

Pandemic Plan for the Church

Ministering to the Community in a Time of Crisis

Using Bleach

Currently there are over one hundred disinfectant products registered with the EPA labeled with a claim to inactivate "avian influenza A" viruses on hard, non-porous surfaces. For a list of these agents, and more information, please visit the web page:

http://www.epa.gov/opp00001/factsheets/avian_flu_products.htm.

These solutions are available through medical supply companies, retailers supplying poultry farms and online suppliers. They are not necessarily easily obtainable to those outside of these industries. Due to the ease of availability and the ability to stockpile, we will discuss the use of bleach which is readily on hand at the local grocery.

The World Health Organization (WHO) recommends sodium hypochlorite (bleach / chlorine) The World Health Organization (WHO) and other public health agencies recommend using sodium hypochlorite (bleach / chlorine) to disinfect surfaces contaminated with H5N1 avian influenza, particularly for cleaning up materials exposed to blood or body fluids. Bleach is effective at inactivating the virus on hard surfaces.^{i ii iii} The US Centers for Disease Control (CDC) recommends using EPA-approved disinfectants effective against influenza A viruses, which includes household bleach solutions, for cleaning and disinfecting contaminated surfaces and equipment associated with avian influenza.^{iv} Reiterating, CDC states that bleach solutions will be effective against viruses, bacteria, and fungi when properly diluted.^v

Household bleach typically contains 5%-9% (often 5.25% or 8.25%) active sodium hypochlorite. Hypochlorite solutions have been proven effective against microorganisms such as viruses, bacteria and fungi and is approved for decontamination at facilities that are a biosafety level of four (BSL-4).^{vi} A biosafety level is the level of the precautions required to isolate dangerous biological agents in an enclosed facility. The levels of containment range from the lowest biosafety level one (BSL-1) to the highest at level 4 (BSL-4).

Although it is readily available, and cheap, there are many disadvantages to using bleach, some include:

- It has no detergent agent; therefore, it cannot penetrate soils – surfaces must first be cleaned prior to use.

- It is inactivated when in contact with organic matter such as blood, tissue, and saliva.
- It is very caustic – it can burn skin and eyes.
- It is corrosive – it can eat away at surfaces or metal.
- It is poisonous if ingested.
- It can create toxic fumes when mixed with other chemicals such as ammonia, hydrochloric acid, phosphoric acid and acetic acid (vinegar)
- It can become carcinogenic if mixed with formaldehyde.
- It discolors colored items such as materials, carpets, countertops and floors.
- Fumes can be irritating and even toxic.
- Fumes can move to other areas of the building.
- Diluted solutions cannot sit for long periods of time; they lose their effectiveness.

Precautions

- Follow the manufacturer's instructions, this will ensure efficacy as well as prevent ill effects.
- Pay close attention to the concentration, temperature, and the time the product needs to remain on the surface to be effective.
- Wear PPE such as gloves, mask, and eye protection.
- Different products may contain different concentrations of chlorine. Be sure the concentration is in the 5.25% to 8.25% range for active sodium hypochlorite.
- Use a new bottle of bleach if possible. Bleach loses its efficacy if it sits on the shelf for a long period of time. It should smell strongly of chlorine for it to be effective.
- Thick bleach solutions such as toilet bowl cleaners contain other additives that may be poisonous; these should not be used.
- Use plain bleach; do not use scented versions, as there are other additives that may affect the solution.
- Do not mix bleach with other chemicals as this can cause a reaction that can cause toxic fumes.
- Surfaces must first be cleaned with a detergent before disinfecting with bleach.
- Apply solution to a surface with a moistened cloth. Allow it to remain on the surface for at least three to five minutes and even up to ten minutes.

