

Introduction of Laboratory-based Surveillance System for Enterovirus in Taiwan

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Abstract

The Enterovirus Surveillance System in Taiwan has been established by Taiwan Centers for Disease Control (Taiwan CDC) in 1999, and operated for 16 years. During this period, the Center for Research, Diagnostics and Vaccine Development, Taiwan CDC continuously developed the diagnostic techniques and improved the diagnostic quality. In cooperation with Collaborating Laboratories of Virology, the epidemic trends of different serotypes of enteroviruses were monitored, and some emerging pathogens were detected. For example, more than 40 serotypes of enteroviruses, Human Parechovirus (HPeV) 1, HPeV 3, HPeV 4, and Saffold virus type 3 were identified. This surveillance system not only monitored the enteroviruses, but also other viruses belonged to the family of *Picornaviridae*. However, for the purpose to make public easily understand this system, we still call it “Enterovirus Surveillance System”, not “Picornavirus Surveillance System.”

Keywords : Picornaviridae ; Untypable enterovirus ; Re-emerging infectious diseases ; Emerging pathogens

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Investigation on the Domestic Measles Outbreak in Nantou, 2014

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Abstract

On 16 October 2014, one hospital in Nantou reported a measles case. Since 24 October, there were several measles cases reported, and confirmed to be a domestic measles outbreak. The index patient had not traveled abroad and the infection source was unknown. The second patient was the elder sister of index patient; the third and fourth patients were cousins of index patient. These secondary cases all had contact with index patient during his transmissible period. Besides, the 18 month-old nephew of the third patient who just received Measles-Mumps-Rubella (MMR) vaccination three months before experienced fever without rash. The lab result was positive for measles and confirmed to be vaccine-modified measles infection. Measles virus is highly contagious but vaccine preventable. However, primary vaccine failure occurs 5% to 10% of children at 1 year of age. Also, the immunity might wane off after time in young people who have not experienced natural infection. We recommend routine MMR vaccination and additional shots if working with exposure risk or traveling to endemic area.

Keywords : Measles ; Vaccine-modified measles infection ; Immunity waning

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

Classification	Disease Diagnosed ¹	Case diagnosis week		Week 16		Week 1 – 16	
		2015	2014	2015	2014	2015	2014
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	0	6	11		
	Acute Viral Hepatitis type A	2	1	26	49		
	Amoebiasis	5	2	104	72		
	Anthrax	0	0	0	0		
	Chikungunya Fever	0	0	3	5		
	Cholera	0	0	0	0		
	Dengue Fever	5	4	186	110		
	Dengue Hemorrhagic Fever/Dengue Shock Syndrome	0	0	0	4		
	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	0	1		
	Malaria	0	1	3	6		
	Measles	0	1	1	9		
	Meningococcal Meningitis	0	0	1	2		
	Paratyphoid Fever	0	0	1	6		
	Poliomyelitis	0	0	0	0		
	Rubella	0	0	3	3		
	Shigellosis	1	3	67	49		
Typhoid fever	0	0	12	8			
West Nile Fever	0	0	0	0			
Category III	Acute Viral Hepatitis type B	2	1	34	24		
	Acute Viral Hepatitis type C ²	3	3	61	45		
	Acute Viral Hepatitis type D	0	0	1	0		
	Acute Viral Hepatitis type E	0	0	1	5		
	Acute Viral Hepatitis untype	0	0	0	1		
	Congenital Rubella Syndrome	0	0	0	0		
	Enteroviruses Infection with Severe Complications	0	0	1	1		
	Haemophilus Influenza type b Infection	0	0	1	1		
	Japanese Encephalitis	0	0	0	0		
	Legionellosis	1	1	43	36		
	Mumps ²	22	17	233	231		
	Neonatal Tetanus	0	0	0	0		
	Pertussis	2	1	38	11		
	Tetanus ²	0	0	1	1		
	Category IV	Botulism	0	0	1	0	
Brucellosis		0	0	0	0		
Complicated Influenza		27	17	325	1437		
Complicated Varicella ⁴		0	0	20	25		
Endemic Typhus Fever		0	0	1	5		
Herpesvirus B Infection		0	0	0	0		
Invasive Pneumococcal Disease		7	14	215	283		
Leptospirosis		0	0	11	12		
Lyme Disease		0	0	0	0		
Melioidosis		0	0	6	7		
Q Fever		2	0	10	18		
Scrub Typhus		1	0	63	69		
Toxoplasmosis		0	0	1	5		
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. The epidemiological week calendar established by the World Health Organization is adopted for calculating each week's cumulative total.
 4. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
 5. 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".
 6. 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

- Thirty-four clusters were reported, including 12 upper respiratory tract infection clusters, 9 diarrhea clusters, 6 influenza-like illness clusters, 4 tuberculosis clusters, 2 fever of unknown origin clusters, and 1 pertussis cluster.

Imported Infectious Diseases

- 6 confirmed cases were imported from 2 countries during week 16 of 2015.

Disease \ Country	Country		Total
	Indonesia	China	
Dengue Fever	4		4
Q Fever		1	1
Amoebiasis	1		1
Total	5	1	6

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

- A total of 208 confirmed cases were imported from 23 countries in 2015.
- Top 3 imported diseases : Dengue fever (70), Amoebiasis (62), Shigellosis (37).
- Top 3 countries responsible for most imported cases : Indonesia (139), Vietnam (11), Philippines (11).

