

## **From Wuhan to Delaware: Tracking the Spread of COVID-19**

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### **Introduction**

On November 17, 2019, an individual presented to a healthcare facility in Wuhan, China, with flu-like symptoms. About two weeks later, on December 1, another patient entered the health care system with symptoms of fever and a dry cough. More people presented as 2019 drew to a close with this “unusual pneumonia.” Laboratory testing identified the virus as a SARS (Severe Acute Respiratory Syndrome) -like coronavirus, and on December 31, Chinese officials alerted the World Health Organization of these new findings.

Since the end of 2019, over 350,000 people worldwide have contracted this new virus, over 15,000 have died, and public health officials are desperately trying to study, treat, and contain it. People everywhere are suddenly faced with terms like “social distancing” and “flattening the curve,” and the virus has recently reached the pandemic stage. How did it get so bad so quickly, what can we do to help, and is there an end in sight?

### **The Unknown Virus**

There is a lot about this pandemic that is not yet known, and a lot that will surely come to light in the future. The 55-year-old presenting to their health care professional on November 17, 2019, could have been the first person to contract this new coronavirus.<sup>1</sup> They may or may not have gone to the Huanan Seafood Wholesale Market in Hubei Province, China, where several of the first cases of this novel virus were said to have visited. The virus may be a brand new zoonotic infection (a disease that jumps from animals to humans), or it may have been present for a while.<sup>2</sup>

### **The Virus**

Coronaviruses are a large family of viruses that are common in people and animals (including camels, cattle, cats, and bats).<sup>3</sup> The new virus, named SARS-CoV-2, is a betacoronavirus, like MERS (Middle East Respiratory Syndrome) and SARS (Severe Acute Respiratory Syndrome). All three viruses have their origins in bats, and can be spread from animals to humans.

A zoonotic disease is usually not harmful to humans, however sometimes a virus can mutate and make the jump.<sup>4</sup> If this happens, the human has no immunity, and the individual’s immune system must make new antibodies against it. Sometimes, it ends there, with the virus only being passed from animal to humans (as seen in MERS-CoV). This is why the Chinese government took steps to cleanse and close down the Seafood Market in December – if the disease had mutated to animal-to-human transmission, removing the animals and humans from the same area would stop the spread of the disease.

Later, it was discovered that a growing number of patients had no exposure to animal markets of any kind, indicating the virus may be spread person-to-person instead. In order to begin spreading from person to person, the virus needs to mutate again.<sup>4</sup> Unfortunately, SARS-CoV-2 mutated in such a way that it causes damage to human lungs.

## **The Disease**

The disease called COVID-19 is full of unknowns. Reported illnesses range from very mild to severe, the most serious of which has ended in death for over 7,000 individuals.<sup>5</sup> Common symptoms of COVID-19 may appear 2-14 days after exposure (based on the incubation period of MERS-CoV), and include fever, dry cough, and shortness of breath. Individuals with more serious illness have seen symptoms like severe shortness of breath or trouble breathing (sometimes requiring assisted ventilation), pain or pressure in the chest, confusion or difficulty to awaken, and a bluish tint to their lips or face.<sup>3</sup> Those who have died from the disease in the US have tended to be older (50 years-of age or more), with underlying chronic conditions, although children are not immune.<sup>6,7</sup>

