

Adverse Water Event Planning Tool for Saskatchewan Healthcare Facilities

Saskatchewan Infection Prevention and Control Program

April 2016



The Saskatchewan Infection Prevention and Control Program is a collaboration among Regional Health Authorities (RHAs), the Ministry of Health, and other stakeholders. Its mandate is to ensure that all participants are aware of leading infection control practices and emerging standards.

Correspondence:

Patient Safety Unit
Saskatchewan Ministry of Health
3475 Albert Street
Regina SK S4S 6X6
PatientSafety@health.gov.sk.ca

Table of Contents

Introduction.....	1
Key Components of an Adverse Water Event Plan	1
Process for Adverse Water Event Planning.....	2
Operational Protocols	7
• Reprocessing (surgical instruments, endoscopy, bronchoscopy)	7
• Food Services.....	8
• Renal Dialysis	8
• Operating Room/Surgery	8
• Laboratory Services	9
• Miscellaneous.....	9
Communication Strategy.....	10
Recovery Plan	11
Putting all the Information Together	12
References.....	13

Appendices

Appendix A: Types of Adverse Water Events.....	15
Appendix B: Example Water Use Audit.....	16
Appendix C: List of Essential Services and Minimum Water Needs.....	17
Appendix D: Alternative Water Supply Options.....	18
Appendix E: Operating a Public Eating Establishment or Food Processing Facility During a PDWA or EBWO.....	19
Appendix F: Hemodialysis Water Quality Assurance or ‘What to do in Response to Adverse Events’ <i>Final Draft Nov 2015</i>	21
Appendix G: Example Communication Algorithm.....	23
Appendix H: Example Sign Non-Potable Water / Do Not Drink.....	24
Appendix I: Checklist for Hospitals (Before, During, and After a Drinking Water Advisory)	25

Figures

Figure 1: Alternative Water Supply Options for each Type of Adverse Water Event.....	7
--	---

This page intentionally left blank.

Introduction

In order to maintain daily operations and patient care services, healthcare facilities need to develop a plan to prepare for, respond to, and recover from an adverse water event.¹ For the purpose of this document, an adverse water event includes contamination and/or disruption in the water system (see Appendix A for Types of Adverse Water Events). Because these events may occur unexpectedly, it is important for RHAs “to understand and address how patient safety, quality of care, and the operations of their facility will be impacted.”¹ A well prepared plan will provide RHAs with detailed instructions for what to do and whom to call so they can respond efficiently, effectively, and rapidly to an adverse water event.²

The purpose of this document is to:

- Assist regional health authorities (RHAs) in developing an adverse water event plan (plan should address both planned and unplanned events);
- Encourage RHAs to engage representatives from various departments/areas within their respective health region to develop specific operational plans and coordinate response planning; and,
- Provide tools and resources that RHAs can incorporate into their plan.

This planning tool is primarily intended for RHAs that do not have an adverse water event plan; however, RHAs that do have a plan can still use this tool as a guide to ensure key components have been addressed in their current plan.

Key Components of an Adverse Water Event Plan

An adverse water event plan should include the following¹:

- Description of facility – type of facility, type of population served, types of care/services provided, size of facility, number of beds
- Water supply – description of sources of water that service the healthcare facility
- Water demand – during both normal usage and reduced usage
- Facility drawings/diagrams – showing all water mains, valves, meters, main lines for all utilities
- Equipment and materials list – a list of all equipment/operations that use water, including a location of all plumbing fixtures (e.g. showers/tubs, sinks, toilets, taps, water fountains, ice machines)
- Backflow prevention plan – to protect facility plumbing system from potential contamination that could occur from unanticipated changes in the water pressure
- Copies of all contracts/agreements related to supplying emergency water and providing equipment and supplies that could be used to supply emergency water (e.g. bottled water, water haulers)
- List of alternative water supplies (a list of approved and regularly inspected water haulers, bottlers, and semi-public water supplies is available from local Public Health Inspectors)

- Operational protocols for various departments/areas
- Updated list of maintenance/operations personnel (be sure to include on-call numbers) who are familiar with the healthcare facility's water supply system and function as they may be required to respond quickly to mitigate hazards (e.g. engage shut off valves, isolate sections of the service supply, etc.)
- Communication strategy
- Recovery plan – a protocol to follow once the facility returns to its normal operations. This should include cleaning and/or decontamination of heating, ventilation, and air conditioning (HVAC) equipment, internal plumbing, and medical and laboratory equipment
- Post-incident surveillance – a protocol for maintaining a high level of surveillance for waterborne disease after the water advisory has been lifted
- Plan training exercise and evaluation – a protocol for exercising the plan and refining as necessary

Process for Adverse Water Event Planning

Assemble an Adverse Water Event Planning Committee and the necessary background documents

Why is this step important?

Assembling an adverse water event planning committee should be the first step in the planning process. It will be this group's responsibility to develop the plan, and then review the plan periodically and make changes, if needed.

How is this step performed?

The *adverse water event planning committee* should include individuals with expertise from a range of specialities/areas to ensure a comprehensive plan. Consider representatives from the following areas/specialties:¹

- Facilities management
- Engineering supervisor
- Administration
- Environmental compliance, health and safety
 - Occupational Safety Director
 - Quality and Safety Officer or Manager
- Infection Prevention and Control
- Risk Management
- Nursing Director
- Chief of Surgery/Designate

- Senior Medical Officer/Designate
- Emergency Preparedness Officer
- Public Health
 - Public Health Inspector
 - Medical Health Officer

NOTE: Ensure a team lead is appointed for the adverse water event planning committee. Ideally, the team lead should be knowledgeable in disaster and emergency planning and of the facility's operations and infrastructure (e.g. emergency preparedness officer or the facility manager).

