



## Using the mask – Do's and Don'ts in the COVID-19 scenario

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### ABSTRACT

A face mask is a loose-fitting, disposable outfit that acts as a physical barrier between the mouth and nose of an individual and the potential pollutants in the surrounding environment. COVID-19 which is also called as 2019-nCov is caused by the novel coronavirus and it is spread by the salivary droplets or nasal discharge released when an infected person coughs or sneezes. In the current COVID -19 scenario, the face mask is designed to ameliorate the prevention of airborne transmission of the novel coronavirus. The use of face mask is competent only when the other personal preventive measures are ideally pursued. The effectiveness of the use of face mask depends strongly on the do's and don'ts which has to followed while wearing a face mask. The purpose of this study is to analyze and summarize the published literature associated with the types, usage, risks, limitations, disposal and reusability of face mask. The availability of medication and treatment options are sparse and the development of vaccines for COVID-19 is going to take a longer time. Hence the most effective strategy to curb the spread of the disease is by the judicious use of face mask along with other personal protective measures.



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As of April 2020, the total number of infected patients in the world is 4,256,053 and the death toll is 287,336 ([Coronavirus Worldometer Sections, 2020](#)).

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The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Any person who is in close contact (within 1m) with someone who has respiratory symptoms is at risk of being exposed to potentially infective respiratory droplets. Droplets that land on surfaces where the virus could remain viable make the environment of an infected individual to serve as a source of transmission ([WHO, 2020a](#)). So it is important that everyone of us practice respiratory etiquette. Though current studies have highlighted that the infection spreads from symptomatic confirmed cases, non-symptomatic patients may also be contagious owing to the long incubation period of the COVID-19 virus which ranges from 5-6 days on average to as long as 14 days ([Yu et al., 2020](#)).

### INTRODUCTION

COVID 19, an outbreak of pneumonia caused by a novel coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has led to a serious epidemic in China since December 2019 ([Pan et al., 2020](#)). Rapidly the disease has spread to other countries and it has become a pandemic taking the whole world down.

Currently there are very few treatment options available to treat the symptoms and research is going on to discover a vaccine for the disease. In this situation the only strategy to control the outbreak is to contain the virus and stop the spread of the disease. The current measures taken to decrease the spread of the virus includes personal preventive measures such as hand hygiene, wearing face-masks, self-quarantine, social distancing such as closing schools and cancelling mass gatherings which come under non-pharmaceutical intervention (NPI) (Qualls *et al.*, 2017).

Due to anxiety and the fear of transmission, the adherence to wearing a mask has increased in the general public, causing a dearth in the availability of masks in medical stores.

There is a constant demand for medical masks and the public have been exploited by the vendors paying almost three times the original cost. This growing demand for medical masks has affected the health care sector and our health care providers like doctors, nurses are suffering from a shortage of supply. With the overwhelming patient flow, it is very important to ensure the safety of our health care workers and ensure they are supplied with amenities, for instance the face masks as they are in direct contact with the infection and need to be protected.

Though wearing a medical mask is one of the preventive measures, this alone is not enough to limit the spread of COVID-19. In conjunction maximum compliance with hand hygiene, respiratory etiquette and other measures should also be adopted to ensure maximum protection (WHO, 2020b).

Medical masks can be used to prevent the spread of infectious droplets from an infected individual to a healthy individual. Dormant contamination of the environment by these virulent droplets can also be avoided by wearing a medical mask (Feng *et al.*, 2020).

According to the Association of Perioperative Registered Nurses, medical masks have the efficiency to filter, (WHO, 2014).

1. 90–95% bacteria
2. particles of at least 0.3  $\mu\text{m}$  for regular use and 0.1  $\mu\text{m}$  for laser use (protection against laser smoke).

The prerequisite measures like hand hygiene practices and social distancing should not be overlooked as the use of medical masks may construct a feel of safety. The usage of medical masks is potent only when used along with frequent hand-washing.

Contemporarily, as the use of face mask is playing one of the vital role in combating COVID-19, this paper reviews the types, usage, risks and limitations of face mask in various contexts.

