BIOLOGICAL AGENTS AND ASSOCIATED WORK-RELATED DISEASES IN OCCUPATIONS THAT INVOLVE TRAVELLING AND CONTACT WITH TRAVELLERS

Health effects related to exposure to biological agents at the workplace

Between 2015 and 2017, EU-OSHA carried out a project to address the lack of knowledge and awareness of exposures to biological agents, the related health problems, and the lack of a systematic approach to workplace prevention in terms of these risk factors at work. In 2016, an extensive literature search was carried out on work-related diseases due to biological agents. The research concluded that workers in occupations that involve travelling or contact with travellers are at a high risk to exposure to biological agents. In addition to the literature review, expert survey and collection of data on health problems and exposure from monitoring systems, information on policy measures for reducing the risk of biological agents was obtained from interviews with experts and focus groups with workplace practitioners. Additional information was gained during a stakeholder workshop in 2017. This article focuses on occupations that involve travelling and contact with travellers and biological agents related health effects. It covers workers who travel across national borders and those who work with migrants and refugees.

Due to the increase in long-distance travel, and the globalisation of trade and services, work-related travel and contact with travellers has become more common in recent decades. Among the workers concerned are transport staff (e.g. airline personnel), people who travel frequently for work, custom workers, global trade workers (i.e. people that travel to other countries to set up business contracts for international trade), workers in war zones (e.g. soldiers, military doctors), epidemic control (field) workers and epidemiologists that travel to foreign countries, journalists and media professionals. The literature search provided a broad overview of the relevant occupations and health effects which is presented in Table 1 (biological agents per agent), Table 2 (biological agents per occupation) and Table 3 (allergens). The workers covered in this article may be exposed to various types of bacteria, viruses, fungi, and parasites. For some biological agents, it is indicated in the tables that they can be vector[1] transmitted.

In general, travel staff (airline personnel, custom workers), global trade workers, workers in war zones, epidemic control (field) epidemiologists, journalists and media professionals, are likely to be at risk of contracting diseases comparable to those among leisure and business travellers. This includes the risk of contracting avian influenza, Q-fever, dengue fever, Ebola/Marburg virus infection, tularaemia, legionella, measles, tuberculosis, yellow fever, SARS, cholera or meningitis (EU-OSHA, 2007a). Exposure can occur via, for example, contact with people, the air, food or exposure to animals. Infection transfer may be the result of bites or other direct animal contact, or from bites by vectors (e.g. tick-borne diseases), covering infections with, for example, *Coxiella burnetii*.

Airline personnel appear to be exposed to a diverse range of microorganisms (i.e. viruses, bacteria, parasites). This might be due to frequent contact with people from different countries. Frequently reported diseases in the transport sector are Q-fever caused by *Coxiella burnetii*, legionellosis, chromomycosis (mostly among professional drivers), hepatitis, and tularaemia.

Other workers who are at risk of exposure to multiple kinds of agents are (professional) drivers, military personnel (overseas work), (air) travellers and workers in war zones. Some agents may cause

[1] Vector: an organism that does not cause disease itself, but spreads infection by conveying pathogens from one host to another. Infection transfer may be the result of bites or other direct animal contact, or from bites by vectors (e.g. tick-borne diseases).

infections in several of these occupations, such as *Francisella tularensis*, the *Dengue* virus, the *Ebola* virus and *SARS coronavirus* (Table 1).

It is generally accepted that working areas with air-conditioning systems, high humidity or systems containing stagnant warm water are amenable to the growth of Legionella (EU-OSHA, 2011). Workers at risk are workers in cleaning and disinfection jobs in contaminated areas, professional (bus) drivers (Pontiac fever), journalists, railway conductors, subway personnel, and workers in war zones (EU-OSHA, 2007a; EU-OSHA, 2009b, Dutkiewicz et al., 2011; EU-OSHA, 2011a; Haagsma et al., 2012; Applebaum et al., 2016).

