Emerging Infections : The Threat to Malaysia

V K E Lim, FRCPath, Department of Medical Microbiology and Immunology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur

In recent years emerging and reemerging microbial threats have become an important problem worldwide. A global effort has been organised by JAMA for international journals to dedicate all or a part of their January or first issue of 1996 to this topic. Over 25 journals including the *Medical Journal of Malaysia* has agreed to participate. This is probably the first time medical journals in the world has agreed to such a collaboration. In this editorial the threat posed by emerging infections to Malaysia is discussed.

An emerging infection has been described as one that has either newly appeared in the population or have existed in the past but is rapidly increasing in incidence[1]. An emerging infection may be caused by (i) a novel pathogen like HIV (ii) an old pathogen but only recently recognised like *Helicobacter pylori* or (iii) an old pathogen that have recently acquired increased virulence or antibiotic resistance eg. methicillin-resistant *Staphylococcus aureus.* Over the past decade there has been many examples of these infections. Apart from those already mentioned they would include dengue fever, cholera, Lyme Disease, Group A streptococcal infection, hantavirus infection and enterohaemorrhagic *E. coli.* The reasons which have led to the emergence of these infections are complex and multifactorial and include economic, social and political factors.

A very important specific factor is demographic change. Migration either between countries or from rural to urban within the same country has led to the spread of infections. Human migration has been the cause of major epidemics throughout history. In the fifteenth and sixteenth centuries, the non-immune native populations of the Caribbean and Mexico were devastated by epidemics of infectious diseases like smallpox and tuberculosis. This was the result of contact with Western explorers who brought with them infections hitherto unknown in the New World. In Malaysia there are an estimated two million migrant workers. Infections like tuberculosis, malaria and chloramphenicol-resistant typhoid are commonly encountered among this group.

A consequence of human migration is the rapid urbanisation that results. There is a great rural-to-urban shift in Malaysia and it has been estimated that 50% of the country's population will be urban by the year 2000. The increase in the urban population will put a severe strain on existing health facilities both curative and preventive. Migrants, often crowded into shanty towns and slums have no access to proper water supply and sewerage. Such overcrowding and the lack of hygiene has been associated with increases in the incidence of air-borne, water-borne and food-borne infections. Uncontrolled urbanisation together with inadequate vector control has been associated with dengue fever and dengue haemorrhagic fever[2]. Dengue is endemic in Malaysia and recently large dengue outbreaks have occurred in the newer middle-class housing areas of the Klang Valley.

Apart from migration, travel for business, pleasure and other purposes is another factor causing emergence of infectious diseases. It has been estimated that in the early 1990s more than 500 million persons crossed international boundaries in commercial airlines each year. In Malaysia, the numbers of both inbound and outbound travellers continue to increase annually. In recent years there has been reports of infections which are uncommonly encountered in Malaysia among locals who have returned from overseas. Meningococcal meningitis have occurred in pilgrims returning from the Middle East. There has also been reports in the local literature of exotic infections like kala-azar among migrants[3]. Aircraft may transport arthropod vectors and mosquitoes are present on international flights. Some of these arthropods have been shown to survive in aircraft wheel bays at external temperatures of -42°C[4].

With regular flight services from Malaysia to all parts of the globe including Africa and South America the likelihood of importation of exotic infections is increased. The threat of an outbreak of an infection like yellow fever becomes very real since the vector host, *Aedes aegypti* is common in Malaysia.

Changes in the environment is another reason for the emergence of infectious diseases. Changes in the ecology can lead to increases in the populations of animal reservoirs and vectors of infection. Such developmental changes can also increase the risk of human contact with these natural reservoirs. Deforestation and economic development of land for agriculture has been the factors identified in the emergence of infections like Bolivian haemorrhagic fever and hantavirus infection. In the case of Hantaan virus infection, the cause of Korean haemorrhagic fever, conversion of land to rice-fields increases the population of the field mouse, *Apodemius agrarius,* the virus natural host with subsequent increase in human infections[5]. The building of dams has been associated with the increase in incidence of Rift Valley fever and schistosomiasis[6]. In Malaysia there has been much concern over such development and its negative effects on the environment. Thus far this concern has been prompted more by the occurrence of landslides and floods rather than by emerging infections. Nevertheless, it would be prudent for the authorities to look into the health implications as well. The impact of the Bakun dam on the pattern of infectious diseases in Sarawak would be a project definitely well worth studying.