### Types of mask

Basically, there are two types of masks. They are

#### 1. Medical masks

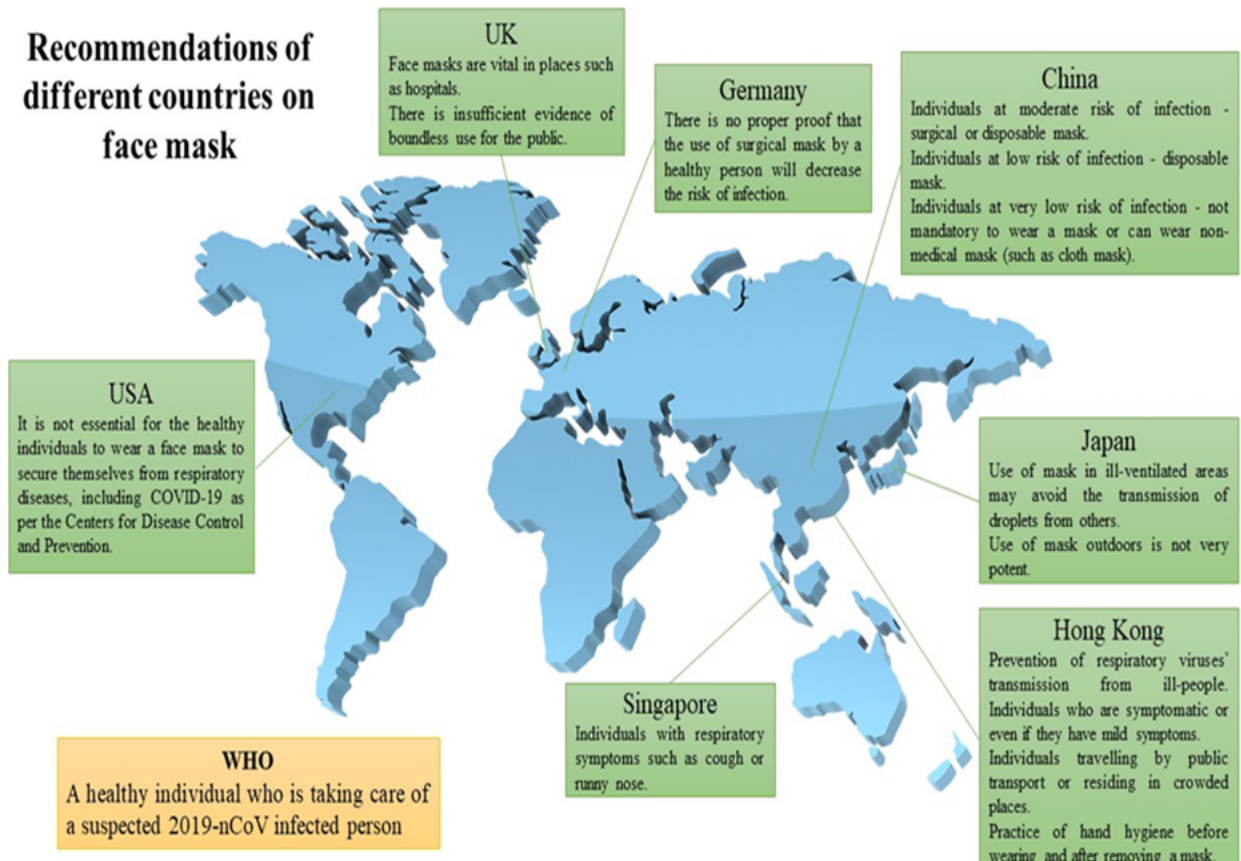
Medical masks refer to disposable surgical or procedure masks that are flat or pleated (some are like cups) which are affixed to the head with straps or to the ear with loops. It is made up of three layers of non-woven material (WHO, 2020a).