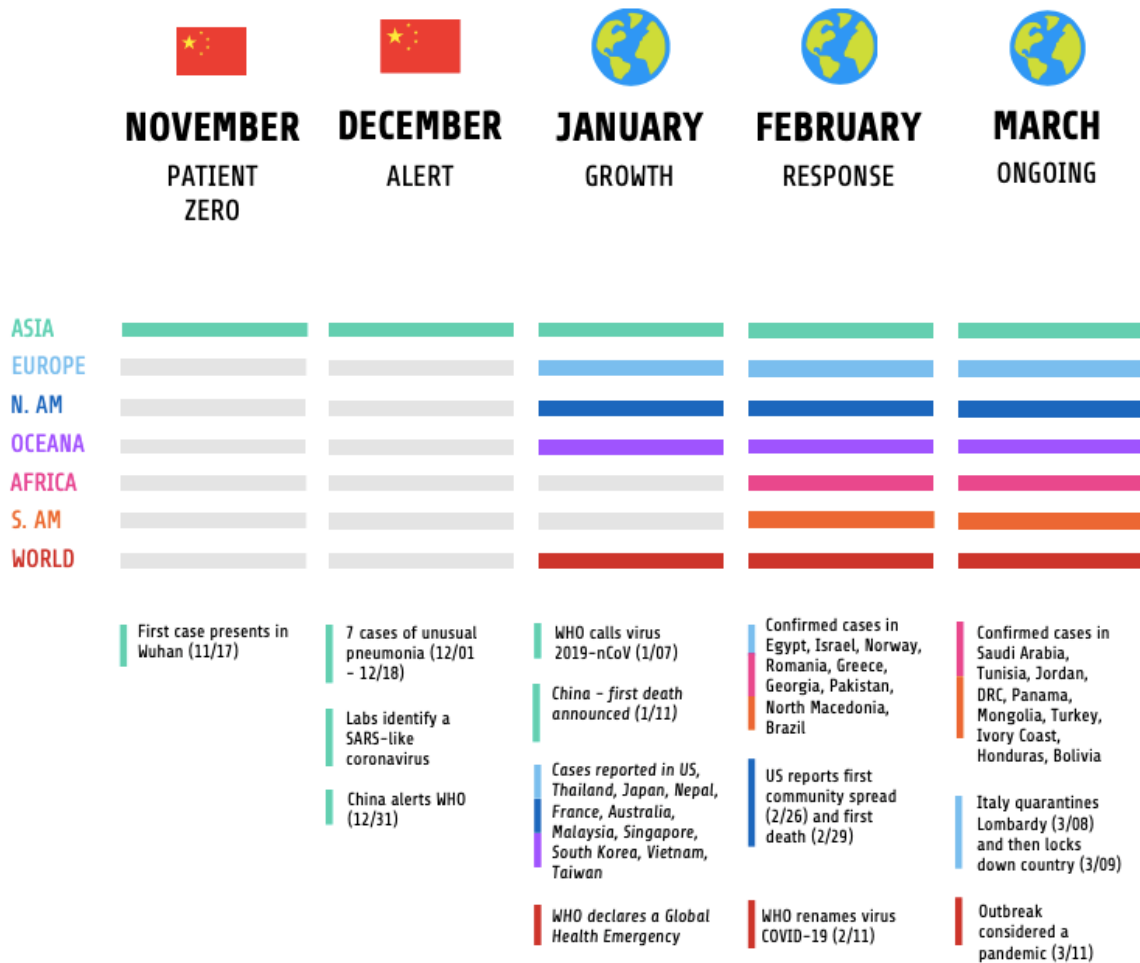
## **Pandemic Timeline**

### **December 2019 - January 2020<sup>8</sup>**

By the end of December 2019, China had seen several cases of “unknown pneumonia.” The Chinese health authorities reported these to the World Health Organization (WHO) on December 31 (see Figure 1). Since some of these individuals had visited the Huanan Seafood Wholesale Market, the market was closed on January 1, 2020 as a precaution and for further study. Within the next week, health officials had discovered that these new pneumonia cases were not due to SARS or MERS, but were instead due to a new coronavirus, initially called 2019-nCoV (2019 for the year of discovery, n for novel, and CoV for COronaVirus).

Figure 1. Coronavirus Timeline

# CORONAVIRUS TIMELINE



On January 11, the first death due to 2019-nCoV was recorded; that of a 61-year-old man exposed to the virus at the Seafood Market. He died of respiratory failure due to severe pneumonia. Two days later, Thai officials reported that a Chinese national traveling from Wuhan was infected with this new coronavirus. Three days after that, on January 16, Japan reported that they, too, had a case of coronavirus in country, also from a traveler from China. By January 20, China reported 139 cases of this new disease, and three deaths.

By the end of the month, Chinese authorities had locked down transport into and out of the cities of Wuhan, Huanggang, and Ezhou Huanggang; cancelled all large-scale Lunar New Year festivities and all national and international tours; and agreed to host an international team of

experts from WHO, the United States Centers for Disease Control and Prevention (CDC), and other agencies to investigate the outbreak. On January 30, the WHO determined that the outbreak constituted a Public Health Emergency of International Concern (PHEIC).

In the United States, the State of Washington confirmed the first coronavirus case on US soil on January 21, and by January 30, US officials confirmed the country's first case of person-to-person transmission.

## **February 2020 – March 2020**

In February, the world saw the first of many deaths due to coronavirus outside of China; confirmed cases aboard quarantined cruise ships; containment efforts in major cities across both Asia and Europe; and changing criteria for presumptive coronavirus diagnoses. The WHO officially named the illness COVID-19 (CORonaVirus Disease – 2019). The United States saw the first probable case of “community spread,” the first death due to the disease was recorded in Washington State, and Vice President Mike Pence was placed in charge of the US government response to the outbreak.

