



2020-2021 Chief Drinking Water Inspector annual report

Learn about the performance of our regulated drinking water systems and laboratories, drinking water test results, and enforcement activities and programs.

Message from the Chief Drinking Water Inspector

I am pleased to present the Chief Drinking Water Inspector's Annual Report, which showcases the achievements of the ministry and our drinking water partners from April 1, 2020 to March 31, 2021.

The Ministry of the Environment, Conservation and Parks, along with the Ministry of Health and our many partners and stakeholders, share a commitment to excellence in helping to ensure the continued safety of Ontario's drinking water. This year's performance results reinforce this commitment to high quality drinking water. I would like to commend everyone for their dedication and efforts.

This commitment to quality drinking water never wavered, even during the COVID-19 pandemic. The Ontario government, local government, system owners and operators, and laboratory staff, as well as many other water industry professionals, have worked tirelessly so that drinking water remains well-protected. The ministry continues to work collaboratively with stakeholders and partners to identify possible challenges early, adapt processes without compromising safeguards, and provide oversight.

In this report you will find information on the performance of Ontario's regulated drinking water systems and laboratories, a summary of drinking water test results, and the ministry's inspection and enforcement activities.

In his message, Dr. Kieran Moore, the Chief Medical Officer of Health for Ontario, provides an update on the performance of the province's small drinking water

systems and how the program is helping to protect the health of Ontarians. I would like to thank Dr. Moore, former Chief Medical Officer of Health Dr. David Williams, and their teams for their tireless efforts throughout the pandemic and their continued work in the protection of Ontario's drinking water.

Together with our many partners, we will continue our efforts to maintain the sustainability and safety of Ontario's water sources for generations to come.

Alison Pilla

Chief Drinking Water Inspector

Ministry of the Environment, Conservation and Parks

Message from the Chief Medical Officer of Health

Fresh water is an integral part of any society and here in Ontario we are blessed to have so much of it in our lakes and ground water. As Ontarians are entitled to expect their drinking water to be safe, there are high drinking water standards in the province.

The COVID-19 pandemic and response has been a major focus since I became the Chief Medical Officer of Health. I am sincerely thankful for all those who are involved in the process of keeping our water safe to drink, even in the midst of a global pandemic.

Around 10,000 business and community sites in Ontario use small drinking water systems in order to supply clean, potable water to the public. As we release the 2020-2021 program results, I am impressed to see that 98 per cent of test results met the high standard Ontarians expect, and I am happy to see a continuing decline in adverse water quality incidents.

The Small Drinking Water Systems Program is a unique and innovative program overseen by the Ministry of Health and administered by local boards of health. Public health inspectors conduct inspections and risk assessments of all small drinking water systems in Ontario, and provide owner/operators with a tailored, site-specific plan to help keep drinking water safe.

This customized approach has reduced unnecessary burden on small drinking water

system owner/operators without compromising provincial drinking water standards. These positive results would not be possible without the ongoing efforts and leadership of the local boards of health and our drinking water partners, helping to protect the health and safety of all Ontarians.

Kieran Moore

Chief Medical Officer of Health
Ministry of Health

2020-2021 At-a-Glance**Statistics**

- 99.9% of the more than half a million drinking water test results from municipal residential drinking water systems met Ontario's drinking water quality standards.
- 99.69% of more than 40,000 results from non-municipal year-round residential systems met the standards.
- 99.72% of almost 50,000 results from systems serving designated facilities met the standards.
- 93% of the over 25,000 test results met Ontario's standard for lead in drinking water at schools and child care centres. When looking at flushed samples only, this number increases to 95.9%.
- Staff at licensed laboratories reported over a million drinking water test results.
- 99.1% of municipal residential drinking water systems received a compliance rating above 80% and 100% of licensed laboratories received a compliance rating above 80%.
- 7,963 operators were certified to run drinking water systems and 3516 operator certificates were renewed.
- 216 sets of Municipal Drinking Water Licenses and Drinking Water Works Permits were renewed.
- Owners or operators of over 1,200 drinking water systems and laboratories were contacted by the ministry to check that they were able continue to operate and

meet regulatory requirements during the pandemic.

Enhancements to drinking water protection

Ontario continues to take action to remain a leader in drinking water protection. The following actions were undertaken as we strive for continuous improvement.

- The Walkerton Clean Water Centre pivoted to virtual training and enhanced safety protocols for in-class training to ensure the continuation of operator training.
 - The ministry:
 - developed a new course, Ethics for Drinking Water Operators, with the Walkerton Clean Water Centre
 - released a new technical bulletin (<https://www.ontario.ca/page/technical-bulletin-making-changes-supervisory-control-and-data-acquisition-systems-municipal>) on making changes to computer systems that are used to gather and monitor real-time data and control treatment equipment in municipal residential drinking water systems
 - updated the watermain disinfection procedure (<https://www.ontario.ca/page/water-main-disinfection-procedure>) to address feedback from stakeholders and incorporate additional information
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Protecting Ontario's drinking water

Maintaining Ontario's drinking water status as among the best protected in the world is a key priority for the provincial government. The majority of people in Ontario receive their drinking water from municipal residential drinking water systems. Other residents receive water from non-municipal sources, have a private supply such as a well, or receive hauled water.

The Ministry of the Environment, Conservation and Parks regulates:

- municipal residential drinking water systems that are owned by municipalities and supply drinking water to homes and businesses
- non-municipal year-round residential drinking water systems that are privately owned and supply drinking water all year to people's homes in places such as

trailer parks, apartments, and condominium and townhouse developments where there are six or more private residences

- this also includes drinking water systems owned by local services boards, which are volunteer organizations that are set up in rural areas where there is no municipal structure
- public and privately-owned systems serving designated facilities that have their own source of water and provide drinking water to facilities such as children's camps, schools, health care centres and senior care homes
- licensed laboratories that perform testing of drinking water
- operator certification and training

The Ministry of Health regulates:

- small drinking water systems that provide drinking water to the public where no municipal residential drinking water system exists, such as restaurants, bed and breakfasts, campgrounds, and other public settings, when those systems do not serve designated facilities

Providing safe drinking water is a shared responsibility. Government, municipalities, drinking water system owners and operators, local health units, Conservation Authorities, the Walkerton Clean Water Centre, and water industry associations work to ensure that high quality tap water is delivered to homes. In the face of COVID-19 challenges, all these parties remained committed to providing safe drinking water.

