Current Infectious Disease Reports (2019) 21:48
https://doi.org/10.1007/s11908-019-0705-6

TROPICAL, TRAVEL AND EMERGING INFECTIONS (L CHEN AND A BOGGILD, SECTION EDITORS)

Migration Health: Highlights from Inaugural International Society of Travel Medicine (ISTM) Conference on Migration Health

Anita E. Heywood[1] · Francesco Castelli[2,3] · Christina Greenaway[4,5,6]

Abstract

Purpose of Review International migration is a global phenomenon that is growing in scope, complexity and impact. The inaugural International Society of Travel Medicine (ISTM) International Conference on Migration Health provided a forum to discuss scientific evidence on the broad issues relevant to migration health. This review summarises the key health issues, with a focus on infectious diseases, current effective strategies and future considerations presented at this forum and in the recent literature.

Recent Findings Migrants face health disparities for both communicable and non-communicable diseases. Their heightened infectious disease risks, compared to host populations, are related to pre-migration exposures, the circumstances of the migration journey and the receptivity and access to health services in their receiving countries. While the prevalence of infectious diseases identified through screening programmes are generally low, delays in diagnosis and treatment for a range of treatable infectious diseases result in higher morbidity and mortality among migrants. Barriers to care in host countries occur at the patient, provider and health systems levels. Coordinated and inclusive health services, healthcare systems and health policies, responsive to patient diversity reduce these barriers.

Summary Structural barriers to healthcare provision impede equitable care to migrants and refugees. Public health and medical professionals have a role in advocating for policy reforms.

Keywords Migration · Immigrant · Travel health · Migration health · Screening · Infectious diseases

This article is part of the Topical Collection on *Tropical, Travel and Emerging Infections*

Francesco Castelli is responsible for the choice and presentation of views contained in this article and for opinions expressed therein, which are not necessarily those of UNESCO and do not commit the organisation.

✉ Anita E. Heywood
a.heywood@unsw.edu.au

Francesco Castelli
francesco.castelli@unibs.it

Christina Greenaway
ca.greenaway@mcgill.ca

[1] School of Public Health and Community Medicine, Faculty of Medicine, UNSW Sydney, Sydney, Australia

[2] University Department of Infectious and Tropical Diseases, University of Brescia and ASST Spedali Civili, Brescia, Italy

[3] UNESCO Chair "Training and empowering human resources for health development in resource-limited countries", University of Brescia, Brescia, Italy

[4] Division of Infectious Diseases, Jewish General Hospital, McGill University, Montreal, Canada

[5] Centre for Clinical Epidemiology of the Lady Davis Institute for Medical Research, Jewish General Hospital, Montreal, Canada

[6] JD MacLean Centre for Tropical Diseases at McGill, McGill University Health Centre, McGill University, Montreal, Canada

Published online: 16 November 2019

Introduction

Human migration is at an all-time high, with an estimated 258 million international migrants globally (3.4% of the world's population), a 50% increase since 2000 [1]. This includes an unprecedented 70.8 million people who have been forcibly displaced from their homes [2], driven primarily by conflicts, social injustice and global inequities. International migration is increasing at a greater rate than global population growth [1] and is projected to continue to increase due to climate change [3]. While human migration is not a new phenomenon, the current magnitude and complexity of human movement has placed migrants and migration at the forefront of the global health agenda [4]. The World Health Organization (WHO) Global Action Plan (2019–2023) "Promoting the health of migrants and refugees" was accepted by the World Health Assembly in May 2019 [5]. This is a call to action for all countries to address and promote migrant health with an underpinning principle of Universal Access to Health Care [5]. This provides an opportunity and an obligation for the scientific community to generate and disseminate evidence on the health issues of the migrant population and interventions that address their health disparities. Practitioners can play a critical role in advocating for health equity and to offset the increasingly negative public narrative about migration and migrant health through the provision of positive counterpoints.

In October 2018, the International Society of Travel Medicine (ISTM) held the inaugural International Conference on Migration Health, in Rome, Italy (www.istm.org/ICMH2018). The objective of the conference was to provide an international forum to discuss scientific evidence on the broad areas of migrant and migration health and brought together clinicians, public health professionals, national policy makers and personnel from humanitarian and non-government organisations caring and advocating for migrants. The ISTM International Conference on Migration Health was organised in collaboration with key multisectoral stakeholders in migration and migrant health, including the International Organization for Migration (IOM), European Centre for Disease Prevention and Control (ECDC) and the US Centers for Disease Control and Prevention (US CDC), the European Society of Clinical Microbiology and Infectious Diseases and the American Society of Tropical Medicine and Hygiene. For over 25 years, the ISTM has been dedicated to promoting healthy, safe and responsible travel for all mobile populations. Increasingly, the body of knowledge required to practice travel medicine includes the provision of care to migrants [6]. In response, the ISTM has increasingly led activities to address the health needs of migrant populations; first, through recognition of the risk disparity of travellers visiting friends and relatives (VFR travellers) [7••] and more recently broadening its scope to the health needs of migrants [8•, 9]. This review aims to summarise the key health issues facing migrants, drawing on data presented at the conference as well as the recent literature including several reviews published in the recent thematic issue on Migration Health in the Journal of Travel Medicine. While all aspects of migrant health were included in the conference, this review has an emphasis on the infectious disease aspects of migrant healthcare and will outline future priorities to improving the health of migrants and key messages put forward at the conference.

Who Are Migrants?

