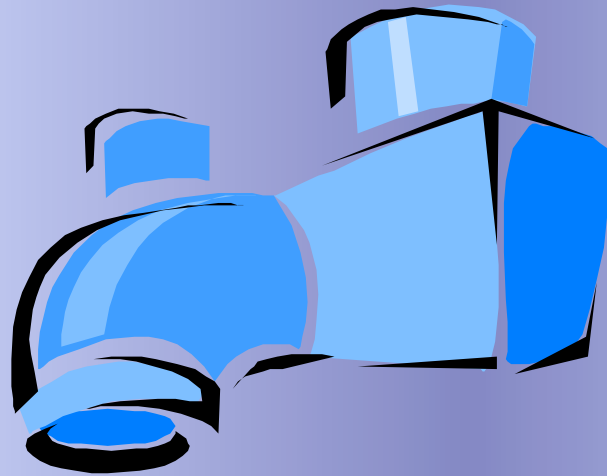


DRINKING WATER SAFETY & BOIL WATER ADVISORIES



Presented By:

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Department of Health and Community Services**

OUTLINE OF SESSION

- **Microbiological Water Quality - What Do We Test For and Why?**
- **Microbiological Testing of Drinking Water - Who Does the Testing**
- **Boil Water Advisories**

PLAYERS

- **Department of Health and Community Services, Public Health Laboratory**
- **Department of Government Services and Lands**
- **Regional Health and Community Services Boards**
- **Communities**
- **Health Canada**

DRINKING WATER QUALITY

- **Microbiological parameters**
 - disease causing microorganisms in water
 - indicator organisms
- **Chemical and physical parameters**
 - chemicals, pesticides, THMs
 - colour, turbidity, pH
- **Radiological parameters**

MICROBIOLOGICAL GUIDELINES FOR DRINKING WATER

- **Needed to control the presence of microbial pathogens**
- **Water-borne infectious diseases cause GI symptoms**
- **Generally, non-life threatening in healthy adults. Infants, the elderly and immunocompromised at an increased risk.**
- **Not practical or technically feasible to monitor for all microbial pathogens**
- **Microbiological Safety of water and guidelines are based on indicator organisms and effective treatment**

Key Microbial Contaminants in Drinking Water

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

Waterborne Enteric Infections

Contamination from human / animal wastes

- **Salmonella**
- **Shigella**
- **E. coli**
- **Campylobacter**
- **Hepatitis A**
- **Enteroviruses**
- **Norwalk virus**
- **Giardia**
- **Cryptosporidium**

Waterborne Non-Enteric Infections

Organisms indigenous to the environment

- **Pseudomonas**
- **Stapylococci**
- **Legionella**
- **Mycobacterium**
- **Vibrio**

Potential for Microbiological Contamination

- **Significant deterioration in source water quality**
- **Equipment malfunction during treatment or distribution**
- **Inadequate disinfection or disinfection residuals**
- **unacceptable microbiological quality**
- **unacceptable turbidity**

Indicator Organisms for Bacteriological Quality

- **Total coliforms-** Present in human and animal wastes, in soil and on vegetation
 - indicates treatment efficacy
 - indicates regrowth or infiltration in the distribution system
 - indicates potential for fecal contamination
 - principle indicator of suitability of water for domestic and industrial purposes
 - density of coliforms indicate the degree of pollution
 - unsafe for drinking

Indicator Organisms for Bacteriological Quality

- **Fecal coliforms- present in human and animal waste**
 - indicates fecal/sewage contamination
 - *E. coli* is the definitive indicator of fecal contamination
 - high risk, should not be consumed without treatment

BACTERIOLOGICAL WATER QUALITY TESTING METHODS

- New Test Methods introduced in December 2000.
- The Newfoundland Public Health Laboratory and the Department of Health and Community Services carried trained staff in the use of the new methods.
- Testing is done at either the Newfoundland Public Health Laboratory or at one of the twelve Government Service Centre Locations

BACTERIOLOGICAL WATER QUALITY TESTING METHODS

COLILERT

- Qualitative presence - absence test
- Simultaneous detection of total coliforms and *E. coli*
- **Yellow Colour - total coliform** (B-galactosidase-O-nitrophenyl-B-D-galacto-pyranoside)
- **Fluorescence - *E. coli*** (B-glucuronidase-4-methyl-umbelliferyl-B-D-glucuronide)

BACTERIOLOGICAL WATER QUALITY TESTING METHODS

COLIBLUE

- Quantitative membrane filtration method (like m-endo)
- **Simultaneous detection of coliforms and *E. coli* with enzymatic chromogenic indicators**
- **Red colonies - Coliforms**
- **Blue colonies - *E. coli***

Recovery of Coliform & *E. coli* On Colilert

	Colilert Method*	Standard Membrane Filtration*
• Presumptive Coliforms	296	363
• Confirmed Coliforms	296	257
• Presumptive <i>E. coli</i>	70	102
• Confirmed <i>E. coli</i>	70	71

*Based on 7389 Samples

WHO COLLECTS THE SAMPLES?