Table 1:: Overview of occupations that involve travelling or contact with travellers, biological agents and related diseases.

Agent	Occupation	Disease
Bacteria		
Anaplasma phagocytophilum (transmitted by vector)	Border guard Military personnel (overseas work)	Anaplasmosis
Borrelia burgdorferi (transmitted by vector)	Border guard	Lyme Borreliosis
Legionella spp.	Airline personnel Driver (professional) Epidemic control worker Global trade Journalist/media professional Traveller (air) Worker in war zones	Legionellosis
Mycobacterium tuberculosis / bovis / caprae	Airline personnel Epidemic control worker Global trade Journalist/media professional Traveller (air) Worker in war zones	Tuberculosis
Coxiella burnetii (may be transmitted by vector)	Airline personnel Epidemic control worker Global trade Journalist/media professional Military personnel (overseas work) Traveller (air) Worker in war zone	Q-fever

Agent	Occupation	Disease
Francisella tularensis (may be transmitted by vector)	Airline personnel Epidemic control worker Global trade Journalist/media professional Military personnel (overseas work) Traveller (air) Worker in war zone	Tularaemia
Fungi		
Tropical fungi	Development worker	Dermatomycoses (e.g. mycetoma)
Cladosporium carrioni	Driver (professional)	Chromomycosis
Fonsecaea pedrosoi	Driver (professional)	Chromomycosis
Phialophora verrucosa	Driver (professional)	Chromomycosis
Rhinocladiella aquaspersa	Driver (professional)	Chromomycosis
Coccidioides immitis and *posadasii*	Military personnel	Coccidioidosis
Microsporum canis, gypseum	Military personnel	Dermatomycoses
Dermatophytes, calfs, *Trichophyton verrucosum*))	Driver (professional)	Dermatomycoses (e.g. Trichophyton verrucosum infections)
Trichophyton interdigitale, mentagrophytes, rubrum tonsurans, verrucosum	Military personnel	Dermatomycosis, Tinea
Parasites		
Trypanosoma cruzi (transmitted by vector)	Military personnel (overseas work)	Chagas disease
Plasmodium falciparum, knowlesi malariae, ovale, vivax (transmitted by a vector)	Military personnel (overseas work)	Malaria
Viruses		
Virus transmitted by a vector	Military personnel (overseas work)	Sandfly fever

Agent	Occupation	Disease
Avian influenza virus	Airline personnel Epidemic control worker Global trade worker Journalist/media professional Traveller (air) Worker in war zone	Avian influenza
Crimean Congo Hemorrhagic fever virus (transmitted by a vector)	Military personnel (overseas work)	Crimean Congo haemorrhagic fever
Dengue virus	Airline personnel Epidemic control epidemics Global trade worker Journalist/media professional Military personnel (overseas work) Traveller (air) Worker in war zone	Dengue fever
Ebola / Marburg virus	Airline personnel Epidemic control epidemics Global trade worker Journalist/media professional Traveller (air) Worker in war zone	haemorrhagic shock, death
Hepatitis B, C virus	Driver (professional) Military personnel	Hepatitis B, C
Hepatitis E virus	Airline personnel Travellers	Hepatitis E
Human immunodeficiency virus (HIV)	Driver (professional)	Virus
Lassa virus	Airline personnel	Lassa fever

Agent	Occupation	Disease
Measles virus	Airline personnel Epidemic control epidemics Global trade worker Journalist/media professional Traveller (air) Worker in war zone	Measles
RNA virus of the genus *Flavivirus*	Airline personnel Epidemic control worker Global trade worker Journalist/media professional Traveller (air) Worker in war zone	Yellow fever
SARS coronavirus	Airline personnel Driver (professional) Epidemic control worker Global trade worker Journalist/media professional Traveller (air) Worker in war zone	Severe acute respiratory syndrome (SARS)
Tick-borne encephalitis virus (transmitted by vector)	Border guard	Encephalitis
Herpes simplex virus type 2	Military personnel	Herpes
Chikungunya virus	Military personnel (overseas work)	Chikungunya fever
Rift Valley Fever virus	Military personnel (overseas work)	Rift valley fever
West Nile virus	Military personnel (overseas work)	West Nile encephalitis