#### 2. Non-medical masks

Non-medical masks are usually made-up of two layers of cotton, fabric or linen material which doesn't interfere with easy breathing. Non-medical masks can be made by one's own self. While making a non-medical mask, the vital criteria to be met includes the number of fabric layers, the type of fabric used, breathability of the fabric, hydrophobic nature of the material, shape and fit of the mask (WHO, 2020a). The penetration of cloth masks by fine particles is almost 97% (MacIntyre *et al.*, 2015) and therefore it is not advisable to be used by health care workers. The Center for Disease Control and Prevention (CDC) presently recommends the use of cloth face in public places like grocery store, pharmacy etc where relevant social distancing is difficult to manage.

### Who should use a medical mask?

1. A healthy individual who is taking care of a suspected COVID-19 infected person at home.
2. People with suspected COVID-19.
3. Health care workers who are in close contact with the infected population.
4. If a person is coughing or sneezing.
5. When exposed to high-risk areas such as areas of high population density (e.g., hospitals, rail-way station).
6. Healthy individuals in the community setting so as to prevent infections.
7. Susceptible populations, like older adults and those with latent medical conditions (Feng *et al.*, 2020).



**Figure 1: Recommendations of Different Countries on Face Mask**

## USAGE OF FACE MASK BY DIFFERENT CATEGORIES OF PEOPLE

### 1. People with suspected COVID-19

People with suspected COVID-19 should be encouraged to wear a medical mask as much as possible. The mask should be changed at least once daily. Individuals who cannot withstand the use of a medical mask should meticulously practice respiratory hygiene. Respiratory hygiene includes

1. Covering of mouth and nose with a disposable paper tissue when coughing or sneezing and immediately discarding the same after its use in a closed bin.
2. Practice of bent elbow procedure followed by hand hygiene.

### 2. Care givers

Care givers should be advised regarding the use of medical mask when in the same room with the affected person and discard it appropriately after its use (WHO, 2020a).

### 3. Health care workers

The use medical mask by health care workers is mandatory while entering the room of a suspected or confirmed COVID-19 patients. When the health care workers are executing aerosol-generating procedures such as tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation and bronchoscopy, it is safe for them to use a protective particulate respirator like a US National Institute for Occupational Safety and Health-certified N95, European Union standard FFP2, or any other respiratory protective device equivalent to it (WHO, 2020a).

### 4. COVID-19 symptomatic people

Symptomatic individuals are strictly advised to wear a medical mask while waiting in hospital areas and also in the course of transportation within the hospital. It is not necessary to use a medical mask when separated in a single room but it is vital to cover the mouth and nose with disposable paper tissues when coughing or sneezing. Disposal of the tissues must be done properly and hand hygiene should be followed instantly (WHO, 2020a).

### 5. Healthy People

Forthwith, there is no clear documentation that the use of medical mask by an uninfected person will prevent the occurrence of respiratory infections

including COVID-19 as acknowledged in the recommendations from the UK and Germany (Feng *et al.*, 2020) and hence it cannot be considered as a safety net. Various recommendations have been given by different countries for the use of face mask as shown in Figure 1.

### How to wear a medical mask?

#### Do's when wearing a medical mask

1. Both the hands should be cleansed with alcohol-based soap and water before wearing the mask. .
2. The mask should be checked for any damage.
3. Hold the mask by the ear loops and place it behind each ear or if the mask has strings tie it behind the head.
4. The colored side of the mask should face outwards.
5. If there is a metallic strip, make sure it is positioned at the top of the mask and against the bridge of the nose.
6. The bottom of the mask must be pulled over the mouth and chin.
7. Care should be taken that there are no gaps between the face and the mask.
8. If the mask is damp or soiled, immediately replace with a new one.
9. Do not re-use single-use masks. While removing the mask, the colored side of the mask should not be touched.
10. The mask should be removed from behind.
11. After removing the mask, it should be discarded properly.

#### Dont's when wearing a medical mask

1. Do not touch the mask once it is worn as it might have some pathogens on it.
2. Do not droop the mask from one ear.
3. Do not hang the mask around the neck.
4. Do not intertwine the ties.

