



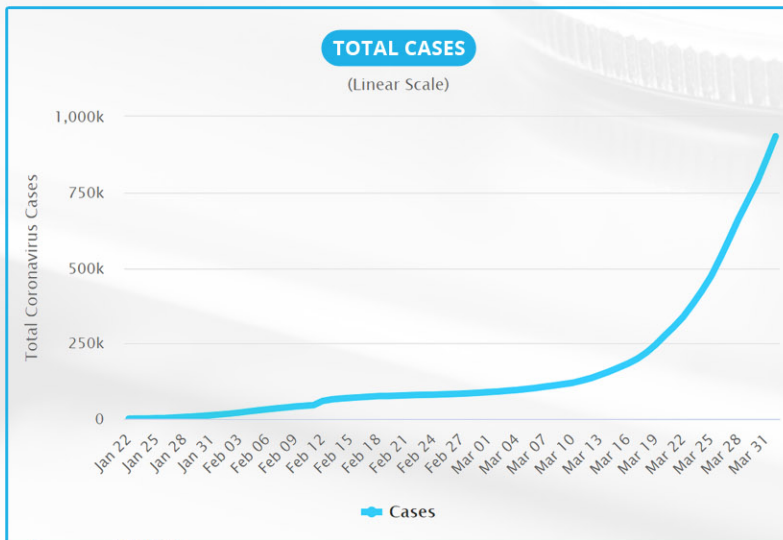
SPECIALTY TELEMEDICINE AND THE 2019 NOVEL CORONAVIRUS



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Source: 4/17/2020

(<https://www.worldometers.info/coronavirus/coronavirus-cases/#total-cases>)

A decade removed from the last pandemic --Novel H1N1 Influenza in 2008-9, which resurfaced again in 2013 -- the world is confronting the next global viral outbreak, the Coronavirus Disease of 2019 (COVID-19) novel coronavirus (named the SARS-CoV-2 virus), which has emerged prominently in the global arena. The novel 2019-nCoV Coronavirus was first identified and isolated in December 2019 among patients with respiratory illnesses in Wuhan City, China. In only a few months it has already infected over 1,000,000 individuals in over 50 countries including the U.S.

THE CRITICAL ROLE OF TELEMEDICINE

Telemedicine is poised to play a crucial, life-saving role in the management of this potential global health hazard.

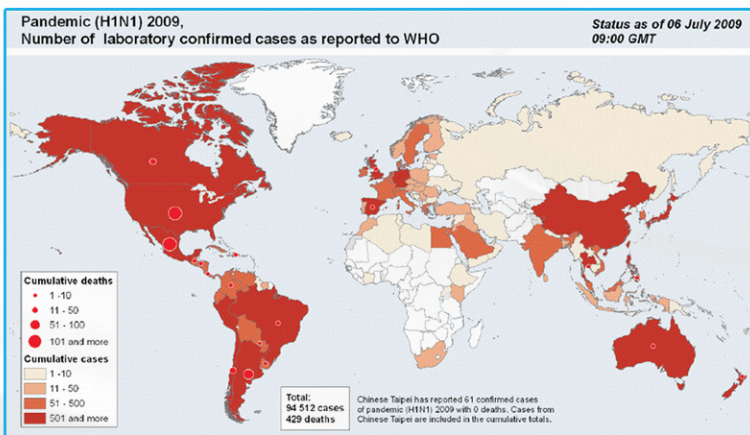
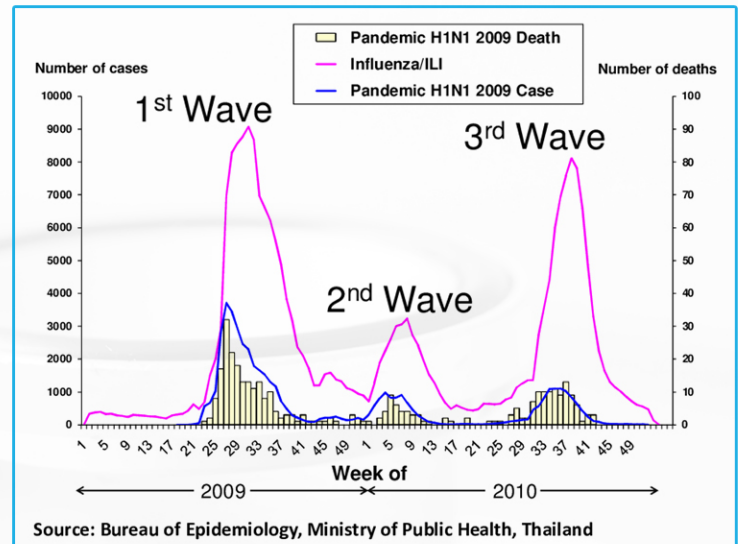
Through the use of telemedicine, healthcare providers are able to remotely distinguish and separate valid cases from those with lower probability. They are also able to maintain necessary distance that is critical in protecting the provider from this highly contagious disease. By enabling remote medical care, telemedicine is, quite literally, saving lives during this time.

