Management of waterborne pathogens in dental care during the COVID-19 pandemic

1. Summary

During COVID-19 outbreak registered managers of dental practices should ensure that:

- There is a documented Water Safety plan (WSP)[1], developed by persons who are experienced and competent[2], which includes up to date asset registers, risk assessments and management plans for all water systems including the Dental Unit Water Lines (DUWL). These should be reviewed and updated to reflect the current status of each of these systems and associated equipment during the COVID-19 pandemic
- Recommendations of the written scheme and risk assessment are implemented for the control of Legionella within the dental waterline system before during and after shutdown during COVID-19
- That all water systems and equipment that use water are reviewed for safe decommissioning and recommissioning
- Regular flushing or treatment programmes based on equipment and manufacturer's guidance are planned
- That there is a plan to recommissioning of all water services including disinfection, flushing and validation and which ensures enough time is planned for recommissioning in advance of recommencing services
- Actions are documented during the decommissioning and recommissioning phases (this can be done by annotating your existing risk assessments and dental-unit water-line (DUWL) management plan)

2. Who is this guidance aimed at?

This guidance is aimed at independent primary care dental providers as well as those in primary care GP practices. Particular attention should be given to the control of water borne pathogens in dental unit water lines and related equipment.

3. Why this guidance?

Dental service providers should not be carrying out routine dental care during COVID-19 but as per CQC guidance may be offer telephone triage and advice as well as giving prescriptions. Patients who need active emergency treatment should be referred to regional urgent care centres where treatment can be provided safely.

Registered Managers of dental practices have an overriding general duty of care under the Health and Safety at Work etc Act 1974 (1) and associated legislation. Part of this duty of care is ensuring that the water supply, storage and distribution services should comply with the guidance given in the Approved Code of Practice and Guidance L8, HTM 04-01 Safe water in healthcare premises and HTM 01-05 decontamination in primary care dental practices.

1 A Water Safety Plan (WSP) is a documented approach based on identifying all significant risks to public health from water within buildings, ensuring that effective controls and barriers are applied to minimize these risks to acceptable levels, with monitoring plans put in place to ensure the controls remain effective e.g. temperature and biocide monitoring regimes to ensure that safety is maintained. The WSP is supported by ensuring all relevant staff who may have an influence on water safety are suitably trained and there is good communication, and surveillance, including of patients so any waterborne infections would be promptly identified

2 competent person is someone with the necessary skills, knowledge and experience to carry out this function.

During partial or full dental surgery shutdown it will be important for registered managers to consider what actions are required to decommission and recommission dental water services including DUWLs. This information has been provided to remind practices of their responsibilities regarding water quality safety and to plan the recommissioning of the dental practice.

4. Why do we need to prepare now?

Whilst water systems may not seem to be high on the priority list during the COVID-19 pandemic it is important for the health and safety of patients, staff, and visitors that all water systems are managed safely. Evidence from China (Zhou *et al*., 2020) is that half of COVID-19 fatalities had experienced a secondary infection. This suggests patients are at increased risk of secondary infections and for some months after recovery.

Bacteria may grow and develop biofilms, which, combined with the generation of aerosols from high speed powered hand-pieces and ultrasonic devices, may expose your patients to microbial pathogens including *Legionella, Pseudomonas* and *Mycobacterium* species. These pathogens can proliferate in water systems and DUWLs between 20°C to 45°C, in the water during shutdown and this stagnated water will lead to the presence of biofilms.

Water from DUWLs will enter patients' mouths, come into contact with open wounds and will be swallowed or aspirated by patients. Vulnerable patients such as those suffering from chronic respiratory diseases, alcoholics, diabetics and immuno-compromised patients may be at increased risk of respiratory infection or colonisation from inhaling contaminated aerosols during dental treatment. In addition, there will potentially be an occupational risk to the dental team from exposure to contaminated aerosols that may be produced from equipment connected to DUWLs.

Under normal circumstances the risk assessment and DUWL plan should ensure that water is flushed before each session and between patients. This flushing is an important control measure to prevent cross contamination and water from stagnating, which is a major risk factor for water borne pathogens to colonise and form biofilms. Where there is access to the surgery then it is recommended that flushing of the DUWL be maintained on a daily basis and all the hot and cold water outlets including toilets be flushed weekly (run taps gently to avoid splashing and aerosol production until the hot is too hot to keep your hand under and the cold feels cold). The DUWL bottle(s) should be disconnected, emptied, rinsed and stored inverted clean and dry overnight.

Where your surgery is likely to be shut down for several weeks then decommissioning and recommissioning of the water system and DUWL will be required. In the event of prolonged shut-down (e.g. 2-3 months), it would be prudent to have some arrangements in place to disinfect the DUWL as per manufacturer's instructions and to repeat this process as necessary depending on the timeline. If your DUWL have been shut down for 2-3 months there may be considerable biofilm formation and you may need to consider replacing the DUWL tubing. However, where this is not possible or practical then the DUWL should be disinfected as below.

