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## Handwashing Stations and Supplies for the COVID-19 response

### KEY TAKEAWAYS

- Especially in an emergency response, the adaptation, repair, rehabilitation and maintenance of existing infrastructure should be prioritized.
- Handwashing station designs should be appropriate for the intended use case and needs to consider health, design features and local procurement as well as user experience and accessibility.
- The design of the tap is essential to limit cross-contamination between hand washers and with 1 m distance between users should be given a primary consideration in the context of the Covid-19 response.
- UNICEF aims to contribute to creating healthy and sustainable local markets where possible, hence products are generally procured locally.
- Different kinds of soap and alcohol-based hand rub are available as hand cleaning agents. Chlorine-based solutions, ash and handwashing with water only are not recommended, but can be considered as last resort.

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## 1. INTRODUCTION

Handwashing with soap, when done correctly, is critical in the fight against COVID-19, but 3 billion people have no ready access to a place to wash their hands with soap at home [27]. WHO released interim guidance on 1 April 2020, recommending to all Member States to make hand hygiene facilities in front of public and private commercial buildings as well as at all transport hubs obligatory [28]. In particular people in densely populated settings will benefit from improved hand hygiene infrastructure at home and in public places.

This document provides an overview of available handwashing station designs for policy makers, implementers and procurement officers. It places special importance on local manufacturing and procurement and complements existing technical [29] and programmatic [30] guidance on WASH and COVID-19.

This Fact Sheet was developed in the context of the Covid-19 response jointly by UNICEF's Supply Division and Programme Division and includes products known to be available on the market and prototypes in May 2020. This is a living document to be updated as the need arises based on feedback from Country Offices and new technology development. This rapid Fact Sheet will be complemented later in 2020 by a more detailed product guide and stand alongside local compendia developed by UNICEF country offices and/or local partners (see Section 5) as well as other existing compendia. [3,6-7]

## 2. NEED DESCRIPTION AND PROGRAMMATIC RELEVANCE FOR UNICEF

Low-cost, rapidly scaled up solutions for hand hygiene made from local materials such as the tippy tap can foster community engagement and ownership, but evidence suggests that these handwashing facilities might break easily and it's unclear whether they lead to sustainable behaviour change. [37] Higher-end, more durable, attractive and disability accessible commercial products are more expensive and not as easy to manufacture and repair locally but might be more likely to encourage sustained behaviour change. [40]<sup>1</sup>

This document will help the reader to make an informed choice which handwashing station design to introduce and procure. In the context of COVID-19, handwashing is critical wherever a people meet and touch surfaces, but handwashing remains also a key hygiene practices to prevent many other water-borne diseases. This includes homes, but also public places such as schools, health care facilities, workplaces, markets, places of worship and public transportation hubs. The handwashing station needs to be intuitive and easy to use for all, including people living with a disability and children. The provision, operation and maintenance of handwashing stations needs to go in hand with behaviour change programming to promote uptake and strengthening of the enabling environment to ensure sustainability of the facilities and their use.

Especially in an emergency response, the adaptation, repair, rehabilitation and maintenance of existing infrastructure should be prioritized. The refilling with water and supplies (soap, towels, etc.) and maintenance of the handwashing facility should follow an established protocol with clearly defined roles, responsibilities and accountabilities for critical tasks as well as budget assigned for critical supplies and spare parts. Regular monitoring and adequate regulation need to be in place to ensure the long-term operability of the infrastructure.

## 3. KEY CONSIDERATIONS FOR CHOOSING A HANDWASHING STATION DESIGN

The global indicator for hygiene in household settings is access to handwashing stations with soap and water on premises.<sup>2</sup> The WHO/ UNICEF Joint Monitoring Programme defines a handwashing station as a device that: *“may be fixed or mobile and include a sink with tap water, buckets with taps, tippy-taps, and jugs or basins designated for handwashing”* [27].

<sup>1</sup> In the context of Covid-19, the handwashing facilities will likely be provided “externally” by governments or third parties, so demand and use need to be carefully considered.

<sup>2</sup> For health care settings the indicator is a functional hand hygiene facility (with water and soap and/or alcohol-based hand rub) are available at points of care, and within 5 metres of toilets.

