For discussion on
10 March 2008

Legislative Council Panel on Health Services

Surveillance of Communicable Diseases in Hong Kong – Key Trends and Follow up

Purpose

This paper provides an update on the surveillance of communicable diseases in Hong Kong, some key trends observed in recent years, and the future plans to strengthen communicable disease surveillance.

Communicable Disease Surveillance

2. Communicable disease surveillance refers to the systematic collection, analysis, interpretation and dissemination of public health data in relation to communicable diseases. It is central to effective communicable disease prevention and control.

3. In Hong Kong, communicable disease surveillance is under the purview of Department of Health (DH). The DH's Centre for Health Protection (CHP) coordinates with local partners[1], health authorities in the Mainland and overseas, and the World Health Organization (WHO) to organize a comprehensive communicable disease surveillance system. In line with many developed economies, Hong Kong's communicable disease surveillance adopts a multi-pronged approach to maximize its sensitivity and performance. The main components are as follows –

(i) Statutory notification;
(ii) Outbreak reporting;
(iii) Sentinel surveillance;
(iv) Laboratory surveillance;
(v) Monitoring of hospital admissions and mortality statistics; and
(vi) Monitoring of Mainland, overseas or unofficial disease

[1] Examples include Government Bureaux/Departments, the Hospital Authority, private hospitals, private medical practitioners, operators of elderly homes and childcare centres, Chinese medicine practitioners, etc.

reports.

(i) Statutory notification

4. All registered medical practitioners are required by law to report any suspected or confirmed cases of infectious diseases specified in the First Schedule of the Quarantine and Prevention of Disease Ordinance (Cap. 141), which currently consists of the 32 diseases listed in **Annex A**. This ensures that each individual case of statutory notifiable disease is properly investigated and public health measures are appropriately implemented at both the individual and population levels. New infections have been added to the list by gazettal as warranted by particular situations. Additions in recent years include Japanese Encephalitis (July 2004), Influenza H5, H7 and H9 (January 2005), *Streptococcus suis* infection (August 2005) and community-associated methicillin resistant *Staphylococcus aureus* (CA-MRSA) infection (January 2007). Apart from the 32 statutory notifiable diseases, the CHP also conducts surveillance on other communicable diseases of topical interest and monitors the occurrence of unusual conditions related to communicable diseases.

(ii) Outbreak reporting

5. The CHP receives reports of outbreaks occurring in institutional settings such as hospitals, schools, kindergartens, childcare centres, and residential care homes for the elderly and the disabled. Common examples include outbreaks of respiratory tract infections, acute gastroenteritis, etc.

(iii) Sentinel surveillance

6. Sentinel surveillance refers to the regular collection of data from a network of sentinel points. This component monitors trends of influenza-like illness, acute gastroenteritis, hand-foot-mouth disease and acute conjunctivitis in the community. At present, the CHP maintains sentinel surveillance points at 41 private doctors, 64 general outpatient clinics, 59 Chinese medicine practitioners, 43 childcare centres and 57 residential care homes for the elderly. Clinic doctors or centre operators are required to collect relevant data on a regular basis and send them to the CHP for analysis.

(iv) Laboratory surveillance

7. The CHP serves as the reference laboratory for confirmation, typing and characterizations of many infectious disease agents. Both common infectious agents, e.g. influenza viruses and norovirus, and uncommon or emerging pathogens, e.g. avian influenza A virus (H5N1), enterovirus 71, *E. Coli* O157:H7, human immunodeficiency virus (HIV) and dengue viruses are constantly monitored.

(v) Hospital admissions and mortality statistics

8. The CHP works together with the Hospital Authority and private hospitals in monitoring hospital admissions for certain infectious diseases including influenza, pneumonia and hand-foot-mouth disease. Death statistics for infectious diseases that present with an unusual pattern are also being monitored.

