



Health
Canada

Santé
Canada

*Your health and
safety... our priority.*

*Votre santé et votre
sécurité... notre priorité.*

Guidance for Issuing and Rescinding Boil Water Advisories

Canada 

Health Canada is the federal department responsible for helping the people of Canada maintain and improve their health. We assess the safety of drugs and many consumer products, help improve the safety of food, and provide information to Canadians to help them make healthy decisions. We provide health services to First Nations people and to Inuit communities. We work with the provinces to ensure our health care system serves the needs of Canadians.

Published by authority of the Minister of Health.

Guidance for Issuing and Rescinding Boil Water Advisories
is available on Internet at the following address: www.healthcanada.gc.ca

Également disponible en français sous le titre :
Conseils concernant l'émission et l'annulation des avis d'ébullition de l'eau

This publication can be made available on request on diskette, large print,
audio-cassette and braille.

For further information or to obtain additional copies, please contact:

Publications
Health Canada
Ottawa, Ontario K1A 0K9
Tel.: 613-954-5995
Fax: 613-941-5366
E-mail: info@hc-sc.gc.ca

© Her Majesty the Queen in Right of Canada, represented by the
Minister of Health, 2009

This publication may be reproduced without permission provided the source is fully
acknowledged.

HC Pub.: 4116
Cat.: H128-1/09-578E
ISBN: 978-1-100-12678-4

Guidance for Issuing and Rescinding Boil Water Advisories

Federal-Provincial-Territorial Committee on
Drinking Water

Federal-Provincial-Territorial Committee on
Health and the Environment

Ottawa, Ontario

February 2009

This document supersedes previous documents on issuing and rescinding boil water advisories. It may be cited as follows:

Health Canada (2009). Guidance for Issuing and Rescinding Boil Water Advisories. Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

The document was prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment.

Any questions or comments on this document may be directed to:

Water, Air and Climate Change Bureau
Healthy Environments and Consumer Safety Branch
Health Canada
269 Laurier Avenue West, Address Locator 4903D
Ottawa, Ontario
Canada K1A 0K9

Tel.: 613-948-2566
Fax: 613-952-2574
E-mail: water_eau@hc-sc.gc.ca

Other documents concerning Canadian drinking water quality can be found on the following Web page: www.healthcanada.gc.ca/waterquality

Table of contents

Background on Guidance Documents	1
<u>Part A - Guidance on boil water advisories</u>	2
A.1 Incident response	2
A.2 Conditions for issuing a boil water advisory	3
Specific guidance during a boil water advisory, including instructions for boiling or disinfecting water	4
A.3 Conditions for rescinding a boil water advisory	5
A.4 Other drinking water quality advisories	5
<u>Part B - Supporting information</u>	6
B.1 Decision trees	6
Routine microbiological testing of public systems	6
Routine microbiological testing of semi-public systems	7
B.2 References	8

Guidance for Issuing and Rescinding Boil Water Advisories

Background on Guidance Documents

The main role of the Federal-Provincial-Territorial Committee on Drinking Water is the development of the *Guidelines for Canadian Drinking Water Quality*. This role has evolved over the years, and new methodologies and approaches have led the Committee to develop a new type of document, Guidance documents, to provide advice and guidance on issues related to drinking water quality for parameters that do not require a formal Guideline for Canadian Drinking Water Quality.

There are two instances when the Federal-Provincial-Territorial Committee on Drinking Water may choose to develop guidance documents. The first would be to provide operational or management guidance related to specific drinking water related issues (such as boil water advisories), in which case the documents would provide only limited scientific information or health risk assessment.

The second instance would be to make risk assessment information available when a guideline is not deemed necessary. The Federal-Provincial-Territorial Committee on Drinking Water establishes the *Guidelines for Canadian Drinking Water Quality* specifically for contaminants that meet all of the following criteria:

1. exposure to the contaminant could lead to adverse health effects;
2. the contaminant is frequently detected or could be expected to be found in a large number of drinking water supplies throughout Canada; and
3. the contaminant is detected, or could be expected to be detected, at a level that is of possible health significance.

If a contaminant of interest does not meet all these criteria, the Federal-Provincial-Territorial Committee on Drinking Water may choose not to establish a numerical guideline or develop a Guideline Technical Document. In that case, a guidance document may be developed.

