

Integration of water, sanitation and hygiene for the control of neglected tropical diseases: a review of progress and the way forward

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A WHO roadmap to control, eliminate and eradicate neglected tropical diseases (NTDs) proposes a public health approach integrating diverse prevention and treatment interventions. Water, sanitation and hygiene (WASH) has long been a recognized, yet under-prioritized intervention of global disease control efforts. Through collaboration with the WASH sector, efforts have been made to integrate WASH in NTD control. This article reviews progress made in recent years, explores mechanisms supporting advances, and identifies priorities and next steps for accelerating WASH integration. This paper reveals advances in collaboration between WASH and NTD sectors, resulting in progress made across areas of programming; research; advocacy and policy; training and capacity building; and mapping, data collection and monitoring. Face to face meetings between WASH and NTD sector experts with a clear purpose of informing wider sector discussions, and the development of actionable joint workplans, have been particularly critical in supporting progress. Priority next steps include building capacity for WASH programming among NTD control teams, coordination at the country level, and strengthening the epidemiological evidence and operational learning for joint WASH and NTD interventions. In order to accelerate WASH integration in NTD control through strong collaborations with the WASH sector, the NTD sector could make use of strong data management skills and advocacy opportunities.

Keywords: Integration, Monitoring, NTDs, Sanitation, WASH, Water

Introduction

Neglected tropical diseases (NTDs), endemic in 149 countries, affect more than a billion of the worlds' most impoverished and marginalized people.¹ Although not commonly fatal, they are associated with chronic disability, malnutrition,^{2,3} stigma and social exclusion,^{4,5} poor mental health,⁶ and lost educational and employment opportunities.^{7,8}

A 2012 WHO roadmap for implementation (the roadmap) lays out the strategy to prevent, control, eliminate and eradicate NTDs.⁹ As recognized in the roadmap, success relies on the implementation of a public health approach integrating diverse prevention and treatment-based interventions. This includes preventive chemotherapy, interruption of transmission routes, and patient treatment and care. The roadmap, and many disease specific global strategies,^{10–12} have specified the need for improved water, sanitation and hygiene (WASH). The role of WASH as a means of interrupting numerous NTDs transmission pathways and supporting patient treatment and care has been well described and documented (see WHO 2015 Annex II).¹³ Several recent systematic reviews

have found evidence supporting improvements to water supply and quality, access to and use of basic sanitation, and adequate personal hygiene as relevant to reducing burdens of disease.^{14–16}

Despite a strong rationale for the integration of WASH programming for the control of NTDs, to date, disease intervention has relied predominantly on preventive chemotherapy and treatment. Disease specific targets and indicators of progress are largely related to treatment-based clinical interventions and mass drug administration (MDA).^{9, 17–19} However, in order to reflect the roadmap and achieve NTDs control, elimination and eradication targets, no aspect of the public health approach should be overlooked.²⁰ In order to identify priorities, next steps and mechanisms for improving WASH integration, this article reviews progress and efforts to improve collaboration among WASH and NTD sectors.

Integrating WASH in NTDs control: a review of progress

Collaboration between the WASH and NTD sectors provides an opportunity for accelerating and sustaining disease control efforts.

Although explicit efforts to initiate collaboration started in the early 1990s,²¹ challenges have long been evident.²² These challenges reflect the nature of, and funding for, NTD and WASH programming.²² NTD control, predominantly driven by MDA and focalized treatment interventions, operates at a national level through the Ministry of Health and requires intense stakeholder time commitments during sporadic periods of drug delivery and medical treatment, such as wound care and surgery. Programs are primarily targeted towards endemic areas, and funding streams, largely supported by pharmaceutical company drug donations, are relatively consistent. On the other hand, WASH programming occurs predominantly at a district or local level, has diverse considerations for targeting programs, such as coverage levels, accessibility and supply chains, and relies on constant stakeholder engagement from planning to maintenance. WASH funding requirements are also larger and more varied than those needed for MDA and outreach related NTDs control interventions; these include both capital expenditure for infrastructure and recurring expenditure on operations, maintenance and management. While both sectors aim to target the most marginalized communities, WASH typically operates within a rights-based framework,²³ cross-cutting health and development with diverse focuses on livelihoods and food security, economics, nutrition, childhood mortality, maternal health and HIV, whereas NTDs control has operated mostly within the health sector.

