

# *Six Months of Coronavirus: Here's Some of What We've Learned*

Much remains unknown and mysterious, but these are some of the things we're pretty sure of after half a year of this pandemic.

By The New York Times

June 2, 2020, 9:37 a.m. ET

*[Follow our live coronavirus pandemic updates.]*

We don't really know when the novel coronavirus first began infecting people. But as we turn a page on our calendars into June, it is fair to say that Sars-Cov-2 has been with us now for a full six months.

At first, it had no name or true identity. Early in January, news reports referred to strange and threatening symptoms that had sickened dozens of people in a large Chinese city with which many people in the world were probably not familiar. After half a year, that large metropolis, Wuhan, is well-known, as is the coronavirus and the illness it causes, Covid-19.

In that time, many reporters and editors on the health and science desk at The New York Times have shifted our journalistic focus as we have sought to tell the story of the coronavirus pandemic. While much remains unknown and mysterious after six months, there are some things we're pretty sure of. These are some of those insights.

## **Here are some things we think we know about coronavirus:**

- We'll have to live with this for a long time.
- You should be wearing a mask.
- American public health infrastructure needs an update.
- Responding to the virus is extraordinarily expensive.
- We have a long way to go to fix virus testing.
- We can't count on herd immunity to keep us healthy.
- The virus produces more symptoms than expected.

- We can worry a bit less about infection from surfaces.
- We can also worry less about a mutating virus.
- We can't count on warm weather to defeat the virus.

## We'll have to live with this for a long time.

By Denise Grady



Jens Mortensen for The New York Times

Summer is almost here, states are reopening and new coronavirus cases are declining or, at least, holding steady in many parts of the United States. At least 100 scientific teams around the world are racing to develop a vaccine.

That's about it for the good news.

The virus has shown no sign of going away: We will be in this pandemic era for the long haul, likely a year or more. The masks, the social distancing, the fretful hand-washing, the aching withdrawal from friends and family — those steps are still the best hope of staying well, and will be for some time to come.

“This virus just may become another endemic virus in our communities, and this virus may never go away,” Dr. Mike Ryan, the executive director of the World Health Organization’s health emergencies program, warned last month. Some scientists think that the longer we live with the virus, the milder its effects will become, but that remains to be seen.

Predictions that millions of doses of a vaccine may be available by the end of this year may be too rosy. No vaccine has ever been created that fast.

The disease would be less frightening if there were a treatment that could cure it or, at least, prevent severe illness. But there is not. Remdesivir, the eagerly awaited antiviral drug? “Modest” benefit is the highest mark experts give it.

Which brings us back to masks and social distancing, which have come to feel quite antisocial. If only we could go back to life the way it used to be.

We cannot. Not yet. There are just enough wild cards with this disease — perfectly healthy adults and children who inexplicably become very, very sick — that no one can afford to be cavalier about catching it. About 35 percent of infected people have no symptoms at all, so if they are out and about, they could unknowingly infect other people.

Enormous questions loom. Can workplaces be made safe? What about trains, subways, airplanes, school buses? How many people can work from home? When would it be safe to reopen schools? How do you get a 6-year-old with the attention span of a squirrel to socially distance?

The bottom line: Wear a mask, keep your distance. When the time comes in the fall, get a flu shot, to protect yourself from one respiratory disease you can avoid and to help keep emergency rooms and urgent care from being overwhelmed. Hope for a treatment, a cure, a vaccine. Be patient. We have to pace ourselves. If there’s such a thing as a disease marathon, this is it.

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## **You should be wearing a mask.**

**By Knvul Sheikh**



Jens Mortensen for The New York Times

The debate over whether Americans should wear face masks to control coronavirus transmission has been settled. Although public health authorities gave confusing and often contradictory advice in the early months of the pandemic, most experts now agree that if everyone wears a mask, individuals protect one another.

Researchers know that even simple masks can effectively stop droplets spewing from an infected wearer's nose or mouth. In a study published in April in *Nature*, scientists showed that when people who are infected with influenza, rhinovirus or a mild cold-causing coronavirus wore a mask, it blocked nearly 100 percent of the viral droplets they exhaled, as well as some tiny aerosol particles.

Still, mask wearing remains uneven in many parts of the United States. But governments and businesses are beginning to require, or at least recommend, that masks be worn in many public settings.