Guidance documents undergo a similar process as Guideline Technical Documents, including public consultations through the Health Canada web site. They are offered as information for drinking water authorities, and in some cases to help provide guidance in spill or other emergency situations.

Part A - Guidance on boil water advisories

Boil water advisories are public announcements, issued by the responsible authority, advising the public that they should boil their drinking water prior to consumption. They are generally issued as a result of a possible or confirmed microbiological contamination. Depending on the jurisdiction, the terminology may vary; the terms “boil water order” and “boil water notice” may be used in place of, or in conjunction with, “boil water advisory.”

Boil water advisories are used more commonly than drinking water avoidance advisories and can be issued either as a precaution against or in response to a waterborne disease outbreak. Decisions concerning boil water advisories are made at the provincial/territorial or local level, using a risk management/risk assessment approach based upon site-specific knowledge and conditions. Specific guidance related to the implementation of drinking water advisories, including the issuing and rescinding of boil water advisories, should be obtained from the appropriate drinking water authority in the affected jurisdiction.

This document summarizes the factors that should be considered before boil water advisories are issued or rescinded. It provides specific guidance for use during a boil water advisory, including how to properly boil or disinfect water. It also provides guidance, through the inclusion of decision trees, for routine microbiological testing of public and semi-public systems.

A.1 Incident response

A quick and effective response to incidents, such as the issuing of a boil water advisory, is a critical part of the source to tap approach to the provision of safe drinking water (CCME, 2004). Consequently, an incident response team should be established before an incident occurs, to enable a quick response to any drinking water-related event that has had or may have an effect on drinking water quality or public health. Incident response team members should include professionals responsible for source water protection, treatment plant operation and water distribution, water quality monitoring, regulation of drinking water, and public health surveillance. Incident response teams provide an effective mechanism for the rapid exchange of information, so that remedial measures that may be required in the watershed, at the treatment plant, or in the distribution system can be instituted without delay. It is also important for appropriate communication mechanisms to have been identified prior to the occurrence of an incident, so that those affected are notified as soon as possible and detailed instructions are provided to specific target groups, such as doctors, dentists, and operators of health care facilities, food processors, retail food establishments, day care facilities, schools, hotels, restaurants, spas, and swimming pools.

Depending on the nature and seriousness of the incident, the public health representative or other designated member of the team may issue a boil water advisory. The team should also have criteria in place to determine when a boil water advisory can be rescinded. In some jurisdictions, these criteria are specified in the applicable regulations.

A.2 Conditions for issuing a boil water advisory

Boil water advisories are most frequently based on unacceptable bacteriological quality. Advisories may be issued exclusively in response to the presence or confirmed presence of *Escherichia coli* (*E. coli*). In some jurisdictions, they are also issued on the basis of the confirmed presence of total coliforms or thermotolerant coliforms. The presence or confirmed presence of total coliforms or thermotolerant coliforms in the absence of *E. coli* in the distribution system, but not in water leaving the treatment plant, usually indicates that the distribution system is experiencing bacterial regrowth problems.

A number of factors may prompt further investigation or form the basis for issuing a boil water advisory. These include:

- a) operational conditions such as:
 - local maintenance or emergency repairs in the distribution system where there is a concern that microbiological contamination may exist;
 - equipment malfunction during treatment or distribution;
 - inadequate disinfection or disinfectant residuals;
 - situations where operation of the system would compromise public health;
- b) water quality conditions such as:
 - significant deterioration in the microbiological quality or turbidity of the source water (i.e., levels that cannot be treated at the plant);
 - sudden unexpected changes in water quality;
 - unacceptable microbiological quality of treated water;
 - unacceptable turbidity or particle counts of treated water;
 - where epidemiological evidence indicates that the drinking water is or may be responsible for an outbreak of illness.

The presence of *E. coli* is a definite indication of human or animal faecal contamination and the possible presence of pathogenic microorganisms. If the presence of *E. coli* is confirmed in drinking water, a boil water advisory should be issued immediately. Additional guidance on actions in response to the presence of *E. coli* in drinking water can be found in the appendices, which provide decision trees for routine microbiological testing of public systems (Appendix A) and of semi-public systems (Appendix B), as well as in the Guideline Technical Document for *E. coli* (Health Canada, 2006).

