

Respiratory Health in Migrant Populations: A Crisis Overlooked

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Abstract

The crisis in the Middle East has raised awareness about the challenges encountered by migrant populations, in particular, health-care access and delivery. Similar challenges are encountered by migrant populations around the world, including those entering the United States as refugees and/or survivors of torture as well as Mexicans and other Latin Americans crossing the border. During the 2016 International American Thoracic Society Meeting held in San Francisco, California, a group of researchers and health-care providers discussed these challenges at a minisymposium devoted to the respiratory health of migrants. The discussion focused on the increased incidence of airway diseases among individuals migrating to more developed countries, the problems created by sleep disorders and their implications for cardiovascular and mental health, the

challenges inherent in the control of infections in refugee populations, and the problems resulting from deportation. The group also discussed the potential impact of novel strategies made available by Internet-based technologies and how these strategies could be deployed to support worldwide efforts in assisting migrants and refugees, even in countries that find themselves in the direst circumstances. These presentations are summarized in this document, which is not meant to be exhaustive, but to improve awareness about the challenges confronted by migrants and their host nations regarding respiratory health-care access and delivery, and about the need for adequate investment of resources to better define these challenges through research and for the development of efficient strategies for intervention.

Keywords: lung; asthma; deportation; sleep; refugees

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The crisis in the Middle East has raised awareness about the challenges encountered by migrant populations. The United Nations estimates that there are more than 1 billion migrants in the world, with an estimated 244 million international migrants in 2015; close to 20 million of these

are considered refugees (1). More than 47 million international migrants live in the United States, making it the country with the highest number of immigrants. Of these, 10–20% are estimated to be more than 65 years of age. In 2014, according to the Migration Policy Institute, 81 million

people (26% of the overall U.S. population) represented immigrants and their United States-born children. Mexican immigrants accounted for 28% of the 42.4 million foreign-born in the United States. India, China, and the Philippines accounted for 5% each, and El Salvador, Vietnam, Cuba,

and Korea accounted for another 3% each. Dominican Republic and Guatemala represented 2% each. Together, these countries accounted for 60% of the U.S. immigrant population that year (2).

Migrations are triggered by the search for better social, educational, and economic opportunities or by the need to flee crises, among other causes (3). Thus, migrants comprise a wide range of populations including workers, refugees, students, and undocumented migrants, among others.

Migrant populations, especially those driven to migrate by the horrific problems imposed by war and famine, experience tremendous hardship in host countries, with difficulties in accessing health care representing an important challenge that is often overlooked. These challenges are encountered by migrant populations all around the world, including those entering the United States as refugees and/or survivors of torture, as well as Mexicans and other Latin Americans illegally crossing the border.

Migrants suffer from medical conditions typical of other populations (e.g., asthma, tobacco-related disease, sleep-disordered breathing), but also have conditions relevant to the nature of their living circumstances, including infection (e.g., tuberculosis) and malnutrition. The ability of host countries to address the health-care needs of migrants (e.g., mental health, childhood immunizations, care of chronic illness) is greatly reduced, and often overwhelmed, by difficulties inherent in the identification of such populations, the limited understanding by health officials about the needs of migrants, the lack of well-supported and comprehensive strategies to address this problem, and the limited resources available as reported for Syrian refugees in Lebanon, where immigrants represent 30% of the total population (4, 5).

During the 2016 American Thoracic Society International Conference held in San Francisco, California, a group of researchers and health-care providers discussed these challenges at a symposium devoted to the respiratory health of migrants. Below, we provide a summary of the discussion, which is not meant to be exhaustive, but to improve awareness about the challenges confronted by migrants and their host nations regarding respiratory health-care access and

delivery, and about the need for adequate investment of resources to better define these challenges through research and for the development of efficient strategies for intervention.

Chronic Airway Disease: Asthma in Mexican Migrants

Although it is generally assumed that moving into a more economically developed country leads to quantifiable gains in living standards, it also increases the risk for acquiring chronic diseases. This is certainly the case for asthma, in which migrants from less industrialized countries moving toward more economically developed ones, over time, develop higher asthma prevalence rates (6). This health paradox is not unique to any specific racial or ethnic group, and has been reported in many areas of the world.

