

# CORONAVIRUS

OUTBREAK, ALL THE SECRETS REVEALED ABOUT THE  
**COVID-19 PANDEMIC**

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A Complete Rational Guide of its Evolution, Expansion,  
Symptoms and First Defense.



SIDNEY **OSLER**

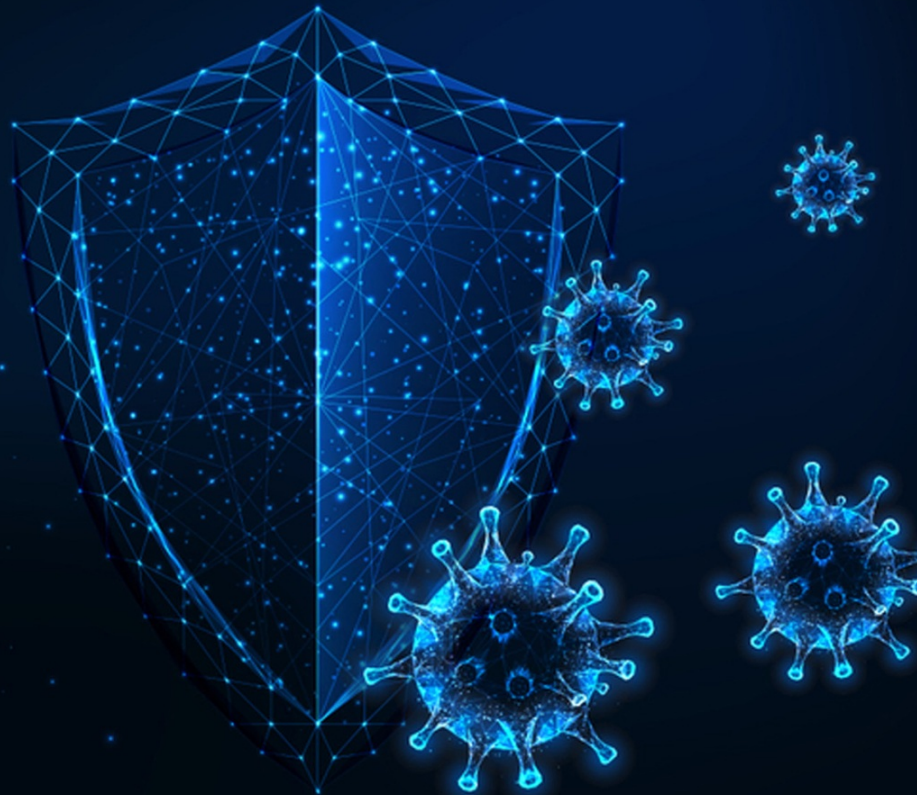
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# **Coronavirus outbreak**

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Written by Sidney Osler

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## **INTRODUCTION: WUHAN EPIDEMY**

According to most of the world's leading transmittable disease experts, the Wuhan corona virus spreading from China is now likely to develop into a pandemic that circles the globe. Its prospect is really overwhelming. A pandemic — a spreading outbreak on two or more continents — may well have global consequences, with China and other countries, including the United States, which are now enforcing unprecedented travel restrictions and quarantines.

Yet scientists still don't know how lethal the new corona virus is, so there's concern about how much harm the pandemic might do. There is, however, growing consensus that the pathogen is being readily transmitted among humans. The Wuhan corona virus acts more like the highly transmissible influenza than scientists have found in its slow-moving viral relatives, SARS and MERS.

The number of laboratory-confirmed cases has risen over the last three weeks from about 50 in China to over 17,000 in at least 23 countries; there have been more than 360 deaths. Yet specific epidemiological models predict the total number of cases to be 100,000, or even more. While that growth isn't as quick as flu or measles, it's a huge leap beyond what virologists saw when SARS and MERS came up.

Researchers are yet to say who is at the highest risk of developing serious or life-threatening disease, and what factors may protect against the disease. Kids are far less likely than middle-aged and older men to develop severe illnesses. Most of these foreign nationals who have lately visited China are barring entry through the United States. Americans who return from Wuhan and the epicenter of the outbreak, Hubei Province, are to be quarantined for two weeks. Federal health officials warn Americans not to fly to China anyway.

This is a very critical public health problem, and proactive action to protect the public has been and will continue to be taken by the C.D.C. and federal government. However, there are only a handful of cases in the U.S. and the risk to the Americans is low for now. Here's what people have learned about the virus and the outbreak so far.

## **CHAPTER 1: HUMAN CORONA VIRUS OUTBREAK 2020**

As 2019 drew to a close, reports emerged from an outbreak of unexplained aetiology pneumonia, with cases clustered around Wuhan's Huanan Seafood Wholesale Market, China that sold live fish, poultry, and birds. The cases were observed as of December 8th and the cluster was first identified on December 31st. The market was being shut down on 1 January 2020 and on 7 January a new type of corona virus was officially detected by the Chinese authorities. All suspect cases found were checked by active case finding and retrospective examination. Around 300 cases in Wuhan were believed to have been infected with this new virus, and four died.

It is also suspected that previous outbreaks of similar diseases, including SARS, have arisen from live animal markets. Camels transmit the corona virus which causes MERS to humans. The animal that was the source of the latest corona virus is still unknown, and the collapse of the meat market in Wuhan has made the matter almost impossible to investigate. Bats are considered a possible source, because many viruses, including corona viruses, have adapted to coexist. Nevertheless, it is very likely that the virus was transmitted to an intermediate species from the bats, and then to humans.

Wuhan, a strong virology centre in China, was well placed to diagnose and tackle the outbreak. It has however brought China's disease preparedness to the test in a part of the world that still regularly remembers the 2003 extreme corona virus outbreak of acute respiratory syndrome (SARS). The virus then spread from China to 25 other nations, infecting over 8,000 people and killing about 800 people before it was contained. In the present case, the pace at which the Chinese authorities announced the outbreak to the international community was commendable and shows that lessons from previous outbreaks have been learned.

As the international community reacts to an outbreak of corona virus induced pneumonia in Wuhan, China, early and transparent data sharing—essential to its protection—is dependent on the trust that the data will not be used without proper attribution to those who created it.

### **What is the Human Corona virus, and How Dangerous Is It?**

Corona viruses are a large virus family usually targeting the respiratory organ. The name is being derived from the Latin word corona, meaning crown, due to the spiky fringe which surrounds these viruses. Many species, such as bats, cats



and birds, get sick. Just seven are known to infect humans like Covid-19, SARS, and MERS.

SARS is believed to have developed in China from bats to civet cats to humans; MERS has spread from bats to camels into Middle East humans. No one knows where the Covid-19 came from. For now, livestock in Wuhan, China, a town of 11 million, are thought to have taken the jump late last year. But scholars still seek to understand their exact roots.

As for the signs, in 10 and more than 30 percent of cases, two of the seven corona viruses that infect humans, SARS and MERS, can cause severe pneumonia, and even death. The others, though, show milder effects, like a common cold. Apparently, it's evident that Covid-19 will kill — but it's not clear how often or how it relates the fatality rate to SARS and MERS.

Most patients now start with fever, cough, and shortness of breath, according to the Centers for Disease Control and Prevention. An early analysis, published in *The Lancet*, offered even greater detail. It has looked at a subset of the first 41 patients in Wuhan with confirmed Covid-19. Fever, cough, muscle pain, and exhaustion were the most common symptoms; vomiting, nausea, and coughing up mucus, or blood, were less common. They all had CT scans of pneumonia and lung abnormalities. As for the severity of the disease: 13 people were taken to an ICU, where six died. By January 22, most patients had been discharged from the hospital (68 per cent).

More recently, records have also been made of people with very mild symptoms, such as the cases in southern Germany. There is even evidence that events are asymptomatic. It's likely that Covid-19 can look more like flu than it does like SARS. That's because when they are first detected, infectious diseases usually seem more serious, because people appearing in hospitals tend to be the sickest. However, the new virus seems less dangerous than both SARS and MERS.

### **How Bad Could The Outbreak Be?**

The novel corona virus, similar to SARS, seems highly contagious. The size of an epidemic depends on how quickly and easily a virus is transmitted from one person to another. Although work has just started, scientists have estimated that without successful containment measures, every person with the new corona virus could infect between 1.5 and 3.5 people elsewhere. This would make the virus nearly as infectious as SARS, another corona virus that spread in China in 2003 and was contained after 8,098 people were sickened and 774 killed. Those respiratory viruses may move through the air, wrapped in tiny droplets formed when a sick person breathes, speaks, coughs, or sneezes. Some droplets fall



within a few feet to the ground. This makes it harder for the virus to get unlike viruses like measles, chickenpox and tuberculosis, which can fly through the air for a hundred miles. Nevertheless, detecting is better than H.I.V. or hepatitis which only spreads by direct contact with an infected person's body fluids.

If each individual infected with the new corona virus contaminates two to three other people, this may be sufficient to sustain and intensify an epidemic if nothing is done to reduce it. Contrast that to a virus less infectious, like seasonal flu. Those with the flu appear, on average, to infect 1.3 other people. The difference may seem slight, but the result is a striking contrast: In the same situation, only about 45 people could be infected.

The number of cases outside of China has so far been limited. Yet reports have occurred in several countries in recent days, including the United States, of citizens who have not visited China. In addition, in 2003, the number of cases within China far exceeded the rate of SARS cases. The actual number of cases is almost definitely much greater than the number officially confirmed by laboratory tests.

Thousands of people are suspected of having been infected in Hubei province, where the epidemic started, but have not been officially diagnosed. Doctors say there's a shortage of test kits and other medical supplies, and residents say it's almost difficult to get the health care they need to treat the corona virus — or even diagnose it—. Various epidemiological models predict the total number of cases to be 100,000, or more. Experts have urged caution when calculating these figures.

### **How Deadly Is The Virus?**

It is still hard to know. Perhaps the fatality rate is less than 3 per cent, however, much fewer than SARS. This is one of the utmost significant factors, and one of the least known, in how destructive the outbreak will be. Assessing the lethality of a new virus is challenging. The worst cases are usually first identified which may distort our perception of how patients are likely to die. Around one third of Wuhan's first 41 patients had to be treated in an ICU, many with fever symptoms, serious cough, shortness of breath and pneumonia. But people with mild cases are never allowed to visit a doctor. There may be more deaths than we know therefore, and the death rate may be smaller than we initially thought.

At the same time there may be underreported deaths from the virus. The Chinese cities at the heart of the outbreak are facing a shortage of test kits and hospital beds, and many sick people could not see a doctor. There is still a lot of uncertainty about the existence of this virus and what it is doing. Early

indications show that the fatality rate for this virus is significantly lower than that of another corona virus, MERS, which kills about 35 per cent of infected people, and SARS, which kills about 10 per cent. All the diseases tend to bind on proteins on the lung cell surface, but MERS and SARS seem to be more harmful to lung tissue.

Of China's 17,000 people infected, 82% had moderate infections, 15% had severe symptoms, and 3% were listed as critical. Lower than 2 percent had died from confirmed infections. Many of those that died were elderly men with underlying health issues. The virus causes serious respiratory disease (i.e., pneumonia) and death from mild symptoms. Many deaths occurred in people over the age of 65 and who were also suffering from another chronic condition or illness. Data suggest a case-fatality rate of about 2 percent (meaning 2 deaths out of every 100 confirmed cases), even though it is still too early to give a reliable cipher. If the number of undiagnosed asymptomatic cases or cases with very mild symptoms turns out to be high it could be lower. If the virus mutates, it could intensify. In any case, the fatality rate tends to be smaller than that of SARS (10%), and higher than that of seasonal flu (less than 0.01%).

### **Where Has the Virus Spread?**

We still don't know how exactly Covid-19 spreads, but we do have a lot of data on how MERS, SARS, and other respiratory viruses travel from person to individual. In fact, this is primarily by exposure to droplets caused by sneezing or coughing. So when a sick individual coughs or sneezes, they let out a mist, and when those droplets touch another person's nose, eyes, or mouth, they will pass on the virus. In rare cases, a person can indirectly catch a respiratory illness, "by touching droplets on surfaces— and then touching mucosal membranes" in the mouth, eyes, and nose. This is why hand-washing is an important measure of public health and particularly in an outbreak.

The virus spread rapidly because it began in a transport hub. Wuhan is a hard place to get an outbreak in. It has 11 million people, more than the City of New York. On a typical day, 3,500 passengers take direct flights to towns in other countries from Wuhan. Those cities were among the first outside of China to record virus cases. Wuhan is also a major transportation center within China, linked by high-speed trains and domestic airlines to Beijing, Shanghai and other major cities. Up to two million people flew from Wuhan to other places inside China in October and November last year.

During the SARS outbreak in 2003, China had not been nearly as well associated. Large numbers of migrant workers are now moving domestically and

internationally—to Africa, other parts of Asia and Latin America, where China's Belt and Road Initiative is making a huge infrastructure drive. This travel poses a high risk of outbreaks in countries with health-care systems not equipped to handle them, such as Zimbabwe, which is facing a growing hunger and economic crisis.

Furthermore, China has about four times as many passengers on the train and air as it did during the SARS outbreak. China took the unprecedented step of enforcing travel restrictions on tens of millions of people living in Wuhan and surrounding towns. Experts, however, cautioned that the lockdown might have come too late, with restricted access to food and medication. Wuhan's mayor confirmed that five million people had left the city in the run-up to the Lunar New Year, before the restrictions began.

### **The Mode of Transmission**

**The Transmission Mode** Much of how Covid-19, a new corona virus, spreads is unclear. Current awareness is based in large part on what is learned of related corona viruses. Corona viruses are a large family of viruses commonly found in many different animal species, including camels, goats, cats, and bats. Rarely can animal corona viruses infect people, and then spread among people including MERS, SARS, and now with Covid-19. Most respiratory viruses are spread by sneezing and coughing. Although the Chinese authorities initially played down the possibility of human-to-human transmission, substantial and sustained transmission among people has now become apparent. Chinese scientists have cautioned that some infected people may transmit the virus to others even before they develop illness or experience any symptoms, though a published study documenting asymptomatic transmission in Germany has been criticized as inaccurate.

If the virus can be spread by individuals with no symptoms at all or mild symptoms due to respiratory disease—including headache or back ache—that is terrible. They're up and about, going to work or the gym or religious services, and breathing on or touching other people when people don't know they're sick. Most often, the spreading from person to person happens within close contacts (about 6 feet). It is thought that spreading from person to person occurs primarily through respiratory droplets created when an infected person coughs or sneezes, similar to how influenza and other respiratory pathogens spread. Such droplets may land in nearby people's mouths or noses, or probably be inhaled into the lungs. Whether a person can get Covid-19 by touching a surface or object with the virus on it, and then touching their own mouth, nose, or probably eyes, is

currently unclear. Usually, people are thought to be most infected with most respiratory viruses when they're most symptomatic (the sickest).

It is important to note that the ease with which a virus spreads will vary from person to person. Many viruses (such as measles) are highly contagious, while other viruses are less so. There's much more to learn about the transmissibility, frequency, and other characteristics associated with Covid-19 and ongoing investigations. This information will help the risk assessment further.

### **What Symptoms Should I Look Out For?**

Symptoms of this infection include fever, heavy cough and breathing difficulties or shortness of breath. The disease triggers pneumonia and lung lesions. Mild cases may mimic flu or a bad cold, making it difficult to identify. Patients might be familiar with other symptoms, such as gastrointestinal issues or diarrhea. It is known that the incubation period—the duration from exposure to the onset of symptoms—is anywhere from 10 days to two weeks.

See your health care provider if you have a fever or cough and have recently visited China, or spent time with someone who did. Call first, so they can plan for your visit and take steps to prevent potential exposure to other patients and staff.

### **How Time-consuming Does It Take To Reveal Symptoms?**

The new corona virus novel shows symptoms ranging from 2 to 14 days, enabling the disease to go undetected. Reported diseases have ranged from people with little to no symptoms to people who are severely sick and dying with reported Covid-19 infections. Symptoms may include:

- Fever
- Cough
- Shortness of breath

This is dependent on what was historically known as MERS virus incubation period. The amount of time it takes for signs to occur after an infected person can be critical for prevention and control. Identified as the duration of incubation, this time helps health officials to isolate or track individuals who may have been exposed to the virus. Nevertheless, if the incubation period is too long or too short, then it may be difficult to implement such steps.

