



Clean Water for Carolina Kids

Program Instructions

This document provides helpful “how to” tips for lead in water testing and eliminating lead exposure. This includes the following:

 HOW TO SAMPLE FOR LEAD IN YOUR DRINKING OR COOKING WATER <u>PAGES 3-4</u>	 HOW TO SHIP YOUR WATER SAMPLES TO THE LAB <u>PAGE 5</u>	 WHAT HAPPENS WHEN YOUR SAMPLES GET TO THE LAB <u>PAGE 6</u>
 UNDERSTANDING THE RESULTS OF YOUR WATER TEST <u>PAGES 7-9</u>	 HOW TO COLLECT FOLLOW-UP SAMPLES <u>PAGES 10-11</u>	 HOW TO CHOOSE THE RIGHT WATER FILTER <u>PAGES 12-17</u>
 HOW TO MAINTAIN A WATER FILTER <u>PAGE 18</u>	 HOW TO REPLACE YOUR FAUCET <u>PAGES 19-20</u>	 HOW TO CHECK FOR LEAD AND GALVANIZED STEEL SERVICE LINES <u>PAGE 21</u>

You can scroll this document or click on the boxes above to jump to the section you want.

We have a full video series on how to test for lead in water and eliminate exposure. **If you prefer to watch our videos, click [here](#) for our How to resources page.**



PROGRAM OVERVIEW

Overview of Lead Hazards for Young Children

The Legacy of Lead in Drinking Water

Due to its useful chemical properties lead has been used in a variety of industries, including ammunition, batteries, ceramics, paint, gasoline, and plumbing components. Lead is possibly the most notorious toxic chemical in history, yet it is still common where kids live and play. Since the 1970s, environmental levels of lead have declined, largely due to regulations in the U.S. to control lead sources, including gasoline, paint, and plumbing.¹ However, these rules only applied to future installations and don't address lead-based paint or leaded plumbing that was already in place. Because of this, lead in drinking water from leaded-pipes, fixtures, and service lines poses an ongoing health risk, especially for infants and children. Children may be exposed to lead by drinking water at home, schools, and child care centers.

Early Childhood Lead Exposure

Lead is toxic to the brain and the nervous system even at very low levels of exposure. Infants and young children are especially sensitive to chemicals like lead in their environments. Early childhood exposures to lead can result in harmful, lifelong health effects. These effects are often related to children's developing brains and can include IQ loss, learning disabilities, and behavioral disorders.^{2,3} It is important to make sure that children's homes, day cares, and schools are free from sources of lead. Potential sources of lead exposure include old paint, drinking and cooking water, toys, or other manufactured products. This document focuses on lead in drinking and cooking water.

An Overview of Our Steps to Identify and Eliminate Exposure to Lead in Drinking and Cooking Water

The first step to identify and eliminate exposure to lead in drinking and cooking water is to get your water tested. If you do find lead in your water, there are straightforward, cost-effective steps to reduce exposure. You can designate one "clean tap," use water filters, and/or replace old plumbing fixtures. Taking these simple steps can help get lead out of your drinking and cooking water. Importantly, boiling water does NOT remove lead or prevent lead exposures.

In addition to testing your water, we also describe how to check your pipes to identify the material they are made of to help understand your water test results. You can report the results of your check to us. If your pipes are lead or copper and your water test showed high levels of lead, we can help prioritize your location for lead service line replacement to remove the source of lead.

¹ Dignam, T., Kaufmann, R. B., LeSturgeon, L., & Brown, M. J. (2019). DOI: [10.1097/PHH.0000000000000889](https://doi.org/10.1097/PHH.0000000000000889).

² Canfield, R. L., Henderson, C. R., Jr., Cory-Slechta, D. A., Cox, C., Jusko, T. A., & Lanphear, B. P. (2003). DOI: [10.1056/NEJMoa022848](https://doi.org/10.1056/NEJMoa022848).

³ Lanphear, B. P., Hornung, R., Khoury, J., et al. (2005). DOI: [10.1289/ehp.7688](https://doi.org/10.1289/ehp.7688).



HOW TO SAMPLE FOR LEAD IN YOUR DRINKING OR COOKING WATER

Initial Sampling



Read through the sampling and shipping instructions (pages 3-5) completely before starting sampling.

Your building should be in normal operations. Testing during reduced operations is also acceptable. Check with your specific program to see if you can test during extended closure periods like holiday and summer breaks and closures due to COVID-19.

IMPORTANT!

Save the box and bubble wrap. You need it for the return shipment!

Step 1. Open your test kit and check the contents:

- An empty bottle for each drinking and cooking tap, in a large plastic zip bag
- A return mailing label.
- A chain of custody document showing your sample locations, in a zip bag.



*If you have more than 18 taps used for drinking or cooking, you may receive more than one box. Each box will contain its own chain of custody document.

Step 2. Set a date to collect your samples.



- **Plan** to collect your samples on a Monday morning when nobody has used water for at least eight hours and before staff, students, and cafeteria workers arrive or use water.
- **Notify staff, students, and cafeteria workers** so no water is used before you sample.
- Any drinking and cooking taps that are shut off or unused should each be run for 1-2 minutes on the Friday before you sample.
- Set a calendar invite and phone alarm for the day and time you and any others plan to sample.

AVOID COMMON MISTAKES

- Do NOT allow someone in the building to start using water before you complete all sampling.
- Do not flush or use any water in your building for at least 8 hours before sampling.
- Maintain normal water usage in the week up to sampling.
- Do NOT remove any aerators on your tap prior to collecting these samples.
- Do NOT close the shutoff valves on the pipes beneath the sinks.

