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Original Article

Epidemiology and Evolution of Influenza A/H7N9

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Abstract

The World Health Organization (WHO) has reported a first human infection by H7N9 virus from China in March 2013. Cases continued to be reported throughout April till now. There were four imported cases in Taiwan and one of them died. It has been established that many of the human cases of H7N9 appear to have a link to live bird markets except few cases. Due to the increasing travel frequency between Taiwan and Mainland China, it is needed to strengthen monitoring of the H7N9 virus and its epidemics. This study focuses on the epidemiology, genetics and evolution of H7N9 virus. The results showed that influenza tends to strike during the winter months, and the second wave which began in October 2013, although the mortality rate from H7N9 infection is less than the first wave, however, the age and geographic distribution is broader. According to the genetic analysis data, the amino acids composition of this virus makes it easier to replicate and to infect human. To prevent the H7N9 epidemic in this winter period, any traveler visiting China and has influenza-like illness symptoms developed upon arriving in Taiwan, such as fever and cough, please put on a surgical mask and seek immediate medical attention. Moreover, physicians and medical workers should pay attention to patient's recent travel history; include visiting live poultry markets, direct contacting with poultry and birds or their droppings/dead bodies, to facilitate the diagnosis and treatment.

Keywords： Influenza A/H7N9, epidemiology, genetic evolution

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Outbreak of Respiratory Syncytial Virus Infection in Postpartum Nursing Home, Changhua County, 2014

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Abstract

Respiratory syncytial virus (RSV) is one of the major pathogens that cause neonatal bronchiolitis and pneumonia. We report an outbreak of RSV infection among neonates in a postpartum care center. A total of 33 infants (attack rate 73%)and 3 health care (attack rate 8%)workers were infected with RSV. The index neonate contracted RSV through contact of the ill family. The following RSV transmission was associated with inadequate infection control practice. Our report highlights the importance of infection control in the postpartum care center. Health care workers are recommended stringently to follow the infection control guideline for the postpartum care.

Keyword: Postpartum nursing home, cluster infection, respiratory syncytial virus

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

Case diagnosis week		Week 51		Week 1—51	
Classification	Disease Diagnosed[1]	2014	2013	2014	2013
Category I	Plague	0	0	0	0
	Rabies	0	0	0	1
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	0	1	30	25
	Acute Viral Hepatitis type A	1	0	121	129
	Amoebiasis	2	7	285	264
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	8	27
	Cholera	0	0	4	7
	Dengue Fever	301	48	15516	828
	Dengue Hemorrhagic Fever/Dengue Shock Syndrome	7	2	138	16
	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	1	0	20	12
	Measles	0	0	26	8
	Meningococcal Meningitis	0	1	3	6
	Paratyphoid Fever	0	0	8	8
	Poliomyelitis	0	0	0	0
	Rubella	0	0	6	7
	Shigellosis	6	1	136	153
	Typhoid fever	0	0	25	20
	West Nile Fever	0	0	0	0
Category III	Acute Viral Hepatitis type B	3	4	116	105
	Acute Viral Hepatitis type C[5]	2	0	194	9
	Acute Viral Hepatitis type D	0	0	1	0
	Acute Viral Hepatitis type E	0	1	11	7
	Acute Viral Hepatitis untype	0	0	4	5
	Congential Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	1	7	10
	Haemophilus Influenza type b Infection	0	0	3	10
	Japanese Encephalitis	0	0	18	16
	Legionellosis	3	0	134	109
	Mumps[2]	7	22	865	1151
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	1	69	47
	Tetanus[2]	0	1	8	23
Category IV	Botulism	0	0	0	1
	Brucellosis	0	0	0	0
	Complicated Influenza	2	14	1763	909
	Complicated Varicella[4]	4	0	56	0
	Endemic Typhus Fever	1	0	25	25
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	11	20	566	625
	Leptospirosis	2	0	96	85
	Lyme Disease	0	0	2	0
	Melioidosis	0	1	33	21
	Q Fever	0	0	49	47
	Scrub Typhus	5	6	425	532
	Toxoplasmosis	0	0	14	14
	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. 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 changed to the fifth class of infectious diseases "novel influenza A virus infections". The original "H5N1 flu" and "H7N9 flu" were removed on the same day.

Suspected Clusters

● In regard to disease clusters,11 outbreak events were reported, including 3tuberculosisclusters, 3 varicella clusters, 2 diarrheaclusters, 1 influenza-like illness cluster, 1 shigellosis cluster and 1amoebiasis cluster.

Imported Infectious Diseases

●14confirmed infectious cases were imported from 7 countries during week 51of 2014.

Country / Disease	Indonesia	China	Philippines	Singapore	Cameroon	Thailand	Malaysia	Total
Dengue Fever		1	1	1		1	1	5
Shigellosis	4							4
Amoebiasis	3							3
Malaria					1			1
Legionellosis		1						1
Total	7	2	1	1	1	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 693infectious cases were imported from 39 countries in 2014.

●Top 3 imported diseases：Dengue fever (238), Amoebiasis (182), Shigellosis (116).

