2020 Novel Coronavirus Outbreak: A Review of the Current English Literature

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Abstract

The authors of this study reviewed the substantial research carried out over the last decade into the microbiology of the built environment (BE) and the known information about SARS-CoV-2. The objective was to provide actionable and achieveable guidance to BE decision makers, building operators and all indoor occupants attempting to minimize infectious disease transmission.

HVAC operational practises to reduce the spread of SARS-CoV-2

It has been confirmed that SARS can be, and is most often, transmitted through droplets. Considering that SARS-CoV-2 is from a sister clade to the 2002 SARS virus, that is known to transmit from person-to-person, the high incidence of observed person-to-person transmission, and the rapid spread of COVID-19 throughout the world, it is generally accepted at this time that SARS-CoV-2 can also be spread through droplets.

Based upon previous investigation into SARS, spread through aerosolization remains a potential secondary transmission method, especially within the BE that contain heating, ventilation, and air conditioning (HVAC) units.

- Higher outside air fractions and higher air exchange rates in buildings may help to dilute the indoor contaminants that are breathed within the BE. Higher outside air fractions may be possible by increasing ventilation damper positions on air-handling units, thus exhausting a higher ratio of indoor air and any airborne viral particles present. For buildings without central HVAC systems, simply opening windows, when outdoor temperatures allow, will increase air exchange.

- Maintaining an indoor relative humidity between 40%-60% may help to limit the spread and survival of SARS-CoV-2 within the BE. Concurrently it maintains hydrated and intact mucosal barriers of human occupants, resulting in an increase resistance against any microbial attack.

- Light is another mitigation strategy for controlling the viability of some infectious agents indoors. Building operators should encourage blinds and shades to be opened, to admit abundant daylight and sunlight. Implementing targeted UVGI treatment may be prudent in spaces where individuals that tested positive for COVID-19 were known occupants.

Keywords: rapid spread of COVID-19 throughout the world, it is generally and toilets.

INTRODUCTION

Coronavirus History

Some of them cause the common cold in people. Others infect animals, including bats, camels, and cattle. But how did SARS-CoV-2, the new coronavirus that causes COVID-19, come into being? Here's what we know about the virus that was first detected in Wuhan, China, in late 2019 and has set off a global pandemic. **Personal hygiene practises to reduce the spread of SARS-CoV-2**

- Proper handwashing is a critical component of controlling the spread of SARS-CoV-2, other coronaviruses, and many respiratory infections.
- Individuals should avoid contact and spatial proximity with infected persons.
- Properly applied hand sanitizer may be a valuable tool against the spread of SARS-CoV-2 in the BE.
- Items should be removed from sink areas to ensure aerosolized water droplets do not carry viral particles onto commonly used items, and countertops around sinks should be cleaned using bleach or an alcohol-based cleaner on a regular basis.

Administrators and building operators should post signage about the effectiveness of handwashing for at least 20 seconds with soap and hot water, ensure soap dispensers are full, provide access to alcohol-based hand sanitizer, and implement routine surface cleaning protocols to high touch surfaces where contamination risks are high, such as around sinks

What Is the Coronavirus? History of Concerning Outbreaks

While the news is making it sound like a new thing, the coronavirus is common. The latest version coming out of China is a more dangerous form of something that has been around for a while. The biggest thing filling news headlines right now is arguably the Coronavirus outbreak in China. The outbreak is causing a lot of concern over how far the virus will travel, and how deadly it will prove to be. Historically, this virus is related to the SARS and MERS outbreaks. Many are wondering whether this breakout will be worse.

What Is the Coronavirus?

While it may seem as if the coronavirus is a brand new thing, it's actually a common strain of viruses. There are several types of the virus, and some of those are very serious. For the most

This new strain, the 2019 Novel Coronavirus, or 2019, sometimes called the "Wuhan Coronavirus," is one of the nastier ones. According to the CDC, symptoms of the virus include fevers, coughs, shortness of breath, aches, sore throat, and vomiting. A respiratory illness, the severity for patients has ranged from a mild cold to very severe symptoms that can lead to death. These symptoms can occur between 2 to 14 days after being exposed to someone infected with the coronavirus.

How Much Damage Has It Caused?

Seemingly originating out of Wuhan China, the coronavirus can cause pneumonia and can be deadly for some. Perhaps the most frightening thing about the situation is the lack of information. There still isn't a lot of information on how this virus is different from other coronaviruses. As of January 29, the caseload for the virus has passed 6,000 in China; officially becoming a larger outbreak than the SARS incident a few years ago. Estimates for total infections are 6,150 globally, with 132 deaths. Thus far, the average American should be more concerned about getting the flu. In comparison to the statistics listed above, there have been around 15 million cases of the flu this season, and 8,200 deaths, according to the CDC. There have been a few confirmed cases in the U.S., but no deaths, and the families of those infected are being closely monitored.

