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衞生防護中心
Centre for Health Protection
保障市民健康
Protecting Hong Kong's health

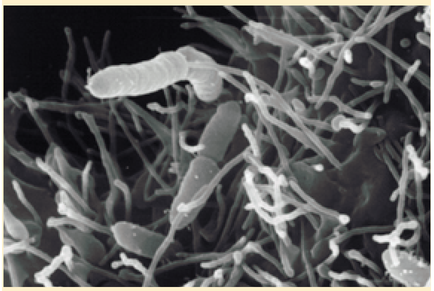
Department of Health
Hong Kong SAR


**Features:**

Review of necrotising fasciitis associated with *Vibrio vulnificus* in Hong Kong

Using reproductive numbers in understanding influenza outbreaks in schools

## LENS ON CHP



*Above: Vibrio vulnificus,* one of the bacteria which may cause necrotising fasciitis. (Source: Courtesy of Northwest Fisheries Science Center, U.S. National Marine Fisheries Service)

## NEWS

### Be vigilant against food poisoning in summer

From January to May this year, the Centre for Health Protection (CHP) recorded 24 to 44 cases of food poisoning outbreaks affecting 80 to 226 persons each month. The figures increased significantly in June (78 outbreaks, 288 persons affected) and July (107 outbreaks, 374 persons affected). Among the 107 outbreaks reported in July, 9 cases/clusters of food poisoning had more than 10 persons affected. Three of them involved people who had travelled outside Hong Kong before they developed gastroenteritis and they had probably acquired the infection abroad. The remaining six cases/clusters, each affecting 13 to 57 persons, were associated with meals consumed at different local food premises. Two food premises were temporarily suspended.

# Review of necrotising fasciitis associated with *Vibrio vulnificus* in Hong Kong

***Reported by Dr Allen Chan, Medical Officer, Field Epidemiology Training Programme, Surveillance and Epidemiology Branch, CHP.***

Necrotising fasciitis is a rare but life-threatening infection characterized by rapidly spreading inflammation and necrosis of soft tissue and fascia. *Vibrio vulnificus* is one of the bacteria that may cause necrotising fasciitis. From July 2005 - August 15, 2008, the Centre for Health Protection recorded 23 cases of necrotising fasciitis caused by *V. vulnificus* (Figure 1). We reviewed the clinical and epidemiological features of these cases.

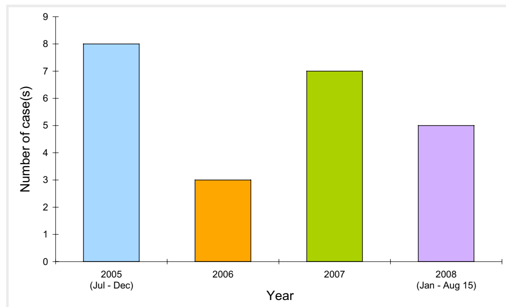



*Figure 1 – V. vulnificus* necrotising fasciitis in Hong Kong, number of cases by year of report.

Fourteen patients were male and 9 were female. Half of them were aged ≥ 65 years (range 25 - 88). Most cases (22/23, 96%) occurred in the summer, from May to October (Figure 2).

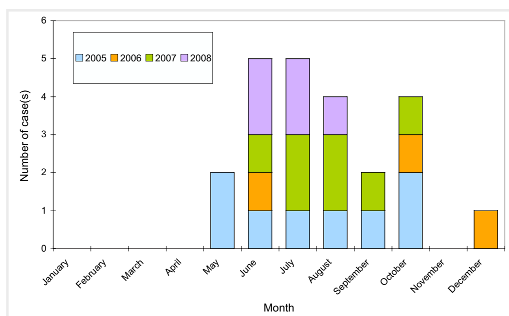



*Figure 2 – V. vulnificus* necrotising fasciitis in Hong Kong, number of cases by month of onset.

The patients presented with fever, pain, swelling, skin discolouration and skin blistering (Table 1). Upper limbs and lower limbs (including buttock) were equally affected. All patients received antibiotic therapy and 21 required surgical interventions. Seventeen (74%) patients required more than one operation and amputation of whole or part of the affected limbs was necessitated in 7 patients.