An example of continued operational excellence in Ontario was Halton Region becoming Canada's first municipality to earn the coveted Partnership for Safe Water Director's Awards. The awards, for successfully completing Phase III of the Partnership Program, were presented to Halton Region by the Ontario Water Works Association on behalf of the American Water Works Association in 2020.

The Partnership for Safe Water is a collaboration of six prestigious international drinking water organizations, including the American Water Works Association, which has grown to include approximately 300 water service provider members. The program's mission is to improve the quality of water delivered to customers by optimizing system operations. This voluntary program fosters a culture of excellence and continuous improvement by providing members with the tools needed to improve performance beyond regulatory requirements, further enhancing the protection of public health. There are four distinct phases: Commitment, Baseline

protection of public health. There are four distinct phases: Commitment, Baseline Data Collection and Reporting, Self-Assessment and (Fully) Optimized System; formal recognition awaits those who successfully complete Phases III and IV.

Drinking Water Protection Framework

The drinking water protection framework's multiple protective barriers continued to help protect drinking water from source to tap during the COVID-19 pandemic.

Examples of these barriers include:

- health-based drinking water quality standards
- constant operational checks and water monitoring
- duplicative reporting
- highly trained and licensed operators with continuing education requirements
- regular inspections of drinking water systems and licensed laboratories

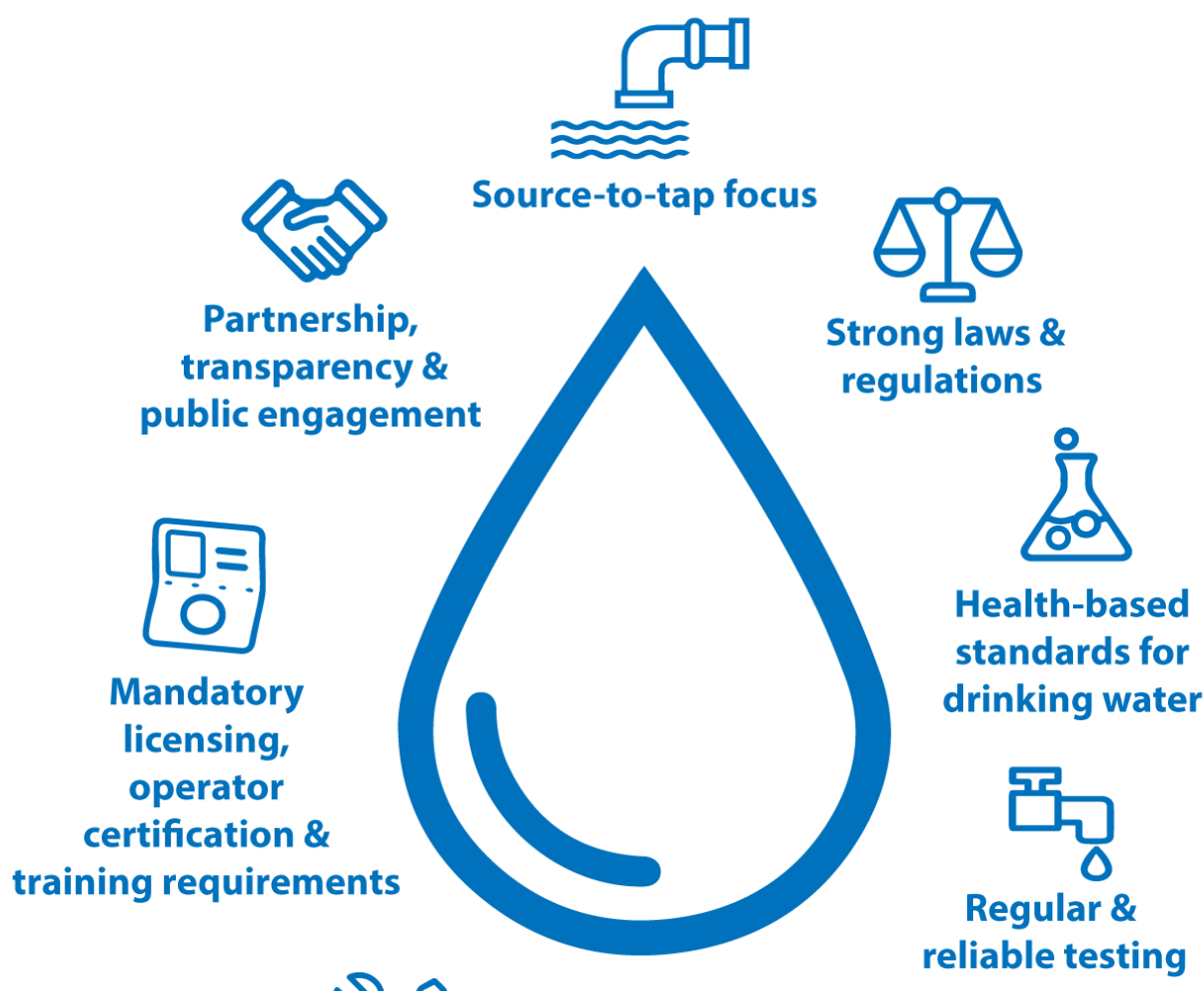




Figure 1: Drinking water protection framework.

The eight components consist of source-to-tap focus; strong laws and regulations; health-based standards for drinking water; regular and reliable testing; swift, strong action on adverse water quality incidents; a multi-faceted compliance improvement toolkit; mandatory licensing, operator certification and training requirements; and partnership, transparency and public engagement. All the components work together to protect drinking water.

The framework is comprised of multiple checks and balances to ensure drinking water management in Ontario remains robust. Safeguards are in place at every step of the process to address risks to the quality of drinking water and deal with potential problems before they become issues.

One of the safeguards in place is regular monitoring and sampling so that water quality issues are quickly identified and addressed. Drinking water system operators routinely collect samples to check water quality and submit them to a licensed laboratory for analysis. The laboratory analyses the sample and conducts quality assurance and control checks within its own testing systems, and then uploads the information to a ministry database. If the result is adverse, the laboratory reports the adverse test result to the owner and operator of the drinking water system, the ministry, and the local medical officer of health.

The system owner or operator then must also report the adverse results to the ministry and the local medical officer of health and take corrective action to resolve the incident. This duplicative reporting helps to ensure all necessary parties are aware of the adverse test result. Ministry water inspectors follow up with the system owner and operators to confirm they have taken all required corrective actions in relation to adverse water quality incidents.

