

Are Healthcare Systems Ready For COVID and the Flu?

A SCALABLE HEALTH WHITE PAPER



SCALABLE
HEALTH

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INTRODUCTION

Just as the US, and many other countries around the world, is reaching the end of flu season, COVID-19 takes its toll. If the US has the second wave of COVID-19 this winter, the Director of the Centers for Disease Control, Robert Redfield, has warned that the next outbreak will hit the healthcare system even harder.

The reason for this is because the health care system in winter is already under strain with the flu, killing thousands of Americans annually. This situation, combined with the second wave of COVID-19, will cause turmoil in hospitals and medical centers. We have already seen that the system is lacking supplies for a pandemic, let alone an epidemic in the flu season.

"We're going to have the flu epidemic and the coronavirus pandemic at the same time." He continued to highlight that two simultaneous respiratory outbreaks would "put unimaginable strain on the healthcare system."

Mr. Redfield
told The Washington Post,



The CDC estimates that between **October 1, 2019, and April 4, 2020,**

there were at least
410,000
cases of the flu, which required hospitalization,

and it could have been as many as
740,000.

At the same time, there were more than
24,000
deaths, with maximum estimates at
62,000.

So far, there have been over
1.48
million
COVID-19 cases and almost
90,000
deaths.

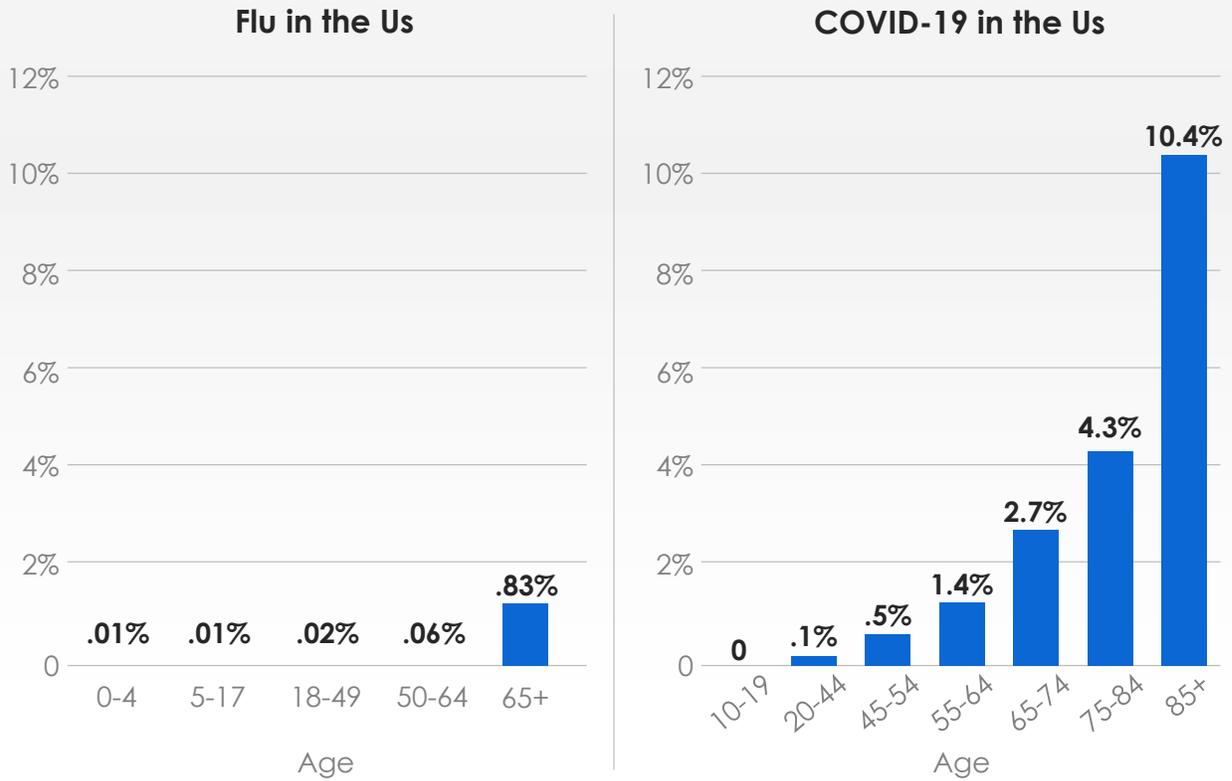
WHAT DOES A BAD FLU SEASON LOOK LIKE?