- After time allowed, wipe again with another clean wet cloth.
- The chlorine must be wiped away from metal objects with a more dilute solution to prevent corrosion. This can be done with clean water or 70% alcohol. Set apart cloths just for this purpose.
- If bleach gets into the eyes, immediately rinse with water for at least fifteen minutes and seek medical attention.
- Bleach is not intended as a disinfectant for hands, even a weaker solution of 1:100 should not be used. The principal means for disinfecting hands is washing with soap and water, coupled with the use of a commercial hand sanitizer with alcohol. (However, when serving in Haiti with a medical team, and dealing with cholera, we rinsed our hands in a 1:100 solution.)

Bleach Solutions

Differing solution strengths are used for different purposes:

- A strong 1:10 bleach solution (0.5% chlorine concentration), is used to disinfect items exposed to blood, urine or fecal material or surfaces exposed to corpses. It is also used to prepare the 1:100 bleach solution.
- A weaker 1:100 bleach solution (contains 0.05% chlorine concentration), is used to disinfect frequently touched surfaces, medical equipment, objects close to the patient, bedding, and other laundry.

Preparing Bleach Solutions

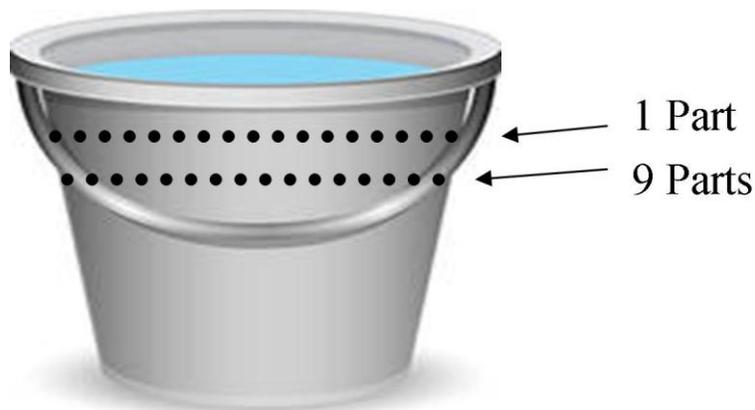
Diluted bleach solutions should be prepared fresh daily because they can lose their strength within twenty-four hours. If a strong smell of chlorine is not present, it has lost its efficacy. When preparing a bleach solution, the following is recommended:

- Solution should be prepared in a well-ventilated area (open windows).
- Wear PPE, avoid direct contact with skin and eyes.
- Use plastic containers because metal containers can corrode easily.
 - Use a plastic grade of HDPE (High-density polyethylene) #2, which has a high chemical resistance and able to withstand sodium hypochlorite.
- Start with household bleach that contains 5.25-8.25% sodium hypochlorite.
 1. Gather the necessary supplies:

- One container that holds ten measures (for example, ten cups) to make the base 1:10 bleach solution.
 - Five gallon buckets, cat liter buckets, large dog and cat dry food containers, clean milk containers, are examples of possible containers.
- One large or several smaller containers (One for each station) with covers or lids to hold the 1:100 bleach solutions. These containers should be labeled clearly of the different solutions.
- Chlorine bleach containing 5.25% active sodium hypochlorite.
- Use clean water. Do not use dirty or used water because organic matter destroys chlorine.
- A measuring cup or other container. A bottle or jar marked with one cup or one liter can be used.