As total coliform bacteria are ubiquitous in nature, their presence in the distribution system does not necessarily indicate a health risk. Nevertheless, if remedial measures, such as flushing water mains and increasing chlorine residuals, do not correct this problem, then the local authorities may wish to issue a boil water advisory after consultation with the water purveyor and appropriate municipal officials.

Although not common, some authorities prefer to use the presence of thermotolerant coliforms (faecal coliforms) as a trigger for the issuance of boil water advisories. However, as some species in this group—for example, *Klebsiella pneumoniae*—occur naturally in vegetation and soils as well as in faeces, they are not absolute indicators of faecal contamination. When thermotolerant coliforms are detected, their identity should be determined. If species other than *E. coli* are present, it is likely that the distribution system is experiencing bacterial regrowth and the water purveyor may wish to attempt to correct the problem before any decision on the

issuance of a boil water advisory is made. The possible negative consequences of boil water advisories—for example, the risk of scalding, especially to young children and elderly people—should also be considered.

In circumstances where an advisory is in place for an extended period of time, it is recommended that frequent reminders be issued to the public about the boil water advisory. The frequency of these reminders should be determined by the incident response team.

Specific guidance during a boil water advisory, including instructions for boiling or disinfecting water

All water used for drinking, preparing food, hot and cold beverages and ice cubes, washing fruits and vegetables, and dental hygiene must be boiled. This is of particular importance in the case of the preparation of infant formulas (Health Canada, 2005), for which water should be boiled at all times. Severely immunocompromised individuals should also be advised to discuss these risks and remedial measures (such as always boiling tap water) with their physicians (Juranek, 1995; Working Group on Waterborne Cryptosporidiosis, 1997). In the event that boiling is not practical, the local public health or other responsible authority will give directions for the disinfection of water or the use of an alternative supply known to be safe.

Research indicates that holding water at a rolling boil for 1 minute will inactivate waterborne pathogenic microorganisms (Harp et al., 1996). Water can be boiled in a heat-resistant container on a stove, in an electric kettle, or in a microwave oven.¹ The water should then be cooled and poured into a clean container or refrigerated until needed. At elevations over 2000 m, water boils at a slightly lower temperature; it should be boiled for at least 2 minutes to ensure that all disease-causing organisms are killed.

Under most circumstances, it is not necessary to boil tap water used for other household purposes, such as bathing, showering, laundry, or washing dishes. In non-outbreak situations, dishes and laundry may be washed in tap water, either by hand or by machine. Hands can continue to be washed using tap water and a proper handwashing technique that includes rubbing all parts of the hands with soap and water for a minimum of 20 seconds. Adults, adolescents, and older children may shower, bathe, or wash using tap water, but should avoid swallowing the water. Toddlers and infants should be sponge bathed.

In the event of a waterborne outbreak, it may be necessary to advise the public to take additional precautions for bathing, showering, handwashing and washing dishes. Local health authorities are generally responsible for establishing criteria for water used for bathing and showering. One approach that may be taken is to establish this criteria based on the *Guidelines for Canadian Recreational Water Quality* (Health and Welfare Canada, 1992). Using this approach, a single, 100 mL sample should not contain more than 200 *E. coli*. If the source of contamination is known to be human sewage, local health authorities may advise the public to sponge bathe. The preferred method for disinfecting hands during a known outbreak is to continue to use proper handwashing technique (using tap water), followed by the use of an alcohol-based hand gel disinfectant containing more than 60% alcohol, or rub hands with a

¹ If water is boiled in a microwave oven, it is advisable to include a glass rod or wooden or plastic stir stick in the container to prevent the formation of superheated water (water heated above its boiling point, without the formation of steam).

65-95 % alcohol solution (Kampf and Kramer, 2004). Alcohol-based disinfectant should be rubbed into all areas of the hands until hands are dry. Hands should not be towel dried. If dishes are washed by hand, they should be (1) washed and rinsed in hot tap water, then (2) soaked in a dilute solution of unscented household bleach (20 mL of unscented bleach in 10 L of water) for 1 minute and (3) left to air dry for a minimum of 4 hours (Robertson et al., 1992). All three steps are needed to disinfect the range of pathogens that could be present in the tap water. Alternatively, dishwashers that use hot water and have a drying cycle will disinfect dishes. These precautions should reduce the possible spread of illness and minimize the need to boil tap water and the risks of serious burns and scalds. It should also be noted that house pets can carry waterborne pathogens and transmit them to humans (Working Group on Waterborne Cryptosporidiosis, 1997). As a precaution, it may be advisable to provide the pets with boiled water during an outbreak.

