

Common Water Quality Problems

Problem	Possible Cause	Treatment
Health effects: · diarrhea · stomach cramps · vomiting	Bacteria, parasites and viruses	1. Chlorination (Filter Method) 2. Ultraviolet Systems 3. Chlorination (Injector Units) 4. Ozonator
· Methemoglobinemia (blue baby syndrome)	Nitrate	1. Reverse-osmosis Units
· High blood pressure	Sodium	1. Reverse-osmosis Units
· Scale build up in kettles and water heaters · Soap scum, bathtub ring	Hardness (hard water)	1. Water Softeners
· Red to brown slime in toilet tanks · Iron staining · Unpleasant taste or odours	Iron bacteria	1. Chlorination Filtration Units
· Rusty black stains on fixtures, laundry	Iron and/or manganese	1. Filtration 2. Greensand Filters 3. Water Softeners 4. Chlorination Filtration Units
· Rotten-egg smell and taste	Hydrogen sulphide and/or sulphate reducing bacteria	1. Filtration 2. Greensand Filters 3. Aeration
· Water has laxative effects	Sulphate	1. Reverse-osmosis Units
· Salty taste, corrosive	Chloride	1. Reverse-osmosis Units
· Gassy smell, gas bubbles escaping from water	Gases (methane)	1. Aeration 2. Activated Carbon Filters
· Cloudy water	Turbidity (clay)	1. Filters 2. Alum Treatment

Acknowledgements: Environment Canada; Ministry of the Environment; Ministry of Agriculture, Food and Rural Affairs; original produced by Region of Waterloo Public Health. *Revised January 2013*

How Well Is Your Well?

A Sampling and Information Package for Owners of Private Wells

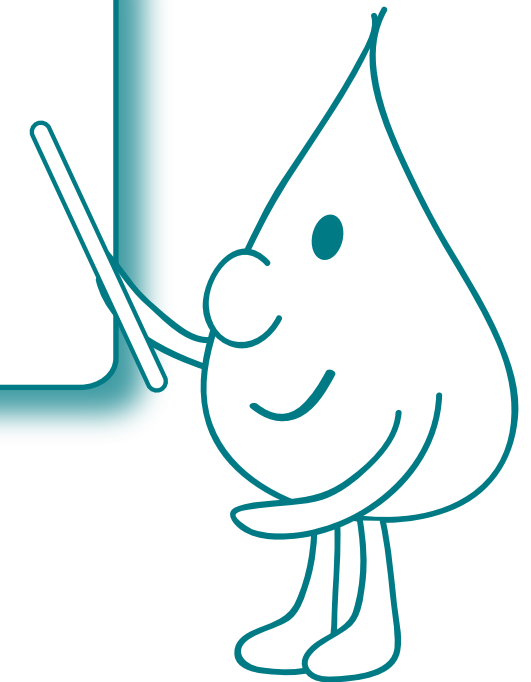
Willy says...

**MAKE SURE YOUR WATER
IS SAFE TO DRINK!**

SAMPLE!

SAMPLE!

SAMPLE!



Willy Water Droplet

Safe Water Program
Inspection Services
Peterborough Public Health
705-743-1000 • www.peterboroughpublichealth.ca



**Peterborough
Public Health**

This document is available in an alternate format on request.

How to Test Your Well for Bacteria

1. Use the water sample bottle from the Public Health Lab, Health Unit, or Municipal Office (*the granular material inside the bottle is sodium thiosulphate and is intended to be there*).
2. Do not submit samples from an unprotected source (*eg: lake, spring, or stream*) unless water has been treated first.
3. The bacterial quality of water cannot always be determined from a single sample. To establish drinking water quality, initially submit 3 samples at least one week apart. If the well shows acceptable coliform/E. coli counts, then sample 2-4 times a year. Do not send several samples at the same time.
4. Remove screen or other attachment from the tap.
5. Run **cold** water for 2-3 minutes before collecting the sample in a Public Health Laboratory bottle.
6. Fill bottle to line indicated. Note that the bottle contains a preservative - **DO NOT RINSE**. Leave at least one barcode label attached to the bottle.
7. Take water sample to laboratory as soon as possible. Keep refrigerated. Do not freeze. Results are unreliable if the sample was improperly collected or stored.
8. Water samples that take more than 48 hours to reach the laboratory are too old for reliable analysis and will not be tested.