●Top 3 countries responsible for most imported cases：Indonesia (330), Philippines (84), Malaysia (74).

Summary of Epidemic

●**Dengue fever**：A downward trend has been observed in the overall epidemic. The outbreaks in the majority of the districts in Kaohsiung City are expected to gradually slow down. Although the outbreak in Pingtung County has reached a plateau, new sporadic cases have been reported. InTaitung County, a cluster of dengue cases originated from local outbreak has been reported in Taimali village. In addition, there was no new case be reported in Tainan City. The public is once again urged to clean up and remove any vector breeding sites and take personal precautions against mosquito bites; doctors are advised to stay vigilant for suspected cases, especially cases presenting symptoms pertaining to dengue hemorrhagic fever, to ensure prompt diagnosis and treatment

●**Influenza**：Influenza activity has gradually increased. 2 cases of severe complicated influenza(type B) were confirmed. Since August 1, 2014, a total number of 53 cases ofsevere complicated influenza have been confirmed, including 33 cases infected byH1N1, 6 cases infected by H3N2, 2 cases infected by untyped influenza A and 12 cases infected by influenza B. Of these cases, 14 died.

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

Case diagnosis week		Week 52		Week 1—52	
Classification	**Disease Diagnosed**[1]	**2014**	**2013**	**2014**	**2013**
Category I	Plague	0	0	0	0
	Rabies	0	0	0	1
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	0	0	30	25
	Acute Viral Hepatitis type A	1	6	122	135
	Amoebiasis	5	6	290	270
	Anthrax	0	0	0	0
	Chikungunya Fever	0	1	8	28
	Cholera	0	0	4	7
	Dengue Fever	186	25	15702	853
	Dengue Hemorrhagic Fever/Dengue Shock Syndrome	1	0	139	16
	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	20	12
	Measles	0	0	26	8
	Meningococcal Meningitis	0	0	3	6
	Paratyphoid Fever	0	0	8	8
	Poliomyelitis	0	0	0	0
	Rubella	0	0	6	7
	Shigellosis	1	1	137	154
	Typhoid fever	0	0	25	20
	West Nile Fever	0	0	0	0
Category III	Acute Viral Hepatitis type B	1	1	117	106
	Acute Viral Hepatitis type C[5]	6	0	200	9
	Acute Viral Hepatitis type D	0	0	1	0
	Acute Viral Hepatitis type E	0	0	11	7
	Acute Viral Hepatitis untype	0	0	4	5
	Congential Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	1	7	11
	Haemophilus Influenza type b Infection	1	0	4	10
	Japanese Encephalitis	0	0	18	16
	Legionellosis	3	2	137	111
	Mumps[2]	15	17	880	1168
	Neonatal Tetanus	0	0	0	0
	Pertussis	1	4	70	51
	Tetanus[2]	0	1	8	24
Category IV	Botulism	0	0	0	1
	Brucellosis	0	0	0	0
	Complicated Influenza	2	20	1765	929
	Complicated Varicella[4]	1	0	57	0
	Endemic Typhus Fever	0	1	25	26
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	15	6	581	631
	Leptospirosis	1	1	97	86
	Lyme Disease	0	0	2	0
	Melioidosis	0	0	33	21
	Q Fever	1	0	50	47
	Scrub Typhus	8	9	433	541
	Toxoplasmosis	0	0	14	14
	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. 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 changed to the fifth class of infectious diseases "novel influenza A virus infections". The original "H5N1 flu" and "H7N9 flu" were removed on the same day.

Suspected Clusters

●In regard to disease clusters,19 outbreak events were reported, including 8 varicella clusters, 5tuberculosisclusters, 4 diarrhea clusters and 2 upper respiratory tract infection clusters.

Imported Infectious Diseases

●4 confirmed infectious cases were imported from 2 countries during week 52 of 2014.

Country / Disease	Indonesia	Malaysia	Total
Dengue Fever	1	1	2
Amoebiasis	1		1
Shigellosis	1		1
Total	3	1	4

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

●A total of 696 infectious cases were imported from 39 countries in 2014.

●Top 3 imported diseases：Dengue fever (240), Amoebiasis (183), Shigellosis (117).

●Top 3 countries responsible for most imported cases：Indonesia (334), Philippines (84), Malaysia (75).

Summary of Epidemic

●**Dengue fever**：A downward trend has been observed in the overall epidemic.

●**Influenza**：Influenza activity has gradually increased. 2 cases of severe complicated influenza(H3N2) were confirmed. Since August 1, 2014, a total number of 55 cases of severe complicated influenza have been confirmed, including 33 cases infected by H1N1, 8 cases infected by H3N2, 2 cases infected by untyped influenza A and 12 cases infected by influenza B. Of these cases, 14 died.

●**Novel Influenza A Virus Infections**：Due to the number of novel H7N9 influenza infections have increased in China, the public urges travelers visiting Zhejiang Province or Guangdong Province to take preventive measures such as avoiding direct contact with poultry and birds and consuming only thoroughly cooked poultry and eggs, and practice good personal hygiene such as washing hands frequently to ward off infection.

