

# Experts suggest smokers more at risk of death in virus outbreak

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 [asahi.com/ajw/articles/13138556](https://www.asahi.com/ajw/articles/13138556)

Men are nearly three times more likely to die from COVID-19 infections than women, according to a study, and some health experts say the gap may be related to the high rate of smoking among males in China.

“If you looked at any infectious lower respiratory pathogen, I think it tends to obviously affect people in their older age and certainly those with chronic obstructive pulmonary disease,” Michael Ryan, executive director of World Health Organization’s Health Emergencies Programme, said at a news conference in Geneva on Feb. 14.

“So it goes without saying that smoking is a risk factor for severity of any lower respiratory tract infection, and we would expect it to be no different here,” he said.

According to a 2010 nationwide survey of smoking in China, 54 percent of men smoked regularly, while 2.6 percent of women did so.

Although Ryan said that connecting smoking rates with the coronavirus death rates among men and women is “an excellent hypothesis,” he noted that the link is still unproven.

“But I’m sure through the studies and the observations that are happening, there will be a lot of interest to look at smoking as a risk factor, and I think it should be relatively straightforward to establish the science on that,” he said.

Since the outbreak of COVID-19 in China, a research team, including scientists from the University of Florida and Peking University, has analyzed clinical and epidemiological characteristics of the disease based on 8,866 confirmed and suspected cases in China until Jan. 26.

Nearly half of the patients studied were at the age of 50 or older.

The overall fatality rate of these patients was an estimated 3.1 percent. Among male patients, 4.5 percent died, compared with a fatality rate of 1.3 percent among female patients, the study showed.

The findings were posted on Feb. 11 on medRxiv, an online archive and distribution server for preliminary reports in medical, clinical and related health sciences that have not been peer-reviewed.

The research findings did not mention the smoking habits of the patients, nor did it examine possible contributing factors for the difference in the fatality rates.

Ryan was asked by a reporter about whether smokers were more at risk of developing severe coronavirus symptoms than nonsmokers.

“They (smokers) are at very high risk of negative consequences of viral infection and particularly secondary bacterial pneumonia and other things,” Ryan said.

He added, “There is a marked difference between males and females in this outbreak in terms of severity, and there is certainly a marked difference in those (smoking) habits in China, and it does demark along male and female lines.”


Ryan was not the only health expert who has raised the possibility that smoking heightens the health dangers in patients after they come down with pneumonia caused by the coronavirus.

Patients with cardiac diseases or diabetes are believed to be more likely to develop severe symptoms when they are infected with the COVID-19.

It has also been established that smoking raises the chances of developing cardiac diseases and diabetes.

“It is well known that smoking increases the risk of dying from common pneumonia,” said Kazunori Tomono, a professor at Osaka University who specializes in infection control and prevention. “It would be little wonder if smoking has something to do with the aggravation of COVID-19.”

# Smokers at increased risk of coronavirus complications, leading experts warn

 [telegraph.co.uk/global-health/science-and-disease/coronavirus-dangerous-smokers](https://www.telegraph.co.uk/global-health/science-and-disease/coronavirus-dangerous-smokers)

By Anne Gulland, By LaToya Harding By Harriet Barber By Anne Gulland By Paul Nuki By Sarah Newey By Jordan Kelly-Linden

Lung disease experts have warned that there could be a link between smoking and the development of complications of coronavirus as new research sheds more light on who is most susceptible to the disease.

The large volume of data now being released by researchers shows clear patterns among those falling ill from the disease, now called Covid-19 by the World Health Organization.

A new analysis of the first 8,000 cases of the coronavirus carried out by researchers in China and the United States shows that men are more likely to be diagnosed with the disease, are more likely to have the most severe symptoms, such as pneumonia, and are more likely to die.

One reason for the bias against males may be that Chinese men are heavy smokers.

The analysis was published as the latest figures show there have been more than 64,000 cases of the disease and more than 1,400 deaths. The ninth case in the UK has also been confirmed.

The Chinese and US analysis of patients shows that men are far more likely to become infected with Covid-19, with 55 per cent of confirmed cases among men.

It also shows that men tend to suffer more serious complications - 61.5 per cent of those diagnosed with the most severe pneumonia are men. And the case fatality rate for men was more than three times higher than for women - 4.45 per cent of men died, compared to 1.25 per cent of female patients, the study found.

Being an older male is a particular risk, the study showed, as nearly 10 per cent of male patients over the age of 60 in the study died.

The reason why men are more susceptible to the disease is not fully understood but this has been the case in two previous coronavirus outbreaks - Middle East respiratory syndrome (Mers) and severe acute respiratory syndrome (Sars).



Watch Video At: <https://youtu.be/K1T0gFuZwQE>

Some researchers say it could be down to what WHO describes as women's "inherent biological advantage". However, it could be down to lifestyle factors, particularly smoking.

The most up-to-date figures from the WHO show that 52.1 per cent of Chinese men smoke, compared to just 2.7 per cent of women. In the UK 16.5 per cent of men smoke, compared to 13 per cent of women.

High rates of smoking have also been linked to more serious outcomes in both Sars and Mers.

One of the UK's leading respiratory disease experts, Gisli Jenkins, professor of experimental medicine at Nottingham University, said that smokers had high rates of chronic obstructive pulmonary disease (COPD), a form of lung damage. And people with COPD are at high risk generally of respiratory illnesses such as the new coronavirus.

Prof Jenkins said it would be "astonishing" if smokers were not at greater risk of Covid-19 than non smokers. And he said there may be a link between high smoking rates and severity of the disease.

"China has extremely high rates of COPD and it also has high rates of severe pneumonia. In this particular coronavirus 15 per cent of the Chinese population who have been infected have severe respiratory disease and around two per cent have died - in the rest of the world the disease doesn't seem to be as bad.

Show more

"We don't yet know why that is - it could be that the epidemic is later in its evolution in the rest of the world. But we do know that in China there are very high rates of smoking

and COPD,” he said.

Dr Sanjay Agrawal, chair of the Royal College of Physicians’ Tobacco Advisory Group, said research showed that smokers were twice as likely to get pneumonia as non smokers.

“They are also more likely to get infections, the reason being that smoking will affect your defences so you’re susceptible to both viral and bacterial infections,” he said.

He added that the current strategy for managing the disease was focused on containment and delay - if it takes a couple of months for Covid-19 to really take off in the UK, smokers who quit today would be less at risk from the disease when it eventually arrives.