Handwashing stations should be appropriate for the intended user(s) or the use case (households, markets, health care facilities, schools, places of worship, public transportation hubs, refugee camps, etc.). Three sets of criteria should be taken into consideration. First, the station should enable recommended handwashing. Second, the design should be adapted to the local context, allowing local manufacturing, management and repair and adequate use of water and soap. Third, the design should provide a pleasant, convenient user experience for all users.

**Health.** Handwashing stations are not meant for dispensing drinking water and should be clearly labelled as such. The facility should easily accommodate soap (e.g. soap dish, dispenser for liquid soap, bottle with soapy water). In the current pandemic, the setup of multiple-user facilities should allow a minimum 1-meter (or as directed by local authorities) free space and/or partition walls between users to allow physical distancing and minimize the risk of human to human transmission. Taps that limit the risk of cross-contamination through touch, for example elbow/forearm operated taps, elbow/foot pumps or time delay self-closing taps, should be prioritised (see Table B) especially in public settings. Consider extending the handle of existing taps so they can be operated using the elbow or forearm. Where such taps are not available, consider installing a structure made from metal or PVC pipes which allows the user to pedal-operate the tap and soap dispensers.<sup>3</sup> [2] Another option to avoid cross-contamination is to provide a smaller container with a whole attached to the main outlet. Once the container is filled with water, the tap is switched off. The water flowing out of the container is used for handwashing until it runs out.

The design should allow easy regular cleaning/ disinfecting of taps, basins, soap dispensers and frequently touched surfaces. Refilling of consumables such as soap and water storage should be easy and safe. Likewise, if basins drain into emptying buckets/containers, those collection containers should be easily accessible. If these are manually emptied, personal protective equipment such as impermeable apron, rubber gloves, medical mask and eye protection should be used in health care and other public facilities. If no drainage is possible on site, soakaway pits to pour or pipe the wastewater into should be built using rocks/coarse gravel. The size of the soakaway pit depends on the volume of liquid to be disposed of and the type of soil in which the pit is excavated. Infiltration rate varies greatly from 1500-2400 litres/m<sup>2</sup>/day in gravel, coarse and medium sand down to 120-240 litres/m<sup>2</sup>/day in silty clay loam and clay loam [47].

**Design features and local procurement.** The handwashing station can be temporary or permanent installations, which impacts the selection of materials used for construction as well as the cost and durability of the station. Temporary solutions can usually be constructed with low-cost materials such as a bucket or a bottle with tap and are quick and usually simple to build. Permanent handwashing stations may consist of a wood or steel frame or concrete work depending on the availability of materials and skills. The durability of the materials, including their heat resistance and protection against rust (iron) and rotting (wood), needs to be considered. In

## KEY CONSIDERATIONS

**Use case:** setting, permanent/ temporary handwashing station

Health:

- Minimal touch handling water and soap
- Ease to clean taps and basin
- Drainage of wastewater
- Minimum 1m distance between users, or as directed by local authorities (Covid-19 specific)

Design features and local procurement:

- Connection to water source, water usage and storage capacity
- Local availability of construction materials and spare parts
- Durability of construction materials
- Skills required for local manufacturing, repair and maintenance

User experience and accessibility:

- Accessibility
- Acceptability and ease to use
- Attractiveness to consumers

<sup>3</sup> Several local versions of these constructions are being shared currently, for example using [PVC pipes](#) and [metal bars](#).

some cases, mobile handwashing stations might be preferable over permanent infrastructure as they can be stored in a secure location when not in use (e.g. at night or during school vacations). Mitigation measures to limit theft, especially of consumables, should be considered in the choice of materials, design of the station and location of installation.

The handwashing stations must have access to low turbid water (ideally less than 20 NTU) either through connection with water mains or manually filling. An independent storage container such as a plastic or concrete tank, jerrycan or a bucket is usually beneficial to include even if connected to the mains, especially if water supply is intermittent. Such storage should be closed to avoid the spread of insects or other vectors, and to avoid the intrusion of dust or debris. Transparent containers allow good monitoring of the water levels. The capacity of water storage container depends on the number of handwashes and will influence the frequency of refilling. Handwashing can consume up to 2 litres of water if the water is left running during the recommended 20 seconds of hand scrubbing. However, water conscious usage, or water saving taps/ technologies, can bring the consumption down to 0.3 – 0.6 litres per handwash. Where possible, consider connecting handwashing stations to rainwater collection systems to use rainwater as supplementary/ main source of water for handwashing.

