

Drug Resistant Tuberculosis among Tuberculosis Patients and Their Referral Rates

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Abstract

The World Health Organization (WHO) proposed a DOTS-plus (Directly Observed Therapy Strategies-plus) policy in 1999, in the hopes of treating multi-drug resistant TB (MDR-TB) properly and reducing the transmission of MDR-TB within communities. In 2006, the WHO stated that extensive drug-resistant tuberculosis (XDR-TB) is a serious threat to public health globally.

The Taiwan Multidrug-resistant TB Consortium (TMTC) was established in May 2007. TMTC is composed of five professional medical care teams responsible for treating MDR-TB patients; it trains designated DOTS workers to provide comprehensive and professional DOTS-plus service in communities. Earlier detection of MDR-TB patients makes the referring process to TMTC more efficient. The purpose of this study is to calculate case finding and referral rates for MDR-TB patients enrolled with the TMTC.

For pulmonary TB patients who (1) registered as new or relapsed in the National TB Registry between February 2015–April 2015; and (2) had a culture-proven diagnosis, 98.5% had drug susceptibility test (DST) results. Of the 2122 patients with DST results, 37 patients (1.7%) were with rifampicin resistance, and 3 patients (0.1%) were with three or more anti-TB drugs resistance. Among 31 MDR-TB patients who met TMTC enrollment criteria, 23 (74.2 %) were referred. Patients not being referred to TMTC included 2 with MDR-TB (25%, 2/8), 5 with RR-TB (62.5%, 5/8), and 1 with three or more drug-resistant TB (12.5%, 1/8).

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Case finding for MDR-TB in Taiwan has been very thorough. If the utilization of rapid molecular diagnosis among smear-positive, high-risk populations is more comprehensively applied, turnaround time for the detection of drug-resistant TB will be minimized. We believe that a rapid turnaround can help minimizing transmission of drug-resistant TB in Taiwan.

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

Investigation of Two Concurrent Tuberculosis Outbreaks in a University in Northern Taiwan

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Jhy-Wen Wu, Kun-Bin Wu

Abstract

From November 2013 to April 2015, a total of 16 confirmed tuberculosis cases had been reported in a university in Northern Taiwan. According to epidemiological and microbiological results, two outbreaks were identified and each involved six and two cases, respectively.

After environmental assessment of the university campus, poor classroom air quality with high indoor carbon dioxide levels due to inadequate air-conditioning equipment were discovered, which could easily facilitate the accumulation of *Mycobacterium tuberculosis*. Through contacts examination and latent tuberculosis infection treatment, the outbreaks have been controlled after the improvement of classroom ventilation.

Keywords: Tuberculosis, School outbreak, Air quality

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Numbers of New Cases and Cumulative Cases of Notifiable Infectious Diseases
(by week of diagnosis)

Classification	Disease Diagnosed ¹	Week 22		Week 1–22	
		2016	2015	2016	2015
Category I	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	1	1	14	8
	Acute Viral Hepatitis type A	41	0	370	35
	Amoebiasis	14	8	118	157
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	4	3
	Cholera	0	0	0	4
	Dengue Fever	4	16	552	241
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	3	0
	Malaria	0	0	5	4
	Measles	0	8	4	21
	Meningococcal Meningitis	0	0	2	2
	Paratyphoid Fever	1	0	1	3
	Poliomyelitis	0	0	0	0
	Rubella	0	0	4	6
	Shigellosis	3	2	93	82
Typhoid fever	0	0	2	14	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	1	2	41	52
	Acute Viral Hepatitis type C ⁵	3	1	89	95
	Acute Viral Hepatitis type D	0	0	1	1
	Acute Viral Hepatitis type E	0	0	8	1
	Acute Viral Hepatitis untype	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	1	4	2
	Haemophilus Influenza type b Infection	0	0	5	1
	Japanese Encephalitis	0	0	1	0
	Legionellosis	0	6	43	68
	Mumps ²	22	16	241	329
	Neonatal Tetanus	0	0	0	0
	Pertussis	1	2	7	51
	Tetanus ²	1	1	4	5
Category IV	Botulism	0	0	1	1
	Brucellosis	0	0	0	0
	Complicated Influenza	1	35	1831	489
	Complicated Varicella ⁴	4	3	19	29
	Endemic Typhus Fever	0	1	4	8
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	10	11	318	276
	Leptospirosis	5	2	25	25
	Lyme Disease	0	0	0	0
	Melioidosis	0	1	5	12
	Q Fever	0	1	18	16
	Scrub Typhus	19	4	150	124
	Toxoplasmosis	0	1	5	6
Tularremia	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections ⁶	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
Yellow Fever	0	0	0	0	

