

Evaluation of the Effectiveness of Hepatitis A Vaccination for Post-Exposure Prophylaxis in Taiwan, 2016

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Abstract

The number of hepatitis A confirmed cases had increased since June 2015 in Taiwan. According to the surveillance data compiled by Taiwan Centers for Disease Control (TCDC), 1,133 cases were confirmed in 2016, and the age of the most cases ranged 20–39 years old. About 60% of these cases also had HIV, syphilis or gonorrhea, and unsafe sex between men and men was the main risk factor of this outbreak. In order to control this outbreak, TCDC implemented “Free Hepatitis A Vaccination Pilot Program for Contacts of Confirmed Cases” since January 2016, providing a free dose of hepatitis A vaccine to family members, sexual partners and household contacts of hepatitis A confirmed cases.

To assess the effectiveness of the hepatitis A vaccine applied as post-exposure prophylaxis (PEP) in preventing infection among contacts of hepatitis A confirmed cases, we collected the contacts information from Taiwan’s notifiable disease system. Totally 1,001 contacts were eligible for the program, and 979 persons were suggested to receive the post-exposure vaccination. Among the 979 contacts, 920 (94.0%) were vaccinated, of which 720 (78.3%) accomplished the PEP vaccination on schedule. After follow-up, the attack rate of unvaccinated and vaccinated contacts was 8.47% and 1.67%, respectively. The relative risk (RR) was 0.20 (95% CI: 0.07–0.54), and the vaccine effectiveness was 80.3% (95% CI: 46.1%–92.8%).

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Timely administration of hepatitis A vaccine in PEP is important and the vaccine effectiveness is high in contacts. Therefore, in order to prevent contacts of hepatitis A confirmed cases from infection after exposure and avoid the risk of virus transmission in community, hepatitis A PEP is highly recommended.

Keywords: acute hepatitis A, contacts, post-exposure prophylaxis

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

Case diagnosis year		Week 33★		Week 1-33			
Classification	Disease Diagnosed	2018	2017	2018		2017	
				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	0	50	0	22	0
	Acute Viral Hepatitis type A	3	5	64	24	317	35
	Amoebiasis	7	9	188	79	225	126
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	1	4	4	9	9
	Cholera	0	0	4	0	0	0
	Dengue Fever	13	15	167	149	194	191
	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	1	0	1	0
	Malaria	1	0	2	2	4	4
	Measles	0	0	31	12	5	5
	Meningococcal Meningitis	0	0	5	1	10	0
	Paratyphoid Fever	1	0	5	2	3	3
	Poliomyelitis	0	0	0	0	0	0
	Rubella	1	0	8	7	2	2
	Shigellosis	4	2	102	33	112	41
Typhoid fever	0	2	7	5	13	12	
West Nile Fever	0	0	0	0	0	0	
Category III	Acute Viral Hepatitis type B	4	1	85	6	105	4
	Acute Viral Hepatitis type C	9	6	300	3	191	1
	Acute Viral Hepatitis type D	0	0	0	0	1	0
	Acute Viral Hepatitis type E	0	0	5	0	13	3
	Acute Viral Hepatitis untype	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	1	0	29	0	7	0
	Haemophilus Influenza type b Infection	0	0	4	0	3	0
	Japanese Encephalitis	0	0	34	0	22	0
	Legionellosis	10	4	113	2	107	11
	Mumps	10	16	370	5	425	7
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	1	2	16	0	22	0
	Tetanus	1	0	5	0	6	0
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Influenza	2	0	34	0	18	1
	Complicated Varicella	0	0	18	0	28	1
	Endemic Typhus Fever	0	0	0	0	0	0
	Herpesvirus B Infection	8	9	321	0	321	2
	Invasive Pneumococcal Disease	1	2	38	0	56	1
	Leptospirosis	0	0	111	1	0	0
	Lyme Disease	1	0	1	1	0	0
	Melioidosis	1	1	11	1	14	0
	Q Fever	0	0	9	1	11	0
	Scrub Typhus	10	9	225	0	282	0
	Toxoplasmosis	33	45	880	5	1148	6
	Tularremia	0	1	12	1	9	0
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0	1	1
	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.
- The following chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
- Numbers of mumps, neonatal tetanus and tetanus cases are summed up by the week of report.
- Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.
- Since 2018/1/1, "Listeriosis" was listed as a Notifiable Infectious Disease.

Suspected Clusters

- Twenty-four clusters were reported, including 6 tuberculosis clusters, 4 diarrhea clusters, 4 upper respiratory tract infection clusters, 6 influenza-like illness clusters, 1 varicella cluster, 1 enterovirus cluster, and 2 fever of unknown origin clusters.

Imported Infectious Diseases

- There were 21 confirmed imported cases from 9 countries during week 33 of 2018.

Country \ Disease	Indonesia	Thailand	China	Cambodia	Kenya	Vietnam	Philippines	Malaysia	USA	Total
DF	2	2		2		1	1	1		9
Amoebiasis	6									6
Acute Hepatitis A			1					1		2
Rubella			1							1
Lyme Disease									1	1
Malaria					1					1
Shigellosis	1									1
Total	9	2	2	2	1	1	1	2	1	21

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

- There are 342 confirmed imported cases from 25 different countries in 2018. The top 3 countries are Indonesia (104), Philippines (45), and Thailand (38).
- Top 3 imported diseases are Dengue Fever (151), Amoebiasis (79), and Shigellosis (33).

