

Briefly describe CCHP Program and the Washington State Child Health & Safety Advisory Committee.

Make mention that the information provided takes into account the different counties across the state. Photos included in these presentations are also from counties on both the East and the West side of the mountains.

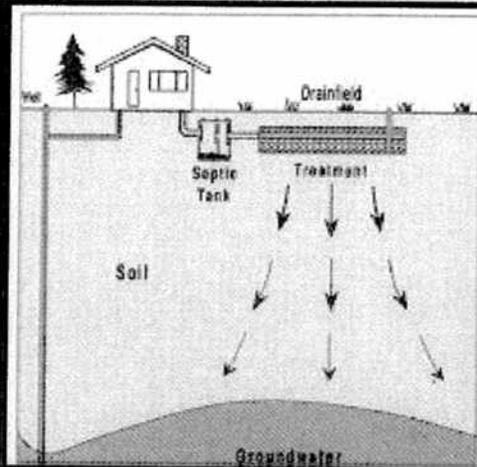
## What are septic systems?

- Provide an alternative to sewers
- Protect public health
  - Shigella
  - Dysentery
  - Cholera
- Protect our groundwater

### Septic systems

- 1) provide an alternative to sanitary sewers where sewers are not available.; With one-fourth of U.S. homes using septic systems, more than 4 billion gallons of wastewater per day is dispersed below the ground's surface.
- 2) Septic systems keep the sewage or wastewater underground, therefore minimizing exposure to harmful waste. Safe treatment of sewage protects public health by preventing the spread of infection and disease such as dysentery, shigella and cholera; Typical pollutants in household wastewater are nitrogen, phosphorus, and disease-causing bacteria and viruses. If a septic system is working properly, it will effectively remove most of these pollutants.
- 3) to protect our groundwater; Inadequately treated sewage from septic systems can be a cause of groundwater contamination. It poses a significant threat to drinking water and human health because it can contaminate drinking water wells and cause diseases and infections in people and animals. Improperly treated sewage that contaminates nearby surface waters also increases the chance of swimmers contracting a variety of infectious diseases. These range from eye and ear infections to acute gastrointestinal illness and diseases like hepatitis.

## Septic Systems



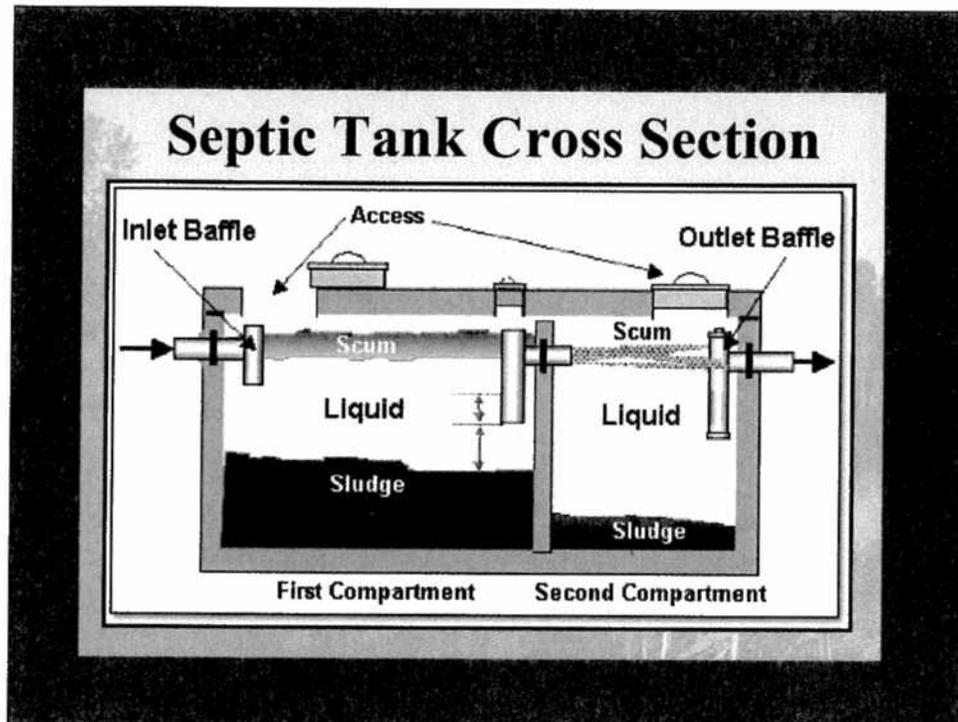
### 3 Main Components:

- Septic Tank
- Drainfield
- Soil

So how does the septic system dispose of wastewater in a sanitary manner without contaminating the groundwater?

There are three basic components to an OSS: **1)** the septic tank; **2)** drainfield; and **3)** the surrounding soil.

The septic tank breaks up the waste, stores the waste, and it partially treats the wastewater. The drainfield distributes and disposes the wastewater. The soil treats the wastewater. As long as soil is allowed to breathe and drain without being compacted, saturated, or clogged with solids, water will percolate through soil layers and rejoin groundwater in a clean and thoroughly recycled state.



