

## CORONAVIRUS DISEASE (COVID-19) OUTBREAK AND FACE MASKS – AN OVERVIEW

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**Abstract:** *Coronavirus, was first detected in the city of Wuhan, China, in late 2019 and is continuing its spread across the world which causes the respiratory infection Covid-19 and as on today there is no vaccine which is available to prevent coronavirus disease. The best way to prevent illness due to Coronavirus is to avoid being exposed to this virus which is thought to spread mainly from person-to-person who are in close contact with one another (within about 6 feet) and when an infected person coughs, sneezes or talks , droplets produced through respiratory can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. Therefore apart from the various other preventive measure like frequently Washing of hands, Avoiding close contact, covering coughs and sneezes, Cleaning and disinfecting frequently touched surfaces daily , it is essential to cover mouth and nose with a cloth face cover or mask when around others.*

*In this paper various types of face mask has been described in detail which may be familiar to the end user.*

**Keyword:** Covid-19, Coronavirus, Face Mask, CDC, Wuhan

### I. INTRODUCTION : CORONAVIRUS DISEASE (COVID-19) OUTBREAK

Coronavirus, was first detected in the city of Wuhan, China, in late 2019 and is continuing its spread across the world, with more than four million confirmed cases in 188 countries. More than 300,000 people have lost their lives till April 2020.<sup>1-15</sup> Coronavirus, which causes the respiratory infection Covid-19 and as on today there is no vaccine which is available to prevent coronavirus disease and the best way to prevent illness due to Coronavirus is to avoid being exposed to this virus which is thought to spread mainly from person-to-person who are in close contact with one another (within about 6 feet) and when an infected person coughs, sneezes or talks , droplets produced through respiratory can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs.<sup>16</sup>

In fact, there is increasing evidence that the Covid-19 can be spread by pre-symptomatic and asymptomatic carriers. For this reason, many Governments and health organisations , like the CDC, are recommending people consider wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain.<sup>17</sup>

Therefore apart from the various other preventive measure like frequently Washing of hands, Avoiding close contact, covering coughs and sneezes, Cleaning and disinfecting frequently touched surfaces daily , it is essential to cover mouth and nose with a cloth face cover or mask

when around others.

In this paper various types of face mask has been described in detail which may be familiar to the end user.

### II. TYPES OF MASK

There are various types of mask which are available in market. These include following.

#### CLOTH MASK :

Cloth mask is made by simple cloth to cover mouth and nose. It can be anything like fabric which covers face. Ideally mask wearer would want a mask to work in both directions, protecting the wearer from the environment and reducing the contamination of the environment, air and surfaces by the wearer and cloth mask is good up to certain extent. Cloth mask can block particles, even aerosol-sized particles

The evidence shows that cloth masks, particularly those with several layers of cotton cloth, block droplet and aerosol contamination of the environment, which may reduce transmission of COVID-19.

#### Cloth masks

Recommended by CDC for general public

May help keep respiratory droplets of the wearer in

Efficacy is unknown and varies by material

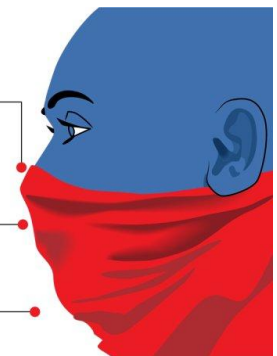


Fig . 1: Cloth Mask Prevent spread by those without symptoms<sup>29</sup>

Cloth faces covering not only protect the wearer, but also it may keep the wearer from spreading the virus to others. 19A dual-layered cloth mask is sufficient to protect people in public settings. It's unlikely you'll be infected in public by airborne viral particles. The real threat is touching an infected surface and then putting your hand to your face: Frequent hand-washing is a sure way to avoid COVID-19.<sup>27</sup>

Merits: Cloth masks have following merits.

- Some particles are stopped, particularly outwardly, from the wearer.
- Cloth masks also protect others from the wearer
- Cloth face coverings may slow the spread of the

virus and help people who may have the virus and do not know it from transmitting it to others. 19

- Cloth face coverings can be made from household items. 19
- Cloth and cloth masks can reduce contamination of air and surfaces.
- After washing can be reusable

Demerits: Cloth masks have following demerits.  
Some particles can penetrate the mask.

