

Influenza

Start antiviral medicine within 48 hours for anyone over 65, pregnant, under 5, or with heart/lung/diabetes trouble. Get your flu shot every fall.

THE ONE-LINE TRUTH

Flu is a virus that attacks the wet lining inside your nose, throat, and lungs, causing sudden fever, body aches, and cough — and high-risk people can get pneumonia fast.

The chain — how it unfolds

1. Influenza A or B virus lands on the wet lining of your nose, throat, or airways and punches into epithelial cells. — why: The virus hemagglutinin protein latches onto sialic acid receptors on the cell surface like a key in a lock, the cell pulls the virus inside, and the viral RNA hijacks the nucleus to copy itself thousands of times in 6 to 8 hours.
2. Infected cells burst open, releasing waves of new virus particles that spread to neighboring cells, and the dead cell debris piles up. — why: Each infected cell makes 1,000 to 10,000 new virus copies before it ruptures, so the infection spreads exponentially across large patches of airway lining within 12 to 24 hours.
3. The immune system floods the area with cytokines (alarm chemicals like interleukin-6, tumor tissue death (necrosis) factor-alpha, and interferon-gamma), which enter the bloodstream and reach the hypothalamus in the brain. — why: The hypothalamus reads the cytokine surge as a major threat and cranks up your core temperature (fever, often 102–104°F) to slow viral copying and speed immune cell activity — that is why flu fever hits suddenly and hard.
4. The cytokines also trigger muscle protein breakdown and fatigue as the immune system burns huge amounts of energy. — why: Fighting a viral infection takes as much energy as running a marathon, so your muscles ache (especially back and legs), you feel bone-tired, and you lose your appetite because the body is redirecting all fuel to immune cells.
5. The airway lining sits raw, swollen, and stripped of its protective cilia for 5 to 14 days, even after the virus is cleared. — why: The cilia that normally sweep mucus and bacteria out are destroyed when the epithelial cells die, so mucus pools and bacteria that live harmlessly in your throat (like *Streptococcus pneumoniae* or *Staphylococcus aureus*) can drift down into the lungs and start a second infection — that is secondary bacterial pneumonia, which causes a new fever spike and shortness of breath 1 to 2 weeks after flu starts.

6. In high-risk patients (over 65, pregnant, under 5, asthma, COPD, heart disease, diabetes, weak immune system), the virus can spread directly into the alveoli (tiny air sacs) and trigger massive inflammation, fluid leak, and respiratory failure (ARDS) within 24 to 72 hours. — why: These patients cannot mount a fast enough immune response to stop the virus before it reaches the deep lungs, or their baseline lung/heart reserve is too low to handle the extra work, so oxygen levels drop and they need hospital care fast.
7. Antiviral medicine (oseltamivir or baloxavir) started within 48 hours cuts viral replication, shortens symptom duration by 1 to 2 days, and halves the risk of pneumonia in high-risk groups. — why: The drugs block neuraminidase (the enzyme that cuts new viruses free from infected cells) or cap-dependent endonuclease (the enzyme that starts viral RNA copying), so fewer new viruses are made, the immune system catches up faster, and the airway lining has time to heal before bacteria can invade.
8. The yearly flu vaccine trains your immune system to recognize that season's influenza strains so it can neutralize the virus at the door, before it ever punches into cells. — why: The vaccine contains inactivated pieces of hemagglutinin and neuraminidase proteins from the predicted circulating strains; your B cells learn to make antibodies against those proteins, so when real flu virus lands on your airway lining months later, the antibodies tag it immediately and your immune system destroys it before it can infect a single cell — no infection, no fever, no pneumonia.

Spot it — what you see, and why

- Sudden high fever (usually 100–104°F): The influenza virus invades cells in your nose and throat. Your immune system fights back by releasing chemicals called cytokines (messengers that call in your body's defense team). These cytokines reset your body's thermostat in the hypothalamus (the brain's temperature control center) to a hotter setting, cooking the virus and speeding up your immune cells.
- Dry cough: The flu virus damages the lining of your airways (the tubes that carry air to your lungs). Your body tries to clear out the dead cells and mucus by coughing. Early on, there's not much mucus yet, so the cough stays dry and harsh.
- Muscle and body aches (myalgia): Those same cytokines (immune messengers) that cause fever also make your muscles sore and achy. They're trying to keep you still so your body can focus all its energy on fighting the virus instead of moving around.
- Severe fatigue and weakness: Fighting the flu is like running a marathon inside your body. Your immune system uses huge amounts of energy, and the cytokines signal your brain to make you feel exhausted so you rest and heal instead of pushing through.
- Headache: The cytokines (chemical messengers fighting the virus) cause blood vessels in your brain to swell slightly and send pain signals. The fever and dehydration from sweating also trigger headache pain.