This is a typical two compartment septic tank, which has three functions -

- It separates the waste; heavy solids fall to the bottom while the lighter solids such as grease, oil and toilet paper float to the top.
- It acts as a storage container for the solid waste, the waste that shouldn't go into the drainfield.
- And it pretreats the waste water. By removing approximately 30% of the disease causing organisms, thus reducing the strength of the waste before it goes into the soil

Most septic tanks need to be pumped every 3 years at a cost of about \$300 by a certified septic system pumper. There are many private companies throughout the state that offer this service (for example, Snohomish County has 25 certified pumpers). The frequency of pumping depends on the tank size, the amount of solids entering the tank and the habits of the users. The only sure way to know is to have the septic tank inspected routinely. By measuring the sludge and scum layer thickness it can be determined when the tank needs to be pumped. While a homeowner could check the level of sludge in the tank themselves, most would gladly pay a certified pumper to check for them.

## Drainfield

- Water percolates into the soil for final treatment
- Requires suitable soil and depth to water table
- Alternative systems
- Reserve area



### *Drainfield*

The wastewater exits the septic tank and is discharged into the drainfield for further treatment by the soil. The partially treated wastewater is pushed along into the drainfield for further treatment every time new wastewater enters the tank. If the drainfield is overloaded with too much liquid, it will flood, causing sewage to flow to the ground surface or create backups in plumbing fixtures and prevent treatment of all wastewater. A reserve drainfield, required by many states, is an area on your property suitable for a new drainfield system if your current drainfield fails. Treat this area with the same care as your septic system.

### *Soil*

Septic tank wastewater flows to the drainfield, where it percolates into the soil, which provides final treatment by removing harmful bacteria, viruses, and nutrients. Suitable soil is necessary for successful wastewater treatment.

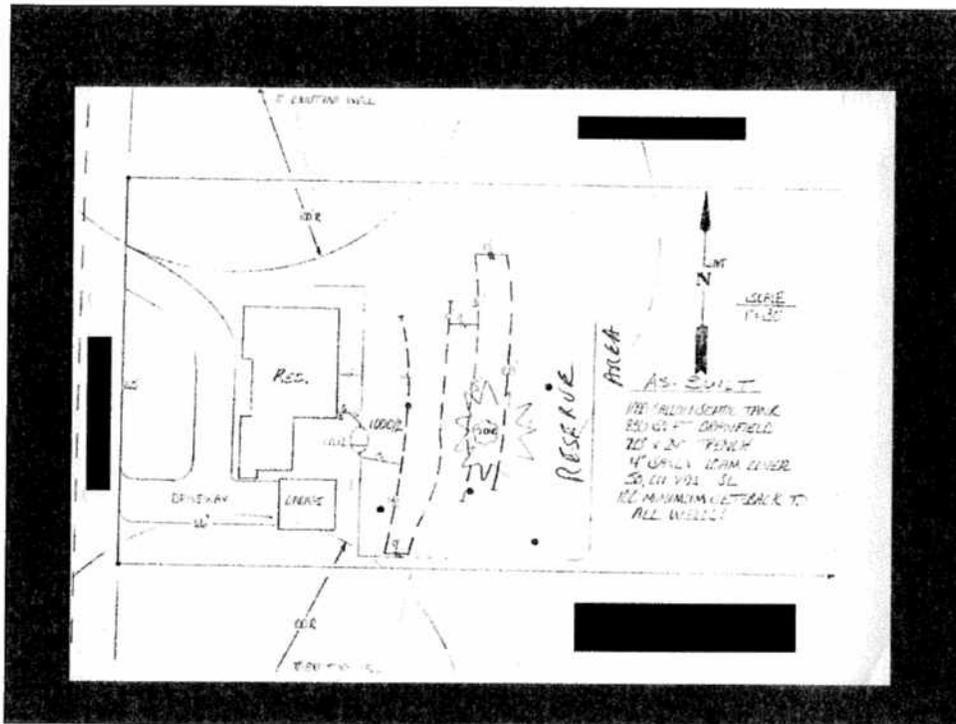
**Alternative systems** Because many areas don't have soils suitable for typical septic systems, you might have or need an alternative system. You might also have or need an alternative system if there are too many typical septic systems in one area or the systems are too close to groundwater or surface waters. Alternative septic systems use new technology to improve treatment processes and might need special care and maintenance. Some alternative systems use sand, peat, or plastic media instead of soil to promote wastewater treatment. Other systems might use wetlands, lagoons, aerators, or disinfection devices. Float switches, pumps, and other electrical or mechanical components are often used in alternative systems. Alternative systems should be inspected annually. Check with your local health department or installer for more information on operation and maintenance needs if you have or need an alternative system.

## **Determination of Capacity**

- Designed based on use (i.e. those designed for a single family residence are to be used only for single family residence)
- Designed based on number of bedrooms in a house, assuming 2 individuals per bedroom
- Licensed septic system designers can design systems based on expected water use by the family plus any additional child care use

Read slide.

Roughly 75 gallons per person per day (a 3 bedroom house is typically designed for 450 gallons per day).



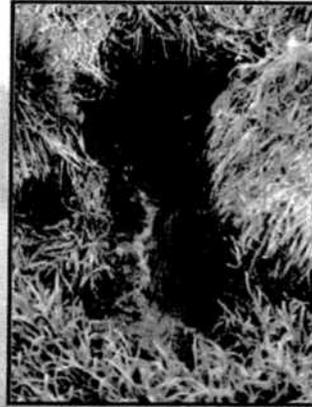
Initially, a proposal sketch of the septic system is submitted to the Local Health Jurisdiction by a certified designer. The plan, along with an application showing the number of bedrooms in the proposed building and other information, is reviewed with final approval after a site visit at the proposed location (soil testing, etc.). Just before the drainfield trenches are covered up, a drawing called the “As-built” is created. It shows the dimensions and location of the septic system after installation.

