

Adhering to Boil Water Advisories and Public Health Risk

Karen Hann C.P.H.I (C)

Environmental Health Officer Corner Brook



Introduction /Overview



- Environmental Health Officers Newfoundland
- Public perception/Importance
- Determining Risk
- Boil Water Advisory Instructions
- Effective Communication
- Challenges





Facts



- IT is estimated that 334 966 cases of acute Gastrointestinal illness per year are associated with the consumption of tap water from municipal
- Water-borne disease outbreaks in small drinking water systems are often the result of a combination of water system failures
- the risk of getting sick from drinking water in Canada is low

Public Perception



- The 2014 study surveyed 676 individuals
- (80%) said that boil water advisories were not effectively communicated
- 58% of the respondents knew that the municipality is responsible for ensuring clean and safe water in the community
- 80% of the respondents thought boil water advisories is not being disseminated effectively and broadly

Determining Risk



What works?



Responsibility Where does Service NL fit?



- In Newfoundland and Labrador the majority of people receive drinking water from sources that are owned and operated by a municipality or local service district
- These supplies are known as public community water supplies.
- Environmental Health Officers, with the Government Service Centre, Service NL, collect water samples and conduct chlorine residual testing from public water supplies monthly.

Drinking Water Quality



- **Microbiological parameters**
 - Indicator organisms
 - Bacteriological quality
- **Chemical and physical parameters**
 - Chemicals, pesticides, THM
 - Color, turbidity, pH
- **Radiological parameters**

Who Collects the Samples and Monitors the Bacteriological Quality



- Environmental Health Officers (EHO's) & Environmental Technicians (ETs) with Service NL
 - 5 Regions and 14 Offices
 - Responsible for Bacteriological Water Quality Monitoring
 - Linkage with the Medical Officer of Health
- Some municipalities (e.g. St. John's, Corner Brook, CBS, Paradise, Labrador)

*Who Monitors
Bacteriological
Water Quality?*

*Service NL Regional
and Satellite Offices*



Happy Valley-Goose Bay • Grand Falls - Windsor

Corner Brook

- Stephenville
- Port aux Basques

St. Anthony

St. John's

- Harbour Grace

Gander

- Lewisporte

- Springdale

Clarenville

- Grand Bank
- Marystown

Sampling Frequency



- Sampling frequency depends on:
 - Quality and number of water sources
 - History of unsatisfactory samples
 - Method of disinfection and adequacy of treatment
 - Size and complexity of the distribution system
 - Size of the population served

<http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php>

How Often Are Samples Collected?



- Samples are collected monthly. The provincial sample frequency standard is based on the *Guidelines for Canadian Drinking Water Quality*, 6th Edition. Chlorine residual testing is done in conjunction with sample collection.

Population Served

No distribution system or very small system serving less than 100 people

< 5,000

5000 - 90,000

> 90,000

of Samples per month

1 sample

4 samples

1 per 1000

90 + 1/ 10,000

<http://www.env.gov.nl.ca/Env/env/waterres/Policies/PolicyList.asp>

Drinking Water Contamination



Surface water:

- Source of most drinking water

- Constantly under threat from environmental contamination (e.g. runoff)

- Requires treatment prior to consumption

Groundwater:

- Tends to be purer, lesser potential for surface contamination

- Lesser need for treatment

- Subject to natural contamination

- Contamination longer lasting and more difficult to correct

Potential for Microbiological Contamination



- Significant source water quality deterioration (e.g., flooding, Badger disaster)
- Inadequate disinfection or disinfection residuals
- Unacceptable turbidities or particle counts (based on local conditions and experience)

Microbial Contamination



- Examples of Disease Causing Microorganisms Include:
 - Giardia
 - Campylobacter
 - Enterohemorrhagic E. coli (e.g., E. coli O157:H7)
- Examples of symptoms include:
 - diarrhea, bloody diarrhea, vomiting, stomach cramps, chills
 - more severe symptoms(or illnesses) may develop such as kidney problems (e.g., HUS)
- Most at Risk: Young, Elderly and Sick People