Usage:

The team's opinion was published in the Annals of Internal Medicine on May 22. Whether was studied in the 1960s and 1970s. A mask made of three layers (muslin-flannel-muslin) reduced surface contamination by 99 %, total airborne microorganisms by 99 %, and bacteria recovered from the smaller particles, aerosols, by 88 % to 99 %.

A commercial mask made of four-layer cotton muslin was shown to reduce all particles by 99 %, compared with 96 % to 99 % for contemporary disposable medical masks. Even for aerosols, the cloth mask was comparable with the medical masks of the day, the researchers say.

The filtration of cloth is quite variable and single layers of scarf, sweatshirt and t-shirt may be in the 10 to 40 % range. But multiple layers increase efficiency, and modern studies have confirmed that some combinations of cloth, for example, cotton-flannel, block more than 90 % of particles.

In terms of making masks, it is important to realise that more layers will give more protection, both inward and outward, but will make it harder to breathe. For this reason, it is not recommended that children under two and people with breathing difficulties wear masks.

CDC recommends wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain, such as grocery stores, pharmacies, and gas stations.

While people who are sick or know that they have COVID-19 should isolate at home, COVID-19 can be spread by people who do not have symptoms and do not know that they are infected. That's why it's important for everyone to practice social distancing (staying at least 6 feet away from other people) and wear cloth face coverings in public settings. Cloth face coverings provide an extra layer to help prevent the respiratory droplets from traveling in the air and onto other people.

People older than 2 years of age in public settings where other social distancing measures are difficult to maintain should wear cloth mask.

Children under age 2 and anyone who has trouble breathing, or is unconscious, incapacitated or otherwise unable to remove the mask without assistance should not wear cloth mask. 19

#### SURGICAL MASK :

A surgical mask, also familiar as a face mask, is intended to be worn by health professionals during healthcare procedures. It is designed to avoid infections in patients and

treating personnel by catching bacteria shed in liquid droplets and aerosols from the wearer's mouth and nose. Surgical masks may be labeled as surgical, isolation, dental, or medical procedure masks. Chinese health officials distinguish between medical (non-surgical) and surgical masks. Surgical masks are made of a nonwoven fabric created using a melt blowing process. They came into use in the 1960s and largely replaced cloth facemasks in developed countries. 20

The design of the surgical masks depends on the mode; usually, the masks are three-ply or three layers. This three-ply material is made up of a melt-blown polymer, most commonly polypropylene, placed between non-woven fabric. The melt-blown material acts as the filter that stops microbes from entering or exiting the mask. Pleats are commonly used to allow the user to expand the mask such that it covers the area from the nose to the chin. The masks are secured to the head with ear loops, head ties, or elastic straps. 20

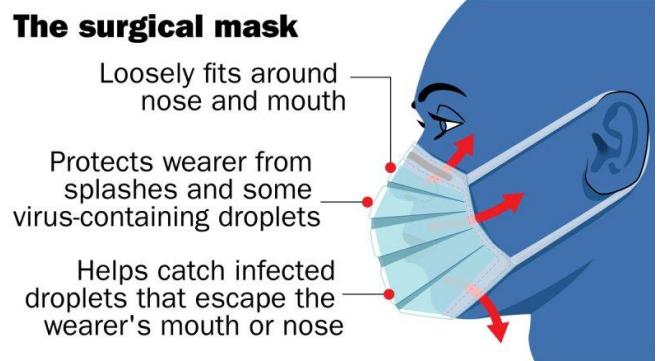


Fig . 2: The Surgical Mask 29

Merits :

Surgical masks have following merits.

1. A surgical mask is better than cloth mask.
2. With respect to some infections like influenza they appear as effective as respirators, such as N95 or FFP masks, though the latter provide better protection in laboratory experiments due to their material, shape and tight seal. 20

Demerits: Surgical masks have following demerits.

