WASH and the Neglected Tropical Diseases

A MANUAL FOR WASH IMPLEMENTERS

OCEANIA

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This document will be updated as new or improved information becomes available. Please share your comments, case studies and data regarding NTDs and WASH integration with us by emailing info@washntds.org.

Visit [www.washntds.org](http://www.washntds.org) to download country-specific versions of this manual, and for the most up-to-date maps and information.

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Introduction and Background

For centuries, humans have recognized the vital roles that access to safe water and toilets and practicing good hygiene play in maintaining human health and dignity. In spite of this recognition, development professionals must still justify investments in water, sanitation, and hygiene (WASH), typically by demonstrating the health impacts of such investments. The WASH sector often uses reduced incidence of diarrhea as the main indicator of improved health.

While many donors or practitioners know of the impact of WASH on reducing diarrhea, few are aware that controlling and eliminating five of the so-called “neglected tropical diseases” (NTDs) also requires WASH. The NTDs are a set of 17 chronic, disabling diseases that disproportionately affect the world's poorest communities. While these diseases are rarely fatal, they cause high rates of morbidity that compromise the health, educational attainment, and economic opportunity of communities across the globe.

The WASH and NTD sectors have a common target population—the world's poorest citizens. This population lacks access to safe and reliable water services and sufficient sanitation or the tools to practice good hygiene behaviors. As a result, they suffer disproportionately from debilitating disease.

Although the WASH and NTD sectors work in the same communities, they have historically worked in parallel rather than coordinating their efforts. This lack of coordination is due in part to the different health outcomes on which each sector focuses. The WASH sector focuses on improved health, such as reduced diarrheal disease, and also on additional desired outcomes like improved livelihoods and overall well-being. The NTD sector, however, focuses mainly on providing treatment for diseases, with less emphasis on prevention.

To better serve the poor, we urge the NTD and WASH sectors to collaborate. Such collaboration should ensure that communities have adequate and equitable access to water and sanitation, as well as the tools to practice good hygiene—all of which serve as the basis for prevention of the NTDs and other disabling diseases.

We intend this manual to serve as a practical guide to WASH practitioners working to implement, support, and sustain WASH interventions at the country level. This manual will equip WASH-implementing organizations with the knowledge they need to target their interventions to NTD-vulnerable communities; to engage in and promote collaborative monitoring for NTD-specific health outcomes; and to communicate the impact of WASH on the NTDs for the purposes of advocacy and policy change.

Why Should WASH Practitioners Care about the Neglected Tropical Diseases?

Worldwide, at least one billion people are infected with one or more of the 17 NTDs—and two billion more may be at risk of infection. As diseases of poverty, many NTDs occur in areas with limited access to water and sanitation, and where hygiene practices, household infrastructure and health services are limited. These diseases are called “neglected” because they receive less attention and fewer resources than diseases such as HIV/AIDS, malaria, and tuberculosis. NTDs are also diseases of neglected people, with the majority of people at risk of infection from them living in the poorest regions of the world. All 17 NTDs are entirely preventable.

The global impact of NTDs is remarkable; they cause blindness, disability, malnutrition and anemia, stunted growth, social stigma, and chronic pain. Beyond their negative impact on health, NTDs contribute to an ongoing cycle of poverty and stigma that leaves people unable to work, go to school, or participate in family and community life.
Increasing sustainable water, sanitation, and hygiene (WASH) services is a central element in the prevention, control, and elimination of five of the NTDs: soil-transmitted helminthiasis (STH), trachoma, schistosomiasis, lymphatic filariasis (LF), and Guinea worm. Reducing levels of these WASH-preventable NTDs not only improves health and alleviates suffering, but can also lead to improved educational outcomes for children and increased economic progress for communities and nations.

The WASH sector can significantly impact health and development of people living in these areas by targeting WASH activities where these diseases occur at the highest rates and by incorporating into existing hygiene promotion efforts behavior change messages relevant to specific NTDs. Currently, there is global momentum toward control and elimination of these diseases. WASH organizations and programs can highlight the impact they can make on those diseases to capitalize on this momentum, elevating global interest and public investment in WASH as a vital component of good health.

The Case for Coordinated WASH/NTD Programming

The WASH and NTD sectors have a strategic opportunity to work together to address multiple needs of those in their common target population who are vulnerable to various WASH-preventable diseases. Through expanding and enhancing WASH interventions for NTD control, both sectors can take an integrated approach to health and development.

Clearly harmonized efforts between the two sectors will improve the livelihoods and well-being of this population. But from an implementation perspective, what activities can the WASH sector undertake to contribute to this integrated programming? From a strategic perspective, what does it stand to gain by doing so?

Essentially, the WASH sector must make a concerted effort to target appropriate WASH interventions to communities where NTDs are most prevalent. This will require them to increase their coordination with governments, non-governmental organizations (NGOs), and donors to fund sufficient and appropriate interventions, targeting, and progress tracking in NTD-endemic communities.

There are 17 neglected tropical diseases, many of which have connections to WASH. However, this manual focuses on only those with the strongest links to WASH. For more information about the connections between WASH and all 17 NTDs, look at Table 1 of the document “WASH: The Silent Weapon against the NTDs,” a joint publication of WaterAid and the NTD NGDO Network, available at [http://trachoma.org/sites/default/files/guidesandmanuals/WASH%20The%20Silent%20Weapon%20Against%20NTDs.pdf](http://trachoma.org/sites/default/files/guidesandmanuals/WASH%20The%20Silent%20Weapon%20Against%20NTDs.pdf)
By undertaking these activities, the WASH sector will substantially contribute to the reduction of NTDs, and thus contribute to the overall health of the world’s poorest citizens. Furthermore, the WASH sector stands to gain proof of effectiveness because reductions in NTDs, which can be measured more concretely than reduction of diarrheal disease, may prove to be valuable indicators of WASH sector impact. Concrete evidence of the WASH sector’s impact on health and development can be used to advocate for greater investment in WASH as foundational to a nation’s health, education, and economic potential.

**Objectives of This Manual**

This manual is intended to enable WASH practitioners who work in Oceania to contribute to the reduction of WASH-preventable NTDs. To achieve this, the manual is designed to:

- Deepen WASH practitioners’ understanding of how WASH services can prevent the five mentioned WASH-preventable NTDs.
- Promote targeting of WASH-sector activities in NTD-endemic areas to facilitate deliberate and sustainable WASH programs for health gains.
- Promote collaborative measurement and evaluation of NTD-specific health outcomes by WASH sector implementers (governmental and NGOs) and health professionals (governmental and NGOs).
- Drive funding to integrated WASH and health programming by providing key strategies and messages for advocacy and policy development.

**What’s in This Manual**

To help achieve those objectives, this manual includes:

- A background discussion on WASH and the NTDs in Oceania.
- Disease specific chapters that describe how WASH services can alleviate the disease burden of the two WASH-preventable NTDs endemic to Oceania: lymphatic filariasis and soil-transmitted helminthiasis.
- Monitoring and evaluation tools to help WASH practitioners collaborate with health professionals to jointly measure program impact on NTDs.
- Advocacy tools and policy resources to help WASH practitioners drive funding to interventions with proven health impacts.