<u>Bacteria</u>	<u>Viruses</u>	<u>Enteric Protozoa</u>
<i>Shigella</i> spp.	Norwalk-like virus	Giardia lamblia
Campylobacter spp.	Rotavirus	Cryptosporidium parvum
E.coli 0157:H7	Caliciviruses	Microsporidium
Mycobacterium avium complex	Adenoviruses	
Legionella pneumophila	Hepatitis A	

Waterborne Enteric Infections Contamination from human/animal wastes

Newfoundland
Labrador

- Salmonella
- Shigella
- E. coli
- Campylobacter
- Hepatitis A
- Enteroviruses
- Norwalk virus
- Giardia
- Cryptosporidium
- Pseudomonas
- Staphylococci
- Legionella

- Mycobacterium
- Vibrio



Protozoal Infections



GIARDIA

CRYPTOSPORIDIUM

CYCLOSPORA

Common in communities which use unfiltered surface water

Cysts are highly resistant to disinfection

Testing methodologies are cumbersome, costly, inconsistent and lack specificity and sensitivity

Sampling Limitations



Problem in depending on water sampling to determine safety of system:

- Small sample size
- Microorganisms not evenly distributed, with clustering and adherence to suspended solids
- 0/100 mL samples is the detection limit

Responsibility



- Environmental Health Officers (EHOs) and/or Environmental Technicians with Service NL are responsible for:
- The collection of water samples, for bacteriological testing, from public water supply distribution systems.
- The testing of chlorine residuals in public water supply distribution systems (e.g., at entry to distribution system and throughout distribution system).
- Coordination of testing with regional testing sites and/or the Public Health Laboratory Environmental Health Officers are responsible for:
- The interpretation of test results and appropriate follow-up action, including advisories (as outlined in the document) advice and consultation.

Boil Water Advisory



- The results of bacteriological testing of public water supplies are forwarded to the municipal council office responsible for the water supply.
- A boil water advisory is necessary when testing, or some other circumstance, has identified the potential for disease causing organisms (e.g., bacteria) to be present in the public water supply
- R

Procedures for Issuing a Boil Water Advisory



- Community officials must be notified immediately
- They are required to take the necessary steps to inform all users.
- The Boil Water Advisory must be implemented by one of the following, depending on the nature of the drinking water supply.
 - municipal council
 - local service district
 - water committee
 - other water purveyor/provider

Notification



SAMPLE BWA NOTIFICATION LETTER

(Insert date)

Dear: *(insert name and address of appropriate person(s))*
Note: be sure to send the BWA Notification Letter to communities sharing water supply systems)

Subject: **Boil Water Advisory**
(insert name of Municipality/Local Service District)
(insert name of Water Supply)

This letter is a follow-up to our telephone conversation on *(insert date and time)* concerning the issuance of a Boil Water Advisory for the public water supply of *(insert name of municipality or local service district, name of water supply and specific section of distribution system, if applicable)*.

A Boil Water Advisory is recommended for the following reason(s):

- *(enter reason code(s) and description of the code as per the most recent version BWA reason codes).*

Results of most recent bacteriological and chlorine test results are attached *(insert this sentence and test results if applicable to the issuing of the BWA)*.

As the operator/owner of a public water supply, you must immediately alert all users of your water supply that drinking water must be boiled before being consumed. As well consumers should be informed about the boil water advisory at regular intervals. For advisories that remain in effect for more than one month, a monthly reminder to continue to boil drinking water should be forwarded to water consumers.

To help with notifying consumers about the boil water advisory, please refer to the attached boil water advisory notice, boil water advisory pamphlets, sample warning signs and public service announcement. Pamphlets are available online for printing at <http://www.health.gov.nl.ca/health/publichealth/envhealth/drinkingwater.html#q1-4>. In addition, you can call *(enter office phone number)* to obtain multiple printed copies.

The boil water advisory shall remain in effect until the reason for issuing the advisory has been corrected and the following criteria have been met:

1. *(enter "One" or "Two")* set(s) of satisfactory bacteriological water samples *(is or are)* obtained (absence of total coliform and absence of *E. coli* per 100ml of sample).
2. Satisfactory free chlorine residual is maintained at the entry to the distribution system.
3. Free chlorine residual is detectable & maintained throughout the distribution system.

