

Appendix 2 Water Quality Guide

Table 1 Causes and Symptoms of Some Waterborne Diseases

<i>Disease</i>	<i>Microbiological Agent</i>	<i>Symptoms</i>
Bacterial gastroenteritis	Bacteria –various organisms including E. coli	Diarrhea or bloody diarrhea, abdominal cramps, fever, nausea, vomiting
Campylobacteriosis	Bacteria – campylobacter jejuni	Fever, abdominal pain, diarrhea or bloody diarrhea, nausea, vomiting
Cryptosporidiosis	Protozoa – cryptosporidia	Diarrhea, abdominal discomfort, slight fever, nausea, vomiting, headaches
Cyclospora infection	Protozoa – cyclospora	Diarrhea, bloating, abdominal cramps, nausea, vomiting, fever
Giardiasis	Protozoa – giardia	Diarrhea, abdominal cramps, nausea, vomiting, chills, headache, fever
Hepatitis	Virus – hepatitis A	Fever, chills, abdominal pains, jaundice, dark urine
Shigellosis	Bacteria – shigella	Diarrhea, or bloody diarrhea, fever, abdominal cramps
Typhoid fever	Bacteria – Salmonella typhi	High fever, headache, constipation, loss of appetite, diarrhea, vomiting, abdominal rash
Viral gastroenteritis	Viruses – Norwalk type, rotaviruses, adenoviruses, enteroviruses	Diarrhea, vomiting, fever, headache, abdominal cramps

Table 2 Chemicals and Their Associated Risk to Human Health

Chemical	Source	Potential Health Effect	Canadian Drinking Water Quality Guideline (mg/L)
Aluminum	Natural deposits in earth and aluminum-based coagulants	Unknown; unproven links to Alzheimer's and Parkinson's diseases	Under review
Barium	Natural deposits in earth	Circulatory system effects	1
Boron	Natural deposits in earth	Damage to reproductive system	5
Copper	Natural deposits; corrosion products from piping	Gastrointestinal irritation at levels much higher than guideline	1*
Lead	Natural deposit and corrosion products from piping, solder, and some brass alloys	Damage to kidneys, reproductive and nervous systems; development damage in young children	0.01
Nitrate	Fertilizers; human or animal wastes	Methemoglobinemia in infants under six months; unproven link to some cancers	45
Pesticides (including various fungicides, herbicides, rodenticides and insecticides)	Agricultural activities (spraying and water runoff)	Various effects depending upon type of pesticide; suggested links to cancers, damage to liver, kidneys, nervous and reproductive systems	Varies depending upon pesticide (see Health Canada website or contact local health authority for specific details)
Petroleum hydrocarbons	Leak in fuel oil or gasoline tanks allowing seepage into water	Some hydrocarbons have been linked to various cancers, damage to liver, kidneys, nervous system	Under review
Phytoplankton toxins	Natural toxins produced and released by microscopic plants and algae	Liver and nervous system damage	Under review
Sodium*	Natural deposits in earth	Health risk only for individuals on salt-restricted diets	200**
Sulphate	Natural deposits in earth; some flocculants	At elevated levels causes laxative effect leading to dehydration	500***
Trihalomethanes	By-products of disinfection of water	Cancer	0.1****
Turbidity	Suspended mineral or organic material	Shelters pathogens from disinfection. Increases requirement for disinfectant	1 NTU*****

* Guideline established based on aesthetic quality. Adverse health effects are possible at levels much higher than guideline.

** Guideline established based on aesthetic quality. Adverse health effects possible only for those on salt-restricted diets.

*** Guideline established based on aesthetic quality. Consumption of water with elevated levels of sulphates may result in gastrointestinal irritation including diarrhea.

**** Average of four quarterly samples.

***** Nethelometric Turbidity Units

Table 3 Chemical Agents and Microbiological Species Affecting Aesthetic Quality of Water

Chemical/Species	Source	Symptom
Calcium	Natural deposits (limestone)	Hard water; scales and deposits in kettles and water heaters
Copper	Natural deposits; corrosion products from piping	Green staining of fixtures; metallic taste
Hydrogen Sulphide	Present in water with high iron content and low pH	Rotten egg odour
Iron	Natural deposits and iron-based coagulants	Rusty reddish-brown staining of fixtures and laundry; metallic taste
Iron bacteria	Bacteria feeding on iron in water	Reddish-brown slime on fixtures
Magnesium	Natural deposits	Hard water; scales and deposits in kettles and water heaters
Manganese	Natural deposits	Black staining of fixtures and laundry; metallic taste
Sodium	Natural deposits	Salty taste
Sulphate	Natural deposits; some flocculants	Objectionable taste
Sulphate	Bacteria feeding on sulphates in water	Rotten egg odour; blackish slime on fixtures
Tannins and Humic Acids	Natural organic matter (decaying plants and animals)	Various odours (aromatic, fishy, musty, earthy, woody) and tastes
Turbidity	Excessively fine sand or silt; runoff from soil	Abrasive texture to water; residue left in sink and tub
Zinc	Natural deposits; corrosion products from plumbing	Objectionable metallic taste