Pandemic Fun

RSTC

Written By: RSTCA Foundation / Saswot Raj Sharma
Co Author Sushant Raj Sharma/ Archana Shrestha/ Raj Sharma Holdings Pvt Ltd

Table of content

Introduction

Humans may have little or no immunity against a new virus. Often, a new virus cannot spread between animals and people. However, if the disease changes or mutates, it may start to spread easily, and a pandemic may result. A pandemic affects a higher number of people and can be more deadly than an epidemic. It can also lead to more social disruption, economic loss, and general hardship on a wider scale. A pandemic can also increase the pressure on healthcare systems by raising the demand for certain treatments. However, countries have put in place measures to counter this. Authorities hope that these emergency manufacturing measures and the restrictions of movement — which have a worldwide economic and social impact — will slow the spread of the disease.

Countries are collaborating on sourcing medical equipment and developing a vaccine, even though it may not be available for months or even years. Medical science has advanced rapidly in recent years, but it is unlikely ever to offer full protection from a possible pandemic because of the novel nature of the diseases involved.

Humans would not have natural immunity to a newly mutated disease, meaning that it could have severe effects after spreading between people From Europe's Black Death during the Middle Ages to the Spanish flu around the time of the First World War, pandemics can change the course of society for many years to come.

The current pandemic, COVID-19, is causing disruption across the entire world. And its must we need to understand actually what it is and how can we protect ourselves against covid situation.

Definition

What is an epidemic?

Epidemic means there is huge affect on world due to some problem. Usually problem is related to nature.

An epidemic disease is one "affecting many persons at the same time, and spreading from person to person in a locality where the disease is not permanently prevalent." The World Health Organization (WHO) further specifies epidemic as occurring at the level of a region or community.

Epidemic is commonly used all on its own as a noun, meaning "a temporary prevalence of a disease." For example: The city was able to stop the flu epidemic before it spread across the state.

Metaphorically, epidemic is "a rapid spread or increase in the occurrence of something," usually with a negative or humorous connotation: An epidemic of gentrification was affecting low-income communities or The hipster look gave way to an epidemic of 1990s fashion.

The -demic part of epidemic (and pandemic) comes from the Greek dêmos, "people of a district." This root also ultimately gives English the word democracy. More on the prefix epi– later.

What is a pandemic?

Compared to an epidemic disease, a pandemic disease is an epidemic that has spread over a large area, that is, it's "prevalent throughout an entire country, continent, or the whole world."

While pandemic can be used for a disease that has spread across an entire country or other large landmass, the word is generally reserved for diseases that have spread across continents or the entire world. For instance: After documenting cases in all continents except Antarctica, scientists declared the disease a pandemic.

As an adjective, pandemic can also mean "general" and "universal," also often with a negative connotation. However, pandemic appears to be most commonly used in the context of epidemiology, which is concerned with infectious diseases.

Pandemic also entered English, through Latin, in the 1600s. Like epidemic, pandemic ultimately derives from the Greek pándēmos, “common, public.” Also like epidemic, pandemic was originally used of diseases when in came into English.

What is an endemic?

Endemic is an adjective that means natural to, native to, confined to, or widespread within a place or population of people.

Endemic is perhaps most commonly used to describe a disease that is prevalent in or restricted to a particular location, region, or population. For example, malaria is said to be endemic to tropical regions. In this context, it can also be used as a noun: an endemic disease can simply be called an endemic.

When used to describe species of plants or animals that are found only within a specific place, it has the same meaning as native or indigenous, as in This plant is endemic to this region.

It can also be applied to characteristics of a people, place, or situation, as in Corruption was endemic in that organization when I worked there.

The first records of endemic in English come from the mid-1600s. It comes from the Greek éndēm(os). The prefix en- means “in or within” and the Greek root dēm(os) means “people.” So the basic meaning of endemic is “within a certain people” (or “within a certain area”).

The worst epidemics and pandemics in history

1.Prehistoric epidemic: Circa 3000 B.C.

About 5,000 years ago, an epidemic wiped out a prehistoric village in China. The bodies of the dead were stuffed inside a house that was later burned down. No age group was spared, as the skeletons of juveniles, young adults and middle-age people were found inside the house. The archaeological site is now called "Hamin Mangha" and is one of the best-preserved prehistoric sites in northeastern China. Archaeological and anthropological study indicates that the epidemic happened quickly enough that there was no time for proper burials, and the site was not inhabited again.

Before the discovery of Hamin Mangha, another prehistoric mass burial that dates to roughly the same time period was found at a site called Miaozigou, in northeastern China. Together, these discoveries suggest that an epidemic ravaged the entire region.

2. Plague of Athens: 430 B.C.

Around 430 B.C., not long after a war between Athens and Sparta began, an epidemic ravaged the people of Athens and lasted for five years. Some estimates put the death toll as high as 100,000 people. The Greek historian Thucydides (460-400 B.C.) wrote that "people in good health were all of a sudden attacked by violent heats in the head, and redness and inflammation in the eyes, the inward parts, such as the throat or tongue, becoming bloody and emitting an unnatural and fetid breath" (translation by Richard Crawley from the book "The History of the Peloponnesian War," London Dent, 1914).

What exactly this epidemic was has long been a source of debate among scientists; a number of diseases have been put forward as possibilities, including typhoid fever and Ebola. Many scholars believe that overcrowding caused by the war exacerbated the epidemic. Sparta's army was stronger, forcing the Athenians to take refuge behind a series of fortifications called the "long walls" that protected their city. Despite the epidemic, the war continued on, not ending until 404 B.C., when Athens was forced to capitulate to Sparta.

3.Antonine Plague: A.D. 165-180

When soldiers returned to the Roman Empire from campaigning, they brought back more than the spoils of victory. The Antonine Plague, which may have been smallpox, laid waste to the army and may have killed over 5 million people in the Roman empire, wrote April Pudsey, a senior lecturer in Roman History at Manchester Metropolitan University, in a paper published in the book "Disability in Antiquity," Routledge, 2017).

Many historians believe that the epidemic was first brought into the Roman Empire by soldiers returning home after a war against Parthia. The epidemic contributed to the end of the Pax Romana (the Roman Peace), a period from 27 B.C. to A.D. 180, when Rome was at the height of its power. After A.D. 180, instability grew throughout the Roman Empire, as it

experienced more civil wars and invasions by "barbarian" groups. Christianity became increasingly popular in the time after the plague occurred.

4. Plague of Cyprian: A.D. 250-271

Named after St. Cyprian, a bishop of Carthage (a city in Tunisia) who described the epidemic as signaling the end of the world, the Plague of Cyprian is estimated to have killed 5,000 people a day in Rome alone. In 2014, archaeologists in Luxor found what appears to be a mass burial site of plague victims. Their bodies were covered with a thick layer of lime (historically used as a disinfectant). Archaeologists found three kilns used to manufacture lime and the remains of plague victims burned in a giant bonfire.

Experts aren't sure what disease caused the epidemic. "The bowels, relaxed into a constant flux, discharge the bodily strength [and] a fire originated in the marrow ferments into wounds of the fauces (an area of the mouth)," Cyprian wrote in Latin in a work called "De mortalitate" (translation by Philip Schaff from the book "Fathers of the Third Century: Hippolytus, Cyprian, Caius, Novatian, Appendix," Christian Classics Ethereal Library, 1885).

5. Plague of Justinian: A.D. 541-542

A mosaic of Emperor The Byzantine Empire was ravaged by the bubonic plague, which marked the start of its decline. The plague reoccurred periodically afterward. Some estimates suggest that up to 10% of the world's population died.

The plague is named after the Byzantine Emperor Justinian (reigned A.D. 527-565). Under his reign, the Byzantine Empire reached its greatest extent, controlling territory that stretched from the Middle East to Western Europe. Justinian constructed a great cathedral known as Hagia Sophia ("Holy Wisdom") in Constantinople (modern-day Istanbul), the empire's capital. Justinian also got sick with the plague and survived; however, his empire gradually lost territory in the time after the plague struck.

6. The Black Death: 1346-1353

The Black Death traveled from Asia to Europe, leaving devastation in its wake. Some estimates suggest that it wiped out over half of Europe's population. It was caused by a strain of the bacterium Yersinia pestis that is likely extinct today and was spread by fleas on infected rodents. The bodies of victims were buried in mass graves.

The plague changed the course of Europe's history. With so many dead, labor became harder to find, bringing about better pay for workers and the end of Europe's system of serfdom. Studies suggest that surviving workers had better access to meat and higher-quality bread. The lack of cheap labor may also have contributed to technological innovatio

7. Cocoliztli epidemic: 1545-1548

The infection that caused the cocoliztli epidemic was a form of viral hemorrhagic fever that killed 15 million inhabitants of Mexico and Central America. Among a population already weakened by extreme drought, the disease proved to be utterly catastrophic. "Cocoliztli" is the Aztec word for "pest."

A recent study that examined DNA from the skeletons of victims found that they were infected with a subspecies of Salmonella known as S. paratyphi C, which causes enteric fever, a category of fever that includes typhoid. Enteric fever can cause high fever, dehydration and gastrointestinal problems and is still a major health threat today.

8. American Plagues: 16th century

The American Plagues are a cluster of Eurasian diseases brought to the Americas by European explorers. These illnesses, including smallpox, contributed to the collapse of the Inca and Aztec civilizations. Some estimates suggest that 90% of the indigenous population in the Western Hemisphere was killed off.

The diseases helped a Spanish force led by Hernán Cortés conquer the Aztec capital of Tenochtitlán in 1519 and another Spanish force led by Francisco Pizarro conquer the Incas in 1532. The Spanish took over the territories of both empires. In both cases, the Aztec and Incan armies had been ravaged by disease and were unable to withstand the Spanish forces. When citizens of Britain, France, Portugal and the Netherlands began exploring, conquering and settling the Western Hemisphere, they were also helped by the fact that disease had vastly reduced the size of any indigenous groups that opposed them.

9. Great Plague of London: 1665-1666

The Black Death's last major outbreak in Great Britain caused a mass exodus from London, led by King Charles II. The plague started in April 1665 and spread rapidly through the hot summer months. Fleas from plague-infected rodents were one of the main causes of transmission. By the time the plague ended, about 100,000 people, including 15% of the population of London, had died. But this was not the end of that city's suffering. On Sept. 2, 1666, the Great Fire of London started, lasting for four days and burning down a large portion of the city.

10. Great Plague of Marseille: 1720-1723

Historical records say that the Great Plague of Marseille started when a ship called Grand-Saint-Antoine docked in Marseille, France, carrying a cargo of goods from the eastern Mediterranean. Although the ship was quarantined, plague still got into the city, likely through fleas on plague-infected rodents.

Plague spread quickly, and over the next three years, as many as 100,000 people may have died in Marseille and surrounding areas. It's estimated that up to 30% of the population of Marseille may have perished.

11. Russian plague: 1770-1772

Portrait of Catherine II by Vigilius Erichsen (ca. 1757-1772). Even Catherine the Great couldn't bring Russia back from the devastation caused by the 1770 plague. (Image credit: Shutterstock)

In plague-ravaged Moscow, the terror of quarantined citizens erupted into violence. Riots spread through the city and culminated in the murder of Archbishop Ambrosius, who was encouraging crowds not to gather for worship.

The empress of Russia, Catherine II (also called Catherine the Great), was so desperate to contain the plague and restore public order that she issued a hasty decree ordering that all factories be moved from Moscow. By the time the plague ended, as many as 100,000 people may have died. Even after the plague ended, Catherine struggled to restore order. In 1773, Yemelyan Pugachev, a man who claimed to be Peter III (Catherine's executed husband), led an insurrection that resulted in the deaths of thousands more.

12. Philadelphia yellow fever epidemic: 1793

When yellow fever seized Philadelphia, the United States' capital at the time, officials wrongly believed that slaves were immune. As a result, abolitionists called for people of African origin to be recruited to nurse the sick.

The disease is carried and transmitted by mosquitoes, which experienced a population boom during the particularly hot and humid summer weather in Philadelphia that year. It wasn't until winter arrived — and the mosquitoes died out — that the epidemic finally stopped. By then, more than 5,000 people had died.

13. Flu pandemic: 1889-1890

In the modern industrial age, new transport links made it easier for influenza viruses to wreak havoc. In just a few months, the disease spanned the globe, killing 1 million people. It took just five weeks for the epidemic to reach peak mortality.

The earliest cases were reported in Russia. The virus spread rapidly throughout St. Petersburg before it quickly made its way throughout Europe and the rest of the world, despite the fact that air travel didn't exist yet.

14. American polio epidemic: 1916

A polio epidemic that started in New York City caused 27,000 cases and 6,000 deaths in the United States. The disease mainly affects children and sometimes leaves survivors with permanent disabilities.

Polio epidemics occurred sporadically in the United States until the Salk vaccine was developed in 1954. As the vaccine became widely available, cases in the United States declined. The last polio case in the United States was reported in 1979. Worldwide vaccination efforts have greatly reduced the disease, although it is not yet completely eradicated.

15. Spanish Flu: 1918-1920

An estimated 500 million people from the South Seas to the North Pole fell victim to Spanish Flu. One-fifth of those died, with some indigenous communities pushed to the brink of extinction. The flu's spread and lethality was enhanced by the cramped conditions of soldiers and poor wartime nutrition that many people were experiencing during World War I.

Despite the name Spanish Flu, the disease likely did not start in Spain. Spain was a neutral nation during the war and did not enforce strict censorship of its press, which could therefore freely publish early accounts of the illness. As a result, people falsely believed the illness was specific to Spain, and the name Spanish Flu stuck.

16. Asian Flu: 1957-1958

The Asian Flu pandemic was another global showing for influenza. With its roots in China, the disease claimed more than 1 million lives. The virus that caused the pandemic was a blend of avian flu viruses.

The Centers for Disease Control and Prevention notes that the disease spread rapidly and was reported in Singapore in February 1957, Hong Kong in April 1957, and the coastal cities of the United States in the summer of 1957. The total death toll was more than 1.1 million worldwide, with 116,000 deaths occurring in the United States.

17. AIDS pandemic and epidemic: 1981-present day

AIDS has claimed an estimated 35 million lives since it was first identified. HIV, which is the virus that causes AIDS, likely developed from a chimpanzee virus that transferred to humans in West Africa in the 1920s. The virus made its way around the world, and AIDS was a pandemic by the late 20th century. Now, about 64% of the estimated 40 million living with human immunodeficiency virus (HIV) live in sub-Saharan Africa.

For decades, the disease had no known cure, but medication developed in the 1990s now allows people with the disease to experience a normal life span with regular treatment. Even more encouraging, two people have been cured of HIV as of early 2020.

18. H1N1 Swine Flu pandemic: 2009-2010

The 2009 swine flu pandemic was caused by a new strain of H1N1 that originated in Mexico in the spring of 2009 before spreading to the rest of the world. In one year, the virus infected as many as 1.4 billion people across the globe and killed between 151,700 and 575,400 people, according to the CDC.

The 2009 flu pandemic primarily affected children and young adults, and 80% of the deaths were in people younger than 65, the CDC reported. That was unusual, considering that most strains of flu viruses, including those that cause seasonal flu, cause the highest percentage of deaths in people ages 65 and older. But in the case of the swine flu, older people seemed to have already built up enough immunity to the group of viruses that H1N1 belongs to, so weren't affected as much. A vaccine for the H1N1 virus that caused the swine flu is now included in the annual flu vaccine.

19. West African Ebola epidemic: 2014-2016

Ebola ravaged West Africa between 2014 and 2016, with 28,600 reported cases and 11,325 deaths. The first case to be reported was in Guinea in December 2013, then the disease quickly spread to Liberia and Sierra Leone. The bulk of the cases and deaths occurred in those three countries. A smaller number of cases occurred in Nigeria, Mali, Senegal, the United States and Europe, the Centers for Disease Control and Prevention reported.

There is no cure for Ebola, although efforts at finding a vaccine are ongoing. The first known cases of Ebola occurred in Sudan and the Democratic Republic of Congo in 1976, and the virus may have originated in bats.

20. Zika Virus epidemic: 2015-present day

The impact of the recent Zika epidemic in South America and Central America won't be known for several years. In the meantime, scientists face a race against time to bring the virus under control. The Zika virus is usually spread through mosquitoes of the Aedes genus, although it can also be sexually transmitted in humans.

While Zika is usually not harmful to adults or children, it can attack infants who are still in the womb and cause birth defects. The type of mosquitoes that carry Zika flourish best in warm, humid climates, making South America, Central America and parts of the southern United States prime areas for the virus to flourish.

Past Coronaviruses

1) Corona virus is not a recent virus spread in mankind it was on earth since long time .
2) Coronaviruses were first identified in the 1960s. Almost everyone gets a coronavirus infection at least once in their life, most likely as a young child. In the Affected Place , regular coronaviruses are more common in the fall and winter, but anyone can come down with a coronavirus infection at any time.
3) The symptoms of most coronaviruses are similar to any other upper respiratory infection, including a runny nose, coughing, sore throat, and sometimes a fever. In most cases, you won't know whether you have a coronavirus or a different cold-causing virus, such as a rhinovirus. You treat this kind of coronavirus infection the same way you treat a cold.

Have there been other serious coronavirus outbreaks?

1. Middle East respiratory syndrome (MERS). About 858 people have died from MERS, which first appeared in Saudi Arabia and then in other countries in the Middle East, Africa, Asia, and Europe. In April 2014, the first American was hospitalized for MERS in Indiana, and another case was reported in Florida. Both had just returned from Saudi Arabia. In May 2015, there was an outbreak of MERS in South Korea, which was the largest outbreak outside of the Arabian Peninsula.
2. Severe acute respiratory syndrome (SARS). In 2003, 774 people died from an outbreak. As of 2015, there were no further reports of cases of SARS.

Corona facts

What is a coronavirus?

Coronaviruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered coronavirus causes coronavirus disease COVID-19.

Coronavirus is a family of viruses, which can cause the common cold or more severe diseases such as severe acute respiratory syndrome, Middle East respiratory syndrome, and the new coronavirus disease that first appeared in late 2019 in Wuhan, China, called COVID-19. A COVID-19 pandemic has sickened more than 23.9 million people globally and claimed the lives of more than 820,000 people around the world. The United States has the largest number of cases in the world — over 5.7 million — and more than 178,000 people have died.

COVID-19 is a contagious disease that causes mild to severe respiratory symptoms with fever, cough, and shortness of breath. It can be transmitted through person-to-person contact, mainly through respiratory droplets that become airborne when an infected person coughs, sneezes, or speaks. However, much remains unknown about how it spreads.

The new coronavirus was first identified on Dec. 31, 2019. The World Health Organization declared the outbreak a public health emergency of international concern on Jan. 30. This declaration places countries on alert to do all they can to identify, isolate, and care for people who are infected; to prevent transmission; and to help other countries with weaker health systems. The WHO later declared a pandemic, meaning it is spreading globally, on March 11.

The COVID-19 pandemic threatens to reverse decades of progress in the fight against poverty and income inequalities, and it jeopardizes the future of a generation of children.

Worldwide, World Vision is working diligently in all its program and development areas to keep children safe from infection. Within 18 months, our coronavirus response aims to provide support to at least 72 million people, half of them children. We have already served 24.5 million people, including 9.7 million children.

How does COVID-19 spread?

People can catch COVID-19 from others who have the virus. The disease spreads primarily from person to person through small droplets from the nose or mouth, which are expelled when a person with COVID-19 coughs, sneezes, or speaks. These droplets are relatively heavy, do not travel far and quickly sink to the ground. People can catch COVID-19 if they breathe in these droplets from a person infected with the virus. This is why it is important to stay at least 1 meter) away from others. These droplets can land on objects and surfaces around the person such as tables, doorknobs and handrails. People can become infected–by touching these objects or surfaces, then touching their eyes, nose or mouth. This is why it is important to wash your hands regularly with soap and water or clean with alcohol-based hand rub.

How long does the virus survive on surfaces?

