

BAINBRIDGE PREPARES



★ ROCK STEADY ★
WATER RESOURCE TEAM



This presentation will just give an overview focusing on 3 important questions:

1. **Why** do we need to pay attention to sanitation? (to protect public health and guard against the spread of disease)
2. **What** is it that we need to pay attention to? (the full sanitation service chain: containment, emptying, transport, treatment, disposal)
3. **How** can individual households go about this? (there are a variety of solutions, depending on the specific situation, ranging from continued use of septic tanks to pit latrines or a dual bucket system).

Practical Information on equipping your household with a dual bucket system will be available and can be discussed if there is interest in this.

Why Bother?

WHY

WASH Prevents Disease

- ▶ Water, Sanitation and Hygiene (WASH) is the 3-legged stool of public health
- ▶ Clean water will be the most important resource for survival after an emergency
- ▶ Hygiene is essential to prevent spread of disease (wash hands!)
- ▶ Sanitation closes the loop: your poop can spread disease



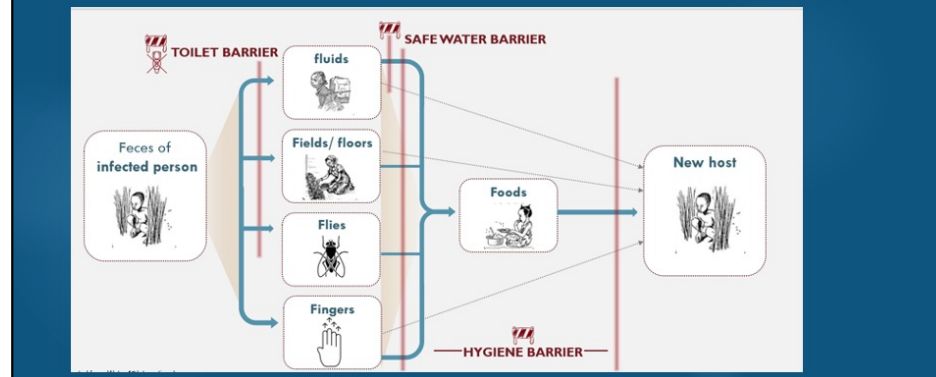
This really shouldn't need any further explanation...

Effective sanitation is essential to provide a healthy and acceptable environment for people to live in after a disaster strikes. The first priority in preventing the spread of fecal contamination is to isolate and contain feces. The links between sanitation, water supply, and health are directly affected by hygiene behavior. It is important to bear this in mind when considering options and next steps, so that solutions are effective and acceptable and can be used and maintained hygienically.

The image of the F-diagram on next slide makes visible how disease organisms (viruses, bacteria, protozoa) spread through the environment, and how transmission can be interrupted.

Spreading disease: The F-Diagram

WHY



Human feces may contain a range of disease-causing organisms including viruses, bacteria, and eggs or larvae of parasites. On the other hand, urine is relatively harmless. Microorganisms contained in human feces may enter a human body through contaminated food, water, eating and cooking utensils, and by contact with contaminated objects. Fecal-Oral transmission of enteric microorganisms may especially be a major cause of illness in disasters and emergencies. Such infections can contribute to stress, fluid loss and undernourishment, making people more susceptible to the impacts of other health hazards. The F-Diagram in this picture shows the Fecal-Oral transmission routes.

For those interested in details about how public health engineers talk about the spread of disease.

The F diagram was first developed in 1958 and it makes visible how disease can spread.

Start on the left, with an infected person going to the toilet out in the open (i.e. not using a toilet).

[Infected person meaning someone who carries an infectious disease.

Diarrhea, cholera, giardiasis, amoebiasis, intestinal worm infections,... the list

is long. What these diseases have in common is that they spread via the fecal-oral route; i.e. the feces of a sick person reach the mouth of a healthy person, by one of the routes displayed on the F diagram.]

The feces that are now in the environment can contaminate a local water source (fluids) and drinking this water (or using it to prepare food) can infect a healthy person, making them sick.

Or imagine the contamination being carried on someone's feet to the floor of a home, where a baby plays. Other F's include the spread by flies, or (unwashed) fingers...

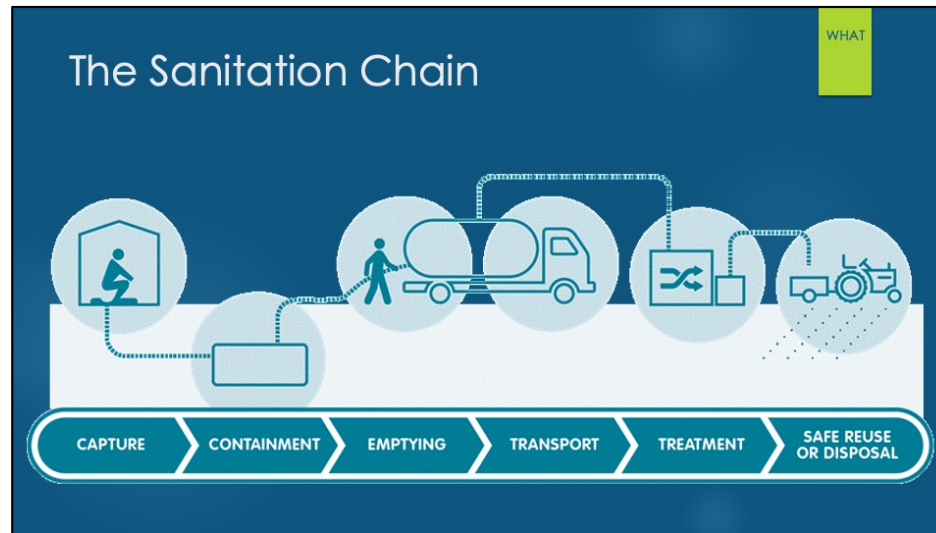
All of these have routes to the mouth of an uninfected person, either directly, or through preparation of food.

