

# sustainable sanitation alliance

Discussion Paper

## WASH & Health

### Prevention is the Best Medicine – WASH in Times of COVID-19

Version 1.0

#### Introduction

Water, sanitation and hygiene (WASH) is an essential component to “ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment” (Agenda 2030, preamble). The intrinsic link between health and WASH becomes evident in many facets: The combat against many Neglected Tropical Diseases (NTDs) requires WASH in the prevention and even treatment. Controlling zoonoses assigns WASH a central role in the comprehensive “One Health” approach. And today more than ever, the COVID-19 pandemic illustrates the importance of hygiene to prevent infectious disease outbreaks.

The Sustainable Sanitation Alliance (SuSanA), an international network of partner organisations and individual members, plays an important role at the WASH and health linkage. Direct and indirect connections are anchored in most of SuSanA’s 13 working groups. While none of them focuses on health only, all of them contribute to services, processes or approaches that are fundamental to achieve sustainable WASH and health impact. This discussion paper visualizes current opportunities and activities from the SuSanA community and highlights synergies between SuSanA working groups and several key issues of the health sector. Furthermore, it is a starting point for dialogue and collaboration with / for implementing organisations of the health sector. In this regard, the discussion paper intends to address the following topics:

- I. **No Health without WASH.** Water, sanitation and hygiene are the foundation for healthy humans, animals and a healthy environment. Section 1 describes the interlinkages between WASH and health through the lens of the problems and through the lens of the solutions, discovering entry points for both sectors to collaborate more closely in order to achieve sustainable health.

- II. **SuSanA as Network for Sustainable Solutions.** SuSanA will continue to be a cornerstone in shaping the agenda and promoting a healthy world based on sustainable sanitation systems and hygiene management. Section 2 discusses how SuSanA can best act to facilitate this process.
- III. **Annex: Glossary of Key Health Terms and Actors.** Section 3 provides an overview about terms and actors helping WASH actors to understand colleagues from the health sector.

#### Content

<b>I. No Health without WASH: How WASH contributes to key health topics</b>	2
Public Health Risks	2
<i>Zoonoses</i>	
<i>Neglected Tropical Diseases</i>	
<i>Large-Scale Outbreaks</i>	
Approaches for Risk Reduction and Prevention	3
<i>One Health</i>	
<i>Health Care Facilities</i>	
<i>(Hand) Hygiene Behaviour</i>	
<i>Comprehensive WASH</i>	
<b>II. SuSanA, a Network for Sustainable Solutions</b>	5
Beyond SuSanA	5
Within SuSanA	5
Timetable	7
<b>III. Annex: Glossary of Key Health Terms and Actors</b>	9

## I. No Health without WASH: How WASH contributes to key health topics

The Sustainable Development Goals (SDGs) provide an overall framework, but in order to achieve long-term impact, WASH actors need to look beyond “their” SDG 6: SDG 6.1 and SDG 6.2 are access targets and therefore output-oriented. The impacts of WASH are manifold and are a precondition for achieving various other SDGs (see SuSanA Interlinkages Document). Indicators e.g. under SDG 3.9 measure the substantial reduction of the number of deaths and illnesses from contaminated soil and water.

### 1. Public Health Risks

The sources for public health threats are manifold; i.a. faecal-oral transmission of pathogens and pathogens transmitted to humans from an animal source are common infection routes. These pathogens cause diseases, conditions, disabilities and even deaths. Some of them have the potential to spread quickly and become severe public health risks.

#### 1.1. Zoonoses

Zoonoses appear at the human-animal-ecosystem interface and are key in the management of public health risks. Zoonoses can cause diseases that are naturally transmissible from vertebrate animals to humans. The World Organization for Animal Health ([OIE](#)) estimates that

- 60 % of existing human infectious diseases are zoonotic
- 5 new human diseases appear every year - three are of animal origin
- At least 75 % of emerging infectious diseases of humans have an animal origin
- 80 % of agents with potential bioterrorist use are zoonotic pathogens

They may be bacterial, viral, or parasitic, or may involve unconventional agents. Many of the major zoonotic diseases are a public health risk (e.g. Zoonotic Influenza, Salmonellosis, West Nile Virus), have effects on the efficient production of food of animal origin and cause barriers to international trade in animal products ([WHO](#)). The interface can appear at the wilderness (e.g. expanding settlement, hunting); at handling domestic animals - wherever humans and animals closely live together (e.g. pets at home, livestock around the compound, pastoralists); and can manifest along the food chain (e.g. abattoirs, agriculture, places of food

production). With regard to the food chain, antimicrobial resistance (AMR) increasingly becomes a problem: When bacteria change after being exposed to antibiotics, they become resistant and turn into “superbugs”, which are more difficult to treat affecting plants, animals and humans ([WHO](#)). With the increased use of antibiotics (treatment and prophylaxis), AMR is an additional dimension of the already complex human-animal-ecosystem connection. The “technical brief on WASH and wastewater management to prevent infections and reduce the spread of AMR” by WHO, OIE and the World Food and Agriculture Organization (FAO) ([WHO/OIE/FAO 2020](#)) provides more information and suggests concrete actions. More than that: WASH programmes can plausibly contribute to control of zoonotic disease given the knowledge about pathogen transmission cycles, through provision of sanitation infrastructure that safely removes human and animal faecal waste from the human environment, provision of clean water sources, and improvement of hygiene practices at the community and household level ([WHO](#)).

#### 1.2. Neglected Tropical Diseases

Populations living in poverty, without adequate sanitation and in close contact with infectious vectors and domestic animals and livestock are those worst affected. Neglected Tropical Diseases (NTDs) are linked with poor WASH and can result in a vicious cycle of poverty. Currently, the WHO classifies 20 diseases and conditions as NTDs affecting more than 1 billion people ([Mitra & Mawson 2017](#)). NTDs impair physical and cognitive development, contribute to mother and child illness and death. These types of diseases that can lead to disabilities, are caused by bacteria (e.g. leprosy, trachoma), parasites (e.g. soil-transmitted helminthiasis, schistosomiasis) or viruses, such as dengue fever. Snakebites and rabies are now also considered NTDs; the connection between humans and animals / animal health is part of the combat against NTDs.

WASH plays an important role in both the prevention and treatment of NTDs (e.g. personal hygiene is essential in the treatment of leprosy and leishmaniasis) – a functioning health system is inevitable. NTDs are encountered community-wide and individually: Effective drugs are regularly distributed to communities in affected regions; in acute cases, individuals are treated after a diagnosis has been made. The “All WASH NTD Manual” addresses WASH implementers and describes in detail how WASH interventions can help preventing soil-transmitted helminths, trachoma, schistosomiasis, lymphatic filariasis and dracunculiasis ([NNN 2013](#)). An overview of the role of WASH in prevention and cure of numerous NTDs is listed in the WHO Global Strategy for WASH and NTDs ([WHO 2015](#)). The new Global Strategy (2021-2030) is currently being developed.

