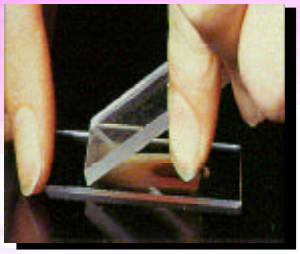


Vector-Borne Diseases

II

VECTOR-BORNE DISEASES

MALARIA

A total of 266 cases were reported during the year compared with 316 cases in 1999, a drop of 15.8%. Of these cases, 264 (99.2%) were imported and 2(0.8%) locally acquired. The distribution of the cases by parasite species was *P. vivax* (64.3%), *P. falciparum* (33.1%), and mixed infection (2.6%) (*Table 2.1*).

The age-specific incidence rate was highest in the 25-34 year age group and the male to female ratio was 3.9:1 (*Table 2.2*). The ethnic-specific incidence rate for Malays was about 3.3 times that of Chinese and 1.7 times that of Indians (*Table 2.3*). Cases were reported throughout the year (*Fig. 2.1*).

Table 2.1

Classification of reported malaria cases by parasite species, 2000

Classification	Parasite species					Total (%)
	P.v.	P.f.	Mixed (P.v. & P.f.)	Mixed (P.v. & P.m.)	P.m.	
Indigenous	0	0	0	0	0	0
Introduced	0	0	0	0	0	0
Induced	0	0	0	0	0	0
Imported*	170 (63.9)	87 (32.7)	7 (2.6)	0	0	264 (99.2)
Cryptic	1 (0.4)	1 (0.4)	0	0	0	2 (0.8)
Total (%)	171 (64.3)	88 (33.1)	7 (2.6)	0	0	266 (100)

P.v. - *Plasmodium vivax* P.m. - *Plasmodium malariae*

P.f. - *Plasmodium falciparum* *Including relapsing and induced cases which were imported.

Table 2.2

Age-gender distribution and age-specific incidence rates of reported malaria cases, 2000

Age group	Male	Female	Total (%)	Incidence rates per 100,000*
0 - 4	6	2	8 (3.0)	3.8
5 - 14	5	2	7 (2.6)	1.4
15 - 24	33	11	44 (16.6)	10.4
25 - 34	69	22	91 (34.2)	16.3
35 - 44	52	5	57 (21.4)	9.0
45 - 54	27	5	32 (12.0)	6.8
55 - 64	20	7	27 (10.2)	5.7
Total	212	54	266 (100)	8.2

*Rates are based on 2000 census population.

(Source: Department of Statistics, Singapore)

Table 2.3

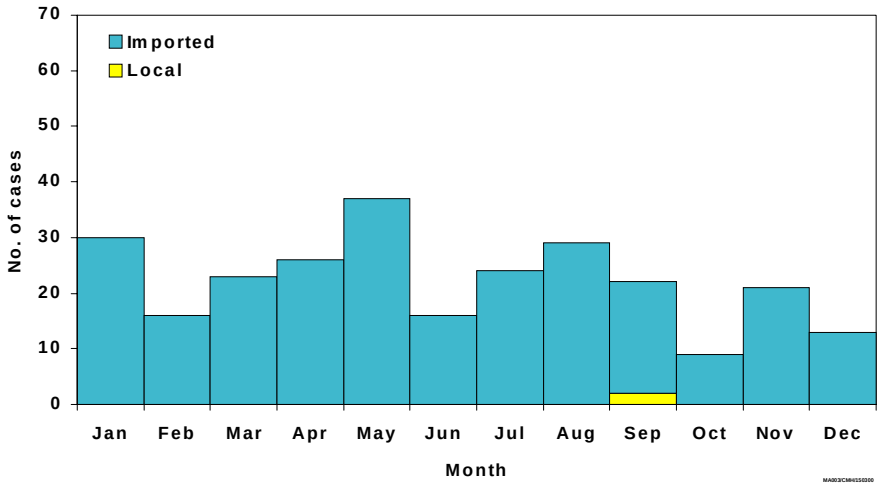
Ethnic-gender distribution and ethnic-specific incidence rates of reported malaria cases, 2000

Age group	Male	Female	Total (%)	Incidence rates per 100,000*
Chinese	39	6	45 (16.9)	1.8
Malays	20	7	27 (10.2)	6.0
Indians	6	3	9 (3.4)	3.5
Others	3	2	5 (1.9)	10.8
Foreigners	144	36	180 (67.6)	-
Total	212	54	266 (100.0)	8.2

*Rates are based on 2000 census population.

(Source: Department of Statistics, Singapore)

Figure 2.1
Monthly distribution of reported malaria cases in Singapore, 2000



Imported malaria

Majority of the imported malaria cases were contracted in Indonesia (51.9%) and India (28.0%) (*Table 2.4*). *P. falciparum* accounted for 40.1% of the infections acquired in Indonesia. Most of the cases (80.6%) had onset of fever within three weeks after entry into Singapore. For vivax malaria, 7.1% did not develop symptoms until more than six months after entry. (*Table 2.5*).

The imported cases comprised 31.8% local residents; 26.5% work permit/employment pass holders; 23.9% foreigners seeking medical treatment in Singapore; 7.2 % tourists from other countries; and 10.6% other categories of foreigners (*Table 2.6*).