(vi) Monitoring of Mainland, overseas or unofficial disease reports

9. The CHP all along maintains close liaison with the Ministry of Health and health authorities in the Guangdong Province and Macao. Based on the agreement in the Tripartite Meeting of the Guangdong-Hong Kong-Macao Expert Group on Prevention and Treatment of Infectious Diseases in May 2003, there has been regular exchange of information on statutory notifiable diseases among the three places. Point-to-point communication has also been established so that the three places can promptly report to one another sudden upsurge of infectious diseases of unknown nature or of public health significance. Visits and short-term exchange programmes have also been organized to deepen mutual understanding of public health work on infectious diseases. In addition, the "Cooperation Agreement on Response Mechanisms for Public Health Emergencies" signed by the health authorities of the Mainland, Hong Kong, and Macao in October 2005 further consolidated cooperation on notification and emergency response, as well as securing a mutual co-ordination and support mechanism in terms of manpower, technologies and resources.

10. Besides liaison with the Mainland and Macao, the CHP surveys daily reports in the print, agency news, electronic media, websites of the WHO and other national health authorities, and information from various unofficial sources to monitor regional and overseas outbreak news.

Verification of the information and follow-up investigation will be undertaken as appropriate.

Key Trends and Follow Up

11. Information gathered through the communicable disease surveillance systems described above enables the CHP to monitor closely the changing patterns of communicable diseases that pose risks to Hong Kong. During recent years, changes in trends for a number of communicable diseases, for example, avian influenza, seasonal influenza, CA-MRSA, dengue fever, norovirus infection, etc. have been noted. Detailed trends on these infections and the follow-up public health measures that have been implemented are summarized in **Annex B**.

12. As Hong Kong faces challenges from changing trends of communicable diseases, there is a need to constantly review and strengthen our surveillance system. The following section describes further enhancements to the communicable disease surveillance system under planning over the next two years.

(i) Expanded list of statutory notifiable diseases

13. In the new Prevention and Control of Disease Bill that is being examined by the Legislative Council, it is proposed that the list of statutory notifiable diseases be increased from 32 to 45.[2] This proactive measure will strengthen the communicable disease surveillance system against infections that pose an appreciable health risk to Hong Kong in the future. In deriving the list, consideration is taken on the public health importance of the disease in question, outbreak potential in Hong Kong, availability of reliable diagnostic tests, prevention and control measures and alternative surveillance mechanisms, international requirements, as well as comparisons with the Mainland and other countries. This also enables Hong Kong to comply with the updated International Health Regulations (2005) of the WHO.

[2] The proposed additions include anthrax, botulism, Creutzfeldt-Jakob disease, *Escherichia coli* O157:H7 infection, *Haemophilus influenzae* type b infection (invasive), hantavirus infection, influenza A(H2) (in addition to influenza A(H5, H7, H9), leptospirosis, listeriosis, psittacosis, Q fever, congenital rubella syndrome (in addition to rubella), smallpox, rickettsial diseases (in addition to typhus), viral haemorrhagic fever and West Nile Virus infection.

(ii) Enhancement of sentinel surveillance community networks

14. At present, the majority of sentinel sites transmit data to the CHP via paper and fax on a weekly basis. There is certainly room for improvement in terms of timeliness, accuracy of data capture, user-friendliness and feedback after data analysis. To this end, the CHP has developed an electronic platform for childcare centres participating in the sentinel surveillance system. The system has been operating effectively. The CHP is planning to extend it to other sentinel surveillance sites.

(iii) Extended application of information technology in surveillance

15. In line with the international trend, the CHP is planning to incorporate more information and communication technologies to organize surveillance information more efficiently and to perform more powerful and advanced analysis. For example, the CHP has initiated work in association with stakeholders to enhance the use of Geographical Information System in communicable disease surveillance. Furthermore, computerized algorithms are being developed and refined to generate early and reliable signals of outbreaks. These tools will improve the performance of the communicable disease surveillance system in the detection of infectious disease outbreaks so that preventive measures can be undertaken at an earlier stage.