Where?

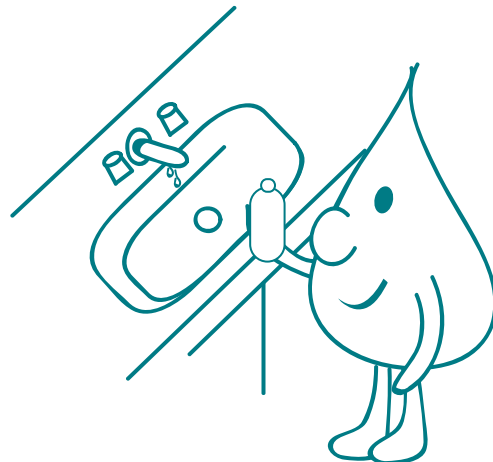
Public Health Ontario Laboratory
99 Hospital Drive
Peterborough, ON K9J 8Y8

When?

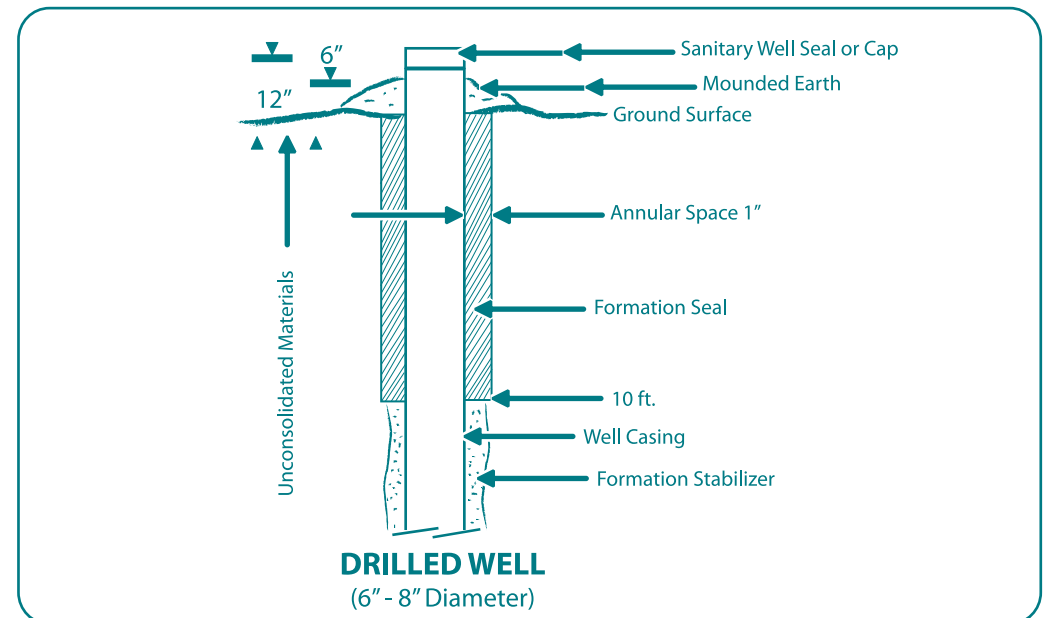
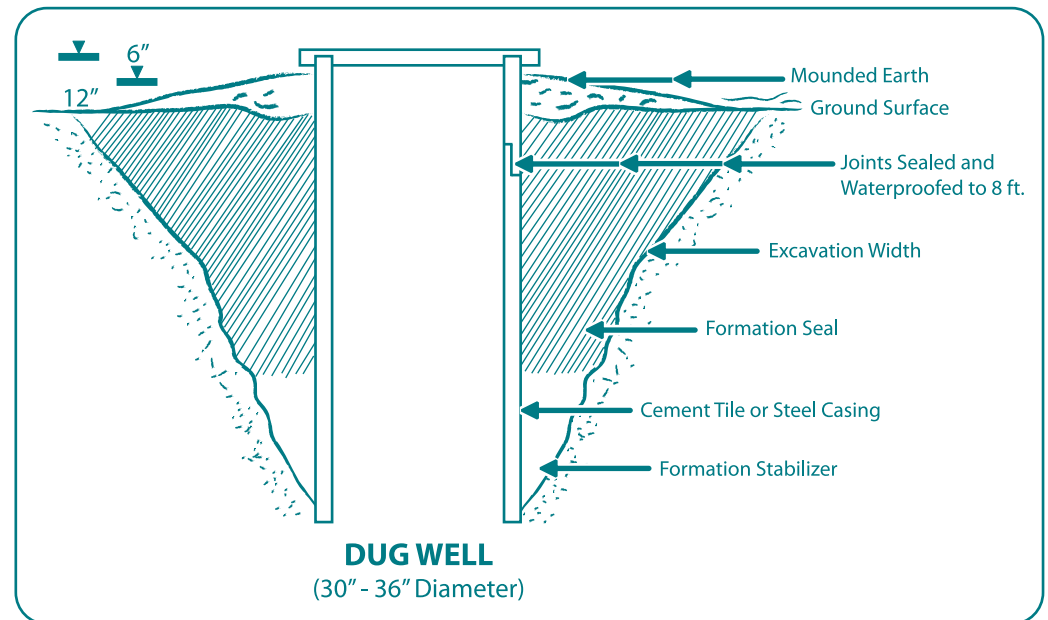
Monday - Friday
8:00 a.m. - 4:30 a.m.