Necessary background documents required:

- Facility drawings and schematics

Perform a Water Use Audit

What is this step?

A water use audit is a series of steps/actions (see 1-3 below) that will enable an RHA to understand their water usage under normal operating conditions. A water use audit answers the following questions:^{3,4}

- What are the healthcare facility's water supply sources?
- What is the healthcare facility's typical water use?
- What are the healthcare facility's principal water uses, and what does it consider essential during a water disruption?
- What specific plans does the healthcare facility have for meeting essential water supply needs?

Why is this step important?

A water use audit is important because it will provide RHAs with information on how and where water demand can be reduced without compromising essential services, patient safety, and quality of care.⁵

How is this step performed?^{1, 4}

1. Estimate the amount of water used per day, under normal operating conditions, for the various functions/areas within the healthcare facility. This information can be obtained from water meter records and water and sewer bills.
 - Where water usage cannot be measured directly, an estimate can be made based on equipment design information, frequency/duration of use, and interviews with staff.

- See Appendix B for an example of a water use audit that may help RHAs gather water use information (Recommendation: A separate form should be completed for each department). At a minimum, healthcare facilities should develop water usage estimates for the following functions/areas:
 - HVAC
 - Boilers
 - Fire suppression sprinkler systems
 - Reprocessing (e.g. surgical instruments, endoscopy, bronchoscopy)
 - Water-cooled medical gas and suction compressors (safety issue for ventilation patients)
 - Medical equipment
 - Drinking fountains
 - Dietary
 - Dialysis
 - Eye-wash stations
 - Ice machines
 - Laboratory
 - Radiology
 - Pharmacy
 - Surgery/Operating Room
 - Toilets, washrooms, showers

2. Identify essential services

- Once documents and estimates of water usage for the various functions/areas within the healthcare facility have been gathered, the facility must then determine whether each is essential (i.e. potential loss of life or threat of severe harm may result if function/service was discontinued) or non-essential (i.e. discontinuation of function/service would have minimal effect on hospital function but no life-threatening consequences would result).⁴
- Once essential services have been determined, the facility must then calculate the minimum amount of water required for those services to remain in operation.
- Appendix C provides an example of how this information can be summarized.

3. Identify emergency conservation measures

- Once normal water usage patterns have been determined for the healthcare facility, the next step is to identify measures that can be put into place that will reduce water use for each department without threatening patient and staff safety.

- Below are some examples of how healthcare facilities can conserve water:¹
 - Cancel elective procedures
 - Use alcohol-based hand rub (ABHR) for hand hygiene
 - Sponge-bathe patients or use no-rinse cleansing cloths
 - Use disposable sterile supplies
 - Use portable toilets
 - Provide heating and cooling for essential areas in the building only
 - Consolidate units/departments with low patient volumes
 - Accelerate patient discharges using clinical judgement
 - Identify clinic services that can be postponed
 - Consider limiting visitors and encourage nonessential staff to work from home
 - If unable to close all restrooms, then limit use of restrooms to those with toilets that use a low water volume
 - Avoid operating water-cooled and water-dependant medical equipment (e.g. clinical chemistry analyzers, film processors, scope washers, hydrotherapy tubs, etc.). If a water-cooled or water-dependant medical device must be used, the department/area using this device is encouraged to contact their regional Biomedical Engineering staff to address the feasibility and safety of running the unit in question.

NOTE: Ensure there are clear criteria for implementing emergency conservation measures in your emergency preparedness plan. The decision to implement any or all of the above measures should take into account the anticipated duration and severity of water loss.

Identify Alternative Water Supply Options

Why is this step important?

After identifying measures for reducing water, it is necessary to explore and identify reasonable options for alternative water supplies. During a water disruption, an alternative water supply of sufficient quantity is required to keep all essential services operational.

How is this step performed?^{1, 5}

Factors such as the type of adverse water event (i.e. water contamination or water disruption) and the anticipated duration of water disruption will determine which water supply options are appropriate for the healthcare facility (see Figure 1) (refer to Appendix D when evaluating the feasibility of alternative water supply options).

- When exploring options for alternative water supplies, consider the following:
 - Equipment that may be impacted such as nebulizers, water baths, ventilator temperature probes, humidifiers, hydrotherapy tanks, eye wash stations, deionized water, etc.⁶
 - Bottled water for drinking: Ensure a supply of at least 2 litres per person in a 24 hour period ⁷ (Important: Children, nursing mothers, and factors such as high temperatures may require an additional supply of water).
 - Contact your local public health inspector to obtain a list of approved water haulers in your RHA.
 - Use non-potable for HVAC, if appropriate (consult with maintenance to determine if this is a possibility).
 - Establish standing contracts to ensure the availability of emergency support services, such as portable toilets, instrument sterilization, medical supplies, meal preparation, and potable water delivery. Keep all documentation of such agreements with the Adverse Water Event Plan.
 - Use 5-10 gallon water containers equipped with a spigot to store potable water for food preparation, hand washing, and other specialized needs.
 - Water used to flush toilets does not need to be potable. Large buckets/containers such as trash bins and mop buckets can be used to store water for this reason.
 - Identify area(s) where water can be stored within the healthcare facility, as facility space may be limited. Ensure water is stored in areas where only staff will have access. Storing water in patient care areas is not appropriate; as they can pose safety issues (i.e. slips, falls, and drownings) if not managed properly.
 - Address management of water containers in your plan (i.e. who will be in charge of distribution, how many people will it take to distribute).