#### Risks of prolonged use of face mask

1. Increased contamination of the mask with pathogens including COVID-19 virus generating the risk of infection.

2. Increased chance of touching the mask.
3. Prone to accidental under-mask touches.
4. Increased reaction or damage of the face skin tissue.
5. Clogging of the filtration media leading to an increase in the breathing resistance and the chance of breathing unfiltered environmental air from the sides of the mask.
6. Jeopardizes the protective effect (WHO, 2020c).

#### Reasons to limit the use of medical mask

1. To prioritize the limited supplies for frontline health-care workers.
2. To reduce the
3. To control the soaring prices

As a reverberation, few countries like Germany and South Korea have banned the exportation of face masks to meet the needs of their country's demand (Tsang, 2020). WHO has also requested for a 40% increase in the production of protective tools, including face masks (WHO, 2020d).

#### Disposability of face masks

Medical / Non-medical mask should be discarded immediately after removal in a closed bin and the hands should be cleansed with alcohol-based soap and water (World Health Organization, 2020 a).

#### REUSE OF FACE MASKS

##### Medical mask

As there is no quality evidence available till date on the reprocessing or reuse of medical mask and as they are disposable in nature, medical mask is not advisable to be reused.

##### Non-medical mask

The used non-medical/cloth mask can be washed in the washing machine or hand washed with a detergent powder after which it should be dried. The temperature of the water can be warm or hot. There are higher chances of thinning of the cloth with repeated laundering which will ultimately lower the prevention of transmission. Hence, if the cloth has become thinner it is better to discard and use a new cloth mask. The cloth mask can also be put into a paper bag and left for at least two days in a warm place after which the virus will become inactive and won't be virulent (Abramson, 2020; Zaiets and Padilla, 2020).



## N95 filtering face-piece respirators

N95 filtering face-piece respirators which is usually referred as “N95 respirators” are most commonly used in the health care environment. As N95 respirators form a tight-fit seal around the wearer’s face it helps in decreasing the individual’s liability to minute particles such as metallic dust, mineral dust, organic dust, vegetable dust like flour, wood, cotton, tea dust, pollen etc. They provide an excellent protection against airborne particles when the face is sealed well with it. If the N95 respirators are worn properly, it will reduce nearly 95% of the entry of airborne and inert mites through inhalation. N95 respirators have higher filtration efficiencies than dust/mist (DM) respirators, dust/fume/mist (DFM) respirators and surgical masks. The most penetrating particle size of N95 respirators is only 0.1 to 0.3  $\mu\text{m}$  (Qian *et al.*, 1998). The face-seal leakage is the main avenue for the entry of sub-micrometer particles into the respirator/mask. As the face-seal leakage is less in N95 respirators and as the health care workers are in close contact with the infected individuals, the use of N95 respirators are highly prioritized and reserved for the health care workers. Hence the use of N95 respirators is not recommended for the use by the general public. To ward-off the shortage of N95 respirators, hydrogen peroxide vapor can be used to decontaminate it and make it ready for reuse (Schwartz *et al.*, 2020). Surgical masks were fundamentally created to secure the environment from the individual, whereas the respirators were created to secure the individual from the environment (Bałazy *et al.*, 2006).

## CONCLUSION

A popular well researched and validated method to provide protection is the practice of non-pharmaceutical interventions like the usage of masks and hand hygiene. This has led to a shortage of face masks for the health care personnel worldwide. In this dire situation prompt action is needed from both the government as well as the general public. The export of masks must be curbed and the raw material required for making the masks must be capped to avoid exploitation of the situation. The government should monitor the movement of face masks and also increase the manufacture of masks to ensure a fair distribution. It is also the responsibility of the citizens to learn and understand the do’s and don’t’s, risk, limitations in the usage of face masks along with awareness of proper reusability and disposal methods. Alternatively, the use of powerful masks and particulate respirators should be reserved for the health care workers to avoid

the shortage in supply of masks. The general public can use the other classes of particulate respirators available in the market which are proven to be more efficient and effective against airborne pathogens. Proper knowledge, awareness and judicious usage of face mask in the current COVID 19 scenario will be an effective strategy to curb the spread of the disease when followed stringently along with other personal protective measures.

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## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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