A large proportion of local residents travelled to malarious areas without taking adequate personal precautionary measures. Only 1 (1.2%) of the 83 local residents with imported malaria took a complete course of chemoprophylaxis (*Table 2.7*).

Deaths from malaria

There were three deaths from falciparum malaria among the imported cases.

The first case was a 25-year-old Singaporean housewife who was admitted to National University Hospital (NUH) with high fever, respiratory distress, hypotension, kidney and liver failure on 23 April. She had been in Pulau Kampong Kang, off Pulau Batam, since 26 Feb and developed fever there on 1 Apr. She subsequently returned to Singapore on 11 Apr for medical treatment. On admission, the diagnosis of falciparum malaria was confirmed by microscopy (1.45% parasitaemia). She died one day after admission.

Table 2.4

Imported malaria cases by country of origin and by parasite species, 2000

Countries	P.v.	P.f.	Mixed (P.v. & P.f.)	Mixed (P.v. & P.m.)	P.m.	Total	%
Southeast Asia							
Indonesia	75	55	7	0	0	137	51.9
Malaysia	7	3	0	0	0	10	3.8
Thailand	5	2	0	0	0	7	2.7
Myanmar	7	0	0	0	0	7	2.7
Vietnam	1	1	0	0	0	2	0.7
Indian subcontinent							
India	64	10	0	0	0	74	28.0
Pakistan	2	0	0	0	0	2	0.7
Sri Lanka	1	0	0	0	0	1	0.4
Pacific islands							
Papua New Guinea	3	2	0	0	0	5	1.9
Africa							
Nigeria	0	1	0	0	0	1	0.4
Tanzania	0	1	0	0	0	1	0.4
Mali	0	1	0	0	0	1	0.4
Mozambique	1	1	0	0	0	2	0.7
South Africa	2	7	0	0	0	9	3.4
Liberia	0	1	0	0	0	1	0.4
Other parts of Africa	2	2	0	0	0	4	1.5
Total	170	87	7	0	0	264	100

P.v. - *Plasmodium vivax*

P.f. - *Plasmodium falciparum*

P.m. - *Plasmodium malariae*

Table 2.5

Imported malaria cases by interval between time of entry and onset of illness and by parasite species, 2000

Interval	Parasite species					
In weeks	P.v. (imported relapsing)	P.f.	Mixed P.v. & P.f.	Mixed P.v. & P.m.	P.m.	Total (%)
<2	111	77	5	0	0	193 (73.1)
2 - 3	13	5	2	0	0	20 (7.5)
4 - 5	6	3	0	0	0	9 (3.4)
6 - 7	2	1	0	0	0	3 (1.1)
8 - 9	6	0	0	0	0	6 (2.3)
10 - 11	6	0	0	0	0	6 (2.3)
12 - 13	4 (1)	0	0	0	0	4 (1.5)
14 - 15	6	0	0	0	0	6 (2.3)
16 - 17	2	0	0	0	0	2 (0.8)
18 - 19	2	0	0	0	0	2 (0.8)
20 - 23	0	0	0	0	0	0 (0.0)
24 - 27	4 (1)	0	0	0	0	4 (1.5)
28 - 31	1	0	0	0	0	1 (0.4)
32 - 35	4	0	0	0	0	4 (1.5)
36 - 39	0	1	0	0	0	1 (0.4)
40+	3	0	0	0	0	3 (1.1)
Total	170 (2)	87	7	0	0	264 (100)

P.v. - *Plasmodium vivax*

P.f. - *Plasmodium falciparum*

P.m. - *Plasmodium malariae*

Table 2.6

Classification of imported malaria cases by population group, 1999-2000

Classification	1999		2000	
	Cases	%	Cases	%
Local residents who contracted malaria overseas	90	29.4	84	31.8
Tourists from other countries	31	10.1	19	7.2
Foreigners seeking medical treatment in Singapore	57	18.6	63	23.9
Work permit holders	53	17.3	49	18.5
Employment pass holders	11	3.6	21	8.0
Foreign residents who contracted malaria overseas	21	6.9	3	1.1
Foreign students	11	3.6	5	1.9
Foreign seamen	20	6.5	20	7.6
Illegal immigrants	3	1.0	0	0
Others	9	2.9	0	0
Total	306	100	264	100

Table 2.7

Epidemiological characteristics of local residents who contracted malaria overseas, 1996-2000

Classification	1996	1997	1998	1999	2000
Purpose of travel					
Social visits/holidays	73	110	108	73	60
Business	10	10	16	9	16
Military service	2	1	5	8	7
Chemoprophylaxis					
Took complete chemoprophylaxis	3	1	4	8	1
No chemoprophylaxis	81	115	119	74	71
Irregular/incomplete chemoprophylaxis	1	5	6	8	11
Ethnic group					
Chinese	37	48	49	46	45
Malays	21	43	60	29	27
Indians	20	17	17	13	8
Others	7	13	3	2	3
Total	85	121	129	90	83

The second case was a 39-year-old male New Zealander who was in Sumatra between 1 Apr and 9 Jun. He had onset of fever on 1 Jun and came to Singapore on 9 Jun for medical treatment. He was admitted to Singapore General Hospital (SGH) in a severely ill condition. His blood smears revealed *P. falciparum* (0.8% parasitaemia) and he subsequently died on 12 Jun.