Contemporary global migration is a complex combination of macro-, meso- and micro-level drivers of migration [10•]. An individual's decision to migrate and broader migration flows result from interactions of both push and pull factors including socioeconomic, political, environmental and individual factors [10•], which differ geographically and over time. As a result, migrant populations are heterogeneous in their social determinants of health and their health needs. The IOM defines a migrant as "any person who is moving or has moved across an international border or within a state away from his/her habitual place of residence, regardless of: (1) the person's legal status; (2) whether the movement is voluntary or involuntary; (3) what the causes of the movement are; or (4) what the length of stay is." [11]. Generally, long-term migrants, who have changed their place of usual residence for 12 months or more, are categorised into economic migrants and forced migrants; the latter includes asylum seekers and refugees. Legal migration refers to organised, regular flow of migration, whereas irregular migration refers to migrants who have entered or remain in a country without authorisation [12], and the latter may also be referred to as undocumented migrants. Irrespective of the type of migrant or their legal status, [12] all migrants should be afforded the same universal human rights as non-migrants in their host countries, including the right to health. However, restrictive policies in receiving countries such as access to healthcare, particularly for irregular migrants, greatly impact on their health and wellbeing [13••]. Highlighted at the conference opening session was the Italian model of care for new migrants during the 2015–2017 wave, before new restrictive measures were introduced. This model was presented as a possible example of coping with an overwhelming number of irregular migrants from the humanitarian social and care standpoints.

Migrant Health

Health issues of migrants across all disciplines and along the migration journey were presented at the conference. At different phases of the migratory process, which consists of the pre-

departure period, the migration journey, the settlement period and potentially return to their country of origin [14•, 15], migrants face numerous health challenges. Exposures in the country of origin, the process and circumstances of migration and receptivity of host countries and access to health care are important risk factors for poor health. Some migrants, including those experiencing protracted displacement, may be at higher risk of several infectious diseases or may arrive from countries with a higher prevalence of infectious diseases. These include neglected tropical diseases such as schistosomiasis, strongyloidiasis and Chagas disease, and chronic infections such as tuberculosis (TB), hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV).

The infectious disease risks associated with travel and migration are well documented and are an important consideration in the health assessment of newly arrived migrants. However, infectious diseases are generally not the most pressing health issue of arriving migrants. Of recent refugees and migrants screened on arrival into Europe, the most prevalent conditions requiring treatment include non-communicable chronic conditions, traumatic, obstetric and psychological disorders, particularly for unaccompanied minors [14•, 16]. While arriving economic migrants are generally healthier than the host population, the duration of residence and the impact of adopting host country lifestyle results in increased risks of non-communicable disease [17]. For some migrant populations with long durations of residence in host countries, obesity and insulin resistance are higher, resulting in a higher incidence, prevalence and mortality of diabetes [17]. While the overall burden of cancers is lower among migrants compared with host populations, cancers related to infectious diseases are higher, including hepatocellular carcinoma, Kaposi's sarcoma and cervical cancer [17].

Evidence of the impact of immigration detention on the mental health of migrants is clear, heightened in long-term detainees and those experiencing trauma prior to detention [18]. Humanitarian entrants, undocumented migrants and those with uncertain legal status are at increased risk of mental health disorders, including psychotic disorders, and depression and anxiety, including post-traumatic stress disorder (PTSD), with adolescents and older adults at greatest risk [19]. Risks relate to pre-migration stressors, the impact of the migration journey and resettlement, including the recent upsurge in anti-migrant rhetoric in host countries [20]. Post-migration stressors for humanitarian refugees include poor societal assimilation, financial stress, loneliness and concern for friends and relatives remaining in their country of origin [21]. Mental health screening in the post-arrival health assessments is complex with the need to build trust with refugees across multiple visits [22]. Enhancing the health and safety of migrant workers [23] is another important consideration of migrant health, with 87% of international migrants of working age (20–64 years), and precarious employment and poor working conditions are key contributors to poor health.

Infectious Diseases Among Migrants

Migrants represent only a small fraction of the total daily international border crossings, with short-term returning travellers more likely to be the source of imported epidemic-prone diseases, such as measles [24, 25]. Transmission of infectious diseases from arriving migrants to host populations is rare. However, migrants do present on arrival with serious, communicable infectious diseases which more likely pose a risk to themselves, if left undiagnosed and/or untreated, and potentially to their close contacts [26•]. Twelve years of GeoSentinel data (excluding screened refugees), a sentinel surveillance system of illness in returning travellers and arriving migrants [27], found that the most common infectious diagnoses in arriving migrant adults were latent TB (24%), acute/chronic hepatitis B (13%) and active TB (11%) and in children (< 19 years) were malaria (20%) and latent TB (11%) [28]. A higher prevalence of latent TB (43%) was seen in screened refugees into the USA over the same time period [29]. A similar prevalence among recent migrants into Italy was found, depending on the testing scenarios used (range 25–40%) [30], highlighting the challenges related to screening and testing strategies [31].

The risk of infectious diseases among migrants is associated with different factors across the migration process [32]. Pre-migration, the prevalence of infectious diseases in the migrants' country of origin, is a key driver of risk. For example, the breakdown in public health systems resulting from protracted economic or political crises, including war, in source countries leads to the re-emergence of previously controlled diseases, as seen in the recent measles outbreaks in Venezuela [33]. The lack of access to treatment in source countries is also a factor in the prevalence of infections, such as strongyloidiasis, in arriving migrants. For protracted migratory journeys, crowded and unhygienic living conditions increase exposure to a range of infectious diseases, and outbreaks in refugee camps are reported [34, 35]. After resettlement, the absence of routine health assessments leads to missed opportunities for screening resulting in delays in diagnosis and treatment among migrants [36]. Once settled in their host country, many migrants return to their country of origin to visit friends and relatives (VFR travellers), which poses additional risks [7••]. VFR travellers are more likely than other short-term travellers to acquire preventable infections during travel, including malaria, hepatitis A and typhoid [7••]. Circular travel from migrant health workers can also lead to introduction of new infectious diseases into their countries of origin. The literature reports rare instances of the spread of infectious diseases by migrant workers, such as the

importation of yellow fever into China from Angola [37] and cases of malaria, enteric fevers, hepatitis A and E and tuberculosis among migrant workers in Singapore [38].

