

## **Discuss the impact of global travel and migration on patterns of disease.**

In the 14<sup>th</sup> century, in response to the discovery that outbreaks of plague were closely associated with the arrival of vessels carrying individuals who were ill or who became ill shortly after arrival, civic and municipal instructions were issued in coastal cities such as Venice to require ships coming from infected ports to sit at anchor for 40 days before landing<sup>[16]</sup>. Indeed, the notion that travel influences disease spread is not new; however, quantum improvements in the speed of transportation and the growing complexity of population flows between countries have taken the public health challenges posed by global travel and migration to hitherto unseen levels.

This essay seeks to explore the effect of global travel and migration on the epidemiology of communicable and non-communicable diseases. I argue that globalization has increased the prevalence of certain diseases in nations and people groups that were previously sheltered from them. This has ramifications on public health; perhaps even necessitating a paradigm shift in the way epidemiology is conceptualised.

### **Short-Latency Diseases**

Arguably the most widespread effect of travel on patterns of disease takes the form of the traveller who presents with disease acquired from exposure to pathogens during short-term travel. Here, the classic examples are that of gastroenteritis due to Giardiasis, cholera or dysentery; Hepatitis A and B; malaria; and many other vector-borne parasitic diseases. However, the ease of air travel and the concomitant increase in global migration have added a new dimension to this. Second-generation immigrants born in high-income countries who return to their countries of origin to visit family or relatives (VFR travellers) may lack the acquired immunity to certain pathogens that their first-generation parents possess. This, coupled with their tendency to travel for longer and live as part of the local community whilst abroad, means that this population is associated with different risk profile and a higher morbidity<sup>[2][17]</sup>. Altogether, this means increased presentation of infectious diseases that may be considered 'rare' in the home country, which the healthcare system needs to be robust enough to diagnose and treat.

Yet, the threat of imported infections remains the foremost concern. This refers to the seeding of infections from endemic to non-endemic areas where they subsequently spread. Travellers are integral in this process, as evidenced by their role in the worldwide spread of SARS in 2003 and MERS-CoV more recently<sup>[1]</sup>. Even vector-borne infections are able to establish themselves in vulnerable areas, provided they have the competent mosquito or arthropod vectors. A case in point is the spread of the Chikungunya virus from Africa to cause multiple explosive outbreaks on the islands of the Indian Ocean since 2005<sup>[10]</sup>, aided by a mutation in the gene encoding the viral envelope protein (A226V) that has allowed mosquitoes to become infected even when exposed to a lower level of viraemia<sup>[9]</sup>, and thus become more potent vectors. Provided there is sufficient similarity in the environments, previously disease-free countries may become receptive to these imported infections. Perhaps the greatest risk comes from within-country rural-urban migration: low-income workers returning home after working in overcrowded cities have been reported to set off outbreaks of STDs, HIV<sup>[13]</sup> and even leishmaniasis<sup>[3]</sup>.

### **Chronic Disease**

To make the matter yet more complex, screening and detection of infectious diseases is even more difficult in delayed presentations of disease due to chronic states or latency. Multidrug resistant (MDR) and even extensively resistant (XDR) tuberculosis has been

reported in geographic areas far from their point of acquisition<sup>[19]</sup>. Patterns of disease can still be drawn, though: in these migrant-receiving nations, tuberculosis prevalence remains far higher amongst the foreign-born immigrant population compared to the local population. These chronic infections may have far-reaching downstream epidemiological consequences, even impacting rates of *H. pylori* related gastric carcinoma and chronic hepatitis induced hepatocellular carcinoma<sup>[15]</sup>.

### **Non-Communicable Disease**

It must also be appreciated that pathology arises from a complex background of biological, socio-economic/environmental and behavioural risk factors. Healthcare determinants of low socio-economic status and poor access to healthcare contribute significantly to the entrenchment of tuberculosis and HIV in migrant populations<sup>[20]</sup>. However, it is in the non-communicable diseases that one can best appreciate the interplay between these risk factors. Multiple reviews have shown an increased risk of coronary heart disease and non-insulin dependent diabetes mellitus in South Asians living overseas<sup>[4][7]</sup>, compared to people of other ethnic groups. Meanwhile, other studies show a positive relationship between mortality and duration of residence in England and Wales<sup>[6]</sup>, pointing to the effect of migration and exposure to new environments on disease. The 'thrifty gene hypothesis' (Neel, 2006)<sup>[8]</sup> goes some way towards explaining these epidemiological findings by drawing the express link between genetic predisposition and environmental factors. A similar story of migration-related acquired lifestyle factors affecting non-communicable disease patterns can be found in cancers – for instance, the risk of breast cancer amongst Chinese, Japanese and Filipino women was shown to rise over several generations to approach that of U.S. whites.<sup>[14]</sup>

### **Conclusion**

Global travel and migration have undoubtedly had a profound impact on patterns of disease. Geographical and political boundaries are less effective barriers to disease spread than ever before, and it is becoming increasingly difficult to pinpoint what diseases are 'expected' or 'unexpected' in any given country. For the individual practitioner, this underscores the importance of a travel history in approaching any query of an infectious disease, as well as a healthy appreciation of how ethnicity and country of origin may affect risk profiles. On a larger scale, a global, multilateral approach towards public health is probably the way forward – intelligence on disease patterns must be gathered on a global scale, and epidemics must be fought with the coordinated input of multiple countries. It is no surprise then that this 'global health' perspective has been captured in the latest UN sustainable development goals, which champion an international approach with the ultimate aim of achieving universal health coverage and access to safe and affordable medicines and vaccines for all by 2030.

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