The most important thing to know about coronavirus on surfaces is that they can easily be cleaned with common household disinfectants that will kill the virus. Studies have shown that the COVID-19 virus can survive for up to 72 hours on plastic and stainless steel, less than 4 hours on copper and less than 24 hours on cardboard.

As, always clean your hands with an alcohol-based hand rub or wash them with soap and water. Avoid touching your eyes, mouth, or nose.

Pandemic Covid Facts That Might Surprise You

1. Anosmia (loss of smell) is a symptom.
The most commonly reported symptoms of COVID-19 include fever, cough and shortness of breath. However, as the disease has spread around the world, healthcare providers have noticed a few unusual symptoms, including loss of smell (anosmia) and decreased sense of taste (ageusia).

In South Korea, 30% of people who tested positive for the virus said that loss of smell was their first major symptom. In

Germany, more than 2 out of 3 confirmed cases included loss of smell and taste.

Doctors recommend that anyone who experiences a sudden loss of smell or taste self-isolate and contact their healthcare provider.

2. SARS-CoV-2 binds tightly to human cells.

In 2003, SARS, or severe acute respiratory syndrome, spread from Asia throughout the world, sickening more than 8,000 people and killing more than 700 over a six-month period. The virus that caused SARS (SARS-CoV) is similar to the one that causes COVID-19—both are types of coronaviruses—but researchers have recently discovered an important difference that may explain why the new coronavirus is so hard to stop: SARS-CoV-2 (the virus that causes COVID-19) binds 10 to 20 times more tightly to human cells than SARS-CoV (the virus responsible for SARS).

3. Coronavirus can make babies seriously ill.

Compared to adults, children appear much less likely to get sick if they contract the novel coronavirus. However, a report from China suggests that the very young may be more vulnerable to serious illness than older children. Researchers reviewed the records of 2,143 Chinese children and found that nearly 11% of sick infants were seriously or critically ill, compared to 7% of children ages 1 to 5 years, 4% of children ages 6 to 15 and 3% of teenagers aged 16 and older.

4. The COVID-19 virus can live on surfaces for days.

COVID-19 is spread primarily through respiratory droplets. When an infected person sneezes or coughs, the virus can travel from one person to another, either directly (which is why the CDC recommends maintaining at least a 6-foot distance from other people) or via an intermediate surface.

Researchers have found that the virus can live up to 24 hours on cardboard and 2 to 3 days on plastic and stainless steel. The CDC reports that the virus was detected on surfaces of the Diamond Princess cruise ship up to 17 days after passengers disembarked. However, only pieces of the virus were detectable, not viruses capable of infecting a person.

5. People who don't have symptoms can spread the virus.

One-third of 565 Japanese citizens who were evacuated from Wuhan, China in February that tested positive for coronavirus infection never developed COVID-19 symptoms; and a study out of China reports more than half of infected children had no symptoms or only mild symptoms.

That's good news for the affected individuals, but bad news for public health because people who are infected but don't have any symptoms can unintentionally spread the virus to others. Public health officials are asking all people to dramatically limit social contact to prevent the spread of disease.

6. People with type A blood may be more susceptible to infection.

A Chinese study of 2,173 individuals who were hospitalized with COVID-19 found that the proportion of sick people with type A blood was significantly greater than researchers would expect based upon the percentage of people with type A blood in the general population. The study also found that there were fewer sick people with type O blood than would be expected.

These findings may be coincidental; a person's blood type may or may not have anything to do with a person's tendency to contract and get sick from coronavirus infection. More studies are needed.

7. You may already have been infected.

Some people never develop symptoms. And some people who had what they thought was a "bad cold" or the flu may have actually had COVID-19.

Right now, there's no way to tell for sure if you had the coronavirus. Scientists are currently working on developing tests that will be able to detect SARS-CoV-2 antibodies in the blood, or evidence of past infection. Such tests may help us eventually understand the true extent of this pandemic.

8. Some people with COVID-19 have digestive symptoms.

Cough, fever and shortness of breath are the most common symptoms of novel coronavirus infection, but many people also experience digestive symptoms, including lack of appetite, diarrhea, vomiting and abdominal pain. According to study published in The American Journal of Gastroenterology, 48.5% of 204 people admitted to the hospital with COVID-19 had digestive symptoms. A small percentage (7 people) only had digestive symptoms; these individuals did not have a cough, fever or shortness of breath.

9. Reinfection may be possible.

If a person gets COVID-19, are they immune to future infection? And if so, will that immunity last a lifetime? No one knows for sure. Reinfection is theoretically possible. Ten to 30% of our common colds are caused by four different coronaviruses, and we all know that having a cold doesn't keep you from catching another cold. But animal research suggests that this coronavirus may be different: Macaque monkeys who were exposed to SARS-CoV-2 after recovering from

The World Health Organization (WHO) announced a large global trial called SOLIDARITY. Its purpose: to find effective treatment for COVID-19. SOLIDARITY is examining four promising drug regimens:

1) Remdesivir—an experimental antiviral medication;
2) Chloroquine and hydroxychloroquine—malaria medications;
3) Lopinavir and ritonavir—two HIV drugs that may be useful in combination; and
4) Lopinavir, ritonavir plus interferon-beta, a medication that works in the immune system.

Major Fact of present days regarding covid

According to the CDC, reported COVID-19 illnesses have ranged from mild (with no reported symptoms in some cases) to severe, including illness resulting in death. People ages 65 and older, those living in a nursing home or long-term care facility, and people of all ages with underlying health conditions (such as diabetes, heart disease, lung disease, and obesity) seem to be at higher risk of developing serious illness. But doctors are still working to develop a complete clinical picture of COVID-19.

"I think there are two main questions," says Richard Martinello, MD, a Yale Medicine infectious diseases specialist and medical director of infection prevention at Yale New Haven Health. "First, we need to know how this virus is transmitted between people so we can be more precise in our efforts to stop its spread. Data is needed not only to better understand when those who become ill shed the virus, but also which body fluids contain the virus and how those may contaminate surfaces and even the air surrounding them," says Dr. Martinello. "Second, there needs to be a better understanding of the pathogenesis of the infection and resulting inflammatory response, so that knowledge can drive the development of therapeutic and preventive medications."

While we still don't know how the situation will progress around COVID-19, studies of influenza have shown that pandemics begin with an "investigation" phase, followed by "recognition," "initiation," and "acceleration" phases, according to the CDC, and that is followed by deceleration, during which there is a decrease in illnesses. Finally, there is a "preparation" phase, where the pandemic has subsided, and public health officials monitor virus activity and prepare for possible additional waves of infection. Different parts of the U.S. have been experiencing the pandemic to different degrees, depending, in part, on the public health response.

According to the CDC, the U.S. is in an acceleration phase, when the peak of illnesses occurs. Efforts have been aimed at "flattening the curve." If you map the number of COVID-19 cases over time, the expectation is that it will peak at some point—on a graph this peak would mirror a surge in patients (which could overwhelm hospitals and health care providers). Flattening the curve would mean there would be fewer patients during that period, and hospitals would be better able to manage the demands of patients who are sick with COVID-19 and other illnesses.

Meanwhile, many places are focused on easing restrictions that have been put in place. White House guidelines for Opening Up America Again, a phased approach to help state and local officials reopen their economies, provides advice on continuing handwashing, wearing face masks, and taking other precautions during the reopening. In late May, Connecticut took the first steps toward a phased reopening by allowing people to return to offices, retail establishments, restaurants, university research laboratories, and outdoor recreation activities, as long as certain precautions are in place (restaurants can serve only outdoors, for example). The state continues to prohibit gatherings of more than five people and direct people to wear face coverings in public when maintaining a six-foot distance is not possible.

Meanwhile, communities are hiring contact tracers to contact and support people who have had a potentially high-risk exposure to someone infected with COVID-19. A call or message from a contract tracer does not mean you have the disease, but it may be a reason to self-isolated and get tested.

There are many things you can do to protect yourself and the people you interact with. "The best thing you can do at this point is take care of yourself the way you would to prevent yourself from getting the flu," says Yale Medicine infectious diseases specialist Joseph Vinetz, MD. "You know you can get the flu when people sneeze and cough on you, or when you touch a doorknob. Washing hands—especially before eating and touching your face, and after going to the bathroom—and avoiding other people who have flu-like symptoms are the best strategies at this point."

Pandemic Covid History and Time Line

Coronaviruses are a big family of different viruses. Some of them cause the common cold in people. Others infect animals, including bats, camels, and cattle. But how did SARS-CoV-2, the new coronavirus that causes COVID-19, come into being?

Here's what we know about the virus that was first detected in Wuhan, China, in late 2019 and has set off a global pandemic.

Experts say SARS-CoV-2 originated in bats. That's also how the coronaviruses behind Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS) got started.

SARS-CoV-2 made the jump to humans at one of Wuhan's open-air "wet markets." They're where customers buy fresh meat and fish, including animals that are killed on the spot.Some wet markets sell wild or banned species like cobras, wild boars, and raccoon dogs. Crowded conditions can let viruses from different animals swap genes. Sometimes the virus changes so much it can start to infect and spread among people.

Multiple myeloma can relapse once or a few times. Learn what this means for you.

Still, the Wuhan market didn't sell bats at the time of the outbreak. That's why early suspicion also fell on pangolins, also called scaly anteaters, which are sold illegally in some markets in China. Some coronaviruses that infect pangolins are similar to SARS-CoV-2.As SARS-CoV-2 spread both inside and outside China, it infected people who have had no direct contact with animals. That meant the virus is transmitted from one human to another. It's now spreading in the U.S. and around the globe, meaning that people are unwittingly catching and passing on the coronavirus. This growing worldwide transmission is what is now a pandemic.

Scientists first identified a human coronavirus in 1965. It caused a common cold. Later that decade, researchers found a group of similar human and animal viruses and named them after their crown-like appearance.

Seven coronaviruses can infect humans. The one that causes SARS emerged in southern China in 2002 and quickly spread to 28 other countries. More than 8,000 people were infected by July 2003, and 774 died. A small outbreak in 2004 involved only four more cases. This coronavirus causes fever, headache, and respiratory problems such as cough and shortness of breath.MERS started in Saudi Arabia in 2012. Almost all of the nearly 2,500 cases have been in people who live in or travel to the Middle East. This coronavirus is less contagious than its SARS cousin but more deadly, killing 858 people. It has the same respiratory symptoms but can also cause kidney failure.Most of us will be infected with a coronavirus at least once in our life. This might be a worrying fact for many people, especially those who have only heard of one coronavirus, SARS-CoV-2, the cause of the disease known as COVID-19.

There is much more to coronaviruses than SARS-CoV-2. Coronaviruses are actually a family of hundreds of viruses. Most of these infect animals such as bats, chickens, camels and cats. Occasionally, viruses that infect one species can mutate in such a way that allows them to start infecting another species. This is called "cross-species transmission" or "spillover".

The first coronavirus was discovered in chickens in the 1930s. It was a few decades until the first human coronaviruses were identified in the 1960s. To date, seven coronaviruses have the ability to cause disease in humans. Four are endemic (regularly found among particular people or in a certain area) and usually cause mild disease, but three can cause much more serious and even fatal disease.The first coronavirus discovered was in chickens.

Coronaviruses can be found all over the world and are responsible for about 10-15% of common colds, mostly during the winter. The coronaviruses that cause mild to moderate disease in humans are called: 229E, OC43, NL63 and HKU1.

The first coronaviruses discovered that are able to infect humans are 229E and OC43. Both of these viruses usually result in the common cold and rarely cause severe disease on their own. They are often detected at the same time as other respiratory infections. When several viruses, or viruses and bacteria, are found in patients this is called co-infection and can result in more severe disease.

In 1965, researchers discovered a vexing respiratory infection called 229E. Today, we know it as the common cold.

IN2016, a 45-year-old schoolteacher in Athens, Greece, arrived at the emergency room of the Hygeia Hospital. A non-smoker with no major health issues, she presented with unusual symptoms— a fever over 103 degrees, a dry cough and severe headache. When the ER doctor examined her, it was noted that the lower part of her left lung was rattling when she breathed, and a chest X-ray confirmed an abnormality.

Thinking this a case of bacterial pneumonia, doctors treated her with antibiotics. But over the next two days, the woman's condition deteriorated—and the pneumonia lab test came back negative. As her breathing began to fail, she was supplied with oxygen and a new set of medications. Meanwhile, she was tested for a broad variety of possible culprits, including various strains of the flu, the bacteria that cause Legionnaires disease, whooping cough, and other serious respiratory diseases. All came back negative, as did tests for SARS and MERS.

In fact, only one test turned up positive, but it was a result so surprising that doctors ran it again. The result was the same: the patient was suffering from a familiar but inscrutable infection known as 229E—the first human coronavirus ever discovered.

The severity of the schoolteacher's condition would have come as a surprise to the researchers in the early 1960s who discovered 229E. That's because they were looking for the viruses responsible for the common cold. By the mid-20th century, scientists had worked out techniques to isolate some viruses, but their research left many strains unaccounted for—about 35% of people with colds had viruses that scientists weren't able to identify.

In 1965, Dorothy Hamre, a researcher at the University of Chicago, took this medical blind spot as a challenge. As she studied the tissue cultures of students with colds, she discovered a new kind of virus, which became known as 229E.

At the same time, a group of researchers in England, led by Dr. David Tyrrell, was learning more about the common cold. They, too, isolated what appeared to be a new type of virus in tissue culture. When Tyrrell's team examined it under an electron microscope, they found that it resembled a virus that had been isolated in the 1930s from chickens with bronchitis. It was a coronavirus—the first proven to infect humans.

These were always very important viruses in animals," says Dr. Ken McIntosh, a researcher at Harvard Medical School. "There was this virus called Avian Bronchitis Virus in chickens. It was very important commercially and vaccines were available."

There is a fascinating time capsule aspect to this early research. Whereas biological studies are conducted today with strict containment and safety procedures, things were a bit more freewheeling a half-century ago. A contemporary newspaper account of Tyrrell's findings noted how his team ensured that the virus they had isolated wasn't already present in the organ cultures they were growing it in. "They put samples of the medium into the nose of 113 volunteers. Only one caught a cold. That took care of that."

BOSTON CHILDREN HOSPITAL ARCHIVES

1. At the time of Hamre and Tyrrell's discoveries, Dr. McIntosh was part of a team at the National Institutes of Health that was also looking at causes for the common cold. ("Quite independently," he adds, as those teams hadn't published any research yet.) Dr. McIntosh's team discovered what is now known as OC43, another common human coronavirus that still leads to respiratory infections today. In 1968, the term "coronavirus" was coined, based on how, under an electron microscope, its crown-like surface resembled the Sun's outer layer, called the corona.
2. While the discovery of novel coronaviruses like 229E and OC43 generated great media interest at the time—one article boldly proclaimed that "science has tripled its chance for eventually licking the common cold"—Dr. McIntosh recalls that the scientific community didn't actively focus on investigating coronaviruses again until the emergence of SARS in 2003. Because 229E and OC43 caused relatively mild illnesses in people, doctors could treat them much like colds caused by other viruses: fever reducers, cough suppressants and the occasional bowl of chicken soup.
3. Then came the 2003 SARS outbreak, which began with a coronavirus in China and ultimately spread to 29 countries. Though that disease was ultimately confirmed to have infected just 8,096 people, there were 774 deaths attributed to it—a shockingly high mortality rate that caused researchers to take a second look at the virus class. "When SARS came along, the world of coronaviruses suddenly changed and it became much larger and much more technical," Dr. McIntosh recalls.
4. Since then, two more coronaviruses that also cause colds—NL63 and HKU1—have been discovered. And it wasn't until 2012—nearly 50 years after its discovery—that the complete genome of 229E was finally sequenced. In the meantime, a number of case reports were published showing that 229E could potentially cause severe respiratory symptoms in patients with compromised immune symptoms, though for most healthy people its impact is mostly limited to a cold.
5. Despite the intense scrutiny that coronaviruses have undergone since SARS, it's still not altogether clear why three coronaviruses—SARS-CoV-1, MERS-CoV and SARS-CoV-2 (the source of the COVID-19 pandemic)—have led to far more severe symptoms and a higher mortality rate, while the other four known human coronaviruses remain much milder.
6. One thing they all have in common: bats. All known coronaviruses that infect humans appear to originate in bats. The viruses then typically spread to another animal—global "wet markets" and open-air food stalls are perfect cross-species breeding grounds for this—before eventually making it to humans. With OC43, for example, it was passed to humans by cattle and may have been circulating since the 18th century. While MERS-CoV, by contrast, transferred to humans from camels. Animal intermediaries are suspected for the other human coronaviruses as well, including SARS-CoV-2.
7. The schoolteacher in Greece eventually recovered from her illness and thankfully never required the use of a ventilator to aid her breathing. Scans of her lungs taken two years after her original trip to the ER showed that they had recovered and were healthy. Still, this severe response to what most people consider "just a cold" highlights one of the most difficult aspects of dealing with coronaviruses—they produce a vast range of symptoms with a wide amount of health impacts across the population.
8. VIRUS HUNTER: Dr. Wayne Marasco, who worked on SARS and MERS outbreaks, is investigating antibodies that can be used to treat COVID-19.
9. BRYCE VICKMARK, DANA-FARBER CANCER INSTITUTE.
10. "If you take a look at the spectrum of diseases in the outbreak right now," says Dr. Wayne Marasco, a researcher at the Dana Farber Cancer Institute in Boston, who has studied SARS, MERS and COVID-19, "there are people who are asymptomatic and people who are dying."
11. Dr. McIntosh suspects that coronaviruses will continue to perplex researchers. First, because coronaviruses are large and complex, and second because they can change relatively easily on a genetic level. He notes that these viruses can also recombine fairly easily within the same cell, and that such mutations are likely what led to both the coronavirus that causes SARS and the novel coronavirus that has caused the current pandemic.
12. "Coronaviruses have the largest RNA genome of any of the animal viruses," Dr. McIntosh says. "And it has a lot of secrets."
13. In 2004, NL63 was detected for the first time in a baby suffering from bronchiolitis (a lower respiratory tract infection) in the Netherlands. This virus has probably been around for hundreds of years, we just hadn't found it until then. A year later, in Hong Kong, another coronavirus was found – this time in an elderly patient with pneumonia. It was later named HKU1 and has been found to be present in populations around the world.

14. But not all coronaviruses cause mild disease. Sars (severe acute respiratory syndrome) caused by SARS-CoV was first detected in November 2002. The cause of this outbreak wasn't confirmed until 2003 when the genome of the virus was identified by Canada's National Microbiology Laboratory. Sars bears many similarities to the current pandemic of COVID-19. Older people were much more likely to suffer severe disease and symptoms included fever, cough, muscle pain and sore throat. But there was a much greater chance of dying if you had Sars. From 2002 until the last reported case in 2014, 774 people died.
15. A decade later, in 2012, there was another outbreak involving a newly identified coronavirus: MERS-CoV. The first case of Middle East respiratory syndrome (Mers) occurred in Saudi Arabia. There were two further Mers outbreaks: South Korea in 2015 and Saudi Arabia in 2018. There are a handful of Mers cases every year, but the outbreaks are usually well contained.So why did Sars or Mers not result in pandemics? The R0 of both Sars and SARS-CoV-2 is about two or three (although some more recent estimates of the R0 for SARS-CoV-2 are around five), meaning that every infected person is likely to infect two or three other people. The symptoms of Sars were more severe, so it was much easier to identify and isolate patients.
16. The R0 of Mers is below one. It is not very contagious. Most of the cases have been linked to close contact with infected camels or very close contact with an already infected person.
17. One of the main challenges in containing the SARS-CoV-2 outbreak is that symptoms can be very mild – some people may not even show any symptoms at all – but can still infect other people. SARS-CoV-2 is not as deadly as either Sars or Mers, but because it can spread undetected, the numbers of people it will infect and the numbers that will die will be higher than any coronavirus we have ever encountered. So please, stay at home

31 Dec 2019

Wuhan Municipal Health Commission, China, reported a cluster of cases of pneumonia in Wuhan, Hubei Province. A novel coronavirus was eventually identified.

