

## Travel associated infectious skin diseases

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## Clinical Letter

### Travel-associated infectious skin diseases

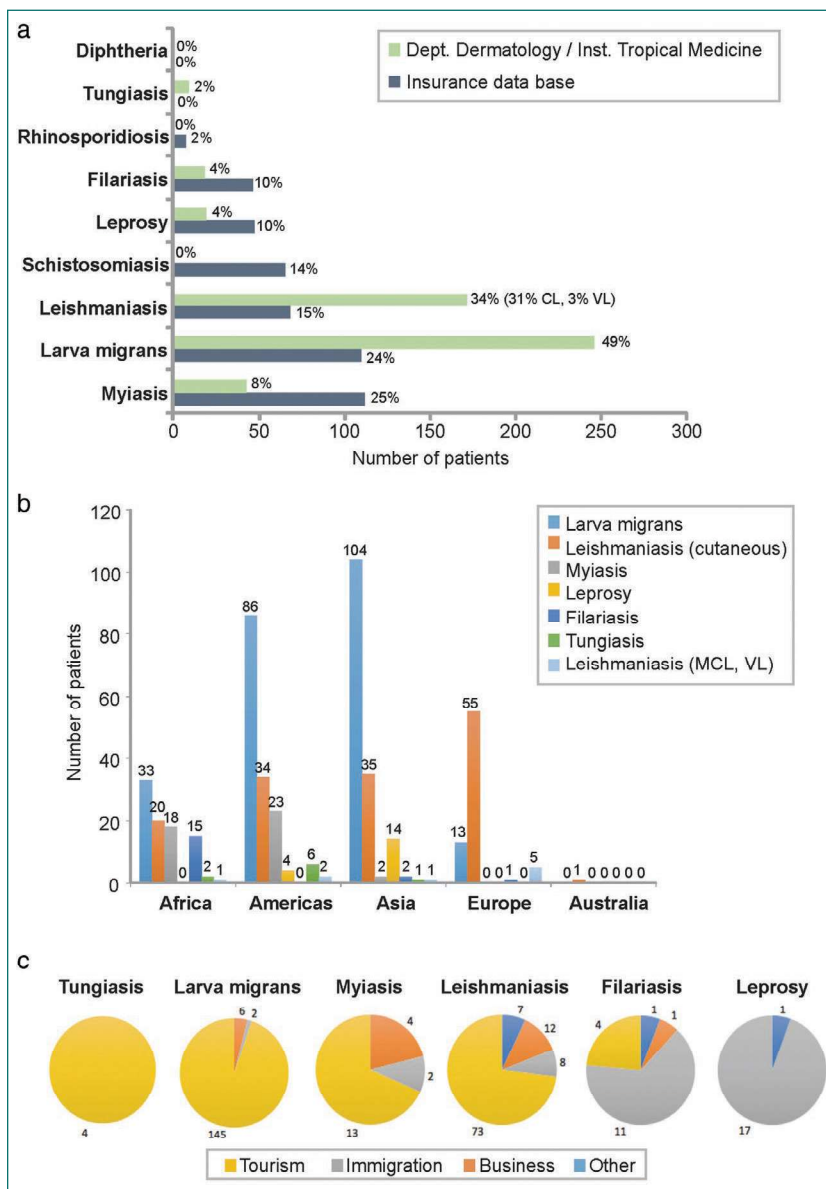
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Dear Editors,

Due to increasing travel and immigration, globally mobile populations are moving more high-impact pathogens across borders [1]. Skin disorders have a prevalence of 23 % among travelers and are the third most common reason for medical consultation after diarrhea and fever [1, 2]. Data on the

frequency of travel-associated skin diseases (TASDs) are scarce, but are crucial for a physician's ability to effectively detect and treat these imported diseases. We assessed the frequency of the most common TASDs in Germany using two approaches.