Please note that you must contact me, or the nearest Government Service Centre location, to make arrangements for re-sampling of your drinking water once corrective measures have been taken.

If you have any questions, please do not hesitate to give me a call at *(enter telephone number of Environmental Health Officer)*.

Sincerely yours,

(Signature of EHO)
Environmental Health Officer

Alerting Consumers – Public Service Announcement



PUBLIC SERVICE ANNOUNCEMENT

BOIL WATER ADVISORY

TO BE READ BY THE ANNOUNCER:

The Municipality (or Local Service District) of *insert name(s) of municipality* is (or are) advising residents and businesses, effective immediately, to boil their drinking water. This would include water used for:

- drinking
- brushing teeth
- making ice
- making juices and other drinks from concentrate or powders
- cooking
- making coffee, tea, etc.
- making infant formula and cereal
- washing fruits and vegetables

Please bring water to a rigorous rolling boil for one (1) minute.

The Municipality (or Local Service District) of *insert name of municipality* will advise residents when the boil water advisory is no longer in effect.

In the interest of protecting public health, your attention to this boil water advisory is appreciated.

More information can be obtained by contacting *insert telephone number*.

Alerting Consumers — Warning Signs



WARNING!
This Water Must Be
Boiled Before Drinking



Department of Health and Community Services
Department of Government Services
Regional Health Authorities

Alerting Consumers – Information for the Public



BOIL WATER ADVISORY

INFORMATION FOR THE PUBLIC

The Municipality of _____ has issued a **Boil Water Advisory**
(enter name of municipality)

for _____ as of _____
(enter the area encompassed by the boil water advisory) (date)

The boil water advisory has been issued for the following reason(s):

⇒
⇒
⇒

Consumers are advised to bring water that you might ingest to a rigorous rolling boil for one (1) minute.

For example, boil water used for:

- ⇒ drinking
- ⇒ brushing teeth
- ⇒ making ice
- ⇒ cooking
- ⇒ washing fruits and vegetables
- ⇒ making coffee/tea and other hot drinks
- ⇒ making juice from concentrate and powders
- ⇒ making infant formula and cereal

For further information about the Boil Water Advisory, please call:

Municipal office:

Government Service Centre:

Regional Health Authority:

NOTE: If using a home water treatment unit (e.g. filter), please read and follow the manufacturer's instructions.



Long Term Boil Water Advisories



Boil water Advisory Status Letters

- Reminds municipal officials to contact the EHO when
- corrective action has been taken
- Tell residents and businesses that the boil water advisory

Why Should You Implement the Boil Water Advisory?



- What should I do first?
- Who Should be alerted?
- How do I keep the consumer informed?
- How should I follow up on the advisory?

What should the consumer be told during an advisory?



- Who is available to help?
- Regional staff from the following departments/agencies should be consulted.
 - Service NL
 - Regional Health Authority
 - Municipal Affairs and Environment

Questions



1. CRAMPTON, A. & RAGUSA, A. T. 2016. Exploring Perceptions and Behaviors about Drinking Water in Australia and New Zealand: Is It Risky to Drink Water, When and Why? *Hydrology*, 3
2. Fitzpatrick-Lewis, D.; Yost, J.; Ciliska, D.; Krishnaratne, S. Communication about environmental health risks: A systematic review. *Environ. Health* 2010, 9. [[Google Scholar](#)]
3. Fonkwe M.L.D. and Schiff R. (2016): A survey of residents' perceptions of municipal drinking water in the community of Happy Valley-Goose Bay, Labrador. The Labrador Institute of Memorial University of Newfoundland, Happy Valley-Goose Bay, NL, Canada, 76 pp.
4. Murphy, HM, et al. Estimating the number of cases of acute gastrointestinal illness (AGI) associated with Canadian municipal drinking water systems. *Epidemiology and Infection*. doi:10.1017/S0950268815002083
5. Moffat, H, Struck, S. Water-borne Disease Outbreaks in Canadian Small Drinking Water Systems. National Collaborating Centre for Environmental Health. <http://www.ncceh.ca/documents/evidence-review/water-borne-disease-outbreaks-canadian-small-drinking-water-systems>