In March, Italy instituted travel restrictions, and then a total, country-wide lockdown in an effort to slow the spread of the disease. States of Emergency were declared in many states, the Federal Reserve slashed interest rates in the biggest one-time cut since 2008, and restrictions to coronavirus testing were removed. Travel restrictions from Europe were instituted, and the administration declared a National Emergency to free up \$50 billion to slow the spread and flatten the curve. By March 18, every state had recorded at least one confirmed coronavirus case.

On March 11, 2020, the WHO declared the novel coronavirus to be a pandemic. This is the first pandemic caused by a coronavirus in recorded history.

## **Responses from Around the World**

### **International Response**

“International responses have unfortunately not been well-coordinated, and seem to either undershoot and then overshoot. In China, cases are decreasing and that is a hopeful sign. In Italy, an early lack of response probably contributed to a rapid rise. In other countries, including the US, testing was delayed as was national guidance on health system preparedness.” – Dr. Omar Khan, Delaware Health Sciences Alliance

Chinese officials began by locking down Wuhan, the epicenter of the outbreak, in an effort to contain the spread throughout China. Countries like the US imposed travel restrictions to and from China, and health care providers were counseled to take detailed travel histories from anyone presenting with a fever, cough, or shortness of breath.

### **National Response**

Once it was confirmed that the virus had left mainland China, medical history questions were updated to include any travel, and any history of contact with people showing similar symptoms. The CDC created a coronavirus page on their website which is updated daily, and Johns Hopkins University created an interactive map of global Coronavirus cases. US residents were told to

wash their hands, engage in non-handshake behavior (fist and elbow bumps), and clean surfaces as needed. Press conferences were held to update the public on changing conditions.

## **Local Response**

In the beginning of February, the Division of Public Health (DPH) created a webpage to direct Delawareans to resources and update them on local Covid-19 cases.<sup>9</sup> Health care providers and the DPH began monitoring individuals who might have contracted the virus through travel to China in the previous two weeks, and Delaware's major universities transferred to distance and online learning for the remainder of the spring semester. The DPH opened a Coronavirus Call Center, and detailed plans for at-risk populations, employers, and insurers in the event of community spread.

On March 11, the first case of COVID-19 in Delaware was confirmed in an individual with ties to the University of Delaware. In the week that followed, three more cases with ties to UD were confirmed, Governor John Carney declared a State of Emergency and closed all Delaware public schools for two weeks, and public events with more than 50 attendees were canceled or rescheduled. The Delaware community was encouraged to abide by social distancing suggestions, and those individuals who might have contracted the disease were quarantined in their homes. By March 23, restaurants and bars were limited to take out or delivery services, unemployment had been extended, and Delaware had 64 confirmed cases of the virus (43 in New Castle, six in Kent, and 15 in Sussex).<sup>9,10</sup> Governor John Carney enacted a Stay-at-Home Order for all Delawareans, effective Tuesday, March 24, 2020 at 8:00 am.<sup>11</sup>

## **A New Normal**

Since the start of the pandemic, new terms ("social distancing," "flattening the curve") and scary terms ("quarantine") have been tossed around by public health officials. Italy has quarantined its citizens in their homes, limiting the movement of all but those most needed for medical, emergency, and public health responses. Individuals have been asked not to meet in groups larger than 10, events and elective medical procedures have been canceled, and restaurants and bars are no longer allowing people to dine in. Lives have shrunk to working from home, homeschooling our children, and having social dates via the internet.