TIPS FOR WATER FOUNTAINS: A WEEK BEFORE SAMPLING, CHECK THE WATER FOUNTAIN TO SEE WHERE THE WATER TYPICALLY HITS AND PUT A LITTLE MARK WITH A SHARPIE SO YOU KNOW WHERE TO POSITION THE BOTTLE. WHEN SAMPLING, YOU MAY NEED TO ANGLE THE BOTTLE TO GET ALL OF THE WATER. IF YOU DON'T GET IT IN RIGHT AWAY, THAT'S OKAY. JUST KEEP THE BOTTLE AS FULL AS YOU CAN. DO NOT POUR IT OUT AND TRY AGAIN.



Step 3. Collect your water samples.

Step 3.1: Read these instructions again first.

- **Do not wash hands before sampling** (doing so uses the water you want to collect).

Step 3.2: Collect a sample from each tap.

- Start with the bottle that matches the first row of your chain of custody document. Each bottle has a sticker with a barcode and sample ID. Each sample ID number matches a row on your chain of custody document.
- **Open the bottle** carefully and place the lid with the threaded side facing up on a clean surface. Do not touch the inside of the bottle or lid.
- **Position the bottle** underneath the tap and **turn the water on** to a normal flow to **fill bottle to the neck**. Turn water down slowly as it gets to the top to avoid splashing, and then turn off. Do not let the bottle overflow. Carefully replace the lid and **close the bottle tightly**.
- **Fill in the date and time on the chain of custody document** for each sample.

NUMBER	SAMPLE ID	SAMPLE ID / DESCRIPTION
1	G00001	Hallway Water Fountain
2	G00002	Hallway Water Fountain
3	G00003	Classroom 101 sink

Step 3.3: Repeat Step 3.2 for any other taps listed on the chain of custody document 

- Collect samples in the order they are listed on the chain of custody document.
- Always **match the bottle sample ID** to each tap.

Step 3.4: Complete the chain of custody document

- Make a note on the chain of custody document about anything that did not go according to plan.
- Add your name in the “Collected by” section, along with the date and time sampling is complete.



HOW TO SHIP YOUR WATER SAMPLES TO THE LAB

Now that you've collected your samples, it's time to ship it back to the lab.

Step 1. Repack the test kit box

- You will **re-use the shipping box and two zip bags** that your kit came in. You can use any box if you lost your initial one.
- Check that each sample bottle is closed tightly**, then place it into the large bag.
- You can put six bottles in a row and stack them up to three high.
- Seal the large bag. If there are fewer than 18 bottles, fold over the top of the bag and then seal.
- Put the chain of custody document in the smaller bag** and seal it so it doesn't get wet.
- Place the bottle bag and chain of custody bag in the box.**



Step 2. Apply the return mailing label

- Place the provided return UPS mailing label on the box**, covering the previous shipping label.
- If you lost your box, you can apply the UPS mailing label to any box.
- Close the box and reseal** the top flap using strong shipping tape.

Step 3. Schedule a UPS pickup

This is a prepaid return mailing label. There is no charge to you.

- Schedule a pickup** at UPS.com OR call UPS at **1-800-742-5877 any time after 7:00 am.**
- If you schedule before 10 am, UPS will come the same day.
- Give UPS your phone number and the label tracking number (circled in red in the example image).
- Write down the confirmation number UPS gives you.



Step 4. Take the box outside for pickup

- Place the box where you typically leave packages for UPS pickup.**
- A location in the shade is ideal.

NEXT STEPS: WE WILL NOTIFY YOU BY EMAIL WHEN YOUR SAMPLE RESULTS ARE READY. YOUR RESULTS WILL COME WITH RISK MITIGATION RECOMMENDATIONS FOR HOW TO TAKE ACTION TO GET THE LEAD OUT OF EACH TAP. THANK YOU FOR YOUR DEDICATION TO PROTECTING CHILDREN'S HEALTH!



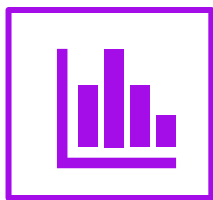
WHAT HAPPENS WHEN YOUR SAMPLES GET TO THE LAB

Summary of RTI Laboratory Procedures

When RTI International receives your samples at the lab, we:

- Log the samples into our system using the barcode on each bottle
- Check to make sure the samples are in good condition. That no water has leaked out and the sample IDs match what's on the chain of custody document
- Measure how much sediment is in the sample (turbidity) to see if we have to do any additional preparation before laboratory analysis
- Preserve the sample by adding high purity nitric acid in a clean environment
- Let acidified samples sit at room temperature for at least 16 hours
- Check the sample pH to confirm it is in the proper range
- Load the samples into the automated sampler for analysis. Samples are analyzed for lead using an ICPMS (Inductively Coupled Plasma Mass Spectrometer)
- Review data to make sure all quality assurance and quality control standards are met
- Report results to program portal

Once the analysis is completed, your results will be available in your online portal and we will send you a notification email. If you don't have email, we will notify you by U.S. mail. Your results report will include recommendations to reduce lead exposures from water based on your results.