The “BEST” framework for NTDs is a comprehensive approach developed by the WHO and the NTD NGO Network (NNN). The framework encompasses behaviors (B), environment (E), social inclusion (S) and treatment (T). The environment component explicitly enumerates sanitation and waste, infection prevention and control in healthcare, water infrastructure, vector control and veterinary public health ([WHO/NNN 2019](#)).

### 1.3. Large-Scale Outbreaks

In contexts, where WASH is inadequate, health risks are ubiquitous. Communicable diseases can become severe public health threats. Over the last decades, large-scale outbreaks of epidemic and pandemic dimension have increased. GAVI, the vaccine alliance, makes out 5 reasons for this development: Increased international travel; urbanization, where extreme population density meets overstressed infrastructure and services; climate change makes societies prone to shocks and lead to conflicts and migration; increased human-animal contact and entering into animal habitat; and health workers shortage ([GAVI](#)).

In controlling Acute Respiratory Infections (ARI) and diarrhoeal diseases, WASH is crucial. ARI refers to infections of the upper or lower respiratory tract. The positive effect of hand hygiene on acute respiratory tract infections and influenza reveal in several studies and systematic reviews ([Rabie et. al. 2016](#), [Warren-Gash et. al. 2013](#), [Aiello et. al. 2008](#)), while the effectiveness of hand hygiene varies highly depending on the context, the practices and frequency. In 2002, a coronavirus causing the Severe Acute Respiratory Syndrome (SARS) started to spread in Asian and East Asian countries. SARS is suspected to have come from an animal source ([WHO](#)). Diarrheal disease is the second leading cause of death among children under the age of 5. Usually, it is the symptom of an infection of the intestinal tract, which can be caused by faecal-oral transmission of pathogens via contaminated drinking water, environment and objects ([CDC](#), [WHO](#)). The severe cholera outbreaks in Haiti (2010-2011) and Yemen (2016-2018) claimed thousands of lives in a short time span and highlighted the close link between WASH and health in crisis situations ([GWN 2019](#)).

Since 2005, the WHO introduced a mechanism to declare a Public Health Emergency of International Concern (PHEIC). Since then, PHEICs were declared six times ([Swine flu](#) - 2009, [Polio](#) - 2014, [Ebola](#) - 2014, [Zika virus](#) - 2016, [Kivu Ebola](#) -2018-20, [COVID-19](#) - 2020). In 2012, a novel coronavirus was detected in Saudi Arabia, causing the viral respiratory disease Middle East Respiratory Syndrome (MERS). Current evidence suggests an animal source (dromedary camels) of MERS infection in humans ([WHO](#)). Between

2014 and 2016, more than 11,000 people died with Ebola ([WHO 2016](#)). The Ebola virus is transmitted to human beings from wild animals (i.a. fruit bats, porcupines and non-human primates). It then spreads among people through direct contact with bodily fluids of an infected person (incl. blood, secretions) and with contaminated surfaces and materials (e.g. bedding, clothing) ([WHO 2020](#), [WHO](#)). Most of these diseases have their origin in animals, from which a pathogen passes to humans and then spreads further among human being (see “Zoonoses”).

Despite the vast knowledge and past experiences, the Centres for Disease Control and Prevention (CDC) ascertain that “more than 70% of the world remains underprepared to prevent, detect, and respond to a public health emergency” ([CDC](#)). The current COVID-19 situation seems to underpin the assumption: COVID-19 is an infectious disease, caused by the new coronavirus SARS-CoV-2, which was first identified in December 2019 in Wuhan, China. After spreading to other countries, the WHO declared the outbreak a Public Health Emergency of International Concern (PHEIC), on 30 January 2020 ([WHO 2020](#)). COVID-19 can be almost asymptomatic or appear like a harmless cold, but it can also lead to severe cases of pneumonia and acute lung failure, particularly in risk groups ([German Center for Infection Research](#)). The virus is transmitted through direct contact with respiratory droplets of an infected person in the immediate environment. Until effective treatment is found, hygiene measures such as physical distancing and hand hygiene are among the most effective methods of preventing infection (see “Hand Hygiene”). Results of studies so far do not provide evidence about infectious new coronaviruses in drinking water or sewerage. While several studies detected genetic material of the new coronavirus in human faeces, their results concerning the ability to cause disease are mixed ([Hygiene Hub](#)). So far, there are no reported cases of a COVID-19 infection due to faecal-oral transmission ([Hygiene Hub](#)).

Apart from water, sanitation and hygiene being important elements for ensuring public health, the current COVID-19 situation puts health systems on the test and reveals inequalities in countries and societies around the world.

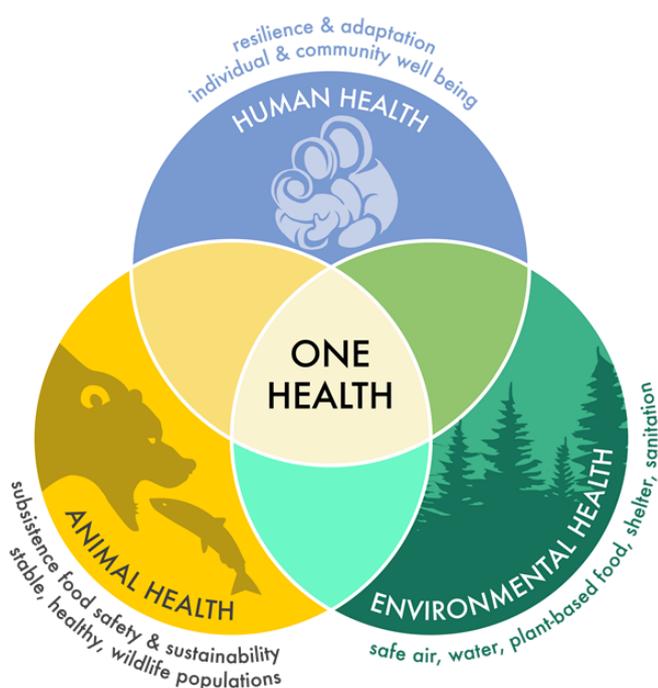
## 2. Approaches for Risk Reduction and Prevention

At different stages and settings, WASH is an essential component in reducing individual and public health risks.