Figure 1: Alternative Water Supply Options for each Type of Adverse Water Event

Water Contamination	Short term (<8 hours) water disruption	Unknown or >8 hours water disruption
<ul style="list-style-type: none"> • Bottled water • Water treatment equipment (e.g. reverse osmosis units, drinking water distillation systems)* • Boiled water • Bulk water provided by certified water haulers 	<ul style="list-style-type: none"> • Bottled water • Water storage containers for potable and non-potable water 	<ul style="list-style-type: none"> • All short term options • Storage tanks • Interconnections with nearby public water systems • Bulk water provided by certified water haulers • Bladder tanks and other storage units

*Consult with local Public Health Inspector for approval of onsite water treatment equipment prior to purchasing or for use during an adverse water event.

Operational Protocols

Each department/area impacted by an adverse water event should develop an operational protocol. The operational protocol should address both water contamination issues and loss of water issues as these events may require different action plans. At a minimum, the following departments require specific operational protocols in response to an adverse water event.

Reprocessing (surgical instruments, endoscopy, bronchoscopy)

Quick tips for developing operational protocols:

- Contact manufacturer to determine if equipment (e.g. washer/disinfector, cart washer, ultrasonic cleaner, pasteurizer, automated endoscope reprocessor, autoclave) can be used during a precautionary drinking water advisory/boil water order.
- Consider addressing these questions when developing the department's contingency plans:
 - Is there an alternative water source that can be used for manual cleaning? High level disinfection?
 - What supplies are on hand to continue services (i.e. surgical procedures)?
 - Is there an inventory of disposable instruments that can be used as an interim measure?
 - If the anticipated length of water outage is unknown or > 8 hours, is there an arrangement to have instruments reprocessed elsewhere?

Food Services

Quick tips for developing operational protocols:

- In the event of a water contamination issue, refer to Appendix E *Operating a Public Eating Establishment or Food Processing Facility During a Drinking Water Advisory*.⁸
- In the event of interruption or loss of water, the following measures should be considered:
 - Minimize access to water-cooled walk-in cooler so that temperature is maintained for as long as possible. If temperature rises above safe limits, make arrangements to move items to individual electric refrigeration units.⁷
 - Limit food preparation to pre-packaged or ready to eat meals.
 - Change food sources: switch to pre-washed produce, canned vegetables, and bottled drinks.
 - Use disposable plates and utensils where possible.

Renal Dialysis

The Provincial Dialysis Committee has developed a draft guidance document titled *Saskatchewan Protocols for Hemodialysis Water Treatment* (see Appendix F). Within the document is an excerpt pertaining to contingency plans for adverse water events:

“Each dialysis site is to have an emergency preparedness plan based on ‘Hemodialysis Water Quality Assurance or What to do in Response to Adverse Events’ for regional dialysis that identifies:

- Risks to normal conditions and how those risks can be reasonably managed
- Adverse events that may jeopardize patient safety
- Procedures to be followed
- Primary and alternate contact persons”⁹

Operating Room/Surgery

Quick tips for developing operational protocols:¹⁰

- In the event of a water contamination issue
 - Surgical scrubs should be performed using bottled water.
 - Sterile water should be used for irrigation of wounds or incision.
 - Do not use operating instruments/equipment if it connects to the plumbing system (e.g. dental rinse instrument).
- In the event of interruption or loss of water
 - Implement steps listed above.
 - Evaluate instrument inventory, including disposable instruments, in order to estimate the number of procedures/days the operating room can remain operational.

Laboratory Services

- In the event of a water contamination issue, contact instrument manufacturer to determine whether laboratory equipment directly connected to the water supply can be used in the event of a drinking water advisory/boil water order. If not, determine alternative sources of water.
- In the event of a loss or interruption of water supply, contact instrument manufacturer for advice on contingency planning and determining alternative sources of water.
- Upon loss of adequate water pressure, the cooling units for water-cooled walk-in coolers will automatically shut down. Therefore affected departments (e.g. blood bank, pathology) will need to decide whether to extend the cooling capability for as long as possible (i.e. minimize access to these units so that temperatures are maintained) or to start relocating critical items until water pressure is re-established.⁷

Miscellaneous

Quick tips for developing operational plans:

Drinking water	Plans should in place for a rapid delivery of bottled water. Consider at least a 24-hour supply.
Hand hygiene	Use alcohol based hand rub if hands are not visibly soiled. If hands are visibly soiled, use soap and bottled water (alternatively, can rent portable hand hygiene stations or use water containers equipped with a spigot).
Patient/resident bathing	Sponge bathe with potable water or use no-rinse cleansing cloths. ¹⁰
Toilet flushing	Can use non-potable water for flushing. Various community resources may need to be accessed for water (e.g. swimming pool). ⁷
Environmental cleaning	Identify products used for environmental cleaning. If pre-mixed, ready-to-use disinfectants or disinfectant wipes are not available, then a risk assessment must be performed before non-potable water can be used, to ensure no pathogens, chemicals or physical contaminants are present – approval will be made on case by case basis by Medical Health Officer or Public Health Inspector. ¹⁰

Communication Strategy

Clear, accurate and timely communication plays a key role in how well RHAs will be able to respond to an adverse water event.¹¹ The communication plan developed by the RHA should include:

- Communication with departments/areas impacted by an adverse water event;
- Communication with water users who may be impacted by an adverse water event (patients, residents, staff, visitors, and volunteers); and,
- Communication to external contacts, if necessary.