This manual also provides further resources and links for learning more about WASH and the NTDs. By making connections with NTD control programs, WASH sector implementers may discover opportunities to share existing human and capital resources with NTD control programs to maximize the efficiency of these programs.
NTD Landscape

Quick Facts about NTDs in Oceania

- WASH-impacted NTDs endemic in the country: lymphatic filariasis and soil-transmitted helminthiasis
- Number of people at risk of infection from at least one NTD: 1.16 million (WHO PCT Databank, 2013)

Disease Distribution
Each disease chapter in this manual contains maps of the distribution of disease in Oceania, as well as more details about how many people are at risk.

National NTD Policy
Appendix E. Policy Landscape for NTD Control provides information about Oceania’s NTD policy landscape.

WASH Landscape
Sub-national WASH Coverage Mapping
Recently, the London School of Tropical Medicine and Hygiene has used household survey data to develop the first comprehensive maps of drinking water supply and sanitation coverage at sub-national levels for Sub-Saharan Africa. These maps can provide insight into the epidemiology of the WASH-impacted NTDs, help track progress in provision of water and sanitation, and prioritize resource allocation to areas of greatest impact. The maps provided below display access to improved drinking water supply and sanitation at the sub-national level in Ethiopia as an example.

School WASH in Oceania
Data on coverage of WASH in schools in Oceania are available from UNICEF’s WASH in Schools program at http://www.washinschoolsmapping.com.

National WASH Policy
Appendix E. Policy Landscape for NTD Control provides information about Oceania’s NTD policy landscape.
NTD Mapping Tool

An example of the mapping information that can be viewed using the NTD Mapping Tool available at http://www.ntdmap.org.

Mapping WASH and NTDs Together
The newly created, interactive NTD Mapping Tool (www.ntdmap.org) allows users to visualize the geographic distribution of NTDs as well as data on access to improved sanitation and improved water sources. Users can select layers, such as improved sanitation access, open defecation, and safe water access, along with the diseases they want to map, and visually explore the relationship between NTDs and water and sanitation. See the image above for a screenshot of the NTD Mapping Tool.

Currently, the NTD Mapping Tool includes only information on soil-transmitted helminthiasis, schistosomiasis and trachoma in Sub-Saharan Africa; future releases will cover other diseases and geographic regions. The NTD Mapping Tool is possible thanks to funding from The Bill & Melinda Gates Foundation.

References


# WASH Interventions for Integrated NTD Control

In areas where multiple NTDs are present, a single WASH intervention can impact multiple NTDs. The table below shows how water and sanitation interventions can be implemented to target multiple diseases.

<table>
<thead>
<tr>
<th>Type of intervention</th>
<th>Specific intervention</th>
<th>Diseases Impacted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td>Increasing access to sufficient amounts of safe water for personal hygienic purposes (e.g., washing hands or body; bathing; and doing laundry)</td>
<td>Lymphatic filariasis, soil-transmitted helminthiasis</td>
</tr>
<tr>
<td></td>
<td>Increasing access to sufficient amounts of safe water for environmental sanitation (e.g., cleaning latrines)</td>
<td>Soil-transmitted helminthiasis</td>
</tr>
<tr>
<td></td>
<td>Increasing access to safe water for drinking/food preparation</td>
<td>Soil-transmitted helminthiasis</td>
</tr>
<tr>
<td></td>
<td>Monitoring impact of water resource development, waste water management, and sanitation programs on vector breeding levels</td>
<td>Lymphatic filariasis</td>
</tr>
<tr>
<td><strong>Sanitation</strong></td>
<td>Reducing open defecation</td>
<td>Soil-transmitted helminthiasis</td>
</tr>
<tr>
<td></td>
<td>Disposing of infant/child feces properly</td>
<td>Soil-transmitted helminthiasis</td>
</tr>
<tr>
<td></td>
<td>Increasing improved sanitation coverage</td>
<td>Soil-transmitted helminthiasis</td>
</tr>
<tr>
<td></td>
<td>Promoting maintenance and cleaning of latrines</td>
<td>Soil-transmitted helminthiasis</td>
</tr>
</tbody>
</table>

## Combining Hygiene Messages for Maximum Impact

Specific hygiene messages for prevention and management of NTDs can be integrated into existing hygiene education at little to no cost. The table below summarizes NTD-specific hygiene messaging.

<table>
<thead>
<tr>
<th>Type of intervention</th>
<th>WASH Messages – Emphasizing the importance of:</th>
<th>Diseases Impacted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hygiene</strong></td>
<td>Hand washing</td>
<td>Soil-transmitted helminthiasis</td>
</tr>
<tr>
<td></td>
<td>Wearing shoes outside</td>
<td>Soil-transmitted helminthiasis</td>
</tr>
<tr>
<td></td>
<td>Daily washing, with soap, of swollen limbs, feet, and between toes to prevent bacterial infections</td>
<td>Lymphatic filariasis</td>
</tr>
</tbody>
</table>
Targeting Your WASH Work to High-risk Areas

You can use the following approaches to target WASH efforts to high-risk areas for WASH-preventable NTDs.

- Use the disease maps included in this manual to identify the areas of high disease prevalence and where they overlap with your intervention areas.
- Familiarize yourself with national NTD Plans of Action and with WASH recommendations included in these plans.
- Identify organizations working in your implementation zones that are preventing or treating the NTDs, and collaborate with them to conduct joint monitoring of WASH program impact. The Reference sections in each disease chapter of this guide serve as one source for identifying organizations working in NTD control.
Preventing Soil-transmitted Helminths (Intestinal Worms) with WASH Interventions

What Are Soil-transmitted Helminths (STH)?
Soil-transmitted helminths (STH) refer to a group of parasites that live in the human digestive system. These parasites include roundworm, whipworm, and hookworm. The parasites live in the soil in warm and humid climates and are spread through contact with feces of infected people. Worldwide, approximately 1 billion people are infected with STH or at risk of infection (WHO, 2013a).

Health and Development Impacts of STH
STH infection can cause blood loss, leading to anemia. It can also lead to nutritional deficiencies, which are especially harmful to children and women of child-bearing age. Infections can limit development and result in poor physical and cognitive growth in children. Girls are particularly affected due to lost educational gains and productivity. At the community level, this results in decreased educational outcomes and economic loss (Hotez, 2008; Baird, Kremer, Hicks, & Miguel, 2011).

WASH for STH Control
STH are spread through contact with feces of infected individuals. Infection happens when fecally contaminated soil or food is ingested, or when larvae living in soil penetrate bare skin. Infections can be treated with deworming drugs. However, reinfection nearly always occurs following treatment when WASH conditions remain poor (WHO, 2013b). Thus, improved and sustained water and sanitation and good hygiene practices are essential to stop the cycle of STH transmission.

