

Challenges and Progress of Drug Resistant Tuberculosis Control in Taiwan, 2007–2016

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Abstract

Drug-resistant tuberculosis (DR-TB) has become a serious threat to global health. According to 2016 WHO global tuberculosis report, the crisis of multidrug-resistant tuberculosis (MDR-TB) detection and treatment continued. In 2015, there were around 480,000 new cases of MDR-TB and 100,000 cases with rifampicin-resistant tuberculosis (RR-TB). In order to enhance the DR-TB epidemic control, the Taiwan Centers for Disease Control (TCDC) has launched several strategies since 2007, including the initiation of MDR-TB case reporting, enhancement of DR-TB contacts investigation and follow-up, provision of rapid molecular drug-resistance tests, and control of quinolone antimicrobial drugs. Furthermore, a new MDR-TB program, the Taiwan MDR-TB Consortium (TMTC), was established by TCDC in May 2007.

For the past decade, DR-TB epidemic of Taiwan has declined significantly since 2007. The number of MDR-TB cases under management decreased from 440 cases in 2007 to 168 cases in 2016, and the number of reported MDR-TB cases decreased from 178 cases in 2009 to 117 cases in 2016 as well. The treatment success rate at 24 months for patients enrolled in the TMTC increased from 59.4% in 2007 to 72.5% in 2015, and the treatment success rate at 36 months increased from 84.6% in 2007 to 90% in 2014. Under the TMTC, a proper MDR-TB case management program, the number of extensively drug resistant tuberculosis (XDR-TB) and chronic cases have also been effectively reduced.

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The future decline of new cases of MDR-TB relies on strengthening implementation of DR-TB case finding, contact investigation, and follow-up for contacts. Besides, MDR-TB cases importation, sustainability of the TMTC, and inadequate manpower of public health workers are the persisted challenges for preserving the achievements of DR-TB control.

Keywords: Drug-resistant tuberculosis, Taiwan MDR-TB Consortium, TMTC, MDR-TB, RR-TB

week 2–3(Jan. 6–Jan. 19, 2019)

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

Case diagnosis year		Week 2★		Week 2			
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	0	2	1	0	4	0
	Acute Viral Hepatitis type A	0	2	0	0	5	2
	Amoebiasis	6	2	6	2	9	4
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	0	0	0	1	1
	Cholera	0	0	0	0	0	0
	Dengue Fever	7	2	19	19	2	2
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	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	0	0
	Malaria	0	0	1	1	0	0
	Measles	0	0	1	1	1	0
	Meningococcal Meningitis	1	0	1	0	0	0
	Paratyphoid Fever	0	0	0	0	0	0
	Poliomyelitis	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	
Shigellosis	1	0	2	0	5	1	
Typhoid fever	0	0	3	3	0	0	
West Nile Fever	0	0	0	0	0	0	
Category III	Acute Viral Hepatitis type B	1	3	6	0	4	0
	Acute Viral Hepatitis type C	22	6	32	0	10	0
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	3	0	3	0	0	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	2	0	0	3	0
	Haemophilus Influenza type b Infection	0	0	0	0	0	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionellosis	10	0	14	1	4	0
	Mumps	8	8	20	0	22	1
	Neonatal Tetanus	0	0	0	0	0	0
Pertussis	0	0	0	0	0	0	
Tetanus	0	0	0	0	0	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	0	0	1	0	1	0
	Endemic Typhus Fever	0	1	0	0	1	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	13	13	28	0	27	0
	Leptospirosis	1	0	3	0	1	0
	Listeriosis	5	1	5	0	1	0
	Lyme Disease	0	0	0	0	0	0
	Melioidosis	0	0	0	0	0	0
	Q Fever	0	0	0	0	0	0
	Scrub Typhus	13	7	22	0	12	0
	Severe Complicated Influenza	49	42	74	0	61	0
Toxoplasmosis	0	1	0	0	2	0	
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
Zika virus infection	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-seven clusters were reported, including 8 tuberculosis clusters, 3 diarrhea clusters, 9 upper respiratory tract infection clusters, 10 influenza-like illness clusters, and 7 varicella clusters.

