

TECHNICAL FACT SHEET 3

Safe plumbing for WASH services in health care facilities

Plumbing is an essential service that needs to be considered in the overall planning, operation and maintenance of water, sanitation and hygiene (WASH) services in health care facilities. The provision of a safe, reliable, resilient water supply – including reliable access to water for handwashing; provision of clean, functional toilets; and assurance of safe wastewater management (including disposal) – is vital to protecting the hygiene and safety of patients and staff in the health care facility.

Regardless of location, health care facilities must enlist the services of competent, trained plumbers to install and maintain plumbing systems and components. Availability of good-quality plumbing fixtures and fittings in the local area or region is also important to facilitate repair and service of the installed products and components.

Skilled plumbers should be considered as key members of the Water and Sanitation for Health Facility Improvement Tool (WASH FIT) team with regard to installing and maintaining water sanitation systems in the facility.⁷ It is important for the WASH FIT team and facility management to establish a relationship with local plumbing contractors and/or plumbers.

The nature of plumbing in the WASH FIT process

Plumbing covers:

- pipework from supply (water tank, municipal supply, borehole or well) to end-points (taps);
- taps, traps, toilets, handwashing basins, sinks, laundry facilities and shower facilities; and
- drainage from all fixtures to safely managed wastewater systems.

The roles of a competent plumber are to:

- install and maintain the water supply and sanitation systems;
- have thorough knowledge of the installed plumbing systems, and work with the facility's WASH FIT team to keep all systems working at all times; and
- develop and implement preventive maintenance plans, and resolve problems as they are identified (e.g. leaks or blockages).




The roles of the facility WASH FIT team are to:

- ensure that water from the water supply system is tested regularly, and is safe and fit for purpose;
- conduct regular inspections of the facility to ensure the cleanliness of all toilet facilities, check for system leaks, ensure that plumbing fixtures and fittings are working properly, and ensure that any problems are reported and resolved quickly; and
- know when to enlist the services of a skilled plumber.

⁷ If such certifications and/or regulations exist, teams should use a certified, accredited or licensed plumber or technician.

Plumbing considerations within the WASH FIT cycle

Step	Activity
Preparation	Obtain any available plans or drawings of existing plumbing systems, through appropriate local networks or authorities. Identify contacts at the municipal water and sewerage utility. Review national plumbing codes and other relevant policies (e.g. on climate). Evaluate the facility's access to, and relationship with, local, skilled plumbing tradespeople.
Step 1: Establish the team	Work with skilled tradespeople, including plumbers. Determine who is responsible for maintaining the water and sanitation systems, for water quality and for routine plumbing system inspections. Where available, basic plumbing awareness training for the team may be conducted. Provide a plumbing awareness training programme for the WASH FIT team to ensure a basic knowledge of the facility's plumbing system so that they can identify problems.
Step 2: Assess the facility	<p>Specific elements to monitor and improve include the following.</p> <p>Water supply: source, storage (leaks and potential exposure to contamination), frequency and results of water quality testing, cleanliness and functionality of fixtures and fittings, absence of dead legs/stagnant pipes, appropriate circulation and temperature to manage <i>Legionella</i> risks in hot-water systems/coolers/shower heads.</p> <p>Wastewater management: septic system (free from pooling water); appropriate setback distance for soakage pits/septic effluent from on-site water sources; functionality of toilets, urinals and wastewater system (free from blockages and overflows).</p> <p>Note any recent or ongoing plumbing issues and the probability of infrastructure causing further risks to health. Common issues include:</p> <ul style="list-style-type: none"> • faulty or leaking pipework and taps – wasting water, increasing costs to the facility through higher utility payments and/or pumping and energy costs; • poor water quality due to corrosion, chemical contamination (e.g. lead) or dead legs leading to stagnation; • blocked and overflowing toilet(s), handbasins and sinks – spreading pathogens and increasing risk of infection for staff, patients and carers; • pooling of water on floors – spreading pathogens and increasing risk of infection for staff, patients and carers; and • failing drainage/septic system – leading to stagnant water (presence of mosquitoes), risk of flooding and water contamination.
Step 3: Risk assessment	<p>Risks to facility users linked to poor plumbing include:</p> <ul style="list-style-type: none"> • psychosocial effects – dignity and morale of staff and patients affected by using dirty or broken toilets, or having no toilets; • infections – from inability to perform hand hygiene (broken sinks and insufficient water supply), contaminated water source (including drinking water) or chemical contamination from leaching of pipe material; and • environmental and wider community hazards – contamination of water source from poorly managed sanitation system, spread of antimicrobial resistance or flooding from poor drainage.
Step 4: Develop and implement improvement plan	A number of simple, low-cost improvements can be made, including fixing or replacing taps and leaking pipes, and regularly cleaning toilets. More major improvements (e.g. installing a septic tank, upgrading wastewater systems) will necessitate securing additional capital and funds for operation and maintenance.
Step 5: Monitor, review, adapt, improve	If there are recurring problems with plumbing systems, review procedures for identifying and acting on problems, funds to purchase spare parts and availability of skilled plumbers to complete repairs in a timely manner.

