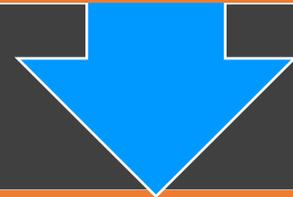


(Courtesy of Prof Igbo Ofotokun)



SARS-CoV-2 Virus: the cause of COVID-19

It is a coronavirus – similar in some respects to other coronaviruses that cause the common cold
"catarrh"



It is however different from other coronaviruses

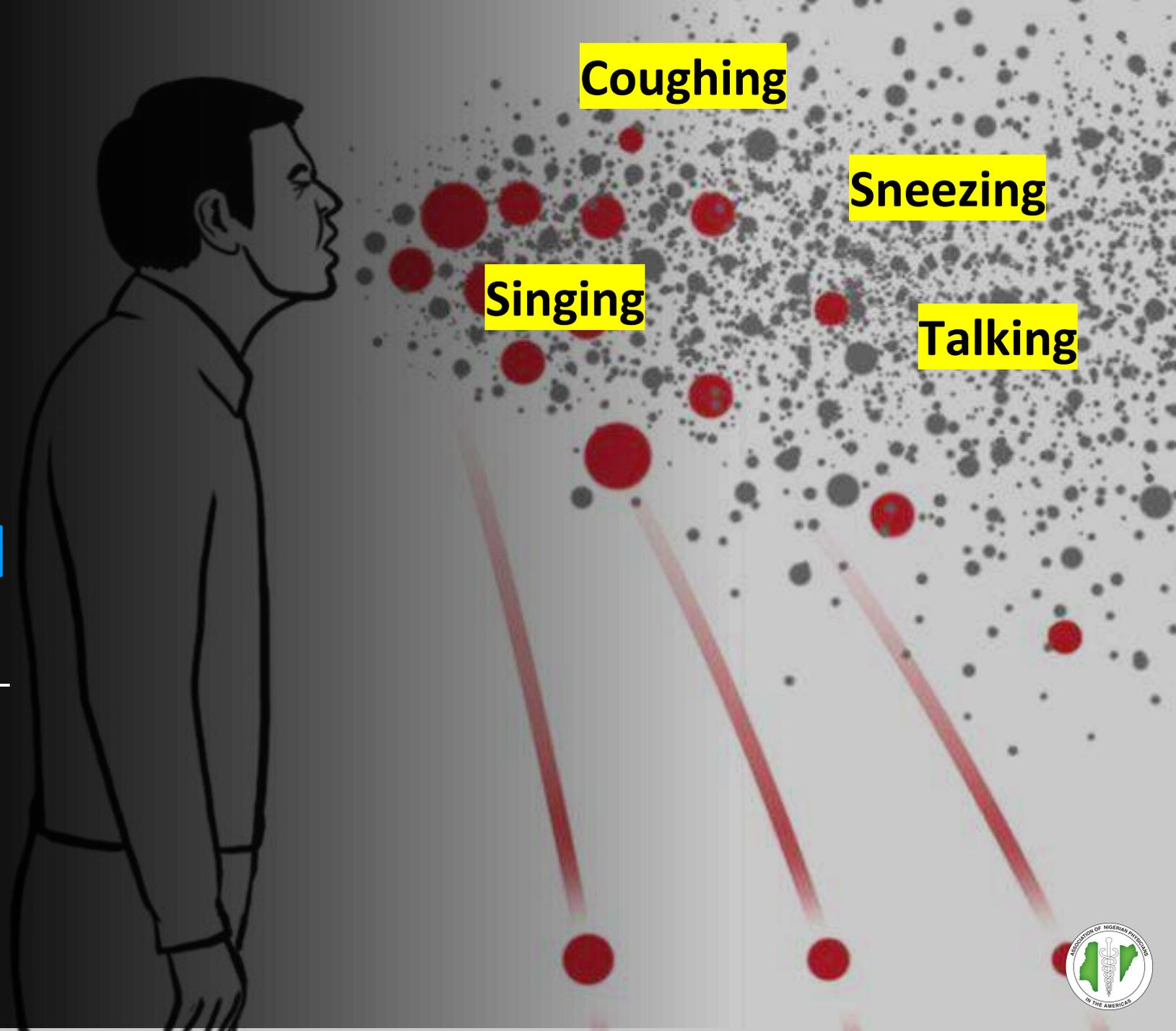
It is highly contagious – can spread very rapidly from person to person