The third case was a 50-year-old self-employed Singaporean who had traveled to Pulau Batam on business between 10 and 13 Jun. He developed fever on 20 Jun after returning home but did not seek any medical treatment. He was admitted to SGH on 15 Jul following a fall. On admission, he was found to have a high fever and was diagnosed to have falciparum malaria by microscopy with a parasite loading of 4%. Other complications included pneumonia, kidney and liver failure and septicaemic shock. He died on 13 Aug.

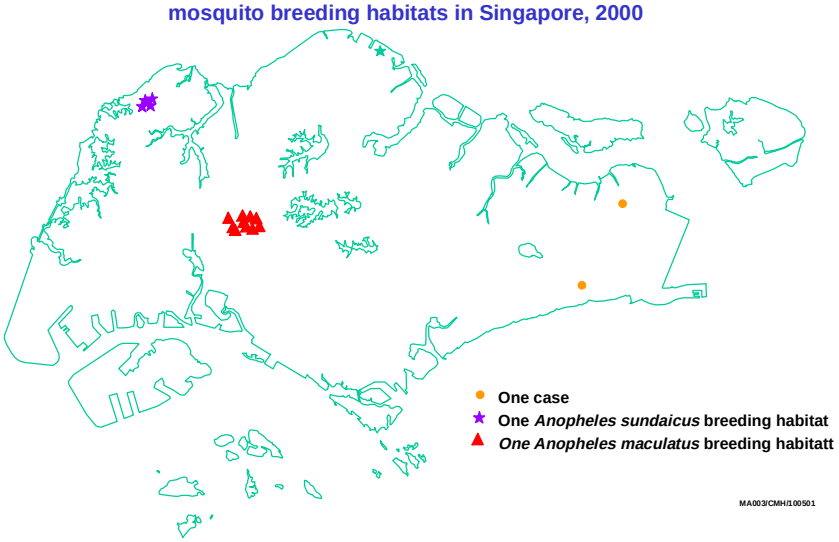
Local malaria

There were two local cases of malaria. The first case was a 35-year-old Indian inmate from Selarang Drug Rehabilitation Centre with vivax malaria. The other case was a 28-year-old Filipino nurse from East Coast Medical Centre with falciparum malaria. (*Fig 2.2*). No secondary cases resulting from these two local cases were detected.

All the 400 blood films taken from the inmates, staff and foreign construction workers in the vicinities were negative for malaria parasites.

Vector surveillance and control operations were carried out in the localities. Despite extensive larval surveys and night trapping of adult mosquitoes, no *Anopheles* larvae or adults were detected.

Figure 2.2
Geographical distribution of 2 reported local cases of malaria and *Anopheles* mosquito breeding habitats in Singapore, 2000



Blood slides examination

A total of 3,136 blood films was collected during routine epidemiological investigations and examined for malaria parasites. None of the blood films was found positive (*Table 2.8*). In addition, 22,995 blood films were examined at the clinical laboratories of restructured hospitals. Of these, 407 (1.8%) were positive for malaria parasites (*Table 2.9*).

Table 2.8

Malaria surveillance, 2000

Locality	No. of blood films examined	No. positive for malaria parasites
Hillview Avenue	285	0
Hume Avenue	313	0
Bukit Batok Road	227	0
Bukit Batok West Avenue 5	205	0
Bukit Batok West Avenue 7	207	0
Dairy Farm Road	61	0
Upper Bukit Timah Road	229	0
Chestnut Drive	33	0
Sembawang Road (end)	77	0
Hindhede Road	74	0
Yishun Street 23	150	0
Mandai Road	202	0
Eastwood Road	89	0
Punggol Track 24	75	0
Pandan Loop	65	0
Selarang Park Road	104	0
Calshot Road	207	0
Hougang Avenue 7	84	0
Sengkang	200	0
Clemenceau Avenue	99	0
Bayshore Road	150	0
Total	3,136	0

Table 2.9

Examination of blood films for malaria parasites at various restructured hospitals, 2000

Institution	No. of blood films examined	No. positive	%
Singapore General Hospital	8,865	38	0.4
Tan Tock Seng Hospital	4,145	289	7.0
Changi General Hospital	3,437	33	1.0
Alexandra Hospital	1,533	12	0.8
National University Hospital	3,101	20	0.6
KK Women's & Children's Hospital	1,914	15	0.8
Total	22,995	407	1.8

DENGUE FEVER/DENGUE HAEMORRHAGIC FEVER (DF/DHF)

In 2000, a total of 673 cases of DF/DHF were reported compared with 1,355 cases in 1999, showing an overall decrease of 50%. Of the reported cases, 663 cases (98.5%) were diagnosed as DF and 10 cases (1.5%) as DHF. Majority of the cases (85%) were hospitalised.

The incidence rate among local residents was highest in the 15-24 year age group with a male to female ratio of 1.8:1 (*Table 2.10*). Among the three major ethnic groups, the incidence rate was highest among the Chinese followed by the Malays and Indians. Foreigners comprised 24.4% of the indigenous case *(Table 2.11*). 43.9% of these foreigners were employed as labourers or related workers in the construction and manufacturing industry (*Table 2.12*).