Adaptation, repair and rehabilitation of existing hand hygiene infrastructure for the context of the Covid-19 outbreak can include temporarily plugging taps and/or installing partition walls between taps to allow users to maintain physical distance while handwashing. Partition walls only need to cover the top body part (hip to head) and can be built using local material like plywood, plastic sheet (hard) or suspended tarpaulin. Partitions should be installed at a width of at least 800mm to accommodate wheelchair users. Replacing existing taps with taps that limit touch can additionally reduce the risk for cross-contamination.

**User experience and disability accessibility.** The handwashing station must be relevant, accessible for persons with disabilities and acceptable for the intended user of the facility, considering height, colour, attractiveness and the ease of the product use. Accessories such as mirrors, high-quality soap and behaviour

### Box: Building behaviour change into the hardware

Integrating behaviour change and hardware provisions opens up a range of opportunities how the hand hygiene hardware itself can facilitate adequate hygiene behaviours. This box provides a few examples and ideas:

- If the handwashing station is located where it is hard to avoid (e.g. walk around them), very visible and it takes no additional time to get to the handwashing place, they are more likely to be used. Where this is not possible nudges such as footprints on the floor, crowd control barriers and/or signs to guide people's movements can be used. These have been shown to increase handwashing compliance by 86%.
- In bathroom settings, people on average spend longer washing their hands if a mirror is placed above the handwashing place.
- Most soap companies promote their products as beauty products, not health products. If the soap smells nice, the facility is clean, attractive and easy to use, the chances are higher it actually gets used. Note that some artificial fragrances might cause allergic reactions and hence should be avoided.
- Information about handwashing at the station might promote adequate handwashing but has shown to be less effective with men. Doable instructions (at least 20 seconds) might help orient users.
- Surprising or thought-provoking information about handwashing as well as suggestions of activities that make handwashing more fun (e.g. lyrics of a song or dance moves) have proven to be effective in some contexts. In the context of Covid-19, emphasize the that handwashing is done to protect loved ones/ the community, rather than oneself.
- Reinforcing a social norm by providing information about how others are complying to it, is a powerful driver of behaviours. For example, this could be a sign saying "93% of people who shopped at this market yesterday washed their hands upon entering the market", but avoid this information if compliance is low.

change messages might attract attention and increase the use of the facility, especially among children and young adults. Recommended height of basin and tap for children is between 500 and 700 mm and it must not exceed 850 mm for wheelchair access. Soap should be placed within reach of wheelchair users. Placing the soap, hot and cold tap and foot pump consistently at an agreed location will help visually impaired users to locate them.







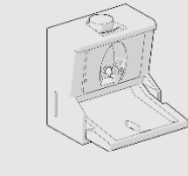
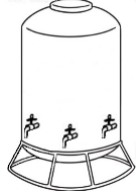
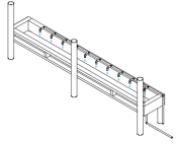
The amount of space the handwashing station occupies should be considered, especially in crowded informal urban settings or camps. The handwashing station should be strategically located so they can't be missed and are difficult to avoid during daily routines (e.g. at entrances of buildings, near toilets, etc.).<sup>4</sup> Where possible select locations for handwashing stations that are already accessible for persons with disabilities, i.e. flat level ground, ramps, no steps and door widths that are 800 mm. WHO/UNICEF guidelines for WASH in school [31] and WHO guidelines for WASH in Health [32] give more details on handwashing station number and location requirements.

Table A *Categories of handwashing stations* lists a summary of handwashing stations to guide local selection, procurement and construction. The table focuses on categories of models, not on specific brands/products. Variations can be found within these categories based on local and/or commercial availability, preferences, desired longevity of the facility and user case/ setting. These variations will range significantly in cost. More designs and design details such as drawings, bill of quantities, advantages and disadvantages are available in Chapter 8 (References).

Table B *Category of taps for handwashing stations* lists taps used in various handwashing stations around the world, including in humanitarian contexts. Some taps listed below are especially recommended to limit cross-contamination, a primary consideration for choosing the type of tap in the context of the Covid-19 response.