Recommendation: Include clear roles/responsibilities for each person in the communication plan (e.g. who will post signage throughout the facility).

Communication with Departments/Areas

- All Directors/Department heads impacted by an adverse water event should be notified promptly so they can institute operational protocols for their respective departments.⁷
- Appendix G provides an example of a communication algorithm. Each RHA's communication algorithm will differ slightly depending on the services it provides.
- **IMPORTANT:** Always ensure contact information including phone numbers is up-to-date.

Communication with Water Users⁷

- In the event of a drinking water advisory/boil water order
 - Post signage at locations that are highly visible to the public. At a minimum, ensure signage is posted at facility entrances, elevators, entrances to patient units, kitchen areas, staffrooms, and inside all public and staff washrooms.
 - In most cases, the notification signage is provided by the authority (i.e. Water Security Agency, local Public Health Unit) responsible for issuing the drinking water advisory and provides information specific to the advisory in place.
- Whether there is a water disruption or water contamination issue, ensure signage is posted at all drinking fountains, ice machines, and sinks that clearly states "Non-Potable Water / Do Not Drink"¹ (see Appendix G for an Example Sign). In addition to posting signage, other means of communicating water issues and/or providing updates may include announcements on the facility's overhead paging system and through social media such as Facebook and Twitter.

Communication with External Contacts⁷

- Upon loss of water pressure or supply, the healthcare facility should contact the Municipal Office to determine the nature of the outage and the estimated duration.
- Upon loss of water pressure or supply, the healthcare facility should notify the Municipal Fire Department that in the event of an actual fire, the fire suppression system will be non-functional.

- In the event bacteriological testing for water quality is required, contact the Saskatchewan Disease Control Laboratory (SDCL).

Recovery Plan

A recovery plan addresses how the healthcare facility will return to normal operations once water service is re-established and/or the water advisory/order has been rescinded. It includes procedures to follow such as decontamination and possibly disinfection of any internal plumbing, and medical and laboratory equipment. This step should be developed in consultation with facility maintenance and equipment manufacturers. The following steps should be taken once water service has been re-established:^{7,12}

- If applicable, contact the Municipality to verify that their remediation efforts are complete and that water service is back to normal.
- If applicable, contact the Municipal Fire Department to notify them that the fire suppression systems are operational again. An overhead announcement should be made to notify all facility staff that the fire system is operational again.
- Notify Directors/Department Heads that water service has been re-established so that they can discontinue their water-loss contingency plans.
- Faucets/fountains must be flushed at full flow for at least 5 minutes. If the service connection is long or complex, consider flushing for a longer period of time. Control the flushing process so that debris that may burst from faucets does not contaminate patients and supplies. The facility maintenance department should be advised of the appropriate flushing time for your specific facility.
- Ensure equipment with water line connections, such as refrigerator water and ice dispensers are drained, flushed, cleaned, and disinfected according to the manufacturer's recommendations.
- Replace the filters on any water filtration devices, and flush the fixture according to the manufacturer's instructions.
- Run water softeners through a regeneration cycle according to the manufacturer's instructions.
- If the facility has a water-holding reservoir or water-storage tank, consult with the facility engineer and local public health department to determine whether this equipment needs to be drained, disinfected, and refilled.
- Drain and refill hot water heaters that have been set below 45°C/110°F.
- Consult with your local Public Health Inspector to determine whether a Precautionary Drinking Water Advisory (PDWA) will be issued and whether bacteriological testing for water quality is required.
- If bacteriological testing is required, **contact the Environmental Services section at the SDCL as soon as possible** to notify them of incoming water samples.

Putting all the Information Together

The goal of this step is to organize all the information gathered during the planning process and transform it into a single comprehensive document that is accessible, and that can be updated or revised, as needed. Consider organizing your adverse water event plan as follows:

- Policies
- General Procedures
- Communication notification list (always ensure contact information is up to date)
- Any contracts/agreements required for emergency supplies (e.g. equipment, water, etc.)
- Specific departmental operational plans
- Other documents (checklists, facility drawings)

References

1. Centers for Disease Control and Prevention and American Water Works Association, "Emergency Water Supply Planning Guide for Hospitals and Health Care Facilities," (Atlanta: U.S. Department of Health and Human Services, 2012).
[\[http://www.cdc.gov/healthywater/pdf/emergency/emergency-water-supply-planning-guide.pdf\]](http://www.cdc.gov/healthywater/pdf/emergency/emergency-water-supply-planning-guide.pdf) – retrieved November 2015]
2. Water Security Agency and Saskatchewan Ministry of Environment, "Guidelines for Waterworks Emergency Response Planning EPB 240," (Water Security Agency and Saskatchewan Ministry of Environment, 2013).
[\[http://www.sask20.ca/DWBinder/epb240.pdf\]](http://www.sask20.ca/DWBinder/epb240.pdf) – retrieved December 2015]
3. California Hospital Association, "Guidelines for Developing Best Practices to Assist California Hospitals in Preparing for and Responding to a Water Disruption," (California, 2011).
[\[http://www.calhospitalprepare.org/post/hospital-water-disruption-best-practices\]](http://www.calhospitalprepare.org/post/hospital-water-disruption-best-practices) – retrieved December 2015]
4. Welter G, Bieber S, Bonnaffon H, Deguida N and Socher M, "Cross-sector emergency planning for water providers and healthcare facilities," *Journal American Water Works Association* 102:1 (2009): 68-78.
5. Spence S, Robertson JA and Hildebrand D, "Emergency Water Supply Planning, Part 1: Hospitals and Health Care Facilities," *Journal American Water Works Association* (May 2010): 36-40.
6. Cayuga County Government, "Boil Water Events Frequently Asked Questions from Hospitals and Other Resident Medical Facilities," (Cayuga County, 2016).
[\[http://www.cayugacounty.us/Portals/0/environmental/Hospitals%20&%20Resident%20Medical%20Facilities%20-%20FAQ.pdf\]](http://www.cayugacounty.us/Portals/0/environmental/Hospitals%20&%20Resident%20Medical%20Facilities%20-%20FAQ.pdf) – retrieved December 2015]
7. Infection Prevention and Control Canada, "IPAC in Emergencies and Disasters Toolkit Example Contingency Plan for Interruption or Loss of Water," (IPAC Canada, 2014).
8. Government of Saskatchewan, "Water Quality and Testing," (Government of Saskatchewan, Environmental Services).
[\[http://www.saskatchewan.ca/residents/environment-public-health-and-safety/environmental-health/water-quality-and-testing#water-quality\]](http://www.saskatchewan.ca/residents/environment-public-health-and-safety/environmental-health/water-quality-and-testing#water-quality) – retrieved March 2016]
9. Saskatchewan Protocols for Hemodialysis Water Treatment (Final Draft November 2015).

