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TB control in humanitarian emergencies: Lessons from the Syria displacement crisis

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Abstract

The *TB care for communities in emergency contexts* satellite session at the 2017 48th Union World Conference on Lung Health discussed the impact of the Syrian displacement crisis on regional tuberculosis (TB) control. At the session, representatives of the affected countries and of international organizations reviewed the epidemiologic impact of Syrian displacement on regional TB control, as well as challenges and successes seen in TB control during this displacement. This discussion offered several lessons for TB control in other humanitarian emergencies. TB control in humanitarian emergencies requires increasing awareness of TB symptoms and services among healthcare workers and the affected populations. It also requires performing standardized symptom screening at borders or registration, while leveraging more widely available radiographic and diagnostic tools to find cases in high-burden settings that may be missed using symptom screening alone. Additionally, treatment completion rates can be maintained and improved through dedication of sufficient resources and innovative strategies to keep mobile populations on treatment. Finally, sustained commitment, including funding, from the international humanitarian community is necessary to improve TB control, and ultimately end TB, both in the Syria crisis and other humanitarian emergencies worldwide.

Keywords

Tuberculosis; Humanitarian emergencies; Surveillance; Syria; Displaced populations

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Authors' contributions

Both authors attended and participated in the referenced satellite conference session. Both authors contributed to the structure of the manuscript, the interpretation of data, and the drafting of the manuscript. Both authors approved the final manuscript.

Statements

Competing interests

Both authors declare that they have no competing interests.

Supplementary materials

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Background

The *TB care for communities in emergency contexts* satellite session at the 2017 48th Union World Conference on Lung Health, presented on October 13, 2017, discussed the impact of the Syrian displacement crisis on regional tuberculosis (TB) control, including within Syria and in the neighboring countries of Iraq, Jordan, Lebanon, and Turkey [1]. There are now over 13 million Syrians in need of humanitarian assistance, with 5.4 million having fled into neighboring countries [2]. Such large-scale population migration has posed challenges for TB control in the region, both as Syria tries to maintain its national TB program and as neighboring countries manage the influx of new and highly mobile patients. In this setting, the International Organization for Migration (IOM) has provided extensive regional support to the National TB Programs (NTPs) of Jordan, Lebanon, and Iraq for refugee TB screening and case detection, diagnosis, and treatment. This support was bolstered through early funding from the United Nations High Commissioner for Refugees (UNHCR) and then through a Global Fund Emergency Grant in 2015. This satellite session was organized and chaired by a staff member from IOM Jordan and a staff member from the U.S. Centers for Disease Control and Prevention (CDC). It brought together regional NTP directors, representatives of international organizations, and other stakeholders to provide a series of presentations on the current surveillance data demonstrating the epidemiologic impact of TB cases among Syrian refugees in the region and to discuss strategies used by programs in managing challenges presented by Syrian refugee TB cases. Importantly, the session also provided lessons for TB control in emergencies that can be applied in other humanitarian settings around the world, including in regions with high TB burden.

Epidemiologic impact of displacement on TB in the region presented at the satellite session

At the outset of the Syria displacement crisis, the NTPs of the region had made tremendous strides in TB control; in 2013, of Syria, Iraq, Jordan, Lebanon, and Turkey, only Iraq had an annual TB incidence rate over 20 per 100,000 population [3]. Incident cases in Syria declined from 4,138 in 2009 to 2,851 by 2013 (NTP data, cited by IOM). By 2011 in Jordan, the NTP had reached the Millennium Development Goal for TB reduction and was preparing to eliminate TB in the country [4].

The Syria displacement crisis arrested that progress. In Syria, political instability, coupled with violence directed at health care infrastructure and workers [5], contributed to TB control limitations of case-finding, delays in initiation of treatment, and increased disruption of treatment, potentially leading to risk of TB transmission and to drug resistance. Incident cases in Syria increased from 2,851 in 2013 to 3,134 by 2015, and there were nine reported drug-resistant cases in 2015, up from two in 2013 (NTP data cited by IOM). In neighboring countries, refugee TB cases represented a substantial proportion of the total TB burden, straining national TB control resources. In Lebanon, which hosts over 1 million Syrian refugees, TB cases among Syrian refugees rose from 41 in 2012 to 139 in 2015, representing 22% of total incident TB cases by 2015 (NTP Lebanon data). In Turkey, which hosts over 3 million refugees, TB cases among Syrian refugees rose from 23 in 2012 to 489 in 2015,

representing 4% of total incident TB cases by 2015 (NTP Turkey data). An important characteristic of the refugee population in this region is that less than 10% live in refugee camps; as in other concurrent humanitarian emergencies, the vast majority live within the host community, often in overcrowded conditions [6].