Burden of STH In Oceania
Approximately 641,000 children aged 1 to 15 years old are at risk of infection with STH (World Health Organization [WHO], 2013a).
How to use this map
This map displays prevalence of STH infection at the sub-national level based on survey data. Areas in dark red have the highest prevalence (50% or above). Areas in medium red have moderately high prevalence (20-50%), followed by orange, yellow and blue (10-20%, 1-10%, and <1% prevalence, respectively.) Use this map to identify the areas of highest STH risk and where they overlap with your intervention areas. For more information and the most up-to-date version of this map, visit the Global Atlas of Helminth Infection at www.thiswormyworld.org. Map courtesy of the Global Atlas of Helminth Infection.
**Treating STH Infection**

The WHO recommends annual or bi-annual treatment of at least 75% of pre-school and school-age children. STH infections can be treated with deworming drugs such as albendazole or mebendazole. Pharmaceutical companies donate these drugs to Ministries of Health (The Bill & Melinda Gates Foundation, 2012). Governments frequently distribute deworming treatments as part of immunization and vitamin A programs, or in schools in coordination with Ministries of Education.

**STH Treatment in Oceania**

The percentage of all people at risk of soil-transmitted helminth infection by country in Oceania who were reported to have received treatment were between 0 and 100%. (WHO, 2013a).

**The Evidence Base for WASH Prevention of STH**

A recent WASH/NTD meta-analysis estimated the average association of WASH variables with STH infection. See Appendix B for the complete results of the meta-analysis. The relationship between WASH and STH is summarized in the results* below

- Wearing shoes reduces hookworm infection by an average of 71%.
- Access to a household latrine was associated with reduced risk of infection with roundworm and whipworm by more than 40%.
- Hand washing with soap at critical times, such as after defecation and before eating, can reduce risk of infection with all three STH species by more than 30%.
- Households that have piped water access have a markedly reduced risk of infection (43% to 60%), although this may be related to other sanitation and hygiene practices that occur due to having a water source close to home.

* Results of analysis as of December 2013.

Another systematic review and meta-analysis of the effect of sanitation availability and use on STH infection (Ziegelbauer et al., 2012) found:

- People who either had or used a latrine were 49% less likely to be infected with STH as people who neither had nor used a latrine.
- Exclusive of use, people with access to sanitation facilities were 51% less likely to be infected with STH compared to people with no access to sanitation facilities.

**Key WASH Activities to Prevent STH**

**HYGIENE**

- Promoting hand washing before eating, after working, and after defecation.
- Promoting proper disposal of infant/child feces.
- Promoting wearing shoes when walking outside.

**SANITATION**

- Reducing open defecation to minimize soil contamination.
- Ensuring access to a household latrine and latrines in schools to minimize open defecation.
- Ensuring that processes are in place for regular cleaning and maintenance of latrines because these are necessary to encourage consistent use.

**WATER**

- Facilitating access to sustainable safe water services for hygiene, drinking, and food preparation.
- Promoting household water treatment and proper storage.

**If You Only Do ONE Thing**

Reduce the “fecal footprint”: Ensure that hygiene education emphasizes wearing shoes when outside and on dirt floors inside the home to help prevent hookworm transmission.
Bangladesh Case Study - Save the Children
A 2002 study by Save the Children in Bangladesh found that children in primary schools in Nasirnagar region suffered from a wide range of worm infections, diarrheal diseases, and micronutrient deficiencies. At baseline, the enabling environment in schools for practicing good hygiene and sanitation was poor; handwashing stations were rare, and latrines were often unusable. To address these issues, Save the Children worked with the Ministry of Primary Education and implemented the following activities in all schools in the region: deworming and vitamin A supplementation; improving the school environment with safe water and child-friendly sanitation facilities; school and community-based health education activities; and training for community groups to sustain the practices after the completion of the program. Follow-up assessments showed that the number of children with heavy levels of worm infection was reduced from 66% to nearly zero, and that nearly all schools installed a hand-washing system. In part due to the demonstrated success of these interventions, the government of Bangladesh has expanded deworming coverage to all school-age children in the country, and undertaken hygiene promotion activities in schools. (Save the Children, 2009)

Additional Resources
Below we have provided a selection of information that may be helpful to you as you explore opportunities for collaboration. Please note that this is not an exhaustive list; you should seek to identify many more partners, resources, and documents at both a global level and specific to your country context.

Partners and Programs Working in STH Control
- Children Without Worms
  http://www.childrenwithoutworms.org
- Deworm the World
  http://www.dewormtheworld.org
- World Health Organization
  http://www.who.int/intestinal_worms/en

Maps of STH Geographic Distribution
- The Global Atlas of Helminth Infections
  http://www.thiswormyworld.org

Information, Education, and Communication Materials
- WHO Fact sheet on STH
- STH Health Education Materials by Country

Policy
- World Health Assembly Resolution 54.19
  http://www.who.int/entity/neglected_diseases/mediacentre/WHA_54.19_Eng.pdf
- Helminth control in school-age children: A guide for managers of control programs (WHO)
- Eliminating STH as a public health problem in children: Progress report 2001-2010 and strategic plan (WHO)
  http://whqlibdoc.who.int/publications/2012/9789241503129_eng.pdf
References


What is Lymphatic Filariasis (LF)?
Lympathic filariais (LF) is a parasitic disease spread by mosquitoes. Larvae introduced into the body by mosquitoes enter the bloodstream, and the adult worms damage the body’s lymphatic system, resulting in swelling and disfigurement of the limbs and genitalia. Worldwide, nearly 1.4 billion people are at risk of infection, and approximately 40 million suffer from the disease (WHO, 2013).

Health and Development Impacts of LF
LF affects the lymphatic system, which is responsible for removing waste products and excess fluid from the body and helping the body’s immune system fight infection. Disruption of the lymphatic system causes accumulation of fluids in the tissues and extremities, leading to permanent swelling called lymphedema. In endemic communities, up to 50% men suffer swelling of the genitals, notably hydrocele (swelling of the scrotum) (WHO, 2013). People with lymphedema are prone to painful bacterial skin infections that can cause further swelling, inflammation, and damage to the lymphatic system. Repeated episodes of these bacterial infections worsen the effects of lymphedema, and can lead to permanent disability. In turn, this results in economic loss for the community, along with physical and mental suffering for patients.

Burden of Lymphatic Filariasis in Oceania
Approximately 1.16 million people are at risk of infection with LF in Oceania (WHO, 2013).
WASH for LF Control

Hygiene plays a critical role in managing the physical morbidity resulting from LF infection, especially lymphedema. Daily washing of the legs and feet with soap, especially between the toes, is key to preventing bacterial infections. Mild exercise and elevation of the leg after washing also helps the flow of lymphatic fluid and can decrease the volume of swollen limbs, which decreases disability (Jullien, et al., 2011).

Water resource management and wastewater management can inadvertently expand breeding sites of the mosquitoes that transmit LF, depending on the species (Bockarie, Pederen, White, & Michael, 2008). Monitoring for disease transmission in areas where water resource development is being conducted is important (Erlanger, 2005). WASH implementers should use linkages with the health sector to access data on LF transmission in these areas.

Treating LF

LF can be treated using a combination of albendazole and either ivermectin or diethylcarbamazine. The pharmaceutical industry donates these drugs to Ministries of Health for the treatment of communities at risk for the disease (The Bill & Melinda Gates Foundation, 2012).