1. A surgical mask are not designed to protect the wearer from breathing in airborne bacteria or viruses whose particles are smaller. 20
2. As compare to easy available cloth mask , shortages of surgical masks is a central issue
3. A surgical mask, by design, does not filter or block very small particles in the air that may be transmitted by coughs, sneezes, or certain medical procedures.
4. Surgical masks also do not provide complete protection from germs and other contaminants

because of the loose fit between the surface of the face mask and the face.<sup>20</sup>

Usage :

1. A surgical mask use mainly by Health care workers : A surgical mask is intended to be worn by health professionals during surgery and certain health care procedures to catch microorganisms shed in liquid droplets and aerosols from the wearer's mouth and nose
2. General Public: In community and home settings, the use of facemasks and respirators usually are not recommended, with other measures preferred such as avoiding close contact and maintaining good hand hygiene. Surgical masks are widely worn by the general public in many part of the world , to reduce the chance of spreading airborne diseases to others, and to prevent the breathing in of airborne dust particles created by air pollution. More recently, due to the rising issue of smog in South and Southeast Asia, surgical masks and air filtering face masks are now normally used in major cities in India, Nepal and Thailand when air quality deteriorates to toxic levels.<sup>20</sup>

Function :

A surgical mask is a loose-fitting, disposable device that creates a physical barrier between the mouth and nose of the wearer and potential contaminants in the immediate environment. If worn properly, a surgical mask is meant to help block large-particle droplets, splashes, sprays, or splatter that may contain viruses and bacteria, keeping it from reaching the wearer's mouth and nose. Surgical masks are effective barriers for retaining large droplets released from the mouth and nose by the wearer in public. Surgical masks help reduce exposure of the wearer's saliva and respiratory secretions to others that could otherwise travel up to 26 feet. Surgical mask also remind wearers not to touch their mouth or nose, which could otherwise transfer viruses and bacteria after having touched a contaminated surface.

Modern surgical masks are made from paper or other non-woven material and should be discarded after each use.

Surgical masks retain some of the respiratory droplets released from the wearer through talking, coughing, or sneezing. Thus they reduce the spread of pathogens.<sup>20</sup>

DUSTL MASK :

A dust mask is a flexible paper pad held over the nose and mouth by elastic or rubber straps for personal comfort against non-toxic nuisance dusts. They are not intended to provide protection from toxic airborne hazards. In the United States, they are not subject to the approvals that respirators (such as N95 respirators) and surgical masks require. The European FFP1 mask, the lowest-grade mechanical filter

respirator available in the jurisdiction, is also used as a dust mask.

Dust masks are used in environments with dusts encountered during construction or cleaning activities, such as dusts from drywall, brick, wood, fiberglass, silica (from ceramic or glass production), or sweeping. A dust mask can also be worn in environments with allergens such as tree and grass pollen. A dust mask is also used to prevent the wearer from inhaling dust or sand in a dust storm or black blizzard.



Fig.3: A half-face dust mask

A dust mask is worn in the same fashion as a filtering face piece respirator or surgical mask, but it is dangerous to confuse them because they each protect against specific airborne dangers. Using the wrong mask for a job can present a significant and possibly deadly danger as many dust masks with widely varied levels of protection may look similar, and even masks that do not protect against dust at all. Misfitting masks are also a danger as they allow a material to bypass the mask entirely. A correct fit may not be as critical in masks that are intended to protect against splattering liquids or mists. Dust masks do not protect against chemicals such as vapors and mists. For this reason, it is dangerous to confuse dust masks with respirators used as paint masks.

Dust masks are a cheaper, lighter, and possibly more comfortable alternative to respirators, but do not provide respiratory protection, and may be more susceptible to misuse or poor fit.

Some dust masks include improvements such as having two straps behind the head (one upper and one lower), having a strip of aluminum on the outside across the bridge of the nose that can be bent for a custom fit, and having a strip of foam rubber on the inside across the bridge of the nose to ensure a better seal even if the aluminum on the outside does not fit.<sup>21</sup>

Regulation: Some Asian countries have regulations for dust-grade masks intended for everyday civilian use as opposed to occupational use. These include China, GB/T 32610:2016 – masks for daily protection.<sup>21</sup>

Wearing a dust mask or a respirator is one of the easiest ways to reduce or eliminate your exposure to dust, pollen, chemical pollutants, mold, bacteria, and other contaminants. 3M and Moldex dust masks carry a NIOSH approval rating (such as N95). For example, the 8233 N100 mask is the best high-rated respirator against lead, metal fumes, certain radioactive particulate materials, and non-oil containing mists. In general, all of these masks should be discarded after

they become soiled, or breathing becomes difficult due to filter loading.<sup>22</sup>

