

A Study on the Relationship between the Spread of Emerging Infectious Diseases and Bats

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Abstract

In recent years, the outbreak frequency of emerging infectious diseases increased and most of the outbreaks were related to wild animals. For example, rabies, severe acute respiratory syndrome (SARS), Ebola virus disease (EVD) and so forth, may be transmitted to human by bats directly or indirectly. World Health Organization's advocacy on epidemic prevention concept of One Health advocates ecological health, so that environmental health, human and animal are all free from threats of diseases. Due to the special terrain and geographical location, bat diversity in Taiwan is the highest around the world. Therefore, to understand the relationship between bats and emerging infectious diseases is important. We reviewed related research of bats and emerging infectious diseases, including the important risk factors influencing the spread of emerging infectious diseases related to the biological characteristics and ecological habits of bats, and the epidemic situation of the bat-borne emerging infectious diseases and the present research progress. We explored the relationship between the spread of emerging infectious diseases and bats, as the reference of future investigation of the prevalence of bat-borne emerging infectious diseases, establishment of surveillance platform, set up a notify and test mechanism with standard and systematic process, and risk assessment.

Keywords: emerging infectious diseases, rabies, severe acute respiratory syndrome (SARS), Ebola, bats

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Investigation of Abnormality of Drinking Water During Ship Sanitation Inspection at Suao Port, 2017

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Abstract

On March 27 2017, quarantine officers inspected ship sanitation for a ten-thousand-toned ship docked in 12th harbor at Suao port. Through sampling and testing, zero residual chlorine result was found in drinking water. Further observation, sampling and testing of residual chlorine of drinking water in shore water supply point also showed zero residual chlorine. Investigation of drinking water distribution system at port found that the water valve was closed to be the reason of deteriorating the drinking water. After reopening the water valve, the value of residual chlorine in drinking water in distribution system at port promptly became normal. We suggested that when inspecting ship sanitation and tests of drinking water show abnormal, quarantine officers should check the quality of drinking water in shore water supply point. If the result also shows abnormal, information should be reported immediately to competent authorities. Besides, port authorities should set up a monitoring mechanism and test drinking water in distribution system at port regularly to maintain the quality of water supply and protect the water safety of the ship.

Keywords: ship sanitation inspection, quarantine, drinking water, residual chlorine, water valve

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

| Case diagnosis year | | Week 3★ | | Week 1-3 | | | |
|-------------------------------|---|----------|------|--------------|----------------|--------------|----------------|
| 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 | 3 | 2 | 7 | 0 | 2 | 0 |
| | Acute Viral Hepatitis type A | 3 | 19 | 8 | 3 | 46 | 2 |
| | Amoebiasis | 5 | 2 | 14 | 3 | 19 | 12 |
| | Anthrax | 0 | 0 | 0 | 0 | 0 | 0 |
| | Chikungunya Fever | 0 | 0 | 1 | 1 | 0 | 0 |
| | Cholera | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dengue Fever | 0 | 7 | 2 | 2 | 20 | 20 |
| | 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 | 1 | 0 |
| | Malaria | 0 | 0 | 0 | 0 | 0 | 0 |
| | Measles | 0 | 0 | 1 | 0 | 0 | 0 |
| | Meningococcal Meningitis | 1 | 0 | 1 | 0 | 0 | 0 |
| | Paratyphoid Fever | 0 | 0 | 0 | 0 | 1 | 1 |
| | Poliomyelitis | 0 | 0 | 0 | 0 | 0 | 0 |
| | Rubella | 0 | 0 | 0 | 0 | 0 | 0 |
| | Shigellosis | 1 | 4 | 6 | 1 | 16 | 6 |
| Typhoid fever | 1 | 1 | 1 | 0 | 2 | 2 | |
| West Nile Fever | 0 | 0 | 0 | 0 | 0 | 0 | |
| Category III | Acute Viral Hepatitis type B | 1 | 2 | 5 | 0 | 14 | 2 |
| | Acute Viral Hepatitis type C | 11 | 4 | 21 | 1 | 12 | 0 |
| | Acute Viral Hepatitis type D | 0 | 0 | 0 | 0 | 1 | 0 |
| | Acute Viral Hepatitis type E | 1 | 0 | 1 | 0 | 1 | 0 |
| | Acute Viral Hepatitis untype | 0 | 0 | 0 | 0 | 0 | 0 |
| | Congenital Rubella Syndrome | 0 | 0 | 0 | 0 | 0 | 0 |
| | Enteroviruses Infection with Severe Complications | 0 | 0 | 3 | 0 | 0 | 0 |
| | Haemophilus Influenza type b Infection | 0 | 0 | 0 | 0 | 0 | 0 |
| | Japanese Encephalitis | 0 | 0 | 0 | 0 | 0 | 0 |
| | Legionellosis | 8 | 2 | 12 | 0 | 5 | 1 |
| | Mumps | 12 | 11 | 34 | 2 | 36 | 1 |
| | Neonatal Tetanus | 0 | 0 | 0 | 0 | 0 | 0 |
| | Pertussis | 1 | 0 | 1 | 0 | 0 | 0 |
| | Tetanus | 1 | 0 | 1 | 0 | 1 | 0 |
| | Category IV | Botulism | 0 | 0 | 0 | 0 | 0 |
| Brucellosis | | 0 | 0 | 0 | 0 | 0 | 0 |
| Complicated Influenza | | 53 | 11 | 114 | 0 | 38 | 0 |
| Complicated Varicella | | 0 | 0 | 1 | 0 | 0 | 0 |
| Endemic Typhus Fever | | 0 | 0 | 1 | 0 | 0 | 0 |
| Herpesvirus B Infection | | 0 | 0 | 0 | 0 | 0 | 0 |
| Invasive Pneumococcal Disease | | 12 | 15 | 39 | 0 | 38 | 0 |
| Leptospirosis | | 1 | 2 | 2 | 0 | 9 | 0 |
| Lyme Disease | | 0 | 0 | 0 | 0 | 0 | 0 |
| Melioidosis | | 2 | 1 | 2 | 0 | 1 | 0 |
| Q Fever | | 0 | 0 | 0 | 0 | 1 | 0 |
| Scrub Typhus | | 9 | 9 | 21 | 0 | 23 | 0 |
| Toxoplasmosis | | 1 | 0 | 3 | 0 | 0 | 0 |
| Tularremia | | 0 | 0 | 0 | 0 | 0 | 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 | 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.
- The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
- Numbers of mumps 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.

