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The Influence of Migration on the Burden of and Response to Infectious Disease Threats in China

A Theoretically Informed Review

Joseph D. Tucker, Chun Hao, Xia Zou, Guiye Lv, Megan McLaughlin, Xiaoming Li and Li Ling

Migration and Health in China
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UNRISD, Palais des Nations, 1211 Geneva 10, Switzerland; Tel: +41 (0)22 9173020; Fax: +41 (0)22 9170650; info@unrisd.org; www.unrisd.org

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Sun Yat-sen Center for Migrant Health Policy, Sun Yat-sen University, #74, Zhongshan Road II, Guangzhou City 510080, P.R. China; Tel: +86 20 8733 5524; Fax: +86 20 8733 5524; cmhp@mail.sysu.edu.cn; http://cmhp.sysu.edu.cn/

Introduction to Working Papers on Migration and Health in China

This paper is part of a series of outputs from the research project on Migration and Health in China.

China is confronted by major challenges posed by the massive population movement over the past three decades. In 2009, approximately 230 million rural inhabitants moved temporarily or permanently to cities in search of employment and better livelihoods. Such large-scale mobility has huge implications for the pattern and transmission of diseases; for China's health care system and related policies; and for health of the Chinese population in both receiving and sending areas. The health and social issues associated with population movement on such an unprecedented scale have been inadequately addressed by public policy and largely neglected by researchers. Based on interdisciplinary research across the health, social science and policy fields, this project constitutes a major effort to fill research and policy gaps. Collectively, the papers and commentaries in this series aim to provide a comprehensive assessment of the health and public policy implications of rural to urban migration in China, to inform policy and to identify future research directions.

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Working Papers on Migration and Health in China

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Abstract

Massive rural-to-urban migration in China may influence infectious disease spread, but the same powerful social forces that reliably promote migration can also be used to design more effective health systems. We systematically reviewed eight databases to identify research studies focused on migrant infectious disease epidemiology and control policies. Grounded in Zimmerman et al.'s migration-health framework, we examined the sequential phases of rural-to-urban migration (pre-departure, travel, destination, interception, and return) in terms of their influence on infectious disease epidemiology and control policies. The migration process has a profound impact on the distribution of airborne, blood-borne, sexually transmitted, and mosquito-borne infectious diseases in addition to influencing potential control strategies. The spread of vaccine preventable diseases in China underscores the need for more responsive vaccination systems among migrants. Scaling up successful pilot migrant infectious disease control policies and new programmes are urgently needed in order to achieve health equity for Chinese migrants.

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Authors

Joseph D. Tucker, MD (University of North Carolina Project-China, Guangzhou, China; University of North Carolina at Chapel Hill, Chapel Hill, United States; Sun Yat-sen University Center for Migrant Health Policy, Guangzhou, China)
Chun Hao, PhD (Sun Yat-sen Center for Migrant Health Policy, Guangzhou, China)
Xia Zou, MPH (Faculty of Medical Statistics and Epidemiology, School of Public Health, Sun Yat-sen University, Guangzhou, China; Sun Yat-sen University Center for Migrant Health Policy, Guangzhou, China)
Guiye Lv, MPH (Faculty of Medical Statistics and Epidemiology, School of Public Health, Sun Yat-sen University, Guangzhou, China; Sun Yat-sen University Center for Migrant Health Policy, Guangzhou, China)
Megan McLaughlin, MPH (University of North Carolina Project-China, Guangzhou, China; Sun Yat-sen University Center for Migrant Health Policy, Guangzhou, China)
Xiaoming Li, PhD (Prevention Research Center, Wayne State University School of Medicine, Detroit, United States; Sun Yat-sen University Center for Migrant Health Policy, Guangzhou, China)
Li Ling, PhD (Faculty of Medical Statistics and Epidemiology, School of Public Health, Sun Yat-sen University, Guangzhou, China; Sun Yat-sen University Center for Migrant Health Policy, Guangzhou, China)

Correspondence to Dr. Joseph D. Tucker (jdtucker@med.unc.edu) or Dr. Li Ling (lingli@mail.sysu.edu.cn).

Introduction

Infectious diseases remain a major public health threat in China, but their spatial distribution across China is uneven.[1,2] The persistence of infectious diseases in rural regions, evolving rural health systems and massive movement of migrants from rural to urban areas make rural infectious diseases relevant on national[2] and international scales.[3, 4] Migrants' periodic return from urban destinations to rural origins also carries substantial public health implications.[5] While migrants in China are often considered a high-risk group for many infections,[2] the underlying mechanisms linking the migration process and infectious disease spread are unclear.