Human behaviour has important effects on the emergence on infections. Increased sexual promiscuity leads to increased incidence of sexually transmitted diseases. Intravenous drug use is correlated with infections like HIV/AIDS, Hepatitis B, Hepatitis C and staphylococcal endocarditis and this has been clearly shown in our drug addict population[7-10]. Until the behaviour of this segment of our population is modified appropriately, through cessation of the habit or using clean needles or both, it is unlikely that the increasing incidence of these infections will be altered. HIV/AIDS itself is the reason for the reemergence of a variety of other infections like mycobacterioses, cyptococcosis, toxoplasmosis and cryptosporidiosis.

Technological advances can also be a cause for the emergence of infections. Modern food production methods improves efficiency and reduces cost but can increase the chances of contamination. There has been outbreaks of enterohaemorrhagic *E. coli* and the haemolytic-uraemic syndrome following consumption of contaminated burgers[11]. Since such food products may be widely distributed within a country or exported to other countries, such infections can occur on a nationwide or even global scale. Contamination of air conditioning systems has caused outbreaks of legionellosis. Even though such outbreaks have yet to be reported in Malaysia, there has already been at least one report of the isolation of *Legionella* sp from the air-conditioning systems of buildings in Kuala Lumpur[12].

Technological advances in medical practice has also been partly responsible for the emergence of hospital acquired infections. The increasing use of invasive techniques for diagnostic, therapeutic and monitoring procedures, the use of steroids and other immunosuppresants, radiotherapy and other modalities of treatment designed to prolong life has increased patients' susceptibility to infection. The overuse of antibiotics has resulted in the emergence of bacteria which are resistant to almost all currently available antibiotics. Antibiotic resistance is now a major problem in Malaysian hospitals and methicillin-resistant *Staphylococcus aureus,* extended spectrum betalactamase producing *Enterobacteriacae,* multi-resistant *Acinetobacter* and vancomycin-resistant enterococci are some of the major threats in hospitals today[13].

The emergence or reemergence of an infection is often the result of more than one factor. In order to meet these threats a multi-pronged strategy involving various governmental and non-governmental agencies should be adopted. There is a need for high quality surveillance and the development of early warning systems. The relevant authorities should not only monitor disease patterns within the country but outside the country as well. An efficient and effective health screening system of the migrant worker population is required. There is a need for increased vigilance at all ports of entry. Special laboratories capable of accurate and rapid diagnoses of the so-called "newer" infections should be set up. Urbanisation must be controlled and

the basic amenities like adequate housing, potable water and proper sewerage provided for all inhabitants of cities. Similarly the development of forest areas should be undertaken only after proper environmental impact assessments which must also include a study of its health implications. Regulations on food hygiene have to be upgraded but more importantly the effective enforcement of these regulations looked into. Public education and behaviour modification is essential in curbing sexually transmitted infections and infections related to intravenous drug use. Finally there must be more research undertaken locally to seek solutions to these problems.

References

1. Morse SS, Schluederberg A. Emerging viruses: the evolution of viruses and viral diseases. J Infect Dis 1990;162 : 1-7.
2. Gubler DJ. Dengue and haemorrhagic fever in the Americas. In : WHO Regional Office for SE Asia, New Delhi, Monograph SEARO 1993;22 : 2-22.
3. Hamidah NH, Cheong SK, Hassan JA. A case of kala-azar diagnosed by bone marrow aspiration. Malaysian J Pathol 1995;17 : 39-42.
4. Russel RC. Survival of insects in the wheel bays of a Boeing 747B aircraft on flights between tropical and temperate airports. Bull WHO 1987;65 : 659-62.
5. Johnson KM. Emerging viruses in context : an overview of viral haemorrhagic fevers. In : Morse SS (ed). Emerging viruses. New York; Oxford University Press, 1993.
6. Monath TP. Arthropod borne viruses. In : Morse SS (ed) Emerging viruses. New York; Oxford University Press, 1993.
7. Rokiah I. Medicine in Malaysia : Sexually transmitted diseases and AIDS. Med J Malaysia 1995;50 (Suppl A) : S42-5.
8. Yap SF. chronic hepatitis infection in Malaysia. Malaysian J Pathol 1994;16 : 3-6.
9. Sinniah M. Hepatitis C in Malaysia. Med J Malaysia 1992;47 : 155-7.
10. Lim VKE. Staphylococcal infection in Malaysian hospitals. Hospital Infection 1988;11 (Suppl A) : 103-8.
11. Center for Disease Control and Prevention. Update: multistate outbreak of *E. coli* O157 : H7 infections from hamburgers – western United States. MMWR 1993;42 : 258-63.
12. Ngeow WF, Tan CH, Lim SY. Legionella species isolated from cooling towers in Kuala Lumpur. Med J Malaysia 1992;47 : 15-9.
13. Lim VKE. Antibiotic resistance. Med J Malaysia 1994;49 : 315-6.