Residents in Housing & Development Board (HDB) flats, compound houses and condominiums accounted for 53.5%, 25.9%, and 10.4%, respectively, of the cases. The incidence rate of residents of compound houses was about five times higher than that of HDB dwellers (*Table 2.13*).

The incidence was highest during the month of August (*Fig 2.3*). Most of the cases were concentrated in the south-eastern (36.4%) and southern (26.7%) parts of Singapore *(Table 2.14).*

A total of 9 foci of dengue transmission (2 or more epidemiologically related cases) were identified with 1 (11%) having 10 cases or more *(Fig. 2.4).* The main foci were in the following areas:

Table 2.10

Age-gender distribution and age-specific incidence rates of indigenous DF/DHF cases (local residents), 2000

Age-group	Male	Female	Total (%)	Incidence rates per 100,000*
0 - 4	3	2	5 (1.6)	2.3
5 – 14	11	7	18 (5.9)	3.7
15 – 24	44	24	68 (22.4)	16.0
25 - 34	29	21	50 (16.5)	9.0
35 - 44	45	28	73 (24.0)	11.5
45 - 54	29	17	46 (15.1)	9.8
55+	27	17	44 (14.5)	9.3
Total	188	116	304 (100)	9.3

*Rates are based on 2000 census population
(Source: Department of Statistics, Singapore)

Table 2.11

Ethnic-gender distribution and ethnic-specific incidence rates of indigenous DF/DHF cases, 2000

Ethnic group	Male	Female	Total (%)	Incidence rates per 100,000*
Chinese	144	93	237 (58.9)	9.5
Malays	26	14	40 (9.9)	8.8
Indians	14	5	19 (4.7)	7.4
Others	4	4	8 (2.0)	17.2
Foreigners	72	26	98 (24.4)	-
Total	260	142	402 (100)	12.3

*Rates are based on 2000 census population
(Source: Department of Statistics, Singapore)

Table 2.12

Occupational profile of indigenous DF/DHF cases among foreigners, 2000

Occupation*	No. (%)
Labourers and related workers	
Construction labourers and related workers	28 (28.6)
Manufacturing labourers and related workers	15 (15.3)
Service workers and shop/market sales workers	
House stewards and related workers	6 (6.1)
Wholesale and retail trade salesmen	1 (1.0)
Prefessional/associate professional/technicians	
Engineers/assistants	4 (4.1)
Technicians	4 (4.1)
Mechanics	3 (3.1)
Health professionals/associate professionals	3 (3.1)
Teaching professionals	1 (1.0)
Professionals not elsewhere classified	8 (8.2)
Corporate managers	2 (2.0)
Unclassified	
Students	10 (10.2)
Housewives	6 (6.1)
Others	7 (7.1)
Total	98 (100)

*Based on Singapore Standard Occupational Classification, 2000
(Department of Statistics, Singapore)

Table 2.13

Incidence rates of reported indigenous DF/DHF cases by housing type, 2000

Housing types	Cases (%)	Incidence rates per 100,000 population*
Compound house	104 (25.9)	43.6
HDB flat	215 (53.5)	8.8
Condominium	42 (10.4)	21.6
Bangsals, containers/workers' quarters	41 (10.2)	45.0
Total	402 (100)	13.5

*Rates are based on 2000 census population
(Source: Department of Statistics, Singapore)