1 January 2020

WHO had set up the IMST (Incident Management Support Team) across the three levels of the organization: headquarters, regional headquarters and country level, putting the organization on an emergency footing for dealing with the outbreak.

4 January 2020

WHO reported on social media that there was a cluster of pneumonia cases – with no deaths – in Wuhan, Hubei province.

5 January 2020

WHO published our first Disease Outbreak News on the new virus. This is a flagship technical publication to the scientific and public health community as well as global media. It contained a risk assessment and advice, and reported on what China had told the organization about the status of patients and the public health response on the cluster of pneumonia cases in Wuhan.

10 January 2020

WHO issued a comprehensive package of technical guidance online with advice to all countries on how to detect, test and manage potential cases, based on what was known about the virus at the time. This guidance was shared with WHO's regional emergency directors to share with WHO representatives in countries.

Based on experience with SARS and MERS and known modes of transmission of respiratory viruses, infection and prevention control guidance were published to protect health workers recommending droplet and contact precautions when caring for patients, and airborne precautions for aerosol generating procedures conducted by health workers.

12 January 2020

China publicly shared the genetic sequence of COVID-19.

13 January 2020

Officials confirm a case of COVID-19 in Thailand, the first recorded case outside of China.

14 January 2020

WHO's technical lead for the response noted in a press briefing there may have been limited human-to-human transmission of the coronavirus (in the 41 confirmed cases), mainly through family members, and that there was a risk of a possible wider outbreak. The lead also said that human-to-human transmission would not be surprising given our experience with SARS, MERS and other respiratory pathogens.

20-21 January 2020

WHO experts from its China and Western Pacific regional offices conducted a brief field visit to Wuhan.

22 January 2020

WHO mission to China issued a statement saying that there was evidence of human-to-human transmission in Wuhan but more investigation was needed to understand the full extent of transmission.

22- 23 January 2020

The WHO Director- General convened an Emergency Committee (EC) under the International Health Regulations (IHR 2005) to assess whether the outbreak constituted a public health emergency of international concern. The independent members from around the world could not reach a consensus based on the evidence available at the time. They asked to be reconvened within 10 days after receiving more information.

28 January 2020

A senior WHO delegation led by the Director-General travelled to Beijing to meet China's leadership, learn more about China's response, and to offer any technical assistance.

While in Beijing, Dr. Tedros agreed with Chinese government leaders that an international team of leading scientists would travel to China on a mission to better understand the context, the overall response, and exchange information and experience.

30 January 2020

The WHO Director-General reconvened the Emergency Committee (EC). This was earlier than the 10-day period and only two days after the first reports of limited human-to-human transmission were reported outside China. This time, the EC reached consensus and advised the Director-General that the outbreak constituted a Public Health Emergency of International Concern (PHEIC). The Director-General accepted the recommendation and declared the novel coronavirus outbreak (2019-nCoV) a PHEIC. This is the 6th time WHO has declared a PHEIC since the International Health Regulations (IHR) came into force in 2005.

WHO's situation report for 30 January reported 7818 total confirmed cases worldwide, with the majority of these in China, and 82 cases reported in 18 countries outside China. WHO gave a risk assessment of very high for China, and high at the global level.

3 February 2020

WHO releases the international community's Strategic Preparedness and Response Plan to help protect states with weaker health systems.

11-12 February 2020

WHO convened a Research and Innovation Forum on COVID-19, attended by more than 400 experts and funders from around the world, which included presentations by George Gao, Director General of China CDC, and Zunyou Wu, China CDC's chief epidemiologist.

16-24 February 2020

The WHO-China Joint mission, which included experts from Canada, Germany, Japan, Nigeria, Republic of Korea, Russia, Singapore and the US (CDC, NIH) spent time in Beijing and also travelled to Wuhan and two other cities. They spoke with health officials, scientists and health workers in health facilities (maintaining physical distancing).

11 March 2020

Deeply concerned both by the alarming levels of spread and severity, and by the alarming levels of inaction, WHO made the assessment that COVID-19 can be characterized as a pandemic.

13 March 2020

COVID-19 Solidarity Response Fund launched to receive donations from private individuals, corporations and institutions.

18 March 2020

WHO and partners launch the Solidarity Trial, an international clinical trial that aims to generate robust data from around the world to find the most effective treatments for COVID-19.

72 facts about coronavirus

1) Fact 1. Covid-19 and SARS-CoV-2 are not the same thing. Covid-19 is a disease (D stands for disease) caused by a new coronavirus. SARS-CoV-2 is the name of the virus itself.
2) Fact 2. CoV is short for CoronaVirus, Coronavirus. This is the name of the family of viruses (there are about 40 of them), which bear resemblance with the solar corona due to the spinous crests.

3) Fact 3. Coronaviruses are impostors from biology. The tailpiece of each spike “imitates” the molecule of a useful substance, so that the cellular receptors gladly pull it into themselves, and the whole virus is squeezed into the cell after the spike is in. This is how infection occurs.
4) Fact 4. The term "new coronavirus" (novel or nCoV) means that before neither scientists nor the cells met this virus before.
5) Fact 5. Over 2 million years of evolution, our immune system has learned to deal with most known infections, but the new coronavirus catches it by surprise, this it’s so hard to cope with and quite easy to get infected.
6) Fact 6. Once in a cell, the virus “seizes” control over it and forces it to endlessly produce its own copies - instead of its usual proteins. A chain reaction begins. As a result, the cell dies, but the carrier of the infection becomes contagious.
7) Fact 7. At the initial stage of infection, the new coronavirus actively reproduces itself in the throat and upper respiratory tract. Then the infection goes down and can reach the lungs, causing inflammation.
8) Fact 8. That is why the first symptom of infection is a cough. Only then the temperature begins to rise.
9) Fact 9. Or it does not begin - in 30% of patients in Wuhan, the temperature at the time of arrival at the hospital was normal.
10) Fact 10. Many people who become infected (18% or one in five people) do not even have a cough. The disease proceeds without any symptoms at all: a person may not even suspect that he is sick.
11) Fact 11. Moreover, such an asymptomatic patient is still an active carrier of infection and can infect others.
12) Fact 12. If Covid-19 proceeds benignantly, its symptoms are very similar to the usual seasonal flu: dry cough, fever, fatigue, sometimes muscle pain or headache.
13) Fact 13. Covid-19 is also treated in the same way as regular flu - at home, symptomatically.
14) Fact 14. One of the most unusual symptoms of coronavirus is the loss of a sense of taste and/or smell.
15) Fact 15. Loss of a sense of taste and/or smell is not a common symptom - is does not necessarily happens in all Covid-19 cases, sometimes it is the only symptom.
16) Fact 16. So if you suddenly stop smelling or tasting, this is a reason to grow suspicious and take measures.
17) Fact 17. Important: the carrier of a new coronavirus becomes dangerous to others immediately after being infected - long before the first symptoms (if any).
18) Fact 18. The good news: the more deadly a virus is, the worse it is spreading. By killing its master, the virus can no longer infect others. Therefore, the virus rarely mutates into a more deadly form, it is not in its interests.
19) Fact 19. The bad news: SARS-CoV-2 - is just from a different category. This virus makes its host a spreader, but it does not appear immediately or does not appear at all, so the carrier manages to infect several more people.
20) Fact 20. On average, each carrier of a new coronavirus manages to infect 2 to 4 healthy people. This number is higher than seasonal flu (1.3), but lower than measles (12+).
21) Fact 21. Although, like any infection, the SARS-CoV-2 coronavirus has the so-called superspreders - carriers that infect incomparably more people: hundreds or even thousands.
22) Fact 22. In South Korea, the virus was controlled until the number of cases reached 30. But the woman, codenamed "Patient 31", immediately infected about 1,200 people.
23) Fact 23. It turned out that she was very religious and continued visiting church, despite the cough and fever, ignoring the orders of the Korean authorities.
24) Fact 24. Over 10 days, the number of infected in South Korea increased from 30 to 5,000.
25) Fact 25. The mortality rate from Covid-19 is still difficult to calculate with accuracy, but most studies estimate it at 1-3%.
26) Fact 26. This is about 20 times higher than seasonal flu, but falls short compared to the predecessors of the coronavirus SARS (10%) and MERS (25%).
27) Fact 27. Mortality from Covid-19 is highly dependent on the overall burden on the healthcare system and the rapidity of delivery medical care: in Germany it is only 0.3%, in Italy it is almost 9%.
28) Fact 28. In the age group of 70+, mortality exceeds 5%; 80+, every tenth dies of the virus.
29) Fact 29. That is why the main task of authorities around the world now is to stretch the epidemic for as long as possible, without allowing a large number of people to get Covid-19 at the same time.
30) Fact 30. The pandemic is quickly developing: 100,000 patients 67 days after the first diagnosis, the second 100,000 became ill in 11 days, and the third - in 4 days.
31) Fact 31. Every day, the number of people infected with the virus increases by about a third.
32) Fact 32. The pandemic has already reached the most remote corners of the globe, including the famous Easter Island, where on March 24, the first patient, a 42-year-old man, was officially confirmed.
33) Fact 33. Experts warn: you need to psychologically prepare yourself in advance for the fact that the number of infected people can amount to tens of millions, and perhaps hundreds of thousands will die.

34) Fact 34. It is not exactly known where SARS-CoV-2 came from, but bats and pangolins carry viruses similar to this one.
35) Fact 35. Most likely, the virus mutated and was transmitted to some other animal, and then to a human.
36) Fact 36. Was the virus dangerous for a person at the moment when the first person got it? Or did he mutate and learn to penetrate into our cells while already in a person? Scientists have not yet found answers to these questions.
37) Fact 37. If the virus was already dangerous when it came into contact with humans, it means that it can still walk somewhere in the animal kingdom and sooner or later infect people again.
38) Fact 38. That is why at the beginning of the outbreak in Wuhan, the first thing they did was closing the wildlife markets.
39) Fact 39. This, by the way, is a standard measure in China: first they close the markets when a new infection is suspected and lockdown is introduced. It usually helps, but this time it was too late: the asymptomatic virus has already gone "to the people."
40) Fact 40. No, the virus did not run away from the biological laboratory, no matter how much someone would like to believe it.
41) Fact 41. The version of the artificial origin of coronavirus was carefully checked by several teams of scientists from different countries at once and rejected as untenable.
42) Fact 42. "Our analysis clearly shows that SARS-CoV-2 was not designed in the laboratory and is not a virus that was aimed for any targeted manipulation," quoted researchers from the journal Nature.
43) Fact 43. Since we went to bust myths, here's another one: surgical masks DO NOT protect against coronavirus. Its particles are so small that they easily pass through the pores.
44) Fact 44. For you to imagine the size of the virus: about 100 million copies can be easily placed on the tip of a needle.
45) Fact 45. When coughing from an infected patient, the smallest drops of saliva fly off, each of which may contain billions (!) of virus particles.
46) Fact 46. It makes sense to wear a mask for those who are afraid to infect others. It does not provide 100% protection, but slightly reduces the risk to others.
47) Fact 47. Contrary to popular belief, pets can NOT spread the coronavirus. No cases of human infection from a dog or cat have yet been reported.
48) Fact 48. But the virus can be picked up in an absolutely empty room, where the infected had previously been present.
49) Fact 49. In the air, the coronavirus remains viable (that is, it can infect healthy people) for three hours.
50) Fact 50. On plastic and steel surfaces, SARS-CoV-2 remains dangerous for up to three days, on paper and cardboard - up to a day, on copper - up to four hours.
51) Fact 51. That is why the main and most reliable means of prevention is to wash your hands thoroughly after contacting any surfaces outside your home.
52) Fact 52. If there is no opportunity to wash your hands with soap, use hand gel antiseptic.Fact 52. If there is no opportunity to wash your hands with soap, use hand gel antiseptic.
53) Fact 53. At the very least, miramistin or chlorhexidine will do for disinfection: they both destroy bacteria and viruses.
54) Fact 54. Antibiotics against coronavirus are useless.
55) Fact 55. Lockdown and other restrictive measures may be extended around the world (with short interruptions) until a vaccine or effective treatment for Covid-19 are found.
56) Fact 56. It is absolutely clear that an effective vaccine for coronavirus will NOT appear earlier than in a year - year and a half, by the mid or end of 2021. At this point under the threat are likely to get sick.
57) Fact 57. Vaccine may never appear at all. The whole world has been trying to develop a vaccine against HIV for 35 years - this mounted to nothing. Although HIV pills have already been developed for effective prevention.
58) Fact 58. There is no specific therapy for SARS-CoV-2 yet. Infected people are treated exclusively symptomatically, that is, they are fighting not with the disease itself, but with manifestations of a disease.
59) Fact 59. Over 100,000 people with confirmed Covid-19 have successfully recovered.
60) Fact 60. The majority of patients (over 80%) do not need medical assistance at all. They treat themselves at home, with the help of ordinary flu, and usually recover in about a week.
61) Fact 61. Approximately one in five or six cases require for hospitalization, this is true mainly for the elderly and/or those with chronic diseases.
62) Fact 62. In heavy cases (about 4%), the patient needs lung ventilation - i.e. to get connected to a ventilator. The ventilation apparatus may not be enough if there are too many sick people. Some car companies have switched to the production of ventilators.

63) Fact 63. This is one of the main causes of high mortality in Italy. There are a lot of elderly patients, the peak load on hospitals and, as a result, the emaciation of medical staff and lack of equipment.
64) Fact 64. For 10,300 Italians recovered from Covid-19, more than 8,000 died. Another 62 thousand people are still ill (data as of March 27).
65) Fact 65. In a separate development, the search for a remedy for the virus goes on. There is no time to develop new drugs, because doctors are checking existing antiviral drugs, namely how effective they are in the fight against SARS-CoV-2.
66) Fact 66. In February, Chinese doctors noticed that chloroquine, a drug designed to prevent and treat malaria, does a good job in tratment of coronavirus. Since then, several studies have confirmed its effectiveness in controlling Covid-19.
67) Fact 67. Two other possible remedies are lopinavir, which is commonly used to treat HIV patients, and remdesivir, originally developed to treat Ebola and Marburg virus. So far, both have been successfully tested.
68) Fact 68. The latest encouraging discovery is the antiviral drug, Avigan (Favipiravir), a popular anti-flu medicine in Japan. It has been specifically designed to fight RNA viruses.
69) Fact 69. In tests in Wuhan, coronavirus-infected patients who received Avigan recovered in four days.
70) Fact 70. In some cases, heavily ill Covid-19 patients got transfusion of blood plasma from recovered people - with antibodies against the virus. This practice has proven itself during outbreaks of SARS, MERS and Ebola virus and has been officially recommended by WHO.
71) Fact 71. Sneezing is NOT a symptom of coronavirus. Coughing - yes, sneezing - no.
72) Fact 72. SARS-CoV-2 continues mutating. From December to March, some variants of the virus managed to change the genome 14 time

Different Types of Flu

Cold vs. Flu vs. Allergies vs. COVID-19				
Symptoms	Cold	Flu	Allergies	COVID-19 (can range from moderate to severe)
Fever	Rare	High (100-102 F), Can last 3-4 days	Never	Common
Headache	Rare	Intense	Uncommon	Can be present
General aches, pains	Slight	Usual, often severe	Never	Can be present
Fatigue, weakness	Mild	Intense, can last up to 2-3 weeks	Sometimes	Can be present
Extreme exhaustion	Never	Usual (starts early)	Never	Can be present
Stuffy/runny nose	Common	Sometimes	Common	Has been reported
Sneezing	Usual	Sometimes	Usual	Has been reported
Sore throat	Common	Common	Sometimes	Has been reported
Cough	Mild to moderate	Common, can become severe	Sometimes	Common
Shortness of breath	Rare	Rare	Rare, except for those with allergic asthma	In more serious infections
Loss of smell and taste	Sometimes	Sometimes	Never	Has been reported
Diarrhea	Never	Sometimes in children	Never	Has been reported

HUNT FOR CURE

Coronavirus Diagnosis

Call your doctor or local health department if you think you've been exposed and have symptoms like:

1) Fever of 100 F or higher
2) Cough
3) Trouble breathing

In most states, decisions about who gets tested for COVID-19 are made at the state or local level.

A swab test is the most common method. It looks for signs of the virus in your upper respiratory tract. The person giving the test puts a swab up your nose to get a sample from the back of your nose and throat. That sample usually goes to a lab that looks for viral material, but some areas may have rapid tests that give results in as little as 15 minutes.

If there are signs of the virus, the test is positive. A negative test could mean there is no virus or there wasn't enough to measure. That can happen early in an infection. It usually takes 24 hours to get results, but the tests must be collected, stored, shipped to a lab, and processed.

The FDA is granting emergency use authorizations for tests that don't have full approval yet. These include a home nasal swab test, a home saliva test, and tests that check your blood for things called antibodies. Your immune system makes antibodies in response to an infection.

A swab test can only tell whether you have the virus in your body at that moment. But an antibody test can show whether you've ever been exposed to the virus, even if you didn't have symptoms. This is important in officials' efforts to learn how widespread COVID-19 is. In time, it might also help them figure out who's immune to the virus.

The FDA is working with laboratories across the country to develop more tests.

COVID-19 and Autoimmune Drugs

If you have an autoimmune disorder, you probably take medicine to manage your condition. Some of those drugs can raise your chances of getting an infection. That might include COVID-19, the disease caused by the new coronavirus. And medicines called immunosuppressants may make you more likely to have serious complications from the virus, as can your autoimmune disorder itself.

But you shouldn't stop taking your medicine on your own. Instead, talk to your doctor about your concerns and whether you should adjust your treatment.

You can take steps to protect yourself from COVID-19. If you do get sick, your health care provider will consider all parts of your treatment when deciding what to do.

What Do Autoimmune Drugs Do?

Autoimmune disorders happen when your immune system attacks your body's own cells or tissues. Medications for these conditions change how your immune system works. But each drug does it in a different way. Some can slow down the entire system. Others target only certain parts.

Treatments that lower your immune response include:

1) Corticosteroids. These drugs, such as prednisone and prednisolone, affect your whole immune system.
2) Disease-modifying drugs or therapies
3) Inhibitors. These make it harder for certain immune cells to work.
4) Immunomodulators. Some are also immunosuppressants. Medicines like cyclosporine can stop cells called lymphocytes, or T cells, from working.
5) Biologics/biosimilars. These mimic certain proteins in your body to help lower inflammation. They include anti-tumor necrosis factor (anti-TNF) drugs.
6) WEBMD
7) Chronic Lymphocytic Leukemia Explained

Chronic lymphocytic leukemia (CLL) is a cancer that affects a type of white blood cell called a "lymphocyte." Learn more about the symptoms, causes, diagnosis, risk factors, and

What Conditions Do They Treat?