Thirteen (57%) patients were complicated with septic shock, acute renal failure or disseminated intravascular coagulopathy (DIC). Eight (35%) died despite intensive treatment. Among those deceased, the median interval between onset of symptoms to death was 5 days (ranged from 0 to 36 days).

*Table 1* - Clinical presentation of 23 cases of *V. vulnificus* necrotising fasciitis.

| Clinical features | Number | Percentage |
|---|---|---|
| **Main symptoms/signs** | | |
| Pain | 22 | 96% |
| Swelling | 20 | 87% |
| Skin discolouration | 19 | 83% |
| Fever | 17 | 74% |
| Skin blistering | 13 | 57% |
| Chills | 5 | 22% |
| **Complications** | | |
| Septic shock | 13 | 57% |
| Acute renal failure | 7 | 30% |
| DIC | 3 | 13% |
| **Death** | 8 | 35% |

Eighteen (78%) patients had underlying medical problems such as diabetes mellitus and liver diseases. No statistical association was noted between patients' past health and their clinical outcomes. The patients lived in different districts across the territory. Among the 22 patients with detailed information available, 15 (68%) recalled history of handling marine products and 16 (73%) recalled visiting wet markets before onset of symptoms. Eleven (50%) reported injury or had a pre-existing wound during the preparation of seafood or when they went to a wet market.

To prevent *V. vulnificus* infection, the public especially immunocompromised persons, including those with underlying liver disease, are advised to:

★ avoid exposure of open wounds or broken skin to seawater or salty water;
★ thoroughly clean and properly cover all wounds;
★ wear protective clothing (e.g. gloves) when handling raw seafood;
★ cook seafood, especially shellfish (oysters, clams, mussels), thoroughly;
★ seek medical advice promptly if symptoms and signs of infection (e.g. increasing redness, pain and swelling) occur.

### *V. vulnificus* necrotising fasciitis

Necrotising fasciitis is commonly referred as "flesh-eating disease". It is a serious bacterial infection of soft tissue and fascia. It destroys tissue and can cause death within 12 to 24 hours. Necrotising fasciitis can be caused by a number of different bacteria including *Vibrio vulnificus. V. vulnificus* is a bacterium that normally lives in warm seawater and can be present in seafood. According to the US Centers of Disease Prevention and Control, the infection is seasonal; over 85% of cases occur between May and October. Environmental factors, such as warm water and moderate salinity, can increase the number of *V. vulnificus* organisms in shellfish.

Any person can be affected. Those with underlying medical conditions, especially liver disease, may be at increased risk of bloodstream infection and serious complications. The incubation is usually 12 to 72 hours. Symptoms may include intense pain, redness, swelling and rapid tissue destruction. Sometimes, the swelling starts at the site of minor injury such as a small cut or bruise, but in other cases there is no obvious source of infection. Bloodstream infection, characterised by fever, chills, decreased blood pressure, blistering skin lesions, may occur, and may result in death. Immediate medical care in a hospital is often necessary. Appropriate antibiotics are needed to kill the bacteria and surgery may be needed to stop the infection from spreading.

## CA-MRSA cases in July

In July 2008, the CHP recorded 37 cases of community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infection, affecting 20 males and 17 females aged between 2 months to 87 years (median 35 years). Twenty-five were Chinese, the others were Filipino (5), British (1), Australian (1), New Zealander (1), Indian (1), Pakistani (1) and of unknown ethnicity (2). Among these cases, there were 9 managers/clerks, 8 students, 6 service workers, 4 preschool children, 3 domestic helpers, 4 unemployed persons/retiree/housewife, as well as 3 with unknown occupation. Clinically, 36 cases presented with skin or soft tissues infection and with otitis media. Thirty-five had recovered and two are still hospitalized in stable condition. The isolates of all 37 cases exhibited the Panton-Valentine Leucocidin (PVL) gene and were positive for SCC*mec* type IV (22) or V (15). Two cases were members of the same family and epidemiologically linked. The other cases were not found to have any epidemiological linkage.