Using a toilet (see "Toilet Barrier" on the left) interrupts many of those pathways. Washing hands after using the toilet interrupts all of them.

Water treatment and safe storage (see right Safe Water Barrier) interrupts the "fluids" pathway.

The Hygiene Barriers (see bottom) operates at two levels (hygiene practiced by the uninfected person, or by the infected person and potential others in the middle) can interrupt almost all transmission (hygiene here primarily interpreted as the practice of washing hands with water and soap, or use of an alcohol hand cleanser at critical moments: before preparing food, after cleaning a baby / changing a diaper, before eating).

This information may be over the top for most people; in the US it is not hard to convince people of the need to practice basic hygiene. But this could be a nice summary for those who are interested.



Safe management of human waste (poop and pee) does not stop at the toilet. Unless we address all steps in the chain, we will not eliminate risk of disease transmission through waste.

Our discussion today will only cover the capture and containment steps shown in this picture.

But for the community to be safe and protect public health, collection, transport, treatment and final disposal also need to be addressed. However, this goes beyond the level of responsibility for individual households. Bainbridge Prepares / the City of Bainbridge Island / Kitsap County will have roles to play in ensuring those steps are thought through, and systems are in place to handle them.

At the time of this writing (8/2023), this is still a work in progress, but at today's discussion, available details will be shared.

The Bainbridge Sanitation Chain Today: Magic Toilets

- ▶ Today, everyone on Bainbridge has a magic toilet (picture on right)
- ▶ Push the handle, and all waste disappears
- ▶ Requires water (1.6 gallons per flush) and either a sewer connection, or a septic tank and a drainfield.



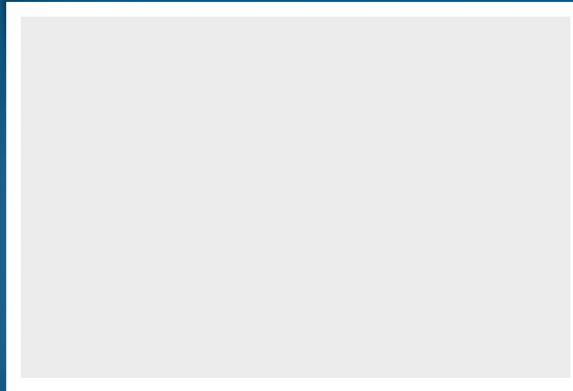
Easy to take for granted, but magic toilets need a lot of systems and infrastructure to work.

Sewers have pumping stations, miles of pipe (which sometimes break, as we well know) and a treatment station at the end, requiring power, supplies and skilled operators.

Septic tanks require a functional drain field to which the tank is connected, and they need to be emptied every 3-5 years, with the waste finding its way to a treatment plant.

After: No More Magic

WHAT



It doesn't really matter "After what?" Could be an earthquake, a fire, a flood,...

The thing to think about is that for most of us on Bainbridge, our magic toilets will no longer function.

This situation is likely to last for weeks, if not months.

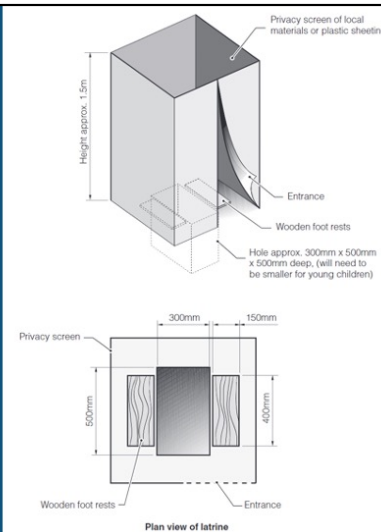
With a family of 2 producing 4lbs of waste every day, this adds up quickly.

It is important to let that sink in, and to act now to make sure you are prepared for that situation.

