

Enhancing Integration of HIV Testing into TB Control Program and Factors Associated with Refusal of HIV Testing in Taiwan, July 2013–June 2014

Wan-Ting Hsieh^{1*}, Mei-Yu Chiou¹, Pin-Hui Lee¹, Pei-Chun Chan¹,
Shiang-Lin Yang¹, Chien-Bang Hsu², Yen-Fang Huang¹, Chang-Hsun Chen³

Abstract

People living with human immunodeficiency virus (PLWH) had 29 times higher risk to develop active tuberculosis (TB) than non-HIV infected persons, and TB was still the leading cause of death among PLWH. Collaborative management of TB/HIV had been recommended by WHO that aimed to reduce the burden of TB and HIV co-infection in affected populations. The TB control program in Taiwan endorsed active HIV counseling and testing, or encouraging HIV testing in TB care facilities by public health staff for TB patients aged 15–49 years old of unknown HIV status since June 27, 2013. A total of 3,533 TB patients were eligible during July 2013 to June 2014 after excluding 63 patients who had been identified HIV co-infection before notification of TB disease. We found that 2,664 TB patients (75.4 %) received HIV testing with the increasing trend of testing proportion during the study period. This intervention identified newly diagnosed HIV infected TB patients and referred them to initiate highly active anti-retroviral therapy (HAART) treatment. Among them, up to 89.7% received HAART. The main reasons that patients refused HIV testing were having low risk to get

¹Division of Chronic Infectious Diseases, Centers for Disease Control, Ministry of Health and Welfare, Taiwan

²Division of Planning and Coordination, Centers for Disease Control, Ministry of Health and Welfare, Taiwan

³Division of Preparedness and Emerging Infectious Diseases, Centers for Disease Control, Ministry of Health and Welfare, Taiwan

Corresponding author: Wan-Ting Hsieh^{1*}

E-mail: hwt1221@cdc.gov.tw

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HIV infection (42.3%); and not important to test HIV (36.1%). In the future, we suggest enhancing TB screening in HIV control program and isoniazid preventive therapy (IPT) for PLWH.

Keywords: Tuberculosis (TB), People living with human immunodeficiency virus (PLWH), HIV testing

Preliminary Analysis of Timely Diagnosis of Multidrug-Resistant Tuberculosis Using a Streamlined Molecular Diagnostic Process

Ting-Yi Chiang, Wei-Lun Huang, Shin-Yuan Fan, Chao-Chieh Tseng, Ru-Wen Jou *

Abstract

To improve utilization of molecular diagnostics for tuberculosis case management, we implement an algorithm for intensifying diagnosis for multidrug-resistant tuberculosis (MDR-TB). The GeneXpert MTB/RIF (Xpert) assay was adopted as an initial diagnostic for populations at high-risk of MDR-TB. Sputum sample identified by the Xpert as *Mycobacterium tuberculosis* complex (MTBC) with rifampin (RIF) resistance is subsequently and simultaneously tested using the GenoType MTBDR*plus* test for the detection of MDR-TB (resistance to rifampin [RIF] and isoniazid), and the GenoType MTBDR*slv2* for the identification of resistance to fluoroquinolones (FLQ) and second-line injectable drugs (SLIDs) including kanamycin, amikacin and capreomycin. We identified 902 MDR-TB cases from high-risk populations in January–April, 2016. Of the 902 cases, 303 (33.6%) were relapse, 206 (22.8%) were treatment failure, 21 (2.3%) were treatment default, 14 (1.5%) were MDR-TB contacts, and 358 (39.7%) were from MDR high incidence area/countries. Of the 902 sputum samples tested, 38.5% (347/902) were MTBC positive and 5.2% (18/347) were RIF-resistant using the Xpert test. Of the 18 RIF-resistant specimens analyzed using the GenoType MTBDR*plus* test and the GenoType MTBDR*sl* test; we identified 10 MDR-TB and 8 RIF mono-resistant TB (RIF^r). Of the 10 MDR-TB cases, 6 were susceptible to both FLQ and SLID, 2 were FLQ-resistant and SLID-susceptible and 2 were FLQ-susceptible and SLID-resistant. Six RIF^r TB cases were susceptible to both FLQ and SLID, 2 were FLQ-susceptible and SLID-resistant. Among 10 MDR-TB cases, 2 were treatment failure, 1 was MDR-TB contact, 5 were relapse cases and 2 were from MDR-TB high burden countries (one was a businessman lived in Mainland China, the other was foreign spouse from Mainland China). The turnaround time for molecular detection of MDR-/XDR-TB was 3 working days, while 6 weeks for MDR-TB and 10 weeks for XDR-TB using conventional tests.