It can cause severe upper respiratory disease (cold-like illness) and lower respiratory disease (pneumonia)

In many individuals, these illnesses can lead to death



Most common mode of COVID-19 spread: infected nasopharyngeal and oropharyngeal droplets

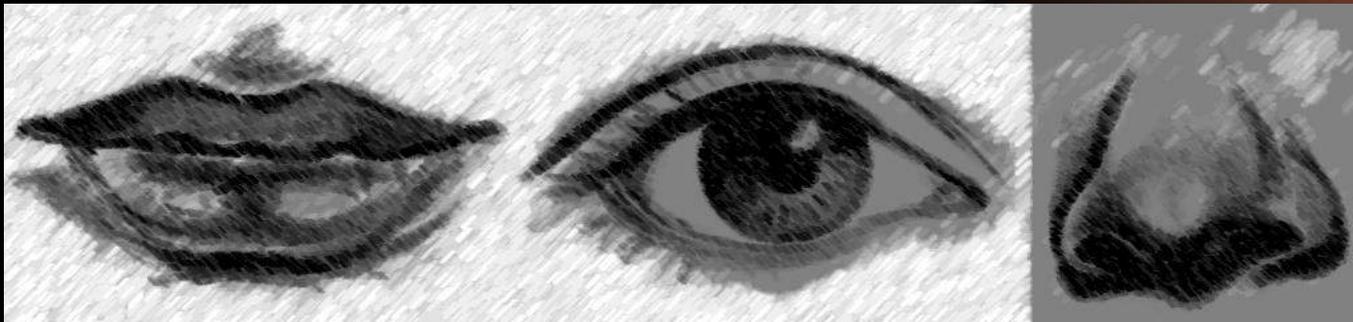


(Courtesy of Prof Igbo Ofotokun)



COVID-19 can also be spread via contaminated hands to the mouth, eyes, and nose

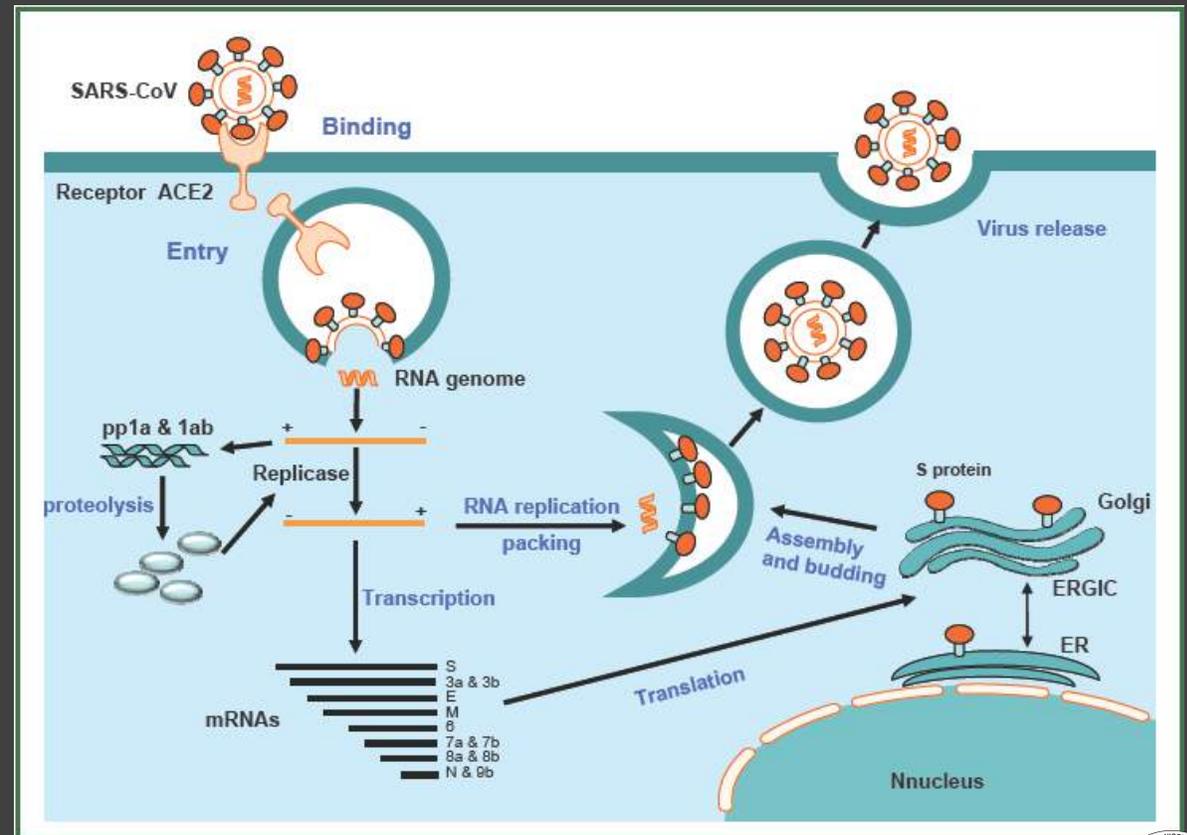
(Courtesy of Prof Igbo Ofotokun)



