

# UPDATES ON COVID-19 SITUATION IN KENYA AND INTERNATIONALLY

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# COVID-19 Pandemic- Introduction

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- **Coronavirus disease 2019 (COVID-19)** is an infectious disease caused by SARS-CoV-2, a recently discovered novel Corona Virus.
- Coronaviruses have been a common pathogen for **upper respiratory tract (URT) infections** for years, both in adults and children. They are responsible for about 20% of such infections.
- Infections usually last for several days and have a **mild course**.
- The discovery of the new virus, initiated research into its epidemiology. An initial investigation associated the morbidity to the **seafood** and **exotic animals** in **Wuhan** market, Hubei province, China.
- Though, the disease has **covered** almost the **entire world** irrespective of no such contact in subsequent patients.



# COVID-19 Pandemic- Disease Burden

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- **This coronavirus was first detected in Wuhan City**, Hubei province, China in December 2019. Since then, it rapidly spread across the world, except Antarctica.
- On 11 March, 2020, the **WHO** declared COVID-19 a **pandemic**.
- So far, **over 96 million people** around the world have been known to be **infected**, and a bit more than **2 million** people have **died** because of coronavirus and its complications.
- A bit less than **69 million** COVID-19 patients have already **recovered**.
- Number of **active cases** (currently infected patients) are **25.3 millions**; 99.6% of them (25.2 millions) are in mild condition and only 0.4% (112.000 patients) are in serious or critical condition.
- **Closed cases** (cases which had an outcome) are more than **70 millions**, 97% of them (68.7 millions) are either recovered or discharged from the hospitals and only 3% (2.05 million patients) have died.

# Situation in Kenya

## Jan 20<sup>th</sup>, 2021

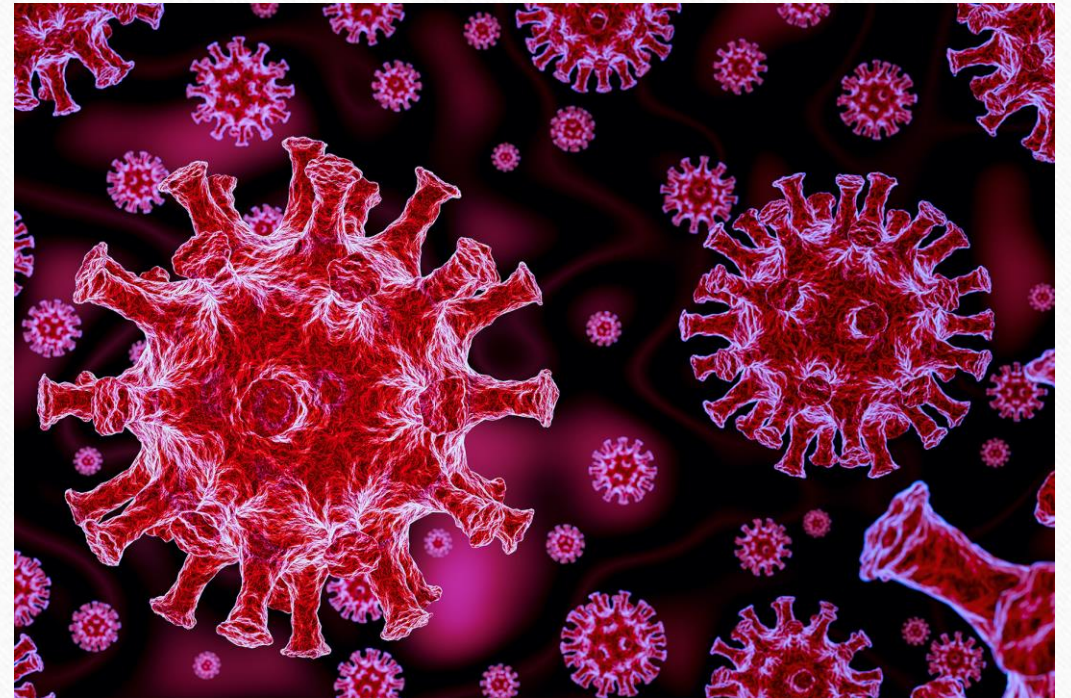
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- So far we have 1,128,360 people tested for COVID-19.
- 99,227 patients were confirmed positive for COVID-19.
- We have around 1,734 deaths because of COVID-19 and its complications.
- Around 82,427 COVID-19 patients recovered from COVID-19.
- We have more than 600 COVID-19 patients, admitted to the hospitals and around 29 patients are in serious condition, and are admitted to the HDU/IC