Here is an example of an as-built.

Knowing where the tank and especially the drainfield lines is critical. If a heavy play structure, a bunch of woodchips, or even a patio is placed over the drainfield, it will not function properly and may lead to a failure.

## Why Do Septic Systems Fail?

- Excessive water use
- Physical damage
- Improper maintenance and operation



•Excessive water use: Leaking plumbing fixtures, increased laundry, more people in the home than drainfield was designed for, etc.

Example: 3 bedroom system with a family of 4 living there. How many people is the system designed for? 6. When you add a child care licensed for 12 children to this system, the amount of water use is most often considerably more than the system was originally designed to handle. Water use comes from handwashing, food preparation, toilet flushing, laundry, and cleaning activities. Even if children are in diapers, there is still considerable water use occurring – and these children will likely grow up and become potty trained in the same child care. The excess water saturates the drainfield. It has no where to go except up to the surface.

•Physical damage: Parking or driving over septic system, building over septic system, digging in drainfield area, tree roots in drainfield, playstructures over the drainfield, etc.

•Improper maintenance and operation: Not pumping tank, disposing of improper waste

There are different types of septic systems, some include pumps, sand filters, specialty treatment units that require specific types of maintenance.

example: child care provider with a specialty treatment unit containing UV bulbs. She had never changed the bulb and thus her system was not working properly. Before our educational visit, she didn't even know she had to perform this routine maintenance. This lack of maintenance, in addition to the increased water usage from the child care business, greatly increases the risk of a system failure.

A key reason to maintain your septic system is to save money! Failing septic systems are expensive to repair or replace, and poor maintenance is often the culprit. Having your septic system inspected regularly is a bargain when you consider the cost of replacing the entire system. Your system will need pumping depending on how many people live in the house and the size of the system. An unusable septic system or one in disrepair will lower your property value and could pose a legal liability.

## How do we identify a failure?

- Check for odors of sewage or a “rotten egg” smell around the septic system.
- Look for wet spongy soil or lush green growth near the septic system. The effluent will be dark in color (gray, black or brown).
- Ask questions: When is the last time you pumped your tank? Does your plumbing ever back up or drain slowly?

## Ways to help prevent septic problems....

It is good to walk over the drainfield area (which you can find with the as-built). Pay special attention to any parts of the drainfield that are lower than others (pipes can “blow out” at the end if the wastewater cannot leach out of the holes in the pipes).

There are things that a homeowner can do to help prevent septic problems/failures. These include:

- Conserve water
- Repair leaking plumbing fixtures
- Have the septic tank pumped every 3 years
- Run dishwasher when full
- Spread out laundry loads during the week
- Direct roof drains away from drainfield
- Avoid the use of garbage disposals

Septic system “Don’t”s include:

- Install large play structures over drainfield
- Dispose of indigestible materials (feminine napkins, solvents, paints, diapers, etc.)
- Drive, park or allow livestock on drainfield
- Plant trees or install sprinklers over drainfield
- Pave or build over septic system

However, the best thing to do to make sure there are no septic problems, is to NOT use more water than the system was designed to treat.

## **Surfacing Sewage (Failed System)**

**Surfacing Sewage**



**Confirmed Sewage  
(with Tracer Dye)**



Some times people will tell you that this is surface water run off, or they might try and tell you that it's a spring...if your not sure, then contact your local health dept and they can do dye test.

This what a dye test looks like....we'll have the answer within 1-2 days.

## Septic System Laws

- DOH creates regulations about septic systems for residential and business uses
- LHJs can adopt local rules that are more strict than the state standard
  - Rules are based on water use and strength of the wastewater
- LHJ enforcement varies across counties

Read slide.

LHJs review and permit on-site sewage disposal systems

LHJs respond to complaints of failing sewage disposal systems

LHJs can adopt local rules that are more strict than the state standard (WAC 246-272A)

Differences across counties are due to the definition of a residential system. Waste strength is the SAME as a regular residential wastewater. So some counties will enforce residential standards only. We are requiring a septic review at no-cost to review the risks of operating a child care on a septic system and make recommendations on how to best use that system (capacity #).

However, the wastewater flows are increased by operating a child care business. So other counties may have additional requirements for a family home child care business. Some counties require a septic review by a WW sanitarian prior to licensing. This septic review costs up to \$300. Changes to the system may be required for licensing.

## Examples

- Snohomish County CCHP:
  - 160 septic reviews conducted since July 2004
    - 88 new apps approved with limited license capacity
    - 25 new applications denied
      - 7 addressed concerns and were approved
    - 34 of 47 previously licensed providers operating beyond recommended capacity



113 septic reviews for providers who want to get a new license

88 were approved with recommended license capacities (anywhere between 4 and 12)

25 were denied (primarily for no identified reserve area; some because of no as-built and some because septic system was being used to original design capacity by family)

Example: provider was denied because no reserve area was indicated on as-built. Sewer district states that it would cost over \$175,000 to hook up to sewer if the septic failed and no reserve area was available.