<sup>4</sup> For key moments to wash hands, please refer to [UNICEF's Handwashing M&E Toolkit](#).

TABLE A: CATEGORIES OF HANDWASHING STATIONS











Type	Tippy tap	Raised bucket with tap/ outlet	Two buckets suspended	Suspended bottle or bag with outlet/ hole/ pop-up plug	Sink with tap	Foot pump sink	Purpose-built all-in-one system	Free standing water tank with tap(s)/ outlet(s) (public facility)	Tube with outlets (group facility)
Image/ illustration									
Recommended use cases	Household	Household	Household	Household	Household Community Institutions	Household Community Institutions	Household Institutions	Community Institutions	Community Institutions
Type of facility structure	Temporary, mobile	Temporary, mobile	Temporary, mobile	Temporary, mobile	Permanent, immobile	Temporary, mobile	Temporary, mobile	Temporary, mobile	Permanent or temporary, immobile
Durability	Low	Low to medium	Low to medium	Low to medium	High	Medium	Medium to high	Medium to high	Medium to high
Connection to water source	Individual storage tank	Individual storage tank	Individual storage tank	Individual storage tank	Connected to storage tank or piped network	Individual storage tank	Individual storage tank	Storage tank	Individual storage tank or piped network
Examples of tap(s) or water outlet(s)	Hole with foot lever	Drum tap, regular tap, hole with plug/ pin	Drum tap, regular tap	Hole with pin, commercial product	Any type of tap	Hose connected to foot/elbow pump	Built-in tap	Any type of tap. Often self-closing tap or foot pump	Any type of tap or perforated pipe with 1 valve
Number of taps or water outlets	Single	Single	Single	Single	Single	Single	Single	Single or Multiple	Multiple, variable by type
Basin	No	Feasible	Yes	Feasible	Yes	Yes	Yes	Yes	Yes
Examples of construction materials	Jerry can or bottle, rope, poles or timber, nails	Bucket or Jerry can with tap	Two buckets and rope	Bottle and rope; commercial	Basin and piping	Buckets, hose, basin; mass-produced	Commercially available plastic product;	Metal/plastic tank, wood/ steel stand, mass-	Storage container, piping, fittings, basin, taps or perforated tubes,

				product available		commercially available products	several other designs under development	produced commercial product available and others are under development	iron sheets, tube bars/timber, wheels
Construction skills	Basic skills	Basic skills	Basic skills	Basic skills	Basic skills	Advanced skills	Basic skills	Advanced skills	Advanced skills
Installation	<1 day	<1 day	<1 day	<1 day	<1 day	<0,5 day	<0.5 day	1-3 days	1 - 3 days
Product lifetime+	1-2 year	1 – 2 years	1 – 2 years	1-2 years	10 + years	1-2 years	2-4 years	2-4 years	5-8 years
Drainage	Soil infiltration	Basin and soil infiltration	Basin, wastewater collection	Basin and soil infiltration	Basin and drain, and soil infiltration	Basin, wastewater collection	Basin, wastewater collection and soil infiltration	Basin, wastewater collection and soil infiltration	Drain and soil infiltration
Price indication*	Low (<10 \$)	Low (<10 \$)	Low (<10 \$)	Medium low (<50 \$)	Medium low (<50 \$)	Medium to high (100 -250 \$)	Medium low to high (10 -200 \$)	Medium to high (50 -450 \$)	Medium to high (50 -1,000 \$)
Example of available commercial products	n/a	Various	n/a	SaniTap SpaTap	Various	SereneLife Portable Sink KTC-INDIA Pedal Operated Hand Wash Sink	HappyTap Handeman Kiddiwash e-Smart Hand Hygiene Station S Model	PolyJohn handwashing station Gemini-two user hand washing unit	n/a
Example of prototype products and reference						Jengu Handwashing Unit (ref. 14)	Mrembo Handwashing Device (ref. 13, 16)	Oxfam's Promotion and Practice Handwashing Kit (ref. 15)	
References, see Chapter 8	3, 6, 9, 10, 20	3, 6, 8	4, 5, 7	6, 7,19, 20, 25	2,6	6, 21	6, 7, 11, 12, 16, 22, 23, 26	2, 24	1,6

+ depending on how heavily used it is and how well maintained

\* Price indication, price range depends on available local material for procurement; price might have variations; for budgeting purpose a more detailed local market assessment might be needed. Operation and Maintenance is not included in the price indication and might need to be assessed on local market conditions.