LF Treatment in Oceania

By 2012, coverage of at-risk individuals with mass treatment for lymphatic filariasis by country was between 0 and 93% in Oceania. (WHO, 2013)

The Evidence Base for WASH Prevention of LF

The relationship between WASH and LF is demonstrated by the following:

- Several studies in India have observed significant decreases in acute attacks of LF-associated illness, including fever, chills, pain, and swelling of the limbs, after patients were trained in foot care, which included foot washing (Joseph et al., 2004; Shenoy, Sandhya, Suma, & Kumaraswami, 1995; Shenoy, Kumaraswami, Suma, Rajan, & Radhakuttyamma, 1999).
- In Haiti, patients reported experiencing approximately two annual episodes of acute attacks of LF-associated illness in the year prior to enrolling in a treatment program that emphasized hygiene and skin care. Over 18 months, patients reported 75% fewer annual episodes of LF-associated illness (Dahl, B.A., 2001; Addiss et al., 2010a).
- A study in Haiti found that patients who washed their swollen limbs with either antimicrobial or regular soap experienced a nearly 60% decrease in annual incidence of acute attacks of LF-associated illness, regardless of type of soap used. This suggests that hygiene itself is more important than the antimicrobial content of the soap (Addiss et al, 2010b).

Key WASH Activities to Prevent LF

HYGIENE

- Provide hygiene education that encourages daily washing of infected limbs with soap and water, especially between fingers and toes, to reduce bacteria on the skin and prevent infection. Secondary infections occur when bacteria enter the body through lesions in the skin, which are common in people with lymphedema, especially between the toes. These infections, which are painful and debilitating, further damage the skin and lead to more severe swelling.
- Promote hygiene, in conjunction with exercise and elevation of the affected limb(s), to reduce swelling, improve quality of life, and enable the individual to gain more mobility and thereby reduce disability.
Preventing Lymphatic Filariasis (LF) with WASH Interventions

SANITATION
- Work with health, environmental management, and agriculture sectors to ensure broad-based monitoring and surveillance of LF into large-scale water resource development and waste-water management, as these activities may impact breeding levels of mosquitoes that spread the disease.

WATER
- Increase access to clean water to encourage water use for good hygiene.
- Cover and/or treat water storage systems to limit mosquito habitat.

Additional Resources
Below we have provided a selection of information that may be helpful to you as you explore opportunities for collaboration. Please note that this is not an exhaustive list; you should seek to identify many more partners, resources, and documents at both a global level and specific to your country context.

If You Only Do ONE Thing
Encourage lymphedema patients to wash their swollen limbs and feet daily to prevent infection. Foot hygiene, in addition to gentle exercise and elevation of the swollen limb, can reduce swelling and result in decreased disability.

Partnerships and Programs Working in LF Control
- Global Alliance to Eliminate Lymphatic Filariasis
  http://www.filariasis.org
- Global Program to Eliminate Lymphatic Filariasis (WHO)
  http://www.who.int/lymphatic_filariasis/disease/en

Mapping of Geographic Distribution of LF
- The Global Atlas of Helminth Infections
  http://www.thiswormyworld.org

Information, Education, and Communication Materials
- Lymphatic Filariasis: Managing Morbidity and Preventing Disability (WHO)
  http://apps.who.int/iris/bitstream/10665/85347/1/9789241505291_eng.pdf
- Training materials on home-based care of disabilities caused by LF (WHO)
  http://www.who.int/lymphatic_filariasis/resources/training/en/index.html
- WHO Fact Sheet on LF: http://www.who.int/mediacentre/factsheets/fs102/en

Policy
- World Health Assembly Resolution 50.29
  http://www.who.int/entity/lymphatic_filariasis/resources/WHA_50%2029.pdf

Case Study: Lymphatic Filariasis Morbidity Control
Leogane, Haiti has high levels of lymphatic filariasis. Between 1995 and 1998, a study led by the US Centers for Disease Control and Prevention followed 175 people with lymphedema of the leg. In the year preceding the study, the patients reported an average of 2.1 episodes of secondary bacterial infections of the leg, resulting in fever, chills, pain, and swelling of the limb; these attacks typically lasted for two and half days.

The intervention focused primarily on hygiene and skin care. Clinic staff was trained to provide simple, clear and assertive messages about limb hygiene and skin care. Colorful booklets were provided to each lymphedema patient with messages about the importance of washing their swollen limbs and feet. Because people with lymphedema living in the area were often stigmatized, a “soap opera” was broadcast over local radio to educate the general public about lymphedema self-care.

The study found that when proper basic limb hygiene, skin care, and other self-care measures including limb elevation and exercise were implemented, the incidence of secondary bacterial infections decreased to 31% of earlier levels. A follow-up study two years later found that the incidence of secondary infections remained low and had even decreased further. (Addiss, et al 2010a)
References


Dahl, B.A. (2001). Lymphedema treatment in Leogane, Haiti: An effective, sustainable and replicable model program for lymphatic filariasis morbidity control. Emory University, Atlanta, GA.


Long-term reduction and control of disease, including the NTDs, requires lasting, sustainable, and appropriate WASH interventions. Therefore, to best serve their common target populations, WASH organizations and NTD control groups should ensure that WASH interventions meet these requirements. The only way to do that is to monitor or facilitate the monitoring of WASH services and disease over time.

Post-implementation monitoring of water services, sanitation systems, and hygiene behavior is particularly important because their long-term sustainability is a significant challenge in many developing and developed countries. Operation and maintenance of water supply infrastructure is an ongoing challenge in many contexts, as is ensuring water source quality and quantity, the hygienic use of toilets, and consistent practice of personal hygiene behaviors.

For the WASH sector, developing partnerships with organizations engaged in NTD control, as well as with local and national governments, can increase potential for connecting the impacts of WASH services to both the reduction of NTD prevalence and concrete and measurable health gains. It is possible that the WASH-preventable NTDs that are monitored regularly could serve as sentinel indicators for the functionality of WASH services.

**How Can Monitoring WASH Service Delivery Help Reduce NTDs?**

The WASH/NTD Roundtable Discussion hosted by the Bill & Melinda Gates Foundation in December 2012 identified mapping and monitoring as one of four important areas for collaboration (Freeman et al., 2013). Opportunities and next steps identified for mapping, data collection, and monitoring included:

- Creating a centralized resource for all available maps and data related to WASH and NTDs, for example, a web site to host mapping resources and provide links to the various sites where data already exists regarding WASH and NTDs, separately or together.

- Compiling a list of indicators currently used by the WASH and NTD control programs respectively, and determining gaps.

- Establishing common indicators for WASH and NTDs, realistic to mapping efforts (Freeman et al., 2013).

Monitoring requires asking: 1) if the interventions or activities planned for implementation are happening according to plan (project monitoring), and 2) if they continue to happen over time (post-implementation or services monitoring). Monitoring ensures that organizations are accountable to beneficiaries and donors, and is essential for tracking progress towards both project and organizational goals.

