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InTouch
Clinical update for healthcare workers with an interest in safety and infection prevention

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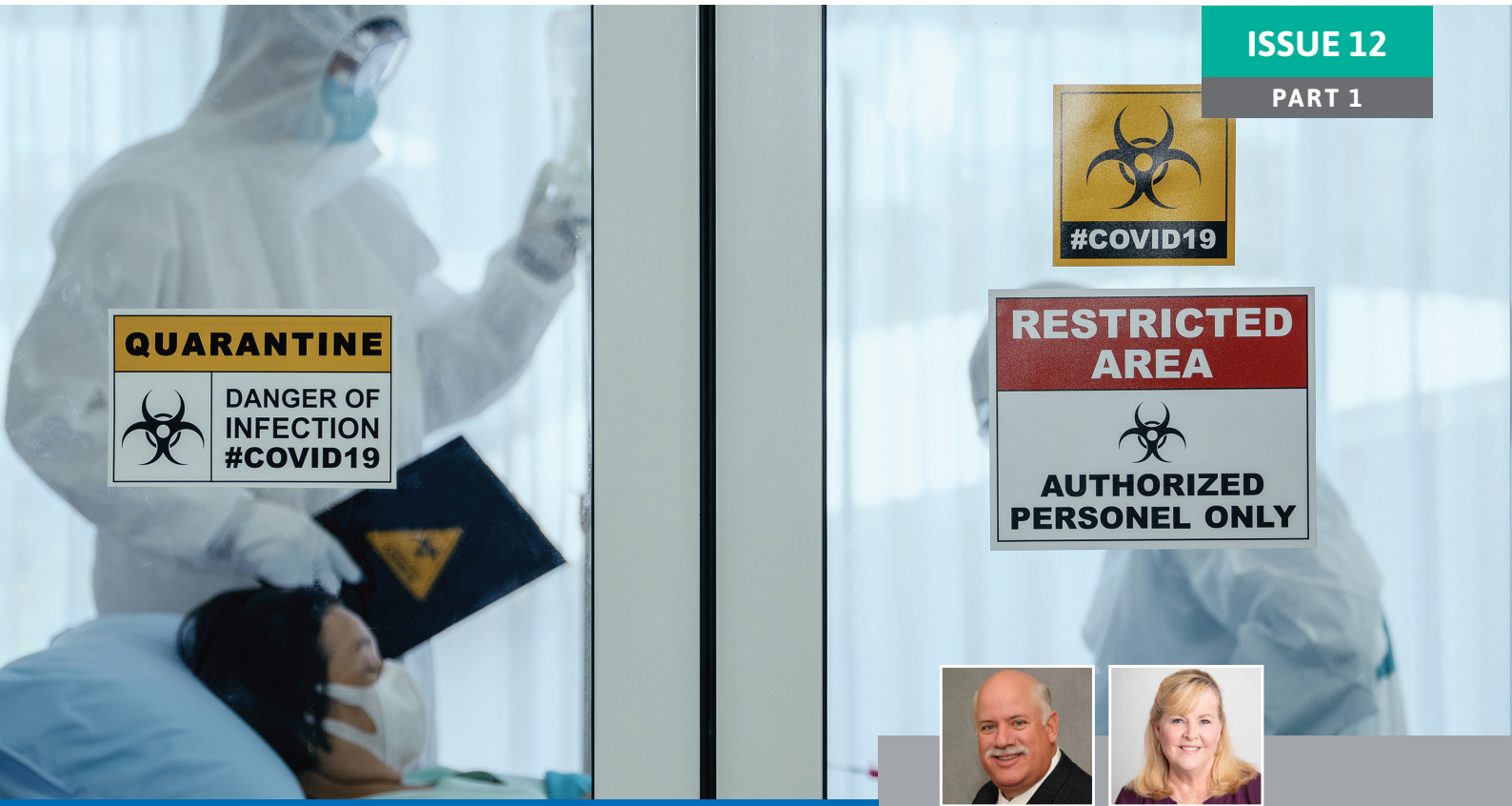
PART 1



PART 1: COVID-19 A GLOBAL PANDEMIC

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LEARNING OBJECTIVES

1. Review the disease outbreak of COVID-19.
2. Understand the steps put in place to reduce the global and local spread of the SARS-CoV-2 virus, including surveillance to monitor its spread.
3. Examine current available testing for COVID-19.
4. Understand the typical COVID-19 symptoms and recent studies exploring these symptoms in predicting the severity of the disease.