# Etiology and Pathogenesis

- According to the data published by the **WHO**, the first cases of unknown etiology appeared in the city of **Wuhan**, the Chinese province of **Hubei** in early December 2019.
- **Infections with** influenza virus, avian influenza virus, adenovirus, (SARS-CoV), and (MERS-CoV) were all **excluded**.
- Subsequently, previously unknown type of virus was isolated in January 2020, originally labelled as “**novel coronavirus**” (nCoV). Currently, the pathogen is named **SARS-CoV-2**.



# Duration of infectivity

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- The **incubation period** for COVID-19 is on average 6.4 days (from 2.1 to 11.1 days). However, to ensure a **safe duration of quarantine**, it is reasonable to assume the incubation time between 2.4 and 15.5 days.
- On the other hand, according to the **WHO** data, the time to **onset of symptoms** is between 5–6 days, but can be up to 14 days.
- During this period, also known as the “**pre-symptomatic**” period, some infected persons can be contagious, from 1–3 days before symptom onset.
- It is important to recognize that **pre-symptomatic transmission** still requires the virus to be spread via **infectious droplets** or by direct or indirect **contact** with bodily fluids from an infected person.



# Host & Reservoir, and Survival Capacity of COVID-19

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- Wild animal, “**bats**” is the most possible **host** of the 2019-nCoV. However, its direct transmission from bats or through an intermediate host requires further confirmation. It is believed that clarifying the source of the virus will help to help determine zoonotic transmission patterns.
- The **survival capacity of COVID-19** on surfaces is not certain, but it behaves like other Corona viruses. Studies suggest that Corona Viruses, including COVID-19 virus, may persist on surfaces for a few hours or up to several days depending on different conditions (e.g. type of surface, temperature or humidity of the environment).

# Transmissibility of COVID-19

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- Up to present, the **main infection source** is the patients who have pneumonia, caused by the 2019-nCoV.
- **Respiratory droplet** and **direct contact** with an infected person are the main routes of transmission.
- Viral **transmission** mainly occurs from **symptomatic people** to others by **close contact** through respiratory droplets, by direct contact with infected persons, or by contact with contaminated objects and surfaces.
- Shedding of SARS-CoV-2 is highest in the **upper respiratory tract (URT)** (nose and throat) early in the course of the disease, within the first 3 days from onset of symptoms.
- When a person suffering from this disease sneezes or coughs, a lot of droplets spread in the air or fall on the ground and nearby surfaces. If another person is nearby and **inhales the droplets** or **touches these surfaces** and then **touches his face, eyes or mouth**, he can get the infection. The chances are more if one is within a distance of less than 1 meter from the infected person.
- The **spread** of the virus by **air** have not been confirmed.
- **Conjunctiva of the eye** is the most likely portal of entry for aerosol and fluids.



# Transmission Susceptibility

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- Research from early cases in China suggests that some individuals are more vulnerable to the most outcomes of the virus:
  - Older adults
  - People who have serious chronic medical conditions like,
    - Hypertension (27-30%)
    - Diabetes (19%)
    - Cardiovascular disease (6-8%)
    - Chronic respiratory disease
    - Cancer
  - Smokers

# Pathophysiology of COVID-19 infections

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- **One study has shown that** binding of SRAS-CoV-2 to ACE2 results in decrease in the presence of ACE2. That leads to accumulation of angiotensin-II. Because angiotensin-II is a vasoconstrictor, this accumulation increases the risk of vasoconstriction and hypertension.
- **To support this hypothesis,** a study found elevated levels of angiotensin-II in the plasma of patients with COVID-19, correlated with high total viral load and significant lung damage.
- **This phenomenon has been identified as** one of the main reasons for pulmonary hypertension, contributing to major damage to the lungs after infection with SARS-CoV-2.
- **Infection would lead to** a decrease in the presence of ACE2 in the different organs where the receptor is normally expressed. This phenomenon could significantly increase blood pressure in these organs and cause acute damage to the lungs or heart. Decreases in ACE2, especially in the elderly, result in changes in neutrophil influx and resultant lung injury.



