

### The Prevention Strategies for Dengue Fever in Macau

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#### Abstract

The World Health Organization has laid out dengue as one of the ten big threats to global health in 2019. Macau is located in a subtropical area suitable for mosquito breeding. Each year Macau attracts tens of millions of tourists with lots of them coming from South China or Southeast Asia, the regions often witnessing dengue outbreaks. Macau experienced its own dengue outbreak in 2001 and even since has established a comprehensive preventive system. This system is led by public health organizations with participation of non-governmental groups and community residents. Health education and mosquito eradications are the essential components of the preventive strategies. Due to long hot and humid summer time and compacted living space in Macau, personal protections from mosquitoes such as household window screens, long-sleeved clothes, and insecticide treated materials, were often insufficient, leaving the preventive measures largely depending on the vector control carried out by the government. Also the vector control was compromised by the government's limited access to the abandoned private properties. Further, the majority of dengue cases in Macau were imported, implying the loose surveillance on borders. Suggestions are offered for better prevention in future.

**Keywords:** Dengue, prevention, mosquito eradications, Macau

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Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis year		Week 29★		Week 1–29			
Classification	Disease Diagnosed	2019	2018	2019		2018	
				Total cases★	Imported cases	Total cases★	Imported cases
Category I	Plague	0	0	0	0	0	0
	Rabies	0	0	0	0	0	0
	SARS	0	0	0	0	0	0
	Smallpox	0	0	0	0	0	0
Category II	Acute Flaccid Paralysis	3	1	35	0	47	0
	Acute Viral Hepatitis type A	2	2	52	13	52	21
	Amoebiasis	8	1	193	95	161	71
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	3	0	13	13	2	2
	Cholera	0	1	0	0	1	0
	Dengue Fever	22	5	291	236	114	111
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	1	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	0	0	1	0
	Malaria	1	0	2	2	1	1
	Measles	0	1	106	40	31	7
	Meningococcal Meningitis	0	0	2	0	5	1
	Paratyphoid Fever	0	2	2	1	4	3
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	0	19	16	5	4
	Shigellosis	5	3	81	29	90	27
	Typhoid fever	0	0	17	13	7	5
West Nile Fever	0	0	0	0	0	0	
Zika virus infection	0	0	1	1	0	0	
Category III	Acute Viral Hepatitis type B	1	6	58	0	70	4
	Acute Viral Hepatitis type C	12	13	342	2	257	3
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	1	7	1	5	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	3	1	21	1	24	0
	Haemophilus Influenza type b Infection	0	0	0	0	4	0
	Japanese Encephalitis	2	4	14	0	30	0
	Legionellosis	7	5	154	10	94	2
	Mumps	7	6	334	1	322	5
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	0	0	22	0	13	0
Tetanus	0	0	1	0	4	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	1	2	34	1	27	0
	Endemic Typhus Fever	1	1	8	1	17	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	10	6	254	2	293	0
	Leptospirosis	6	4	40	0	29	0
	Listeriosis	4	1	112	1	93	0
	Lyme Disease	0	0	1	1	0	0
	Melioidosis	1	1	7	0	9	1
	Q Fever	0	0	12	2	8	1
	Scrub Typhus	9	9	238	3	170	0
	Severe Complicated Influenza	53	24	1182	6	779	5
Toxoplasmosis	0	0	8	0	11	1	
Tularemia	0	0	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
Yellow Fever	0	0	0	0	0	0	

- ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
- MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease are excluded from the table.
- Numbers of mumps and tetanus cases are summed up by the week of report.
- Since 2018/1/1, "Listeriosis" was listed as a Notifiable Infectious Disease.

## Suspected Clusters

- Thirty-one clusters were reported during week 29, including 6 tuberculosis clusters, 5 diarrhea clusters, 5 upper respiratory tract infection clusters, 13 influenza-like illness clusters, 1 fever of unknown origin cluster, and 1 enterovirus cluster.

## Imported Infectious Diseases

- There were 26 imported cases from 10 countries during week 29 of 2019.

Diseases \ Countries	Indonesia	Philippines	Thailand	Myanmar	Malaysia	Maldives	Vietnam	Nigeria	Singapore	Cambodia	Total
DF	2	5	1	1	2	1	1		1	1	15
Amoebiasis	6										6
Chikungunya Fever			1	1		1					3
Shigellosis	1										1
Malaria								1			1
Total	9	5	2	2	2	2	1	1	1	1	26

Note: The table summarized the number of imported cases that were either **confirmed** or **updated** in the given week.

- There are 490 imported cases from 24 different countries in 2019. The top 3 countries are Indonesia (178), Vietnam (68), and the Philippines (60).
- Top 3 imported diseases are Dengue Fever (236), Amoebiasis (95), and Measles (40).