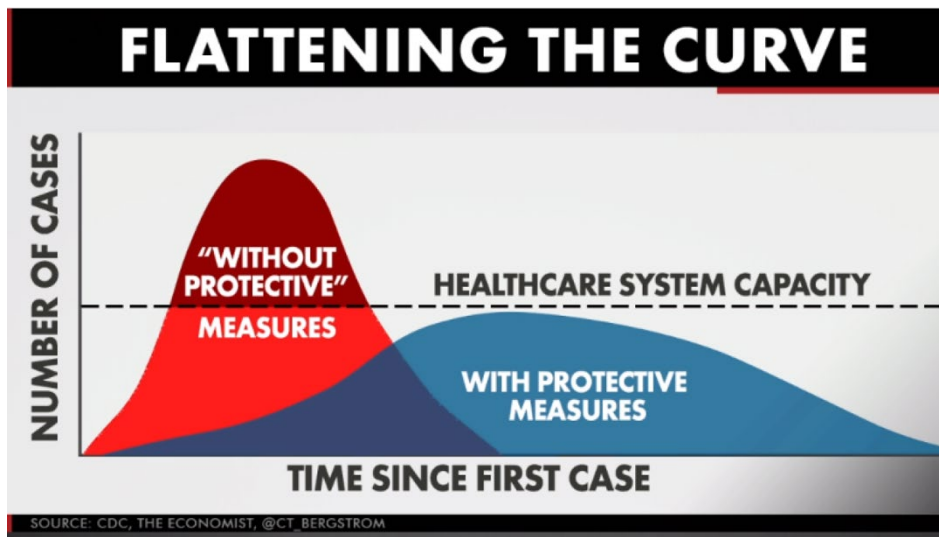
## **Social Distancing**

Social distancing measures are taken to restrict when and where people can gather to go about their daily business, while simultaneously trying to slow the spread of disease. Things like remaining six feet (two arm lengths) away from people in public, limiting the gathering of large groups of people, closing buildings and canceling events can decrease the number of people we come into contact with every day. Individuals are encouraged to get outside and walk, run, and/or bike in any of Delaware's parks, run errands while keeping their distance from others, and reaching out to their neighbors, family, and friends via telephone and online capabilities. All signs point to this disease being spread among the community by those who are unaware they are infected; by limiting our interactions with each other, we can limit the number of infected individuals in our communities, and limit the strain on our hospitals and health care systems.

## Flattening the Curve

In infectious disease outbreaks, one case becomes two cases, which become four, then sixteen, thirty-two... If measures like social distancing are not enacted, this exponential growth will continue until millions of individuals are infected.<sup>12</sup> Health systems, with finite numbers of staff and beds, would be unable to accommodate all the sick – both due to the outbreak and those with other forms of disease (heart disease, stroke, etc.), and those numbers will continue to rise until all individuals in a community are infected. When social distancing is enacted, we can flatten the curve; that is, keep the number of new cases of a disease at a level that the health care system can accommodate (see Figure 2).

Figure 2. Flattening the Curve<sup>3</sup>



### Quarantine.

DPH is quarantining those people who may have been exposed to SARS-CoV-2, but might not be showing symptoms of the disease. These people must remain in their homes, and refrain from leaving for work, shopping, worship, or other outside activities. They must have no visitors, and keep 3-6 feet away from anyone living in the home.<sup>13</sup> This quarantine lasts for up to two weeks, the presumed time the virus takes to incubate in an individual and for symptoms to appear.

### Isolation.

Individuals who have tested positive for COVID-19 are kept in isolation from those who are not sick. They are being asked to stay in a separate room and use a separate bathroom from healthy family members and housemates; have no visitors; not share dishes, towels, or bedding; not take public transportation if at all possible; and wear a mask when around other people until their symptoms are gone.<sup>13</sup>

“If you are diagnosed with COVID, then the state health department should be contacting you and giving you very specific instructions around staying isolated at home. You should try to separate yourself from other people as much as possible, including from your own family living with you. Use a separate bathroom if

possible, hand hygiene, covering your cough, wiping down surfaces, and just really not going out at all unless you need medical care.” – Marci Drees, MD; Chief Infection Prevention Officer, ChristianaCare

## Moving Forward

While the full scale of the coronavirus pandemic will likely take months to unveil, some scientists have said that the scale and lethality is similar to the timeline of the Spanish Flu pandemic of 1918.<sup>14</sup> This is one of the first pandemics in the era of global travel, social media, and rapid testing and response.

“This is a game-changer, but it has lessons for the predictable epidemics as well... We need to practice effective handwashing and appropriate prevention every day of the year, not just when a novel coronavirus comes to town. We will emerge from this as will the rest of the world, and hopefully will apply the lessons we learned for the next time- as there will almost certainly be a next time.” – Dr. Omar Khan, Delaware Health Sciences Alliance

All eyes are turning to vaccine manufacturers, and about thirty-five companies have potential vaccines in the works, four are in the animal testing phase, and one has begun phase I testing on humans.<sup>15,16</sup> Several anti-virals are being tested in hopes of finding a cure,<sup>16,17</sup> and experts around the world are working to contain the spread of the virus and treat those already infected.<sup>18</sup>

## Conclusion

Social distancing, isolation, and quarantine will likely remain the new normal for some time. Older Americans, and those with chronic diseases will be more likely to suffer more than mild symptoms of COVID-19. Health care services will be stressed and overworked. More information will be forthcoming every day on the disease, its treatment, and its potential outcome. Everyone needs to do their part to slow the spread of COVID-19, flatten the curve, and work for the health of our community.

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