Phone: 705-743-6811

Fax: 705-745-1257



Two Most Common Types of Wells



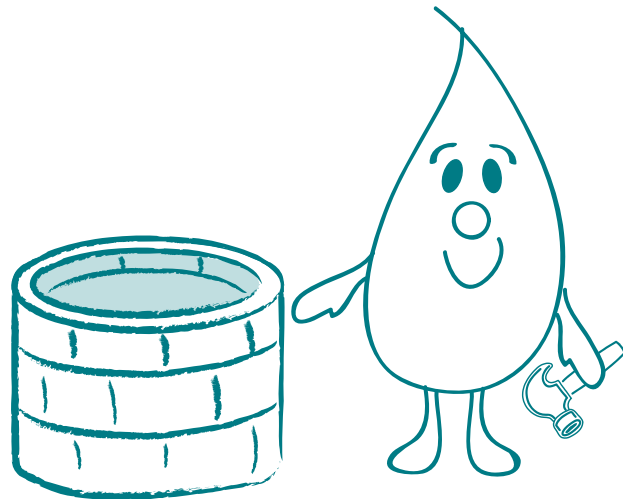
How To Care For Your Private Well

Your well can be contaminated by:

- openings in the well seal.
- improperly installed well casing.
- a well casing that is not deep enough.
- a well casing that is not sealed.
- a remote source of contamination not related to well construction.

Make sure that:

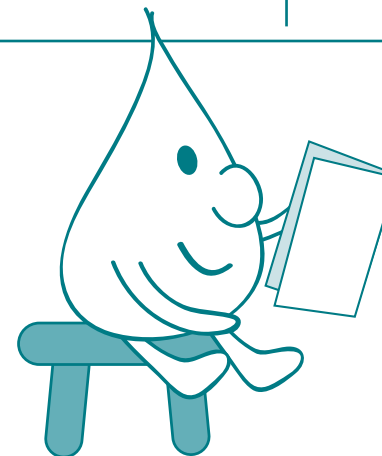
- the sanitary seal or well cap is securely in place and water-tight.
- the cap is at least 12 inches above the ground.
- joints, cracks and connections in the well casing are sealed.
- surface water near the well flows away from the well casing.
- surface water does not pond near the well.
- well pump and distribution systems are checked regularly.
- changes in the quantity and quality of water are investigated immediately.