These drugs help with a number of autoimmune disorders, including:

1) Rheumatoid arthritis
2) Inflammatory bowel disease, including Crohn's disease and ulcerative colitis
3) Multiple sclerosis
4) Psoriasis
5) Lupus
6) Thyroid diseases
7) Type 1 diabetes

Tips for prevention

1. Wash your hands frequently and carefully
2. Use warm water and soap and rub your hands for at least 20 seconds. Work the lather to your wrists, between your fingers, and under your fingernails.
3. You can also use an antibacterial and antiviral soap. Use hand sanitizer when you cannot wash your hands properly. Rewash your hands several times a day, especially after touching anything including your phone or laptop.
4. Avoid touching your face
5. SARS-CoV-2 can live on hard surfaces for up to 72 hours. You can get the virus on your hands if you touch a surface like a doorknob, gas pump handle, or your cell phone.
6. Avoid touching any part of your face or head including your mouth, nose, and eyes. Also avoid biting your fingernails. This can give SARS-CoV-2 a chance to go from your hands into your body.
7. Stop shaking hands and hugging people — for now
8. Similarly, avoid touching other people. Skin to skin contact can pass SARS-CoV-2 from one person to another.
9. Don't share personal items
10. Do not share personal items like phones, makeup, or combs. It's also important not to share eating utensils and straws. Teach children to recognize their reusable cup, straw, and other dishes for their own use only.
11. Cover your mouth and nose when you cough and sneeze
12. SARS-CoV-2 is found in high amounts in the nose and mouth. This means it can be carried by air droplets to other people when you cough or sneeze. It can also land on hard surfaces and stay there for up to 3 days.
13. Use a tissue or sneeze into your elbow to keep your hands as clean as possible. Wash your hands carefully after you sneeze or cough, regardless.
14. Clean and disinfect surfaces
15. Use alcohol-based disinfectants to clean hard surfaces in your home like countertops, door handles, furniture, and toys. Also clean your phone, laptop, and anything else you use regularly several times a day.
16. Disinfect areas after you bring groceries or packages into your home. Use white vinegar or hydrogen peroxide solutions for general cleaning in between disinfecting surfaces.
17. Take social distancing seriously
18. If you are carrying the SARS-CoV-2 virus, it will be found in high amounts in your spit (sputum). This can happen even if you do not have symptoms.
19. Social distancing means staying home and working remotely when possible. If you must go out for necessities, keep a distance of 6 feet from other people. You can transmit the virus by speaking to someone in close contact to you.
20. Do not gather in groups
21. Being in a group or gathering makes it more likely that you will be in close contact with someone. This includes avoiding all religious places of worship, as you may have to sit or stand too close to another congregant. It also includes congregating at parks or beaches.
22. Avoid eating or drinking in public places
23. Now is not the time to go out to eat. This means avoiding restaurants, coffee shops, bars, and other eateries. The virus can be transmitted through food, utensils, dishes, and cups. It may also be airborne from other people in the venue.
24. You can still get delivery or takeaway food. Choose foods that are thoroughly cooked and can be reheated. High heat (at least 132°F/56°C, according to one recent, not-yet-peer-reviewed lab study) helps to kill coronaviruses. This means it may be best to avoid cold foods from restaurants and all food from buffets and open salad bars.
25. Wash fresh groceries
26. Soak all raw, whole fruits and vegetables in a solution of food-grade hydrogen peroxide or white vinegar. Let dry before putting them away in your fridge and cupboards. You can also use vegetable antibacterial wash to clean produce. Wash your hands before and after handling fresh produce.
27. Wear a (homemade) mask The Centers for Disease Control and Prevention (CDC) recommendsTrusted Source that almost everyone wear a cloth face mask in public settings where social distancing may be difficult, such as grocery stores.
28. When used correctly, these masks can help prevent people who are asymptomatic or undiagnosed from transmitting SARS-CoV-2 when they breathe, talk, sneeze, or cough. This, in turn, slows the spread of the virus.

29. The CDC's website provides instructionsTrusted Source for making your own mask at home, using basic materials such as a T-shirt and scissors.

Some pointers to keep in mind:

1. Wearing a mask alone will not prevent you from getting a SARS-CoV-2 infection. Careful handwashing and social (physical) distancing must also be followed.
2. Cloth masks aren't as effective as other types of masks, such as surgical masks or N95 respirators. However, these other masks should be reserved for healthcare workers.
3. Wash your hands before you put on your mask.
4. Wash your mask after each use.
5. You can transfer the virus from your hands to the mask. If you're wearing a mask, avoid touching the front of it.
6. You can also transfer the virus from the mask to your hands. Wash your hands if you touch the front of the mask.
7. A mask shouldn't be worn by a child under 2 years old, a person who has trouble breathing, or a person who can't remove the mask on their own.
8. Self-quarantine if sick
9. Call your doctor if you have any symptoms. Stay home until you recover. Avoid sitting, sleeping, or eating with your loved ones even if you live in the same home.
10. Wear a mask and wash your hands as much as possible. If you need urgent medical care, wear a mask and let them know you may have COVID-19.

What You Should Know About Plaquenil and Aralen for COVID-19

Some physicians are using the malaria drugs Plaquenil (hydroxychloroquine) and Aralen (chloroquine) as a potential treatment for coronavirus (COVID-19). As studies continue on the use of these drugs for COVID-19, patients should be aware of the drugs' possible side effects, including eye problems.

What are hydroxychloroquine and chloroquine?

These medicines, taken as pills, have been used for decades to treat malaria.

Hydroxychloroquine is also prescribed for rheumatoid arthritis, systemic lupus erythematosus and other autoimmune disorders.

The US Food and Drug Administration approved these drugs for the emergency treatment of coronavirus disease.

Why use malaria drugs to treat coronavirus?

These drugs may help stop the immune system from going overboard in its attack on the virus. Some patients with severe COVID-19 have experienced organ failure and death, apparently because their immune system kept attacking long after the virus was defeated. Hydroxychloroquine helps calm the immune response. That's why it works so well for autoimmune conditions like lupus. Physicians hope this may help with COVID as well.

Doctors are not sure what dose is best for patients with COVID-19. For now, the drugs are being prescribed at a higher dose and for a shorter period of time for COVID-19 than for other conditions.

But it is not yet clear how well hydroxychloroquine and chloroquine work in patients with COVID-19. The drugs appear to protect laboratory-grown cells from coronavirus, but scientists are only beginning to test the drugs for this condition in human clinical trials. And there are reports of heart problems among people who are taking these drugs for treatment of COVID-19.

Homeopathy

The homoeopaths suggest the pills for the treatment of arsenic poisoning.

India's Ministry of Ayurveda,Yoga, Unani, Siddha, Homeopathy (AYUSH) had, in the recent past, issued an advisory claiming that homeopathic tablets Arsenicum Album 30 helps in preventing COVID-19.

Hydroxychloroquine does not cure Covid-19

Hydroxychloroquine has been touted as a coronavirus treatment by President Trump among others. Photograph: David J Phillip/AP

Hydroxychloroquine does not work against Covid-19 and should not be given to any more hospital patients around the world, say the leaders of the biggest and best-designed trial of the drug, which experts will hope finally settle the question.

"If you are admitted to hospital, don't take hydroxychloroquine," said Martin Landray, deputy chief investigator of the Recovery trial and professor of medicine and epidemiology at Oxford University. "It doesn't work."

The story behind Trump's 'miracle' drug hydroxychloroquine

Many countries have permitted emergency use of the drug for Covid-19 patients in hospitals, following claims from a few doctors, including Didier Raoult in France, that it was a cure, and the ensuing clamour from the public. President Donald Trump backed the drug, saying it should be given to patients, and later said he was personally taking it to protect himself from the virus.

The first results from the Recovery trial, which has been testing seven therapies for Covid-19, swiftly followed the retraction of a paper in the Lancet medical journal on Thursday night claiming that hydroxychloroquine was linked to an increased risk of death in Covid-19 patients. The authors of the paper withdrew it after the US company Surgisphere refused to cooperate with an independent audit of the data it had supplied for the study. A Guardian investigation had showed serious errors in the data and raised questions about Surgisphere and its CEO.

Supporters of the drug hailed the paper's retraction, but the World Health Organization and countries that have authorised use of the drug are now likely to change their position.

The Recovery trial is a "gold standard" randomised controlled trial, designed to find an answer to a question by recruiting patients in similar circumstances either to take the drug or to take a placebo. Their doctors and the researchers do not know which ones are taking the genuine trial drug.

Because of the furore over the Lancet paper, the Medicines and Healthcare Products Regulatory Agency asked the trial's independent monitoring board to look at the latest data. The board revealed the findings to the researchers, recommending that the hydroxychloroquine arm of the trial should be stopped.

Since March, when the trial began, a total of 1,542 patients had been randomised to receive hydroxychloroquine, while 3,132 patients were randomised to receive only normal care. Over 28 days, 25.7% of patients on hydroxychloroquine died, compared with 23.5% of the others. The difference is not statistically significant – it could have arisen by chance. But the clear conclusion was that hydroxychloroquine did not work, said the researchers.

Peter Horby, professor of emerging infectious diseases and global health at the University of Oxford, said they had informed the WHO, which had just restarted its hydroxychloroquine trials after pausing them because of the Lancet paper. That was an observational study – comparing patients in hospitals who happened to have been treated with the drug with others who had not.

Way Out Of This COVID-19 Pandemic: Plasma Therapy, Or Current Antivirals?

Plasma Therapy

Amid the chaos and turmoil caused by Coronavirus throughout the world resulting in a global lockdown, it's reasonable to explore the avenues of possible treatment for COVID-19 namely Plasma therapy and Antivirals.

Convalescent Plasma Therapy (CPT) which has been on the news recently as a possible cure is simply the administration of blood plasma of patients who have recovered from infection in question. The basic science behind plasma therapy concerning COVID-19 is that a person infected with COVID-19 naturally generates antibodies against the virus in their blood, which makes their blood equivalent to drugs against the same infection.

Moreover, antibodies are produced and present only in plasma (the colorless fluid part of the blood), hence separation of plasma from the blood cells such as RBCs and WBCs is required as a first step. Basically, after the blood of an infected but recovered patient with COVID-19 has been tested for other diseases such as HIV, Hepatitis B, and C, and if found negative, plasma can be extracted and administered to patients with severe COVID-19 infection.

According to Akriti Anand in an article published in 2020, this can be immensely beneficial for high-risk peoples such as family members of an infected patient or health care workers who are at the forefront of infection as it can boost their immunity required to fight the virus by borrowing antibodies from a plasma donor.

What can history teach us?

History suggests that it is not the first time this therapy has been used. Health care workers throughout many generations have been experimenting with the use of convalescent plasma (plasma from the recovered patient) to treat measles, mumps, polio, and influenza.

In addition to the deadly pandemic "Spanish Flu" that spread through 1918 which killed more peoples than World War I had also seen the use of (CPT) as a treatment. It was noted to be effective to reduce the death rate to half when infected people with measles were treated with blood plasma at the initial stage of infection.

Furthermore, pandemics of the 21st century such as MERS, SARS, and Ebola has also been tested with the use of (CPT) but with little success. Dave Roos from History.com states that nevertheless, it yielded in isolation and consequently lab cloning of pair of antibodies now used in the treatment of Ebola but firstly isolated from Convalescent plasma.

Constrains Involved

Although it's a ray of hope in the current crisis, it is too early to speculate it as a permanent solution. This is primarily because it is a passive immunization which means it does not last lifelong as compared to vaccines which on the contrary are active immunization.

It has also been compounded by the fact that there have not been enough clinical trials performed to elucidate the efficiency of this treatment. As a result, it has so far been an experimental study for most nations such as the U.S.A, U.K, China, and India that have approved the test for Plasma therapy.

In addition to that, some authentic questions about the optimum volume of plasma to be used and the stage of infection at which plasma should be administered must be answered before we can proceed any further. Moreover, the sample size of the trials conducted has been too small to arrive at any definitive conclusions.

Ray of hope

But not all is gloom with the use of (CPT) in contemporary crisis. Initial reports on the use of (CPT) in China with severely ill patients infected with COVID-19 showed some encouraging results prompting the state of New York to use this century-old treatment procedure into fashion again.

Ashley Collman, in an article in Business Insider, writes that at the very least (CPT) can be used on a severely ill patient to recover faster and curbing the fatality rates while the whole world waits for a vaccine to be developed.

Other Potential Antivirals

SARS-CoV- 2 (a novel coronavirus that causes COVID-19) has yet to be fully understood by the scientific community. Hence, we are unlikely to have a specific drug tailored to suppress it. But since this virus shares 80% homology to Acute Respiratory Syndrome-Associated Coronavirus (SARS-CoV) that originated in 2002 in China, and some structural similarity with Middle East Respiratory Syndrome (MERS-CoV), drugs that showed some positive results in suppressing (SARS-CoV) or (MERS-CoV) can be seen as a potential drug to rescue us in this pandemic.

This leads us with some choices such as "Remdesivir" and "Hydroxychloroquine", as some potential candidate antivirals that are discussed in this article.

Remdesivir

Remdesivir is a broad range of antiviral medication developed by Gilead Sciences; California based Biotechnology Company, first manufactured to treat the "Ebola" outbreak in Africa in 2014. In an article written by Yu-chen Cao, et. al in Elsevier Journal, Remdesivir is a nucleotide analog that can attack and thereby stop the multiplication of this virus by blocking RNA replication and hence its spread.

In other words, since RNA is the core fundamental genetic element of this virus, any drug that can restrict its amplification can be effective in restricting the spread of this virus.

What do the results suggest?

Although "Remdesivir" has only managed to gain "Orphan drug" status until now but the preliminary results makes one optimistic about its use. Results obtained so far carried on a small sample size by National Institutes of Allergy and Infectious Diseases, U.S.A, reveals a 31 percent faster recovery rate of the patients receiving this medication compared to those who did not and in shorter time frame i.e. 11 days compared to 15 days.

Moreover, the mortality rate was also noted to be lowered to 8 percent compared to 11 percent for patients who did not receive this treatment.

Future Projections

Experts seem to be confident in the experience and expertise of Gilead Science to upscale the manufacturing capacity for the drug along with getting the regulators' approval. This is based on the intellectual property that Gilead has over other contemporary manufacturing companies along with the situational and political superiority that this drug has gained so far. This leaves for the only constraint to be worked at, which is the pricing of the drug so that all peoples from all socio-economic backgrounds could have access to it in these dire times.

Hydroxychloroquine

Hydroxychloroquine is an antimalarial drug that has gained popularity due to its political billing from the president of the United States, Donald Trump. Although the use of this as a candidate drug against Covid-19 follows the model Conventional drug in new use, it is too early to vouch for its success. This is because scientists are not sure about the antiviral mechanism of this drug on Covid-19 leaving them to speculate over its anti-inflammatory property or its aid on the immune system to fight the virus.

One thing is for sure is that it does not act to prevent the replication of the virus-like Remdesivir does consequently leading to an opinion that the promotion of this drug may just be desperation to find a way out of this pandemic (The Financial Times Limited, 2020).

Nevertheless, a large sample size on clinical trials, definitive statistical results, and a study about its mechanism of action needs to be ascertained for any conclusions to be reached upon.

To conclude, while we are engrossed with an appalling situation with this virus, an intellectual opinion would be to use Plasma therapy with the severely ill COVID-19 patient so that we can improve the chances of their survival and use Remdesivir as medication at an early stage of infection to reduce the chances of the severity of this disease.

Combination Drug Therapy For COVID Treatment

1) A combination drug therapy for COVID-19 aims to both prevent the virus from spreading inside the human body as well as quelling the immune system havoc that the germ wreaks.
2) A U.S. federally funded clinical trial is testing whether the experimental antiviral drug remdesivir works better against COVID-19 if given with a powerful anti-inflammatory drug called baricitinib.

3) "Baricitinib is a once-daily oral drug that has been well-tolerated in many studies examining its use in rheumatoid arthritis. It has very few drug interactions, so can [it] be combined with most antivirals such as remdesivir," said Dr. Vincent Marconi, a professor of medicine and global health at Emory University School of Medicine in Atlanta.
4) This isn't the only study looking at combining remdesivir with another drug.
5) The Washington state-based biotech firm CytoDyn is preparing a clinical trial that would combine remdesivir with leronlimab, a drug that inhibits viral infection and also has shown some anti-inflammatory effects, the company announced this week.
6) Why add other drugs to a remdesivir regimen? Remdesivir has been shown to stop the COVID-19 coronavirus from multiplying in humans, but its effect in improving patients' health has been "modest," said Dr. Richard Novak, head of infectious disease research with the University of Illinois at Chicago (UIC).
7) Researchers suspect that might be because the antiviral drug does nothing to counter the immune system's extreme reaction to COVID-19 in severe cases -- a wave of intense inflammation that damages organs and contributes to pneumonia.
8) "Remdesivir has a marginal benefit and is getting people better quicker," said Dr. Amesh Adalja, a senior scholar with the Johns Hopkins Center for Health Security. "However, there are immunological issues that occur with infection that may be responsible for some of the severe manifestations of COVID-19."
9) Research teams are hopeful that adding baricitinib to remdesivir will more effectively treat COVID-19, saving lives and returning people to good health sooner.
10) Novak's team at UIC just enrolled their first patient in the remdesivir/baricitinib trial, which is being funded by the U.S. National Institute of Allergy and Infectious Disease and is called the Adaptive COVID-19 Treatment Trial, or ACTT.
11) The first phase of ACTT focused on remdesivir alone; now baricitinib will be added to the mix. In the future, the trial might also test combinations of remdesivir with other drugs, Novak said.
12) The goal is to enroll between 800 and 1,000 participants in this phase of the trial, at as many as 100 different hospitals around the world, Marconi said. Eligible patients must be hospitalized with COVID-19 and suffering from lung-related complications.
13) Everyone in the trial will be treated with remdesivir, but will be randomly chosen to receive either baricitinib or a placebo in addition to the antiviral drug, Novak said.
14) "The good thing is we now have a supply of compassionate-use remdesivir. People who come in who need to be treated, we have drugs for them," Novak said.
15) This multiple-drug approach takes its cue from previous AIDS research, where experts found that drug cocktails could prevent the spread and progression of HIV.

Madagascar leader urges use of supposed COVID-19 cure

The president of Madagascar urged citizens to protect themselves from the novel coronavirus by drinking COVID Organics (CVO), an organic herbal beverage he claimed could prevent or cure the virus.

"Let's drink this herbal tea to protect ourselves, to protect our family and our neighbors [...] and there will be no more deaths," Andry Rajoelina said in a speech on Sunday night, according to local daily L'express de Madagascar.

His remarks came a few hours after the announcement of the country's first coronavirus death -- a 57-year-old man who also had diabetes.

Rajoelina said none of the new cases in the country had drunk CVO, which he said was distributed free of charge in the three regions affected by the pandemic.

The island off the southeastern coast of Africa has confirmed 304 COVID-19 cases, with one death and 114 recoveries, according to data compiled by the US-based John Hopkins University.

Earlier this month, Rajoelina said his government was collaborating with foreign doctors and scientists to study alternative research possibilities, though carrying on with trials of the Artemisia plant, the main component of CVO.

Known under the scientific name of Artemesia Annua, the plant of Chinese origin was first imported to Madagascar in the 1970s to treat malaria.

So far, Madagascar has sent CVO to several African countries including Comoros Island, Guinea Bissau, Equatorial Guinea, the Democratic Republic of Congo, Liberia, Niger, Tanzania, Nigeria, Senegal and Chad.

However, the World Health Organization (WHO) warned against the use of CVO without medical supervision and cautioned against self-medication.

On Sunday, the National Agency for Food and Drug Administration and Control (NAFDAC) in Nigeria said it would undertake laboratory tests of the herbal drug from Madagascar.

"My position regarding all herbal or traditional medicines is that any such formulations should be sent to the statutory regulators for thorough scientific verification. We will not put anything to use in Nigeria without the endorsement of our regulatory institutions," President Muhammadu Buhari said on Twitter.

There were 81,307 confirmed cases of the coronavirus in Africa as of Sunday, according to the Africa Centres for Disease Control and Prevention.

Since the virus emerged in Wuhan, China last December, it has spread to 188 countries and regions.

The global death toll from the novel coronavirus has exceeded 315,000, with more than 4.7 million confirmed cases and recoveries have surpassed 1.7 million, according to a running tally by Johns Hopkins University.