Imported Infectious Diseases

- There were 13 confirmed imported cases from 7 countries during week 2 of 2019.

Country Disease	Indonesia	Vietnam	Malaysia	Maldives	Thailand	Philippines	Cambodia	Total
DF		2	2	1	1		1	7
Amoebiasis	2					1		3
Legionellosis		1						1
Acute Hepatitis A	1							1
Shigellosis	1							1
Total	4	3	2	1	1	1	1	13

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

- There are 27 confirmed imported cases from 9 different countries in 2019. The top 3 countries are Vietnam (7), Indonesia (5), and Philippines (5).
- Top 3 imported diseases are Dengue Fever (19), Typhoid fever (3), and Amoebiasis (2).

Summary of Epidemic

- **Influenza:** Taiwan is in the midst of influenza season. The epidemic activity has been gradually increasing.

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

Case diagnosis year		Week 3★		Week 3			
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	3	3	0	7	0
	Acute Viral Hepatitis type A	3	3	3	1	8	3
	Amoebiasis	9	5	15	5	14	6
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	0	0	0	1	1
	Cholera	0	0	0	0	0	0
	Dengue Fever	10	0	29	29	2	2
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	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	0	0
	Malaria	0	0	1	1	0	0
	Measles	4	0	5	5	1	0
	Meningococcal Meningitis	0	1	1	0	1	0
	Paratyphoid Fever	0	0	0	0	0	0
	Poliomyelitis	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	
Shigellosis	1	1	3	0	6	1	
Typhoid fever	0	1	3	3	1	1	
West Nile Fever	0	0	0	0	0	0	
Category III	Acute Viral Hepatitis type B	2	1	8	0	5	0
	Acute Viral Hepatitis type C	7	11	39	0	21	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	1	3	0	1	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	0	0	3	0
	Haemophilus Influenza type b Infection	0	0	0	0	0	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionellosis	5	8	19	1	12	0
	Mumps	15	12	35	0	34	2
	Neonatal Tetanus	0	0	0	0	0	0
Pertussis	0	1	0	0	1	0	
Tetanus	0	1	0	0	1	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	4	0	5	0	1	0
	Endemic Typhus Fever	0	0	0	0	1	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	10	12	38	0	39	0
	Leptospirosis	1	1	4	0	2	0
	Listeriosis	0	1	5	0	2	0
	Lyme Disease	0	0	0	0	0	0
	Melioidosis	0	2	0	0	2	0
	Q Fever	0	0	0	0	0	0
	Scrub Typhus	7	9	29	0	21	0
	Severe Complicated Influenza	54	53	128	0	114	0
Toxoplasmosis	0	1	0	0	3	0	
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
Zika virus infection	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 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

- Thirty-nine clusters were reported, including 7 tuberculosis clusters, 9 diarrhea clusters, 12 upper respiratory tract infection clusters, 10 influenza-like illness clusters, and 1 enterovirus cluster.

Imported Infectious Diseases

- There were 20 confirmed imported cases from 4 countries during week 3 of 2019.

Disease \ Country	Philippines	Indonesia	Vietnam	Cambodia	Total
DF	3	4	2	1	10
Measles	3		2		5
Amoebiasis	1	3			4
Acute Hepatitis A				1	1
Total	7	7	4	2	20

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

- There are 46 confirmed imported cases from 9 different countries in 2019. The top 3 countries are Philippines (12), Vietnam (11), and Indonesia (11).
- Top 3 imported diseases are Dengue Fever (29), Measles (6), and Amoebiasis (5).

Summary of Epidemic

- **Influenza:** The epidemic activity has been increasing. Influenza A/H1N1 and A/H3N2 virus were co-circulating in community, however influenza A/H1N1 isolates were more than A/H3N2.

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