The high mobility of this population means following the patient until treatment completion has been difficult. While in Jordan, the treatment completion rate among Syrian refugees diagnosed in 2013 was 96% (NTP Jordan data), in Lebanon in 2013 it was 63% (NTP Lebanon data), and in Turkey in 2014, it was 76% (NTP Turkey data). In both Lebanon and Turkey, these completion rates were lower than those of the native populations.

Strategies to manage challenges of TB among Syrian refugees in the region, and lessons for other humanitarian emergencies

The twin challenges of managing newly arriving refugee TB cases and providing treatment to highly mobile patients prompted NTPs in the region to use and evaluate newly developed TB control strategies. In response to the crisis, in 2013 the Jordan NTP, collaborating with IOM, UNHCR, and the CDC, developed a public health strategy for TB control among Syrian refugees by focusing on increasing awareness and knowledge of TB among Syrian refugees and healthcare workers, and increasing TB screening and detection, diagnosis, and treatment completion among Syrian refugees [4]. A similar strategy was adopted by NTP Lebanon with IOM assistance.

An evaluation of the Syrian refugee TB control program in both Jordan and Lebanon performed by a CDC epidemiologist in December 2016 provided some useful insights into the success of this strategy in TB control in the region. Reflecting on the components of the strategy also offers lessons for TB control in other humanitarian emergencies. Learning and applying these lessons elsewhere is important because the global impact of migration on TB control is driven in part by TB transmission in and between high TB burden countries, from which mobile populations often originate. In fact, in 2015, 28 (93%) of the 30 identified World Health Organization (WHO) high-burden TB countries were either a country of origin or a country of settlement for at least 1,000 refugees [7]. Of the world’s refugees in 2015, almost 20% originated from a high TB burden country, and 30% sought refuge in a high TB burden country [7].

Increasing awareness and knowledge of TB

In both Jordan and Lebanon, by the end of 2016, NTP and IOM training sessions sensitized hundreds of thousands of refugees to the signs and symptoms of TB, as well as to TB treatment services offered in the host countries. In Jordan, IOM-employed community health workers based in the two largest refugee camps had provided awareness sessions for families within the camps. Additionally, to reach the Syrian refugees living in the host community, IOM employed community health workers to provide awareness sessions to community-based organizations (CBOs) and cultural societies in areas where Syrian refugees live. IOM staff physicians also provided information to non-governmental organizations (NGOs)

and Ministry of Health service providers about TB signs, symptoms, adverse reactions to treatment, and how to refer Syrian refugees for TB services.

In Lebanon, awareness raising had historically been done as part of mass screenings in informal refugee settlements, meaning refugees in the community may be missed. There was an increase in the number of professional health workers trained in TB symptoms and services in 2016, compared with 2015, in both Jordan and Lebanon, following an increased focus from IOM and the NTPs on reaching professional health workers in the national public health care system. Of note, the Global Fund emergency grant of 2015–2016 provided the funding for training and outreach to both professional and lay community health workers.

One lesson for TB control in other humanitarian emergencies is to increase awareness and recognition of TB not only among emergency-affected populations, but also among healthcare providers serving them. Humanitarian aid health policymakers have historically considered TB a disease of low priority in humanitarian emergencies. Part of this lack of concern may be because other diseases, like measles and cholera, are easier to identify and are more closely linked to rapid death in mobile populations [8]. Additionally, the clinical case definition for TB is very non-specific, mimicking other diseases, which makes the ability to determine its contribution to morbidity and mortality among emergency-affected populations more difficult [9]. Yet the disruption of healthcare infrastructure, stress and poor health associated with migration, and poor living environments upon taking refuge all contribute to risk of contracting, reactivating, and transmitting TB. Today, the Rohingya refugee crisis in Bangladesh and Myanmar is likely to present high TB burden, and indeed, humanitarian health workers are already observing refugees suffering from TB in areas hosting Rohingya refugees [10]. In addition, where emergency-affected populations do not reside in camps, but instead reside in host communities, often seeking health care in primary care clinics, awareness and recognition should be augmented among both professional primary and community health workers [11]. The need to increase awareness among humanitarian aid workers as well as primary healthcare workers, especially when the emergency-affected populations are from or are settling in a country with high TB burden, is of paramount importance.