How to Interpret Your Laboratory Results

For Bacteria Only

Total Coliforms	E. coli	What it Means
0	0	Safe for drinking. Maintain regular testing (<i>at least twice per year for drilled wells, four times per year for dug wells</i>).
0 to 5	0	May be unsafe for drinking unless boiled or treated. Resample. If this range is achieved for three consecutive samples taken one to three weeks apart, the water is considered satisfactory.
6 to greater than 80	0	May be unsafe for drinking unless boiled or treated.
1 to greater than 80	1 to greater than 80	Unsafe for drinking unless boiled or treated.
Overgrown (O/G)		May be unsafe for drinking unless boiled or treated.



If Unsafe

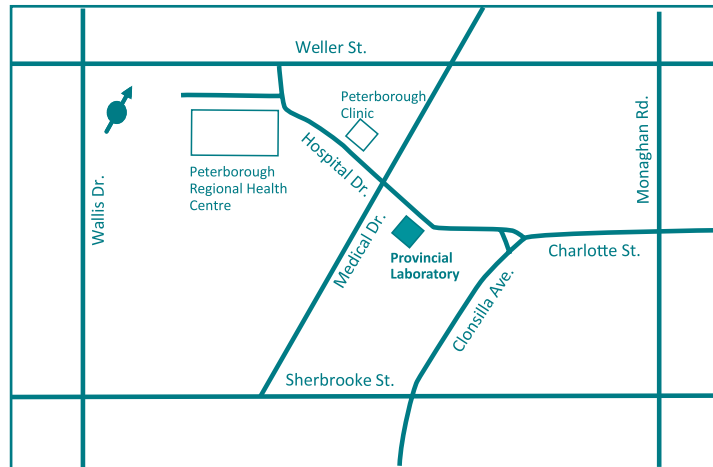
Refer to "How to Disinfect Your Well" on the next page and resample.

Why Should You Test Your Well?

Did you know that municipal water supplies are regularly tested for bacteria?

Drinking water that has harmful bacteria in it can make you sick. These bacteria can give you stomach cramps and/or diarrhea, as well as other problems. Water that has these bacteria in it is unsafe to drink.

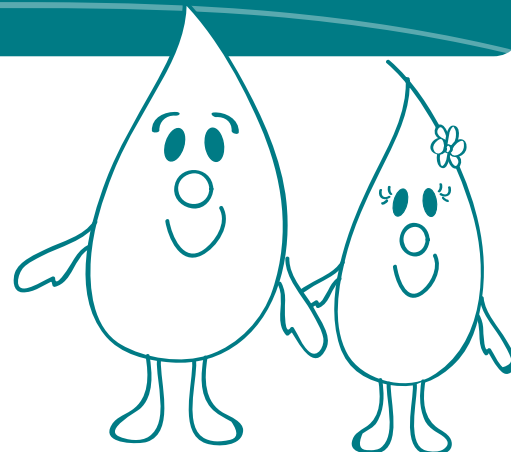
The only way to make sure that your water supply is safe to drink is to test it regularly. Testing for **bacteria** is done for FREE. Sample bottles are available at the Provincial Laboratory and at the Peterborough Public Health office at Jackson Square, 185 King Street, Peterborough.



How Often to Test?

Dug Wells - at least four (4) times per year.

Drilled Wells - at least two (2) times per year.