## RISK COMMUNICATION DIGEST

| Press releases | # |
|---|---|
| Food poisoning | 8 |
| Dengue fever | 4 |
| EV 71 | 3 |
| Necrotising fasciitis | 3 |
| Leptospirosis | 2 |
| Child illness | 1 |
| E.coli O157:H7 | 1 |
| Legionnaires' Disease | 1 |
| Red-eye syndrome | 1 |
| **Letter to doctors** | |
| IVSS | 1 |
| **Media interviews** | |
| Legionnaires' disease | 1 |
| **Media stand-ups** | |
| Influenza | 3 |
| Reported child illness | 1 |

# Using reproductive numbers in understanding influenza outbreaks in schools

***Reported by Dr Dennis Ip, Disease Modelling Specialist, Surveillance and Epidemiology Branch, CHP.***

The basic reproductive number, $R_0$, has played a central role in infectious diseases epidemiology as it measures the infectiousness of a pathogen in a given population. $R_0$ is generally defined as the average number of secondary cases infected by a typical infected person in a population that is almost fully susceptible. If an infection has a value of $R_0$ less than 1, the number of people infected by the disease decreases in each generation of infection and the possibility of developing into a major epidemic is small. If $R_0$ is greater than one, the number of people infected by the disease increases in each generation of infection, and the infection may be able to spread in a population (Figure 1). Other factors being equal, a larger value of $R_0$ generally implies an increased likelihood of an infection to spread through the population causing an epidemic.

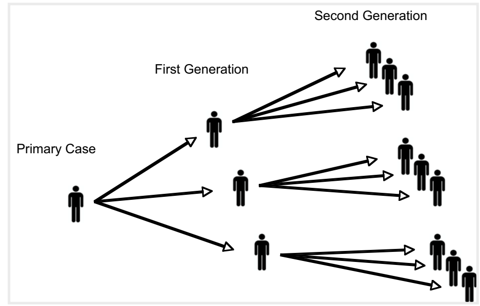



*Figure 1 – When $R_0 > 1$, each infected person may infect more than one person and cause the epidemic to spread ($R_0 = 3$ in this example).*

During the seasonal influenza peak in February and March of 2008, a number of influenza outbreaks occurred in institutions including child care centres, kindergartens, primary and secondary schools. About 27% of laboratory confirmed influenza outbreaks in schools involved more than 20 students. There had been concerns on whether we were encountering a particularly infectious strain of influenza virus at that time. To address this question, we used mathematical modelling methods to estimate the basic reproductive number ($R_0$) of influenza infection in these school outbreaks. We assumed each school as a closed system and the outbreak was originated from a single affected student. Using the epidemic curve, we estimated the initial growth rate & doubling time during the early growing phase of the outbreak in each school. Together with an appropriate assumption on the disease generation time based on previous understanding on the latent period (1.5 days) and infectious period (3 days) of influenza infection, we estimated the value of the reproductive number in the setting of each school.

Using the above method, the estimated $R_0$ of 8 randomly selected laboratory-confirmed influenza school outbreaks with more than 20 students affected in each outbreak ranged from 1.98 to 8.22 (Figure 2). These estimates agreed well and did not appear to be exceptionally high when compared with previous reports of $R_0$ of influenza from different international studies, which ranged from less than 2 to as high as 20. If we assumed in the model that the school outbreaks originated from more than one student, the estimated $R_0$ would be even lower.