WHAT FACTORS CONTRIBUTE TO A GLOBAL PANDEMIC?

In short, it amounts to two major considerations: Disease Spread and Disease Severity¹. A disease that can be easily transmitted and is particularly virulent can cause worldwide disaster. Conversely, a disease which cannot be easily communicated to others, or one which, even if easily transmitted, has a relatively benign clinical course (like the common cold, the most common viral infection from the family of Rhinovirus) is not of great concern to the global medical community.

RECENT PANDEMIC: H1N1 OF 2009

In the spring of 2009, a novel influenza A virus variant emerged (H1N1, named pdm09) and quickly spread worldwide.² Although seasonal influenza disproportionately affects the elderly, because of exposure to other H1N1 variants, individuals aged over 60 years tended to have existing immunity to the virus and, proportionally, were affected less than the younger population in 2009.³ Hence, the 2009 Influenza A (H1N1) pandemic strain featured a demographic skew that featured a higher incidence and virulence in younger individuals, obese patients and pregnant women.



Moreover, substantial numbers of critically ill patients developed rapidly progressive hypoxemia requiring ventilatory support and rescue therapies such as high frequency oscillatory ventilation, prone positioning and extracorporeal membrane oxygenation (ECMO).^{4 5 6} While initially reported in 2009, there were 3 subsequent waves documented worldwide, with similar clinical presentation, case mix and fatalities.^{7 8}

¹ <https://www.cdc.gov/flu/pandemic-resources/basics/index.html>

² <https://www.cdc.gov/flu/pandemic-resources/2009-h1n1-pandemic.html>

³ Jain S, Kamimoto L, Bramley AM, et al. Hospitalized Patients with 2009 H1N1 Influenza in the United States, April-June 2009. *NEJM* 2009, 361(20): 1935-1944.

⁴ The ANZIC Influenza Investigators. Critical care services and 2009 influenza in Australia and New Zealand. *NEJM* 2009, 361(20): 1925-34

⁵ The Australia and New Zealand Extracorporeal Membrane Oxygenation (ANZ ECMO) Influenza Investigators. *JAMA*. 2009, 302(17): 1888-1895.

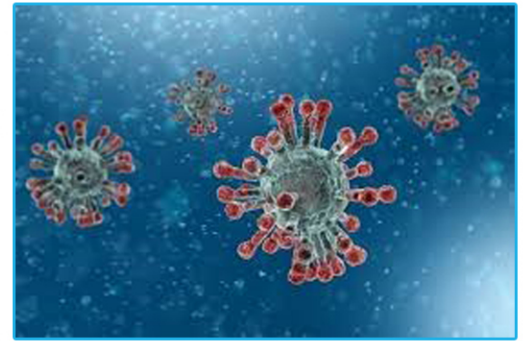
⁶ Chowell G, Bertozzi SM, Colchero MA, et al. Severe respiratory disease concurrent with the circulation of H1N1 influenza. *NEJM* 2009;361(7):674-9.

⁷ The ANZIC Influenza Investigators. Critical care services and the H1N1 (2009) Influenza epidemic in Australia and New Zealand in 2010: the impact of the second winter epidemic. *Crit Care* 2011; 15(3):R143.