10. Dickey L. (2014). Water Systems Issues and Prevention of Waterborne Infectious Diseases in Healthcare Facilities, APIC Text of Infection Control and Epidemiology, 4th Edition 115-15. Washington, DC: Association for Professionals in Infection Control and Epidemiology, Inc.
11. British Columbia Ministry of Health and Ministry Responsible for Seniors, “Emergency Response Planning for Small Waterworks Systems,” (British Columbia Public Health Protection, 2000). [<http://www.health.gov.bc.ca/library/publications/year/2000/PHI061.PDF> – retrieved January 2016]
12. Centers for Disease Control and Prevention, “Healthcare Water System Repair Following Disruption of Water Supply,” (Atlanta, 2011). [<http://emergency.cdc.gov/disasters/watersystemrepair.asp> – retrieved January 2016]
13. Grover R, Copes R, Mavinic D and Teschke K, “Water Security Guidance Document Part 3 Section 7 Boil Water Advisory Protocol (BWAP),” (University of BC, 2012). [http://watergovernance.ca/wp-content/uploads/2011/12/Water_Security_Guidance_Document_March_2012.pdf – retrieved December 2015]

Appendix A: Types of Adverse Water Events

Event	Description	Examples
Water Supply Disruption / No Water Available	May result in a partial or total water loss	<ul style="list-style-type: none"> • Severe weather • Broken water main • Flood
Do Not Drink	Issued by the Water Security Agency (WSA) when the water contains a chemical contaminant that cannot be removed by boiling	<ul style="list-style-type: none"> • High arsenic • High uranium concentrations in water • Elevated disinfection byproducts
Do Not Use	Issued by the WSA if there is a contaminant in the water that may be inhaled or otherwise harmful on contact	<ul style="list-style-type: none"> • Pesticide/hydrocarbon contamination • Security breach at a water treatment/storage facility • Water treatment chemical overfeed
Emergency Boil Water Order (EBWO)	Issued by the Medical Health Officer (or designate) when a threat to the public health exists	<ul style="list-style-type: none"> • Confirmed presence of <i>Escherichia coli</i> (<i>E. coli</i>) • When epidemiological evidence indicates that the drinking water is responsible for an outbreak of illness
Precautionary Drinking Water Advisory (PDWA)	Issued by the WSA when drinking water quality concerns exist but immediate public health threats have not been identified	<ul style="list-style-type: none"> • Routine maintenance or planned repairs • Minor equipment malfunction • High turbidity levels • Inadequate disinfection of water system

Adapted from Water Security Guidance Document¹³

Appendix B: Example Water Use Audit

Date: _____ Name(s) of staff completing form: _____

Department Name/Function: _____

Population Water Use for the Department (Enter the following as daily averages)

Employees: _____ 8-hour shifts: _____ 12-hour shifts: _____

Inpatient Occupancy Rate: _____ Outpatients: _____ Outpatient average stay: _____

Can outpatients be temporarily postponed? _____ If so, how many days? _____

Water fixture types/Quantity of each: Faucets ____ Urinals ____ Toilets ____ Showers ____

Other _____

Activity Water Use for the Department (Enter the following as daily averages) (Use one form for each activity, if necessary)

Activity Name/Function: _____

Description of activity (including critical aspects): _____

Can water use be measured/estimated for the activity? (Y/N) _____ If yes, how much water is used for the activity? (e.g., volume per dialysis) _____

Is this activity essential for hospital operations (i.e. would loss of this function require partial or complete shut-down of the facility or the department)? (Y/N) _____

Can the activity be temporarily postponed or substantially reduced in the event of a prolonged emergency? (Y/N) ____ If yes, how many days? ____

Are there waterless alternatives for this activity? (Y/N) ____ If yes, describe. _____

Is this activity dependant on water use in other departments (e.g., operating room requires sterile instruments from MDR department)? _____

How long can the activity operate without the need for outside water use (e.g., sterile instruments are in stock for how many procedures)? _____

If an emergency water shortage occurs in warm or cold weather, is it possible to allow the air temperature to increase or decrease temporarily without adversely affecting health and safety or equipment function? (Y/N) _____

Other comments/considerations: _____

Adapted from CDC/AWA "Emergency Water Supply Planning Guide for Hospitals and Healthcare Facilities."¹

Appendix C: List of Essential Services and Minimum Water Needs

Identify all functions/services within the healthcare facility that requires water for continued operation. Determine whether each is essential to facility/department operations and the minimum water required for operation. The chart below provides only a few examples of functions/areas within a healthcare setting that would not be available if the water supply was disrupted. RHAs are encouraged to add to the list as appropriate.

