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CHAPTER 100

Tuberculosis and migration

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INTRODUCTION

The global spread of disease has as a consistent point of reference human population movement. From the advent of measles in the New World to the more recent spread of human immunodeficiency virus (HIV) disease, the movement of people, or even a single person, has been central. Understanding the complexities of human population movement and its role in the spread of disease is critical for the development of effective international TB control strategies.

HUMAN MIGRATION

Most of human history is based on the movement of people from one place of residence to another, since it has been through this continued movement of populations that every part of the planet has been settled. Termed ‘the great adventure of human life’, migration is the 60 million Europeans leaving their homes from the sixteenth to twentieth centuries and the 15 million Hindus, Sikhs, and Muslims swept up in the tumultuous shuffle of citizens between India and Pakistan after the partition of the subcontinent in 1947. The lure of land, a ‘better life’, and a safer habitat is perpetual – the so-called push and pull factors are enduring facts of human history. Migration has shaped our societies, and with all its entwined economic and political aspects has been called ‘one of the greatest challenges of the coming century’ (see Fig. 100.1).

Through improved transportation and communications, a growing world economy, and increasing social inequality, human migration has reached unprecedented levels. The ease of movement and the rapid dissemination of information concerning opportunities to improve personal well-being mean that increasing numbers of countries are now points of origin, destination, or transit for migrants. Migration involves increasingly diverse populations moving rapidly between the sending and receiving locations, often with unequal social and physical environments that affect the health and well-being of those migrating.

Migration continues to be the result of social, political, and economic factors, as well as discrete environmental and political events such as natural disasters and humanitarian crises. The process of population mobility is regularly termed ‘human migration’ with a focus on the legal and administrative aspects of individual and group movement. Human migration is often perceived to be a slow and unidirectional process resulting in permanent resettlement.

However, human migration is a dynamic process and efforts to describe the phenomena and its impact often falter by focusing on discrete episodes. Migration is a long-term process dotted with vital events and changing health status.

Integrated international policy development and attention to the health status and the healthcare needs of migrants is often complicated by the fact that migration is linked to other politically charged issues such as international security, trade, economic development, labour needs, demography, poverty relief, integration and citizenship, social networks, gender, human rights, public health, organized crime, and remittances in an intricate web of competing forces. The interconnectedness of these issues precludes consensus on their rank order of importance. Each has far reaching effects beyond the individual migrant and the community of residence or origin.

Remittances for example play an increasingly important role in the world economy. It is presumed that a large percentage of migrant remittances are delivered through unofficial channels, with total remittances believed to amount to more than US$100 billion. In 2004, India received some US$21 billion, the greatest amount of migrant remittances, followed by Mexico with US$18 billion (Fig. 100.3).

Even as health issues are being raised more often in foreign policy discussions, focus continues to be on the legal or regulatory aspects of migration for those persons crossing international borders. Considerable attention is given to migration from low-income countries into high-income countries, with a notable emphasis on the overburdening of healthcare systems. Until recently there has been little concern about the health of persons emigrating from countries like the USA despite their capacity to spread disease. The impact of migrants returning to low-income countries with a communicable disease is starting to receive greater attention as sending countries study the epidemiology of disease within their own countries. For example, Mexico reports that the greatest risk factor for HIV infection among rural Mexicans is migration to the USA. Return visits to the country of origin are also an important consideration. A study in the United Kingdom...
demonstrated that children who were second-generation migrants of South Asian ethnic origin had a higher risk of TB than their Caucasian counterparts. One risk factor explaining this was frequent visits to their countries of out-migration, i.e. Bangladesh, India, and Pakistan. Box 100.1 lists what travels with humans as they travel into new regions.

