The State of Handwashing in 2015

What we learned about handwashing in 2015

A recent Lancet paper ranked handwashing in 21st place as a leading cause of Disability-Adjusted Life Years (DALYs) globally, stating:

> *"The finding that no handwashing with soap is a global risk present in all regions is a reminder that this nexus of risks is relevant to all countries, not just the poorest."*[1]

As such, it is important that we continue to seek to both learn more about handwashing and apply the latest evidence to programs in meaningful ways. In this summary, we outline key themes and findings from 44 peer-reviewed handwashing-related research papers published globally in 2015 and specifically relevant in low and middle-income countries.

These findings can be categorized by five key themes:

- Benefits of handwashing with soap
- Measuring handwashing behavior
- Approaches to handwashing behavior change
- Handwashing station sustainability
- Handwashing in the emergency setting

The first half of this summary explores the overarching findings in each thematic area and includes useful resources where relevant. The second half outlines specific data and context.

Overarching Findings

Benefits of handwashing with soap

Handwashing with soap was shown to reduce diarrhoeal disease, intestinal helminth infection, undernutrition, stunting, maternal mortality, hand foot and mouth disease, hepatitis A, schistosomiasis, foodborne infections, phthalate esther exposure, and water supply contamination. We can use this information to harness synergies and drive the integration of handwashing promotion into diverse international development programs.

Measuring handwashing behavior

Handwashing behavior continues to vary widely. The challenge of achieving accurate measurement of true handwashing behavior change must be addressed when designing programs and initiatives.

Approaches to handwashing behavior change

The interplay of knowledge, emotional motivators, habit and handwashing "hardware" is important in achieving effective handwashing behavior change. In some instances, just the promotion of making handwashing hardware, such as tippy-taps, would be adequate to overcome infrastructural barriers.[45] Handwashing promotion programs should be designed accordingly. To help practitioners better incorporate these behavior change drivers into their handwashing programs, the Global Public-Private Partnership for Handwashing hosts an annual Behavior Change Think Tank. Findings and presentations from the most recent Think Tank can be found here.

Handwashing station sustainability

Evidence that basic handwashing infrastructure is proving to be sustainable is encouraging. Such approaches can be considered as part of handwashing behavior change programs.

Handwashing in the emergency setting

Hygiene is vitally important in emergency settings, and it is clear that handwashing promotion can be improved in this context. When designing programs, implementers should ensure practical, specific actions and clearly defined, measurable targets are in place.

Specific Findings

Benefits of handwashing with soap

Significant findings	Location
Diarrhoeal disease	
Handwashing promotion in the community in low- and middle-income countries was found to prevent about 28% of diarrheal episodes by increasing handwashing at key moments. Providing soap in interventions seems to increase the size of the effect. Handwashing promotion in child day centers and schools in high-income countries prevent about 30% of diarrheal episodes. Similar findings are likely in lower income countries but there is currently insufficient data.	Systematic review[2]
Handwashing by people living with HIV was associated with diarrhea reduction, but not specifically quantified.	Systematic review[3]
Caregivers' handwashing was associated with a 15% risk reduction in their children having diarrhea.	Afghanistan[4]

Handwashing before and after attending to children or sick persons, and handwashing between 30 seconds - 1 minute were protective against diarrhea.	Singapore[46]
Intestinal helminths	
Schoolchildren receiving handwashing interventions were 68% less likely to have intestinal helminth infections.	Ethiopia[5]
Children of parents who did not regularly wash their hands were more likely to have intestinal helminth infections	Ethiopia[6] South Africa[7]
Children attending a school with access to handwashing stations with soap were less likely to have helminth infections.	Kenya[8] India[9]
Nutrition and Stunting *(in addition to benefits from diarrhoeal disease and helminth infection prevention)*	
Children in households with a handwashing station were less likely to be underweight (adjusted odds ratio 2.08).	Ethiopia[10]
Children in households with a handwashing station were 61% less likely to be anaemic.	Ethiopia[5]
Children age 5 to 19 years who did not wash hands regularly before eating had significantly higher odds of undernutrition than children who did.	Ethiopia[47]
Caregivers' handwashing was associated with a 15% reduced risk of stunting.	India[11]
The number of times a child's hands were washed per day and the use of soap were two of seven independent predictors of stunting in children under age five. Each additional handwashing episode per day decreased the likelihood of child stunting by 24%. Never or rarely using soap during a child's handwashing was associated with a 3.6-times higher risk of the child being stunted.	Armenia[12]
Maternal Mortality	
Birth attendants' handwashing was associated with a 49% reduction in the odds of post-partum maternal death.	Southeast Asia[13]

Handwashing with soap is an intervention with very high impact on maternal mortality, accounting for 20% of all deaths that could be prevented, and second only to breastfeeding (30%).	South Africa[48]
Other Infections	
Hand, foot, and mouth disease Handwashing after playground visits was associated with an 18.7% reduced risk of infection.	China[14]
Hepatitis A A small association was found between handwashing and reduced risk of Hepatitis A.	China[15]
Schistosomiasis Research noted that soap is toxic to parasites that cause schistosomiasis, but the effect on infection risk is not quantified.	Systematic review[16]
P. Alcalifaciens Investigation of an outbreak of this foodborne bacterial infection identified that the infection was likely passed from mother to child after the infected mothers visited the toilet and then fed their children without washing their hands with soap.	Kenya[17]
Contamination	
Phthalate esther exposure Schoolgirl handwashing reduced urinary evidence of phthalate exposure.	Taiwan[18]
Contamination of water supplies Good handwashing techniques were found to be associated with reduced E Coli contamination of stored water supplies.	Peru[19]
School absenteeism	
Handwashing interventions may reduce school absence and respiratory infections. Evidence of impact on gastrointestinal infection or symptoms was equivocal.	Systematic review[20]