“The bottom line is there’s never a bad time to quit. You’ll see benefits within days, weeks and months. ... If you quit smoking today you will reduce your risk [of picking up the disease] and in two to three months you will benefit,” he said.

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Monday, February 03, 2020, 11:22

Letter to China Daily: Wuhan virus and smoking cigarettes

Dear Sir,

Because men are more at risk of the Wuhan nCoV virus, health officials suspect that smoking-damaged lungs are more vulnerable to further damage from the Wuhan virus.

This applies to both catching the infection but particularly to the death rate, which is recently reported at about three or four males to every female.

Given that about 50 percent of males in China smoke compared with only 3 percent of females, it is imperative that China document the smoking habits of all patients diagnosed with the virus.

The problem is that the epidemic is being handled by infectious-disease medical staff — people who are not switched on to the fact that smokers' lungs are damaged and therefore more susceptible.

There may be other causes of the gender imbalance, but the skewed statistics of male predominance suggest that, in the meantime, it would surely be prudent for all smokers to quit. Quitting should not be a short-term measure, but lifelong, to avoid not only lung damage, but also a formidable array of health problems and premature death.

*Judith Mackay*

*Director, Asian Consultancy on Tobacco Control*

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19 February 2020

# Coronavirus' Top Targets: Men, Seniors, Smokers

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[M medscape.com/viewarticle/925855](https://www.medscape.com/viewarticle/925855)

Viruses can strike one group more severely than another. The 1918 [flu](#), which claimed 50 million lives worldwide, particularly affected young adults. The [Zika](#) outbreak that raged through Brazil in 2015-2016 had an especially devastating effect on pregnant women, attacking the brains of the fetuses they carried.

COVID-19, the disease caused by the new coronavirus that originated in China, appears to get more dangerous with age, says Michael Mina, MD, PhD, an assistant professor of epidemiology at the Harvard T.H. Chan School of Public Health.

"There seems to be this threshold — below [age] 35 we're seeing practically zero [cases]," he says. "As people increase in age from their 40s to 80s, we're seeing mortality increase."

The virus, which erupted late last year, now counts more than 80,000 cases and 2,700 deaths, the majority of them in China.

A study published Monday in [The Journal of the American Medical Association](#) that examined the first 45,000 cases in China found that 80% of the reported cases [appear](#) to be mild. The other 20% of those diagnosed had moderate, severe, or critical symptoms, including a hard time breathing, pneumonia, and organ failure. About 2.3% of overall infections have been lethal. [Severe acute respiratory syndrome \(SARS\)](#), a similar virus that started in China in 2002, also [hit people over 60 the hardest](#). More than 8,000 people contracted the virus over 8 months, nearly 10% of whom died.

With COVID-19, so far children ages 1-9 account for just 1% of all Chinese infections, and none of the deaths, according to the *JAMA* study. Another 1% were ages 10-19.

Of people in their 70s who got the virus, 8% died, the study found, along with nearly 15% of those 80 and older. "Someone in their 80s has a pretty high risk of not leaving the hospital" if treated for COVID-19, Mina says.

Early data suggested that men were more vulnerable, as they accounted for just more than half the cases, according to the [Chinese Center for Disease Control and Prevention](#). Infected men died twice as often as infected women. Mina says men might account for more cases because they were tested more often, but the "evidence is not strong to make any good conclusions."

<https://www.scmp.com/lifestyle/health-wellness/article/3051745/lungs-how-they-work-what-coronavirus-does-them-and>

SCMP [Lifestyle / Health & Wellness](#)

## The lungs: how they work, what the coronavirus does to them, and the effects of smoking and asthma

Less balloons than buckets of blood strung with air bubbles, the lungs help pull in oxygen, dispel carbon dioxide and play a key role in speech. A person can survive on a single lung, provided it is in top condition, but lungs are easily damaged by illnesses and smoking.



[Anthea Rowan](#)

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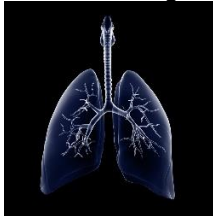
We look at how lungs function, and what damage **smoking** and asthma can do to them, as well as how to protect ourselves from flus, colds and viruses that affect the respiratory system. Photo: Shutterstock

Our lungs are a clever combination of effective filter and pair of bellows, huffing and puffing air in and out, pumping with muscle and the aid of the diaphragm and rib cage. Every cell in the body needs oxygen to work properly and the lungs are crucial to this: with every breath we take, oxygen enters our bloodstream and moves throughout the body.

The lungs are one of the biggest organs, a twosome of slightly odd shaped balloons between the liver and heart.

The two are not symmetrical; they're shaped to neatly fit into our anatomy, the right being wider than the left, but shorter to make room for the liver beneath it. The left one is narrower to accommodate the heart. The ribs neatly encircle them in a protective embrace. The surface area of all the tiny alveoli – the little sacs where oxygen and blood meet and mix – would cover a tennis court.

We need oxygen to survive, but if we don't rid the body of carbon dioxide, we'd die anyway. That's where the lungs also play a big role: expelling it.



At rest, a man's lungs can hold about 710ml (24 ounces) of air, a woman's around half that. Photo: Shutterstock

Exhaling toxic CO<sub>2</sub> is just as important as inhaling life-sustaining oxygen – we use only about 5 per cent of the oxygen of every breath, the rest is exhaled and the cycle continues. And lungs also play a key role in speech – the larynx, or voice box, is directly above the windpipe, pushing air from the lungs through the voice box to produce sound.

Lungs are less balloons than buckets – buckets of blood strung with air bubbles. Every time the heart beats, it sends equal amounts of blood to the lungs as it does the rest of the body. Blood is in the lungs for less than a second – long enough to balance the gases.

[Want to quit vaping? It may be harder than quitting smoking](#)  
[10 Oct 2019](#)





At rest, a man's lungs can hold about 710ml (24 ounces) of air, a woman's around half that. According to the American Lung Association, adults typically take 15 to 20 breaths a minute, about six litres of air, and around 20,000 breaths a day. Babies breathe faster than adults; a newborn's normal breathing rate is about 40 breaths each minute.

The lungs have a neat housekeeping arrangement. Cilia, like a coat of fine hairs, line the bronchial tubes and wave back and forth like seaweed underwater, spreading mucus to help rid the lungs of dust and germs.

A person can survive on a single lung quite well – providing that lung is in tip top condition. Lungs are easily damaged, though. Covid-19, the disease at the centre of the [current coronavirus outbreak](#), is a case in point. Patients in serious condition have inflamed lungs whose tiny alveoli fill with water and pus, and are unable to make the oxygen exchange effectively.