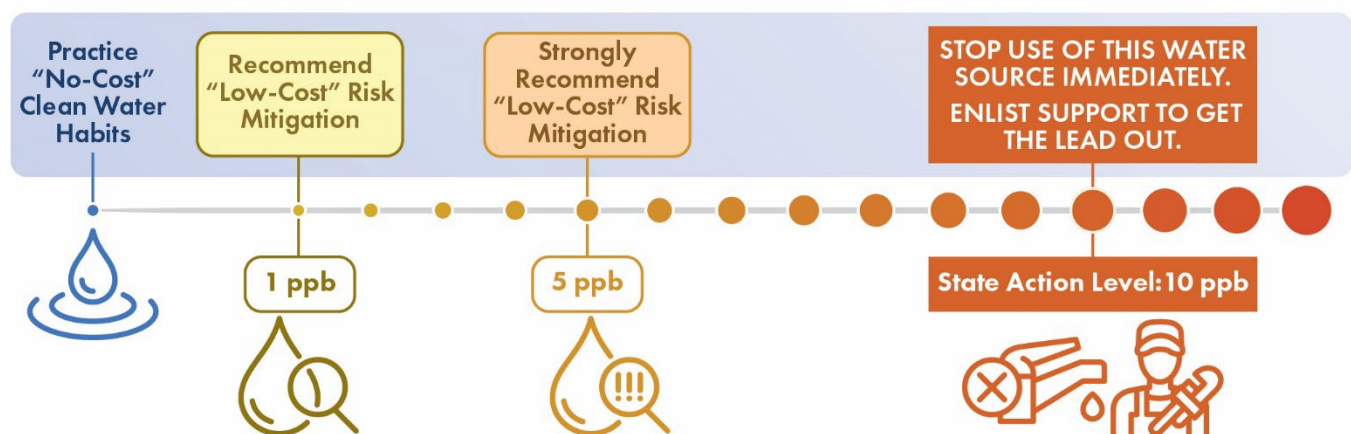


UNDERSTANDING THE RESULTS OF YOUR WATER TEST

Results and Recommendations for your Taps

Your laboratory results report will show the level of lead detected at each drinking or cooking water tap you sampled. It will also have recommendations based on the level of lead found in each sample. Lead results are measured in parts per billion (ppb). One ppb is about the same as one drop of food coloring in a backyard swimming pool. We recommend different actions depending on the level of lead in your water, as shown in **Figure 1**.

Figure 1. Illustration of Recommended Risk Mitigation Based on Test Results for Each Tap.



Our recommendations are detailed below by the level of lead found in each sample or tap.

Results below Detection Limit (0.1 ppb)

If any results are below our laboratory detection limit, there is either no lead in your water or the amount is so low that our instruments cannot measure it (less than 0.1 ppb). Even if no lead is detected, we recommend practicing "**Clean Water Habits**" for all tap water, this includes:

- **Designate taps** that have tested low in lead for drinking and cooking. **Place designated use signs** for children and staff to understand which taps are for consumption and which can be used for other purposes (e.g., handwashing).
- **Keep it cold:** Use only cold water for drinking, cooking, or preparing infant formula.
- **Flush water** at all taps used for drinking or cooking water for several minutes after holidays or weekends, or other times when the building is not in use. This clears out standing water in the pipes, replacing it with fresh water.
- **Clean the faucet:** Remove and rinse loose debris from faucet strainers/aerators regularly.

CLEAN WATER HABITS

RECOMMENDATIONS FOR RESULTS BELOW DETECTION LEVEL

- Use signs to designate low-lead taps for drinking and cooking water
- Use only cold water
- Flush water after weekends
- Clean faucets and aerators
- Empower through communication
- Contact a plumber promptly for decreased flow problems
- If you have a filter, maintain it per manufacturer instructions
- Choose certified lead-free products



- **Communicate** the findings and clean water actions to parents, staff members, and children.
- If you notice a clog or decreased water flow, **contact a plumber** promptly.
- When purchasing equipment or renovating, **choose certified lead-free products**, as well as lead-free cups and dishware for drinking and eating, and lead-free garden hoses that might be used for filling coolers and other sources of drinking water.

Any detected lead (over 0.1 ppb)

If your results are at or above our laboratory detection limit of 0.1 ppb, we *recommend* low-cost solutions to remove lead and reduce exposure. The American Academy of Pediatrics recommends that lead in water in schools should not exceed 1 ppb. We *recommend* low-cost solutions, this includes:

- Follow the **Clean Water Habits** shown above.
- **Remove Sources of Lead:**
 - **Flush:** After periods of inactivity (e.g., first thing in the morning and after holiday breaks), let cold water run from the tap for 1-5 minutes prior to use. You can also flush taps before each use during normal activity levels.
 - **Install and maintain certified water filters:** Install a water filter certified to remove lead at the point-of-use for drinking and cooking taps. Ensure that the filter is maintained following manufacturer specifications. For smaller buildings, like homes, child care centers, and family child care homes, one cost-saving option is to designate one clean tap for cooking and drinking and use a filter on that faucet only. For larger buildings, like schools and office buildings, this approach can be scaled up to one clean tap per wing on each floor. See our filter guide (How to Choose the Right Water Filter: [pages 12-17](#)) for more information.
 - **Replace faucet fixtures:** Oftentimes the faucet fixture is the source of lead. Hiring a plumber to change an old faucet fixture to a certified lead-free fixture may reduce or eliminate the level of lead detected. Look for lead-free certified fixtures that meet NSF/ANSI 61 or NSF/ANSI 372 standards. You can check for these certifications on the packaging.
 - **Replace water fountains and/or water coolers:** Consider replacing existing water fountains and water coolers with a new fountain or water cooler dispenser that meets the current and most stringent lead-reduction regulations according to NSF/ANSI 61 or NSF/ANSI 372 standards; ensure these new products are also equipped with certified filtration systems. If this is not feasible, consider designating a nearby tap without detectable lead for drinking and cooking and shutting off the fountain with proper signage.
- **Stop using taps** for cooking and drinking. Post a designated use sign (e.g., “Water Play Only” or “Handwashing Only”).

