

COVID-19

A plain-English guide for you and your family

WHAT IS HAPPENING

Your airways and lungs are lined with tiny cells that act like security guards — they catch germs, sweep them out with mucus, and sound the alarm for your immune system. The SARS-CoV-2 virus tricks those guards by grabbing onto a doorway on the cell surface called ACE2 (a protein that normally helps control blood pressure). Once inside, the virus makes thousands of copies of itself, which kills the cell and spills out to infect neighbors. Your immune system rushes in to fight, sending white blood cells and chemicals that cause swelling and mucus — that is why you cough and feel short of breath. In most people, the fight stays in the upper airways and you get a sore throat, cough, and fever for a few days, then recover. But in some people, the virus spreads deeper into the lung air sacs (alveoli), where oxygen crosses into your blood. The immune swelling fills those sacs with fluid (pneumonia), so oxygen cannot get through — your blood oxygen drops and you breathe faster and harder to try to make up for it. If the swelling gets out of control (a storm of immune chemicals), the lungs stiffen, clots form in small blood vessels, and other organs (heart, kidneys, brain) start to suffer from low oxygen and inflammation. Some children develop a delayed reaction weeks later (MIS-C) where the immune system attacks the heart and blood vessels. Every weird symptom — loss of smell, belly pain, brain fog, rashes — traces back to the virus entering cells through ACE2 (found in nose, gut, blood vessels, and brain) and the immune system's fierce response. Your body is doing everything it can to wall off the virus and keep oxygen flowing, but sometimes that defense itself causes the damage.

What you might feel

- Fever
- Cough (usually dry)
- Loss of smell or taste
- Shortness of breath or fast breathing
- Fatigue (feeling very tired)
- Headache
- Belly pain, nausea, or diarrhea

- Low oxygen level (hypoxia) without feeling very short of breath (silent low oxygen (hypoxia))

Call the doctor right away if...

- Trouble breathing, chest pain, or blue lips or face (means oxygen is too low)
- Confusion or trouble waking up (means the brain is not getting enough oxygen)
- Sudden worsening around day 7 to 10 of illness (may signal severe lung inflammation or a clot forming)

What the care team will do

- Check oxygen saturation (SpO2) with pulse oximeter every 4 hours and immediately if patient reports shortness of breath
- Place patient on contact and airborne precautions with N95 mask for staff and keep patient in negative-pressure room if available
- Monitor respiratory rate and work of breathing every 4 hours, watching for use of neck muscles, flaring nostrils, or inability to speak full sentences
- Encourage prone positioning (lying on stomach) for 2 to 4 hours at a time if oxygen is low but patient is not intubated
- Administer dexamethasone 6 mg once daily exactly as ordered for hospitalized patients on oxygen, and never give steroids to patients not requiring oxygen
- Assess and document venous thromboembolism (VTE) risk daily and ensure preventive (prophylactic) anticoagulation (blood thinner shots) is ordered for all hospitalized patients unless contraindicated
- Monitor fluid balance closely and avoid giving too much IV fluid unless patient is truly dehydrated
- Screen daily for delirium (sudden confusion) using a validated tool and reorient patient frequently if confused

Medicines you may be given — and why

Nirmatrelvir-ritonavir (Paxlovid)

Nirmatrelvir blocks a scissors-like enzyme the COVID virus uses to cut big protein chains into working pieces inside your cells; without those pieces, the virus cannot make copies of itself. Ritonavir slows down the liver so nirmatrelvir stays in your blood longer and can keep fighting the virus.

Molnupiravir

This drug looks like one of the building blocks (nucleosides) the virus uses to copy its genetic instruction manual (RNA). When the virus accidentally uses molnupiravir instead of the real block, it makes so many mistakes in the copies that the new viruses cannot work.

Remdesivir

Like molnupiravir, remdesivir is a fake building block. When the virus tries to copy its genetic instructions (RNA), remdesivir gets added to the new strand and then stops the copying machine from adding any more blocks, so the virus cannot finish making copies of itself.

Dexamethasone

Dexamethasone is a strong copy of cortisol, a hormone your body makes to calm down inflammation. It tells many immune cells to stop releasing chemicals (cytokines) that cause swelling, fluid leak, and damage in the lungs. This keeps the immune system from attacking your own lung tissue while it fights the virus.

Baricitinib

Baricitinib blocks enzymes called JAK1 and JAK2 that sit inside immune cells and pass along signals from inflammatory messengers (cytokines) outside the cell. By blocking these enzymes, the drug stops the cell from getting the 'attack' message, so the immune system calms down and causes less lung damage.

Tocilizumab

Tocilizumab is a lab-made antibody that sticks to the receptor for interleukin-6 (IL-6), a powerful inflammatory messenger. By covering the receptor, it stops IL-6 from delivering its 'attack' signal, so immune cells make less inflammation and the lungs take less damage.

Heparin or low-molecular-weight heparin (enoxaparin)

These drugs boost the activity of antithrombin, a natural protein in your blood that stops clotting factors (especially factor Xa and thrombin) from turning liquid blood into a solid clot. COVID makes blood stickier and more likely to clot inside vessels; heparin helps keep blood flowing smoothly.

Monoclonal antibody therapies (bebtelovimab, and earlier sotrovimab, casirivimab-imdevimab, bamlanivimab-etesevimab—now largely inactive against current variants)

These are lab-made copies of human antibodies that stick tightly to the spike protein on the surface of the COVID virus. By covering the spike, they prevent the virus from grabbing onto ACE2 receptors on your cells, so the virus cannot enter and cannot make copies of itself.

Supplemental oxygen (nasal cannula, high-flow nasal cannula, non-rebreather mask, or mechanical ventilator)

COVID damages the air sacs (alveoli) in your lungs so oxygen cannot pass easily into your blood. Giving extra oxygen through a tube, mask, or breathing machine raises the amount of oxygen in the air you breathe (from the normal 21% up to 100%), which pushes more oxygen across the damaged lung membrane into your bloodstream and keeps your organs alive while your lungs heal.

COVID-19 vaccines (mRNA vaccines: Pfizer-BioNTech, Moderna; protein subunit: Novavax)

The vaccine delivers instructions (mRNA) or a piece of the spike protein itself into your body. Your immune system sees the spike protein (or the protein your cells make from the mRNA) as foreign, learns to recognize it, and builds an army of memory B cells and T cells. If the real virus enters later, those memory cells respond fast and stop the virus before it can cause serious illness.

Where this information comes from

- CDC COVID-19 Guidelines
- NIH COVID-19 Treatment Guidelines
- WHO COVID-19 Clinical Management
- AAP COVID-19 Interim Guidance

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