Economic Implications

In terms of markets, names that tie into the consumer base of China could likely take a hit in sales. **Starbucks** (**SBUX**) - Get Report has closed over 2,000 stores in China as a direct result of fears of the spreading of the virus, and CEO Kevin Johnson has stated that the company will close more if need be. Transportation stocks that have business in China all face the possibility of short term pain given fears of how far the virus might spread. One might even argue that the *fear* of the situation will have more of an impact, as consumers will be far less enthusiastic about going out in public places unless they have to. **General Motors** (**GM**) - Get Report is in the midst of a shutdown of its Chinese factories through February 9. The original shutdown for a holiday was extended as a precaution against spreading the virus. It's unclear how much of an effect this will really have, but it is a demonstration of the manufacturing headaches that may ensue if this escalates. **Apple** (**AAPL**) - Get Report also has major manufacturing exposure in Asia.

History of Large-Scale Virus Outbreaks This is not an unprecedented event. Even in the last decade, we've seen a few events similar in nature to the current outbreak. The Middle East respiratory syndrome, also known as MERS, is a type of the virus that began in Saudi Arabia in 2019. Severe acute respiratory syndrome, known as SARS, was another coronavirus outbreak that came from China. It was believed that the SARS strain came from bats before spreading to other wild animals that were consumed by humans. By comparison, these viruses haven't been nearly as damaging to humanity as major outbreaks of the past. The pandemic of 1918, known as the Spanish Flu, infected around 500 million people across the globe. At least 50 million are estimated to have died worldwide.

6 Ways to Stay Healthy

While the coronavirus does not yet hold as much threat to Americans as the flu, this time of year is still a period where many are catching colds. Coming straight from the CDC, here are ways to avoid getting a cold, as well as how to avoid spreading it.

1. Wash Hands With Soap and Water

If you're out in public, or have been out in public, wash your hands. It might seem cliché, but there's a lot stuff floating around in public places. Considering you use your hands more than anything, washing them with soap can help get rid of anything you've picked up.

It can't be said enough. Washing your hands for 20 seconds helps kill viruses. If you cough or sneeze or blow your nose, wash your hands.

2. Avoid Touching Your Face :If you've picked something up on your hands, the virus can enter your body through your eyes, nose and mouth.

3. Stay Away From Sick People,: That's right. Avoid the friend with the cough and runny nose. You might feel guilty, but you'll avoid the headache of catching it yourself.

4. Stay Home If you're sick, stay home.

5. Clean Up Clean surfaces you've touched, using disinfectants.

6. Tissue Sneeze and cough into a tissue. Don't cough into the air where others will have to breathe it.

Regarding the coronavirus itself, even if you find the means to travel to China, don't do it.

Where Did the Coronavirus Come From?

Experts say SARS-CoV-2 originated in bats. That's also how the coronaviruses behind Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS) got started.

SARS-CoV-2 made the jump to humans at one of Wuhan's open-air "wet markets." They're where customers buy fresh meat and fish, including animals that are killed on the spot.

Some wet markets sell wild or banned species like cobras, wild boars, and raccoon dogs. Crowded conditions can let viruses from different animals swap genes. Sometimes the virus changes so much it can start to infect and spread among people.

Still, the Wuhan market didn't sell bats at the time of the outbreak. That's why early suspicion also fell on pangolins, also called scaly anteaters, which are sold illegally in some markets in China. Some coronaviruses that infect pangolins are similar to SARS-CoV-2.

As SARS-CoV-2 spread both inside and outside China, it infected people who have had no direct contact with animals. That meant the virus is transmitted from one human to another. It's now spreading in the U.S. and around the globe, meaning that people are unwittingly catching and passing on the coronavirus. This growing worldwide transmission is what is now a pandemic.

Coronavirus Evolution

Scientists first identified a human coronavirus in 1965. It caused a common cold. Later that decade, researchers found a group of similar human and animal viruses and named them after their crown-like appearance.

Seven coronaviruses can infect humans. The one that causes SARS emerged in southern China in 2002 and quickly spread to 28 other countries. More than 8,000 people were infected by July 2003, and 774 died. A small outbreak in 2004 involved only four more cases. This coronavirus causes fever, headache, and respiratory problems such as cough and shortness of breath.