#### RESPIRATOR MASK OR N95 RESPIRATORS :

This type of mask is the surgical N95 respirator, which is used to filter surgical smoke created by energy-generating devices such as electrosurgical units, lasers and ultrasonic scalpels or dissectors during invasive procedures. The N95 is recommended whenever there is a need to wear respiratory protective equipment as secondary protection against residual surgical smoke. It should also be worn during higher-risk aerosol-generating procedures on patients with known or suspected aerosol-transmittable diseases such as tuberculosis, varicella and rubella. Standard surgical masks with ties should not be used during these procedures.<sup>23</sup>

N95 respirators and surgical masks (face masks) are examples of personal protective equipment that are used to protect the wearer from airborne particles and from liquid contaminating the face. Centers for Disease Control and Prevention (CDC) National Institute for Occupational Safety and Health (NIOSH) and Occupational Safety and Health Administration (OSHA) also regulate N95 respirators.

#### The N95 respirator

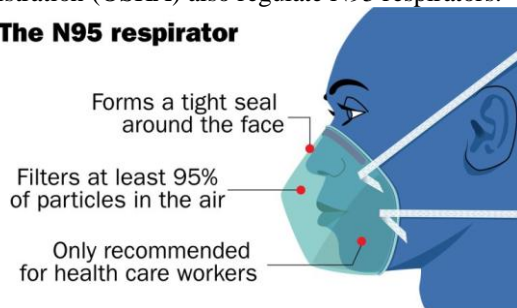


Fig.4 . N95 respirators<sup>29</sup>

It is important to recognize that the optimal way to prevent airborne transmission is to use a combination of interventions from across the hierarchy of controls, not just PPE alone.<sup>24</sup>

Merit: Respirator masks have following merits.

1. An N95 respirator is a respiratory protective device designed to achieve a very close facial fit and very efficient filtration of airborne particles.<sup>24</sup>
2. The 'N95' designation means that when subjected to careful testing, the respirator blocks at least 95 % of very small (0.3 micron) test particles. If properly fitted, the filtration capabilities of N95 respirators exceed those of face masks.

Demerit: Respirator masks have following merits.

1. Respirator Mask or N95 respirators are Costly as compare to other types of mask like cloth mask , surgical mask etc.

The similarities among surgical masks and surgical N95s are:

- They are tested for fluid resistance, filtration efficiency (particulate filtration efficiency and bacterial filtration efficiency), flammability and biocompatibility.
- They should not be shared or reused.<sup>24</sup>

#### General N95 Respirator Precautions

People with chronic respiratory, cardiac, or other medical conditions that make breathing difficult should check with their health care provider before using an N95 respirator because the N95 respirator can make it more difficult for the wearer to breathe. Some models have exhalation valves that can make breathing out easier and help reduce heat build-up. Note that N95 respirators with exhalation valves should not be used when sterile conditions are needed.

All FDA-cleared N95 respirators are labeled as "single-use," disposable devices. If your respirator is damaged or soiled, or if breathing becomes difficult, you should remove the respirator, discard it properly, and replace it with a new one. To safely discard your N95 respirator, place it in a plastic bag and put it in the trash. Wash your hands after handling the used respirator.

N95 respirators are not designed for children or people with facial hair. Because a proper fit cannot be achieved on children and people with facial hair, the N95 respirator may not provide full protection.

#### N95 Respirators in Industrial and Health Care Settings

Most N95 respirators are manufactured for use in construction and other industrial type jobs that expose workers to dust and small particles. They are regulated by the National Personal Protective Technology Laboratory (NPPTL) in the National Institute for Occupational Safety and Health (NIOSH), which is part of the Centers for Disease Control and Prevention (CDC)

However, some N95 respirators are intended for use in a health care setting. Specifically, single-use, disposable respiratory protective devices used and worn by health care personnel during procedures to protect both the patient and health care personnel from the transfer of microorganisms, body fluids, and particulate material. These surgical N95 respirators are class II devices regulated by the FDA, under 21 CFR 878.4040, and CDC NIOSH under 42 CFR Part 84. N95s respirators regulated under product code MSH are class II medical devices exempt from 510(k) premarket notification, unless:

- The respirator is intended to prevent specific diseases or infections, or
- The respirator is labeled or otherwise represented as filtering surgical smoke or plumes, filtering specific amounts of viruses or bacteria, reducing the amount of and/or killing viruses, bacteria, or fungi, or affecting allergenicity, or
- The respirator contains coating technologies unrelated to filtration (e.g., to reduce and or kill microorganisms).