(iv) Better risk communication to the public

16. The CHP uses a variety of channels to communicate surveillance data and health risks to the general community and target segments. For instance, a bi-weekly bulletin (Communicable Disease Watch) is published on the CHP's website to provide information on recent updates and trends for medical professionals. Weekly reports of sentinel surveillance findings are published at the CHP website. The CHP also sends letters to medical professionals and operators of community institutions, such as schools and elderly homes, whenever surveillance data reflect changes that require their actions. Media briefings, press releases and Announcement of Public Interests (API) are put up for information of the general public. To further enhance user-friendliness, the CHP is planning to revamp its website this year. New API on important themes in communicable disease control, e.g. proper use of antibiotics, will be publicized.

(v) Continued close liaison with the Mainland in communicable disease surveillance and response

17. Building on the established communication channels with the Mainland, the CHP will further strengthen ties with the counterparts in respect of communicable disease surveillance and response. In the past, the CHP sent experts to participate in joint investigations of infectious diseases of major concern in the Mainland, which yielded important information for assessing risks posed to Hong Kong. Later this year, a Tripartite meeting (The Eighth Tripartite meeting of Guangdong, Macao and Hong Kong on the Prevention and Control of Infectious Diseases) will be held in Macao to discuss the latest trends of communicable diseases. The CHP is also planning to organize drills and exercises on communicable diseases jointly with the Mainland this year.

Conclusion

18. A robust communicable disease surveillance system is cardinal to defending Hong Kong against the threats posed by communicable diseases. It is CHP's core mission to constantly review and enhance the system in collaboration with relevant stakeholders and publicize useful information for healthcare professionals and the general community at large in a timely manner.

Department of Health
February 2008

Annex A

Statutory Notifiable Infectious Diseases of Hong Kong

1. Acute poliomyelitis
2. Amoebic dysentery
3. Bacillary dysentery
4. Chickenpox
5. Cholera
6. Community-associated methicillin resistant *Staphylococcus aureus* infection
7. Dengue fever
8. Diphtheria
9. Food poisoning
10. Influenza A (H5), Influenza A (H7) or Influenza A (H9)
11. Japanese encephalitis
12. Legionnaires' disease
13. Leprosy
14. Malaria
15. Measles
16. Meningococcal infections
17. Mumps
18. Paratyphoid fever
19. Plague
20. Rabies
21. Relapsing fever
22. Rubella
23. Scarlet fever
24. Severe Acute Respiratory Syndrome
25. *Streptococcus suis* infection
26. Tetanus
27. Tuberculosis
28. Typhoid fever
29. Typhus
30. Viral hepatitis
31. Whooping cough
32. Yellow fever