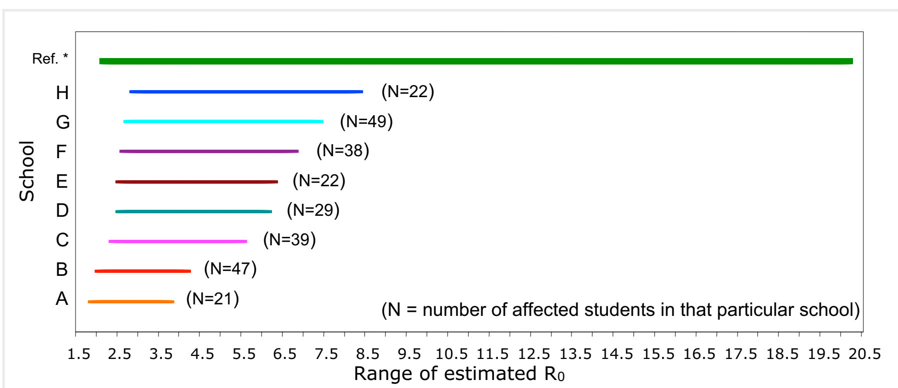


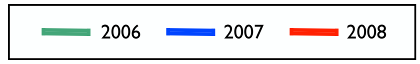

*Figure 2 – Range of estimated $R_0$ in eight school influenza outbreaks.*

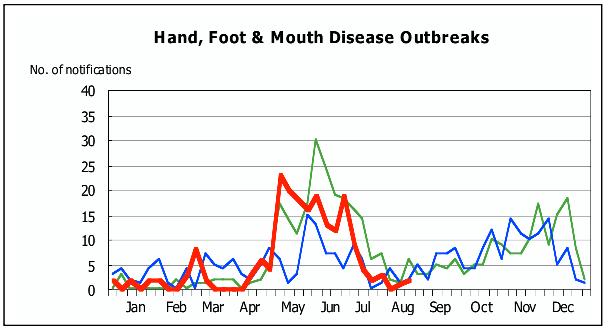
** Ref. = Reference range of $R_0$ of influenza from international studies.*

*1. Mills CE, Robins JM, Lipsitch M. Transmissibility of 1918 pandemic influenza. Nature 2004;432: 904–6.*
*2. Gog JR, Rimmelzwaan GF, Osterhaus AD, Grenfell BT. Population dynamics of rapid fixation in cytotoxic T lymphocyte escape mutants of influenza A. Proc. Natl Acad. Sci. USA. 2003;100:11 143–11 147.*

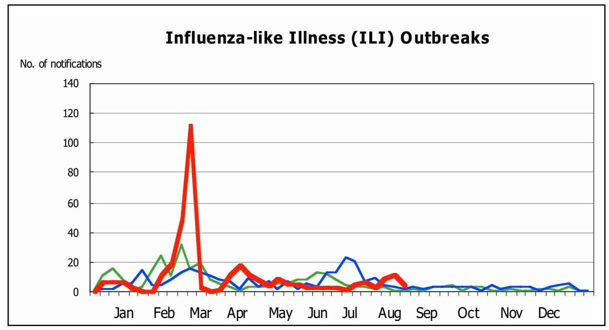
In conclusion, the results did not indicate increased infectiousness of circulating influenza viruses during February and March this year. This article illustrates how mathematical modelling analysis can be helpful in our understanding of the spread of infectious diseases in our community.

# SUMMARY OF SELECTED NOTIFIABLE DISEASES AND OUTBREAK NOTIFICATIONS (WEEKS 32 - 33)

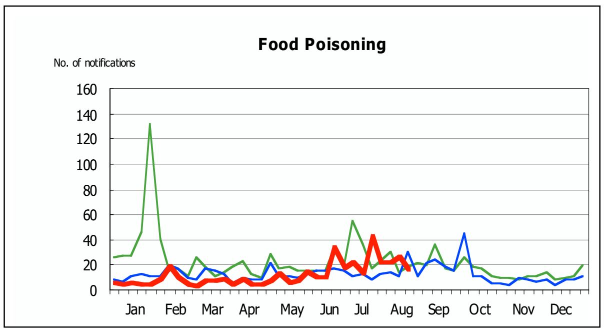


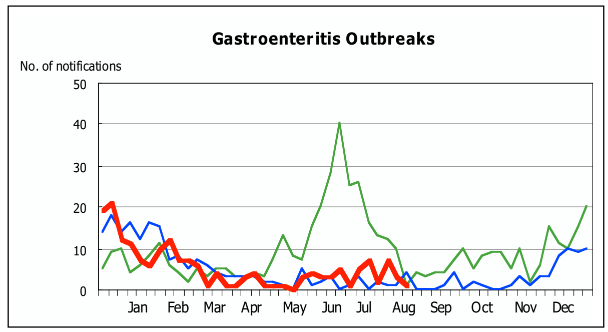

| | | | |
|---|---|---|---|
| Week 30: | 3 | Week 32: | 1 |
| Week 31: | 0 | Week 33: | 2 |