TABLE B: CATEGORY OF TAPS FOR HANDWASHING STATIONS

	Recommended to limit cross-contamination				Not recommended to limit cross-contamination					
Type	Elbow or forearm operated tap	Time delay self-closing tap	Tap with sensor (hardwired or battery-operated)	Diaphragm pump, foot or elbow operated	Drum tap (often plastic)	Ball valve tap with extended handle	Butterfly tap (ball valve)	Regular tap (screw down valve)	Self-closing tap	Water dispenser tap (lever or push button)
Example										
Cross-contamination likely?	No, by allowing to open/ close the tap with elbow or forearm	No, by closing without need to manipulate; often allows operation with the elbow or forearm	No, due to hands-free water supply	No, by controlling water flow with foot or elbow	Yes	Maybe, although not designed to be operate using elbow or forearm, it is possible	Yes	Yes, it requires extended manipulation as the handle needs to be turned several times	Yes, tap needs to be manipulated to keep water flowing	Yes
Water saving compared to conventional taps	No	Might reduce water wastage especially in public facilities	Yes, water only runs when it is needed	Yes, user needs to press the pump for water to flow.	No	No	No	No	Yes, suitable for low pressure systems 0.5 - 30 m head (<3 bar)	Yes, button needs to be pressed continuously for water to flow.
Ease of use and accessibility	Might require user guidance. Recommended for disability accessibility.	Strong spring system, which might be difficult to use for younger children and	Not usable during power outages/ when battery is empty. Recommended for	May be difficult to operate for children and people with disabilities	Easy to operate. As tap handle is small, may be difficult to operate for persons with disabilities.	Easy to operate. Due to long handle, recommended for disability accessibility.	Easy to operate, requires only a 90-degrees turn. May be difficult to operate for	May be difficult to operate for persons with disabilities	Might not be easy to use for children and persons with disabilities	May be difficult to operate for persons with disabilities



		persons with disabilities	disability accessibility.				persons with disabilities.			
Durability +		Calcium deposits should be removed regularly	In average battery lasts up to 10 years	Requires installation of flexible hose prone to damage	Not intended for heavy public use	Extended use may result in the holding nut becoming loose	In average use for 6 years		Calcium deposits should be removed regularly	Not intended for heavy public use
Other observations	Especially recommended for health facilities and other public facilities. Should be available in most markets.	Self-closing must have a time delay providing user with enough rinsing time. Should be available in most markets.	Modern design; more expensive, but water and energy-effective results in cost savings in long term. Might not be readily available in lower income countries.	Product cannot be directly attached to conventional pipe fittings. Might not be readily available in lower income countries.	Simple plastic tap intended for household use, attached to a bucket or other plastic container	Common tap in most hardware store. It is easy to operate, requiring turning the handle 90°.		Readily available in hardware shops, this is a standard household tap often made of brass	Commonly used on tap stands and other water distribution points to prevent or reduce water waste; plastic model currently being prototyped	Commonly used for drinking water dispenser

+ depending on how heavily used it is and how well maintained

## 4. PROCUREMENT<sup>5</sup> AND MARKET CONSIDERATIONS

UNICEF aims to contribute to creating healthy and sustainable local markets where possible and in collaboration with partners. Therefore, UNICEF Supply Division (SD) does not, in general, procure handwashing stations, elements and consumables globally or regionally. SD has however Long-Term-Arrangements (LTA) for hygiene supplies such as soap and hand sanitizers, (both part of the Emergency Supply List (ESL)) with the primary focus of kit packing (e.g. WASH & Dignity Kit). Procurement of handwashing stations and supplies is fully delegated to UNICEF Country Offices. UNICEF may either procure directly, indirectly via Procurement Service (PS) or support governments procurement.