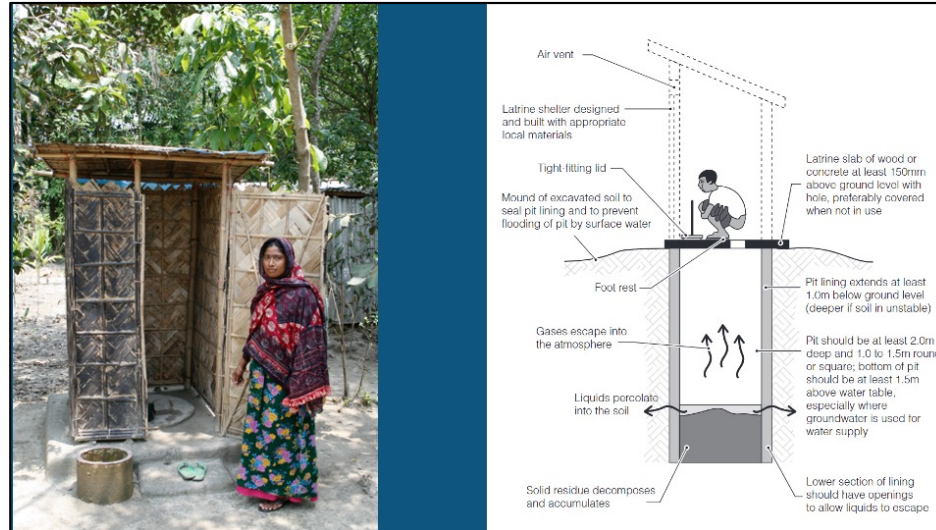
There is no "one size fits all" solution. What will work will depend on your situation. There is a solution for each situation that exists on Bainbridge and the following slides will outline them.

1: Latrines (pit- or trench toilets)

- ▶ Pit in the ground that collects poop and pee
- ▶ Simple, cheap, effective
- ▶ Suitable for the more rural parts of BI, where space is not an issue
- ▶ Used by individual household, or shared
- ▶ Longer-term versions possible (3-5 years) but take more excavation and construction



Detailed instructional manuals (in English and Spanish) for the construction of temporary or semi-permanent pit latrines are available (as Word document, or PDF) from the Bainbridge prepares Water resources Team.



Picture: Permanent pour-flush pit latrine in Bangladesh (JW Rosenboom).

2: Three bucket system

HOW

- ▶ 1 bucket for pee, 1 for poop, one for filler material
- ▶ Simple, cheap, effective
- ▶ Suitable for urban and rural settings, apartment buildings, etc.
- ▶ Used by individual household
- ▶ Requires collection and treatment / disposal for bagged waste



The Twin Bucket System was developed in Christchurch, New Zealand after the February 2011 earthquake. The system meets the criteria of being simple, cheap and effective. The key to this method is separating pee and poo. This lessens volume and odor, making bucket contents safer and easier to store and dispose of. This method is ideal for dense urban areas with limited open space and locations with a high water table.

Use in familiar setting

- ▶ Separating pee and poo minimizes odor
- ▶ Using boat/RV toilet paper minimizes volume, but not essential
- ▶ Cover poop with organic material after each use (sawdust, shredded paper, leaves, etc.)
- ▶ Put toilet paper in poop bucket.
- ▶ Tie compostable plastic bag closed once half full and replace. Store full bags away from food, water, kids, etc. Don't put in garbage bin.
- ▶ Empty pee bucket outside, if possible after diluting with grey water
- ▶ Everything you need available at ACE Hardware on BI except toilet seats and compostable liner bags.



Three-bucket system components - About \$200.00

- ▶ 3x5 gallon buckets, three lids
- ▶ 2x bucket toilet seats (Amazon)
- ▶ Peat moss, kitty litter, sawdust, landscape bark
- ▶ Scoop
- ▶ Biodegradable liner bags (Amazon)
- ▶ Potable water
- ▶ graywater bucket
- ▶ hand sanitizer
- ▶ soap
- ▶ toilet paper, paper towels
- ▶ gloves
- ▶ 32 gallon sealable trash can



Bucket Toilet Seats and biodegradable liner bags from Amazon

- ▶ 5 gallon bucket toilet seats (2 required)
- ▶ https://www.amazon.com/dp/B0BBFD9C4G?psc=1&ref=ppx_yo2ov_dt_b_product_details
- ▶ Biodegradable liner bags.
- ▶ https://www.amazon.com/dp/B0BFHYVRHP?ref=ppx_yo2ov_dt_b_product_details&th=1

Resources

▶ **Sanitation Guidance:**

- ▶ <https://extension.oregonstate.edu/catalog/pub/em-9334-survival-basics-sanitation-waste-management#Hand-washing%20system>
- ▶ <https://www.phlush.org/emergency-sanitation/>

▶ **WHO Technical Notes, WASH in Emergencies:**

- ▶ <https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/environmental-health-in-emergencies/technical-notes-on-wash-in-emergencies>

▶ **Sphere Standards and Handbook (emergency response):**

- ▶ <https://www.spherestandards.org/handbook/>

Also, I downloaded a number of resources and put them on the google Drive:
Water/Sanitation Team members/Sanitation External Resources

Photographs and images used in this presentation (plus others, not used) are also on the Google Drive and are free to use:

Water/Sanitation Team members/Visual materials



QUESTIONS?