The Biology

Once the virus gains entrance into the human body:

- It binds to the angiotensin converting enzyme 2 (**ACE 2**) receptors to gain access to the cells
- It uses the human cell materials to reproduce several million copies of itself and spread across the entire body



Clinical presentation of COVID-19

- Symptoms occurs 2 – 14 days after exposure
- Some infected individuals may develop no symptoms
- In the majority of cases (~80%), symptoms are mild
- In others (~20%) symptoms may be severe enough to require hospitalization
- About 5% of hospitalized patients may require intensive care unit (ICU) and ventilation assistance

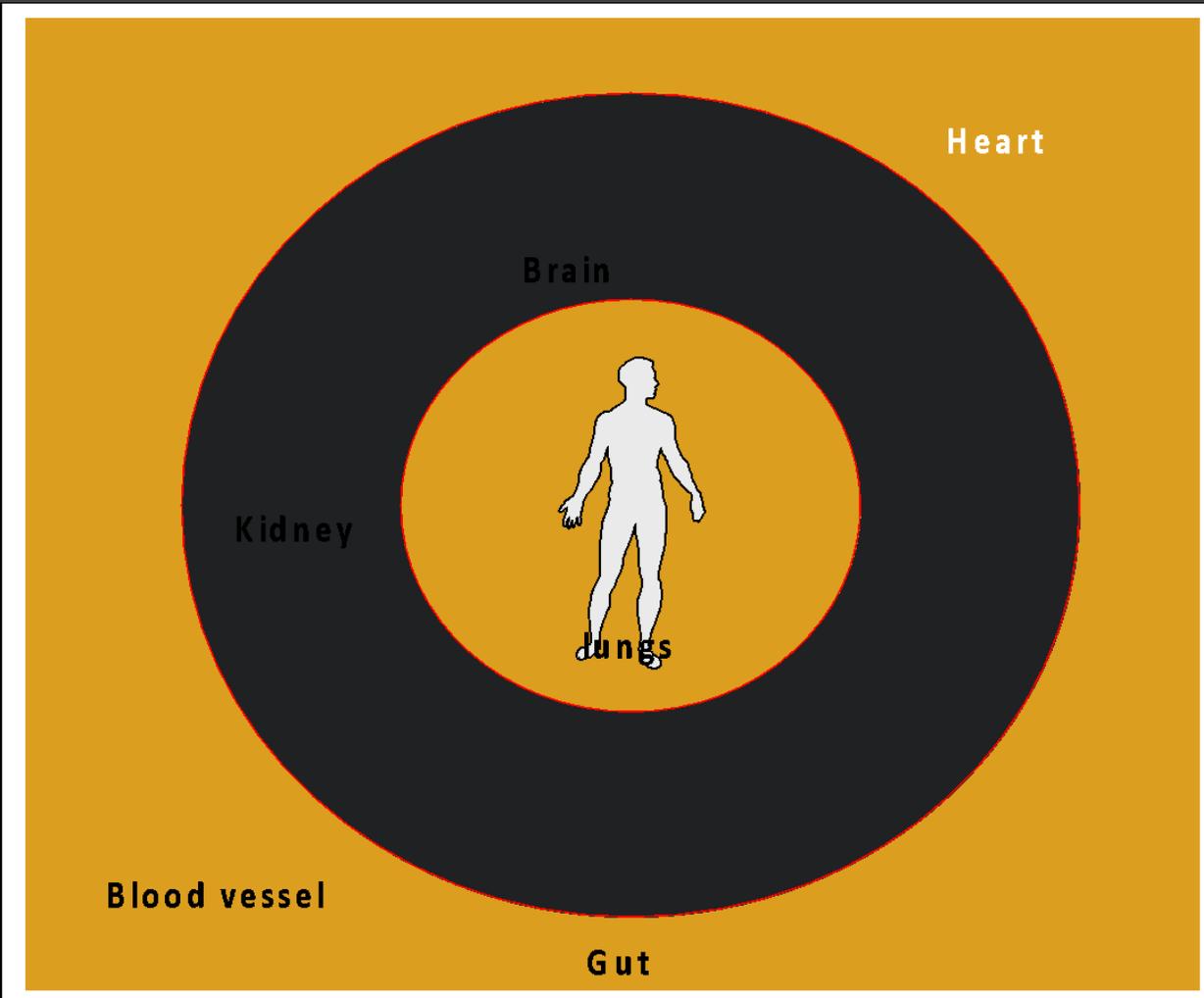
Initial symptoms include:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea



(Courtesy of Prof Igbo Ofotokun)

Severe cases and complications



The ACE2 receptor, the target for the COVID-19 virus is widely distributed throughout the body, particularly in the lungs, blood vessels, heart, kidneys, brain and the gut.

Complications may include:

- Pneumonia with respiratory failure (ARDS)
- Coagulation defects with thrombosis (pulmonary emboli)
- Cardiovascular collapse
- Acute kidney failure
- Cerebrovascular accident (stroke)
- Kawasaki-like illness in children

Triaging a suspected COVID-19 case in the outpatient clinic or emergency room

Universal precautions should be practiced in the care of ALL patients.

All patients should undergo initial COVID-19 assessment with:

- Temperature checks for fever
- Symptom check for cough, sore throat, running nose and diarrhea.

Patients who screen positive with any of these symptoms can be designated as persons under investigation (PUI) and should be triaged to a separate COVID-19 assessment area for full evaluation by the rapid response team or the designated clinical team.

Healthcare workers evaluating these patients should use appropriate personal protective equipment (PPE) – see Infn Control section and accompanying videos on [donning](#) and [doffing](#) PPE.



Suspected COVID-19 cases or PUI

- All PUIs should be placed on contact and respiratory droplet precautions per in country and local standards.
- Nasopharyngeal swabs should be obtained for COVID-19 RT-PCR testing – see [video on appropriate NP swab specimen collection](#)
- All patients should be assessed for severity of COVID-19 disease
 - Note that patients with pre-existing medical conditions such as those listed below may have worse outcomes
 - Hypertension
 - Diabetes
 - Coronary artery disease
 - Structural lung disease
 - Immunocompromising conditions or medications
 - Age > 60 years

Reporting of COVID-19 test results

Turn around time for testing varies from place to place.

Suspected cases or PUIs should remain under transmission-based precautions while results are pending.

Best practices for test reporting include setting up a COVID-19 pager or dedicated cell phone for each treatment facility.

- Testing centers call in all results for the facility to that pager/cell phone number. The clinician on call then communicates the results to the individual patients.

Note that the COVID-19 test (RT PCR) is only about 75% sensitive. If clinical index of suspicion is high, the patient should be kept for observation and management, regardless of the test result.

See video on [COVID19 Testing Explained 1](#) and [COVID19 Testing Explained 2](#)

Evaluation of COVID-19 cases in the hospital setting

Most cases of COVID-19 are mild and will resolve with little or no medical intervention.

Moderate to severe cases can progress with fatal outcomes.

Initial assessment should include:

- Fluid and electrolytes status particularly in those with diarrhea
- Complete blood count to assess for anemia, neutropenia and thrombocytopenia
- Respiratory status with pulse oximetry and chest radiograph (CXR) for pneumonia
- Inflammatory status with CRP and serum ferritin
- Coagulation status with INR, PT, PTT, D-dimer, fibrinogen and troponin
- Renal and hepatic laboratory tests to rule out acute kidney failure and liver involvement

Definitions

Mild illness = no hypoxia or radiographic evidence of pneumonia

Risk factors for disease progression include:

- Hypoxia (SpO₂ <94% on room air) requiring supplemental oxygen in a patient who has one of the co-morbidities listed below **OR**
- Radiographic evidence of pneumonia in a patient with any of the following:
 - Immunocompromising conditions or medications
 - Structural lung disease
 - Hypertension
 - Coronary artery disease
 - Diabetes
 - Age >60 years
 - Obesity (BMI>40)