Neglected Tropical Diseases

Migrants from endemic countries are at risk of several neglected tropical diseases and screening is recommended for strongyloidiasis, schistosomiasis and Chagas disease among national guidelines of high-income receiving countries [39–43]. *Strongyloides*, a soil-transmitted helminth, is estimated to infect between 10 and 40% of populations in tropical and sub-tropical countries globally [44] and an estimated 12% of screened migrants to low endemic countries [45•]. While commonly asymptomatic, case fatality rates of disseminated disease among immunocompromised people exceed 50% [32]. Early screening is recommended for all migrants from endemic countries, particularly before commencement of immunosuppressive treatments [45•]. Schistosomiasis, caused by freshwater-transmitted parasitic fluke worms, infects an estimated 3.5% of the global population [46]; the majority of whom live in sub-Saharan Africa. Prevalence among migrants reflects the prevalence of their country of origin [32]. While screening is recommended for arriving migrants, it is not universal, and delayed diagnosis can be attributed to weak screening policies in receiving countries [47]. Infection with the protozoa, *Trypanosoma cruzi*, results in Chagas disease and is endemic in Latin America [48]. It is predominantly a zoonotic vector-borne disease of poverty, infecting around 8% of populations in endemic regions [48]. Of the estimated 4.2% of Latin American migrants in Europe infected, less than 10% are diagnosed [32, 49•]. Vertical transmission can occur, with screening of pregnant Latin American migrants of particular importance [32]. Migrants may also be at risk of leprosy, filariasis and other helminthiases and protozoal infections such as cutaneous leishmaniasis. Recent GeoSentinel analysis, however, showed that cutaneous leishmaniasis was more common among travellers than arriving migrants [50].

Multidrug-Resistant Organisms

Low- and middle-income countries, particularly the Indian subcontinent, have a higher prevalence of drug-resistant pathogens [51]. In studies of returning short-term travellers, up to 80% were colonised with multidrug-resistant *Enterobacteriaceae* [52]. Due to the volume of short-term travel, migrants play a minor role in the global spread of antimicrobial resistant organisms. However, the conditions during transit and crowding, such as during the processing of migrants into Europe, favour exposure to multidrug-resistant organisms [53•]. A pooled prevalence of any detected antimicrobial resistance (AMR) carriage or infection of 25.4% (95% CI 19.1–31.8) was reported among studies of screened migrants [53•], and prevalence remains increased after settlement [54].

Infectious Disease Screening

For most receiving countries, comprehensive health assessments are not mandatory for arriving migrants, may be limited to humanitarian entrants, or are limited in the spectrum of infectious diseases screened. Only a few countries including Australia, Canada, New Zealand, the UK and the USA require pre-arrival screening and treatment of TB for all immigrant applicants and have variable requirements for screening for other infectious diseases such as syphilis, HIV and viral hepatitis. Several countries recommend post-arrival screening and national guidelines are available [39–43] and outlined infectious and non-infectious components of a comprehensive health assessment for newly arrived migrants. Infectious disease screening after arrival should include assessment for active and latent TB, HBV, HCV, HIV, strongyloidiasis, schistosomiasis, Chagas disease, malaria and sexually transmitted infections (STIs), if originating from endemic areas or risk factors are present [14•, 40]. Despite the numerous infectious diseases recommended for screening, prevalence in arriving migrants and refugees is generally low.

Early detection of infectious diseases in migrants is important to reduce morbidity in migrant populations and protect the host community. In high-income countries, the majority of cases of TB are in foreign-born populations [55•], including MDR-TB. These cases are primarily due to reactivation of latent TB acquired prior to migration, with the highest risk period of developing active TB in the first 5 years post-migration and the highest rates among migrants from high TB incidence countries in Asia and Africa [56]. Despite this, latent TB screening practices vary by receiving country, with stigma and fear related to legal status also a barrier to accessing health services. Once screened, latent TB treatment uptake and completion among migrants is low, although similar to other populations [57]. In low prevalence receiving countries, a substantial proportion of chronic HBV and HCV infections are foreign born [58]. As a result of delays in diagnosis and access to treatment, migrant populations have a higher mortality from hepatocellular carcinoma than non-migrant populations [59•, 60]. For migrants arriving from high HIV prevalence countries, or with risk factors for disease acquisition, HIV screening is warranted, although prevalence is low (< 1% of all migrants) [61]. Migrants are also less likely to be linked to treatment for HIV [36] due to linguistic, cultural and financial barriers. Migrants are at risk of acquiring HIV after migration, with a European study estimating 72% of HIV cases among migrant men who have sex with men (MSM), and over half of cases among heterosexual men and women were acquired post-migration [62•] highlighting the need for

post-migration screening. In Australia, the majority of heterosexually transmitted infections are in migrant populations, and new infections in MSM are increasingly among migrants [63], who may miss health promotion messages targeting MSM populations.

