The new health threats of exotic and global travel

INTRODUCTION

We live in a globalised world with travel, population movements, and migration impacting virtually all countries. As a result, global infectious disease epidemiology is changing. Greater global mobility leads to the potential of importing, exporting, or spreading communicable diseases across regions, borders, and continents, potentially posing a health threat to the UK. The movement of animals, plants, and other goods across the globe, through international trade, also creates new public health challenges. London is a key transit hub for global air networks, and the number of passengers continues to grow. Heathrow is the world's busiest airport in terms of international passenger traffic. With the open borders in the European Union, there is greater trans-border mobility in this region.

RESPIRATORY DISEASE

In 2009, a novel influenza virus A (H1N1) was detected causing human illness in Mexico. Within 2 months, cases had spread to North America and 39 other countries. This highlights that infectious agents rarely remain localised and focal infectious diseases outbreaks have the ability to spread and pose global risks. Modern travel allows individuals to circumvent the globe in less than the incubation time of almost all infectious pathogens. Therefore, every country relies on the health surveillance, control, and reporting of other countries to recognise, report, and reduce the spread of diseases. A coordinated international effort has been set up by the World Health Organization for this particular role.

Additionally, the increased accessibility of cheap travel makes it possible for many more nationalities to attend mass gatherings; for example, religious or sporting events such as the Olympics. This conglomeration of large numbers of individuals from around the world, confined in time and space, enhances the potential threat of outbreaks. Public health preparedness for these events requires meticulous planning, screening, surveillance, and response strategies to minimise these risks.

VECTOR BORNE DISEASE

Global health can be affected by the globalisation of international trade. An example has been the expansion in the trade of used rubber tyres, which are shipped

around the world for reprocessing. This weakly-regulated trade route has been postulated to be responsible for the spread of mosquitoes (*Aedes aegypti* and *Aedes albopictus*), and hence the spread of vector borne diseases such as dengue fever, Japanese encephalitis, and chikungunya (Box 1). Indeed, dengue has now spread to most of the world's tropical cities. Mosquitoes breed in stagnant water reservoirs, including old tyres during transportation, and now inhabit Pacific Islands, parts of Africa and Latin America, 14 European countries, and 28 US states.¹ Tyres imported from the US to north eastern Italy, in the 1990s, were thought to be responsible for introducing the *Aedes* vector into Italy. In 2007, there was an outbreak of chikungunya in the Ravenna province of Italy, the first outbreak described outside a tropical region. Chikungunya is a viral infection transmitted between humans by mosquitoes and causes fever, joint pains, and skin rash. In the Italian outbreak, the index case, a man of Indian origin was visiting relatives in Italy, and introduced the virus to the local *A. albopictus* vector, which resulted in an outbreak of 205 humans across two villages.¹ Chikungunya does not occur in the UK, but 79 cases were reported in 2010, acquired through travel

to endemic regions, predominantly South/South East Asia and Africa. This highlights the potential for unexpected outbreaks to develop anywhere and it is important for GPs to be aware of unusual infectious diseases and consider recent travel and exotic or tropical diagnoses when assessing patients.

MULTIDRUG RESISTANT PATHOGENS

A further global public health threat is the emergence of 'superbugs', resistant to multiple antimicrobial agents, which have developed through misuse of antimicrobials and medical tourism. One such example is New Delhi metallo-D-lactamase-1 (NDM-1), which is a genetic sequence encoding multiple resistance genes and is found in several bacterial species, including *Klebsiella* and enterobacteriaceae. Some of the organisms with this gene are resistant to all antimicrobial agents, except the polymyxins.² NDM-1 was first reported in 2009, in a Swedish patient of Indian origin, who had recently returned from a visit to New Delhi (hence named). Population mobility and travel has been attributed as the key factor in the rapid dissemination of NDM-1 to the UK, India, Pakistan, Austria, Belgium, France, Netherlands, Germany, Canada, US, Japan, Hong Kong, Singapore,

Box 1. Summary of diseases

Disease	Transmission	Presentation
Dengue fever	Arbor (arthropod borne) viruses transmitted by <i>Aedes</i> mosquitoes	From South East Asia and South America presenting with widespread fever rash muscle pains and headache, and low platelets. Commonest exotic febrile viral infection.
Japanese encephalitis		From South East Asia very rare >1:106 visits. Presenting with encephalitis and systemic viral illness.
Chikungunya		From India and Indian Ocean. Joint and muscle pains with fever. Associated with outbreaks very uncommon.
Schistosomiasis	Contacted through water exposure in lakes and rivers	Africa and particular Malawi. Presenting lethargy, malaise, and haematuria. Common after freshwater exposure. Serology and urine/stool microscopy diagnosis.
Strongyloidiasis	Nematode infection through skin usually bare feet	Global. Presenting with non-specific abdominal pain and unexplained eosinophilia. Serology and stool microscopy diagnosis. Common in migrants.
Lujov virus	Unknown transmission	Highly fatal nosocomial viral haemorrhagic fever first seen in Lusaka and Johannesburg (Lujov). Very rare.
Chagas disease	Assassin bug faeces. Perinatal transmission	South America. Chronic disease presenting with cardiomyopathy and autonomic dysfunction (for example, constipation). Serology and histology rare.
MDR and XDR tuberculosis	Usually following incomplete treatment. Rarely respiratory spread	MDR-TB resistance to at least rifampicin and isoniazid. XDR-TB resistance to above, and quinolone and second line drug (for example, kanamycin, capreomycin, or amikacin).

