				
Gender	Age (Yrs)	Ethnic group	Causative agent	Status
M	49	Malay	*Neisseria meningitides* Grp B	Died
M	22	Malay	*Neisseria meningitides* Grp B	Recovered
M	61	Indian	*Neisseria meningitides* Grp B	Recovered
M	22	Chinese	*Neisseria meningitides* (untyped)	Recovered
M	39	Chinese	*Neisseria meningitides* Grp A	Recovered*

*Foreigner seeking treatment in Singapore

MUMPS

Mumps or infectious parotitis is an acute viral disease characterised by fever, swelling and tenderness of one or more salivary glands. The mumps virus, a member of the genus Paramyxovirus, is antigenically related to the parainfluenza viruses. The mode of transmission is airborne spread via infected droplet or by direct contact with the saliva of an infected person.

The incidence of mumps in Singapore increased five-fold between 1998 and 1999, from 1,183 cases (37.4 per 100,000 population) to 6,384 cases (198.4 per 100,000 population). Children below 15 years were the most affected age-group. This increase was due to the low protective efficacy of vaccines containing the Rubini strain, which had been used between the years 1993 - 1995. Following this resurgence, a more efficacious vaccine replaced the Rubini strain-containing vaccine. Since then, the annual incidence of mumps has declined rapidly from 6,384 cases (198.4 per 100,000 population) in 1999 to 1,090 cases (33.9 per 100,000 population) in 2002 (Figure 1.13).

Figure 1.13
Incidence of reported mumps cases, 1990 – 2005

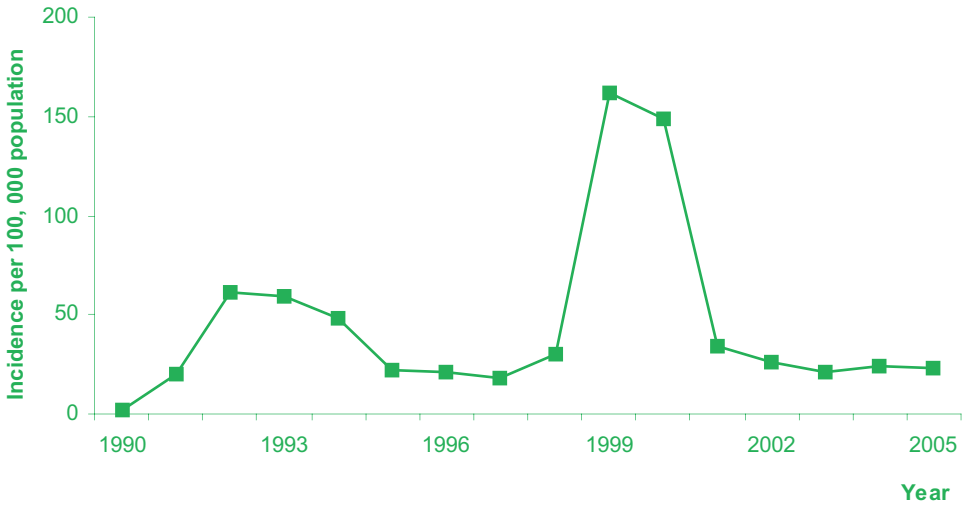
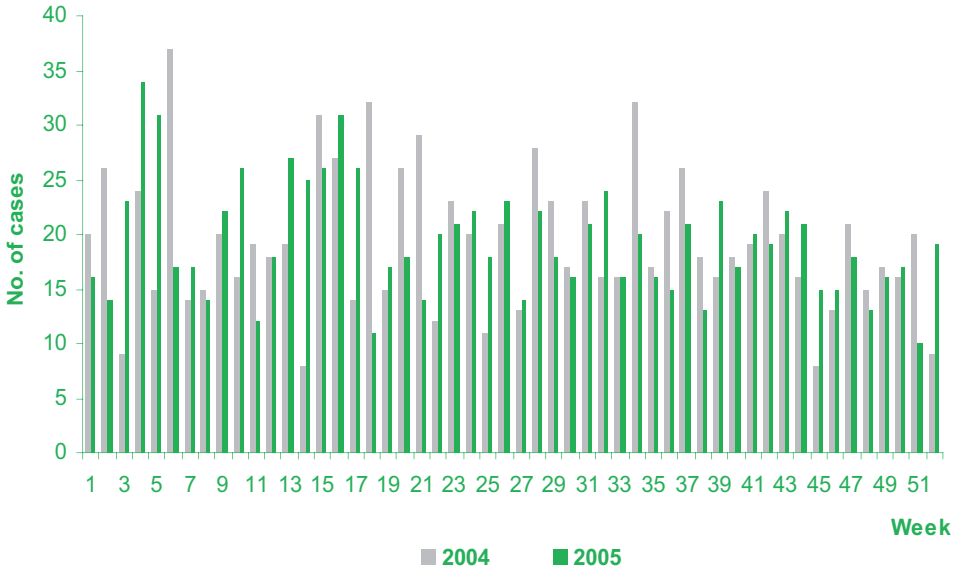