In order to account for sustainable WASH services and long-term health impact, WASH sector monitoring is shifting from a focus on coverage (counting program outputs and beneficiaries) to lasting and quality services. However, this approach is harder to do in practice, and may be more costly over time. Technological breakthroughs with mapping, cell phone data collection, and data management and sharing will make this easier in the near future (Global World Congress [GWC], 2013).

**Monitoring data can also be used for advocacy, planning, and inter-agency coordination.** Ideally, NGOs that conduct post-implementation monitoring of water systems, sanitation systems, and hygiene behavior in NTD-endemic areas should incorporate indicators of disease prevalence. These indicators can be obtained from entities that specialize in collecting this information (see Table 2 below). Results showing that WASH services have led to a reduction in disease prevalence can be used by both the WASH and NTD sectors to plan and adapt their future programming. These results can also be used to conduct effective advocacy to guide national NTD control efforts.
Examples of why monitoring is important: When WASH projects lead to increased disease

Some WASH activities can have unintended consequences that may result in increased risk of infection with an NTD. For example, latrines that are poorly maintained can actually result in increased risk for STH infection by becoming “vectors” for increased contact with feces from infected individuals (see Figure 1). Monitoring may uncover such unexpected outcomes. Such information should be used to advocate for revised programming.

Current Collaborative Monitoring Context

Several documented district-level collaborations between WASH and NTD stakeholders have helped to target WASH implementation in communities where WASH-preventable NTD burden is highest. These collaborations have helped to increase the visible impact of the WASH sector. However, they have been largely ad hoc, minimally formulated, and have not yet led to more deliberate long-term collaborations or joint post-implementation monitoring (Freeman et al., 2013).

Monitoring is conducted within the WASH and NTD sectors by a vast array of stakeholders, and requires harmonization of implementers, service providers, local governments, national governments, and international organizations (like the World Health Organization and UNICEF). Some in the WASH sector have called for harmonization and standardization of the monitoring landscape at both the national and the international levels (Dietvorst, 2013).

Long-term monitoring of WASH can be challenging because of the unclear roles of these various stakeholders and funding issues. The Sustainable WASH Forum report (Global World Congress, 2013) describes ideal roles for monitoring as follows:

- National government: monitors for national targets, and accredits responsible service providers.
- Local government: audits and monitors project outcomes and service delivery. Local government should also ensure that mechanisms exist for citizens to get involved and voice their concerns, thereby promoting greater transparency and accountability.
- Multi-lateral agencies: provide support in coordination, planning, and monitoring. Support for funding is important, as there will continue to be gaps. Make sure that governments are acting with transparency and accountability.
- NGOs: harmonize monitoring with governments and share information with each other.

Figure 1

Percentage of pupils with presence of E. coli on their hands at schools receiving hygiene promotion and water treatment (HP&WT), additional sanitation (HP&WT + San), and control schools at baseline and follow-up (Source: SWASH+, 2011.)

In this example, monitoring of a school WASH intervention in Kenya showed that students who benefited from construction of improved school latrines as well as hygiene promotion and water treatment had significantly higher fecal contamination on their hands (Figure 1) than students who did not benefit from construction of improved school latrines. This increased exposure to fecal contamination represents a much greater risk of disease. Another example of unintended consequences of WASH interventions: poor drainage around water points can lead to increased breeding grounds for mosquitoes that spread lymphatic filariasis.
Donors also play a role: WASH programs are frequently designed without adequate funding to enable long-term monitoring. Much monitoring and evaluation work for WASH, especially in developing countries, is still donor-driven and designed to meet the needs of outside agencies (UNICEF, 2009). Advocacy should be conducted among donors to raise awareness and commitment to monitoring.

Furthermore, monitoring must lead to learning. Resources and skills must be dedicated to learn from the data by analyzing shortcomings and incorporating changes to improve outcomes (GWC, 2013).

**Sources of Data**
National NTD control programs already measure progress towards achieving national NTD targets. This is achieved through periodic mapping and surveillance of the levels of disease occurring in specific geographical areas. Because levels of disease are often highest where WASH coverage is low, existing mapping efforts present valuable opportunities for joint monitoring or data sharing.

In addition, new mapping tools are emerging that may benefit both the WASH and NTD control sectors.

For example, a district-level mapping tool of water and sanitation coverage for Sub-Saharan Africa that can overlay WASH coverage with district level NTD treatment coverage data to identify districts with low WASH coverage and high disease prevalence is available at [http://www.ntdmap.org](http://www.ntdmap.org). Country-level maps of disease prevalence are available at [http://www.trachomaatlas.org](http://www.trachomaatlas.org) and [http://www.thiswormyworld.org](http://www.thiswormyworld.org), and district-level WASH coverage maps utilizing DHS data are also forthcoming to the site. These efforts can help WASH implementing NGOs more effectively target and plan WASH interventions appropriate to NTD endemic communities.

Table 1 highlights the specific roles that WASH activities play in reducing NTDs. Table 2 shows monitoring methods for NTDs and sources of existing data. Appendix C lists disease diagnostic information for your reference, which helps WASH practitioners understand how NTDs can be monitored. However, WASH practitioners are not expected to directly collect this information.

**Table 1: The Impact of WASH on the NTDs**

<table>
<thead>
<tr>
<th>WASH objectives for disease control</th>
<th>Enabling Activities</th>
<th>Desired behaviors</th>
<th>NTD-specific outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced amount of human feces in environment</td>
<td>Construction and maintenance of latrines</td>
<td>Elimination of open defecation practices</td>
<td>Reduced transmission of STH eggs</td>
</tr>
<tr>
<td>Daily practice of personal and environmental hygiene activities</td>
<td>■ Increase access to water in homes, schools and communities</td>
<td>Increased daily hand washing behaviors at key times</td>
<td>Elimination of bacteria and eggs from hands</td>
</tr>
<tr>
<td></td>
<td>■ Behavior change communication</td>
<td>Cleaning and upkeep of latrines</td>
<td>Increased use of latrines to contain feces that spread STH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased washing of lower limbs and feet affected by lymphedema</td>
<td>Removal of dirt and bacteria that can cause skin infections</td>
</tr>
</tbody>
</table>
Table 2: Monitoring the NTDs

<table>
<thead>
<tr>
<th>NTD-specific indicators</th>
<th>Data sources</th>
<th>Monitoring methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphatic filariasis</td>
<td>■ NTD Mapping Tool, WHO Interactive map,</td>
<td>■ Disease diagnostics (see Reference Table in Appendix C)</td>
</tr>
<tr>
<td>Trachoma</td>
<td>■ Local health clinic records</td>
<td>■ Access measures</td>
</tr>
<tr>
<td>Soil-transmitted helminthias</td>
<td>■ NTD Mapping Tool, WHO Interactive map,</td>
<td>■ Knowledge, attitudes and practice measures</td>
</tr>
<tr>
<td></td>
<td>■ Local health clinic records</td>
<td></td>
</tr>
<tr>
<td>Reduced intensity of parasitic infections</td>
<td>■ District-level surveys conducted by national</td>
<td>■ Morbidity measures</td>
</tr>
<tr>
<td></td>
<td>health system or research institutions</td>
<td>■ Access measures</td>
</tr>
<tr>
<td></td>
<td>■ Local health clinic records</td>
<td>■ Knowledge, attitudes and practice measures</td>
</tr>
<tr>
<td>Decreased morbidity caused by NTDs</td>
<td>■ District-level surveys conducted by national</td>
<td></td>
</tr>
<tr>
<td></td>
<td>health system or research institutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ Local health clinic records</td>
<td></td>
</tr>
</tbody>
</table>

References


Partnership Building

Effective partnerships take time and resources to build, but the benefits of cross-sector partnerships are many. Partnering with the NTD sector can increase the impact of WASH interventions on health through targeting areas at high risk for NTDs. In addition, joint monitoring can generate powerful data that provides the WASH sector with significant opportunities to conduct more effective advocacy for policy change and fundraising.