Keywords: Tuberculosis, Multidrug-resistant TB, Molecular diagnostics

Division of Chronic Infectious Diseases,
Centers for Disease Control, Ministry of
Health and Welfare, Taiwan
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Corresponding author: Ru-Wen Jou*
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Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis week		Week 7		Week 1–7		
Classification	Disease Diagnosed ¹	2017	2016	2017	2016	
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	0	0	4	5	
	Acute Viral Hepatitis type A	19	14	105	56	
	Amoebiasis	8	0	41	30	
	Anthrax	0	0	0	0	
	Chikungunya Fever	0	0	1	2	
	Cholera	0	0	0	0	
	Dengue Fever	8	12	47	478	
	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	1	0	
	Malaria	0	0	0	3	
	Measles	0	0	0	0	
	Meningococcal Meningitis	0	0	1	0	
	Paratyphoid Fever	0	0	2	0	
	Poliomyelitis	0	0	0	0	
	Rubella	0	0	0	1	
	Shigellosis	8	2	31	18	
	Typhoid fever	0	0	2	1	
West Nile Fever	0	0	0	0		
Category III	Acute Viral Hepatitis type B	2	4	25	12	
	Acute Viral Hepatitis type C ⁵	9	3	32	16	
	Acute Viral Hepatitis type D	0	0	1	0	
	Acute Viral Hepatitis type E	1	0	4	4	
	Acute Viral Hepatitis untype	0	0	0	0	
	Congenital Rubella Syndrome	0	0	0	0	
	Enteroviruses Infection with Severe Complications	0	0	0	1	
	Haemophilus Influenza type b Infection	0	1	1	1	
	Japanese Encephalitis	0	0	0	0	
	Legionellosis	3	3	12	20	
	Mumps ²	11	6	85	72	
	Neonatal Tetanus	0	0	0	0	
	Pertussis	0	0	2	1	
	Tetanus ²	0	0	2	1	
	Category IV	Botulism	0	0	0	0
		Brucellosis	0	0	0	0
Complicated Influenza		12	319	81	583	
Complicated Varicella ⁴		0	1	1	6	
Endemic Typhus Fever		0	0	0	2	
Herpesvirus B Infection		0	0	0	0	
Invasive Pneumococcal Disease		11	29	95	125	
Leptospirosis		0	0	12	6	
Lyme Disease		0	0	0	0	
Melioidosis		0	0	5	0	
Q Fever		0	2	1	5	
Scrub Typhus		13	1	56	65	
Toxoplasmosis		0	0	0	1	
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	1	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.
6. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

Suspected Clusters

- Thirty-one clusters were reported, including 3 tuberculosis clusters, 21 diarrhea clusters, 4 upper respiratory tract infection clusters, 2 influenza-like illness clusters and 1 varicella cluster.

Imported Infectious Diseases

- 12 confirmed cases were imported from 5 countries during Week 7 of 2017.