⁸ Martin-Loeches I, Diaz E, Vidaur L, et al. Pandemic and post pandemic Influenza A (H1N1) infection in critically ill patients. *Crit Care* 2011; 15(6): R286.

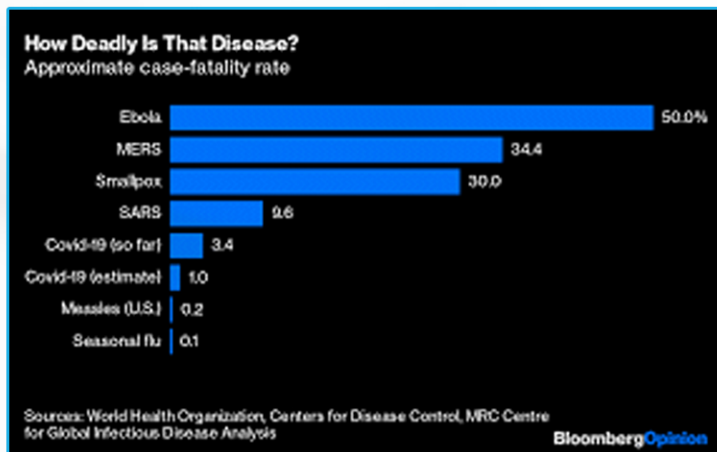
WHAT ARE CORONAVIRUSES?

Coronaviruses are a family of viruses which are well known and have been studied since the 1930's. While most are forms of Coronavirus infection are benign, such as the common cold, particular mutations can cause an uptake in the virulence of the microorganism, leading to outbreaks of severe disease states. This includes Severe Acute Respiratory Syndrome (SARS), which was responsible for over 700 deaths, predominantly in Asia in 2003; and Middle Eastern Respiratory Syndrome (MERS). COVID-19 is this type of virus.⁹



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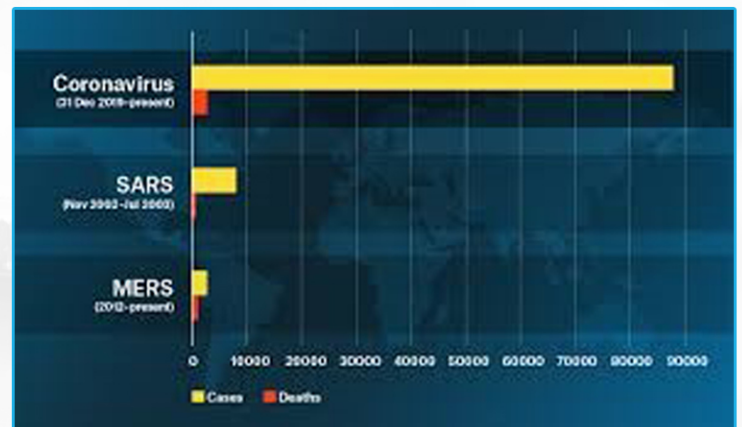
WHAT DO WE KNOW ABOUT THIS MOST RECENT VIRUS STRAIN?



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Although there were initially very few cases in the United States, **March 2020 brought a deluge of viral infections to its shores.** The United States is currently the country with the largest volume and highest rate of spread of diagnosed COVID cases.¹² There have been over 300,000 confirmed cases in the U.S. with almost 10,000 deaths. Major outbreaks have been noted in large metropolitan areas, particularly New York City. The Center for Disease Control (CDC) warned that it is likely that there will be widespread transmission over the coming months, a sentiment echoed by Dr. Anthony S. Fauci in his testimony to the U.S. government.¹³