Taiwan, Africa, Oman, and Australia. Over 50% (14/29) of UK patients with these isolates have travelled to India and Pakistan. A similar problem is emerging with multi-drug resistant (MDR) and extensively-drug resistant (XDR) tuberculosis (TB), predominantly in counties with high HIV and/or TB prevalence, spurring the WHO to produce a global response plan in 2007.³

MIGRANTS' HEALTH

In 2001, approximately 8% of the UK population was born abroad, increasing to 12% in 2010. Although many long-term settled migrants will have similar health issues to the UK-born demographic group, health beliefs, behaviours, and engagement with health services varies between cultures and ethnic groups. Undocumented migrants may avoid public services altogether due to the fear of deportation. There is a need to provide culturally-sensitive and language-supported health services to specifically address the health needs of these populations. One such service is 'Project London' run by the charity Doctors of the World (<http://doctorsoftheworld.org.uk/>), which helps vulnerable people access NHS services.

Many factors impact on the health needs of a patient. Of particular relevance to this article is the patient's country of origin, that may reflect not only epidemiology of infectious disease risk, but also other social factors, which affect health. A Health Protection Agency report on migrant health showed that most of the burden of certain infectious diseases (70% of TB, HIV, and malaria) were from a small group of the population not born in the UK.⁴ This group of patients is at further risk when they return to visit friends and relatives in their home country; for example, 61% of malaria cases and 87% of enteric fever cases (between 2007–2010) were reported in patients who had visited friends or relatives.

Social factors, which may impact the health needs of a migrant patient include circumstances prior to migration (such as, healthcare access in country of origin, socioeconomic status, political circumstances, education, employment, and family support), reason for migration (such as, students versus 'vulnerable migrants' [trafficked people, asylum seekers, refugees, unskilled workers, or undocumented migrants]) and their circumstances in the UK. The Health Protection Agency has a series of country specific advice pages on their website, outlining key risks and support considerations.⁵ It is important to ensure that we can identify and appropriately treat

these patients rapidly, for both physical and psychological disorders. Furthermore, these health risks can continue for many years after relocation to the UK; for example, 77% of non-UK born cases of TB in 2010 were diagnosed 2 or more years after arrival in the UK.⁴ Rapid detection and management of many 'imported diseases' is not only important for the patient, but also, in some cases, at a population level in terms of public health.

There is a growing burden of non-communicable diseases in low- and middle-income countries and this is true in relation to migrants in the UK. For example, the prevalence of diabetes is over threefold higher in Bangladeshi, Pakistani, and Indian males living in the UK than in the overall population.⁴

HPA data show that 65% of hepatitis B infections and 68% of hepatitis C infections (reported in a sentinel surveillance scheme between 2007–2010) were diagnosed in primary care (by GPs and other primary care services) and genitourinary medicine clinics, and other primary care services.⁴ Rapid detection is vital to improve health outcomes; for example, the late detection and diagnosis of HIV leads to a tenfold risk in mortality within 1 year of diagnosis.⁴ When considering a differential diagnosis, it is important to consider the patient's country of origin and to enquire about potential risk exposures to refine the differential diagnosis; for example, non-UK-born TB cases present with a higher proportion of extra-pulmonary disease, compared to UK-born cases (54% versus 31%).⁴ Some clinical presentations of infectious diseases are rare in the UK and, therefore, many UK practitioners may be unfamiliar with them and these conditions are likely to be under-diagnosed: for example, Chagas disease (South American trypanosomiasis transmitted through the bite of a Reduviid bug or perinatally), schistosomiasis and strongyloidiasis (both chronic parasitic infestations presenting with non-specific symptoms). New diseases continue to be recognised and classified, such as the characterisation of a new haemorrhagic fever in Southern Africa in 2009: Lujo virus,⁶ highlighting that novel and dangerous threats still remain, despite significant advances in science.

CONCLUSION

The consequences of globalisation are wide reaching and a global perspective is necessary to overcome these threats. The UK government acknowledges that in today's society, health has become a global issue and has published a government-wide

ADDRESS FOR CORRESPONDENCE

Ron H Behrens

Hospital for Tropical Diseases, Mortimer Market Centre, Capper Street, London, WC1E 6JB, UK.

E-mail: ron.behrens@lshtm.ac.uk

strategy on global health, *Health is Global*.⁷ Cultures, travel, and population movements lead to increasing and changing spatial and temporal dimensions to infectious diseases with rapid spread across borders. Health in one country affects not only neighbouring countries, but all countries linked by travel networks. Healthcare practitioners need to maintain vigilance for these conditions, particularly in migrants and travellers.

Cordelia EM Coltart,

Specialist Registrar, Hospital for Tropical Diseases, London.

Ron H Behrens,

Consultant Physician in Tropical and Travel Medicine, Hospital for Tropical Diseases, London.

Competing interests

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