Despite these challenges, collaboration has progressed between the two sectors in recent years. In some cases, progress has been seen at a NTDs programming level, resulting in the successful integration of WASH interventions in NTD programs. In other cases, progress has supported WASH integration in practice through achievements in areas of research, advocacy and policy, training and capacity building, and mapping, data collection and monitoring.

Guinea worm and trachoma are examples of NTDs that have seen the successful integration of WASH as a key intervention in disease control. Spread through the consumption of contaminated drinking water, provision of safe drinking water has played a prominent role in Guinea worm control.²⁴ Global trachoma control efforts rely on the WHO-endorsed 'SAFE' strategy. F and E (facial cleanliness and environmental improvements) are deeply embedded in improved WASH. Successful WASH integration has contributed to Guinea worm being poised for eradication.²⁵ Although only partially realized for trachoma control, WASH integration is alleviating disease burdens. The F and E pillars of the 'SAFE' strategy tend to be deprioritized in comparison to S and A (surgery and antibiotic treatment). This has been in part because trachoma control is frequently the remit of blindness prevention departments under ministries of health, which often lack the expertise and capacity to implement WASH-related interventions. To support the full uptake of F and E, a collaborative toolkit, 'All You Need for F & E' has recently been released.²⁶ Despite varied levels of success, Guinea worm and trachoma provide strong cases for enhancing collaboration across other NTDs programs.

Other NTDs with particularly close ties to WASH have seen limited progress integrating WASH interventions in practice. A lack of rigorous evidence on the precise impact of WASH interventions for NTDs prevention and control has long been a challenge.²² Impact trials typically used to evaluate medical interventions for NTDs, such as drugs, prove challenging and costly when evaluating WASH

interventions.²⁷ Consequently, there has been some reluctance among NTD actors to integrate WASH without 'sufficient' trial evidence. In an attempt to identify and address gaps, systematic reviews and meta-analyses have recently been published on the relationship between WASH and trachoma,¹⁴ WASH and soil-transmitted helminths,¹⁶ and WASH and schistosomiasis,¹⁵ though evidence from gold-standard randomized controlled trials remain limited. A review on WASH and lymphatic filariasis is also forthcoming.

While the evidence accumulates, advocacy and policy efforts have garnered NTD sector support for WASH integration and cross-sector collaboration. WASH had its own chapter as a key intervention in the WHO's 3rd Report on NTDs progress.¹⁸ Before this, past progress reports and the roadmap merely mentioned WASH as an intervention, without targets being defined or insights into approaches to integrate provided. Since the launch of the 3rd progress report, WHO launched 'Water, Sanitation and Hygiene for Accelerating and Sustaining progress on Neglected Tropical Diseases: A Global Strategy 2015–2020' in August 2015.¹³ The strategy calls for joint WASH and NTDs efforts and, together with a strategic action plan, represents an unprecedented effort by the WHO to guide collaboration on WASH and NTDs across the agency at all levels, and among endemic countries and their partners. Considering WHO significantly influences countries' NTDs program planning, the release of the strategy is an important step towards improved collaboration.

Training and capacity building is a priority for effectively incorporating WASH in NTDs control, and NTD considerations in WASH programs. WASH and NTDs e-courses and manuals,^{28,29} as well as disease specific toolkits,²⁶ have begun to support training and capacity development. In order to collate and share information accessibly, an international knowledge center for digital resources related to NTDs is in development. This information portal will mirror the already tried and tested disease specific InfoLEP platform,³⁰ and will include a specific section on WASH. A process to collate an inventory of existing joint WASH and NTDs resources to populate the portal, as well as identify gaps and needs, has been initiated.