Immunisation

Migrants and refugees are under-immunised on arrival and often remain so after settlement [64, 65], and pockets of low vaccination coverage threaten the overall success of national immunisation programmes [66]. Global national immunisation coverage varies, high-income receiving countries have more comprehensive vaccination schedules and marginalised populations, such as refugees, may not have had access to vaccination services in their country of origin. As such, very few arriving migrants will be fully vaccinated according to their receiving country schedules [67]. Recent reviews of European countries managing irregular, large-scale migration have highlighted the differences in national immunisation policies and practices targeting migrant and refugees, with few collecting data on vaccine coverage [68, 69]. For most OECD countries, vaccination is not a requirement for migration and as such migrant groups have lower immunisation rates than the non-migrant populations of their host countries [70]. The US CDC pre-settlement immunisation programme for US-bound refugees, in collaboration with IOM [71], includes pre-departure vaccination for diphtheria-tetanus-pertussis, HBV, Hib, IPV/OPV and MMR. The programme has been found to be cost-saving [72] with no outbreaks of vaccine-preventable diseases among US-bound refugees occurring since the commencement of the programme, reducing morbidity and costly delays to resettlement [73]. For migrants and refugees to other receiving countries, restrictive policies around access, including age restrictions for funded vaccines, and poor documentation of vaccines received results in under-immunisation after settlement [74]. The complexities of providing catch-up to migrants and refugees in primary care are an additional barrier to achieving high coverage [67]. Although non-migrant populations in Europe are more likely to be susceptible to measles than migrants [24], immunity among some migrant sub-populations, such as those arriving from the African region, may be suboptimal [75], and opportunistic MMR vaccination during health screening is warranted. Vaccine hesitancy is a growing concern globally, including among migrant groups [76•]. Low vaccine uptake among migrant communities post-migration can lead to measles outbreaks, such as among the Somali population of sexually transmitted infections (STIs), USA, due to concerns about autism [77], or among the Samoan population of Sydney, Australia, due to barriers of access [78].

Access to Healthcare

Despite their heightened health needs, migrants are less likely to access health services than host populations, particularly culturally and linguistically diverse migrant groups [79••]. Conditions of poverty and issues related to poor adjustment during settlement reduce access to care and may lead to poorer health outcomes, including delayed diagnosis and treatment of chronic infectious diseases [80]. Barriers to care in host countries occur at the patient, provider and health systems levels [79••]. For migrants, language and cultural barriers are well recognised barriers to accessing quality healthcare, in addition, stigma associated with infectious diseases, differences in health-seeking practices, fear of deportation and limited health system literacy of their new country of residence all impact on access to healthcare. Immigrants with high language proficiency and familiarity with the host healthcare system are more likely to have regular access to health services, with acculturation and time since migration factors in disease prevention participation [81]. For healthcare providers, providing care to culturally and linguistically diverse patients is a challenge, and cultural competency training [82] and use of medically trained interpreters [83] can improve access and effectiveness of healthcare for migrants. An additional barrier is clinicians' limited technical knowledge of infections uncommon in host countries. Health systems of receiving countries must adapt and respond to the challenges of caring for migrants, regardless of the circumstances of migration. Coordinated, inclusive health services, targeted health policies and healthcare systems and services responsiveness to patient diversity [84] reduce barriers to care for migrant populations.

Strategies to Improve Migrant Health

At a policy level, equitable access to healthcare services for all migrants, regardless of immigration or insurance status, is crucial to improving migrant health [85]. Public health and medical professionals involved in the care of migrants and refugees are well placed to promote the health of migrants and refugees, through the dissemination of effective strategies that engage migrants in healthcare. These strategies include screening, immunisation and the development of policies that enable access to care that effectively promote the health of migrants during the different migration phases and innovative education models for training of healthcare professionals in migrant health. The best practice in the care of migrants is linguistically and culturally adapted models of care with integrated screening for a range of infectious diseases [32]. Strategies to improve healthcare access and utilisation by migrant groups include the following: community outreach, such as the use of community-based bi-lingual health workers and community point-of-care screening and treatment service;

provision of culturally and linguistically appropriate health services, including cultural competency training for health workers and the use of interpreters; tailored and culturally appropriate health promotion messaging [79••]. Community engagement approaches can lead to improvements in the health of disadvantaged populations, including migrant groups, although the impact is difficult to measure [86].

Where to from Here?

Host countries have a responsibility to the health of their migrant populations. To do this, national policies are needed to effectively implement the WHO's Global Action Plan on Promoting the Health of Refugees and Migrants, 2019–2013 [87]. The WHO's Global Action Plan provides the foundations for greater advocacy for countries to provide equal access to healthcare [87]. Public health and medical professionals are well placed to advocate for the health rights of migrants and refugees. For medical professionals, this includes communicating the challenges in the provision of healthcare to migrants. For public health practitioners and policymakers, this includes positive messaging of the contribution of migrants and countering claims of health risks to the community posed by migration. Graded evidence for best practice is needed to better inform the provision of migrant health [88]. Responding to the diverse and complex health needs of migrants and refugees is multi-sectorial, encompassing health, immigration, social services and education sectors [89]. In 2016, the WHO European Regional Office adopted a strategy for improving migrant health, which included the provision of quality affordable healthcare, adaptive health systems, trained healthcare workers in migrant health, better data collection and enhancing multi-sectoral action on migrant health [80]. There is a clear overlap of travel medicine and migration health, and the ISTM is well placed to play a key role in advocating for multi-sectorial policy reform to remove impediments to healthcare access and improve migrant health [90]. ISTM has a continued commitment to migrant health through the establishment of a Migration Health Taskforce, with the aim of building partnerships and engaging migrant health stakeholders to promote migrant health.