Figure 2.3
Monthly distribution of DF/DHF cases in Singapore, 2000

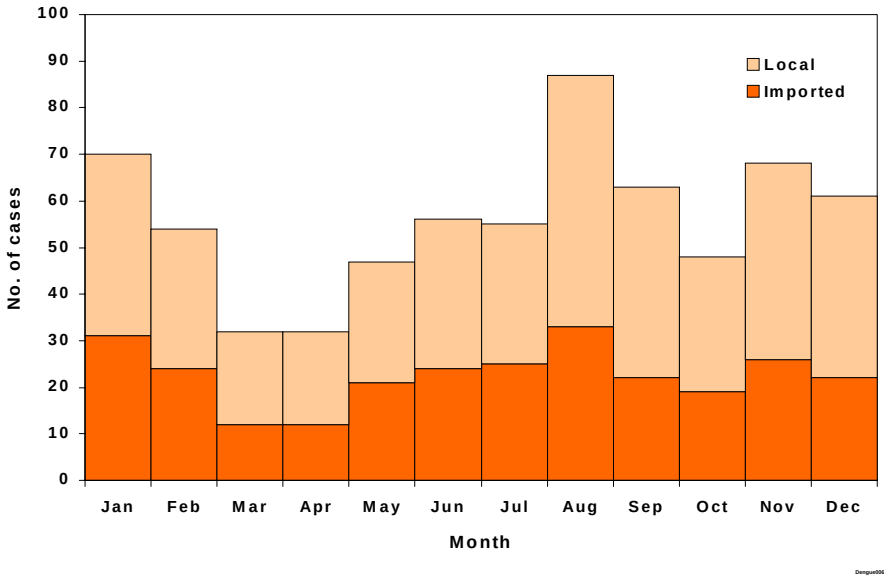


Figure 2.4
Geographical distribution of DF/DHF clusters in Singapore, 2000

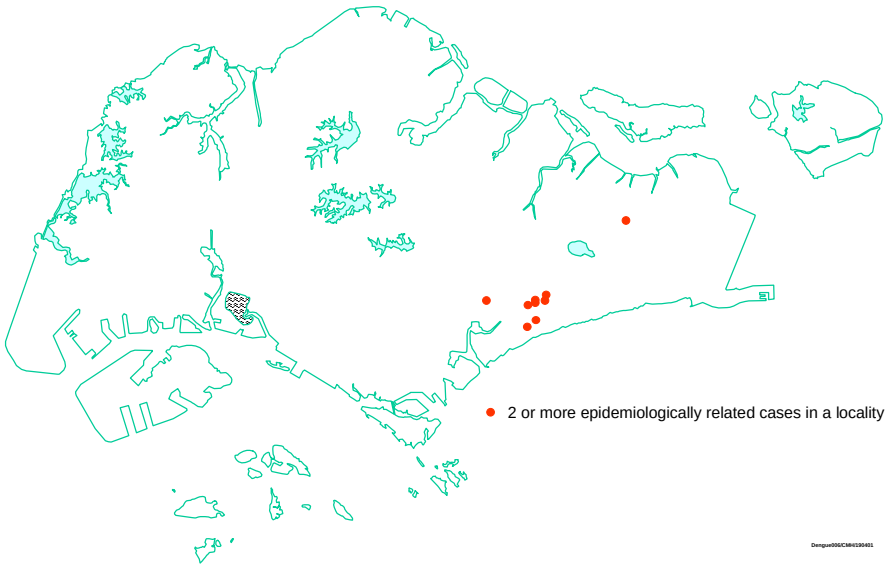


Table 2.14

Geographical distribution of DF/DHF cases in Singapore, 2000

Geographical location	Constituency	No. of cases	%
Southeastern			
	Aljunied	37	5.5
	East Coast	69	10.3
	Hougang	10	1.5
	Jalan Besar	26	3.9
	Macpherson	2	0.3
	Marine Parade	98	14.6
	Potong Pasir	3	0.4
Northeastern			
	Ang Mo Kio	21	3.1
	Cheng San	17	2.5
	Pasir Ris	17	2.5
	Tampines	37	5.5
Southern			
	Kampong Glam	5	0.7
	Kreta Ayer- Tanglin	153	22.7
	Tanjong Pagar	22	3.3
Northern			
	Ngee Soon Central	4	0.6
	Sembawang	38	5.6
Western			
	Ayer Rajah	8	1.2
	Boon Lay	4	0.6
	Bukit Gombak	5	0.7
	Choa Chu Kang	4	0.6
	Hong Kah	23	3.4
Central			
	Bishan-Toa Payoh	23	3.4
	Bukit Timah	29	4.3
	West Coast	18	2.7

Tampines Street 21/Tampines Street 24 area - 11 cases (Dec); Ipoh Lane/Haig Road area - 5 cases (Jun – Jul); Rambutan Road/Joo Chiat Place area - 5 cases (Dec); Peach Garden/Meyer Road area - 4 cases (Jul - Aug); and Koon Seng Road/Rambai Road area - 4 cases (Aug - Sep).

One-tenth of the total cases reported was epidemiologically linked to these specific foci of transmission (*Table 2.15*). The median number of cases in these foci was 4 and the median duration of transmission was 15 days.

Imported cases

There were 271 (40.3%) imported cases, comprising 265 cases of DF and 6 cases of DHF. Majority of the cases (92%) were from the countries in the Southeast Asian region:- 171 from Indonesia and 64 from Malaysia (*Table 2.16*). All these cases had a history of travel 2-10 days prior to the date of onset of illness.

Table 2.15

Dengue clusters* identified during the period 1990-2000

Year	No. of indigenous cases	No. of clusters	No. of cases in cluster area (% total cases)	No. of clusters with ≥ 10 cases (% total clusters)	Median no. of cases per cluster	Median duration of transmission (days)
1990	1,640	40	270 (16.5)	11 (27.5)	4.5	10.0
1991	2,062	74	414 (20.1)	9 (12.2)	3.5	6.0
1992	2,741	134	733 (26.7)	13 (9.7)	3.0	5.0
1993	794	33	183 (23.0)	4 (12.1)	3.0	8.0
1994	1,084	75	424 (39.1)	8 (10.7)	3.0	7.0
1995	1,756	118	679 (38.7)	16 (13.6)	3.0	7.0
1996	2,877	143	1,088 (37.8)	27 (18.9)	3.0	6.0
1997	4,039	198	1,124 (27.8)	24 (12.1)	3.0	5.0
1998	5,105	239	1,197 (23.4)	23 (9.6)	2.0	7.0
1999	1,138	54	230 (20.2)	6 (11.1)	3.0	11.0
2000	402	9	40 (10.0)	1 (11.1)	4.0	15.0

*A cluster is defined as two or more cases epidemiologically linked by place (within 200 metres) and time (within three weeks or approximately two incubation periods)