Corrective actions are required by the *Safe Drinking Water Act, 2002*

(<https://www.ontario.ca/laws/statute/02s32>) and may include resampling and retesting, reviewing operational processes to identify and correct faulty processes, increasing

reviewing operational processes to identify and correct faulty processes, increasing chlorine doses and flushing the system, and any other steps directed by the local medical officer of health. The local medical officer of health can also issue a drinking water advisory (see the Drinking Water Advisory section for further information).

It is important to note that the report of an adverse test or operational issue (e.g. low chlorine or improper disinfection) does not necessarily mean that the drinking water is unsafe, but does mean that the owner and operator need to investigate what may have caused the adverse result or operational issue and take all steps necessary to resolve it.

The ministry also has a comprehensive regular inspection program to help assure the public that owners and operators of drinking water systems and owners of laboratories are fulfilling their legislated obligations. Inspections of water systems focus on source, treatment, and distribution components as well as management practices. Inspections of laboratories focus on chain of custody (the path of a sample from the time it is collected to when it is accepted by the laboratory), reporting, sample handling, subcontracting and management practices.

During an inspection at a drinking water system, the inspector evaluates requirements such as proper operation of the treatment system, the availability of up-to-date policy and procedures, sampling and monitoring, and proper operator certification. They also review test results and operational checks during their inspections to confirm all required activities, such as adjusting operational equipment, reporting adverse water quality incidents, and implementing corrective actions, were completed.

During an inspection at a licensed laboratory, the inspector evaluates requirements such as the availability of up-to-date policy and procedures, use of approved testing methods, quality control and assurance practices, and reporting and record-keeping practices.

In cases where the inspection identifies a problem, the inspector works with system or laboratory owners to bring them into compliance. For more serious instances of non-compliance, the inspector may issue an order or refer the matter to the ministry's Environmental Investigations and Enforcement Branch for investigation.

The decision to refer non-compliant behaviour for investigation depends on a number of criteria, including:

- the potential impact of the non-compliance to the health of the users of the system
- the compliance history of the inspected system owner and/or operator
- how cooperative the owner/operator is
- what steps the owner and/or operator has taken or is taking to resolve the issue

The Compliance and Enforcement Regulation (O. Reg. 242/05) also requires the ministry to take mandatory action (e.g. order or referral for investigation) when a violation may compromise the safety of the drinking water. This is further detailed in the Compliance and Enforcement section below.

Drinking water advisories

Drinking water advisory notices are tools used by local medical officers of health to protect consumers when the safety of the drinking water may be in question, or as a precautionary measure during system maintenance such as watermain repairs. In most situations, system owners are able to quickly resolve the issue, and the advisory is lifted within one to two weeks.

Drinking water advisories consist of four specific types of notices:

- Boil Water Advisory
 - An advisory notice that is issued to notify users that boiling is required to render the water safe to use, (e.g., adverse microbiological levels of *E. coli* or total coliforms).
- Do Not Drink Advisory
 - An advisory notice that is issued to users when action(s) other than boiling the water is required to protect users (e.g., exceedances of lead or nitrates). This may require some type of filtration and/or chemical or non-chemical treatment (i.e., reverse osmosis or ion exchange).
- Do Not Use Advisory
 - An advisory notice that is issued to users when boiling or treatment will not render the drinking water supply safer for users, e.g. trichloroethylene. At such time, the operator or operating authority may notify users of an alternate source of water or provide an alternate source for users of the

affected system.

- Health Information Advisory
 - An advisory notice that is issued to inform specific community users of an exceedance (such as fluoride and sodium) and the recommended measures to be taken to reduce exposure and mitigate the risk to human health (i.e., local board of health staff may notify dental or medical offices)

With the exception of a Health Information Advisory, when an advisory is issued, all affected users must be notified and advised to either boil the water or use water from an alternate source, such as bottled water. The notifications can be hand delivered, distributed through media channels, or posted on the municipality's and/or the local health unit's website.

Drinking water advisories are only issued and rescinded by the local medical officer of health based on site-specific and health-related information and conditions. The medical officer of health may consult with other agencies, including the Ministry of the Environment, Conservation and Parks.

The ministry considers any advisory that remains in place for longer than 12 months to be a long-term drinking water advisory. Medical officers of health will only lift an advisory if they are satisfied that all corrective actions have been taken and that the situation has been resolved.

Continued operations during the pandemic

In 2020, the world adapted to the challenges faced as a result of the COVID-19 pandemic. Collectively, the government of Ontario, owners and operators, and the water community worked to identify challenges and determine the supports needed in order to continue the safe delivery of drinking water. To support the continuity of drinking water and wastewater operations, the province issued a temporary emergency order under the *Emergency Management and Civil Protection Act* (<https://www.ontario.ca/laws/statute/90e09>) on March 24, 2020.

The order allowed system owners and operating authorities temporary flexibility to rapidly redeploy staff to drinking water systems and wastewater facilities, and employ qualified, non-certified staff to maintain operations. These provisions were phased

out in July 2020, as drinking water and wastewater system owners had limited need for these temporary provisions.

In addition, the order extended drinking water certificates and licences by six months to allow operators to remain certified and licensed as they focused on providing safe drinking water and proper treatment of wastewater. These measures gave operators additional time to complete the training required to renew their certification as the availability and accessibility of training was significantly impacted by the COVID-19 pandemic.

The ministry also granted temporary regulatory relief on a framework of established criteria and where it promoted the safety of the operators but did not compromise the safety of the drinking water. Relief granted included allowing more time to collect water samples and extending timelines on annual reporting. These two actions gave drinking water and wastewater system owners and operating authorities the ability to adapt to challenges brought on by the pandemic.

From October 1, 2020 to November 15, 2021, the ministry received 125 requests for regulatory relief from owners and operators of municipal and non-municipal drinking water systems and owners of municipal wastewater systems. Relief was only granted when requested and when ministry officials were satisfied that public health and the environment would continue to be protected. For relief issued prior to October 1, 2020, please see the 2019-20 Chief Drinking Water's Inspector Annual Report (<https://www.ontario.ca/page/2019-2020-chief-drinking-water-inspector-annual-report>) .

Of these requests, the ministry:

- approved and issued relief for 119 requests
- continues to review 5 requests

The remaining 1 request was withdrawn by the applicant.

The tables below give a breakdown of the types of relief provided by the ministry as of November 15, 2021.