LOW-COST SOLUTIONS

RECOMMENDATIONS FOR ANY DETECTED LEAD

- Follow **Clean Water Habits**
- Remove sources of lead (filtering and/or flushing)

OR

- Stop using the faucet and designate a low-lead tap for drinking and cooking water

Results at or above 5 ppb

For samples at or above 5 ppb, we *strongly recommend* the low-cost solutions above to remove lead and reduce exposure.



Results at or above 10 ppb

If you have a sample that is at or above your state's action level, **stop use immediately** and place a "Do not use for cooking and drinking" sign and tape over the tap to ensure that no one uses it. Steps you can take to avoid lead exposures include:

- **Do not use water from this location** for drinking or cooking until follow-up sampling and/or mitigation actions are complete.
- **Check for a lead service line**, especially if you had many results above this level.
- **Inspect plumbing system:** Hire a plumber to assess the age of plumbing elements and fixtures that may have been used during construction or renovations, the type of solder used in the building, other leaded materials, including brass fixtures with lead alloy, locations and information about any pressure tanks or gravity storage tanks, screens and aerators on faucets, signs of corrosion, and any electrical equipment grounded to water pipes. A plumber can also check for lead service lines.
- **Provide alternate drinking water sources:** Use water from another tap that tested low in lead and designate that tap for drinking or cooking. Children can bring in their own bottles from home to fill, or bottled water can be purchased while waiting to complete mitigation and remediation.
- **Install and maintain certified water filters:** Install a water filter certified to remove lead at the point-of-use for drinking and cooking taps. Ensure that the filter is maintained, and filter replacement follows manufacturer specifications. Filters are certified to remove a maximum of 150 ppb of lead. If your lead levels exceed this amount, follow the steps below and test again before installing a filter.
- **Replace faucet fixtures:** Oftentimes the faucet fixture is the source of lead. Hiring a plumber to change an old faucet fixture to a certified lead-free fixture may reduce or eliminate the level of lead detected. Look for lead-free certified fixtures that meet NSF/ANSI 61 or NSF/ANSI 372 standards. You can check for these certifications on the packaging.
- **Replace water fountains and/or water coolers:** Consider replacing existing water fountains and water coolers with a new fountain or water cooler dispenser that meets the current and most stringent lead-reduction regulations according to NSF/ANSI 61 or NSF/ANSI 372 standards; ensure these new products are also equipped with certified filtration systems. If this is not feasible, consider using a sign to designate that the tap is not for drinking or cooking. Then, designate a nearby tap without detectable lead for drinking and cooking.

RECOMMENDATIONS FOR RESULTS ABOVE 10 PPB

- DO NOT USE tap
- Take steps to remove lead
- After mitigation follow
Clean Water Habits



HOW TO COLLECT FOLLOW-UP SAMPLES

Some program participants will receive a follow-up sampling kit for taps with prior results for lead at or above 10 ppb. Others will receive a visit from state or local health department officials for follow-up sampling.

These taps should be taped over with "Do Not Use" signage until follow-up and mitigation occurs.



Read through instructions completely before starting sampling.

Step 1. Open your follow-up test kit and check the contents:

- A large bag with bottles inside, **two bottles for each tap** to re-sample
- A small bag with chain of custody document that lists sample locations
- A return shipping label

IMPORTANT!

Save the box and bubble wrap. You need it for the return shipment!

Place items back in the box until you collect samples.

Step 2. Plan to flush these taps on Friday and sample Monday morning.

Step 2.1: Set a date to collect your follow-up samples.



- **Plan** to collect your follow-up samples on a Monday morning when nobody has used water for at least eight hours and before staff, students, and cafeteria workers arrive or use water.
- Set a calendar invite and phone alarm on the day and time you and any others plan to sample.
- **Notify staff, students, and cafeteria workers** so no water is used before you sample.

Step 2.2 Flush the taps on Friday, ONLY for taps included in this follow-up sampling kit.

- You may need to remove the tape covering the tap.
- **Flush** each follow-up tap **for 1-2 minutes** on the Friday before your Monday sampling event.
- **Put back the tape** and "Do Not Use" sign at each tap.



TIPS FOR WATER FOUNTAINS: *THE WEEK BEFORE SAMPLING, CHECK THE WATER FOUNTAIN TO SEE WHERE THE WATER TYPICALLY HITS AND PUT A LITTLE MARK WITH TAPE OR A SHARPIE SO YOU KNOW WHERE TO POSITION THE BOTTLE. YOU MAY NEED TO ANGLE THE BOTTLE TO GET ALL OF THE WATER. IF YOU DON'T GET IT IN RIGHT AWAY, THAT'S OKAY. JUST KEEP THE BOTTLE AS FULL AS YOU CAN. DON'T POUR IT OUT AND TRY AGAIN.*



Step 3. Collect your water samples.

***** Make sure nobody has used water for at least eight hours. If somebody has used the water already, simply postpone your sampling until the next Monday, and repeat the flushing on Friday.*****

Step 3.1: Get a timer or use your phone timer and read these instructions again first.

- You will take two samples at each tap: a first-draw sample and a 30-second flush sample
- Do not wash hands. We need “first-draw” water samples before any other water has been used.

Step 3.2: Collect samples from the tap listed in the first row of the chain of custody document.

