Pandemic Plan for the Church

Ministering to the Community in a Time of Crisis

Disinfecting Surfaces

Second to wearing PPE when caring for a patient with a pandemic virus,
is keeping all surfaces clean from the infectious agent.
This is crucial to preventing the spread of the disease.

Introduction

Until an influenza virus has mutated and become human-to-human transmissible posing the threat of a pandemic, it is impossible to determine how it will conduct itself once it is loosed on people. In other words, health officials can forecast how a virus may be transmittable; however, certainty cannot be established until the virus presents itself in the population. For instance, the virus may spread more easily by droplets than aerosols. Studying characteristics of existing viruses aid in predicting what proper precautions to take by donning personal protective equipment (PPE), or to what disinfectants it is vulnerable, but all this may change depending on how the particular virus achieves transmission.

Longevity of a Virus on a Surface

The longevity of the virus is dependent on several factors such as humidity, temperature, and porosity of the surface. Viruses tend to survive longer on surfaces in cooler temperatures and lower humidity. Influenza viruses can survive on surfaces, both porous and non-porous for up to forty-eight hours

Studies have shown that viruses can live on hands anywhere from five minutes to three hours; porous materials eight to twelve to forty-eight hours; stainless steel three to seven days; and glass from four to five days. Some studies have shown that viruses can remain active on cotton fabric for several weeks. They can also survive on paper/tissue for up to thirty minutes, and banknotes up to four days. It has been determined that viruses are more active in the wintertime due to the colder, less humid weather.

<u>CoV-2 (COVID-19)</u>

According to studies COVID-19 can live on the following surfaces:

- Cardboard – eight to 24 hours

  - Packages received in the mail
  - Items purchased from store

- Paper/tissue: 30 minutes to 3 hours

- Non-porous surfaces – up to 72 hours (3 days)
  - Stainless steel/kitchen appliances/faucets
  - Countertops
  - Doorknobs
  - Plastics
    - Cell phones
    - Computers
    - Remote Controls
    - Elevator buttons
    - Milk containers
    - Bus seats[i]

- Fabric – several hours to several days[ii]
  - Clothing
  - Furniture
  - Linens

- Other surfaces:
  - Glass: 5 days
  - Wood: 4 days
  - Skin: up to 9 hours[iii]

During the COVID-19 February 2020, there was an outbreak on the Diamond Princess cruise ship. Workers found CoV-2 RNA (virus genetic material) on various surfaces in cabins up to 17 days after passengers and crew had disembarked off the coast of Japan.[iv]

CoV-2 RNA survives longer on hard surfaces like plastic and stainless steel compared to porous materials like fabric. Survival time decreases with higher temperatures and humidity;

disinfection significantly reduces its lifespan. Regular cleaning, especially frequently touched surfaces, is recommended to minimize risk.[v]

Seasonal Influenza

Seasonal influenza viruses generally survive on hard surfaces like plastic and stainless steel for 24 to 48 hours. They tend to survive for a shorter duration on porous materials, such as cloth or paper, typically lasting less than 12 hours.[vi]

HPAI H5N1

According to studies H5N1 highly pathogenic avian influenza is a resilient virus that can survive on some surfaces for months at cooler temperatures. In 2010 tests were conducted to determine the environmental persistence of the HPAI H5N1 virus. The tests were performed from an H5N1 virus originating in Viet Nam. Different environmental conditions, including changes in temperature, humidity, and simulated sunlight were used. They found that H5N1 survived longer (at least two weeks and up to two months) at cooler temperatures around 39°F. The virus also tends to persist at low humidity and no sunlight on certain surfaces including glass and steel. Although when exposed to simulated sunlight, the virus survived longer on soil and chicken feces compared to other materials. It could potentially survive for up to two months on those materials, they estimate.[vii] [viii]

The materials were tested:

- Glass
- Wood
- Galvanized metal
- Topsoil
- Chicken feces (wet or dry)

Other studies have determined that the H5N1 virus can survive in the following:

Optimal Conditions (Cold/Wet):

- Temperature (Cold): H5N1 thrives at lower temperatures. It can survive for up to two weeks at 39°F (around 4°C), whereas it often lasts only one day at room temperature (approx. 20–22°C).
- Moisture (Wet/High Humidity): Survival is significantly extended in wet, moist conditions, such as in water, damp feces, or high-humidity environments.
- Combined Cold & Wet (Optimal):
    - Feces: In wet or dry chicken feces at 4°C, the virus can survive for up to 8 weeks.

