



COVID 19 and Lung Disease

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OBJECTIVES

- Discuss Lung Disease Associated With COVID 19
- Strategies to Prevent Chronic Lung Disease Associated COVID 19
- Discuss evaluation/Follow-up on Patient with COVID 19



Targeted Audience

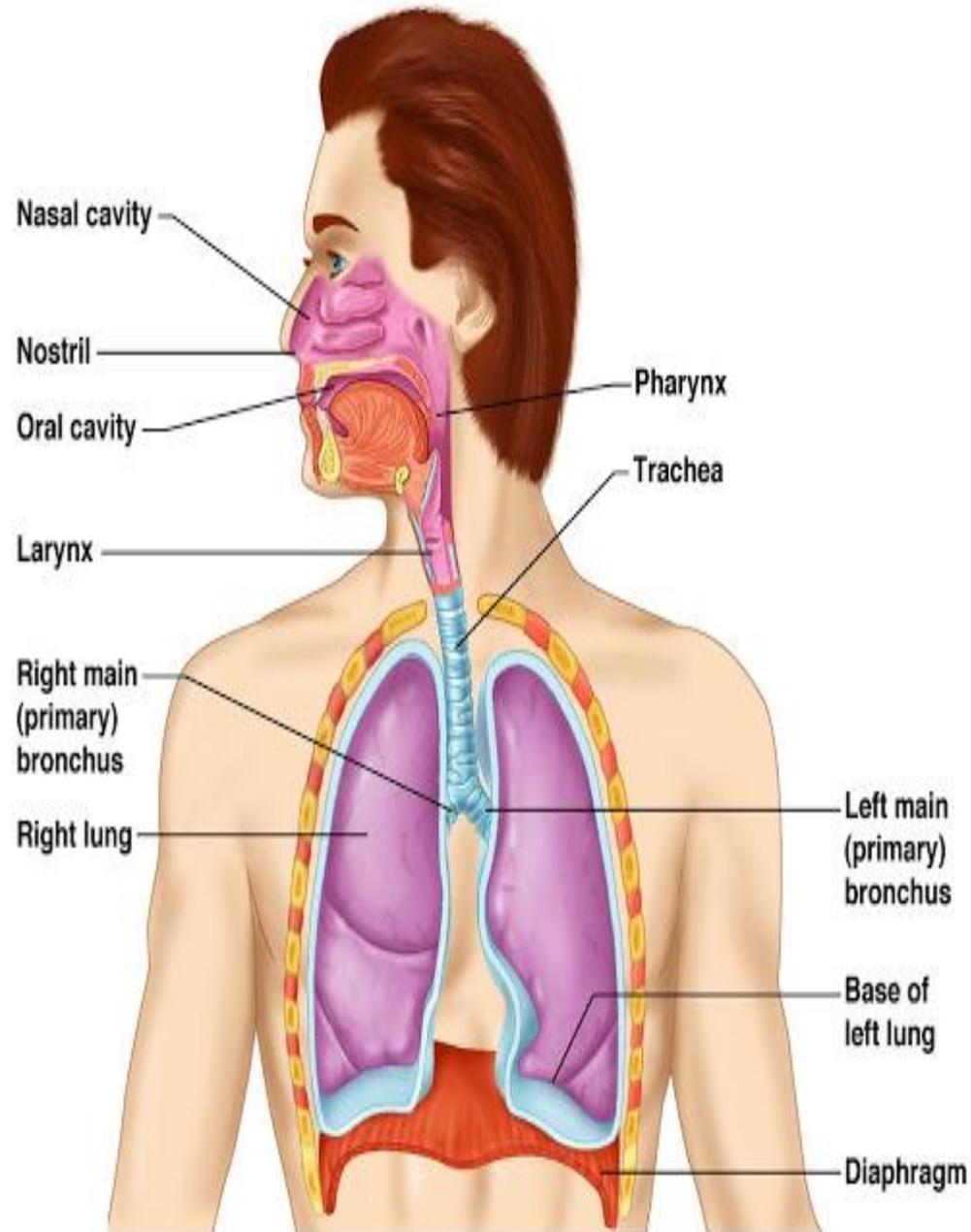
- Community Health Tech
- Public Health Workers
- General Public
- Family and Friends Taking Care of COVID 19 Patients



COVID 19 and Lung

- Lungs are a major target of COVID-19.
- When the virus is inhaled into the lungs, it invades the tissues, causing inflammation and breathing problems.

COVID 19 and Lung



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- The virus get into the body and comes into contact with the mucous membranes that line your nose, mouth, and eyes.
- The virus enters a healthy cell and uses the cell to make new virus parts. It multiplies, and the new viruses infect nearby cells.
- The coronavirus can infect the upper or lower part of your respiratory tract.
- It travels down your airways. The lining can become irritated and inflamed.

COVID 19 and Lung

- ▶ Doctors can see signs of respiratory inflammation on a chest X-ray or CT scan of the Chest
- ▶ On a chest CT, they see something they call “ground-glass opacity” because it looks like the frosted glass on a shower door.





