

# Handwashing: Prevent Disease & Outbreak Intervention

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FOR HIGH SCHOOL AND ADULTS

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# Preparing for Handwashing with Adults

## Materials:

- rubber chicken
- non-preservative bread
- Small baggies
- petri dishes
- cotton swabs
- distilled water
- markers
- masking tape
- blacklight
- Glow germ lotion and powder
- sandwich
- bar soap
- antibacterial soap
- alcohol hand sanitizer gel or wipes

## Objectives:

- Emphasize the importance of good handwashing for the prevention of disease.
- Teach correct handwashing technique.

# People Really Don't Wash Their Hands

Today we are going to give you information about the two most important things that can keep you healthy or make you very sick. They are your hands!

## There is good news and bad news.

The good news is that proper, thorough handwashing can help you remain healthy and good handwashing is very easy to do.

The bad news is that people don't wash their hands or don't do it well enough to make a difference.

- According to the American Society of Microbiology 97% of females and 92% of males say they wash but actually only 75% of females and 58% of males wash.
- Fifty percent of middle and high school students wash, and of these only 33% of females and eight percent of males use soap.

## What's the Big Deal?

- Hands are the most exposed part of the body to germs.
- Germs are hiding everywhere.
- Germs are microscopic.
- Germs are tough.
- People can become very ill.
- Illnesses have an economic impact.

## Hands are the most exposed part of the body to germs.

A person has more bacteria on their body than there are people in the United States, according to Colorado State University Extension. Touching the eyes, mouth, nose or food transfers the germs into the body. Also pretend sneeze into your hands. Who would like to shake hands with me? Have you ever watched someone sneeze heartily into his or her hands and then touch a door handle? Where do you suppose the germs from their hands went?

## Germs are hiding everywhere.

"The bulk of germs are hiding where you least suspect – playground equipment, the phone receiver, ATMS and elevator buttons." according to Charles Gerba, professor of environmental microbiology at the University of Arizona. There are:

- 229,000 germs per square inch on frequently used faucet handles.
- 21,000 germs per square inch on work desks about 400 times more than the average toilet seat.
- More germs at the kitchen sink than at the toilet.
- 1,500 on each square centimeter of hands.

## High on the worst list:

- Work desk
- Kitchen sink
- Dishcloth, sponge
- Garbage can
- Refrigerator
- Telephone receiver
- Bathroom doorknob
- Keyboards
- Escalator handrails
- Shopping cart handles
- Picnic tables
- Pens, pencils and crayons
- Remote controls
- Light switches
- Bathroom cups
- Pet cages
- Toys

## GermS are microscopic, so you can't see them.

There are also good bacteria and other microorganisms. Some good ones are also on your hands and are fighting the bad ones. Some microorganisms are used for making bread, beer, and yogurt.

## GermS are tough.

Viruses can be transferred from dry smooth surface up to 20 minutes after being contaminated. E. Coli, salmonella and other bacteria can live up to two hours on surfaces like doorknobs, keyboards, and tables. Viruses can travel on droplets through the air.

Bacteria doubles every 20 minutes. Five bacteria in a sandwich at noon will total over 10 million by 7 pm. After three days, with no bacteria dying, there would be enough to cover the earth.

Microorganisms can build up resistance to medications intended to kill them. Hot water or freezing will not kill bacteria – only temperatures over 140 degrees can kill germs.

## People can become very ill.

Everyone, no matter how clean, will have bacteria and viruses on and around them. Usually this will not make people ill. However, for small children, infants, elderly and people with compromised immune systems, bacteria and viruses can make them very ill; can cause long illnesses and even death. One bacterium can make an infant very ill.

## Illnesses have an economic impact to society.

Approximately one-fifth of the population attends or works in a school. The US Center for Disease control (CDC) reports 164 million school days lost per year. There are 25 days lost per every 100 Americans per year for diarrhea, second only to the common cold. Teacher illness costs time and money. Teacher absences averaged 5.3 days per year, students 4.5 days. Costs add up for substitute teachers, re-teaching absent students, lost workdays for parents, decrease numbers for school lunches. Parents lose work time to stay home with sick children or for themselves.

# Four handwashing experiments

## Rubber Chicken and Blacklight

**Materials:** Rubber chicken, other items to pass, Glitter Bug powder, blacklight stick, extension cord, telephone, an apple or other fruit and a sandwich

**Note:** You may do this experiment before the start of the presentation.

### Procedure:

1. Prior to arriving, sprinkle Glitter Bug Powder on rubber chicken and other items including handouts. Rub on well so it is invisible. Pass items around the room for all to touch without telling them about the Glitter Bug powder.
2. After all have touched the items, tell them that the items had fake germs on them that will glow under blacklight.
3. Turn out lights and take ultraviolet light around room or have participants come forward to observe their hands under the blacklight.
4. Use the blacklight stick to trace the “germs” from the objects to their hands, face, tables etc.