Conclusions

Migrants are at increased burden of a range of non-communicable and infectious diseases and have unique health needs due to linguistic and cultural differences and numerous barriers access to care. There was a clear consensus by ISTM International Conference on Migration Health attendees that the travel and migrant health communities need to respond to the structural barriers to healthcare provision through advocating for the needs of migrants and challenging inequitable policies that impede access to healthcare for migrants and refugees. This is in alignment with the WHO Global Action Plan (2019–2023) "Promoting the health of migrants and refugees". Practitioners and Scientific Societies that care for migrants such as ISTM can play a key role in providing care to migrants, producing scientific evidence in this area and in advocating for multi-sectoral policy reform to remove impediments to healthcare access and improve migrant health. Addressing the health of migrants can bring profound benefits to the individual, populations, countries of resettlement and global health security.

Compliance with Ethical Standards

Ethical Statement This review complies with ethical standards.

Conflict of Interest Anita Heywood has received consultation fees from GSK and grant funding for investigator-driven research from GSK and Sanofi-Pasteur unrelated to this manuscript.

Francesco Castelli acts as Principal Investigator for Company-sponsored clinical trials in the field of HIV, viral hepatitis and antimicrobial therapy, unrelated to this manuscript.

Christina Greenaway has no conflicts of interest to declare.

Human and Animal Rights and Informed Consent This review does not contain any studies with human or animal subjects performed by any of the authors.

References

Papers of particular interest, published recently, have been highlighted as:

- • Of importance
- •• Of major importance

1. United Nations. Population Facts No. 2017/5, December 2017. [Available from: https://www.un.org/en/development/desa/population/publications/pdf/popfacts/PopFacts_2017-5.pdf. Accessed 09/08/2019]
2. United Nations High Commission on Refugees (UNHCR). Statistical yearbooks - figures at a glance 2019 [Available from: https://www.unhcr.org/uk/figures-at-a-glance.html Accessed 09/08/2019
3. Semenza JC, Ebi KL. Climate change impact on migration, travel, travel destinations and the tourism industry. J Travel Med. 2019;26(5):taz026.
4. United Nations (UN). Resolution 71/1. New York declaration for refugees and migrants. 2016 [Available from: https://refugeesmigrants.un.org/declaration Accessed 09/08/2019
5. World Health Organisation. Draft global action plan "Promoting the health of refugees and migrants" (2019-2023) 2019 [Available from: https://www.who.int/migrants/en/ Accessed 09/08/2019
6. Marano N, Angelo KM, Merrill RD, Cetron MS. Expanding travel medicine in the 21st century to address the health needs of the world's migrants. J Travel Med. 2018;25(1). https://doi.org/10.1093/jtm/tay067.

7.•• Heywood AE, Zwar N. Improving access and provision of pre-travel healthcare for travellers visiting friends and relatives: a review of the evidence. J Travel Med. 2018;25(1). https://doi.org/10.1093/jtm/tay010 **Summarises the current literature of infectious disease risks and prevention strategies for VFR travellers.**

8.• Greenaway C. Promoting the health of migrants: what is the role of the travel medicine community? J Travel Med. 2018;25(1). https://doi.org/10.1093/jtm/tay060 **Highlights the role of the travel medicine community in promoting migrant health.**

9. Wilder-Smith A. Closing the gap in travel medicine. J Travel Med. 2017;24(4). https://doi.org/10.1093/jtm/tax027.

10.• Castelli F. Drivers of migration: why do people move? J Travel Med. 2018;25(1). https://doi.org/10.1093/jtm/tay040 **Highlights the drivers of migration and therefore the risk activities posed by the migration journey.**

11. International Organization for Migration (IoM). Key migration terms 2019. Available from: https://www.iom.int/key-migration-terms Accessed 09/08/2019

12. Douglas P, Cetron M, Spiegel P. Definitions matter: migrants, immigrants, asylum seekers and refugees. J Travel Med. 2019;26(2)taz005.

13.•• Juarez SP, Honkaniemi H, Dunlavy AC, Aldridge RW, Barreto ML, Katikireddi SV, et al. Effects of non-health-targeted policies on migrant health: a systematic review and meta-analysis. Lancet Glob Health. 2019;7(4):e420–e35 **Highlights the impacts of restrictive migration policies on the health of migrants.**

14.• Greenaway C, Castelli F. Infectious diseases at different stages of migration: an expert review. J Travel Med. 2019;26(2):taz007 **Summarises the key infectious disease risks by migration stage.**

15. Zimmerman C, Kiss L, Hossain M. Migration and health: a framework for 21st century policy-making. PLoS Med. 2011;8(5):e1001034.

16. Pavli A, Maltezou H. Health problems of newly arrived migrants and refugees in Europe. J Travel Med. 2017;24(4). https://doi.org/10.1093/jtm/tax016.

17. Agyemang C, van den Born BJ. Non-communicable diseases in migrants: an expert review. J Travel Med. 2019;26(2). https://doi.org/10.1093/jtm/tay107.

18. von Werthern M, Robjant K, Chui Z, Schon R, Ottisova L, Mason C, et al. The impact of immigration detention on mental health: a systematic review. BMC Psychiatry. 2018;18(1):382.

19. Rousseau C, Frounfelker RL. Mental health needs and services for migrants: an overview for primary care providers. J Travel Med. 2019;26(2). https://doi.org/10.1093/jtm/tay150.

20. Abubakar I, Aldridge RW, Devakumar D, Orcutt M, Burns R, Barreto ML, et al. The UCL-Lancet Commission on migration and health: the health of a world on the move. Lancet. 2018;392(10164):2606–54.

21. Chen W, Hall BJ, Ling L, Renzaho AM. Pre-migration and post-migration factors associated with mental health in humanitarian migrants in Australia and the moderation effect of post-migration stressors: findings from the first wave data of the BNLA cohort study. Lancet Psychiatry. 2017;4(3):218–29.