PATIENT SYMPTOMS



COVID 19 and Lung Injury

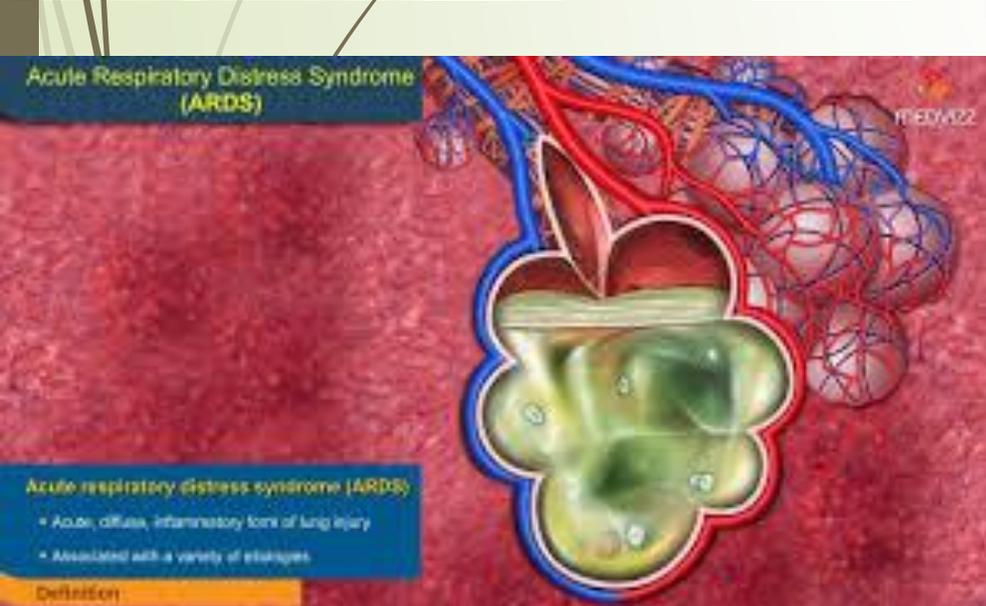
Symptoms such as:

- Cough
- Difficulty Breathing
- Low Oxygen Level
- Severe Fatigue/Tired



Pneumonia associated With COVID 19

- The airsacs become filled with fluid and inflamed,
- As pneumonia progresses, more of the air sacs become filled with fluid leaking from the tiny blood vessels in the lungs.
- Eventually, shortness of breath sets in, and can lead to acute respiratory distress syndrome (ARDS)
- Patients may require ventilator support
- People who survive ARDS and recover from COVID-19 may have lasting pulmonary scarring