### 2.1. One Health

Established in the early 2000’s, “One Health” is a collaborative global approach to understanding risks for

human and animal health (including both domestic animals and wildlife) and ecosystem health as a whole to achieve better public health outcomes (OIE). With changing global circumstances (see “large-scale outbreaks”), One Health nowadays receives growing attention. According to the CDC, among the common issues in the approach are zoonotic diseases, antimicrobial resistance, food safety and food security, vector-borne diseases, environmental contamination, but can also include chronic disease, mental health, injury, occupational health and noncommunicable diseases (CDC). It shows that for a successful and long-term impact, expertise from different sectors are needed. More concretely, it means professionals from the field of human health (doctors, nurses, public health practitioners, epidemiologists), animal health (veterinarians, paraprofessionals, agricultural workers), environment (ecologists, wildlife experts) and other related fields (CDC). WASH expertise is fundamental in this multi-sectoral, multi-stakeholder approach.



University of Alaska Fairbanks, 2020

## 2.2. Health Care Facilities

Hospitals and health care facilities are key elements of a health system. Poorly equipped and poorly managed health facilities are not only ineffective; they can actually make matters worse and increase the risk of infection and diseases. In settings, where WASH is inadequate and infectious disease risks are high, prophylactic use of antibiotics is more common. This adds to complications caused by AMR (JMP 2019). Patients and staff at health care facilities are at special risk, if WASH services are insufficient, missing completely and infection prevention

control (IPC) measures can thus not be carried out. The Global Baseline Report on WASH in Health Care Facilities highlights that one in four health care facilities lacks basic water service (affecting more than 900 million people), one in five has no sanitation service (affecting about 1.5 billion people), and one in six has no hygiene service. Waste management and environmental cleaning also belong to basic WASH services in health care facilities (JMP 2019). Transmission pathways must be interrupted to prevent the spread of infectious diseases. Basic WASH services, staff protection and patient protection, information and communication are essential elements of prevention (CDC). In addition to sufficient and well-functioning WASH services, transmission routes can be reduced by wearing a face mask and by not touching surfaces if avoidable to prevent infection by droplets and smear infections.

“The COVID-19 pandemic not only draws into focus the need to rebuild resilient health systems with increased access to quality health services, lowered financial cost and a strengthened health workforce, but also calls for the provision of services such as routine vaccinations and basic hygiene and sanitation.” (WHO Stats 2020, p. vii) During a pandemic, the fact that millions of healthcare facility staff — from doctors and nurses to aides and cleaners — do not have water, soap and proper waste disposal is inexcusable and can be deadly. This is a serious challenge, but it is solvable. It is critical that water, soap and sanitation, the foundation of infection prevention and control, is made available in all healthcare facilities. This could well be key to stopping the spread of COVID-19 and other infectious diseases.

## 2.3. (Hand) Hygiene Behaviour

Conscious hygiene behaviors such as sneezing / coughing in the bend of the arm or tissue can help prevent the spreading of the virus, so does thorough cleaning of frequently touched surfaces and objects. Experts and institutes around the world recommend frequent and proper hand hygiene as one of the most effective measures to interrupt infection pathways. Besides critical times, there is also a big emphasis on the way hands are washed.

If neither water and soap nor an alcohol-based hand sanitizer with at least 60% alcohol is available, then chlorinated water (0.05%) may be a temporary solution, but not recommended for routine handwashing as it irritates the skin (WHO/UNICEF). There is poor evidence about ash preventing infection with the novel coronavirus (Hygiene Hub), but alternative ways of handwashing in water-scarce areas need further investigation (Kivuti-Bitok et. al. 2020). In some cases, physical distancing can be a way of reducing the risk of infection.

How to wash hands	In general	In the context of COVID-19 prevention	For health workers
<ol style="list-style-type: none"> <li>1) Wet hands with running water</li> <li>2) Apply enough soap to cover wet hands</li> <li>3) Scrub all surfaces of the hands – including backs of hands, between fingers and under nails – for at least 20 seconds</li> <li>4) Rinse thoroughly with running water</li> <li>5) Dry hands with a clean, dry cloth, single-use towel or hand drier as available</li> </ol>	<ul style="list-style-type: none"> <li>• After using the toilet</li> <li>• Before and after eating and handling food</li> <li>• Before serving/feeding another person food</li> <li>• After handling garbage</li> <li>• After touching animals and pets</li> <li>• After changing babies' diapers or helping others use the toilet</li> <li>• When hands are visibly dirty</li> </ul>	<ul style="list-style-type: none"> <li>• After blowing your nose, coughing or sneezing</li> <li>• After visiting a public space, including public transportation, markets and places of worship</li> <li>• After touching surfaces outside of the home, including money</li> <li>• Before, during and after caring for a sick person</li> <li>• Before and after eating</li> </ul>	<ul style="list-style-type: none"> <li>• before touching a patient</li> <li>• before clean/aseptic procedures</li> <li>• after body fluid exposure/risk</li> <li>• after touching a patient, and</li> <li>• after touching patient surroundings</li> </ul>
<a href="#">UNICEF</a>	<a href="#">UNICEF</a>	<a href="#">UNICEF</a>	<a href="#">WHO</a>

## II. SuSanA, a Network for Sustainable Solutions

### 2.4. Comprehensive WASH

Large-scale and comprehensive WASH is an effective measure for ensuring public health, which may come with large investments (piped systems, treatment plants) or small investments (water, soap), but it is essential to keep the environment free from contamination and thus reduce potential sources of infections: Sanitation only shows health benefits when addressed community-wide (“total sanitation”) and considering the full sanitation service chain. Access to drinking water must involve wastewater treatment as it can spread pathogens, become puddles and evolve in breeding grounds for mosquitos or other vectors. Hygiene starts with handwashing, includes menstrual hygiene, personal hygiene, food hygiene, animal husbandry and an uncontaminated environment (water, soil, air) far beyond household level.

The journal “Nature” published an article, according to which scientists found traces of viral RNA of the new coronavirus in wastewater in the Netherlands and the US and Sweden. If evidence becomes more concrete, wastewater surveillance could function as a non-invasive early-warning system for a potential next outbreak or wave in places equipped with a sewerage system ([Nature](#)), but data is not (yet) sound enough to build action on this.

The SuSanA community already has the structures to effectively and collectively create impact. The potential of SuSanA becomes evident in view of the current COVID-19 situation. Different phases of a pandemic require different strategies and actions from the WASH sector. In order for SuSanA to contribute visibly/knowingly to different health outcomes including COVID-19, we recommend the following immediate, mid- and long-term actions.

#### 1. Beyond SuSanA

- Align actions with other international networks and initiatives (e.g. Sanitation and Water for All Partnership, Hygiene for All Initiative, Hygiene Hub) for anchoring WASH in national and organizational health strategies and policies to promote and invest in WASH as a long-term prevention measure for ensuring public health using the example of the current COVID-19 crisis.
- Facilitate (online) discussion to allow actors from different sectors (One Health) to exchange with each other about the effectiveness of different interventions including the example of COVID-19.