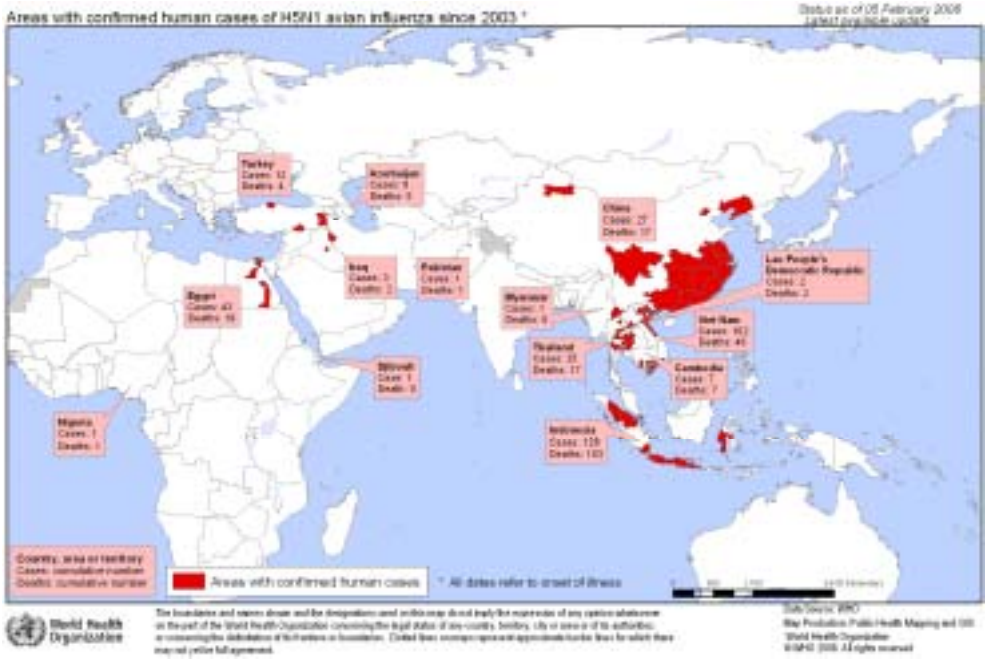
Annex B

Specific Disease Trends

Avian Influenza A(H5N1) in humans

Between end 2003 and 23 February 2008, avian influenza A(H5N1) has affected a total of 362 individuals in 14 countries (Figure 1). During this period, the virus has expanded its geographical extent beyond the Asia-Pacific to different parts of central Asia, Middle East, Europe and Africa. Out of the 362 cases, there were 228 deaths, representing a mortality rate of 63%. No human case was recorded in Hong Kong since mid-2003.

Figure 1: Areas with confirmed human cases of avian influenza H5N1 since 2003 (courtesy from WHO)



2. To keep the infection at bay, avian influenza (H5) was included in the statutory list of notifiable diseases since January 2004. Under the Government's Pandemic Influenza Preparedness Framework, the Alert Response Level was put in force as a result of H5N1 infections occurring in the region. The CHP maintains global surveillance of avian influenza and issues a weekly Avian Influenza Report at its website to inform the public of the latest situation. When the situation warrants, targeted surveillance

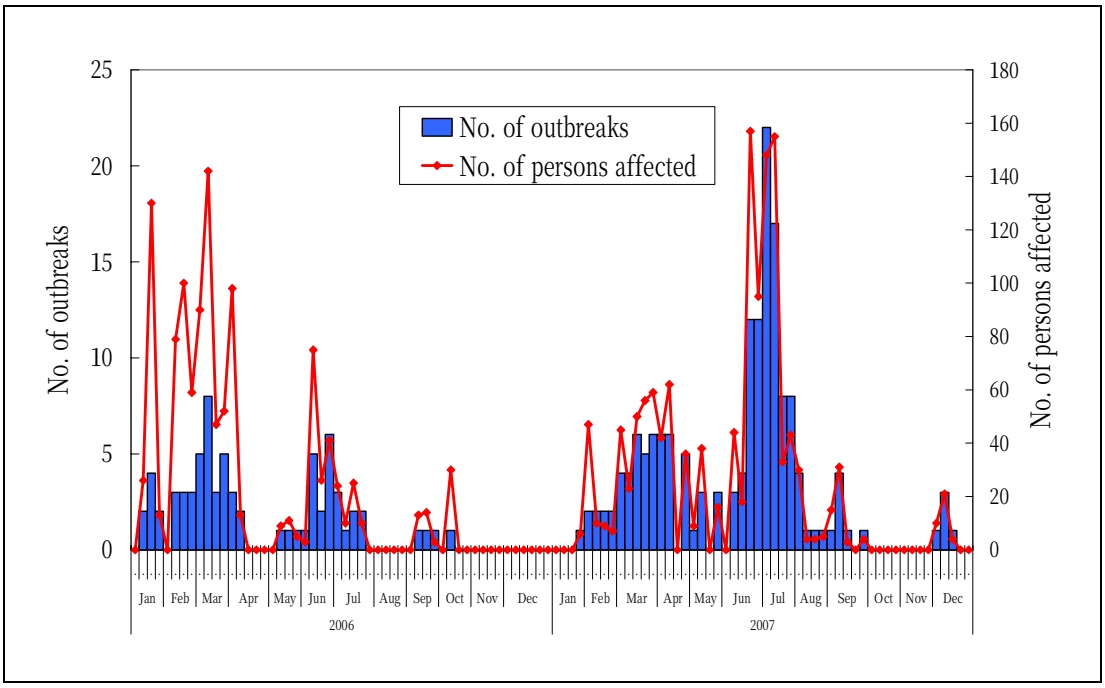
activity is enhanced. Following the notification of a human case of avian influenza (H5N1) affecting a 44-year-old lady in Shanwei in Guangdong Province by the Ministry of Health on 24 February 2008 and its subsequent confirmation, a four-week Enhanced Surveillance Programme in all public and private hospitals was set up. Port Health control measures including temperature screening for inbound travellers at all immigration control points have been enhanced.