- You will sample in order of the rows on the chain of custody document.
- First, collect the “**first-draw**” sample in the bottle with the yellow “**First Draw**” sticker:
 - Start with the bottle and the **Lab Sample ID** for the first tap on the list.
 - Open the bottle** carefully and place the lid with the threaded side facing up on a clean surface. **Do not touch** the inside of the bottle or lid.
- Position the bottle underneath the tap and **turn the water on** to a normal flow to **fill bottle to the neck**. Turn water down slowly as it gets to the top to avoid splashing, and then turn off. Do not let the bottle overflow.
 - Carefully replace the lid and **close the bottle tightly**.
- Next, collect the **30-second flush sample** using your timer.
 - Open the other bottle for the same tap (the next Lab Sample ID on list).
 - Place the lid aside like before.
 - Run the water at full speed from the same tap for **30 seconds with a timer**.
 - After 30 seconds, **fill the second bottle** exactly as before.
 - Turn the water off and close the bottle tightly.



Step 3.3: Repeat Step 3.2 for any other taps listed on the chain of custody document

- Follow the order on the chain of custody document.
- First-draw samples will always be collected in the bottles with yellow labels marked “First Draw.”
- 30-second flush samples will always be collected in the bottles without the yellow labels.
- Always match the bottle’s sample ID to each tap and sample type listed on your chain of custody document. Make a note on the chain of custody document about anything that did not go according to plan.

Step 4. Fill out the Chain of Custody document.

- Fill in the **date and the time** on the chain of custody document for each sample.
- Add your name in the “Collected by” section, along with the date and time sampling is complete.

Get The Lead Out

How to Choose a Water Filter to Remove Lead

Installing and maintaining a point-of-use water filter that is certified to remove lead may be a low-cost solution to improve your drinking water. Whether water testing has shown you need to take action to remove lead or you want to choose a water filter as a precaution, this flyer will help you make the right filter choice and answer some of the most frequently asked questions about dealing with lead in drinking water.

No amount of lead in drinking water is safe. Installing a point-of-use water filter can help remove or reduce lead in your drinking water. Point-of-use water filters treat water from one tap—such as a kitchen sink—after the water has passed through most of the pipes and fixtures that could increase the water's lead content. We recommend using water filters at taps designated for cooking or drinking water.

Where Does Lead in My Water Come From?

Lead does not generally come from the water source or water system itself. Instead, lead in drinking water usually comes from corroding pipes, plumbing, and fixtures on the way to the tap. Some plumbing components that are still in use were made partly or wholly of lead, including solder, pipes, and faucet fixtures. Even new components may have a small amount of lead. In addition, lead can be part of a build-up of minerals on the inside of the pipes.

What Are Point-of-Use Water Filters?

Point-of-use filters treat the water where you use it, typically at a sink. There are also “point-of-entry” water treatment systems that can make the water less corrosive before it continues through the rest of the plumbing in a building. These systems can reduce lead in drinking water but are much more expensive and may not fully solve a lead problem if plumbing components within the building still contain lead. Water softeners are another common type of point-of-entry system, but they are not designed to reduce or remove lead in the building. Since lead can come from so many different sources in a building's plumbing, a point-of-use filter is often the best and most cost-effective option for removing lead in the water that you drink.

How Do I Choose Among the Different Types of Point-of-Use Water Filters?

Many types of point-of-use filters are available, including faucet-mounted filters, countertop units, plumbed-in units installed underneath the sink, pour-through pitchers, and refrigerator water dispensers. Here, we compare the types of water filters that are certified to remove lead. The examples in the table below are not particularly recommended over other certified systems. We encourage you to research the best filter that fits your needs. Products also change often, so these products in the table may no longer be available.

Activated carbon

The most common filters are made with activated carbon, a highly porous material designed specifically for water treatment. Activated carbon can also improve the taste of your water. These filters are economical and come in the different all types mentioned above. Not all activated carbon filters are certified to remove lead, however, and they don't remove certain other contaminants like nitrate.








Reverse osmosis

This other common type of point-of-use system removes the widest range of contaminants but is usually more expensive than activated carbon. It also has lower flow rates, creates waste that increases total water use, and requires more space underneath the sink. Most reverse osmosis systems also require a post-treatment remineralization step to add flavor back into the water and prevent the water from becoming more corrosive, which could be a concern for lead.

A note about pitcher-style water filters: We do not recommend pitcher filters because they do not have adequate capacity to meet the needs of a child care center or school, or homes that rely on filtered water for all drinking and cooking uses. They have also been shown to be less effective at removing lead in tap water and are more expensive to operate per gallon because they require frequent filter changes.

Regardless of the type of filter you choose, make sure it is certified to remove lead by an accredited third party (see [How Are Water Filters Certified?](#) below).

See examples of certified products in the table below.