MERS started in Saudi Arabia in 2012. Almost all of the nearly 2,500 cases have been in people who live in or travel to the Middle East. This coronavirus is less contagious than its SARS cousin but more deadly, killing 858 people. It has the same respiratory symptoms but can also cause kidney failure.

COVID-19: A History of Coronavirus

The COVID-19 coronavirus pandemic has led to mass scientific conference cancellations, travel restrictions, social distancing, and other unprecedented prevention measures. How did we get to this point?

A novel coronavirus outbreak was first documented in Wuhan, Hubei Province, China in December 2019. As of this writing, it has now been confirmed on six continents and in more than 100 countries. As the world's health systems funnel resources into learning about, treating, and preventing infections in humans, new information is released daily. In this two-part article series, we will first provide some history on coronaviruses to put this disease outbreak in perspective, and discuss global health security and planning for pandemic response. Secondly, we will offer guidance from the best trusted sources for prevention and planning in the workplace and at home.

What are coronaviruses?

Coronaviruses are a large family of zoonotic viruses that cause illness ranging from the common cold to severe respiratory diseases. Zoonotic means these viruses are able to be transmitted from animals to humans. There are several coronaviruses known to be circulating in different animal populations that have not yet infected humans. COVID-19 is the most recent to make the jump to human infection.

Common signs of COVID-19 infection are similar to the common cold and include respiratory symptoms such as dry cough, fever, shortness of breath, and breathing difficulties. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure, and death.

The COVID-19 infection is spread from one person to others via droplets produced from the respiratory system of infected people, often during coughing or sneezing. According to current data, time from exposure to onset of symptoms is usually between two and 14 days, with an average of five days.

Recent coronavirus outbreak history

Two other recent coronavirus outbreaks have been experienced. Middle East Respiratory Syndrome (MERS-CoV) of 2012 was found to transmit from dromedary camels to humans. In 2002, Severe Acute Respiratory Syndrome (SARS-CoV) was found to transmit from civet cats to humans.

Although COVID-19 has already shown some similarities to recent coronavirus outbreaks, there are differences and we will learn much more as we deal with this one. SARS cases totaled 8,098 with a fatality rate of 11 percent as reported in 17 countries, with the majority of cases occurring in southern mainland China and Hong Kong. The fatality rate was highly dependent on the age of the patient with those under 24 least likely to die (one percent) and those over 65 most likely to die (55 percent). No cases have been reported worldwide since 2004.[2]

According to the World Health Organization (WHO), as of 2020, MERS cases total more than 2,500, have been reported in 21 countries, and resulted in about 860 deaths.[3] The fatality rate may be much lower as those with mild symptoms are most likely undiagnosed. Only two cases have been confirmed in the United States, both in May of 2014 and both patients had recently traveled to Saudi Arabia. Most cases have occurred in the Arabian Peninsula. It is still unclear how the virus is transmitted from camels to humans. Its spread is uncommon outside of hospitals. Thus, its risk to the global population is currently deemed to be fairly low.[4]

Global Health Security

An international panel of experts undertook a comprehensive assessment and benchmarking of health security and response capabilities across 195 countries.[5] The purpose of the project was to address risks from infectious disease outbreaks that could lead to international epidemics and pandemics and measure response capabilities for each nation. The hope was that the GHS Index would lead to quantifiable changes in national health security and improve international preparedness.

The GHS Index measured indicators across six broad categories:

1. **Prevention:** Prevention of the emergence or release of pathogens.
2. **Detection and Reporting:** Early detection and reporting for epidemics of potential international concern.
3. **Rapid Response:** Rapid response to and mitigation of the spread of an epidemic.
4. **Health System:** Sufficient and robust health system to treat the sick and protect health workers.
5. **Compliance with International Norms:** Commitments to improving national capacity, financing plans to address gaps, and adhering to global norms.
6. **Risk Environment:** Overall risk environment and country vulnerability to biological threats.

The major GHS Index summary findings were:

1. Although the United States scored an 83 out of 100 points, health security around the world is very weak and no country is adequately prepared for epidemics or pandemics. The average score was only 40.2 out of 100.
2. Preparedness is very weak, and capacities have not been tested.
3. Funding and budgets are inadequate.
4. Training and coordination are lacking along with foundational health systems' capacities for epidemic and pandemic response.

Unfortunately, the veracity of the GHS Index study is being borne out in real time with the COVID-19 outbreak the world is experiencing now. But there is no time to point fingers and say "I told you so." We need to act, fast and furious.