Measuring handwashing behaviour

A wide range of studies measured handwashing behavior at key moments. This is a snapshot of findings from of key papers addressing the question of handwashing frequency:

Measurement	Handwashing Moment	Country	Percent of frequency
Self-reported	After defecation	Afghanistan	<40%[4]
		Turkey	91%[21]
	Before food preparation	Turkey	67%[21]
		Peru	68%[22]
	Before eating	West Bank and Gaza Strip	85%[23]
		Turkey	61%[21]
		India	95%[24]
	Before feeding infants	Nigeria	30%[25]
	After contact with animals	US and Thailand	47% always 35% sometimes[26]
Observed	After defecation	Bangladesh	32%[27]
		South Sudan	38% water only 46% with soap[49]
	Before eating	South Sudan	80% water only 7% with soap[49]
	Presence of soap in households	Afghanistan India	70%[4] 49-77%[28]
	Handwashing at key moments	Peru	16%[22]

Challenges in measuring handwashing behavior

Further consideration was given to the challenge of measuring handwashing behavior, particularly the inaccuracies due to overestimation during self-reporting and observer bias during observed reporting.

Inaccuracies in self-reporting

A study in Ethiopia identified key factors associated with over-reporting: the perception of handwashing as a social norm, social desirability, and the personal tendency to overestimate other events. Health knowledge was associated with food- but not post-defecation-related over-reporting, while answering in the presence of a spouse or other adult did not seem to influence responses.[29]

Inaccuracies in observed reporting

A study in India repeated discreet spot checks in more than 10,000 household visits and over the course of a year observed an increase of soap availability from 49% to over 77%. This increase was despite hygiene not being addressed in the study. This suggests that observation can significantly confound results of longitudinal studies that use observation to measure results.[28]A

proposed approach to reducing this confounder is embedding electronic loggers in soap to measure handwashing.[30]

Relevance of these findings for implementers

- There continues to be a wide range of handwashing behavior.
- The potential for measurement inaccuracies should be taken into account. Handwashing program measurement should be carefully designed and consider options for most accurately measuring handwashing behavior and impact of programs.

Approaches to handwashing behavior change

The interaction of behavioural, environmental, and emotional factors were identified as significantly driving handwashing behavior change:

Significant findings	Location
Knowledge and Planning	
General knowledge about the importance/methods of handwashing (with self-efficacy)	Philippines[31] Cambodia[32]
Perceived susceptibility and fear of health consequences of not washing hands (including Ebola)	Philippines[31] Nigeria[33] Ethiopia[34] India[24] Guinea[35]
Plans in place to overcome potential barriers/self-efficacy	Haiti and Ethiopia[34]
Strength of commitment	Haiti[34]
Strength of public commitment combined with infrastructure promotion	Ethiopia[45]
Emotional Motivators	
Disgust	Haiti and Ethiopia[34] Zimbabwe[36]
Nurture	Zimbabwe[36]

Social Norms	Haiti and Ethiopia[34]
Desire to be clean/pure	Philippines[31] India[24]
Habit	
Habit (general)	Philippines[31]
Association with using latrines (as opposed to open defecation)	India[9]
Children adopting behaviors role modelled by adults	Philippines[31]
Enabling "hardware"	
Soap available near latrine	India[30]
Infrastructure in place	Ethiopia[37]
Teaching how to make tippy-tap	Ethiopia[45]

A selection of key barriers identified:

Barrier	Country
Knowledge about handwashing without self-efficacy	Haiti and Ethiopia[34]
Forgetting	Turkey[21] India[38]
Lack of convenient/available handwashing stations or soap	Turkey[21] India[38] Nicaragua[39]
Perceived inadequate time available for handwashing	Turkey[21] India[38]
Cost	Australia[40]

Relevance of these findings for implementers

- We should recognize the interplay of knowledge, emotional motivators, habit and handwashing 'hardware' in achieving effective handwashing behavior change, and design programs accordingly.

Handwashing station sustainability

The biggest finding in this category from 2015 was that most handwashing stations installed in healthcare facilities[41,42] and homes[43] in Kenya were functional at least 4 months later. Similarly, 83% of tippy-taps built by rural households in Ethiopia were still in use after 3 months and 80% of tippy-taps built for rural households in Zimbabwe were still in use after a year. [45,36]

Relevance of these findings for implementers

- Given the importance of handwashing infrastructure in achieving behaviour change, we can be encouraged by the evidence that even basic handwashing infrastructure is being found to be sustainable. Handwashing infrastructure should be considered as a part of handwashing promotion programs in addition to behavior change.

Handwashing in the emergency setting

A survey of experts discussed that low priority is often ascribed to handwashing in emergency settings, particularly during the initial period. When handwashing is addressed, there can be a lack of clearly defined, measurable targets and practical, specific implementation guidance. The respondents observed that hardware distribution tends to be prioritized over behavior change communication (though guidelines for most appropriate hardware can be lacking), and noted that contrary to current behavior change theory, the primary communication focus is health messaging (though this approach may have enhanced effectiveness in emergency settings).[44]

- Handwashing promotion can be improved in emergency settings—when designing programs, ensure practical, specific actions and clearly defined, measurable targets are in place.
- In response to a Hepatitis E outbreak in the refugee camps of Maban County, South Sudan, an intensive hygiene promotion and soap provision campaign was organized. One year after the outbreak, a cross-sectional survey showed that 85% of the survey respondents (female heads of households in the camps) reported exposure to handwashing promotion, but only 46% of the respondents washed their hands with water and soap after toilet use, and only 7% washed their hands before eating.[49] Further studies on local beliefs and more effective messaging may be needed in order to bridge the gap between exposure to handwashing promotion and actual handwashing behaviour.

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