While human migration is fuelled by the desire to improve one’s circumstances, it does not always mean that the movement is voluntary nor across international boundaries. Large groups of migrants move regularly between intracountry regions for a variety of reasons and varying periods of time. Some are looking for seasonal work; others migrate temporarily because of the nature of their work, e.g. truck drivers, transport workers, and fishermen. Others migrate for educational purposes, for health care, to escape environmental degradation, or to seek a safe habitat, e.g. internally displaced persons (IDPs). We should not underestimate the size of this seasonal ‘migration’ in volume (millions in the USA and Europe; Fig. 100.4), or the problems related to poor access to health services of this population. While it is important to understand the motivations for and effects of migration, it can be more useful to consider that migration is ‘a social process that links networks of people in a set of intimate relationships’. These relationships allow for both the transfer of disease and the provision of services to interrupt disease transmission.

A principal distinction that can be made for all forms of human migration is whether the travel is planned or initiated with limited or no planning. The two categories of population movement identified by Peters et al. are:

- anticipatory – the orderly plan to leave the point of origin with resources intact and destination clearly chosen; and
- acute – the escaping from a major crisis with few resources, arriving in the state of shock and depending on the receiving community aid agencies for assistance.

Anticipatory migration can include students and travellers, as well as workers. Even as these migrants may plan for the move to a new location, the receiving site may be unprepared for the influx and unable to absorb the demand created by their arrival. Acute migration includes those forced to move in response to political crisis or natural disaster. Among this group are early stage refugees and IDPs, as well as victims of human trafficking. In the case of refugees, they often spend long periods in cramped, poorly located, and poorly equipped resettlement camps. The rise in human trafficking reported internationally means that migrants are being brought to another location not only under cover but also to work in illegal industries such as prostitution. Female...
migrants are rapidly outnumbering male migrants, and are more likely to be trafficked.\textsuperscript{4}

In the initial stage of a refugee crisis, the immediate needs are shelter, food, water, sanitation, and security. The main health problems seen in this initial stage are measles, malnutrition, respiratory infections, malaria (in many tropical countries), and diarrhoeal diseases. Once the emergency stage is over, the healthcare needs change. Services required now are much wider and the needs tend to mirror those of the host nation, although more exaggerated due to worse living conditions. At this stage, the provision of treatment for TB often becomes a major health priority.

As for general migrants, linguistic and cultural barriers may exist for refugee communities in accessing healthcare. However, in many refugee situations, outside agencies, such as the United Nations High Commission for Refugees (UNHCR) or international non-governmental organizations (INGOs), come in to assist in the care of refugees, and services may be set up outside of the host nation’s health services to provide healthcare for the refugees. Paradoxically in some ‘stable’ refugee situations, due to an influx of healthcare services from UNHCR and INGOs, services and indicators may actually be better inside the refugee community than in the host country’s population. For example, in the Bhutanese refugee camps situated in eastern Nepal served by the INGO Save the Children (UK), antenatal care coverage was almost 100\% (compared with Nepal figure of 44\%), with 85\% of deliveries attended by a trained health worker (cf. 33\%), infant mortality rate (IMR) 62 per 1000 live births (cf. 98), and expanded programme on immunization (EPI) coverage of 95\% (cf. 78\%).\textsuperscript{17,18} In the more acute stages of refugee situations or where the situation remains ever unstable such as in recent times in the Darfur region of Sudan, morbidity and mortality rates are and may remain phenomenally high.\textsuperscript{19}

International migration is the category of human migration most often considered when the topic is discussed. Within the category of international migration, two additional distinctions are made: regular and unofficial. Regular migrants are those who arrive after
migrants participate in multiple industries, particularly low-wage unskilled labour such as agriculture. They usually work in the sectors known as the ‘3D’ jobs – dirty, dangerous, and demanding, or as SALEPs – jobs that are shunned by all except the very poor.

Migrants in different industries are affected by similar health access factors, such as unfamiliarity with local health resources, inability to communicate in the local language, and ineligibility for publicly or privately funded health services. Their health status is also affected by environmental and occupational exposure to hazardous chemicals, dangerous and repetitive work activities, and unsanitary housing and working conditions.

