

Introduction of Taiwan Antibiotic Resistance Surveillance System

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Abstract

Since the discovery of penicillin, many infectious diseases have been treated effectively, and patient safety has been promoted significantly. However, irrational use of antibiotics not only wastes medical resources but also produces the "antimicrobial resistance (AMR)" problem.

Facing the continuous spread of new drug resistance organism, existing antibiotics lose their efficacy faster than the development of new antibiotic drugs. In the recent years, the World Health Organization (WHO) calls upon all States should take actions as soon as possible to solve the problem of AMR and consider AMR and healthcare-associated infection as the most important challenge of patient safety.

To combat AMR, strategies or interventions proposed internationally all include improving surveillance of drug resistance. The topic, "Combat antimicrobial resistance: No action today, no cure tomorrow" was adopted from WHO for World Health Day 2011. Member States were required to promote the surveillance of AMR with political commitment. Obama Administration released "National Action Plan for Combating Antibiotic-resistant Bacteria" in 2015, and one of the 5 goals of the Plan was to strengthen national one-health surveillance efforts to combat resistance. To prevent and control drug resistance, European Union also established European Antimicrobial Resistance Surveillance Network and published annual AMR surveillance report.

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Received: Dec. 14, 2017

Accepted: Aug. 07, 2018

DOI: 10.6525/TEB.201902_35(3).0001

Taiwan CDC implemented "Antibiotic Resistance Surveillance System" as part of "Taiwan Nosocomial Infection Surveillance System" with the experiences of Taiwan Antibiotic Stewardship Program and the knowledge learnt from US CDC's "National Healthcare Safety Network" establishment. Taiwan CDC will then expand drug resistance monitoring to understand the epidemiology and trends of drug-resistant microorganisms in local hospitals for further strategy formulation and effectiveness evaluation.

Keywords: antibiotic resistance, multi-drug resistance bacteria, Taiwan Nosocomial Infection Surveillance System (TNIS)

week 4–6(Jan. 20–Feb. 9, 2019)

DOI: 10.6525/TEB.201902_35(3).0002

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

Case diagnosis year		Week 4★		Week 1–4			
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	5	6	0	12	0
	Acute Viral Hepatitis type A	2	0	5	1	8	3
	Amoebiasis	8	7	23	9	21	9
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	0	0	0	1	1
	Cholera	0	0	0	0	0	0
	Dengue Fever	5	1	34	34	3	3
	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	2	0	7	6	1	0
	Meningococcal Meningitis	1	0	2	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	3	4	6	0	10	2
	Typhoid fever	0	0	3	3	1	1
	West Nile Fever	0	0	0	0	0	0
Category III	Acute Viral Hepatitis type B	7	2	15	0	7	1
	Acute Viral Hepatitis type C	9	6	47	0	27	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	0	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	1	1	1	1	4	0
	Haemophilus Influenza type b Infection	0	0	0	0	0	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionellosis	2	6	21	2	18	0
	Mumps	10	11	45	0	45	2
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	2	0	2	0	1	0
	Tetanus	0	0	0	0	1	0
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	4	1	9	0	2	0
	Endemic Typhus Fever	0	0	0	0	1	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	17	6	55	0	45	0
	Leptospirosis	3	3	7	0	5	0
	Listeriosis	6	3	11	0	5	0
	Lyme Disease	0	0	0	0	0	0
	Melioidosis	0	0	0	0	2	0
	Q Fever	1	1	1	0	1	0
	Scrub Typhus	15	12	44	0	33	0
	Severe Complicated Influenza	58	45	186	0	159	0
	Toxoplasmosis	0	0	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, Gonorrhea, 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 clusters were reported, including 5 tuberculosis clusters, 8 diarrhea clusters, 5 upper respiratory tract infection clusters, 9 influenza-like illness clusters, 2 varicella clusters, and 1 enterovirus cluster.

Imported Infectious Diseases

- There were 11 confirmed imported cases from 7 countries during week 4 of 2019.

Country Disease	Philippines	Indonesia	Cambodia	Japan	Vietnam	Malaysia	Thailand	Total
DF	2	1	1		1			5
Amoebiasis	2	1					1	4
EVSC						1		1
Legionellosis				1				1
Total	4	2	1	1	1	1	1	11

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

- There are 57 confirmed imported cases from 10 different countries in 2019. The top 3 countries are Philippines (16), Indonesia (13), and Vietnam (12).
- Top 3 imported diseases are Dengue Fever (34), Amoebiasis (9), and Measles (6).

Summary of Epidemic

- **Influenza:** Entering the peak of the medical visits before the Lunar New Year. Influenza A/H1N1 and A/H3N2 virus were co-circulating in community; however, the proportion of influenza A/H1N1 isolates were higher than A/H3N2.

