

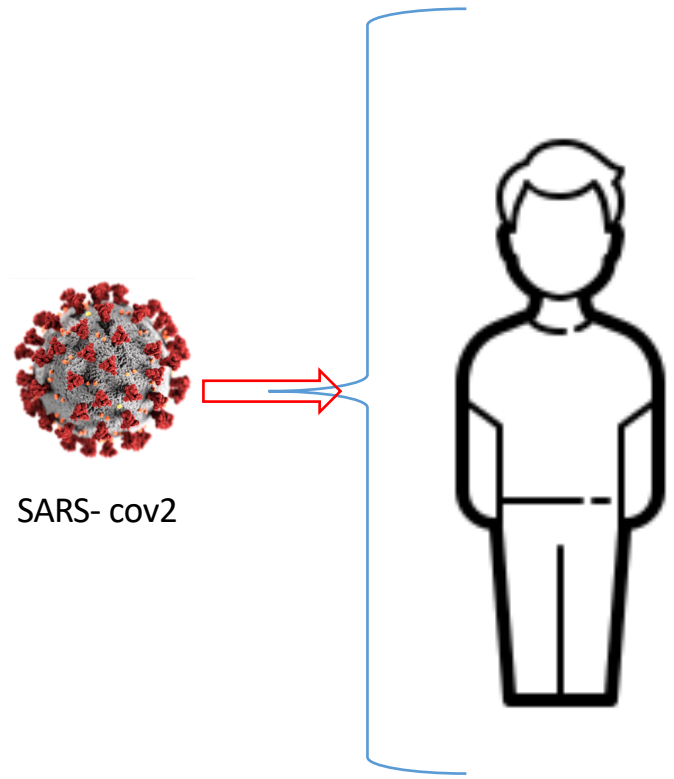
Health and epidemiological perspectives associated with water and wastewater systems in a post-COVID 19 world







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COVID-19 in the environment



Barriers	Waste generated	End outlet
	Medical Waste	} Landside Soil Rivers/Ocean
	Solid Waste	
	Waste Water	
		

What we Know for Coronavirus in Water, sanitation and Hygiene environments

- SARS Coronavirus has been detected in wastewater but not as infectious particles.
- Temperature is an important environmental factor affecting CoV survival in water.
- CoV show limited environmental stability and sensitivity to oxidants as chlorine.
- There is no evidence of CoV transmission through contaminated water.
- Methods for CoV concentration from waters should be optimized.

Survival of surrogate, Human coronaviruses

Media	Temp (°C)	Time	Removal	Reference
Dechlorinated tap water	20	2 days	None surviving	Wang et al, J Virol Methods, 2005
Dechlorinated tap water	23	8-12 days	99.9%	Gundy et al Food Environ Virol, 2009
Hospital wastewater	20	2 days	None surviving	Wang et al, J Virol Methods, 2005
Settled sewage	25	14 days	99.9%	Casanova, et al, Water Research, 2009
Wastewater	23	2-4 days	99.9 %	Gundy et al Food Environ Virol, 2009
Baby faeces	20	3 hours*	None surviving	Lai, et al., Clinical Infectious Disease, 2005
Adult faeces	20	1 day	None surviving	Lai, et al., Clinical Infectious Disease, 2005
Cotton gown	20	5 min- 24 hours**	None surviving	Lai, et al., Clinical Infectious Disease, 2005
Various surfaces (review of 22 studies)	Average 20	2 hours-9 days	None surviving	Kampf, et al., Journal of Hospital Infection, 2020.

*Quicker die off attributed to lower pH in baby feces (pH 6-7).

