

COMMUNICABLE DISEASES OF COMMUNITY IMPORTANCE

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INTRODUCTION

Communicable diseases continue to receive the attention of epidemiologists, infectious disease experts, and medical practitioners around the world. Contrast this with the popular view in the 1960s and 1970s. The popular view then was that it might be possible with interventions such as antimicrobials and vaccines to “close the book” on infectious diseases and shift public health resources to chronic diseases¹. Today, communicable diseases continue to pose a threat to the health of Singaporeans² and the health of humankind worldwide³.

CLASSIFYING COMMUNICABLE DISEASES

There are so many communicable diseases of community importance in some location or other. The simplest way is to classify them alphabetically. Another way is to group them together by their mode of spread into vector-borne, food- and water-borne, zoonotic, as well as soil and water associated, e.g., melioidosis.

Yet another useful way is to group them into the three categories of the endemic or baseline matrix of worldwide infectious diseases; the re-emerging diseases; and the newly emerging diseases¹. Into this way of grouping of the infectious diseases we should also include a small but important fourth category in this present era of bioterrorism, namely, the deliberately introduced infections. These are not the usual naturally communicable infections, but are created by exposing susceptible individuals to the infecting agent. An example in recent memory are the anthrax spores sent through the mail, resulting in 22 anthrax cases and five deaths in the United States⁴.

ENDEMIC DISEASES

The endemic diseases form the baseline matrix of infectious diseases throughout the world. Together they constitute an ongoing threat. Some of these occur intermittently, as little blips on the radar screen and some as major public health issues. At some point in time, the matrix diseases have all been emerging diseases. After a while, they become so

entrenched that they are considered part of the background matrix and not the emerging or re-emerging diseases. As we eradicate some of these diseases, e.g., poliomyelitis or smallpox, others will take their vacated places. This is the nature of perpetual challenge of the communicable diseases¹. Some of the endemic infections have long term consequences e.g. Hepatitis B carrier state and hepatocellular carcinoma⁵.

RE-EMERGING DISEASES

Re-emerging diseases are diseases that have been around for decades or centuries, but have come back in a different form or different location, because of changes in the environment and host factors. Key examples in the Asia Pacific region are tuberculosis, malaria, and more recently the dengue fever outbreaks in Singapore.

Tuberculosis. Tuberculosis is a disease of poverty³. It tends to occur in crowded urban settings in developing countries. It should routinely be included in pre-employment check-up of workers from the developing countries. It is an airborne disease and travellers who plan to do mission work in slums or in poor settings such as hospitals or nursing homes in developing countries should follow local protocols for detection and treatment of latent tuberculosis. This involves either Mantoux skin testing or the use of the new interferon-gamma assays.

Malaria. Malaria threatens the lives of more than one-third of the world's population. Its endemicity is very extensive. The cover picture of this issue of the Singapore Family Physician shows the extent. Pre-travel advice to endemic areas need to routinely address malaria prevention as well as actions to take for the returned febrile traveller. There is a need to inculcate the mindset of the traveller who visits endemic areas to consider the possibility of malaria and seek a medical opinion early if he or she is febrile. The key to diagnosing malaria clinically is to have a high index of suspicion³. It is important to remember that inadequate chemoprophylaxis will not prevent malaria but may lull the patient into a false sense of security. Such a situation happened to a young woman in the 1990s who went on a mission trip in Cambodia. When malaria was finally thought of, she was beyond rescue and died of fulminant falciparum malaria.

Dengue. Dengue is the commonest vector-borne viral illness globally, with frequent and cyclical epidemics. After a 15-year period of low incidence, dengue has re-emerged in Singapore in the past decade. Lowered herd immunity, significant virus transmission outside of the home, and the

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increase in adult infections explain its re-emergence in Singapore⁶.

Influenza. The influenza virus constantly changes, and therefore can be considered a classic example of a re-emerging disease¹. In most years, human influenza viruses undergo gradual changes in their antigenicity to escape the anti-influenza immune responses of most people. This process is called antigenic drift and is the reason influenza vaccines must be re-evaluated and usually updated every year. Influenza viruses are common in nature and infect many different animal species especially migratory water fowl, pigs and horses. Occasionally, one of these animal influenza viruses acquire the ability to infect other hosts and jumps from its normal hosts into humans, as has occurred with the avian influenza virus. Fortunately, the avian influenza has not yet changed sufficiently to acquire the capability to spread efficiently from person to person, the result of which can be a fast-moving and deadly pandemic¹.

NEWLY EMERGING INFECTIONS

Newly emerging infections are diseases which have never been recognised before. Notable examples in this part of the world in recent memory are the Nipah virus encephalitis outbreak in 1998-1999 and the severe acute respiratory syndrome (SARS) outbreak in 2002-2003. HIV/AIDS is an earlier example.

HIV/AIDS. This infection was first described in the scientific literature in Jun 1981 (MMWR, 1981 on Pneumocystis pneumonia; MMWR, 1981 on Kaposi's sarcoma and pneumocystis pneumonia)¹. Since the AIDS pandemic is now more than 20 years old, it will soon be considered one of the fundamental matrix diseases. In 1981, however, it was truly an emerging disease.