Cilia line the bronchial tubes and wave back and forth, spreading mucus to help rid the lungs of dust, germs and harmful bacteria. Photo: Shutterstock

The first two patients to die from the virus in China were healthy adults, but they were long-time smokers. Dr Raymond Tso, a US-trained Hong Kong specialist in respiratory medicine, stresses that smoking is the single worst thing we can do for our lungs.

“Both [cigarette smoking and heat-not-burn e-cigarettes can cause great damage to the lung tissue](#),” Tso says.

According to the Mayo Clinic, based in Rochester in the US state of Minnesota, **people who smoke have the greatest risk of lung cancer. The more a person smokes, the greater the risk: 15 to 30 times more, according to the US Centres for Disease Control and Prevention – about 80 per cent of deaths from lung cancer can be attributed directly to smoking. More than 60 carcinogens in cigarette smoke directly damage and mutate DNA, a study published in the journal *Nature* last month reported.**

**Despite the assault of smoking, and second-hand smoking** – which has been shown to increase deaths in fetuses and newborns, play a role in sudden infant death syndrome, worsen the severity of asthma in children, and affect healthy lung growth – **after quitting smoking, the lungs can heal virtually completely, that study concluded.**

### [Asthma](#)

is another prevalent lung disease in which the air passageways in the lungs become narrowed and inflamed, making it hard to breathe. It's a common problem in Hong Kong, Tso says. He cites the Hong Kong Asthma Society, which estimates there are 350,000 to 400,000 asthmatics in Hong Kong. The disease's prevalence in Hong Kong, at 10 per cent, is higher than in the US, where it is around 8 per cent. Poor air quality and allergens are the primary causes. Growing up in [cities with poor air quality](#) inhibits healthy lung growth in children, predisposing whole populations to asthma later.

With support and drugs, asthma can be managed quite well – and exercise can help to alleviate it. If the condition is under control, exercising is recommended to keep lungs and body in good shape, as it helps to strengthen muscles used in breathing and boost the immune system, helping to protect from respiratory infections.

“With limited personal space in our living environment, transport system and hospital system, Hong Kong residents are particularly prone to get infected with communicable respiratory infections,” Tso notes.



US-trained Hong Kong specialist in respiratory medicine Dr Raymond Tso **stresses that smoking is the single worst thing we can do for our lungs**. Photo: Shutterstock

**Tso explains that covid-19 attaches to a receptor in lung tissue and enters the cells, then makes more copies of itself.** The immune system, recognising these infected cells, mounts a defence, causing cell death. As more cells die, lung tissue is damaged and can stiffen. This makes pumping oxygen to the other vital organs much harder for the heart. It can also lead to a secondary bacterial infection on top of the viral infection. This can trigger an excessive immune response and cause multiple organ damage.

### **How can we protect ourselves from covid-19 and other flus, colds and viruses that affect the respiratory system?**

Tso says many studies “have shown **masks are beneficial for those that are actually sick**, the immunocompromised, helping to prevent further spread of the infections. And of course, masks are warranted for health-care workers as they come into contact with all sorts of infections.”



Poor air quality and allergens are the primary causes of asthma. Photo: SCMP / K.Y. Cheng  
As Tso has advised his own two sons, “the best way to prevent infection is to avoid being exposed to this virus”. That entails careful attention to personal hygiene, including washing your hands with soap and water for at least 20 seconds, or using an alcohol-based hand sanitiser; avoid touching your eyes, nose and mouth with unwashed hands; avoid close contact with sick people; cover your mouth and nose when coughing and sneezing; and keep your home, personal surroundings and objects clean.

To best maintain our lungs to ensure they function well throughout our lifetime, Tso offers sensible advice.

1. If you smoke, quit
2. Take regular aerobic exercise
3. Encourage a stress-free environment
4. Increase your personal living space, if you can
5. Reduce exposure to air pollution or chemicals
6. Prevent infection with good personal hygiene practices (see above)
7. Get a flu jab

This article appeared in the South China Morning Post print edition as: Why smoking can be a death sentence

### [Anthea Rowan](#)

Anthea Rowan has written for papers and magazines on almost every continent and on a huge variety of subjects, from travel in Africa to mental illness in the States to education in Europe. Her work has appeared in The Times in London, the Washington Post in America and regularly at the South China Morning Post.

### **Want to quit vaping? Compared with cigarette smoking, it might be even harder**

Higher levels of nicotine inhaled during vaping when compared with traditional cigarettes could make quitting more challenging, experts say

As vapers tend to be younger than cigarette smokers, traditional smoking groups are not necessarily the answer

Topic | Wellness



[Tribune News Service](#)

Published: 10:00pm, 9 Oct, 2019 Updated: 12:20am, 10 Oct, 2019



Inspired and scared by the recent spate of US hospitalisations and deaths from a mystery respiratory illness linked to vaping, young people can be seen throwing out their e-cigarettes on social media, vowing to quit.

Just as there is a lot to learn about [e-cigarettes \[1\]](#) – a relatively new trend that is especially popular among young people – doctors say there is little known about how to successfully quit. “Are we going to use the same techniques and medications [used for quitting [traditional cigarettes \[2\]](#) ], or are there unique features?” says Andrea King, professor of psychiatry and director of the Courage to Quit programme at the University of Chicago.

She adds that as these products have come on the market and been rapidly adopted, there just hasn't been enough time to develop specific treatment programmes for those looking to quit vaping.

Nicotine patches deliver smaller, slower amounts of nicotine to ease withdrawal symptoms, with dosing based on how many cigarettes someone smokes each day – something harder to calculate with vaping. Photo: Alamy

Because the basis of a vaping addiction is nicotine, King says, it's possible that traditional methods for quitting could work. Those use a combination of counselling on changing behaviours together with medications that quell nicotine cravings, and are proven to be more effective than someone going “cold turkey” or quitting on their own. **But experts wonder if the higher levels of nicotine inhaled during vaping when compared with traditional cigarettes could make quitting more challenging.**

[\[3\]](#)

**“It's almost going to be easier to get people off traditional cigarettes than e-cigarettes because of the dose [of nicotine],” says Dr Sana Quddus, a pulmonologist at Loyola University Medical Centre in Maywood, Illinois.**

There are other factors that make vaping unique. Users may also vape [THC \[4\]](#), the ingredient in marijuana that creates a high, and they tend to be younger, even adolescents, a group that hasn't been studied when it comes to medications and other resources that help people kick smoking.