WHAT IS THE COVID-19 PANDEMIC?

A pandemic by its very definition is a disease outbreak happening over a wide area which affects the majority of the population. The world has seen 6 viral pandemics since 2000. Three of them have been caused by the Coronavirus species. People alive today have never been exposed to SARS-CoV-2 virus. SARS-CoV-2 is a coronavirus which causes the COVID-19 disease in humans. Like the prior Coronaviruses, no one has immunity to the virus. This makes all of us vulnerable.

TABLE 1: There have been many deadly pandemics in the world's history.

Pandemic	Year	Organism	Number of estimated deaths
Smallpox	1520	Variola (smallpox)	56 million
Spanish Flu	1918-1920	H1N1 influenza A virus	40-50 million
SARS	2003	Coronavirus	<1,000
Swine Flu	2009-2010	H1N1 influenza virus	200,000
MERS	2012-present	Coronavirus	<1,000
Ebola	2014-2016	Ebolavirus	>11,000
COVID-19 (SARS-CoV-2)	2019-ongoing	Coronavirus	>430,000

Beginning in late 2019, Chinese health authorities started seeing a growing number of severe acute respiratory infections in the province around the city of Wuhan. Wuhan is located in the Hubei province, in central China. They discovered that this was a new or "novel" coronavirus. While it was initially seen to be an epidemic in China, the virus quickly spread.

On December 31, 2019, China notified the World Health Authority that there was an outbreak of a novel Coronavirus. The virus SARS-CoV-2 was renamed COVID-19, a shortened form of "coronavirus disease of 2019." On January 30, 2020, The World Health Organization (WHO) designated the ongoing COVID-19 outbreak as a Public Health Emergency of International Concern. Just a few weeks later, WHO declared COVID-19 as a global pandemic on March 11, 2020.

By the end of March, the world saw more than a half-million people infected and nearly 30,000 deaths. Today, COVID-19 has rapidly spread to over 215 countries and territories in a very short period of time. Almost 8 million have been infected; many have died.

Taxonomically, SARS-CoV-2 is a strain of severe acute respiratory syndrome-related coronavirus (SARS-CoV). It is believed to have zoonotic origins and has close genetic similarity to bat coronaviruses, suggesting it may have emerged from a bat-borne virus that was transferred to the human population. It is considered by public health officials to be more infectious than the flu and Ebola. There have even been reports of spreading it to cats and dogs.

SARS-CoV-2 is an enveloped, single-stranded RNA (ribonucleic acid) virus that is **highly contagious and easily transmissible between humans.** The SARS-CoV-2 virus is primarily spread person to person through close contact and via respiratory droplets produced from coughs and sneezes and from contact with contaminated surfaces, then touching the eyes, nose, or mouth. As a result of increased emphasis and awareness, people from all over the world have become more aware of the best practices during a pandemic.

From the very beginning of the COVID-19 outbreak, the global public health and governmental recommendations have been centered around slowing and stopping the spread by raising awareness on transmission prevention. One of the most important prevention methods is focused upon the **need to perform handwashing with soap and water for a minimum of 20 seconds.** The primary reason hand washing is recommended is due to the lipid coating of the SARS-CoV-2 virus and reducing the risk of hands transferring the virus to mucous membranes. Soap is effective in breaking down the lipid layer, effectively causing the virus to fall apart. The lipid layer is essentially the Achilles heel of the SARS-CoV-2 virus.

Another recommendation has been to maintain social distancing of at least 6 feet/2 metres. This is utilized in order to reduce contact with droplets generated from others. SARS-CoV-2 is highly transmissible via the airborne route. In addition, mask wearing which is often a social norm in many parts of the world, is now recommended to protect the public from the mask wearer. This is the opposite of the purpose of standard precautions.

Many countries have proactively closed their borders to travel and immigration and imposed mandatory 14-day quarantine periods for all that arrive. International air travel has been dramatically reduced or even halted in some cases. All in an effort to curb the transmission of SARS-CoV-2 and to control the spread. Around the globe, various measures are being used to flatten the curve, such as implementing stay-at-home measures; schools, universities, businesses and restaurants closed; and large public assemblies and venues cancelled. All these, and many more efforts were aimed to reduce the spread of COVID-19 from overwhelming the healthcare system. Even as these measures were being implemented, in some cities and countries, healthcare systems were quickly at or beyond capacity. Reports of medical supplies and personal protective equipment (PPE) shortages due to the depletion of supply chain became the new norm. Conservation guidelines were implemented in many countries for the reuse of single-use N95/P2/FFP2 respirators with proper reprocessing.