There are several potential explanations for this phenomenon. On one hand, moving to a different region is associated with a time-dependent increase in allergic sensitization and atopy. In the Gene Environments and Admixture in Latin Americans (GALA II) Study, children from the second or third generation, with or without asthma, have 30–50% greater odds of having atopy relative to first-generation migrants (7). Similarly, the prevalence of asthma also increases in relation to the number of generations after migration (8). For example, Mexican Americans born in the United States have an asthma prevalence of 8%, which is doubled that of Mexicans residing in the United States who were born in Mexico (9). Not only is the time spent in the host country a determinant of risk, but so is the age on arrival. Most studies have shown that the risk for asthma and allergic disorders is greatest when migration occurs within the first years of life or during early childhood (10–12). This strongly suggests that early environmental exposures in the country of origin positively influence immune development.

On the other hand, moving to a different country involves a necessary process of adaptation to new values, language, and behaviors, many of which can contribute to the development of chronic diseases. Acculturation has been associated with greater risk for smoking,

obesity, and stress, all of which have been associated with greater asthma risk (13–15). Using language preference as an acculturation proxy, The El Paso Children's Study showed that Hispanics who primarily spoke English were more likely to have asthma or allergies (16). In a cross-sectional study of Mexican-American youths participating in the National Health and Nutrition Examination Survey, relative to those born in Mexico and having low acculturation, those who had a high degree of acculturation, whether born in the United States (odds ratio, 3; 95% confidence interval, 1.52–5.96) or in Mexico (odds ratio, 2.63; 95% confidence interval, 1.17–5.93), had the greatest odds for having asthma and wheezing, even after adjusting for insurance coverage and having a regular place of health care (17).

In addition, the potential for differences in diagnostic practices and health services availability to confound the association between migration and asthma risk cannot be overlooked. The possibility of reporting bias was suggested by a study of the European Respiratory Health Survey, in which the rates of reported asthma symptoms were higher among immigrants and emigrants, but were not accompanied by a greater degree of airway responsiveness (18).

Regardless of what underlying mechanisms may be active, understanding asthma in the context of migration is a unique opportunity to understand the complexities of gene–environment interactions, individual susceptibility, health policies, and behavioral risk factors.

Sleep Disorders: Poor Sleep in Migrants and Implications for Mental Health

Good sleep is not only a key feature of having a good quality of life, but it is also increasingly recognized to be a vital part of good health (19). As such, adverse sleep may represent an important mechanism by which migrant populations are at risk for a host of chronic health problems, in particular adverse mental and cardiometabolic health outcomes. Displaced populations frequently experience traumas such as natural disasters, war, and governmental repression

in the originating country, which lead to the decision to migrate. Abuse and physical hardships during the migration process, and crime in the new home (both hate crimes from xenophobic groups and nonspecific crimes suffered in the refugee camps and neighborhoods where displaced populations are often resettled), are frequently experienced. Such traumas adversely impact sleep, and thus refugees have an extremely high prevalence of sleep complaints.

In one study, more than one-fourth of refugee children had difficulty falling asleep, and more than one-third had problems with nightmares and difficulty staying asleep (20). Independent risk factors for poor sleep in this group included having a parent who had been tortured and a grandparent who had died violently before the child's birth. These findings suggest trauma can have long-lasting effects on sleep across generations.

Poor sleep after experiencing trauma is an independent risk factor for the development of post-traumatic stress disorder (PTSD), and PTSD is one of the most common health disorders in displaced populations, impacting nearly 10% of refugees (21, 22). Sleep difficulties, in particular insomnia and nightmares, are hallmark symptoms of PTSD and tend to be the most refractory to PTSD interventions (23). Although PTSD is commonly conceived to cause sleep symptoms, there is more likely a bidirectional association, as sleep interventions such as cognitive behavioral therapy for insomnia improve not only sleep, but also PTSD symptoms (24).