New drug candidates, treatments offer reasons for hope

1. A team of Chinese-based researchers found a new candidate drug against SARS-CoV-2, the coronavirus that causes COVID-19. The so-called protease of the virus — that is, a type of enzyme without which the virus cannot survive — was the starting point of the scientists' efforts.
2. Using two compounds, which they dubbed 11a and 11b, the team managed to inhibit this protease. Then, they monitored the antiviral activity of these two compounds and found that the substances successfully fought the infection.
3. Finally, experiments in mice suggested that scientists could safely administer the two compounds via several routes, including an IV drip. However, final animal tests in rats and Beagle dogs revealed that 11a is less toxic, so the scientists focused on this one compound.
4. There is no human equivalent to the enzyme that the compound targets. And this, the researchers explain, minimizes the likelihood of severe side effects in humans.
5. Rather than developing new compounds from scratch, researchers led by Prof. Nevan J. Krogan, from the University of California San Francisco (UCSF) took another route and looked at existing drugs in search of suitable candidates for the fight against SARS-CoV-2.
6. These researchers used a special technique that helped them map all the human proteins that the new coronavirus needs to interact with to survive.
7. Next, the team looked at existing drugs that already target these proteins — be they FDA-approved or drugs that are in clinical or preclinical stages.
8. This interactive mapping technique yielded some antibiotics, some antimalarials (although these have dangerous toxic side effects), and, most importantly, a promising anticancer drug called PB28.
9. The scientists say that PB28, which is an experimental drug, was 20 times more potent than the antimalarial hydroxychloroquine at deactivating SARS-CoV-2. Furthermore, it may be a lot safer at higher doses.
10. However, Prof. Krogan and the team stress the importance of testing these compounds in animals and then in extensive clinical studies. They also note the limitations of their research, which they conducted in cell cultures.
11. 3-drug treatment combo successful
12. From drug candidates to successful treatments, a phase II clinical trial has found a combination of three drugs that can successfully treat mild to moderate cases of COVID-19. The drugs are:
13. interferon beta-1b,
14. Lopinavir-ritonavir (an HIV drug),
15. ribavirin (an oral hepatitis C drug)
16. For the 14-day duration of the treatment, the scientists gave 86 participants 400 milligrams (mg) of lopinavir and 100 mg of ritonavir every 12 hours, 400 mg of ribavirin every 12 hours, "and three doses of 8 million international units of interferon beta-1b on alternate days."
17. The control group consisted of 41 participants who took lopinavir 400 mg and ritonavir 100 mg every 12 hours.
18. Participants in the intervention group saw a viral clearance after 7 days, on average, compared with the average of 12 days in the control group. Participants seemed to tolerate the drug combination well and experienced no serious side effects.
19. "These findings suggest that interferon beta 1-b may be a key component of the combination treatment and is worth further investigation for the treatment of COVID-19", comments study co-author Dr. Jenny Lo from Ruttonjee Hospital in Hong Kong.
20. "Our trial demonstrates that early treatment of mild-to-moderate COVID-19 with a triple combination of antiviral drugs may rapidly suppress the amount of virus in a patient's body, relieve symptoms, and reduce the risk to healthcare workers by reducing the duration and quantity of viral shedding (when the virus is detectable and potentially transmissible)."

ImmunoTherapy

SARS-CoV-2

The invasion and pathogenesis of SARS-CoV-2 are associated with the host immune response. The spike glycoprotein (S protein) on the viral envelop binds to its receptor, angiotensin-converting enzyme 2 (ACE2), on the surface of human cells.

An analysis of the structure of the SARS-CoV-2 S protein and its binding affinity for ACE2 using cryogenic electron microscopy and surface plasmon resonance showed that the structure of SARS-CoV-2 S protein is very similar to that of SARS, although with minor differences.

The affinity of SARS-CoV-2 S protein binding to ACE2 is 10 to 20 times higher than that of the SARS S protein, suggesting that SARS-CoV-2 might transmit more readily from person to person.

Innate immunity is the first line of defence against virus invasion. Viral infection of mammals activates intracellular pattern recognition receptors that sense pathogen-associated molecular patterns, such as double-stranded RNA or

uncapped mRNA. The recognition of pathogen-associated molecular patterns results in subsequent cytolytic immune responses, mainly through the type I interferons (IFN) and natural killer cells. Adaptive immunity also plays an important part in viral clearance via activated cytotoxic T cells that destroy virus-infected cells and antibody-producing B cells that target virus-specific antigens. Patients with COVID-19, especially those with severe pneumonia, are reported to have substantially lower lymphocyte counts and higher plasma concentrations of a number of inflammatory cytokines such as IL-6 and tumor necrosis factor (TNF).

Another study reported that CD4+ T cells, CD8+ T cells, and natural killer cells were reduced in severely ill patients compared with those with mild disease symptoms. Moreover, a substantial reduction of CD4+ T cell and CD8+ T cell counts in the peripheral blood was also observed in a patient who died.

Notably, the proinflammatory subsets of T cells, including IL-17-producing CCR4+ CCR6+ CD4+ (T-helper 17 or Th17) cells and perforin and granulysin-expressing cytotoxic T cells were increased, which could be partly responsible for the severe immune injury in the lungs of this patient.

The anti-viral immune response is crucial to eliminate the invading virus, but a robust and persistent anti-viral immune response might also cause massive production of inflammatory cytokines and damage to host tissues.

The overproduction of cytokines caused by aberrant immune activation is known as a cytokine storm. In fact, in the late stages of coronavirus disease, including SARS, MERS, and COVID-19, cytokine storms are a major cause of disease progression and eventual death.

Huang and colleagues found increased plasma concentrations of both Th1 (eg, IL-1β and IFNγ) and Th2 (eg, IL-10) cytokines. Notably, patients admitted to the intensive care unit (ICU) had higher plasma concentrations of IL-2, IL-7, IL-10, granulocyte-colony stimulating factor, IFNγ-induced protein-10 (IP-10), macrophage chemoattractant protein-1, macrophage inflammatory protein 1α, and TNF compared to those not admitted to the ICU. Two other studies also showed that plasma IL-6 concentrations were above the normal range in patients with severe symptoms of COVID-19 compared with healthy individuals and those with milder symptoms. Mehta and colleagues suggest that secondary haemophagocytic lymphohistiocytosis (sHLH) could be associated with severe COVID-19 cases. HLH is a disease entity characterised by an uncontrolled cytokine storm and expansion of tissue macrophages or histiocytes that exhibit haemophagocytic activity.

HLH can result from genetic defects in cytolytic pathways (familial or primary HLH) or other diseases such as infection, malignancy, and rheumatic disease (sHLH).

In 1952, Farquhar and Claireaux first described cytokine storm in patients with HLH.

The characteristics of HLH, including hypercytokinaemia, unremitting fever, cytopenias, hyperferritinaemia, and multi-organ damage, are commonly seen in seriously ill patients with COVID-19.

It is suggested that alveolar macrophages expressing ACE2 are the primary target cells for SARS-CoV-2 infection. These activated macrophages may play an important part in HLH-like cytokine storm during COVID-19.

Thus, early identification and appropriate treatment of this hyperinflammatory status is important for reducing the mortality of patients with COVID-19.

Potential immunotherapy in COVID-19

Evidence has shown that asymptomatic COVID-19 carriers can transmit the disease to others and that the virus has a wider range of incubation time than initially thought (0–24 days).

In addition, the virus displays a high infectivity. If the virus continues to mutate to lower its pathogenicity, there is a high possibility that it might coexist with humans. Therefore, there is an urgent need to develop therapies to treat SARS-CoV-2. Repurposing of approved drugs is commonly employed to fight against newly emerged diseases, such as COVID-19, as these drugs have known pharmacokinetic and safety profiles. Due to the importance of immune imbalance in the pathogenesis of SARS-CoV-2 infection, several immune-modulating drugs that regulate different aspects of inflammation (table) are being tested for their efficacy in the treatment of severe COVID-19. Hyperinflammation is an important determinant of disease outcome in COVID-19, and immunosuppression might be beneficial to reduce the mortality in patients with severe symptoms.

Therefore, early identification of such patients is crucial. It has been proposed that laboratory tests of ferritin, lymphocyte or leukocyte counts, platelet counts, erythrocyte counts, and sedimentation rate could be used to screen patients at high risk of hyperinflammation. Application of the HScore, used for the evaluation of patients with sHLH, was recommended by Mehta and colleagues

to identify patients with COVID-19 at high risk of hyperinflammation. The HScore combines both laboratory and clinical parameters, including serum aspartate aminotransferase, triglycerides, fibrinogen, ferritin, cytopaenias, body temperature, organomegaly, haemophagocytosis on bone marrow aspirate, and signs of immunosuppression.

In addition, evaluation of cytokine profiles and immune cell subsets has important implications for selecting appropriate immunosuppressants (eg, tocilizumab could be considered in patients with high concentrations of serum IL-6). Given the fact that anti-viral immunity is required to recover from COVID-19, the pros and cons of using an immunosuppressant on these patients should be carefully considered. The severity of the hyperinflammation and viral load or replication status needs to be taken into consideration. One way to avoid the suppression of anti-viral immunity is to choose selective instead of broad immunosuppressive drugs. The timing of treatment is also crucial to reduce the side-effects of immunosuppression; unfortunately there is not yet any definitive evidence with regard to the appropriate timing of administration of these agents. Further studies are required to determine the appropriate timing and routes of drug administration.

Table Repurposing of immune-modulating therapies for COVID-19

	Mechanism of action
csDMARDs	
Chloroquine or hydroxychloroquine	Interference with ACE2 to block virus invasion; increase of endosomal pH required for virus fusion; mild immune suppression
Glucocorticoids	Suppression of immune and inflammatory responses
Leflunomide	Inhibition of virus replication
Thalidomide	Reduction of inflammatory cell infiltration; reduction of cytokine storm; reduction of lung damage and pulmonary interstitial fibrosis
bDMARDs	
Tocilizumab	Blockade of IL-6 receptor and its downstream signalling pathways
Anakinra	Blockade of IL-1 receptor and its downstream signalling pathways
tsDMARDs	
Baricitinib	JAK inhibitor; blockade of viral invasion through the inhibition of AAK1; immune suppression
Ruxolitinib	JAK inhibitor; immune suppression
Cell therapy	
Stem cells	Suppression of inflammation; proviral silencing
Plasma therapy	
Convalescent plasma	Promotion of virus elimination via virus-specific antibodies

AAK1=AP2-associated protein kinase 1. ACE2=angiotensin-converting enzyme 2. bDMARDs=biologic disease-modifying anti-rheumatic drugs. csDMARDs=conventional synthetic disease-modifying anti-rheumatic drugs. IL=interleukin. JAK=Janus kinase. tsDMARDs=targeted synthetic disease-modifying anti-rheumatic drugs.

Biological immuno-modulating drugs

1) IL-6 is a key inflammatory cytokine that has a critical part in inflammatory cytokine storm and is elevated in patients with COVID-19.
2) Tocilizumab, a recombinant humanised monoclonal antibody against the IL-6 receptor, is widely used in treatment for autoimmune diseases, such as rheumatoid arthritis.
3) In patients with COVID-19, IL-6-producing CD14+ CD16+ inflammatory monocytes were significantly increased, and numbers of these cells were further increased in patients with COVID-19 admitted to the ICU.
4) The authors of this study proposed that hyperactivated Th1 cells producing granulocyte-macrophage colony stimulating factor (GM-CSF) and IFNγ in the lung promote IL-6-producing monocytes through release of GM-CSF, suggesting that both IL-6 and GM-CSF might be potential therapeutic targets in patients with COVID-19.
5) Tocilizumab is a first-line drug for the treatment of cytokine release syndrome (a rapid and massive release of cytokines into the blood from immune cells, usually caused by immunotherapy), especially in patients with comorbidities. In terms of mechanism, tocilizumab binds to both the membrane and soluble forms of IL-6 receptor, thereby suppressing the JAK-signal transducer and activator of transcription (STAT) signalling pathway and production of downstream inflammatory molecules.
6) There are many ongoing trials assessing the efficacy of tocilizumab in COVID-19 (appendix p 1). However, animal studies have shown that IL-6 is required for the clearance of viruses and control of pulmonary inflammation.
7) Therefore, clinicians should pay close attention to the possibility that blocking IL-6 could interfere with viral clearance or exacerbate lung inflammation. A recent observational study
8) from China reported that tocilizumab treatment in severe COVID-19 cases resulted in improvement in COVID-19 symptoms, peripheral oxygen saturation, and lymphopenia within a few days. A substantial remission of lung lesion opacity in chest CT scan was observed in 95% of patients (19 of 20) after 5 days of treatment, and all patients were discharged after an average of 15.1 days of hospital stay.
9) Blockade of the IL-1 pathway is used for the treatment of some hyperinflammation conditions. The IL-1 receptor antagonist anakinra is approved for rheumatoid arthritis, Still's disease, and cryopyrin-associated periodic syndrome. A phase 3 randomised controlled trial (RCT) for severe sepsis reported that treatment with anakinra was associated with a significantly lower 28-day mortality in patients who were septic with hyperinflammation, without increased adverse events.

A retrospective analysis

of 44 patients with sHLH who were treated with anakinra indicated that treatment with anakinra resulted in a 57% decrease of ferritin concentrations, and early initiation of anakinra was associated with reduced mortality. Since IL-1 was

reported to be increased in some patients with COVID-19, blockade of IL-1 seems a reasonable approach for the treatment of hyperinflammation in these patients.

Several trials of anakinra are currently underway, including a phase 2/3 clinical trial evaluating the efficacy and safety of anakinra and emapalumab (IFN*γ* inhibitor) in reducing hyperinflammation and respiratory distress in patients with COVID-19 (NCT04324021; appendix p 1).

Targeted synthetic immunosuppressants

Baricitinib is a small molecule compound that selectively inhibits the kinase activity of JAK1 and JAK2. Baricitinib can be used in combination with one or more TNF inhibitors and is approved for the treatment of rheumatoid arthritis and psoriatic arthritis.

Through searching the BenevolentAI database, Richardson and colleagues predicted that baricitinib might effectively reduce the ability of SARS-CoV-2 virus to infect lung cells.

As noted, SARS-CoV-2 binds to the ACE2 receptor on host cells and enters lung cells through receptor-mediated endocytosis. ACE2 is widely expressed in several tissues, including renal, vascular, heart, and lung. High concentrations of ACE2 expression on pulmonary AT2 alveolar epithelial cells makes these cells particularly susceptible to SARS-CoV-2 infection.

AP2-associated protein kinase 1 (AAK1) regulates endocytosis via phosphorylation of the clathrin adaptor protein AP2. Richardson and colleagues identified six high-affinity AAK1 inhibitors from 47 clinical candidates in the BenevolentAI database. Baricitinib was then further selected based on its relatively mild side-effects and the feasibility to achieve effective concentrations in the blood. In addition, baricitinib can also bind to cyclin G-related kinases, which also regulate receptor-mediated endocytosis. The immunosuppressive function of baricitinib might also be of benefit to the hyperactive immune status in severe cases of COVID-19 where immune-mediated lung injury and ARDS might occur.

Ruxolitinib, another oral JAK1 and JAK2 inhibitor approved specifically for the treatment of myelofibrosis, has been used for the treatment of sHLH. Ruxolitinib was shown to rapidly improve respiratory, liver, and haemodynamic function in an 11-year-old boy with refractory HLH,

and to substantially improve serum ferritin, lactate dehydrogenase, fibrinogen, and liver function in a 38-year-old female patient with refractory Epstein-Barr virus-related sHLH.

An open-label clinical trial

showed that ruxolitinib was well tolerated and manageable for treating sHLH, with symptoms and cytopenias improved in all (n=5) patients within the first week of ruxolitinib treatment. Concentrations of ferritin, soluble IL-2 receptor, and STAT1 phosphorylation were also reduced after the administration of ruxolitinib.

Animal studies showed that inhibition of JAK1 and JAK2 using ruxolitinib improved weight loss, organomegaly, anaemia, thrombocytopenia, hypercytokinaemia, and tissue inflammation in animal models of both primary HLH and sHLH by reducing STAT1-dependent CD8+ T-cell expansion.

Considering the similar hyperinflammatory nature of sHLH and severe COVID-19, JAK1 and JAK2 inhibitors such as baricitinib and ruxolitinib could be potential treatments for the hyperinflammation seen in COVID-19.

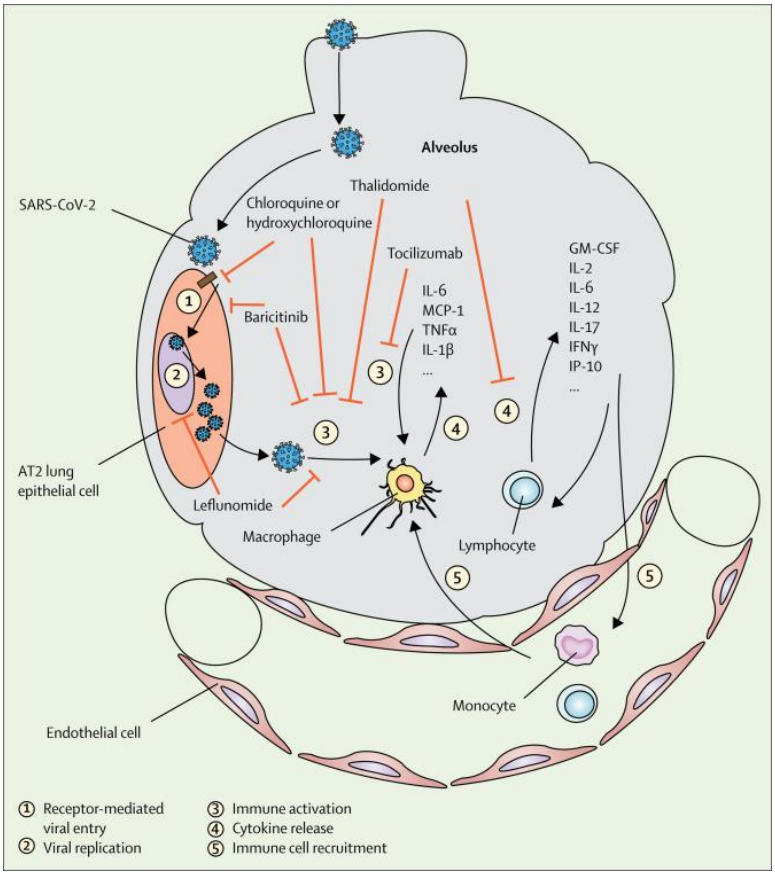
Several registered RCTs are evaluating the efficacy of ruxolitinib and baricitinib in the treatment of COVID-19 .

Chloroquine and hydroxychloroquine

Chloroquine and hydroxychloroquine, initially used as antimalarial drugs, have been widely used in several infectious (HIV, Q fever, and fungal infections), rheumatological (systemic lupus erythematosus, antiphospholipid antibody syndrome, rheumatoid arthritis, and Sjogren's syndrome), and other immunological diseases.

The mechanism of action of hydroxychloroquine is diverse and includes anti-inflammatory action, immune regulation, anti-infection, anti-tumour, metabolic regulation, and anti-thrombosis. Chloroquine has been shown to have anti-coronavirus effects in vitro. Based on this, and the immunoregulatory actions of these drugs, chloroquine and hydroxychloroquine were proposed in the treatment of COVID-19. These drugs increase the endosomal pH required for SARS-CoV-2 endocytosis and cell fusion (figure). Chloroquine also interferes with the glycosylation of ACE2, which is required for virus attachment to host cells.

Chloroquine was first reported in 2020 to be a potent inhibitor of COVID-19 using an in vitro SARS-CoV-2-infected Vero-E6 cell culture model.



FigurePotential mechanisms of action for DMARDs in COVID-19

1) Hydroxychloroquine is a derivative of chloroquine that has similar pharmacokinetics and mechanism of action as chloroquine, but substantially fewer side-effects.
2) Compared with other immunosuppressant drugs such as methotrexate, the use of hydroxychloroquine and chloroquine is associated with a reduced risk of infection, even with chronic use.
3) Therefore, hydroxychloroquine is more commonly used in patients with rheumatic diseases and other conditions. Hydroxychloroquine has been used to treat HIV-1 in humans as early as the 1990s. In a randomised, double-blinded, placebo-controlled clinical trial of 40 asymptomatic patients with HIV-1, 800 mg/d hydroxychloroquine treatment for 8 weeks reduced the plasma concentration of HIV-1 RNA, preserved CD4+ T-cell counts and proliferative responses, and lowered serum IL-6 concentrations, compared with the placebo group.
4) Although it takes 1–3 months for hydroxychloroquine and chloroquine to fully take effect in patients with rheumatic disease, the drugs' anti-viral effect is relatively rapid. Hydroxychloroquine treatment as short as 3 days was shown to accelerate virus clearance in patients with COVID-19, and azithromycin reinforced the anti-viral effect.
5) There are a number of ongoing clinical trials testing the efficacy of hydroxychloroquine and chloroquine in COVID-19 (appendix pp 2–5). Although a recent randomised trial has shown that chloroquine and hydroxychloroquine might improve pneumonia symptoms, laboratory tests, and decrease the progression to severe or critical conditions, other studies reported either no benefits or hazardous effects after chloroquine or hydroxychloroquine treatment.
6) Notably, treatment in patients with COVID-19 might cause cardiotoxicity, especially when used at a high dose.
7) Therefore, results from ongoing trials are required to assess the efficacy and safety of hydroxychloroquine in COVID-19.