We often lose sight of the fact that HIV/AIDS is a totally preventable disease. There are multiple modalities of prevention and some of these work very well. The various approaches can prevent HIV/AIDS, but to be effective, all these approaches need to be pursued concomitantly. The preventive strategies include: education, behaviour modification, treatment of drug users, distribution of condoms, clean syringes, needle exchange programmes, topical microbicides, antiretroviral therapy, and abstinence¹.

Nipah virus outbreak in Malaysia and Singapore. The Nipah virus, a new paramyxovirus, closely related to Hendra virus was the cause of an outbreak of encephalitis in people with close contact exposure to pigs in Malaysia and Singapore. In contradistinction to the infection in pigs where encephalitis and respiratory disease also occur but with a relatively low mortality rate, in humans, the encephalitis was severe and had a high mortality. The outbreak first occurred in northern part of the Malaysian peninsula in late September 1998. It

subsequently spread to various regions of the country, and Singapore in the south, due to the movement of infected pigs.

Fruitbats of Pteropid species were identified as the natural reservoir hosts. Evidence suggested that climatic and people driven ecological changes caused by slash-and-burn of forests in Indonesia led to acute reduction of flowering and fruiting forest trees for fruitbats in their already shrinking habitat. This led to the unprecedented encroachment of fruitbats into cultivated fruit orchards in the initial outbreak area in the suburb of Ipoh. The location of piggeries in orchards and the design of pigsties allowed the spill-over of this novel paramyxovirus from its reservoir host into the domestic pigs and ultimately to humans and other animals⁸.

By mid-June 1999, more than 265 encephalitis cases – including 105 deaths, had been reported in Malaysia, and 11 cases of encephalitis or respiratory illness with one death had been reported in Singapore⁷.

Severe Acute Respiratory Syndrome (SARS) outbreak. The newly emerging SARS infection caused by a new coronavirus (SARS-CoV) really took healthcare providers by storm in 2002-2003. It first surfaced in Guangdong, China, in November 2002, made its appearance in Hong Kong in February 2003, and then subsequently spread to Vietnam, Singapore and Canada. By the time SARS was declared contained on 5 July 2003 by the World Health Organisation (WHO), it had afflicted 8,096 patients in 29 countries. No other disease had such a phenomenal impact on health care workers (HCWs) who formed about 21% of SARS patients. In Vietnam, Canada and Singapore, HCWs accounted for 57%, 43% and 41% of SARS patients respectively⁹.

SARS was imported into Singapore in late February 2003 by a local resident who returned from a holiday in Hong Kong and started an outbreak in the hospital where she was admitted on 1 March 2003. The disease subsequently spread to four other healthcare institutions and a vegetable wholesale centre. During the period between March and May 2003, 238 probable SARS cases, including 8 imported cases and 33 deaths, were reported. Its high infectivity and seriousness was initially not recognised. Transmission within the healthcare setting accounted for 90% of the cases¹⁰.

SARS has taught us many lessons. First, infectious diseases are here to stay and new diseases will continue to surprise mankind. We cannot let our guard down. Second, in the fight against infectious diseases, being proactive is often necessary to pre-empt the escalation. Reacting to the epidemic will grant the disease a head start which can prove disastrous. Third, fighting infectious diseases requires a joint effort by all. The public, in particular, play an important role. Mobilising and galvanising the people into action in turn, requires transparency and timely information. Prompt sharing of information with the people, what we know and what we do not yet know, helps to build trust, reduce speculation, fears and panic. Fourth, we need effective legislation to mount a successful war against an epidemic¹¹.

RESPONDING TO COMMUNICABLE DISEASES

Surveillance. Adequate and rapid response to communicable diseases is necessary to limit its spread. The most important step in the whole chain of response is early diagnosis and sounding the warning. A well established surveillance system is necessary¹². Such a system enables us to observe and predict dangers posed by the outbreak, and to understand the factors contributing to its spread. In responding to outbreaks of public health importance, the primary objective is to break the chain of transmission. Speed and accuracy are essential. One important determinant of the success or failure is communication of the epidemiological findings and action taken to the public and all those who need to know¹³. Communication leads to societal learning.

Societal learning. Societal learning in epidemics is important. A paper by Drake et al found that rapid learning noticeably affects the final outbreak size even when learning exhibits diminishing returns (relaxation). If societal learning in SARS had occurred at half the actual rate, the authors estimated that the expected final size of the outbreak would have reached nearly 800 cases, more than three times the observed number of infections. By contrast, the expected outbreak size for societal learning twice as effective is 116 cases¹⁴.

Pandemic preparedness. Societal learning in the intervening period between epidemics will also be important too. There is only one factor that stands between an influenza pandemic and the present human avian influenza – the ability to spread efficiently from human to human¹³.

Legislation. Legislation is necessary as a backup measure to provide Government the necessary powers to impose social distancing measures speedily in response to a potential severe public health emergency of communicable disease outbreak. This is the reason behind the Infectious Disease (Amendment) Bill that was read in Parliament the second time on 22 April 2008.

CONCLUSION

There is much to be learnt about communicable diseases of community importance. It is also clear that communicable diseases will impose threats to humankind. The best response is for healthcare providers and society to be ready. Societal learning is the primary intent. Legislation is a backup measure.

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