Seasonal Influenza

3. Influenza occurs in Hong Kong throughout the year and often displays two seasonal peaks. The larger seasonal peak is in winter time, usually during February and March. A smaller summer peak is sometimes observed in July and August. From January 2006 to December 2007 (Figure 2), the CHP recorded a total of 234 influenza outbreaks, involving 118 elderly homes (50.4%), 30 childcare centres or kindergartens (12.8%), 44 primary schools (18.8%), 12 special schools (5.1%), 6 secondary schools (2.6%) and 7 hospitals (3.0%).

4. Laboratory surveillance of influenza has a crucial role in establishing local epidemiology. It also contributes to the global influenza surveillance on the circulating viral strains in the world. The latter is among the key considerations for recommending influenza vaccine strains developed by the WHO every February and September. In Hong Kong, among the specimens tested for influenza viruses every year, about 6 000 are positive. In 2007, 70.6% of these detections were influenza A (H3N2), 22.2% were influenza B and only a small proportion, 2.0%, were influenza A (H1N1).

Figure 2: Influenza outbreaks and persons affected in Hong Kong in 2006-2007



5. Before the influenza season arrives, the CHP will issue alerts to elderly home residents, the general public and medical professionals so that appropriate prevention action can be taken. A weekly surveillance report, the Flu Express, is issued during the flu season to inform the public of the latest situation.

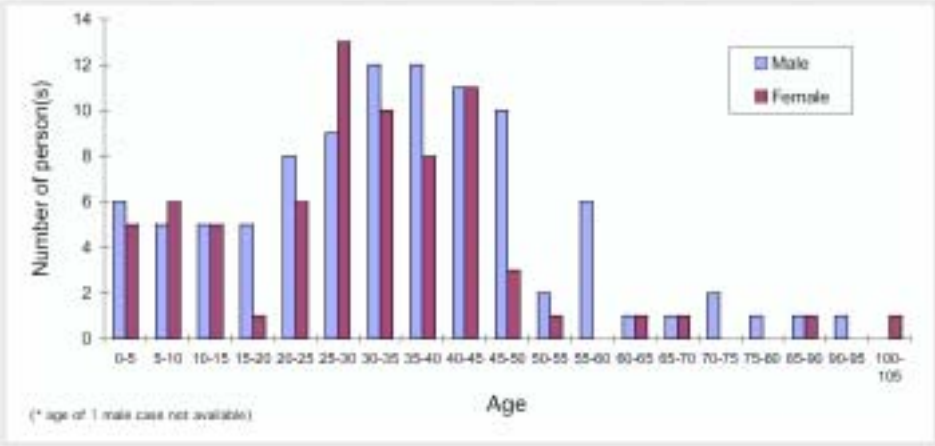
Community-associated Methicillin Resistant *Staphylococcus aureus* Infection

6. Methicillin resistant *Staphylococcus aureus* (MRSA, a type of *Staphylococcus aureus* that is resistant to many commonly used antibiotics) infection has long been recognized in hospitalized patients. In recent years, many countries observed MRSA infections in healthy individuals who have not been hospitalized or have not stayed in healthcare facilities. These are known as community-associated MRSA, or CA-MRSA, infections. In order to strengthen surveillance and implement public health measures more effectively, CA-MRSA infection was made notifiable by law on 5 January 2007. Since then, the CHP recorded a total of 172 CA-MRSA infections as of the end of 2007.