Multi-organ failure = ALT >5x upper limit of normal, CrCl < 30 mL/min, or on any form of renal replacement therapy (dialysis)

Management – moderate to severe cases

- Monitor fluid and electrolyte status and correct as appropriate
- Monitor oxygenation status and offer supplemental oxygen therapy – see details in pulmonary/ICU management
- Offer anticoagulation as per in-country or local standards to patients with abnormal coagulation profiles, pulmonary emboli or deep vein thrombosis
- Antiviral therapy
 - Remdesivir – has a US FDA Emergency Authorization Use approval for treating hospitalized patients with COVID-19
 - Chloroquine or hydroxychloroquine – benefit unproven, may cause harm
 - Lopinavir/ritonavir – had no benefit in a Chinese trial.



ICU Management and Ventilatory support

- The following practice should be performed before intubating a patient
 - Low flow nasal cannula set at 1-6 litres/minute
 - High flow nasal cannula based on patient's oxygen saturation. If FiO₂ requirement is over 80%, use CPAP or BiPAP
 - Awake pronation plus high flow nasal cannula or CPAP/BiPAP. Patient has to be able to cooperate.
- Patient should be intubated if all of the above measures fail or when there is increased work of breathing (e.g., use of accessory muscles, sensation of air hunger and diaphoresis) or altered mental status
- If available, care for patient in a negative pressure room

(Courtesy of Prof Igbo Ofotokun)



When to discharge a COVID-19 patient without symptoms

- According to the US CDC - **Patients with laboratory-confirmed COVID-19 who have not had any symptoms** should remain under Transmission-Based Precautions until **either**:
- *Time-based strategy*
 - 10 days have passed since the date of their first positive COVID-19 diagnostic test, assuming they have not subsequently developed symptoms since their positive test. Note, because symptoms cannot be used to gauge where these individuals are in the course of their illness, it is possible that the duration of viral shedding could be longer or shorter than 10 days after their first positive test.
- *Test-based strategy*
 - Negative results of an FDA Emergency Use Authorized COVID-19 molecular assay for detection of SARS-CoV-2 RNA from at least two consecutive respiratory specimens collected ≥ 24 hours apart (total of two negative specimens). Note, because of the absence of symptoms, it is not possible to gauge where these individuals are in the course of their illness. There have been reports of prolonged detection of RNA without direct correlation to viral culture.



When to discharge a COVID-19 patient with symptoms

According to the US CDC - **Symptomatic patients with COVID-19** should remain under Transmission-Based Precautions until **either**:

Symptom-based strategy

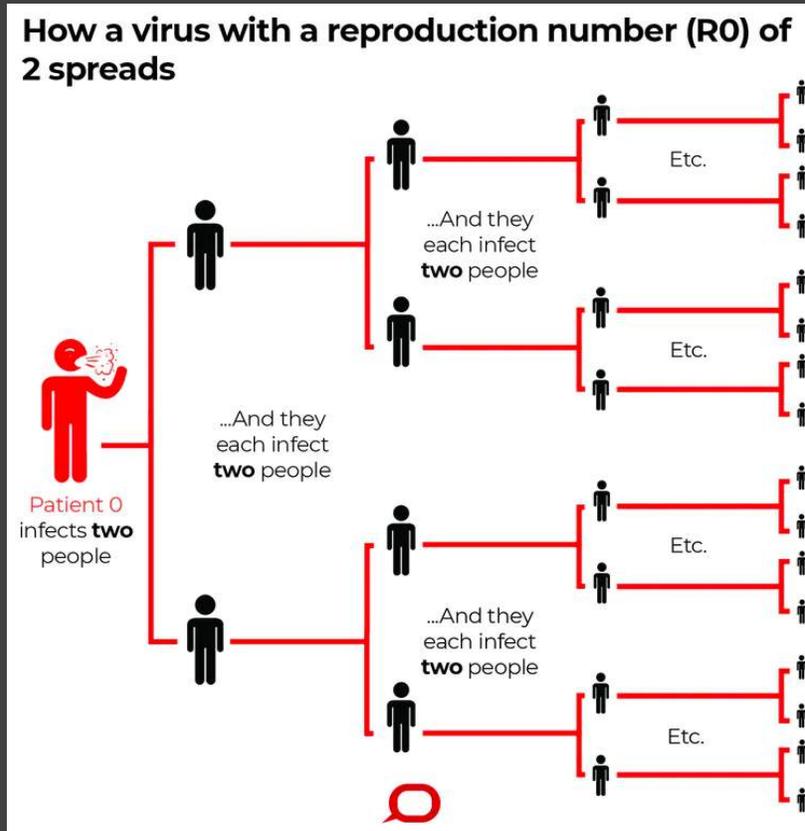
- At least 3 days (72 hours) have passed *since recovery* defined as resolution of fever without the use of fever-reducing medications **and** improvement in respiratory symptoms (e.g., cough, shortness of breath); **and**,
- At least 10 days have passed *since symptoms first appeared*.