Table 1: Relief that the ministry provided to drinking water system owners and operators as a result of the pandemic

pandemic		
Description	Municipal systems	Non-municipal systems
Temporary relief from lead sampling assessed as low risk to protect system operators and residents (e.g. relief from having to sample within private homes while continuing to sample from locations in the distribution system near these homes like fire hydrants and pump houses).	48	27
Temporary flexibility in water quality sampling where this was determined to be low risk (e.g. collecting fewer samples or varying sample locations when samples could not be collected from businesses impacted by the COVID-19 pandemic).	18	13
Flexibility in timelines for annual equipment calibration (e.g. calibration activities undertaken by external vendors)	1	0
Extending timelines for required reporting (e.g. preparation of annual reports)	1	0
Other system-specific relief (e.g.	15	10

Other system-specific relief (e.g. flexibility in timelines for implementing new procedures or flexibility in timing of operational checks to align with other activities)

10

10

Table 2: Relief that the ministry provided to municipal wastewater system owners and operators as a result of the pandemic

Description	Municipal wastewater systems
Flexibility in timelines for calibration of flowmeters (e.g. calibration activities undertaken by external vendors)	1
Extending timelines for required reporting (e.g. preparation of annual performance reports, quarterly reporting)	6
Relief from raw sewage sampling (e.g. where raw sewage sampling will not impact routine operation of the system in the short term)	0
Relief from overflow/bypass sampling (e.g. where the volume of and nature of the flow can be estimated based on historical data)	2
Other system-specific relief (e.g. flexibility in timelines for installing equipment)	8

To further support owners and maintain oversight at drinking water systems and licensed laboratories, ministry inspectors reached out to confirm they were able to continue to operate and meet regulatory requirements at the beginning of the pandemic. The ministry continued to follow up with owners who indicated they were experiencing or anticipating issues until they were confident the concerns were alleviated.

The ministry put health and safety measures in place so that inspectors were able to safely conduct all legally required inspections at municipal residential drinking water systems and licensed laboratories. Non-municipal drinking water systems that were identified as high risk based on the ministry's non-municipal inspection risk-evaluation methodology tool were also inspected. Inspectors also continued to follow up on all adverse water quality incidents and lead exceedance notifications to check that corrective actions were taken.

Update on ministry actions to protect drinking water

Drinking water operators and ethical conduct

The ministry is implementing several measures to emphasize the importance of ethical conduct among operators. The newest version of the mandatory certificate renewal course includes a specific module focused on the importance of ethical conduct, proper logbook recording practices, impacts of operator misconduct on public health, and consequences of operator non-compliance. In the Spring of 2021, the Walkerton Clean Water Centre launched a new virtual course, Ethics for Drinking Water Operators, which operators may complete to earn continuing education units to renew their certificates. Additionally, to help increase awareness of operators' ethical responsibilities, the ministry is introducing a Code of Ethics for Drinking Water Operators, which operators will be required to review and acknowledge when applying for certification.

Operator training

The Walkerton Clean Water Centre continued to build upon its 2020 launch of virtual training in response to the COVID-19 pandemic. Since the first virtual course was

introduced in May 2020, the Walkerton Clean Water Centre has delivered more than 250 virtual training sessions so that drinking water operators were able to earn the continuing education units required for certification renewal despite restrictions associated with the COVID-19 pandemic. As of September 2021, 20 courses were available for virtual delivery.

Supervisor control and data acquisition bulletin

A technical bulletin Making changes to supervisory control and data acquisition systems in municipal residential drinking water systems (<https://www.ontario.ca/page/technical-bulletin-making-changes-supervisory-control-and-data-acquisition-systems-municipal>) was released. The bulletin provides high-level information about what is and is not required by the ministry when an owner of a municipal residential drinking water system is making changes to their SCADA (supervisory control and data acquisition) system. The examples included in this bulletin will help owners and operators identify the types of changes that may be considered repair and maintenance that are not subject to approval requirements under the *Safe Drinking Water Act, 2002* or an alteration to the system that is pre-authorized by conditions in Schedule B of a drinking water works permit. This will help owners better understand their regulatory requirements when making these SCADA related changes.

Watermain disinfection procedure

The ministry made revisions to its Watermain Disinfection Procedure (<https://www.ontario.ca/page/water-main-disinfection-procedure>) to address issues identified by stakeholders and incorporate additional improvements related to new watermain construction and replacement. The revisions, which were published in August 2020, represent significant collaboration between the province, municipalities, members of the Ontario Water Works Association (OWWA), the Ontario Municipal Water Association (OMWA), the Ontario Clean Water Agency (OCWA) and the Walkerton Clean Water Centre (WCWC) over a two-year period. The revised procedure addresses issues and provides additional clarity and flexibility in the interpretation of American Water Works Association (AWWA) standard C651 and allows for time and cost savings while maintaining the safety of potable water. The 2020 procedure will take effect through conditions in the Drinking Water Works Permit.

Moving forward

The government and our partners continue to work together to improve drinking water protection and compliance. The ministry is also continuing to modernize our programs and keep pace with current information and technology. Current initiatives in progress include:

Best management practices

The ministry is working on several best practice initiatives to support drinking water system owners and operators. Topics include:

- How owners and operators of municipal residential drinking water systems can use digital data to demonstrate compliance with regulatory requirements (e.g. electronic records, data monitoring etc.).
- What owners of municipal residential drinking water systems should consider relating to cybersecurity as part of a Drinking Water Quality Management Standard risk assessment.
- New best practices for source water protection for individuals and communities with their own drinking water systems that have not been included in source protection plans and may not be aware of the risks to their drinking water sources, or how to take action to address those risks.

Amendments – operator certification

In fall 2021, Ontario moved forward with regulatory changes to allow the ministry and owners of drinking water systems and sewage works to act quickly to help ensure drinking water and waterways are protected during an emergency, such as a pandemic. These changes will help these owners have the staff needed to continue operations in an emergency, including through the extension of operator certificates and allowance of certain qualified but non-certified staff to temporarily maintain system operations.

Additional non-emergency changes were made to operator certification regulations. Information is available on the Environmental Registry (<https://ero.ontario.ca/notice/019-3513>).

Drinking water performance

The following section outlines the performance of our regulated drinking water systems and laboratories, drinking water test results, and enforcement activities and programs. The performance results show that Ontario's drinking water systems continue to be operated well, and our water is still among the best protected in the world.

Table 3: Number of drinking water systems and laboratories regulated by the Ministry of the Environment, Conservation and Parks in 2020-2021

Category	Number of drinking water systems and laboratories
Municipal residential drinking water systems	656
Non-municipal year-round residential drinking water systems (e.g. year-round trailer parks)	462
Systems serving designated facilities (e.g. a school on its own well supply)	1,409
Licensed laboratories	53

Table 4: Summary of drinking water test results for syst types in 2020-2021

Category	Number of tests results	Microbiological adverse test results	Chemical and radiological adverse test results	Percentage meeting standards
Municipal residential systems	505,281	560	121	99.9%
Non-municipal year-round residential systems	42,760	83	50	99.8%
Systems serving designated facilities	49,376	98	42	99.8%

Year over year, there are minor changes in the number of test results meeting the standard for all drinking water system categories. (Figure 2).