In King's programme and others, the strategy is to use a combination of techniques. The programme educates and helps change behaviours with individual, group or phone counselling, King says, and also uses medication such as Chantix that interferes with the brain's response to nicotine. Nicotine patches or gum can also help ease the symptoms of nicotine withdrawal.

The US Centres for Disease Control and Prevention has confirmed 380 cases across the country of a mysterious respiratory disease linked to vaping. Photo: Alamy

But dosing is an issue for those looking to quit vaping, says Lori Wilken, a clinical pharmacist at the University of Illinois at Chicago who runs a tobacco dependence clinic.

For patches and gum, which deliver smaller, slower amounts of nicotine to ease withdrawal symptoms, dosing is based on how many cigarettes someone smokes each day, Wilken says. When patients come to her hoping to quit vaping, she has to estimate a dose based on how many pods they vape, which usually have higher amounts of nicotine that enter the system faster.

**It's really important for parents to be a part of this and have knowledge and also offer support. It also opens up a conversation where they can show they're invested, interested and they care Jim Brunetti, clinical director, Renz Addiction Counselling Centre**

Wilken and others who run quitting programmes say that while they often deal with adults, adolescents could benefit from seeing other peers quit, in addition to traditional cessation methods. “A traditional smoking group isn't exactly the right fit,” says Jim Brunetti, clinical director at the Renz Addiction Counselling Centre in Elgin, Illinois, who is developing a new programme geared toward teens who want to quit vaping.

The centre would like to partner with school districts to offer the programme, which refers students caught vaping at school to a “psychoeducational group” where they learn about the harmful effects of e-cigarettes and nicotine withdrawal alongside their peers, Brunetti says. Then, they break into groups for individual counselling, while their parents also receive education on vaping. Afterwards the students and parents come together.

“It's really important for parents to be a part of this and have knowledge and also offer support,” Brunetti says. “It also opens up a conversation where they can show they're invested, interested and they care.” There is still a lot to learn about the health effects of vaping. Photo: Alamy

Parents and teens alike are becoming more aware of vaping after reports emerged in the US earlier this summer of otherwise healthy patients who regularly vape requiring hospitalisation after they struggled to breathe.

The respiratory illness still mystifies public health officials, who continue to investigate the cases. The US Centres for Disease Control and Prevention has confirmed 380 cases across the country. At least seven of those patients have died.

Dr Kiran Bojedla, a family medicine doctor at Advocate Christ Medical Centre in Oak Lawn, Illinois, says he has had patients and friends come to him, asking how to cut back on vaping, “similar to the cigarette panic that slowly happened over decades”. But with vaping, “it feels like it’s all at once”. He says traditional smoking cessation programmes now address vaping but use traditional smoking cessation philosophies.

Bojedla says he is also concerned that adults who [turned to vaping to quit smoking \[5\]](#) could be tempted to return to their prior bad habit. He tells them “as much as possible, try not to do either”.

**Source URL:** <https://scmp.com/lifestyle/health-wellness/article/3031984/want-quit-vaping-compared-cigarette-smoking-it-might-be>

#### **Links**

[1] <https://www.scmp.com/lifestyle/health-wellness/article/3010622/smoking-vs-vaping-debate-continues-and-experts-offer-ways>

[2] <https://www.scmp.com/lifestyle/health-wellness/article/3010979/facts-about-smoking-health-risks-how-many-die-e>

[3] <https://www.scmp.com/lifestyle/health-wellness/article/3031846/asian-american-fitness-influencer-losing-weight>

[4] <https://www.scmp.com/lifestyle/health-wellness/article/3002511/cannabis-linked-psychotic-disorders-schizophrenia-and>

[5] <https://www.scmp.com/lifestyle/health-wellness/article/2167818/i-used-e-cigarettes-quit-smoking-after-10-years-trying>

# Why the Coronavirus Seems to Hit Men Harder Than Women

[nytimes.com/2020/02/20/health/coronavirus-men-women.html](https://www.nytimes.com/2020/02/20/health/coronavirus-men-women.html)

Roni Caryn Rabin

February 20,  
2020



The coronavirus that originated in China has spread fear and anxiety around the world. But while the novel virus has largely spared one vulnerable group — children — it appears to pose a particular threat to middle-aged and older adults, particularly men.

This week, the Chinese Center for Disease Control and Prevention published the largest analysis of coronavirus cases to date. Although men and women have been infected in roughly equal numbers, researchers found, the death rate among men was 2.8 percent, compared with 1.7 percent among women.

The figures were drawn from patient medical records, and the sample may not fully reflect the scope of the outbreak. But the disparity has been seen in the past.

Men also were disproportionately affected during the SARS and MERS outbreaks, which were caused by coronaviruses. More women than men were infected by SARS in Hong Kong in 2003, but the death rate among men was 50 percent higher, according to a study published in the *Annals of Internal Medicine*.

Video

# China Is Censoring Coronavirus Stories. These Citizens Are Fighting Back.

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Information about the coronavirus outbreak is not immune from Chinese censors. But more and more citizens are dodging censorship by creating a digital archive of deleted posts. They told us how.

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Voices like these from Chinese citizens are very rare. People who are willing to speak out about the government's attempts to control news about the deadly coronavirus. They asked to remain anonymous, because what they're doing could put them and their families at great risk. But these people are part of a new wave of Chinese citizens, fighting to get the message out in a country that aggressively censors information. Accounts or messages like these calling for free speech are quickly scrubbed from the internet. Or videos like this, showing people frustrated about life under lockdown. [clanging] Posted online one day, but gone the next. But the crisis over the coronavirus is changing the landscape, for now at least. Everyday citizens are preserving and reposting information the government doesn't want out there. Experts say this kind of digital resistance is happening at a scale they've never seen before. Social media networks like YouTube, Facebook and Twitter are blocked in China. But internet savvy people use techniques that allow them to repost censored content to these platforms, while staying under the radar of authorities. They're creating a visual archive by preserving videos like this one, showing overwhelmed hospitals. [screaming] And they're reposting people's personal stories. Some are also turning to less obvious platforms, including GitHub, which is a site mostly used by coders. Another taboo Chinese citizens are pushing back on? They're making open and widespread calls for freedom of speech. These were triggered by the death of Dr. Li Wenliang. He was an early whistleblower who warned about the virus, and was punished by officials for speaking out. He died in early February from the coronavirus. Right after his death, the hashtag "I want freedom of speech" started to trend on Weibo, a Chinese social media site. Then, it was quickly censored by the government. Dr. Li's become an icon in the online fight for freedom of speech between censors and citizens. So, who's winning? For now, citizens are staying a step ahead of the authorities. But a renewed government crackdown could test the strength of this digital resistance.