An opportunity to identify infrastructure-related capacity needs, inform programming, and align WASH and NTD sector goals lies in joint data collection, monitoring and mapping. Attempts to capitalize on identified opportunities have been made. The Global Trachoma Mapping Project (GTMP) launched in December 2012, and has since been collecting primary data on disease and WASH related indicators.³¹ The NTD Mapping Tool Project also now overlays NTD data with available WASH data.³² While both efforts have made strides in progressing joint data collection, monitoring and mapping, there are limitations. Challenges have arisen in aligning scales. The NTD sector collects data at national, regional, district and local levels while WASH sector data is usually available at national level, and more rarely at district level.

Efforts to improve joint data collection and monitoring are underway. An expert consultation using the Delphi method to determine priority, measureable joint WASH and NTDs indicators is in progress. To date, two rounds of consultation have been completed. Priority indicators with indications of feasibility of use in practice have been identified. At the World Water Week conference in Stockholm in August 2015, WASH experts were consulted on methods and findings, and invited to participate in further consultation to identify optimal next steps. The 6th meeting of the

NTDs Non-governmental Development Organizations Network (NNN) (established in 2009, the NNN is a global forum, which has grown into a major coordinating and influencing body within the NTD sector) in September 2015 provided an opportunity for the NTD sector to do the same. Consolidated findings of the expert consultation will be published, and key stakeholders, including the WHO, will work to mobilize the adoption and use of joint indicators in practice. Mainstreamed joint indicators will facilitate joint data collection, monitoring and mapping while encouraging WASH integration for NTD control in practice.

Reviewing progress so far on integrating WASH in NTD control has revealed that many advances have been made in recent years. Successful collaborations can be seen at the NTDs programming level and across areas of research, advocacy and policy, training and capacity building, and mapping, data collection and monitoring.

Mechanisms supporting improved WASH integration

In the past 3 years, several meetings and fora have improved communications between WASH and NTD communities (see [supplementary Table 1](#)). In particular, the WASH and NTDs Roundtable hosted by The Bill & Melinda Gates Foundation in Seattle, December 2012, facilitated discussion at a critical juncture for the NTD sector (The 2012 WHO Roadmap indicated WASH as an intervention for NTDs control, elimination and eradication). At this meeting, Global WASH and NTD sector representatives met to identify challenges and strategic opportunities for collaboration, coordination and consultation. The vision ‘disease free communities that have adequate and equitable access to water and sanitation, and that practice good hygiene’,²² was defined, and opportunities and next steps in four key areas—advocacy, policy and communication; capacity building and training; research; and mapping, data collection and monitoring—were identified.

Bringing together diverse WASH and NTD stakeholders to align goals and review common challenges resulted in a rationale for collaboration being well established and supported.²² This facilitated the formal establishment of a WASH Working Group within the NNN following its 4th annual meeting in Brighton in September 2013 (Sarah and Koporc, personal communication, 2015), where Seattle Roundtable outputs were presented and discussed.³³ Together, the Seattle Roundtable and presentation of outputs at NNN 4 progressed collaboration, particularly in areas of advocacy, policy and communication, capacity building and training, and mapping. They emphasized the mutual benefits of integration, advanced joint mapping initiatives (e.g. the GTMP and the NTD Mapping Project), and stimulated the development of joint manuals and e-courses for an online resource (www.washntds.org) (Ogden, personal communication, 2014).

As a follow-up to the Seattle Roundtable, the SHARE Research Consortium hosted a WASH and NTDs Roundtable in London, September 2014.³⁴ The London Roundtable brought together global leaders from research institutions, non-governmental organizations, and donor agencies. Ahead of the event, experts agreed that gaps in progress in two of the four areas identified in Seattle were most evident and pressing: research; and mapping, data collection and monitoring. They also expressed the lack of specificity and inability to track the next steps identified at Seattle as a limitation to progress. In order to address perceived gaps and limitations in progress, a

collaborative work plan (see [supplementary Table 2](#)) was developed at the London Roundtable, and work commenced to address priority work stream number 8: the development of joint indicators to support greater coordination of advocacy and programming.