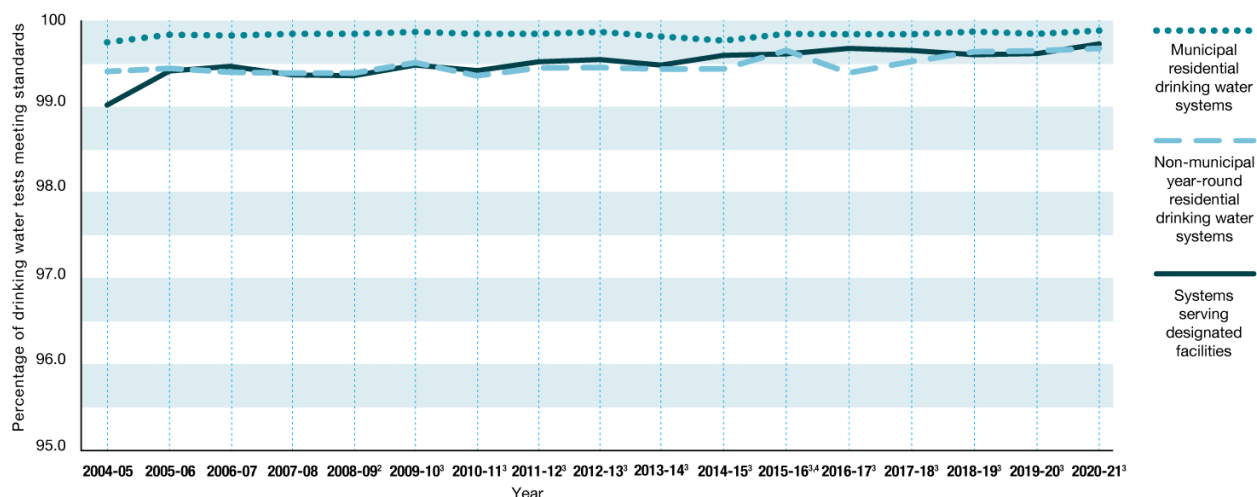


Figure 2: Trends in percentage of drinking water tests meeting Ontario Drinking Water Quality Standards, by system type^[1]

A chart showing trends in percentage of drinking water tests meeting standards for municipal residential drinking water systems, non-municipal year-round residential drinking water systems and systems serving designated facilities over 16 years. The trend is consistent for all three system categories showing that over 99% of drinking water test results since 2004-2005 have met standards.

For municipal residential drinking water systems, the percentage of drinking water test results meeting standards ranged from 99.74% in 2004-2005 to 99.87% in 2020-2021.

For non-municipal year-round drinking water systems, the percentage of drinking water test results meeting standards ranged from 99.41% in 2004-2005 to 99.69% in 2020-2021.

For systems serving designated facilities, the percentage of drinking water test results meeting standards ranged from 99.06% in 2004-2005 to 99.72% in 2020-2021.

Table 5: Summary of adverse water quality incidents for system types in 2020-2021

Category	Number of adverse water quality incidents ^[2]	Number of systems reporting
Municipal residential systems	1 149	320
Non-municipal year-round residential systems	395	168

Systems serving designated facilities	284	195
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Table 6: Number of inspections conducted in 2020-2021

Category	Number of inspections
Municipal residential drinking water systems	656
Non-municipal year-round residential drinking water systems	25
Systems serving designated facilities	27
Licensed laboratories	107

Table 7: Number of compliance outreach activities in 2020-21

Category	Number contacted for operational assessment during pandemic	Number sent Year-at-a-glance reports^[3]
Municipal residential	409	n/a

drinking water systems		*****
Non-municipal year-round residential drinking water systems	284	272
Systems serving designated facilities	476	656
Licensed laboratories	53	n/a *****

Inspection ratings

The ministry assigns a rating for each inspection conducted at a municipal residential drinking water system or licensed laboratory. A risk-based inspection rating is calculated based on the number of areas where a system is deemed to be non-compliant during the inspection, and the significance of these areas to administrative, environmental, and health consequences.

In 2020-2021:

- 71% of municipal residential drinking water systems received a 100% rating.
- 99% of municipal residential drinking water systems received an inspection rating above 80%.
- 70% of laboratories received a 100% rating in at least one of their inspections.
 - 36% of laboratories received a 100% in both inspections
- 100% of laboratory inspections received ratings above 85%.

An inspection rating of less than 100% does not indicate that drinking water is unsafe. It shows areas where a system's or laboratory's operation can improve. In these situations, the ministry uses a range of compliance tools to help ensure that the owners address specific areas requiring attention. For the 2020-21 data, the ministry identified the following areas for improvement:

Municipal residential drinking water systems

- Ensuring that continuous monitoring equipment is performing and recording tests correctly.
- Ensuring proper operation of treatment equipment (e.g. using the correct dosage of chlorine, that filters are performing).
- Maintaining secondary disinfection (e.g. ensuring chlorine residuals do not drop below the required levels).
- Using the correct disinfection products and procedures when performing modifications or repairs.

Non-municipal year-round residential systems

- Collecting microbiological samples in the distribution system and performing turbidity monitoring at the proper frequencies and correct locations.
- Maintaining secondary disinfection (e.g. ensuring chlorine residuals do not drop below the required levels).
- Ensuring proper operation of treatment equipment (e.g. ultraviolet radiation equipment).
- Ensuring reporting requirements for adverse water quality incidents are met.

Systems serving designated facilities

- Collecting microbiological samples at the proper frequency and correct location.
- Ensuring maintenance of treatment equipment is conducted and reported properly (e.g. changing ultraviolet bulbs and filters).
- Ensuring reporting requirements for adverse water quality incidents are met.
- Ensuring persons operating the drinking water system possess the proper designation and training.

Licensed laboratories

- Ensuring documentation and record-keeping contain sufficient detail.
- Ensuring policies and procedures are up to date.

- Ensuring policies and procedures are up to date.
- Ensuring that laboratory personnel are conducting drinking water testing according to the licensed test method.
- Ensuring that adverse results are reported, and reports include all the required information.