First isolated from a patient with respiratory illness in Wuhan City, China, it has since been identified in almost a million patients worldwide, including tens of thousands of patients in China, Italy, Spain and Iran. There have been over 50,000 confirmed deaths worldwide, though the true number is likely much higher due to underreporting and under-diagnosis, particularly at the outset of the pandemic and in countries that do not have high rates of testing or reporting.^{10 11}



www.bloomberg.com

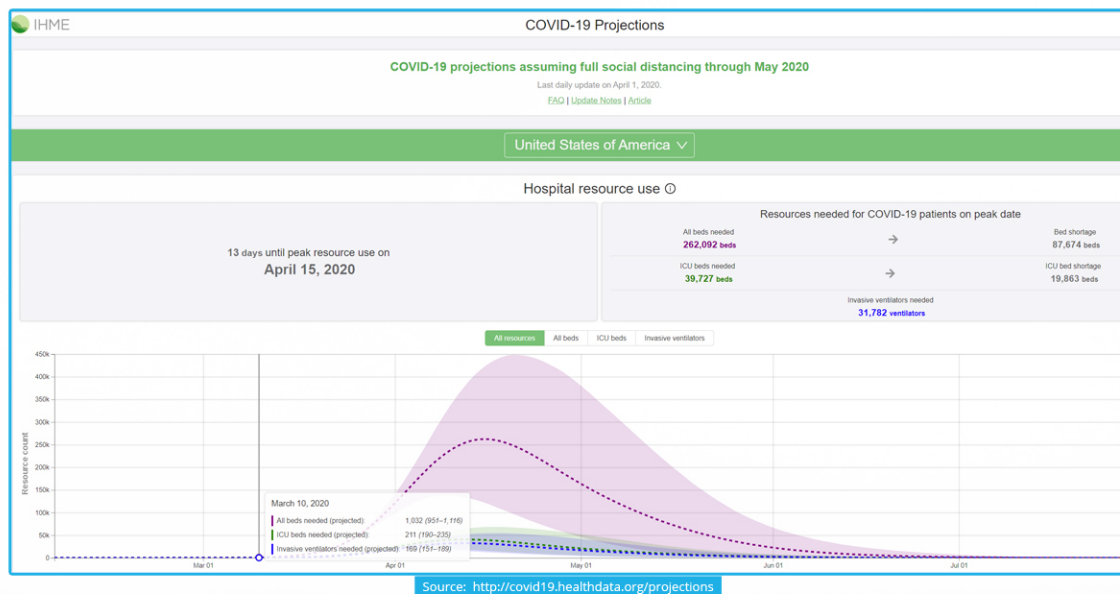
⁹ <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

¹⁰ <https://www.worldometers.info/coronavirus/> accessed 3/30/20

¹¹ <https://www.google.com/covid19-map/> accessed 3/30/20

¹² <https://www.google.com/covid19-map/> accessed 3/30/20

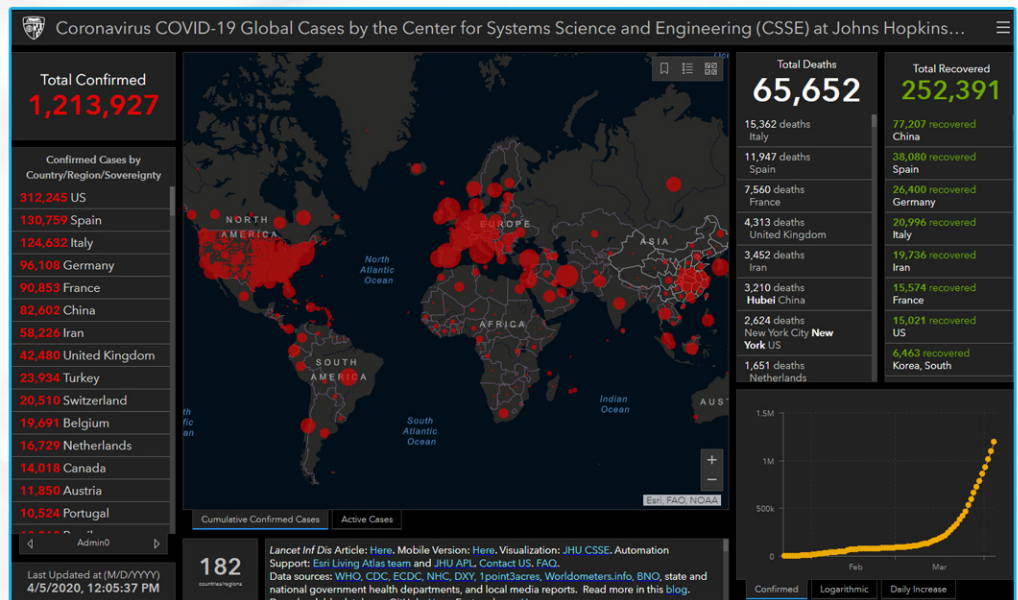
¹³ <https://appropriations.house.gov/events/hearings/national-institutes-of-health-budget-request-for-fy-2021> accessed 3/30/20