Table 2: Biological agents and diseases by profession/occupation

Occupation	Agent category	Agent	Disease
Airline personnel	Bacteria	*Legionella* spp.	Legionellosis
		Mycobacterium tuberculosis / bovis / caprae	Tuberculosis
	Bacteria (transmitted by a vector)	*Coxiella burnetii*	Q-fever
		Francisella tularensis	Tularemia
	Virus	Avian influenza virus	Avian influenza
		Dengue virus	Dengue fever
		Ebola / Marburg virus	hemorrhagic shock, death
		Hepatitis E virus	Hepatitis E
		Lassa virus	Lassa fever
		Measles virus	Measles
		RNA virus of the genus Flavivirus	Yellow fever
		SARS coronavirus	Severe acute respiratory syndrome (SARS)
Border guard	Bacteria (transmitted by a vector)	*Anaplasma phagocytophilum*	Anaplasmosis
		Borrelia burgdorferi	Lyme Borreliosis
	Virus (transmitted by a vector)	Tick-borne encephalitis virus	Encephalitis
Development worker	Fungi	Tropical fungi	Dermatomycoses (e.g. mycetoma)
Driver (professional)	Bacteria	*Legionella* spp.	Legionellosis
	Fungi	*Cladosporium carrioni*	Chromomycosis
		Dermatophytes, Calfs, *Trichophyton verrucosum*))	Dermatomycoses (e.g. Trichophyton verrucosum infections)
		Fonsecaea pedrosoi	Chromomycosis
		Phialophora verrucosa	Chromomycosis

		Rhinocladiella aquaspersa	Chromomycosis
	Virus	*Hepatitis* B, C virus	Hepatitis B, C
		Human immunodeficiency virus (HIV)	AIDS
		SARS coronavirus	Severe acute respiratory syndrome (SARS)
Epidemic control worker	Bacteria (transmitted by a vector)	*Coxiella burnetii*	Q-fever
		Francisella tularensis	Tularemia
	Virus	Avian influenza virus	Avian influenza
		Dengue virus	Dengue fever
		Ebola/Marburg virus	Hemorrhagic shock, death
		Measles virus	Measles
		RNA virus of the Flavivirus genus	Yellow fever
		SARS coronavirus	Severe acute respiratory syndrome (SARS)
Global trade worker	Bacteria (transmitted by a vector)	*Francisella tularensis*	Tularemia
	Virus	Avian influenza virus	Avian influenza
		Dengue virus	Dengue fever
		Ebola/Marburg virus	haemorrhagic shock, death
		Measles virus	Measles
		RNA virus of the Flavivirus genus	yellow fever
		SARS coronavirus	severe acute respiratory syndrome (SARS)
Journalist/media professional	Bacteria transmitted by a vector)	*Coxiella burnetii*	Q-fever
		Francisella tularensis	Tularemia
	Virus	Avian influenza virus	Avian influenza
		Dengue virus	Dengue fever

