



Contents lists available at [SciVerse ScienceDirect](#)

Acta Tropica

journal homepage: [www.elsevier.com/locate/actatropica](http://www.elsevier.com/locate/actatropica)



## Towards effective prevention and control of helminth neglected tropical diseases in the Western Pacific Region through multi-disease and multi-sectoral interventions

Jun Nakagawa<sup>a</sup>, John P. Ehrenberg<sup>a</sup>, Joshua Nealon<sup>a</sup>, Thomas Fürst<sup>b,c</sup>,  
Padmasiri Aratchige<sup>a</sup>, Glenda Gonzales<sup>a</sup>, Chitsavang Chanthavisouk<sup>a</sup>,  
Leda M. Hernandez<sup>d</sup>, Tayphasavanh Fengthong<sup>e</sup>, Jürg Utzinger<sup>b,c</sup>, Peter Steinmann<sup>b,c,\*</sup>

<sup>a</sup> World Health Organization, Regional Office for the Western Pacific, Division of Combating Communicable Diseases, P.O. Box 2932, 1000 Manila, Philippines

<sup>b</sup> Department of Epidemiology and Public Health, Swiss Tropical and Public Health Institute, P.O. Box, CH-4002 Basel, Switzerland

<sup>c</sup> University of Basel, P.O. Box, CH-4003 Basel, Switzerland

<sup>d</sup> Infectious Disease Office, National Centre for Disease Prevention and Control, Department of Health, Sta. Cruz, 1000 Manila, The Philippines

<sup>e</sup> Department of Hygiene and Health Promotion, Ministry of Health, P.O. Box 1232, Vientiane, The Lao People's Democratic Republic

### ARTICLE INFO

#### Article history:

Received 8 November 2012

Received in revised form 22 April 2013

Accepted 21 May 2013

Available online xxx

#### Keywords:

Neglected tropical diseases

Helminth infection

Prevention

Control

Multi-disease

Multi-sectoral

### ABSTRACT

Neglected tropical diseases (NTDs) cause serious health, social and economic burdens in the countries of the World Health Organization Western Pacific Region. Among the NTDs, helminth infections are particularly prominent with regard to the number of infected individuals and health impact. Co-endemicity is common among impoverished and marginalized populations. To achieve effective and sustainable control of helminth NTDs, a deeper understanding of the social-ecological systems governing their endemicity and strategies beyond preventive chemotherapy are required to tackle the multiple causes of infection and re-infection. We discuss the feasibility of implementing multi-disease, multi-sectoral intervention packages for helminth NTDs in the Western Pacific Region. After reviewing the main determinants for helminth NTD endemicity and current control strategies, key control activities that involve or concern other programmes within and beyond the health sector are discussed. A considerable number of activities that have an impact on more than one helminth NTD are identified in a variety of sectors, suggesting an untapped potential for synergies. We also highlight the challenges of multi-sectoral collaboration, particularly of involving non-health sectors. We conclude that multi-sectoral collaboration for helminth NTD control is feasible if the target diseases and sectors are carefully selected. To do so, an incentive analysis covering key stakeholders in the sectors is crucial, and the disease-control strategies need to be well understood. The benefits of multi-disease, multi-sectoral approaches could go beyond immediate health impacts by contributing to sustainable development, raising educational attainment, increasing productivity and reducing health inequities.

© 2013 Elsevier B.V. All rights reserved.

### 1. Introduction

Neglected tropical diseases (NTDs) are a diverse group of diseases caused by a variety of pathogens whose distribution and local prevalence are intimately linked to conditions of poverty (Feasey et al., 2010; Hotez et al., 2007; Utzinger et al., 2012). Indeed, NTDs are the most prevalent diseases among the 2.7 billion people who currently live on less than US\$ 2 per day (Liese et al., 2010). While NTDs do not cause mortality on a