At this writing, we are about three months into the COVID-19 outbreak. The WHO officially declared it a pandemic on March 11, 2020. Countries experiencing the greatest number of cases include China, Iran, Italy, and the Republic of Korea. Although the United States ranks eighth, currently, with under 2,000 confirmed cases, insufficient testing does not provide a clear and complete picture. Therefore, we need to take immediate and serious actions to: first, protect ourselves, family, loved ones, and others in our communities; and second, act to contain the spread by preparing our homes, workplaces, and businesses.

This article is the first of a two-part article series detailing the COVID-19 pandemic. To continue reading the second part of this series discussing the recommended cleaning protocols and transmission prevention, .

- To learn more about the numerous pandemics that have occurred throughout history, up to the most recent pandemic, SARS-CoV-2 (COVID-19), access our

All three points are true for all currently available international data sources on COVID-19 deaths.

- the actual total death toll from COVID-19 is likely to be higher than the number of confirmed deaths – this is due to limited testing and problems in the attribution of the cause of death; the difference between reported confirmed deaths and total deaths varies by country
- how COVID-19 deaths are recorded may differ between countries (e.g. some countries may only count hospital deaths, whilst others have started to include deaths in homes)
- the reported death figures on a given date does not necessarily show the number of new deaths on that day: this is due to delays in reporting.
    - Charts which simply show the change in confirmed deaths over time are not very useful to answer the question of how the *speed* of the outbreak compares between different countries. This is because the outbreak of COVID-19 did not begin at the same time in all countries.
    - This chart here is designed to allow such comparisons.

- The trajectory for each country begins on the day when that country had 5 confirmed deaths.
- This allows you to compare how rapidly the number of confirmed deaths increased after the outbreak reached a similar stage in each country.
- The grey lines in the background help you to see how rapidly the number of confirmed deaths is increasing
- These lines show the trajectories for doubling times of 1, 2, 3, 5, and 10 days. If the slope that a country is on is steeper than a particular grey line, then the doubling time of confirmed cases in that country is faster than that. For example, there are several countries for which the slope was steeper than the '…every 2 days' line – this means their death count doubled faster than every two days

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I don't think it's too soon to say that the COVID-19 global pandemic will likely be one of the defining events of 2020, and that it will have implications that last well into the decade. The situation is rapidly changing. The amount of people deemed safe to gather in a single place has dwindled from thousands, to hundreds, to ten. Restaurants, bars, movie theatres, and gyms in many major cities are shutting down. Meanwhile many office workers are facing new challenges of working remotely full time. Essentially, people are coming to terms with the realities of our interconnected world and how difficult it is to temporarily separate those connections to others. To say that we are living in unprecedented times feels like an understatement.

One of the responses we've seen to how people are approaching this period of isolation and uncertainty is in huge overnight changes to their shopping behaviors. From bulk-buying to online shopping, people are changing what they're buying, when, and how.

As more cities are going under lockdowns, nonessential businesses are being ordered to close, and customers are generally avoiding public places. Limiting shopping for all but necessary essentials is becoming a new normal. Brands are having to adapt and be flexible to meet changing needs.

This resource is intended to provide information so that you can make the best decisions for your brand during uncertain times. We've gathered some facts and numbers around how behaviors are changing, what products people are buying, and what industries are feeling the strain to help you determine what choices you can make for your business.

With COVID-19 coming into the picture, the Indian economy is going through a major slowdown, which was evident over the recent quarters even before the crisis struck. In the third quarter of the current financial year, the economy grew at a six-year low rate of 4.7%. With all these problems hitting the world of work from multiple directions, companies are finding it difficult to sustain in this environment. They are forced to take tough decisions such as cutting down the salaries, giving pink slips to employees and opting for other cost-

cutting measures. The outbreak has presented new roadblocks for the Indian workforce and especially for the daily wage and contractual workers.

Coronavirus has disrupted the demand and supply chain across the country and with this disruption, it can be seen that the tourism, hospitality, and aviation sectors are among the worst affected sectors that are facing the maximum impact of the current crisis. Closing of cinema theatres and declining footfall in shopping complexes has affected the retail sector by impacting the consumption of both essential and discretionary items. As the consumption of any product or services goes down, it leads to an impact on the workforce. In the current scenario, with all the retailers closing down their services, the jobs of the employees are at a huge risk.

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The financial market has experienced uncertainty about the future course and repercussions of COVID-19. An estimated Rs 10 lakh crore of market cap was reportedly wiped off due to the fall of sensex in the second week of March 2020. The fall has continued till date as investors resorted to relentless selling amid rising cases of coronavirus. The supply-side impact of shutting down of factories resulted in a delay in supply of goods from China which has affected a huge number of manufacturing sectors which source their intermediate and final product requirements from China. Some sectors like automobiles, pharmaceuticals, electronics, chemical products etc were impacted big time.