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
2. Reported cases.
3. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
4. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical and laboratory conditions" to "meet the clinical or laboratory conditions".
5. Since 2014/7/1, various subtypes of human cases of avian influenza are reported as "novel influenza A virus infections", a Category V Notifiable Infectious Disease. The original "H5N1 flu" and "H7N9 flu", which were respectively listed as a Category I Notifiable Infectious Disease and a Category V Notifiable Infectious Disease were removed from the list on the same day.

Suspected Clusters

- Thirteen clusters were reported, including 6 varicella clusters, 4 diarrhea clusters, 1 tuberculosis cluster, 1 upper respiratory tract infection cluster, and 1 influenza-like illness cluster.

Imported Infectious Diseases

- 21 confirmed cases were imported from 9 countries during Week 22 of 2016.

Country Disease	Indonesia	Philippines	Malaysia	Fiji	China	Thailand	Nepal	Peru	India	Total
Amoebiasis	5	1				1				7
Dengue Fever	1	1	2							4
Hepatitis A					2	1		1		4
Chikungunya Fever				2						2
Shigellosis	1						1			2
Zika virus infection	1									1
Paratyphoid Fever									1	1
Total	8	2	2	2	2	2	1	1	1	21

Note: The statistics listed in this table include imported cases that were either confirmed or updated* in the previous week.

- A total of 288 confirmed cases were imported from 25 countries in 2016.
- Top 3 imported diseases : Dengue fever (117), Amoebiasis (54), Shigellosis (44).
- Top 3 countries responsible for most imported cases : Indonesia (133), Thailand (26), Malaysia (22).

Summary of Epidemic

- Enterovirus** : The enterovirus activity has increased continuously and the peak of enterovirus season is fast approaching. Coxsackie A virus is currently the dominant strain circulating in the community. Sporadic cases of enterovirus 71 infection have been confirmed recently. This year, a total of 52 cases of enterovirus 71 infection, including 5 severe cases, 42 mild cases and 5 suspected severe cases, have been confirmed. The public is urged to enhance personal hygiene and stay vigilant for suspicious symptoms of enterovirus infection with severe complications in infants.

- **Dengue Fever** : Imported cases have continued to be reported. The recent high temperatures and the continuous occurrence of intermittent rain have promoted mosquito growth, elevating the risk of dengue transmission. The public is urged to clean up and remove any vector breeding sites and take prevention measures against mosquito bites.
- **Scrub Typhus** : The numbers of cases reported and confirmed are expected to continue increasing. The peak of scrub typhus season is during the months of June to July. The endemic areas are primarily eastern and outlying islands of Taiwan.