Migrant workers are a mobile, working, poor population that struggles with problems of healthcare access similar to those of other underserved populations, with the additional burden of having to search for new care options as they move. In addition, the desire by some to avoid contact with governmental agencies makes the access to healthcare even more complicated. Their mobility results in poor continuity of care, as they are often unable to complete medical treatments, keep track of their medical records, and obtain routine or preventive care. Mobility is both the reason for and one of the larger barriers to continuity of care.

Migrant workers have other barriers to healthcare services, such as poverty, low literacy, limited transportation, limited local language proficiency, and cultural differences. In addition, most low-wage jobs are hourly and do not provide sick leave or other benefits such as insurance. Many employers may prefer migrant or even illegal workers, who they perceive as more ‘obedient’, willing to do more work for less pay, and having little or no recourse to the law. Economic pressures make them reluctant to miss work and afraid of losing their jobs if they take time off to get medical care.

Migrants can face psychological stresses. They are often dislocated from their families, on their own, and with no support. The family at home may be reliant on the migrant to remit part or all of their income. What part stress may play in the development of diseases in migrants is unknown, though it is well recognized that rates of TB increase in stressed populations, e.g. in times of war.
IMPACT OF MIGRATION ON THE DISSEMINATION OF DISEASE

Migration has played an historic role in the spread of disease. Genetic comparisons of *Mycobacterium tuberculosis* suggest a common ancestor existed an estimated 3 million years ago with the spread of complex strains that resemble *M. tuberculosis*, perhaps coinciding with waves of human migration out of Africa. The appearance of TB in ancient peoples speaks to the importance of human migration in the movement of disease. Genetic comparisons of *Mycobacterium tuberculosis* suggest a common ancestor existed an estimated 3 million years ago with the spread of complex strains that resemble *M. tuberculosis*, perhaps coinciding with waves of human migration out of Africa. The appearance of TB in ancient peoples speaks to the importance of human migration in the movement of disease. For many countries, TB is a reason to deny entry to potential immigrants, or even for deportation. This legal stance towards TB in migrants, not only violates human rights, but also is counterproductive to disease control. It has been shown that if migrants fear that going to a physician might lead to trouble with immigration authorities, then they are significantly more likely to delay seeking care for over 2 months, leading to disease progression in the individual migrant and an increased risk of continued transmission of TB infection to others. An additional assumption is that migrants will not complete their treatment because of their ‘migrating’ status. Again blame for lack of services and/or adherence to treatment is placed on the migrants themselves and not the authorities.

MIGRANTS AND TUBERCULOSIS DISEASE IN LOW-BURDEN COUNTRIES

For countries like the USA where migration has been a large part of population growth, concern that immigrants would bring disease into the country resulted in the development of public health screening systems and border control health policies. This approach came out of the focus on the recognition, identification, and management of specific diseases, illnesses, or health concerns in mobile populations either pre-departure from their country of residence or at the time and place of their arrival. The specific activities of immigration medical screening and border control practices, which derive from the historical practices of quarantine, intend to reduce threats to the public health and/or to mitigate potential impacts on the receiving country’s healthcare services. The quarantine-associated historical basis of migration health practices in high-income country settings has ensured that much of the interest in health and migration has been directed towards communicable diseases, commonly on those diseases differentially prevalent between the migrant and host population, TB being one such disease. The case study in Box 100.2 highlights the

| Category                          | No. | Per cent of total TST positives (%) | Per cent of positives started on treatment (%) |
|-----------------------------------|-----|------------------------------------|-----------------------------------------------|
| Completed treatment               | 109 | 59.9                               | 79.6                                          |
| Lost after starting treatment     | 13  | 7.1                                | 9.5                                           |
| Stopped treatment because of side effects | 6   | 3.3                                | 4.4                                           |
| Never started on treatment because of previous treatment | 1   | 0.5                                | 0.7                                           |
| Treatment ongoing                 | 1   | 0.5                                | NA                                            |
| Moved or lost before starting on treatment | 19  | 10.4                               | NA                                            |
| Refused treatment                 | 26  | 14.3                               | NA                                            |
| Pregnant                          | 7   | 3.8                                | NA                                            |
challenges and issues raised by TB in a migrant community in a high-income, low-TB-burden setting, in this case, the USA. The demographics of this migrant population emphasize the need for culturally competent outreach and nursing staff in communities experiencing a marked change in population migration. While gateway locales—cities that are the traditional ports of entry for most migrants—continue to receive the largest number of Hispanic and Asian immigrants, domestic migrants are increasingly moving to new areas for economic opportunity in the labour market.

