Water, sanitation, hygiene and waste management for preventing COVID-19

Summary of key evidence and WASH and waste interventions

July 2020
Latest figures (20 July 2020)
https://covid19.who.int/

Countries and territories with cases: 216
Total global cases: 14.3 million
Total global deaths: 602,000
WASH is vital to COVID-19 response and recovery

UN-Wide plan, 10 Billion USD (June 2020)

WHO Strategic Response (April 2020) and Operational Guidance (May 2020)

- 8 pillars: WASH integral to Pillar 6 (infection prevention and control), Pillar 2 (risk communication) and Pillar 7 (case management)

- 5 Key WASH recommendations in country planning guidelines
  - Continuation of essential WASH services during outbreak
  - Provision and O&M of hand hygiene facilities in public spaces
  - Provision of hygiene supplies in vulnerable households
  - Provision and monitoring of WASH in health care facilities
  - Community engagement for hygiene behavior change
WASH also being furthered through new global hand hygiene for all initiative

- **Aim**: Ensure all people in all settings (health care facilities, schools, workplaces, public places, camps, homes) have access and practice regular hand hygiene
- **Co-led** by WHO and UNICEF with support from 10 core partners
- **Global focus** on four main areas (learning, intersectoral engagement, investments and monitoring) to support country progress

-Launched June 2020
Takeaways from evidence

1. **Hand hygiene:** Frequent and effective hand hygiene is one of the most important prevention measures. Hand hygiene at the right time.

2. **Environmental hygiene:** Effective inactivation on surfaces can be achieved within 1 minute using common disinfectants.

3. **Water and sanitation:** Existing WHO guidance on the safe management of drinking-water and sanitation services applies; water disinfection and wastewater treatment can reduce viruses.

4. **WASH investments:** Should be fundamental to all country preparedness and response plans.

5. **Co-benefits:** Many will be realized through good WASH, including preventing millions of deaths each year caused by other infectious diseases.
COVID-19 virus and the environment

- Enveloped virus, surrounded by weak lipid membrane
- Relatively fragile in the environment and will become inactivated much faster than non-enveloped human enteric viruses (e.g. norovirus, rotavirus, hepatitis A virus)
- Approximately 2–27% of those with confirmed COVID-19 have diarrhoea and several studies have found COVID-19 RNA fragments in fecal matter during illness and after recovery.
- Detection of COVID-19 RNA fragments do not allow for determining if virus is alive or dead, but we assume these fragments are not infectious because of difficulty in culturing in stool and fragility to harsh gut environment
- Three studies have detected infectious COVID-19 virus in feces, however other studies have not found infectious COVID-19 virus in feces. Shed virus is rapidly inactivated during transit through the colon.
- **Risk of transmission of COVID-19 virus from the faeces of an infected person appears to be low.**
Presence of COVID-19 virus in water and wastewater

- Infectious COVID-19 virus has not been detected in drinking-water supplies; RNA fragments were detected in one Italian river during the peak of the epidemic.
- Infectious COVID-19 virus has not been detected in untreated or treated sewage.
- RNA fragments have been detected in untreated sewage and sludge in a number of countries (e.g. Australia, France, Italy, the Netherlands, Spain, USA); the concentration is closely correlated with confirmed community cases.
- In most cases RNA fragments are not detected in treated sewage but small amounts have been detected in partially treated sewage.
- Main take-aways: **Low risk to drinking-water supplies and low risk of transmission via sanitation supplies**; including for reasons mentioned on previous slide.
Environmental surveillance of COVID-19 virus in wastewater

- Environmental surveillance is still in a research and proof of concept phase

- Proposed use scenario: Environmental surveillance may compliment public health data and provide info on when cases may spike 5-7 days in advance

- Research is underway in many countries on:
  - Sampling and analytical methods
  - Modelling and interpretation of data
  - Use of data to inform public health (including WASH) actions

- Surveillance should not be used as a substitute for robust testing, reporting and tracking of COVID-19 cases; many questions remain on how concentrations of COVID-19 RNA fragments relate to number of cases in a community

- Primary aim of governments, utilities and investments should be on the continuity and expansion of safely managed sanitation supplies.
# Survival of coronaviruses, including COVID-19 virus

Median half-life survival of SARS-CoV-2 on surfaces is 1-7 hours.