Name of function/service	Water needs under normal operating conditions	Essential to facility/department operations (Yes or No)	Waterless alternatives available (Yes or No)	Minimum water required to remain operational
HVAC				
Fire suppression sprinkler system				
Water-cooled medical gas and suction compressors				
Food preparation				
Laboratory				
Radiology				
Operating Room				
Medical Device Reprocessing				
Endoscopy				
Flushing toilets				
Drinking water				
Total minimum water needs to keep facility open and meet patients' needs				

Adapted from CDC/AWA "Emergency Water Supply Planning Guide for Hospitals and Healthcare Facilities."¹

Appendix D: Alternative Water Supply Options

Alternative Water Supply Options	For Potable Use (✓)	For Non-Potable Use (✓)	Feasibility of the Option (consider whether the option requires special equipment, valves, backflow prevention devices, contract/agreement, etc.)
Bottled water approved by outside sources (e.g. brewery)			
Bottled water provided by local retailers (e.g. Costco)			
Bulk water provided by certified water haulers			
Bulk water provided by neighbouring water utilities by truck			
Bulk water from local industry that maintain backup water supplies for consumption			
Interconnections with nearby public water systems			
Water treatment equipment (e.g. reverse osmosis units)*			
Boiled Water			
Other			

*Consult with local Public Health Inspector for approval of water treatment equipment prior to purchasing or for use during an adverse water event.

Adapted from California Hospital Association "Guidelines for Developing Best Practices to Assist California Hospitals in Preparing for and Responding to a Water Disruption."³

Appendix E: Operating a Public Eating Establishment or Food Processing Facility During a PDWA or EBWO

Operating a Public Eating Establishment or Food Processing Facility During a Drinking Water Advisory

Precautionary Drinking Water Advisories (PDWAs) and Emergency Boil Water Orders (EBWOs) are typically issued due to concerns about potential contamination of a communal water supply. The following precautionary measures are in addition to those listed in the drinking water advisory/order.

Water advisory/order signage supplied by the community or regulatory authority must be posted at the facility entrance, public and staff washrooms and in the food preparation area.

Discard all food and beverage products made with the potentially contaminated water, if the water was not brought to a rolling boil for over 1 minute or if the food product was not thoroughly cooked.

In a foodservice operation boiled or bottled water should be used for:

- All water used as an ingredient in any “ready to eat” food products (e.g. salads, puddings, and desserts).
- All water used to wash or rinse food products.
- All water used for drinking.
- Making ice cubes.

Equipment directly connected to the public water supply must not be used, and ideally turned off or disconnected while the advisory remains in effect. This equipment can include: post-mix beverage machines, spray misters, instant hot water heaters, and ice machines. Ice machines should be emptied and not used while the advisory remains in effect.

In certain cases, points of use water treatment systems such as reverse osmosis are acceptable alternatives to boiled or bottled water. The suitability of any device should be verified by the Public Health Inspector.

Coffee Makers

If the coffee produced by your coffee maker is at least 72°C (162°F) for 1 minute the coffee will be bacteriologically safe. This can be verified by running a full cycle of the brewer with water and placing the probe of a thermometer below the funnel when the decanter is half full.

Dishwashers

For bacterial concerns, use standard procedures as outlined in the Public Eating Establishment Standards and as summarized below:

- Use dishwasher if final rinse temperature reaches 82°C (180°F) for 10 seconds.
- Properly operated chemical sanitizing dishwashing machines are also acceptable.

3-Step Manual Dishwashing (Wash/Rinse/Sanitize)

- Wash dishes manually using the three sink method in bottled or boiled water with sanitizer concentrations listed below.
- For the sanitizer step during manual dishwashing, immerse items completely for at least two minutes in the following solutions:
 - chlorine, >100 ppm at 44°C (111°F) and air dry.
 - quaternary ammonium, 200 ppm at 44°C (111°F) and air dry.
 - Iodine, between 12.5 ppm-25ppm at 44°C (111°F) and air dry.
- For clean-in-place items, use the same concentrations of sanitizer as above, after washing and rinsing. Rinse clean-in-place items thoroughly with boiled/purified water to remove residual sanitizer.

Water

For cyst concerns, use the procedures below:

- Use dishwasher if final rinse temperature reaches 82°C (180°) for 10 seconds.
- Chemical sanitizing dishwashing machines are not capable of destroying parasite cysts which may be present. Facilities which utilize chemical sanitizers in their dishwashing machines MUST SWITCH to using single service plates, cups, and cutlery (i.e. disposable) or wash dishes manually.

Handwashing

During PDWAs, no changes need to be made for hand hygiene practices. The use of an alcohol-based hand gel containing at least 60% alcohol after thorough handwashing is recommended.

During EBWOs (or where the public water supply has been epidemiologically linked to a waterborne outbreak), food handlers should:

- Use a safe water supply (bottled or boiled then cooled water cooled tap water) and liquid soap for hand washing. Untreated tap water should not be used for hand washing. This second procedure is the preferred option.

Recommendation: Fill 5 to 10 gallon water containers for food preparation, hand washing, and other operational needs. The water containers should have a spigot to allow the water to flow like a domestic tap.