2. Begin by making a 1:10 dilution:

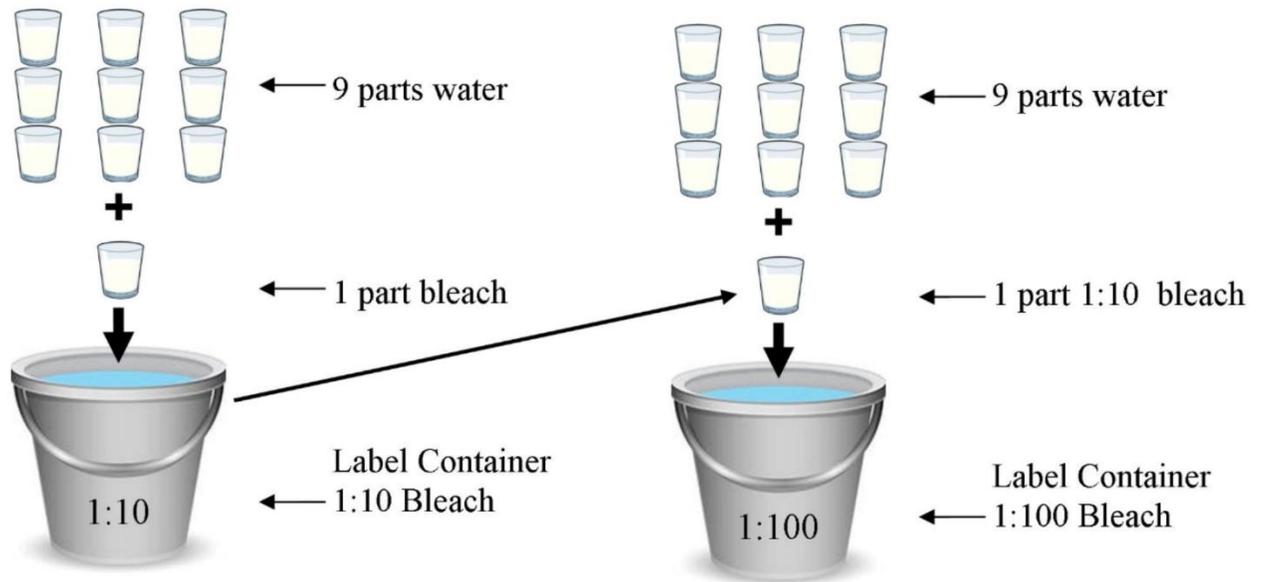
- Pour nine measures of water into the container.
- Mark a line on the container delineating nine parts.
 - You can use a permanent sharpie or scratch the plastic container.
- Add one measure of bleach to the first nine parts.
- Mark a line on the container at the total ten parts volume.
- This will make it easier and quicker for future solutions.



Making a 1:10 Bleach Solution

3. To prepare 1:100 bleach solution:

- Measure and pour nine parts of water into another large container.
- Then measure and pour one part of 1:10 bleach solution into the water to make a 1:100 bleach solution.



Making a 1:100 Bleach Solution

4. Place containers of proper solutions with clean cloths where they will be used.

- Be sure to label each container properly.
- Use the 1:10 bleach solution to clean after contamination with blood or body fluids.
- Use the 1:00 bleach solution to clean surface areas and laundry.
- When there is a large outbreak, make larger quantities.

Always follow label instructions. If instructions are not available:

- Leave the diluted bleach solution on the surface for at least 5 minutes before removing or wiping.
 - This is known as the “contact time” for disinfection.
 - The surface should remain visibly wet during the contact time.

- Apply bleach solution to the surface with a clean rag or sponge.
- Rinse the surface with warm water.
- Allow to air dry.

Remove the solutions every day or when solutions become cloudy or dirty. Remember if you cannot smell chlorine in the bleach solution, the concentration is no longer strong enough for disinfection. Replace the solution with a fresh supply.

Be sure to include surfaces such as:

- Doorknobs
- Light switches
- TV controls
- Telephones
- Keyboards
- Dresser tops
- Alarm clocks
- Bathroom surfaces
- Kitchen counter tops
- Faucets
- Floors
- Any horizontal surface

How to Clean the Walls and Floors

Walls and floors are not generally involved in disease transmission. However, in a highly pathogenic situation, if walls are visibly soiled – clean them as follows:

- Wash the wall with a detergent to remove any visible dirt.
- Use a sprayer or mop to wash the walls with 1:100 bleach solution.
- Rinse the mop in a fresh supply of 1:100 bleach solution.

- If using a sprayer, apply the spray close to the surface to minimize splashing and aerosols.
- Wipe the walls with a clean cloth.
- Discard any waste in container for collecting infectious waste.