Table 2.16

Imported DF/DHF cases, 1996-2000

	Year				
	1996	1997	1998	1999	2000
Southeast Asia					
Indonesia	113	103	51	116	171
Malaysia	99	107	66	65	64
Thailand	8	20	18	9	5
Philippines	4	4	1	1	3
Vietnam	1	2	1	2	0
Cambodia	0	5	3	2	2
Brunei	1	0	3	0	5
Myanmar	0	4	1	3	0
Laos	1	1	6	0	0
Indian subcontinent					
India	14	8	2	7	6
Bangladesh	2	0	0	4	9
Sri Lanka	4	0	0	6	3
Pakistan	1	0	0	0	0
Others					
China	2	0	0	0	0
Maldive Islands	0	0	0	1	1
Nigeria	0	0	0	0	1
Libya	0	0	1	1	1
Unknown	1	7	0	0	0
Total	251	261	153	217	271

Deaths from dengue

There were two deaths in 2000. Both were classified as imported.

The first case was a 53-year-old male local resident (gardener) who had a travel history to Tanjong Pinang 3 days preceding his onset of symptoms on 23 May. He was admitted to Changi General Hospital 2 days later with high fever, vomiting and a generalised petechial rash. While in the ward, he continued to deteriorate with progressive thrombocytopaenia. He developed massive gastro-intestinal bleeding and died on 29 May. Test for dengue IgM antibody was positive.

The second case was a 45-year-old Bangladeshi engineer who presented with symptoms of fever and headache on 23 July in Dhaka. He was admitted to a hospital there between 27 and 30

July and diagnosed as having DHF. On 31 July, he was flown in to Singapore for further medical treatment. He was found to be in a moribund state and had progressive thrombocytopaenia over the next few days. A brain scan done showed areas of haemorrhage in the right temporal lobe and the left parieto-occipital lobe. His condition deteriorated rapidly and he died on 8 August. Test for dengue IgM antibody was positive.

Laboratory surveillance

All cases were serologically confirmed by one or more of the laboratory tests; viz. IgM enzyme immunoassay (EIA) and the haemagglutination-inhibition test. Dengue virus isolation was undertaken from the blood samples of 327 cases. Of these, 11 (3.4%) were positive. DEN-1 was isolated from 4 cases, DEN-2 from 4 cases, DEN-3 from 1 case and DEN-4 from 2 cases (*Table 2.17*).

Table 2.17

Surveillance of dengue serotypes in Singapore, May 1992 - Dec 2000

Year	Total no. of samples tested	No. of positive isolates (%)				
		Dengue 1	Dengue 2	Dengue 3	Dengue 4	Untyped
1992 (wef May)	154	4 (2.6)	5 (3.2)	21 (13.6)	0	0
1993	257	1 (0.4)	14 (5.4)	4 (1.6)	0	2 (0.8)
1994	309	8 (2.6)	16 (5.2)	20 (6.5)	0	1 (0.3)
1995	257	20 (7.8)	8 (3.1)	17 (6.6)	2 (0.8)	0
1996	255	10 (3.9)	5 (2.0)	2 (0.8)	1 (0.4)	0
1997	254	18 (7.1)	15 (5.9)	0	0	0
1998	266	12 (4.5)	19 (7.1)	3 (1.1)	0	0
1999	348	11 (3.2)	8 (2.3)	2 (0.6)	0	0
2000	327	4 (1.2)	4 (1.2)	1 (0.3)	2 (0.6)	0
Jan	23	0	0	0	0	0
Feb	25	0	1	0	0	0
Mar	22	0	0	0	0	0
Apr	38	4	1	0	2	0
May	36	0	0	1	0	0
Jun	31	0	0	0	0	0
Jul	26	0	0	0	0	0
Aug	23	0	0	0	0	0
Sep	28	0	2	0	0	0
Oct	22	0	0	0	0	0
Nov	25	0	0	0	0	0
Dec	28	0	0	0	0	0

Entomological surveillance

Of 583,916 premises checked for mosquito breeding, 3,265 (0.6%) were found to breed *Ae. aegypti* (*Table 2.18*) while 4,549 (0.8%) were found to breed *Ae. albopictus* (*Table 2.19*). Among the various types of premises, the proportion of compound houses found breeding *Ae. aegypti* was twice higher than that of HDB flats. In the case of *Ae. albopictus*, it was six times higher. The most common *Aedes* mosquito breeding habitats were domestic and ornamental containers and discarded receptacles. Of 26,605 vacant premises surveyed, 0.5% were found breeding *Ae. aegypti* and 0.2%, *Ae. albopictus*

Outbreak at Tampines St 21/Tampines St 24

On 6 Dec 00, the Ministry of the Environment was notified of a case of dengue fever involving a resident at Tampines Street 21. Within the next six days, two more cases from the same area were notified.

As soon as the cluster of cases in the area was identified on 11 Dec 00, vector control operations were stepped up.

A total of 21 HDB residents who presented with fever (100%) and petechial rash (45%) were serologically confirmed to have dengue by the IgM EIA test. Their onset of illness was between 1 Dec 00 and 5 Feb 01 (*Fig. 2.5*). There were 20 cases of DF and 1 case of DHF. Almost all the cases (95%) were hospitalised.