Many diseases, such as influenza, have a brief two to three-day incubation period. Until they show flu symptoms, people can shed infectious virus particles, making it almost impossible to recognize and isolate people who have the virus. Nevertheless, SARS had an incubation period of about five days. It also took

four to five days after symptoms started before the virus could be spread to sick people, which gave officials time to stop the infection, and contain the outbreak effectively.

Executives at the Centers for Disease Regulation and Prevention say the incubation period for the current corona virus is 2-14 days. But whether a person can spread the virus before symptoms occur is still not clear, or whether the nature of the disease influences how quickly a patient can spread the virus. This is troubling because it may mean the identification of the infection will elude.

## **CHAPTER 2: CORONA VIRUS - SARs**

In 2003, SARS first became known as a distinct corona virus strain. The origin of the virus was never clear, although the first human infections can be traced back to Guangdong Province in 2002. The virus then became a pandemic which caused more than 8,000 influenza-like disease infections in 26 countries with nearly 800 deaths. Unlike SARS, this new outbreak is caused by a corona virus, a family of animal-common viruses ranging from common cold to more serious diseases, such as respiratory syndrome in the Middle East (MERS).

The Wuhan corona virus has caused fear all over the world but memories of a deadly virus have also been brought up in Asia. There are two things in common between the corona virus spreading in China and the 2003 SARS outbreak: both belong to the corona virus family and both were probably passed from animals to humans on a wet market. Corona viruses are zoonotic diseases which mean they spread from animals to humans. Since wet markets put people and live and dead animals—dogs, chickens, pigs, rats, civets, and more—in close contact, making an interspecies leap can be easy for a virus.

Poorly regulated live-animal markets combined with illegal trade in animals offer a unique opportunity for viruses to spill over into the human population from wildlife hosts. Bats were the original hosts of SARS, and possibly this corona virus outbreak too. Then, they infected other animals via their poop or saliva, and transmitted the virus to humans through the unwitting intermediaries. Bats and birds are considered pandemic-potential reservoir species for viruses.

At least three other pandemics (apart from SARS) have been traced back to bats in the last 45 years. The animals were the original source of Ebola, which since 1976 has killed 13,500 people in multiple outbreaks; Middle Eastern respiratory syndrome, better known as MERS, found in 28 countries; and Nipah virus, which has a fatality rate of 78 per cent. To many, the current epidemic sounds eerily similar for 2003 when severe acute respiratory syndrome (SARS) spread across the country, infecting more than 8,000 people and killing 774.

But whilst a similar virus triggers the Wuhan corona virus and SARS, they are not exactly the same. Here's how the two line themselves up. The number of confirmed Wuhan corona virus cases has outpaced the 2003 SARS outbreak within mainland China, as several countries evacuated their people from the region at the center of the outbreak. According to Chinese officials, there have been 6,061 confirmed cases of the virus in mainland China, including 132 deaths. As of Tuesday, the number of cases rose by about 1,500, an increase of

more than 30 percent. The numbers do not include Hong Kong and Macau, both of which had a small number of cases registered. There were at least 91 reported cases of the virus outside mainland China, too.

Nevertheless, there were 5,327 confirmed disease cases in mainland China during the 2003 SARS outbreak, with 349 deaths. Previously, experts suggested that the Wuhan virus statistics could still be widely underreported, rendering the novel corona virus much more infectious, but also less lethal, than SARS.

Chinese authorities have also confirmed a suspected case of the Wuhan virus in Tibet, which was previously the only place to prevent the virus. If confirmed, the spread to Tibet despite strict traveler checks and the closure of tourist sites will renew concerns about how easily the virus can be transmitted, especially when people are asymptomatic.

## **Origin**

Both the outbreaks of SARS and Wuhan started in China— and both are thought to have originated from the wild animal markets. In China, scientists compared the Wuhan corona virus genetic code to other corona viruses and found it to be most similar to two samples of bat corona virus. The animal species that caused it to spread to humans have not yet been verified by experts but they have some guesses. Scientists believe that the corona virus causing SARS emerged from a reservoir in bats, which then spread to the civet cat, a wild animal considered a delicacy in parts of southern China, then human.

In the case of this new outbreak, it was traced to the now-shuttered Huanan Seafood Wholesale Market in Wuhan, where a number of wild animals, including raccoon dogs and snakes, were for sale. Experts believe the corona virus was carried by animals— likely snakes— and then transmitted to humans, perhaps from bats again. That's because further genetic analysis found that the snakes closely resembled the genetic building blocks of the Wuhan corona virus. So the researchers believe a bats population could have contaminated rats, which transmitted the virus to humans as they were being sold at the Wuhan Huanan Wholesale Seafood Market. Amid SARS, China has banned civet cats from slaughter and consumption. China has gone a step further this time; the government announced its banning all sales of wild animals across the world.

Nonetheless, another study that contradicts the idea that the virus originated in the Huanan wet market has recently been released. According to Science, which cited a report published in The Lancet medical journal, Chinese scientists found that the first reported case of the Wuhan corona virus since December had no connection to the wet market. Moreover, 13 of the 41 cases they investigated for



corona virus had no connection to the Huanan marketplace, the researchers said. The only way to be sure where the virus came from is to take samples of DNA from animals that were sold on that market and from wild snakes and bats in that area.

### **Number of Infections**

Globally more than 7,700 people have been infected since the first confirmed Wuhan corona virus case in December. For contrast, between November 2002 and July 2003, there were 8,098 confirmed cases of SARS. It took fewer than two months to get infected over a span of nine months, about 75 percent of the number diagnosed with SARS.

In China, the number of confirmed Wuhan corona virus cases has already surpassed that of SARS infected in 2002 and 2003. Since the outbreak of China's SARS 17 years ago a lot has changed. But there are certain issues that have not. To date, at least 7,711 cases have been reported in mainland China, compared with 5,327 confirmed cases of SARS on 16 August 2003, the last time the Chinese Ministry of Health reported these results.

Chinese local and international travel has risen intensely since 2003, which may help spread the disease more rapidly. The number of outbound visitors rose from 16.6 million trips in 2003 to 149.7 million in 2018, according to Chinese government estimates. It's worth noting that this outbreak occurred in China at the worst time of the year— Lunar New Year— when millions travel home to see their families. As of January 27, there were still 4,096 Wuhan tourists overseas according to Wuhan's Culture and Tourism office.

### **Number of Deaths**

Amount of Deaths 774 people died during the 2003 SARS epidemic. In mainland China, and in Hong Kong, the vast majority of the deaths occurred. This time, the virus has infected 170 people— and so far, they were all in mainland China. Nonetheless, when assessing deaths, the best thing to look at is the case fatality rate— the indicator of what percentage of infected people end up dying. The case-fatality rate for Wuhan virus is currently about 2 percent— significantly lower than the mortality rate of 9.6 percent for SARS. It is also lower than Middle East Respiratory Syndrome (MERS) — another form of corona virus— which has a 35% case fatality rate.

But that estimate is only as good as the reported numbers. Some experts are worried that they may not have an accurate picture of the number infected in China, as test kits have been in short supply.

## **Identifying the Virus**

**Recognizing the Virus** One of the prime differences between SARS and this present outbreak is how rapidly it was announced and how easily it was detected by scientists. On the 31<sup>st</sup> of December, 2019, about three weeks after the first event was known, China told the World Health Organization about the new virus. On January 7, they identified the virus behind the outbreak. This is as rapid as any other advanced nation could have found it.

Genome sequencing has a huge impact— it helps many countries to develop virus tests early on and to research the virus. After SARS the disease was kept under wraps by China. The disease was first identified officially in February 2003 but by that time five people had died and 300 had fallen ill from the disease in Guangdong province of China. It was also not until five months after the first SARS outbreak began that American and Canadian scientists revealed that they had sequenced the genome that was believed to be the source of that virus. Health authorities had been struggling with a lack of knowledge about what the virus was back in 2003.

And china has done things differently this time around. Beijing not only had the scientific ability to classify the genome but it also taught other countries about it. Yet concerns also emerged about how open China has been. There are still some worried that the problem's size might be much worse than the official figures let on. Not all corona viruses are fatal— those that are unique to humans, including common cold, are often considered unreliable. Nevertheless, the corona viruses which pose a pandemic risk are those which hang out in animals. Because these viruses didn't exist in humans before, there is no clear immunity in humans to these viruses.

## CHAPTER 3: EVOLUTION AND IDENTIFICATION

The new corona virus that jumped at the end of last year from some animal to a person in the city of Wuhan has managed to attract huge attention from the media, scientists and the international community in just a few weeks. The epidemic is developing very rapidly and with it we have the knowledge of this new virus. The scientific community has managed to isolate it from not understanding anything at the beginning of 2020, sampling it, identifying it and creating a diagnostic test.

As with each new outbreak, however, there are many open questions that will be addressed as the disease progresses and as scientists continue to get a better grasp of the nature of the virus. In this episode, we will try to provide steady updates on the most important virus and epidemic information. The World Health Organization launched a strategic plan this week to respond to the novel corona virus it has declared an "international public health emergency" as the first person in the U.S. with a confirmed case of illness from the hospital went home.

According to the World Health Organization, with more than 30 000 confirmed cases in China, the Covid-19 virus has killed more than 600 people, disrupted global travel and prompted governments and other organizations to take extreme measures to prevent its global spread, from evacuations to mass quarantines. It is not currently spreading beyond people in close touch with returning Wuhan travelers within the U.S., the Centers for Disease Control and Prevention said.

Researchers are working to understand this new threat and warn current public health efforts, including the potential creation of a vaccine, including how the virus is evolving and moving from person to person. Infectious-disease specialists at Fred Hutchinson Cancer Research Center, such as Dr. Trevor Bedford, are among the scientists at the front lines of that research effort. Bedford, a computational biologist who studies how viruses grow and spread, is gaining information about Covid-19 which he hopes will help save lives from this emerging respiratory virus disease.

While he studied the spreading virus, Bedford shared what he has learned so far with the public through media interviews, the open-source platform for real-time viral evolution monitoring by his team. Here are examples of what he and other experts have learned so far— and the critical questions they are still pursuing:

- How to reduce the risk of infection?

- Signs
- What to do if you think you may be infected?
- Tips for travelers to and from China, the epicenter of the outbreak
- How U.S. health officials respond to the virus
- What doctors and healthcare workers need to know

Bedford's and other analyzes of the genetic sequences of some of the first human cases found that after it first appeared the virus had a surprising lack of genetic diversity from person to person. First, there was not sufficient evidence to clarify what this meant — was the virus repeatedly springing from animals to humans or, more seriously, spreading rapidly among humans after an initial animal jump? “These two cases cannot be separated by DNA”. Only the reservoir animal can get epidemiological data or DNA. Figuring this out will presently be the main epidemiological target for everyone.

I think we're looking at a pandemic if it's not implemented early, "Bedford told STAT News on Jan. 27— though he warned it was impossible to say how serious a Covid-19 pandemic would be. Such work by Bedford and other virus trackers is possible due to the rapid genetic sequencing of infected people— unfeasible or even unlikely not too many years ago— and a collective effort to openly share such genetic data with the research community around the world.

Basically, a week after reporting that there is this new thing; China's outstanding scientists have a genome for the novel virus that had never before been seen. That first genome was great for people developing quick testing to actually be able to validate cases and these subsequent genomes are very useful in understanding simple epidemiological issues. "Adding a few main samples will change the story dramatically, due to the rapidly evolving nature of the disease.

With access to additional genetic sequences from more infected people, teammates from Bedford and Nextstrain wrote on a post on their site on Jan. 30 that the low mutation rate of the disease is the result of spreading person-to-person from unknown animals to humans in November or early December 2019 since its initial jump. The team also wrote in their Jan. 30 report: While the virus has started to catch up mutations as it spreads among people— as this form of virus naturally does — such mutations do not appear to be related to changes in the actions of the virus. The new virus seems to be less likely to kill those with confirmed cases than its corona virus predecessor, SARS, but data are too scant for firm conclusions.

Bedford and colleagues explain their latest data on the Covid-19 spread and evolution around the world. The map shows the number and location of viral

sequences they study as the virus spread out of China from cases around the world. Meanwhile, a new analysis of the first 425 people with the virus, reported by a research team based in China in the New England Journal of Medicine on January 29, found that it takes about five days for a person who is eventually diagnosed with the disease to develop symptoms following their initial infection with the virus.

## **CHAPTER 4: REPORTED CASES ALL OVER THE WORLD**

In mid-December, the first cases of corona virus were identified at Wuhan. The number of confirmed cases has since increased exponentially, and infections have been identified all over the world. Hospitals in Wuhan are already heavily overcrowded, and hundreds of emergency medical staff was sent to the region for assistance. Two new hospitals are also being constructed on the outskirts of the town dedicated to treating the virus.

The city's authorities said there were still more than 4,000 Wuhan residents overseas as of January 27. The Wuhan Culture and Tourism office said after the lockdown was announced all tour groups were cancelled, but groups that left before that date were still slowly returning to the region. More than a dozen countries have reported Wuhan virus cases, as authorities are struggling to avoid its spread.

More than 100 people died from a corona virus outbreak that began in Wuhan, China, and more than 4,600 people across 17 countries were infected. The virus, characterized like symptoms by fevers and pneumonia, probably originated in a wet market in Wuhan, an 11-million-person city in Hubei province of China. Authorities placed Wuhan under quarantine on January 23—stopping all public transport, including city buses, trains, and ferries. The order would bar any bus or train from entering or leaving the city and will land all planes at Wuhan airport. Wuhan authorities also started the next day to restrict car travel, The Guardian reported.

Huanggang City (which is home to about 7.5 million people) also locked up last week as authorities closed down subway stations and train stations. Ten additional cities— Chibi, Enshi, Ezhou, Huangshi, Suizhou, Qianjiang, Xianning, Xiantao, Yichang, and Zhijiang — have followed suit with their own travel restrictions by the next day. The cities of Xiangyang, Jingmen, Xiaogan, and Dangyang were also in quarantine as of Monday.

Wuhan is China's fifth-largest city and has a size of over 3,200 square miles. In contrast, there are about 8 million people in New York City— nearly 3 million fewer than Wuhan. The town is divided into three districts: Hankou, Wuchang, and Hanyang, with rivers flowing in between. Most people work in one district and live in another, so the inter-district travel ban is disrupting the usual workings of the community. People are no longer allowed to leave Wuhan without a "special reason," according to local authorities.

Meanwhile, officials in Huanggang ordered the closing of cinemas and internet cafes, and instructed people not to leave the city unless there were special circumstances, Reuters said. Long-distance buses and trains to the city have been halted. The nearby town of Ezhou, too, closed its train stations, while bus travel in two smaller towns, Chibi and Zhijiang, was halted. Such quarantines come among the festivities of the Lunar New Year, which began on Saturday. The annual holiday typically fills the country's trains, buses, bridges, and ferries, as 3 billion people travel home to be with their families. The Chinese government, however, has requested people to cancel plans to visit Wuhan, and last week the government in Beijing cancelled its Spring Festival activities.