7. The cases reported included 99 male and 73 female cases. Their ages ranged from 1 month to 102 years (median 33 years) (Figure 3). The majority (99%) of them presented with skin or soft tissue infections and four presented with severe invasive infections. All cases recovered. The majority of cases were Chinese (59%), followed by Filipino (22%), Caucasians (10%), and others (6%). The CHP conducted epidemiological investigation of every CA-MRSA case reported and provided decolonization therapy to close contacts. Five household clusters affecting a total of 10 persons were identified. For the rest, no epidemiological linkage was identified. No outbreaks have been observed in institutional settings.

8. To improve surveillance for CA-MRSA, the CHP has worked with the Hospital Authority to implement an enhanced surveillance programme for CA-MRSA by taking swabs from all purulent lesions from patients of public hospitals and outpatient clinics since January 2008. Such enhanced surveillance is expected to detect more cases in 2008 as compared with 2007. As there is a proportionately higher number of cases among ethnic Filipinos, the CHP has enhanced health education to this group.

Figure 3: Age and sex distribution of CA-MRSA cases in 2007



Dengue Fever

9. Dengue fever is primarily an imported disease in Hong Kong. Local cases occurred in 2002 (20 cases) and 2003 (1 case) only. From 2004 to 2007, the number of cases reported ranged from 31 to 58 (Figure 4). Most were imported from Southeast Asian countries. Among the 151 imported cases reported in the past four years (2004-2007), Indonesia,

Thailand and the Philippines were the most common importing countries, accounting for 33.8%, 18.5% and 13.9% of cases respectively (Figure 5).

Figure 4: Number of dengue fever cases notified in 1994 to 2007

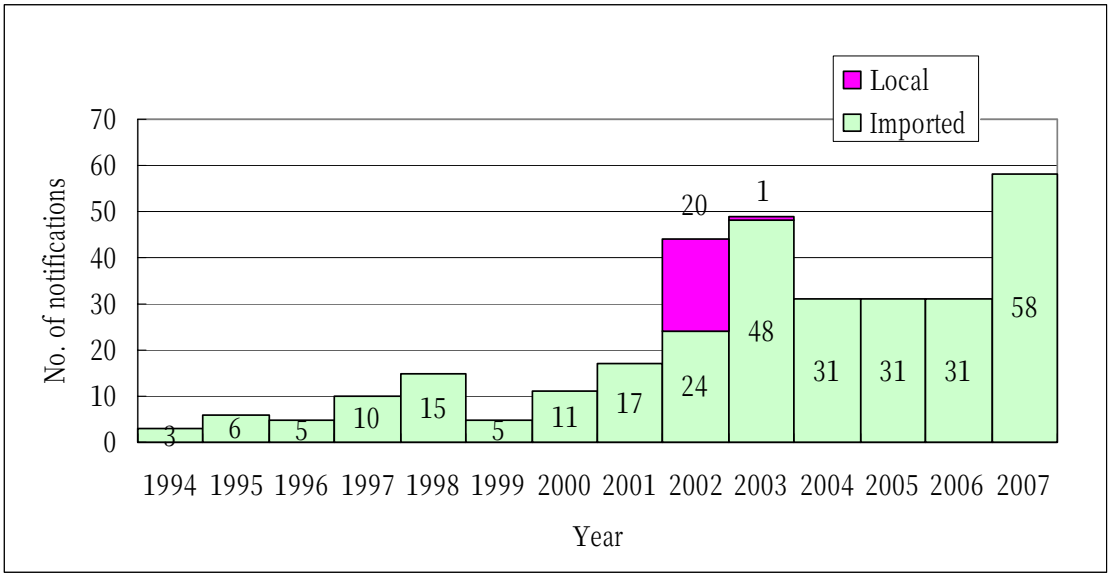
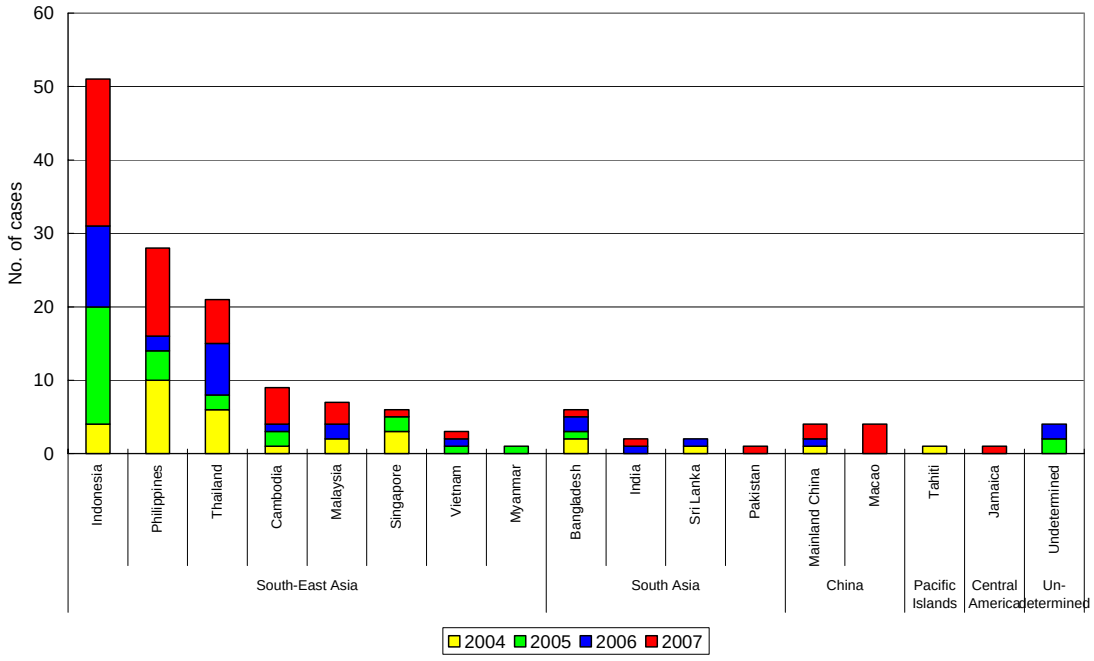