  - Surfaces: The virus can survive on stainless steel, glass, and plastic for over 40–60 days at 4°C, particularly with high relative humidity.
  - Water: H5N1 can persist in aquatic environments for up to 20 days at 4°C.
  - Tissues: Contaminated bird carcasses or tissues can harbor the virus for up to 160–240 days at 4°C.
- Freezing: The virus can survive indefinitely while frozen, and it can persist in ice for months or years[ix]

Second to wearing PPE when caring for a patient with pandemic influenza, is keeping all surfaces clean from the infectious agent. This is crucial to preventing the spread of the disease. People can acquire a virus, bacteria, or other microorganism by touching a contaminated object then touching a mucous membrane such as their eyes, nose, or mouth. Although good hand hygiene, and sneeze and cough etiquette, are all good defenses in combating the spread, keeping surfaces disinfected will be a key element in the battle. Such surfaces include telephones, counter tops, door handles, light switches, and bathroom surfaces. This section will cover strategies of effectively cleaning surfaces, and laundry.

Methods of Disinfecting Surfaces

Removing and killing an infectious agent on a surface effectively must be performed properly and methodically. There are several methods of performing this action; all following the steps of *cleaning, disinfecting*, and *sterilizing*.

- Cleaning – is the removal of visible soil from an object.
- Disinfection – eliminates many but not all pathogenic microorganism.
- Sterilization – kills all microorganisms

Although sterilization would seemingly be the goal when dealing with a pandemic influenza virus, please keep in mind this process is usually carried out in health care facilities. Examples of sterilization methods are steam under pressure, dry heat, ethylene oxide gas, hydrogen peroxide gas plasma, and liquid chemicals.

Since the focus of this book is caring for the sick outside of the healthcare setting, and sterilizing methods will not be readily available, this section will focus on the proper ways of cleaning and disinfecting surfaces.

Proper Cleaning of Objects

Cleaning the object thoroughly is the first step to disinfection. The obvious particles must be removed so not to hinder the disinfecting process. The proper cleaning of an object can greatly affect the efficacy of disinfection. This can be done by using soap and water with wiping and rubbing to wash soil away. Methods other than routine cleansing are not necessary. The soap can be a simple detergent or an enzymatic solution. The temperature of the water should be what is recommended on the label.

Because the removal of soils from a surface is first required for a disinfectant to be effective, some disinfectants are also disinfectant cleaners. If the disinfectant contains a detergent that allows it to penetrate soil, then the cleaning and disinfectant process can be completed in one step.

Proper precautions such as donning personal protective equipment (PPE) should be practiced when cleaning and disinfecting surfaces or laundry. Please see the "Personal Protection Equipment" section of "Infection Control" for more information. PPE and precautionary measures include:

- Wear gloves, either disposable or rubber.
- Wear a surgical mask in accordance with droplet precautions.
- Use a respirator when airborne precautions are warranted by the circumstances.
- Gowns are not necessary for routine cleaning; however, wear a gown if your clothes may be become exposed to the patient's bodily fluids.
- Wear face and eye protection if the patient is coughing.
- Keep unnecessary objects at least three feet away for the patient.
- Consider covering objects that are not necessary and not easily removed.
- Cleaning and disinfection should be performed daily.

Proper Disinfecting of Objects

Choosing the correct disinfectant to use will aid in this process. Healthcare facilities use germicidal agents that include both antiseptics and disinfectants. Antiseptics are for use on skin, disinfectants are used on surfaces. Their use is not interchangeable. These agents may have the suffix cide or cidal in the name. Virucide, fungicide, bactericide, sporicide, and tuberculocide can kill the type of microorganism identified by the prefix. For example, a bactericide is an agent that kills bacteria. Reading the labels and following strict adherence to instructions will be vital

in this second step. For example, some disinfectants are only effective after being left on the surface for more than one minute and even up to twenty or more minutes.

Influenza viruses can be eliminated by disinfectants destroy viral particles (virions) by damaging their protein shells or genetic material. Some basic or intermediate level disinfectants should contain any of the following ingredients:

- Chlorine or hypochlorite
- Aldehydes
- Quaternary ammonium compounds [quats]
- Phenolics
- Alcohols
- Peroxygen compounds

Use of disinfectants registered by the U.S. Environmental Protection Agency (EPA) is recommended whenever these are available. Lists of all registered disinfectants can be found at http://www.epa.gov/oppad001/chemregindex.htm.

Many, if not all, of these products indicate potency for several target pathogens on the label. There are approximately 400 registered disinfectants with human influenza A and/or B listed on the product label, and all will inactivate influenza viruses when used according to manufacturer instructions (USDHHS, Environmental Management of Pandemic Influenza, 2013).[x]

All disinfectants marketed in the United States are required to be registered by the U.S. Environmental Protection Agency (EPA). These products must be used in accordance with their label instructions; following label instructions is necessary to achieve adequate efficacy and to avoid unreasonable adverse effects.