Several countries across Asia have put additional screening at airports and warned people not to fly to China. Neighboring Mongolia has placed tight border controls on travelers coming into the country to China's north. Indonesia and the Philippines have both imposed additional restrictions on Chinese tourists, while Japan has upgraded its response, allowing authorities to "strengthen suspected hospitalization and testing cases." Around one hundred cases have been reported worldwide, with most of them 14 found in Thailand, a popular destination for Chinese tourists. Countries with colder climates are more likely to spread in the future, as corona viruses thrive in cold environments and do not replicate in warm, hot areas as well. Nevertheless, in a patient in Illinois the Centers for Disease Control and Prevention reported the first case of human-to-human corona virus transmission in the U.S. The transmission took place between a husband and wife, who were in close touch with each other. The partner, who was a woman in her 60s, had traveled to Wuhan, China, and was diagnosed last week with the virus. The husband, who also resided in his 60s in Chicago, and who has underlying health issues, had not traveled to China. The risk to the general public in Illinois remains low, "state health officials emphasized". They said they don't think the virus spreads widely in neighborhoods and are working to ensure that health care workers are safe at the facility where the patient is being treated. On Thursday night, the State Department released a "Do Not Fly" advisory to China, its strongest warning. The Level 4 warning was already in effect for the outbreak's heart, Wuhan. It also advised Americans to leave via commercial flights in China. The new corona virus is under investigation for 165 people in the United States. Of those, 68 tested negative, and six tested positives. Tests of the remaining individuals are in transit or have reports pending.

Twenty American airports check travelers for symptoms of illness and provide corona virus signs to people returning from China with educational materials.



Several flights to China have been suspended by airlines around the world—United, Delta, American Airlines, British Airways, Air Seoul, Lion Air, Lufthansa Group, Cathay Pacific, Finnair, Air Asia, Air India, Air Canada, All Nippon Airways, Asiana Airlines and Korean Air.

The US government chartered a flight from Wuhan, China to evacuate 196 Americans. Such evacuees were screened and monitored before and during their flight for signs of illness. The passengers have entered voluntary three-day quarantine since arriving in California and will be given virus monitoring according to the Centers for Disease Control and Prevention.

Although most recorded cases outside of China have a direct link to Wuhan, there are signs that the virus is starting to spread within other countries. In Germany, three fresh cases have been stated including what is believed to be the first human-to-human transmission in Europe. Multiple countries have advised that people do not visit China due to the ongoing outbreak. The US Base for Disease Regulator and Prevention (CDC) has released a Level 3 warning recommending against all "non-essential travel"—the highest alert on a scale of 1 to 3. The White House, however, denied reports that it was planning to cancel all US-China flights.

With many of China seeing the sort of cold weather suitable for corona virus, and continuing doubt about how contagious it is, experts expect the number of cases to continue to rise for several weeks. Zhong Nanshan, one of the leading breathing experts in China and a hero of the 2003 war against SARS, said he anticipated the peak to arrive in up to 10 days. Definitely, it is very difficult to estimate when the epidemic occurs. But it will hit the pinnacle in one week or about 10 days and then there will be no large-scale rises.

Other experts have warned, however, that while the Hubei outbreak could peak in the coming weeks, other Chinese megacities may see self-sustaining epidemics that continue to spread the pathogen across the country and around the world. An Australian laboratory became the first outside of China to develop the Wuhan corona virus from a sample of patients. This will "provide crucial information to foreign specialist laboratories to help combat the virus. We model epidemic curves up to August 2020 for all major city clusters: Chongqing, Shanghai-Guangzhou, Shenzhen and Beijing. Chongqing is expected to have the largest epidemic due to large population and the most extreme volume of traffic combined with Wuhan.

## **Ecuador**

On 26 January Ecuador was one of the first countries outside Mainland China to

announce a suspected case of corona virus. The Chinese resident, who was 49, arrived from Hong Kong and showed symptoms of the infection. The Ministry of Health of Ecuador confirmed on February 05 the alleged case of corona virus tested negative.

### **Botswana**

In Botswana a total of five suspect cases of corona virus infection have been identified. All of the cases tested negative for the infection as confirmed by Botswana government on February 05. On January 30 the first reported case of corona virus in Botswana was registered, the Ministry of Health and Wellness announced on January 31st. The suspect arrived from China on an Ethiopian Airways flight, is isolated and under investigation.

### **Czech Republic**

Until the end of February 04, a total of 48 individuals were screened for the novel corona virus and all of them tested negative, the Czech Ministry of Health has confirmed. Respilon Group, a Czech-based nanofibre-technology company, announced it was developing a new face mask that could limit the spread of corona virus.

### **Namibia**

On 1 February Namibia Broadcasting Corporation (NBC) announced that a 30-year-old woman with symptoms similar to those of corona virus is being observed in a hospital in Swakopmund, Namibia. The woman had visited Melbourne, Australia and arrived at the international airport in Hosea Kutako. He noticed that their flight back included Chinese passengers wearing masks and coughing. The Namibia Ministry of Health reported the news of the suspect case, NBC added. The Namibian Minister of Health announced on 03 February that the alleged case has tested negative.

### **Peru**

The Peruvian Ministry of Health reported in its most recent February 03 update that there are no confirmed cases of corona virus in the region. The ministry announced earlier on January 31 that all four alleged to have tested negative corona virus.

### **Maldives**

Maldives, which is already working hard to control a measles outbreak, witnessed a male who arrived from Xiamen, China, on 30 January in the first reported case of corona virus. Six other cases of Malvidians who traveled to

China were subsequently identified. The Ministry of Health of Maldives confirmed on 03 February that all cases had tested negative for the virus.

### **Myanmar**

A Chinese visitor's first suspected case of corona virus in Myanmar was registered on 31 January. The visitor arrived from Guangzhou, on a flight from China Southern Airlines in Yangon. Of the remaining 78 passengers that the flight carried, only two were allowed to disembark the plane, while the remaining 76 were not, Anadolu Agency reported. Nevertheless, Myanmar reported that the suspected case has checked the virus as negative.

### **Ivory Coast (Côte d'Ivoire)**

The Ivory Coast confirmed one suspected case of corona virus infection on 26 January 2020. The woman, a 34-year-old female student, had arrived in the Ivory Coast from Beijing to Abidjan. She was placed in solitary confinement and was healthy during the observation period. Her samples have tested negative for corona virus, officials announced.

### **Ethiopia**

It was confirmed that four people suspected of contracting the corona virus infection and put in isolation in Addis Abeba had tested negative for the infection. Four of them are students who study at Wuhan City Universities.

### **Kenya**

On 30 January 2020 Kenya announced that the first confirmed case of corona virus infection had tested negative. The case was a Guangzhou traveler who showed symptoms of the disease, first published on 28 January 2020. He was first placed in solitary confinement at Jomo Kenyatta International Airport upon arrival and then isolated at Kenyatta National Hospital's Infectious Disease Unit. Test results revealed the sufferer was common cold but not the infection of corona virus.

### **Austria**

A total of seven Austrians who came from China and quarantined at the Hygiene Center Vienna on February 04 tested negative for corona virus infection. On February 2 the seven people arrived in Austria and areolate as a precautionary measure.

### **Mexico**

Seven suspected cases of corona virus infection recorded in City Mexico, all of which tested negative on January 27. The suspected cases included a 42-year-old

man, who visited Wuhan recently, and a 37-year-old woman and a two-year-old girl who came in touch with the man. Actually they receive medical treatment for other respiratory diseases. In Jalisco 20 January a further three cases were reported.

### **New Zealand**

Tested negative on 31 February the first reported case confirmed in New Zealand. Dr Ashley Bloomfield, the Director-General of Health, announced the test results on 1 February. The individual was accused of contracting the disease and was held at Auckland City Hospital in solitary confinement.

### **Cyprus**

According to the Cyprus News a man from China who was accused of contracting the infection with corona virus tested negative on 2 February 2020. The man was put under quarantine at the General Hospital of Nicosia on January 31, after showing symptoms of the illness.

### **Croatia**

According to Total Croatia News, a man held in solitary confinement at Split KBC hospital for showing symptoms of corona virus infection tested negative on 03 February. He was suspected of having contracted the infection after visiting China recently on 2 February.

### **Switzerland**

According to SWI, on 28 January two suspected cases of corona virus infection had tested negative. The two cases were first identified on January 27 and placed in solitary confinement at Zurich's Triemli hospital. The people had recently visited China, and returned with infection symptoms.

### **Greece**

According to the Greek City Times, a sixty-year-old man suspected of contracting corona virus has tested negative for the disease. The man had been put under quarantine at the General Hospital of AHEPA University.

### **Denmark**

Denmark has confirmed that as of February 04 all those screened for suspected corona virus have turned out negative. The most recent tests have been on those arriving from Wuhan at Roskilde Airport. Earlier, a Danish woman who returned from Wuhan with infection symptoms was isolated and examined at Aarhus University Hospital. The test has been proven negative.

## **Ireland**

Ireland suspected a person who came from Wuhan to be infected with corona virus and admitted him to the Royal Victoria Hospital, but the health department announced that the tests were negative, the BBC reported on 25 January.

On 31 January the World Health Organization identified 13 countries on the continent of Africa as at risk for corona virus infection. Such nations include Algeria, Angola, Cote d'Ivoire, the DRC, Ethiopia, Ghana, Kenya, Mauritius, Nigeria, South Africa, Tanzania, Uganda and Zambia. Either they have direct links to China or they manage a large volume of trips to China. Active screening programs were implemented at all of those countries ' major airports.

## **CHAPTER 5: OMS GLOBAL HEALTH EMERGENCY**

With no indication that a new corona virus epidemic is fading, virologists are waiting around the world to get their hands on the virus ' physical samples. We are developing plans for testing drugs and vaccines, creating animal models of the infection and researching concerns about the virus ' nature such as how it spreads. The moment we heard about this outbreak, virologist started putting out their feelers to gain access to the isolates. At the epicenter of the outbreak was the first laboratory to isolate and study the virus, known provisionally as Covid-19: in Wuhan, China. A team led by virologist Zheng-Li Shi at the Wuhan Institute of Virology isolated the virus from a 49-year-old woman, who developed symptoms on 23 December 2019 before becoming critically ill. Shi's team found that the virus can destroy human cells that are cultured and enter them through the same molecular receptor as another corona virus: the one that causes SARS (severe acute respiratory syndrome). On 28 January a laboratory in Australia confirmed it had collected virus samples from an infected person who had returned from China. The team was getting ready to share these findings with other scientists. Laboratories in France, Germany and Hong Kong are also isolating and planning to exchange samples of viruses from local patients that they collected.

Nevertheless, at a news conference in Geneva the World Health Organization declared corona virus to be a public health emergency of international concern. It's only the sixth time such an emergency has been declared, with past examples including the Democratic Republic of Congo Ebola outbreak and the Zika virus. Through seeking to spread worldwide, the WHO reserves the designation for "extraordinary events" that present a public health risk. The step reversed the organization's decision to hold off such a statement just a week earlier. Since then, several other nations, including the United States, have seen thousands of new cases in China and clear evidence of human-to-human transmission. This all warranted reconsideration by the emergency committee of the W.H.O.

The statement "is not a vote of mistrust in China". The W.H.O., on the contrary, appears to believe in China's ability to control the outbreak. The announcement now comes because of concerns that the corona virus could enter countries with poor health care systems where it could run amok, potentially infecting millions of people and killing thousands.

The State Department warned travelers to avoid China altogether following the declaration. The spokeswoman for China's foreign ministry, Hua Chunying, said

“the country is fully confident and able to win the fight against this epidemic”. She added in a statement on the ministry's website that China is willing to continue collaborating with the W.H.O. and other countries to protect public health.

The announcement of the W.H.O. — officially called an "international public health emergency"— does not have the force of law. The department is governed by an annual meeting of all U.N. ministers of health. Countries and their function are merely to provide instruction. Governments will now make their own conclusions about how to protect themselves.

To Americans concerned about their health, the best advice are to follow good flu season hygiene, including regular hand washing, covering coughs and keeping up-to-date on new CDC details. The CDC does not suggest wearing a face mask to avoid corona virus. Our conclusion remains that there is low immediate risk for the American public.

The Illinois transmission is the sixth corona virus outbreak in the USA. Last week the WHO deliberated for two days before agreeing not to declare an emergency. Nevertheless, patients from Germany, Japan, Taiwan, Vietnam and the United States have since been infected with the new corona virus without visiting China. The new corona virus is within the same virus family as common cold and SARS.

A lot of uncertainty emerges from that human-to-human transmission outside China. At last count, the novel corona virus has sickened more than 7,700 people, and 170 have died from it. More than 90 percent, and every death, of those cases were in China. 20 percent of cases are considered serious, and 2 percent have been fatal, according to World health organization. The fatality rate of the latest corona virus is expected to decline as more cases are identified, as the sickest people tend to seek first medical treatment.

Emergency systems are "just instructions. Governments and even private firms "may or may not obey it." However, announcements of emergency signal that the situation is critical for the worlds top health advisory body. The decision had been accepted by many scientific experts. The emergency in public health "allows them to rely further on the role of global leadership for governments and the private sector."

The first aim should be to learn more about how the virus spreads — whether it's mostly in hospitals and clinics, what ages and sexes or occupations are most affected, how sick they are, and what risk factors are most harmful. Yet Amir Attaran, a law and epidemiology professor at the University of Ottawa and a



frequent critic of W.H.O., called the announcement "inexcusably late." The committee's rationale that it lacked sufficient scientific evidence to declare an emergency last week was "balderdash," he said. W.H.O. is crippled with SARS, Ebola and Zika for the same political reasons that destroyed its scientific judgment, "he said. Borders are closed, planes are grounded and ships anchored like W.H.O. are quietly dithers about whether or not to declare an emergency. "Things have overtaken them greatly, proving their uselessness yet again," he said.

Declaring emergencies is always a tough decision to take. Border closures and cancelations of flights will cause misery for millions of healthy people close to the epicenter, and huge economic disruption. In the worst situations, food and medicine supplies can run short, and fear can spread, threatening to do more harm than the disease.

Experts at the W.H.O., however, have lavishly and consistently praised the response by China as exceptionally violent. In just two weeks, the nation has built two hospitals for the home of patients with corona virus. Chinese scientists deposited the corona virus genetic signature in public libraries, which greatly accelerated the production of diagnostic tests and, eventually, vaccines. The Chinese authorities cordoned off the major cities at the epicenter of the epidemic, Hubei Province, stranding over 50 million people at the height of New Year's Lunar holidays—a step that few other countries could have taken.

It remains to be seen whether that massive cordon can prove effective. Five million people were able to flee Wuhan, the city where the outbreak started, before it closed its train and bus stations and airports. The Chinese Government has set a new standard for response to the outbreak. Many countries should be thankful that only 98 of the nearly 10,000 cases reported so far have taken place outside of the borders of China, he said.

Notwithstanding the state of emergency, and notwithstanding the fact that the State Department is advising Americans to stay away from China, the W.H.O. is opposed to limits on travel to or trade with China. According to the president of the agency's emergency committee, steps the agency finds unwarranted include border closures, visa restrictions and the quarantining of apparently healthy travelers from affected regions.

Other countries have already taken many of those steps against China. That's not to say that there weren't missteps. Last week the W.H.O. described its outbreak risk assessment as "moderate" when it should have said "high." The mistake was added to the agency's report in a footnote. U.S. researchers have written about

spotty epidemiological knowledge coming from China. The W.H.O., too, cannot share information with Taiwan, which now has eight patients with corona virus, as Taiwan is not a member of the UN.

The corporation "does not want its main stakeholders to get upset. China holds the political clout many countries don't have. Yet, along with its effects, the epidemic seems to be accelerating. On Friday China said another 43 people had died of the disease, bringing the total to 213. There have yet to be any fatalities outside China.

Russia sealed much of its 2,600-mile boundary with China and halted all of the country's train service except for a regular train between Moscow and Peking. Several airlines, like British Airways, stopped flying there; others reduced their service considerably. Some medical experts within China have challenged the response from their government, arguing that local officials should have implemented more stringent travel restrictions before the virus spills out of Wuhan. The country now has cases confirmed in every province and area.

People have argued that local authorities kept quiet about the extent of the outbreak— initially maintaining that there was no proof of transmission from person to person outside Wuhan— but admitted the truth after Hong Kong press reports. As the magnitudes of the outbreak became vivid, Wuhan's mayor offered resignation on Monday.