Besides refugee populations, migrants in general are subjected to a large number of stresses that can contribute to poor sleep. These stresses can include those from discrimination, concerns about neighborhood violence or lack of safety, and disproportionate rates of unemployment or underemployment. In addition, the sleep environment is often suboptimal in migrants who are more likely to live near roads or areas with high nighttime noise and light pollution, have poor housing quality with high household density, and are disproportionately employed in shiftwork causing circadian misalignment.

As discussed for asthma, another risk factor for poor sleep among migrants is acculturation. United States-born

Mexican-Americans have shorter sleep duration and more sleep complaints than do Mexican Americans born in Mexico (25). Similar relationships exist in other U.S. Hispanic and Asian populations (26, 27). This sleep worsening may be related to the stress created by the acculturation process itself (e.g., conflicts within the family about intrafamilial relationships) or to the development of adverse behavior patterns as one accepts new cultural norms. For example, United States-born Mexican Americans spend more time watching television and are more likely to consume caffeine than their counterparts born in Mexico (28). Various domains of poor sleep including short sleep duration, irregular sleep patterns, and insomnia symptoms are independent predictors of obesity, diabetes, and cardiovascular disease (29–31). These same diseases are linked to greater acculturation, supporting the notion that poor sleep may represent a pathway by which acculturation raises cardiometabolic disease risk (32, 33).

Thus, the traumas and stresses experienced by refugees and other immigrant populations have adverse effects on sleep, which not only reduces quality of life, but also elevates risk for a number of adverse mental and cardiometabolic health outcomes that disproportionately impact migrants. Further research to better define strategies for improving sleep in migrant populations may result in novel opportunities to improve migrant health.

Refugees and Infection: The Kentucky Experience

Since 2005, an average of almost 100,000 people/year have been admitted to the United States as part of refugee resettlement, and more than 140,000 were admitted during the year 2015 (34, 35). The leading countries of nationality for refugees were Cuba, Burma/Myanmar, Democratic Republic of the Congo, Iraq, Iran, Somalia, and Bhutan. On arrival, each refugee is eligible to receive a comprehensive health assessment. This assessment is based on Centers for Disease Control and Prevention guidelines, and includes the review of overseas medical records, testing for communicable diseases and parasites, evaluation of immunization records and referral for vaccines, screening for mental

health issues, and referral to subspecialties as needed. This assessment serves as a bridge to primary care.

Each year, approximately 3,000 refugees are resettled in the Commonwealth of Kentucky. Health assessments are performed in Louisville (85%), Lexington, Owensboro, and Bowling Green. Approximately 75% of the health assessment data is submitted for inclusion into the state report, which is available for review at <http://globalhealth.center/rhp/state.php>. Of a total of 4,595 refugees (adults and children) seen for a refugee health assessment in Kentucky during 2014 and 2015, 35% came from Cuba and 15% from Iraq. Other countries of origin were Somalia, Democratic Republic of the Congo, and Burma/Myanmar (11%), Bhutan (9%), Syria (3%), and Afghanistan (2%).

When analyzing infectious diseases within the top 10 health conditions documented during screening assessments, exposure to tuberculosis and parasite infections were the main ones identified. Of those individuals diagnosed with latent tuberculosis infection (LTBI), 56% ended up never receiving any treatment, with only 11% completing treatment. The latter is due to many factors including the slow pace of the enrollment process, delays in coverage allocation, and sometimes lack of resources outside of local health departments. Importantly, refugees initially do not easily understand the local health-care process, and local health departments may not be used to working with this population. Consequently, the health department LTBI process often ends up being off-putting, and many refugees do not return for follow-up. Certainly, there is a huge need for education regarding TB in the refugee population. Not only is it difficult to address the concept of an asymptomatic disease, but it is incredibly difficult if the refugee must spend money to treat.