Deficiencies, infractions and orders

The Compliance and Enforcement regulation requires the ministry to undertake mandatory action, such as issuing an order or referring non-compliant behaviour for investigation, for deficiencies at municipal residential drinking water systems and for infractions at laboratories.

A deficiency is a violation of specified provisions of the *Safe Drinking Water Act, 2002* and its regulations that could or does pose a drinking water health hazard. For example, water treatment equipment that is not operated according to provincial requirements may impact the quality of drinking water and adversely affect the health of those using the system. An infraction is a violation of specified provisions of the *Safe Drinking Water Act, 2002* and its regulations by a licensed laboratory. For example, using an unlicensed method to test microbiological parameters may result in inaccurate results being reported by the laboratory, which may lead to a missed adverse test result.

In 2020-21, the ministry identified four deficiencies at two different municipal residential drinking water systems.

At the first system, the deficiency consisted of failing to operate the equipment in a manner to achieve the required minimum level of treatment in three months due to not meeting the monthly filter performance criteria. The owner was issued an order.

At the second, the three deficiencies consisted of failing to immediately respond to alarms and take the required corrective action, review records within 72 hours, and take distribution microbiological samples as required. The owner was issued an order.

There were also five infractions identified at five licensed laboratories that were all tied to adverse reporting. Three owners were issued orders and two were referred for investigation.

None of the deficiencies/infractions identified presented an immediate drinking water health hazard.

The following orders were issued in 2020-2021 (including those issued as a result of a deficiency/infraction):

- Two orders were issued to owners of municipal residential drinking water systems:
 - One order was issued to an owner to retain the services of a licensed engineering practitioner to assess the filtration system, and to submit the practitioner's assessment report and a plan to implement any recommendations.
 - The owner is currently in the process of implementing the recommendations and the ministry continues to monitor the situation.
 - One order was issued to retain a third-party operator to oversee the actions of the system's operator and report any instances of non-compliance and improper behaviour to the ministry on a bi-weekly basis.
 - The order was amended to reduce the reporting frequency to monthly as the operator's behaviour improved.
 - The owner complied with the order and has since retained a different operating authority.
- One order was issued to a private corporation requiring it to install backflow prevention devices and put a procedure in place to protect the municipal drinking water supply from cross-contamination. The private corporation complied with the order.
- Two orders were issued to owners of non-municipal year-round residential systems:
 - One order to provide proper treatment and monitor for primary disinfection.
 - One order to submit documentation indicating that a certified operator was hired.
 - Both owners have complied with their orders.
- One order was issued requiring a school board to submit an action plan to ensure that corrective actions for future lead exceedances are reported and

implemented properly. The school board complied with the order.

- Three orders were issued to owners of licensed laboratories. All orders contained direction to conduct a root cause analysis to identify deficiencies in the adverse reporting process and implement corrective actions to address any deficiencies. All owners have complied with the orders.

Convictions

In 2020-21, the following convictions were obtained:

- one operating authority at a municipal residential drinking water system for failing to immediately report to the ministry a prescribed adverse result of a drinking water test
- one operator at a municipal residential drinking water system for the inclusion of false and misleading information in a document that was required to be created and stored at two separate locations
- one individual at a non-municipal year-round residential system for failing to:
 - ensure at least one distribution sample was taken every week
 - use an approved device to test for free chlorine residual
 - immediately report to the ministry a prescribed adverse result of a drinking water test
 - ensure the drinking water system was operated by a properly certified person
- one corporate entity for conducting upgrade and repair work without a well technician's licence

These convictions are tied to offences that occurred prior to 2020-21.

Compliance and enforcement regulation

The Compliance and Enforcement regulation outlines the requirements the ministry's compliance program must meet. The ministry fulfilled its requirements in 2020- 2021. Requirements met included:

- completing an inspection at all 656 municipal residential drinking water systems in the province

- ensuring that at least one in every three inspections of municipal residential drinking water systems was unannounced (in 2020-2021, 254 inspections were unannounced and 402 were announced)
- completing two inspections at each of the 53 licensed laboratories
- ensuring at least one of the two inspections conducted at each licensed laboratory was unannounced
- ensuring all inspection reports for municipal residential drinking water systems and licensed laboratories were issued within 45 days of the completion of the inspection
- taking mandatory action within 14 days of finding a deficiency at a municipal residential drinking water system or an infraction at a licensed laboratory

In addition to setting requirements for inspection and compliance activities, the Compliance and Enforcement regulation also provides the public with the right to request an investigation of an alleged contravention of the *Safe Drinking Water Act, 2002* or any of its regulations. In 2020-2021, there was one application from the public for an investigation.

The ministry received an Application for Public Drinking Water Investigation and supporting information in February 2021 requesting an investigation into alleged violations of the *Safe Drinking Water Act, 2002* by the operators of a municipal drinking water system. The ministry's investigation concluded that there were no grounds to support the allegations presented and the file was closed. The results of the ministry's investigation were communicated to the applicant within 120 days of receiving the application, as required by the regulation.

Further information on drinking water quality, inspections, orders and convictions data is available on the Drinking Water Quality and Enforcement (<https://data.ontario.ca/en/dataset/drinking-water-quality-and-enforcement>) page on the Ontario Data Catalogue.

Long-term drinking water advisory

The only long-term drinking water advisory in place at a municipal residential drinking water system was rescinded in 2021. A drinking water advisory was issued for the Lynden Drinking Water System in September 2011 due to lead levels in the distribution system testing above the Ontario Drinking Water Quality Standard. The

municipality drilled a new well and added a new treatment facility to resolve the issue. The new water treatment plant was commissioned in July 2020. The long-term drinking water advisory for lead was left in place at that time to confirm the drinking water could consistently meet the standard. This included rigorous testing and flushing of the drinking water by the City of Hamilton to ensure the water was safe to drink without the use of filters. The City of Hamilton's Public Health Services lifted the drinking water advisory in August 2021 as the testing data showed that the lead levels were well below the provincial drinking water standard. The ministry worked closely with the municipality to make sure it complied with the corrective actions indicated by the public health unit and approved the design of the new water treatment plant submitted by the municipality.

2020-21 Highlights of Ontario's small drinking water system results

Ontario has approximately 10,000 businesses and other community sites that use a small drinking water system for the public in these settings to access drinking water. These systems, which are regulated under the *Health Protection and Promotion Act* (<https://www.ontario.ca/laws/statute/90h07>) and its regulation, O. Reg. 319/08 (Small Drinking Water Systems) (<https://www.ontario.ca/laws/regulation/080319>), are located across the province in semi-rural to remote communities and provide drinking water in restaurants, places of worship, community centres, resorts, rental cabins, motels, bed and breakfasts, campgrounds and other public settings, where there is not a municipal drinking water supply.