00:00

4:08

4:08 China Is Censoring Coronavirus Stories. These Citizens Are Fighting Back.



Information about the coronavirus outbreak is not immune from Chinese censors. But more and more citizens are dodging censorship by creating a digital archive of deleted posts. They told us how.

Some 32 percent of men infected with Middle East Respiratory Syndrome died, compared with 25.8 percent of women. Young adult men also died at higher rates than female peers during the influenza epidemic of 1918.

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A number of factors may be working against men in the current epidemic, scientists say, including some that are biological, and some that are rooted in lifestyle.

Get an informed guide to the global outbreak with our daily **Coronavirus** newsletter.



When it comes to mounting an immune response against infections, men are the weaker sex.

“This is a pattern we’ve seen with many viral infections of the respiratory tract — men can have worse outcomes,” said Sabra Klein, a scientist who studies sex differences in viral infections and vaccination responses at the Johns Hopkins Bloomberg School of Public Health.

“We’ve seen this with other viruses. Women fight them off better,” she added.

Women also produce stronger immune responses after vaccinations, and have enhanced memory immune responses, which protect adults from pathogens they were exposed to as children.

“There’s something about the immune system in females that is more exuberant,” said Dr. Janine Clayton, director of the Office of Research on Women’s Health at the National Institutes of Health.

But there’s a high price, she added: Women are far more susceptible to autoimmune diseases, like rheumatoid arthritis and lupus, in which the immune system shifts into overdrive and attacks the body’s own organs and tissues.

Nearly 80 percent of those with autoimmune diseases are women, Dr. Clayton noted.

The reasons women have stronger immune responses aren’t entirely clear, and the research is still at an early stage, experts caution.

One hypothesis is that women’s stronger immune systems confer a survival advantage to their offspring, who imbibe antibodies from mothers’ breast milk that help ward off disease while the infants’ immune systems are still developing.

A stew of biological factors may be responsible, including the female sex hormone estrogen, which appears to play a role in immunity, and the fact that women carry two X chromosomes, which contain immune-related genes. Men, of course, carry only one.

Experiments in which mice were exposed to the SARS coronavirus found that the males were more susceptible to infection than the females, a disparity that increased with age.

The male mice developed SARS at lower viral exposures, had a lower immune response and were slower to clear the virus from their bodies. They suffered more lung damage, and died at higher rates, said Dr. Stanley Perlman, a professor of microbiology at the University of Iowa who was the senior author of the study.

When researchers blocked estrogen in the infected females or removed their ovaries, they were more likely to die, but blocking testosterone in male mice made no difference, indicating that estrogen may play a protective role.

“It’s an exaggerated model of what happens in humans,” Dr. Perlman said. “The differences between men and women are subtle — in mice, it’s not so subtle.”

Health behaviors that differ by sex in some societies may also play a role in disparate responses to infections.

China has the largest population of smokers in the world — 316 million people — accounting for nearly one-third of the world’s smokers and 40 percent of tobacco consumption worldwide. But just over 2 percent of Chinese women smoke, compared with more than half of all men.

Chinese men also have higher rates of Type 2 diabetes and high blood pressure than women, both of which increase the risk of complications following infection with the coronavirus. Rates of chronic obstructive pulmonary disease are almost twice as high among Chinese men as among women.



In the United States, women are more proactive about seeking health care than men, and some small studies have found the generalization applies to Chinese students at universities in the United States, as well.

In unpublished studies, Chinese researchers have emphasized that patients whose diagnoses were delayed, or who had severe pneumonia when they were first diagnosed, were at greatest risk of dying.

One study of 4,021 patients with the coronavirus emphasized the importance of early detection, particularly in older men. And men have been turning up in hospitals with more advanced disease.

But in areas of China outside Hubei Province, the disease's epicenter and where the majority of those affected are concentrated, the patterns are different: The disease appears to have dramatically lower mortality rates, and men are being infected at much higher rates than women, according to the Chinese C.D.C. analysis.

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Men may have a “false sense of security” when it comes to the coronavirus, said Akiko Iwasaki, a professor of immunology at Yale University who studies why some viruses affect women more severely.

Gathering and analyzing data about the new virus by sex is important both for the scientists studying it and for the general public, experts said.

Since the start of the outbreak, for example, public health officials have emphasized the importance of washing hands well and often, to prevent infection. But several studies have found that men — even health care workers — are less likely to wash their hands or to use soap than women, Dr. Klein said.

“We make these broad sweeping assumptions that men and women are the same behaviorally, in terms of comorbidities, biology and our immune system, and we just are not,” Dr. Klein said.

Updated March 2, 2020

### **What is a coronavirus?**

It is a novel virus named for the crownlike spikes that protrude from its surface. The coronavirus can infect both animals and people and can cause a range of respiratory illnesses from the common cold to lung lesions and pneumonia.

### **How contagious is the virus?**

It seems to spread very easily from person to person, especially in homes, hospitals and other confined spaces. The pathogen can travel through the air, enveloped in tiny respiratory droplets that are produced when a sick person breathes, talks, coughs or sneezes.

### **Where has the virus spread?**

The virus, which originated in Wuhan, China, has sickened more than 89,700 in at least 67 countries and more than 3,000 have died. The spread has slowed in China, but is picking up speed in Europe and the United States.

### **What symptoms should I look out for?**

Symptoms, which can take between two to 14 days to appear, include fever, cough and difficulty breathing or shortness of breath. Milder cases may resemble the flu or a bad cold, but people may be able to pass on the virus even before they develop symptoms.

### **How do I keep myself and others safe?**

Washing your hands frequently is the most important thing you can do, along with staying at home when you're sick and avoiding touching your face.

### **How can I prepare for a possible outbreak?**

Keep a 30-day supply of essential medicines. Get a flu shot. Have essential household items on hand. Have a support system in place for elderly family members.

### **What if I'm traveling?**

The C.D.C. has advised against all non-essential travel to South Korea, China, Italy and Iran. And the agency has warned older and at-risk travelers to avoid Japan.

### **How long will it take to develop a treatment or vaccine?**

Several drugs are being tested, and some initial findings are expected soon. A vaccine to stop the spread is still at least a year away.