The most commonly identified pathogenic parasites were *Blastocystis hominis*, *Giardia lamblia*, and *Entamoeba histolytica*. Both LTBI and parasitic infections present at a higher rate in refugees when compared with the prevalence in United States-born individuals, because they are coming from endemic, high-risk areas (36, 37). Identification of individuals with LTBI and their treatment is key not only from a

human rights perspective, but also as a public health approach directed at controlling and eliminating tuberculosis. Parasitic infections, although not necessarily a public health threat, represent one of the most common causes of chronic anemia in this population, and clinicians should keep these infections in mind when caring for these patients.

Chronic hepatitis B infection was documented in 3% of the refugees, which is consistent with previously published data (38, 39). These imported cases represent the majority of the newly identified cases in the United States (39). As previously reported elsewhere, chronic infection with hepatitis C virus was documented in 2% of the newly arrived refugees (40). Active surveillance for both types of hepatitis should be recommended routinely in this population, to provide treatment and therefore control the spread of disease. Furthermore, identification of susceptible individuals will provide the opportunity for vaccination of those at risk. Syphilis and HIV were found to have similar prevalence rates as those reported for United States-born individuals, and thus standard recommendations for screening and testing should still apply.

The ultimate goals of health screening for newly arrived refugees are early disease detection, treatment, and prevention. There is a need to develop a centralized database to foster collaboration at the local and national levels to achieve such goals.

Health and Social Implications of Deportation: Mexican Deportees in Tijuana

Since the late 1990s, deportees have constituted an important sector of the Mexican migrant community. Annually, Latinos of Mexican descent account for roughly two-thirds of migrants expelled from the United States (41). The increased displacement of migrants is largely a product of the criminalization of undocumented entry into the United States or visa overstays, the classification of certain offenses as “deportable crimes” (41, 42), and aggressive efforts to remove undocumented and criminal migrants. Importantly, even authorized migrants (e.g., permanent residents) who have committed a crime have been targeted by

deportation policies. However, the range in severity of deportable crimes varies greatly, from driving without a license or speeding to drug-related and violent offenses (43).

Deported migrants’ ties to the United States vary significantly. Some deportees have limited time in the country, having barely entered the country and then undergoing immediate removal. In contrast, other deportees may have been brought by their migrant parents as children. Others may have resided in the United States for an extended period; these migrants are often well embedded within the social fabric of U.S. communities before their expulsion. Notably, as migrants have longer standing in the United States, some migrants have become members of “mixed status” families, composed of U.S. citizens and noncitizens. An estimated four of every five children of migrant parents are U.S. citizens by birth (44).

The displacement of deported migrants to Mexico has important social, economic, and health implications for U.S. citizens in their families. Furthermore, most Mexican deportees are male (~90%) (45); their deportation can result not only in the fracturing of families and loss of a parent and breadwinner, but also adversely impact the mental health status of the migrant and family members left behind, including U.S.-citizen children (46–48). Alternatively, entire families may opt to return to Mexico with the deportee, thus disrupting the communities and lives of the migrants’ families and U.S.-citizen children, including their academic trajectories (49–52).

The city of Tijuana, Mexico, which borders California, is a key community that is not only witness to migrants’ struggles to enter the United States, but also to their postdeportation resettlement experiences. Tijuana annually receives approximately 25% of all Mexican deportees, numbering more than 815,000 between 2008 and 2013 (53–57). As a border metropolis, Tijuana offers deportees a unique resettlement environment that blends U.S. and Mexican cultures and economies (58, 59). Despite and because of the large number of deportees arriving in Tijuana each year, the city can serve as a natural experiment that can provide insight into the potential implications that deportation—a forced migration—can have on migrants (60). Studies conducted in Tijuana suggest that deported migrants face multiple

vulnerabilities, which impact their physical and mental health. Deported migrants in Tijuana are subjected to significant stigma from being labeled a “deportee” and having tattoos (61), report high rates of drug use and poor mental health status (62), are systematically targeted and victimized by police (63), and are at high risk for HIV and tuberculosis infection (64).

Research conducted in injection drug users who have been deported from the United States finds that these vulnerabilities and patterns persist (65–67), with low rates of health services use (66) and perception of HIV risk despite high engagement in high-risk behaviors (67). However, research focused on deportee health is limited, in that data and the trajectory from deportation to injection drug user are unclear. These studies likely represent a fraction of the deported migrant experience, as data on those who successfully resettle are absent from the literature.