With the virulence associated to this particular virus strand in the context of the global interconnected world in which we live, **experts are justifiably concerned for wide and rapid spread of the infection.** The World Health Organization places the mortality rate from COVID19 infection at 3-4%, which is significantly higher than Influenza infection this year. Hence, there is genuine and legitimate concern that a global infectious spread could prove catastrophic. This has led the WHO to declare a pandemic on the 11th of March.¹⁴

COMBATting THE SPREAD OF THE VIRUS

Thankfully, public health experts, epidemiologists, infectious disease specialists, and public policy leaders have stepped in to take **meaningful, aggressive measures to combat the spread of the virus.** Leaders have quarantined city inhabitants, closed local shops and instituted both travel and social interaction regulations in many regions.



The entirety of the world's technology prowess has similarly been launched towards understanding the spread of the virus and anticipating its spread and risk profile. Apple¹⁵ has launched a symptom checker and Google has an up to date COVID tracker. Even Alexa from Amazon has an interactive chat bot feature.

Medical Industry has similarly come on board in the effort to combat COVID 19. Abbot received FDA approval for their rapid (5 minute) COVID19 diagnostic test¹⁶, and the U.S. Food and Drug Administration (FDA) approved a medication regimen (hydroxychloroquine with azithromycin) for treatment of patients with severe forms of the viral infection.¹⁷

¹⁴ <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

¹⁵ <https://www.apple.com/covid19/>

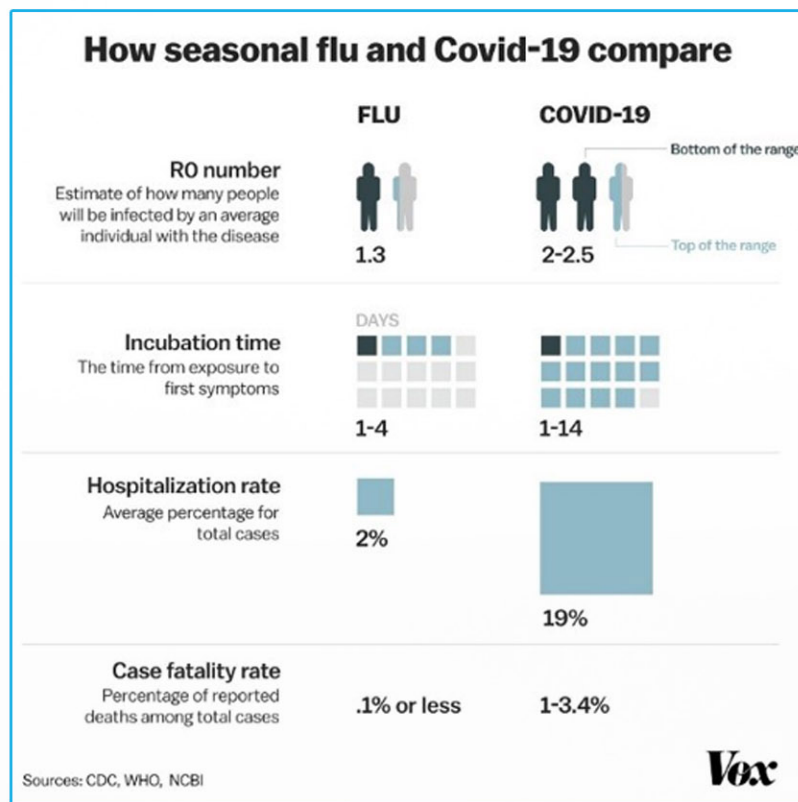
¹⁶ <https://abbott.mediaroom.com/2020-03-27-Abbott-Launches-Molecular-Point-of-Care-Test-to-Detect-Novel-Coronavirus-in-as-Little-as-Five-Minutes> accessed 3/30/20