- Investigate entry points for collaborative action and consortia between health actors and the SuSanA community / other WASH actors.

## 2. Within SuSanA

- Initiate discussion on all following points within different segments of the SuSanA community (SuSanA Core Group, Discussion Forum, SuSanA Meeting, WG Meetings) to identify possible synergies among SuSanA WGs and break down initial barriers between WASH and health sectors to start dialogue and collaboration.
- Collect and display tools and interventions of SuSanA partners and members from which others can benefit while looking beyond WASH access, but targeting particular health outcomes
- Inspire relevant SuSanA working groups to contribute to various components of health issues and COVID-19 in particular:

**WG 1 (Capacity development):** New ways of capacity development in times of “lock-down”; minimize travel and in this way contributing to the climate change discourse as well; trainings and other learning resources on prevention.

**WG 2 (Market development):** Supply chain issues and private sector engagement on WASH infection prevention (producer and consumer side), incl. disinfection products for health care facilities, disinfection kits (surface, water, equipment sterilization) for hospitals, orphanages etc., HH disinfectant products and water treatments (planning an online seminar).

**WG 3 (Climate change):** indirect links evoke i.e. from the economic crisis following the health crisis and thus limiting the possibilities to afford water and sanitation services and lead to limited income for water operators, which need short, medium and long-term investments in water and sanitation.

**WG 4 (Sanitation systems):** How could wastewater testing be used as an early-warning system for (coronavirus) outbreaks (see "[Nature](#)"), if evidence becomes more concrete? How to cushion negative effects on the sanitation chain due to the lock down (e.g. effects emptier, providers)?

**WG 5 (Food security and productive sanitation):** Looking at zoonoses, food chains and antimicrobial resistance through the lens of food security and productive sanitation; Discovering potentials in the interdisciplinary One Health approach.

**WG 6 (Cities):** Discussion on COVID-19 mitigation and adaptation strategies and on WASH as an investment in prevention of public health risks geared towards informal settlements and urban poor, that will be useful for practitioners such as forum topic with a series of posts to crowd source ideas, best practices and perspectives as well as an online seminar with expert discussion incl. WG6 members.

**WG 7 (WASH in institutions):** Any location, where individuals assemble, are critical targets for preventing the spread of infectious disease (e.g. health centers and schools). WASH in Schools (WinS) work has now raised importance. Much of disease transmission among school-age children is believed to happen at schools, in which it is difficult to maintain contact restrictions and physical distance. Schools in low income contexts are ill-equipped to manage public health emergencies. In many cases, handwashing facilities and soap are not available to assure regular hand hygiene as recommended by guiding bodies. Cleaning staff and/ or maintainers are not present or are not equipped with sufficient material and supply to perform needed cleaning and disinfection. School heads are often not prepared too act in the event of a pandemic, and contingency / hygiene plans have not been developed. Great investments by Ministries of Education to comply with WASH in Schools basic service standards and additional measures to comply with pandemic preparedness and response are necessary. The education sector needs to take on greater responsibilities. Close linkage with the Global WinS Partnership Network is highly recommended.

**WG 8 (Emergency and reconstruction):** Dissemination of COVID-19 advice by Global WASH Cluster; potential sanitation input to existing materials, including wastewater- and faecal sludge management; handwashing solutions in water-scarce contexts; recommendations for operation and maintenance of shared / public sanitation facilities (e.g. proper and regular cleaning of all surfaces, correct disinfection in the event of a sick case).

**WG 9 (Public awareness, advocacy, civil society engagement):** Developing advocacy messages on the interlinkages between WASH and health in general and WASH and COVID-19 in particular; Sharing materials that can be used for online and offline campaigns for the role of WASH to public health.

**WG 10 (Operation, maintenance and sustainable services):** Importance of continuing WASH services even in lock down situations to prevent the additional outbreak of other diseases (e.g. Cholera) especially in densely populated areas or crowded places; protection of staff in the whole WASH service chain (i.a. operators, emptier).

**WG 11 (Groundwater protection):** The need for high quality groundwater resources to increase resilience during a pandemic: Groundwater often has the benefit of providing decentralized access to relatively safe water, in times when centralised public supply may be out of order or compromised in terms of quality. Having good quality groundwater resources surely raises resilience in times of a pandemic. One Health: Groundwater protection, especially in terms of reducing uncontrolled wastewater spillages / leakage surely contributes to reduce antibiotic resistance. In summary, groundwater & sanitation activities have two main contributions to the fight against this kind of pandemic: Improving access to clean water in times of crisis and if protection measures for groundwater are taken seriously (e.g. protection zones, appropriate discharge of sewage and effluent), this goes hand in hand with a reduction of the risk of (Corona-)infection.

**WG 12 (WASH and nutrition):** The nutritional status of people is not only at risk with only poor WASH, but also due to limited access to food and information during a lock down situation; collection of information on healthy diets and development or provision of guidelines on how to construct and maintain handwashing facilities without on-site support (see [SUN](#) and [ENN](#)). The predicted negative impact of COVID-19 a raise in numbers of malnourished children, including those who require in-patient treatment: Additional 6.7 children will suffer from wasting in 2020. WASH services in healthcare facilities will be essential to support the treatment of malnutrition.

**WG 13 (Behavior change):** Hygiene Behaviour Change at scale as ‘first line of defense to COVID-19’; Importance of targeting multiple behaviours including handwashing with soap to prevent the spread of COVID-19; What are behavior challenges and opportunities in lock down situations?

In order for SuSanA to consolidate its links with the health sector, the latter part of this document provides an overview of key health actors, platforms, events, definitions, approaches, entry points and tools. Hopefully, this paper will inspire a discussion within SuSanA, redirecting it to improve its impact with regard to pandemic protection and health in general.

### 3. Timeline

<b>2015</b>	The Bonn WASH Nutrition Forum, an international conference bringing together stakeholders from both thematic fields, focused on the role of WASH for improving the nutritional status of children. SuSanA was the online host of the event. Only a healthy gut can absorb nutrients and prevent undernutrition. Health was recognized as the intrinsic link. Several WASH-Nutrition events followed.
<b>2019</b>	At the Stockholm World Water Week, various partners including SuSanA hosted a session on the linkage between Neglected Tropical Diseases (NTDs) and WASH. The question was raised how health issues are addressed within SuSanA, leading to the development of the discussion paper.
<b>7/2020</b>	Initially focusing on NTDs, the discussion paper was revised and adapted due to the COVID-19 pandemic. The product is a result of suggestions, questions and inputs from the SuSanA community, but also from health experts uncovering blind spots on both sides.
<b>8/2020</b>	The discussion paper will be presented and discussed with the broader SuSanA community during the online SuSanA Meeting.
<b>8/2020</b>	During the Week on Water for Development (WW4D), the session “Secure WASH – Promote (One) Health” will continue the dialogue by presenting practical examples.
<b>2020</b>	Dialogues with other initiatives and networks are key to collaborative action. The SuSanA secretariat will therefore continue to investigate options for collaborations with others.
<b>2021</b>	For achieving sustainable health for everyone, medical treatment is not enough, but the focus of discussion must shift to the cause of diseases: Prevention is the best medicine. A conference would be an appropriate format to further develop a common understanding of the WASH and Health linkage and introduce comprehensive approaches.