# Pathophysiology of Severe COVID-19

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- **In later stages of COVID-19 illness**, a hyperinflammatory state is manifest that is akin to a cytokine release syndrome (initial cytokine storm), that can result in ARDS, and macrophage activation syndrome (characterized by uncontrolled proliferation of T-lymphocytes and well-differentiated macrophages, leading to widespread hemophagocytosis and cytokine overproduction).
- This initial phase is then followed by a period of immune dysregulation, which is the major cause of sepsis-related fatalities.
- **This multisystemic syndrome results in** elevated cytokines and dysregulated T-cells with lymphopenia (typically an early finding).
- **This is coupled with marked elevations in** C-reactive protein, cytokines such as interleukins (IL-2 and IL-6), elevated natriuretic peptides (suggesting cardiac inflammation or dysfunction), and high serum ferritin.

# Laboratory Investigations

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- **COVID-19 PCR (SARS-CoV-2 PCR) test:**
  - **WHO recommends**, for all suspect cases, collection of upper respiratory tract (URT) specimens (nasopharyngeal and oropharyngeal) for testing by reverse transcription polymerase chain reaction (**RT-PCR**).
  - **Where clinical suspicion remains** and **URT specimens** are **negative (around 35% of tests are false negative)**, to collect specimens from the lower respiratory tract (LRT) when readily available (expectorated sputum, or endotracheal aspirate/bronchoalveolar lavage in ventilated patient). In addition, testing for other respiratory viruses and bacteria should be considered when clinically indicated.
  - **SARS-CoV-2 antibody tests** are not recommended for diagnosis of current infection with COVID-19.



# Laboratory Investigations- Cont'd

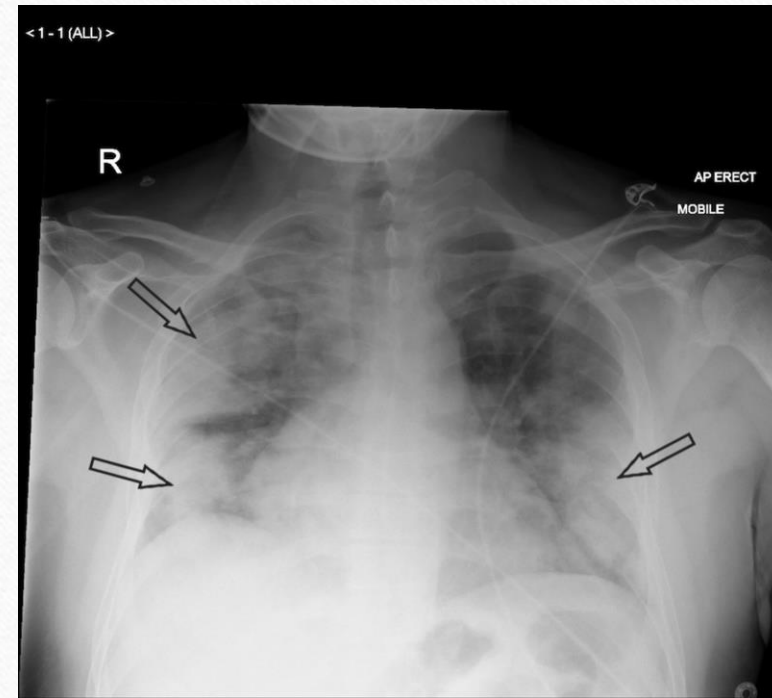
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- **FBC**: The characteristic leukopenia and lymphopenia occur at the initial stage. However, 25–30% of patients presented with leukocytosis.
- Increased activity of transaminases (**ALT** and **AST**), creatine phosphokinase (**CPK**) and lactate dehydrogenase (**LDH**), increased **myoglobin**, and sometimes **troponin** was reported. In most patients, C-reactive protein (**CRP**) levels are increased, while procalcitonin (**PCT**) levels remain normal. Increased **D-dimer** and **creatinine** levels, and increased **lactate** levels are observed in severe infections.
- High levels of **cytokines** (IL-2, IL-7, IL-10, GCSF, IP10, MCP1, MIP1a and TNF- $\alpha$ ) were found in patients developing severe infections and treated in ICUs, but not in patients with mild infection.