Benefits of WASH sector partnership with the NTD sector include the:

- Ability to make a measurable contribution to improved health and well-being of target populations.
- Potential inclusion of WASH in policies and plans of relevant government agencies.
- Opportunity to build and strengthen relationships with Ministries of Health and other health-sector players at various levels.
- Ability to influence and participate in key policy and planning processes related to NTDs and health.
- Successful advocacy for increased resources for WASH as a central package of interventions that accelerates attainment of improved health and related development outcomes in poor and marginalized communities.
- Contribution to the evidence base surrounding WASH approaches and impact as the basis for advocacy and a convincing “case” for increased WASH prioritization.

Assessing the Landscape for Partnerships

Once the WASH sector gains awareness of the NTDs in program areas of intervention, local partners may be able to help define the links between WASH interventions and NTDs in the communities served. WASH workers should approach relevant organizing bodies, other NGOs, and government partners to set up meetings to get acquainted. Areas of potential collaboration are many, and may extend beyond a program’s current and planned activities to conferences, training, monitoring and impact evaluation methods, and funding opportunities. Some meetings may lead immediately to joint activities, while others may require further dialog to produce measurable change. Fostering pathways of communication is also a valuable result of these meetings.

Although continual engagement with local partners is often difficult, those working in the WASH sector should strive to accept invitations from potential partners and participate in stakeholder group meetings. This keeps the lines of communication open over time, which can lead to eventual partnership or collaboration (Binder-Aviles, 2012).

Developing a Framework for Collaboration

In order to ensure that partnership in mutually beneficial, it is essential that partners agree upon the following:

- A shared vision.
- Common goals and objectives, and a coordinated strategy for achieving them.
- Coordinated outreach and education efforts (to ensure that disparate messages on topics of common interest do not detract from each other).
- Clear leadership roles.
- Clear financial responsibilities.

It is important that partners define these at the outset of collaboration.

WASH/NTDs Messaging

Appendix D: Advocacy Messaging provides examples of WASH/NTDs messaging that can be used in partnership building and influencing. Messaging has been designed to appeal to specific impacts of NTD control. Information included throughout this manual can also be used to create targeted messages for a specific audience.
Policy Landscape
When engaging with partners in the NTD sector, it is helpful to have an understanding of the policy context for NTD control at both the global and national levels. Appendix E, Policy Landscape for NTD Control provides more information.

Partnership in Action
The following case studies provide examples of successful collaboration between the WASH and NTD sectors. These examples can provide lessons for WASH organizations as they begin their partnership-building process.

WaterAid Tanzania’s Engagement on NTDs
WaterAid and the NTD sector share a common vision of reaching the most marginalized communities. WaterAid has recognized the potential for the impact of its activities on the control and even elimination of the NTDs.

In February 2013, Tanzania’s Water and NTD programs, and the Environmental Health Division of the Ministry of Health and Social Welfare convened to plan for better integration between the WASH and NTD sectors. With the National NTD Taskforce as the collaboration platform, the partnerships developed a strategy to improve the health of poor communities through WASH.

WaterAid Tanzania participated in key policy and planning processes through the development of the National Policy on the Elimination of NTDs. This process has given WaterAid the opportunity to build relationships with the Ministry of Health and other actors at various levels. WaterAid’s participation has increased the profile and relevance of environmental health within the NTD community. This has led to successful advocacy to increase resourcing and collaboration for WASH as a central component of NTD control. (Velleman, 2013)

References

Velleman, Y. (2013, September). What will it take for a WASH NGO to work on NTDs? [presentation] Presented at NTD NGDO Network Annual Meeting, Brighton, UK. Based on work carried out by WaterAid Tanzania, led by Dr. Ibrahim Kabole, Marko Msambazi, Godfrey Mpangala, Alex Ndama and Ferdinandes Axweso.
Appendix A: Acronyms and Glossary of Terms

Acronyms

CI: Confidence Interval
HIV: Human immunodeficiency virus
HPV: Human papillomavirus
LF: Lymphatic filariasis
MDA: Mass drug administration
NTD/NTDs: Neglected tropical disease(s)
OR: Odds Ratio
PCT: Preventive chemotherapy
SAFE: Surgery, antibiotics, facial cleanliness, environmental improvement
STH: Soil-transmitted helminths or helminthiasis
WASH: Water, sanitation, and hygiene
DALYs: Disability-adjusted life years
JMP: Joint Monitoring Program (WHO/UNICEF)

Glossary

at-risk population: Total population in the endemic area.

association: Statistical relationship between two or more events, characteristics, or other variables.

carrier: A person or animal without apparent disease who harbors a specific infectious agent and is capable of transmitting the agent to others. The carrier state may occur in an individual with an infection that is inapparent throughout its course (known as an asymptomatic carrier), or during the incubation period, convalescence, and post-convalescence of an individual with a clinically recognizable disease. The carrier state may be of short or long duration (transient carrier or chronic carrier).

case: In epidemiology, a countable instance in the population or study group of a particular disease, health disorder, or condition under investigation. May also refer to an individual with the particular disease.

certainty interval (CI): A range of values for a variable of interest; for example, a rate, constructed so that this range has a specified probability of including the true value of the variable. The specified probability is called the confidence level, and the end points of the confidence interval are called the confidence limits.

control: The reduction of disease incidence, prevalence, morbidity or mortality to a locally acceptable level as a result of deliberate efforts; continued intervention measures are required to maintain the reduction.

distribution: In epidemiology, the frequency and pattern of health-related characteristics and events in a population. In statistics, the observed or theoretical frequency of values of a variable.

elimination of disease: Reduction to zero of the incidence of a specified disease in a defined geographical area as a result of deliberate efforts; continued intervention measures are required.

elimination of infections: Reduction to zero of the incidence of infection caused by a specific agent in a defined geographical area as a result of deliberate efforts; continued measures to prevent re-establishment of transmission are required.

endemic disease: The constant presence of a disease or infectious agent within a given geographic area or population group; may also refer to the usual prevalence of a given disease within such area or group.

environmental factor: An extrinsic factor (geology, climate, insects, sanitation, health services, etc.) that affects the agent and the opportunity for exposure.

epidemiology: The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems.
eradication: Permanent reduction to zero of the worldwide incidence of infection caused by a specific agent as a result of deliberate efforts; intervention measures are no longer needed. Example: smallpox.