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- The [Annex](#) provides an overview of key health terms and approaches, puts a spotlight on common blind spots and argues for a better understanding of WASH and Health interlinkages for the prevention and as part of the treatment of diseases.

### III. Annex: Glossary of Key Health Terms and Actors

What do WASH actors need to know about the health sector to link efficiently and effectively?

This section provides an overview of key health terms and approaches, puts a spotlight on common blind spots and argues for a better understanding of WASH and Health interlinkages for the prevention and as part of the treatment of diseases.

#### 1. Definitions, Approaches and SuSanA's Contribution

##### Definitions and approaches

##### SuSanA's current and potential future contribution

**Antimicrobial Resistance (AMR):** When bacteria change after being exposed to antibiotics (in humans, animals or plants) and consequently become more difficult to treat

AMR is a health threat in health care facilities due to intense use of drugs. WASH in health care facilities is a must at the WASH and Health interface. AMR also appears along the food chain due to the chemicals used preventively to treat animals and fields, hardly metabolized entering the human body. Especially drinking water and hygiene in food production and preparation is important.

**“Big Three”:** The “Big Three” refer to HIV/Aids, tuberculosis and malaria, the three deadliest infectious diseases, therefore the largest public health threats ([UNDP](#)).

The “Big Three” as such do not yet seem to be very prominently addressed within SuSanA. Malaria is transmitted via mosquitos, whose breeding grounds are standing waters. Facilities for handwashing must ensure that waste water does not create standing water. It also accounts for any water storage container, which must always be covered. As tuberculosis is also a lung infection (airborne), hygiene is very important (similar to covid-19) i.a. handwashing; hygiene in homes. This could be another entry point for increased health impact of SuSanA. A few references regarding HIV can also be found (e.g. in SuSanA library: “Water, sanitation and hygiene considerations in home-based care for people living with HIV - Technical guidance”)

**Epidemic:** Occasionally, the amount of disease in a community rises above the expected level. Epidemic refers to an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area ([CDC](#)). It occurs when an agent and susceptible hosts are present in adequate numbers, and the agent can be effectively conveyed from a source to the susceptible hosts. More specifically, an epidemic may result from:

- A recent increase in amount or virulence of the agent,
- The recent introduction of the agent into a setting where it has not been before,
- An enhanced mode of transmission so that more susceptible persons are exposed,
- A change in the susceptibility of the host response to the agent, and/or
- Factors that increase host exposure or involve introduction through new portals of entry ([CDC](#)).

WASH plays a critical role in the reduction of epidemics and pandemics, therefore SuSanA already contributes to their avoidance or reduction. Joint messages for health workers and could be developed together with actors from the health sector. SuSanA can make use of those partners in the SuSanA community, which have a thematic focus on health. The analysis of wastewater might become a valuable forecast tool for epidemics / pandemics.

...(continues)

Definitions and approaches	SuSanA's current and potential future contribution
<p>... (continued) Early detection often relies on close collaboration between the animal health and wildlife sectors (the “One Health Approach”); otherwise early signals of emergence in animals or the environment are often missed. This collaborative approach, another pivotal element of global health security, can also contain outbreaks at an early stage by reducing animal-to-human transmission (<a href="#">WHO</a>).</p>	
<p><b>Infection Prevention and Control (IPC):</b> IPC is a scientific approach and practical solution designed to prevent harm caused by infection to patients and health workers. It is grounded in infectious diseases, epidemiology, social science and health system strengthening. IPC occupies a unique position in the field of patient safety and quality universal health coverage since it is relevant to health workers and patients at every single health-care encounter (<a href="#">WHO</a>).</p>	<p>WASH in health care facilities ensures health of patients and staff. Water, sanitation, hygiene, waste management and environmental cleaning make up the 5 categories of the <a href="#">JMP</a> service ladder for health care facilities. The JMP report finds that 12% of health care facilities globally had <i>no</i> water service. 9% of hospitals and 20% of other health care facilities had no sanitation service. SuSanA i.a. can impact on immediate health when WASH conditions in institutions are improved.</p>
<p>(Seasonal) <b>Influenza:</b> Seasonal influenza is an acute respiratory infection caused by influenza viruses which circulate in all parts of the world (<a href="#">WHO</a>).</p>	<p>Effective measures to protect oneself and others from an infection of influenza, but also other infectious diseases, hygiene behaviours are important. Prevention of diseases should be captured in hygiene messages.</p>
<p><b>Neglected Tropical Diseases (NTDs):</b> NTDs are a diverse group of 20 diseases and conditions that prevail in tropical and subtropical conditions in 149 countries, affecting over one billion people. Populations living in poverty, without adequate access to water and sanitation and in close contact with infectious vectors and domestic animals and livestock are those worst affected (<a href="#">WHO</a>). Currently classified as NTDs are <a href="#">Buruli ulcer</a>, <a href="#">Chagas disease</a>, <a href="#">Dengue and Chikungunya</a>, <a href="#">Dracunculiasis (guinea-worm disease)</a>, <a href="#">Echinococcosis</a>, <a href="#">Foodborne trematodiasis</a>, <a href="#">Human African trypanosomiasis (sleeping sickness)</a>, <a href="#">Leishmaniasis</a>, <a href="#">Leprosy (Hansen’s disease)</a>, <a href="#">Lymphatic filariasis</a>, <a href="#">Mycetoma</a>, <a href="#">chromoblastomycosis and other deep mycoses</a>, <a href="#">Onchocerciasis (river blindness)</a>, <a href="#">Rabies</a>, <a href="#">Scabies and other ectoparasites</a>, <a href="#">Schistosomiasis</a>, <a href="#">Soil-transmitted helminthiasis</a>, <a href="#">Snakebite envenoming</a>, <a href="#">Taeniasis/Cysticercosis</a>, <a href="#">Trachoma</a>, <a href="#">Yaws (Endemic treponematoses)</a></p>	<p>In 2019, NTDs became more prominent within SuSanA: SuSanA co-convened a session at the Stockholm World Water Week 2019, in which WASH and NTD actors discussed interlinkages and various examples. Poor WASH is often linked and cause a vicious cycle of poverty. WASH not only plays a preventive role, but also a curative one in the combat against NTDs: The aspect of hygiene can be integrated for several skin NTDs (e.g. leprosy, BU and LF). It is essential for preventing secondary infections, for promoting proper wound healing, and importantly for preventing severe forms of those diseases, including prevention of disabilities – reducing the disability-adjusted life years (DALYs) through simple WASH measure). The curative angle of WASH is another facet, which SuSanA can further elaborated on.</p>
<p><b>One Health Approach:</b> “One Health” refers to public health threats at the human-animal-ecosystem interface. It includes food safety, the control of zoonoses, and combatting antimicrobial resistance (<a href="#">WHO</a>).</p>	<p>In the SuSanA community, “One Health” is already present in discussions and actions, as a SuSanA search of this key word revealed. The 46 items found in the discussion forum and in the library include research and policy papers and discussions about the need to widen the view on sanitation to expand the focus to animal faeces that contaminate the environment and can cause preventable diseases. ... (continues)</p>