There is also growing evidence that some kinds of masks may protect you from other people's germs. High-grade N95 masks are cleared by federal public health agencies because they filter out at least 95 percent of particles that are 0.3 microns in diameter when properly worn. One study showed that N95s were able to capture over 90 percent of viral particles, even if the particles were about one-fifth the size of a coronavirus. Other studies have shown that flat, blue surgical masks block between 50 to 80 percent of particles, whereas cloth masks block 10 to 30 percent of tiny particles.

"Wearing a mask is better than nothing," said Dr. Robert Atmar, an infectious disease specialist at Baylor College of Medicine. Because the coronavirus typically infects people by entering their body through the mouth and nose, covering these areas can act as the first line of defense against the virus, he said.

Donning a face covering is also likely to prevent you from touching your face, which is another way the coronavirus can be transmitted from contaminated surfaces to unsuspecting individuals. And when combined with hand washing and other protective measures, such as social distancing, masks help reduce the transmission of disease, Dr. Atmar said.

## American public health infrastructure needs an update.

By Donald G. McNeil Jr.



Jens Mortensen for The New York Times

The United States knows how to fight wars. But, as the past few months have shown, the American response to pathogens can easily become a shambles — even though pathogens kill more Americans than many wars have.

We have no viral Pentagon. The Centers for Disease Control and Prevention is more of an F.B.I. for outbreak investigations than a war machine. For years — under both the Obama and Trump administrations — its leaders have had to seek clearance for almost every utterance.

Dr. Anthony S. Fauci, the most prominent of the doctors advising the coronavirus task force, is actually the head of a research institute, the National Institute for Allergy and Infectious Disease, rather than of the medical equivalent of a combat battalion.

The Surgeon General is essentially an admiral without a crew. He dispenses health warnings and recommendations, but the Public Health Services Commissioned Corps, which reports to him, are only about 6,500 strong, and many members have other jobs, often at the C.D.C.

Almost all the front-line troops — the contact tracers, the laboratory technicians, the epidemiologists, the staff in state and city hospitals — are paid by state and local health departments whose budgets have shriveled for years. These soldiers are led by 50 commanders, in the form of governors, and with that many in charge, it is amazing that any response moves forward.

The rest of the response is in the hands of thousands of private militias — hospitals, insurers, doctors, nurses, respiratory technicians, pharmacists and so on, all of whom have individual employers. Within limits, they can do what they want. When they cannot get something they need from overseas they are largely powerless without federal logistical help.

As war does to defeated nations, pandemics expose the weaknesses of their systems. Our patchwork and uncoordinated response has produced more than 100,000 deaths; surely we can do better.

“The superpowers have their priorities all wrong,” Dr. Michael Ryan, the head of the W.H.O.’s emergencies program, said recently.

“They spend billions on missiles and submarines, and on fighting terrorism, and pennies on viruses. You can start peace talks with your enemy. You can change your policies to lessen the threat of terrorism. But you cannot negotiate with a virus, and we know that new threats are coming along every year.”

## **Responding to the virus is extraordinarily expensive.**

By Reed Abelson

The federal government has spent hundreds of billions of dollars and promised to spend more than \$2 trillion to address the coronavirus pandemic.

Of that money, \$2 billion has gone to helping companies develop new vaccines, expanding testing capacity nationwide and shoring up the economic fallout since the beginning of March. (Even more could be on the way, but how much and when is unclear.)

The vast majority of this spending has been aimed at blunting the economic pain of small businesses shutting down and people losing their jobs or being furloughed. Congress also provided additional money for Medicaid and other social programs.

Hospitals, community health centers and other providers have been allocated \$175 billion to cover the cost of caring for patients with Covid-19 and for the visits, procedures and surgeries that were canceled because of the pandemic. In the latest bill, \$25 billion was targeted for coronavirus testing.

Many experts say more funding is needed, but there is ample controversy over how the money already allocated is being spent and which entities are getting funds. Various groups like the Committee for a Responsible Federal Budget are tracking the spending. By that organization's calculation, roughly \$1.6 trillion has already been disbursed or committed. The Federal Reserve has also provided more than \$2 trillion in emergency lending, asset purchases and other activities, it said.

## **We have a long way to go to fix virus testing.**

**By Katie Thomas**

The landscape for testing looks far better than it did in the early days of the outbreak, when a botched rollout of coronavirus tests failed to detect the spread of the virus in the United States.

Today, hundreds of thousands of tests a day are being conducted in the United States, and in some areas it is so widely available that public health officials have complained they do not have enough takers. In Los Angeles, where testing is free to everyone, a drive-through site at Dodgers Stadium can process 6,000 people a day.