Increasing TB screening and detection

At the single official entry point for Syrian refugees into Jordan, the International Committee of the Red Cross staff performed a health screening, which included asking about TB diagnosis and treatment history, and screening for physical symptoms of pulmonary TB. Of note, this screening was performed by IOM until August 2014. Suspect TB cases or people who reported already being on TB treatment were referred to IOM and NTP for follow-up. In the camps, patients with symptoms of pulmonary TB were detected through community health worker awareness sessions or through NGO- or foreign government-run primary care clinics or hospitals on site. In the community, presumptive refugee TB cases were detected through community health workers, CBO awareness sessions, or public primary healthcare providers. Of note, from 2013 through 2016, the proportion of people 15 years of age or older screened compared with those under 15 years

of age increased, so that by 2016, 97% of those screened were 15 years of age or older (IOM data, cited by Dr. Andrew Boyd, CDC).

Community health workers who detected presumptive TB cases among Syrian refugees within camps or the community called IOM staff physicians, who came to the site as a mobile medical team, performed their own clinical history and exam, and determined if further diagnostic assessment was appropriate, including use of on-site, portable radiography.

In Lebanon, within informal settlements and collective shelters, IOM-employed community health workers conducted mass screenings, in which they searched for people with symptoms of pulmonary TB using a standardized questionnaire. Additionally, IOM deployed community health workers in informal refugee settlements to carry out active case finding for refugees with presumptive pulmonary TB. In contrast with IOM Jordan, IOM Lebanon did not use a mobile medical team for field-based initial medical evaluation. Instead, in Lebanon, all presumptive cases were sent to the nearest NTP TB treatment center for evaluation. Also in contrast with Jordan, there was no single entry point for Syrian refugees in Lebanon, so they did not receive a formal health screening upon entry into Lebanon. The age and sex distribution of those screened was not available in Lebanon. Similar to Lebanon, Turkey had not done TB symptom screening for Syrian refugees crossing the border (NTP Turkey data).

A lesson for TB control in other humanitarian emergencies is to target screening for TB among emergency-affected populations based on the specific epidemiologic context. In cross-border mass migrations, a symptom-based screening for TB should be offered at the border or upon registration, both to identify undiagnosed active TB cases as well as those emergency-affected patients who have been on treatment for TB, to prevent the risk of transmission and development of drug-resistant disease [12–14]. A recent molecular epidemiology study found a cluster of almost 30 multi-drug resistant TB cases in Europe among persons fleeing hardship in the Horn of Africa, exemplifying the risk of TB transmission during transit, the need for screening during migration, and the need for follow-up and treatment in the country of asylum [15]. Even where treatment is not available, conducting screening for and providing information about presumptive TB allows those with symptoms to minimize risk of transmission to close contacts. Of course, the humanitarian community should assure that any offer of border screening be accompanied with a guarantee of protection and without a fear of repatriation for the emergency-affected person.

In the early years of the Syria refugee crisis, mass symptom screening had been done primarily in refugee camps in Jordan and in informal settlements in Lebanon, but the vast majority of Syrian refugees in the region live within host communities. This disconnect between where screenings are done and where vulnerable populations live may contribute to missed TB cases. Efforts of community and professional primary health workers and refugee-focused CBOs should be leveraged to find and screen at-risk populations where they live.

Data from Jordan indicates that the vast majority of recent TB screening of Syrian refugees had been done among adults 15 years old or greater, despite the fact that the proportion of the population of Syrian and Jordan under 15 years of age is 35% [16]. The sensitivity of adult symptom screening checklists is diminished in children. Children can present with symptoms of malnutrition, lack of playfulness, or weight loss. In addition, they are at greater risk of having extra-pulmonary TB rather than cough, the classic symptom in most symptom checklists. Children account for 7% of the reported new TB cases in 2016, but only about one-third of children are ever diagnosed [17]. Thus, refugee children require careful and specific screening for TB, especially in humanitarian emergencies in high TB burden settings. As with adult refugees, child refugees may seek care in primary health clinics instead of in a refugee camp, and thus pediatric screening should be available in various clinical settings, including in maternal-child health centers and supplemental feeding centers [18,19]. This is especially important given the greater vulnerability for severe forms of TB and the high mortality rate of almost 50% among children aged 0–4 years [20].