Definitions and approaches	SuSanA's current and potential future contribution
	<p>...(continued)</p> <p>In July 2019, Waterlines started an (open-ended) call for paper, "One Health" is among the suggested topics (<a href="#">Call for Paper</a>).</p> <p>There is a potential in the SuSanA community for building a better understanding about the important role of WASH in disease control, activities to improving health as well as a stronger acknowledgement of the presence of (domestic) animals in WASH-interventions as well as interdependencies and the interplay of WASH and the environment. It can include community dialogues, joined development of community action plans on how to free the environments of animal faeces etc.</p>
<p><b>Pandemic:</b> An epidemic occurring over a very wide area, crossing international boundaries, and usually affecting a large number of people. Only some pandemics cause severe disease in some individuals or at a population level.</p> <p>Characteristics of an infectious agent influencing the causation of a pandemic include: the agent must be able to infect humans, to cause disease in humans, and to spread easily from human to human (<a href="#">Dictionary of Epidemiology 2001</a>). The phases of a pandemic are closely linked to animals, livestock, zoonoses, the One Health Approach. (<a href="#">Source</a>)</p> <ul style="list-style-type: none"> <li>• Phase 1: No animal influenza virus circulating among animals has been reported to cause infection in humans.</li> <li>• Phase 2: An animal influenza virus circulating in domesticated or wild animals is known to have caused infection in humans and is therefore considered a specific potential pandemic threat.</li> <li>• Phase 3: An animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks.</li> <li>• Phase 4: Human-to-human transmission (H2H) of an animal or human-animal influenza reassortant virus able to sustain community-level outbreaks has been verified.</li> <li>• Phase 5: The same identified virus has caused sustained community level outbreaks in two or more countries in one WHO region.</li> <li>• Phase 6: In addition to the criteria defined in Phase 5, the same virus has caused sustained community level outbreaks in at least one other country in another WHO region.</li> <li>• Post-Peak Period: Levels of pandemic influenza in most countries with adequate surveillance have dropped below peak levels.</li> <li>• Possible New Wave: Level of pandemic influenza activity in most countries with adequate surveillance rising again.</li> <li>• Post-Pandemic Period: Levels of influenza activity have returned to the levels seen for seasonal influenza in most countries with adequate surveillance.</li> </ul> <p>... (continues)</p>	<p>See "Epidemic"</p>

Definitions and approaches	SuSanA's current and potential future contribution
<p>... (continued)  More about the controversy geographical appearance vs. severity can be found in the <a href="#">WHO Bulletin 2011</a>.</p>	
<p><b>Pathogen:</b> Pathogens are microorganisms, viruses, toxins and ionizing radiation that can cause disease. They are pathogenic organisms and substances, respectively (<a href="#">German Center for Infectious Disease</a>).</p>	
<p><b>Personal Protection Equipment (PPE):</b> PPE is the protection gear and commonly refers to gown, mask / respirator, goggles / face shield and gloves (<a href="#">CDC</a>). It is used in spaces, where hygiene is of utmost importance, such as intensive care units.</p>	<p>Protection gear is relevant for sanitation workers such as emptier and operators – in times of pandemics, but also in non-pandemic times.</p>
<p><b>Public Health Emergency of International Concern (PHEIC):</b> A PHEIC is an extraordinary event which is determined 1) to constitute a public health risk to other States through the international spread of disease; and 2) to potentially require a coordinated international response (<a href="#">WHO 2020</a>). It is declared by the WHO, on the basis of the International Health Regulations from 2005. Since then, PHEICs were declared six times: <a href="#">Swine flu</a> (2009), <a href="#">Polio</a> (2014), <a href="#">Ebola</a> (2014), <a href="#">Zika virus</a> (2016), <a href="#">Kivu Ebola</a> (2018-20), <a href="#">COVID-19</a> (2020)</p>	
<p><b>Reassortment:</b> Reassortment is the process by which influenza viruses swap gene segments. This genetic exchange is possible due to the segmented nature of the viral genome and occurs when two differing influenza viruses co-infect a cell. The viral diversity generated through reassortment is vast and plays an important role in the evolution of influenza viruses (<a href="#">NCBI</a>).</p>	
<p><b>Universal Health Coverage (UHC):</b> Universal health coverage means that all people have access to the health services they need, when and where they need them, without financial hardship. It includes the full range of essential health services, from health promotion to prevention, treatment, rehabilitation, and palliative care (<a href="#">WHO</a>).</p>	<p>WASH in institutions is among the key areas of engagement within the SuSanA. It includes Schools and Health Care Facilities with dedicated discussion space in the forum.</p> <p>In the health sector, the focus on services is rather mature. Several SuSanA partners change their way of working towards service orientation and strengthening WASH systems. A cross-sectoral exchange could be a useful way of mutual learning. Great potential to achieve UHC also lies in community-based approaches. The lack of sanitation is a major problem, vast contamination with enteropathogenic agents in the environment causing major infections and chronic manifestations leading (among others) to severe forms of malnutrition in children. Affordable and acceptable community-centred approaches and solutions are lacking too often. This is where SuSanA can bring in expertise from partners (e.g. community-led total sanitation CLTS to name only one approach).</p>