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# Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China

## Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention

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 [jamanetwork.com/journals/jama/fullarticle/2762130](https://jamanetwork.com/journals/jama/fullarticle/2762130)

February 24,  
2020

The Chinese Center for Disease Control and Prevention recently published the largest case series to date of coronavirus disease 2019 (COVID-19) in mainland China (72 314 cases, updated through February 11, 2020).<sup>1</sup> This Viewpoint summarizes key findings from this report and discusses emerging understanding of and lessons from the COVID-19 epidemic.

## Epidemiologic Characteristics of the COVID-19 Outbreak

Among a total of 72 314 case records ([Box](#)), 44 672 were classified as confirmed cases of COVID-19 (62%; diagnosis based on positive viral nucleic acid test result on throat swab samples), 16 186 as suspected cases (22%; diagnosis based on symptoms and exposures only, no test was performed because testing capacity is insufficient to meet current needs), 10 567 as clinically diagnosed cases (15%; this designation is being used in Hubei Province only; in these cases, no test was performed but diagnosis was made based on symptoms, exposures, and presence of lung imaging features consistent with coronavirus pneumonia), and 889 as asymptomatic cases (1%; diagnosis by positive viral nucleic acid test result but lacking typical symptoms including fever, dry cough, and fatigue).<sup>1</sup>

Box.

### Key Findings From the Chinese Center for Disease Control and Prevention Report

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- 72 314 Cases (as of February 11, 2020)
  - Confirmed cases: 44 672 (62%)
  - Suspected cases: 16 186 (22%)
  - Diagnosed cases: 10 567 (15%)
  - Asymptomatic cases: 889 (1%)

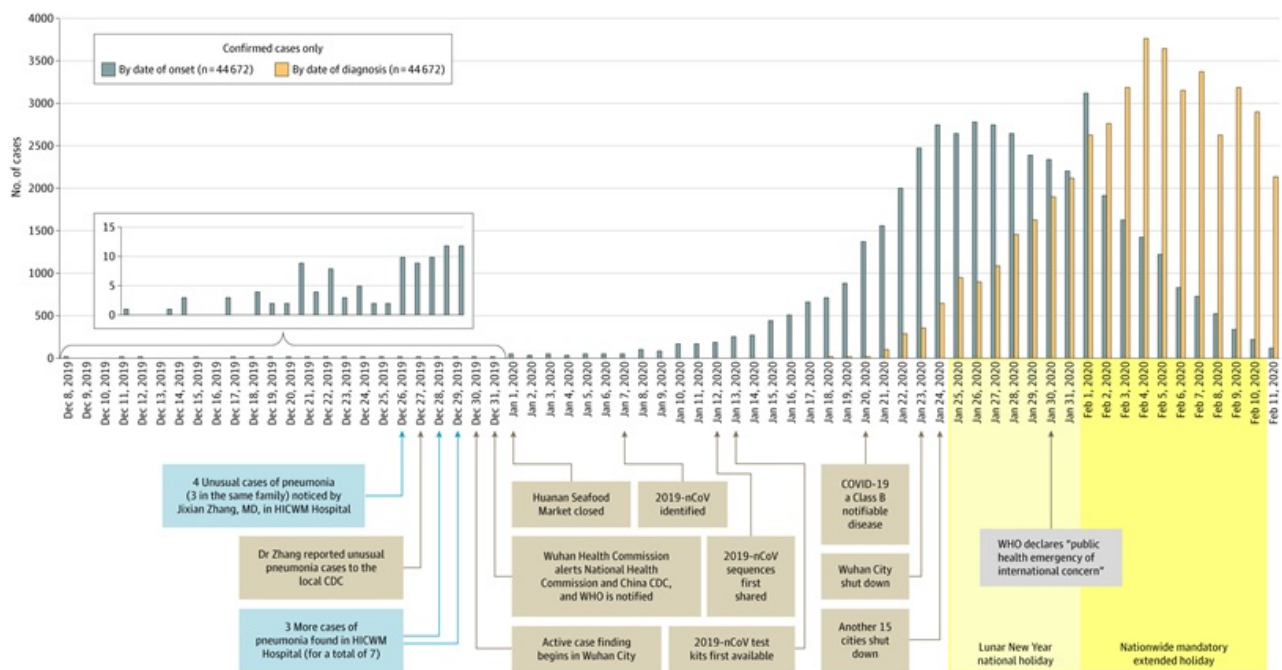
- Age distribution (N = 44 672)
  - ≥80 years: 3% (1408 cases)
  - 30-79 years: 87% (38 680 cases)
  - 20-29 years: 8% (3619 cases)
  - 10-19 years: 1% (549 cases)
  - <10 years: 1% (416 cases)
- Spectrum of disease (N = 44 415)
  - Mild: 81% (36 160 cases)
  - Severe: 14% (6168 cases)
  - Critical: 5% (2087 cases)
- Case-fatality rate
  - 2.3% (1023 of 44 672 confirmed cases)
  - 14.8% in patients aged ≥80 years (208 of 1408)
  - 8.0% in patients aged 70-79 years (312 of 3918)
  - 49.0% in critical cases (1023 of 2087)
- Health care personnel infected
  - 3.8% (1716 of 44 672)
  - 63% in Wuhan (1080 of 1716)
  - 14.8% cases classified as severe or critical (247 of 1668)
  - 5 deaths

Most case patients were 30 to 79 years of age (87%), 1% were aged 9 years or younger, 1% were aged 10 to 19 years, and 3% were age 80 years or older. Most cases were diagnosed in Hubei Province (75%) and most reported Wuhan-related exposures (86%; ie, Wuhan resident or visitor or close contact with Wuhan resident or visitor). Most cases were classified as mild (81%; ie, nonpneumonia and mild pneumonia). However, 14% were severe (ie, dyspnea, respiratory frequency  $\geq 30$ /min, blood oxygen saturation  $\leq 93\%$ , partial pressure of arterial oxygen to fraction of inspired oxygen ratio  $< 300$ , and/or lung infiltrates  $> 50\%$  within 24 to 48 hours), and 5% were critical (ie, respiratory failure, septic shock, and/or multiple organ dysfunction or failure) ([Box](#)).<sup>1</sup>

The overall case-fatality rate (CFR) was 2.3% (1023 deaths among 44 672 confirmed cases). No deaths occurred in the group aged 9 years and younger, but cases in those aged 70 to 79 years had an 8.0% CFR and cases in those aged 80 years and older had a 14.8% CFR. No deaths were reported among mild and severe cases. The CFR was 49.0% among critical cases. CFR was elevated among those with preexisting comorbid conditions—10.5% for cardiovascular disease, 7.3% for diabetes, 6.3% for chronic respiratory disease, 6.0% for hypertension, and 5.6% for cancer. Among the 44 672 cases, a total of 1716 were health workers (3.8%), 1080 of whom were in Wuhan (63%). Overall, 14.8% of confirmed cases among health workers were classified as severe or critical and 5 deaths were observed.<sup>1</sup>

COVID-19 rapidly spread from a single city to the entire country in just 30 days. The sheer speed of both the geographical expansion and the sudden increase in numbers of cases surprised and quickly overwhelmed health and public health services in China, particularly in Wuhan City and Hubei Province. Epidemic curves reflect what may be a mixed outbreak pattern, with early cases suggestive of a continuous common source, potentially zoonotic spillover at Huanan Seafood Wholesale Market, and later cases suggestive of a propagated source as the virus began to be transmitted from person to person (Figure 1).<sup>1</sup>

Figure 1.