- **24 Certified Public Health Inspectors - Dept of Government Services and Lands**
- **5 Regions and 12 Offices**
- **Responsible for Bacteriological Water Quality Monitoring.**
- **Linkage with the Medical Officer of Health**

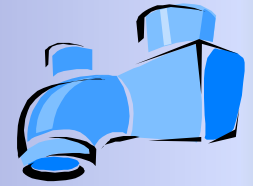
HOW OFTEN ARE SAMPLES COLLECTED?

- **Samples are collected monthly based on the frequency outlined below.**

<u>Population Served</u>	<u># of Samples per month</u>
• < 5,000	4 samples/month
• 5000 - 90,000	1 per 1000/month
• > 90,000	90 + 1/ 10,000/month

WHAT'S DONE WITH
THE
RESULTS?

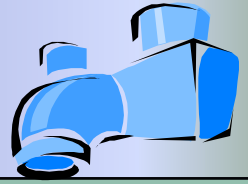
MICROBIOLOGICAL SAFETY



- **Total and Fecal Coliform Bacteria are used as indicators of the microbiological quality (& safety) of drinking water**
- **Results are Compared with the Guidelines for Canadian Drinking Water Quality**

BOIL WATER ADVISORIES

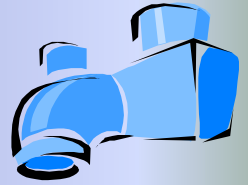
Unsatisfactory Samples



- **> 10 total coliforms per 100 ml sample**
- **>0 fecal coliforms per 100 ml sample**
- **1-10 coliforms detected and consecutive sample cannot be collected within 24 hours.**
- **Coliforms detected in consecutive samples**
- **> 1 sample, or >10% of samples, from a set of samples collected on a given day show coliforms**

**UNSATISFACTORY
SAMPLE RESULTS WILL
LEAD TO A
BOIL WATER ADVISORY**

WHAT IS A BOIL WATER ADVISORY?

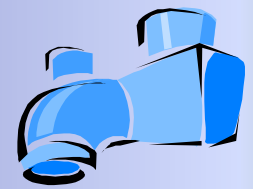


**Recommendation/warning by
the water system
owner/operator to water
consumers that they should
not consume water without
boiling the water first.**

- **THERE IS INDICATION THAT DRINKING WATER IS NOT MICROBIOLOGICALLY SAFE.**
- **THE DRINKING WATER IS NOT ADEQUATELY DISINFECTED (E.G., CHLORINATED).**
- **OTHERS....**

DISINFECTION OF DRINKING WATER

- **Water from Drinking Water Sources Must be Disinfected.**
- **Includes Sources such as Rivers, Ponds, Streams, Lakes and GroundWater Wells.**
- **Most Common Method of Disinfection is Chlorination**