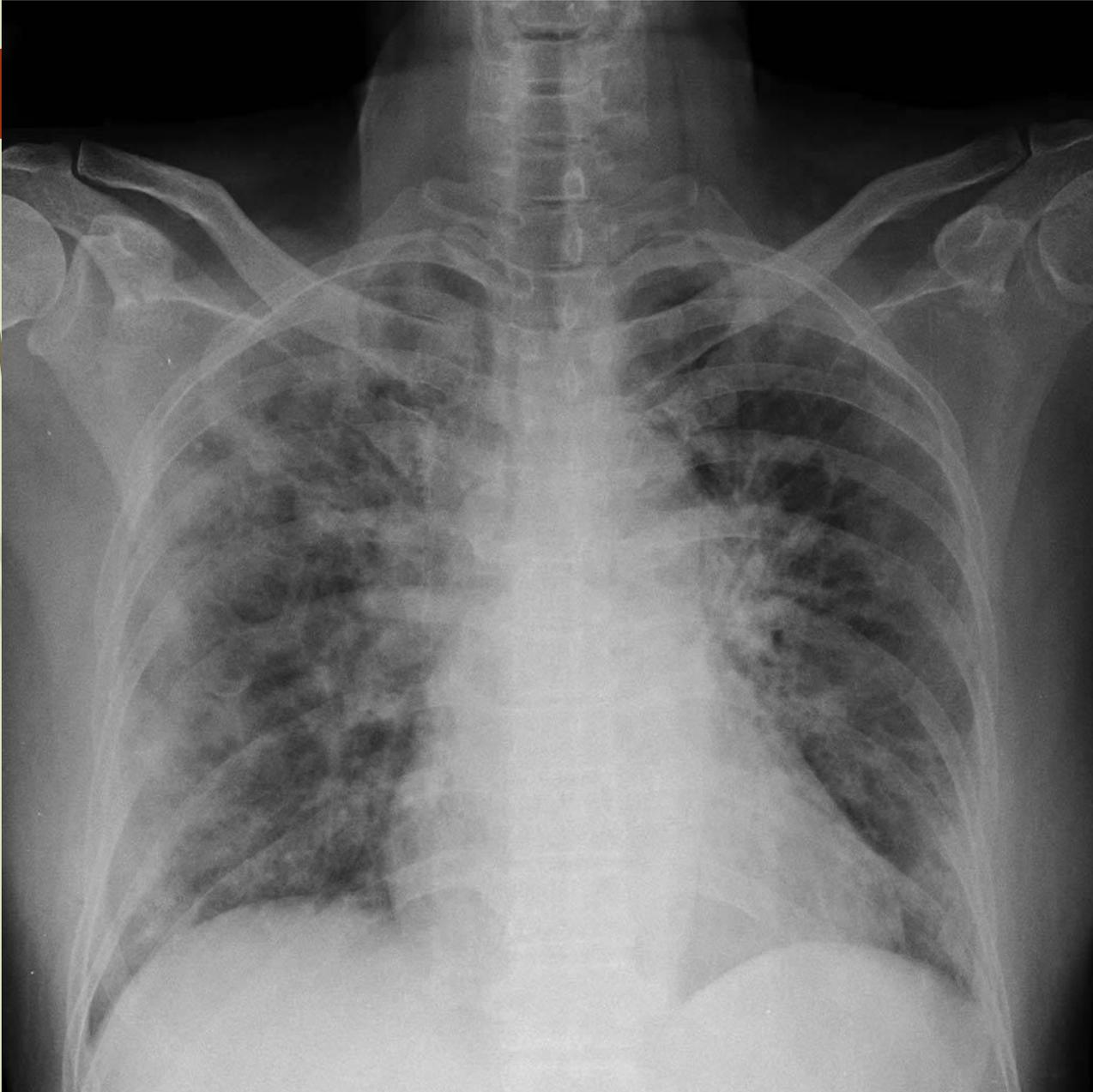




IMAGING OF THE LUNGS

Pneumonia features of COVID 19 Lung Disease

- Involves both Lungs in about 85% of patients



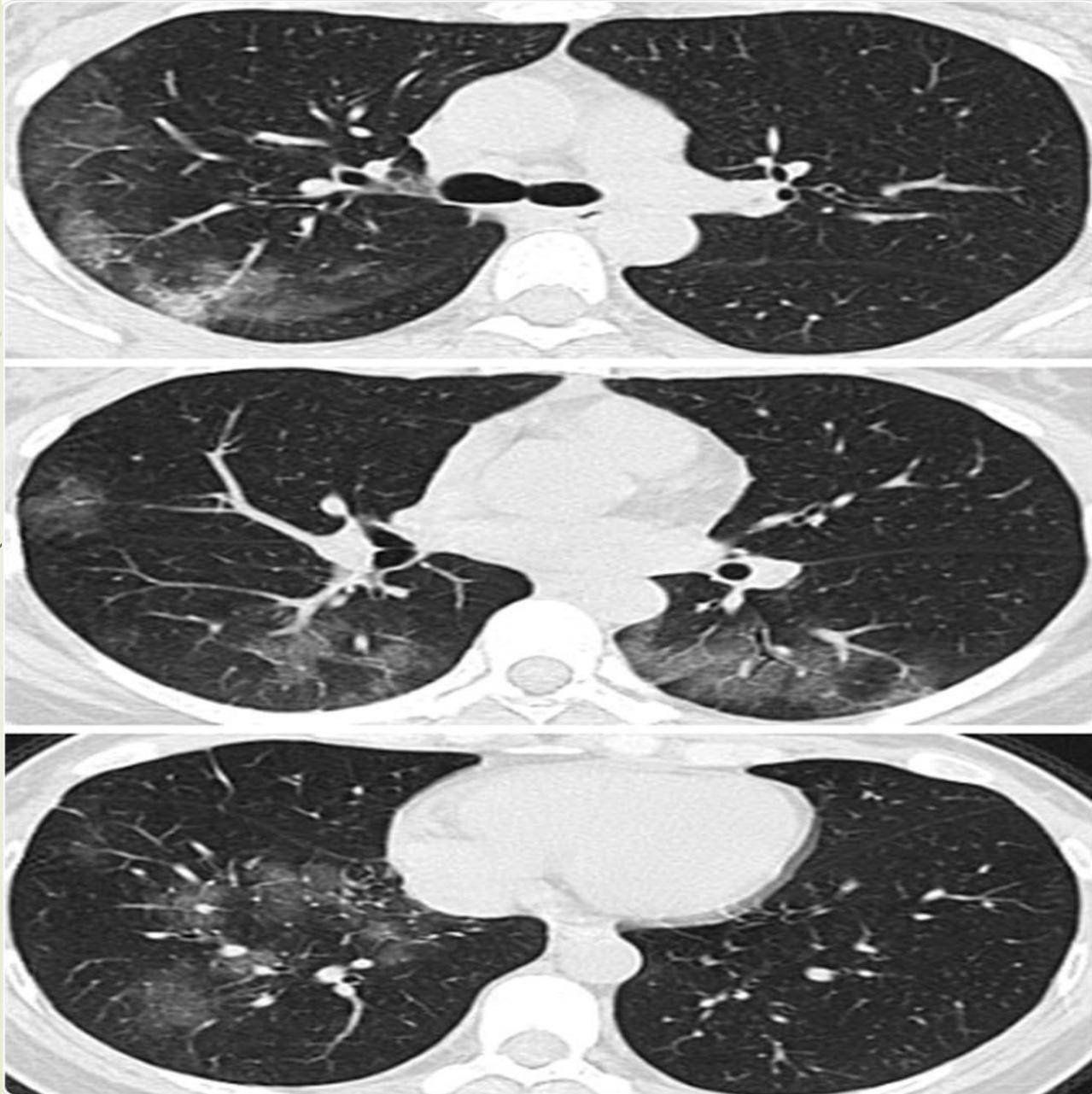


CT Chest

- **Extra imaging such as CT of chest should be avoided unless otherwise reason for imaging** e.g. for other causes of hypoxemia like pulmonary embolism.
- Often will not change management
- Associated with potentially unnecessary risk (risk to staff of transmission in transit, risk to patient for decompensate in transit)
- Approximately half of CT scans are normal up to 2 days after symptom onset