The London Roundtable provided an opportunity to examine progress made since Seattle, and to maintain targeted momentum for collaboration. The development of a work plan with clear streams for uptake proved an effective means of supporting collaboration. Four work plan items identified in London (numbers 2, 4, 6 and 8) have since been progressed, indicating most success being seen where priority work streams were identified for uptake by pre-existing collaborative bodies, specifically the NNN. Successes advancing collaboration may in part be attributable to the London Roundtable capitalizing on the first meeting of the NNN WASH Working Group taking place in Paris the following week. With many of the London Roundtable participants present, the WASH Working Group would be developing terms of reference and identifying priority work streams at the 5th NNN meeting. London Roundtable work plan items number 2, 4 and 8 were successfully taken forward at the meeting.

The Seattle and London Roundtables provided opportunities for WASH and NTDs collaboration ahead of key NTD sector meetings. This ultimately enabled the preparation and alignment of WASH and NTDs communication, which informed NNN meeting sessions and discussions. Strategic alignment of collaborative opportunities supported the progression of outputs of collaborative efforts. Initiating a priority work stream at the London Roundtable also supported progress, ensuring key stakeholders were aware of and endorsed forthcoming efforts to progress work stream number 8, which will likely result in ease of uptake of the final joint indicators proposed.

Outputs of the Roundtables were further strengthened at the 6th NNN meeting in Abu Dhabi, September 2015. The WASH Working Group met to refine its work plan and prioritized alignment of the group’s work streams with the new WHO WASH Strategy action plan. Ahead of the meeting, work streams were already well aligned ([supplementary Table 3](#)). The evolution of shared priority work streams has long been supported through transparency, dialogue and opportunities to collaborate face to face. Ultimately, the WHO WASH strategy was informed by, and responded to, increasing interests and needs for WASH integration in NTD control.

While recent efforts have facilitated collaboration and contributed to integrating WASH in NTD programming, successes have yet to make significant impact at a disease control level for NTDs, and few WASH programs have integrated NTD control activities or explicitly targeted endemic areas. As seen with Guinea worm and trachoma, access to targeted funding, and disease specific strategies with clear WASH targets, will be essential to integration in practice. Nonetheless, the progress and alignment of WASH and NTDs collaborative efforts to date indicate mechanisms for coordination as important facilitators of successful WASH integration.

The way forward: priority activities and next steps

While there is a lot to commend in terms of progressing the integration of WASH for NTDs control, much remains to be done. Reviewing progress to date has revealed priorities and next steps for moving forward. In order to fully realize WASH integration, the sectors must continue working on efforts currently in

progress, such as developing joint indicators, resources, and information sharing platforms, as well as address emerging gaps (e.g., building evidence, supporting capacity development, and collaborating at a program level to ensure integration in practice). Despite needs for incorporating WASH in practice and building capacity, little progress has been made on the NTD sector's efforts to influence and fully engage WASH partners. Collaborative opportunities, such as the Roundtables, sought to target NTD sector proceedings.

Targeted advocacy, policy and communication will be critical to influencing and engaging the WASH sector. Going forward, the NTD sector should specifically prioritize support for the WASH sector to target programming in areas of high NTD endemicity. Achieving alignment of target communities would support the disease-specific control targets of ongoing NTD programs. The NTD sector should also capitalise on existing opportunities to influence the WASH sector. For example, the Global Goals' shift to 'universal' WASH access by 2030 puts an emphasis on the WASH sector to prioritize inequalities; NTDs prevalence is being proposed as a 'proxy for poverty and disadvantage'.³⁵ Supporting the WASH sector to target programming in areas of NTD endemicity would help to target WASH interventions to the poorest.

The Global Goals' focus on 'universal' access to WASH also further strengthens synergies between the sectors and creates an opportunity for aligning monitoring efforts and indicators. The NTD sector's strong data collection systems, as well as existing relationships with ministries of health and education, provide entry points for collaboration. If the NTD sector can support the WASH sector to enhance and align monitoring, existing limitations to joint data collection, mapping and research can be alleviated. Ultimately, the NTD sector should identify and capitalize on such opportunities.