If you need more information, the link below provides the contact information for public health officers throughout the province:

<http://www.saskatchewan.ca/live/health-and-healthy-living/provincial-health-system/saskatchewan-health-regions/regional-public-health-inspectors>

Appendix F: Hemodialysis Water Quality Assurance or 'What to do in Response to Adverse Events' *Final Draft Nov 2015*

Note 1: All Routine maintenance schedules as per Manufacturers recommendations; NOT all routines apply: i.e. RGH disinfect daily loop disinfect with heat.

Note 2: When an RO membrane is replaced as routine maintenance on an established system, and disinfection is completed, treatments may proceed, concurrent to baseline testing for: 1) microbial, 2) endotoxin, and 3) water quality non-physiology components. Test results are not required in order to proceed.

Note 3: Following a **Catastrophic event**, Water Quality Test Results determine whether Dialysis treatment can proceed following APPROVAL BY MEDICAL DIRECTOR.

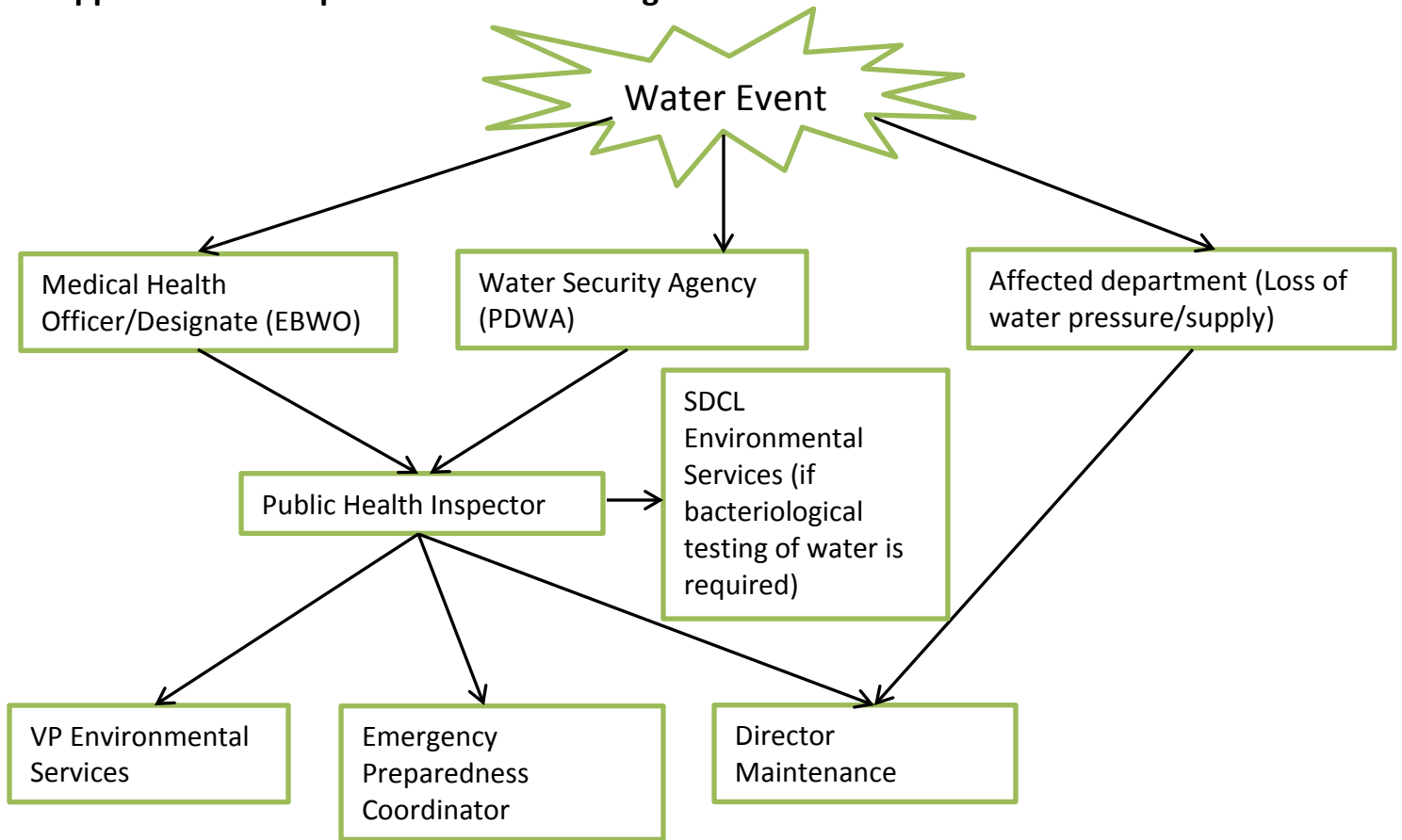
Action Items	Schedule	Disinfection RO loop	Disinfection RO membranes	Change Pre-RO filters	Change RO membrane	Testing Bacteriology CFU	Testing Endotoxins EU	Testing Non- physiological	Remove from service
Routine: See note 1	Daily	√							
	Weekly		√						
	Monthly			√		√	√		
	Annually							√	
Change RO membrane routine	As required	√	√	√	√	√	√	√	See note 2
Adverse Event Internal:									
Bacteria &/or Endotoxin Fail	First Fail	√	√			√	√		
	Second Fail	√	√	√	UF loop filter See Note 1	√	√		
	Third Fail	√	√	√	√	√	√	√	√
Third Fail	Following Corrections	√	√	√		√	√	√	
Adverse Event External:									
Suspected Water quality issue Action To Be Determined from Issue -TBDI	Meeting of Stakeholders	TBDI	TBDI	TBDI	TBDI	TBDI	TBDI	TBDI	TBDI
Water Disruption No action Required - NAR Short interval(<24hrs)	Water restored	NAR	NAR	NAR	NAR	NAR	NAR	NAR	
Water Disruption Long interval (>24 hrs)	Water restored	√	√	√		√	√		
Potential Boil Water Advisory (BWA) - Medical Director advised	Alert Stakeholders	NAR	NAR	NAR	NAR	NAR	NAR	NAR	
Actual Boil Water Advisory/ Non-potable water	Daily	as scheduled							
	Weekly		as scheduled	√		√	√		
	BWA rescinded		√	√		√	√		