Summary of Epidemic

- **Influenza** : The influenza epidemic has not fluctuated. Since January 1, 2015, a total number of 325 cases of severe complicated influenza have been confirmed, including 58 cases infected by H1N1, 225 cases infected by H3N2, 6 cases infected by untyped influenza A and 36 cases infected by influenza B. Among these cases, 37 deaths were caused by infection with H3N2, 3 deaths were caused by infection with H1N1 and 4 deaths were caused by infection with influenza B. During week 16, H3N2 was the dominant strain circulating in the community and followed by influenza B, which became more active. Thus far, no resistant viruses have been detected.
- **Dengue Fever** : Two new cases were confirmed in Fongshan District, Kaohsiung City. Both cases had visited market prior to disease onset. Thus far this year, the average of number of cases reported every week is approximately 50. However, the number of cases reported during week 16 is comparatively lower than those reported in the past weeks. The public is urged to seek medical attention immediately when suspected symptoms develop. Doctors are advised to stay vigilant for suspected cases to ensure prompt reporting.

- **Enterovirus** : The ER consultation rate for enterovirus infection has fluctuated around the epidemic threshold. Coxsackie A virus is currently the dominant strain circulating in the community accounting for approximately 68.8% of all cases. So far, one severe case of enterovirus infection has been confirmed (CB5). Taiwan CDC will continue to monitor the development of the epidemic and the variation in of the dominant strain.

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

Case diagnosis week		Week 17		Week 1–17	
Classification	Disease Diagnosed ¹	2015	2014	2015	2014
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	6	11
	Acute Viral Hepatitis type A	0	0	26	49
	Amoebiasis	6	5	110	77
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	3	5
	Cholera	0	0	0	0
	Dengue Fever	4	4	190	114
	Dengue Hemorrhagic Fever/Dengue Shock Syndrome	0	0	0	4
	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	0	1
	Malaria	0	0	3	6
	Measles	0	0	1	9
	Meningococcal Meningitis	0	0	1	2
	Paratyphoid Fever	0	0	1	6
	Poliomyelitis	0	0	0	0
	Rubella	1	0	4	3
	Shigellosis	1	3	68	52
Typhoid fever	0	0	12	8	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	2	3	36	27
	Acute Viral Hepatitis type C ²	6	5	67	50
	Acute Viral Hepatitis type D	0	0	1	0
	Acute Viral Hepatitis type E	0	0	1	5
	Acute Viral Hepatitis untype	1	0	1	1
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	1	1
	Haemophilus Influenza type b Infection	0	1	1	2
	Japanese Encephalitis	0	0	0	0
	Legionellosis	2	2	45	38
	Mumps ²	20	23	253	254
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	0	38	11
	Tetanus ²	0	0	1	1
Category IV	Botulism	0	0	1	0
	Brucellosis	0	0	0	0
	Complicated Influenza	22	12	347	1449
	Complicated Varicella ⁴	1	0	21	25
	Endemic Typhus Fever	0	1	1	6
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	12	6	227	289
	Leptospirosis	2	1	13	13
	Lyme Disease	0	0	0	0
	Melioidosis	1	0	7	7
	Q Fever	2	0	12	18
	Scrub Typhus	3	1	66	70
	Toxoplasmosis	2	0	3	5
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 ⁵	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. The epidemiological week calendar established by the World Health Organization is adopted for calculating each week's cumulative total.
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6. 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

- Twenty-nine clusters were reported, including 12 upper respiratory tract infection clusters, 10 diarrhea clusters, 4 varicella clusters, 2 tuberculosis clusters and 1 influenza-like illness cluster.

Imported Infectious Diseases

- 9 confirmed cases were imported from 4 countries during week 17 of 2015.

Disease \ Country	Indonesia	Singapore	Brazil	Malaysia	Total
Dengue Fever	1	2	1	1	5
Amoebiasis	4				4
Total	5	2	1	1	9

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

- A total of 217 confirmed cases were imported from 24 countries in 2015.
- Top 3 imported diseases : Dengue fever (75), Amoebiasis (66), Shigellosis (37).
- Top 3 countries responsible for most imported cases : Indonesia (144), Vietnam (11), Philippines (11).

Summary of Epidemic

- **Influenza** : The influenza epidemic has gradually slowed down and passed its peak. Since January 1, 2015, a total number of 344 cases of severe complicated influenza have been confirmed, including 64 cases infected by H1N1, 234 cases infected by H3N2, 6 cases infected by untyped influenza A and 40 cases infected by influenza B. Among these cases, 40 deaths were caused by infection with H3N2, 6 deaths were caused by infection with H1N1 and 4 deaths were caused by infection with influenza B. During week 17, H3N2 was the dominant strain circulating in the community and followed by influenza B, which became more active. Thus far, no resistant viruses have been detected.
- **Dengue Fever** : Although no new case was confirmed during Week 17, the number of imported cases reported was higher than that during the same periods in the past years. In addition, the number of cases last week reported increased. Thus, the public is urged to seek medical attention immediately when suspected symptoms develop. Doctors are advised to stay vigilant for suspected cases to ensure prompt reporting.

● **Enterovirus** : The peak of enterovirus season has approached and the number of visits to outpatient services and ER has recently increased. At the moment, the ER consultation rate for enterovirus infection is higher than epidemic threshold. Coxsackie A virus is currently the dominant strain circulating in the community, accounting for approximately 63.6% of all cases. So far, one severe case of enterovirus infection has been confirmed.

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