Increasing TB diagnosis

In Jordan, the proportion of pulmonary cases that were clinically diagnosed, that is, diagnosed via symptoms with or without use of radiography, as opposed to confirmed with laboratory methods, was high in 2015–2016, with 33 of 43 cases (76.7%) diagnosed clinically in 2016 (Table 1) (NTP data, cited by Dr. Boyd). Among extra-pulmonary cases, the proportion that were clinically diagnosed was 50.0% in 2015 and 60.0% in 2016. In Lebanon, the proportion of pulmonary cases that were diagnosed by laboratory methods remained higher than in Jordan, with 67 of 100 cases (67.0%) diagnosed by laboratory methods in 2016 (Table 1). Among extra-pulmonary cases, 28 of 34 cases (82.4%) in 2015 and 44 of 44 cases (100%) in 2016 had laboratory confirmation of the diagnosis. The low proportion of confirmed pulmonary cases may have been because of the lack of awareness of the use of Xpert® MTB/Rif (Cepheid, Sunnyvale, CA). Although both Jordan and Lebanon NTP diagnostic and treatment sites have access to Xpert® for diagnosis, fewer than half of pulmonary cases across both years and in both countries received an Xpert® test. In addition, there were not yet well-disseminated guidelines for the use of Xpert®.

A lesson for TB control in other humanitarian emergencies is to leverage laboratory and radiographic diagnostic techniques to confirm TB cases, to better guide treatment. Historically, access to these techniques in emergency settings was limited, but today, with the expanded availability of the highly sensitive and specific Xpert®, the ability to provide confirmatory TB test results, including the presence of rifampin resistance, in a rapid manner at low cost is occurring even in humanitarian emergencies. IOM has used Xpert® in Cambodia, Ethiopia, Nepal, Thailand and elsewhere among migrants and refugees [21]. Use of mobile and digital radiography is also becoming more widely available, and its flexibility has facilitated its use in emergencies, especially in smear-negative presumptive cases [22]. Additionally, mobile radiography has been suggested for use among emergency-affected migrant populations in informal shelters [23]. Especially in high TB burden settings, use of radiographic and laboratory diagnostics may improve sensitivity of diagnosis beyond that of screening for symptoms alone. Vanino *et al.* found that using only a symptoms-based screening among asylum seekers missed 33% of a sample of migrants who were later

identified as having TB through radiographic abnormalities, illustrating the potential utility of radiographic and laboratory confirmation of TB, in addition to symptom screening, in emergencies in high TB burden contexts [24,25].

Increasing TB treatment success

In Jordan, Lebanon, and Turkey, TB medications were provided free of charge to Syrian refugees (Dr. Boyd and NTP Turkey data). Jordan and Lebanon had well-implemented policies of directly observed therapy, short course (DOTS) among this population, both inside and outside of camps. In Jordan, DOTS for refugees was administered by community health workers in the camps and via contracted CBOs in the host community, with supervision and monitoring of CBOs by IOM to ensure correctly administered DOTS. In Lebanon, DOTS coordinators were nurses by training; no community health workers or CBOs provided DOTS.

To assure continuation of TB treatment for refugee cases crossing into or leaving Jordan, IOM in Jordan had developed a cross-border treatment protocol for Syrian refugees between Jordan and Syria. In contrast, Lebanon had not to date developed a formal cross-border treatment protocol.

TB treatment completion rate among Syrian refugees in Jordan remained over 94% in all three years from 2013 through 2015, and improved in Lebanon from 77.1% in 2014 to 87.8% in 2015 (IOM data, cited by Dr. Boyd). The improvement in Lebanon coincided with Global Fund grant support for staffing to provide improved patient follow-up.

A lesson for TB control in humanitarian emergencies is that treatment completion rates can be high if sufficient resources can be devoted to maintaining treatment completion. However, in order for treatment success to occur among highly mobile patients in humanitarian emergencies, innovative and multipronged approaches should be used to follow up patients. Follow-up of patients could include using community health workers, auxiliary healthcare providers, or even laypeople like community representatives or family members for DOTS, or providing virtual or video-based DOTS.