Suspected Clusters

- Forty-seven clusters were reported, including 7 tuberculosis clusters, 9 diarrhea clusters, 11 upper respiratory tract infection clusters and 20 influenza-like illness clusters.

Imported Infectious Diseases .

| Disease \ Country | China | Vietnam | Malaysia | Cambodia | Total |
|-------------------|-------|---------|----------|----------|-------|
| Acute Hepatitis A | | | 1 | 1 | 2 |
| Acute Hepatitis C | | 1 | | | 1 |
| FluSC | 1 | | | | 1 |
| Total | 1 | 1 | 1 | 1 | 4 |

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

- 4 confirmed cases were imported from 4 countries during Week 3 of 2018.
- A total of 11 confirmed cases were imported from 6 countries in 2018, the top 3 countries are : Indonesia (3), Philippines (2), Malaysia (2).
- Top 3 imported diseases : Amoebiasis (3), Hepatitis A (3), Dengue Fever (2).

Summary of Epidemic

- **Enterovirus D68** : Most reported cases experienced mild symptoms. The cases of enterovirus D68 infection with severe complications were confirmed sporadically.
- **Influenza** : The large temperature fluctuations continued to occur. The epidemic activity is expected to increase slightly as all schools started winter break. The most frequently isolated influenza virus in the community was influenza B.