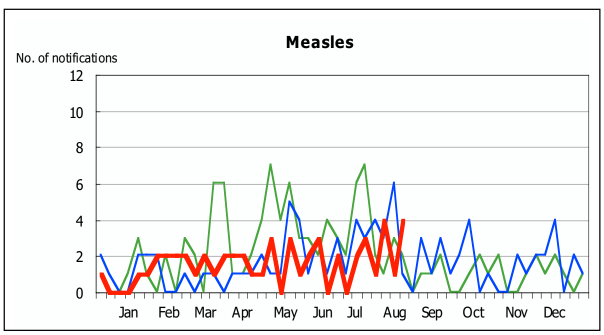

| | | | |
|---|---|---|---|
| Week 30: | 3 | Week 32: | 11 |
| Week 31: | 9 | Week 33: | 4 |



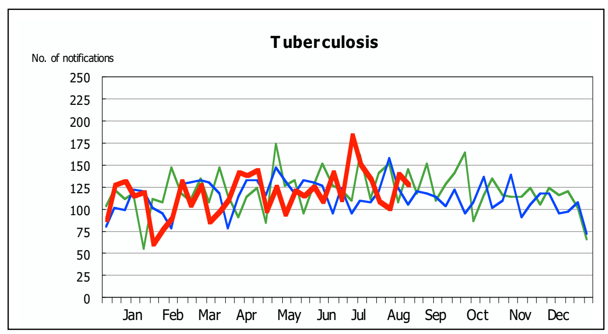

| | | | |
|---|---|---|---|
| Week 30: | 22 | Week 32: | 26 |
| Week 31: | 22 | Week 33: | 16 |



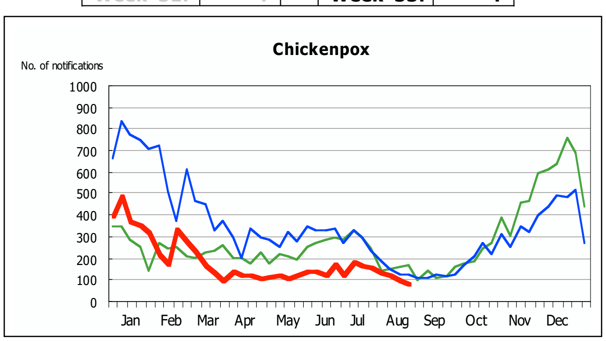

| | | | |
|---|---|---|---|
| Week 30: | 2 | Week 32: | 3 |
| Week 31: | 7 | Week 33: | 1 |



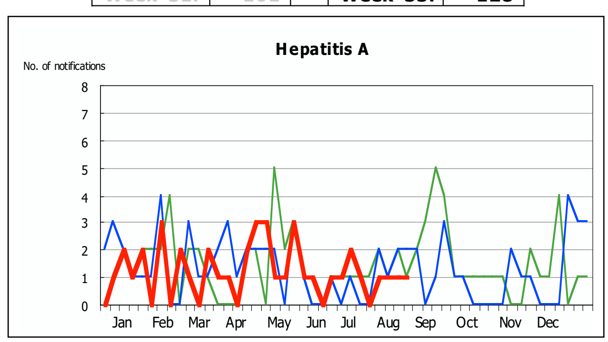

| | | | |
|---|---|---|---|
| Week 30: | 1 | Week 32: | 1 |
| Week 31: | 4 | Week 33: | 4 |




| | | | |
|---|---|---|---|
| Week 30: | 109 | Week 32: | 139 |
| Week 31: | 101 | Week 33: | 128 |




| | | | |
|---|---|---|---|
| Week 30: | 125 | Week 32: | 95 |
| Week 31: | 119 | Week 33: | 81 |




| | | | |
|---|---|---|---|
| Week 30: | 1 | Week 32: | 1 |
| Week 31: | 1 | Week 33: | 1 |

*Data contained within this bulletin is based on information recorded by the Central Notification Office (CENO) and Public Health Information System (PHIS) up until August 16, 2008. This information may be updated over time and should therefore be regarded as provisional only.*