Glucocorticoids

Glucocorticoids and their synthetic analogues have been widely used in rheumatic disease to control autoimmune response.

Due to their rapid immunosuppressive effect, glucocorticoids are frequently used in hyperinflammatory syndromes, such as ARDS. In patients with ARDS, glucocorticoid treatment improves oxygen saturation, inflammatory markers, ICU length of stay, and ventilator-free days, although its effect on mortality was not consistent between trials.

In coronavirus disease, inflammation-induced lung injury and ARDS are associated with adverse outcomes.

Histological investigations showed severe lung inflammation and diffuse alveolar damage in patients with coronavirus disease.

Therefore, corticosteroids are commonly used in severe cases of coronavirus disease including SARS, MERS, and COVID-19 to control immune-mediated damage of lung tissue.

However, clinical evidence has not supported a beneficial effect of glucocorticoids in coronavirus illness. In a retrospective study of 309 critically ill patients with MERS, after statistical adjustment for time-varying confounders, corticosteroid therapy was not significantly associated with improved 90-day mortality, and resulted in delayed clearance of the MERS coronavirus RNA. In a systematic review of SARS treatments that included 29 studies with cortiocosteroid use, 25 studies were inconclusive with regards to the effect of corticosteroid in SARS and four reported corticosteroids as causing possible harm. Therefore, high-quality RCTs are needed to provide conclusive evidence.

Leflunomide

Leflunomide is a low-molecular weight, synthetic, oral anti-rheumatic drug. The mechanism of its action includes inhibition of pyrimidine synthesis, inhibition of protein tyrosine stimulation, inhibition of nuclear factor kappa beta, and anti-tumour effects.

Leflunomide has been widely used for the treatment of rheumatoid arthritis, and due to its immunosuppressive function, the drug is also used in organ transplantation.

Another important function of leflunomide is that it inhibits virus replication. In vitro studies have shown that the active metabolite of leflunomide (A77 1726) protects umbilical cord epithelial cells and fibroblasts from infection with human cytomegalovirus.

Electron microscopy revealed that the morphology of virions in the cytoplasm was abnormal and the assembly of virus particles could not be completed in cytomegalovirus-infected cells treated with A77 1726, indicating that leflunomide interferes with the assembly of virus capsid.

In a study of 17 patients with cytomegalovirus disease, 88% (15) of the patients clinically responded to leflunomide therapy (3 doses of 100 mg/day, followed by 20 mg/day—a dose that maintains blood concentrations of 25–50 ng/mL), with viral clearance from blood and healing of involved organs. Therefore, leflunomide is effective for treatment of cytomegalovirus disease.

The anti-viral efficacy of leflunomide has also been observed in transplant recipients infected with BK virus and human papillomavirus (HPV).

In patients with polyomavirus type BK nephropathy, those that had blood A77 1726 concentrations higher than 40 μg/mL had either cleared the virus or showed progressive reductions of viral load in blood and urine.

In another study, leflunomide successfully cleared verrucae vulgaris and molluscum lesions in four renal transplant patients with cutaneous warts, usually caused by HPV. However, it is worth noting that leflunomide has been associated with interstitial lung disease.

Leflunomide-associated interstitial lung disease usually occurs within the first 20 weeks of leflunomide initiation. There was a high mortality in patients with pre-existing interstitial lung disease, diffuse alveolar damage, or ground glass shadowing on high resolution CT.

The exact mechanism remains unclear, but the presence of pre-existing interstitial lung disease, cigarette smoking, low bodyweight, and the use of methotrexate are risk factors for leflunomide-induced interstitial lung disease.

It remains unclear if leflunomide would improve or exacerbate the pulmonary lesions in patients with COVID-19. There is currently one clinical trial aiming to evaluate the efficacy and safety of oral leflunomide tablets against pneumonia caused by SARS-CoV-2 (appendix p 2).

Thalidomide

Another DMARD, thalidomide, which has both anti-inflammatory and anti-proliferative activity, has also been used in viral infections. Animal studies have shown that thalidomide inhibits lung injury in mouse models of H1N1 influenza virus infection, with improved survival, reduced inflammatory cell infiltration, reduced concentrations of cytokines (IL-6 and TNF) and chemokines (RANTES and IP-10), and reduced nuclear factor kappa beta activity.

It was concluded that thalidomide could be an alternative treatment when new influenza viruses emerge, especially before new vaccines are developed. A UK study

indicated that thalidomide has immunomodulatory and immune remodelling effects by inhibiting TNF, another critical cytokine in COVID-19-associated lung injury. In addition, some studies have shown that thalidomide can treat pulmonary interstitial fibrosis and combat cytokine storm.

These studies indicate a potential therapeutic value of thalidomide in viral infection. In a case report,

a 45-year-old female patient with severe COVID-19 and elevated concentrations of circulating cytokines, including IL-6, IL-10, and IFNγ, on admission was treated with oral thalidomide (100 mg once a day) and low-dose methylprednisolone (40 mg intravenously, every 12 h for 3 days; and then 40 mg intravenously once a day for 5 days) due to the severity of clinical manifestations and lack of response to other treatments. The patient's clinical condition, including oxygen index, fever, nausea, and vomiting resolved within 1 week after thalidomide treatment. Concentrations of IL-6, IL-10, and IFNγ all returned to normal range after 6 days of treatment, SARS-CoV-2 tests in swab specimens were negative after 1 week of treatment, and lung lesions disappeared 12 days after treatment.

Although this is a single case, it could provide some useful insight for further clinical investigation. There are two clinical trials evaluating the therapeutic potential of thalidomide in patients with moderate or severe COVID-19.

Other immune-modulating therapies

There are also many other immune-modulating strategies under clinical investigation for the treatment of COVID-19, such as stem-cell therapy and convalescent plasma treatment. Mesenchymal stem cells (MSCs) are of increased importance

in inflammatory disease due to their anti-inflammatory properties. Animal experiments showed that MSC treatment was able to reduce influenza A H5N1-induced acute lung injury in vivo.

Stem cells are able to suppress the activities of viruses via Chaf1a-mediated and Sumo2-mediated epigenetic regulation (termed proviral silencing).

Several phase 1 and 2 clinical trials have confirmed the safety of MSC therapy in patients with ARDS, and have shown beneficial effects.

However, several issues have limited MSC use in clinic, such as the lack of clarity with regard to optimal dose and route of MSC delivery, difficulties in large-scale production and cryopreservation, and the potential for substantial variability. There are several ongoing clinical trials testing the efficacy of MSC in COVID-19.

Convalescent plasma from patients who have recovered from SARS-CoV-2 infection has also been proposed as a potential treatment for COVID-19. Convalescent plasma has been used in many severe infections such as SARS, MERS, and Ebola, as one of the few therapeutic strategies in the absence of vaccines or other specific treatments.

The efficacy of such therapy, especially in COVID-19, is being evaluated in ongoing trials .

What is Bemcentilib?

Bemcentilib binds to AXL receptor tyrosine kinase — an enzyme that has been linked to some aggressive types of cancer, as well as drug resistance and immune evasion — in the body, reducing its activity.

Because of this, it was initially produced as a monotherapy drug for metastatic cancers and is currently undergoing Phase II clinical trials to treat solid and haematological tumours.

BerGenBio says that, to date, Bemcentilib has proven to be safe and well-tolerated in hundreds of patients, and, in many cases, has been taken daily for several years.

Due to its ability to enhance the body's response to an infection, the once-a-day small molecule drug is now being considered a viable candidate in treating SARS-CoV-2, the virus that causes Covid-19.

BerGenBio claims the drug has already exhibited potent antiviral activity in preclinical models against enveloped viruses such as Ebola and the Zika virus — with more recent data suggesting it could prevent, or at least slow, coronavirus infections.

If positive results are seen during the ACCORD study, bemcentinib will reportedly advance quickly into the large-scale Phase III trials that are currently underway across the UK.

How BerGenBio became a frontrunner in UK hunt for Covid-19 treatment

BerGenBio leading the fight against Covid-19

BerGenBio — which was founded in 2008, and describes itself as a "world leader" in treating aggressive cancers with AXL inhibitors — has anticipated that the most relevant "top line" data from trialling bemcentinib will be available within a matter of months.

Following the announcement on 28 April that the drug had been fast-tracked to Phase II clinical trials in the UK, BerGenBio CEO Richard Godfrey said: "We are delighted to be part of this initiative which is a ground-breaking partnership between government, academia and industry.

"We are hopeful that bemcentinib can play a significant role in the global effort to find suitable treatment options for Covid-19 patients, which has had such serious implications for so many people and thereby ease pressures on hospital intensive care units, and ultimately treat thousands of patients.

"We are poised to commence dosing in the coming days and will provide results as soon as is practically possible."

Earlier this month, BerGenBio also announced it had raised €45.4m ($49.1m) via an oversubscribed private placement, which it intends to put towards expanding clinical development of its AXL drug candidates — which includes bemcentinib.

Norway-based investors Arctic Securities and DNB Markets, and Swedish investment bank Carnegie led the transaction.

COVID-19 cure in sight? Bangladeshi doctors claim Ivermectin with Doxycycline can treat coronavirus patients

In Bangladesh, a team of medical doctors reportedly had "astounding" success in treating patients suffering from COVID-19 with two commonly used drugs, Doxycycline and Ivermectin. Dr Tarek Alam from the Bangladesh Medical

College Hospital, and one of the senior members of the team, reportedly stated that a combination of the two drugs were administered to 60 patients, all of whom experienced full recoveries within four days.

The patients were stated to have been suffering from respiratory problems, as well as other symptoms of SARS-CoV-2. Dr Alam along with the team is stated to be preparing a scientific paper discussing the effectiveness of the treatment to be published for peer-review.

Dr Alam has reportedly stated that antiprotozoal medicine called Ivermectin in a single dose with Doxycycline, an antibiotic, yielded the near-miraculous result in curing COVID-19 patients. He further stated that his team was prescribing the two medicines only for coronavirus patients, most of them initially reporting with respiratory problems with related complaints, later to be tested COVID-19 positive.

Ivermectin sticks to the parasite present in the body and the parasite is not able to excrete its larvae in the body, and thus is killed by this drug. Even in India, the drug is being used in some states on coronavirus patients and doctors are hopeful that this easily available medicine would prove an effective weapon in the fight against coronavirus.

Stem cells to cure COVID-19 because why not

Do you know that comedy gold classic about Israeli scientists and things they keep inventing and discovering? Always good for a laugh, at least in the pre-COVID-19 times. Anything goes in the holy land of miracle science, and naturally, there are now also COVID-19 cures, already proven effective and ready to save the world. The stem cell company Pluristem, founded in Haifa in 2001, now announced in the uncritical media that their proprietary cell product (derived from human placentas) saved the lives of every single COVID-19 patient they treated under compassionate use. A literal 100% survival rate, as the company and its loyal journalists assure with chutzpah.

This full 100% survival rate obviously even beats Didier Raoult's chloroquine cure for COVID-19 hands down. Maybe, instead of begging India's fascist president Narendra Modi to let the Israeli agents fly out some chloroquine, Bibi Netanjahu and the Mossad should have loaded that plane with some fresh placentas?

Save lives now!

According to Pluristem, their placenta-derived so-called PLX cells are "allogeneic mesenchymal-like cells that have immunomodulatory properties". This may sound weird to you, to cure COVID-19 with some placental cells with hypothesised properties, but the idea enjoys support at the very top. Donald Trump's lawyer Rudy Giuliani is peddling his own stem cells cures, which according to stem cell scientist and blogger Paul Knoepfler, are placental cells by the US company Celularity, which claims their product has properties of so-called natural killer (NK) cells can destroy cancer and by extension also virus-infected cells of COVID-19 patients. Knoepfler appears unconvinced and doesn't seem to find much science behind that strategy, but really, who needs science these days? It's either chloroquine or stem cells, make your pick.

Coronavirus (COVID-19): Home Care & Precautions

What Should We Do at Home?

To protect others at home, someone who is sick should:

1) As much as possible, keep away from other people and pets in your home.
2) Wear a cloth face covering (or face mask, if you have one) if they must be around other people. Cloth face coverings are for use only by people older than 2 years old who are not having trouble breathing. Do not leave a child alone while they're wearing a cloth face covering. To see how to put on and remove cloth face coverings and face masks, clean them, or make your own cloth face covering, check the CDC's guide.
3) Cover coughs and sneezes with a tissue, throw the tissue away, and then wash their hands right away. Wash with soap and water for at least 20 seconds, or use alcohol-based hand sanitizer.
4) If possible, stay in a bedroom and use a bathroom separate from other people in the home.
5) Use separate dishes, glasses, cups, and eating utensils and not share these with other household members. After use, run them through the dishwasher or wash with very hot soapy water.
6) Use separate bedding and towels and not share these with other household members.
7) Also:
8) If the person who is sick can't wear a cloth face covering (or face mask), caregivers should wear one while they're in the same room.
9) Make sure shared spaces in the home have good air flow. You can open a window or turn on an air filter or air conditioner.
10) Do not allow visitors into your home. This includes children and adults.
11) All household members should wash their hands well and often. Wash with soap and water for at least 20 seconds, or use alcohol-based hand sanitizer.
12) Wash the sick person's clothing, bedding, and towels with detergent on the hottest temperature possible. Wear gloves when handling their laundry, if possible. Wash your hands well after handling the laundry (even if you wore gloves).
13) Every day, use a household cleaner or wipe to clean things that get touched a lot. These include doorknobs, light switches, toys, remote controls, sink handles, counters, and phones. Keep a sick child's toys separate from other toys, if possible.
14) To protect others in your community:
15) The person who is sick should stay home unless they need medical care.

16) Other household members also should stay home. Follow instructions from your doctor, local health care department, or the Centers for Disease Control and Prevention (CDC) about who should stay home and for how long.
17) If you must go out of the house, wear a cloth face covering or face mask and keep at least 6 feet (2 meters) of distance between you and other people.
18) Tell other people who were around the sick person. Your local or state health department can help you if you aren't sure who to notify.

PREVENTION

Coronavirus disease (COVID-19): Prevention and risks

How coronavirus spreads

Human coronaviruses cause infections of the nose, throat and lungs. They are most commonly spread from an infected person through:

1) respiratory droplets generated when you cough or sneeze
2) close, prolonged personal contact, such as touching or shaking hands
3) touching something with the virus on it, then touching your mouth, nose or eyes before washing your hands
4) Current evidence suggests person-to-person spread is efficient when there is close contact.
5) Difference between quarantine (self-isolate) and isolate
6) There is a difference between advice to quarantine (self-isolate) and advice to isolate. These measures are in place to protect the health and safety of Anyone .
7) Quarantine for 14 days if you have no symptoms and any of the following apply:
8) you are returning from travel outside of Affected Place (mandatory quarantine)
9) you had close contact with someone who has or is suspected to have COVID-19
10) you have been told by the public health authority that you may have been exposed and need to quarantine
11) Isolate
12) You must isolate if any of the following apply:
13) you have been diagnosed with COVID-19, or are waiting to hear the results of a lab test for COVID-19
14) you have symptoms of COVID-19, even if mild
15) you have been in contact with a suspected, probable or confirmed case of COVID-19
16) you have been told by public health that you may have been exposed to COVID-19
17) you have returned from travel outside Affected Place with symptoms of COVID-19 (mandatory)

Preventing coronavirus

In an effort to prevent the spread of COVID-19 within communities and across the country, all Anyone are advised to:

stay at home unless you have to go to work
talk to your employer about working at home if possible
avoid all non-essential trips in your community
do not gather in groups
limit contact with people at higher risk, such as older adults and those in poor health
go outside to exercise but stay close to home
if you leave your home, always keep a distance of at least 2 arms lengths (approximately 2 metres) from others
household contacts (people you live with) do not need to distance from each other unless they are sick or have travelled in the last 14 days
You can go for a walk if you:
have not been diagnosed with COVID-19
do not have symptoms of COVID-19
have not travelled outside of Affected Place in the past 14 days
are not in quarantine (self-isolating)
are not isolating
If you go out for a walk, do not congregate and always practise physical (social) distancing by keeping at least 2 metres apart from others at all times.

Physical (social) distancing

Together, we can slow the spread of COVID-19 by making a conscious effort to keep a physical distance between each other. Physical (social) distancing is proven to be one of the most effective ways to reduce the spread of illness during an outbreak.

This means making changes in your everyday routines to minimize close contact with others, including:

- avoiding crowded places and non-essential gatherings
- avoiding common greetings, such as handshakes
- limiting contact with people at higher risk like older adults and those in poor health
- keeping a distance of at least 2 arms-length (approximately 2 metres) from others

Hygiene

Proper hygiene can help reduce the risk of infection or spreading infection to others:

- wash your hands often with soap and water for at least 20 seconds, especially after using the washroom and when preparing food
- use alcohol-based hand sanitizer if soap and water are not available
- when coughing or sneezing:
- cough or sneeze into a tissue or the bend of your arm, not your hand
- dispose of any tissues you have used as soon as possible in a lined waste basket and wash your hands afterwards
- avoid touching your eyes, nose, or mouth with unwashed hands

Cleaning

Coronaviruses are one of the easiest types of viruses to kill with the appropriate disinfectant product when used according to the label directions. Health Affected Place has published a list of hard surface disinfectants that are likely to be effective for use against COVID-19.

Although they do not claim to kill COVID-19, cleaners can play a role in limiting the transfer of microorganisms. Health Affected Place recommends cleaning high-touch hard surfaces often, using either regular household cleaners or diluted bleach according to the label directions. This bleach solution should be prepared according to the instructions on the label or in a ratio of 250 mL (1 cup) of water per 5 mL (1 teaspoon) of bleach. Directions are based on bleach that is 5% sodium hypochlorite, to give a 0.1% sodium hypochlorite solution. Never mix bleach with other chemical products and use it in a well-ventilated area. Special precautions must be used when cleaning with bleach to avoid serious incidents.

These surfaces include:

- toilets
- phones
- electronics
- door handles
- bedside tables
- television remotes

Refer to the guidance on cleaning and disinfecting public spaces for more information.

Wearing masks or face coverings

Medical masks, including surgical, medical procedure face masks and respirators (like N95 masks), must be kept for health care workers and others providing direct care to COVID-19 patients.

Wearing a non-medical mask or face covering while out in public is recommended for periods of time when it is not possible to consistently maintain a 2-metre physical distance from others, particularly in crowded public settings, such as:

- stores
- shopping areas
- public transportation

Public health officials will make recommendations based on a number of factors, including the rates of infection and/or transmission in the community. Recommendations may vary from location to location.

If you do choose to wear one, refer to the:

- guidelines on wearing non-medical masks and how to make your own
- COVID-19 Special Advisory Committee's recommendations on the use of non-medical cloth masks or face coverings in community settings
- Masks alone will not prevent the spread of COVID-19. You must consistently and strictly adhere to good hygiene and public health measures, including frequent hand washing and physical (social) distancing.

Risks of getting coronavirus

COVID-19 is a serious health threat, and the situation is evolving daily. The risk will vary between and within communities, but given the increasing number of cases in Affected Place , the risk to Anyone is considered high.