The cases comprised 8 students, 5 supervisors, 3 housewives, 1 national servicemen, 1 manager, 1 waitress, 1 operator and 1 designer. Majoritiy of the cases were in the 15 – 34 year age group with a male to female ratio of 1: 1 *(Table 2.20)*. The geographical distribution of the cases is shown in *Fig. 2.6*.

Aedes breeding habitats were identified in 214 (1.6%) of 13,508 premises inspected.

Abundant breedings were found in plant containers (38.8%), domestic containers (16.4%), roof top scupper drains/concrete floors (12.6%), scupper drains (8.4%). Other breeding habitats included discarded containers (6.1%), bamboo pole holders (4.7%), gully traps (2.8%), toilet bowls/ cisterns (1.9%), perimeter drains (1.3%), concrete floors (0.0%), and others (6.1%).

The main vector was *Ae. aegypti*, which accounted for 84.5% of the breedings detected.

Table 2.18

Distribution of *Aedes aegypti* breeding habitats by type of premises, 2000

Type of premises	Total no. checked	No. of premises breeding (%)	Number of breeding habitats																		
			Ornamental container	Domestic container	Discarded receptacle	Perimeter drain	Toilet bowl/cistern	Roof-top water tank	Puddle/ground depression	Canvas/plastic sheet	Roof gutter	Pond/swimming pool	Water stopcock pit/valve chamber	Roof-top	Plant	Sumpit	Inspection chamber cover	Lightning conductor pit	Gully trap	Others	Total
Flat	321,874	1,163 (0.36)	549	360	47	13	15	1	21	8	5	9	0	25	5	0	1	0	4	172	1,235
Compound house	146,726	1,134 (0.77)	283	431	80	46	19	1	18	56	106	44	0	4	6	1	4	1	5	126	1,231
Slum	175	4 (2.28)	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
Shophouse	35,123	203 (0.58)	15	106	19	2	12	1	16	8	12	0	1	3	1	0	1	0	3	23	223
Factory	4,692	37 (0.79)	3	18	3	1	1	0	5	3	0	0	0	0	0	0	0	0	0	7	41
School	1,297	14 (1.08)	1	3	3	0	0	0	1	0	2	1	0	1	0	0	0	0	0	2	14
Hospital	48	1 (2.08)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Construction site	8,145	221 (2.71)	9	48	30	5	13	0	83	23	3	2	0	5	0	4	0	0	0	51	276
Vacant premises	26,605	136 (0.51)	1	45	28	1	29	0	8	10	4	4	0	2	0	0	1	0	15	16	164
Others	39,231	352 (0.90)	78	81	65	17	8	3	24	19	12	3	1	3	2	1	0	0	6	68	391
Total	583,916	3,265 (0.56)	939	1,095	276	85	97	6	176	127	144	63	2	43	14	6	7	1	33	466	3,580
Total no. of larvae			19,108	38,222	13,282	4,136	2,715	309	15,499	7,794	11,591	3,757	40	13,464	263	910	69	100	521	14,765	146,545
Average no. of larvae/habitats			20	35	48	49	28	52	88	61	80	60	20	313	19	152	10	100	16	32	41

Source: Vector Control & Research Department, Ministry of the Environment

Table 2.19

Distribution of *Aedes albopictus* breeding habitats by type of premises, 2000

Type of premises	Total no. checked	No. of premises breeding (%)	Number of breeding habitats																		
			Ornamental container	Domestic container	Discarded receptacle	Perimeter drain	Toilet bowl/cistern	Roof-top water tank	Puddle/ground depression	Canvas/plastic sheet	Roof gutter	Pond/swimming pool	Water stopcock pit/valve chamber	Roof-top	Plant	Sumpit	Inspection chamber cover	Lightning conductor pit	Gully trap	Others	Total
Flat	321,874	688 (0.21)	197	170	81	10	7	1	20	16	29	6	8	7	13	2	2	3	35	142	749
Compound house	146,726	1,863 (1.27)	584	638	197	45	19	1	23	130	89	36	5	2	53	3	28	1	62	166	2,082
Slum	175	4 (2.29)	0	5	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7
Shophouse	35,123	113 (0.32)	7	42	23	1	0	0	1	24	3	0	2	1	2	0	0	0	2	13	121
Factory	4,692	452 (9.63)	27	133	121	13	3	0	14	208	19	2	2	2	5	2	0	3	5	108	667
School	1,297	110 (8.49)	14	26	32	4	3	0	3	9	5	2	6	3	13	3	0	0	3	17	143
Hospital	48	7 (14.58)	1	1	3	0	0	0	2	0	1	0	0	0	0	0	0	0	1	1	10
Construction site	8,145	562 (6.90)	25	98	169	17	10	0	170	94	6	1	4	6	4	6	6	0	5	145	766
Vacant premises	26,605	59 (0.22)	20	87	134	15	22	0	18	31	6	4	0	8	18	0	4	0	71	35	473
Others	39,231	691 (1.76)	64	157	259	40	10	2	22	123	43	8	7	1	43	2	8	4	31	149	973
Total	583,916	4,549 (0.78)	939	1,357	1,020	145	74	4	273	636	201	59	34	30	151	18	48	11	215	776	5,991
Total no. of larvae			23,157	45,010	42,099	6,904	3,016	43	17,761	30,581	32,122	2,607	1,488	4,634	5,294	995	808	425	4,883	30,215	252,042
Average no. of larvae/habitats			25	33	41	48	41	11	65	40	160	44	44	154	35	55	17	39	23	39	42