scale comparable to other communicable diseases such as malaria, tuberculosis and HIV/AIDS, the disability, human suffering and societal impact attributable to NTDs are considerable (Murray et al., 2012). NTDs cause sequelae such as anaemia (e.g. hookworm infection), blindness (e.g. trachoma), malnutrition (e.g. soil-transmitted helminthiasis), intellectual and physical growth retardation (e.g. schistosomiasis), damage to internal organs, and long-term physical disability and disfigurement that lead to stigmatization (e.g. lymphatic filariasis and leprosy) (Hotez et al., 2007; Utzinger et al., 2012; Weiss, 2008). Recent research also suggests that infections with certain NTDs may increase the vulnerability to other infectious diseases, such as malaria and HIV/AIDS (Emerson et al., 2008; Gyapong et al., 2010; Hotez et al., 2006; Secor, 2012), and contribute to the chronic disease burden (Tanowitz et al., 2009).

\* Corresponding author at: Department of Epidemiology and Public Health, Swiss Tropical and Public Health Institute, P.O. Box, CH-4002 Basel, Switzerland.  
Tel.: +41 61 284 8229; fax: +41 79 408 6772/61 284 8105.

E-mail address: [peter.steinmann@unibas.ch](mailto:peter.steinmann@unibas.ch) (P. Steinmann).

Although medically and epidemiologically diverse, NTDs share certain important characteristics that allow them to thrive in conditions of poverty, while remaining rare among affluent populations. As a consequence, NTDs are concentrated almost exclusively among impoverished populations with precarious access to clean water and improved sanitation and unsafe hygiene practices. Such groups often inhabit geographic areas highly marginalized by the health sector and have scant access to other basic services (Holveck et al., 2007; Hotez et al., 2006; Molyneux et al., 2005; Schratz et al., 2010). The impact of NTDs on individual health and societal performance furthers the entrenchment of poverty by trapping communities in poor health, resulting in decreased economic potential (Conteh et al., 2010; King, 2010; Utzinger et al., 2011). For example, chronic schistosomiasis japonica in the Philippines causes the loss of an estimated 45 days of work per infected person every year, demonstrating the appreciable social and financial burden of NTDs (Blas et al., 2006). On a national scale, there is evidence for a correlation between the average national intelligence quotient (IQ) and high parasite stress, perhaps because the energetic cost of the parasite burden redirects energy away from brain development (Eppig et al., 2010).

In the absence of population-based preventive and curative measures, most NTDs occur at stable levels of endemicity. NTDs thus generally do not cause epidemiological or public health emergencies, conspicuous morbidity or immediate mortality, and hence, NTDs are often not of high priority for policy makers, and are usually not subject to compulsory reporting. As a consequence, NTDs are not perceived as major public health problems compared to epidemic-prone diseases, such as influenza, which explains that they draw little attention from the media and public sector (Ehrenberg and Ault, 2005; Hotez et al., 2006). The minimal threat that NTDs present to high-income populations also renders the development of drugs, diagnostics and vaccines relatively unprofitable (Cohen et al., 2010; Ehrenberg and Ault, 2005; Keiser and Utzinger, 2012; WHO, 2010b).

The World Health Organization Regional Office for the Western Pacific (WHO-WPRO) groups together 37 countries and areas, stretching from China and Mongolia in the North and West, to New Zealand and the Pitcairn Islands in the South and East. The region is home to a range of NTDs, many of them caused by helminths. Soil-transmitted helminthiasis, schistosomiasis, lymphatic filariasis and food-borne trematodiasis combined form a group of infections known as helminth NTDs. These helminth NTDs put the highest number of people at risk of infection and cause the highest burden due to NTDs in the region. Table 1 provides an overview of the helminth NTDs covered in the current article. Additional NTDs occur in the Western Pacific Region, but are not considered in this paper (Fürst et al., 2012; Hotez and Ehrenberg, 2010; WHO, 2010b).

To successfully control and prevent helminth NTDs, the attention of all key stakeholders is needed as sustaining reduced

prevalence rates following mass drug administration requires integrated approaches (Utzinger and de Savigny, 2006). Multi-disease, multi-sectoral interventions may offer an opportunity for sustaining control efforts and achieving, in some instances, elimination. In this paper, we explore the feasibility of a multi-disease and multi-sectoral package of interventions for preventing and controlling helminth NTDs in a sustainable and cost-effective manner. We review current strategies for helminth NTD control, and identify activities of different sectors that are likely to have a significant impact on one or more helminth NTDs. In addition, we discuss our experience and the challenges inherent in multi-sectoral collaboration.