A.3 Conditions for rescinding a boil water advisory

Criteria for rescinding a boil water advisory should include the resolution of the contamination event that prompted the issuing of the advisory. Boil water advisories are usually rescinded:

- if the advisory was issued on evidence of operational conditions, when the treatment, distribution, or operational malfunction has been corrected and sufficient water displacement has occurred in the distribution system (including the plumbing systems within buildings) to eliminate any remaining contaminated water; or
- if the advisory was issued on evidence of water quality conditions, as soon as the turbidity, particle counts, or disinfectant residual of the treated water has returned to an acceptable level, as determined by the incident response team, when at least two consecutive sets of bacteriological samples collected a minimum of 24 hours apart produce negative results.

In the case of an outbreak, advisories are usually rescinded after the above conditions have been met and when surveillance indicates that the incidence of the illness in the community has returned to background levels. Owing to lengthy incubation periods for some pathogens and their secondary spread, new cases of illness may occur after the period of contamination has passed. Conversely, a lack of new cases may indicate that the boil water advisory is being followed and not that the causative situation has been rectified.

Additional guidance on actions in response to the presence of *E. coli* in drinking water, including rescinding boil water advisories, can be found in the appendices.

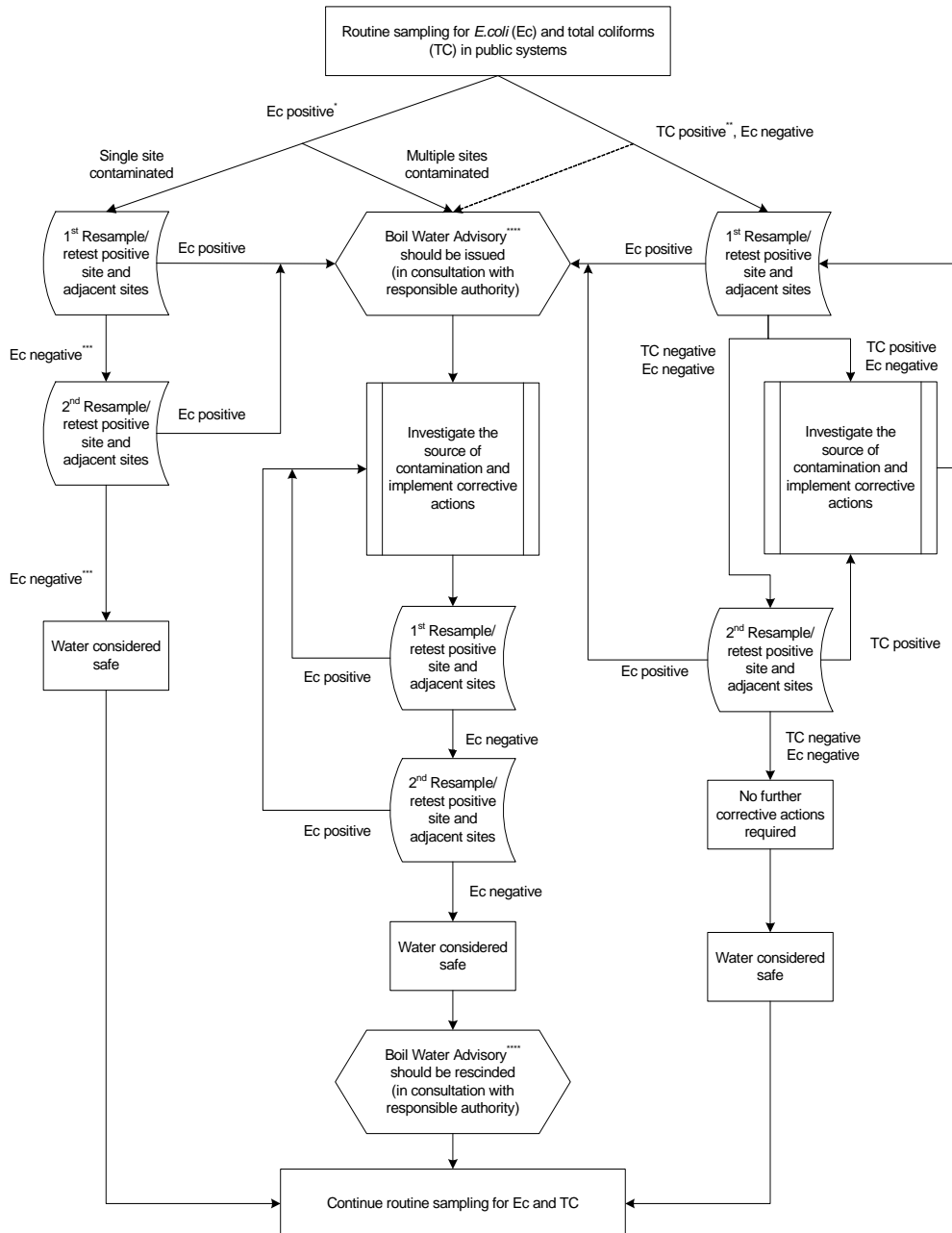
A.4 Other drinking water quality advisories