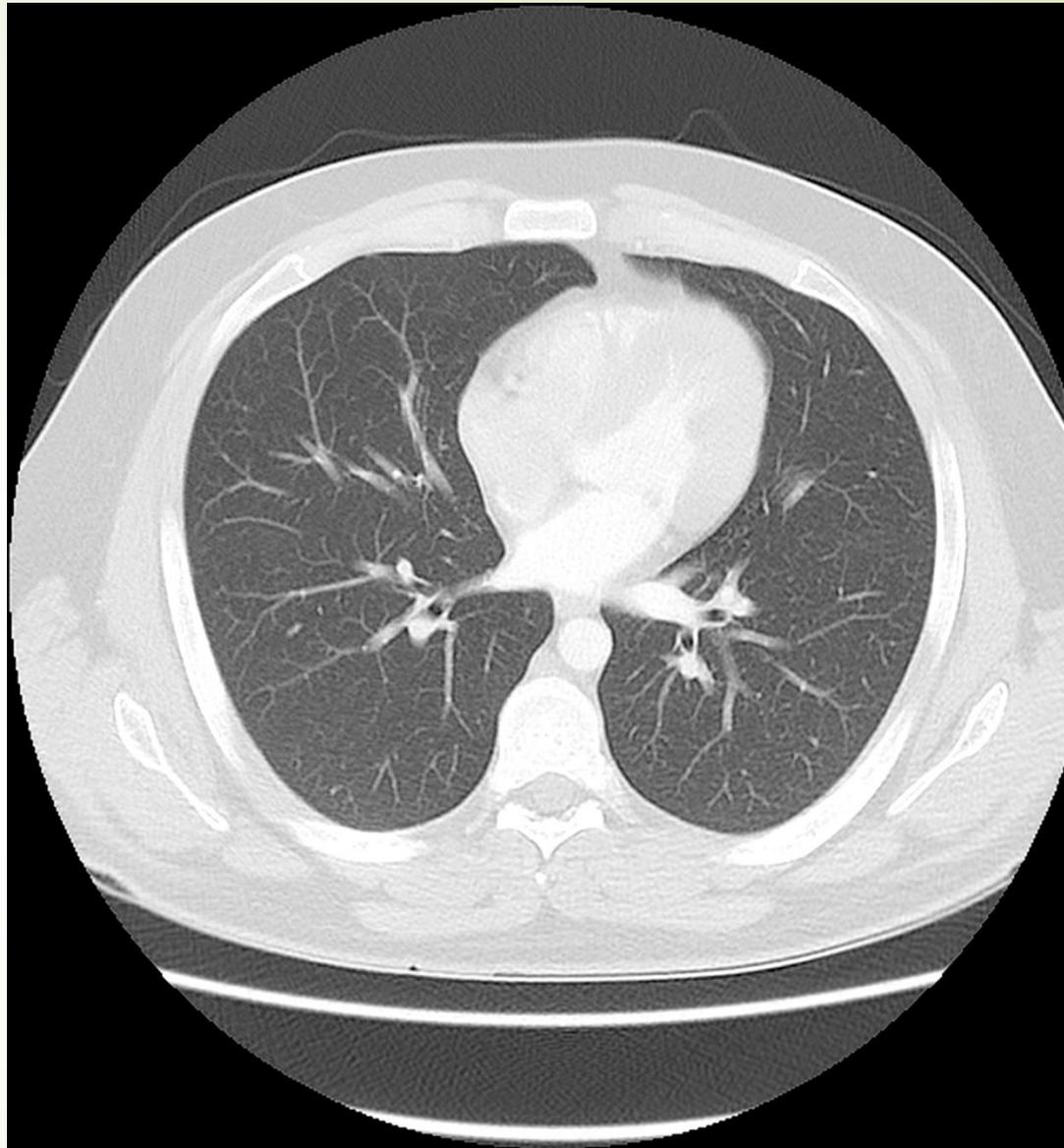
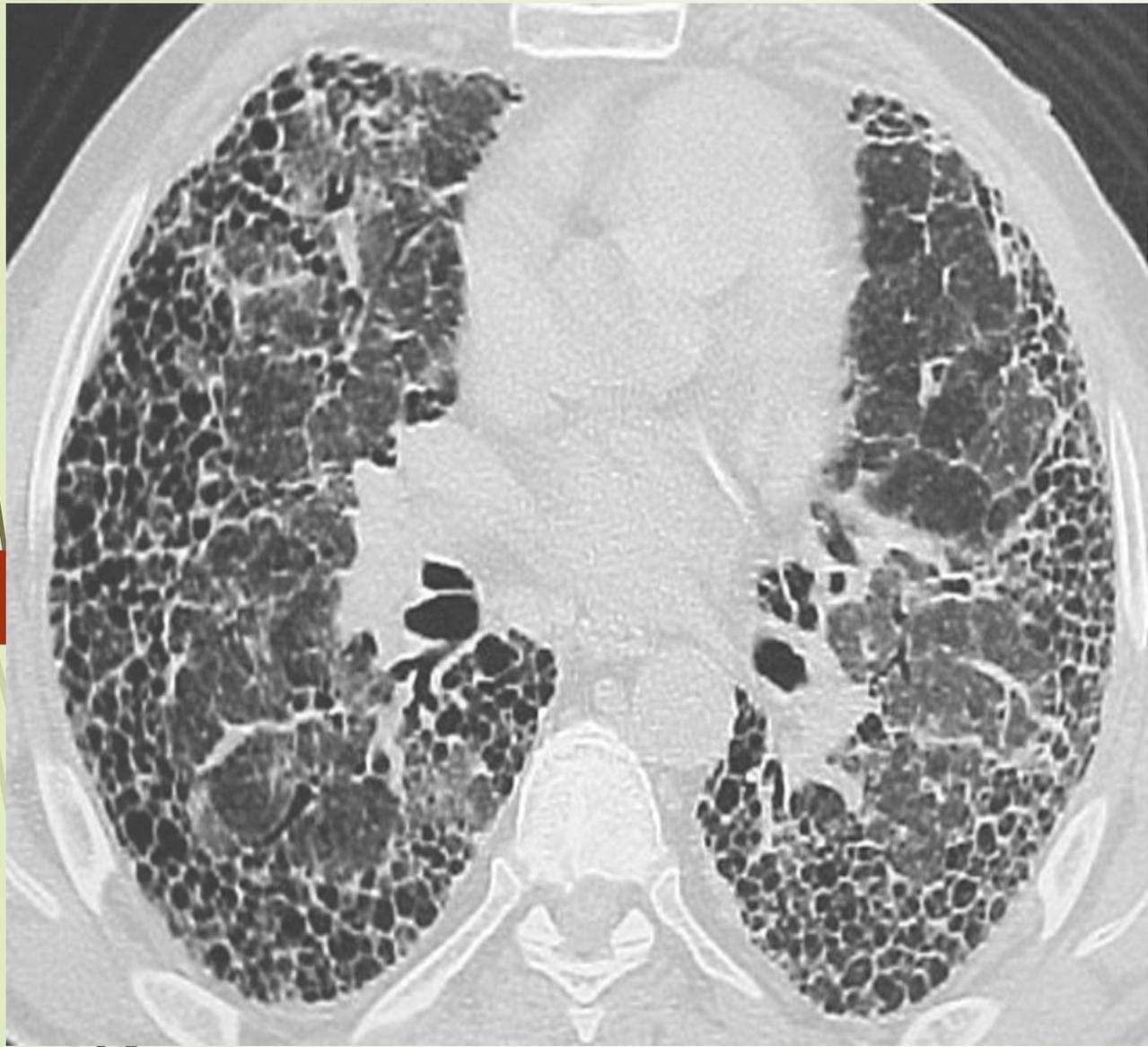
CT Imaging of Lung





Lung Consolidation







Is Lung Damage Reversible?