The mobility of this population is also significant, as a highly infectious case within a mobile population requires rapid deployment of contact investigators to review all potential contacts before they move to a new work setting or return to the country of origin. Without a concentrated rapid response to this highly infectious case, a wider spread of infection throughout the community could have occurred, resulting in a larger number of active cases.

The impact of a single case on a low-incidence area is challenging in terms of both material costs and human resources. The case described in Box 100.2 occurred in a small, rural community in Pennsylvania (USA) with a very low incidence of TB. In addition to the public health impact of this case, the County Health Department had to gear up to handle the wider implications of treating this case and the many contacts. Table 100.2 shows the estimated total cost of treating this case and contacts—at US$170,000, the estimated expenditure was a sizeable one.

Ramping up of the TB control system can be hampered by the absence of categorical TB funding or funding for emergency public health actions. In addition, as TB cases become less common in high-income country settings, healthcare workers become less experienced in identifying and managing cases, which can lead to delay in diagnosis and poor case management.

| Item          | Quantity | Cost  |
|---------------|----------|-------|
| Nursing       | 1,800 hr | $55,800 |
| Physician     | 156 hr   | $7,020 |
| Interpreters  | 285 hr   | $3,420 |
| Clerical      | 250 hr   | $19,950 |
| TB Reps       | 600 hr   | $18,000 |
| HIV Reps      | 150 hr   | $3,900 |
| Volunteers    | 50 hr    | $0     |
| Medication    | 480 mo/Rif | $34,323 |
| Chest X-ray   | 182 exams | $44,226 |
| CT scan chest | 3 exams  | $1,151 |
| **Total:**    |          | **$170,150** |

Unfortunately, apart from a number of studies in refugee situations, there is little research around the problem of TB in migrant populations in low-income country settings. Liberalization of population movement and the economy in China have resulted in large numbers of people leaving the rural areas for the urban municipalities and rapid urbanization. The number of migrants in Beijing, China, increased rapidly from 2.8 million in 1994 to about 4 million in 2005. The majority of migrants are young and engage in unskilled manual labour. From 1993 to 2005, the proportion of TB cases who were migrants steadily rose from around one in 10 to just over one in three. Two-thirds of the migrant patients were under 30 years of age compared to less than 30% of permanent residents. Cure rates were significantly worse amongst the migrants at only 37% compared to over 90% in permanent residents. Thus, migrants with TB pose a major challenge to the TB services, and to TB control, in Beijing.

A similar picture is seen in Vietnam with rapid urbanization and population movement, especially of men of working age, since the economic liberalization of the late 1980s. In a number of studies in the country, it has been observed that TB notification rates among the young, especially males, in urban settings increased, most notably in industrialized districts during the period 1990–2003. It is hypothesized by the authors that this is mainly due to poor living and working conditions and internal migration, although increasing HIV coinfection rates play a role. This limited impact of directly observed treatment, short course (DOTS), control measures is seen despite the National
Tuberculosis Programme in Viet Nam having achieved the WHO targets of 70% of case detection and 85% cure from 1997 onwards – achievements predicted to reduce TB incidence rates by 11% per year in the absence of high HIV prevalence.60,61

A little considered form of migration in low-income, high-TB country settings is migration in order to seek healthcare, mainly in urban areas. Towns and cities in low-income countries, where the number of healthcare facilities is greatest and also where referral centres may exist, have a large ‘pull’ factor on people seeking healthcare. In a study in Kathmandu, Nepal, amongst a group of migrants who had TB, almost 40% had specifically moved there, seeking a diagnosis of their disease and medical care. They tended to delay longer in seeking healthcare than locals.62