¹⁷ https://www.pmlive.com/pharma_news/fda_grants_emergency_authorisation_to_chloroquine_for_covid-19_1331981

CLINICAL ASPECTS OF COVID 19

From an epidemiological standpoint, **there are certain differences between this year's seasonal influenza viral infection and that of COVID 19.**

- ▶ The time from infection to the development of symptoms (latency period) is longer, hence individuals can exist in a carrier state for up to two weeks.
- ▶ It transmits more easily than seasonal influenza, through means such as via coughing, sneezing and touching surfaces that infected individuals have contacted.
- ▶ Unlike the flu which typically has high fevers, body aches and fatigue, in addition to upper respiratory symptoms such as runny nose or cough, the symptoms of COVID19 are mild. Both, however, can cause severe pneumonias and other respiratory complications, particularly in elder individuals and those with chronic medical conditions.¹⁸



The initial signs and symptoms of the infection cannot be easily distinguished from other more benign coronavirus, or other viral infections, such as influenza, and the syndrome cannot be diagnosed without specific diagnostics.

HOW TELEMEDICINE IS SAVING LIVES

The high level of transmissibility of the COVID 19 virus, which has made social distancing essential, poses numerous challenges for the medical system whose infrastructure is composed – both historically and out of necessity – on in person evaluation and care. Patients who are not acutely ill are no longer able to see their physicians for essential outpatient evaluations. Those who are acutely ill and require evaluation in a hospital or office risk infecting other patients or their providers. Telemedicine allows near equivalent evaluation remotely. Hence telemedicine has been billed as a life saving intervention during this time.¹⁹

TELEMEDICINE IN COVID 19 MANAGEMENT

There are a number of important roles that telemedicine physicians can play.

First and foremost, physicians must counsel patients who may need to travel to the region on the risks that such an endeavor would entail. Patients must be made aware as to the scientific realities on the ground. Additionally, those who were in the regions in question, or who were potentially exposed, must be instructed on the proper means – barrier, anti-septic, quarantine, etc. – to prevent exposing others.

¹⁸ The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China. Zhonghua Liu Xing Bing Xue Za Zhi. 2020 Feb 17;41(2):145-151. [Translated from Chinese.][Epub ahead of print].

¹⁹ The effective use of telemedicine to save lives and maintain structure in a healthcare system: Current response to COVID-1. Elkbuli A, Ehrlich H, McKenney M. Am Jour of Emerg Med. Accepted for publication April 4, 2020.

Specifically, recommendations include:

- **Washing one's hands regularly with soap** and water for at least 20 seconds
- **Avoiding unnecessary social contact** such as hand shaking and hugging
- **Avoiding touching one's nose, mouth or face;** and washing one's hands (or disinfecting) after such contact occurs
- **Staying home if one feels ill,** particularly with a fever, cough or runny nose
- **Seeking medical attention if one is short of breath,** has difficulty breathing, has high spiking fevers or symptoms that continue without improvement.

Moreover, patients with possible exposure who are experiencing symptoms must be coached to seek medical attention immediately, alert those who they may have inadvertently spread the illness to and direct their medical teams to rule out the novel virus via specific diagnostic evaluation.²⁰

Lastly, **telemedicine may prove to be a useful area of health information** regarding the spread of the infection, identifying new areas of infection and serving as a helpful means of containment. What better clinical service to coordinate and quarantine a disease than a national centralized physician network whose expertise is remote communications and cloud-based software reporting?

Patients and providers who have **ANY QUESTIONS** at all are recommended to contact their local health department for further information and guidance.



²⁰ <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>

Even before the arrival of the current pandemic, reports noted the shortage of both primary and specialty physicians in the United States and worldwide. Within the United States a physician shortage of over 100,000 providers was estimated, distributed relatively evenly between primary and specialty doctors.²¹ The overwhelming majority of shortages are expected in rural regions. Reasons for the shortfall include uneven distribution of providers, a shortage of training facilities, and physicians leaving practice owing to burnout and retirement.²² This finding is not novel, with reports going back years that have been documenting this trend.²³

The onset of the COVID19 Pandemic, and the subsequent closure of many primary and specialty care outpatient clinics, will likely exacerbate this deficiency. Anecdotal reports from physicians during the early weeks of the pandemic reflect that up to 80% of patients did not show up in person to their visit, despite waiting months for specialists appointments. Even when visits were transitioned to telephonic encounters, only half of patients elected to proceed with the visit, the rest presumably elected to defer their assessment for later.