Water Filter Type/Examples ¹	Purchase Price ²	Installation Difficulty	Flow	Number of cartridges	Filter Life ³	Maintenance Cost ⁴	Other Considerations
Faucet mounted filters							
PUR PLUS Faucet Mount Filtration System	\$33			1	100 gal. 3 mos.	\$0.15/gallon \$5/month	<ul style="list-style-type: none">Requires manual switch for filtered waterNeed to replace filter cartridge more often than other typesMay not fit some faucets
BRITA Complete Water Filter Faucet System	\$20			1	100 gal. 4 mos.	\$0.18/gallon \$4.5/month	
Countertop filters							
Pentair Pelican Countertop Drinking Filter System (PDF-450)	\$135			2	450 gal. 6 mos.	\$0.18/gallon \$13/month	<ul style="list-style-type: none">Uses existing faucetRequires manual switch for filtered water
Refrigerator filters							
Specific filter type for each refrigerator brand and model	\$30-50			1	200–300 gal. 6 months	\$0.10–0.20/ gallon \$5–10/month	<ul style="list-style-type: none">Requires refrigerator connected to water lineAlso filters water for the refrigerator ice dispenser
Under-sink activated carbon filters							
A.O. Smith Main Faucet Single-Stage Carbon Block Under Sink Filtration System (AO-MF-ADV)	\$100			1	784 gal. 6 mos.	\$0.09/gallon \$12/month	<ul style="list-style-type: none">Different designs either filter the full flow of cold water from the main faucet or filter water to a separate lead-free faucet
Culligan US-2 Two-Stage Under Sink Drinking Water Filtration System	\$105			2	500 gal. 6 mos.	\$0.11/gallon \$9/month	
Under-sink reverse osmosis (RO) filters							
AquaSana OptimH2O Reverse Osmosis + Claryum Filter	\$250			4	Pre/post filters: 6 mos. RO membrane: 12 mos.	\$20/month	<ul style="list-style-type: none">Removes the most contaminantsFilters water to a separate lead-free faucetTakes up more space underneath the sinkGenerates wastewaterMay change water’s taste
GE Under Sink Reverse Osmosis Water Filtration System (GXRQ18NBN)	\$200			3	Pre/post filters: 6 mos. RO membrane: 12 mos.	\$15/month	

 Easy DIY installation, no tools required
 Low flow, less than 0.5 gallons per minute

 Can be installed without professional help with basic tools
 Full faucet flow, up to 1.5 gallons per minute

 May require the help of a professional plumber or additional tools

1 These are examples only, not recommendations.

2 Purchase price is approximate and may change. Purchase price does not include installation costs. Some systems may need to be installed by a plumber at an additional cost.

3 Filter life is measured by volume of water filtered and time in use. Some filters have a built-in flow meter or timer with an indicator light that turns on to remind you when to replace the filter. If your filter has an indicator light, be sure to replace the cartridge promptly when the light turns on. If your filter does not have an indicator light, be sure to replace the filter promptly after the recommended amount of time.

4 Maintenance cost is calculated in two ways: 1) assuming the filter is changed at the time limit (price per month), and 2) assuming the filter is changed at the volume limit (price per gallon). The price per gallon estimate is only relevant for filters with a built-in device to measure water use over time. In most cases, the price per month provides a more realistic estimate. Reverse osmosis membranes usually need to be replaced every 12 months, regardless of the amount of use, so a price per gallon estimate is not available for RO filters.



How Are Water Filters Certified?

The National Sanitation Foundation (NSF) and the American National Standards Institute (ANSI) have developed standards for ensuring that point-of-use filters remove what they claim to remove. Not all filters on the market are certified. To be sure you choose a reliable product:

1. **Make sure that the device you choose lists lead as one of the removed contaminants** by reviewing the filter's "performance data sheet," which is a list of all the contaminants it is certified to remove. This can generally be found online by downloading the user guide or manual for the product.
2. Check for its **certification**. This can be found online or on product packaging.
 - For activated carbon filters, make sure it is certified for lead removal according to **NSF/ANSI 53** and for particle removal according to **NSF/ANSI 42**.
 - For reverse osmosis filters, check that it is certified for lead removal according to **NSF/ANSI 58**.
3. Make sure it was certified by an **accredited third-party organization** such as NSF, the International Association of Plumbing and Mechanical Officials (IAPMO), the Water Quality Association (WQA), or Canadian Standards Association (CSA) Group. You should see their logo on the product packaging.

For images of the certification logos, see the [Environmental Protection Agency's Consumer Tool for Water Filters to Reduce Lead](#).

Why Is Filter Replacement Important?

Regularly maintaining your filter is the only way to make sure your water continues to be lead free. Both activated carbon and reverse osmosis filters have disposable cartridges that must be replaced regularly according to manufacturer specifications, based on how much time has passed or how much water has been used since it was installed. Activated carbon filters work by accumulating contaminants from the water onto the filter's surface. Once the filter cartridge is full, it cannot remove any more contaminants and may release the accumulated contaminants back into the water. Reverse osmosis filters use specialized membranes to separate contaminants from the water, but these membranes wear out over time and need to be replaced.

Determining when the filter cartridge is full or when the membrane is worn out can be difficult. Replace the filter cartridges as often as the manufacturer recommends—usually every three to six months, or after a certain volume of water has been filtered, whichever occurs first. Some devices have an indicator light or alarm that turns on when the filter needs to be changed. If the device doesn't have a built-in indicator, add a reminder to your calendar for when the filter needs to be replaced.

Make sure to purchase the manufacturer's replacement filters because off-brand filters may not be certified. Only buy replacement filters certified to remove lead to NSF/ANSI standards.

How Much Do Water Filters Cost?

In general, the operating costs—that is, the costs of replacing the filter cartridges regularly—will quickly exceed the initial cost. Thus, we recommend that you weigh maintenance cost more heavily than initial cost in your planning. If water in your area is expensive or scarce, note that reverse osmosis systems create 1 or more gallons of wastewater for every 1 gallon of filtered water.

What About Water Fountains?

If there is lead in your water fountain, you can replace the existing fountain with one that contains a filter certified to remove lead. These fountains also often have bottle fillers, which promote water consumption and can allow for water bottle filling that follows COVID-19 precautions (e.g., [Elkay Enhanced ezH2O Bottle Filling Station](#), \$1,000).