Figure 1.14
E-weekly distribution of reported mumps cases, 2004 – 2005



A total of 1,004 cases were reported in 2005, the same number of cases as 2004 (Figure 1.14). The highest incidence rate was observed in the 0 - 4 years age group (Table 1.15). Among the three major ethnic groups, Malays had the highest incidence rate followed by Chinese and Indians (Table 1.16). A mumps outbreak at a primary school is discussed below.

Table 1.15
Age-gender distribution and age-specific incidence rates of reported mumps cases, 2005

Age (Yrs)	Male	Female	Total (%)	Incidence rate per 100,000 population*
0 – 4	110	67	177 (17.6)	85.0
5 – 14	206	131	337 (33.6)	63.5
15 – 24	42	62	104 (10.4)	15.9
25 – 34	89	76	165 (16.5)	18.8
35 – 44	70	61	131 (13.1)	16.8
45 – 54	32	26	58 (5.8)	9.4
55+	10	22	32 (3.2)	4.7
Total	**559**	**445**	**1,004 (100.0)**	**23.1**

***Rates are based on 2005 estimated mid-year population.**
(Source: Singapore Department of Statistics)

Table 1.16
Ethnic-gender distribution and ethnic-specific incidence rates of reported mumps cases, 2005

	Male	Female	Total (%)	Incidence rate per 100,000 population*
Singapore Resident				
Chinese	326	246	572 (57.0)	21.3
Malay	93	70	163 (16.2)	33.6
Indian	22	15	37 (3.7)	12.0
Others	14	17	31 (3.1)	41.5
Foreigner	104	97	201 (20.0)	25.2
Total	**559**	**445**	**1,004 (100.0)**	**23.1**

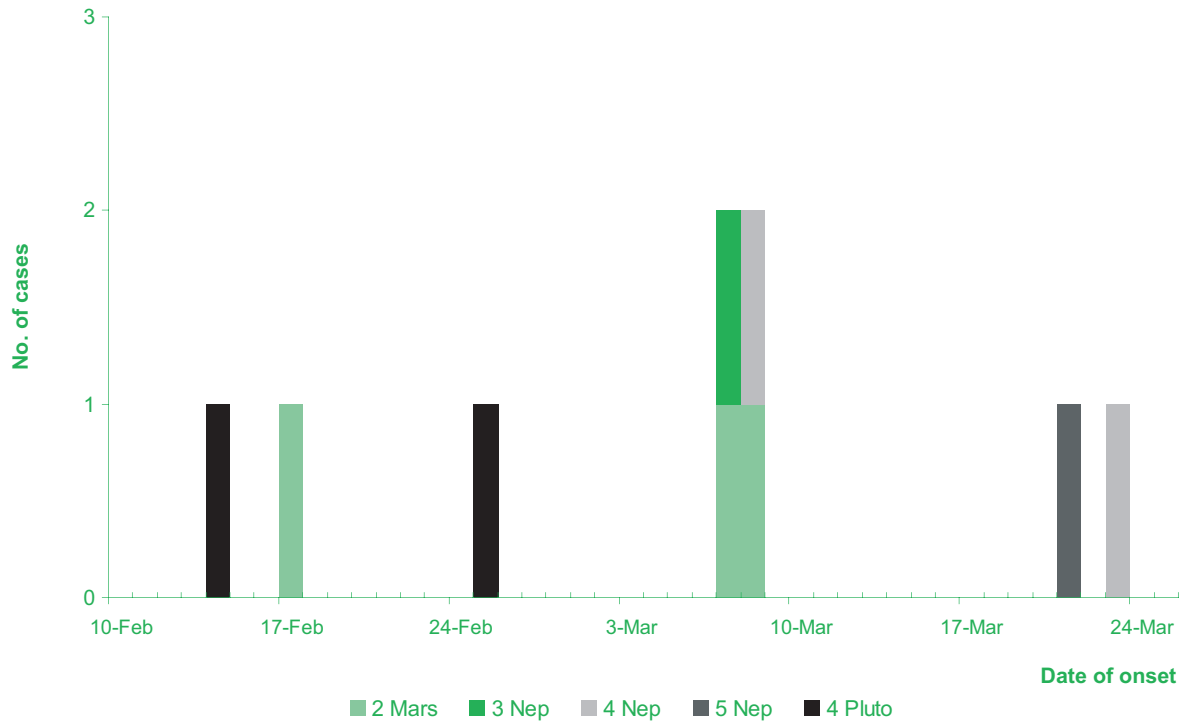
***Rates are based on 2005 estimated mid-year population.**
(Source: Singapore Department of Statistics)