Water Treatment Devices for Bacteria

Chlorinator

- Mechanical unit that continuously adds chlorine to the water storage tank.
- Chlorine in the tank is allowed enough contact time to kill harmful bacteria.
- Requires continuous checking to ensure that the correct amount of chlorine is being added to the water.

Ultraviolet (UV) Light

- Water is passed through an ultraviolet light source to kill harmful bacteria.
- Water should be filtered before treatment.

Distiller

- Device that boils water in one compartment, condenses the vapour and then collects it in another.
- Removes some organic and inorganic chemicals.

Ozonator

- Mechanical unit that adds small amounts of ozone to the water.
- Ozone kills most harmful bacteria.

Water Treatment Devices for Chemicals (These do not kill bacteria!)

Softener

- Reduces "hardness" of water (e.g. sodium and magnesium).
- May increase salt levels; unsoftened tap water should be used for drinking and cooking.

Carbon Filter

- Removes some chemicals by passing the water through an activated carbon filter.
- Best at removing tastes, odours and organic chemicals.
- Filters must be changed according to the manufacturer's instructions.

Reverse Osmosis

- Removes some chemicals by passing water through a semi-permeable membrane.
- Best at removing inorganic chemicals (nitrates).
- Often used in combination with carbon filters.
- Water should be filtered before treatment.

How to Prevent Contamination

- Do not allow liquids or wastes from garbage and manure piles to drain towards the well casing.
- Do not treat the area around the well with pesticides or fertilizer.
- Do not flush oils, detergents, paints, solvents or other chemicals down the toilet.
- Chlorinate and test your well after any repairs or property renovations.

Abandoned wells should be carefully sealed to prevent pollution of groundwater and any safety hazards. The hiring of a well contractor familiar with sealing abandoned wells is strongly recommended.

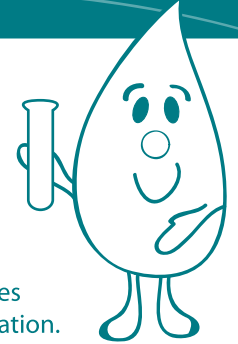
AGENCY	SERVICES
Peterborough Public Health Inspection Services Phone: 705-743-1000 Toll Free: 1-877-743-0101 Website: www.pcchu.ca	<ul style="list-style-type: none"> • Problem Solving • Information • Result Interpretation
Ministry of the Environment Peterborough District Office Phone: 705-755-4300 Toll Free: 1-800-558-0595 Website: www.ene.gov.on.ca/environment	<ul style="list-style-type: none"> • Well Records • Information
Local water well drilling companies Consult the yellow pages	<ul style="list-style-type: none"> • Servicing • Consultation
Ontario Ground Water Association Phone: 1-519-869-8933 Website: www.ogwa.ca	<ul style="list-style-type: none"> • Recommendations • Technical Expertise

Hazardous chemicals and wastes for county and city residents can be disposed of at the Hazardous Waste Depot, 400 Pido Road, Peterborough. For more information call 705-743-8898.

Common Water Quality Tests

Bacteria

There are two tests for bacteria: Total Coliform and E. coli.



Coliform

- Coliform bacteria are always present in animal wastes and sewage, but are also found in soil and on vegetation.
- High levels of coliform bacteria in your well may mean that rainwater and run-off is getting into your well.

E. coli

- E. coli bacteria are found in the intestinal contents of people and animals.
- The presence of E. coli bacteria in your well is usually the result of recent sewage contamination from a nearby source.
- These bacteria are of great concern because of the risk of disease-causing agents.
- E. coli levels should always be zero.

Nitrates

- Nitrates are present in groundwater due to contamination by decaying plant or animal material, manure, fertilizers, domestic sewage or geological formations containing soluble nitrogen compounds.
- High levels of nitrates in drinking water can cause methemoglobinemia (*blue baby syndrome*) in infants. This condition can turn the skin a blue or purplish colour.
- Infants under 6 months of age are at risk because they lack the enzymes which can protect against methemoglobinemia.
- The main risk to infants results from consuming formula prepared with nitrate-contaminated water.
- Where well water is being used to feed an infant under 6 months of age, call the Health Unit at 705-743-1000 and ask about testing.