The first approach included an assessment of patient data from a German health insurance database covering ~9.5 million individuals. We performed an ICD-10 search for the most common TASDs in 2014. The insurance database held 455 cases; the most common were myiasis (n = 112/25 %), larva migrans (n = 110/24 %) and leishmaniasis (n = 68/15 %) (Figure 1a). 49 % of the study population were female (n = 224); the age range was from 0 to 95 years. Most patients were between 21 and 30 years old, followed by ages



**Figure 1** Prevalence of the most common travel-associated skin disorders among travelers returning to Germany. Data were obtained from a German health insurance database (Techniker Krankenkasse) covering ~12 % of the German population (n = 455) as well as from 20 different departments of dermatology and institutes for tropical medicine (n = 506) (a). Prevalence of travel-associated skin diseases classified by travel destination (n = 478) (b). Prevalence of travel-associated skin diseases classified by purpose of travel (n = 311) (c).

51 to 60 and 31 to 40. Larva migrans was especially common in travelers aged 21 to 30.

The second analysis included patient, demographic and travel data collected between 2000 and 2011 from 20 German university departments of dermatology/tropical medicine. A total of 506 cases were identified 52 % were female (n = 264). The most common TAsDs were larva migrans (n = 246/49 %), cutaneous leishmaniasis (n = 157/31 %) and myiasis (n = 43/8 %) (Figure 1a). The age group with the highest prevalence was that from 21–30 years. Travel destinations were documented in 478 cases (94 %). TAsDs were mainly diagnosed in travelers returning from Asia (n = 159/33 %), the Americas (n = 155/32 %), and Africa (n = 89/19 %) (Figure 1b), with TAsD patients most commonly returning from Thailand (n = 60), Brazil (n = 37) or Mexico (n = 20). One exception was cutaneous leishmaniasis, which was most often acquired in Spain (n = 33). The main reason for travel was “tourism” (77 %), followed by “immigration” (13 %), “business” (7 %) and “other” (3 %). All tungiasis cases were associated with tourism. Larva migrans (95 %) as well as leishmaniasis (73 %) were also mostly found among tourists. Travelers returning from business trips were most often diagnosed with leishmaniasis; leprosy (94 %) and filariasis (65 %) were mainly found among immigrants (Figure 1c).

The largest studies regarding TAsD have been published by Lederman et al. [3] (n = 4594), Herbinger et al. [1] (n = 4158) and Caumes et al. [4] (n = 269). A unique feature of the present study is not only the large base of patients (n = 961) but also the opportunity to compare two different statistical and clinical data sets. It is noteworthy that the present study was conducted before the European refugee crisis in 2015 and therefore represents unique TAsD data.

In the study population of Herbinger et al., larva migrans was reported in 8 % of subjects, cutaneous leishmaniasis in 2 %, rickettsiosis, myiasis and tungiasis in 1 % [1]. The top five TAsDs in the Caumes collective included larva migrans (25 %), pyoderma (18 %), arthropod-related pruritic dermatitis (10 %), myiasis (9 %) and tungiasis (6 %) [4]. Lederman et al. also found larva migrans to be the most common TAsD (10 %) [3]. Our findings are in line with these studies, with larva migrans having the greatest proportion of TAsDs. However, in our study population from the health insurance database, the most common diagnosis was myiasis. In line with these reports, men and women were equally affected [1, 3, 4].

Lederman et al. pointed out that TAsD patients were more likely to be young and to have traveled as tourists [3]. This is consistent with our findings as well as the findings of Caumes et al., where 75 % of patients were returning from tourism-related travel [4]. In our cohort, the age groups 21

to 30 and 51 to 60 years were more likely to be diagnosed with TAsD. The group of millennials are more adventurous and tend to travel to distant destinations, preferably off the beaten track. Their (retired) parents enjoy frequent travel opportunities with larger financial assets.

In line with the observations of Lederman et al., we found that TAsD patients were most likely to have traveled in Southeast Asia and the Americas [3]. Regarding cutaneous leishmaniasis, the highest geographical association was with Spain (24 %), which differs from the findings of other studies (35 % Africa, 53 % Asia) [5, 6]. However, Spain is clearly the favorite travel destination of German tourists, and is therefore likely to be overrepresented.

To determine the appropriate management and therapy of the most frequent TAsDs, the physician’s knowledge of demographic and endemic data, age/sex distributions as well as individual travel habits is important. This applies not only to dermatologists, but also to general practitioners, who are often the first contact for ill returned travelers. Our results as well as recently published guidelines will assist physicians and help public health policy makers to prevent, detect and manage TAsDs in travelers [7–11].

#### Conflict of interest

None.

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