The range of tests available is also expanding. Tests that once required a health care worker to insert a swab through the nose to the back of the throat can now be done with a swipe inside the nose, or by spitting into a cup. A handful of companies now sell at-home test kits, and a test from Abbott can detect the virus in as little as five minutes.

In addition to the tests that detect active infections, Americans can also get tested for antibodies to the virus, which shows whether they have ever been infected, and could help give a better picture for how widely the coronavirus has spread in communities.

But despite this progress, the United States still has a long way to go. Public health experts say that anywhere from 900,000 tests to millions a day will be needed to screen hospital patients, nursing home residents and employees returning to work.

And even as testing is abundant in some areas, it is still hard to come by in others. Shortages of key supplies needed to run the tests — such as swabs and chemical reagents — have persisted. The federal government has effectively delegated oversight to the states, creating a patchwork of policies and putting states in competition with one another. Even tracking the number of tests conducted has proved difficult, after the C.D.C. and several states began lumping tests for the virus as well as antibodies together, to the bafflement of epidemiologists trying to track active infections, which the antibody tests do not show.

## **We can't count on herd immunity to keep us healthy.**

**By Gina Kolata**

The idea is simplicity itself: If enough of the population has antibodies to the novel coronavirus, the virus will hit too many dead ends to continue infecting people. That is herd immunity.

That is the great hope for a vaccine. But it may not happen, even if a vaccine becomes available, as experience with flu vaccines shows.

Dr. Paul Offit of Children's Hospital of Philadelphia and the University of Pennsylvania noted that while vaccines eliminated measles, rubella and smallpox and almost eliminated polio in the United States, vaccines against influenza and whooping cough have not stopped outbreaks. (With some parents declining measles vaccines, the disease is coming back.)

Influenza and whooping cough have spread, even after enough people in a community have been vaccinated to, in theory, stop the diseases. That's because the antibodies that protect people against viruses infecting mucosal surfaces like the lining of the nose tend to be short-lived.

Vaccines against respiratory diseases are, at best, modestly effective, agreed Dr. Arnold Monto of the University of Michigan,

Since the coronavirus usually starts by infecting the respiratory system, Dr. Monto suspects that a Covid-19 vaccine would have a similar effect to a flu vaccine — it will reduce the incidence of the disease and make it less severe on average, but it will not make Covid-19 go away.

#### The Coronavirus Outbreak >

## Frequently Asked Questions and Advice

Updated June 1, 2020

- **How do we start exercising again without hurting ourselves after months of lockdown?**

Exercise researchers and physicians have some blunt advice for those of us aiming to return to regular exercise now: Start slowly and then rev up your workouts, also slowly. American adults tended to be about 12 percent less active after the stay-at-home mandates began in March than they were in January. But there are steps you can take to ease your way back into regular exercise safely. First, "start at no

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He would like the virus to disappear, of course, but a vaccine that reduces the disease's spread and severity is a lot better than nothing.

"As an older person, what I want is not to end up on a respirator," Dr. Monto said.

## The virus produces more symptoms than expected.

By Roni Caryn Rabin



Jens Mortensen for The New York Times

Covid-19 is a viral respiratory illness. Many early descriptions of symptoms focused on patients being short of breath and eventually being placed on ventilators. But the virus does not confine its assault to the lungs, and doctors have identified a number of symptoms and syndromes associated with it.

In some patients, the virus propels the immune system into overdrive, causing the lungs to fill with fluid and damaging multiple organs, including the brain, heart, kidneys and liver.

The first symptoms of an infection are usually a cough and shortness of breath. But in April the C.D.C. added to the list of early signs sore throat, fever, chills and muscle aches. Gastrointestinal upset, such as diarrhea and nausea, has also been observed.

Another telltale sign of infection may be a sudden, profound diminution of one's sense of smell and taste. Teenagers and young adults in some cases have developed painful red and purple lesions on the fingers and toes, but few other serious symptoms.

Severe disease leads to pneumonia and acute respiratory distress syndrome. The blood oxygen levels plummet, and patients may get supplemental oxygen or be placed on a machine, called a ventilator, to help them breathe.

But even without lung impairment, the disease can cause injury to the kidneys, heart or liver. Critically ill patients are prone to developing dangerous blood clots in the legs and the lungs. In rare cases, the disease triggers ischemic strokes that block the arteries supplying blood to the brain, or brain impairments, such as altered mental status or encephalopathy.

Death can result from heart failure, kidney failure, multiple organ failure, respiratory distress or shock.