You can also replace the water fountain with a freestanding dispenser that filters water from your building's water supply. These units can be purchased or rented from water cooler companies (e.g., [quenchWATER+ QZ series](#)). The company covers maintenance costs when renting a unit. The cost to rent a unit is typically less than the cost to purchase bottled water. However, the rental cost may be higher than the cost to maintain a water fountain. Investing in a water fountain with a certified lead filter is likely to pay off in a few years compared to renting a freestanding dispenser.

What About Having Drinking Water Outside?

It is not recommended to drink water from outdoor spigots because they may not meet the lead-free requirements of indoor plumbing. If you need drinking water available outdoors, you can use a portable water jug that can be filled inside at a lead-free or filtered tap. For water play, a certified lead-free hose can be purchased (e.g., [Camco Premium Drinking Water Hose](#), \$15–\$25). Keep in mind that lead-free hoses will not address lead in other parts of the plumbing, just lead from the hose itself.

What About Other Chemicals in My Water?

If you suspect other chemical contaminants are in your water, such as per- and polyfluoroalkyl substances (known as PFAS), make sure that the filter is certified to specifically remove them according to NSF/ANSI performance standards. For PFAS, make sure that the filter is certified according to NSF P473 or that the chemicals PFOA and PFOS are listed in the performance data sheet for filters certified under NSF/ANSI 53 or NSF/ANSI 58. Reverse osmosis filters are generally the most reliable for PFAS and other emerging contaminants, but certified activated carbon filters can also be effective for the levels of PFAS typically found in U.S. tap water. To find more information about whether there may be PFAS in your tap water, contact your water utility.



Can I Eliminate Sources of Lead in the Plumbing?

You may be able to eliminate or reduce sources of lead in your plumbing and fixtures. A plumber can help to locate and replace any lead-lined water fountains, lead service lines, or other plumbing components containing lead. Detailed water testing can also help you identify lead sources.

We recommend replacing any faucets where lead is detected with new, certified lead-free faucets. Look for faucets certified according to NSF/ANSI 372 or NSF/ANSI 61. Stainless steel is best. Avoid brass and chrome-plated faucets because they may contain small amounts of lead. The [Lead Service Line Replacement Collaborative](#) also has helpful resources for checking whether water lines in your building are made of lead and provides suggestions for coordinating with your utility. Your local or state health department, water utility, or other relevant program may be able to provide additional support.

After taking any actions to remove lead, it is important to retest the water to make sure the actions were effective.

Should I Just Use Bottled Water?

If the tap water in your home or building has less than 150 parts per billion (ppb) of lead, installing a water filter will be more cost-effective than buying bottled water. Bottled water can cost up to \$1–\$2 per gallon, while maintaining a point-of-use filter costs only a few cents per gallon. If your tap water has over 150 ppb lead, however, you should consider using bottled water because point-of-use filters are not certified to remove more than 150 ppb of lead.

If you use bottled water, check the package or the manufacturer's website to ensure the company meets Food and Drug Administration (FDA) standards. The FDA mandates that bottled water contain less than 5 ppb of lead. For long-term bottled water use, we recommend buying refillable 5-gallon jugs to lower costs and waste. Make sure to store all bottled water out of direct sunlight and away from heat to avoid microbial growth and reduce leaching of other chemicals from the plastic into the water.

What If I Get My Water from a Private Well?

If your home or building is connected to a private well, there can be other sources of lead in your plumbing, including the bore hole, pump components, and pressure tank. Many water utilities treat the water with certain chemicals to make it less corrosive, but private well water is not required to have any corrosion control so children who get their water from private wells may be at greater risk of lead exposure. Fortunately, point-of-use water filters are also effective for removing lead from private well water. However, if you are on a private well, make sure to test your water for microbial contaminants, including *E. coli* and total coliforms. If any microbial contamination is detected, consult a well water professional to make sure your well is properly sealed, protected, and disinfected before installing a filter since most point-of-use filters are not protective against bacteria and viruses. You can find a well water contractor and schedule a well water checkup at [WellOwner.org](#).

Additional Resources

This informational flyer was developed for RTI International's Clean Water for US Kids program. For additional resources please refer to the following links.

- www.cleanwaterforUSkids.org
- [Environmental Working Group Water Filter Buying Guide](#)
- [Environmental Protection Agency Consumer Tool for Water Filters to Reduce Lead](#)
- [Environmental Protection Agency Consumer Tool for Lead-Free Plumbing Products](#)
- [NSF Lead Filtration Guide](#)
- [FDA Bottled Water Consumer Update](#)

More Information

Clean Water for US Kids

www.cleanwaterforUSkids.org/contact

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Clean Water For US Kids



HOW TO MAINTAIN A WATER FILTER

Now that you've picked the best water filter for your tap or fountain, it's time to install and maintain it!

Step 1. Install your filter

Your filter should come with written or visual instructions for installation. Just follow those instructions. Lots of filter manufacturers also create videos that show you exactly how to install their filter on your sink. You can view our water filter guide on YouTube here: <https://youtu.be/DIOZtd0g2rw>. This and other videos are also linked on our <https://www.cleanwaterforcarolinakids.org/howto> page. You may need a plumber to install an under-counter (in-line) filter unless you are handy with plumbing.

Step 2. Maintain your filter

NSF-certified filters are a great way to keep your water as safe and clean as possible. But they only work if you maintain them properly!