Numbers of New Cases and Cumulative Cases of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis week		Week 23		Week 1—23	
Classification	Disease Diagnosed ¹	2016	2015	2016	2015
Category I	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	1	0	15	8
	Acute Viral Hepatitis type A	34	1	404	36
	Amoebiasis	1	9	119	166
	Anthrax	0	0	0	0
	Chikungunya Fever	2	0	6	3
	Cholera	0	0	0	4
	Dengue Fever	9	22	561	263
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	3	0
	Malaria	0	0	5	4
	Measles	0	3	4	24
	Meningococcal Meningitis	0	0	2	2
	Paratyphoid Fever	0	0	1	3
	Poliomyelitis	0	0	0	0
	Rubella	0	0	4	6
	Shigellosis	2	2	95	84
	Typhoid fever	0	0	2	14
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	2	6	43	58
	Acute Viral Hepatitis type C ⁵	2	4	91	99
	Acute Viral Hepatitis type D	0	0	1	1
	Acute Viral Hepatitis type E	0	0	8	1
	Acute Viral Hepatitis untype	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	3	1	7	3
	Haemophilus Influenza type b Infection	1	0	6	1
	Japanese Encephalitis	1	1	2	1
	Legionellosis	0	2	43	70
	Mumps ²	10	23	251	352
	Neonatal Tetanus	0	0	0	0
	Pertussis	1	6	8	57
	Tetanus ²	1	0	5	5
	Category IV	Botulism	1	0	2
Brucellosis		0	0	0	0
Complicated Influenza		1	48	1832	537
Complicated Varicella ⁴		1	0	20	29
Endemic Typhus Fever		2	0	6	8
Herpesvirus B Infection		0	0	0	0
Invasive Pneumococcal Disease		3	10	321	286
Leptospirosis		1	2	26	27
Lyme Disease		0	0	0	0
Melioidosis		0	2	5	14
Q Fever		1	1	19	17
Scrub Typhus		13	8	163	132
Toxoplasmosis		0	0	5	6
Tularremia		0	0	0	0
Category V	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections ⁶	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
Yellow Fever	0	0	0	0	

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
2. Reported cases.
3. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
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5. Since 2014/7/1, various subtypes of human cases of avian influenza are reported as "novel influenza A virus infections", a Category V Notifiable Infectious Disease. The original "H5N1 flu" and "H7N9 flu", which were respectively listed as a Category I Notifiable Infectious Disease and a Category V Notifiable Infectious Disease were removed from the list on the same day.
6. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

Suspected Clusters

- Eight clusters were reported, including 3 diarrhea clusters, 2 tuberculosis clusters, 2 varicella clusters, and 1 upper respiratory tract infection cluster.

Imported Infectious Diseases

- 17 confirmed cases were imported from 9 countries during Week 23 of 2016.

Country Disease	Indonesia	Thailand	Philippines	Singapore	Vietnam	Maldives	Cambodia	Japan	Malaysia	Total
Dengue Fever	1	1	2	2	1	1	1		1	10
Hepatitis A		2			1			1		4
Shigellosis	1									1
Amoebiasis	1									1
Scrub Typhus			1							1
Total	3	3	3	2	2	1	1	1	1	17

Note: The statistics listed in this table include imported cases that were either confirmed or updated* in the previous week.

- A total of 303 confirmed cases were imported from 25 countries in 2016.
- Top 3 imported diseases : Dengue fever (126), Amoebiasis (55), Shigellosis (45).
- Top 3 countries responsible for most imported cases : Indonesia (136), Thailand (29), Malaysia (23).

Summary of Epidemic

- **Enterovirus** : The enterovirus activity has increased continuously and the peak of enterovirus season is fast approaching. Coxsackie A virus is currently the dominant strain circulating in the community. Sporadic cases of enterovirus 71 infection have been confirmed recently. This year, a total of 60 cases of enterovirus 71 infection, including 6 severe cases, 49 mild cases and 5 suspected severe cases, have been confirmed. The public is urged to enhance personal hygiene and stay vigilant for suspicious symptoms of enterovirus infection with severe complications in infants.
- **Dengue Fever** : Imported cases have continued to be reported. The recent continuous occurrence of intermittent rain have promoted mosquito growth, elevating the risk of dengue transmission. The public is urged to clean up and remove any vector breeding sites and take prevention measures against mosquito bites.

- **Scrub Typhus** : The numbers of cases reported and confirmed are expected to continue increasing. The peak of scrub typhus season is during the months of June to July. The endemic areas are primarily eastern and outlying islands of Taiwan.
- **Japanese Encephalitis** : The peak of Japanese encephalitis season is during the months of June to July. The endemic areas are primarily central and southern Taiwan.

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