**Quicker die off when there is a lower initial concentration of the virus.

Diseases Burden for inadequate WASH services, WHO, 2016

Table 1. | Disease burden from inadequate WASH, 2016^a

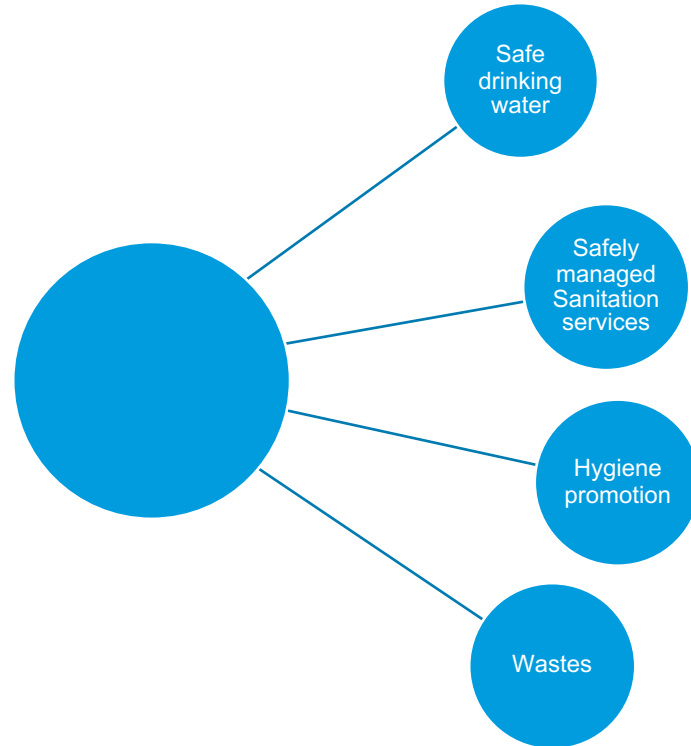
DISEASE	DEATHS	DALYS (THOUSANDS)	POPULATION- ATTRIBUTABLE FRACTION
Diarrhoeal diseases	828 651	49 774	0.60
Soil-transmitted helminth infections	6 248	3 431	1
Acute respiratory infections	370 370	17 308	0.13
Malnutrition ^b	28 194	2 995	0.16
Trachoma	<10	244	1
Schistosomiasis	10 405	1 096	0.43
Lymphatic filariasis	<10	782	0.67
SUBTOTAL: drinking-water, sanitation and hygiene	1 243 869	75 630	NA
Malaria	354 924	29 708	0.80
Dengue	38 315	2 936	0.95
Onchocerciasis	<10	96	0.10
SUBTOTAL: water resource management	393 239	32 740	NA
Drownings	233 890	14 723	0.73 ^c
SUBTOTAL: safety of water environments	233 890	14 723	NA
TOTAL: inadequate water, sanitation and hygiene	1 870 998	123 093	NA

- Frequent and proper hand hygiene one of the most important prevention measures.
- Existing WHO guidance on the safe management of drinking-water and sanitation services applies to the COVID-19 outbreak. Another reason to invest in WASH.
- Many co-benefits will be realized through good WASH, including preventing many other infectious diseases, which cause millions of deaths each year.

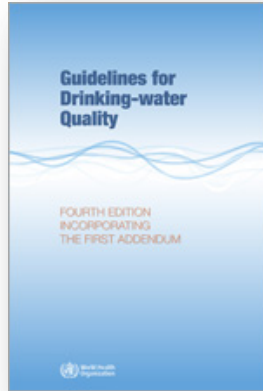
Children affected by COVID,19

- An estimated 77 per cent of children under the age of 18 worldwide – 1.80 billion out of 2.35 billion – were living in one of the 132 countries with stay-at-home policies, as of early May.
- Nearly 1.3 billion students – over 72 per cent – are out of school as a result of nationwide school closures in 177 countries.
- 40 per cent of the world's population are not able to wash their hands with soap and water at home.
- Nearly 370 million children across 143 countries who normally rely on school meals for a reliable source of daily nutrition must now look to other sources as schools are shuttered.
- As of 14 April, over 117 million children in 37 countries may miss out on their measles vaccination as the pandemic causes immunization campaigns to stop to reduce the risk of spreading the virus

The actual responses for Covid-19 in Water, sanitation and Hygiene environments



Safely managed water supplies



Guidelines



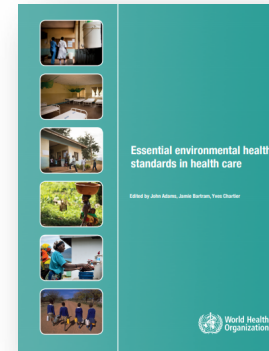
Water safety planning and climate

Water treatment performance

(e.g. boiling, high performing ultra or nano filters, solar, UV, or appropriately dosed chlorine)

Key considerations

- **Drinking water safety for viruses is long-established and based on knowledge about the removal of viruses (more robust than SARS-CoV-2) by water treatment processes.**
- Residual chlorine of ≥ 0.5 mg/l after at least 30 minute of contact time
- Point of use treatment where safe, piped supplies not available