Timeline of World Health Organization (WHO) Covid-19 Responses[1]

JAN 4 — WHO reports on cluster of pneumonia cases in Wuhan, China. No reported deaths.

JAN 10 — WHO issues technical guidance on how to detect, test and manage potential cases of the new virus.

JAN 22 — WHO issues a statement with evidence of human-human transmission in Wuhan.

JAN 30 — WHO Director-General Dr Tedros Adhanom Ghebreyesus declared the 2019-nCov outbreak a **Public Health Emergency of International Concern.**

FEB 21 — WHO Director-General emphasized window of opportunity to contain the outbreak is "narrowing" and that the international community needs to ramp up efforts and finances.

FEB 28 — WHO raised the risk assessment of the coronavirus from **"high"** to **"very high"** across the world.

FEB 29 — WHO continues to advise against enforcement of travel or trade restrictions on countries grappling with COVID-19 outbreaks. Recommend reinforcing epidemiological surveillance.

FEB 29 — WHO publishes *Rational use of personal protective equipment* for COVID-19.

MAR 7 — Global number of reported COVID-19 cases surpassed 100,000. WHO strategy is to interrupt human-to-human transmission.

MAR 11 — **WHO declared COVID-19 a pandemic.**

MAR 16 — The total number of cases outside China has exceeded the numbers in China.

MAR 23 — The Director-General warned pandemic is accelerating.

MAR 24 — WHO spokesperson Margaret Harris said US has potential to be the next epicenter amid a rapid acceleration of cases across the nation.

MAR 26 — WHO called on G20 leaders to fight, unite, and ignite against COVID-19 as total number of COVID-19 cases surpasses 500,000.

GLOBAL PREVALENCE AND SURVEILLANCE PRACTICES

Public health surveillance is an ongoing, systematic collection, analysis, and interpretation of health-related data, essential for planning, implementation, and evaluation of public health practice and response. This is the essence of what is taking place with the current COVID-19 pandemic. Governments large and small, everywhere, are actively planning their reopening strategies around the responses being implemented weeks or months ago. They are conducting population surveillance through a variety of new, old, and emerging technologies, all using large data sets to guide what to do next.

To date, at the writing of this InTouch update in late June 2020, there have been almost 8 million people confirmed globally, with up to 215 countries affected. More than 430,000 have died, and almost 4 million have recovered. Cases continue to increase, with prevalence rates varying from country to country, even within the same geographic area. Currently countries, such as Brazil and India are reporting a dramatic rise. With diagnostic testing limited in some low-income countries, under-reporting may not reflect true prevalence numbers.

In the case of COVID-19, each country's public health surveillance systems and sources are often unique, but many draw data from a combination of sources. Common sources rely upon existing disease surveillance systems (i.e. influenza, respiratory disease, commercial or state-run labs results, and various other sources) to develop a snapshot of current trends and results. This data is used by a number of officials and governments when establishing national policy all the way down to geographical region COVID-19 response planning.

TESTING TYPES AND AVAILABILITY

The global pandemic has created acute and **significant shortages of not just personal protective equipment, but also diagnostic equipment and supplies.** When the COVID-19 disease began to be detected around the globe, testing was in its infancy. During the first few months of the outbreak, the world dealt with faulty tests, shortages of tests, and inconsistent guidelines. These guidelines often excluded people who should have been tested to mitigate the outbreak.

There are essentially two main types of SARS-CoV-2 tests available. These are nucleic acid detection/PCR tests and serology tests. The nucleic acid detection test is a viral test and only detects the presence of viral material during active infection. This type of testing is based on a common molecular testing technique used globally called polymerase chain reaction or PCR. Serology or antibody blood tests may be used to identify individuals who previously had mild symptoms, were asymptomatic, and need confirmation of a past COVID-19 infection, not active disease. It make take up to 1-3 weeks for antibodies to be produced after infection.

Viral testing requires a sample to be collected from the inside of the upper nasopharynx (nose) using a swab. This test is then sent to a lab where results are returned in a day or more. While the patient is waiting for results, they should follow their healthcare providers instructions regarding self-quarantine. Some of the newer viral diagnostic test kits are considered point-of-care – giving the clinician results in some instances, within a few minutes. Questions often arise on who should seek testing for COVID-19. If there is ever a doubt that you may be seriously ill, you should seek immediate medical care or contact emergency services. Top priorities for COVID-19 testing are[2]:

a. **Highest priority (those with symptoms)**
   i. Hospitalized patients with symptoms
   ii. Healthcare workers with symptoms
   iii. Workers in congregated work settings
   iv. First responders with symptoms
   v. Residents of long-term care or group homes
   vi. Prisoners and residents of shelters

b. **Priority for testing**
   i. Persons with symptoms suggestive of COVID-19
   ii. Others that have been identified by healthcare providers and or health departments (close contacts exposed to a positive individual; part of surveillance/monitoring etc.)