Flu Season in the US 2019-2020

The CDC bases its statistics on an estimated number of flu illnesses, medical visits, hospitalizations, and flu-associated deaths

within one flu season. As an approximation, the flu has infected more than 30 million Americans this flu season.

Flu vs COVID-19 death rate in the US, by age



Note: US data as of March 18, 2020.

Source: CDC; CDC COVID-19 Response Team

WHAT DOES A BAD FLU SEASON LOOK LIKE?

The flu season of 2018-2019 was the longest in 10 years, lasting 21 weeks. It began in November, and the levels remained high throughout January and into February. Influenza A viruses were the most common starting with A(H1N1pdm09) from October to the middle of February and A(H3N2)

taking over at the end of February. There were approximately 35.5 million cases, 16.5 million requiring medical care, and 490,600 needing hospitalization.

Hospitalization and deaths influenza, US, 2018-2019 (estimated figures)

Total cases requiring hospitalization- **490,600**, total deaths- **34,200**

46,000 hospitalizations of children under **18**

57% of hospitalizations were adults over **65**

136 child deaths confirmed in a laboratory- approximately **480** deaths in total

75% of deaths were over **65**-year-olds

Approximately **8,100** deaths were adults aged **18-64**

Hospitalization and deaths influenza, US, 2017-2018

The 2017-2018 flu season was a particularly hard one with almost 50 million cases and close to 79,000 deaths. It has been estimated that the number of patients requiring hospital treatment in 2019-2020 (up to February 15) at 280,000 is in line with figures from previous years. More children

and young adults have been hospitalized compared with recent flu seasons.

The fatalities this season has been lower, looking at the same period, there have been 16,000 flu-related deaths, of which 105 were children.

Total cases of flu
44,802,629
(29,220,523 the previous season)

Total hospitalizations
808,129
(496,912 the previous season)

Total influenza deaths
61,099
(36,230 the previous season)

% of deaths that were over 65 years old
83.3%
(85.9% the previous season)

WHAT DOES A BAD FLU SEASON LOOK LIKE?

Flu Strains

Contagion reported that the most predominant flu strain in the US for this

season was influenza B/Victoria and the most common for young children. Below is a breakdown of 2019-2020 influenza types based on age:



Children aged **0-4**
53% reported influenza B



5-24 year old's
63% reported B viruses



25-64 year old's
57% reported A(H1N1pdm09) viruses



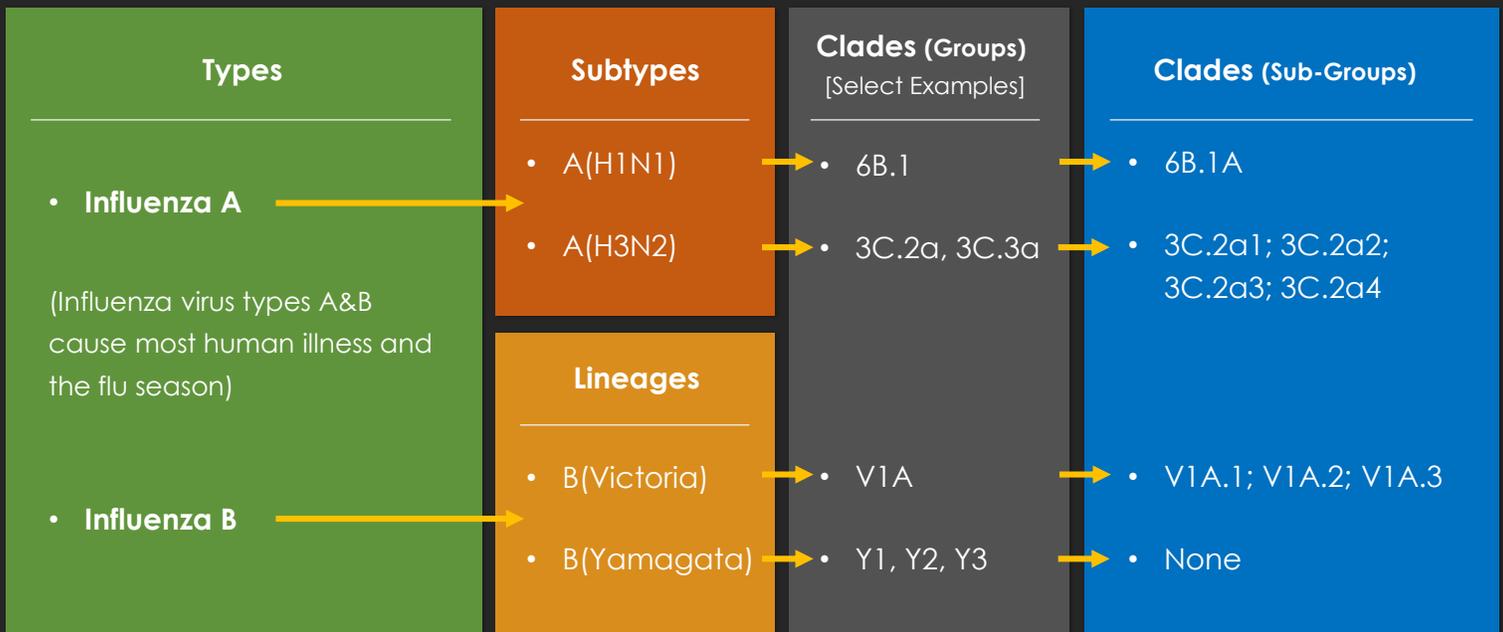
65+ year old's
64% reported A(H1N1pdm09) viruses

HUMAN SEASONAL INFLUENZA VIRUSES

The flu shot has had some positive results. The CDC's Morbidity and Mortality Weekly Report estimated that the vaccine had been 45% effective overall in 2019-2020

and 55% effective in children.

Human Seasonal Influenza Viruses



This graphic shows the two types of influenza viruses (A,B) that cause most human illness and that are responsible for the flu season each year. Influenza A viruses are further classified into subtypes, while influenza B viruses are further classified into two lineages: B/Yamagata and B/Victoria. Both influenza A and B viruses can be further classified into specific clades and sub-clades (which are sometimes called groups and sub-groups).

SIMILARITIES BETWEEN COVID-19 AND THE FLU

Symptoms

The two viruses share symptoms that can be mild, severe, or fatal. The most common symptoms are fever, cough, aching body, and tiredness. Some people present with vomiting and diarrhea. Both viruses can lead to pneumonia. A full list of symptoms for the flu and COVID-19 can be found at [medical news today](#).