Adverse Water Event Planning Tool for Saskatchewan Healthcare Facilities

Adverse Event Catastrophic									
Flood with Disruption of Water and Power – Note 3	Meeting of Stakeholders								√
Water & power restored	Meeting of Stakeholders	√	√	√	√	√	√	√	See Note 3

Developed by the Provincial Dialysis Committee⁹

Appendix G: Example Communication Algorithm



Ensure the following departments/staff are notified:

Facility Administration/Director of Care
Food Services
Laboratory

Reprocessing Departments
Dialysis
Radiology
Pharmacy
Nursing Director(s)
Surgery/OR
Critical Care Units
Respiratory Therapy
Communications
IPAC
Materials Management

- Notify patients, residents, staff, visitors, and volunteers by posting appropriate signage
- If appropriate, contact the Municipal Office and notify Municipal Fire Department

Appendix H: Example Sign Non-Potable Water / Do Not Drink

CAUTION!



NON-POTABLE WATER DO NOT DRINK

Appendix I: Checklist for Hospitals (Before, During, and After a Drinking Water Advisory)

Before a drinking water advisory:

- ☐ Check and update your adverse water event plan for appropriate steps and critical equipment/processes/connections. Update contact lists for personnel and organizations.
- ☐ Work with facility engineering and maintenance staff to identify all routes of exposure to tap water for patients, residents, staff, visitors, and volunteers. Develop procedures to control these exposures.
- ☐ Identify all procedures, appliances, and equipment that use tap water, ice made from tap water or are interconnected to the water supply. Include equipment and procedures that use tap water for patient care, medical processes, sanitizing processes, preparing solutions, preparing food and beverages, etc. If you provide supplemental water treatment at your healthcare facility, discuss the adequacy of this treatment with your local Public Health Inspector.
- ☐ Determine in advance how much water you will need, where you will need it, and where you can get it from. Keep an emergency supply of bottled water on site.
- ☐ Develop procedures to follow once the drinking water advisory has been rescinded.

During a drinking water advisory, do not use tap water for drinking water or sanitation without appropriate precautions:

- ☐ Check and follow your regional adverse water event plan.
- ☐ Do not use tap water for drinking, brushing teeth, mixing oral solutions, contact with open wounds or sores, internal treatment or contact within body cavities, and hand washing. Use boiled water*, bottled water, or water from a safe alternative source.
- ☐ Post advisory and order notices at locations that are highly visible to the public (e.g. facility entrances, elevators, entrances to patient units, kitchen areas, staffrooms, and inside all public and staff washrooms).
- ☐ Identify and control (shut off or bag and post a “Do Not Drink” sign) all locations where people can access tap water: water fountains, sinks, spigots, ice machines, etc.
- ☐ **Notify all departments affected by a drinking water advisory promptly** so they can institute operational protocols.

* Bring tap water to a rolling boil > 1 minute, then allow the water to cool before use. This may take 20-30 minutes, so plan ahead.

- ☐ Make sure patients, residents, visitors, volunteers, and staff on all shifts are aware and implement needed measures.
- ☐ Any ice made or mixed with ice made since the drinking water advisory should not be used. If the age of the ice is uncertain, do not consume or use and label as unsafe for consumption. Drain and disconnect the ice machine. If the ice does not have a critical use, such as cooling medication, discard it.
- ☐ Identify products used for environmental cleaning. If pre-mixed, ready-to-use disinfectants or disinfectant wipes are not available, then a risk assessment must be performed before non-potable water can be used, to ensure no pathogens, chemicals or physical contaminants are present – approval will be made on case by case basis by Medical Health Officer or Public Health Inspector.
- ☐ Some medical equipment that is properly installed, operated, and maintained may provide additional treatment of the tap water for normal equipment operations that may be sufficient to operate without the need for boiling or other supplemental disinfection. Examples could include equipment with reverse osmosis filtration and dialysis equipment. Others, such as cartridge filters, may require adjustments or modifications to do so. Refer to the manufacturer's specifications and your technical support staff to confirm proper operations and to determine any appropriate adjustments, increased monitoring, or other precautions.

After the drinking water advisory is over:

- ☐ Flush **all** water lines, and then wash sinks, fountains, faucets and spigots. If your service connection is long or complex (like an office building), consider flushing for a longer period. A general recommendation is at least 5 minutes; however, your facilities engineer should be able to advise you on an appropriate time.
- ☐ All potentially affected equipment that uses tap water, such as your medical equipment, solution machines, beverage machines, dishwasher, and ice machines, should be flushed and disinfected per the manufacturer's recommendations. This should include dedicated water lines and tubing.
- ☐ If the facility has a water-holding reservoir or water-storage tank, consult with the facility engineer and local public health department to determine whether this equipment needs to be drained, disinfected, and refilled.
- ☐ Follow other procedures outlined in your regional recovery plan.

Adapted from Cayuga County "Boil Water Events Checklist for Hospitals and Resident Medical Facilities."⁶