47 septic review for providers who were already licensed when we did the review: 34 (72.3%) were operating beyond system design, with struggling systems, or with no as-built

13 (27.6%) currently licensed providers operating within design capacity

27 providers in our database had a documented failed systems or had told us about a prior system failure that was repaired without permit

## WACs

- DOH WAC 246-272A – On-site Sewage Systems
- DEL WAC 170-296-1150
  - “Your home must discharge sewage and liquid wastes into a public sewer system or into an independent septic system maintained so as not to create a public health nuisance as determined by the local health authority.”
- Consideration: Initial septic review by the LHJ or a licensed septic designer

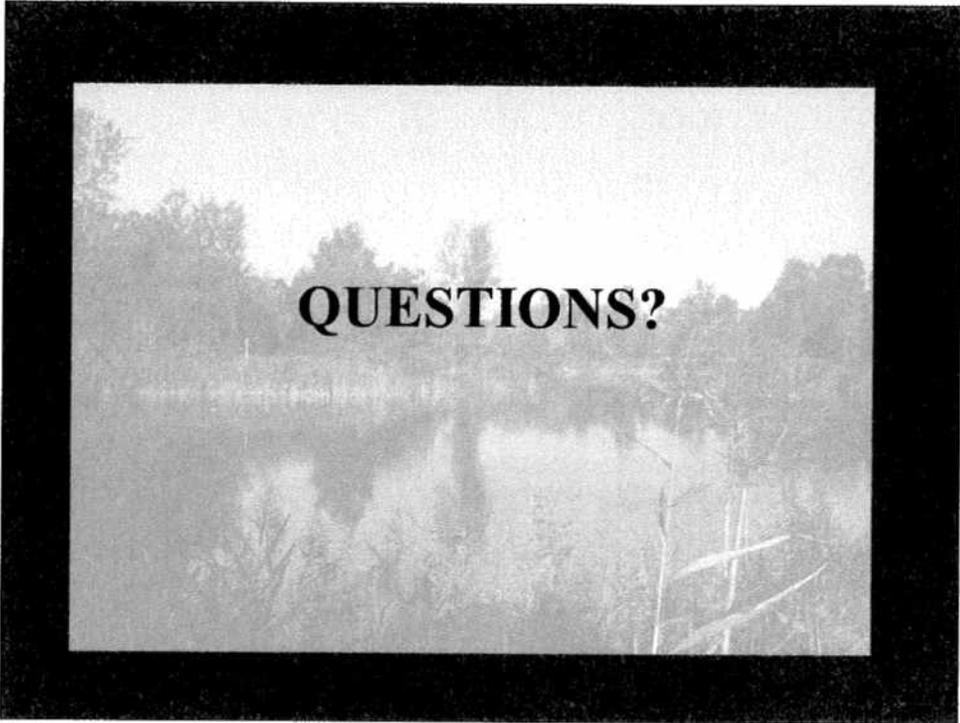
Local health jurisdictions can adopt rules that are more strict than the state Department of Health WAC, but not less strict.

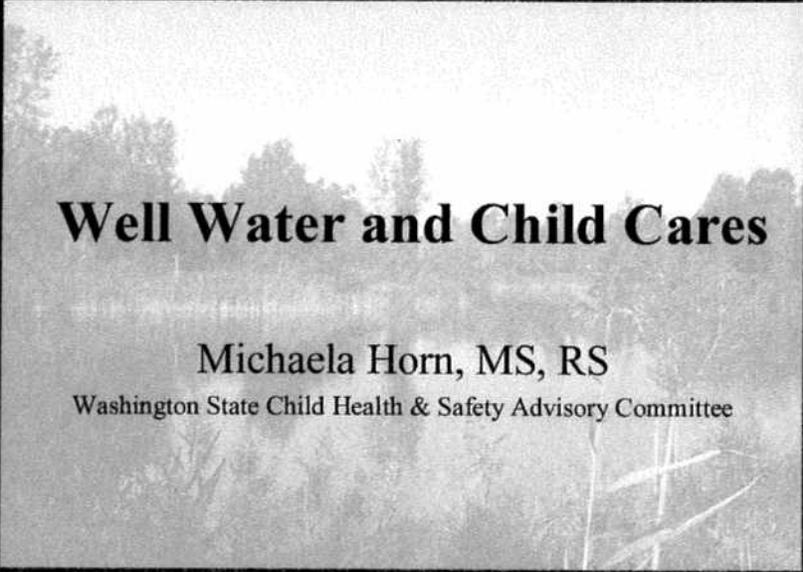
DEL WAC was written in a general way on purpose because the LHJs in different counties may have different rules regarding on-site septic systems – again more strict than the state, but not less.

All local health jurisdictions are happy to discuss ramifications of adding child care to a single family residence at no cost. Some counties require a formal review and the cost for that ranges from free to about \$300.00. Several LHJs are using a system whereby they take the design capacity of the system into consideration, along with the number of people living in the home and between 15 and 25 gal per child per day to determine recommended license capacities.

A licensed septic system designer can also be hired to do the work. In Snohomish County, they have been charging around \$400.00 to do such a review.

A review should include assessing the integrity of the system, the original design capacity, the reserve area, the number of people living in the residence, and the recommended license capacity.