# Radiological Investigations

- Chest X-Ray:

- It does not show specific features at initial stage.
- At advanced stage, changes of lobar/multi-lobar **bilateral consolidation** are evident.

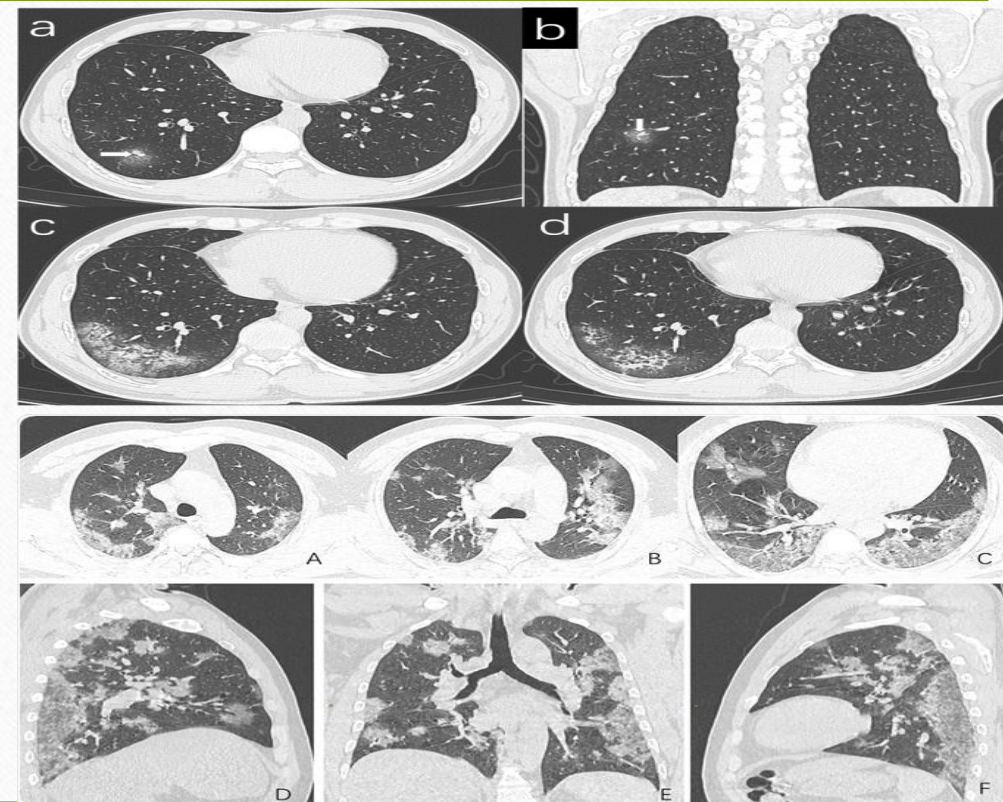




# Radiological Investigations- Cont'd

- **HRCT Chest:**

- CT imaging is diagnostic with confirmed characteristic lesions of **pneumonia**.
- The patchy **ground-glass opacities** and interstitial changes at the early phase of the disease progresses to more regular (round) opacities and **infiltrative lesions**.
- **Consolidation** without pleural effusion is very characteristic of severe cases.
- The CT imaging demonstrates **5 stages** according to the time of onset and the response of body to the virus.



# Clinical Syndromes

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- **Vast majority** of individuals infected with SARS-CoV-2 have a **mild infection** and the **symptoms** are **not specific**.
- **The symptoms include:** Fever, sore throat, cough and shortness of breath. These are similar to the symptoms of any viral infection like common cold, influenza etc.
- The **most common symptoms of infection are** fever (83–99%), dry cough (59–82%), productive cough with thick sputum (33.4%), fatigue (44–70%), anorexia (40–84%), shortness of breath (31–40%), myalgia (11–35%).
- **Other non-specific symptoms**, such as sore throat (13.9%), nasal congestion, headache (13.6), diarrhea, nausea and vomiting, have also been reported. Loss of smell (anosmia) or loss of taste (ageusia) preceding the onset of respiratory symptoms has also been reported.
- **Elderly and immunosuppressed patients** in particular may present with **atypical symptoms** such as fatigue, reduced alertness, reduced mobility, diarrhea, loss of appetite, delirium, and absence of fever.