Availability of handwashing stations and elements locally will depend both on local production and importation of products and should be evaluated prior to assessing which solution to include locally (e.g. assessing market shortages) and launching a procurement process. Local market scanning (high level market assessment) based on estimated volume/demand helps to better identify potential suppliers either already existing suppliers who are already providing this kind of commodities or potential suppliers such as plastic producers or others. Tools such as Expression of Interest (Eoi), Industry Consultation, Market Information sharing, Tenders are designed to provide market insights and share specific business opportunities. Those tools might be used at different timings for short-term or long-term planning or market shaping activities.

Selection of the specific handwashing station and supplies to fit the programme requirements will be done through a solicitation process as per the Supply Manual guidance.<sup>6</sup> Note that a waiver for bidding could be considered in case of an emergency situations or exigencies of the service that do not permit the delay attendant upon the issuance of invitations to bid or requests for proposals (more details should be considered under Supply Manual - Solicitation Process).<sup>7</sup> It is highly recommended to discuss the best solicitation strategy with your Supply and WASH team.

Furthermore the office could consider different strategies to procure those facilities, elements or consumables: in case of a rapid emergency response (in line with the emergency classification), the office can consider an emergency process to fast track procurement while as a second phase the office might consider tendering locally and/or regionally for Long-term Arrangements (LTAs) by making use of competition in the market.

Material lists and bill of quantities for the solution are included in the reference documents under chapter 8. References, which can be adapted and could be useful for budgeting purposes. Multiple commercial products are available for offshore/ regional procurement as per table A. For this it is important to re-confirm the production status of the product and to ensure that mass production is available. In addition, in case of offshore and local procurement it is recommended not only to focus on the finished handwashing facility, but also to consider supply chain elements especially in terms of quality assurance, transport/shipping (e.g. packaging, stackability of frames, protection of taps/connectors, weight/volume, storage), storage, installation, operation and maintenance, spare parts and consumables. Those elements should be included in a tender.

Finally, the office should consider sustainable procurement elements especially in terms of new vs re-habitation/re-fitting, waste management (e.g. water, plastic buckets etc.) and the dependency on consumables (e.g. soap, water scarcity).

## 5. LOCAL INNOVATIONS

The previous sections summarized types available and tested at global level and at scale as well as models developed for mass-production. However, in the context of the Covid-19 response many new models of locally designed and built handwashing stations emerge. These local innovations may be able to close potential gaps

<sup>5</sup> Procurement considerations are most relevant for UNICEF internally than to external partners.

<sup>6</sup> [UNICEF Supply Manual Guidance](#)

<sup>7</sup> [UNICEF Supply Manual – Solicitation Process](#)

in product designs which are readily available, durable, adequate for the local context and attractive to use. UNICEF country offices and other local actors are documenting those designs.

- UNICEF India – Covid-19 Handwashing With Soap (HWWS) Facilities. April 2020. [Available here.](#)
- Aquamor (Zimbabwe) - Teaching Ecological Sanitation in Schools. How to make simple hand washing devices. [Available here.](#)
- UNICEF and GIZ - Scaling up group handwashing in schools - Compendium of group washing facilities across the globe. [Available here.](#)

## 6. CONSIDERATIONS FOR CLEANING AGENT, HAND DRYING AND WATER QUALITY

A number of options for hand cleaning supplies are available. These include different kinds of soap (bar of soap, liquid soap, foaming soap, detergent, soapy water) and alcohol-based hand rub. Chlorine-based solutions, ash and handwashing with water only are not recommended, but can be considered as last resort.

**Soap.** The quality of soap matters for the handwashing experience. High-quality soap foams quicker and thus makes lathering and hand rubbing easier. Several resources are available to guide local soap making ([CAWST](#) and [WEDC](#)). Commercial availability of soap in most locations is high and past experience with local soap production is not very positive. Therefore, partnerships with private sector soap suppliers should be prioritized over local soap making.

Washing with contaminated bar soap is unlikely to transfer pathogens. [46] Liquid soap is more expensive and less environmentally friendly<sup>8</sup> compared to bars of soap. If dispensers are used for liquid soap, foaming dispensers should be considered. Although more expensive, the foaming results in less soap required per handwash. Hence, the investment will pay off especially in handwashing stations that are frequently used. For soap dispenser see reference [18]. Where bar or liquid soap is unavailable, a soapy solution can be produced from laundry detergent. For instructions, see reference [44].