Laundry

Although viruses do not survive as easily on materials such as sheets, towels, and clothing – laundry should still be handled with similar care as cleaning other items. Keep in mind there may be wet or dry bodily secretions or fluids, including respiratory droplets on the bedding. Use the following precautions when handling laundry:

- Wear gloves and a mask when handling the laundry of a sick person.
- Place the dirty laundry into a laundry bag that is kept in the patient’s room. Keep the bag closed when taking to the laundry room. Don’t carry unpackaged soiled linens out of the sick room into a clean room.
- Keep soiled linen at arm’s length; don’t hold laundry close to your body, or to your face.
- Make every effort to not shake or agitate the linens to unsettle any dried matter that has attached to the material. This will prevent contaminated particles from becoming airborne.
- Place laundry of sick person directly into washer from laundry bag; don’t place uncovered laundry in a basket for common use.
- Set the washer and dryer controls to hot.
- Soak in 1:100 bleach solution for thirty minutes. Be sure all items are completely soaked.
- Wash items in soapy water.
- Items may be line dried if necessary.
- After handling soiled laundry, remove gloves and perform hand hygiene.
- For additional information, see the section Laundry and Bedding, in “Guidelines for Environmental Control in Health-Care Facilities” at http://www.cdc.gov/ncidod/dhqp/gl_environmentinfection.html^{vii}.

ⁱ “Chlorine Inactivation of Highly Pathogenic Avian Influenza Virus (H5N1),” Eugene W. Rice, Noreen J Adcock, Mano Sivaganesan, et al., Emerging Infectious Diseases, October 13, 2007, https://pmc.ncbi.nlm.nih.gov/articles/PMC2851495/#:~:text=The%20study's%20results%20indicate%20that%20*%20The,of%20the%20virus%20to%20humans%20and%20poultry., Accessed March 2, 2026

ⁱⁱ “Coronavirus Disease (COVID-19): Cleaning and Disinfecting Surfaces in Non-Health Care Settings” World Health Organization, March 31, 2022, <https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-covid-19-cleaning-and-disinfecting-surfaces-in-non-health-care-settings>, Accessed March 2, 2026

ⁱⁱⁱ “Questions & Answers on potential transmission of avian influenza (H5N1) through water, Sanitation and Hygiene and ways to reduce the risks to human health” World Health Organization Department of Public Health and Environment & WASH Inter Agency Group, April 2007, https://cdn.who.int/media/docs/default-source/wash-documents/q-a-on-avian-influenza.pdf?sfvrsn=b09be87a_3, Accessed March 2, 2026

^{iv} “Guidelines for Laboratory Biosafety: Handling and Processing Specimens Associated with Novel Influenza A Viruses, Including Potential A(H5N1) Virus” Public Health, May 15, 2025, <https://www.cdc.gov/bird-flu/php/severe-potential/guidelines-for-laboratory-biosafety.html#:~:text=Decontaminate%20work%20surfaces%20and%20equipment%20with%20appropriate,directions%20for%20the%20safe%20use%20of%20disinfectants.,> Accessed March 2, 2026

^v “When and How to Clean and Disinfect Your Home,” U.S. Centers for Diseases Control, January 31, 2025, <https://www.cdc.gov/hygiene/about/when-and-how-to-clean-and-disinfect-your-home.html>, Accessed February 28, 2026

^{vi} “Sodium Hypochlorite (Bleach)” Stanford Environment Health & Safety, Stanford University, <https://ehs.stanford.edu/reference/sodium-hypochlorite-bleach#:~:text=Warning:%20May%20Not%20Play%20Well%20with%20DNA/RNA,produce%20high%20hazard%20by%20products%20and%20toxic%20gases.,> Accessed March 2, 2026

^{vii} “Pandemic Influenza Preparedness and Response Guidance for Healthcare Workers and Healthcare Employers” Occupational Safety and Health Administration U.S. Department of Labor, OSHA 3328-05R, 2009, p33.