A delegation from the W.H.O. was authorized to visit Wuhan for only one day of rain; he said the visit was not intended to pass judgment. Everything is performed with a sense of strength, and good practice, to threes evaluation. You need to recognize the large scale and comprehensiveness of the project. "After the tour, China agreed to allow W.H.O.-coordinated international experts to collaborate with Chinese scientists to control the outbreak in the region. A team to join them is assembled by the C.D.C. Since its formation in 2005, the W.H.O. has made only five emergency declarations: for the 2009 pandemic influenza; for the 2014 polio resurgence; for the West African Ebola epidemic during that year; the Zika virus erupt in 2016; and an Ebola outbreak in the Democratic Republic of Congo last year.

The country has taken very strong steps including daily contact with WHO and robust multi-sector strategies to avoid further spread. In other cities and provinces, it has also taken public health measures; is conducting studies on the magnitude and transmissibility of the virus, and sharing data and biological content. The country has also agreed to work with other countries that require support from them. The steps that China has taken are positive for that country

as well as the rest of the world. The Committee recognized WHO and its collaborators as leading role.

The Committee also noted that many unknowns remain, cases have now been identified in five WHO regions within one month, and human-to-human transmission has occurred outside of Wuhan and outside of China.

The Committee claims that it is still possible to prevent the spread of virus, if countries put in place effective measures to identify disease early, isolate and treat cases, monitor interactions and encourage risk-sensitive social distancing steps. It is important to note that as the situation continues to evolve, the strategic objectives and measures to prevent and reduce the spread of the infection will also evolve. The Committee concluded that the epidemic now meets the criteria for a globally concerned public health emergency, and offered the following advice to be given as Temporary Recommendations.

The Committee emphasized that a PHEIC's statement should be interpreted in a spirit of support and respect for China, its citizens, and China's actions on the front lines of this outbreak, with openness and, it is to be hoped, progress. In line with the need for global unity, the Committee felt a need for an internationally coordinated effort to improve preparedness in other parts of the world that might need additional support.

The Committee welcomed an upcoming multidisciplinary technical mission to China which included national and local experts from the WHO. The mission will examine and support efforts to investigate the animal source of the outbreak, the clinical scope and nature of the disease, the degree of human-to-human transmission within the population and in health care facilities, and efforts to control the outbreak. This mission will provide the international community with information to assist in understanding the situation and its effects and facilitate exchange of knowledge and effective action.

The Committee wished to re-emphasize the importance of researching the possible source, excluding secret transmission and informing steps for risk management. The Committee also underlined the need for enhanced surveillance in non-Hubei areas, including pathogen genomic sequencing, to understand whether local transmission cycles are occurring.

World health organization should continue to use its international specialist networks to determine how best to control the outbreak globally. WHO should provide enhanced preparatory and response support, especially in vulnerable countries and regions. Measures should be established to ensure rapid development and access for low-and middle-income countries to future

vaccinations, medications, antiviral medicines and other therapies.

WHO should continue to provide all the technical and operational support necessary to respond to this outbreak, including with its broad networks of partners and collaborating organizations, to adopt a robust risk communication strategy, and to allow research and scientific advances in relation to this novel corona virus to be furthered.

The WHO will continue to explore the advisability of establishing an intermediate level of warning between the binary possibilities of PHEIC or no PHEIC, so that discussions on the IHR text do not need to be reopened (2005).

The WHO will review the situation with consistency in due time and update its recommendations based on evidence. The Committee does not propose any restrictions on travel or trade based on the current available information. The Director-General announced that the Covid-19 outbreak constitutes a PHEIC and acknowledged the advice of the Committee and released this advice as Temporary Recommendations under the IHR.

To the People's Republic of China:

- Develop a systematic risk communication strategy to inform the public on a regular basis about the nature of the outbreak, the population's prevention and security measures, and the response measures taken for its containment.
- Improve public health programs to curb the current outbreak.
- Ensure health system stability and secure health-care workers.
- Increase monitoring and successful case finding across China.
- Collaborate with the WHO and its collaborators in carrying out studies to clarify the epidemiology and evolution of this epidemic and its control steps.
- Partake of appropriate human case info.
- Continue to identify the zoonotic source of the outbreak as soon as it becomes available, and in particular the potential for circulation with WHO;
- Perform exit screening at international airports and ports with the goal of early detection for further assessment and treatment of symptomatic travelers while reducing interference with international traffic.

To all countries:

- More foreign export of cases is expected to appear in any region. All countries should therefore be prepared for containment, including active

monitoring, early detection, isolation and case management, communication tracking and prevention of further spread of Covid-19 infection, and full data sharing with World health organization. Professional guidance can be found on the WHO web site.

- Countries are reminded that they are legally obliged under the IHR to share information with the WHO.
- Any identification of the Covid-19 in animals (including species information, diagnostic tests and relevant epidemiological information) should be reported as an emerging disease to the World Organization for Animal Health (OIE).
- Countries should place particular emphasis on reducing human infection, preventing secondary transmission and international dissemination, and contribute to international response through multi-sector cooperation and collaboration and active participation in enhancing virus and disease awareness, as well as advancing research;
- The Committee does not propose any restrictions on travel or trade based on the current available information.
- Countries shall inform WHO, as required by the IHR, of travel measures taken. Countries are warned against acts encouraging stigma or prejudice, in accordance with the IHR's Article 3 principles.
- In view of this rapidly evolving situation, the Committee requested the Director-General to provide further guidance on these matters and, if necessary, to make new case-by-case recommendations.

To the global community:

- As this is a new corona virus and it has been shown previously those similar corona viruses require substantial efforts to allow routine information sharing and analysis, the global community will continue to show solidarity and cooperation in supporting each other in identifying the source of this new corona virus, in compliance with Article 44 of the IHR (2005).
- Help low-and middle-income countries to respond to this incident and to promote access to diagnostics, possible vaccines and therapies.

Under Article 43 of the IHR, States Parties adopting additional health measures that substantially interfere with international traffic (refusal of entry or departure for more than 24 hours of international travelers, luggage, freight, containers, conveyances, goods and the like) are obliged to send to the WHO a rationale and justification for public health within 48 hours of their arrival. WHO will review the reasoning and may ask countries to rethink their steps. WHO is required to

share information regarding interventions and the rationale obtained with other States Parties. The UN's health arm said the move was to protect countries with "weaker health systems," but the WHO also said there was no excuse for steps that would interfere excessively with international travel and trade.

## **CHAPTER 6: PREVENTIVE MEASURES BY COUNTRIES**

Scientists and health specialists around the globe are trying to stop the spread of a deadly virus that originated in December in the Chinese city of Wuhan. The new corona virus has already been contracted by thousands of people which cause respiratory disease. The death toll is 213, and increases regular. The outbreak was declared a "public-health emergency of international concern" by the World Health Organization (WHO) on 30 January—a warning it reserves for incidents that pose a risk to multiple countries and that involve a concerted international response.

### **How Many People will the Virus Infect?**

The Chinese authorities have locked down cities at the center of the outbreak, and researchers have been swift to share virus data with the World Health Organization and with researchers. But the numbers of cases have increased, and past 9,000 have surged in the past day, mostly in China. This has resulted in one estimate that the virus could infect about 39,000 of the 30 million people living in the Wuhan region. It seems like the virus got out of hand in China, spreading too far, spreading too quickly to really be controlled.

In the best case, fewer people will get infected because the results of the control measures will start kicking in, says University of Hong Kong epidemiologist Ben Cowling. But it's too early to tell if efforts are working to quarantine men, and the common use of face masks. The virus incubation period-up to 14 days is longer than most prevention measures are in place, he notes.

In a worst-case scenario, according to another prediction model, some 190,000 people could get infected in Wuhan. Scientists are particularly concerned by the appearance of fresh outbreaks outside China. The virus has already spread in small, scattered clusters in Vietnam, Japan, Germany and the U.S., but officials were able to isolate the affected people. As of January 30 fewer than 100 cases were reported outside China.

### **Is the Virus Here To Stay?**

It is said to be normal when a virus circulates continuously in a population. In many countries, the viruses that cause chicken pox and influenza are common but outbreaks can be managed through vaccination and holding people at home when they're sick.

One big question is if the corona virus is here to live, too. When attempts to eradicate it fail, then there is a high likelihood it will become widespread. This

could mean, as with influenza, that deaths occur every year as the virus circulates, until a vaccine is created. When people who are infected but do not have symptoms will spread the virus, it will be harder to control its spread, making it more likely that the virus will become endemic to them.

Some cases of infected people with no symptoms have occurred, but it is still uncertain whether such asymptomatic or mild cases are normal and whether or how contagious they are. "Probably we are looking at a virus that will be with us for a long time, possibly forever," Mackay says.

Asymptomatic cases differentiate the new virus from related corona virus, which causes severe acute respiratory syndrome (SARS). This virus had a global epidemic in 2002–03 but usually only spread until people were sick enough to need hospital care. When outbreaks were brought under control in hospitals, SARS had been controlled. There's no proof the virus continues to spread in humans, says Mackay.

If control measures are successful, and transmission slows down so that no more than one person infects per infected person, the current outbreak may simply peter out, Cowling says.

### **Is the Virus Likely To Change?**

Some researchers are worried that the pathogen will mutate as China's corona virus spreads so that it can spread more easily, or become more likely to cause disease in young people. The virus has currently caused severe illness and death, particularly in older people, especially those with pre-existing conditions such as diabetes and heart disease. The youngest victim identified so far, is a 36-year-old Wuhan man with no documented pre-existing health conditions.

Kristian Andersen, a Scripps Research infectious-disease expert in La Jolla, California, is not concerned about the virus becoming more virulent. He says viruses are continually mutating as part of their life cycle, but these mutations usually don't make the virus more virulent or cause more serious illness. "I can't think of any cases of this having happened with pathogenic outbreaks," he says.

In cases where a virus moves from one animal host to another species— which is possibly how the current corona virus began infecting humans— there may be a selection pressure in the new host to enhance survival, but that seldom, if ever, affects human disease or the transmissibility of the virus. Some mutations damage the virus, or have no consequence. A 2018 study of SARS in primate chambers showed that its virulence was possibly diminished by a mutation sustained by the virus during the 2003 epidemic.



Scientists have exchanged hundreds of genetic sequences from the latest corona virus strains, and a steady supply of those samples will show genetic changes as the epidemic progresses, MacKay said. "If they change sequence, viruses do not change behavior, and we need to see persistent or consistent virus change," he says.

### **How Many People Will It Kill?**

The fatality rate for a virus— the proportion of infected people who die — is difficult to calculate in the midst of an outbreak as reports are continuously being updated on new cases and deaths. The fresh corona virus has a decrease amount of 2–3 percent with 213 deaths so far out of nearly 10,000 infections. This is expressively lesser than SARS, which killed about 10 percent of its infected people. The reported mortality rate for the latest corona virus is likely to decline as mild and asymptomatic cases are detected, virologist Mark Harris at Leeds University, UK, told London's Science Media Centre.

There are no effective drugs against the virus at this time. Two HIV treatments that are thought to target a protein that helps replicate corona viruses are being studied as a cure. Many current medicines that target this role have also been identified by scientists, and numerous intercontinental investigative groups are operating on a serum.

The amount of deceased will also depend on how the large number of cases copes with China's health care system. Putting people on drips and ventilators will make sure they get enough fluids and oxygen while the immune system in their body battles the infection. China is constructing two new hospitals in Wuhan to treat sick people, but if the virus spreads to parts of the world with fewer resources, such as African income regions, their health systems could fail, says Sanjaya Senanayake, an infectious disease specialist at Canberra's Australian National University.

The director-general of the WHO, Tedros Adhanom Ghebreyesus, said his main concern in announcing a global health emergency was that the epidemic could spread to countries with weak health care systems.

If the virus is spreading all over the world, the number of deaths could be significant. For an infectious disease, the current death rate of 2–3 per cent— although not as high as for SARS — is still quite high. The epidemic of influenza in 1918, known as Spanish flu, affected about half a billion people at the time, one-third of the world's population, and killed more than 2.5 per cent of those infected; others reported that as many as 50 million people died. The China corona virus is unlikely to induce such an apocalyptic scenario, because it does

not usually infect or kill healthy young people.

### **How Long Will It Take To Exploit A Serum?**

A vaccination is still one year away — at least. A corona virus vaccine may prevent infection and stop the disease from spreading. But it does take time for the vaccines. While new technology, advances in genomics and improved global collaboration have enabled researchers to move at unprecedented pace, vaccine development remains a costly and risky operation. Scientists usually have to start from scratch with every new outbreak. After the 2003 SARS outbreak, it took about 20 months for researchers to get a vaccine ready for human trials. (The vaccine was never needed, because it ultimately contained the disease.) By the 2015 Zika outbreak, experts had brought down the timetable for vaccine development to six months.

Now, they are hoping research from previous outbreaks will help further cut the timeline. Scientists have already researched the current corona virus genome and identified the proteins that are essential to infection. National Institutes of Health scientists, in Australia and at least three companies are working on candidates for vaccines.

If they do not face any unexpected challenges, a Phase 1 trial can be completed within the next three months. The experts warned that it may also take months, and even years, to carry out extensive testing after initial trials that can confirm a vaccine is safe and effective. A vaccine will, in the best case, be made available to the public a year from now.

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

Traveling to China at that time is possibly ill-advised. It is not clear how the virus can be transmitted, and who is at the greatest risk of a poor result. Hubei has been given a Level 4 travel advisory by the U.S. State Department which means "do not fly" and is the highest level of alert. For the rest of China, a Level 3 alert is in place. The biggest risk of travel to China right now is that the Chinese government has imposed stringent quarantine and travel bans. That said, if you have to go to China where there are reports of the virus, experts recommend that you wear a mask, wash your hands regularly and avoid anyone who's sick.

Remember that over - the-counter masks do not protect against airborne diseases and masks will be ineffective if the virus mutates to become airborne. In the United States the CDC is closely monitoring the status. There are a total of 165 cases under investigation as of 29 January 2020. Four were upheld. Arizona,

Washington, California and Illinois are the states with confirmed cases.

### **Should I Wear a Surgical Mask To Protect Myself?**

If you have a respiratory infection, wearing a mask will help protect the people around you from getting sick by reducing the risk of spreading the infection. And if there is an epidemic, wearing a surgical mask may somehow protect you from infection in a crowd. However, in general, surgical masks are not sufficiently close-fitting to absorb all the air you breathe in, and the heavy-duty N95 respirators are extremely uncomfortable. Experts recommend you regularly wash your hands throughout the day. Stop touching your face, and keep a distance from anyone who coughs or sneezes.

Apparently, the risk of infection in the United States with the latest corona virus is far too small for the general public to start wearing a face mask. If you have signs of a respiratory disease, however, wearing a mask reduces the risk of infecting others. "I've arranged a trip to China; should I go?

### **I Have a Trip Planned to China; Should I Go?**

Do not go. The department of state has warned Americans not to go to China unless it is absolutely necessary. If it is appropriate for visitors to go, the C.D.C. recommends improved precautions: avoid contact with anyone who is ill, as well as with the animals and markets in which they are sold; and avoid eating raw or undercooked meats.

Anyone who is older or has an underlying health problem that raises infection vulnerability should check with a health care provider before making a trip. Considering the outbreak, access to medical care in China may be difficult, and federal officials have warned that new travel restrictions, including quarantine, may be placed upon return. Several airlines have cancelled flights to China and many passengers have been left in limbo when looking for bookings to change or cancel.

### **What are Health Authorities Doing to Contain the Virus?**

It is no surprise that 2020 began a new decade in China with the announcement of a novel threat to corona virus (Covid-19). Changes in human behavior and environmental factors have led over the past three decades to the emergence of more than 30 novel infectious diseases ranging from rotavirus, which causes infantile diarrhea, to Middle East respiratory corona virus syndrome, first identified in 2012. As the human populace remains to grow, demand for agricultural land is increasing, exposing livestock and humans to wildlife infections. Climate change is also changing the environment and animal vector

abundance, and rapid expansion of air traffic, people's movement through different borders, political instability and conflicts means that these new diseases can easily spread around the world.