### Script:

Before the presentation started, I sprinkled a substance called Glitter-Bug powder around the room. Even though the powder is all over in the room, the only way we can see it is by using an ultraviolet light. Microorganisms are a lot like this powder. Microorganisms can be everywhere, even though we can't see them without the use of a microscope.

Remember the rubber chicken? When you touch a real raw chicken, where do the germs go? How about picking up a sandwich after touching raw meat and not washing your hands – where do the germs go? (Using a real sandwich has a better effect.) What about cutting up a raw chicken on the counter (demonstrate with rubber chicken). Now I put my sandwich on the counter (where the chicken was) when I go to answer the phone. And how about the chicken juice on the phone?

After using the toilet and toilet paper and then not washing hands, you may have microscopic bacteria on your hands. Then pick up a sandwich. Again, where do the germs go? You ingest them. That's what makes you sick – also touching your mouth, nose or eyes gives the germs a way to get inside your body.

### How do hands get germs on them?

- Everyone had a chance to touch the “contaminated” rubber chicken.
- If your hands were contaminated from the items you passed around, would you want to pick up an apple and eat it? (Demonstrate)

- If your hands had really touched bacteria laden objects, not washed your hands and then ate an apple, you could have put bacteria in your mouth if you hadn't thoroughly washed your hands after touching the items.

## Growing Germs in Petri Dishes

**Materials:** *Sterile petri dishes, sterile swabs or Q-tips, distilled water, masking tape and permanent markers.*

*Note:*

*Petri dishes can be obtained from a local hospital or clinic. If they have reached an expiration date, the facility cannot use them for tests. They still will work for this experiment.*

*Red gelatin made with less water can be used for this experiment as well. Small sample plastic cups from a local deli will work well to hold the gelatin.*

### Script:

Today we will each be selecting an object or surface to sample for microorganisms. We will be growing the microorganisms in containers called petri dishes. The red gelatin-like substance in the petri dishes is called agar. The agar provides nutrients or food to the microorganisms so that they can grow—they are used to test for strep throat. It will be interesting to see which objects or surfaces have the most microorganisms including our hands.

### Procedure:

1. Give each person the following items or two can share a dish:
2. Instruct the participants to select one surface or object that they would like to test for the presence of microorganisms.
3. Each person should test a different surface or object, rather than several testing the same area.
4. Mark the bottom of the petri dish in half with permanent marker and test two sites or touch one side with their fingers.
5. Instruct the participants to hold the swab at one end, and rub it over the surface or object to be tested.

If the object or surface is dry, the participants should wet the swab with distilled water and then rub the swab over the object or surface.

6. If the object or surface is wet, the participants should use a dry swab to rub over the object or surface.

The participants should then gently rub the swab on the agar and touch part of the plate with their fingers, close the lid, and tape the dish shut around the edge.

7. Dishes should be labeled with the names, class period, and the name of the surfaces or objects tested if used in a classroom.

- Label one clean, unused petri dish as the control. The control is used to show that a petri dish that was not opened would not have any microorganisms growing on it. Any growth on the petri dishes is coming from the surface or objects that they tested.
- Place the dishes in a warm spot (such as on top of a refrigeration unit, wrapped in plastic in a sunny window, or by a heater) for three days. Store them upside down so there is no chance of anything leaking out of the dishes.
- Without opening the dishes, the students should examine the petri dishes daily.  
  
Safety Note: Never open the dishes anytime after adding the contaminant. The dishes could contain harmful microorganisms, which could cause illness if people are exposed to them. A cross-curricular activity suggested is to have students look at their plates under a microscope.
- At the end of exercise, collect dishes for proper disposal. Check with the custodian or janitor.

## Dirty Hands on Bread Slice

**Materials:** *Preservative-free bread, sandwich bags, permanent markers and water*

### Procedure:

- Ask students to touch their desks, hair, and faces to get their hands contaminated.
- Give each student a piece of bread or a half piece and instruct them to touch it all over, keeping it flat.
- Have students place bread slice in bag with two small drops of water. Seal shut.
- Label with name and date.
- Put all bread slices in a brown grocery bag and seal shut. Place in warm spot.
- Have one piece of bread in a baggie that was untouched as a control.