## Summary of Epidemic

- **Enterovirus:** Taiwan is in the midst of enterovirus season. The epidemic has slowed down gradually.
- **Dengue Fever:** The dengue epidemic in Southeast Asia is increasing. The raise of vector indices was due to continuous rainfall and high temperature in southern Taiwan, and the indigenous dengue epidemic expanded geographically in Tainan City and Kaohsiung City, therefore the risk of indigenous dengue epidemic is expected to raise.
- **Japanese Encephalitis:** Taiwan is in the midst of Japanese encephalitis season. New cases are expected to primarily in central and southern Taiwan.

### Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis year		Week 30★		Week 1–30			
Classification	Disease Diagnosed	2019	2018	2019		2018	
				Total cases★	Imported cases	Total cases★	Imported cases
Category I	Plague	0	0	0	0	0	0
	Rabies	0	0	0	0	0	0
	SARS	0	0	0	0	0	0
	Smallpox	0	0	0	0	0	0
Category II	Acute Flaccid Paralysis	2	0	37	0	47	0
	Acute Viral Hepatitis type A	1	2	53	14	54	22
	Amoebiasis	5	4	198	97	165	75
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	6	0	19	18	2	2
	Cholera	0	1	0	0	2	0
	Dengue Fever	37	13	328	267	127	123
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	1	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	0	0	1	0
	Malaria	0	0	2	2	1	1
	Measles	2	0	108	42	31	7
	Meningococcal Meningitis	0	0	2	0	5	1
	Paratyphoid Fever	1	0	3	2	4	3
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	0	19	16	5	4
Shigellosis	4	3	85	30	93	30	
Typhoid fever	0	0	17	13	7	5	
West Nile Fever	0	0	0	0	0	0	
Zika virus infection	0	1	1	1	1	1	
Category III	Acute Viral Hepatitis type B	1	6	59	0	76	6
	Acute Viral Hepatitis type C	9	10	351	2	267	3
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	0	7	1	5	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	3	1	24	1	25	0
	Haemophilus Influenza type b Infection	0	0	0	0	4	0
	Japanese Encephalitis	3	2	17	0	32	0
	Legionellosis	6	3	159	11	97	2
	Mumps	15	13	349	2	335	5
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	0	0	22	0	13	0
Tetanus	0	0	1	0	4	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	2	0	36	1	27	0
	Endemic Typhus Fever	4	1	12	1	18	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	6	8	260	2	301	0
	Leptospirosis	0	2	40	0	31	0
	Listeriosis	3	9	115	1	102	0
	Lyme Disease	0	0	1	1	0	0
	Melioidosis	0	0	7	0	9	1
	Q Fever	2	0	14	2	8	1
	Scrub Typhus	15	16	253	3	186	0
	Severe Complicated Influenza	63	24	1245	6	803	5
Toxoplasmosis	0	0	8	0	11	1	
Tularemia	0	0	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
Yellow Fever	0	0	0	0	0	0	

1. ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
2. MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.
3. Numbers of mumps and tetanus cases are summed up by the week of report.
4. Since 2018/1/1, "Listeriosis" was listed as a Notifiable Infectious Disease.

## Suspected Clusters

- Forty-one clusters were reported during week 30, including 4 tuberculosis clusters, 7 diarrhea clusters, 8 upper respiratory tract infection clusters, 15 influenza-like illness clusters, 3 fever of unknown origin clusters, 3 enterovirus clusters, and 1 varicella cluster.

## Imported Infectious Diseases

- There were 44 imported cases from 9 countries during week 30 of 2019.

Diseases \ Countries	Cambodia	Vietnam	Thailand	Indonesia	Myanmar	India	North Korea	Morocco	Singapore	Total
Dengue Fever	12	10	4	3		1			1	31
Chikungunya Fever					4	1				5
Amoebiasis				2						2
Measles		1	1							2
Acute Hepatitis A								1		1
Legionnaires' Disease							1			1
Scrub Typhus			1							1
Paratyphoid Fever						1				1
Total	12	11	6	5	4	3	1	1	1	44

Note: The table summarized the number of imported cases that were either **confirmed** or **updated** in the given week.

- There are 534 imported cases from 26 different countries in 2019. The top 3 countries are Indonesia (183), Vietnam (79), and the Philippines (60).
- Top 3 imported diseases are Dengue Fever (267), Amoebiasis (97), and Measles (42).

## Summary of Epidemic

- Enterovirus:** Taiwan is in the midst of enterovirus season. The epidemic has slowed down gradually.
- Dengue Fever:** The dengue epidemic in Southeast Asia is increasing. As the imported cases has increased in Taiwan, continuous rainfall, and the indigenous dengue epidemic expanded geographically in Tainan and Kaohsiung cities, therefore the risk of indigenous dengue epidemic is expected to raise.

- **Japanese Encephalitis:** Taiwan is in the midst of Japanese encephalitis season. New cases are expected to primarily in central and southern Taiwan.

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