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

*week 53 is not available in 2013

Case diagnosis week		Week 53		Week 1—53	
Classification	**Disease Diagnosed**[1]	**2014**	**2013***	**2014**	**2013**
Category I	Plague	0	-	0	0
	Rabies	0	-	0	1
	SARS	0	-	0	0
	Smallpox	0	-	0	0
Category II	Acute Flaccid Paralysis	1	-	31	25
	Acute Viral Hepatitis type A	2	-	124	135
	Amoebiasis	5	-	294	270
	Anthrax	0	-	0	0
	Chikungunya Fever	0	-	8	28
	Cholera	0	-	4	7
	Dengue Fever	63	-	15765	853
	Dengue Hemorrhagic Fever/Dengue Shock Syndrome	0	-	139	16
	Diphtheria	0	-	0	0
	Enterohemorrhagic E. coli Infection	0	-	0	0
	Epidemic Typhus Fever	0	-	0	0
	Hantavirus Pulmonary Syndrome	0	-	0	0
	Hemorrhagic Fever with Renal Syndrome	1	-	2	0
	Malaria	0	-	20	12
	Measles	0	-	26	8
	Meningococcal Meningitis	0	-	3	6
	Paratyphoid Fever	0	-	8	8
	Poliomyelitis	0	-	0	0
	Rubella	1	-	7	7
	Shigellosis	1	-	138	154
	Typhoid fever	0	-	25	20
	West Nile Fever	0	-	0	0
Category III	Acute Viral Hepatitis type B	3	-	120	106
	Acute Viral Hepatitis type C[5]	6	-	206	9
	Acute Viral Hepatitis type D	0	-	1	0
	Acute Viral Hepatitis type E	0	-	11	7
	Acute Viral Hepatitis untype	0	-	4	5
	Congential Rubella Syndrome	0	-	0	0
	Enteroviruses Infection with Severe Complications	0	-	7	11
	Haemophilus Influenza type b Infection	0	-	4	10
	Japanese Encephalitis	0	-	18	16
	Legionellosis	2	-	139	111
	Mumps[2]	13	-	893	1168
	Neonatal Tetanus	0	-	0	0
	Pertussis	1	-	71	51
	Tetanus[2]	2	-	10	24
Category IV	Botulism	0	-	0	1
	Brucellosis	0	-	0	0
	Complicated Influenza	0	-	1765	929
	Complicated Varicella[4]	0	-	57	0
	Endemic Typhus Fever	0	-	25	26
	Herpesvirus B Infection	0	-	0	0
	Invasive Pneumococcal Disease	16	-	597	631
	Leptospirosis	1	-	98	86
	Lyme Disease	0	-	2	0
	Melioidosis	1	-	34	21
	Q Fever	0	-	50	47
	Scrub Typhus	4	-	437	541
	Toxoplasmosis	0	-	14	14
	Tularremia	0	-	0	0
Category V	Ebola Virus Disease	0	-	0	0
	Ebola-Marburg Hemorrhagic Fever	0	-	0	0
	Novel Influenza A Virus Infections[6]	0	-	0	0
	Lassa Fever	0	-	0	0
	Rift Valley Fever	0	-	0	0
	Middle East Respiratory Syndrome Coronavirus	0	-	0	0
	Yellow Fever	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. The epidemiological week calendar established by the World Health Organization is adopted for calculating each week's cumulative total.
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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 changed to the fifth class of infectious diseases "novel influenza A virus infections". The original "H5N1 flu" and "H7N9 flu" were removed on the same day.

Suspected Clusters

●Eleven outbreak events were reported, including 7 diarrhea clusters, 2 varicella clusters, 1tuberculosiscluster and 1 upper respiratory tract infection cluster.

Imported Infectious Diseases

●15confirmed infectious cases were imported from 6 countries during week 53 of 2014.

Country / Disease	Indonesia	Malaysia	Vietnam	Thailand	Hong Kong	South Africa	Total
Amoebiasis	5						5
Dengue Fever		3	2				5
Rubella						1	1
Hepatitis B					1		1
Melioidosis				1			1
Legionellosis				1			1
Shigellosis	1						1
Total	6	3	2	2	1	1	15

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

●A total of 709 infectious cases were imported from 40 countries in 2014.

●Top 3 imported diseases：Dengue fever (245), Amoebiasis (186), Shigellosis (118).

●Top 3 countries responsible for most imported cases：Indonesia (339), Philippines (84), Malaysia (79).

Summary of Epidemic

●**Dengue fever**：A downward trend has been observed in the overall epidemic. Local transmission of dengue was still observed in Kaohsiung and Pingtung. The public is once again urged to clean up and remove any vector breeding sites and take personal precautions against mosquito bites.

●**Influenza**：The influenza epidemic season has approached. During week 53, there was no new case with severe complications reported. Since August 1, 2014, a total number of 55 cases of severe complicated influenza have been confirmed, including 33 cases infected by H1N1, 8 cases infected by H3N2, 2 cases infected byuntyped influenza A and 12 cases infected by influenza B. Of these cases, 14 died.

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