# Complications of COVID-19 infection

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- If the patients develop emergency warning signs, they have to seek medical attention immediately. Warning signs may include:
  - Shortness of breath (18.6%)
  - Persistent pain or pressure in the chest
  - New confusion or inability arouse
  - Bluish lips or face
- While most people with COVID-19 develop only mild (40%) or moderate (40%) disease, approximately **15% develop severe disease** that requires oxygen support, **5% have critical disease with complications** such as respiratory failure, acute respiratory distress syndrome (ARDS), sepsis and septic shock, thromboembolism, and/or multi-organ failure, including acute kidney injury and cardiac injury, and **3.5% of the patients die**.

# Mild Illness

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- Patients with **uncomplicated URT viral infection** may have **non-specific symptoms** such as fever, fatigue, cough (with or without sputum production), anorexia, malaise, muscle pain, sore throat, dyspnea, nasal congestion, or headache.
- **Rarely**, patients may also **present with** diarrhea, nausea, and vomiting.
- The **elderly and immunosuppressed** may present with **atypical symptoms**. Symptoms due to physiologic adaptations of pregnancy or adverse pregnancy events, such as dyspnea, fever, GI-symptoms or fatigue, may overlap with COVID19 symptoms.
- **Treatment:** Symptomatic treatment with **paracetamol** to control the fever and pain and perhaps a **cough syrup**, **proper nutrition**, and a lot of fluids for **adequate rehydration**. There is no need for admission. **Self-quarantine** is needed for 14 days. **WHO** recommends **against** use of **antibiotics**.
- Patients with mild illness should be **monitored** closely for the possible risk of **deterioration**.



# Pneumonia

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- Patients with **moderate pneumonia** present with fever, cough, dyspnea, and fast breathing, but no signs of severe pneumonia, including  $\text{SpO}_2 \geq 90\%$  on room air, and no need for supplemental oxygen.
- Patients with **severe pneumonia** present with fever or suspected respiratory infection, **plus one of the following**: respiratory rate  $> 30$  breaths/min; severe respiratory distress; or  $\text{SpO}_2 \leq 90\%$  on room air.
- While the diagnosis can be made on **clinical grounds**; **chest imaging** (radiograph, and CT scan) may assist in diagnosis and identify or **exclude pulmonary complications**.

# Management of Pneumonia in COVID-19

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- Moderate pneumonia with no hypoxia:
  - If there is no evidence of secondary bacterial infection: treat symptomatically as the mild cases.
  - If there is an evidence of secondary bacterial infection: start an antibiotic, preferably azithromycin 500mg PO OD for 5-7 days.
  - These patients might not need to be admitted to the hospital and can be treated at home with self-quarantine for 14 days.
  - Patients with moderate illness should be **monitored** closely for the possible risk of **deterioration**.



# Management of Pneumonia in COVID-19- Cont'd

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- **Severe pneumonia with hypoxia:**

- Patients should be **admitted to** the hospital, preferably to the **HDU**.
- **Symptomatic treatment** with paracetamol IV 1gm TDS or QID according to the severity of the fever.
- Non-rebreather **oxygen face mask** to correct the hypoxia.
- **IV antibiotics:** Azithromycin 500mg IV OD for 5-7 days, and if the pneumonia persists, proceed to linezolid 600mg IV BD or teicoplanin 200mg IV BD for 3 days then 200mg IV OD (wider-spectrum antibiotics might be needed).
- **Dexamethazone:** 6mg/day (PO or IV)- (The RECOVERY trial).
- **Budesonide** (Pulmicort) nebulization.

