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Viewpoint – Handwashing and COVID-19: Simple, right there...?

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ABSTRACT

COVID-19 is a disease with no proven pharmaceutical intervention and no proven vaccine. In such circumstances, prevention is all we have. The role of handwashing in the prevention of communicable diseases has been known for over a century, yet it remains severely neglected as a public health investment, to be periodically re-discovered during pandemic-scale infections. Over 26% of the global population has no access to a handwashing station in the home; for many low-income countries this proportion rises to over 50%. In other instances, the water is unaffordable or the supply has been shut off on account of unpaid bills. But when there is no water in the home or yard, or no mechanism for delivering enough water, good hand-washing is extremely difficult. Well before COVID-19, global cost-benefit analyses of water and sanitation investments, with benefits measured in time-savings as well as health, showed significant net benefits in all sub-regions of the developing world. This Viewpoint paper argues that, in the current crisis and its aftermath, it is imperative for governments and donors to prioritize and generously fund affordable, reliable, and accessible water services in underserved regions of the world. More than ever before, this is a foundational investment for health, dignity and development.

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As of July 4, 2020, the official global death toll from COVID-19 had risen to 528,364.¹ We have all been told again and again that frequent and thorough handwashing, wearing masks, and vigilant social distancing are the most important protective measures we can take to disrupt the transmission pathways for coronavirus. The US Centers for Disease Control and the World Health Organization list frequent handwashing at the top of their COVID-19 prevention advice for the public.² In March, *The Guardian* carried an article on hand hygiene and COVID-19, in which a distinguished biologist says: “Here’s one thing you can do to lower your risk”;³ *The New York Times* quoted a professor of emergency medicine: “Your hands carry almost all your germs to your respiratory tract”.⁴ The March 20, 2020 Google doodle honored Dr. Semmelweis, the “father” of handwashing as a way to control disease transmission, depicting in real time the multiple separate steps of correct handwashing.⁵

I’ve been a water, sanitation and hygiene (WASH) researcher for many years, and I have been thinking about handwashing among

the world’s poor as COVID-19 rips through low- and middle-income countries. The media has been full of stories and photographs conveying the impossibility of social distancing in crowded settlements from Mumbai to Monrovia; much less attention has been devoted to the handwashing challenge. Frequent and thorough handwashing is especially important when people have to live shoulder-to-shoulder, near trash heaps and open drains. But how do you wash your hands frequently if you have no soap and water in the home? This is the case with >26% of the global population, and with >50% of the population in sub-Saharan Africa and Oceania (Brauer, Zhao, Bennitt, & Stanaway, 2020).

Consider the 263 million people who have to fetch water that takes 30 min or longer to collect, or the 581 million that depend on unprotected wells, springs or lakes for their domestic needs (WHO/UNICEF, 2017). Or consider the relatively fortunate households with piped water through taps shared with neighbors; certainly an improvement, but about a third of piped households in Africa and half in Asia, including those with private taps, receive only intermittently-supplied water (Kumpel & Nelson, 2013). Members of such households cannot soap up under running water every time they eat, come home with the groceries, clean their child’s feces, or feed their animals. They must store water in metal and plastic containers between their walks to water, or between one supply cycle and the next. They have to pour or ladle water from the storage container into a bowl and then wash their hands with soap – ideally – in that bowl of standing water. If they have a designated handwashing station with e.g. a “tippy-tap”, that is a

E-mail address: isharay@berkeley.edu¹ <https://coronavirus.jhu.edu/map.html>; Accessed 7/4/2020.² <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>; <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>.³ <https://www.theguardian.com/world/2020/mar/18/keep-it-clean-the-surprising-130-year-history-of-handwashing>.⁴ <https://www.nytimes.com/2020/03/13/world/how-to-wash-your-hands-coronavirus.html>.⁵ <https://www.google.com/doodles/recognizing-ignaz-semmelweis-and-handwashing>.

significant improvement in access (Brauer et al., 2020; Contzen, Meili, & Mosler, 2015), but they are still washing hands in stored, and often standing, water. It is extremely difficult in these conditions to wash thoroughly, going between the fingers, scrubbing the thumbs, cleaning under the nails. It is impossible to wash the way handwashing is promoted in the media, with the hands lavishly lathered all the way to the wrists, next to a gushing faucet. Yet there is little public health guidance on how to wash “properly” with limited or stored water.