Country Disease	Indonesia	Malaysia	Philippines	Vietnam	Singapore	Total
Dengue Fever	0	3	1	3	1	8
Amoebiasis	4	0	0	0	0	4
Total	4	3	1	3	1	12

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

- A total of 95 confirmed cases were imported from 15 countries in 2017.
- Top 3 imported diseases : Dengue fever (47), Amoebiasis (23), Shigellosis (8).
- Top 3 countries responsible for most imported cases : Indonesia (34), Vietnam (14), Philippines (11).

Summary of Epidemic

- **Diarrhea** : As the viral gastroenteritis season is upon us, the risk of clustered cases remains.
- **Influenza** : As a strong continental cold air mass will arrive on Thursday, it is likely that influenza activity will remain similar to that last week. H3N2 is currently the dominant strain circulating in the community.
- **Zika Virus Infection** : As the epidemic in affected areas has continued to increase, the risk of importing Zika virus into Taiwan from those countries remains elevated.

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

Case diagnosis week		Week 8		Week 1—8	
Classification	Disease Diagnosed ¹	2017	2016	2017	2016
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	0	1	4	6
	Acute Viral Hepatitis type A	14	7	119	63
	Amoebiasis	9	7	50	37
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	1	2
	Cholera	0	0	0	0
	Dengue Fever	6	5	53	483
	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	1	0
	Malaria	0	0	0	3
	Measles	0	0	0	0
	Meningococcal Meningitis	0	1	1	1
	Paratyphoid Fever	1	0	3	0
	Poliomyelitis	0	0	0	0
	Rubella	0	1	0	2
	Shigellosis	3	6	34	24
	Typhoid fever	1	0	3	1
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	3	4	28	16
	Acute Viral Hepatitis type C ⁵	7	2	38	18
	Acute Viral Hepatitis type D	0	1	1	1
	Acute Viral Hepatitis type E	0	0	4	4
	Acute Viral Hepatitis untype	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	0	1
	Haemophilus Influenza type b Infection	0	0	1	1
	Japanese Encephalitis	0	0	0	0
	Legionellosis	2	2	14	22
	Mumps ²	12	8	97	80
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	0	2	1
	Tetanus ²	0	0	2	1
	Category IV	Botulism	0	0	0
Brucellosis		0	0	0	0
Complicated Influenza		11	338	92	921
Complicated Varicella ⁴		0	0	1	6
Endemic Typhus Fever		0	1	0	3
Herpesvirus B Infection		0	0	0	0
Invasive Pneumococcal Disease		10	23	105	148
Leptospirosis		1	0	13	6
Lyme Disease		0	0	0	0
Melioidosis		0	0	5	0
Q Fever		0	1	1	6
Scrub Typhus		12	2	68	67
Toxoplasmosis		1	0	1	1
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	1	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".
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.
6. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

Suspected Clusters

- Thirty-six clusters were reported, including 28 diarrhea clusters, 6 upper respiratory tract infection clusters, 1 influenza-like illness cluster and 1 varicella cluster.

Imported Infectious Diseases

- 18 confirmed cases were imported from 7 countries during Week 8 of 2017.

Country Disease	Indonesia	Malaysia	Cambodia	Philippines	Vietnam	Myanmar	China	Total
DF	2	3	0	0	1	0	0	6
Amoebiasis	5	0	0	0	0	0	0	5
Hepatitis A	1	0	0	1	0	0	0	2
Shigellosis	2	0	0	0	0	0	0	2
Legionellosis	0	0	0	0	0	0	1	1
Paratyphoid Fever	0	0	1	0	0	0	0	1
Typhoid fever	0	0	0	0	0	1	0	1
Total	10	3	1	1	1	1	1	18

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

- A total of 113 confirmed cases were imported from 15 countries in 2017.
- Top 3 imported diseases : Dengue fever (53), Amoebiasis (28), Shigellosis (10).
- Top 3 countries responsible for most imported cases : Indonesia (44), Vietnam (15), Malaysia (13).