		Ebola / Marburg virus	Haemorrhagic shock, death
		Measles virus	Measles
		RNA virus of the Flavivirus genus	Yellow fever
		SARS coronavirus	Severe acute respiratory syndrome (SARS)
Military personnel	Fungi	*Coccidioides immitis* and *posadasii*	Coccidioidosis
		Microsporum canis, gypseum	Dermatomycoses
		Trichophyton interdigitale, mentagrophytes, rubrum, tonsurans, verrucosum	Dermatiomycosis, Tinea
	Virus	*Hepatitis B, C* virus,	Hepatitis B, C
		Herpes simplex virus type 2	Herpes
		Human immunodeficiency virus (HIV)	AIDS
Military personnel (overseas work)	Parasite	*Plasmodium falciparum, knowlesi, malariae, ovale, vivax*	Malaria
		Trypanosoma cruzi	Chagas disease
	Bacteria (transmitted by a vector)	*Anaplasma*	Anaplasmosis
		Coxiella burnetii	Q-fever
		Francisella tularensis	Tularemia
	Virus	Chikungunya virus	Chikungunya fever
		Dengue virus	Dengue fever
		Rift Valley Fever virus	Rift valley fever
		West Nile virus	West Nile encephalitis
	Virus (transmitted by a vector)	Crimean Congo Hemorrhagic fever virus	Crimean Congo hemorrhagic fever
			Sandfly fever
Traveller (air)	Bacteria	*Legionella* spp.	Legionellosis

		Mycobacterium tuberculosis / bovis / caprae	Tuberculosis
	Bacteria (transmitted by a vector)	*Francisella tularensis*	Tularemia
	Virus	Avian influenza virus	Avian influenza
		Dengue virus	Dengue fever
		Ebola/Marburg virus	Hemorrhagic shock, death
		Measles virus	Measles
		RNA virus of the Flavivirus genus	Yellow fever
		SARS coronavirus	Severe acute respiratory syndrome (SARS)
Travellers	Viruses	*Hepatitis E* virus	Hepatitis E
Workers in war zone	Bacteria	*Legionella* spp.	Legionellosis
		Mycobacterium tuberculosis / bovis / caprae	Tuberculosis
	Bacteria (transmitted by a vector)	*Coxiella burnetii*	Q-fever
		Francisella tularensis	Tularemia
	Virus	Avian influenza virus	Avian influenza
		Dengue virus	Dengue fever
		Ebola/Marburg virus	Haemorrhagic shock, death
		Measles virus	Measles
		RNA virus of the Flavivirus genus	Yellow fever
		SARS corona virus	Severe acute respiratory syndrome (SARS)

Table 3: Allergenic agents identified in the review and related diseases.

Category	Occupation	Agent	Disease
Arthropods	Aviation personnel Flight crew	Screw worm fly	Asthma

- **Armed forces**

Armed forces are a group that may be particularly at risk of contracting diseases that are endemic in the areas which they are destined to, and to bloodborne diseases from contact with casualties.

Pages et al. (2010) reported that the vector-borne diseases West Nile encephalitis and chikungunya are a new potential threat to Western armed forces overseas. Moreover, the following known diseases in tropical areas also affect Western armed forces overseas: malaria, dengue fever, sand fly fever, leishmaniasis, Rift valley fever, tick-borne spotted fevers, African tick bite fever, ehrlichiosis, Q fever, tularaemia, Crimean-Congo haemorrhagic fever, scrub typhus, sleeping sickness and Chagas disease (Pages et al., 2010). Hepatitis B, C and E (Khan and Attaullah, 2011; Freshwater, 2013a and b), fungal skin diseases (Seyfarth and Eisner, 2010; Leite et al., 2014), tinea (Leite et al., 2014) and coccidiosis (Maves and Crum-Cianflone, 2012) were also identified as risks to military personnel.

Hepatitis E virus was first discovered during the Soviet occupation of Afghanistan in the 1980s after an outbreak of unexplained hepatitis at a military camp. The prevalence is high in certain operational areas (28.5% in Afghanistan), and Freshwater (2013b) recommends to pay attention to food and water supplies together with scrupulous attention to environmental hygiene. He also mentions a much higher risk of fulminant hepatitis in pregnant women, with a mortality rate of up to 25%. As regards the risk of transmission of hepatitis B and C viruses among armed forces operating in high hepatitis B prevalence areas for years, Freshwater (2013a) reported that transmission from local people during mass-casualty scenarios to UK armed forces had been a concern for years. It was recommended that anyone with penetrating injuries should be subject to an accelerated vaccination regime to prevent the transmission of hepatitis B virus. According to Freshwater (2013a) this is also advised in situations in low hepatitis B virus areas such as the 2005 London bombing incident, in relation to which universal vaccination of UK armed forces against hepatitis B virus was recommended.