5. Where do I start?

Registered Managers of dental practices should consult their Water Safety Plan (WSP. This should already be in place and have been developed by someone who is experienced and competent to do so (refer to LCA registration) together with the Responsible Person (refer to ACOP)) and ensure that:

- The WSP includes all water systems, including DWULs and associated equipment and has up to date risk assessments and documented management plans (schemes of control) together with monitoring plans to validate and verify their effectiveness.
- Legionella management plans are based on the risk assessment findings and the recommendations are implemented.

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6. When do we need to undertake these actions?

The actions that you take now will influence the level of control that you will achieve and how quickly you will be able to safely reopen your dental surgery, so it is important that you devise these arrangements now so that they are available when needed.

7. DOMESTIC WATER SERVICES

For many practices in primary dental care, it may not be practical or possible to return to the premises to ensure the domestic water systems are flushed regularly. In this case, you will need to undertake extensive flushing of your system on return or contact a competent service provider to manage on your behalf or you may have to consider thermal or chemical disinfection of the water system. Risks to those who are conducting the flushing will need to be considered and controlled and aerosolisation should be controlled.

7.1 If the building is to be closed for less than a month:

If you still have some occupancy you can also make the decision to follow your normal control regimes. If the practice is closed for longer than a month but you wish to remain safe to re-open immediately after the closure:

- Maintain your normal control regime so that the hot water is circulating throughout all part of the system so that the flow temperature is maintained at ≥60 °C and the return on all loops is at ≥50 °C.
- The temperature reaches all outlets at ≥ 50 °C within one minute and the cold reaches ≤20°C after running the outlet (turn on gently to avoid splashing) for 2 minutes. If using a biocide, maintain target levels throughout all parts of the system.
- Flush gently (to reduce aerosols) all hot and cold outlets (showers and taps) at least weekly until they achieve the above temperatures. Where there are thermostatic mixer valves (TMVs) ensure the pipework feeding them achieves target the same temperatures. Flush all WC cisterns, urinals, by-passes and any other points on the network
- Keep drinking water storage tanks at 0.2-1.0 mg / L of free chlorine.
- Adjust your monitoring regime to be able to verify these levels have been achieved at all sentinels outlets and other little used outlets.
- Ensure you keep all documentation: reviewed and amended risk assessments (these can be annotated by hand) including monitoring data for inspection, with evidence of who carried out the monitoring, add time date and signature.

7.2 If the building is to be closed for longer than a month:

Where it has not been possible to maintain the normal water management plan because of lack of access; flushing, disinfection of the domestic water systems is recommended as stagnation provides

ideal conditions for biofilms, which may contain *Legionella* to form in the storage tanks, pipework, fittings and components such as TMVs. There may be many buildings that will require disinfection in order to re-open after the lockdown period for COVID19. It may be worth contacting your service provider now, to be able to access services of experts in system disinfection and to ensure that disinfection of your surgery is prioritised. Any water tanks should be inspected and are likely to require cleaning and disinfection as identified by inspection. Disinfection with chemicals such as chlorine should be carried out in accordance with BS 8558:2015 and PD 855468:2015 (see also HTM 04-01 Part A Chapter 17) and under the direct supervision of a nominated person or consider using point of use filters.

Dental surgeries within NHS premises which provide other medical services (e.g. GP services, other primary care services and/ or hospital services) may have arrangements in place to ensure flushing of water systems during the closure period. If your surgery is within a polyclinic or multipurpose building, consider discussing with others whether they would flush your premises, if maintaining critical and key service functions within a health centre. It is important that records of these activities are kept as these will provide assurances needed in order to reopen the practice safely.

To reduce the presence of waterborne pathogens in the water system and associated equipment, ensure on return and prior to patient treatment, that the calorifier (storage hot water heater) temperatures are as recommended in HSG274 Part 2 (the technical guidance relating to hot and cold water systems and which supplements the Health and Safety Executive's Approved Code of Practice, L8) and in accordance with HTM 04-01.

7.3 To manage systems without maintaining temperature control

If you have made the decision not to heat your hot water for energy conservation or to prevent warming of the cold water or have no one on site then to ensure your systems remain safe: -

When closing down the water system completely:

- Turn off the water supply to the hot water heater
- Carry out a full system disinfection by flushing through to all outlets to achieve 50 ppm HOCL or equivalent biocide for at least one hour and check the biocide is at the highest target concentration at the furthest outlets. Flush through and refill.

When restarting:

- Repeat the full disinfection of 50 ppm HOCL or equivalent biocide for at least one hour in the cold-water system; circulate and flush through each outlet
- Refill to achieve maximum target disinfection concentrations equivalent to at least 0.2 ppm HOCL (or equivalent biocide)
- Refill and reheat the calorifier and when reaching at least 60 °C and flush through all outlets taking care to avoid any scalding risk.
- Monitor temperatures and biocide levels where applicable and adjust where necessary for at least 48 hours and then take samples from the sentinel outlets.
- Open when you are satisfied the hot and cold-water systems are under control.
- Keep all documentation: review of risk assessments (these can be annotated by hand) including monitoring data for inspection, with evidence of who carried out the monitoring with, add time, date and signature.