Telemedicine has been proposed as an intuitive solution for a number of reasons:

- ▶ **Telemedicine levels the playing field and streamlines physician availability.** Physicians can remotely cover multiple locations at once, thereby increasing their accessibility to accept consultations. Moreover, inefficiencies in the system such as travel time, delays during patient intake, etc. do not prevent the physician from seeing patients, but rather the astute telemedicine physician can simply recalibrate and see other patients during these down times. Lastly, lifestyle considerations, which may prevent physicians from residing personally or with their family in the rural locations of the greatest physician deficiencies would not preclude the doctor's ability to still see patients in that region.
- ▶ **Telemedicine is cost effective** and has demonstrated a great return on investment both patients, healthcare providers, and payers. For patients, telemedicine related costs are at least (if not more than!) half of the alternative modalities of treatment. The range of telemedicine costs reaches a maximum of just \$79, compared to \$146 for outpatient physician consults or \$1734 for an ER visit.

The reasons for this are simple: in a telemedicine consult, the only two required parties are the physician and the patient, whereas in a patient visit, infrastructure which includes buildings, office personnel, test equipment, nurses and various other expense items. Vendor data from WHO also shows that telemedicine reduces the need for urgent healthcare visits by 45%, as simple conditions can be treated easily, and more complex ones can be detected and solved early on. Furthermore, 83% of conditions can be solved through telemedicine consultation instead of scheduled doctor's visit.²⁴

²¹ https://aamc-black.global.ssl.fastly.net/production/media/filer_public/31/13/3113ee5c-a038-4c16-89af-294a69826650/2019_update_-_the_complexities_of_physician_supply_and_demand_-_projections_from_2017-2032.pdf

²² <https://www.medscape.com/viewarticle/912259> accessed 3/30/20

²³ https://www.merrithawkins.com/uploadedFiles/MerrittHawkins/Content/News_and_Insights/Thought_Leadership/mhwhitepaperspecialties2018.pdf

²⁴ World Health Organization (WHO) (2010): TELEMEDICINE: opportunities and developments in member states. Available: https://www.who.int/goe/publications/goe_telemedicine_2010.pdf

CONCLUSION

Everyone hopes and prays that current measures will help stem the tide of infection spread and prevent worldwide viral dissemination. Telemedicine stands to play a crucial role both in the continued management and isolation of the virus, as well as in coordinating care should it emerge in small pockets in other international domains.

IN SUMMARY

- **The spread of the COVID19 virus is occurring globally** and its continued transmission, particularly within the U.S., is anticipated to continue in the immediate future
- **Most cases of infection are minor and self-limited**, but severe infections do occur, particularly in individuals with underlying chronic medical problems
- **ALL INDIVIDUALS should take the following steps** to minimize further transmission:
 - Avoid contact with all sick individuals
 - Cover mouth with your elbow or arm when sneezing
 - Washing one's hands regularly with soap and water for at least 20 seconds, particularly after sneezing or wiping one's nose
 - Avoiding unnecessary social contact such as hand shaking and hugging
 - Avoiding touching one's nose, mouth or face; and washing one's hands (or disinfecting) after such contact occurs
 - Staying home if one feels ill, particularly with a fever, cough or runny nose
 - Seeking medical attention if one is short of breath, has difficulty breathing, has high spiking fevers or symptoms that continue without improvement.
- Since there are no approved medications or vaccines for the infection, **care for patients is limited to supportive and preventive care.**
- **Telemedicine is poised to play a crucial** role owing to its ability to decrease the infection risk for patients and providers, as well as its ability to address physician shortages and increase access to care.

With the hope of good health,

Jonathan Wiesen, MD & Michael Gorton, MS, JD



Additional References:

<https://www.cdc.gov/coronavirus/2019-ncov/about/index.html>

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