Epidemic Curve of the Confirmed Cases of Coronavirus Disease 2019 (COVID-19)

Daily numbers of confirmed cases are plotted by date of onset of symptoms (blue) and by date of diagnosis (orange). Because, on retrospective investigation, so few cases experienced illness in December, these cases are shown in the inset. The difference between the cases by date of symptom onset curve (blue) and the cases by date of diagnosis curve (orange) illustrates lag time between the start of illness and diagnosis of COVID-19 by viral nucleic acid testing. The graph's x-axis (dates from December 8, 2019, to February 11, 2020) is also used as a timeline of major milestones in the epidemic response. The first few cases of pneumonia of unknown etiology are shown in blue boxes on

December 26 (n = 4) and 28-29 (n = 3). Most other cases that experienced onset of symptoms in December were only discovered when retrospectively investigated. Major epidemic response actions taken by the Chinese government are shown in brown boxes. The normally scheduled Lunar New Year national holiday is shown in light yellow, whereas the extended holiday during which attendance at school and work was prohibited (except for critical personnel such as health workers and police) is shown in dark yellow. This figure was adapted with permission.<sup>1</sup> CDC indicates Chinese Center for Disease Control and Prevention; HICWM, Hubei Integrated Chinese and Western Medicine; 2019-nCoV, 2019 novel coronavirus; WHO, World Health Organization.

## Comparison of COVID-19 With SARS and MERS

The current COVID-19 outbreak is both similar and different to the prior severe acute respiratory syndrome (SARS; 2002-2003) and Middle East respiratory syndrome (MERS; 2012-ongoing) outbreaks. SARS was initiated by zoonotic transmission of a novel coronavirus (likely from bats via palm civets) in markets in Guangdong Province, China. MERS was also traced to zoonotic transmission of a novel coronavirus (likely from bats via dromedary camels) in Saudi Arabia. All 3 viral infections commonly present with fever and cough, which frequently lead to lower respiratory tract disease with poor clinical outcomes associated with older age and underlying health conditions. Confirmation of infection requires nucleic acid testing of respiratory tract samples (eg, throat swabs), but clinical diagnosis may be made based on symptoms, exposures, and chest imaging. Supportive care for patients is typically the standard protocol because no specific effective antiviral therapies have been identified.

The World Health Organization (WHO) declared the SARS outbreak contained on July 5, 2003. A total of 8096 SARS cases and 774 deaths across 29 countries were reported for an overall CFR of 9.6%. MERS is still not contained and is thus far responsible for 2494 confirmed cases and 858 deaths across 27 countries for a CFR of 34.4%. Despite much higher CFRs for SARS and MERS, COVID-19 has led to more total deaths due to the large number of cases. As of the end of February 18, 2020, China has reported 72 528 confirmed cases (98.9% of the global total) and 1870 deaths (99.8% of the global total). This translates to a current crude CFR of 2.6%. However, the total number of COVID-19 cases is likely higher due to inherent difficulties in identifying and counting mild and asymptomatic cases. Furthermore, the still-insufficient testing capacity for COVID-19 in China means that many suspected and clinically diagnosed cases are not yet counted in the denominator.<sup>2</sup> This uncertainty in the CFR may be reflected by the important difference between the CFR in Hubei (2.9%) compared with outside Hubei (0.4%).<sup>1,2</sup> Nevertheless, all CFRs still need to be interpreted with caution and more research is required.

Most secondary transmission of SARS and MERS occurred in the hospital setting. Transmission of COVID-19 is occurring in this context as well—3019 cases have been observed among health workers as of February 11, 2020 (of whom there have been 1716 confirmed cases and 5 deaths).<sup>1</sup> However, this is not a major means of COVID-19 spread. Rather, it appears that considerable transmission is occurring among close contacts. To date, 20 provinces outside of Hubei have reported 1183 case clusters, 88% of which

contained 2 to 4 confirmed cases. Of note, 64% of clusters documented thus far have been within familial households (Chinese Center for Disease Control and Prevention presentation made to the WHO Assessment Team on February 16, 2020). Thus, although COVID-19 seems to be more transmissible than SARS and MERS, and many estimates of the COVID-19 reproductive number ( $R_0$ ) have already been published, it is still too soon to develop an accurate  $R_0$  estimate or to assess the dynamics of transmission. More research is needed in this area as well.