- **Change the filter cartridge on time.** If you don't, contaminants can build up in an old filter cartridge, and then be released back into your water, making your water less safe. So, be sure to change your filter following your manufacturer's recommendations. Some filter devices include a light or an alarm that tells you when the filter needs to be changed. How often you need to change the filter depends on how much water you use. That means that your main kitchen faucet may need to be replaced sooner than a secondary sink. Check your filter instructions to understand exactly when it's time to replace your filter cartridge. If your filter doesn't come with a device to measure how much water you've used, just be sure to replace the cartridge on a regular schedule according to the manufacturer's recommendation, usually every 3-6 months.
- **Use only the brand-name replacement cartridges made by your manufacturer.** Off-brand filter cartridges may not be properly certified to get the lead out. Cheaper replacement cartridges may seem like a good deal, but if they don't work properly, you're wasting your money and potentially still being exposed to lead.
- **Flush some water through a newly installed filter cartridge to get it working.** Each filter is different: some filter cartridges need as much as 10 gallons of water run through them before they're ready to use. So, carefully read the instructions that come with your filter.
- **Use the filter exactly as instructed by the manufacturer.** That usually means filtering only COLD water. Hot water can damage many types of filters.
- **Flush your filter regularly.** Regularly running some water through the filter for several minutes, especially after long periods when it hasn't been used, can help reduce bacteria build-up inside the filter and help the filter continue to operate properly.

Maintain Your Filter Properly

- Change the filter on time.
- Use only brand-name replacement filters.
- Flush water through a new filter.
 - Use as instructed (e.g., cold water only).



HOW TO REPLACE YOUR FAUCET

Sinks, faucets, and plumbing fixtures sometimes contain significant amounts of lead.

If your faucet is the source of the lead in your water, you have two options:

Option 1: Install a faucet-mounted or counter-top filter.

Keep in mind these do NOT fit sinks that have a drop-down nozzle.

Option 2: Replace the faucet itself with a certified lead-free faucet.

Look for NSF/ANSI 372 or NSF/ANSI 61 certification. You can check for these certifications on the packaging.

Replacing a faucet may sound complicated, but it's actually pretty straightforward. If you are somewhat handy, you can replace a faucet yourself. If not, you may want to get a plumber or handyman to do the job. The faucet you choose will come with written instructions. Many manufacturers also make videos to help you. You can view our faucet replacement guide on [YouTube](https://www.youtube.com/watch?v=...). This and other videos are also linked on our <https://www.cleanwaterforcarolinakids.org/howto> page. General instructions for replacing a faucet are:

Step 1. Assemble the tools you'll need

- A light for under the sink
- An adjustable wrench
- WD-40 or another penetration oil spray
- You may also need a wire brush and a hair dryer.

Step 2. Shut off your water

You can find the water shutoff valves in the cabinet below the sink. Use your fingers to twist the hot water AND cold water supply lines to the "off" position. Sometimes those valves can get stuck or rusted, which can make them difficult to budge. If that happens to you, get a hair dryer and apply some heat to the valve. That should loosen the valve enough that you can close it by hand. Don't use tools like wrenches to try to close the valve: if you put too much twisting pressure on it, it could break. If you're still having trouble, shut off the building's main water valve before you go any further.

Step 3. Remove the old faucet

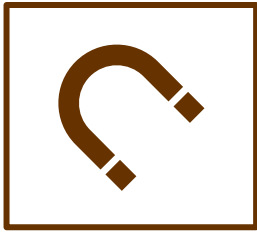
Removing the old faucet is often the trickiest part of the process. The space under the sink is often narrow and dark. You'll need a work light, and an adjustable wrench to loosen the nuts. The nuts can often be stuck or rusted. Try brushing away as much corrosion as possible with a wire brush. Then spray on some WD-40. That will help dissolve the corrosion and make the nuts easier to turn. If you're still having trouble loosening the nuts, it may be time to call a professional.



Step 4. Install the new faucet

Once the old faucet is out, installing the new faucet is the easy part. Follow the video or written instructions that come with your new faucet to learn how to install it. This includes flushing the water before use.

Once the new faucet is installed, you will want to have follow-up water testing done to be sure the new faucet has eliminated the lead from your water.



HOW TO CHECK FOR LEAD AND GALVANIZED STEEL SERVICE LINES

If sampling shows you have extensive elevated lead detected throughout your building, you should consider checking for lead service lines on your property.

To check for lead service lines, you'll need a metal tool, such as a screwdriver or a key, and a magnet.

Step 1. Locate where the water line enters the building

Typically, this is in the basement or lowest level of the building. Look for the water meter and identify the inlet valve coming into the building. If you find plastic or PVC pipe, you either have plastic or PVC service lines or you are not at the right location. We suggest you contact a plumber to assist.

Step 2. Scratch off rust or corrosion on the outside of the pipe

Find a place on the pipe to examine and use the metal tool to scrape off any rust or corrosion. If there is a covering around the pipe, uncover or unwrap the pipe first.

Step 3. See if the magnet sticks to the pipe

If the **magnet sticks, the pipes are probably galvanized steel**, which is typically a dull gray. Galvanized steel pipes can be a source of lead, especially if the galvanized steel pipes are downstream of leaded components in the distribution system of your public water supply.

Step 4. If the magnet does not stick, check the color of the pipe

If the magnet does not stick, the pipes must be lead or copper. You can distinguish between these by the color (both are typically shiny):

- Lead pipe is silver or gray
- Copper pipe is the color of a penny.

If you are not comfortable completing these steps or suspect you have lead or galvanized steel pipes, we suggest you consult a plumber for verification. See <https://www.lslr-collaborative.org/identifying-service-line-material.html> for more information and sample photos.