

Strategies of Stockpiling and Use of Influenza Antivirals in Taiwan

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Abstract

In accordance with a WHO recommendation to maintain a diverse stockpile of influenza antivirals in preparation for a pandemic, Taiwan Centers for Disease Control has established a national stockpile of government-funded influenza antivirals. Following recommendations from the Advisory Committee on Influenza Control and Prevention, the stockpile is managed with the material management system (MIS) to supply antivirals to those who are at higher risks for influenza-related complications. In this article, we analyzed MIS data from four influenza seasons from 2010 to 2013. The data show that during each influenza season, 200–400 thousand patients, about 1%–2% of the Taiwan population, used government-funded influenza antivirals; the prescriptions were highly associated with influenza activity. Close contacts of patients with influenza-like illness (ILI) and ILI patients with warning signs of severe influenza complications (including those who has fever for more than 48 hours) used 95.5% of the antivirals, whereas children under the age of 12 years used 32%. By using and procuring 1%–2% of the influenza antiviral stockpile during each influenza season, Taiwan Centers for Disease Control can effectively respond to seasonal influenza and use stockpiled drugs properly.

Keywords: Influenza season, Influenza antivirals, Government-funded influenza antivirals

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Received : Nov. 13, 2015

Accepted : Feb. 24, 2016

DOI : 10.6525/TEB.20161122.32(22).001

Outbreak Investigation of a Food Poisoning Event at a Resort Hotel, Kenting, 2015

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Abstract

In March, 2015, Taiwan Centers for Disease Control was notified of a food poisoning event occurred at a resort hotel in Kenting. There were more than 200 gastroenteritis cases among students of a senior high school after breakfast at the resort restaurant. To identify the source and transmission route of this outbreak, Taiwan Field Epidemiology Training Program conducted a retrospective cohort study. A semi-structured questionnaire for consumed food items was used to interview all students. Statistical analysis was performed to identify suspicious food items. Environmental inspection was then done according to the statistical findings. Bacterial culture for common enteropathogens and viral test for norovirus and rotavirus were done for specimens collected from ill students and suspicious food items. Of 267 students interviewed, 131 (49%) met our case definition. Students consumed iced tea had higher risk for gastroenteritis (risk ratio 1.53, $p = 0.005$). Ice used for iced tea and six stool and vomitus specimens of ill students were tested positive for norovirus. Major genotype (80%) was GII.17. These evidence suggested norovirus-contaminated ice made by raw water caused the event. We recommend relevant authorities to provide guidance to secure drinking water safety and to avoid similar outbreaks in the future.

Keywords: Norovirus, Outbreak, Waterborne, GII.17

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Received : Apr. 21, 2016

Accepted : May. 2, 2016

DOI : 10.6525/TEB.20161122.32(22).002

week 44–45 (Oct. 30–Nov. 12, 2016)

DOI: 10.6525/TEB.20161122.32(22).003

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

Case diagnosis week		Week 44		Week 1–44	
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	0	0	35	19
	Acute Viral Hepatitis type A	24	5	959	120
	Amoebiasis	4	2	269	308
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	8	4
	Cholera	0	0	10	10
	Dengue Fever	10	2188	757	31914
	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	2
	Malaria	0	1	13	9
	Measles	0	0	13	29
	Meningococcal Meningitis	0	0	6	3
	Paratyphoid Fever	0	0	5	5
	Poliomyelitis	0	0	0	0
	Rubella	0	0	4	6
	Shigellosis	5	4	189	159
Typhoid fever	0	1	7	25	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	2	2	91	106
	Acute Viral Hepatitis type C ⁵	0	2	172	177
	Acute Viral Hepatitis type D	0	0	1	1
	Acute Viral Hepatitis type E	0	0	15	2
	Acute Viral Hepatitis untype	0	0	0	1
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	27	5
	Haemophilus Influenza type b Infection	0	0	14	2
	Japanese Encephalitis	0	0	23	29
	Legionellosis	3	2	94	150
	Mumps ²	12	15	531	672
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	0	17	82
	Tetanus ²	0	1	10	10
	Category IV	Botulism	0	0	5
Brucellosis		0	0	0	2
Complicated Influenza		20	2	1927	808
Complicated Varicella ⁴		2	1	37	46
Endemic Typhus Fever		0	0	13	30
Herpesvirus B Infection		0	0	0	0
Invasive Pneumococcal Disease		16	10	491	440
Leptospirosis		4	1	104	77
Lyme Disease		0	0	2	2
Melioidosis		2	2	39	35
Q Fever		0	0	41	40
Scrub Typhus		14	17	405	388
Toxoplasmosis		0	0	8	11
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".
 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

- Twenty-three clusters were reported, including 9 diarrhea clusters, 5 upper respiratory tract infection clusters, 4 varicella clusters, 3 tuberculosis clusters, and 2 influenza-like illness clusters.

Imported Infectious Diseases

- 21 confirmed cases were imported from 8 countries during Week 44 of 2016.

Country Disease	Indonesia	Philippines	China	India	Vietnam	Myanmar	Cambodia	Thailand	Total
Dengue Fever	3	3			1	1	1		9
Amoebiasis	4			1					5
Legionellosis			2						2
Hepatitis A	1							1	2
Shigellosis	1								1
Chikungunya a Fever				1					1
Scrub Typhus			1						1
Total	9	3	3	2	1	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 693 confirmed cases were imported from 37 countries in 2016.
- Top 3 imported diseases : Dengue fever (316), Amoebiasis (136), Shigellosis (85).
- Top 3 countries responsible for most imported cases : Indonesia (292), Philippines (83), Thailand (64).