evaluation: A process that attempts to determine as systematically and objectively as possible the relevance, effectiveness, and impact of activities in the light of their objectives.

exposed (group): A group whose members have been exposed to a supposed cause of disease or health state of interest or possess a characteristic that is a determinant of the health outcome of interest.

health indicator: A measure that reflects, or indicates, the state of health of persons in a defined population. Example: the infant mortality rate.

high-risk group: A group in the community with an elevated risk of disease.

host: A person or other living organism that can be infected by an infectious agent under natural conditions.

hydrocele: swelling of the scrotum or penis as a result of Lymphatic filariasis (LF)

hyperendemic disease: A disease that is constantly present at a high incidence and/or prevalence rate.

incidence rate: A measure of the frequency with which an event, such as a new case of illness, occurs in a population over a period of time. The denominator is the population at risk; the numerator is the number of new cases occurring during a given time period.

mass drug administration: A modality of preventive chemotherapy (see definition) in which medicines are administered to the entire populations of an area (e.g., state, region, province, district, sub-district, or village) at regular intervals, irrespective of the individual infection status.

morbidity: Any departure, subjective or objective, from a state of physiological or psychological well-being.

neglected tropical diseases (NTDs): A group of primarily infectious diseases that thrive in impoverished settings, especially in tropical climates.

odds ratio (OR): A measure of association that quantifies the relationship between an exposure and health outcome from a comparative study; also known as the cross-product ratio. pooled odds ratio (OR): Aggregated odds ratios from a variety of studies.

prevalence: The number or proportion of cases or events or conditions in a given population.

preventive chemotherapy: The use of medicine, alone or in combination, as a public health tool against the neglected tropical diseases. Mass drug administration is one modality of preventive chemotherapy.

rate: An expression of the frequency with which an event occurs in a defined population.

risk: The probability that an event will occur, for example, the probability that an individual will become ill or die within a stated period of time or age.

risk reduction: The estimated percentage of reduction in risk of a given outcome. This is calculated by subtracting the odds ratio (OR) from one (1 – OR).

significance (statistical): The probability that the observed data would occur by chance. Referred to as the p-value.

transmission of infection: Any mode or mechanism by which an infectious agent is spread through the environment or to another person.

vector: An animate intermediary in the indirect transmission of a disease agent that carries that agent from a reservoir to a susceptible host.

Sources
http://www.cdc.gov/mmwr/preview/mmwrhtml/su48a7.htm
The Evidence Base: Quantifying the Association between WASH and the NTDs

The evidence base supporting the linkages between WASH and soil-transmitted helminthiasis (STH) is extensive. However, there have been gaps in the evidence base examining the impact of specific WASH interventions on disease indicators. A recent meta-analysis has been undertaken to close this gap by examining the impact of WASH interventions on STH. The results of this WASH/NTD meta-analysis, which are pending publication, are included in the table below.

Associations between WASH and STH

The WASH/NTD meta-analysis estimated the average association of WASH variables on infection with STH. The table below summarizes the results.

<table>
<thead>
<tr>
<th>WASH variable</th>
<th>Estimated % reduction in risk of infection</th>
<th>Odds Ratio</th>
<th>Confidence Interval (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of piped water source (ascaris)</td>
<td>60%</td>
<td>0.40</td>
<td>(0.39, 0.41)</td>
</tr>
<tr>
<td>Use of piped water source (trichuris)</td>
<td>43%</td>
<td>0.57</td>
<td>(0.45, 0.72)</td>
</tr>
<tr>
<td>Household treats its own water or uses treated water (all STH species)</td>
<td>64%</td>
<td>0.46</td>
<td>(0.37, 0.58)</td>
</tr>
<tr>
<td>Individual wears shoes (hookworm)</td>
<td>71%</td>
<td>0.29</td>
<td>(0.18, 0.47)</td>
</tr>
<tr>
<td>Soap use/availability in the home (all STH species)</td>
<td>34%</td>
<td>0.66</td>
<td>(0.39, 1.10)</td>
</tr>
<tr>
<td>Individual washes hands after defecation</td>
<td>46%</td>
<td>0.54</td>
<td>(0.25, 1.16)</td>
</tr>
<tr>
<td>Household has access to improved sanitation (all STH species)</td>
<td>35%</td>
<td>0.65</td>
<td>(0.56, 0.74)</td>
</tr>
<tr>
<td>Household has access to improved sanitation (trichuris)</td>
<td>40%</td>
<td>0.60</td>
<td>(0.46, 0.78)</td>
</tr>
<tr>
<td>Household has access to improved sanitation (ascaris)</td>
<td>48%</td>
<td>0.62</td>
<td>(0.44, 0.88)</td>
</tr>
<tr>
<td>Household has access to improved sanitation (hookworm)</td>
<td>7%</td>
<td>0.93</td>
<td>(0.67, 1.3)</td>
</tr>
</tbody>
</table>

Sources

This table summarizes the most commonly used diagnostics for detecting NTD infection, and the resources needed to conduct these diagnostics. This table is for informational purposes only; WASH practitioners are not expected to undertake diagnostic activities.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Diagnostic</th>
<th>Indicator</th>
<th>Personnel needed to conduct diagnostic</th>
<th>Sampling frame</th>
<th>Data collected at...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil-transmitted helminths</td>
<td>Stool sample (Kato-Katz method)</td>
<td>Presence and number of eggs in feces</td>
<td>Laboratory technician</td>
<td>Schools</td>
<td>District level</td>
</tr>
<tr>
<td>Lymphatic filariasis</td>
<td>Blood test</td>
<td>Level of microfilaria (baby worms) in blood</td>
<td>Laboratory technician</td>
<td>Communities</td>
<td>National Level</td>
</tr>
</tbody>
</table>
Appendix D: Advocacy Messaging

**Disease-specific Messages**
The following messages relate to specific WASH-impacted NTDs, and can be used for targeted advocacy to increase commitment to WASH for NTD control.

*Soil-transmitted helminthiasis (STH)*

**The Problem**
- Over a billion people are infected with one or more species of STH, and over 900 million children worldwide are at risk of infection (WHO, 2012a).
- Infection with STH causes up to 39 million disability-adjusted life-years (DALYs) annually (WHO, 2012a).
- 40 million women of child-bearing age are infected with hookworm in the developing world; the infection can cause serious complications during pregnancy and childbirth (Hotez, 2001).

**How WASH Services Address the Problem**
- Improved water supplies and/or sanitation have been shown to reduce illness from one of the STH worms, roundworm, by a median of 29% (Esrey et al., 1991).
- Recent comprehensive, systematic review and meta-analyses (Ziegelbauer et al., 2013; Strunz, et al., 2013) found that:
  - Wearing shoes reduces hookworm infection by an average of 71%.
  - Combined sanitation availability and use were associated with a reduction of infection of 46% for roundworm, 42% for whipworm, and 40% for hookworm; overall, combined sanitation availability and use were associated with a 49% reduction of infection with three species of STH.
  - Access to a household latrine was associated with a greater than 40% reduced risk of infection with roundworm and whipworm.
- Hand washing with soap at critical times, such as after defecation and before eating, can reduce risk of infection with all three STH species by greater than 30%.
- Households that have piped water access have a markedly reduced risk of infection (43% – 60%), though this may be related to other sanitation and hygiene practices as a result of having a water source close to home.