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

Case diagnosis year		Week 5★		Week 1–5			
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	1	8	0	13	0
	Acute Viral Hepatitis type A	1	1	6	1	9	3
	Amoebiasis	5	4	28	13	25	11
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	0	0	0	1	1
	Cholera	0	0	0	0	0	0
	Dengue Fever	8	3	42	42	6	6
	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	3	0	10	7	1	0
	Meningococcal Meningitis	0	0	2	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	5	5	11	2	15	2
	Typhoid fever	0	0	3	3	1	1
	West Nile Fever	0	0	0	0	0	0
Category III	Acute Viral Hepatitis type B	0	4	15	0	11	1
	Acute Viral Hepatitis type C	13	10	60	0	37	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	1	1	4	0	2	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	2	1	3	1	5	0
	Haemophilus Influenza type b Infection	0	0	0	0	0	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionellosis	9	3	30	2	21	0
	Mumps	8	5	53	0	50	2
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	1	0	3	0	1	0
	Tetanus	0	0	0	0	1	0
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	1	0	9	0	2	0
	Endemic Typhus Fever	0	1	0	0	2	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	16	5	71	0	50	0
	Leptospirosis	3	2	10	0	7	0
	Listeriosis	6	3	17	0	8	0
	Lyme Disease	0	0	0	0	0	0
	Melioidosis	0	1	0	0	3	0
	Q Fever	0	0	1	0	1	0
	Scrub Typhus	5	19	49	0	52	0
	Severe Complicated Influenza	65	57	250	0	216	1
	Toxoplasmosis	0	0	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, Gonorrhea, 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

- Eighteen clusters were reported, including 6 diarrhea clusters, 6 upper respiratory tract infection clusters, 5 influenza-like illness clusters, and 1 varicella cluster.

Imported Infectious Diseases

- There were 15 confirmed imported cases from 5 countries during week 5 of 2019.

Disease \ Country	Indonesia	Vietnam	Philippines	India	Cambodia	Total
DF	2	3	2		1	8
Amoebiasis	2	1		1		4
Shigellosis	2					2
Measles		1				1
Total	6	5	2	1	1	15

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

- There are 72 confirmed imported cases from 10 different countries in 2019. The top 3 countries are Indonesia (19), Philippines (18), and Vietnam (17).
- Top 3 imported diseases are Dengue Fever (42), Amoebiasis (13), and Measles (7).

Summary of Epidemic

- **Influenza:** Entering the peak of the medical visits before the Lunar New Year. Influenza A/H1N1 and A/H3N2 virus were co-circulating in community; however, the proportion of influenza A/H1N1 isolates were higher than A/H3N2.

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

Case diagnosis year		Week 6★		Week 1–6			
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	8	0	15	0
	Acute Viral Hepatitis type A	1	1	7	1	10	3
	Amoebiasis	1	8	29	13	33	15
	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	49	48	8	8
	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	2	0	12	9	1	0
	Meningococcal Meningitis	0	0	2	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	0	1	11	2	16	3
	Typhoid fever	0	1	3	3	2	2
	West Nile Fever	0	0	0	0	0	0
Category III	Acute Viral Hepatitis type B	1	1	16	0	12	1
	Acute Viral Hepatitis type C	1	7	61	0	44	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	0	4	0	2	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	3	1	5	0
	Haemophilus Influenza type b Infection	0	0	0	0	0	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionellosis	1	3	31	2	24	0
	Mumps	5	7	58	0	57	2
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	0	0	3	0	1	0
	Tetanus	0	0	0	0	1	0
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	0	0	9	0	2	0
	Endemic Typhus Fever	0	1	0	0	3	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	6	13	77	0	63	0
	Leptospirosis	0	1	10	0	8	0
	Listeriosis	0	2	17	0	10	0
	Lyme Disease	0	0	0	0	0	0
	Melioidosis	0	0	0	0	3	0
	Q Fever	0	0	1	0	1	0
	Scrub Typhus	0	6	49	0	58	0
	Severe Complicated Influenza	45	53	295	1	269	2
	Toxoplasmosis	0	0	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

- ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
- MDR-TB, Tuberculosis, Syphilis, Gonorrhea, 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

- Seventeen clusters were reported, including 10 tuberculosis clusters, 3 diarrhea clusters, 1 upper respiratory tract infection cluster, and 3 influenza-like illness clusters.

Imported Infectious Diseases

- There were 9 confirmed imported cases from 6 countries during week 6 of 2019.

Countries Diseases	Vietnam	Thailand	China	Malaysia	Indonesia	Philippines	Total
DF	2	2		1	1		6
Measles	1					1	2
Severe Complicated Influenza			1				1
Total	3	2	1	1	1	1	9

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

- There are 81 confirmed imported cases from 11 different countries in 2019. The top 3 countries are Indonesia (20), Vietnam (20), and Philippines (19).
- Top 3 imported diseases are Dengue Fever (48), Amoebiasis (13), and Measles (9).

Summary of Epidemic

- **Influenza** : People being in close contact with each other during the Lunar New Year holiday and schools started a new semester this week, therefore, influenza activity is expected to increase. On the other hand, the most frequently isolated influenza virus in the community is influenza A/H1N1.

The Taiwan Epidemiology Bulletin series of publications is published by Centers for Disease Control, Ministry of Health and Welfare, Taiwan (R.O.C.) since Dec. 15, 1984.

Publisher: Jih-Haw Chou

Editor-in-Chief: Yung-Ching Lin

Executive Editor: Hsueh-Ju Chen, Hsin-Lun Lee

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Suggested Citation:

[Author].[Article title].Taiwan Epidemiol Bull 2019;35:[inclusive page numbers]. [DOI]