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REVIEW

Prioritising immunisations for travel: International and Japanese perspectives

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Summary Immunisation has traditionally played an important role in travel medicine practice and unlike routine immunisations, vaccines for travel are sought by and often paid for by the traveller. A convenient way of looking at vaccines for travel is by grouping them into those that are: Required, Routine, or Recommended, although this classification is not always consistent. Prioritising the use of vaccines classed as "Recommended" has proved the most controversial. There are a number of factors that influence both the traveller and health professional in this decision making process. The incidence rate and impact of a disease are thought by many to be the two most important factors to consider when prioritising vaccines. For travellers, the efficacy and adverse events associated with vaccines may also be important. This article reviews the role of immunisation in travel health with the aim of assisting travel health professionals prioritise their use of vaccines. It also highlights the need for travel medicine advisors worldwide to be aware of the differences between Japan and other nations with regard to national immunisation programmes, vaccine availability and vaccine uptake.

Global travel from industrialised countries to developing countries is growing rapidly [1]. This is due mainly to increased demand for tourism, business and other professional purposes, visits to friends and relatives by a rising immigrant population and religious pilgrimages. Larger aircraft carrying capacity and the expansion of travel routes has increased travel by making it more affordable and accessible. Japan is no exception, and the annual number of Japanese citizens departing to foreign countries increased from 270 thousand in 1965 to over 18 million in 2012 [2], with many of those destined for developing

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countries. In such a large population of travellers, infectious disease risks, including rare, life-threatening diseases, are becoming an important clinical and public health issue.

Over the last two decades, travel medicine has grown as an independent medical specialty, and the importance of informing travellers about health risks and advising on preventive measures before departure is increasingly recognised. As with other travel-related risks, the behaviour of the traveller while abroad impacts upon his/her risk of contracting an infectious disease, and advice on behaviour modification is an important part of the travel health consultation. Immunisation has traditionally played an important role in travel medicine practice [3] and, where appropriate, vaccines provide a highly effective, largely safe, and usually long-lasting means of preventing infectious disease. This article reviews the role of immunisation in travel health, with the aim of helping travel medicine practitioners recognise when immunisations are appropriate, enabling them to prioritise their use effectively. Issues pertinent to travellers from Japan are discussed and the differences between Japan and Western countries in their approach to immunisation are outlined. While influenza is increasingly recognised as an important cause of travel associated morbidity [4], this will not be reviewed here.

Routine and travel immunisations

Routine immunisations are administered according to the national policy of a country in order to protect not just individuals, but also the community, against infectious disease threats. For this reason, vaccines may continue to be routinely recommended to maintain herd immunity, despite their associated costs and adverse events (AEs). A good example of this is the poliomyelitis vaccine which remains part of the childhood immunisation programme worldwide, including in industrialised countries. The costs of routine immunisations are paid for by the government of a country. Compensation for individuals who experience severe AEs after routine vaccines can usually be claimed through a Government scheme, for example, in Japan, compensation is covered under the Protective Vaccinations Act. Several routine immunisations have been shown to be cost effective, e.g., measles, mumps, and rubella vaccines, particularly when the incidence of disease is high in the community [5].

In contrast, travel immunisations are sought by travellers who wish to reduce their own health risks and disruption to their travel plans, the cost of which is usually borne by the traveller. Travel immunisations can also help prevent diseases being imported to a country. Outbreaks of meningococcal disease in 2000 due to the serogroup W135 in British, French and other European visitors to the Hajj [6], and of hepatitis A in German and other European travellers to Egypt in 2004 [7] resulted in secondary outbreaks after travellers returned home. Travellers tend to be unaware of, or indifferent to, the importance of this public health concern and are often reluctant to have vaccines solely for this reason. In Japan, compensation for AEs associated with travel vaccines is covered by the Pharmaceuticals and Medical Devices Agency (i.e., by pharmaceutical companies, rather than through a Government scheme) if the vaccine is used within its licensed indication. However, the compensation granted is lower than that provided through the Government. Travel immunisations are not usually cost effective [3] as evidenced by a British study on hepatitis A and typhoid vaccines (injectable Vi polysaccharide and oral Ty21a) [8], and a more recent study on typhoid vaccines [9]. An exception to this may be the whole-cell-recombinant B subunit (WC/rBS) oral cholera vaccine which is cross-reactive to the heat-labile enterotoxin (LT) released from enterotoxigenic *Escherichia coli* (ETEC), thus providing cross-protection against ETEC-induced travellers' diarrhoea. This vaccine may prove cost effective where the illness occurs in $\geq$1 per 10 travellers [10]. Despite the generally poor cost-effectiveness of travel immunisations, travellers may be willing to pay for these to reduce their own risk of an illness which may affect their travel plans or prevent them returning to work post travel.

Vaccines for travellers: the three Rs

A convenient way of categorising travel vaccines is to group them as: Required, Routine, or Recommended [3]. This classification, however, is not always clear-cut as some vaccines belong to more than one group, and these categories may differ between countries.

Required vaccines

Yellow fever vaccine is mandatory for entering many sub-Saharan African countries and is required for entry to many Middle Eastern, Asian, and Latin American countries when travelling from a country with yellow fever transmission risk. This requirement is based on the International Health Regulations (IHR) of the World Health Organization (WHO) [11]. Since yellow fever vaccine requirements change intermittently, updated information should be sought from official reference sources such as the WHO International Travel and Health [12] and Travelers' Health, Centers for Disease Control and Prevention (CDC), the United States (U.S.) [13]. Where the yellow fever vaccination is contraindicated on medical grounds, a letter of medical exemption can be issued by the physician; however, its acceptance is at the discretion of the authorities of the destination country. Since May 2001, quadrivalent meningococcal vaccination has become a requirement for entry to Saudi Arabia for pilgrims, and some polio-free countries may require travellers from countries, or areas, reporting wild poliovirus to be vaccinated against the disease before an entry visa is granted. However, neither of these two vaccines is required under the IHR. Currently, no country formally requires cholera vaccine as a condition of entry.

Measles vaccination, as well as other routine vaccinations, may be required for entry into schools in some countries, especially the U.S. Even when not required, measles vaccination should be updated, especially in travellers from high prevalence countries travelling to countries where local transmission has been eradicated. In the U.S.,