Guidance on measures other than boiling the water may be required following a chemical or radiological contamination event. For advice on dealing with these types of events, refer to the Guidance Document entitled “Issuing and Rescinding Drinking Water Avoidance Advisories in Emergency Situations” (Health Canada, 2009)

Part B - Supporting information

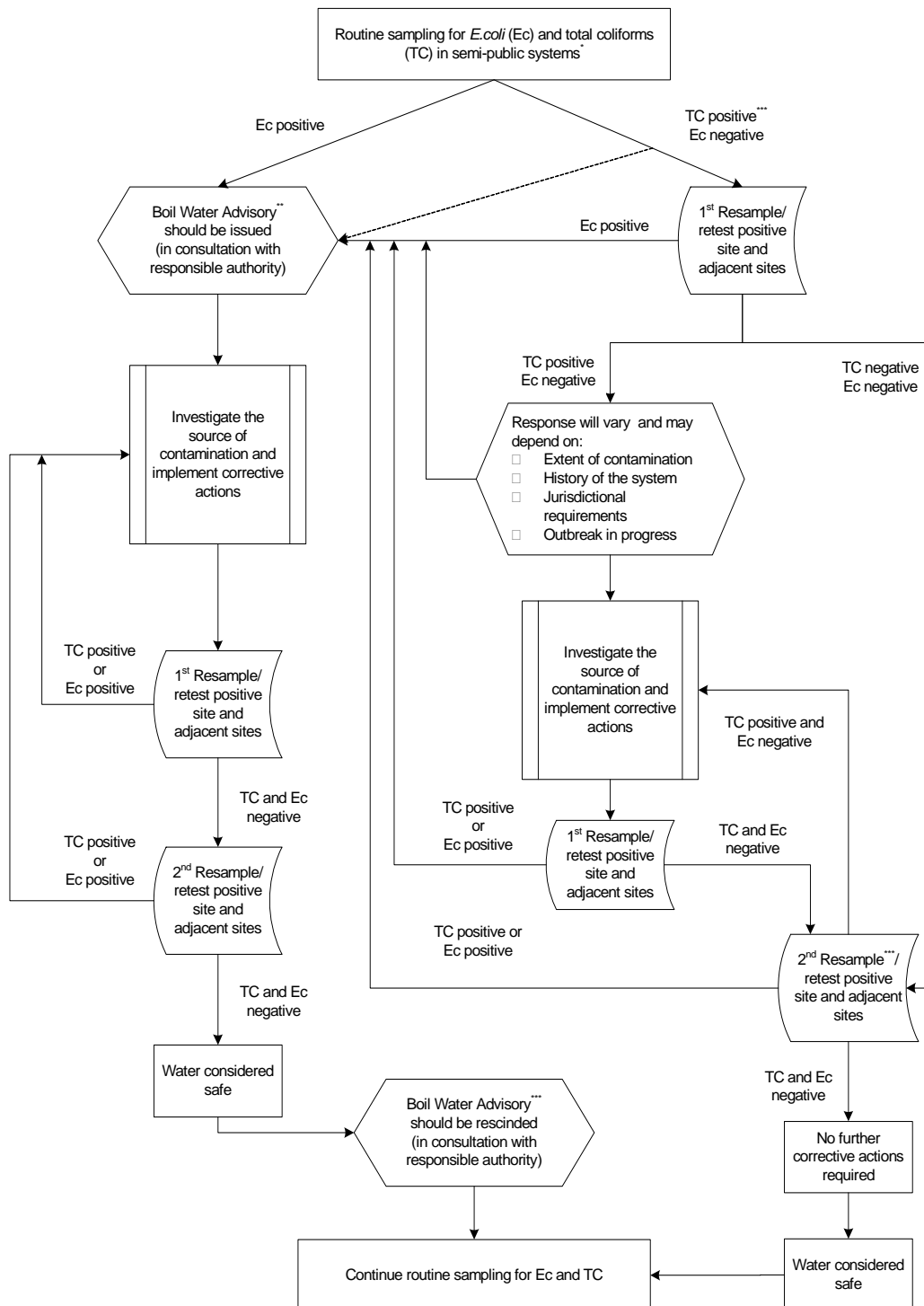
B.1 Decision trees

Routine microbiological testing of public systems



* A boil water advisory may be issued on a single site contamination, depending on the jurisdiction.
 ** A boil water advisory may be issued based on a positive total coliform, in the absence of *E. coli*, if deemed necessary by the responsible authority.
 *** If a total coliform positive sample is detected during resampling for *E. coli*, the decision route for detection of a total coliform positive sample, in the absence of *E. coli*, should be followed (right-hand side of the decision tree).
 **** Depending on the jurisdiction, "boil water order" may be used in place of, or in conjunction with, "boil water advisory."

Routine microbiological testing of semi-public systems



* Private systems (eg, an individual well serving a rural home) are responsible for the microbiological quality of the water serving the system. Nevertheless, health authorities should be willing to provide advice on remedial actions, when necessary.

** Depending on the jurisdiction, "boil water order" may be used in place of, or in conjunction with, "boil water advisory."

*** A boil water advisory may be issued based on a single positive TC result, if deemed necessary by the responsible authority.

B.2 References

CCME. 2004. From source to tap: Guidance on the multi-barrier approach to safe drinking water. Produced jointly by the Federal-Provincial-Territorial Committee on Drinking Water and the CCME Water Quality Task Group. Canadian Council of Ministers of the Environment, Winnipeg, Manitoba. (www.ccme.ca/assets/pdf/mba_guidance_doc_e.pdf)