22. Colborne M. Syrian refugees' mental health is top priority. Cmaj. 2015;187(18):1347.

23. Ujita Y, Douglas PJ, Adachi M. Enhancing the health and safety of migrant workers. J Travel Med. 2019;26(2). https://doi.org/10.1093/jtm/tay161.

24. Heywood AE. Measles: a re-emerging problem in migrants and travellers. J Travel Med. 2018;25(1). https://doi.org/10.1093/jtm/tay118.

25. Bednarczyk RA, Rebolledo PA, Omer SB. Assessment of the role of international travel and unauthorized immigration on measles importation to the United States†. J Travel Med. 2016;23(3):taw019-taw.

26.• Boggild AK, Geduld J, Libman M, Yansouni CP, McCarthy AE, Hajek J, et al. Spectrum of illness in migrants to Canada: sentinel surveillance through CanTravNet. J Travel Med. 2019;26(2) **Report on the range of infectious diseaeses diagnosed in arriving mgirants into Canada and an example of the role of GeoSentinel surveillance sites.**

27. Wilder-Smith A, Boggild AK. Sentinel surveillance in travel medicine: 20 years of GeoSentinel publications (1999-2018). J Travel Med. 2018;25(1). https://doi.org/10.1093/jtm/tay139.

28. McCarthy AE, Weld LH, Barnett ED, So H, Coyle C, Greenaway C, et al. Spectrum of illness in international migrants seen at GeoSentinel clinics in 1997-2009, part 2: migrants resettled internationally and evaluated for specific health concerns. Clin Infect Dis. 2013;56(7):925–33.

29. Barnett ED, Weld LH, McCarthy AE, So H, Walker PF, Stauffer W, et al. Spectrum of illness in international migrants seen at GeoSentinel clinics in 1997-2009, part 1: US-bound migrants evaluated by comprehensive protocol-based health assessment. Clin Infect Dis. 2013;56(7):913–24.

30. Bertoncello C, Ferro A, Ferraresso A, Mascarello M, Fonzo M, Minascurta V, et al. LTBI among migrants by Mediterranean Sea: assessing prevalence and its variations according with different thresholds and diagnostic tools. A 10-month on-field experience. J Travel Med. 2018;25(1). https://doi.org/10.1093/jtm/tay020.

31. Barnett ED. Screening migrants and travellers for latent tuberculosis: what is new? J Travel Med. 2018;25(1). https://doi.org/10.1093/jtm/tay102.

32. Greenaway C, Castelli F. Migration medicine. Infect Dis Clin N Am. 2019;33(1):265–87.

33. Tuite AR, Thomas-Bachli A, Acosta H, Bhatia D, Huber C, Petrasek K, et al. Infectious disease implications of large-scale migration of Venezuelan nationals. J Travel Med. 2018;25(1). https://doi.org/10.1093/jtm/tay077.

34. Jones G, Haeghebaert S, Merlin B, Antona D, Simon N, Elmouden M, et al. Measles outbreak in a refugee settlement in Calais, France: January to February 2016. Euro Surveill. 2016;21(11):30167.

35. Lesens O, Baud O, Henquell C, Lhermet Nurse A, Beytout J. Varicella outbreak in Sudanese refugees from Calais. J Travel Med. 2016;23(5). https://doi.org/10.1093/jtm/taw042.

36. Gunaratnam P, McManus H, Watchirs-Smith L, McGregor S, Callander D, Brown G, et al. People born in non-main English speaking countries are less likely to start HIV treatment early in Australia: a national cohort analysis, 2014-15. J Acquir Immune Defic Syndr. 2018;77(3):e31–e4.

37. Wilder-Smith A, Leong WY. Importation of yellow fever into China: assessing travel patterns. J Travel Med. 2017;24(4). https://doi.org/10.1093/jtm/tax008.

38. Sadarangani SP, Lim PL, Vasoo S. Infectious diseases and migrant worker health in Singapore: a receiving country's perspective. J Travel Med. 2017;24(4). https://doi.org/10.1093/jtm/tax014.

39. Pottie K, Greenaway C, Feightner J, Welch V, Swinkels H, Rashid M, et al. Evidence-based clinical guidelines for immigrants and refugees. Cmaj. 2011;183(12):E824–925.

40. Chaves N, Paxton G, Biggs B, Thambiran A, Smith M, Williams J, et al. Recommendations for comprehensive post-arrival health assessment for people from refugee-like backgrounds. 2016. Available from: https://www.asid.net.au/documents/item/1225 Accessed 09/08/2019

41. Centers for Disease Control & Prevention. Guidelines for predeparture and post-arrival medical screening and treatment of U.S.-bound refugees 2013. Available from: https://www.cdc.gov/immigrantrefugeehealth/guidelines/refugee-guidelines.html Accessed 09/08/2019

42. New Zealand Ministry of Health. Refugee health care: a handbook for health professionals 2012. Available from: https://www.health.