## 2. Current strategies for the prevention and control of helminth NTDs

### 2.1. Preventive chemotherapy and other strategies

As helminth NTDs affect large numbers of people and most infections are concentrated in the poorest population segments, their prevention and control must rely on low-cost and practical tools that can easily be deployed to large populations, and require limited technical skills. In their first global report on NTDs, the WHO recommended five specific public health strategies for the prevention and control of NTDs: (i) preventive chemotherapy; (ii) intensified case management; (iii) vector control; (iv) provision of safe water, sanitation and hygiene; and (v) veterinary public health interventions (WHO, 2010b).

*Preventive chemotherapy* refers to the periodic administration of drugs to entire populations or particularly vulnerable groups (e.g. school-aged children) to reduce morbidity and, in the longer term, reduce transmission (Gabrielli et al., 2011; WHO, 2006; 2010b). In the Western Pacific Region, the NTDs targeted by preventive chemotherapy are soil-transmitted helminthiasis using either albendazole or mebendazole, schistosomiasis using praziquantel, and lymphatic filariasis using diethylcarbamazine plus albendazole (WHO, 2006). *Intensified case management* involves early diagnosis and treatment of infected individuals, a strategy particularly relevant for food-borne trematodiasis (Sripa et al., 2010) for which standardized preventive chemotherapy interventions have yet to be developed. *Vector control, provision of safe water, sanitation and hygiene, and veterinary public health* are crucial interventions for achieving sustainable control of certain NTDs, as treatment usually does not prevent re-infection (Bartram and Cairncross, 2010; Jia et al., 2012; Luz et al., 2010; Ziegelbauer et al., 2012). Following decades of neglect, *vector control* is once again considered a relevant strategy to complement preventive chemotherapy against lymphatic filariasis (Bockarie et al., 2009; WHO-WPRO, 2009a; WHO, 2010a,b). *Provision of safe water, sanitation and hygiene* affect the transmission of soil-transmitted helminthiasis (Ziegelbauer

**Table 1**  
Epidemiological indicators of selected helminth neglected tropical diseases in the Western Pacific Region.

Neglected tropical disease	Estimated population at risk (millions)	Estimated population infected (millions)	Estimated disability-adjusted life years (thousands)	Main endemic countries
Soil-transmitted helminthiasis (ascariasis, hookworm disease, trichuriasis) <sup>a</sup>	352–705 <sup>d</sup>	Not known	941 <sup>c</sup>	19+
Schistosomiasis <sup>b</sup>	200 <sup>d</sup>	Not known	13 <sup>d</sup>	4
Lymphatic filariasis <sup>c</sup>	40 <sup>d</sup>	Not known	65 <sup>d</sup>	22
Food-borne trematodiasis	Not known	53 <sup>e,f</sup>	623 <sup>e,f</sup>	7

<sup>a</sup> Caused by *Ascaris lumbricoides*, *Trichuris trichiura* and hookworm; the burden of *Strongyloides stercoralis* is unknown but might be considerable as its global focus is in Southeast Asia.

<sup>b</sup> Caused by *Schistosoma japonicum* (China and the Philippines) and *S. mekongi* (Cambodia and the Lao People's Democratic Republic).

<sup>c</sup> Caused by *Wuchereria bancrofti*, *Brugia malayi* and *B. timori*.

<sup>d</sup> Source: World Health Organization (WHO, 2010b).

<sup>e</sup> Source: Fürst et al. (2012).

<sup>f</sup> Data include a maximum of 11 million people infected and 131,000 disability-adjusted life years from Thailand.

Download English Version:

<https://daneshyari.com/en/article/6127273>

Download Persian Version:

<https://daneshyari.com/article/6127273>

[Daneshyari.com](https://daneshyari.com)