

Influenza Vaccine: New Indication for Travelers

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Abstract

Contemporary with elucidating the travel-related morbidity and mortality impact of influenza, health care providers emphasized general populations and medical practitioner to medical and economic benefit of vaccination before journey. However influenza in travelers is the second most common vaccine-preventable infection, travelers are major suspected persons in propagation of influenza outbreaks at any time of the year and anywhere. Unfortunately general acceptance of this strategy of prevention is low and its remains to be improved. Considering accretion travel frequency worldwide, lack of general epidemiological data and uniform international advisory guidelines on influenza vaccination should be solved by clinical experts in travel medicine. This article presents current information on indications, mechanisms of action, efficacy and practical aspects to emphasize importance of influenza vaccination in travelers.

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Introduction

Passengers' redeployment, nearly 1 billion per year, prepares special opportunities for issuance of contagious disease. Therefore by growth of international travels, the risk of disease transmission had expanded accordingly [1].

Although a few percentage of these diseases could be prevented by vaccination (0.1%), routinely recommended immunizations should be consider as integral part of the provision of each pre-travel visit with each aim of travel including tourism, visiting friends and relatives, health treatments, teaching, and unspecified purposes especially for business man, religious pilgrims, policeman and governmental persons [2].

Evidence based risk assessment before traveler vaccination is a critical role of travel medicine practitioners especially when journey is planned for immunocompromised, to grave destination in special season or for long duration [3].

Based on previous instigations, there are 3 accepted different classifications for vaccination prior to international travel [4-7]: 1-Routine

vaccination schedule in home country, 2- Recommended vaccination schedule based on International Health Regulations 3- Required vaccination schedule based on destination country.

According to this classification immunization against yellow fever, hepatitis A and Japanese encephalitis are the most wanted vaccine in travelers, and the most common vaccine-preventable infection among them is hepatitis A [8-10].

Influenza is one of the critical viruses which protection against it, was integrated to traveler vaccination schedule newly. Although the economic burden and clinical risk of influenza is 3 fold greater than risk of hepatitis [8], fortuity of traveler for influenza vaccine use was very scares (0.7-1.4% of all traveler vaccination) [11].

Different surveys showed a poor coverage of influenza vaccine in European (14.2%) [12] and US (<50%) travelers [13]. Furthermore risk perception of influenza in business traveler was the worst [14].



Therefore influenza vaccination was underscored for all at risk travelers by the Committee to Advise on Tropical Medicine and Travel (CATMAT) in Canada [15], Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices in US [4] and National Health and Medical Research Council in Australia [16].

Influenza virus characteristics

Although influenza peaks in winter months seasonally in temperate regions, it occurs at a low rate all times of year round in the tropical and subtropical destinations [17, 18].

Close contact during the travel predisposed passengers to rapid dissemination of influenza infection by large droplet, cough or sneeze as well as contaminated surfaces [19].

The risk of transmission increases when the conveyor of disease is in latent period. In the situation of travel, only one influenza patient in close contact with other passengers could be contaminated 20-72% of them by the evidence of virological or serological tests. From these affected person infections remained clinically undetected in 15%–42% and they had great potential to transfer virus into their home country [16, 20-22].

Epidemiology Parameters for Risk Assessment of Influenza

After burden measurement of three influenza pandemics of the 20th century, this infectious disease, even in seasonal form, has been known as a significant reason for human morbidity (350-1050 ×10⁶ affected persons annually) and mortality (250–500 ×10³ deaths annually) [17, 23-25]. By increasing the rate of international movements in the 21th century, burden of novel influenza outbreaks and pandemic, especially swine origin influenza A/ H1/N1 and avian influenza A/ H5/N1, superimposed the impact of seasonal influenza [26, 27]. Approximately, 2 thousand million Euro was allocated as a total economic burden of diseases caused by influenza virus in Germany [16].

Current Indications of Influenza Vaccination

Despite low risk of side effects, 30% failure rate and only 44% overall efficacy [25, 28-30], vaccination against influenza virus is the most important preventive modality and could be saved direct cost of the disease about 120\$ per case [31].

Systemic reactions (fever and muscle pain) and rare severe side effects (allergic reactions to egg protein or thiomersal and Guillain-Barre syndrome) of influenza vaccine are venial comparing risk of severe influenza infection. Moreover, this vaccine could not be used in those with acute respiratory or other active infections [11, 32, 33].

