# Surveillance of travel-related infections in China

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Li-Qun Fang and colleagues' Article[1] in *The Lancet Public Health* explores infections imported into China and discovered via routine active surveillance of inbound travellers. This report is timely in view of the volume of travel to and from China, and the publicised cases of arboviral and other infections imported into the country in the past 5 years.[2] The effects of population movements on disease occurrence are well exemplified by malaria: imported cases now comprise more than 97% of all notified cases in China, emphasising that rapid detection of cases acquired elsewhere is essential if malaria elimination in China is to be feasible.[3,4] In this context, one can understand the rationale for the system of active surveillance among people arriving at all 272 ports (air, land, and sea), the stated aim of which is to aid early detection of illness and potentially limit secondary autochthonous spread. Infections associated with possible onward transmission merit attention—particularly influenza, sexually transmitted infections, and vector-borne infections for which competent vectors exist.

The *Rules for the Implementation of Frontier Health and Quarantine Law of the People's Republic of China* state that all individuals suspected of harbouring an infection are to be quarantined while undergoing diagnostic tests, which are done according to variable algorithms based on presenting clinical manifestations.[5] This systematic surveillance underpins the availability of novel and rich data for the 45 pathogens included in Fang and colleagues' study.[1] The sheer number of infections found in 3 years—22 797—is notable. Additionally, a particularly laudable aspect of the study is that a denominator of 805 million inbound travellers has been provided, enabling calculation of an incidence rate (28·3 per million).

The authors have characterised the range of imported infections, and showed the variability in the frequency of each infection by factors including exposure country or region and traveller type. Examples of imported vaccine-preventable infections included influenza, varicella zoster, measles, mumps, rubella, hepatitis A and B virus infections, typhoid fever, and yellow fever. Although tourists accounted for two-thirds of all imported infection, Chinese labourers returning to mainland China were the main importers of tuberculosis, hepatitis A virus infection, dengue, malaria, yellow fever, Rift Valley fever, and sexually-transmitted infections. Migrant workers often live in crowded conditions conducive to spread of infections, are a particularly vulnerable group for disease acquisition, and can potentially spread disease upon return to China. The importation of cases of yellow fever from Angola into China provides a vivid example of the consequences of low coverage of pre-travel vaccinations and poor adherence to preventive behaviours among migrant workers.[6,7] Estimates suggest that more than 1 million Chinese workers now reside in Africa, and Fang and colleagues' data support targeting of migrant workers for pre-travel care.[6] 10% of people in the study who had an infection were sailors, who should also be encouraged to seek vaccination and chemoprophylaxis before travel.

Citizens of mainland China accounted for 74% of all cases, citizens of Hong Kong, Macao, and Taiwan accounted for 9%, and citizens of other countries accounted for 17%. A five-times increase was noted in both the number and incidence of infections during the 3-year study period. The authors state that increased travel and improvements in diagnostic procedures probably contributed to these rises. Other contributing factors might include changes in travel patterns and destinations, and a rise in travel among vulnerable populations. Exploration of the precise reasons behind the rise in number and incidence of infection would help to direct necessary interventions to counteract the recorded increases. Influenza was the most common single disease cause overall. Dengue and malaria were frequent among travellers arriving from Africa. Inclusion of data for antimicrobial resistance to key pathogens in the analysis would have been helpful.

Most internationally acquired cases of infection were imported from the Western Pacific (53%) and South-East Asia (27%) regions, suggesting that travellers to and from these regions deserve special attention. Denominator data for the number of travellers arriving from each country or region are needed to optimise provision of risk-based data for disease acquisition according to place of exposure, but were not captured. Demographic data for arriving travellers who were not suspected to have an infection were also not gathered,

so the main characteristics of people with infection could not be compared with those of the 805 million people without infection. The data provided in this study can nonetheless provide some insights into missed opportunities for disease prevention among travellers, and into probable acute infections in returned ill travellers.

Other limitations of this paper are also worth noting. How exactly diagnoses were judged to be related to travel is unclear, especially for diseases with long latent or incubation periods, for which there would be uncertainty about whether infection was acquired in China before travel or was truly travel related. Additionally, although screening for fever resulted in diagnosis of 83% of the respiratory infections and about two-thirds of mucocutaneous and vector-borne infections, travellers who were infected with pathogens but still in the incubation period at the time of arrival were missed. Thus the findings reported by Fang and colleagues are probably a substantial underestimation of total disease importations. Furthermore, the number of already-active infections that went undetected is unknown, so although there has been much debate about the value of fever screening at entry points such as airports, this Article does not detail the proportion of cases of infection detected by screening.[8,9]

To conclude, Fang and colleagues provide a fascinating insight into importation of infection into China, which received 57 million tourist arrivals in 2015 alone. Their work is a good starting point for understanding the burden of imported infections into China, and details the priority diseases, regions, and populations that should be targeted with education and pre-travel vaccinations to provide the greatest potential protection to the resident population. Rates of pre-travel visits and vaccination in China are unknown, but in a study[10] published in 2016, people attending for care before a trip often had requirements from visa applications, companies, or foreign schools. As the authors state, the "rapid increase in cross-border travelling has become the main driver of the global spread of infections".[1] Recognition of the role of travellers as vectors of infections is a crucial step in global efforts to reduce this spread of disease.

*Karin Leder, Mary E Wilson*
School of Public Health and Preventive Medicine, Monash University and Royal Melbourne Hospital, Melbourne, VIC Australia (KL); School of Medicine, University of California, San Francisco, San Francisco, CA, USA (MEW); and Harvard TH Chan School of Public Health, Boston, MA, USA (MEW)
karin.leder@monash.edu

We declare no competing interests.



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