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The elderly, the young and the pregnant traveler — A retrospective data analysis from a large Swiss Travel Center with a special focus on malaria prophylaxis and yellow fever vaccination

Veronika K. Jaeger [a,b,1], Nadine Tschudi [c,1], Rolanda Rüegg [c], Christoph Hatz [b,c], Silja Bühler [c,*]

[a] Department of Rheumatology, Basel University Hospital, Petersgraben 4, 4031 Basel, Switzerland
[b] Swiss Tropical and Public Health Institute, Department of Medicine and Diagnostics, Socinstrasse 57, 4051 Basel, Switzerland
[c] Department of Public Health, Division of Infectious Diseases/Travel Clinic, Epidemiology, Biostatistics and Prevention Institute, Hirschengraben 84, 8001 Zurich, Switzerland

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Summary *Background:* Vulnerable individuals such as elderly, children/adolescents and pregnant/breastfeeding women increasingly travel overseas. We describe the travel and vaccination patterns of these groups at the largest Travel Clinic in Switzerland especially focusing on travel to yellow fever and malaria-endemic countries, and yellow fever vaccination (YFV) and malaria medications.
Method: An analysis of pre-travel visits between 2010 and 2012 at the Travel Clinic of the University of Zurich, was performed assessing differences between the elderly, young and middle-aged travelers as well as between pregnant/breastfeeding and other female travelers.
Results: Overall, the vulnerable groups did not differ from other travelers regarding their travel patterns. YFV was the most often administered vaccine to elderly travelers; half of them received it for the first time. More than 30% of children/adolescents received YFV, but no child below six months was vaccinated. 80% of young travelers and a similar percentage of pregnant women went to malaria-endemic regions. Twenty-five pregnant/breastfeeding women traveled to YF endemic areas.

* Corresponding author. Tel.: +41 44 634 4631; fax: +41 44 634 4984.
E-mail addresses: veronika.jaeger@usb.ch (V.K. Jaeger), nadine.gfrerer@ifspm.uzh.ch (N. Tschudi), rolanda.r@gmx.ch (R. Rüegg), christoph.hatz@unibas.ch (C. Hatz), silja.buehler@ifspm.uzh.ch (S. Bühler).
[1] shared first co-authorship.

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Conclusions: Travel patterns of vulnerable travelers are comparable to those of other travelers. In view of the limited data on malaria medications and precautions against YFV during pregnancy and at the extreme ages of life, giving travel advice to these groups is challenging.

1. Introduction

Individuals who are vulnerable due to different underlying conditions increasingly travel overseas [1]. Three groups of vulnerable travelers seeking pre-travel advice at the Travel Clinic of the University of Zurich were looked at in this study: the elderly, the young traveler and pregnant or breastfeeding women.

In 2013, 12.7% of the Swiss population was aged between 65 and 79 years and 4.8% were aged 80 years and above [2]. By 2035, it is expected that more than 25% of the Swiss population will be aged 65 years and above [3]. A significant proportion of the elderly population travels abroad as longer life expectancy leads to a longer life span in retirement and allows the aging population to explore remote areas. However, the elderly have a higher risk of infection due to age-related dysfunction of the immune system (immunosenescence) [4]. These infections include diseases occurring worldwide, such as pneumonia and urinary tract infections, but also travel-related infections, such as malaria, where the elderly have a substantially increased risk of severe or life-threatening course of disease [4–6]. Also the effectiveness of vaccinations has been shown to be reduced or delayed in the elderly [7–10]. Furthermore, the risk of complications after yellow fever vaccination (YFV), one of the most commonly used vaccinations in travel medicine [11], is higher in individuals aged 60 years and above receiving the vaccine for the first time. Yellow fever vaccination-associated viscerotropic disease (YEL-AVD) or yellow fever vaccination-associated neurotropic disease (YEL-AND) occur in around 0.5/100,000 distributed doses [12]; in individuals aged above 60 the risk of YEL-AVD is estimated to be as high as 1.0–1.1/100.000 administered YFV doses, rising to 2.3–3.2/100.000 in persons aged over 70 years [13–15].

Infections in the elderly traveler are one important concern. Another is the higher prevalence of chronic diseases in this population. Complications of pre-existing conditions, especially cardiac diseases, are a major risk during travel for the elderly [6,11].

Not only the elderly, but also the very young are at increased risk during travel. Although parents are generally advised against traveling to subtropical and tropical areas with a high burden of infectious diseases, children account for one in ten international travelers [16]. Up to the age of two years, the immune system has not fully matured, leaving children at a higher risk of infection. Furthermore, prevention measures such as vaccinations can be less effective [17], or even bear a risk, such as YEL-AND in children aged less than six to nine months [15]. Older children are also exposed to travel-associated risks; for example, complications of malaria can be more severe in children [18], and symptoms are often difficult to distinguish from other childhood diseases [19]. Children visiting friends and relatives (VFR) in sub-Saharan Africa account for the highest percentage of imported malaria cases to industrialized countries [19–22].

Similarly to the elderly and the young traveler, the group of pregnant or breastfeeding women has a higher risk of a more severe course of various infectious diseases, such as hepatitis E, influenza or malaria due to the pregnancy-related weakened immune system [23–26]. Plasmodium falciparum malaria is associated with significant morbidity for both mother and fetus [27]. Therefore, pregnant women are generally discouraged from traveling to malaria endemic regions. Furthermore, giving advice on malaria medications is complicated as safety data during pregnancy are limited [28,29]. Live vaccinations, such as vaccination against yellow fever (YF), are usually contraindicated during pregnancy and should only be administered after a very careful risk-benefit assessment [30]. Additionally, yellow fever and other live vaccinations should not be administered to a breastfeeding woman, as live virus can be transmitted via breastfeeding, thus posing a risk to the newborn with a still incompletely developed immune system [31]. Cases of yellow fever vaccine associated encephalitis in breastfed children have been reported [32].

In light of a paucity of data regarding vulnerable travelers in Switzerland, our goal in this study was to assess the number of elderly, young, pregnant and breastfeeding travelers in the largest Travel Clinic of Switzerland. Furthermore, we aimed to evaluate their travel patterns with a focus on YF and malaria-endemic areas, pre-existing diseases, vaccination patterns with special attention on YFV, as well as prescribed malaria medications.

2. Methods

2.1. Data collection and analysis

Data were collected during pre-travel visits at the Travel Clinic of the University of Zurich (Zentrum für Reisemedizin, ZRM) as described earlier [11]. The ZRM is a walk-in clinic and provides travel advice without need of referral from a primary care setting.

Young and elderly travelers were categorized into groups according to the competence of the immune system; travelers below 16 years were assigned to the children and adolescent group, travelers aged 60 years or above were included in the elderly group [13,33,34]. Travelers aged 60 years and above will subsequently be referred to as elderly travelers and those below 16 years of age will be called young travelers.

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