China took drastic measures to prevent people from leaving affected areas, but five million people left Wuhan alone before the restrictions came into effect. On 8 December 2019, the Chinese government confirmed the deaths of 1 patient and 41 others hospitalized with unknown etiology in Wuhan, a city in central China<sup>2</sup> with an estimated population of approximately 10 million and a major transport hub<sup>3</sup>. The government shut down a seafood market known to sell live exotic small animals for food on 1 January 2020, less than a month after the first patients were identified, of which most of the 41 laboratory-confirmed cases were found to have ties.

People were also told to wear the masks in public to prevent the disease from spreading. Two new hospitals are being built for patients with corona virus; the first one opened Monday. Governments around the world have screened new Chinese travelers for signs of illness, and some have gone even further, barring people from China from entering. Most of its borders with China were closed by Russia and Mongolia. Australia has said it will evacuate Wuhan citizens and quarantine them on Christmas Island for 14 days.

A consortium led by Chinese scientists and foreign researchers was quickly coming together in a massive effort of national and international cooperation. These included the Shanghai Public Health Medical Center and Public Health School, Wuhan Central Hospital, China's Center for Disease Control and Prevention (CDC), Huazhong University of Science and Technology, the Wuhan Center for Disease Control and Prevention, the National Institute for Communicable Disease Control and Prevention, and the University of Sydney, Australia.

By 10 January 2020, the group had sequenced and publicly released partial sequences obtained from a Wuhan patient showing at least 70 percent genetic material similarities to severe acute respiratory syndrome (SARS) <sup>5</sup>. This openness in sharing information about the sequence is crucial to the production of diagnostic tests and future treatments and vaccinations to help control the outbreak, should it spread widely. The sequences were deposited in GenBank (code MN908947 for accession). Recent findings appear to suggest that the Covid-19 fatality (2 deaths out of 48 laboratory-confirmed cases, or 4.1 percent) may be smaller than that of SARS. A better understanding of the Covid-19 animal reservoir, pathogenesis, epidemiology and clinical continuum also needs

to be provided.

The response to this new outbreak by the Chinese Government has been swift and decisive. This indicates a marked departure from public health policies that led to the deaths of 774 people during the 2002 SARS epidemic, the spread of the disease to 37 countries and an economic loss of more than US\$ 40 billion over a 6-month period<sup>6,7</sup>. It is clear that China has made significant progress in responding effectively to disease outbreaks in just less than two decades. First, a notable change in the political stance of public-health has prompted China to accept that a novel corona virus exists quite early on. The Chinese government did not report the irregular new infection to the World Health Organization until 4 months after the first case was identified, in reaction to the 2002 SARS outbreak.

Second, the government was proactive in closing the seafood market in Wuhan, taking lessons from the 2002 SARS outbreak which only came to an end when the palm civet eaten in China was later identified as the source and withdrawn from the markets.

Thirdly, the rapid development of a national and international consortium has helped to diagnose the virus quickly and make the sequences available to the public within a few days. By comparison, on 24 March 2003, 5 months after the first cases were reported in November 2002, the first laboratory sequences indicating a new corona virus was the cause of SARS. The 2002 SARS epidemic clearly demonstrated the vulnerabilities of their leading public health organization, the China CDC program. Nevertheless, once the epidemic ended, through the Field Epidemiology Training Program, the government prioritized improvement of CDC processes, improving public health monitoring and laboratory services, as well as the workforce-development program. No doubt this increase in key public-health systems and facilities will be crucial in the response to the current outbreak of Covid-19. Nevertheless, an assessment performed in 2012 revealed the impressive progress made by China CDC since 2002, resulting in quicker responses to emerging epidemics, with the overall comprehensiveness of public health services increasing dramatically from 47.4% to 76.6%.

China CDC has played a critical role in improving the country's tiered national public-health system. The agency has also acknowledged that global disease risks will impact China; therefore, it is now actively exporting its expertise to help other developing countries better prepare for and respond to emerging pathogen outbreaks, including active support for the 2013 epidemic of West

Africa's Ebola virus. C.D.C. teams also support state health investigations of illnesses, including contact monitoring, which ensures that anyone who may have been in touch with an infected person is warned of exposure and monitored. The research will enhance knowledge of the virus and how it can be stopped from spreading. C.D.C. teams have also offered to send experts in public health to China to help with the testing and containment efforts. The strengthening of the Chinese Center for Disease Control and Prevention was a turning point in region outbreak responses. That reflects very important progress and development for the security and diplomacy of global health.

### **Building Hospitals for Corona virus Care and Treatment**

China planned the opening of Dabie Mountain Regional Medical Center, a 1,000-bed hospital, by expediting its building and opening it to people with corona virus symptoms in quarantine on 29 January. It is also building a second quarantine hospital called Leishenshan with up to 1,500 beds in Wuhan.

A new 1,000-bed hospital, called Huoshenshan hospital, has been completed in just ten days to provide better care and treatment for patients with corona virus. The new temporary hospital was opened on 03 February to admit patients.

China has planned to turn 11 facilities across the city of Wuhan, including gymnasiums, exhibition centers and sports centers, into make-shift hospitals with over 10,000 beds to treat patients with mild symptoms. Eight additional sites to be converted into hospitals were announced. On 03 February, the first three hospitals were converted offering 3,400 beds for treating patients.

Furthermore, 20 mobile hospitals and 1,400 nurses from across the country were sent to Wuhan to treat patients with mild symptoms. There was also the construction of an infectious disease hospital in Zhengzhou, Henan Province.

In collaboration with a biopharmaceutical firm developed two diagnostic kits for the novel corona virus antibody by the Wuhan Institute of Virology of the Chinese Academy of Sciences. The infection is detected in just two hours or more using an improved test method developed by Wuhan University's Zhongnan Hospital, which has helped to start care sooner and improve recoveries.

The National Medical Products Administration also licensed on January 26 two diagnostic kits and a test system developed by biopharmaceutical companies based in Hubei. Meanwhile, vaccine development efforts are advancing, with two chemical compounds found to be successful in controlling the viral activity that will help the novel corona virus accelerate drug development. Wuhan

Jinyintan Hospital was the earliest to use Kaletra (lopinavir / ritonavir), a treatment for HIV / AIDS, to treat patients with novel corona virus, and to note that it is safe. The Chinese Academy of Sciences has provided open and free access for Chinese researchers to resources and services from the China Science and Technology Cloud (CSTC) to assist in their Covid-19 work. To promote cooperation with co-researchers, researchers must gain access to high-performance computing and software, and other tools.

Baidu Research has allowed gene testing agencies, disease control centers and research institutions to use LinearFold, their RNA structure algorithm that will help understand the virus and screening compounds in less than half a minute compared to roughly an hour before.

### **Why Africa Should Be Prepared**

As of January 20, 2020, the Chinese government announced 136 new cases of infection with this virus that spread to other cities across the country over the weekend, bringing the total confirmed cases to over 200 worldwide (ref. 10). Cases of Covid-19 infection have now been identified in several other countries in the region: a case of Covid-19 infection of a 61-year-old Chinese tourist from Wuhan in Bangkok was registered in Thailand on 8 January 2020<sup>11</sup>. On 10 January 2020, a male patient was confirmed to be hospitalized by the Japanese Ministry of Health and tested positive for the virus. It also reported suspected cases in Hong Kong and Singapore.

The study of the models has suggested that more than 1,700 people could have been contaminated. The study, which had a broad confident interval of 95 percent ranging from 427 to 4,471, made assumptions based on the vast international air traffic from Wuhan, which is a travel hub, and the patients' incubation periods in Thailand and Japan.

As a consequence of air traffic and vast population movements the rapid spread of Covid-19 in Asia will matter in Africa. Africa was largely spared the SARS epidemic in 2002, as only one case was recorded in South Africa— a businessman who had traveled to Hong Kong. But as a result of the rapid expansion of Chinese investment in Africa<sup>18</sup>, air traffic between China and Africa has risen by more than 600 per cent in the past decade. For example, Ethiopian Airlines, Africa's largest airline, today operates nearly half of Africa's 2,616 annual flights to China<sup>18</sup>.

Therefore, African countries need to be on the alert and improve their public-health surveillance and laboratory networks, coordinated by functional national public-health agencies, to better prepare to prevent, identify and monitor any

potential spread of the novel virus on the continent, rapidly. Efforts between the Africa Centers for Disease Control and Prevention, based in Addis Abeba, Ethiopia, and China CDC for sharing information on potential people suspected of being sick traveling from China to Africa also need to be more organized.

China's political openness to timely coverage and the discovery of the novel Covid-19 virus, together with the rapid sequencing and public dissemination of the sequences, represents a new dawn for global health security and international health diplomacy. Additionally, there is hope that China CDC's much-strengthened networks will produce a huge return on public health investment in combating the outbreak, should it spread more widely in China. It will also improve health protection for the world, as the global health chain is only as strong as its weakest link, so a threat to disease will easily become a threat anywhere.

### **List of Countries That Have Restricted or Banned Chinese Tourists or Visitors**

On 2 February 2020, the US released the highest level of travel advisory (level 4) and instructed its citizens not to fly to China. It also encouraged US people in China to leave as far as possible through commercial means or stay home while avoiding contact with others. On 1 February 2020, Australia announced strengthened border control measures to curb the spread of the virus. All incoming passengers are subject to enhanced screening measures and, as of 1 February 2020, passengers leaving China are denied entry. The trip excludes Australian nationals, permanent residents and members of their immediate family.

New Zealand imposed temporary travel restrictions for all foreign nationals coming from China into the country. The limits were set for up to 14 days and should be checked every 48 hours.

On 3 February 2020, Maldives announced new border security measures to limit the entry of all passengers from China, except Maldivian nationals or those who have transited through China. Maldivians were also warned against non-essential travel to China and other countries affected by the virus.

Indonesia, Israel, Iraq, Italy, Honduras, El Salvador, Oman, Saudi Arabia, Russia, Japan, Vietnam, Singapore and Pakistan are some of the other countries that either have placed travel restrictions or cancelled direct flights to China, as stated by the BBC and Reuters.

### **Fiscal Measures to Minimize Economic Impact: Liquidity Infusion and**



## **Tariff Cuts**

Cuts Corona virus outbreaks will have a greater negative impact on the global economy than the outbreak of SARS (Severe Acute Respiratory Syndrome) in 2003, as any recession in the Chinese economy would not send ripples but waves around the globe, IHS Markit said Friday.

The epidemic has brought to a standstill large part of the world's second-largest economy and its influence has been felt through industries. Corona virus will have a greater negative impact on the global economy than was the 2003 SARS outbreak. China was the sixth biggest economy at the time of SARS, accounting for only 4.2 per cent of world GDP. China is now the second-largest economy in the world, accounting for 16.3 per cent of global GDP. Therefore, any downturn in the Chinese economy does not send ripples but waves across the globe, "IHS said in a commentary on corona virus outbreak.

In this case, the corona virus and the subsequent measures will reduce global real GDP by 0.4% in 2020. On the other hand, if containment measures begin to rise on February 10, the impact on global GDP will be more minimal, leading to 0.1 per centimeter.

The effects of corona virus in household consumption are most pronounced and somewhat mitigated in the industrial sector because factories are seasonally idle during this time period. Nonetheless, China's economy today is more fragile in many ways than it was in 2003, with production and overall economic growth already slowing and the consequences of the trade dispute between the US and China, "it said.

Because SARS and its effect on the world economy are now much bigger, China's GDP has risen dramatically.

Chinese growth slowdown can be a significant drag on global growth. China contributed 23 per cent of global GDP growth in 2002, with China contributing an additional 38 per cent of world growth in 2019, "IHS said.

The People's Bank of China (PBOC) publicized strategies to carry out RMB1.2tn (\$173bn) reverse repurchase operations to ensure an adequate supply of liquidity to the economy. The current liquidity in the banking system is RMB900bn (\$129bn) more than the one registered in the previous year during the same time. China is also expected to announce tariff reductions on essential goods imported from major countries like the US, in order to ensure supplies despite the recent trade war between the two countries.

## **Non-Fiscal Measures**

The Chinese Trade Ministry ensures that adequate stocks of beef, pork and other essential food items are maintained in order to avoid shortages. Amid preventive safety measures by some of the biggest and busiest international airports to prevent corona virus from spreading after its outbreak in Wuhan, China, many others took similar action. The corona virus spread to 25 more countries in a month, prompting border closures and a number of countries declared health emergencies.

### **CDC Response**

To counter this public health issue, the federal government works closely with state, local, tribal, and territorial partners, as well as public health agencies. The approach to public health is multi-layered, with the goal of identifying and mitigating introductions of this virus in the United States to reduce the spread and effects of this virus. On 7 January 2020, CDC developed a Covid-19 Incident Management Program. CDC activated its Emergency Operations Center on January 21, 2020 to help provide continued support for the Covid-19 response.

CDC released revised health advice for China on January 27, 2020, recommending that travelers avoid all non-essential travel to all of the country (Level 3 Health Notice).

The U.S. government has taken unprecedented travel measures in response to the growing threat posed by this emerging corona virus to public health: effective February 2, 2020 at 5 pm, the U.S. government has prohibited the entry of foreign nationals who have been in China for the past 14 days.

U.S. citizens, visitors and their immediate family members who have been to Hubei Province and other areas of mainland China are permitted to enter the U.S., but are subject to health monitoring and potential quarantine for up to 14 days. On 1 February 2020, the CDC released an interim Health Alert Network (HAN) update to notify state and local health departments and health professionals about this outbreak.

On January 30th, 2020, CDC released guidelines on the clinical care of Covid-19 patients for health care professionals. CDC released guidelines on February 3, 2020 to determine the potential risk for different exposures to Covid-19 and to treat those people appropriately.

CDC has sent multidisciplinary teams to Oregon, Illinois, California, Arizona and Wisconsin to support hospital care, information finding, and outreach divisions of safety. CDC developed a real-time Reverse Transcription-

Polymerase Chain Reaction (rRT-PCR) test that can diagnose Covid-19 from clinical specimens in both respiratory and serum samples. CDC publicly posted the assay protocol for that study on January 24, 2020. The CDC sent to the United States an Emergency Use Authorization (EUA) kit, food and Drugs Administration for their check on 3 February 2020. On 4 February 2020 the FDA approved the EUA. On February 5, 2020, CDC test kits were available to order through the agency's International Reagent Service External symbol from domestic and international partners. When sequencing was done, CDC submitted the entire genome of the viruses from reported cases in the United States to GenBank. CDC has developed the Covid-19 virus in cell culture that is required for additional studies, including further genetic characterization. The cell-grown virus has been sent to the NIH BEI Tool symbol for the large scientific community to use.

### **Travelers from China Arriving in the United States**

CDC is collaborating with public health agencies to implement new travel protocols reported in a Presidential Proclamation on Novel Corona virus to slow the spread of 2019 novel corona virus into the United States. Will summarize:

1. Foreign nationals visiting China in the past 14 days are not allowed to enter the United States.
2. American citizens, lawful permanent residents, and their families who have been in China for the last 14 days will be allowed to enter the United States, but will be diverted to one of 11 airports to undergo health screening. We will have some form of limits on their movements for 14 days, depending on their safety and travel background, from the time they leave China.

If you are in the second group above and are flying to the U.S.:

- Your travel will be diverted to one of 11 U.S. airports where CDC has quarantine stations
- We'll ask you about your health and your work.
- Your well being is checked for fatigue, cough or breathing difficulties.

Based on your safety and travel history:

- For a cycle of 14 days from the time you exited China you will have certain limits on your movement.
- Such measures are being taken to protect your safety, other travelers ' health and the health of U.S. communities from the current corona

virus that is spreading from person to person in parts of China.

**Travelers who have been in Hubei Province for the past 14 days:**

If you have fever, cough, or breathing problems, you will be checked for illness by CDC workers at the airport. They will drive you to a medical facility for further examination and care. Your travel itinerary won't be complete.

If you have no symptoms (fever, cough, breathing problems): you will be put under a federal, state, or local quarantine order for a maximum of 14 days from the time you left China. You might not have the chance to complete your travel itinerary until the time of 14 days is finished.

Travelers from other parts of China (outside the province of Hubei) in the last 14 days: if you have fever, cough, or breathing problems: CDC workers at the airport will test you for illness. They will drive you to a medical facility for further examination and care. Your travel itinerary may not be complete.