Note: Takes about five days for good mold growth

## How to Wash Hands

### How long do you need to wash your hands to be effective?

- 20 seconds

### How is a thorough handwashing done?

#### Three Components:

- Soap
- Warm running water
- Friction



## Technique:

Soap and warm running water, fingers pointing down, rub hands vigorously for 20 seconds. Wash all surfaces including:

- Backs of hands
- Wrists
- Between fingers
- Tips of fingers
- Thumbs
- Under fingernails (nailbrush is best)
- Dry vigorously with paper or clean cloth towel
- Turn off faucet with towel
- Open door with towel

## Why It Works:

- The soap suspends the dirt and soils.
- The friction motion helps pull dirt and greasy soils free from the skin.
- Warm running water washes away suspended soils that trap germs.
- Final friction of wiping hands removes more germs.

## Handwashing Under Blacklight

**Materials:** *Glitter Bug lotion, ultraviolet light stick, access to warm water, soap, paper towels and a 20-second timer*

Warning: People with skin allergies should not use this lotion.

## Procedure:

1. Place one drop of Glitter Bug Potion in the palm of each student's hand; have them rub Glitter Bug Potion all over their hands and wrists as if they were applying hand lotion.
2. Students observe "contaminated" hands under UV light.
3. Instruct to wash hands without any hints as to correct technique.
4. Have all students check hands with UV light for any residual Glitter Bug Potion.
5. Point out areas commonly missed: cuticles, under nails, thumb and finger webs, wrists.
6. Use 20-second timer to demonstrate how long 20 seconds is.
7. Instruct as to correct handwashing procedure:
  - Soap and warm running water
  - Fingers pointing down
  - Rub hands vigorously for 20 seconds
  - Wash all surfaces including:
    - Backs of hands
    - Wrists

- Between fingers
- Tips of fingers
- Thumbs
- Under fingernails (nailbrush is best)
- Dry vigorously with paper or clean cloth towel.
- Turn off faucet with towel,
- Open door with towel.

## When to wash hands:

- After going to the toilet or changing diapers
- After coughing or sneezing
- After getting visible soil on hands
- After handling raw meat/poultry or unwashed fruits and veggies
- After playing with pets
- After smoking, eating or drinking
- After touching sores, lacerations or infected areas
- After playing/working outside
- After playing in water more than one person has used
- After touching any animals
- When arriving at work or school
- Before handling foods
- Before eating
- Before giving medications
- Before putting contacts in eyes
- Before playing in water more than one person is using
- Before touching ready-to-eat foods/snacks

Note: If soap and water are not available, use alcohol wipes or gel if hands are not visibly soiled.

## Good Handwashing Really Works

The US Centers for Disease Control (CDC) confirms, “Handwashing is the single most important means of preventing the spread of infection.” A Wirthlin study of 305 Detroit students washed four times a day resulting in 24% fewer colds and 51% less stomach upsets. A Minnesota daycare provider reported that teachers helped the kids wash their hands every morning when they arrived and the staff disinfected all areas parents may have touched. Result was 50% fewer illnesses at those daycares. Another Minnesota school has begun using foam soap resulting in a 75% increase in handwashing rates.

# Which Soap is Best?

## Regular Soap, Antibacterial Soap or Alcohol Hand Sanitizers?

Soap and water is very effective and is necessary if soil is visible. To really work, handwashing must be done frequently and properly. Washing with plain soap and water will eliminate most bacteria.

“Using hand sanitizers is an excellent method for hand hygiene and can be alternative to soap and water, particularly when a sink isn’t available” according to Harvard Medical School. Alcohol based sanitizers kill 99.99 percent of the most common germs, they work within seconds and without water. In order to prevent drying effects of the alcohol, the sanitizers need to contain moisturizers. These products do not have any effect on viruses.

The American Medical Association and the CDC do not recommend use of antibacterial soaps. Many scientists fear widespread use could lead to a strain of resistant bacteria or "super bugs." There is no need to use anti-bacterial soaps, which may actually do more harm than good. The antibacterial compounds need to be left on hands for about two minutes or these products do not have any effect on bacteria. These products have no effect on viruses.

## So What is the Big Deal?

So we ask the question again – What’s the Big Deal? Hands carry germs; germs are everywhere and very tough; can’t see germs; people can get very ill.

Good news: a simple handwashing can prevent illness for you and your family.

- It’s better to be safe – not sorry.
- Be Safe: wash your hands for 20 seconds or use alcohol wipes.
- Or Be Sorry: you might get very sick.
- Be Safe Not Sorry.