Development of Infection Control Risk Assessment (ICRA) Tools That Include Water Management for Construction

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Background

There is currently a gap between the requirement for a comprehensive water management plan, and the implementation of an infection control risk assessment (ICRA) that includes mitigation for waterborne pathogen growth and spread associated with construction activities. Many healthcare systems participate in accreditation programs that survey to the Centers for Medicare and Medicaid Services (CMS) requirements. CMS requires healthcare facilities to develop and adhere to American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) compliant water management programs. ASHRAE standards include the need to manage water during times of construction, but do not provide specific construction activity risk factors or mitigation measures. This quality improvement project developed ICRA tools that incorporated traditional construction risks and mitigation strategies with those needed for water disruption.

Methods

- Conducted literature review to identify healthcare risks associated with construction activities and the growth and spread of waterborne pathogens, along with existing ICRA tools for water management.
- Partnered with Facilities to develop a comprehensive set of tools incorporating water management for construction with the American Society for Health Care Engineering (ASHE) ICRA 2.0 guidelines.
- Developed integrated decision matrix, construction permit, comprehensive mitigation strategies and water management tracking forms.

Results

- Implementation of the new ICRA and water management for construction tools began in August 2023.
- Revisions to the tool were made in February 2024 to reflect construction activities that did not affect water.
- 83 construction projects have been completed since implementation, with 21 affecting water. All applicable water mitigation strategies were completed.
- 92% of project completion verification measures (i.e., temperature and residual oxidant levels) were within acceptable range; 100% within range after corrective actions completed.

Water Management for Construction Tools

Construction Activity Type:	Water Management for Construction (WMC) ☐ Water Not Affected			
Patient Risk Group:	**Type A** *Non-invasive*	**Type B** *Small-scale, short duration*	**Type C** *Large-scale, longer duration*	**Type D** *Major demolition, construction*
Low *Non-patient care areas*	☐ WMC 1	☐ WMC 2	☐ WMC 3	☐ WMC 3 or 4
Medium *Patient care support areas*	☐ WMC 1	☐ WMC 2	☐ WMC 3	☐ WMC 4
High *Patient care areas*	☐ WMC 2	☐ WMC 3	☐ WMC 3 or 4	☐ WMC 4
Highest *Invasive, sterile, compromised*	☐ WMC 2	☐ WMC 3 or 4	☐ WMC 3 or 4	☐ WMC 4

Water Management for Construction
Temp & Residual Oxidant Testing Form

1. Prior to construction document baseline temp and residual oxidant levels
   a. Flush fixtures (hot) for minimum 4 minutes then collect water temp and residual oxidant levels
   b. Flush fixtures (cold) for minimum 4 minutes then collect water temp and residual oxidant levels
2. When work is complete, flush hot for 4 minutes, then cold for 4 minutes and take corresponding temp and residual oxidant measurements
3. **For WMC 3 & 4 only** – Collect water temp and residual oxidant levels post flushing activities 1 day per week, following ICRA instructions

PROJECT NAME:

Date	Sample Type	Location of Sampling *Room and Fixture*	TRO Hot	Temp Hot	TRO Cold	Temp Cold	Corrective Action, if Needed	Completed by (Initials)
	☐ Baseline ☐ Weekly ☐ Completion							
	☐ Baseline ☐ Weekly ☐ Completion							

Construction Activity Type	Water Management for Construction
Type A	**Inspection, maintenance/repair and non-invasive activities of brief duration, and low water age** Includes but is not limited to: • Replacing water fixture trim(s). • Replacing water fixture "in-kind" (i.e., meaning 1:1 or like for like). • Water by fixture or area is shut down for ≤ 24 hours (minimal water age/stagnation).
Type B	**Small scale, short duration activities which create minimal water disruption, and modest water age** Includes but is not limited to: • Replacing or installing water fixtures or trim. • Working within wall cavities and/or ceiling areas • Water by fixture or area is shut down for ≤ 7 calendar days (1 work week for water age).
Type C	**Work generates moderate to high water disruption or removal of any fixed building water distribution system (BWDS) components or assemblies with medium water age** Includes but is not limited to: • Plumbing work requiring multiple fixtures (existing, replacement or new). • Major water system component replacement (boilers, heaters, water main, etc.). • Work in wall cavities or ceilings with major disruption to local and downstream occupied areas. • Change of functional building space program (i.e., moving/changing room or dept. functions) in existing building. • Water by fixture, component, or area is shut down ≤ 30 days.
Type D	**Major BWDS demolition, renovation, infrastructure, and/or new construction projects with high water age** Includes but is not limited to: • Change in functional building space program (i.e., series or rooms and departments). • New shell and core buildings, additions, or expansions on campus (i.e., near existing patient environments). • New shell or core buildings, additions or expansions off campus (i.e., future patient care environments). • Acquisition of building with unknown water quality/safety conditions. • Infrastructure projects connecting to building water systems (i.e., underground piping, utility tunnels, etc.). • Water by fixture or area is not active (new start-up) or was shut down (> 30 days).

Disclosures: *Nothing to disclose*

Conclusion

- The incorporation of water management into existing ICRA processes addresses the significant risks associated with waterborne pathogens during construction activities, and ensures accreditation requirements for a comprehensive water management plan are achieved.

Lessons Learned

- Tools need to account for a variety of different types of construction projects.
- Water flushing and testing forms help to track compliance and ensure appropriate documentation.
- Outlining clear roles and responsibilities for assessment, risk mitigation and documentation is key to successful implementation.

References

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