- Yes, but not overnight.
- Initial injury is followed by scarring
- It can take three months to a year or more for a person's lung function to return to pre-COVID-19 levels
- Some Lung Damage is Not Reversible if Scarring Occurs



Three Factors That Affect Coronavirus Lung Damage

- ▶ Three factors that affect the lung damage and how likely the person is to recover and regain lung function:
- ▶ 1. **Disease severity.** mild case, or a severe one.
- ▶ 2. **Treatment:** what kind of care they get, and how quickly
- ▶ 3. **Health conditions:** such as chronic obstructive pulmonary disease (COPD) or heart disease

Note: Older people are also more vulnerable for a severe case (lung tissues may be less elastic, and weakened immunity



Is Lung Damage Reversible (continued)

- ▶ Patient may be left with permanent lung damage.
- ▶ Growing numbers of people who still have breathlessness and coughing months after illness
- ▶ Chest scans show evidence of irreversible lung scarring.
- ▶ Estimates are as high as one in five who needed intensive care treatment.
- ▶ We have to be prepared in the future to manage these patients

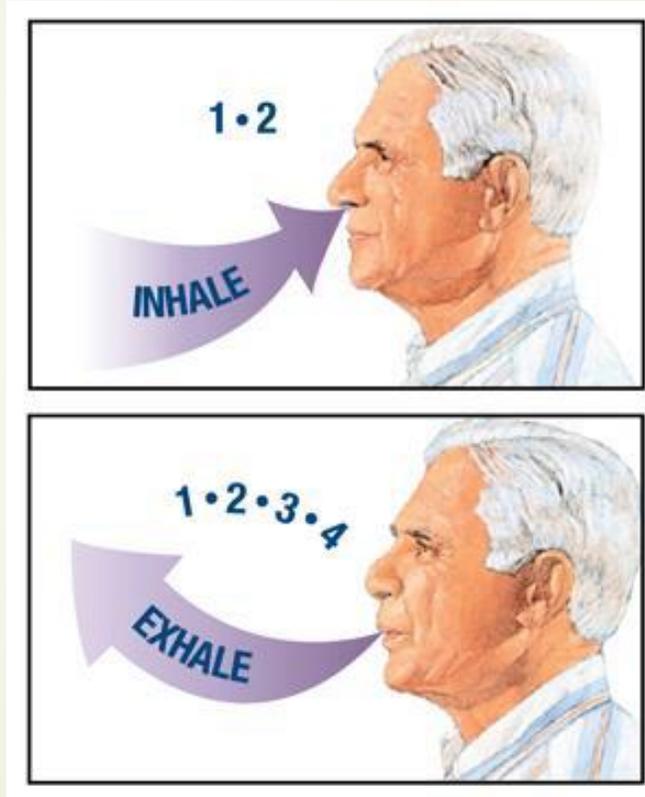


Pathophysiology of Scarring

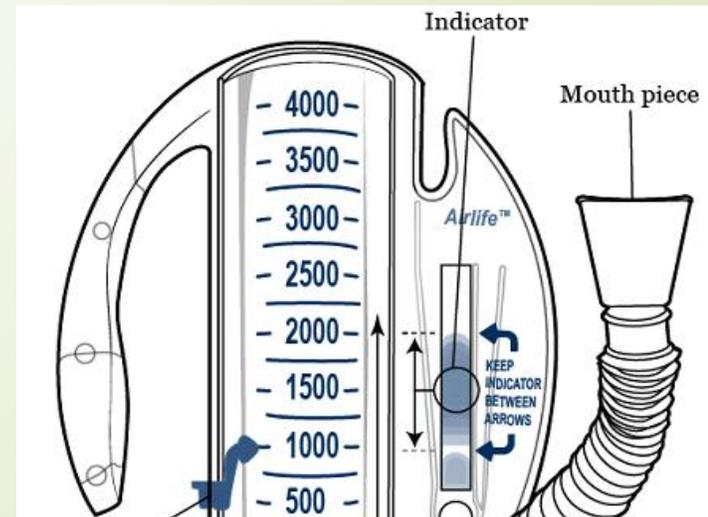
- Most people have only mild symptoms
- Some have serious lung inflammation leading to a complication called a cytokine storm.
- The inflammation can cause damage and scarring
- If someone is left with scarring, also known as fibrosis, there is no way to reverse it
- We can try to improve their aerobic fitness to compensate for their lower lung function and teach patient to cope with breathlessness

Ways To Improve Patient's Breathlessness

- Lung Volume Expansion
- Proactive Proning & breathing exercises
- Incentive Spirometry if patient is able to perform