**Alcohol-based hand rub.** Alcohol-based hand rub (ABHR) should contain a minimum of 60% alcohol. WHO provides [guidance on local production of ABHR](#). ABHR is less effective if applied on wet hands. Therefore, it should be kept separately from handwashing facilities with soap and water to avoid uncertainty and potential bad practice. Highly concentrated alcohol needs to be handled with care. It is toxic if ingested. It needs to be kept out of reach for children. Children must be supervised by an adult when using ABHR. In terms of Dangerous Goods, it is the responsibility of suppliers to provide the Material Safety Data Sheet highlighting the dangerous good classification of the product for transport and storage.

**Chlorine-based solutions, ash and other not-recommended cleaning agents.** The evidence that chlorinated water effectively removes pathogens from hands is weak [39]. Hence, WHO recommends that chlorinated water should only be used in an emergency setting and strategies to change to soap or ABHR should be implemented [38]. Chlorine-based solutions for cleaning surfaces should contain 0.1% hypochlorite or 0.5% hydrogen peroxide. Please refer to guidance by WHO [35] and CDC [36] on how to prepare chlorine solutions locally. Where no water and soap are available, ash can be used as a last resort. Ash lowers the ph-value of the skin, creating an unfavourable environment for pathogen. Yet, there is no evidence available to date that it is effective against the novel coronavirus. If ash is used, it should be taken from a clean environment free of human or animal feces. Likewise, handwashing with salty water alters the ph-value of the skin, but no evidence is available regarding the effectiveness against this specific virus. Handwashing with water alone is not recommended as it does not effectively remove pathogens from hands, but still preferred over no handwashing at all.

<sup>8</sup> Made from chemical ingredients, liquid soap consumes 20 times more energy than bar soap in production and is heavier to transport due to its higher water content. Also, users tend to use more liquid soap than they require to wash their hands and more than bar soap. [45]

**Hand drying.** Reusable towels may become a point of contamination if previous user have not washed their hands adequately. Likewise, the level of residual moisture left on the hands after washing and drying is an important determinant of pathogen being transmitted from hands to surfaces and vice versa. Therefore, the ability to dry hands after washing is important for effective hand hygiene. [41] Clean, single-use towels are recommended by WHO. If those are unavailable, consider air-drying hands with an air-drying system or by shaking the hands dry. [42]

**Water quality.** Water for handwashing does not need to be of drinking water quality. Handwashing provides a net benefit (removal of pathogen) even if the water is contaminated (<1000 E. coli per 100 mL) [33]. Soap alone has shown to be more important than the water quality for handwashing [34]. This means, water from handwashing or laundry could be re-used. In many countries re-using water is culturally unacceptable and hence feasibility should be evaluated for adequate planning.

## 7. REFERENCES

### HANDWASHING STATION DESIGNS

1. UNICEF, GIZ (2016). Scaling up group handwashing in schools - Compendium of group washing facilities across the globe. Link: [http://www.fitforschool.international/wp-content/ezdocs/giz\\_unicef\\_Catalogue\\_WashingFacilities\\_FINAL\\_WEB\\_new.pdf](http://www.fitforschool.international/wp-content/ezdocs/giz_unicef_Catalogue_WashingFacilities_FINAL_WEB_new.pdf)
2. UNICEF India (2020). Covid-19 Handwashing with soap (HWWS) facilities. Compendium of Indicative Layouts, Designs and Cost Estimates, April 2020. Link: [https://www.indiawaterportal.org/sites/indiawaterportal.org/files/covid-19-handwashing\\_with\\_soap\\_facilities-april\\_2020-unicef.pdf](https://www.indiawaterportal.org/sites/indiawaterportal.org/files/covid-19-handwashing_with_soap_facilities-april_2020-unicef.pdf)
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#### FOR MORE INFORMATION CONTACT

For support with regards to local procurement of handwashing stations (identification of appropriate solutions, sharing or review of specifications in preparation of tender, sourcing, etc..) please contact UNICEF's Supply Division's WASH Unit ([washsupply@unicef.org](mailto:washsupply@unicef.org)). For updating this document with additional locally driven designs and/or sharing implementation experience using this Fact Sheet, please contact UNICEF's Programme Division's WASH Section, Janita Bartell ([jbartell@unicef.org](mailto:jbartell@unicef.org)).