The **CDC recommends clinicians use clinical judgment to determine if a patient has signs and symptoms suggesting COVID-19** and whether the patient should be tested. Other considerations that may guide testing are clusters or outbreaks of infection in a hospital, a long-term care facility, nursing home or local community transmission of COVID-19. It is also important for clinicians to test for other causes of respiratory illness, such as influenza, in addition to testing for SARS-CoV-2. CDC recommends the last phase be broad testing of contacts of COVID-positive individuals and of essential workers, even when they have mild symptoms or none at all.

Antibody testing is used to identify past COVID-19 disease, not active disease. The antibody test looks for the presence or absence of antibodies. This is helpful to understand the extent of COVID-19 illness in any given population (region, country, global).

Testing capacities and response times continue to grow globally. Results continue to assist with illuminating the unknowns. These results should be used by local communities and countries to guide their next moves in the battle against COVID-19 until a vaccine is available.

SYMPTOMS AND RELATED RESEARCH

Symptoms of COVID-19 vary from minor or none (asymptomatic) to life threatening requiring immediate medical treatment. Incubation of infection has been identified in the literature ranging from 1-14 days after exposure. Typical COVID-19 symptoms identified globally include the following:

- **Fever or chills**
- **Dry cough**
- **Difficulty in breathing or shortness of breath**
- **Fatigue**
- **A rash on skin, or discoloration of fingers or toes**
- **Muscle pain (body aches)**
- **Headache**
- **Sore throat**
- **Nasal congestion**
- **Mucous or phlegm**
- **Loss of taste or smell (acutely)**
- **Loss of appetite**
- **Diarrhea**

The COVID-19 disease has stimulated a great deal of research at an unprecedented record pace. When reviewing the current research on COVID-19 symptoms, there does not appear to be consensus on symptoms being predictive of mild to severe disease around the world. In an April 1, 2020 online publication by Michelen and colleagues on behalf of the Oxford COVID-19 evidence service team, they reported the following data from systematic review of 18 studies[3]:

- Fever is the most common symptom in those with mild to moderate infections
- Cough was the second most common symptom
- Loss of smell (anosmia) was much higher in COVID-19 positive tests (3 times higher)
- Shortness of breath was most common for those with severe infections

They concluded with the following:

- "Scarce and inconclusive evidence on symptoms that easily distinguish mild and moderate cases. Additional evidence is needed with longer observation periods and larger population size and a more diverse demographic."
- "Fever (< 39.1 °C) and cough are the most frequent symptoms even in mild disease, but relying on cough to diagnose COVID-19 may be misleading as it was observed in less than half of the mild cases in the largest studies of this review."
- "One study reports anosmia is a strong predictor of COVID-19 infection."
- "Presenting symptoms varied widely but, in combination, anosmia, fever, fatigue, persistent cough, diarrhoea, abdominal pain and loss of appetite have a reasonable specificity for COVID-19 diagnosis, though average sensitivity."
- "Symptoms can have rapid cessation or late onset and some people will also be asymptomatic."

CONCLUSION

For most of the world, daily life has been disrupted. Shortages of personal protective equipment, bed space, and ventilators have been in the headlines. Society is scared, healthcare workers (HCWs) are weary, and leaders across the globe are struggling to slow the spread. Global economies and supply lines have been impacted.

Today, the world is slowly awakening from the steps many governments put in place to slow the COVID-19 pandemic spread. When COVID-19 begins its retreat, only then will we begin to see planned phased re-openings. Some places have already begun to see some businesses re-open that provide goods and services. Healthcare facilities who halted elective surgical and procedures to free up bed capacity, personnel, and supplies, are beginning to cautiously reintroduce elective surgery and procedures again. All these activities are beginning across the world at different stages, while health departments are simultaneously keeping a watchful eye on new cases of COVID-19.

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Please Note: Given the novelty of this coronavirus, recommendations from the source references are interim and advisory in nature and are based on current knowledge of the situation. Always ensure compliance with your local public health authorities regulations regarding the COVID-19 pandemic.

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