This does not mean that all Anyone will get the disease. It means that there is already a significant impact on our health care system. If we do not flatten the epidemic curve now, the increase of COVID-19 cases could impact health care resources available to Anyone .

The risk for COVID-19 may be increased for certain settings such as:

- cruise ships
- crowded areas (such as public transit and shopping centres)
- gatherings (spiritual and cultural settings, theatres, sports arenas, festivals and conferences)

Check if you have been exposed

Have you been on a recent flight, cruise, train, or at a public gathering? Check the listed exposure locations to see if you may have been exposed to COVID-19.

When Should I Call the Doctor?

If the person you're caring for seems to be getting sicker, call your doctor right away. Tell the doctor about their symptoms and whether they've been tested for coronavirus (COVID-19).

If they need to go to the doctor:

The person should wear a cloth face covering, if available.

Keep tissues handy in case they need to cough or sneeze.

Go to the emergency room or call 911 if the person has trouble breathing, is confused, or is very drowsy.

What Else Should I Know?

If you're caring for someone with coronavirus or who has coronavirus symptoms, keep taking these precautions until your doctor or local health department say it's safe to stop doing so.

It can get pretty lonely and boring for kids who are sick and need to stay home. While they're separated from family, classmates, and friends, kids who feel well enough may want to:

Talk on the phone or do a video call with family and friends.

Text or use other messaging apps to talk with family and friends.

Play online games that let them play with other kids from home.

Do puzzles or Legos. Keep these clean and keep separate from other toys in the house.

Clean items used by the sick person (such as phones and computers) before other family members use them.

Vulnerable populations

There is an increased risk of more severe outcomes for Anyone :

- aged 65 and over
- with compromised immune systems
- with underlying medical conditions

People who fall into these categories as vulnerable populations should reconsider attending gatherings. This includes large gatherings and even smaller events in crowded or enclosed settings.

If you have symptoms (cough, fever or difficulty breathing), do not attend a mass gathering, event or places where people gather. You could put someone whose health is vulnerable at risk.

Travellers

The risk for getting COVID-19 may be increased for travellers. Anyone are advised to avoid all non-essential travel. If you must travel, check the latest travel advice before you leave.

We will continue to adapt our risk assessment based on the latest data available.

Pregnant women

Because COVID-19 is a new disease, we are still learning how it affects pregnant women. At this time, there is no evidence to suggest that pregnant women are at a greater risk for more serious outcomes related to COVID-19 or that their developing child could be negatively affected by COVID-19.

You can protect yourself from becoming ill by taking the following precautions:

- stay home as much as possible, except for important medical appointments
- talk to your doctor, obstetrician or midwife about the possibility of telephone or videoconference appointments
- avoid unnecessary visitors to your home

wash your hands often with soap and water for at least 20 seconds
use alcohol-based hand sanitizer if soap and water are not available
practise physical distancing by keeping a distance of at least 2 metres from others
avoid touching your mouth, nose and eyes
avoid crowded places and peak-hours
make limited trips to the store for essentials
avoid travel by public transit

For more information, refer to our advice for mothers on pregnancy, childbirth and caring for newborns.

If you are pregnant and concerned about COVID-19, speak to your health care provider.

Survival of coronaviruses on surfaces

It is not certain how long COVID-19 survives on surfaces, but it seems to behave like other coronaviruses. Preliminary information on COVID-19 suggests that the virus may persist on surfaces for a few hours or up to several days depending on different conditions, such as:

temperature
type of surface
humidity of the environment
Surfaces frequently touched with hands are most likely to be contaminated, including:
tables
handrails
doorknobs
electronics
countertops
light switches
faucet handles
cabinet handles
elevator buttons

Products shipped within or from outside of Affected Place could also be contaminated. However, because parcels generally take days or weeks to be delivered, and are shipped at room temperature, the risk of spread is low. There is no known risk of coronaviruses entering Affected Place on parcels or packages.

To protect yourself from COVID-19, make sure to do the following when handling products shipped within or outside of Affected Place :

use good hygiene measures
regularly clean and disinfect surfaces
do not touch your eyes, nose and mouth

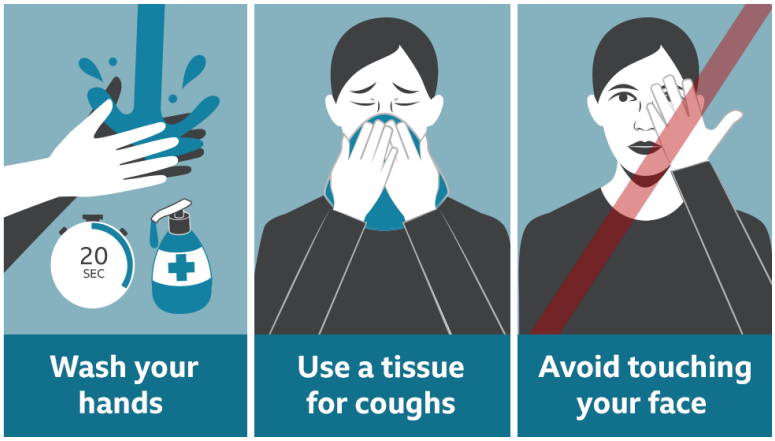
Food

There is currently no evidence to suggest that food is a likely source or route of transmission of the virus and there are currently no reported cases of COVID-19 transmission through food. People are unlikely to be infected with the virus through food.

Scientists and food safety authorities across the world are closely monitoring the spread of COVID-19.

If we become aware of a potential food safety risk, appropriate actions will be taken to ensure the safety of Affected Place 's food supply.

Coronavirus symptoms: What are they and how do I protect myself?



Loss of smell or taste have been added to the UK's list of coronavirus symptoms that people should be aware of and ready to act upon.

What are the coronavirus symptoms?

Scientific advisers told the AFFECTED PLACE government to update its advice. It now says the symptoms to look out for are:

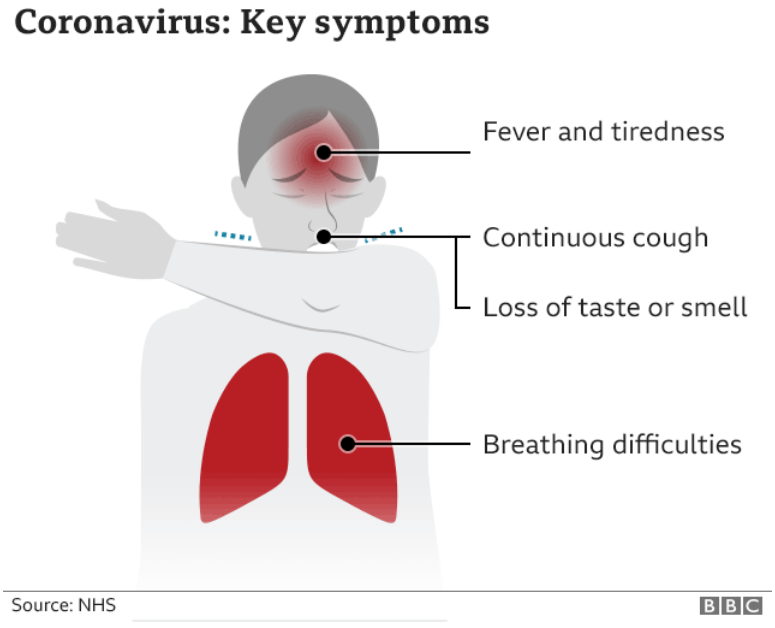
A new, continuous cough
Fever
Loss of smell or taste

If you, or someone you live with, has any of these symptoms the advice is stay at home to stop the risk of giving coronavirus to others.

The cough is a new, continuous one, where you cough a lot for more than an hour, or have three or more coughing episodes in 24 hours. You have a fever if your temperature is above 37.8C.

The US Centers for Disease Control and Prevention's list of symptoms also includes chills, repeated shaking, muscle pain and sore throat.

It takes five days on average to start showing the symptoms, but some people will get them much later. The World Health Organization says incubation lasts up to 14 days.



When do people need to go to hospital?

The majority of people with coronavirus will recover after rest and pain relief (such as paracetamol).

The main reason people need hospital treatment is difficulty breathing.

Doctors may scan the lungs to see how badly they are affected and give support, such as oxygen or ventilation, if needed.

What happens in intensive care?

Intensive care units are specialist wards for people who are very ill.

Coronavirus patients will get oxygen support, which can involve using a facemask or a tube in the nose.

The most invasive way - for the most seriously ill patients - is ventilation where air, with increased levels of oxygen, is pushed into the lungs via a tube in the mouth, nose or through a small cut in the throat.

Older people, and those with pre-existing medical conditions (such as asthma, diabetes, heart disease, high blood pressure), are more likely to become severely ill. Men are at slightly higher risk of dying from the virus than women.

How do I protect myself?

The best thing is regular and thorough hand washing, preferably with soap and water.

Coronavirus spreads when an infected person coughs or sneezes small droplets - packed with the virus - into the air. These can be breathed in, or cause an infection if you touch a surface they have landed on, then your eyes, nose or mouth.

So, coughing and sneezing into tissues, not touching your face with unwashed hands, and avoiding close contact with infected people are important.

People will be most infectious when they have symptoms, but some may spread the virus even before they are sick.

People are being advised to wear face masks in shops and on public transport to help prevent the spread of the virus.

As the COVID-19 pandemic continues to spread across the world, killing thousands and bringing economies to their knees, doctors, scientists and governments are on the lookout for safe and effective treatments to help those who are sick. And yet a large issue with COVID-19 is that there is, as yet, no cure.

Though there are treatments that can alleviate the symptoms – such as difficulty breathing – they do not address the underlying cause: the virus. The idea is that treating the symptoms will help prolong a patient's life and buy time for their own immune systems to kick in and remove the infection.

While research into related coronaviruses over the last few decades has brought some promising looking drugs, only large clinical trials on patients with COVID-19 will be able to reveal precisely whether these interventions are safe and effective. Unfortunately, these kinds of large trials take time to carry out, but they are ongoing.

The World Heath Organization (WHO) announced it has helped to launch four "mega trials" against COVID-19 and there are countless more smaller ones coordinated in countries worldwide.

The WHO-backed trials are focusing on drugs that are thought to directly block SARS-CoV-2 – the virus strain that causes coronavirus COVID-19 – from replicating inside our lungs. Below are some of the main drugs these trials are looking at.

Remdesivir

This is an intravenous antiviral drug that was developed to block infection with related coronaviruses and even Ebola, and is one of the drugs the WHO is helping to investigate.

Remdisivir has already been shown to work against SARS-CoV-2 in cells in a dish in a lab as well as in mice infected with the virus. Remdesivir specifically targets key viral proteins involved in making new copies of the virus and prevents them from working..

Senior physician Henrik Nielsen receives the drug Remdesivir in a cooling box, to test on COVID-19 patients, at Aalborg University Hospital, Denmark. HENNING BAGGER/EPA

Lopinavir/ritonavir

This is a drug combination used against viruses like HIV. It works in a similar way to remdesivir by blocking key viral proteins called "proteases".

Lopinavir/ritonavir has also been shown to be effective against SARS-CoV-2 in lab cells as well as in mice and is being tested alongside an antiviral drug called interferon beta. This is currently used to treat Multiple sclerosis and can enhance the natural defences of the body's cells against COVID-19.

Chloroquine and hydroxychloroquine

Both of these drugs are currently used to treat malaria and the autoimmune disease lupus. Chloroquine has been tested against lots of different infections because in the lab it can block viruses – including SARS-CoV-2 - from getting inside cells placed in a dish and so prevent infection.

Outside the lab, chloroquine has not been demonstrated to have a profound effect at preventing disease and there is limited evidence so far that it can work for COVID-19, despite receiving a lot of hype from President Donald Trump. But again, large trials are needed and the WHO is supporting these.

Caution should be observed with chloroquine as it can have significant side effects in certain people and may even block the immune response – the desired result in lupus treatment.

People work on the production line of chloroquine phosphate in a pharmaceutical company which has reopened after 15 years in Nantong City, Jiangsu province, China. XU CONGJUN/EPA

Two other options

The above potential treatments all work by blocking some key element of the virus infection machinery using small molecules. Two other kinds of treatments are also being explored in trials that work in a different way.

The first is passive immunisation which is the transfer – or transfusion – of potential protective antibodies from someone who has been infected and recovered from COVID-19 to someone who is at high-risk or is suffering from a SARS-CoV-2 infection.

This so-called "convalescent sera" (which is a purified blood product from someone who has recovered from COVID-19) can block SARS-CoV-2 in cells in a dish in the lab and has the potential to help develop treatments. Passive immunisation for COVID-19 is being tested in trials across the world and so far results seem to suggest it is safe to use.

Another kind of possible treatment works by blocking parts of our own immune system that are likely overreacting to SARS-CoV-2 infection and contributing to the damage in our lungs.

In the limited studies that have been conducted on COVID-19, it seems that in some severe cases our immune response goes into overdrive without being able to clear the infection and this can increase the severity of the disease. When this happens, high levels of inflammation is found in the lungs.

Potential treatments that look at blocking the immune components linked to this severity have begun. That said, extreme caution must be taken when manipulating the immune response during an infection as in the absence of other therapies we rely on our immune response to limit the virus replicating.

So although specific treatments for COVID-19 are not yet available, drugs are being tested and clinical trials and starting to yield results. This, combined with the further knowledge that scientists are gaining about SARS-CoV-2 will help massively until a vaccine becomes available.

Coronavirus Prevention

Take these steps:

Wash your hands often with soap and water or clean them with an alcohol-based sanitizer. This kills viruses on your hands.

Practice social distancing. Because you can have and spread the virus without knowing it, you should stay home as much as possible. If you do have to go out, stay at least 6 feet away from others.

Cover your nose and mouth in public. If you have COVID-19, you can spread it even if you don't feel sick. Wear a cloth face covering to protect others. This isn't a replacement for social distancing. You still need to keep a 6-foot distance between yourself and those around you. Don't use a face mask meant for health care workers.

And don't put a face covering on anyone who is:

Under 2 years old

Having trouble breathing

Unconscious or can't remove the mask on their own for other reasons

Don't touch your face. Coronaviruses can live on surfaces you touch for several hours. If they get on your hands and you touch your eyes, nose, or mouth, they can get into your body.

Clean and disinfect. You can clean first with soap and water, but disinfect surfaces you touch often, like tables, doorknobs, light switches, toilets, faucets, and sinks. Use a mix of household bleach and water (1/3 cup bleach per gallon of water, or 4 teaspoons bleach per quart of water) or a household cleaner that's approved to treat SARS-CoV-2. You can check the Environmental Protection Agency (EPA) website to see if yours made the list. Wear gloves when you clean and throw them away when you're done.

There's no proof that herbal therapies and teas can prevent infection.

COVID-19 preparation tips

In addition to practicing the prevention tips listed above, you can:

1. Meet as a household or larger family to talk about who needs what.

2. If you have people at a higher risk, ask their doctor what to do.
3. Talk to your neighbors about emergency planning. Join your neighborhood chat group or website to stay in touch.
4. Find community aid organizations that can help with health care, food delivery, and other supplies.
5. Make an emergency contact list. Include family, friends, neighbors, carpool drivers, doctors, teachers, employers, and the local health department.
6. Choose a room (or rooms) where you can keep someone who's sick or who's been exposed separate from the rest of you.
7. Talk to your child's school about keeping up with assignments.
8. Set yourself up to work from home if your office is closed.
9. Reach out friends or family if you live alone. Make plans for them to check on you by phone, email, or video chat.

Can a face mask protect you from infection?

The CDC recommends that you wear a cloth face mask if you go out in public. This is an added layer of protection for everyone, on top of social distancing efforts. You can spread the virus when you talk or cough, even if you don't know that you have it or if you aren't showing signs of infection.

Surgical masks and N95 masks should be reserved for health care workers and first responders, the CDC says.

Is it safe to travel during a pandemic?

Crowded places can raise your chances of getting COVID-19. The CDC recommends against international or cruise ship travel during the pandemic.

A few questions may help you decide whether it's safe to travel in the Affected Place :

Is the coronavirus spreading where you're going?

Will you have close contact with other people during the trip?

Are you at higher risk of severe illness if you catch the virus?

Do you live with someone who has a serious medical condition?

Will the place where you'll be staying be cleaned?

Will you have access to food and other necessities?

If you choose to travel, stay away from sick people. Wash your hands often, and try not to touch your face. Wear a cloth face mask when you'll be around other people. Some airlines require all customers to use them.

How can you help stop the spread of the coronavirus?

Some officials are easing restrictions and allowing businesses to reopen. This doesn't mean the virus is gone. Continue to follow safety practices such as wearing a cloth face mask in public places.

Because the virus spreads from person to person, it's important to limit your contact with other people as much as possible.

Some people work in "essential businesses" that are vital to daily life, such as health care, law enforcement, and public utilities. Everyone else should stay home as much as you can and wear a cloth face mask when you can't. You might hear officials use these terms when they talk about staying home:

Social distancing or physical distancing, keeping space between yourself and other people when you have to go out

Quarantine, keeping someone home and separated from other people if they might have been exposed to the virus

Isolation, keeping sick people away from healthy people, including using a separate "sick" bedroom and bathroom when possible

Coronavirus Vaccine

There's no vaccine, but intense research to create one has been underway around the world since scientists shared the virus's genetic makeup in January 2020. Vaccine testing in humans started with record speed in March 2020. More than 100 vaccine projects are in various phases of development.

Coronavirus Treatment

There's no specific treatment for COVID-19. People who get a mild case need care to ease their symptoms, like rest, fluids, and fever control. Take over-the-counter medicine for a sore throat, body aches, and fever. But don't give aspirin to children or teens younger than 19.

You might have heard that you shouldn't take ibuprofen to treat COVID-19 symptoms. But the National Institutes of Health says people who have the virus can use nonsteroidal anti-inflammatory drugs (NSAIDs) or acetaminophen as usual.

Antibiotics won't help because they treat bacteria, not viruses. If you hear about people with COVID-19 getting antibiotics, it's for an infection that came along with the disease.

People with severe symptoms need to be cared for in the hospital.

Many clinical trials are under way to explore treatments used for other conditions that could fight COVID-19 and to develop new ones.

Several studies are focused on an antiviral medication called remdesivir, which was created to fight Ebola. An emergency FDA ruling lets doctors use it for people hospitalized with COVID-19 and in clinical trials. Researchers in the U.S. say remdesivir helped patients in one study recover from the disease 31% faster.

The FDA also issued an emergency use ruling for hydroxychloroquine and chloroquine. These medications are approved to treat malaria and autoimmune conditions like rheumatoid arthritis and lupus. Studies on their use against COVID-19 have had mixed results, and research is ongoing.

Clinical trials are also under way for tocilizumab, another medication used to treat autoimmune conditions. And the FDA is also allowing clinical trials and hospital use of blood plasma from people who've had COVID-19 and recovered to help others build immunity. You'll hear this called convalescent plasma.

Is there a cure for the new coronavirus?

There's no cure yet, but researchers are working hard to find one.

COVID-19 Outlook

Every case is different. You may have mild flu-like symptoms for a few days after exposure, then get better. But some cases can be severe or fatal.

What is the recovery rate for coronavirus?

Scientists and researchers are constantly tracking COVID-19 infections and recoveries. But they don't have information about the outcome of every infection. Early estimates predict that the overall COVID-19 recovery rate will be between 97% and 99.75%.

Can you get the coronavirus twice?

Doctors aren't sure if you can get reinfected after you've had it. With other coronaviruses that only cause colds, you have a period that you're immune, but that goes away over time.

MYTH

Myths and misinformation

There is a lot of information and misinformation circulating about the coronavirus. Here and here, we clear up some of the rumours and misconceptions around the outbreak.

Below are some of the myths that may have made you panic, but are not supported by scientific evidence:

No proof hot weather can stop coronavirus

A report by researchers at MIT raised hopes that hotter weather can suppress the coronavirus. But a dramatic surge in infections in Southeast Asia in recent days has increased doubts about the theory, health experts say.