Health care facilities

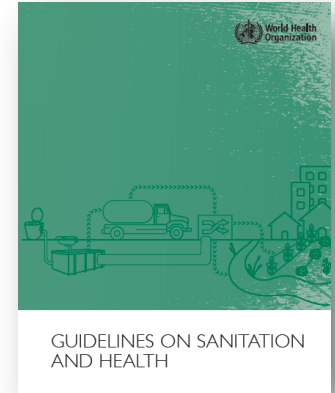
Safely managed sanitation-key points

- Safe management along every point of the sanitation chain important; system should be able to meet an increase in demand
- Important to check safety plumbing (e.g. sealed bathroom drains, backflow valves on bathroom sprayers and faucets)
- Staff and patients should have separate toilets; where possible COVID-19 patients should have their own toilets
- Regular cleaning and disinfection of bathrooms and anyone with risk of exposure to excreta should wear PPE
- Practical, simple wastewater treatment technologies exist (e.g. waste stabilization pond).
- **Monitoring the SARS-COV2 in Wastewater can predict the community infection**



WHO (2018) Guidelines on Sanitation and Health

https://www.who.int/water_sanitation_health/publications/guidelines-on-sanitation-and-health/en/



Hand hygiene

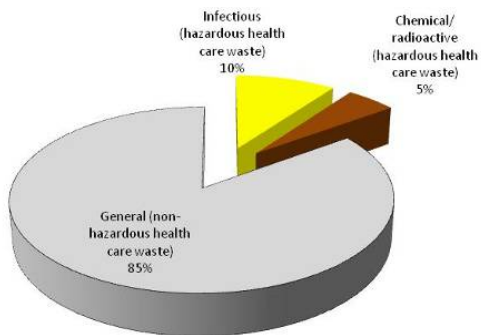
Ensuring hand hygiene occurs at the right time & in the right way is achieved through a multimodal approach:



1. The **infrastructure** & **resources** available to perform hand hygiene
2. People **trained** in the why, when and how
3. **Checks** in place to monitor whether it is being performed at the right time & in the right way & **timely feedback** so that corrective action can be addressed
4. **Reminding** people to perform hand hygiene at the right time and in the right way
5. A **culture** within a care facility that values hand hygiene, especially the support of senior managers

Safe health care waste management

1. Follow regular safe management of waste practices (e.g. segregation, treatment, safe disposal)
2. Use PPE while handling waste (boots, apron, long-sleeved gown, thick gloves, mask and goggles or face shield)
3. **With the increase PPE and Wastes used during the pandemic, consideration is to improve existing infections waste treatment capacities**



Non-Infectious Waste

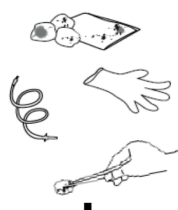
- Paper/Packaging material
- Bottles/Cans
- Food



Black
container
(lined)

Infectious Waste

- Gauze/Dressing
- Blood/IV giving sets
- Gloves
- Pharmaceutical waste



Yellow
container
(lined)

Sharps Waste

- Infusion needles
- Broken slides
- Broken vial
- Broken ampoules
- Lancet
- Retractable blades
- Scalpels
- Needles



Sharps box



Safe management of wastes
from health-care activities

Second edition

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Water, sanitation and Hygiene Post COVID-19

- Strengthen **Hygiene promotion** and scale up the existing programme
- Reinforce **WASH in health care facilities** including waste management
- **Continue monitoring SARS-COV2 in wastewater** and event develop a quick testing kit to support countries with low capacities.
- Support countries with lower capacity to improve their **water and wastewater treatment** according to WHO guidelines and if possible adjust the treatment procedure
- As the crisis continue, Equip WASH workers adequately to perform their duty
- Develop **innovative way to ensure WASH supplies** are available including supporting national procurement and services for WASH

A photograph of two children sitting on the ground in front of a mud-brick wall. The child on the left is a girl with dark hair, wearing a grey headband, a grey scarf, and a floral dress. The child on the right is a boy wearing a grey headband with black polka dots, a white long-sleeved shirt, and a plaid skirt. Both children are smiling and looking at each other. They are holding large, flat, brown mud bricks in their hands. The background is a wall made of mud bricks, with some pipes visible on the right side.

Thanks

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