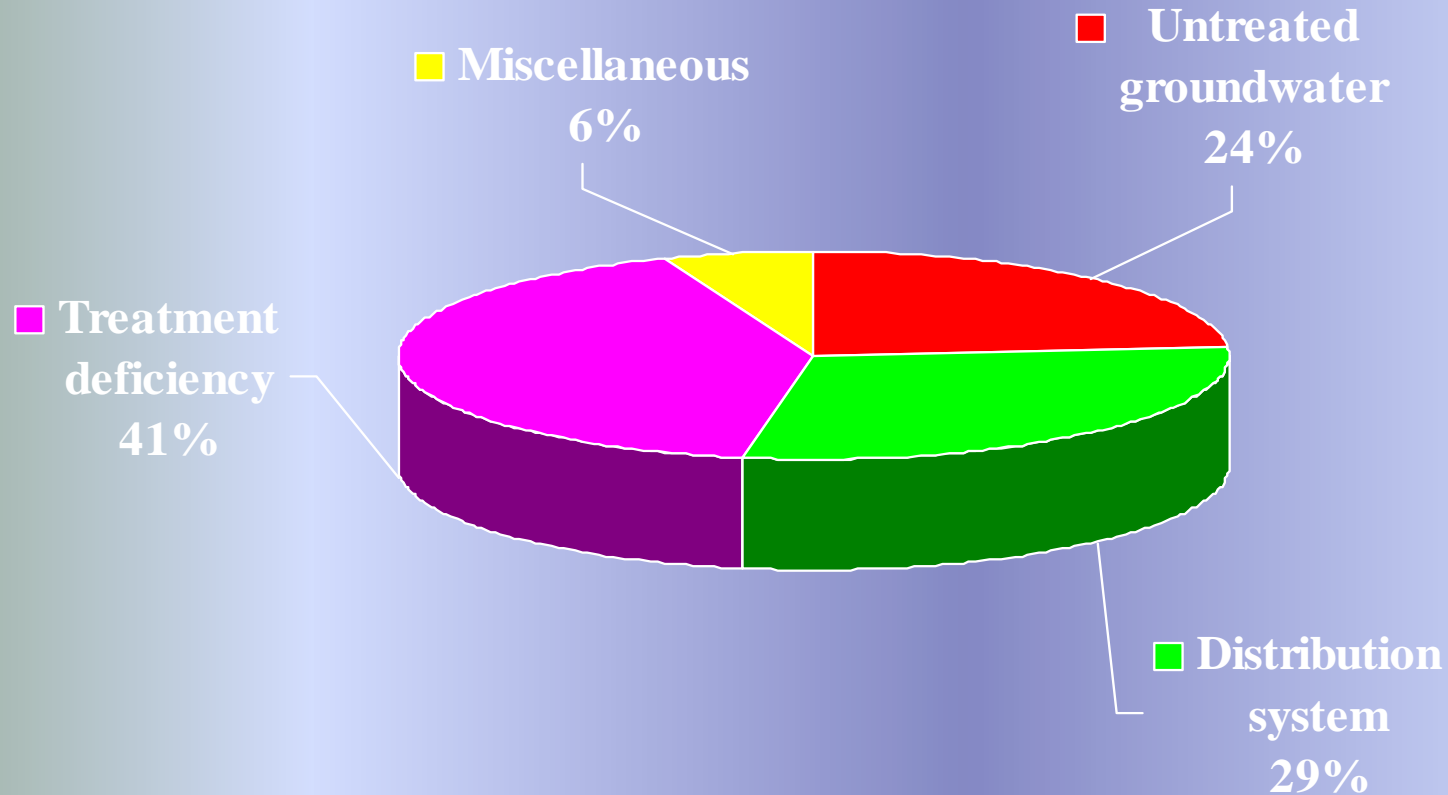


DISINFECTION OF DRINKING WATER - continued

- **Disinfection will kill/destroy/inactivate many of the disease causing micro-organisms in water sources.**
- **Provide protection in the piping system should there be a leak, cross contamination, etc... (residual chlorine)**



Waterborne Disease Outbreaks Associated With Drinking Water, by Type of Deficiency (1997-1998)



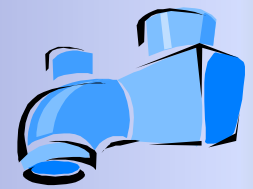
Survey of Drinking Water Quality Concerns

- 3/4 expressed concerns about water quality and safety of drinking water
- 1/3 very concerned
- 1/4 do not drink water straight from the tap because of aesthetic or health concerns
- 4/10 dissatisfied with the information they receive about the quality and safety of their drinking water

BOIL WATER ADVISORIES

Other Reasons for Implementing

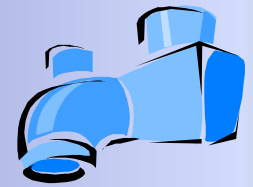
- **Evidence of Waterborne Disease through Disease Surveillance**
- **Gross Contamination of Water Source (e.g., from flood, sewage , agricultural waste...)**
 - **REMEMBER WALKERTON**



BOIL WATER ADVISORIES

Procedures to Issue Advisory

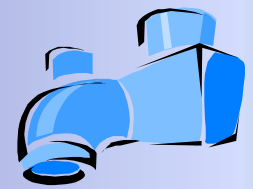
- **Environmental Health Officer III with Dept of Government Services and Lands Notifies Operator (e.g., municipal council) by phone.**
 - **Provides direction for operator**
- **Follow-up with letter**



BOIL WATER ADVISORIES

Community's Role

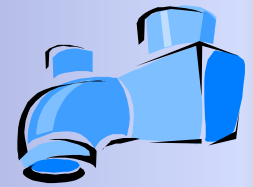
- **Once evidence is available that makes a BWA necessary, (e.g., notified by GSC) it is paramount that the message to boil drinking water gets to consumers**



BOIL WATER ADVISORIES

Community's Role -Notification

- **Post warning boil water notices**
- **Broadcast/print advisory on/in local media**
 - **Radio & Television**
- **Place boil water notice in all mail boxes.**
- **Phone schools, health care facilities, personal care homes, etc...**
- **Do this on a regular basis**



WARNING!

Do Not Drink This Water



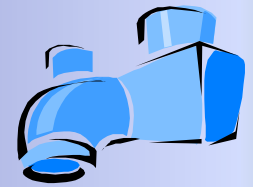
GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Health and Community Services

BOIL WATER ADVISORIES

Procedures to Remove BWA

- **2 consecutive samples are negative for total (fecal) coliform organisms**
- **the cause of the problem has been remedied (examples):**
 - **disinfection (chlorination) resumed**
 - **residuals in the distribution system**

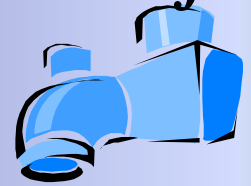


BOIL WATER ADVISORIES

Procedures to Remove BWA

- **where a disease has occurred, the outbreak is over and there is no further incidence linked to water system**

Work with officials of the Government Service Centre, Regional Health and Community Services Board, Depts of Environment and Labour and Municipal and Provincial Affairs to ensure that drinking water is properly disinfected.





THANK-YOU
FOR YOUR
PARTICIPATION!