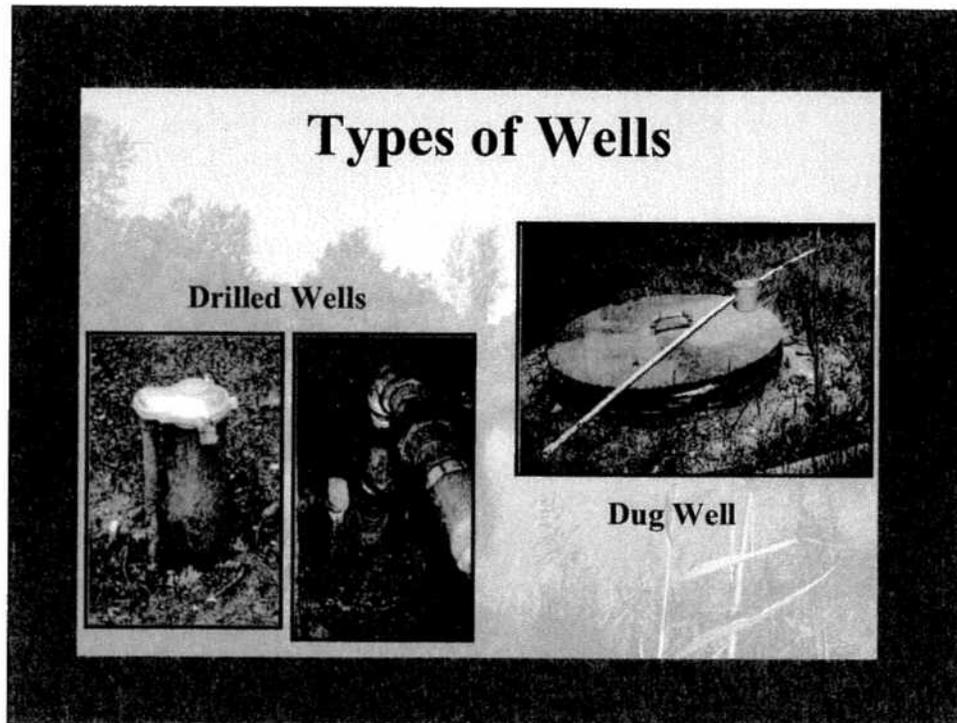




## **Well Water and Child Cares**

Michaela Horn, MS, RS

Washington State Child Health & Safety Advisory Committee



There are two main types of wells that you are likely to encounter:

**Dug Well** – Is a big hole in the ground, often only about 30 feet deep. The hole is surrounded by concrete tiles to keep the side from caving. You can usually recognize this type of well by a large concrete lid.

**Drilled Well** – Is often much deeper, up to 300 feet deep. It is not nearly the diameter of a dug well. The well head can either be found in a well house having a flat lid with pipes protruding from the top as in the middle picture. Or, it may be somewhere else on the property and should have a submersible cap on it (picture on the left).

## What can get into the water?

- Surface water carrying bacteria or chemicals
- Creatures including insects, slugs, and rodents



\*\*\*Pass around three labeled, sealed bottles. Ask participants “If you had to pick one bottle to drink based on appearance alone, which would it be?” Have them write their answer somewhere on one of their handouts.

If you remember from the previous slide, a well puts a big hole into the ground. When you do this, you allow for runoff water from the surface to creep down the outside of the well casing and reach the ground water. For this reason, the hole around the outside needs to be properly sealed. If surface water is allowed to get into the ground water or into the well itself, it can carry with it many different contaminants, such as bacteria or chemicals.

Additionally, when you pump water out of the well, it sucks water from the surrounding area, which can pull in even more contaminants.

If the top part of the well is not properly sealed, small animals such as rodents, insects, spiders, and slugs can crawl inside. Often they fall in to the water and decompose. This introduces bacteria into the water.

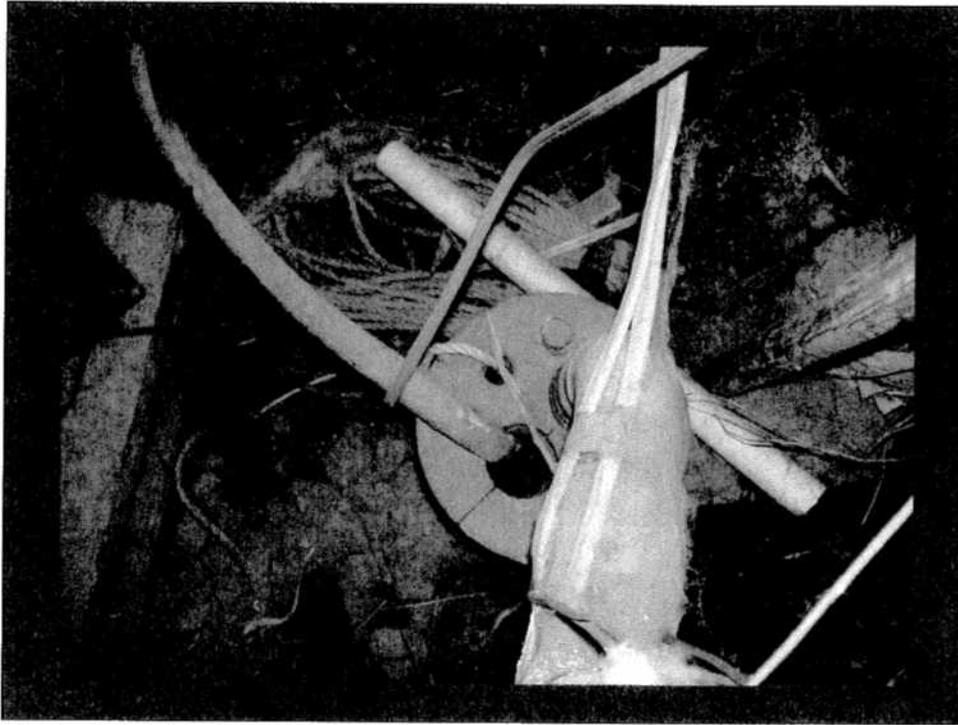
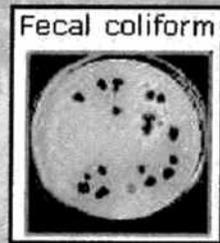


Photo from Benton-Franklin County shows how a rope can create easy access for rodents into a well.