Summary of Epidemic

- **Enterovirus:** Taiwan is in the midst of enterovirus season. Most reported cases experienced mild symptoms. Coxsackie A virus is currently the most frequently isolated virus type. In addition, EV71 is still circulating in the community.
- **Dengue Fever:** The epidemic has been increasing in the nearby Asian countries; therefore, the imported cases are continuously increasing in Taiwan. There have been indigenous dengue fever clusters in Northern and Southern Taiwan. As the temperature and chance of rain remain high, the mosquito activity are increasing. Therefore, the risk of imported and indigenous epidemics remain elevated.
- **Japanese Encephalitis:** The epidemic has passed its peak, but it is still in the midst of Japanese encephalitis season. Cases are likely to occur sporadically.
- **Scrub Typhus:** Taiwan is in the midst of scrub typhus season. The current primarily affected areas include Hualien County and Taitung County.

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

Case diagnosis year		Week 34★		Week 1-34			
Classification	Disease Diagnosed	2018	2017	2018		2017	
				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	1	0	51	0	22	0
	Acute Viral Hepatitis type A	2	7	66	25	324	38
	Amoebiasis	10	6	198	83	231	128
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	0	4	4	9	9
	Cholera	1	0	5	0	0	0
	Dengue Fever	36	14	203	159	208	205
	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	1	0	1	0
	Malaria	0	0	2	2	4	4
	Measles	0	0	31	12	5	5
	Meningococcal Meningitis	0	1	5	1	11	0
	Paratyphoid Fever	0	0	5	3	3	3
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	0	8	7	2	2
	Shigellosis	3	1	105	34	113	41
	Typhoid fever	1	0	8	6	13	12
West Nile Fever	0	0	0	0	0	0	
Category III	Acute Viral Hepatitis type B	3	3	88	6	108	4
	Acute Viral Hepatitis type C	8	7	308	3	198	1
	Acute Viral Hepatitis type D	0	0	0	0	1	0
	Acute Viral Hepatitis type E	0	0	5	0	13	3
	Acute Viral Hepatitis untype	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	2	0	31	0	7	0
	Haemophilus Influenza type b Infection	0	0	4	0	3	0
	Japanese Encephalitis	1	0	35	0	22	0
	Legionellosis	6	2	119	2	109	12
	Mumps	11	13	381	5	438	7
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	2	3	18	0	25	0
	Tetanus	0	0	5	0	6	0
	Category IV	Botulism	0	0	0	0	0
Brucellosis		0	0	0	0	0	0
Complicated Influenza		2	0	36	0	18	1
Complicated Varicella		1	0	19	0	28	1
Endemic Typhus Fever		0	0	0	0	0	0
Herpesvirus B Infection		7	4	328	0	325	2
Invasive Pneumococcal Disease		2	3	40	0	59	1
Leptospirosis		5	0	116	1	0	0
Lyme Disease		0	0	1	1	0	0
Melioidosis		0	2	11	1	16	0
Q Fever		0	1	9	1	12	0
Scrub Typhus		10	6	235	0	288	0
Toxoplasmosis		21	25	901	5	1173	6
Tularremia		0	1	12	1	10	0
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0	1	1
	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. The following chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
3. Numbers of mumps, neonatal tetanus and tetanus cases are summed up by the week of report.
4. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.
5. Since 2018/1/1, "Listeriosis" was listed as a Notifiable Infectious Disease.

Suspected Clusters

- Nineteen clusters were reported, including 6 tuberculosis clusters, 5 diarrhea clusters, 5 upper respiratory tract infection clusters, 2 influenza-like illness clusters, and 1 varicella cluster.

Imported Infectious Diseases

- There were 16 confirmed imported cases from 6 countries during week 34 of 2018.

Country Disease	Indonesia	Cambodia	Malaysia	Thailand	Vietnam	Philippines	Total
DF		4	2	2	1	1	10
Amoebiasis	2						2
Typhoid fever	1						1
Paratyphoid Fever	1						1
Acute Hepatitis A	1						1
Shigellosis	1						1
Total	6	4	2	2	1	1	16

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

- There are 358 confirmed imported cases from 25 different countries in 2018. The top 3 countries are Indonesia (110), Philippines (48), and Thailand (40).
- Top 3 imported diseases are Dengue Fever (161), Amoebiasis (81), and Shigellosis (34).

Summary of Epidemic

- **Enterovirus:** Taiwan is in the midst of enterovirus season. As schools start, the epidemic could increase by close contacts between individuals.
- **Dengue Fever:** The epidemic has been increasing in the nearby Asian countries; therefore, the imported cases are continuously increasing in Taiwan. Several indigenous dengue fever clusters have occurred in Taiwan. Recent extremely heavy rain caused flooding in some areas in central and southern Taiwan might increase the risk of dengue transmission.

- **Scrub Typhus:** Taiwan is in the midst of scrub typhus season. The current primarily affected areas include Hualien County and Taitung County.
- **Japanese Encephalitis:** The epidemic has passed its peak, but it is still in the midst of Japanese encephalitis season. Cases are likely to occur sporadically.

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