Additional research (e.g., mixed-methods longitudinal studies employing qualitative and quantitative methods as well as biological markers for health status) is needed to more clearly elucidate protective and risk factors for the physical and mental health of deportees and their families and communities in the United States and Mexico. An estimated 40% of deportees will reenter the United States (68). Further, the U.S.-citizen children of deportees who return to Mexico with their deported parents may subsequently return to the United States. Thus, more data on reunification experiences of deportees with their families in Mexico, and the health implications for both the deportee and the family, are needed.

Critical Care Delivery at Remote Locations: Tele-ICU in Syria

The conflict in Syria has created the largest humanitarian emergency of the twenty-first century. The 5-year Syrian conflict has destroyed hospitals and severely reduced the capacity of intensive care units (ICUs) and on-site intensivists (69, 70). In October of 2015, a group of Syrian-American intensive care physicians launched the first international tele-ICU program in Syria (71). The program started to operate in

areas with high internally displaced populations. Those areas are extremely high risk for physician volunteers to physically operate. The program used inexpensive, commercially available simple video cameras, satellite Internet, free social media applications, and a volunteer network of Arabic-speaking intensivists in North America and Europe. The volunteering physicians communicated with on-site nurses to manage critical care patients in Syria.

By the end of 2013, the program was operating in five civilian ICUs between Idlib and Aleppo governances in north Syria. The program cared for at least 90 patients per month, covering every single trauma ICU in East Aleppo. The program also provided multidisciplinary services involving volunteering surgeons, orthopedists, radiologists, and neurologists who provided 24/7 clinical decisions for patients at a distance of more than 6,000 miles from North America. Patient care and clinical decisions were provided through daily rounds and real-time response for urgent changes in patients' situation.

In 2015, with the support of the Syrian American Medical Society, this group started to have its own dedicated Internet network in northern Syria, providing better quality communication with medical staff on the ground. The operation cost of this Internet is 5,000 dollars per month, and it provides Internet to eight ICUs, a nursing school, and a warehouse. The program also started to provide online training to local medical students and newly graduated

physicians, who missed out on their training because of the war and decided to engage in hospital work. At the beginning of 2016, the services were extended to nine ICUs located in the Aleppo governance, Idlib governance, and a Damascus suburb. The program currently cares for at least 150 to 200 patients per month. In 2016, the group will become the primary provider of intensive care services in every single civilian ICU in the cities of Aleppo and Idlib.

The early success of the program shows how a small number of committed physicians can use inexpensive equipment spawned by the Internet and the social networking revolution to support afar civilian health care delivery in a high-conflict country. It also showed that telemedicine can be effectively used to provide critical care to an area under conflict or where it is extremely dangerous for volunteering physicians to work (72).

Conclusions

Many of the factors that have influenced migrations for hundreds of years, such as food and water scarcity, safety, wars, and job availability, persist today and do not respect geopolitical boundaries. Challenges addressing the health-care needs of migrant populations are emerging in many countries around the world, including the United States, which houses the largest percentage of migrants anywhere in the world. The negative consequences of not addressing the needs of these populations with urgency

will undoubtedly result in worsening population health and increased health-care costs, ultimately reducing the ability of these populations to integrate into the host country in ways that enhance their productivity. In the United States, approximately 53% of immigrants had private insurance in 2014, while 27% had public health insurance coverage; only 27% were uninsured. Yet, this is not typical of migrant populations in other countries (2).

Furthermore, disparities in health and health-care access may be exacerbated. Increased awareness about the challenges confronted by migrants (e.g., acculturation, language and cultural barriers, and limited health-care access) and their host countries (e.g., screening for infectious diseases, health-care delivery), the redirection of resources targeting these challenges in a comprehensive fashion, and the efficient deployment of effective strategies that use novel Internet-based technologies, among others, will improve the health status of migrants and reduce health disparities, while comprehensive interventions that effectively address the primary causes of this global crisis are identified. ■

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