Registered antimicrobial products with label claims for avian (bird) flu disinfectants can be found at http://www.epa.gov/ pesticides factsheets/avian_flu_products.htm#activ. These EPA disinfectant products are registered and labeled with a claim to inactivate avian influenza A viruses on hard, non-porous surfaces. The label specifies the use sites (e.g., poultry houses and farm premises) for application of the product. Although there are no antimicrobial products registered specifically against the H5N1 subtype of avian influenza A viruses, the EPA believes based on available scientific information that the currently registered avian influenza A products, when applied in strict accordance with the label directions, will be effective against the H5N1 strain (EPA, Registered Antimicrobial Products, 2015).[xi]

When Using Chemical Disinfectants

Cleaning the object thoroughly is the first step to disinfection. Obvious particles must be removed so not to hinder the disinfecting process. This can be done by using soap and water with wiping and rubbing to wash soil away. Soap can be a simple detergent or an enzymatic solution. The temperature of the water should be what is recommended on the label. Methods other than routine cleansing are not necessary.

Some disinfectants are also disinfectant cleaners If the disinfectant contains a detergent that allows it to penetrate soil, then the cleaning and disinfectant process can be completed in one step.

Always read and follow the manufacturer instructions on the label for the use of a disinfectant. This will ensure efficacy as well as prevent ill effects. Pay attention to concentration, temperature, and the time the product needs to remain on the surface to be effective.

In addition, follow these recommendations:

- Wear gloves and consider glasses or goggles for potential splash hazards to eyes
- Ensure adequate ventilation (e.g. open windows)
- Use only the amount recommended on the label
- Use water at room temperature for dilution (unless stated otherwise on the label)
- Label diluted cleaning solutions
- Store and use chemicals out of the reach of children and pets
- Do not mix products or chemicals
- Do not eat, drink, breathe, or apply directly to your skin as disinfection products can cause serious harm
- Do not wipe or bathe pets with any cleaning and disinfection products
- Special considerations should be made for people with asthma. Some cleaning and disinfection products can trigger asthma
- Use any EPA-registered detergent-disinfectant.
- Dispose of mop heads, rags, and other cleaning materials properly.
- Keep mops, cloths, and buckets separate from other household items.
- Do not wipe surfaces using a dry cloth, this may shake up dust and scatter the pathogen into the air.
- Use a vacuum with a HEPA filter.

- Keep disinfecting wipes on hand for quick clean ups.
- To avoid further contamination of surfaces, practice good hand hygiene habits.
- The use of spray disinfectants to disinfect the air is not recommended. In some situations, the use of sprayed chemicals may irritate the airways of the patient and induce coughing.

Clean surfaces such as:

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

Be sure to include patient's personal care items:

- Walker
- Cane
- Wheelchair
- Grab bars/Safety rails
- Bed rails
- Bedside commodes
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Disinfecting Special Equipment

Items used for patient care such as thermometers, stethoscopes, pulse oximeters, and glucometers need special care when cleaning so not to destroy any machinery. Cleaning should be performed between each patient use to avoid transmission of infection. Recommended methods of cleaning for these items are described below:

- Thermometers:
  - Clean it with soap and warm water, then wipe the probe or sensor tip thoroughly with 70% isopropyl alcohol.
  - For non-waterproof digital thermometers, avoid soaking the display, while waterproof and glass models can be sanitized with alcohol wipes.
  - Allow the thermometer to air dry completely before the next use.

- Stethoscopes
  - Wipe the diaphragm, bell, and headset with 70% isopropyl alcohol wipes. 70% alcohol reduces bacterial growth by 97.3%, making it highly effective.
  - For contaminated or specific clinical situations, 2% chlorhexidine, hydrogen peroxide wipes, or 1:100 bleach solutions can be used.[xii]

- Pulse Oximeters
  - Gently wipe the outer surface and sensor (LED and photodetector) with a soft cloth or cotton swab dampened with 75% isopropyl alcohol or mild detergent and water solution between uses.
  - Wipe with a clean dry cloth, and allow to air dry thoroughly before next use
  - Avoid soaking the device allowing liquid in the interior
  - Also clean the finger that will be used for measurement before placing pulse oximeter[xiii]

- Blood pressure cuffs
  - To clean: Wipe the outer surface with a damp cloth and mild detergent
  - To disinfectant: use disinfectant wipes (70 % isopropyl alcohol) or use only a 1-2% bleach solution
  - Rinse with water and allow to air dry
  - No water should enter the tubing or inflated pump during cleaning[xiv]

- Glucometers
  - Wipe all exterior surfaces with a disinfectant wipe
  - Or a cloth dampened with 70% isopropyl alcohol

- Avoid getting liquid in the test strip port or buttons
- Let air dry completely[xv]

- Read instructions for special equipment such as:
  - CPAP
  - BiPAP

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