Mumps outbreak in a primary school at Siglap

An outbreak of mumps involving students from a primary school at Siglap between 14th February and 23rd March 2005 was notified to Ministry of Health in February 2005.

The index case was a 10-year-old Primary 4 student who exhibited signs and symptoms of mumps on 14th February 2005. The infection spread to other students at the Primary 2 and 5 levels and the total number of cases was 9. The epidemic curve is shown in Figure 1.15.

Figure 1.15
Epidemic curve of nine cases of mumps in a primary school at Siglap, 2005



Vaccine efficacy was calculated based on the MMR immunisation records of students in the five affected classes. These were extracted from the students' health booklets and National Immunisation Registry. The majority (80.3%) of these students had been vaccinated with the first dose of MMR vaccine at 15 months of age.

The vaccine efficacy of the first dose of MMR was calculated as follows:

$$\text{Vaccine efficacy} = \frac{\text{Attack rate in unvaccinated} - \text{Attack rate in vaccinated}}{\text{Attack rate in unvaccinated}} \times 100\%$$

$$= \frac{(4/38) - (5/155)}{(4/38)} \times 100\%$$

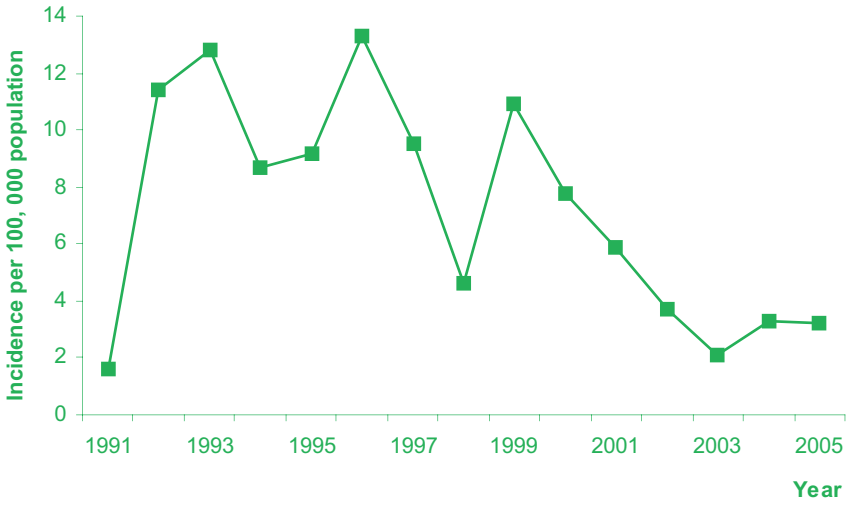
$$= 69.4\ \%$$

RUBELLA

Rubella is a mild febrile viral disease with a diffuse punctuate and maculopapular rash sometimes resembling that of measles or scarlet fever. It is also commonly known as German measles. The causative agent is the rubella virus (*Rubivirus*) from the Togaviridae family and it is spread through droplets or by close contact with the nasopharyngeal secretions of an infected person.

Rubella incidence fluctuated during 1991 - 2000, followed by a steady decline from 2001 - 2003. The incidence rate has stabilised at about 3.25 per 100,000 population for the past 2 years (Figure 1.16).

Figure 1.16
Incidence of reported rubella cases, 1991 – 2005



A total of 139 cases of rubella were reported in 2005, a slight decrease of 1.4% from the 141 cases reported in 2004 (Figure 1.17). The highest incidence rate was observed in the 0 - 4 years age group (19.7 per 100, 000) (Table 1.17). 20.9% of the cases were from the 25 - 34 years old age group. Among the three major ethnic groups, Malay had the highest incidence rate, followed by Chinese and Indians. Foreigners comprised 30.9% of cases (Table 1.18).