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

| Case diagnosis year | | Week 4★ | | Week 1-4 | | | |
|-------------------------------|---|----------|------|--------------|----------------|--------------|----------------|
| 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 | 5 | 2 | 12 | 0 | 4 | 0 |
| | Acute Viral Hepatitis type A | 0 | 16 | 8 | 3 | 62 | 6 |
| | Amoebiasis | 7 | 11 | 21 | 7 | 30 | 21 |
| | Anthrax | 0 | 0 | 0 | 0 | 0 | 0 |
| | Chikungunya Fever | 0 | 0 | 1 | 1 | 0 | 0 |
| | Cholera | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dengue Fever | 1 | 4 | 3 | 3 | 24 | 24 |
| | 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 | 1 | 0 |
| | Malaria | 0 | 0 | 0 | 0 | 0 | 0 |
| | Measles | 0 | 0 | 1 | 0 | 0 | 0 |
| | Meningococcal Meningitis | 0 | 0 | 1 | 0 | 0 | 0 |
| | Paratyphoid Fever | 0 | 0 | 0 | 0 | 1 | 1 |
| | Poliomyelitis | 0 | 0 | 0 | 0 | 0 | 0 |
| | Rubella | 0 | 0 | 0 | 0 | 0 | 0 |
| | Shigellosis | 4 | 2 | 10 | 2 | 18 | 7 |
| | Typhoid fever | 0 | 0 | 1 | 1 | 2 | 2 |
| West Nile Fever | 0 | 0 | 0 | 0 | 0 | 0 | |
| Category III | Acute Viral Hepatitis type B | 2 | 3 | 7 | 1 | 17 | 2 |
| | Acute Viral Hepatitis type C | 6 | 4 | 27 | 1 | 16 | 0 |
| | Acute Viral Hepatitis type D | 0 | 0 | 0 | 0 | 1 | 0 |
| | Acute Viral Hepatitis type E | 0 | 2 | 1 | 0 | 3 | 1 |
| | 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 | 4 | 0 | 0 | 0 |
| | Haemophilus Influenza type b Infection | 0 | 0 | 0 | 0 | 0 | 0 |
| | Japanese Encephalitis | 0 | 0 | 0 | 0 | 0 | 0 |
| | Legionellosis | 6 | 1 | 18 | 0 | 6 | 1 |
| | Mumps | 11 | 13 | 45 | 2 | 49 | 1 |
| | Neonatal Tetanus | 0 | 0 | 0 | 0 | 0 | 0 |
| | Pertussis | 0 | 0 | 1 | 0 | 0 | 0 |
| | Tetanus | 0 | 1 | 1 | 0 | 2 | 0 |
| | Category IV | Botulism | 0 | 0 | 0 | 0 | 0 |
| Brucellosis | | 0 | 0 | 0 | 0 | 0 | 0 |
| Complicated Influenza | | 45 | 7 | 159 | 0 | 45 | 0 |
| Complicated Varicella | | 1 | 1 | 2 | 0 | 1 | 0 |
| Endemic Typhus Fever | | 0 | 0 | 1 | 0 | 0 | 0 |
| Herpesvirus B Infection | | 0 | 0 | 0 | 0 | 0 | 0 |
| Invasive Pneumococcal Disease | | 6 | 11 | 45 | 0 | 49 | 0 |
| Leptospirosis | | 3 | 2 | 5 | 0 | 11 | 0 |
| Lyme Disease | | 0 | 0 | 0 | 0 | 0 | 0 |
| Melioidosis | | 0 | 2 | 2 | 0 | 3 | 0 |
| Q Fever | | 1 | 0 | 1 | 0 | 1 | 0 |
| Scrub Typhus | | 12 | 2 | 33 | 0 | 25 | 0 |
| Toxoplasmosis | | 0 | 0 | 3 | 0 | 0 | 0 |
| Tularremia | | 0 | 0 | 0 | 0 | 0 | 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 | 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. The following 8 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 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.

Suspected Clusters

- Thirty-nine clusters were reported, including 7 tuberculosis clusters, 15 diarrhea clusters, 5 upper respiratory tract infection clusters, 11 influenza-like illness clusters and 1 varicella cluster.

Imported Infectious Diseases

| Disease \ Country | Indonesia | Philippines | Cambodia | China | Vietnam | Total |
|-------------------|-----------|-------------|----------|-------|---------|-------|
| Amoebiasis | 2 | 1 | | | 1 | 4 |
| DF | | | 1 | | | 1 |
| Typhoid fever | | 1 | | | | 1 |
| Acute Hepatitis B | | | | 1 | | 1 |
| Shigellosis | 1 | | | | | 1 |
| Total | 3 | 2 | 1 | 1 | 1 | 8 |

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

- 8 confirmed cases were imported from 5 countries during Week 4 of 2018.
- A total of 19 confirmed cases were imported from 7 countries in 2018, the top 3 countries are : Indonesia (6), Philippines (4), Cambodia (3).
- Top 3 imported diseases : Amoebiasis (7), Acute Hepatitis A (3), Dengue Fever (3).

Summary of Epidemic

- **Influenza** : Under the influence of the cold surge, temperatures began to decrease, the impact on influenza activity could continue to the Lunar New Year. The most frequently isolated influenza virus in the community was influenza B virus.
- **Enterovirus D68** : Most reported cases experienced mild symptoms. The cases of enterovirus D68 infection with severe complications were confirmed sporadically.

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