Transmission

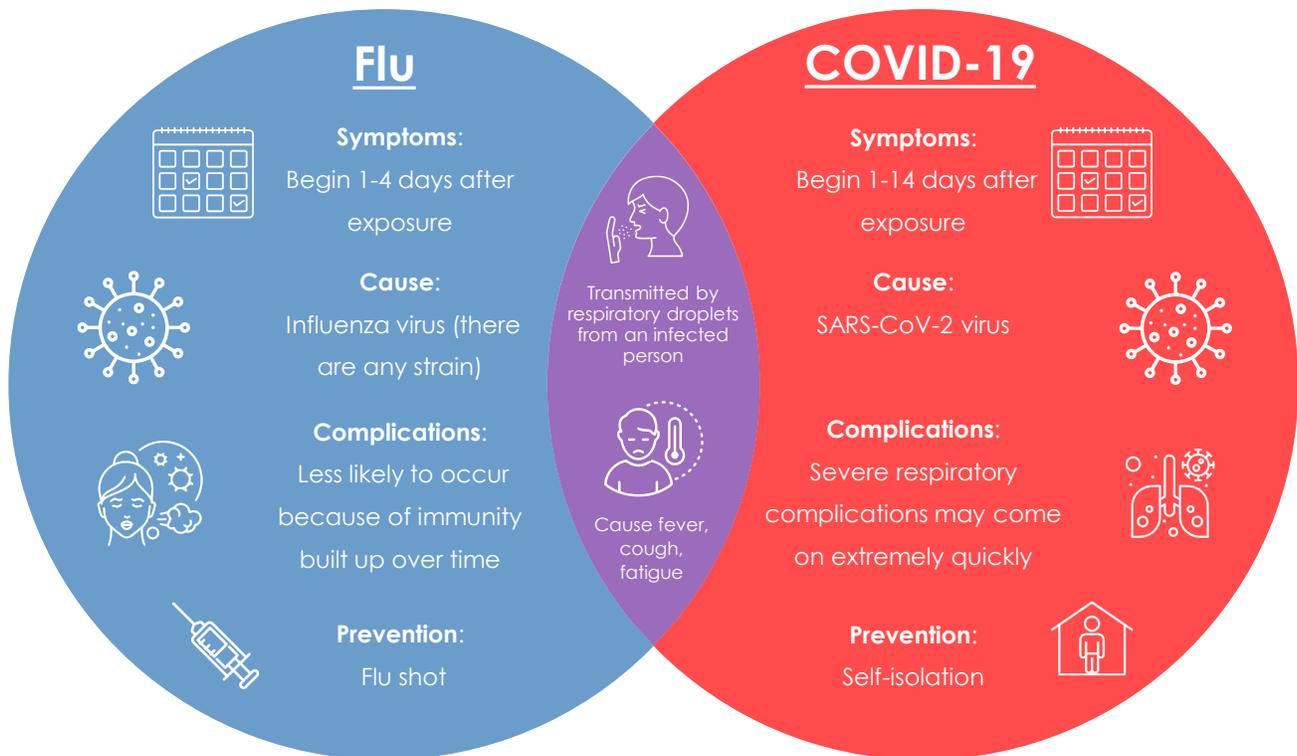
The flu and COVID-19 spread from person to person via droplets in the air when an infected person either coughs, sneezes, or even talks. The viruses can be spread several days before an infected person begins to show symptoms. There is a possible difference in the transmission of COVID-19, but we will discuss this in the next section.

Treatment

Antibiotics only work on bacterial infections, so they will not treat the flu or COVID-19. The first treatment is to address the symptoms, for example, reducing the fever. When symptoms persist or worsen, patients may need hospitalization and ventilation to support the respiratory system.

Prevention

The flu and COVID-19 might be prevented by frequent and thorough handwashing, coughing into the crook of your elbow, and limiting contact with infected people, even staying at home. Social distancing is proving effective at slowing down the spread of COVID-19.



DIFFERENCES BETWEEN COVID-19 AND THE FLU

A new strain of coronavirus causes COVID-19. It has now become known as severe acute respiratory syndrome coronavirus 2, shortened to SARS-CoV-2. One of many types and strains of influenza viruses causes the flu.

Transmission

Aside from transmission from person to person via coughing, sneezing, or talking, COVID-19 could also be airborne, which means that the virus might remain active in tiny droplets that stay in the air once the infected person is no longer there.

Medications and Vaccinations

Antiviral medications can address the symptoms of the flu and reduce the duration of the virus. Antiviral drugs and other therapies are now being tested to

study the effects on COVID-19. There are vaccines available for certain flues; some will prevent a strain; others will reduce the severity of the virus. As of yet, there is no vaccine for COVID-19.