Mosquito bites

There is no evidence showing COVID-19 can be transmitted by mosquitoes, according to the WHO.

Spraying yourself with alcohol or chlorine

Spraying alcohol or chlorine all over your body because you think you were infected will not kill the coronavirus. Alcohol or a chlorine solution can be used to disinfect surfaces, and hand-sanitisers do have a relatively high percentage of alcohol, but the use of these substances has to be according to safety recommendations.

Snow and cold weather

There is no evidence to show that cold weather can kill the new coronavirus. In fact, there is no evidence showing that hot weather can do that, either.

Eating garlic

Garlic is a healthy, aromatic food that is touted for its antimicrobial and culinary properties. But there is no evidence that eating garlic has protected people from the coronavirus, according to the WHO.

Drinking water

There is no scientific evidence that supports consuming large volumes of water at short intervals can help individuals flush the virus into their digestive tract.

Taking antibiotics

Antibiotics only work on bacteria, not viruses.

To date, there is no specific medicine recommended to prevent or treat the new coronavirus.

Coronavirus: Signs, Symptoms, Myths & Prevention Tips

With an increase in number of confirmed coronavirus (COVID-19) cases making news every hour, the panic & anxiety around it also continues to make round. While it is important to be informed, the higher value should be placed on being correctly informed.

Here's a list of Coronavirus Myths around the epidemic that you need to burst immediately.

Myth 1: You need to get a mask

As per the latest guidelines by World Health Organization (WHO), people who are well are not required to wear face masks. Face masks should instead be worn by those who have coronavirus and are showing symptoms or health care workers or people caring for someone infected with the virus in close settings. Disposable face mask can only be used once. If you are not ill or looking after someone who is ill then you are wasting a mask. Buying of face-masks, without the need of it, will only result in shortage and surge in price, which puts the people who need it and healthcare workers at risk.

The most effective Precautions tips to protect from Coronavirus COVID-19 are:

Frequently clean your hands with Hand Sanitizers
Cover your cough with the bend of elbow or tissue
Maintain a distance of at least 1 meter (3 feet) from people who are coughing or sneezing.

Myth 2: People who get the coronavirus will die

The case fatality or death rate for coronavirus is around 2%. People who get coronavirus will typically have symptoms similar to common cold, which include a runny nose, dry cough, sore throat, headache, fever and sometimes diarrhea that may last for a couple of days. These symptoms are usually mild and begin gradually. Some people become infected but don't develop any symptoms and don't feel unwell. Most people (about 80%) recover from the disease without needing special treatment. Around 1 out of every 6 people who gets COVID-19 becomes seriously ill and develops difficulty breathing. Older people, and those with underlying medical problems like high blood pressure, heart problems or diabetes, are more likely to develop serious illness. People with fever, cough and difficulty breathing should seek medical attention.

Myth 3: Flu shots can prevent coronavirus

Flu shots are not preventive against coronavirus. There is no vaccine for coronavirus developed yet, although scientists are still trying to develop a vaccine which can work against the virus.

Myth 4: Heat can kill the virus

According to WHO, hot baths, hand dryers, UV lamps can't kill the virus. The use of UV lamps can be harmful as the radiation can irritate skin. To protect yourself against the disease, frequently clean your hands with an alcohol-based hand rub or wash them with soap and water.

Myth 5: The virus can be transmitted through goods

Getting a letter or package from China won't put you at risk of contracting the virus, according to WHO. The likelihood of an infected person contaminating commercial goods is low and the risk of catching the virus that causes COVID-19 from a package that has been moved, travelled, and exposed to different conditions and temperature is also low.

Myth 6: Spraying alcohol or chlorine all over your body kills the new coronavirus

Spraying alcohol or chlorine all over your body will not kill viruses that have already entered your body. Spraying such substances can be harmful to mucous membranes (i.e. eyes, mouth)

Myth 7: Antibiotics can treat coronavirus

Antibiotics only work against bacteria and not viruses. While some western, traditional or home remedies may provide comfort and alleviate symptoms of Coronavirus or COVID-19, there is no evidence that current medicine can act as prevention of Coronavirus or cure the disease. WHO does not recommend self-medication with any medicines, including antibiotics, as a cure or preventions for COVID-19.

Easing symptoms during a quarantine

Drink plenty of fluids. Remaining hydrated while sick helps your body fight the infection. In general, it's a good rule of thumb to drink 6–8 glasses (8oz/serving) of water a day. Foods with high water content—like some

fruits, vegetables, and soups—also help keep you hydrated. Unsure if you're getting enough fluids? If you're well-hydrated, your urine should be a light color.

Get rest. Rest for as long as you need. This may mean sleeping 8–10 hours per day, but that's okay—your body needs it.

Eat a balanced diet. Eating a balanced diet is ideal: try to choose lean protein sources as well as fruits and vegetables, which are rich sources of zinc and vitamins A, C, and E. All of these help support your immune system.

Consider smaller, more frequent meals. Smaller meals are a great solution for quickly feeling full. Aiming for around 4–6 small meals per day may help maximize calorie intake once you're past the acute phase of the infection (first 24–48 hours).

Try a humidifier to help with breathing. Symptoms like congestion, runny nose, dry cough, and sore throat often make breathing feel challenging. But a humidifier can help ease congestion and coughs. (If you have a diagnosed respiratory condition like asthma, it may be a good idea to check in with your healthcare provider prior to using a humidifier.)

Talk to your healthcare provider. Ask your provider about which over-the-counter pain reliever would be best for your symptoms.

Be sure to keep a close eye on your symptoms, and contact your healthcare provider if you notice your symptoms are severe, do not improve, or get worse. Seek medical attention right away if you experience any of the following:

Severe shortness of breath

Continuous pain or pressure in the chest

Persistent fever greater than 102° F

Stay home until your healthcare provider says you no longer need to. Even if you no longer have any symptoms, follow recommendations for isolation until a healthcare provider has determined you can resume your normal activities.

As many people stay home and try to keep a hospital or clinic visit for emergencies only, at-home collection is an alternative to your routine testing. Learn more about the 30+ at-home tests we offer—like thyroid, HbA1c, cholesterol, and more. Additionally, Everlywell now offers the COVID-19 Test Home Collection Kit to help find out if you have COVID-19. The COVID-19 kit comes with everything needed to safely self-collect a sample at home, ship it to a CLIA-certified lab, and receive results within 24-48 hours of receipt by the lab.

How Corona Was Formed

My Secret Terrius: Netflix show predicted coronavirus outbreak with alarming accuracy in 2018

A TV show on Netflix seemed to accurately predict the coronavirus pandemic back in 2018.

The 10th episode of Korean series My Secret Terrius, which was released two years ago, makes mention of the deadly illness, which has been used to refer to several viruses before it became associated with the COVID-19 outbreak.

However, in prescient scenes from the show that were highlighted by Adam Nowell, a doctor can be heard saying: "The coronavirus attacks the respiratory system," adding: "What's more serious is that the coronavirus has an incubation period of two to 14 days."

She adds: "This virus was manipulated to attack the lungs directly within just five minutes of being exposed."

Top ArticlesUS protests could cause catastrophic setback for coronavirus,experts warn

When asked if there's a cure, she responds: "There's no cure of vaccine available at the moment."

Unlike real life, though, the virus in the show – which is seen being compared to SARS – was "manipulated" in an attempt to make it more contagious, although it's remarked that the coronaviru "sattacsk the lungs directly within just five minutes of being exposed".

Another moment shows children being instructed to wash their hands to prevent the virus from spreading

Last week, a book by a self-proclaimed psychic saw a surge in sales after claiming a global pandemic akin to coronavirus would occur "around 2020".

Another book that recently made headlines for seemingly predicting the coronavirus outbreak is Dean Koontz's Eyes of Darkness.

Other Alternatives

Drugs of abuse

Methanol has one carbon atom (dark grey). It is immediately poisonous; a single dose can cause blindness, brain and spinal cord damage, and death.[49] Blackmarket alcoholic drinks may contain methanol.

Ethanol has two carbon atoms (dark grey). Ethanol should not be confused with methanol. Ethanol-containing drinks are widely drunk. This doesn't prevent COVID-19, and may cause subclinical immunosuppression.

A mix containing amphetamines, cocaine, and nicotine, on sale on the dark web for US$300, was presented as a vaccine against COVID-19.

Cocaine does not protect against COVID-19. Several viral tweets purporting that snorting cocaine would sterilize one's nostrils of the coronavirus spread around Europe and Africa. In response, the French Ministry of Health released a public service announcement debunking this claim, saying "No, cocaine does NOT protect against COVID-19. It is an addictive drug that causes serious side effects and is harmful to people's health." The World Health Organisation also debunked the claim.[Facebook flagged the rumour as misinformation.

A claim that cannabis could protect against the coronavirus appeared on YouTube, along with a petition to legalize cannabis in Sri Lanka. Sri Lankan Health authorities pointed out that there was no evidence that cannabis protected against COVID-19.[A fake webpage purporting to be a Fox News article also claimed that CBD oil was a potential cure

Chloroform and ether-based drug loló was said to cure the disease in messages spread in Brazil

Industrial methanol was claimed to cure the coronavirus. Drinking alcohol is ethanol, while methanol is acutely poisonous. Iranian media were reporting nearly 300 dead and 1000 hospitalized (or 600 dead and 3,000 hospitalized, according to an unidentified doctor in the Health Ministry) as of April 8, 2020. Alcoholic beverages are illegal in Iran, resulting in a black market in liquor made illegally;[11][12] while drinking alcohol is ethanol, other alcohols, such as methanol, are acutely poisonous, and may be present in badly-prepared alcoholic beverages

Contrary to some reports, drinking ethanol alcohol also does not protect against COVID-19, and can increase health risk] (short term and long term).

Herbs and spices

Garlic was said to prevent COVID-19 on Facebook.[109] There is no evidence that garlic protects against COVID-19.

Consuming large amounts of boiled ginger after fasting for a day was rumoured to prevent or cure coronavirus on Facebook. There is no evidence that this prevents or cures any coronavirus infection, Dr. Mark Kristoffer Pasayan, a fellow at the Philippine Society for Microbiology and Infectious Diseases, said

Juice of bittergourd, a vegetable used in traditional medicine, was suggested as a cure for COVID-19 on social medi

Consuming turmeric has been claimed to help prevent COVID-19 but the WHO says there is no evidence that it does

Neem leaves (Azadirachta indica) were claimed to be remedies for COVID-19 in rumours that circulated in Inda.

Mohanan Vaidyar, a self proclaimed naturopath, was arrested in Kerala for claiming that he can cure COVID-19 and treating peop

Botanical claims

A complex Sri Lankan herbal drink was said to remedy all virus infections which can affect humans, including COVID-19, with reposts circulating widely on Facebook. The drink might reduce fever symptoms, but this might lead to the infected person infecting other people, and the mixture could have long-term health complications, according to Dr. L. P. A. Karunathilake, a senior lecturer at the Colombo University Institute of Indigenous Medicine

Andrographis paniculata was claimed to boost the immune systems and relieve symptoms of coronavirus by a Thai media website. Dr. Pakakrong Kwankao, Head of the Empirical Evidence Centre at Chao Phraya Abhaibhubehjr Hospital, and Dr. Richard Brown, Programme Manager of Health Emergencies and Antimicrobial Resistance at the World Health Organisation (WHO) in Thailand, said that there was no evidence to back these claims.

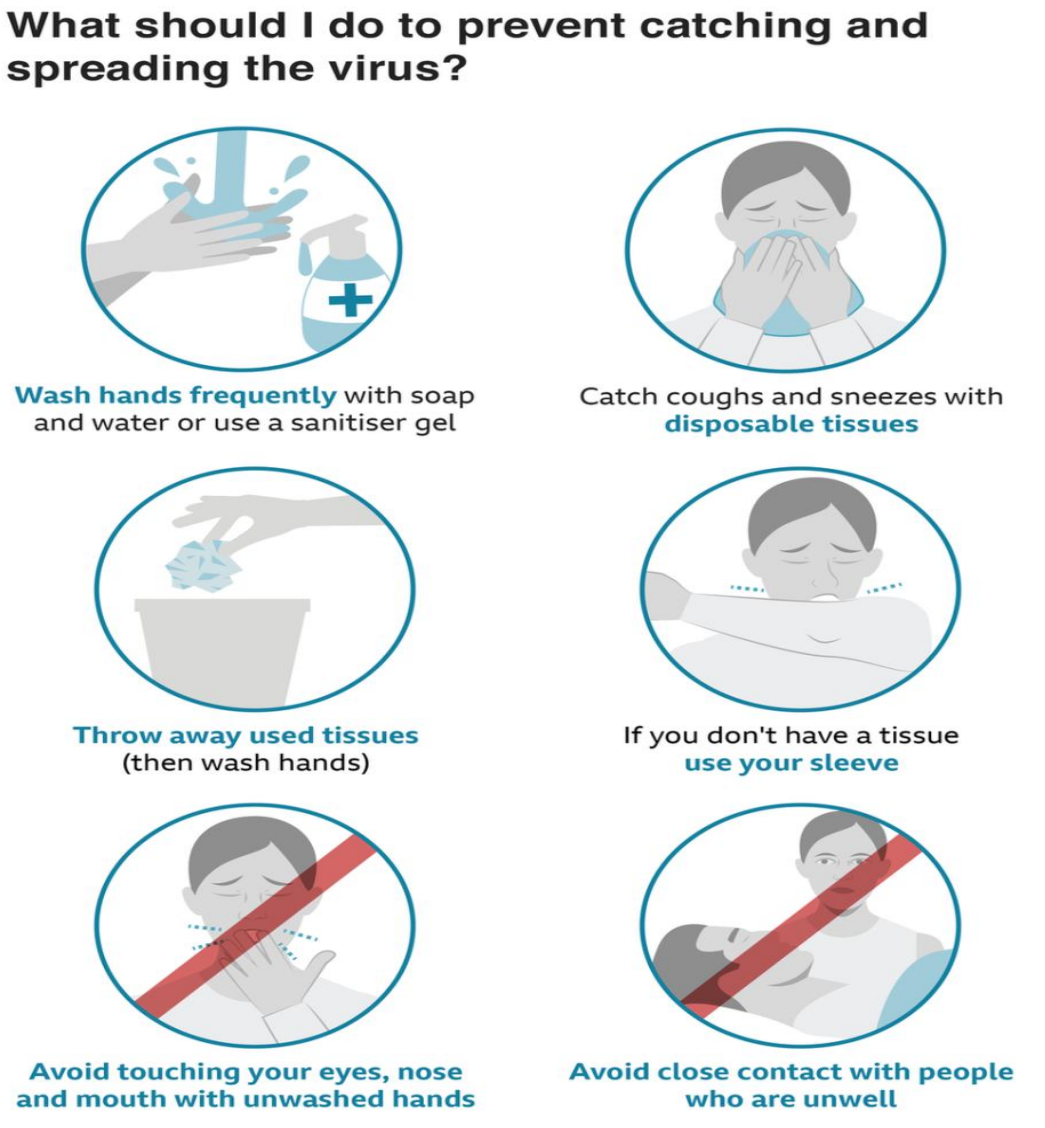
Sap from Tinospora crispa (makabuhay) plants was claimed to serve as an antibiotic against the coronavirus when used as an eye drop; it was also claimed that the coronavirus is from the skin and crawls to the eyes. These rumours circulated in the Philippines. Dr. Jaime Purificacion from the University of the Philippines' Institute of Herbal Medicine said that while there was evidence for makabuhay as a treatment for scabies, there was no evidence that it was useful for treating coronavirus, and no evidence that putting the sap in your eyes was safe. He strongly advised against putting plant sap in the eyes, saying it could be dangerous. The WHO has stated that antibiotics do not kill the coronavirus, as they kill bacteria, not viruses.

The poisonous fruit of the datura plant was falsely promoted as a preventive measure for COVID-19, which resulted in eleven people being hospitalized in India. They ate the fruit, following the instructions from a TikTok video that propagated the misinformation. The fruit was claimed to be effective on the grounds that it is spiky and looks a bit like the coronavirus virion.

A recipe consisting of ingredients often purported to prevent and cure colds, including lemon grass, elder, ginger, black pepper, lemon and honey, was promoted by María Alejandra Díaz, a member of the Venezuelan Constituent Assembly as a cure for COVID-19. Díaz also described the virus as a bioterrorism weapon.

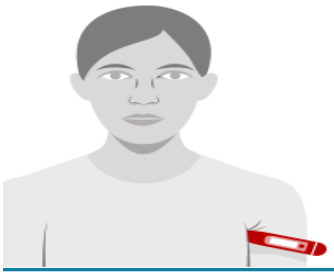
The President of Madagascar Andry Rajoelina launched and promoted in April 2020 a herbal drink based on an artemisia plant as a miracle cure that can treat and prevent COVID-19 despite a lack of medical evidence. The drink has been exported to other African countries

Picture illustration



How do I take my temperature?

Anyone with high temperature of 37.8C+ is advised to self-isolate
The NHS recommends these methods to take your temperature:



Armpit:
- Place thermometer tip in centre of armpit
- Tuck your arm against your body for a minute
- Remove and check temperature

Mouth:
- Place thermometer tip under your tongue
- Leave it in place for about one minute
- Remove and check temperature

Ear:
- Gently tug on ear to straighten ear canal
- Insert digital ear thermometer into ear canal
- Squeeze and hold button for one second
- Remove and check temperature*

*Note reading may not be accurate if thermometer not correctly placed in the ear

BBC

Resources

1) "Definition of Coronavirus by Merriam-Webster". Merriam-Webster. Archived from the original on 2020-03-23. Retrieved 2020-03-24.
2) "Definition of Corona by Merriam-Webster". Merriam-Webster. Archived from the original on 2020-03-24. Retrieved 2020-03-24.
3) Jump up to:a b Tyrrell DA, Fielder M (2002). Cold Wars: The Fight Against the Common Cold. Oxford University Press. p. 96. ISBN 978-0-19-263285-2. We looked more closely at the appearance of the new viruses and noticed that they had a kind of halo surrounding them. Recourse to a dictionary produced the Latin equivalent, corona, and so the name coronavirus was born.
4) Sturman LS, Holmes KV (1983-01-01). Lauffer MA, Maramorosch K (eds.). "The molecular biology of coronaviruses". Advances in Virus Research. spikes which resembled a crown, like the corona spinarum in religious art; hence the name coronaviruses.
5) Estola T (1970). "Coronaviruses, a New Group of Animal RNA Viruses". Avian Diseases. Lalchhandama K (2020). "A biography of coronaviruses from IBV to SARS-CoV-2, with their evolutionary paradigms and pharmacological challenges". International Journal of Research in Pharmaceutical Sciences. .
6) Fabricant J (1998). "The Early History of Infectious Bronchitis". Avian Diseases. Bushnell LD, Brandly CA (1933). "Laryngotracheitis in chicks". Poultry Science.
7) Jump up to:a b Decaro N (2011). "Gammacoronavirus". In Tidona C, Darai G (eds.). Gammacoronavirus‡: Coronaviridae. The Springer Index of Viruses. Springer. pp. Jump up to:a b c McIntosh K (1974). "Coronaviruses: A Comparative Review". In Arber W, Haas R, Henle W, Hofschneider PH, Jerne NK, Koldovský P, Koprowski H, Maaløe O, Rott R (eds.). Current Topics in Microbiology and Immunology / Ergebnisse der Mikrobiologie und Immunitätsforschung. Current Topics in Microbiology and Immunology / Ergebnisse der Mikrobiologie und Immunitätsforschung. Berlin, Heidelberg: Springer..
8) "Il était une fois les coronavirus". Réalités Biomédicales (in French). 2020-03-27. Retrieved 2020-04-18.
9) Kahn JS, McIntosh K (November 2005). "History and recent advances in coronavirus discovery". The Pediatric Infectious Disease Journal.
10) Picture Illustration BBC_NHS

Thank You
RSTCA Group
www.rstca.com.np