govt.nz/system/files/documents/publications/refugee-health-care-a-handbook-for-health-professionalsv2.pdf Accessed 09/08/2019
43. European Commission. Health assessment of refugees and migrants in the EU/EEA 2015. Available from: https://ec.europa.eu/health/sites/health/files/migrants/docs/handbook_healthprofessionals_en.pdf Accessed 09/08/2019
44. Schär F, Trostdorf U, Giardina F, Khieu V, Muth S, Marti H, et al. Strongyloides stercoralis: global distribution and risk factors. PLoS Negl Trop Dis. 2013;7(7):e2288.
45.• Asundi A, Beliavsky A, Liu XJ, Akaberi A, Schwarzer G, Bisoffi Z, et al. Prevalence of strongyloidiasis and schistosomiasis among migrants: a systematic review and meta-analysis. Lancet Glob Health. 2019;7(2):e236–e48 **Provides estimates of the global prevalence of these infections.**
46. Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012;380(9859):2163–96.
47. Mazzitelli M, Matera G, Votino C, Visconti F, Strazzulla A, Loria MT, et al. A case report of Schistosoma haematobium infection in a pregnant migrant raises concerns about lack of screening policies. J Travel Med. 2016;24(1):taw076.
48. Pérez-Molina JA, Molina I. Chagas disease. Lancet. 2018;391(10115):82–94.
49.• Requena-Méndez A, Aldasoro E, de Lazzari E, Sicuri E, Brown M, Moore DAJ, et al. Prevalence of Chagas disease in Latin-American migrants living in Europe: a systematic review and meta-analysis. PLoS Negl Trop Dis. 2015;9(2):e0003540 **Provides estimates of the global prevalence of this infection.**
50. Boggild AK, Caumes E, Grobusch MP, Schwartz E, Hynes NA, Libman M, et al. Cutaneous and mucocutaneous leishmaniasis in travelers and migrants: a 20-year GeoSentinel surveillance network analysis. J Travel Med. 2019. https://doi.org/10.1093/jtm/taz055.
51. Langford BJ, Schwartz KL. Bringing home unwelcome souvenirs: travel and drug-resistant bacteria. Can Commun Dis Rep. 2018;44(11):277–82.
52. Hitch G, Fleming N. Antibiotic resistance in travellers' diarrhoeal disease, an external perspective. J Travel Med. 2018;25(suppl_1):S27–37.
53.• Nellums LB, Thompson H, Holmes A, Castro-Sánchez E, Otter JA, Norredam M, et al. Antimicrobial resistance among migrants in Europe: a systematic review and meta-analysis. Lancet Infect Dis. 2018;18(7):796–811 **Provides estimates of the prevalence of AMR in arriving migrants into Europe.**
54. Ravensbergen SJ, Louka C, Ott A, Rossen JW, Cornish D, Pournaras S, et al. Proportion of asylum seekers carrying multidrug resistant microorganisms is persistently increased after arrival in the Netherlands. Antimicrob Resist Infect Control. 2019;8(1):6.
55.• Pareek M, Greenaway C, Noori T, Munoz J, Zenner D. The impact of migration on tuberculosis epidemiology and control in high-income countries: a review. BMC Med. 2016;14(1):48 **Provides estimates of the global prevalence of TB among migrants and in migrant receiving high-income countries.**
56. Dobler CC, Fox GJ, Douglas P, Viney KA, Ahmad Khan F, Temesgen Z, et al. Screening for tuberculosis in migrants and visitors from high-incidence settings: present and future perspectives. Eur Respir J. 2018;52(1):1800591.
57. Alsdurf H, Hill PC, Matteelli A, Getahun H, Menzies D. The cascade of care in diagnosis and treatment of latent tuberculosis infection: a systematic review and meta-analysis. Lancet Infect Dis. 2016;16(11):1269–78.
58. European Centre for Disease Prevention and Control (ECDC). Public health guidance on screening and vaccination for infectious diseases in newly arrived migrants within the EU/EEA Stockholm: ECDC 2018. Available from: https://ecdc.europa.eu/en/publications-data/public-health-guidance-screening-and-vaccination-infectious-diseases-newly Accessed 09/08/2019
59.• Greenaway C, Azoulay L, Allard R, Cox J, Tran VA, Abou Chakra CN, et al. A population-based study of chronic hepatitis C in immigrants and non-immigrants in Quebec, Canada. BMC Infect Dis. 2017;17(1):140 **An important paper identifying key differences in risk for HCV-infected migrants.**
60. Sharma S, Carballo M, Feld JJ, Janssen HLA. Immigration and viral hepatitis. J Hepatol. 2015;63(2):515–22.
61. Zencovich M, Kennedy K, MacPherson DW, Gushulak BD. Immigration medical screening and HIV infection in Canada. Int J STD AIDS. 2006;17(12):813–6.
62.• Alvarez-del Arco D, Fakoya I, Thomadakis C, Pantazis N, Touloumi G, Gennotte A-F, et al. High levels of postmigration HIV acquisition within nine European countries. AIDS. 2017;31(14):1979–88 **An important paper identifying post-migration HIV acquisiton of migrants into Europe.**
63. Gunaratnam P, Heywood AE, McGregor S, Jamil MS, McManus H, Mao L, et al. HIV diagnoses in migrant populations in Australia-A changing epidemiology. PLoS One. 2019;14(2):e0212268.
64. Kpozehouen E, Heywood AE, Kay M, Smith M, Paudel P, Sheikh M, et al. Improving access to immunisation for migrants and refugees: recommendations from a stakeholder workshop. Aust N Z J Public Health. 2017;41(2):118–20.
65. Mipatrini D, Stefanelli P, Severoni S, Rezza G. Vaccinations in migrants and refugees: a challenge for European health systems. A systematic review of current scientific evidence. Pathog Glob Health. 2017;111(2):59–68.
66. Heywood AE, Kpozehouen E, MacIntyre CR. Protecting Australia: Closing the gap in immunisation for migrants and refugees. Proceedings from a stakeholder workshop 2014. Available from: http://handle.unsw.edu.au/1959.4/53289 Accessed 09/08/2019
67. Paxton GA, Spink PCG, Danchin MH, Tyrrell L, Taylor CL, Casey S, et al. Catching up with catch-up: a policy analysis of immunisation for refugees and asylum seekers in Victoria. Aust J Prim Health. 2018;24(6):480–90.
68. De Vito E, PArente P, de Waure C, Poscia A, Ricciardi W. A review of evidence on equitable delivery, access and utilization of immunization services for migrants and refugees in the WHO European Region (2017) Copenhagen: WHO Regional Office for Europe 2017 [cited 2018 30/07/2018]. Available from: http://www.euro.who.int/en/publications/abstracts/review-of-evidence-on-equitable-delivery-access-and-utilization-of-immunization-services-for-migrants-and-refugees-in-the-who-european-region-a-2017.
69. Giambi C, Del Manso M, Marchetti G, Olsson K, Adel Ali K, Declich S. Immunisation of migrants in EU/EEA countries: Policies and practices. Vaccine. 2019;37(36):5439–51.
70. Charania NA, Gaze N, Kung JY, Brooks S. Vaccine-preventable diseases and immunisation coverage among migrants and non-migrants worldwide: a scoping review of published literature, 2006 to 2016. Vaccine. 2019;37(20):2661–9.
71. Mitchell T, Lee D, Weinberg M, Phares C, James N, Amornpaisarnloet K, et al. Impact of Enhanced Health interventions for United States-bound refugees: evaluating best practices in migration health. Am J Trop Med Hyg. 2018;98(3):920–8.
72. Joo H, Maskery B, Mitchell T, Leidner A, Klosovsky A, Weinberg M. A comparative cost analysis of the vaccination program for US-bound refugees. Vaccine. 2018;36(20):2896–901.
73. Mitchell T, Weinberg M, Posey DL, Cetron M. Immigrant and refugee health: a centers for disease control and prevention perspective on protecting the health and health security of individuals and communities during planned migrations. Pediatr Clin N Am. 2019;66(3):549–60.
74. Mahimbo A, Seale H, Smith M, Heywood A. Challenges in immunisation service delivery for refugees in Australia: a health system perspective. Vaccine. 2017;35(38):5148–55.