## Bacteria in Well Water

- **Coliform Bacteria**

- Found in the surface environment such as soil, vegetation, or human and animal waste
- Indicates that surface water is getting into the well



Coliform bacteria come from natural sources, including soil, vegetation, and human and animal waste. Feces may carry organisms that cause disease. Coliform bacteria are only found in the surface environment and so the presence of them indicates:

1. that surface water is somehow getting into the well.
2. that the water may be contaminated with disease-causing organisms.

## Nitrate in Well Water

- Sources include fertilizers, animal manure, decomposing vegetation, and septic systems
- May cause anemia and even death to young infants (“Blue Baby Syndrome”)
- Maximum contaminant level of 10 mg/L
- Concentrated by boiling
- Levels often fluctuate



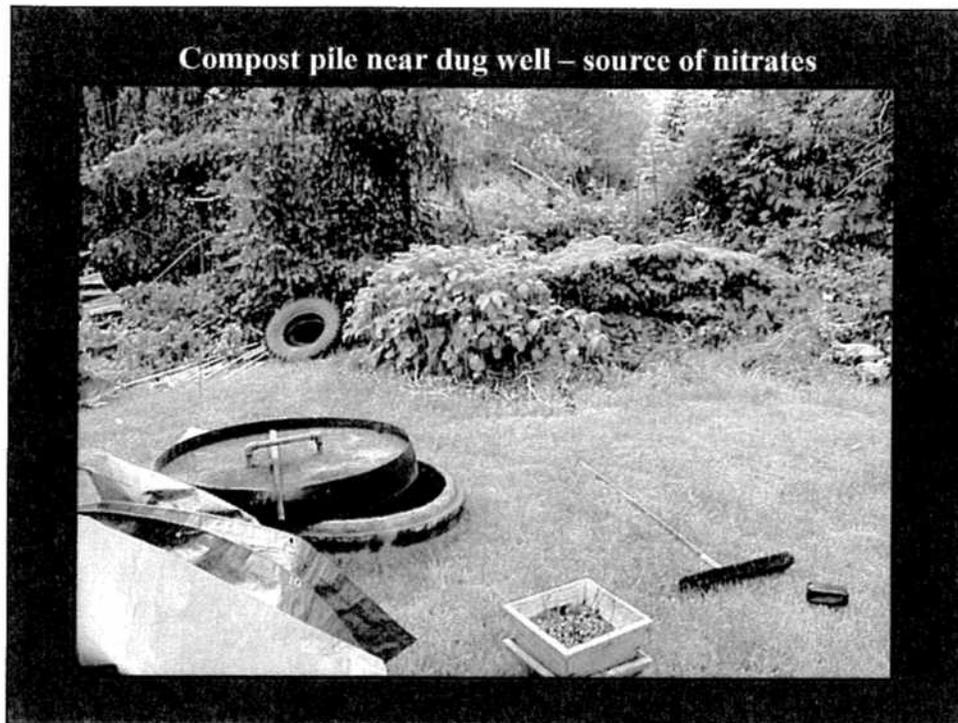
Nitrate is highly soluble in water. Sources of nitrates include fertilizers, animal manure, decomposing vegetation, and septic systems. High levels may be common in agricultural areas.

Methemoglobinemia is a condition caused when nitrates are converted in the body to nitrites. The nitrites then bind very tightly to hemoglobin in the blood, making it less able to carry oxygen. The individual, often a young infant, turns blue because their tissues lack oxygen. Thus the name “Blue Baby Syndrome.” This can be fatal if untreated. First reported in 1944, cases of methemoglobinemia now number in the thousands (often from rural areas). It is thought that high nitrate levels in well water are one cause of this condition. Infants are exposed through well water used to make infant formula.

Infants more susceptible because: lower gastric acid causing increased bacteria converting nitrate to nitrite, fetal hemoglobin more susceptible to conversion to methemoglobin, drink a lot more water per body weight than adults. 542 cases of nitrate/nitrate exposure in children under 6 years old in 1991-1992; 1825 overall.

The maximum contaminant level (MCL) is 10 mg/L. Boiling water does not get rid of nitrates - it actually concentrates them.

The level of nitrate in the ground water can vary from one point in time to another. For this reason, periodic testing is recommended.



Example of potential well contamination from compost pile. Compost pile can be a source of nitrate contamination and/or coliform bacteria.