If the water is not easily accessible, then the per-person use is usually inadequate for health and hygiene. If the home is small, the household is also storage constrained – so its members prioritize the limited stored water for drinking and cooking. A study from Mozambique found that a standpipe (public tap) 15 min away resulted in an average per-person per-day water use of 11 L, but when the source needed a more than 2-h roundtrip the daily use dropped to 4 L per person; washing and hygiene practices accounted for most of the difference (Cairncross & Cliff, 1987). A study from East Africa found that significantly less water was used when the source was not on the premises; drinking and cooking uses were non-discretionary but unpiped households used only half as much water for hygiene as did piped households (Thompson et al., 2001). If there are overall water shortages, such as the shadow of Day Zero that loomed over Cape Town in 2018 and 2019, access for the poor becomes especially restricted.⁵

When I worked in rural India, I experienced this frugal approach to handwashing. The family I lived with had a communal tap and soap. But in the dry season, the between-supply spells could last for almost a week. By tacit agreement, we did not wash our hands with soap except after the toilet, because if we used soap, we would need even more water to get the soap suds off. Our carefully hoarded water had to stretch. (I got sick, of course). This is the lived reality of low-income households in low-income countries – when there is no water in the home or yard, or no mechanism for delivering enough water, you cannot practice good hand-washing. COVID-19, we are told, cannot tell a celebrity from a commoner, a prince from a peasant. Piped water is far more discriminating.

Even where there is a reliable water infrastructure, the water has to be affordable for frequent handwashing. Many utilities face pressure for cost recovery via user fees and other market mechanisms (Bakker, 2014; Banerjee, Foster, Ying, Skilling, & Wodon, 2010), often coming from private-public partnership arrangements in the Global South, so cash-poor households have become acutely conscious of the cost of their water (Von Schnitzler, 2008). Haffajee, Chopra, and Sanders (2007), for instance, found that poor households on prepaid water meters, under which automatic water shutoffs were a constant threat, had worse hand hygiene habits than those on traditional meters for which the bills were due at the end of the month.

Water affordability is not exclusively a “less-developed country” problem. US cities, in particular older cities such as Baltimore, Chicago and Detroit have seen thousands of water shutoffs on account of unpaid bills (Swain, McKinney, & Susskind, 2020).⁶ Residents had to buy or “borrow” water while they were shut off, and, as always, expensive or inaccessible water results in compromised hygiene. Baltimore and Detroit suspended new shutoffs as their COVID-19 numbers began to rise and as governors declared states of emergency. Reconnecting disconnected households has not been easy, however; meters are broken, pipes are damaged, and >2500 households in Detroit remained without running water as late as

March this year.⁸ The disconnected households were disproportionately low-income and/or people of color (Sabourin, 2016). Households with water affordability challenges are having to choose between manageable water bills and protecting themselves from a disease with no known cure.⁹

Hygiene and sanitation among the poor are routinely promoted through “nudges” (c.f. Thaler & Sunstein, 2017), social marketing and behavior change campaigns, all of which are important where the barriers to better hygiene are educational, cultural, or psychological (e.g. Scott, Curtis, Rabie, & Garbrah-Aidoo, 2007; Ejemot-Nwadiaro, Ehiri, Arikpo, Meremikwu, & Critchley, 2015; Vujcic, Ram, & Blum, 2015; Hsan, Naher, Griffiths, Shamol, & Rahman, 2019). But the convenience and affordability of the water supply, often rather casually described in behavior change studies, matter enormously; social marketing cannot make the water accessible, and behavior change efforts are no substitute for reliable and affordable water. I’m guessing that many WASH researchers such as myself have encountered skeptical study participants at the receiving end of yet another “behavior change” campaign or “educational” effort on handwashing: “Don’t talk about my hands. Big people can be clean, small people like us can’t be clean.”