Unintentional exposures

Unintentional exposures result from processes that involve many different microorganisms or environments in which biological agents occur naturally due to specific circumstances. Workers in occupations that involve travelling or contact with travellers are mostly accidentally (unintentionally) exposed to biological agents, although the risk of exposure is not always obvious and health effects may be rather unspecific. Therefore, it is hard to estimate how frequent exposure to biological agents leads to disease. These workers may become infected, as individuals of different continents might differ considerably in their level of immunity. For example, people in Africa might not have the same level of immunity as Western people. Therefore, biological agents may cause an infection in a European worker who travelled to Africa, but African people may not acquire the disease when exposed to the same agent. For example, a European worker who is not vaccinated for yellow fever and travels to Africa where the yellow fever virus is endemic may easily be infected.

Monitoring systems of exposure to biological agents are not likely to cover the occupations covered in this article and, although the tools are adequate, more effort is also needed to ensure the registration of related diseases. However, valuable information might be gained from public health registration databases, in which several relevant diseases are registered, such as Ebola.

Vulnerable groups

In general, vulnerable groups, including trainees and workers in their first jobs are considered as such, because they have less practical experience and are less aware of the risks. Older workers are also considered more susceptible, and this group is increasing in size due to the ageing of the population. Other vulnerable groups are pregnant women; people with pre-existing diseases such as lung diseases, allergies and asthma, diabetes (because of their increased risk of infections) and people with (other) chronic diseases. Furthermore, temporary workers and undocumented (illegal) workers are considered (even more) vulnerable because they are often unaware and uninformed of the risks they are exposed to, and frequently do not receive the appropriate vaccinations.

Particularly on occupations considered in this article, migrant workers and refugee workers are vulnerable groups. For example, worker's instructions may be presented in a different language to the workers' native language. Consequently, these workers may be less informed about prevention measures for biological agents. Also, they are less likely to participate in processes such as the setting of prevention measures or other worker consultation and participation. Considering the lack of knowledge regarding the exposures and the lack of targeted prevention programmes and appropriate tools or guidance, particular care should be taken of these groups of vulnerable workers. The variety of partly exotic biological agents workers can be exposed to in these and the different exposure routes, including vectors, ingestion, water, and other pathways, need to be taken into account.. Young workers participating in voluntary support schemes in these countries were identified as a particular group to target. As an example, during the Ebola crisis, it was new or untrained assistance workers who were at a particular risk of infection, and specific training programmes were set up following infections, as well as clear guidance on the level of experience required for certain tasks.

Emerging risks

Emerging risks consist of newly created or newly identified risks, increasing risks or risks becoming widely known or established. An issue that warrants more attention, especially regarding occupations that involve travel, is climate change, which results in an advantageous environment for bacteria. The global increase in temperature stimulates the growth of microorganisms, and the ensuing higher number of biological agents leads to an increase in exposure risk. Issues that seem to be re-emerging include viruses linked to travel, allergic diseases and tuberculosis, but unfortunately, the available literature fails to clarify why these issues are re-emerging.

Travelling patterns have changed, and travelling, especially outside Europe, is generally assumed to increase the geographical spread of diseases not commonly encountered in Europe. Moreover, the migration of immigrants and refugees to Europe may also introduce diseases not commonly found in Europe and increase the risk of reintroducing diseases that have been nearly eradicated in Europe, such as tuberculosis.

Also, the Hepatitis E virus appears to be an emerging problem in several industrialised countries, where it is mostly associated with travelling to a hepatitis E virus endemic area, for example in the case of airline personnel (EU-OSHA, 2007a; Freshwater, 2013b). Hepatitis E is of particular concern in relation to vulnerable people.