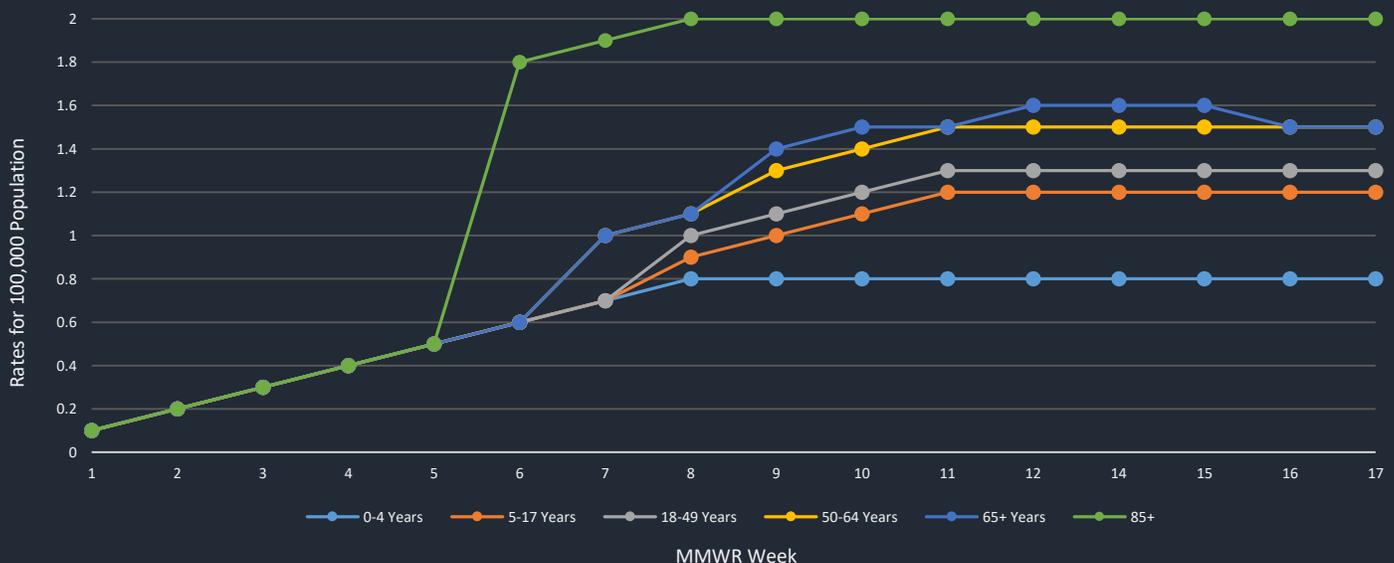
The Number of Infections

COVID-19 first appeared in Wuhan, China, late 2019. The first case was confirmed in the US in January 2020. As of May 18, Johns Hopkins has reported 4,718,215 confirmed cases, 1,486,742 in the US.

The World Health Organization estimates 1 billion global flu cases annually. The flu is not a reportable disease in the US, so exact figures are hard to find. From October 1, 2019, to April 4, 2020, there have been between 39 and 56 million flu cases.

Laboratory-Confirmed Influenza Hospitalizations

FluSurv-NET :: Entire Network :: 2019-20 Season :: Cumulative Rate



WHAT IMPACT HAS COVID-19 HAD ON THE US HEALTHCARE SYSTEM?

When you look at all of the flu statistics we have seen for the US; it is hard to imagine how the healthcare system is coping with such large numbers of hospitalized patients and those requiring weeklong stays in ICUs. Worldwide, we have seen a frightful shortage in hospital beds as well as personal protective equipment, and the US is no different. The US healthcare system is saturated.

It is estimated that there are 2.8 hospital beds per 1,000 people in the US. China has managed to excel that number by 4.3 per 1,000. Countries like South Korea and Japan

have an outstanding 12 hospital beds per 1,000 people.