When we are confronting a disease with no proven pharmaceutical intervention and no proven vaccine, prevention is all we have. The role of handwashing in the prevention of communicable diseases has been understood for over a century, yet it languishes as one of the “forgotten foundations” of health policy (Bartram & Cairncross, 2010) until periodically re-discovered during pandemic-scale infections. Well before COVID-19, global cost-benefit analyses of water and sanitation investments, with benefits measured in time-savings as well as health, and costs measured as upfront capital costs as well as annual maintenance, showed significant net benefits in all sub-regions of the developing world (Hutton, 2012). To meet the Sustainable Development Goals for universal access to basic soap-and-water supplies would cost an estimated USD 1.1 billion per year from 2016 to 2030 for urban areas and USD 0.9 for rural areas, including the cost of maintenance and replenishing of supplies (Hutton & Varughese, 2016).¹⁰ Handwashing investments, if they succeed, are exceptionally efficient; pre-COVID estimates are in the range of \$23/disability-adjusted-life-year (DALY) averted in India and China (Townsend, Greenland, & Curtis, 2017). Even for basic service levels, however, Hutton and Varughese (2016) suggest that full cost recovery from the lowest income quintiles in low-income countries is not feasible, so targeted subsidies will be needed. But with few exceptions, neither public nor private sector investments at the necessary scales have been mobilized for the urban and rural poor.

The biologist cited in *The Guardian* (see above) says that the message about handwashing is empowering because: “It’s simple. It’s right there and doesn’t cost anything.” For a sizable segment of the world, none of this is true. At this time, most WASH expenditures globally are borne by households, through user fees, tariffs and self-provisioning, especially where there are no utility-based services (Bartram & Cairncross, 2010). Yet for many other preventive health measures, it is expected that states and donors will step in with subsidies, because of the externalities inherent in the containment of infectious diseases. The rolling back of state investments in backbone infrastructures, especially those for health and social protections, in high- and low-income countries alike

⁸ <https://www.metrotimes.com/news-hits/archives/2020/03/20/more-than-2500-homes-in-detroit-still-without-water-after-city-pledged-to-restore-service-amid-coronavirus-outbreak>.

⁹ <https://www.bbc.com/news/amp/world-us-canada-52384622>.

¹⁰ As the authors themselves say, the uncertainty range in these estimations is high, and therefore these figures should be treated as “ballpark”. A range of technology options for the handwashing station are also included, some of which may be less conducive to frequent daily use than others.

⁶ <https://www.theguardian.com/global-development/2019/aug/06/extreme-water-stress-affects-a-quarter-of-the-worlds-population-say-experts>.

⁷ <https://www.bridgemi.com/urban-affairs/detroit-shut-water-11800-homes-year-most-are-still>; <https://www.baltimoresun.com/politics/bs-md-ci-water-shutoffs-20150416-story.html>.

has been “sharply regressive” (Marmot, 2020: 1414). In the current crisis and its aftermath, it is imperative for governments and donors to generously fund affordable, reliable, and accessible water services in underserved regions of the world (including in the USA). Immediate measures, such as the provision of conveniently-located free-standing handwashing stations, should be prioritized for the poorest communities (see Biswas et al., 2017). These investments will promote health, dignity and development. The demand-led employment they create could, with time, help revive the devastated global economy. Water for handwashing is a public good, and public goods call for public investments.