The United Nations Conference on Trade and Development (UNCTAD), has suggested that India's trade impact due to the COVID-19 outbreak could be around US$ 348 million. India is among the top 15 countries that have been affected most as a result of manufacturing slowdown in China that is disrupting world trade. For India, the overall trade impact is estimated to be the most for the chemicals sector at 129 million dollars, textiles and apparel at 64 million dollars, the automotive sector at 34 million dollars, electrical machinery at 12 million dollars, leather products at 13 million dollars, metals and metal products at 27 million dollars and wood products and furniture at 15 million dollars. As per UNCTAD estimates, exports across global value chains could decrease by US$ 50 billion during the year in case there is a 2% reduction in China's exports of intermediate inputs.

According to a survey by the Federation of Indian Chambers of Commerce & Industry (FICCI), the immediate impact of COVID-19 reveals that besides the direct impact on demand and supply of goods and services, businesses are also facing reduced cash flows due to slowing economic activity which in turn is having an impact on all payments including to those for employees, interest, loan repayments and taxes.

Major survey results

- A significant 53 per cent of Indian businesses indicate the marked impact of the COVID-19 pandemic on business operations even at early stages.
- The pandemic has significantly impacted the cash flow at organizations with almost 80 percent reporting a decrease in cash flow.
- The pandemic has had a major impact on the supply chains as more than 60 per cent respondents indicate that their supply chains were affected. The companies also highlighted that they are closely monitoring the situation and expect the impact of the pandemic on the supply chain to worsen further.
- Organizations have brought in a renewed focus on hygiene aspects concerning the pandemic. Almost 40 per cent have put in place stringent checks on people entering their offices and disinfection. Nearly 30 per cent organizations have already put in place Work-from-Home policies for their employees.
- Nearly 42 per cent of the respondents feel that it could take upto 3 months for normalcy to return.

For some of the sectors, the work-from-home proposition is posing implementation challenges as it has a direct bearing on the business operations. This is particularly true for manufacturing units where workers are required to be physically present at the production sites, and services sectors like banking and IT where a lot of confidential data is used and remote working can enhance security threats. Hence, companies operating in these sectors are finding it difficult to implement work-from-home facilities without compromising on their day to day operations.

The industry members have also shared suggestions on possible actions that the government and RBI can take to contain the spread of coronavirus in India and mitigate the immediate concerns of the Indian companies.

Need for policy intervention

There is an urgent need to take instant steps to not only contain the spread of the virus, but also to address the key pain areas of the industry which can help in minimising the impact of the outbreak on the Indian economy and businesses. The Indian Government & RBI need to support the Indian industry and economy at this juncture in different ways:

- Maintain liquidity at surplus levels and provide special liquidity support for any companies / NBFCs / banks that come under strain due to intensifying risk aversion in financial markets or due to large demand shock.
- Increase credit limits for all regular banking accounts by 25 percent across the board. Also, Increase overdraft facility to state governments from the RBI. Pay the pending GST compensation immediately.
- IBC to be suspended for a short period for the aviation and hospitality sectors as they are the worst affected.

Conclusion:

Since a large number of people will stand to lose their jobs especially in the retail, hospitality, travel, construction sector, the government can consider giving incentives for employers to keep the workers, while the coronavirus problem tides over.

On March 24th, 2020 the Finance Minister extended the filing dates of ITR, GST, linking of PAN and Aadhar and other reliefs for the big and small enterprises. The finance ministry is already working on an economic package to mitigate the impact of coronavirus on the Indian economy.

The government is taking necessary steps that will not damage the economy further but the damage that has been done in the previous few months will definitely last for a longer period of time. As the country is locked down for the coming three weeks, India Inc has to stretch themselves to sustain the situation and face the challenge. The Indian government has also urged employers to not cut jobs and salaries. Many CEOs and management teams are taking pay cuts to ensure their workforce does not have to bear the brunt.

Due to logistical problems following the lockdown tea estates were unable to harvest the first flush. The impact of this on the second flush is not known. The entire Darjeeling tea based tea industry will see significant fall in revenue.[95] Tea exports could drop up to 8% as a result.[96]

From 20 April, under the new lockdown guidelines to reopen the economy and relax the lockdown, agricultural businesses such as dairy, tea, coffee and rubber plantations, as well as associated shops and industries, will reopen.[68]

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