The US has a population of approximately 330 million, with around 1 million beds. On average, 68% of beds are taken at any one time. So, you are now left with 300,000 beds available across the whole country. Out of 44,000 cases in China, 15% required hospitalization, and 10% of those needing treatment in the ICU. You only need to look at the number of cases in the US to see what impact the pandemic has had and will continue to have on the healthcare system.



Scalable Health clinical analytics for Covid19

HOW CAN AI BE USED TO TRACK AND IMPROVE THE CONSEQUENCES OF COVID-19, THE FLU, AND OTHER DISEASES

Intelligence can be used with predictions, diagnosis, and the treatment of infections, both current and in the future. Natural-language processing (NLP) algorithms could be used to monitor a range of sources for the mention of high-priority diseases. Information can be gathered from arrivals and departures of airports, health organizations, livestock reports, and news outlets. Artificial Intelligence will be able to integrate and examine all of the data collected to follow the spread and risk of infectious diseases.

AI will be able to identify hotspots and even point out the early stages of an infectious disease with the help of machine learning and NLP.

AI will not only be a vital tool for tracking diseases but also enable the detection of diseases earlier. AI has already proven to be successful in the identification of people who have been infected. Machine-learning tools can be taught to examine medical images to spot the early stages of a disease that may otherwise have been missed by doctors.

Can AI Discriminate Between COVID-19 and Influenza Pneumonitis in Chest X-Rays?

We are going to have to employ alternative methods to diagnosing both Chest-Rays and flu-related influenza as there is a shortage of viral test kits. It might be possible to train algorithms to examine chest X-Rays and CT Scans, machines that are already at hand in hospitals, and many medical centers.

A mathematical model has been created, so it has been 80% accurate in predicting individuals most likely to contract COVID-19. This is done by considering age, gender, and a combination of the four most common symptoms; fatigue, severe or persistent cough, fatigue, and a loss of appetite. This data is used in conjunction with data from the COVID Symptom Study app to determine whether a person has the infection.

Whether it's from X-Rays, Chest CT Scans, or predictions by comparing symptoms with data, this method of detecting COVID-19 will allow medical staff to save time and turn resources to where they can most make a difference.

WILL WE BE ABLE TO USE AI TO PREDICT COVID-19 WITHOUT TESTING?

Many governments are talking about the use of apps to register and trace COVID-19. Information can be gathered from mobile phones or laptops. Advantages include daily symptom checks of contacts, alerts about COVID-19 contacts, links to contacts who may be at risk, and the registration of cases.

Wearables are going to be key devices that will permit medical professionals to monitor patients as the virus progresses but from the safety of their homes and hospitals. Data algorithms can catch the early signs and symptoms of COVID-19.

As wearable devices can collect data 24 hours a day, seven days a week, a massive amount of data can be obtained that would otherwise not be possible. This data is real-time and continuous and will save lives by alerting medical professionals and better-utilizing resources.

Scalable Health connected health hub can help deliver quality care outside traditional care settings connecting telehealth, mobile health, wearable devices, clinical data, legacy healthcare data, and other technologies:



[Learn more about Connected Health Science Platform](#)

CONCLUSION

Uncertainty about the future seems to be the one sure thing in the coronavirus pandemic. No one knows if COVID-19 will continue at its current pace or if recently increased interactions among people will generate a barrage of smaller outbreaks or more massive waves. But a few things are clear: The virus that causes the disease is likely to continue circulating through the population until there is a vaccine. The flu season is only a few months away; one thing is for sure that we have to start thinking about using AI to positively impact the detection, tracking, and possible vaccines in the future.

Scalable Health Solutions:

- Covid Patient Input Form
- Post discharge follow up application
- Supply Chain Analytics
- Risk Stratification Analytics
- Operation and workforce optimization analytics
- Connected Health Science Platform

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