Harp, J.A., Fayer, R., Pesch, B.A. and Jackson, G.J. 1996. Effect of pasteurization on infectivity of *Cryptosporidium parvum* oocysts in water and milk. *Appl. Environ. Microbiol.* 62(8): 2866-8.

Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality. Minister of Supply and Services Canada, Ottawa, Ontario. (www.hc-sc.gc.ca/ewh-semt/water-eau/recreat/index-eng.php)

Health Canada. 2004. Guidelines for Canadian Drinking Water Quality: Supporting Documentation — Protozoa: *Giardia* and *Cryptosporidium*. Water Quality and Health Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. (www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/protozoa/index-eng.php)

Health Canada. 2005. Nutrition for Healthy Term Infants - Statement of the Joint Working Group: Canadian Paediatric Society, Dietitians of Canada and Health Canada. Minister of Public Works and Government Services, Ottawa, 2005. (www.hc-sc.gc.ca/fn-an/pubs/infant-nourrisson/nut_infant_nourrisson_term_5_e.html)

Health Canada. 2006. Guidelines for Canadian Drinking Water Quality: Guideline technical document — *Escherichia coli*. Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. (www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/escherichia_coli/index-eng.php)

Health Canada. 2009. Guidelines for Canadian Drinking Water Quality: Guidance document — Issuing and rescinding drinking water avoidance advisories in emergency situations. Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

Juranek, D.D. 1995. Cryptosporidiosis: sources of infection and guidelines for prevention. *Clin. Infect. Dis.*, 21(Suppl):S57-S61.

Kampf, G. and Kramer, A. 2004. Epidemiologic background of hand hygiene and evaluation of the most important agents for scrubs and rubs. *Clin. Microbiol. Rev.*, 17(4):863-93.

Robertson, L.J., Campbell, A.T., and Smith, H.V. 1992. Survival of *Cryptosporidium parvum* oocysts under various environmental pressures. *Applied and Environmental Microbiology* 58(11): 3494-3500.

Working Group on Waterborne Cryptosporidiosis. 1997. *Cryptosporidium and water: A public health handbook*. American Water Works Association, Denver, CO.