Domain	Improvement
<p>Water</p> 	<ul style="list-style-type: none"> ▪ Regularly inspect and test water quality. The use of safe water (according to the WHO <i>Guidelines for drinking-water quality</i>) minimizes the risk of exposure to water-related pathogens of enteric and environmental origin (e.g. <i>Pseudomonas</i>, <i>Legionella</i>). Check for basic visual indicators (e.g. colour, solids), check for tastes and odours, and regularly test water quality. ▪ Maintain, clean and disinfect storage tanks. The facility should have tanks to store water in case of disruption to the main supply. Water storage tanks should be protected from climate-related extreme weather events and sufficient to meet the needs of the facility for 2 days. Ensure that adequate (e.g. vermin-proof) cover is in place, and that access hatches close properly and are securely locked. Ensure that tanks are clean, free from leaks and sources of contamination, and cleaned and disinfected at least once per year following national or global standards. Use sanitary inspection forms for storage tanks and taps, and/or rainwater harvesting. ▪ Maintain functioning sinks and taps. Confirm that sinks are not blocked, pipes are connected to the water system, water is available from taps, and taps are secure, with proper fittings to prevent leaks. Where possible and appropriate, use water-saving or water-efficient taps. All sinks should have water traps that provide a water seal that prevents sewer odours from rising through the drain. ▪ Confirm the reliability and frequency of the municipal water supply for delivery/supply (24 hours per day, 7 days per week; seasonal disruptions). Consider backup sources and additional storage tanks, where needed. Identify an isolation valve in case of emergencies. ▪ Ensure that washing rooms are well maintained. Confirm that there are no leaking pipes (walls, ceiling) and no water pooling on floor; test floor drains (if fitted).
<p>Sanitation</p> 	<ul style="list-style-type: none"> ▪ Maintain functioning toilets. Use water-saving or water-efficient cistern/tank, where possible, and regularly confirm functionality, where fitted. Ensure that toilets are not blocked, are flushing properly and are not continuously running (or overflowing), to save water. ▪ Check sewer connections. If toilets are connected to a public sewer system, ensure that there are no leaks, and that the sewer conveys solids and liquids with minimal leaks/overflows to the treatment facility or sewer. Look downstream to see if the sewer goes to a safely managed treatment plant, or whether septic effluent flows into a community open drain or other water source. ▪ Check functionality of septic tanks. Check lid for damage. Check that there is no water pooling in the surrounding area, no strong odours (could indicate failing system) and no unusual growth in the surrounding area (grass and weeds could indicate a leaking system).
<p>Cleaning</p> 	<ul style="list-style-type: none"> ▪ Regularly inspect toilets and washrooms. Ensure that the facility has a routine cleaning and inspection schedule for all toilets and washrooms. Carry out daily spot checks to ensure that cleaning is being carried out appropriately.
<p>Health care waste</p> 	<ul style="list-style-type: none"> ▪ Regularly inspect water supply to autoclave. Ensure that the water supply to the waste autoclave is of sufficient quantity and quality, all pipes and fittings are secure and without leaks, and water is available during operation of the autoclave.
<p>Management and workforce</p> 	<ul style="list-style-type: none"> ▪ Maintain local supply chain for efficient repairs. Ensure that repair materials (e.g. washers, o-rings, pipe fittings) for commonly broken items (e.g. taps, toilets) and other installed plumbing fixtures and fittings are available and the local supply chain is maintained. Any new infrastructure should be chosen based on local availability of materials and expertise for repairs.

Related tools and further reading

National water conservation standards (where available).

WHO, World Plumbing Council (2006). *Health aspects of plumbing*. https://apps.who.int/iris/bitstream/handle/10665/43423/9241563184_eng.pdf?sequence=1&isAllowed=y

WHO. Guidelines on small water supply management. <https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/water-safety-and-quality/small-water-supply-management>

Healthhabitat Australia (2011). *How a septic tank works* [video]. <https://www.youtube.com/watch?v=uuORuwb4cfs&t=3s>

Netherlands Water Partnership (2006). *Smart water solutions: examples of innovative, low-cost technologies for wells, pumps, storage, irrigation and water treatment*. https://www.joinforwater.ngo/sites/default/files/library_assets/330_NWP_E9_smart_water.pdf

Netherlands Water Partnership (2006). *Smart sanitation solutions: examples of innovative, low-cost technologies for toilets, collection, transportation, treatment and use of sanitation products*. https://www.joinforwater.ngo/sites/default/files/library_assets/360_NWP_E2_Smart_Sanitation.pdf



The World Plumbing Council led the development of this fact sheet.