# Management of Severe Pneumonia in COVID-19- Cont'd

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- **Remdesivir:**

- **MOA:** It is an **antiviral** which acts as an **analogue for ATP** and competes with the natural ATP substrate for incorporation into nascent RNA chains by SARS-CoV-2 RNA-dependent RNA polymerase, which results in delayed chain termination during replication of the viral RNA.
- **Indication:** On May 1, 2020, the FDA has granted an EUA for remdesivir to treat hospitalized suspected or lab-confirmed SARS-CoV-2 infection and severe COVID-19 disease.
- **Dosage:** Day 1 **loading dose-** 200mg IV infused over 30-120 min, then day 2-10 **maintenance dose-** 100mg IV OD (for ventilated patients) and day 2-5 **maintenance dose-** 100mg IV OD (for patients who do not require ventilation), then if clinical improvement is not demonstrated, treatment may be up to 5 additional days (i.e., up to 10 days total).
- In December 2020, the WHO guidelines for management of COVID-19 stated that remdesivir was found ineffective in reducing mortality or the duration of morbidity of COVID-19.



# Discharge standards for COVID-19 patients

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- The **body temperature** returned to **normal** for more than 3 days;
- **Respiratory symptoms** improved significantly;
- **Inflammation of the lungs** showed obvious signs of improvement;
- **Respiratory nucleic acid** (SARS-CoV-2 PCR) was negative for two consecutive times (one-day sampling time interval at least);
- And the patient can be **released from isolation**.

# What diabetic patients should do to prepare themselves?

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- If they are ill with flu-like symptoms, *stay at home*.
- Make sure you have all *relevant contact details* to hand in case you need them.
- *Pay extra attention to your glycemic control*. Regular monitoring can help avoid complications caused by high or low blood glucose.
- *If you do show flu-like symptoms* (fever, cough, difficulty of breathing), it is important to consult a healthcare professional. If you are coughing up sputum, this may indicate a secondary bacterial infection, so you should seek medical support and treatment immediately.
- *Any infection is going to raise your glucose levels* and increase your need for fluids, so make sure you can access a sufficient supply of water.
- Make sure you have a *good supply of the diabetes medications* you need. Think what you would need if you had to quarantine yourself for a few weeks.



# What diabetic patients should do to prepare themselves?- Cont'd

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- Make sure you *have access to enough food*.
- Make sure you will be able to *correct the situation* if your *blood glucose drops suddenly*.
- *If you live alone*, make sure someone you can rely on someone who knows you have diabetes as you may require assistance if you get ill.
- *Keep a regular schedule*, avoiding overwork and having a good night sleep.
- Give *priority to foods with a low glycemic index* (e.g. vegetables, whole wheat pasta/noodles).
- *Avoid* excessive consumption of *fried foods*.
- *Limit consumption of foods high in sugar*, carbohydrates and fat.
- *Choose lean proteins* (e.g., fish, meat, eggs, milk, beans after fully cooked).
- *Eat green*, leafy vegetables.
- *Eat fruits* in two or three servings.

# What about HCQS & AZITHROMYCIN AS POSSIBLE TREATMENTS FOR COVID-19?

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- *In vitro and preliminary clinical research* has suggested that HCQS alone and in combination with azithromycin could be an effective treatment for COVID-19 infection.
- *Although clinical evidence remains nascent*, clinicians in many countries have been using these medications.
- *However*, chloroquine, HCQS, and azithromycin all prolong the QT interval, raising concerns about the risk of arrhythmic death from individual or concurrent use of these medications.
- *It is strongly recommended to* encourage enrollment of patients in clinical trials, whenever available.
- *NIH halted clinical trial of HCQS*, used for the treatment of adults hospitalized with COVID-19. It was found that though there was no harm of using it, the drug was very unlikely to be beneficial to hospitalized patients with COVID-19.



# What are the thrombosis risk and management considerations in COVID-19?

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- ***Despite the limited published evidence***, most experts agree that the signal for increased thrombotic risk is sufficient to recommend pharmacologic VTE prophylaxis, using once daily LMWH in all hospitalized COVID-19 patients as long as there is no contraindication.
- ***The coagulopathy found in severe COVID-19*** appears to be associated with increased fibrinogen levels, unlike DIC, and thus does not present a clear increased risk for bleeding.
- ***High D-dimer levels*** appear to predict a poor prognosis in COVID-19 patients.
- ***Therapeutic anticoagulation is not mandatory for all patients*** based only on an elevated D-dimer test, and there is no evidence supporting use of D-dimer values to guide intensity of anticoagulation. Post-hospital VTE prophylaxis should be considered.