Sanitary Control Area (SCA) is the area around the well that must be completely free of any potential contamination sources. Examples include:

- 100' from septic system tanks and drainfields
- 100' from gas tanks
- 250' from manure piles

## Other Contaminants

- Arsenic (Maximum Level = 10 ppb)
- Fluoride (Maximum Level = 4ppm)
- Pesticides
- Lead
- Other chemicals or metals



Other contaminants may be particular to a geographical area, nearby roads, business, or activities, or your own practices such as fertilizers

Arsenic - found naturally in patches in the ground in certain areas of Washington state. Also was used as a wood preservative and was found in early pesticides. High doses cause abdominal pain and vomiting and can damage kidneys, blood vessels, and nerves, with prolonged exposure being associated with some cancers. EPA recently lowered the allowable level of arsenic from 50 ppb to 10 ppb.

Fluoride (in regards to the question: Do water filters affect the fluoride content in water from a water system that adds fluoride? If yes, what can the child care provider do to replace the fluoride in the water?)

This question is for public (Group A) systems, which often add fluoride for dental health. Some home treatment systems, such as Reverse Osmosis, may remove the fluoride. Most do not. Fluoride cannot be replaced in the water by an individual home owner. Dentists and doctors can prescribe fluoride for individual patients. Most well water does not contain fluoride, but there are some naturally occurring fluoride deposits in parts of Washington state. (Some are even higher than the maximum allowed level for drinking water).

Pesticides - these things are toxic, used to kill weeds, insects, rodents, etc. They are hazardous to human health and need to be kept out of our drinking water. Do not store, apply, or mix these chemicals near your well and try to use less toxic methods of getting rid of pests.

There are many other chemicals or metals that can be in the well water. They can come from natural deposits, surface water contamination, or even from plumbing from the well or within the house.

Your local health department can give you advice on what to test for in your area.

## Keeping Contaminants Out

- Make sure the well is sealed to keep critters and contaminants out
- Keep sources of contamination 100 feet away from your well
- Don't store chemicals in the well house



Looking at a well, there should be no holes in the casing or in the lid (such as where wires pass through). The area around the well should be sealed with concrete for a dug well or bentonite for a drilled well.

\*\*\* Pass around Bentonite

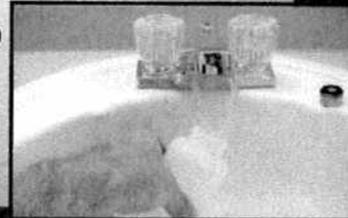
Sources of contamination must be kept at least 100 feet away from the well. These sources may include:

- a septic system
- animal pens/pastures (cows, pigs, dogs, etc).
- manure piles
- old vehicles
- fields or gardens where pesticides are used

Look at what is stored in the well house. Because child care providers have to watch where they store their chemicals to make them inaccessible to children, we often see toxic products moved out to the well house. Spills or possibly even fumes could contaminate the drinking water from the well. The well house is not the place to store such items.

## Testing the Water

- Test every year for coliform bacteria
- Test every 3 years for nitrate
- Contact your local health department for other recommendations
- **Must be done properly to get accurate results**
- Cost is \$15-20 per test



Getting an annual bacT test for your well can be compared to having routine maintenance done on your car, or going to the doctor for an annual exam, or taking an infant in for a well-baby check-up. Many times we may assume the water is okay, when in fact it is not.

It is critical that the water sample be taken properly. If the bottle is contaminated by the person taking the sample, you can get an unsatisfactory result when the water is fine. The opposite can also occur. One provider stated to us that she had been taking samples periodically for over 20 years and they were always okay. The sample taken by our staff was unsatisfactory and a problem with the well itself was found - critters. She had been sampling from her hot water heater instead of from the well.

## Well Systems

- **Group A System** – a water system with 15 or more connections (WAC 246-290)
- **Group B System** – a water system with 2-14 connections (WAC 246-291)
- **Individual Well** – a well serving a single family home (no state standards; LHI regulates at time of building only)
  - No testing requirements, only recommendations
- **Bottled water** – allowing a lower standard and is considered poor public health

Group A definition: A very general definition of a Group A water system is a system with 15 or more connections or serving 25 or more individuals. They can serve a community (such as a housing development, which may include family home child cares) or a non-community source (such as a business, school, child care center, motel, restaurant, etc.). Group A systems can also be divided into transient and non-transient. A non-transient water system provides service to 25 or more of the same nonresidential people for one hundred eighty or more days within a calendar year. *In Snohomish County, Group A systems are always handled by Washington State DOH.*

Group B definition: means a public water system that is constructed to serve less than 15 residential services; or constructed to serve an average nonresidential population of less than 25 per day for 60 or more days within a calendar year; or any number of people 60 days within a calendar year.

Most family home child care served by wells will be in homes that have an individual/private well. Once the child care is licensed, it becomes a business and that **may** change the status of a water system from residential to commercial (Group B). It is up to the LHI to decide if these Group B standards will be enforced (often depends on what the primary usage is and if employees will be working at the residence). Problem: the requirements for a Group B well, in terms of the well site, well seal, and initial testing, are a lot stricter than for an individual well.

– serve a single residential connection. The Health District regulates these systems at the time of building permit issuance only.

**Inspection for adequacy of water supply for new construction** The Snohomish Health District reviews submitted information regarding location, construction, and testing of completed wells to demonstrate compliance with the Growth Management Act.

**Inspection of well seal construction and well decommissioning** The Health District was delegated by the Department of Ecology in accordance with RCW 18.104.043, the responsibility of inspecting well sealing, well decommissioning and well tagging for all drinking water wells constructed or decommissioned in Snohomish County.