- Chills and sweats: When your brain's thermostat (the hypothalamus) pushes your temperature up to fight the virus, your body shivers to make heat. Later, when the fever breaks, you sweat to cool back down. This cycle repeats as your immune system battles the infection.

Red flags — act now

- Trouble breathing, fast breathing, or chest pain when breathing
- Confusion, severe drowsiness, or trouble waking up
- Symptoms improve for a day or two, then suddenly get worse with new high fever or cough (may signal bacterial pneumonia on top of flu)
- Severe weakness or dizziness that makes it hard to stand
- In children: bluish lips or face, not drinking enough fluids, or being so irritable they don't want to be held

Treat it — in this order

1. Oseltamivir 75 mg by mouth twice daily for 5 days (or baloxavir 40–80 mg single dose, or zanamivir 10 mg inhaled twice daily for 5 days) → Oseltamivir blocks neuraminidase (a protein on the flu virus surface that cuts the virus free from infected airway cells). Without neuraminidase, new virus particles stay stuck and cannot spread to new cells. This shortens illness by about 1 day and cuts the risk of pneumonia and hospitalization if started within 48 hours of symptom onset. Baloxavir blocks a different step (the virus copying its RNA inside the cell) and works in one dose.
2. Isolation at home for at least 5 days from symptom onset AND until fever is gone for 24 hours without medicine; wear a mask around others → Influenza spreads through respiratory droplets (when you cough, sneeze, or talk) and can hang in the air briefly in closed rooms. Keeping the sick person away from others breaks the chain of transmission. Most viral shedding (releasing virus) happens in the first 3–5 days of illness.
3. Antibiotics (amoxicillin-clavulanate 875/125 mg twice daily, or ceftriaxone 1–2 g IV daily, or levofloxacin 750 mg daily) if secondary bacterial pneumonia develops → When the flu virus damages the airway lining, bacteria (especially *Streptococcus pneumoniae*, *Staphylococcus aureus*, *Haemophilus influenzae*) can land on the raw tissue and multiply, causing bacterial pneumonia 5–14 days after flu starts. Antibiotics kill these bacteria and stop the infection from spreading into the bloodstream (sepsis).

4. Acetaminophen 650–1,000 mg every 6 hours or ibuprofen 400–600 mg every 6 hours, plus encourage oral fluids (water, broth, electrolyte drinks) → Fever happens because cytokines (alarm chemicals like interleukin-1) tell the hypothalamus (the brain's thermostat) to raise body temperature. Acetaminophen and ibuprofen block prostaglandins (the chemical messengers that carry out the fever signal), so the thermostat resets to normal. Fluids replace water lost through sweating and keep blood pressure and kidney function steady.
5. Annual influenza vaccination (inactivated injectable vaccine or live-attenuated nasal spray, given in fall before flu season) → The vaccine contains pieces of the flu virus surface proteins (hemagglutinin and neuraminidase) from the 3–4 strains predicted to circulate that year. Your immune system makes antibodies and memory T cells against those proteins. If the real flu virus arrives later, your immune system recognizes it immediately and stops it before you get very sick. Reduces flu illness by 40–60% and severe outcomes (hospitalization, death) by 50–80% in most years.

Your top priorities at the bedside

1. Check oxygen saturation with pulse oximeter and breathing rate every 4 hours — why: Flu virus damages the air sacs (alveoli) in lungs where oxygen enters the blood. Oxygen below 94 percent or breathing faster than 20 breaths per minute means pneumonia is starting and the patient needs more oxygen or hospital transfer.
2. Start oseltamivir 75 mg by mouth twice daily within 48 hours of symptom start — why: Oseltamivir (antiviral medicine) blocks the enzyme (neuraminidase) that lets flu virus spread to new cells. It works best in the first two days. After 48 hours it helps less, but still give it to very sick patients or those with chronic disease.
3. Keep the patient in a single room and require masks for anyone entering for 5 days from symptom start — why: Flu spreads through droplets (tiny wet particles) when the patient coughs or talks. The virus stays contagious (able to infect others) for five days. Isolation stops the virus from reaching people with weak immune systems.