Previous studies proved the reverse association between the rate of vaccination and lung infections (25-34%), time off work (32-43%) and physician's visits (42-44%) in all healthy adults, while some physicians and protocols are already disagreeing about the definite timeline for universal vaccine coverage to all age groups [31-33].

However, trivalent inactivated influenza vaccines (TIVs) should be consider in all children aged 6 months to 18 years based on recommendation of Advisory Committee on Immunization Practices (ACIP) as well as live attenuated influenza vaccines (LAIV) in non-pregnant persons aged 2 to 49 years. In first vaccination of children younger than 9 years, they should receive two doses of vaccine with 4 weeks interval. Only one dose is required in any subsequent year [16, 29, 30].

Vaccine also should be used to special conditions and risk groups (such as individuals aged >65, pregnant women exposed to influenza virus and patients with disseminated sclerosis, carcinoma, cardiac-renal-respiratory insufficiency or immunosuppression) and their close relatives which could reduce 25% risk of hospitalization from influenza or respiratory illness in these conditions [17, 34-36].

The vaccine strains have been adapted annually from 1980 to 2002 (22 strain for influenza A and 10 for influenza B) because of high antigen diversity and circulating strains were made based on surveillance data in February and September for northern and southern hemispheres respectively [11, 37].

Traveling, Influenza Risk and New Indication of Vaccination

According to the nature of the influenza virus, travelling is a condition which places passengers at higher risk of infection and carrying virus. Therefore immunization of travelers against this virus should be incorporate in travel protocols to

prevent individual disease and potential outbreaks with new antigenic shift or drift variants that humans have no previous immunologic experience with new strain (e.g. H5N1) [16, 38]. Surveillance surveys showed that among all travelers 2.8-3% were seroconverted [39], 0.6% were cultured positive [40], 1.1% sought medical attention [39], 0.39-0.46% suffered from respiratory illness and 0.2% had to change their travel plans due to influenza virus [41]. Despite this, nearly 66% of travelers did not change their trip plans even in the face of influenza [42]. Therefore the incidence of 1.0 influenza-associated event per 100 person-months was estimated. Because of the impact of travelers' knowledge about influenza educational efforts should be consider to increase the interest of vaccination usage a minimum of 2 weeks before travelling to offer protection [16, 25].

Vaccination against influenza is necessitated when travel associated with close contacts of people from many countries in crowded conditions, crossing the hemispheres depends both on the travel destination (where has new strains) and the time of year (especially winter season) and visiting the tropics attributed to environmental factors (temperature and humidity) [43-46].

Public transportation modes by air travel (72% risk of transmission and 27% risk of disease)[21, 47], cruise ships (42% risk of transmission)[48-51], trains, tour groups [52], military exercises abroad [53] and mass gatherings (Hajj and sport competitions with 10% risk of transmission) [38, 54] facilitate international spread of infections leading to an outbreak [1] . However, traveling limitation could not be effective decision to control pandemic influenza attacks compared to prevention by vaccination [55-57]. Statistic showed that passengers with goal of visiting friends and relatives for 30-130 days have higher risk of transmission and should be vaccinated [41].

Other indications of influenza vaccination which mentioned in above section should be tightly controlled and immunized during travelling including elderly people, chronic illnesses, and pregnant women [16, 58]. Except long-stay or frequent travelers, once vaccine per year has

sufficient coverage for travelers even it is administrated as a seasonal routine influenza vaccine or the arrival will be tropics or the opposite hemisphere [59].

Vaccination is a preventive option which has many preferences than antiviral chemoprophylaxis lower cost [60], single dose rather 7 days therapy [61], low resistance to virus [62], and lower adverse events [63]. However antiviral drugs should be used in postexposure prophylaxis, emergency treatment at the destination, unavailability and contraindication of vaccine [16].

Conclusion

All together, first step to limit the possibility of influenza outbreak is design uniform guidance focusing on both mandatory traveler vaccination and on use of antiviral therapy for all international travelers especially those at greatest risk for morbidity and mortality in addition to general hygiene precautions including hand washing, disinfection of contaminated surfaces and wearing masks. In future vaccine covering the circulating strains of opposite hemisphere should be available for proposed travelers worldwide until universal influenza vaccine might become available. Surveillance health system of each country should investigate travelers with respiratory symptoms and fever for 2 weeks after return.

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Conflict of Interests

None Declared.

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