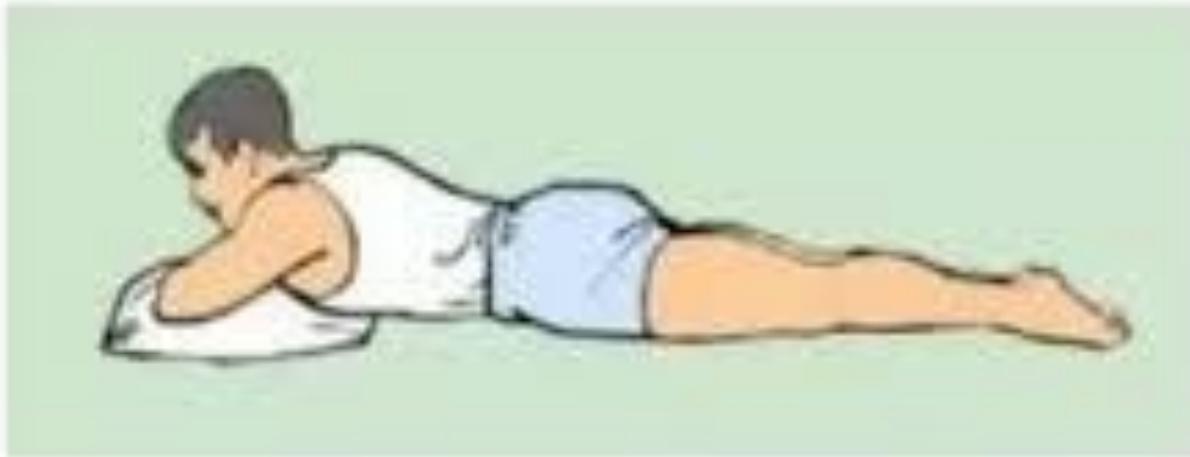


INCENTIVE SPIROMETER USE



PRONING PATIENT

**Awake prone position
(With alveolar collapse)**



- ▶ Patient should try proning every **4 hrs. and stay proned if tolerated.**
- ▶ Proning is often limited by discomfort, but they should be encourage to reach achievable goals, like 1-2 hours (or as long as possible).
- ▶ The ideal goal is 16 hrs. per 24 hours (e.g., 4 times for 4 hours each session) based on common interpretations of the PROSEVA

Note few people will tolerate 16 hrs. of proning per 24 hrs.

How To Use Your Finger Pulse Oximeter



Check your oxygen level a minimum of three times daily. It is easier to remember to check it upon awaking, mid-day, and before bedtime. Normal baseline oxygen levels range from 95 to 100%. Yours is _____. If your oxygen level drops 4 or more points below this number, please contact the clinic at _____ for evaluation and instructions on the next steps or call your call your nearest Emergency Room. If you feel short of breath or have difficulty breathing, call 911 immediately and your nearest Emergency Room.

FACTS

- A Pulse oximeter is a simple and painless way to measure the amount of oxygen your blood is carrying.
- By using a small device like a *pulse oximeter*, your blood oxygen levels can be checked.
- %SpO2** is the value of your **oxygen saturation level**. For most patients it should be between 95 – 100%. Some patient who have chronic lung and heart disease may have values less than this, but it should always be above 90. If your value is less than 90 or is more than 5 points different than your baseline you should contact your healthcare provider.
- PR** is the value of your **Pulse Rate** or heart rate . This value differs among patients and normally ranges between 60-100. Some patients may have lower rates (athletes and patient on certain blood pressure medications), but any values less than 50 or more than 150 can be concerning and you should contact you healthcare provider for evaluation. Any values significantly different from your baseline line values should raise concern and you should contact a healthcare provider.

PROCEDURE

- While in a sitting position, turn on the device. Wait for the display to light up. It will go through calibrations and checks for a few seconds.
- Make sure your hand is at the level of your heart.
- Insert your finger into your device. Most people start with the middle finger, but any finger can be used.
- If you are unable to get a value after adjusting your finger and it has been more than 30 seconds, try another finger.
- To manually check your pulse, place your index and middle fingers on the thumb side of your wrist until you feel a pulse. Count the number of beats in 15 seconds. Multiply this number by 4 to get your beats per minute. *Do not use* your thumb to check your pulse.



- To check the accuracy of the oximeter, manually check your pulse and compare it to your oximeter pulse reading (**PR**). If there is a 5-beat difference, your oximeter likely is not reading correctly. If you are getting low values



Follow-up of Patient's With COVID 19

Checking Up On Patient



Image by [Cler-Free-Vector-Images](#) from [Pixabay](#)

Follow-up Visits



- Follow-up via Telephone call
- Routine follow up for low risk patients: Day 5 of symptoms
- Routine follow up for [high risk patients](#) : Day 4, 7, and 10 of symptoms
- Follow-up after discharge from emergency department or inpatient stay: 2 days
- **Note:** More frequent follow up may be needed for people with **particularly high risk**, concerning symptoms, or concerns about reliability. Always remind person to call provider if worsening or new symptoms.

High Risk Patient Criteria

- Age 65 and older
- Residing in a nursing home, a long-term care facility, a group home, a correctional facility, a dormitory, homeless or with housing insecurity
- Underlying medical conditions: High Blood Pressure :
- Chronic lung disease or moderate to severe asthma-
- Significant heart disease-Immunocompromised (cancer, HIV)
- Severely obesity
- Chronic kidney disease / ESRD / dialysis center
- Chronic liver disease
- Psychiatric or substance use disorder





Questions You Can Ask During Phone Calls



Assessment for Shortness of Breath and Low Oxygen

- ▶ If home pulse oximetry is available, have the patient measure their oxygen saturation.
- ▶ Patients with oxygen saturation $< 94\%$ should be encouraged to seek treatment by medical provider.
- ▶ Assess whether shortness of breath interferes with activities of daily living (walking to bathroom, putting on close)
- ▶ Assess for elevated heart rate (>120), fast breathing >24 or bluing of lips, fingers or difficulty speaking in complete sentences .



Assessment of Alertness

- Inquire about decline or change in alertness, memory, behavior and attention.
- Assess if person is able to answer your questions appropriately or are they have attention problems
- Ask about extreme sleepiness or severe tiredness/fatigue
- Abnormalities in mental status should prompt in-person evaluation.
- Patients with recent falls, syncope, near syncope or near falls should be evaluated in-person