Test-based strategy

- Resolution of fever without the use of fever-reducing medications **and**
- Improvement in respiratory symptoms (e.g., cough, shortness of breath), **and**
- Negative results of an FDA Emergency Use Authorized COVID-19 molecular assay for detection of SARS-CoV-2 RNA from at least two consecutive respiratory specimens collected ≥ 24 hours apart (total of two negative

Of note, there have been reports of prolonged detection of RNA without direct correlation to viral culture.

COVID-19 Infection control (IC): Healthcare setting and community



The COVID-19 virus spreads rapidly. It has a reproductive number of 2-3, i.e., an index case infect 2 to 3 other persons

(Courtesy of Prof Igbo Ofotokun)

How long does the virus last?

SARS-CoV-2, which causes COVID-19, needs a living host to reproduce in. A new study looks at how long it can last outside the body

As aerosol in the air*	Up to 3 hrs
On copper	Up to 4 hrs
On cardboard	Up to 24 hrs
On plastic	2 - 3 days
On stainless steel	2 - 3 days

Study and paper by :
New England Journal of Medicine
CDC
Universitis of California, LA, Princeton

*Researchers used a nebulizer to simulate coughing or sneezing, and found that the virus became an aerosol

© AFP

The virus also sticks to and remains viable on surfaces for a long time



COVID-19 Infection control: Healthcare settings

To prevent the spread of COVID-19 among healthcare workers, the following infection control measures should be adopted in each healthcare facility:

- Perform daily COVID-19 symptom screening for all healthcare workers when they enter the facility. Those who screen positive should be referred for evaluation and only return to work after they have been cleared.
- All workers should be required to wear a protective face mask while at work.
- Workers providing direct care to COVID-19 patients should be supplied with appropriate PPE and be trained in donning and doffing.

COVID-19 Infection control: Healthcare setting

Workers performing aerosol-generating procedures on any patient (regardless of COVID-19 status) should wear PPE.

The work environment should allow physical distancing – no more more than 1 employee should be present per 250 sq. ft. space.

Shared equipment (computers, desk space, microscopes etc.) should be wiped down with approved disinfectant before and after use.

After a patient leaves an exam room or waiting area, all surfaces should be wiped down with an approved disinfectant according to the manufacturer's directions.



COVID-19 Infection control: community

**Stay home when
you are sick**

**Avoid contact with
people who are sick**

**Avoid crowded places and
maintain appropriate social
distance**

**Wash hands often with soap
and water for 20 seconds or
longer**

**Wear a cloth face
cover when going
out in public**

**Avoid touching your face,
nose, or mouth with
unwashed hands or after
touching surfaces**



**Cover your mouth with a
tissue or sleeve when
coughing or sneezing**

**Clean and disinfect high
touch surfaces often**

**Avoid public transit if possible
and don't travel to areas with
active outbreaks**

(Courtesy of Prof Igbo Ofotokun)



COVID-19 Infection control: community

Discussions on return to as close to normal life as possible should be initiated with key stakeholders including:

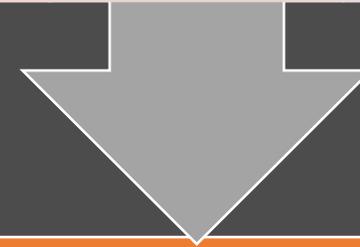
Leaders of institutions of higher education

State and local school boards

Places of worship

Markets

Workplaces, etc.



Plans for a phased return to normalcy should be carefully developed based on the status of local and national outbreak taking into consideration public health measures of testing, contact tracing and isolation of identified cases.