Some workers whose jobs involve travel, for example professional drivers, should also be scrutinised for their risk of contracting diseases linked to exposure to biological agents. For example, fungal infections are reported (Seyfarth et al., 2010; Correia et al., 2010), possibly related to air conditioning. As no prevalence data are available and an increasing and significant number of workers may be concerned, the risks posed to professional drivers should be considered as a subject for future research.

- **Migration**

Despite the greatly increased movement among populations from very diverse regions (including Asia,the Middle East and Africa) to Europe, research on the transfer of biological agent-related diseases from populations outside the region was limited to only one publication identified in this review, which described malaria transmitted in Europe by European-settled immigrants returning from visiting friends and family in their country of origin (Monge-Maillo and López-Vélez, 2012), without, however, an occupational context. Nonetheless, owing to the large migration flow that has been apparent in large parts of Europe in recent years, the transfer of biological agents from the Middle East and Africa may

need to be given extra focus, especially among groups of workers who are in first contact with migrants (e.g. healthcare workers, social workers, rescue workers and customs workers). This risk is reinforced by the fact that vaccination rates are lower in other continents (e.g. Africa, Middle East). Diseases that were eradicated in Europe in the past may therefore resurge. That there are vaccination programmes within EU Member States for diseases, such as pertussis and malaria, that are most commonly associated with developing countries suggests that some Member States (e.g. the UK, the Netherlands) recognise the importance of migration and (work) travel in relation to the distribution of diseases from outside the EU. Also, western people may lack protective immune proteins against a biological agent from Africa. (EU-OSHA, 2019)

The fact that the number of workers who travel for work is increasing may also be because an increasing number of small and medium-sized enterprises are becoming globalised and have bigger international networks. This means that they may need to send their workers to areas with increased risks of infection. These smaller companies do not have the same know-how for example concerning medical travel advice as large companies and authorities. One of the relevant sectors is the transport sector, and one particularly relevant group mentioned here are professional drivers.

Preventive measures and policy measures

It is difficult to present specific preventive measures and policy measures for every one of the diverse group of occupations considered here. According to the interviews with experts in this study, hardly any targeted OSH policies are known that address the range of occupations considered here or for specific occupations, with the exception of the vaccination programmes in the EU Member States, as stated above. Measures could be more effective if they are adjusted to the specific occupation. It should be noted that the range of the risk of exposure differs among the occupations and is determined by the number of different countries they visit. For example, airline personnel may travel to a variety of countries and come into contact with people from different continents within a short time period, while workers in war zones may be in one place for a longer period of time. Airline personnel may therefore be exposed to a wider range of biological agents than workers in war zones. Preventive measures for airline personnel may therefore need to address a wider range of risks and biological agents. Even within the groups, there may be large variations in the type of exposures, as for example a flight attendant may travel to many different places or be on one route only, and a refugee worker may be in contact with many different or a certain group of migrants. However, generic policy measures may feed the development of specific policy measures and might be used for that purpose. For example, in some countries, such as the Netherlands, the potential additional risk of biological agents when working with refugees is specifically considered in workplace risk assessment. An exchange on such national experiences via international networks would be beneficial.

Conclusions

This article addresses a variety of occupations that differ considerably in their risk of exposure to biological agents. Occupations which are at a clear risk of exposure to biological agents) are airline personnel, (professional) drivers, military personnel (overseas work), (air) travellers, and workers in war zones. Due to the range of occupations, it is difficult to monitor exposure. It is questionable whether these occupations are covered by existing monitoring systems. Moreover, unintentional exposure depends on the variety of contacts with people and the biological agents they carry. Currently, hardly any targeted measures are known for the range of occupations in general or for specific occupations, thus there is a need to develop sector-specific measures and to learn from generic policy approaches and apply the hierarchy of control measures. Attention should be paid to jobs involving working with refugees and migrants, which is emerging. Vaccination may be extremely important to prevent the spread of disease, but the recommendations may be challenging, especially for workers of those occupations that travel to different locations or have contact with people from very different regions.