## We can worry a bit less about infection from surfaces.

By Apoorva Mandavilli



Jens Mortensen for The New York Times

The news, when it was reported, added a frightening twist to the threat from the coronavirus: A study in March in The New England Journal of Medicine found that under laboratory conditions, the virus can survive for up to three days on some surfaces, such as plastic and steel, and on cardboard for up to 24 hours.

Other studies reported finding the virus on air vents in hospital rooms and on computer mice, sickbed handrails and doorknobs.

Many people grew worried that by touching a surface that had been covered in droplets by an infected person, and then touching their own mouth, nose or eyes, they then would contract the virus.

You should still wear a mask, avoid touching your face in public and keep washing your hands. But none of these studies tested for live virus, only for traces of its genetic material. Other scientists commenting on these studies said virus on these surfaces might degrade more quickly. The Centers for Disease Control and Prevention has said since March that contaminated surfaces are “not thought to be the main way” the virus spreads.

The main driver of infection is thought to be directly inhaling droplets released when an infected person sneezes, coughs, sings or talks. The C.D.C. recently made changes to its website to make this message even more explicit.

## **We can also worry less about a mutating virus.**

**By Carl Zimmer**

In February, three experts on viruses published an editorial in a journal headlined “We Shouldn’t Worry When a Virus Mutates During Outbreaks.”

But worry we did. As the coronavirus pandemic swept the planet, headlines and tweets poured forth that the new coronavirus was undergoing dangerous mutations.

Many of these worries were based on a misunderstanding of what it means when a virus mutates. When an infected cell produces new viruses, it sometimes makes mistakes in copying the viral genes. Those mistakes are mutations, and it turns out that most are bad for the viruses, getting in the way of their ability to hijack our cells.

The viruses that do manage to spread to new hosts have mutations, too. But those mutations often don’t have any significant effect. The alterations they bring to a virus’s genes don’t lead to any change in how the virus works.

Scientists have identified harmless new mutations in different lineages of the new coronavirus. These lineages are not dangerous new strains.

Some of these lineages have come to be the most common version of the coronavirus in some countries. Again, that doesn’t mean that they’ve got some evolutionary edge. There’s a very common phenomenon in nature called the founder effect: Whatever mutations happen to be common in the founders of a new population will end up common in their descendants.

It is possible for viruses to gain mutations that do affect the way they work. The new coronavirus will be no different. But the only way to know if a new mutation is significant or not is to carry out research. It will take a lot of evidence to reject the more likely hypothesis: that a new mutation has no importance at all.

Fortunately, it doesn’t look like coronaviruses will be picking up these new mutations very quickly. Compared with other viruses, scientists have found, the new coronavirus has a relatively slow rate of new mutations.

That’s a big relief for vaccine makers. Influenza viruses mutate so quickly that people need to get a new flu shot each year to stay protected. H.I.V. has so much genetic diversity that an effective vaccine against it has yet to be found. The new coronavirus poses immense challenges to vaccine makers, but most of them have to do with manufacturing billions of doses in a matter of months.

We have enough worries when it comes to Covid-19; no need to add needless ones to the list.

# We can't count on warm weather to defeat the virus.

By James Gorman



Jens Mortensen for The New York Times

The hot and humid weather of summer will not stop the pandemic. More sunlight and humidity may slow down its spread, but we probably won't know by how much. Other factors, like reduced travel, increased personal distance, closed schools, canceled gatherings and mask-wearing, have effects that would outweigh the influence of the weather.

A few things are known about conditions that do or do not favor the virus. The ultraviolet rays in sunlight help destroy the virus on surfaces and some studies have shown a small effect from humidity. It seems to last longest on hard surfaces like plastic and metal. It won't survive in pool or lake or seawater. Wind disperses it. Risk of transmission is lower outdoors than indoors.

A wooden bench under a bright sun at a breezy beach is a better bet than a metal and plastic recliner on the shady side of the pool. But if someone infected sits near you and coughs, or talks a lot or sings, it doesn't really matter where you're sitting and how nice a day it is.

"The virus doesn't need favorable conditions," said Peter Juni, an epidemiologist at the University of Toronto. It has a world population with no immunity waiting to be infected. Bring on the sun; the novel coronavirus will survive.

Air conditioning may blow the virus right to your restaurant table.

On Memorial Day, many people in the United States gathered in congenial closeness in lovely weather without masks. If any of them were infected and breathing, they probably infected someone else. The same will be true on July 4. Even if the weather is glorious.