Summary of Epidemic

- **Diarrhea** : As the viral gastroenteritis season is upon us, the risk of clustered cases remains.
- **Influenza** : As a strong continental cold air mass will arrive on Thursday, it is likely that influenza activity will remain similar to that last week. H3N2 is currently the dominant strain circulating in the community.
- **Zika Virus Infection** : As the epidemic in affected areas has continued to increase, the risk of importing Zika virus into Taiwan from those countries remains elevated.

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

Case diagnosis week		Week 9		Week 1–9	
Classification	Disease Diagnosed ¹	2017	2016	2017	2016
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	5	7
	Acute Viral Hepatitis type A	17	10	136	73
	Amoebiasis	6	7	56	44
	Anthrax	0	0	0	0
	Chikungunya Fever	1	0	2	2
	Cholera	0	0	0	0
	Dengue Fever	3	6	56	489
	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	1	0
	Malaria	0	0	0	3
	Measles	1	0	1	0
	Meningococcal Meningitis	0	0	1	1
	Paratyphoid Fever	0	0	3	0
	Poliomyelitis	0	0	0	0
	Rubella	0	0	0	2
	Shigellosis	2	5	36	29
Typhoid fever	1	0	4	1	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	3	0	31	16
	Acute Viral Hepatitis type C ⁵	2	5	40	23
	Acute Viral Hepatitis type D	0	0	1	1
	Acute Viral Hepatitis type E	1	0	5	4
	Acute Viral Hepatitis untype	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	0	1
	Haemophilus Influenza type b Infection	0	0	1	1
	Japanese Encephalitis	0	0	0	0
	Legionellosis	1	0	15	22
	Mumps ²	9	7	106	87
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	1	2	2
	Tetanus ²	0	0	2	1
Category IV	Botulism	0	0	0	0
	Brucellosis	0	0	0	0
	Complicated Influenza	14	285	106	1206
	Complicated Varicella ⁴	1	3	2	9
	Endemic Typhus Fever	0	0	0	3
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	11	16	116	164
	Leptospirosis	2	1	15	7
	Lyme Disease	0	0	0	0
	Melioidosis	0	2	5	2
	Q Fever	2	0	3	6
	Scrub Typhus	3	2	71	69
	Toxoplasmosis	0	0	1	1
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	1	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	

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2. Reported cases.

3. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".

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6. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

Suspected Clusters

- Thirty-four clusters were reported, including 9 tuberculosis clusters, 18 diarrhea clusters, 3 upper respiratory tract infection clusters, 2 varicella clusters and 2 acute viral hepatitis type A clusters.

Imported Infectious Diseases

- 14 confirmed cases were imported from 7 countries during Week 9 of 2017.

Country Disease	Indonesia	India	Malaysia	Cambodia	Vietnam	Myanmar	China	Total
Amoebiasis	4							4
DF			1		2	1		4
Hepatitis A				1				1
Chikungunya Fever	1							1
Hepatitis E				1				1
Measles							1	1
Typhoid fever		1						1
Shigellosis	1							1
Total	6	1	1	2	2	1	1	14

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

- A total of 127 confirmed cases were imported from 15 countries in 2017.
- Top 3 imported diseases : Dengue fever (57), Amoebiasis (32), Shigellosis (11).
- Top 3 countries responsible for most imported cases : Indonesia (50), Vietnam (17), Malaysia (14).

Summary of Epidemic

- **Diarrhea** : As the viral gastroenteritis season is upon us, the risk of clustered cases remains.
- **Influenza** : As a strong continental cold air mass expected to arrive on Sunday will last until the following Wednesday, there will be large temperature differences between day and night in the coming days. Influenza activity is expected to remain similar to that last week. H3N2 is currently the dominant strain circulating in the community.

- **Zika Virus Infection** : As the epidemic in affected areas has continued to persist, the risk of importing Zika virus into Taiwan from those countries remains.

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Telephone No : (02) 2395-9825

Website : <http://www.cdc.gov.tw/>

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