References

Applebaum, K.M., Graham, J., Gray, G.M., LaPuma, P., McCormick, S.A., Northcross, A., Perry, M.J.,2016. An overview of occupational risks from climate change. Curr. Environ. Heal. Reports 3, 13-22. doi:10.1007/s40572-016-0081-4

Correia, R.T.M., Valente, N.Y.S., Criado, P.R., Martins, J.E.D.C., 2010. Chromoblastomycosis: Study of 27 cases and review of medical literature. An. Bras. Dermatol. 85, 448-454. pii:S0365-05962010000400005

Dutkiewicz, J., Cisak, E., Sroka, J., Wojcik-Fatla, A., Zajac, V., 2011. Biological agents as occupational hazards: Selected issues. Ann. Agric. Environ. Med. 18, 286-293.

EU-OSHA – European Agency for Safety and Health at Work, 2007. Expert forecast on emerging biological risks related to occupational safety and health. European risk observatory report EN 3. Available at: https://osha.europa.eu/en/publications/report-expert-forecast-emerging-biological-risks-related-occupational-safety-and-health

EU-OSHA (European Agency for Safety and Health at Work), 2011. *Legionella* and Legionnaires' disease: A policy overview. Luxembourg: Publications Office of the European Union. Available at: https://osha.europa.eu/en/publications/legionella-and-legionnaires-disease-policy-overview/view

EU-OSHA (European Agency for Safety and Health at Work), 2009. Biological agents and pandemics: Review of the literature and national policies. Luxembourg: Publications Office of the European Union. Available at: https://osha.europa.eu/es/publications/biological-agents-and-pandemics-review-literature-and-national-policies

EU-OSHA (European Agency for Safet and Health at Work), 2019. Biological agents and work-related diseases: results of a literature review, expert survey and analysis of monitoring systems. Available at: https://osha.europa.eu/en/publications/biological-agents-and-work-related-diseases-results-literature-review-expert-survey-and/view

Freshwater, D.A., 2013a. Hepatitis B and C in the armed forces. J. R. Army Med. Corps 159, 169-174. doi:10.1136/jramc-2013-000096

Freshwater, D.A., 2013b. Hepatitis E: The forgotten virus. J. R. Army Med. Corps 159, 167-168. doi:10.1136/jramc-2013-000095

Haagsma, J.A., Tariq, L., Heederik, D.J.J., Havelaar, A.H., 2012. Infectious disease risks associated with occupational exposure: A systematic review of the literature. Occup. Env. Med. 69, 140-146.

Khan, S., Attaullah, S., 2011. Share of Afghanistan populace in hepatitis B and hepatitis C infection's pool: Is it worthwhile? Virol. J. 8, 216. doi:10.1186/1743-422X-8-216

Leite, D.P., de Souza Amadio, J.V.R., de Almeida Alves Simões, S., Martins de Araújo, S., Rodrigues da Silva, N.M., Anzai, M.C., Hahn, R.C., 2014. Dermatophytosis in military in the central-west region of Brazil: Literature review. Mycopathologia 177, 65-74. doi:10.1007/s11046-013-9714-4

Maves, R.C., Crum-Cianflone N.F., 2012. Coccidioidomycosis. A review. Infect. Dis. Clin. Pr. 20, 18-24.

Monge-Maillo, B., López-Vélez, R., 2012. Migration and malaria in Europe. Mediterr. J. Hematol. Infect. Dis. 4. doi:10.4084/MJHID.2012.014.

Pages, F., Faulde, M., Orlandi-Pradines, E., Parola, P., 2010. The past and present threat of vectorborne diseases in deployed troops. Clin. Microbiol. Infect. 16, 209-224. doi:10.1111/j.1469- 0691.2009.03132.x

Seyfarth, F., Eisner, U.C.N.P., 2010. Pilzinfektionen der Haut als Aufgabe für die Berufsdermatologie. Dermatologie Beruf und Umwelt 58, 119-127.