Procedure For Well Disinfection Using Chlorine Bleach

Chlorine required for Dug Well 0.9 m (3') Diameter

Water Depth		Household Bleach 5%	
Meters	Feet	Litres	Quarts
1.5	5	1.1	1
3.0	10	2.2	2
4.5	15	3.3	3
6.0	20	4.4	4
7.5	25	5.5	5
9.0	30	6.6	6
10.5	35	7.7	7
12.0	40	8.8	8

Chlorine required for Drilled Well up to 15 cm (6") Diameter

Water Depth		Household Bleach 5%	
Meters	Feet	ml	Ounces
7.6	25	140	5
15.2	50	280	10
22.9	75	420	15
30.5	100	560	20
38.1	125	700	25
45.7	150	840	30
53.3	175	980	35
61.0	200	1,120	40

- Using the table above, calculate the amount of household chlorine bleach needed to disinfect your well water.
- Mix the chlorine bleach with several quarts of water and then pour it into your well. If you have a drilled well, you may need to loosen several bolts at the top of the well to take the well cap off.
- If possible, mix the water in the well. To do this, attach a hose to a tap and run the water from the well through the hose and back into the well. If you cannot do this, wait approximately one hour to let the well water and chlorine mix.
- Flush the chlorinated water through your plumbing system by turning on each cold water tap until you can smell chlorine. This should take 5-10 minutes. If there is no chlorine smell, add more bleach and repeat the mixing.
- Turn the taps off and let the chlorine sit in your well and piping overnight, or for at least 12 hours. During this period, you can flush toilets, but do not use the water for cooking, drinking, tooth brushing or bathing.
- Backwash the water softener and all water lines (except carbon filters).
- The next day, run the water until the chlorine odour is no longer present. Use an outside tap and a hose to drain this water away from your house, well and septic system.
- Resample after three days. Use safe water from another source for drinking and cooking until test results show that your well water is safe.

Bottled Water

While bottled water available in Canada is generally of good quality, it is not necessarily safer or healthier than water from municipal supplies.

The sale of bottled water is not licensed in Canada. However, bottled water is regulated as a food produce and must comply with the *Food and Drugs Act*. Part B, Division 12 of the *Food and Drugs Regulations* specifies the requirements for both domestic and foreign bottled water. The Canadian Food Inspection Agency (CFIA) is responsible for the enforcement of the *Food and Drugs Act and Regulations* as they apply to bottled water products produced and sold in Canada. Municipal water supplies are checked for 100 or more substances whereas only three substances must be checked in bottled water. They are bacteria content, fluoride and total dissolved solids (magnesium, iron, sodium). For information on the sale and regulating of bottled water in Canada, visit Health Canada's website at www.hc-sc.gc.ca and search for "bottled water food safety".

Bottled water contains naturally occurring bacteria, which under improper and/or prolonged storage conditions, can increase in numbers to levels that may be harmful to health. Refrigeration is a good way to reduce the growth of these bacteria.

Storage of bottled water may provide an opportunity for bacteria to grow, particularly if the containers were not sterile.

Cisterns

The water in cisterns usually comes from rainfall collected off the roof. It is stored in concrete tanks (reservoirs) in the basement.

The water collected can be contaminated from many sources (especially bird droppings) and thus is not safe for drinking.

If a cistern supply exists or is planned, it is recommended that no connections are made between the main water supply and the cistern. Colour coding of the water pipes is also a good idea to ensure that a separation exists.

Cistern water should be used only for lawn and garden watering, washing cars, flushing toilets, etc.

The Peterborough Public Health does not recommend the use of a cistern water supply for bathing, human consumption or kitchen use.