There was one reported case of congenital rubella for 2005. The mother of the infant had an antenatal history of rubella infection at her 7th week of gestation and decided not to terminate the pregnancy after counseling. She delivered a baby girl with congenital rubella syndrome at 35th week of gestation on 13 October 2005. The baby's congenital defect at birth included low birth weight of 1,055 grams, bilateral Grade 1 intra-ventricular haemorrhage, large Patent Ductus Arteriosus (PDA) of 2.4 millimeters and Arterial Septal Defect (ASD)/ Patent Foramen Ovale (PFO) of 1.36 millimetres. The mother had no documented history of MMR or rubella vaccination.

There were no terminations of pregnancy as a result of acquired maternal rubella infection.

Figure 1.17
E-weekly distribution of reported rubella cases, 2004 – 2005

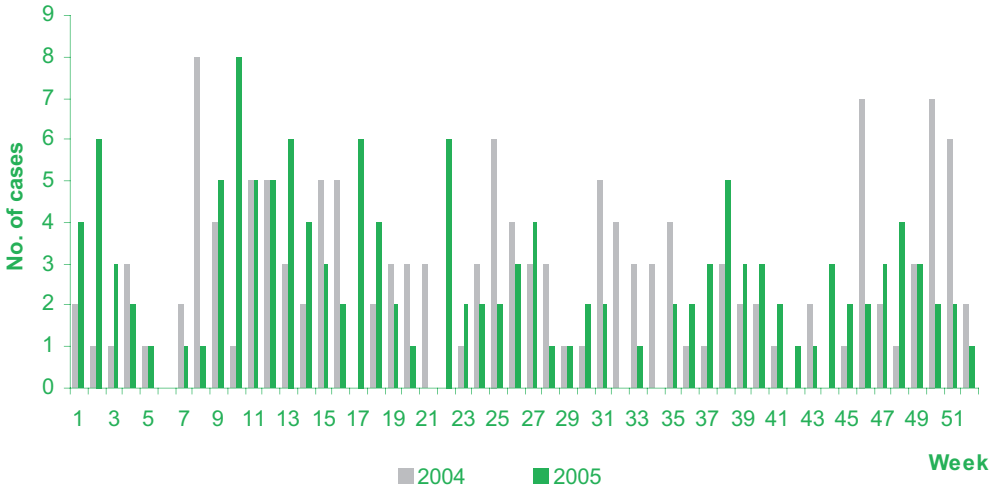


Table 1.17
Age-gender distribution and age-specific incidence rates of reported rubella cases, 2005

Age (Yrs)	Male	Female	Total (%)	Incidence rate per 100,000 population*
0 – 4	25	16	41 (29.5)	19.7
5 – 14	5	9	14 (10.1)	2.6
15 – 24	11	8	19 (13.7)	2.9
25 – 34	14	15	29 (20.9)	3.3
35 – 44	15	7	22 (15.8)	2.8
45 – 54	3	9	12 (8.6)	1.9
55+	1	1	2 (1.4)	0.3
Total	**74**	**65**	**139 (100.0)**	**3.2**

*Rates are based on 2005 estimated mid-year population.
(Source: Singapore Department of Statistics)

Table 1.18
Ethnic-gender distribution and ethnic-specific incidence rates of reported rubella cases, 2005

	Male	Female	Total (%)	Incidence rate per 100,000 population*
Singapore Resident				
Chinese	41	33	74 (53.2)	2.8
Malay	12	6	18 (12.9)	3.7
Indian	1	3	4 (2.9)	1.3
Others	0	0	0 (0.0)	0.0
Foreigner	20	23	43 (30.9)	5.4
Total	**74**	**65**	**139 (100.0)**	**3.2**

***Rates are based on 2005 estimated mid-year population.**
(Source: Singapore Department of Statistics)

VIRAL CONJUNCTIVITIS

Viral conjunctivitis is a clinical syndrome characterised by inflammation of the conjunctiva of the eyes beginning with lacrimation, irritation and hyperemia of the palpebral and bulbar conjunctivae. The common causative agents are the adenoviruses and the enteroviruses.

In 2005, the restructured polyclinics reported 43,944 attendances for conjunctivitis, an increase of 41% from the 31,261 attendances reported in 2004 (Figure 1.18). A major conjunctivitis outbreak was reported between Week 33 and Week 41. This outbreak is discussed in "Special Feature - Viral Conjunctivitis" earlier in this report.

Figure 1.18
E-weekly distribution or reported conjunctivitis cases, 2004 – 2005