The Small Drinking Water Systems Program is a unique and innovative program overseen by the Ministry of Health and administered by local boards of health. Public health inspectors conduct inspections and risk assessments of all small drinking water systems in Ontario, and provide owner/operators with a tailored, site-specific plan to keep drinking water safe. This customized approach has reduced unnecessary burden on small drinking water system owner/operators without compromising provincial drinking water standards.

Owners and operators of small drinking water systems are responsible for protecting the drinking water that they provide to the public. They are also responsible for meeting Ontario's regulatory requirements, including regular drinking water sampling and testing, and maintaining up-to-date records.

2021 at-a-glance

- Over the past nine years, we have seen progressively positive results including a steady decline in the proportion of high-risk systems (9.43% in 2020-21 down from 16.65% in 2012-13).
 - Risk category is determined based on water source, treatment, and distribution criteria. High-risk small drinking water systems may have a significant level of risk and are routinely inspected every two years. Low and moderate risk small drinking water systems may have negligible to moderate risk and are routinely inspected every four years.
 - Public health inspectors often work with the operator to address potential risks, which, when corrected, may result in a lower assigned category of risk.
 - As of March 31, 2021, over three quarters (78.58%) of small drinking water systems are categorized as low risk and a total of 90.57% of systems are categorized as low and moderate risk and subject to regular re-assessment every four years.
 - The remaining systems, categorized as high risk, are re-assessed every two years.
- 97.95% of 83,314 drinking water samples submitted from small drinking water systems during the reporting year have consistently met Ontario drinking water quality standards. The results identified as not meeting the standards represent 1,709 test results, of which 1,548 were microbiological exceedances and 145 were chemical/inorganic exceedances. Public health inspectors work with the system owners and operators to bring their systems into compliance.
 - As of March 31, 2021, 24,578^[4] risk assessments have been completed for the approximately 10,000 small drinking water systems. The risk assessment is used by the public health inspector to develop the directive for the system which is a site-specific plan for the operator to ensure the small drinking water system provides safe water. The directive may include:
 - the frequency and location of sampling
 - water samples to be taken and tested for biological, chemical, radiological, or other potential contamination
 - operational tests such as checking disinfection levels and conducting turbidity tests

- operator training
 - record-keeping
 - installation of treatment equipment
 - posting and maintaining warning signs
- Through the Ministry of Health's Small Drinking Water System Program, public health units provide information to small drinking water system owners and operators on:
 - how to protect their drinking water at the source by identifying possible contaminants
 - how and when to test their water
 - treatment options and maintenance of treatment equipment, where necessary
 - when and how to notify the public, whether it is a poor water sample test result or equipment that is not working properly
 - what actions need to be taken to mitigate the problem

In the event of an adverse test result, the laboratory will notify both the owner/operator of the small drinking water system and the local public health unit for immediate response to the incident. Details of the adverse water quality incident will be also be tracked by the public health unit in the Drinking Water Advisory Reporting System.

Adverse water quality incidents can result from an observation (e.g. an observation of treatment malfunction) or adverse test result (i.e. water sample does not meet drinking water standards under O. Reg. 169/03).

- In the past year, a decline of 23.41% in total number of adverse water quality incidents was observed from 1,085 in 2019-2020 to 831 in 2020-2021; and the number of small drinking water systems that reported an adverse water quality incident for the same period also declined 22.91% from 838 in 2019-2020 to 646 in 2020-2021.^[5]

The small drinking water system adverse water quality incident data demonstrates the success and value of the Ministry of Health's Small Drinking Water System Program because adverse incidents are now being systematically captured and

Program because adverse incidents are now being systematically captured and appropriate action can now be taken and tracked to help protect drinking water users.

Improvements in adverse water quality incidents in small drinking water systems have occurred over time since the start of the program as owners/operators complied with sampling requirements in accordance with their directive and instituted improvements in their drinking water systems. Looking at the longer-term results and in particular over the last six years, we have seen a progressive decline in the number of adverse water quality incidents.

- Since 2013-2014, a significant downward trend in both total adverse water quality incidents and the number of systems that reported an adverse water quality incident has occurred, with some fluctuations.
- As of 2020-2021, total adverse water quality incidents decreased 45.22% and 46.88% fewer systems reported an adverse water quality incident compared to 2013-2014 data, at 1,517 adverse water quality incidents for 1,216 systems.

Note, the Ministry of Health is not aware of any reported illnesses related to these incidents. This is likely in part because, through the Ministry of Health's small drinking water system program, operators now know when and how to notify users when their drinking water may not be safe to drink and are working with public health units to take appropriate corrective actions to mitigate any problems.

Lead in drinking water

Ontario continued its actions to reduce exposure to lead in 2020-2021, as lead in drinking water is a significant health concern, especially for children aged six and under, and negatively impacts infant brain and nervous system development.

Community lead testing

Municipal residential drinking water systems

Treated water from drinking water systems rarely exceeds the Ontario's Drinking Water Quality Standard for lead. However, drinking water comes into contact with plumbing materials that may contain lead (such as services lines, faucets, and fixtures) which may leach and result in elevated lead levels at the tap. Service lines

made of lead that connect the home to the watermain are typically the most significant source of lead in drinking water in older municipalities.

Since 2007, all owners of municipal residential drinking water systems have been sampling to determine whether lead in drinking water is an existing or developing problem within their communities. A system's specific sampling requirements are based on its historical test results. Owners of systems with consistent results below Ontario's standard for lead are permitted to sample at a reduced frequency. All test results from samples collected at private residences must be shared with occupants, along with any advice from the local medical officer of health when the result does not meet the standard for lead. This may include suggestions to replace the fixture or install a filter. The majority of plumbing test results from samples taken for the community lead testing programs in municipalities met Ontario's current standard for lead (10 micrograms per litre) in 2020-21 (table 8).

Where test results indicate an ongoing problem at a community level, system owners must develop a lead reduction strategy. Lead reduction strategies have primarily consisted of chemical corrosion control, lead service line replacement and education and outreach. Owners continue to implement their ongoing lead reduction strategies and undertake initiatives such as:

- sending annual letters to homes with known lead service lines to encourage them to replace them
- offering grants to encourage residents to replace lead service lines on their properties
- leveraging available information and mapping technology to publicly identify areas that may have lead pipes, to help protect vulnerable populations
- providing faucet filters for vulnerable populations
- supporting and participating in research projects

Service lines are underground pipes that connect to the municipal watermain and supply water into buildings. Municipalities are responsible for the portion of the service line up to a homeowner's property line. Prior to the mid-1950s, lead was commonly used as service line material. If a building has a lead service line, lead can dissolve into the drinking water, especially if the water has been left standing in the plumbing for an extended period of time, for example, overnight.