Summary of Epidemic

- **Enterovirus** : New cases have been recently reported in the community. Coxsackie A virus is currently the dominant strain circulating in the community. Sporadic cases of enterovirus 71 infection have been recently confirmed. This year, a total of 157 cases of enterovirus 71 infection, including 21 severe cases, 134 mild cases and 2 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.

- **Influenza** : Due to the recent low temperature, influenza activity has increased. H3N2 is currently the dominant strain circulating in the community.
- **Dengue Fever** : Although dengue activity has decreased in some countries in Southeast Asia, it has remained at its peak in Southeast Asia. Imported cases have continued to be reported. The recent occurrence of rain has become less frequent, but mosquito activity remains high. The public is urged to clean up and remove any vector breeding sites and take prevention measures against mosquito bites.
- **Zika Virus Infection** : The epidemic has continuously increased in Southeast Asian countries, elevating the risk of importing Zika virus into Taiwan from these countries. New cases imported from Southeast Asian country have been confirmed.

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

Case diagnosis week		Week 45		Week 1—45	
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	36	19
	Acute Viral Hepatitis type A	24	3	983	123
	Amoebiasis	5	3	274	311
	Anthrax	0	0	0	0
	Chikungunya Fever	1	0	9	4
	Cholera	1	0	11	10
	Dengue Fever	2	2147	759	34061
	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	2
	Malaria	1	0	14	9
	Measles	0	0	13	29
	Meningococcal Meningitis	0	0	6	3
	Paratyphoid Fever	0	0	5	5
	Poliomyelitis	0	0	0	0
	Rubella	0	0	4	6
	Shigellosis	3	3	192	162
	Typhoid fever	0	1	7	26
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	4	2	95	108
	Acute Viral Hepatitis type C ⁵	2	10	174	187
	Acute Viral Hepatitis type D	0	1	1	2
	Acute Viral Hepatitis type E	0	0	15	2
	Acute Viral Hepatitis untype	0	0	0	1
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	27	5
	Haemophilus Influenza type b Infection	0	0	14	2
	Japanese Encephalitis	0	1	23	30
	Legionellosis	3	2	97	152
	Mumps ²	10	12	541	684
	Neonatal Tetanus	0	0	0	0
	Pertussis	1	1	18	83
	Tetanus ²	0	0	10	10
	Category IV	Botulism	0	0	5
Brucellosis		0	0	0	2
Complicated Influenza		28	3	1955	811
Complicated Varicella ⁴		0	1	37	47
Endemic Typhus Fever		0	0	13	30
Herpesvirus B Infection		0	0	0	0
Invasive Pneumococcal Disease		11	10	502	450
Leptospirosis		3	1	107	78
Lyme Disease		0	0	2	2
Melioidosis		4	0	43	35
Q Fever		1	1	42	41
Scrub Typhus		21	26	426	414
Toxoplasmosis		0	0	8	11
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.
6. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

Suspected Clusters

- Twenty-eight clusters were reported, including 20 diarrhea clusters, 4 upper respiratory tract infection clusters, 2 influenza-like illness clusters, 1 varicella cluster, and 1 tuberculosis cluster.

Imported Infectious Diseases

- 9 confirmed cases were imported from 5 countries during Week 45 of 2016.

Country Disease	Indonesia	Philippines	Thailand	Japan	India	Total
Amoebiasis	3		1			4
Dengue Fever		1	1			2
Malaria					1	1
Scrub Typhus				1		1
Shigellosis		1				1
Total	3	2	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 702 confirmed cases were imported from 37 countries in 2016.
- Top 3 imported diseases : Dengue fever (318), Amoebiasis (140), Shigellosis (86).
- Top 3 countries responsible for most imported cases : Indonesia (295), Philippines (85), Thailand (66).

Summary of Epidemic

- **Influenza** : Although the recent temperature has fluctuated drastically from day to night, influenza activity is expected to remain unchanged. H3N2 is currently the dominant strain circulating in the community.
- **Enterovirus** : The epidemic has slowed down. Coxsackie A virus is currently the dominant strain circulating in the community. Sporadic cases of enterovirus 71 infection have been recently confirmed. This year, a total of 163 cases of enterovirus 71 infection, including 21 severe cases, 140 mild cases and 2 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 mosquito activity remains high. The public is urged to clean up and remove any vector breeding sites and take prevention measures against mosquito bites.
- **Zika Virus Infection** : The epidemic has continuously increased in Southeast Asian countries, elevating the risk of importing Zika virus into Taiwan from these countries.

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.

Address : No.6, Linshen S. Road, Taipei, Taiwan 100 (R.O.C.) **Telephone No** : (02) 2395-9825

Publisher : Jih-Haw Chou

Editor-in-Chief : Wan-Ting Huang

Executive Editor : Hsueh-Ju Chen, Hsiu-Lan Liu

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

Suggested Citation :

[Author].[Article title].Taiwan Epidemiol Bull 2016;32:[inclusive page numbers]. [DOI]