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References

- Bakker, K. (2014). The business of water: Market environmentalism in the water sector. *Annual Review of Environment and Resources*, 39, 469–494. <https://doi.org/10.1146/annurev-environ-070312-132730>.
- Banerjee, S., Foster, V., Ying, Y., Skilling, H., & Wodon, Q. (2010). *Cost recovery, equity and efficiency in water tariffs: Evidence from African utilities. Policy Research working paper; no. WPS 5384*. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/476671468210593814/Cost-recovery-equity-and-efficiency-in-water-tariffs-evidence-from-African-utilities>.
- Bartram, J., & Cairncross, S. (2010). Hygiene, sanitation and water: The forgotten foundations of health. *PLOS Medicine*, 7. <https://doi.org/10.1371/journal.pmed.1000367> e1000367.
- Biswas, D., Nizame, F. A., Sanghvi, T., Roy, S., Luby, S. P., & Unicomb, L. E. (2017). Provision versus promotion to develop a handwashing station: The effect on desired handwashing behavior. *BMC Public Health*, 17, 390. <https://doi.org/10.1186/s12889-017-4316-6>.
- Brauer, M., Zhao, J. T., Bennitt, F. B., & Stanaway, J. D. (2020). Global access to handwashing: Implications for COVID-19 control in low-income countries. *Environmental Health Perspectives*, 128. <https://doi.org/10.1289/EHP7200>.
- Cairncross, S., & Cliff, J. L. (1987). Water use and health in Mueda, Mozambique. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 81, 51–54.
- Contzen, N., Meili, I. A., & Mosler, H.-J. (2015). Changing handwashing behaviour in Southern Ethiopia: A longitudinal study on infrastructural and commitment interventions. *Social Science and Medicine*, 124, 103–114. <https://doi.org/10.1016/j.socscimed.2014.11.006>.
- Ejemot-Nwadiaro, R. I., Ehiri, J. E., Arikpo, D., Meremikwu, M. M., & Critchley, J. A. (2015). Hand washing promotion for preventing diarrhoea. *Cochrane Database of Systematic Reviews* (9). <https://doi.org/10.1002/14651858.CD004265.pub3> CD004265.
- Haffajee, F., Chopra, M., Sanders, D. (2007). The problem of handwashing and paying for water in South Africa. Municipal Services Project, Occasional Paper 13. https://www.municipalservicesproject.org/sites/default/files/PapersNo13_0.pdf.
- Hsan, K., Naher, S., Griffiths, M. D., Shamol, H. H., & Rahman, M. A. (2019). Factors associated with the practice of water, sanitation, and hygiene (WASH) among the Rohingya refugees in Bangladesh. *Journal of Water, Sanitation and Hygiene for Development*, 9, 794–800. <https://doi.org/10.2166/washdev.2019.038>.
- Hutton, G. (2012). *Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage*. WHO/HSE/WSH/12.01. Geneva: The World Health Organization.
- Hutton, G., & Varughese, M. (2016). *The costs of meeting the 2030 sustainable development goal targets on drinking water, sanitation, and hygiene*. Water and Sanitation Program: The World Bank.
- Kumpel, E., & Nelson, K. L. (2013). Comparing microbial water quality in an intermittent and continuous piped water supply. *Water Research*, 47, 5176–5188. <https://doi.org/10.1016/j.watres.2013.05.058>.
- Marmot, M. (2020). The art of medicine: Society and the slow burn of inequality. *The Lancet*, 395, 1413–1414. [https://doi.org/10.1016/S0140-6736\(20\)30940-5](https://doi.org/10.1016/S0140-6736(20)30940-5).
- Sabourin, C. (2016). Responding to the Detroit water crisis: The Great Lakes Water Authority and the city of Detroit. *Journal of Law and Policy*, 51, 305–327.
- Scott, B., Curtis, V., Rabie, T., & Garbrah-Aidoo, N. (2007). Health in our hands but not in our heads: Understanding hygiene motivation in Ghana. *Health Policy and Planning*, 22, 225–233. <https://doi.org/10.1093/heapol/czm016>.
- Swain, M., McKinney, E., & Susskind, L. (2020). Water shutoffs in older American cities: Causes, extent and remedies. *Journal of Planning, Education and Research*. <https://doi.org/10.1177/0739456X20904431>.
- Thaler, R., & Sunstein, C. (2017). *Nudge: Improving decisions about health, wealth and happiness*. New York: Penguin Group.
- Thompson, J., Porras, I. T., Tumwine, J. T., Mujwahuzi, M. R., Katul-Katua, M., Johnstone, N., & Wood, L. (2001). *Drawers of water II*. London: IIED. <https://pubs.iied.org/pdfs/9049IIED.pdf>.
- Townsend, J., Greenland, K., & Curtis, V. (2017). Costs of diarrhea and acute respiratory infection attributable to not handwashing: The cases of India and China. *Tropical Medicine and International Health*, 22, 74–81. <https://doi.org/10.1111/tmi.12808>.
- Von Schnitzler, A. (2008). Citizenship prepaid: Water, calculability, and technopolitics in South Africa. *Journal of Southern African Studies*, 34, 899–917. <https://doi.org/10.1080/03057070802456821>.
- Vujcic, J., Ram, P. K., & Blum, L. S. (2015). Handwashing promotion in humanitarian emergencies: strategies and challenges according to experts. *Journal of Water, Sanitation and Hygiene for Development*, 5, 574–585. <https://doi.org/10.2166/washdev.2015.009>.
- WHO/UNICEF. (2017). Annual Report, Joint Monitoring Programme for Water, Sanitation and Hygiene (JMP). <https://washdata.org/sites/default/files/documents/reports/2018-07/JMP-2017-annual-report.pdf>.