COVID-19 Management Protocols for non-medical personnel

To prevent the spread of COVID-19 among non-medical personnel, the following infection control measures should be adopted in each healthcare facility universally:

- Daily temperature checks on arrival and departure from work.
- Mandatory mask policy.
- Social distancing
 - Limit amount of people that can be in small enclosed spaces, break rooms, security rooms to two or three
- Cleaners should be mandated to use gowns, mask, gloves and face shields in the COVID unit.

COVID-19 Management Protocols for non-medical personnel

To prevent the spread of COVID-19 among non-medical personnel, the following infection control measures should be adopted in each healthcare facility:

- Education provided at each person's level of understanding on principles of disease transmission and the facility's policy.
- PPEs as well as training on their use should be provided to all non medical personnel working in the COVID unit.
- Hand hygiene should be stressed and workers monitored for adherence.
- Clear guidance should be available regarding protocols for workers who become symptomatic. Self reporting should be encouraged without fear of job loss.

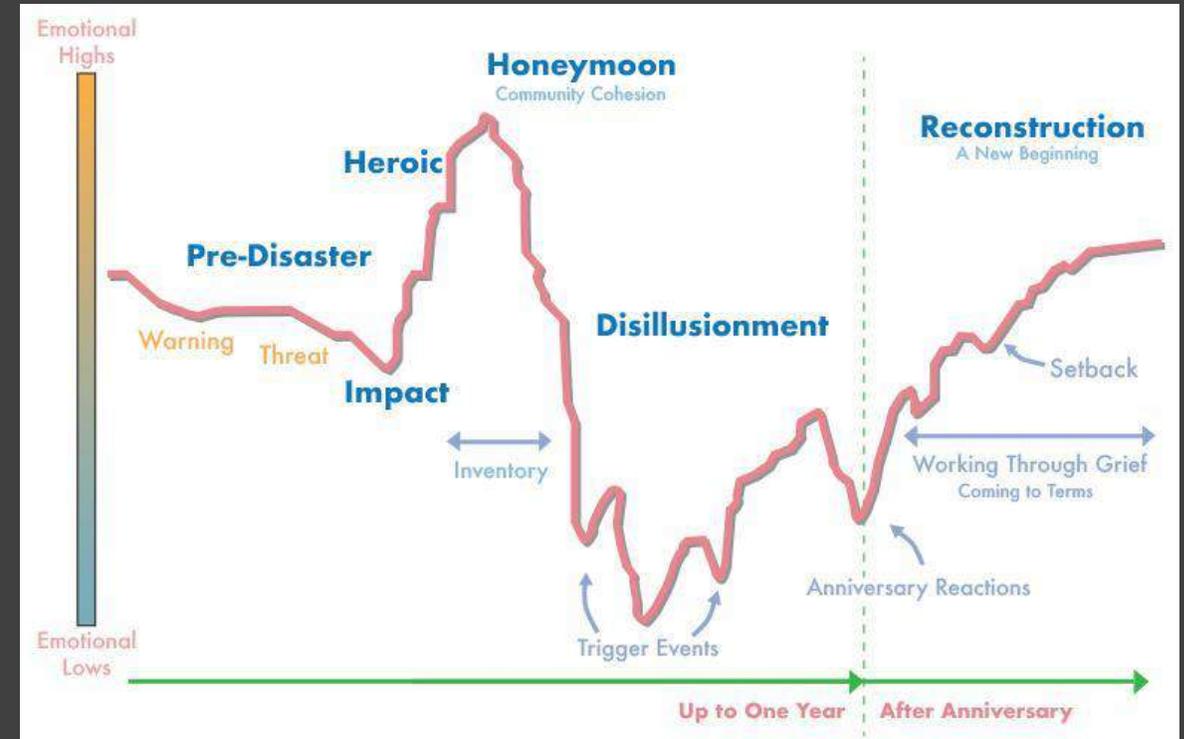
Mental health and wellbeing



Psychological phases of disasters

References: <https://www.samhsa.gov/dtac/recovering-disasters/phases-disaster>

- The COVID-19 pandemic is a large-scale disaster
- Major disasters are characterized by psychological phases that have identifiable characteristics
- COVID-19, like other pandemics, causes high stress due to the possibility of severe outcomes, the uncertainty of the individual risk, and a long duration