Definitions and approaches	SuSanA's current and potential future contribution
<p><b>Virulence:</b> The degree of pathogenicity; the disease-evoking power of a microorganism in a given host. Numerically expressed as the ratio of the number of cases of overt infection to the total number infected as determined by immunoassay. When death is the only criterion of severity, this is known as the case-fatality rate (<a href="#">Dictionary of Epidemiology</a>).</p>	
<p><b>Zoonoses:</b> A zoonosis is any disease or infection that is naturally transmissible from vertebrate animals to humans. Animals thus play an essential role in maintaining zoonotic infections in nature. Zoonoses may be bacterial, viral, or parasitic, or may involve unconventional agents. As well as being a public health problem, many of the major zoonotic diseases prevent the efficient production of food of animal origin and create obstacles to international trade in animal products (<a href="#">WHO</a>).</p>	<p>See also "One Health Approach". The outreach to and collaboration with the health sector are important to address the threat of zoonoses. Involve the community development sector is also critically important (e.g. community or district development officer present in certain planning meetings / discussions, etc.). Through adequate WASH, transmission pathways from animal to a human can reduced or interrupted by a hygienic living environment. Those people, who have close contact with animals are at particular risk e.g. pastoralists (sharing water sources with animals), toddlers (exposed to excreta on the ground). SuSanA can continue to find solutions for those groups and discuss with relevant actors from the health sector.</p>

## 2. Actors and Platforms

### World Health Organization (WHO)

Established in 1948, the WHO is the directing and coordinating authority on international health within the United Nations system with its headquarters in Geneva. It adheres to the UN values of integrity, professionalism and respect for diversity and aims at attaining all peoples highest possible level of health ([WHO](#)). WHO's Programme Budget is financed through assessed and voluntary contributions. Assessed contributions are the dues countries pay in order to be a member. The amount each Member State must pay is calculated relative to the country's wealth and population. In 2018/2019, the USA was the largest contributor, the Bill and Melinda Gates Foundation the second largest ([WHO Results Report 2019](#)).

### Global Health Cluster (GHC)

The GHC is the umbrella of currently 29 health clusters, a coordination mechanism that allow for quick response in case of an emergency. WHO is the Cluster Lead Agency and provides secretariat support through the GHC Team in the WHO Emergency Response Division, Health Emergencies Programme ([WHO](#)). The GHC collaborates closely with other Clusters to strengthen

multi-sectoral action and improve health outcomes in emergency settings. Funding comes from fund raising directly by the GHC Unit and by the GHC partners ([WHO, ToRs 2015](#)).

### Global Alliance for Vaccines and Immunisation (GAVI)

GAVI is the Vaccine Alliance, founded in 2000, initiated by the Bill and Melinda Gates Foundation (BMGF). Its mission is to save lives, reduce poverty and protect the world against the threat of epidemics. GAVI has two operation models, one is partnership model (public-private partnership) and one is the business model (shaping vaccine markets). Partners of the alliance include the BMGF, the WHO, the World Bank, UNICEF and a number of various other stakeholders ([GAVI](#)).

### Johns Hopkins University (JHU)

The JHU in Baltimore consists of 9 schools, of which the School of Medicine is one. It is using its expertise to address the new coronavirus (COVID-19) pandemic, treat patients, protect visitors and staff and provide up-to-date information to the public ([JHU](#)). It set up a dedicated space for coronavirus (COVID-19) Information and Updates section ([JHU](#)).

## Centers for Disease Control and Prevention (CDC)

CDC is one of the major operating components of the Department of Health and Human Services in the USA. Its mission is to protect America from health, safety and security threats, both foreign and in the U.S. ([CDC](#)). The requested budget for the fiscal year 2020 comprises \$ 6.594 billion and includes budget lines among others for Protecting Americans from Infectious Diseases, Preventing the Leading Causes of Disease, Disability, and Death, Protecting Americans from Natural and Bioterrorism Threats.

## World Bank

World Bank Group works in every major area of development, providing a wide array of financial products and technical assistance. In line with its global strategy for health, nutrition and population, the World Bank Group supports countries' efforts to achieve universal health coverage through stronger primary health systems and provide quality, affordable health services to everyone —regardless of their ability to pay ([World Bank](#)). The World Bank houses the Pandemic Emergency Financing Facility (PEF), which is a financing mechanism designed to provide an additional source of financing to help the world's poorest countries respond to cross-border, large-scale outbreaks. It was activated for the COVID-19 pandemic ([World Bank](#)). A webspace on WASH and COVID-19 is available ([World Bank](#)).

## UNICEF

UNICEF promotes the rights and wellbeing of children. It is funded through the voluntary support of millions of people around the world and partners in government, civil society and the private sector ([UNICEF](#), [Annual Report 2018](#)). UNICEF's water, sanitation and hygiene (WASH) scope of work in the COVID-19 response is to support affected, at-risk, low-capacity and fragile countries to secure WASH services and infection prevention control in health facilities, and sustain availability and access to WASH services in schools, households and community settings ([UNICEF](#)).

## Bill and Melinda Gates Foundation (BMGF)

BMGF is a private foundation. It engages in its five programme areas: Global Development, Global Health, Global Growth & Opportunity, United States Program and Global Policy & Advocacy ([BMGF Factsheet](#), [Annual Report 2018](#)). BMGF (financially) supports the development of a vaccine for COVID-19 ([BMGF](#)) and majorly contributes to funding GAVI and the WHO.

## London School of Hygiene and Tropical Medicine (LSHTM)

The London School of Hygiene and Tropical Medicine is renowned for its research, postgraduate studies and continuing education in public and global health. It has an annual research income of more than £ 180 million and are one of the highest-rated research institutions in the UK ([LSHTM](#)). Its three faculties comprise epidemiology and public health, infectious and tropical diseases, and public health and policy. LSHTM experts are involved in many different aspects of research as well as providing guidance to those responding around the globe, information on COVID-19 is compiled on its website ([LSHTM](#)). In addition, LSHTM houses the newly established Hygiene Hub, initiated by individuals of LSHTM, CAWST and WASH'em. The Hygiene Hub is a free service that supports actors in low- and middle-income countries (LMICs) to rapidly design evidence-based hygiene interventions to combat the coronavirus ([Hygiene Hub](#)). It also supports the Hand Hygiene for All Initiative.