7.4 Small Domestic water systems

For small premises with directly heated hot water systems turn on the hot water heater (boiler) and flush gently until hot water has reached ≥ 60°C and flush through the all the outlets sequentially for five minutes taking care to avoid scalding.

7.5 Large building hot and cold-water systems

For larger building ensure that the hot water is:

- maintained at 60˚C from the outlet of calorifiers
- the return, where present, to the calorifiers is at least at 50˚C on all return loops (but preferably above 55˚C)
- taps should reach 55˚C within one minute

For cold water, ensure that:

- water in the storage tanks is maintained below 20˚C (and ideally throughout the system)
- all taps should reach a temperature below 20˚C within two minutes of operating

8. DENTAL UNIT WATER LINE (DUWL) SERVICES

Registered managers should ensure the DUWL management plan includes procedures for decommissioning and recommissioning of the DUW and this should be approved by the responsible person (RP) or competent water treatment adviser.

8.1 Decommissioning of DUWLs

As outlined in HTM 01-05, follow the manufacturer's guidance for the temporary decommissioning of DUWLs. In the absence of manufacturer's guidance, flush, drain and leave disconnected during any temporary closure for each surgery. If this is not practicable, they should be flushed on a weekly basis (as outlined in HTM 01-05). Self-contained water bottles (bottled water systems) should be removed, flushed with distilled and/or reverse osmosis (RO) water, emptied and stored inverted to dry during the temporary closure.

8.2 Recommissioning of DUWLs

The manufacturers guidance for commissioning the chairs should be followed. Effective disinfection of the DUWLs is likely to be required during recommissioning and should be implemented as per the WSP. HTM 01-05 recommends sodium hypochlorite and isopropanol as they have been shown to be effective. Some manufacturers suggest that their disinfectants can be stored within DUWL systems for a fixed time period to manage biofilm. It is important to follow manufacturer's instructions, as the shutdown for prevention of spread of COVID-19 may be a considerably longer time period than these products are designed to be effective for and that the internal equipment components can tolerate.

If the DUWLs have been shut down for ≥one month there may be considerable biofilm formation and you may need to consider replacing the DUWL tubing. However, if this is not possible or practical then disinfect the DUWL with hypochlorite with 50 mg/L free chlorine for 1 h or equivalent (e.g. 25mg/L for 2h). As per HTM 01-05, all water samples from the DUWL should be tested at accredited laboratories at least 48 hours following disinfection. The TVCs should be in the range <100 to 200 colony forming units per millilitre (cfu/mL),

Where in-line filters are present, these will also require replacement or treatment using a cleaning solution as recommended by the manufacturer and this step should be performed after the first DUWL flush. Ensure that any other disposable filters are changed as per manufacturer's instructions.

9. Dental Chair, Spittoon and Cup Filling Services

Ensure thorough flushing of each dental unit and consider (if dental chair and spittoon are connected to domestic water services with appropriate air gap) disinfection as recommended by the manufacturer's instructions.

10. OTHER RISK SYSTEMS WITHIN THE DENTAL PRACTICE

10.1 Do I need to consider other risk systems within the dental practice?

It is a requirement to have an asset register which includes water systems and equipment which require a *Legionella* risk assessment and / or maintenance (ACoP). The *Legionella* risk assessment and the WSP should have identified these risk systems/pieces of equipment e.g. air conditioning units, humidifiers, wet-line suction apparatus, washer-disinfectors, RO systems and self-filling automatic radiographic processors (where still used). Ensure you follow manufacturer's instructions to decommission/recommission. Display signage on equipment to warn that equipment should not be used without appropriate precautionary measures.

10.2 Any other things we need to consider?

When recommissioning, the Registered Manager (as per your national or local guidance e.g. ACoP L8) should ensure that anti-retraction valves are checked before you begin operating.

11. Key Points to remember

- All water systems should have a risk assessment
- All premises should have a written waterline and *Legionella* management plan (scheme of control) which should be written by experienced and competent people (competent person is someone with the necessary skills, knowledge and experience to carry out this function).
- All the recommendations of the written scheme and risk assessment should be implemented
- *Legionella* and other waterborne pathogens should be controlled within the DUWLs
- Disinfect, clean and flush domestic water systems such as taps and showers (as above) prior to re-use
- Keep records of all actions taken during decommissioning and recommissioning
- Take samples to validate your actions have been effective at least 48 hours after any disinfection or pasteurisation.

12. References

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Please note

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These guidelines have been developed by the following experts including: Dr Jimmy Walker (UK, ESGLI), Mary Henderson (UK), Elise Maynard (Water Management Society, UK), Paul McDermott (UK), Susanne Surman-Lee (ESGLI Guidance working Group Chair, UK) and Dr Maria Louisa Ricci (ESGLI Italy).

If you notice any mistakes in these guidelines or have suggestions for improving them, please address them to: jimmywalker@walkeronwater.org