If you have no symptoms: you will reach your final destination. When you arrive at your final destination, you are asked to monitor your health for 14 days from the time you left China. You will receive a health information card telling you what symptoms to watch for and what to do if symptoms arise. You will stay home during that time and restrict as much contact with others as possible. You will be contacted by the State or local health department for further follow-up.

**Interim Considerations for Disposition of Hospitalized Patients with Covid-19 Infection**

There is currently limited information available to describe the scope of clinical illness, the efficiency of transmission and the length of the Covid-19 infection viral shedding. On the basis of available Covid-19 knowledge and what is known about associated corona viruses (MERS-CoV and SARS-CoV), interim guidance for the disposition of hospitalized patients with Covid-19 infection was established. When new information becomes available this advice is subject to change. The following attempts to act as a guide for the treatment of patients. All patients should be handled on a case-by-case basis and addressed with health care providers and public health agencies about their attitude.

**For Hospitalized Patients with Confirmed Covid-19 infection:**

- Usually, in an Airborne Infection Isolation Room (AIIR), hospitalized patients with confirmed Covid-19 infection should be managed using Normal, Contact, and Airborne Precautions with eye protection.
- If no immediate AIIR is available, consideration should be given to

moving the patient to an AIIR facility. The patient should be cared for in a single-person room and the door should be kept closed if relocation is necessary or not medically acceptable. Ideally, the space should have no exhaust, which is re-circulated within the building without filtration of high-efficiency particulate matter (HEPA). Healthcare staff should still use boots, mask, breathing and eye protection and follow all other approved procedures in the prevention and control of infections when caring for these patients.

- If there are inadequate AIIRs for patients with reported Covid-19 infection, prioritization should be provided to existing AIIRs for patients with symptoms of severe illness (e.g., people needing ventilator assistance).
- The decision to discontinue Transmission-Based Precautions for Covid-19 hospitalized patients should be taken on a case-by-case basis in conjunction with physicians, infection prevention and control professionals and public health officials and should consider the seriousness of disease, the signs and symptoms of disease and the findings of the Covid-19 laboratory test in respiratory specimens. Considerations to discontinue Transmission-Based Precautions include meeting all the following:
  - o Relief of fever, without use of antipyretic medication or Improvement of disease signs and symptoms
  - o Negative results of Covid-19 rRT-PCR examination from at least two consecutive respiratory tracts (nasopharyngeal swab and throat swab) specimens obtained within 24 hours\*. For 2019 Novel Corona virus (Covid-19), see Interim Guidelines for the Selection, Treatment, and Testing of Clinical Specimens from Persons under Investigation (PUIs). As more information becomes available, initial guidance is based on limited knowledge and is subject to change. In persons with chronic active cough, sputum specimens may detect Covid-19 RNA for longer periods than the upper respiratory tract specimens (nasopharyngeal swab and throat swab).

#### **For Non-Hospitalized Patients with Confirmed Covid-19 infection:**

- Wherever clinically indicated, patients may be discharged from the health care facility.
- Isolation at home should be maintained when the patient returns home before the decision to discontinue Transmission-Based Precautions is made. The decision to send the patient home should be taken in

consultation with the patient's clinical care team and local or state departments of public health and should include considerations of: the suitability of the home for and the ability of the patient to meet the guidelines for home isolation, and the potential risk of secondary transmission to household members with immune compromising conditions. See CDC Interim Home Care Guidelines for patients with reported nCoV infection and those under review for nCoV infection and Interim Guidelines for Preventing Covid-19 from Spreading to Others at Homes and Communities.

### **Hospital Preparedness Checklist for Suspected or Confirmed Covid-19 Patients**

All U.S. hospitals must be prepared for the 2019 (Covid-19) patients with suspected or confirmed novel corona virus. All hospitals should be prepared and ready to:

- Prevent the spread of Covid-19
- Classify and isolate patients with Covid-19 and notify key facilities personnel and public health authorities
- Care for a small number of patients with Covid-19 identified or suspected as part of routine operations
- Care for a larger number of patients with escalating transmission
- Outline plans for Covid-19
- Track and handle healthcare workers potentially exposed to nCoV in 2019
- Handle effects on patients, facilities and healthcare staff

The format of the checklist is not intended to prescribe mandatory requirements or set national standards.

- Ensuring that the infection prevention and control policies of the facility are in line with the Covid-19 guidance from the Centers for Disease Control and Prevention.
- Review protocols for the rapid detection and isolation of suspected Covid-19 patients,
- Ensure the ability to carry out triage activities based on public health guidelines, including at the hospital and using remote (i.e., cellular, internet-based) methods to reduce pressure on the health care system where applicable.
- Ensure that airborne infection negative pressure isolation rooms are

available and function properly, and are adequately monitored for airflow and exhaust handling.

- Assess the availability of personal protective equipment (PPE) and other infection prevention and control devices (e.g. hand hygiene supplies) to be used for the safety of both healthcare personnel (HCP) and source control for infected patients (e.g., patient facemask).
- Provide contingency plans if the supply exceeds the need for PPE or other supplies;
- Review plans to implement surge efficiency practices and crisis care requirements.
- Check protocols for the delivery of Covid-19 research specimens to laboratory.
- Assess the effectiveness of environmental cleaning procedures; provide training / refresher training for staff working in environmental services.
- Review policies and procedures for monitoring and managing HCP with potential for Covid-19 exposure, including ensuring that HCP has ready access to medical consultation, including by telephone;
- Ensure that suitable HCP has been cleaned medically, tested and trained for respiratory use.
- Include HCP awareness and refresher training on Covid-19 identification, how to obtain specimen testing, and correct PPE use, triage protocols including patient location, HCP sick leave policies, and how and to whom Covid-19 cases should be identified, procedures for taking unprotected exposures to suspected Covid-19 patients at the facility (i.e. not wearing the required PPE).
- Review visitor access and movement plans within the facility
- Ensure that the facility has designated specific persons responsible for communicating with public health officials and disseminating information to other HCP officers at the facility.
- Confirm local or state health department contacts and confirm reporting requirements for Covid-19 incidents.
- Monitor the situation on CDC's web page 2019 Novel Corona virus, Wuhan, China

### **How Airports and Airlines Are Guaranteeing a Secured Travel**

Some of the world's largest and busiest international airports have started to announce preventive safety measures against corona virus spread in China following its outbreak and rapidly spread to 25 more countries. The corona virus

has crossed borders, reporting cases in more than 24 countries including the United States, Canada, United Kingdom, Russia, Germany, France, Japan, India, South Korea, Hong Kong, Macau, Thailand.

Having completed the first case of a Wuhan corona virus on 21 January, followed by a second on 24 January, the Center for Disease Control (CDC) officially announced measures against corona virus by three international airports each in the US and Canada to prevent its spread, with European airports taking similar steps too. Due to the rising increase of the virus, the CDC extended the screening into 20 airports within a week.

United Airlines announced on 1 February the cancelation of several scheduled flights from US hubs to Beijing, Hong Kong and Shanghai expecting lower demand due to nCoV concerns. On 24 January to 29 February, the airline also declared travel waiver, initially to China and later to Hong Kong. American Airlines, the world's largest carrier, followed suit too, and reported similar cancellations to Beijing and Shanghai, but through March for an even longer period.

Different cancelations of select flights were announced by Air Canada to maximize its capacity based on reduced demand. British Airways suspended direct flights from and to China, following confirmed cases of infection with corona virus in France and Germany. In addition to isolating those with the symptoms of the disease, the Changi Airport in Singapore has initiated thermal screening for passengers arriving from China. Indigo Airlines and Air India cancelled majority flights to China, even before the nation reported the first case on 30 January.

### **Intensive measures being taken at Chinese airports**

Aggressive action at Chinese airports has begun China to take aggressive action including shutting Wuhan outbound traffic as millions of people, including local and international visitors, are expected to travel on the occasion of the Chinese Lunar New Year on January 25. Covid-19 cases of people traveling to Wuhan were also reported in Beijing and Guangdong. Airports across China have begun screening travelers and accepting for special cares immediately those with even the simplest of symptoms. Three mostly affected of the ten provinces host China's busiest airports.

### **Rigorous passenger screening in Thailand**

Thailand is conducting thermal screening at all of its 28 airports operated by the Department of Airports (DOA), which has guided thermal scanners and



thermometers to be used. At U-Tapao Rayong-Pattaya International Airport, which is also operated by the Royal Thai Navy, thermal scanning is carried out. Across all airports and tourist destinations, sanitation initiatives are being enforced.

### **Measures at Hong Kong international airport**

Hong Kong quarantined Wuhan traveler who was discovered with symptoms of corona virus to prevent the spread of the novel Corona virus disease (nCoV). Among tourists, the virus arrives at a busy holiday time. International airport in Hong Kong, which had already experienced a decrease in passenger traffic in 2019 as a result of anti-government demonstrations, is taking immediate action to prevent the future epidemic.

Aircraft flying from Wuhan to Hong Kong are parked in a specially designated field. Cleaning and disinfection are rapidly increasing for passengers coming from Wuhan at the arrival terminal, as stated by Time. Meanwhile, Hong Kong flag carrier Cathay Pacific and Hong Kong Airlines plan to cut flights to China and have begun to allow passengers who booked to / from Wuhan to reschedule their trips at no cost.

### **Turkey: Thermal screening at airports and flight cancellations**

Turkey began screening using thermal cameras at all major airports including Istanbul airport. Turkish Airlines flagship carrier cancelled flights to China until February 09. Turkey has also taken safety measures against corona virus across its ports.

### **Corona virus care at South Korean airports**

In addition to disinfecting aircraft more regularly, hazardous material suits are being provided to airline crews flying to and from South Korean airports after the first case of corona virus infection have been identified in South Korea.

### **Screening at Heathrow, Paris and other European airports**

Three European airports provide direct flights from major cities like London, Rome and Paris to Wuhan. Airlines like China Southern and Air France provide year-round non-stop flights into Europe. A special area at Terminal 4 has been approved by London Heathrow Airport to screen passengers arriving from Wuhan and search for, as well as notify passengers of the symptoms. The European Union Aviation Safety Agency (EASA) has proposed that airlines have Universal Security Kits for crew flying to / from the countries affected.

Increasingly, United States and Canadian airports scan for corona virus infection;

the US imposes a temporary travel ban on Chinese people. International airports John F. Kennedy, Los Angeles and San Francisco were the first to start screening for corona virus followed by international airports O'Hare and Hartsfield-Jackson. Within a week the screening expanded to a minimum of 20 airports across the US.

Canadian airports like Toronto International Airport, Montreal International Airport and Vancouver International Airport have confirmed that international passengers will be required to undergo additional screening such as temperature and other symptomatic tests, and to ask about their trips to Wuhan to check for the likelihood of contracting the infection. The US has also placed a ban on tourists traveling to China with a recent travel history.

### **Thermal screening at Indian airports**

The Civil Aviation Ministry of India initially announced several preventive measures against Wuhan corona virus at 11 airports including Chennai, Vishakapatnam, Bengaluru, Bhubaneswar, Hyderabad, Cochin, Delhi, Mumbai, Amritsar, Kochi, and Kolkata. Thermal screening has been expanded to 20 airports, with rapid spread of the infection to other countries. Passengers arriving in Chinese cities such as Wuhan in the preceding 14 days and with signs of viral infection are asked to make a self-declaration, while international passengers from China and Hong Kong are being screened at the airport's pre-immigration areas. Thermal cameras were mounted, and airport signage was shown at all airports. Kerala is India's State with the highest number of perpetrators of corona virus.

### **Corona virus screening at New Zealand, UAE and Iranian airports**

Screening stations were set up at New Zealand's Auckland and Christchurch airports, with further steps planned to be introduced in future. Big UAE airports like Abu Dhabi and Dubai have commenced passenger thermal screening on direct flights from China. Imam Khomeini International Airport in Iran has also undertaken patient health screening.

### **Measures at Australian airports**

Similar to the US, Australia closed borders with visitors arriving from China and foreigners who have a recent history of traveling to China, while Australians returning from China are being checked before allowing entry into the country. Numerous flights from China to Australia have been diverted, although Australians staying in the affected Chinese cities including Wuhan are brought back in special evacuation planes. Major airlines like Qantas have announced

that they would cancel services to Chinese cities like Beijing and Shanghai.

### **Travel restrictions in Trinidad and Tobago against corona virus**

It has been declared by the Government of Trinidad and Tobago that travel restrictions on Chinese travelers, disallowing them for 14 days from the date of departure. Thermal cameras, both handheld and fixed, are mounted at all airports, including Piarco International Airport and guidelines for infectious diseases are being enforced through them, the Ministry of Health, Trinidad and Tobago reported. The health ministry also urged its citizens to postpone travel to countries affected by the corona virus.

### **How airports perform thermal screening of passengers**

Airports perform passenger thermal screening to detect fevers caused by infections like CoV, swine flu and influenza (such as H1N1). Using thermal imaging and temperature measuring equipment such as the FevIR Scan, thermal screening is carried out using mass screening systems which measure the skin temperature at high speed. Such quick mass-screening ensures safety measures are taken without causing passengers delays and discomfort.

## **CHAPTER 7: GUIDELINE FOR PREVENTION: HYGIENE AND CLEANING THE FIRST DEFENSE**

There is presently no vaccine accessible to stop an infection with Covid-19. The best way to prevent infection is to stop the virus being released. As a reminder, however, CDC also recommends routine protective measures to help prevent the spread of respiratory viruses including:

- Avoid close contact with sick people.
- Do not touch your lips, your nose and your mouth with unwashed hands.
- When you're sick, stay home.
- Use tissue to cover the cough or sneeze, then chuck the tissue in the garbage.
- The regularly handled items and surfaces are washed and disinfected using a regular household spray or scrub.
- Follow CDC's Facemask instructions.

CDC does not commend that individuals who are well wearing a facemask, like Covid-19, protect themselves from respiratory viruses. Facemask should be used by people with 2019 novel corona virus symptoms, to shield others from the risk of infection. The use of facemasks is also important for health workers and people who care for someone in close proximity (at home or in a health care facility).

Your hands must be washed often for at least 20 seconds with soap and water, especially after getting to the bathroom; before eating; and after blowing your nose, coughing, or sneezing. Use an alcohol-based hand sanitizer with at least 60 per cent alcohol if soap and water are not readily available. Where hands are visibly dirty, wash hands using soap and water always. For hand washing information, see CDC's Hand washing Website for healthcare specific information, see CDC's Hand Hygiene in Healthcare Settings These are daily practices that can help prevent the spread of multiple viruses. CDC has specific guidelines for travelers. There is no approved clear antiviral treatment for an infection in Covid-19. People infected with Covid-19 will receive medical treatment to assist in symptom relief. Treatment for severe cases should include treatment to maintain vital functions of the organ.

People who think they could have been exposed to Covid-19 will immediately contact their healthcare provider. To prevent spreading in homes and residential

areas, there is an interim advice for individuals who may have 2019 Novel Corona virus (Covid-19). This interim advice is focused on what's known about the Covid-19 epidemiology and other viral respiratory infections transmission. The interim guidance will be revised by CDC when required and as additional information becomes available.

This interim guidance is intended for:

- Persons with confirmed or suspected Covid-19 infection, including those under investigation who do not need to be hospitalized and who may receive care at home (see Interim Guidance on Implementing Home Care of People Not Requiring Hospitalization for 2019 Novel Corona virus (Covid-19));
- Hospitalized persons with confirmed Covid-19 infection, found to be medically stable and discharged (see Interim Guidance for Implementing Home Care of People Not Requiring Hospitalization for 2019 Novel Corona virus (Covid-19));
- Other persons with close contact with a person with confirmed Covid-19 infection.

Below are prevention measures for persons with confirmed or suspected Covid-19 infection (including persons under investigation) who do not need to be hospitalized and persons with confirmed Covid-19 infection who have been hospitalized and who are considered to be medically safe to go home.