# Can I TAKE VITAMINS OR OTHER FOOD SUPPLEMENTS? WHICH ONES? DO THEY PROTECT ME AGAINST THE COVID-19?

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- *Taking formulated vitamins* will not protect you against COVID-19.
- *Several vitamins* (vitamin C, vitamin D, vitamin E) and **zinc** are currently being tested for their effects in COVID-19, but no trustworthy confirmatory data are available as yet.
- *A diet rich in vegetables and fruits* is generally recommended at all times- not just during COVID-19, to help your body maintain a working immune system.
- *Fresh vegetables and fruits* contain a much broader range of necessary nutrients than vitamin pills.
- *If you have lack of specific vitamins or micronutrients*, your attending physician will be able to offer advice.



# CAN PEOPLE CATCH COVID-19 more than once?

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- *The current research suggests that* immunity to COVID19 develops after the first infection, so it is not possible to catch it again.
- It was also found that the *antibodies formed in the blood after the COVID-19* do not stay for very long after infection (between 1-2 months).
- *There are examples of viruses*, like flu and common cold, which can be caught more than once, because of the way the virus changes over time.
- Some very few patients develop COVID-19 TWICE.
- The challenge of *whether the patients will develop immunity after the COVID-19* infection puts a big question mark over the efficacy of the future promised vaccines.

# What should we do as PATIENTS with CVD?

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- *The CDC offers this advise:*

- Make sure you have enough medicine on hand to treat hypertension, diabetes, IHD, heart failure or dyslipidemia.
- Do not discontinue taking your RAAS inhibitor medications.
- Stock up over-the-counter medicines to treat fever and other symptom if you get sick.
- Stay at home and limit contact with other people as much as you can.
- Avoid crowds and anyone who looks sick. Maintain at least 1-meter distance between yourself and anyone who is sick. Wear a face mask if you have to be in a public place where you cannot stay at least 6 feet away.
- Avoid all non-essential travel.



# What should we do as PATIENTS WITH CVD?- CONT'D

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- Wash your hands as often with soap and warm water, for at least 20 seconds.
- Clean and disinfect your hands using alcohol based sanitizers, that contains at least 60% alcohol.
- Clean and disinfect all frequently touched surfaces like tables, desks and doorknobs. It was recently found that it is very difficult for the virus to get transmitted through surfaces.
- A coronavirus vaccine is not available yet, but the ACC recommends that you stay up to date on other vaccines.
- The pneumococcal vaccine will prevent you from catching pneumonia on top of coronavirus.
- Also get a flu vaccine.

# Covid-19 Vaccines

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- The world started vaccination for COVID-19 in December 2020.
- We have more than 52 vaccines, some of them are available for use, like Oxford-Astra-Zeneca, Pfizer, Moderna, and Johnson & Johnson vaccines and some are still under research and they are going to be available soon.
- The COVID-19 vaccines provide between 70-95% efficacy.
- We have no idea for how long these vaccines are going to provide immunity against COVID-19 infection.



# Take care of your heart while at home

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- Continue doing exercise, eat a balanced diet, stay hydrated, and get adequate sleep.
- Maintain your social network even remotely and communicate with your family and friends on a regular basis.
- Limit the information you consume about the pandemic and the time you spend on it and only trust reliable resources.
- Avoid using coping strategies involving alcohol or drugs.
- Communicate with your doctor or your hospital regularly and do not cancel your appointments. Using means of telemedicine is recommended.

# Conclusion

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- **World Health Organization** has declared **COVID-19** as a **pandemic** which **spreads** mainly via **respiratory droplets**.
- **Elderly persons with co-morbidities** are **more affected** and **pneumonia** is the **most common complication**.
- **Severe cases** have a **mortality rate** of 3%.
- Presently **containment** and **prevention** is the best option to manage COVID-10 as there is **no standardized treatment** or **vaccine** available.











**Thank you so much**

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**For your attention**