*Lymphatic Filariasis (LF)*

**The Problem**
- LF is the second leading cause of chronic disability worldwide (Wynd, Melrose, Durrheim, Carron, & Gyapong, 2007).
- Disabilities resulting from infection with LF result in stigmatization and isolation for sufferers (Wynd et al., 2007).
- Disabilities caused by LF result in significant economic loss; in India, it is estimated that $842 million US are lost to patients and households every year from treatment costs and reduced working time (Ramaiah, Das, Michael, & Guyatt, 2000).

**How WASH Services Address the Problem**
- Hygiene plays a critical role in decreasing disability caused by advanced stages of LF. Foot washing with soap helps to manage the debilitating swelling of the limbs (lymphedema) by reducing the frequency of painful secondary bacterial infections in affected limbs (WHO, 2013a).
- Management of wastewater, cesspits and septic tanks, as well as covering water containers, treating water bodies, and other interventions can help prevent breeding of mosquitoes that spread the disease (Bockarie, Pederen, White, & Michael, 2008).
Sector-Specific Messages
The following messages are helpful to incorporate into messaging targeting the finance, health, and education sectors. These messages provide key information and context about the issues in a way that appeals to sector-specific missions.

Economic Benefits of WASH for NTD Control
Tip: Remember that potential partner organizations are intent on efficient investment. Messaging that demonstrates cost-effectiveness and efficiency of programs and actions may be most effective.

Problem
■ The symptoms of NTD infection diminish or eliminate an individual’s chance to contribute to their local economy, as illness makes work difficult or impossible (Norris, Adelman, Spanchak, & Marano, 2012).
■ NTDs prevent children from attending and performing well in school, limiting opportunities to find employment later in life, and decreasing their contribution to the local and national economy (Norris et al., 2012).

Solution
■ Combined treatment and prevention has shown clear gains in the US and other developed countries. Improving sanitation and hygiene, and providing treatment to prevent hookworm led to an increase of more than 40% in future wage earnings in the early 20th century in the US (Bleakley, 2007).
■ The WHO estimates that meeting the water and sanitation Millennium Development Goals using low cost interventions would achieve an estimated rate of return between $5 US and $36 US on a $1 US investment (WHO, 2007).
■ Full household coverage with water and sanitation infrastructure substantially reduces child deaths. The average cost per life-year saved if households have complete water and sanitation coverage ranges between 65% and 80% of the annual gross domestic product per capita of developing countries (Gunther & Fink, 2011).

Health Benefits of WASH for NTD Control
Tip: Remember that the health sector’s perspective is one of improving and maximizing overall health outcomes. Messaging that demonstrates the total improved health outcomes as a result of WASH, NTD control, or combined programs may be most effective. Remember that NTDs and WASH are interrelated with other priority health topics, including maternal and child health, HIV infection, malaria, and tuberculosis.

Problem
■ 40 million women of child-bearing age are infected with hookworm in developing countries. The infection can cause serious complications during pregnancy and childbirth, such as maternal anemia and low birthweight in infants (Hotez, 2001).

Solution
■ Evidence suggests that while NTD treatment and hygiene education reduced intestinal worm infections when implemented individually, the rate of reduction in infection is significantly better when these two methods for disease control are combined (Global Network, 2013).
■ Data suggest that controlling soil-transmitted helminths could substantially reduce the infection rates and reduce health impacts of and improve treatment success for HIV/AIDS, tuberculosis, and malaria (Wolday et al., 2002; Harms & Feldmeier, 2002).

Educational Benefits of WASH for NTD Control
Tip: Remember that the Ministry of Education perspective is one of improving school attendance and performance, and maximizing overall educational attainment. Messaging that demonstrates how WASH programs and NTD control contribute to increased school attendance and performance may be most effective.

Problem
■ Girls are often disproportionately affected by NTDs, leading to decreased school attendance and educational outcomes among women (Courtright & West, 2004).
■ STH infections have a negative impact on children’s cognitive development. The typical side effects of NTD infections can make children too sick to attend school and unable to concentrate on lessons (WHO, 2012).
Solution
■ Studies show that treating STH infections is a cost-effective way to increase school attendance and can reduce school absenteeism up to 25% (Baird, 2012).
■ Girls are more likely to stay in schools where WASH facilities are available, especially when they reach menarche. WASH has been shown to have an even greater impact on the health and well-being of girls (UNICEF, 2013).

References


Global Policy for NTD Control

The vast global impact of the NTDS has been recognized, and support for NTD control at the national level is increasing rapidly. Since 1948, the World Health Assembly has adopted 68 resolutions to reduce the global burden of NTDS. A 2007 meeting of WHO’s global partners for NTD control in Geneva, Switzerland strengthened commitment from Member States and pharmaceutical companies to increase collaboration. In October 2010, the first WHO report on NTDs was released. The report demonstrated that control and elimination efforts are producing tangible results and included provision of WASH services as a part of the five-pronged strategy.

In January 2012, WHO published a roadmap for prevention, control, elimination and eradication of NTDS (WHO, 2012a). This roadmap was the inspiration for the London Declaration on Neglected Tropical Diseases, which was endorsed on January 30, 2012 by a group of donors, politicians, heads of global health organizations, and pharmaceutical industry leaders who formally committed their organizations to support the control or elimination of ten NTDS through providing drug donations, supporting research and development, and technical assistance (London Declaration, 2012). These organizations agreed to enhance control efforts through collaboration with other public, private, non-governmental and multilateral organizations in the NTD community and other sectors, such as water and sanitation (WHO, 2013).

In May 2013, formative policy for the control of the NTDS was adopted. The 66th World Health Assembly adopted Resolution 66.12, which, among other measures, urges Member States to:

- Ensure country ownership of prevention, control, elimination, and eradication programs for the NTDS;
- Expand and implement interventions and advocate for predictable, long-term international financing for activities related to control and capacity strengthening;
- Integrate control programs into primary health-care services and existing programs;
- Ensure optimal program management and implementation; and
- Achieve and maintain universal access to interventions and reach the targets of the roadmap (WHO, 2013).
## Global and Country-level Policies for the NTDs

<table>
<thead>
<tr>
<th>Disease</th>
<th>Relevant Global Policies – World Health Assembly (WHA) Resolutions and Global Programs</th>
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<tbody>
<tr>
<td>Soil-transmitted helminths (STH)</td>
<td>WHA 54.19⁹ (2001): Goal of a minimum of 75% of school-aged children receiving regular chemotherapy by 2010; encouraging member states to promote access to safe water, sanitation, and health education through inter-sectoral collaboration.</td>
</tr>
</tbody>
</table>
| Lymphatic filariasis (LF) | WHA 50.29⁸ (1997): Elimination of LF as a public health problem. Includes a call for increased access to safe water, sanitation and health education through intersectoral collaboration.  

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**References**