The physicians and public health workers can decide whether you can be treated at home. If it's decided that you don't need to be treated and can be protected at home, staff from your local or state health department can track you. Until a health care provider or local or state health department confirms you should return to your normal activities, you will follow the preventive measures below.

**Stay home except for medical treatment:** you can avoid activities outside your house, except for medical treatment. Do not go to work, to school or to public spaces. None use of public transport, ride-sharing, or taxis.

**Separate yourself from other people in your house :** you should live in a specific room as much as possible and in your home away from other people. If available, you should also use a separate bathroom.

**Call ahead before seeing the doctor:** Contact the healthcare provider if you have a medical appointment and inform them you have or may have an infection with Covid-19. This will help the office of the healthcare provider take steps to prevent contamination or exposure of other individuals.

**Wear a facemask:** when you are with people (e.g. sharing a room or vehicle) and before entering the office of a health care provider, you will wear a facemask; If you can't wear a facemask (for example, because it creates breathing difficulties), either people who live with you shouldn't stay with you in the same room, or they should wear a facemask if they enter your house.

**Protect your coughs and sneezes:** If you cough or sneeze protect your mouth and nose with a tissue. Throw used tissues into a lined trash can and wash your hands for at least 20 seconds with soap and water. If there is no detergent and water at the moment, clean your hands immediately with an alcohol-based hand sanitizer containing at least 60 percent alcohol, covering the surfaces of your hands and rubbing them together until they feel warm. When hands are obviously unclean, soap and water should be used preferentially.

**Clean your hands:** Wash your hands regularly over at least 20 seconds with soap and water. If soap and water are not available, use an alcohol-based hand sanitizer that contains at least 60 percent alcohol to clean your hands, cover all surfaces of your hands and rub them together until they feel dry. When hands are visibly unclean, detergent and water should be used preferentially. Stop using unwashed hands to brush your eyes, nose and mouth.

**Avoid sharing personal household items :** In your home, you should not share dishes, drink glasses, cups, eating utensils, towels, or bedding with others. They should be washed scrupulously with detergent and water after using those things.

**Track your symptoms:** If your condition worsens (e.g., shortness of breath or difficulty breathing) seek prompt medical treatment. Contact your health care providers before looking for maintenance to tell them you have, or are being treated for, an infection with Covid-19. Place yourself on a facemask before entering the room. Those measures will allow the office of the health care provider to prevent other individuals from becoming contaminated or exposed. Tell the health-care provider to contact the department of local or state safety. Persons put under active supervision or facilitated self-monitoring will, as applicable, follow the instructions given by their local health department or occupational health professionals.

**Discontinued home isolation:** Patients with confirmed Covid-19 infection will remain under the precautions of home isolation until the risk of secondary transmission to others is considered low. The decision to discontinue measures about home isolation should be taken on a case-by-case basis, in consultation with health care providers and departments of state and local health. Current Covid-19 knowledge is limited; thus, home precautions are cautious and based

on general recommendations for other corona viruses, such as Middle East Respiratory Syndrome (MERS).

CDC also advises that:

While the potential risk to the American public of this new virus is believed to be small at this time, everyone can do their part to help us respond to this growing public health threat: It is currently the season for flu and respiratory diseases and CDC recommends taking a flu vaccine, taking regular preventive measures to help avoid germ spread and taking antiviral flu.

- If you are a healthcare provider, watch out for people with fever and respiratory symptoms who have recently traveled from China.
- Please take care of yourself and follow approved infection control protocols if you are a healthcare provider who cares for a Covid-19 patient or a public health responder.
- Call the healthcare provider for people who have had close contact with someone who experiences problems with Covid-19 to inform them about your symptoms and exposure to the Covid-19 patient.
- For those suffering from Covid-19, please follow CDC recommendations on how to reduce the risk of spreading the disease to others.

### **Interim Control for Businesses and Employers to Plot and Respond to 2019 Novel Corona virus (Covid-19)**

This interim control is based on what is presently known about the 2019 novel corona virus. CDC works in the public health response to Covid-19 across the Department of Health and Human Services and throughout the U.S. government. Of how the Covid-19 spreads, much is unclear. Current awareness is based in large part on what is learned about related corona viruses.

Corona viruses are a large family of viruses common to humans and numerous different animal species, including camels, goats, cats, and bats. Animal corona viruses will occasionally infect people and then spread among people, for example with MERS and SARS. Covid-19 spreads person-to-person in China and some small person-to-person transmission has been recorded in non-China countries, including the USA. Respiratory infections, such as seasonal influenza, are now prevalent in many populations across the US.

In non-healthcare settings, the following interim guidelines can help prevent occupational exposures to acute respiratory diseases, including nCoV. The

advice also includes contingency guidelines where the Covid-19 outbreaks are more common, population. To reduce occupational stigma and prejudice, use only the guidelines provided below to assess the risk of infection with nCoV. Don't make risk determinations based on race or country of origin, and be sure to keep people with reported corona virus infection confidential. There's much more to be learned about the Covid-19 transmissibility, frequency, and other features and inquiries are continuing. The reports can be found on the CDC web page.

### **Recommended Strategies for Employers to Use Now**

- **Actively encourage sick employees to stay at home:**
  - Workers with symptoms of acute respiratory illness are advised to stay at home and not come to work until they are free of fever (100.4 ° F[ 37.8 ° C] or higher using an oral thermometer), fever signs, and any other symptoms for at least 24 hours without the use of fever-reducing or othorax thermometer. Employees should alert their boss if they are sick, and stay at home.
  - Ensure that your sick leave program is flexible and compatible with guidelines on public health and that staff are aware of those policies.
  - Speak to people that work with your company or temporary workers about the value of staying at home for sick employees and urge them to create non-punitive leave policies.
  - Do not request a notice from a health care provider for workers suffering from acute respiratory disease to confirm their condition or return to work, as health care providers ' offices and medical facilities may be extremely busy and unable to provide such paperwork in a timely manner.
  - Employers should develop flexible practices allowing employees to stay home to care for a sick member of their family. Employers should be aware that more staff may need to stay at home to care for sick children or other members of the sick family than is usual.
  
- **Separate sick workers:**



- CDC advises that employees who tend to be suffering from acute respiratory symptoms (i.e. cough, shortness of breath) should be isolated from other employees upon arrival at work or become ill during the day and sent home immediately. When you sneeze or cough (or an elbow or shoulder if there is no tissue available), sick workers will cover their noses and mouths with a towel.
- Emphasize staying at home when sick, breathing sign and hand hygiene for all employees:
  - Place signs that promote staying at home when sick, cough and sneeze, and hand hygiene at the entrance to your workplace and in other workplace places where they are likely to be seen.
- Provide no-touch and tissue disposal receptacles for employee use.
- Instruct workers to disinfect their hands often with an alcohol-based hand sanitizer that contains at least 60-95 percent alcohol, or to wash their hands for at least 20 seconds with soap and water. When hands are visibly dirty, soap and water should be used preferentially.
- Include on - the-job soap and water and alcohol-based hand rubs. Make sure you keep sufficient supplies. To promote hand hygiene, put hand rubs in multiple locations or at conference rooms.
- For more information, visit the Coughing and Sneezing etiquette and clean hands website.

- **Environmental daily cleaning:**

- Daily cleaning of all regularly touched office surfaces, such as workstations, countertops, and door knobs; Use the cleaning agents usually used in these areas, and obey the label instructions.
- No further disinfection is recommended beyond the routine cleaning at this time.
- Include disposable wipes to allow widely used surfaces (e.g., doorknobs, keyboards, remote controls, desks) to be cleaned off by employees prior to each usage.

- **Advise staff to take certain precautions before traveling:**

- Consult the Traveler's Health Notices CDC for the current advice and guidelines for each country you are traveling to. On the CDC website you can find specific travel information for travelers entering and returning from China, as well as information for aircrew.
  - Advise staff to search for acute respiratory disease symptoms before beginning travel and alert their boss and stay home if they are sick.
  - Ensure that workers who become sick while traveling or on a temporary assignment recognize that they should alert their boss and contact the healthcare provider immediately for advice if appropriate.
  - If outside the United States, sick workers should follow the policy of receiving medical care from your employer or contact a healthcare provider or medical assistance company overseas to help them find a suitable healthcare provider in that country. A consular officer in the U.S. can assist in locating health services. U.S. embassies, consulates, and military facilities, however, do not have the legal authority, capacity, and resources to transfer or provide medications, vaccines, or medical care to U.S. citizens outside the country.
- **Additional measures in response to Current Sporadic Imports of the Covid-19:**
  - Workers who are safe but have a sick family member at home with Covid-19 will alert their supervisor and refer to the CDC guidelines on how to carry out a risk assessment of their potential exposure.
  - Where an employee has been reported to be infected with Covid-19, employers should warn fellow employees of their possible exposure to Covid-19 in the workplace but maintain confidentiality as allowed by the American Disability Act (ADA). Employees exposed to a co-worker with Covid-19 reported will refer to CDC guidelines on how to perform a risk valuation of their possible exposure.

### **Preparing for a Possible Covid-19 Plague in the US**

The extent of the disease or how many people will fall sick from Covid-19 at

this time is unclear. If there is evidence of an outbreak in the U.S. in Covid-19, businesses should expect to be able to respond flexibly to varying gravity levels and be prepared to adapt their business response plans as required. The instant health danger from Covid-19 is measured low for the general American public, such as staff in non-healthcare environments and where it is unlikely that job activities pose an increased risk of exposures to Covid-19. The CDC and its collaborators will continue to monitor national and international data on the seriousness of the Covid-19 outbreak, disseminate the findings of these ongoing surveillance assessments, and make additional recommendations as required.

### **Planning Deliberations**

All employers have to contemplate on how best to reduce the spread of acute respiratory disease and reduce the impact of Covid-19 on their workplace in case of an outbreak in the United States. We should define and communicate their priorities, which may include one or more of the following: (a) reducing workforce delivery, (b) protecting people at higher risk for adverse health conditions, (c) sustaining business operations, and (d) mitigating adverse effects on other organizations in their supply chains. Some of the main factors when making decisions regarding appropriate responses are:

- Seriousness of the disease (i.e., number of people who are sick, hospitalization and mortality rates) in the community where the business is located;
- Effect of the disease on workers who are vulnerable and may be at higher risk for adverse health effects in Covid-19. Inform staff that some individuals, such as older adults and those with chronic medical conditions, may be at a higher risk for serious illness.
- Plan for potential increased numbers of employee absences due to illness in workers and their family members, dismissals from early childhood services and K-12 schools due to high levels of absenteeism or disease:
  - Employers should prepare to track and respond to absenteeism at the workplace. Implement plans to continue your critical business functions in the event you encounter absenteeism higher than usual.
  - Cross-train staffs perform essential functions so that the workforce can run even when key staffs are absent.
  - Assess your core functions and the reliance on your services or products that others and the society have. Be ready to adjust

your business practices if compulsory to maintain essential operations (e.g., find substitute suppliers, prioritize customers or, if appropriate, temporarily suspend some of your operations).

- Employers with over one business site are advised to allow local managers to take the appropriate action outlined in their Business Infectious Disease Outbreak Response Plan, based on the condition of each locality.
- Coordination with state and local health officials for all organizations is strongly encouraged so that timely and reliable information can direct appropriate responses wherever their operations reside. As the severity of an outbreak can vary depending on the geographic location, local health authorities may provide specific guidance for their communities.

### **Important Considerations for Creating an Infectious Disease Outbreak Response Plan**

Both companies should be ready to implement measures from Covid-19 to protect their employees while maintaining organizational continuity. Both sick workers should stay at home during a Covid-19 outbreak and be welcomed away from the office, respiratory safety and hand hygiene, and thorough washing of frequently touched surfaces should be done regularly.

- Ensure that the program is flexible, and include your staff in the production and analysis of your strategy.
- Hold a concentrated conversation or exercise using your strategy, to decide in advance whether there are holes or issues that need to be addressed.
- Share the strategy with workers and explain what programs are open to them on human resources, job and leave flexibilities, and pay and benefits.
- Exchange best practices with other businesses in your communities (especially those within your supply chain), chambers of commerce and organizations to strengthen community response efforts.

### **Recommendations for an Infectious Disease Outbreak Response Plan**

- Identify potential work-related threats to your workers and their safety. Further details on how to protect employees from potential

exposure to Covid-19 is available at OSHA.

- Review human resources programs to ensure that policies and practices are consistent with public health guidelines and in accordance with current federal and state labor laws.
- Consider how policies and procedures such as flexible workplaces (e.g., telecommuting) and flexible working hours (e.g. staggered shifts) can be developed to increase physical distance between workers and between employees and others when state and local health authorities consider using social distance strategies. Supervisors should allow workers to telework for employees who are willing to telework, rather than coming into the office before symptoms are fully resolved. Make sure you have the information technology and infrastructure required to support multiple employees who can work from home.
- Identify basic business functions, key positions or responsibilities, and critical elements within the supply chains (e.g., raw materials, manufacturers, subcontractor services / products, and logistics) needed to sustain business operations. Plan how the company will work if there is growing absenteeism or disruption of those supply chains.
- Establish guidelines, triggers and protocols to enable and stop the company's infectious disease outbreak response plan, change business operations (e.g., likely altering or closing operations in the affected areas), and pass business knowledge to key staff. To recognize those causes, work closely with your local health officials.
- Aim to minimize exposure between workers and, if public health officials call for social distancing, also between employees and the public.
- Establish a mechanism for communicating information on your infectious disease outbreak response plans to employees and business partners and the latest Covid-19 details; Anticipate stress, anxiety, rumors, and misinformation among employees, and schedule contact accordingly.
- Early childhood services and K-12 schools may be discontinued in some communities, particularly if Covid-19 worsens. Determine how you will work if absenteeism spikes from increased numbers of sick workers, those who stay at home to care for sick family members, and those who have to stay at home to watch their kids if they are fired. Businesses and other employers should be prepared to set up flexible

- places of work and leave plans for these workers.
- Local conditions will affect public health officials' decisions regarding community-level strategies; businesses should now take the time to learn about the plans in place in each community where they have a business.
  - If proof of a Covid-19 outbreak is available in the United States, consider canceling non-essential business travel to additional countries via travel guidance on the CDC website;
    - Certain countries that impose travel restrictions which may limit employees' ability to return home if they become ill while on travel status.
    - Consider canceling large meetings or activities related to the job.
  - Engage state and local health departments to validate communication channels and strategies for disseminating local information about the outbreak.

### **Interim Contagion Prevention and Control References for Patients with Confirmed 2019 Novel Corona virus (Covid-19)**

Infection control protocols including administrative guidelines and engineering tests, environmental sanitation, proper work practices, and sufficient use of personal protective equipment (PPE) are all necessary to prevent infections from spreading during delivery of health care. Prompt diagnosis and efficient triage and isolation of potentially infectious patients are important to prevent unnecessary interactions at the facility between patients, health care personnel and visitors. All health care facilities must ensure that their personnel are properly trained and able to carry out infection control procedures; individual health care staff should ensure that they understand and can comply with the standards for infection control.

This advice is focused on the currently limited information available about Covid-19 related to seriousness of disease, efficiency of transmission and duration of shedding. A cautious approach will be modified and revised as more information becomes available in the United States, and as the response needs change. This policy extends to all health care environments in the United States. This guideline is not intended for non-healthcare environments (e.g., schools) OR for non-healthcare individuals. Refer to the main CDC Covid-19 website for guidelines related to clinical care, air or ground medical transport, or laboratory

settings.