Understanding migrant infectious disease epidemiology is fundamental for designing responsive control policies. China provides a unique opportunity to examine the relationship between migration and infectious disease control policies for several reasons. First, China's 225 million migrants, alongside an increasingly detailed understanding of their movements,[6] create opportunities to examine the relationship between migration and infectious diseases on a large scale. Second, the China public health system has the capacity to rapidly implement new infectious disease control policies,[7] substantially narrowing the gap between evidence and implementation. Finally, health reform in China provides a strong financial and organizational impetus to achieve health equity among migrant populations.[8] The main purpose of this systematic review is to determine how the migration process influences infectious disease epidemiology and control responses in China.

Methods

While migration is a complex social phenomenon that encompasses many types of movement and resettlement, this review focuses on rural-to-urban migrants (referred to as "migrants" in the review) in China. One of the primary drivers for this massive rural-to-urban migration has been the search for better employment in urban regions, but there are many other reasons underpinning rural-to-urban migration.[9,10] This review has two main components: 1) a systematic review of the burden and distribution of infectious diseases among migrants; 2) a policy-focused review considering how the migration process can enhance disease control efforts.

The first component includes notifiable infectious diseases in China associated with the greatest mortality in 2010 and transmitted via respiratory droplets, blood, sex or mosquitoes (Table 1).[11] In addition, some non-notifiable infections associated with a substantial burden of disease (human papillomavirus, influenza) are also discussed. Zoonotic and fecal-oral infections are not discussed in depth because their mechanism of transmission is not directly related to the migration process.

This analysis uses a migration phase-specific theoretical framework to inform analysis.[12] Developed by Zimmerman et al., this theoretical framework was created as a tool to improve policies related to migration and health. This framework focuses on five sequential phases of the migration process that may influence infectious disease transmission and require policy attention: pre-departure, travel, destination, interception and return (figure 1). These phases are separate stages that many migrants will iteratively move through in their lives, and these transitions characterize the migration process in action. From a health policy perspective, analyzing migration and health at multiple phases will be the most effective for creating responsive control policies. The second component of this paper moves through each of the five phases to describe ongoing and potential strategies to control infectious diseases that

incorporate our understanding of rural-to-urban migration in China. Through using this framework, we are able to draw broader portraits that connect the *migration process*, not simply migrant individuals, to explain risk and tailor effective control programmes.

Search strategy and selection criteria

The systematic review search strategy for the first component of the review (burden of disease) retrospectively analysed studies that included a quantitative measure of the burden of one of the selected infectious diseases among migrants in China. The review of published work was done in several phases, with PRISMA guidelines. Potentially relevant articles were selected from four English databases (Pubmed, EMBASE, Ovid and PsycInfo) and four Chinese databases (CNKI, Wanfang, CBM and VIP). Search terms included "China" AND ("migrant" OR "peasant worker" OR "migrant worker" OR "rural to urban" OR "work personnel" OR "peasant laborer" OR "mobile population" OR "floating population") and one or more terms corresponding to the identified infectious disease. Only papers that identified migrant infectious disease epidemiology were included. The search algorithm was restricted to articles published in any language before 20 November 2012.

Abstracts were checked for relevance and had to meet the following criteria to be included: individual participants were entirely or partly (with disaggregation) rural-to-urban migrants; biomarker specimens were taken from Chinese residents and tested for an infectious disease; and sufficient detail was provided regarding test methodology, specificity, and sensitivity. All full-text articles meeting eligibility criteria were independently analysed by two reviewers before final inclusion. Data from selected full text research manuscripts were recorded.

Results

The migrant infectious disease burden of disease search identified 368 citations (figure 2). These research studies included airborne, blood-borne, sexually transmitted, and mosquito-borne infections.

Airborne infectious diseases

Airborne infections are generally transmitted by inhalation of respiratory droplets containing a pathogen, providing an opportunity for a local epidemic to travel along established routes of human movement. Several airborne pathogens have expanded along migration routes in recent years, which calls for a further investigation of the travel phase of migration. Higher burden of vaccine-preventable diseases in pre-departure areas as well as barriers to accessing health services at destinations further exacerbate these travel-specific risks. Tuberculosis,