When replacing lead service lines, a municipality must rely on homeowners agreeing to replace their portion of the service line to fully reduce exposure from lead. Homeowners can also reduce their exposure to lead by purchasing plumbing parts that are certified lead-free.

Non-municipal drinking water systems

Non-municipal year-round residential drinking water systems supply water on a year-round basis to six or more private residences (e.g. houses, apartments, condominium units, townhouses) or to trailer parks with six or more water service connections. Owners of these systems are required to test for lead in plumbing at a specified number of homes and non-residential buildings and in the distribution system twice a year. The results of this testing help to determine if levels of lead in drinking water are an existing, developing or a potential problem within a community.

The majority of plumbing test results from samples taken for the community lead testing program associated with non-municipal year-round residential drinking water systems met Ontario's current standard for lead.

Table 8: Community lead testing – lead plumbing tests results 2020-21

Category	Number of test results	Percentage meeting the drinking water standard for lead
Municipal residential drinking water systems	1,801	90.1%
Non-municipal year-round residential drinking water systems	641	98.1%

The Drinking Water Quality and Enforcement (<https://data.ontario.ca/dataset/drinking-water-quality-and-enforcement>) page of the Ontario Data Catalogue provides additional information on lead reduction strategies and testing results for municipal and non-municipal residential systems.

Update on testing every drinking water tap and fountain in schools and child care centres

The Ministry of Health is not aware of any reported cases of lead poisoning in children due to drinking water in the last ten years. Operators of child care centres and schools (public and private) with a primary division were required to sample for lead at every drinking water fountain and tap that provides drinking water to children or is used in food preparation for children by January 1, 2020. Operators of schools without a primary division are required to sample all fixtures by January 1, 2022.

The ministry asked facility owners and operators to submit a drinking water fixture inventory listing the number of drinking water fixtures at their facilities and to identify how many have been tested to date.

The inventories submitted show the majority of operators of facilities have met the testing requirements.

Table 9: Drinking water fixture inventories as of September 2021

Category	Number of facilities	Percentage of drinking water fixture inventories submitted	Percentage declaring sampling is completed
Child care centre and	9,830	91%	88.1%

schools with a primary division			
All other schools	1 , 2 5 8	9 7 . 8 %	5 5 %

The ministry is focused on following-up with the operators of the 884 child care centres and schools with a primary division that have not submitted an inventory to determine whether they are still operating and if they have completed their required sampling. Based on the outcome of the follow-up, the ministry will take action, such as education and outreach, inspections and/or issuing orders where facilities have not met the sampling deadlines.

In 2020-21, the ministry conducted 367 inspections at child care centres and schools. The ministry also continues to follow up on lead exceedances and work with operators of schools and child care centres, as well as the local medical officer of health, to resolve issues. When a test result exceeds the standard for lead, facility operators must report the exceedance to the ministry, the local medical officer of health and the Ministry of Education. If a result from a flushed sample fails to meet the standard, owners and operators must take immediate action to make the tap or fountain inaccessible to children by disconnecting or bagging it until the problem is fixed. Other corrective actions can include increased flushing, replacing the fixture, or installing a filter or other device that is certified for lead reduction. Operators must also follow any other directions from their local medical officer of health.

Table 10: Lead test results for schools, private schools, and child care centres in 2020-2021

Sample type	Total number of results	Number of test results meeting Ontario's Drinking	Number of lead exceedances (of total number of results)	Percentage of test results meeting Ontario's Drinking
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		Water Quality Standard for lead		Water Quality Standard for lead
Lead - Flushed	13,868	13,301	567	95.91%
Lead - Standing	13,705	12,336	1,369	90.01%
Lead - Total for standing and flushed samples	27,573	25,637	1,936	92.98%

A facility which has tested all of its drinking water taps and fountains and has a sampling history that indicates there is no issue with lead in drinking water, is able to change from annual sampling to sampling every third year. The ministry confirmed 443 facilities were eligible to move to a reduced sampling schedule in 2020-21.

To find test results for your local school, private school or child care centre, contact it directly or visit the Drinking Water Quality and Enforcement (<https://data.ontario.ca/dataset/drinking-water-quality-and-enforcement>) page on the Ontario Data Catalogue. Download the "2020-21" file, open the spreadsheet called "Test Data - Raw Data" and search for the name of your school or child care centre.

The ministry also continues to evaluate our already comprehensive lead protection framework to better understand the implications of adopting the more stringent federal guideline for lead as an Ontario standard and other potential actions to strengthen the regulatory framework.

Conclusion

As we navigate the on-going impacts of the pandemic, we will continue to provide supports to our ministry partners, stakeholders, businesses, and the public for the delivery of clean, safe drinking water. Ontarians can be confident that we will remain dedicated to our efforts to protect their drinking water. We will continue to strive for improvement through our ongoing work to modernize our programs to keep pace with current science and technology and undertake new initiatives to enhance drinking water protection.

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Footnotes

- [1] ^ There were slight variations in the methods used to tabulate the percentages year-over-year due to regulatory changes and different counting methods.
- [2] ^ See the Drinking Water Protection Framework section for more information about adverse water quality incidents.
- [3] ^ A tailored report, which summarized available ministry data, including drinking water system profile information, sampling information and a list of adverse water quality incidents reported for their system.
- [4] ^ The reported number of risk assessments will change as new systems come into use/change in use, and routine re-inspections and risk assessments are completed. Risk categories may also fluctuate (e.g. if recommended improvements are taken to reduce the system's risk). Similarly, a system may require reassessment to determine if the risk level has changed (e.g. if the water source or system integrity is affected by adverse weather events or system modifications).
- [5] ^ An adverse test result does not necessarily mean that users are at risk of becoming ill. When an adverse water quality incident is detected, the small drinking water system owner/operator is required to notify the local medical officer of health and to follow up with any action that may be required. The

public health unit will perform a risk analysis and determine if the water poses a risk to health if consumed or used and take additional action as required to inform and protect the public. Response to an adverse water quality incident may include issuing a drinking water advisory that will notify potential users whether the water is safe to use and drink or if it requires boiling to render it safe for use. The public health unit may also provide the owners and/or operators of a drinking water system with necessary corrective action(s) to be taken on the affected drinking water system to address the risk.