Although progress is being made towards understanding how to implement WASH interventions for NTDs control, identifying and filling gaps in programmatic guidance is needed. Engagement with WASH sector actors to develop and refine approaches that target NTD-specific behaviors (e.g., facewashing for trachoma control) will require effective WASH programming and improved collaboration. Putting guidelines, strategies and programs into practice will then require sufficient capacity on the ground. Currently, efforts to build capacity are focusing on increasing knowledge, for example through the development of resources and tools; however, building programming capacity is equally important and should be prioritised next. The WASH sector's technical expertise is vital to training NTD actors and, where possible, could fill capacity needs through programmatic level collaborations. In addition to supporting key next steps for WASH integration in practice, there are numerous mutual benefits to realizing WASH and NTDs collaboration, including achieving programme objectives and shared long-term goals, widening funding options, and strengthening the evidence and our understanding of successful NTDs control interventions.^{13, 22}

Documenting experiences of WASH integration in NTDs control and strong programmatic level collaborations is important to building the case for accelerated progress. However, gaps in rigorous evidence on the effectiveness of WASH interventions for NTDs control remain problematic. While calls for strengthening the evidence are valid, the logistical challenges and ethics of randomized control trials for NTDs interventions must be acknowledged and respected.²⁷ Integrating WASH in NTDs control should not be

delayed in order to quantify impact when the rationale and benefits have been clearly articulated. Moving forward, we should collect epidemiological evidence when possible, but also recognize that the positive impact of WASH on NTDs is highly plausible, and thus, move forward with integration where possible. Research should also prioritize operational research and case base learning to ensure effective programming.

The launch of the WHO WASH Strategy for Accelerating and Sustaining progress on NTDs presents a particularly opportune moment to reflect on WASH integration for NTDs control. The momentum created by the release of the strategy, coupled with the WHO's influence on NTDs country programme planning, means we can capitalize on this critical moment in WASH and NTD collaboration to fully realize WASH integration across NTDs control.

While the WASH Working Group of the NNN has identified the need to ensure that progress is maintained, and gaps in work plans are identified and addressed in line with the WHO Strategy, efforts to collaborate with all actors should be made. Considering the NNN has grown to become a key sector coordinating body, engaging and connecting diverse stakeholders may be within their remit. In securing prompt sector alignment, the momentum and opportunity is ripe to see the new WHO strategy successfully put into practice. Ultimately, improved collaboration, communication and coordination will support accelerated progress towards universal access to WASH and NTDs control, elimination and eradication targets.

Conclusions

Integrating WASH in NTD control is critical to interrupting many disease transmission routes and providing patient treatment and care. While historically WASH has been an overlooked NTD control intervention, steps are being taken towards integrating WASH in NTDs programming. A review of progress reveals advances in collaboration between WASH and NTD sectors. In some cases, progress has been made at a NTDs programming level, resulting in the successful integration of WASH interventions in NTD programming. In other cases, progress has supported WASH integration in practice through achievements in areas of research, advocacy and policy, training and capacity building, and mapping, data collection and monitoring.

An analysis of mechanisms supporting WASH integration in NTD control identified the most successful progress to be seen where strong collaborations between WASH and NTD sectors were evident. Developing joint work plans accelerated advances in integration, and momentum was gained when efforts were strongly aligned, supported by key stakeholder consensus and identified with clear streams for uptake (particularly those that were collaborative in nature). Opportunities to collaborate face to face that had a clear purpose of informing wider sector discussions were particularly critical to ensuring the development and progression of well-aligned work streams.

Despite progress made, more remains to be done; particularly in building programming capacity, collaborating at a programmatic level, and building the evidence for joint WASH and NTD intervention. In order to accelerate the realization of successful integration of WASH in NTD control, the NTD sector could make better use of their unique data management skills and advocacy opportunities to more fully engage WASH partners.

Supplementary data

Supplementary data are available at International Health online (<http://inthealth.oxfordjournals.org/>).

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