Treatment success may also include anticipating and planning for treatment continuation during impending emergencies. Over a decade ago, Médecins Sans Frontières proposed a strategy for evacuation of staff and the community that included providing ‘runaway bags’ with a supply of TB medications for their TB patients [26]. A real-world example of the use of these ‘runaway bags’ occurred during the December 2007–January 2008 post-election violence in Kenya, which displaced 350,000 people. Prior to the emergency, healthcare staff provided their TB patients with at least a 45-day supply of TB drugs. Afterwards, a study of a convenience sample of TB patients at twelve health facilities in three provinces affected by violence found that there was an 85% reduction in treatment interruptions, when compared with 2007 rates, because of this action [27]. Thus, preparing and providing ‘runaway bags’ of TB medication may be useful for treatment continuation in humanitarian emergencies. Other components of TB program preparation in anticipating emergencies may include:

- Creating line lists of patients in areas that might be affected by an emergency.

- Ensuring the patient has a list of TB treatment site phone numbers to re-establish contact with TB treatment sites.
- Obtaining contact information for patients' relatives and friends.
- Ensuring back-up copies of patients' records to share with other TB treatment sites or other countries' NTPs.
- Moving essential TB supplies and medication stock to safer locations.

Maintaining and improving TB treatment success in refugee populations also require cross-country NTP coordination, so settling and returning refugees can continue and complete their treatment. This coordination is even more important in regional displacement crises, in which multiple countries may receive patients. To this end, several countries affected by the Syria displacement crisis have developed protocols for communication and formal transfers of patients, although operationalizing these protocols has not yet been completed. Another important component is regional registration and surveillance of patients on treatment, such as through the web-based TB surveillance system piloted in the Syria region [28,29]. Coordination of NTPs and cross-border surveillance systems are important tools for TB control in emergencies.

The satellite session also highlighted the importance, and the necessity, of sustained international humanitarian organization commitment in maintaining and improving TB control in emergencies. As well, the need for cross-border coordination requires international humanitarian participation. To this end, during the satellite session, a representative from the Global Fund described the announcement of two Global Fund *Multicountry Funding Applications*, one for interventions among refugees in Eastern Africa and one for interventions among migrant and mobile population in Asia [30]. Both applications had expected submission timing in Spring 2018 and are committed to finding missing TB patients using multi-country strategies. The former focuses on refugee populations and the latter focuses on people displaced by disaster in Asia, the region with the most natural disasters during 2005–2014, affecting almost 600 million persons [31].

Conclusions

Among populations affected by humanitarian emergencies, we can no longer neglect TB. Policies that have been successful in neighboring affected countries in the Syrian crisis require adaptation to other humanitarian emergencies if we are to *End TB*. This strategy entails identifying the estimated missing 4 million TB cases worldwide, of whom many are among the 65.6 million who are currently forcibly displaced globally [32]. Doing so will require capacitating local health workers, adapting control strategies based on unique epidemiologic profiles and mobility of the displaced population, use of radiographic and laboratory diagnostic tools, sufficient resources to ensure treatment completion, and more standardized NTP coordination. Most importantly, sustained commitment from the international humanitarian community is necessary to reach, provide treatment, and cure TB among these very vulnerable populations.

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Abbreviations:

CBO	community-based organization
CDC	(United States) Centers for Disease Control and Prevention
DOTS	Directly Observed Therapy, Short course
IOM	International Organization for Migration
NGO	Non-governmental organization
NTP	National Tuberculosis Program
TB	Tuberculosis
UNHCR	United Nations High Commissioner for Refugees
WHO	World Health Organization

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Table 1

Numbers of reported TB cases among Syrian refugees stratified by TB type and means of diagnosis per year, Jordan and Lebanon, 2015–2016.

Year	2015 n (%)	2016 n (%)
Jordan		
Pulmonary cases	36	43
Smear positive	14 (38.9%)	8 (18.6%)
Smear negative, culture or PCR positive	6 (16.7%)	2 (4.7%)
Clinically diagnosed	16 (44.4%)	33 (76.7%)
Extra-pulmonary cases	22	15
Laboratory confirmed (e.g., by pathology, culture, or PCR)	11 (50.0%)	6 (40.0%)
Clinically diagnosed	11 (50.0%)	9 (60.0%)
Lebanon		
Pulmonary cases	105	100
Smear positive	64 (61.0%)	58 (58.0%)
Smear negative, culture or PCR positive	2 (1.9%)	9 (9.0%)
Clinically diagnosed	39 (37.1%)	33 (33.0%)
Extra-pulmonary cases	34	44
Laboratory confirmed (e.g., by pathology, culture, or PCR)	28 (82.4%)	44 (100.0%)
Clinically diagnosed	6 (17.6%)	0