**Definition of Healthcare Personnel (HCP):** For the purposes of this guideline, HCP refers to all individuals, paid and unpaid, working in healthcare settings engaged in patient care activities, including: triage assessment of patients, entry of examination rooms or patient rooms to care for or clean and disinfect the environment, collecting clinical specimens, handling of soiled medical supplies or equipment

## **Required**

1. **Reduce Exposure Risk** Ensure policies and practices in place to minimize exposure to respiratory pathogens like Covid-19. Measures should be introduced in the clinical environment prior to patient admission, upon diagnosis and throughout the course of the life of the affected patient.
  - **Upon arrival:** when making appointments, advise patients and accompanying individuals to call or alert HCP upon arrival if they have any signs of respiratory infection (e.g. cough, runny nose, fever<sup>1</sup>) and to take appropriate preventive measures (e.g., wear a facemask at entry to avoid cough, obey triage procedures). When a patient arrives by emergency medical services (EMS) transport, the driver will call the receiving emergency department (ED) or healthcare facility and follow local or regional transport procedures previously agreed upon. This will encourage the healthcare facility to prepare for the patient's acceptance.
  - **Upon onset and all through the stay:** take steps to ensure that all individuals with suspected Covid-19 symptoms or other respiratory infections (e.g., fever, cough) adhere to breathing hygiene and cough protocol, hand hygiene and triage throughout the visit. Consider posting visual warnings (e.g. signage, posters) at the entrance and in strategic locations (e.g. waiting rooms, elevators, and cafeterias) to provide patients and HCP with guidance on hand hygiene, respiratory hygiene, and cough etiquette (in relevant languages). Instructions may include how to use facemasks (see Facemask Description in Appendix) or tissues to cover the nose and mouth while coughing or sneezing, how to dispose of tissues and hazardous products in waste receptacles, and how and when to conduct hygiene by hand. Ensure patients with suspected Covid-19

symptoms or other respiratory infections (e.g., fever, cough) are not required to wait among other patients seeking care. Identify a clear, well ventilated room with easy access to respiratory hygiene supplies, allowing waiting patients to be separated by 6 feet or more. In some settings, patients who are medically stable may choose to wait in a personal vehicle or outside the health care facility where they can be reached by mobile phone when it is their turn to be assessed. Ensure the rapid triage and isolation of patients with suspected Covid-19 symptoms or other respiratory infections (e.g., fever, cough):

- o Identify patients at risk for Covid-19 infection before or immediately after arrival at the health care facility.

- o Develop triage protocols for the identification of persons under investigation (PUI) for Covid-19 during or prior to patient triage or registration (e.g. at the time of patient check-in) and ensure that all patients are informed about the occurrence of symptoms of respiratory infection and travel history to areas experiencing Covid-19 transmission or possible Covid-19 patients contact.
- o Apply respiratory hygiene and cough etiquette (i.e., put a facemask over the patient's nose and mouth, if not already done) and, where possible, isolate the Covid-19 PUI in the Airborne Infection Isolation Room (AIIR). For "Patient Placement" guidelines see below.
- o Alert infection prevention and control programs, local and state public health agencies and other health-care personnel as needed of the involvement of an individual under investigation for Covid-19.

Provide supplies of respiratory hygiene and cough etiquette including 60 percent-95 percent alcohol-based hand sanitizer (ABHS), wipes, no touch receptacles for disposal, and facemasks at entrances to health care facilities, waiting rooms, patient check-in, etc.

## **2. Obedience to Standard, Contact, and Airborne Safety measures, including the Use of Eye Protection**

Standard Precautions presume that each person is potentially contaminated or colonized with a pathogen that could be transmitted in the healthcare setting. Standard Precautionary Elements applicable to patients with respiratory infections, including those caused by Covid-19, are listed below. Education on



proper use, proper donning (putting on) and doffing (taking off) and disposal of any PPE should be taken care. This document does not highlight all aspects of the Standard Precautions (e.g., injection safety) needed for all patient care; the full description is given in the Isolation Guideline

- **Patient Placement**

- Install a patient with known or suspected Covid-19 (i.e., PUI) in an AIIR built and maintained in compliance with current guidelines.
- AIIRs are single-patient rooms with negative pressure compared to surrounding areas and with at least 6 air changes per hour (12 air changes per hour are recommended for new or revamped construction). Before recirculation, air from these rooms should be exhausted directly to the outside or filtered through a high-efficiency particulate air filter (HEPA). Room doors should be shut except when entering or exiting the room and there should be minimal entry and exit. Facilities should track and log those rooms' proper negative-pressure work.
- If no AIIR is open, patients requiring hospitalization should be moved to an AIIR facility as soon as possible. If the patient does not need hospitalization, when considered medically and socially necessary, they may be discharged to the home (in conjunction with the state or local public health authorities). Pending transfer or discharge, place the patient in a facemask and isolate him / her in an exam room with the door closed. Ideally, the patient should not be put in any space within the building where exhaust is re-circulated without HEPA filtration.
- Once an AIIR is in operation, the facemask of the patient may be removed. Restrict the patient's travel and movement outside the AIIR to medically necessary purposes. If not in an AIIR (e.g. during travel, or if there is no AIIR), patients will wear a facemask to prevent secretions.
- Personnel entering the room, as mentioned below, should use PPE, including respiratory protection;
- The room should be accessed only by essential personnel. Implement personnel policies to reduce the number of HCP people entering the room.

- Facilities will consider taking care of these committed HCP patients to reduce risk of transmission and exposure to other patients and other HCP patients.
- Facilities should keep a log of all individuals who care for or access certain patients ' rooms or areas of treatment.
- Using non-critical, dedicated or disposable patient care devices (e.g., blood pressure cuffs). When equipment is used for more than one patient, clean and disinfects this equipment according to manufacturer's instructions prior to use on another patient.
- HCP should use respiratory protection when entering the room soon after a patient has vacated the bed. (See Personal Protective Equipment section below) The standard practice for airborne pathogens (e.g., measles, tuberculosis) is to prevent unprotected individuals, including HCP, from accessing a vacant space before sufficient time has elapsed for sufficient air changes to eradicate potentially infectious particles (more detail on clearance rates under various ventilation conditions). We still don't know how long Covid-19 remains infectious in the soil. In the meantime, adding a similar time period before entering the room without respiratory protection as used for pathogens transmitted through the airborne route (e.g., measles, tuberculosis), is appropriate. The space should also undergo proper cleaning and surface disinfection before returning to daily use.

#### • **Hand hygiene**

- HCP should perform manual hygiene using ABHS before and after all patient contact, contact with potentially infectious material, and before putting on and removing PPE, including gloves. Hand-hygiene in healthcare environments can also be done for at least 20 seconds by washing with soap and water. Use detergent and water before going back to ABHS, if the hands are visibly soiled.
- Healthcare facilities should ensure that portable hygiene products are readily available at any place of treatment.

#### • **Personal protective equipment**

Employers should pick suitable PPE equipment and provide it to HCP in

compliance with OSHA's PPE regulations (29 CFR 1910 Subpart I). HCP must be educated and demonstrate an understanding of when to use PPE; what PPE is needed; how to properly don, use, and doff PPE to avoid self-contamination; how to properly dispose of, or clean, and preserve PPE; and the drawbacks of PPE. Each reusable PPE will need to be properly washed, decontaminated and maintained after and between uses. Facilities should have policies and procedures outlining a prescribed sequence for secure dressing and doffing of PPE:

- **Gloves:** perform hand hygiene, and then put on clean, non-sterile gloves when entering the room or treatment area of the patient. If they get ripped or become highly polluted, change gloves. Before entering the patient's room or treatment area, remove and discard the gloves and practice hand hygiene immediately.
- **Gowns:** put on a clean gown of isolation upon entering the room or region of the patient. If it gets soiled remove the robe. Remove and dispose of the gown in a designated waste or linen tub before leaving the room or treatment area for the patient. You will remove the disposable gowns after use. After each use cloth gowns should be laundered.
- **Respiratory Protection :** Using respiratory protection (i.e., respiratory protection) that is at least as safe as a fit-tested disposable N95 NIOSH-certified respiratory face piece filter when entering the patient room or treatment area. See appendix for interpretation of respirator. Upon leaving the room or treatment area of the patient, and closing the door, remove and discard disposable respirators. Perform cleaning by hand after the respirator has been removed. When reusable respirators (e.g., powered air purifying respirator / PAPR) are used, they must be washed and disinfected prior to re-use in compliance with manufacturer's reprocessing instructions. Respiratory use must be in compliance with the Occupational Safety and Health Administration (OSHA) Respiratory Protection Code (29 CFR 1910.134 external icon) in the form of a full respiratory protection programme. Staff should be properly washed and fit-tested when using respirators with tight-fitting face parts (e.g., a NIOSH-certified disposable

N95) and qualified in proper respiratory usage, safe removal and disposal, and medical contraindications for respiratory use.

- **Eye Protection:** Using eye protection (e.g. goggles, face mask that protects the front and side of the face) when entering the patient room or treatment area. Disable the eye protection before leaving the room or area of treatment for the patient. Reusable eye protection (e.g., goggles) must be washed and disinfected according to the reprocessing instructions given by the manufacturer before re-use. Upon use, the eye cover should be removed.
- Use caution to produce infectious aerosols while conducting aerosol-generating procedures
  - Some of the procedures performed on Covid-19 patients. In particular, procedures which are likely to induce coughing (e.g., induction of sputum, open suction of airways) should be performed with caution and avoided where possible.
  - Such procedures should take place in an AIIR if performed and staff should use respiratory protection as mentioned above.

Additionally:

- Restrict the number of HCP present during the procedure to only those required for patient care and procedural assistance.
  - Clean and disinfect surfaces of the procedure room promptly as defined in the section below on the control of environmental infections.
- **Respiratory Diagnostic Specimen Collection**
  - Collection of diagnostic respiratory specimens (e.g., nasopharyngeal swab) can cause coughing or sneezing. Ideally, people in the room during the treatment should be confined to the specimen being collected by the patient and by the health care provider.
  - HCP collecting Covid-19 test specimens from patients with

known or suspected Covid-19 (i.e., PUI) will adhere to Normal, Contact and Airborne Precautions, including the use of eye care.

- Such tests should be performed in an AIIR or in a closed-door exam room. Ideally, the patient should not be put in any space within the building where exhaust is re-circulated without HEPA filtration.
- Length of Isolation Precautions for PUIs and confirmed Covid-19 patient's
  - Before information on viral shedding following clinical progress is available, discontinuation of isolation precautions should be decided on a case-by-case basis, in accordance with local, state and federal health authorities.
  - Factors to be considered include: the occurrence of Covid-19 symptoms, the date symptoms resolved, other conditions requiring specific precautions (e.g., tuberculosis, *Clostridioides difficile*), other clinical-related laboratory details, alternatives to inpatient isolation, such as the likelihood of safe recovery at home.

### **3. Manage Guest Access and Movement inside the Facility**

- Establish guest tracking, control and training procedures;
- Restricts visitors to access known or suspected Covid-19 patients (i.e., PUI) rooms. Alternate strategies should be considered for patient and guest experiences, such as video-call apps on mobile phones or tablets. Facilities may take exceptions based on end-of-life conditions or when a visitor is necessary for the emotional well-being and treatment of the patient.
- Visitors to patients with known or suspected Covid-19 (i.e., PUI) should be scheduled and monitored to allow:
  - Visitors to be checked for signs of acute respiratory disease before accessing the health care facility;
  - Facilities should determine the visitor's health risk (e.g., visitors may have an underlying disease that puts them at a higher risk for Covid-19) and their ability to comply with precautions.

- Installations should provide guidance on hand hygiene, restriction of touched surfaces and use of PPE in compliance with current facilities policy while in the patient's room before visitors enter the rooms.
  - Facilities should keep a record (for example, log book) of all patients accessing patient rooms.
  - Visitors should not be present during procedures for the processing of aerosols.
  - Visitors should be advised to limit their movement within the building.
  - Exposed visitors (e.g., contact with Covid-19 patient prior to admission) should be recommended to disclose to their health care provider any signs and symptoms of acute illness for a period of at least 14 days after the last reported exposure to the patient.
- Respiratory hygiene and cough etiquette care should be taken by all patients while in common areas of the facility.

#### **4. Implement Engineering Controls**

Consider developing and implementing controls to reduce or eliminate exposures from infected individuals by protecting HCP and other patients. Types of engineering controls include physical barriers or partitions to guide patients through triage areas, curtains between patients in shared areas, closed airway suction systems for intubated patients, as well as suitable air-handling systems (with correct directionality, filtration, exchange rate, etc.) that are designed and maintained properly.

#### **5. Monitor and Manage Ill and Exposed Healthcare Personnel**

Workers Movement and control decisions should be taken in coordination with public health authorities for HCP with access to Covid-19. Health care facilities and entities will adopt HCP sick leave policies that are non-punitive, flexible, and compatible with recommendations for public health.

#### **6. Train and Educate Healthcare Personnel**

Provide HCP with job-or task-specific training and training to prevent infectious agent transmission, including refresher training. HCP must be medically cleaned, trained and checked for the use of respiratory protective devices (e.g., N95 filtering face piece respirators) or medically cleaned and trained to use an alternative respiratory protective device (e.g., Powered Air-Purifying Respirator,

PAPR) if respirators are needed. OSHA has a variety of videos external symbol for the respiratory instruction.

Ensure that HCP is prepared, qualified and used properly before taking care of a patient, including consideration for proper use of PPE and avoidance of clothing, skin and environment contamination during the removal process.

## **7. Implement Environmental Infection Control**

All non-dedicated, non-disposable medical equipment used for patient care should be washed and disinfected as per the guidelines and facilities policies of the manufacturer.

Ensure the processes for the environmental cleaning and disinfection are regularly and correctly followed. Routine cleaning and disinfection procedures (e.g., use of cleaners and water on pre-clean surfaces before applying an EPA-registered, hospital-grade disinfectant to regularly touched surfaces or items for acceptable contact times as indicated on the product label) are appropriate for Covid-19 in healthcare environments, including those patient care areas where aerosol-generating procedures are used. Goods that are believed to have emerging viral pathogens licensed by EPA are recommended for use against Covid-19.

## **8. Establish Reporting within Healthcare Facilities and to Public Health Authorities**

Develop systems and policies that quickly warn key facilities personnel including infection control, health care epidemiology, facility leadership, occupational health, clinical laboratory, and front-line staff regarding Covid-19 patients known or suspected (i.e., PUI). Communicate with public health agencies and cooperate. Notify patients with known or suspected Covid-19 (i.e., PUI) immediately by the State or local public health authorities. Facilities will appoint specific individuals who are responsible for interacting with public health officials and disseminating information to HCP within the health care facility.

## CONCLUSION

When China controls the virus, and outbreaks in other countries don't blow up and spread to more populations, we might see the case count begin to fall and the emergency for public health end. Yet there are already so many cases across China, as well as the very real possibility that in countries with poor health systems, the virus is spreading, undetected, that the likelihood of containment is looking less likely by the day.

Unless 2019nCoV is not included, "if it continues to accelerate, we may very well encounter a pandemic. That will mean more sicknesses and deaths not only in China, but also in other countries around the world, as cases expand to full-blown outbreaks from one-off travelers or small clusters. Therefore, public health officials should move from trying to contain the virus to minimizing its effects — building hospitals to isolate and care for patients, making recommendations for "social distancing" (such as canceling public events), and designing experimental procedures for the many people who may need hospital care.

But again, even though this virus is spreading all over the world— it may not be very lethal. In the best-case scenario, this epidemic may look more like swine flu H1N1 than either SARS or Spanish flu. Once H1N1 was first identified in 2009 and spread across the globe, major concerns about its lethality were expressed. US schools closed, North American citizens quarantined as they landed in other countries, and flights cancelled. Not only did those steps fail to contain the virus, it turned out that H1N1 wasn't dangerous enough.

There are a few approaches that could stop this outbreak. Perhaps public health initiatives — rapidly reporting cases, insulating infected people — will stop this corona virus from spreading. Because this is a zoonotic disease which originated from an animal, it would also help to find and remove the source. Or perhaps a vaccine or antiviral will be discovered quickly to counter a larger outbreak (though that would probably take years). Perhaps the coming warmer weather seasons will play a role in slowing down the virus, at least. Corona viruses are viruses from winter time. Such viruses do not spread when the weather is warm and damp as well as when the weather is cold and dry.

There's eventually the risk that the virus will actually die out. The outbreaks of illness are kind of like flames. The Fire is the Virus. The power is vulnerable people. Finally, if it runs out of kindling, a fire burns itself out. An outbreak of the virus will end when it starts finding people susceptible to infection.



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The End.