75. Ceccarelli G, Vita S, Riva E, Cella E, Lopalco M, Antonelli F, et al. Susceptibility to measles in migrant population: implication for policy makers. J Travel Med. 2018;25(1):tax080-tax.
76.• Wilson L, Rubens-Augustson T, Murphy M, Jardine C, Crowcroft N, Hui C, et al. Barriers to immunization among newcomers: a systematic review. Vaccine. 2018;36(8):1055–62 **A review of qualitative studies identifying barriers to immunisation among new migrants.**
77. Bahta L, Ashkir A. Addressing MMR vaccine resistance in Minnesota's somali community. Minn Med. 2015;98(10):33–6.
78. Najjar Z, Hope K, Clark P, Nguyen O, Rosewell A, Conaty S. Sustained outbreak of measles in New South Wales, 2012: risks for measles elimination in Australia. Western Pac Surveill Response J. 2014;5(1):14–20.
79.•• Heywood AE, Lopez-Velez R. Reducing infectious disease inequities among migrants. J Travel Med. 2019;26(2) **Summarises the current literature of strategies to reduce infectious disease risks and improve uptake of prevention strategies for migrants.**
80. World Health Organisation Regional Office for Europe. Report on the health of refugees and migrants in the WHO European Region. No PUBLIC HEALTH without REFUGEE and MIGRANT HEALTH 2018 [11/8/2019]. Available from: http://www.euro.who.int/en/publications/abstracts/report-on-the-health-of-refugees-and-migrants-in-the-who-european-region-no-public-health-without-refugee-and-migrant-health-2018.
81. Yong A, Lemyre L, Farrell S, Young M. Acculturation in preventive health for immigrants: a systematic review on influenza vaccination programs in a socio-ecological framework. Can Psychol. 2016;57(4):340–55.
82. Truong M, Paradies Y, Priest N. Interventions to improve cultural competency in healthcare: a systematic review of reviews. BMC Health Serv Res. 2014;14:99. https://doi.org/10.1186/1472-6963-14-99
83. Walker P. Preventive healthcare and management of chronic disease in adults. In: Walker P, Barnett E, Stauffer W, Jaranson J, editors. Immigrant medicine. Philadelphia: Elsevier Health Sciences; 2007. p. 537–64.
84. Rosano A, Dauvrin M, Buttigieg SC, Ronda E, Tafforeau J, Dias S. Migrant's access to preventive health services in five EU countries. BMC Health Serv Res. 2017;17(1):588.
85. Ohmans P. CHAPTER 4 - action steps to improve the health of New Americans. In: Walker PF, Barnett ED, editors. Immigrant Medicine. Edinburgh: W.B. Saunders; 2007. p. 27–35.
86. Cyril S, Smith BJ, Possamai-Inesedy A, Renzaho AM. Exploring the role of community engagement in improving the health of disadvantaged populations: a systematic review. Glob Health Action. 2015;8:29842.
87. Gostin LO, Abubakar I, Guerra R, Rashid SF, Friedman EA, Jakab Z. WHO takes action to promote the health of refugees and migrants. Lancet. 2019;393(10185):2016–8.
88. Torresi J, Steffen R. Redefining priorities towards graded travel-related infectious disease research. J Travel Med. 2017;24(6). https://doi.org/10.1093/jtm/tax064.
89. World Health Organisation Regional Office for Europe. Toolkit for assessing health system capacity to manage large influxes of refugees, asylum-seekers and migrants 2016. Available from: http://www.euro.who.int/__data/assets/pdf_file/0018/325611/Toolkit-assessing-HS-capacity-manage-large-influxes-refugees-asylum-seekers-migrants.pdf?ua=1&ua=1 Accessed 11/8/2019
90. Adachi M. ISTM's migration and refugee health interest group: what is our mandate? J Travel Med. 2019;26(2). https://doi.org/10.1093/jtm/tay072.