Figure 5: Places of origin among dengue fever cases reported to the CHP in 2004-07



10. In 2007, increased dengue fever activity was reported in many Southeast Asian countries. Hong Kong also recorded the highest number of notification (58 cases) since the disease became notifiable in 1994, representing an 87% increase compared to 2006. There were 25 males and 33 females affected, with ages ranging from 8 to 76 years (median 36 years). One patient developed dengue haemorrhagic fever and all patients had recovered. Among the 46 cases that was typed using molecular methods, dengue virus type 1 (39%) and type 3 (39%) were the commonest viruses found, followed by type 2 (15%) and type 4 (7%). All 58 cases were imported from countries outside Hong Kong. 82.6% were from Southeast Asian countries, with Indonesia making up the greatest proportion (34.5%), followed by the Philippines (20.7%), Thailand (10.3%) and Cambodia (8.6%). There were three clusters of cases affecting 5, 3 and 2 persons who had been to the Philippines, Macao and Cambodia respectively during the incubation period.

Norovirus Infection

11. Norovirus is a common cause of acute viral gastroenteritis. It is usually more active during winter seasons. Pre-season alerts are issued by the CHP to operators of various institutions such as schools and elderly homes. In 2007, the CHP recorded 127 norovirus outbreaks affecting 1 357 cases.

12. In 2006, a large increase in norovirus activity was observed in the summer season starting from May, as reflected in the increase in outbreak reports and increase in the number of elderly having diarrhoeal symptoms in sentinel elderly homes (Figures 6 and 7). These outbreaks affected mainly elderly homes (59.6%) and hospitals (15.1%). With the implementation of aggressive infection control measures, norovirus activity gradually decreased since June and the epidemic subsided in August 2006. This unusual summer epidemic accounted for about two-thirds of all norovirus outbreaks reported in the year (265 institutional outbreaks affecting 2 806 people). This epidemic was found to be due to a new strain of norovirus variant. That new variant has also been found in Australia, Canada, the United Kingdom and some European countries.