<table>
<thead>
<tr>
<th>Media</th>
<th>Temp (°C)</th>
<th>Time</th>
<th>Removal</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dechlorinated tap water</td>
<td>20</td>
<td>2 days</td>
<td>None surviving</td>
<td>Wang et al, J Virol Methods, 2005</td>
</tr>
<tr>
<td>Dechlorinated tap water</td>
<td>23</td>
<td>8-12 days</td>
<td>99.9%</td>
<td>Gundy et al Food Environ Virol, 2009</td>
</tr>
<tr>
<td>Hospital wastewater</td>
<td>20</td>
<td>2 days</td>
<td>None surviving</td>
<td>Wang et al, J Virol Methods, 2005</td>
</tr>
<tr>
<td>Wastewater</td>
<td>23</td>
<td>2-4 days</td>
<td>99.9%</td>
<td>Gundy et al Food Environ Virol, 2009</td>
</tr>
<tr>
<td>Baby faeces</td>
<td>20</td>
<td>3 hours*</td>
<td>None surviving</td>
<td>Lai, et al., Clinical Infectious Disease, 2005</td>
</tr>
<tr>
<td>Adult faeces</td>
<td>20</td>
<td>1 day</td>
<td>None surviving</td>
<td>Lai, et al., Clinical Infectious Disease, 2005</td>
</tr>
<tr>
<td>Cotton gown</td>
<td>20</td>
<td>5 min- 24 hours**</td>
<td>None surviving</td>
<td>Lai, et al., Clinical Infectious Disease, 2005</td>
</tr>
<tr>
<td>Various surfaces (review of 22 studies + two studies on SARS-CoV-2)</td>
<td>Average 20</td>
<td>2 hours-9 days</td>
<td>None surviving</td>
<td>Kampf, et al., Journal of Hospital Infection, 2020; Dorelman, et al., NEJM, 2020; Chin et al., Lancet Microbe, 2020</td>
</tr>
</tbody>
</table>

*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.
Safely managed water supply

Safe water supplies critical for keeping essential workers' health, treating patients and preventing waterborne disease.

**KEY CONSIDERATIONS**

- Use water safety plan approach (protection from source to consumer)
- Residual chlorine of $\geq 0.5 \text{ mg/l}$ after at least 30 minute of contact time and at pH $< 8.0$
- Point of use treatment where safe, piped supplies are not available
- Develop site-specific plan for flushing pipes and ensuring safe water for reopening of buildings

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E.g. boiling, high performing ultra or nano filters, solar, UV, or appropriately dosed chlorine

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Health care facilities
Safely managed sanitation

- Safe management at every point of the sanitation chain; 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. septic tank + leach field; waste stabilization pond, burying and covering sludge)

WHO (2018) Guidelines on Sanitation and Health
Improving hand hygiene in health care facilities

- Use multi-modal approach (systems change, training, evaluation and feedback, reminders, and “safety” culture)

- Critical actions:
  - Procurement of adequate quantities of hand hygiene supplies for staff, patients and visitors
  - Refreshers of hand hygiene training
  - Refreshers of reminders/communications about its importance to prevent the spread of the COVID-19 virus.
Safe health care waste management

• No evidence that unprotected human contact during handling of health care waste has resulted in transmission of COVID-19
• COVID-19 PPE can increase waste volume by a factor of 5
• Short term: Increase capacity to handle and treat increased volumes of health care waste
• Long term: Establish sustainable waste management chains including logistics, recycling, treatment technologies and policies
• Follow regular safe management of waste practices (e.g. segregation, treatment, safe disposal)
• Use PPE while handling waste (boots, apron, long-sleeved gown, thick gloves, mask and goggles or face shield)
Cleaning