Source: Vector Control & Research Department, Ministry of the Environment

Figure 2.5
Time distribution of 21 reported DF/DHF cases at Tampines Street 21/ Tampines Street 24 area, December 2000 - February 2001

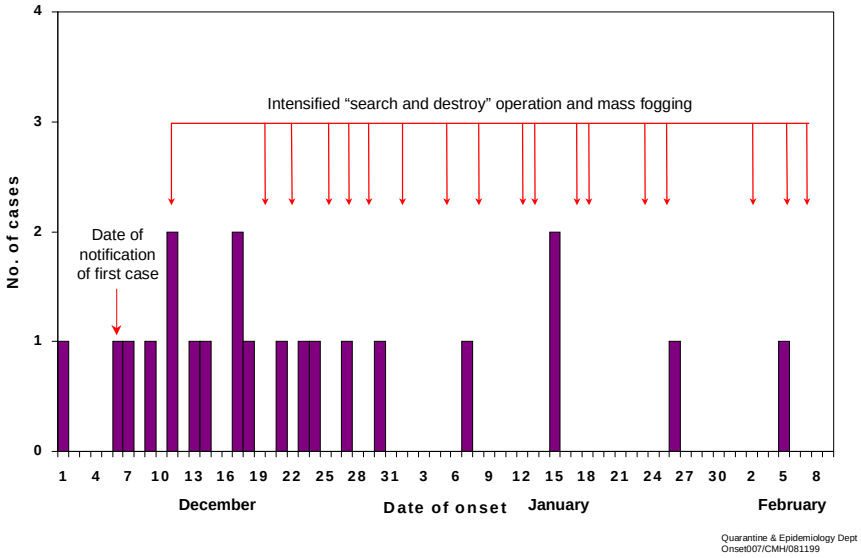
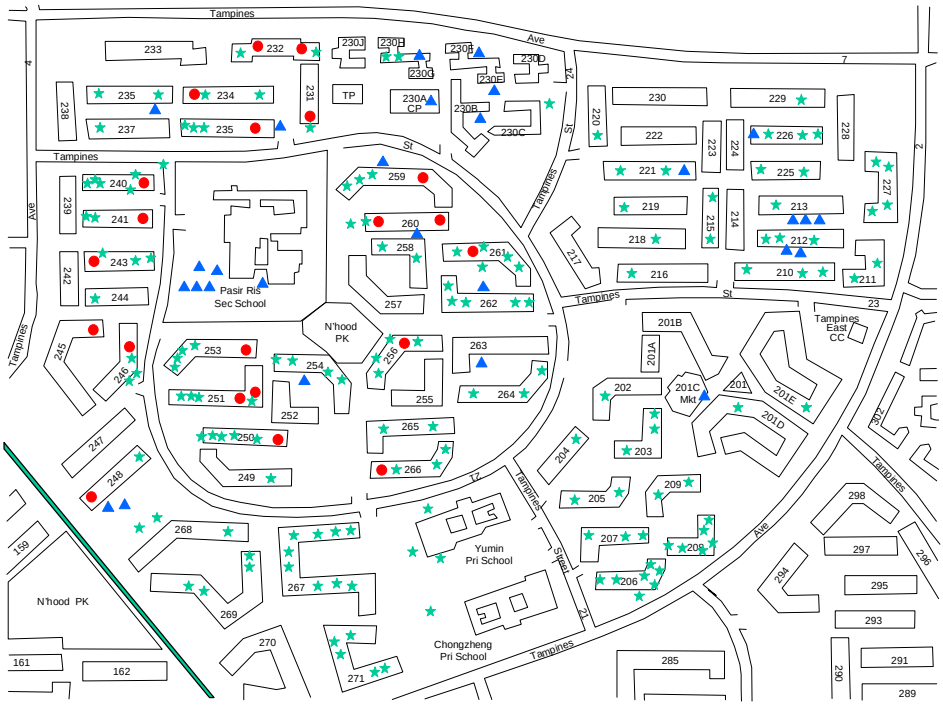


Table 2.20

Age-gender distribution of DF/DHF cases at Tampines Street 21/ Tampines Street 24 area, 2000

Age-group	Male	Female	Total (%)
0 - 4	0	0	0
5 – 14	2	1	3 (14.3)
15 – 24	5	4	9 (42.8)
25 - 34	0	0	0
35 - 44	2	1	3 (14.3)
45 - 54	2	4	6 (28.6)
55+	0	0	0
Total	11	10	21 (100)

Figure 2.6
Geographical distribution of 21 reported DF/DHF cases at Tampines Street 21/ Tampines Street 24 area, December 2000 - February 2001



● One case ★ *Aedes aegypti* breeding habitat ▲ *Aedes albopictus* breeding habitat

Dengue006/CMH/140501

JAPANESE ENCEPHALITIS

No serologically confirmed case of Japanese encephalitis was reported.