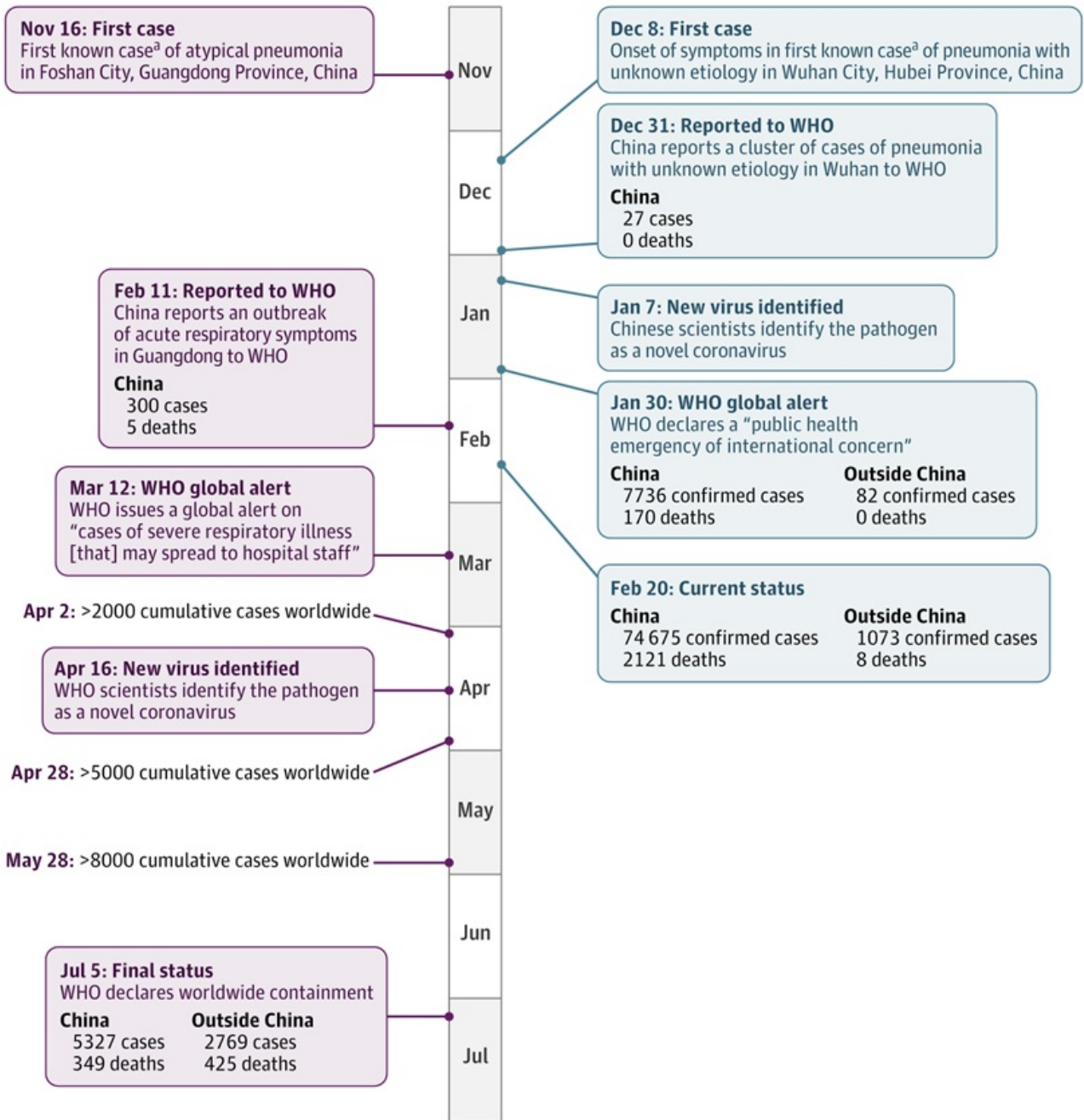
## Response to the COVID-19 Epidemic

Since 2003, the Chinese government has improved its epidemic response capacity. Some of these efforts are evident in the response to COVID-19 ([Figure 2](#)). For example, in the 2002-2003 SARS outbreak, 300 cases and 5 deaths already had occurred by the time China reported the outbreak to the WHO, whereas in the COVID-19 outbreak, only 27 cases and zero deaths had occurred when the WHO was notified (January 3, 2020) ([Figure 2](#)). From the time of WHO notification, 2 months elapsed before SARS-CoV was identified compared with only 1 week from the time of WHO notification until 2019-nCoV was identified.

Figure 2.

**SARS outbreak 2002-2003**

**COVID-19 outbreak 2019-2020**



Timeline Comparing the Severe Acute Respiratory Syndrome (SARS) and Coronavirus Disease 2019 (COVID-19) Outbreaks

The timeline of events for the SARS outbreak (left) from first case to final worldwide containment. The timeline of events for the COVID-19 outbreak (right) from the onset of symptoms for the first case on December 8, 2019, to status on February 20, 2020. Over the course of the first 2 months, more than 70 000 cases have been confirmed and many more are suspected. WHO indicates World Health Organization.

<sup>a</sup>Identified later retrospectively.

The timing of the COVID-19 outbreak, prior to China’s annual Lunar New Year holiday, was an important factor as China considered how to respond to the outbreak. Culturally, this is the largest and most important holiday of the year. It is the expectation that people return to their family homes, which is the cause for the several billion person-



trips made by residents and visitors during this time, mostly on crowded planes, trains, and buses. Knowing this meant each infected person could have numerous close contacts over a protracted time and across long distances, the government needed to quickly act. However, it was not only the speed of the government's response, but also the magnitude of that response that were influenced by the impending holiday travel time. Knowing that specific treatment and prevention options, such as targeted antiviral drugs and vaccines, were not yet available for COVID-19, China focused on traditional public health outbreak response tactics— isolation, quarantine, social distancing, and community containment.<sup>3-5</sup>

Identified case patients with COVID-19 were immediately isolated in designated wards in existing hospitals, and 2 new hospitals were rapidly built to isolate and care for the increasing numbers of cases in Wuhan and Hubei. People who had been in contact with COVID-19 cases were asked to quarantine themselves at home or were taken to special quarantine facilities, where they could be monitored for onset of symptoms. Enormous numbers of large gatherings were canceled, including all Lunar New Year celebrations, and traffic in Wuhan and in cities across Hubei was restricted and closely monitored. Virtually all transportation was subsequently restricted at a national level. All of these measures were instituted to achieve social distancing. In addition, an estimated 40 million to 60 million residents of Wuhan and 15 other surrounding cities within Hubei Province were subjected to community containment measures. Although these types of traditional outbreak response actions have been successfully used in the past, they have never been executed on such a large scale.

There have been some questions about whether these actions are reasonable and proportional responses to the outbreak. Some have argued that a number of these approaches may infringe on the civil liberties of citizens, and some of these measures have been referred to as “draconian.” However, it is not only individual rights that must be considered. The rights of those who are not infected, but at risk of infection, must be considered as well. Whether these approaches have been effective (eg, in terms of reduced infections and deaths averted), and whether these potential benefits have outweighed the costs (eg, economic losses), will be debated for years.<sup>4,5</sup>

## Next Steps

Importantly, another major goal of China's current outbreak response activities is to help “buy time” for science to catch up before COVID-19 becomes too widespread. China must now focus on adjusting tactics and strategies as new evidence becomes available.<sup>3,6</sup> Much remains to be done and many questions remain unanswered. China is very grateful for the help it is receiving from the international scientific, health, and public health communities. The global society is more interconnected than ever, and emerging pathogens do not respect geopolitical boundaries. Proactive investment in public health infrastructure and capacity is crucial to effectively respond to epidemics like COVID-19,

and it is critical to continue to improve international surveillance, cooperation, coordination, and communication about this major outbreak and to be even better prepared to respond to future new public health threats.

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