• Follow existing recommendations (e.g. trained staff, SOPs on cleaning technique and materials, cleaning frequency based on risks)

• Existing disinfectants are effective (e.g. 70% ethyl alcohol and 0.1% sodium hypochlorite for surfaces and 0.5% sodium hypochlorite for blood/spills)

• Studies from Singapore and China indicate recommended cleaning techniques and disinfectants effective for killing COVID-19 virus

• Soiled linens should be machine washed (60-90 C) with detergent OR soaked in warm water and detergent followed by 0.5% chlorine
Hand hygiene in communities

• Huge gaps in access; 3 billion people lack HH in homes; 75% are living in the poorest countries or vulnerable situations (migrants)

• WHO recommends universal access to HH (e.g. Health care facilities, schools, public buildings, camps, workplaces)

• Ideal materials (in order of effectiveness)
  - Water and soap or ABHR
  - Ash
  - Water alone

• Water does not need to be drinking-water quality

• Water quantity: at least 0.2 l/HW event

• Local breweries, pharmacies, etc. encouraged to make ABHR (examples from Kenya, South Africa, Switzerland)
Hand hygiene in communities, contin.

• Design considerations:
  - Tap can be turned off with arm or foot
  - Quantity appropriate for # of users and located in visible and convenient location
  - Grey water should be captured and emptied
  - Easy to repair and parts can be sourced locally
  - Accessible to target users (e.g. children, those with limited mobility)
  - Ensure physical distancing between users (at least 1 m)

• Hygiene promoters should be considered «essential service providers» given free movement and necessary protection

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<tr>
<th>Type</th>
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<th>Raised bucket with tap/ outlet</th>
<th>Two buckets suspended</th>
<th>Suspended bottle or bag with outlet/ hole/ pop-up plug</th>
<th>Sink with tap</th>
<th>Foot pump sink</th>
<th>Purpose-built all-in-one system</th>
<th>Free standing water tank with tap(s)/ outlet(s) (public facility)</th>
<th>Tube with outlets (group facility)</th>
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Community waste

• Waste generated in homes where suspected or confirmed COVID-19 patients live should be packed in strong bags and closed completely before disposal with municipal waste services.

• Setting up a separate waste stream is NOT recommended and there is no evidence of transmission from used tissues, disposal food utensils, etc of COVID-19 patients.

• Always conduct hand hygiene after disposing used tissues and after handling waste used by those infected with COVID-19.

• If no municipal waste services exist, as interim option, waste, safe burial or controlled burning may be done.
Bathing waters

- Risk of transmission of COVID-19 from fresh and coastal water or swimming pools and spa water contaminated with feces is very low.
- Existing WHO recommendations for managing bathing water apply.
- Pools with good hydraulics and filtration, should be operated within its engineered bathing load with routine disinfection (1 mg/l free chlorine and 7.2 <pH<7.8)
- Regular hand hygiene, social distancing and use of face masks when appropriate are recommended in crowded kiosks, changing areas, etc
- Bathrooms should be regularly cleaned and toilet facilities maintained
Summary and what you can do

- **Advocate for inclusion of WASH** programming, messaging, funding and monitoring in national COVID-19 plans and regional efforts.
- **Rapidly assess and make WASH** improvements in health care facilities.
- **Strengthen support to water and sanitation workers and hygiene promoters** (protective gear, training, hand hygiene at work and home).
- **Prioritize rapid expansion of hand hygiene facilities, promote use and ensure operation and maintenance** in key settings while developing longer-term, costed national hygiene plans.
- **Ensure water and sanitation providers have back-up supplies, additional funding and contingency plans** for disinfection chemicals, fecal indicator and chlorine testing equipment.
- **Provide emergency funding to ensure WASH services continue**, even if users can no longer afford to pay and to extend services to those without access.
Key resources


Hand Hygiene for All Initiative: https://www.who.int/water_sanitation_health/publications/hand-hygiene-for-all/en/