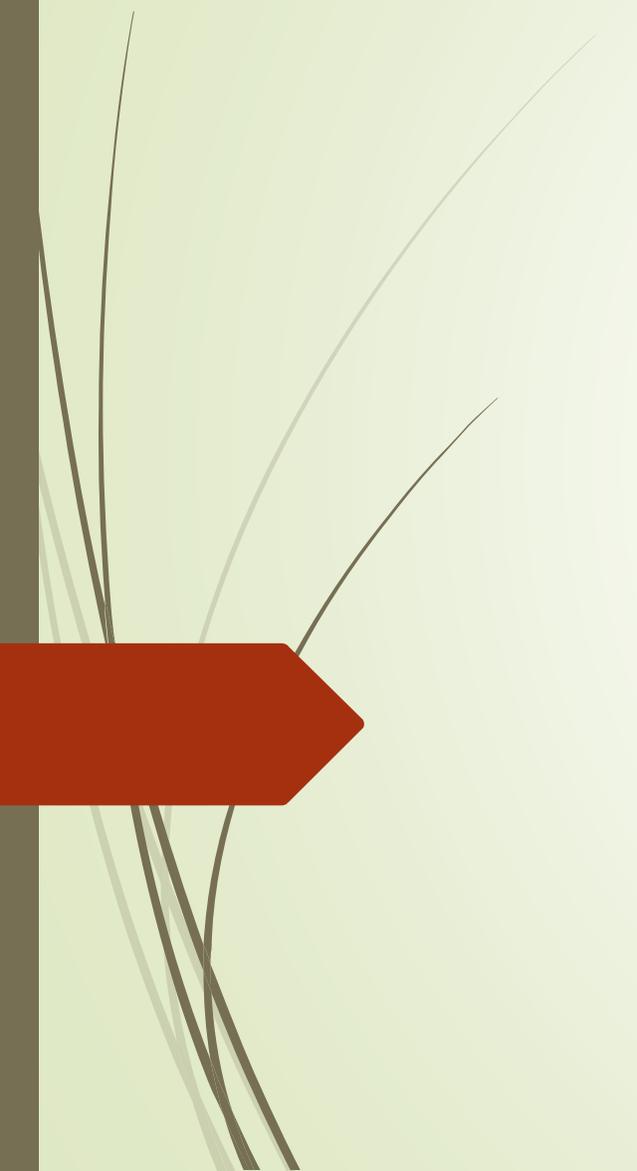
Inquire about Chest Pain/Chest Tightness

- ▶ Any complaints of chest pain or tightness should prompt in-person evaluation in ED.
- ▶ The high rates of heart attacks and clots in the lung (pulmonary embolism) are a concern and patients should be evaluated for this.



In Person Evaluation For Low Oxygen Levels

- It is important that patients who have home pulse oximeters are asked to walk while measuring for signs of relative low oxygen with activity
- Ask patients who have pulse oximeters to walk for a minute and measure oxygen level on pulse oximeter.
- An initial finger pulse oximeter reading may show oxygen saturation to be in acceptable range, but with ambulation patient's oxygen levels may drop significantly
- If oxygen level drops significantly (greater than 5 points) with activity or if oxygen level is $<92\%$ patient should be encouraged to seek medical treatment.



RESOURCES AVAILABLE FOR PATIENTS

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5 Common Ways Germs are Spread

Nose, mouth, or eyes to hands to others:
Germs can spread to the hands by sneezing, coughing, or rubbing the eyes and then can be transferred to other family members or friends. Simply washing your hands can help prevent such illnesses as the common cold or eye infections.



Hands to food:
Usually germs are transmitted from unclean hands to food by an infected food preparer who didn't wash his or her hands after using the toilet. The germs are then passed to those who eat the food. This is easily prevented by always washing your hands after using the toilet and before preparing food items.



Food to hands to food:

Germs are transmitted from raw foods, such as chicken, to hands while preparing a meal. The germs on the hands are then transferred to other uncooked foods, such as salad. Cooking the raw food kills the initial germs, but the salad remains contaminated.



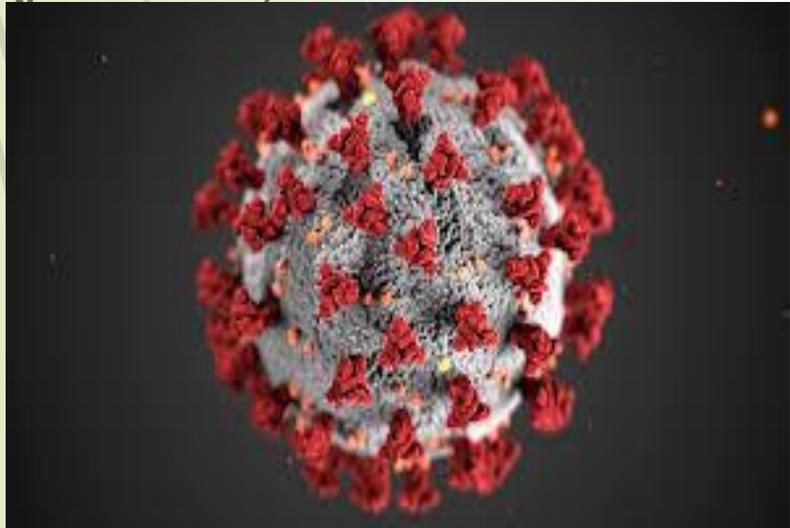
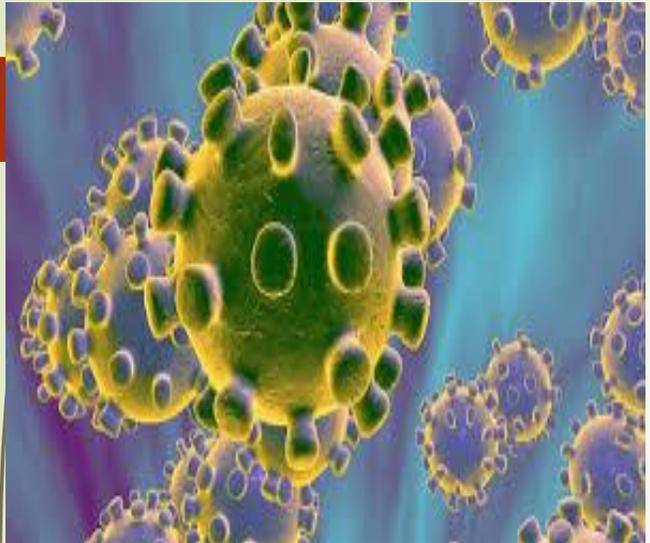
Animals to people:
Wash your hands after petting animals or touching any surfaces they come into contact with.