### 3. Key Dates & Events

- World NTD Day: 30 January
- World Health Day: 7 April
- Anniversary of Human Rights to Water and Sanitation: 28 July (2010)
- Global Handwashing Day: 15 October
- World Health Assembly
- World Health Summit

### 4. Publications & Resources

#### *Neglected Tropical Diseases*

- WHO (2019): WASH and Health Working Together – A 'How-to' Guide for Neglected Tropical Disease Programmes [apps.who.int/iris/bitstream/handle/10665/279913/9789241515009-eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/279913/9789241515009-eng.pdf)
- WHO (2018): Global Strategy WASH and NTDs [www.who.int/water\\_sanitation\\_health/publications/wash-and-ntd-strategy/en/](https://www.who.int/water_sanitation_health/publications/wash-and-ntd-strategy/en/)

#### *COVID-19*

- CAWST/PASA (2020): What is COVID-19? [resources.cawst.org/technical-brief/a5cb957b/covid-19-summary-for-sanitation-professionals](https://resources.cawst.org/technical-brief/a5cb957b/covid-19-summary-for-sanitation-professionals)
- CAWST(2020): COVID-19 Safety for Emptiers [resources.cawst.org/poster/193a4917/covid-19-safety-for-emptiers](https://resources.cawst.org/poster/193a4917/covid-19-safety-for-emptiers)
- CDC (June 2020): Factsheet - What you should know about COVID-19 to protect yourself and others [www.cdc.gov/coronavirus/2019-ncov/downloads/2019-ncov-factsheet.pdf](https://www.cdc.gov/coronavirus/2019-ncov/downloads/2019-ncov-factsheet.pdf)

- EU (April 2020): Waste management in the context of the coronavirus crisis [ec.europa.eu/info/sites/info/files/waste\\_management\\_guidance\\_dg-env.pdf](https://ec.europa.eu/info/sites/info/files/waste_management_guidance_dg-env.pdf)
- IFRC, IOM, UNHCR, WHO (March 2020): Interim Guidance on Scaling-up COVID-19 Outbreak in Readiness and Response Operations in Camps and Camp-like Settings [interagencystandingcommittee.org/other/interim-guidance-scaling-covid-19-outbreak-readiness-and-response-operations-camps-and-camp](https://interagencystandingcommittee.org/other/interim-guidance-scaling-covid-19-outbreak-readiness-and-response-operations-camps-and-camp)
- UN (May 2020): Resolution A73.R1 “COVID-19 Response” [apps.who.int/gb/ebwha/pdf\\_files/WHA73/A73\\_R1-en.pdf](https://apps.who.int/gb/ebwha/pdf_files/WHA73/A73_R1-en.pdf)
- WHO (April 2020): COVID-19 Strategic preparedness and response plan [www.who.int/publications/i/item/strategic-preparedness-and-response-plan-for-the-new-coronavirus](https://www.who.int/publications/i/item/strategic-preparedness-and-response-plan-for-the-new-coronavirus)
- WHO/UNICEF (2020): JMP Hygiene Baselines pre-COVID-19 Global Snapshot [washdata.org/sites/default/files/documents/reports/2020-05/JMP-2020-COVID-global-hygiene-snapshot.pdf](https://washdata.org/sites/default/files/documents/reports/2020-05/JMP-2020-COVID-global-hygiene-snapshot.pdf)
- WHO/UNICEF (March 2020): Water, sanitation, hygiene, and waste management for the COVID-19 virus [www.who.int/publications-detail/water-sanitation-hygiene-and-waste-management-for-covid-19](https://www.who.int/publications-detail/water-sanitation-hygiene-and-waste-management-for-covid-19)

### **(Hand) Hygiene**

- WHO (2020): How to HandWash [www.who.int/gpsc/5may/Hand\\_Hygiene\\_Why\\_How\\_and\\_When\\_Brochure.pdf?ua=1](https://www.who.int/gpsc/5may/Hand_Hygiene_Why_How_and_When_Brochure.pdf?ua=1)
- LSHTM's Hygiene Hub [hygienehub.info/about](https://hygienehub.info/about)
- WHO/UNICEF (2020): Hand Hygiene for All [www.unicef.org/sites/default/files/2020-06/Hand-hygiene-for-all-2020\\_0.pdf](https://www.unicef.org/sites/default/files/2020-06/Hand-hygiene-for-all-2020_0.pdf)
- Brauer, M. et. al. (2020): Global Access to Handwashing: Implications for COVID-19 Control in Low-Income Countries [www.ncbi.nlm.nih.gov/research/coronavirus/publication/32438824](https://www.ncbi.nlm.nih.gov/research/coronavirus/publication/32438824)

### **Health Care Facilities**

- WHO (2019): Water, sanitation, hygiene and health – a primer for health professionals [www.who.int/water\\_sanitation\\_health/publications/water\\_sanitation\\_hygiene-primer-for-health-professionals/en/](https://www.who.int/water_sanitation_health/publications/water_sanitation_hygiene-primer-for-health-professionals/en/)
- JMP Baseline Report (2019): WASH in Health Care Facilities [www.unwater.org/publications/wash-in-health-care-facilities-global-baseline-report-2019/](https://www.unwater.org/publications/wash-in-health-care-facilities-global-baseline-report-2019/)

### **WASH in Schools**

- German Toilet Organization (2020): Recommendations for Infection Prevention and Control in School Sanitation and Hygiene during the COVID-19 Pandemic [germantoilet.org/en/schools/act-now-infection-prevention-in-schools/](https://germantoilet.org/en/schools/act-now-infection-prevention-in-schools/)
- WASH in Schools Network (2020): Knowledge Map – WASH in Schools and Coronavirus [www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3831](https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3831)
- WASH in Schools Network (2020): WASH in Schools Checklists to Manage COVID-19 Response – Checklists for school entrances, classrooms & toilets [www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3893](https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3893)
- WASH in Schools Network (2020): 10 immediate WASH in schools (WinS) actions – For School Heads to manage the response to COVID-19 [www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3855](https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3855)

### **Other**

- WHO/FAO/OIE (2020): Technical brief on water, sanitation, hygiene (WASH) and wastewater management to prevent infections and reduce the spread of antimicrobial resistance (AMR) [www.who.int/publications/i/item/9789240006416](https://www.who.int/publications/i/item/9789240006416)
- WHO (2019): Safer Water, Better Health [www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3744](https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/3744)
- WHO (2019): Global Influenza Strategy 2019-2030 [www.who.int/influenza/global\\_influenza\\_strategy\\_2019\\_2030/en/](https://www.who.int/influenza/global_influenza_strategy_2019_2030/en/)
- WHO (2018): Managing epidemics – Key facts about major deadly diseases [www.who.int/emergencies/diseases/managing-epidemics-interactive.pdf](https://www.who.int/emergencies/diseases/managing-epidemics-interactive.pdf)
- WHO (2011) Bulletin: The elusive definition of pandemic influenza [www.who.int/bulletin/volumes/89/7/11-086173.pdf?ua=1](https://www.who.int/bulletin/volumes/89/7/11-086173.pdf?ua=1)
- Bartram, J., Cairncross, S. (2010): Hygiene, Sanitation, and Water: Forgotten Foundations of Health (Study) [journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1000367](https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1000367)

*“COVID-19 is a crisis of poorly managed sanitation, water and hygiene”, Catarina de Albuquerque CEO, SWA, April 2020*