Figure 6: Number of norovirus outbreaks reported to CHP in 2005 to 2007

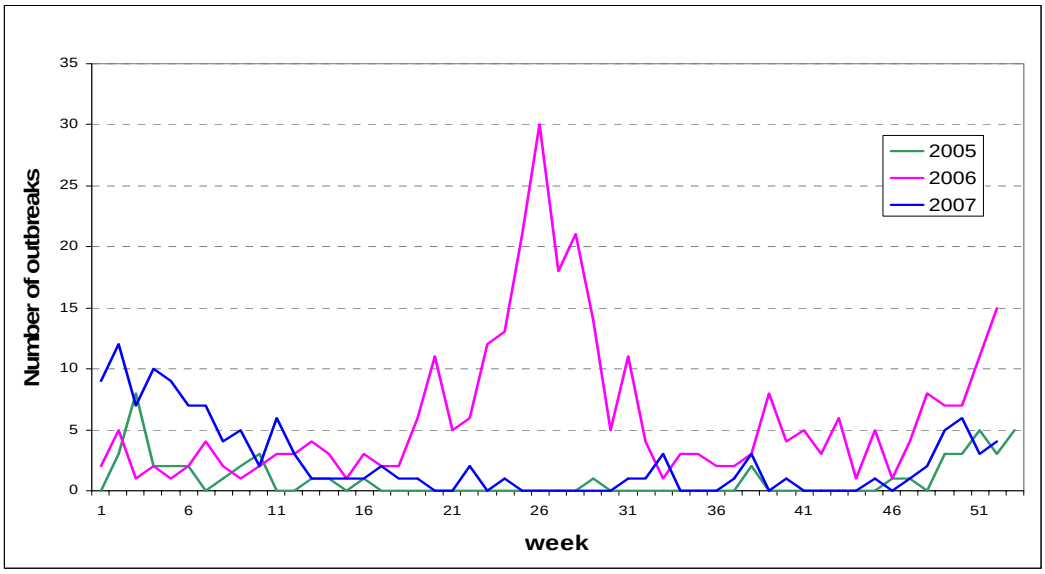
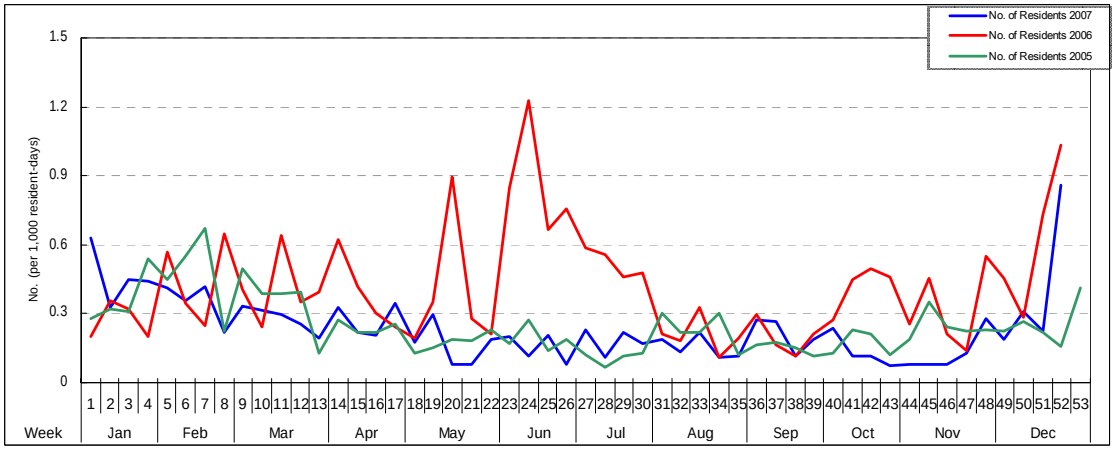


Figure 7: Residents having diarrhoea in sentinel elderly homes in 2005-2007 (Sentinel Surveillance based at Residential Care Homes for the Elderly)



13. The lesson is that norovirus has enormous capacity for genetic changes, and that new variants may cause large outbreaks on a global scale. To better prepare for such scenarios, the CHP is liaising with other national laboratories to monitor the global occurrence of norovirus outbreaks and emergence of new variants.

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