Phase	Duration	Impacts
1. Pre-disaster	Variable, depends on type of disaster	Uncertainty/fear. Feelings of vulnerability, insecurity and fear of sudden loss. Also, blame, guilt, anger in slower developing disasters like pandemics.
2. Impact	Variable, depends on type on type of disaster	Shock, panic, confusion and self-preservation reactions
3. Heroic	Days	Altruistic and rescue behaviors (often without careful risk assessment); high activity with low productivity
4. Honeymoon	Weeks	Helping actions, community bonding, optimism
5. Disillusionment	Months/years	Reality checks, discouragement. Effects of stress—exhaustion, demoralization, resentments
6. Reconstruction	Years	Anniversary reactions; Recovery—personal and community. Rebuilding of lives, infrastructure



Psychological phases of disasters and recommended interventions

References: SAMHA 2000; Swartz 2020

Phase	Interventions
1. Pre-disaster	Strategic planning, trainings, wellness programs
2. Impact	Structured briefings, surveillance, psychological first aid (PFA)
3. Heroic	Surveillance, PFA, wellness programs
4. Honeymoon	Surveillance, PFA, wellness programs
5. Disillusionment	PFA; surveillance and psychological triage, crisis interventions such as Critical Incident Stress Management, psychological and spiritual counseling, formal psychiatric care, healing groups
6. Reconstruction	Surveillance, PFA, wellness programs

Psychological First Aid involves establishing a compassionate presence, providing for immediate safety needs, identifying and calming the emotionally distressed, and providing general physical and emotional comfort.

Critical Incident Stress Management is a short-term psychological intervention focused on relief of acute stress to foster a return to normal roles. It involves non-judgmental debriefing to “talk-through” stressful encounters and preparedness trainings or reviews.



Psychological impacts of COVID-19 in individuals

Psychological/psychiatric signals

- Problems in healthcare workers:
 - Emotions—stress, anxiety, depression, despair
 - Exhaustion
 - Burnout
 - Mental collapse
 - Some reports of suicide
- Community stress, anxiety, depression, etc.
 - Anxiety in the population
 - Adjustment reactions
 - Bereavement
 - Exacerbation of chronic mental illnesses
 - Substance misuse
 - Disruption of mental health services
 - Antisocial behaviors—domestic violence, belligerence, social disorder

Common triggers

- Family illness and complications—death, hospitalization and handicap
- Life disruptions—school closures, loss of recreation
- Loss of income/employment
- Food insecurity
- Strained social services
- Reduced access to healthcare



Cost of COVID-19 care

Given the toll of this pandemic on individuals and the society as whole: the costs of care are covered by the government in many nations.

Economic relief has been provided by governments across the globe to their citizens.

Videos

- [Donning of PPE](#)
- [Doffing of PPE](#)
- [NP swap collection](#)
- [Crisis Management 1](#)
- [Crisis Management 2](#)
- [Mental Health](#)
- [Treatment For Asymptomatic COVID 19](#)
- [Healthcare as Part of the Team](#)
- [COVID19 Testing Explained 1](#)
- [COVID19 Testing Explained 2](#)
- [Handwashing](#)
- [6 Steps to prevent COVID19](#)
- [How COVID19 Can Spread In a Community](#)
- [COVID 19: What Older Adults Need to Know](#)
- [COVID 19: Are You at Higher Risk for Severe Illness?](#)
- [Donning N95 Mask](#)
- [Doffing N95 Mask](#)



The Resistance, Resilience and Recovery model

References: Kaminsky et al., 2006; Bisson et al., 2007; Nucifora et al., 2007; Nucifora et al., 2011; Wu et al., 2020

- **Basic principles**
 - Some individuals or groups withstand high levels of stress (i.e., they have high resistance)
 - Individual or group resilience to stress can be developed (i.e., coping can be trained)
 - Individuals and groups can rebound from stress, recover, adapt and return to their lives
- **Key actions**
 - Individual or community resistance results from “inoculation” through strategic planning that anticipates and prepares in advance the resources, protocols and communication channels
 - Resilience derives from focused leadership that provides facts quickly, builds optimism and spirit, sets realistic goals, gives timely guidance and establishes effective communications
 - Fostering of resilience is achieved through surveillance, PFA, wellness programs and targeted crisis interventions (CISM, counseling, etc.) for individuals or groups
 - Recovery after crisis intervention depends on monitoring and maintenance of ongoing psychological or psychiatric care

Note: group interventions typically are delivered to groups sharing the key characteristic that led to the stress exposure (e.g., emergency medical personnel, intensive care unit nurses, medical residents).



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