Infected child to hands to other children:
Germs are passed from an child with diarrhea to the hands of the parent during diaper changing. If the parent doesn't immediately wash his or her hands, the germs that cause diarrhea are then passed to others.



BACK





Handwashing and Hand Sanitizer Use at Home, at Play, and Out and About



Germs are everywhere! They can get onto hands and items we touch during daily activities and make you sick. Cleaning hands at key times with soap and water or hand sanitizer is one of the most important steps you can take to avoid getting sick and spreading germs to those around you.

There are important differences between washing hands with soap and water and cleaning them with hand sanitizer. For example, alcohol-based hand sanitizers don't kill ALL types of germs, such as a stomach bug called norovirus, some parasites, and *Clostridium difficile*, which causes severe diarrhea. Hand sanitizers also may not remove harmful chemicals, such as pesticides and heavy metals like lead. Handwashing reduces the amounts of all types of germs, pesticides, and metals on hands. Knowing when to clean your hands and which method to use will give you the best chance of preventing sickness.

When should I use?

Soap and Water

- Before, during, and after preparing food
- Before eating food
- Before and after caring for someone who is sick
- Before and after treating a cut or wound
- After using the bathroom, changing diapers, or cleaning up a child who has used the bathroom
- After blowing your nose, coughing, or sneezing
- After touching an animal, animal food or treats, animal cages, or animal waste
- After touching garbage
- If your hands are visibly dirty or greasy

Alcohol-Based Hand Sanitizer

- Before and after visiting a friend or a loved one in a hospital or nursing home, unless the person is sick with *Clostridium difficile* (if so, use soap and water to wash hands).
 - If soap and water are not available, use an alcohol-based hand sanitizer that contains at least 60% alcohol, and wash with soap and water as soon as you can.
- * Do **NOT** use hand sanitizer if your hands are visibly dirty or greasy: for example, after gardening, playing outdoors, or after fishing or camping (unless a handwashing station is not available). Wash your hands with soap and water instead.



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

SCROLL DOWN



STAY SAFE, PHILLY.

phila.gov/COVID

Philadelphia Department of Public Health | Penn Public Health | Design: Evan Thornburg

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phila.gov/COVID

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How to Safely Wear and Take Off a Cloth Face Covering

Accessible: <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html>

WEAR YOUR FACE COVERING CORRECTLY

- Wash your hands before putting on your face covering
- Put it over your nose and mouth and secure it under your chin
- Try to fit it snugly against the sides of your face
- Make sure you can breathe easily
- Do not place a mask on a child younger than 2



USE THE FACE COVERING TO HELP PROTECT OTHERS

- Wear a face covering to help protect others in case you're infected but don't have symptoms
- Keep the covering on your face the entire time you're in public
- Don't put the covering around your neck or up on your forehead
- Don't touch the face covering, and, if you do, clean your hands

FOLLOW EVERYDAY HEALTH HABITS

- Stay at least 6 feet away from others
- Avoid contact with people who are sick
- Wash your hands often, with soap and water, for at least 20 seconds each time
- Use hand sanitizer if soap and water are not available



TAKE OFF YOUR CLOTH FACE COVERING CAREFULLY, WHEN YOU'RE HOME

- Untie the strings behind your head or stretch the ear loops
- Handle only by the ear loops or ties
- Fold outside corners together
- Place covering in the washing machine
- Wash your hands with soap and water

BACK



Cloth face coverings are not surgical masks or N-95 respirators, both of which should be saved for health care workers and other medical first responders.

For instructions on making a cloth face covering, see:

cdc.gov/coronavirus

CS 11648A 05/27/2020



GUIDANCE FOR CLEANING & DISINFECTING

PUBLIC SPACES, WORKPLACES, BUSINESSES, SCHOOLS, AND HOMES



SCAN HERE
FOR MORE
INFORMATION

1 DEVELOP YOUR PLAN

DETERMINE WHAT NEEDS TO BE CLEANED.

Areas unoccupied for 7 or more days need only routine cleaning. Maintain existing cleaning practices for outdoor areas.

DETERMINE HOW AREAS WILL BE DISINFECTED. Consider the type of surface and how often the surface is touched. Prioritize disinfecting frequently touched surfaces.

CONSIDER THE RESOURCES AND EQUIPMENT NEEDED. Keep in mind the availability of cleaning products and personal protective equipment (PPE) appropriate for cleaners and disinfectants.

Follow guidance from state, tribal, local, and territorial authorities.

2 IMPLEMENT

CLEAN VISIBLY DIRTY SURFACES WITH SOAP AND WATER prior to disinfection.

USE THE APPROPRIATE CLEANING OR DISINFECTANT PRODUCT. Use an EPA-approved disinfectant against COVID-19, and read the label to make sure it meets your needs.

ALWAYS FOLLOW THE DIRECTIONS ON THE LABEL. The label will include safety information and application instructions. Keep disinfectants out of the reach of children.

3 MAINTAIN AND REVISE

CONTINUE ROUTINE CLEANING AND DISINFECTION. Continue or revise your plan based upon appropriate disinfectant and PPE availability. Dirty surfaces should be cleaned with soap and water prior to disinfection. Routinely disinfect frequently touched surfaces at least daily.

MAINTAIN SAFE PRACTICES such as frequent handwashing, using cloth face coverings, and staying home if you are sick.

CONTINUE PRACTICES THAT REDUCE THE POTENTIAL FOR EXPOSURE. Maintain social distancing, staying six feet away from others. Reduce sharing of common spaces and frequently touched objects.

SCROLL DOWN

For more information, please visit [CORONAVIRUS.GOV](https://www.cdc.gov/coronavirus)





THANK YOU

QUESTIONS?