This pull factor is strongly seen at those medical colleges involved in the Government of India’s Revised National TB Control Programme (RNTCP). A large number of patients are diagnosed at these medical colleges, but few actually receive their DOTS treatment from the medical college itself (Fig. 100.6).63

Rather they are formally ‘referred back’ to receive their treatment at a health facility closer to their residence. Referral can be within the same district where the medical college is located, an adjacent district, a further district within the same state, or even a district in another state. Patients will migrate large distances to places where they perceive they will receive high-quality care, e.g. at medical colleges. The process of ‘referral for treatment’ across large distances presents major challenges to TB control programmes in order for them to provide seamless care for such patients. The risk of such patients defaulting post-diagnosis and prior to treatment is high unless a mechanism for referring them for treatment is being implemented by the TB control programme. In 2005, the RNTCP piloted such a referral for treatment in two states of India and demonstrated that it was possible to implement such a mechanism under programme field conditions in a low-income setting and provide seamless care to patients. The programme is now in the process of scaling the mechanism across the country and piloting an electronic referral for treatment information system. A similar system for referral of migrant patients undergoing treatment for active TB disease (TBNet) while migrating throughout the United States or from the USA to another country has been functioning since 1996.64

Migrants from low-income high-TB-burden countries account for a growing proportion, and in many regions the majority, of TB cases in high-income low-TB-burden countries.65 To date, activities in relation to migration and TB have been designed for national application and to protect host populations in high-income low-TB-burden countries from the risk of infection transmission and to mitigate the impact on their healthcare systems. However, as long as global health disparities and prevalence differentials exist, the health systems and policies in the migrant-receiving nations will continue to be challenged.

Meeting health challenges through international cooperation and collaboration has become an important foreign policy component in many countries, as well as for the World Health Organization. It would appear that the time is right for a more multilateral and integrated approach to addressing the issue of TB in migrants. Enshrined in Article 2 of the United Nation’s Universal Declaration of Human Rights is the fundamental right of access to healthcare for all, despite residence status.66

Any suggested exclusion of refugees or undocumented migrants from medical care is not only unethical, but also could represent a danger of contamination to the local population.67,68

**CONCLUSIONS**

![Health sector contribution in 14 urban areas, 2005](image-url)

Fig. 100.6 Health sector contribution in 14 urban areas, 2005.
Greater international recognition that the impact of migration and TB is of a much greater magnitude within the low-income high-TB-burden countries themselves via internal migration is also needed. While it is important that high-income low-TB-burden countries try to protect their own citizens against the importation of TB, their respective national control and regulatory systems alone will be unable to extend their immediate mandate or authority to the source of the problem. In addition, the usefulness of screening for TB among immigrants and the rationale for investing large amounts of money in a low-prevalence country have been questioned. To be effective, the management of health issues resulting from population mobility will require a much closer integration of national and global health management of health issues resulting from population mobility will certainly the advent of a TB vaccine, new medications with a shorter treatment period, and better diagnostic tools will find immediate application for use with international and intranational migrants. It has been proposed that the optimal strategy for TB control amongst migrants in the long term would be for high-income countries to dramatically increase their investment in TB control efforts in the low-income high-TB-burden country settings. This would address the problem of TB amongst migrants at the source.

In a subsequent paper, the same group showed that a modest investment of $4.2 million for DOTS expansion in Haiti would result in 63,080 fewer TB cases, 53,120 fewer TB deaths, and net societal savings of $131 million over 20 years. The Haitian government is unlikely to be able to make even this modest investment into TB control activities, leading the authors to state ‘Given this, and the substantial potential humanitarian, economic, and public health benefits, we conclude that foreign donors should strongly consider investing in DOTS expansion in Haiti.’ This would seem to be an example par excellence where all partners would win and a prime case of ‘prevention being the cure’.

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