Allowing for the use of bottled water assumes you would allow a lower standard than that required for new homes construction, which from a public health view makes no sense. Many contaminants are acute in nature and one exposure may lead to illness.

## Well Regulations

- DOH sets the regulations for water systems
- When a business is run out of a residence, the LHJ may require the well to meet Group B standards
  - Depends on LHJ definition of residential usage
- Enforcement of Group B standards varies across counties (may be done by DOH or the LHJ)

Group B standards include:

regular testing

surface seal

protection of the sanitary control area

Most individual wells that are currently serving child care businesses could easily meet the testing requirements, and could likely meet the surface seal requirement (few hundred dollar investment).

SCA area may be more difficult to meet; however, the Group B system requirements do allow the regulating agency (DOH or the LHJ) to grant a waiver if the health of the consumer is not compromised.

Local Health Jurisdictions may adopt rules that are MORE stringent than the DOH rules, or may adopt the DOH rules as-is. They cannot be less stringent.

LHJs can determine if operating a child care out of a home means 'non-residential usage'. In Snohomish county, as long as you are operating in a home that is zoned residential, we require only residential standards, but make recommendations about testing. To support this recommendation, we provide free annual water testing for child care providers.

## Examples

- Snohomish County has 66 providers served by wells since 1995
- 26 (39%) wells we've sampled have had at least one unsatisfactory well water result
- 7 wells at/above the arsenic MCL
- 1 well at the MCL for nitrate

Sampling records since 1995: 66 wells have been tested repeatedly and 26 (40%) of these wells have had \*at least\* ONE unsatisfactory well water result.

But – this number includes many wells that we have tested only once. If we look only at the 39 wells that we have done the tests on over the course of multiple years – 23/39 or 59% have had at least one unsatisfactory bacterial test

{In Snohomish County, CCHP has done 90 well tests in the past 3 years (June 2005 – June 2008) and 19 have tested unsatisfactory (20%)}

In comparison, Snohomish Health District tests approximately 1500 PUBLIC water systems (Group A and B) annually and only 1% of samples test unsatisfactory.

## Important Points

- WAC 170-296-1140
- Well water testing is important
  - What you test for and frequency of testing depends on the type of well and local geography
- Well site inspection is important
  - Integrity of the well
  - Identify sources of contamination
- Both should be done under the guidance of the LHJ

WAC 170-296-1140 states

“You must provide:

1) Drinking water supplied from:

(a) A public water supply regulated by Washington state department of health drinking water operations or the local health authority as appropriate; or

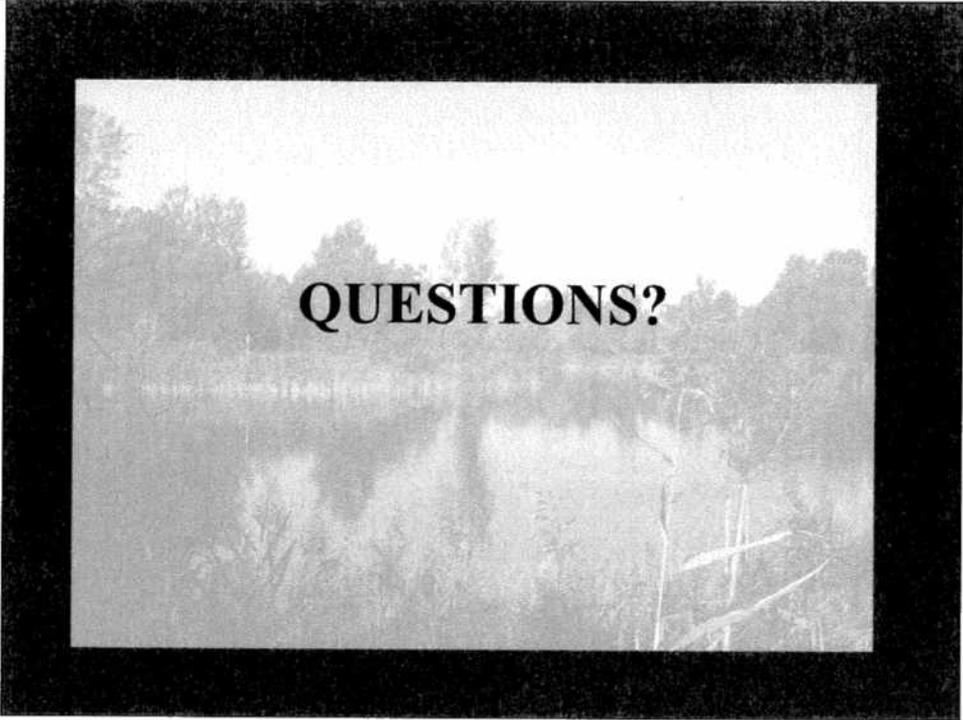
(b) An individual water supply operated and maintained in a manner acceptable to the local health authority; or

(c) Commercially bottled water

The primary goal is to ensure the safety and health of the children in child care. Having safe, healthy water to drink is important for their growth and development.

There is a need for annual testing for bacteria (not just every three years for their license renewal). Nitrates should also be tested for at least every three years. But the frequency of testing and what to test for depends on the type of well, the construction of the well, and the location of the well.

Inspection of the well site is also important. chemicals in and around the well and well house, the sanitary control area around the well head for any obvious sources of possible contamination (such as animal pens, old cars, or manure piles).



**QUESTIONS?**