The FDA has a Memorandum of Understanding (MOU) with CDC NIOSH which outlines the framework for coordination and collaboration between the FDA and NIOSH for regulation of this subset of N95 respirators.<sup>24</sup>

### Respirator Selection <sup>25</sup>

When should a respirator be used?<sup>25</sup>

Workers should use respirators for protection from contaminants in the air only if other hazard control methods are not practical or possible under the circumstances. Respirators should not be the first choice for respiratory protection in workplaces. They should only be used:

- when following the "hierarchy of control" is not possible (e.g., elimination, substitution, engineering or administrative controls)
- while engineering controls are being installed or repaired
- when emergencies or other temporary situations arise (e.g., maintenance operations)

### How should respiratory hazards be controlled?<sup>25</sup>

Respiratory hazards can include airborne contaminants such as biological contaminants, dusts, mists, fumes, and gases, or oxygen-deficient atmospheres. Note that more than one respiratory hazard can be present at the same time.

A hazard control program consists of all steps necessary to protect workers from exposure to a substance or system, the training and the procedures required to monitor worker exposure and their health to hazards such as chemicals, materials or substance, or other types of hazards such as noise and vibration. A written workplace hazard control program should outline which methods are being used to control the exposure and how these controls will be monitored for effectiveness.

After elimination and substitution, well designed and maintained engineering controls are the preferred methods of controlling worker exposure to hazardous contaminants in the air. These control methods include:

- mechanical ventilation
- enclosure or isolation of the process or work equipment
- proper control and use of process equipment, and
- process modifications including substitution of less hazardous materials where possible.

Administrative controls may be used in addition to engineering controls. Administrative controls limit workers' exposures by scheduling reduced work times in contaminant areas or by implementing other such work rules. These control measures have many limitations because the hazard is not removed. Administrative controls are not generally favoured because they can be difficult to implement, maintain and are not reliable.

### What are IDLH considerations?<sup>25</sup>

Some types of atmospheres contain concentrations of hazardous substances that places the worker in immediate

danger because these concentrations would impair the ability to leave the work area (self rescue) or potentially cause irreversible health effects, including serious injury or death in a matter of minutes.

There are particular conditions that are considered "Immediately Dangerous to Life or Health (IDLH)". These include\*:

- A known contaminant at a concentration known to be IDLH
- A known contaminant at an unknown concentration with the potential to be IDLH
- An unknown contaminant at an unknown concentration
- An untested confined space
- An oxygen-deficient atmosphere
- Firefighting
- Contaminants at or above 20% of their lower explosive limit (LEL—the concentration at which the gas or vapour could ignite)

### Different classes of respirators<sup>25</sup>

The two main types are air-purifying respirators (APRs) and supplied-air respirators (SARs).

Air-purifying respirators : Air-purifying respirators can remove contaminants in the air that you breathe by filtering out particulates (e.g., dusts, metal fumes, mists, etc.). Other APRs purify air by adsorbing gases or vapours on a sorbent (adsorbing material) in a cartridge or canister. They are tight-fitting and are available in several forms:

- mouth bit respirator (fits in the mouth and comes with a nose clip to hold nostrils closed - for escape purposes only)
- quarter-mask (covering the nose and mouth)
- half-face mask (covering the face from the nose to below the chin)
- full facepiece (covering the face from above the eyes to below the chin)

Respirators with a full facepiece also protect the eyes from exposure to irritating chemicals.

Examples of Air-purifying respirators include:

- particulate respirators (also called dust, fume, and mist respirators or masks)
- chemical cartridge respirators that can have a combination of chemical cartridges, along with a dust pre-filter. This combination provides protection against different kinds of contaminants in the air
- gas masks (contain more adsorbent than cartridge-type respirators and can provide a higher level of protection than chemical cartridge respirators)

- powered air-purifying respirators (PAPRs)

Supplied-air respirators (SARs) : Supplied-air respirators (SARs) supply clean air from a compressed air tank or through an air line. This air is not from the work room area. The air supplied in tanks or from compressors must meet certain standards for purity and moisture content (e.g., CSA Standard Z180.1-13): Compressed Breathing Air and Systems).

Supplied-air respirators may have either tight-fitting or loose-fitting respiratory inlets. Respirators with tight-fitting respiratory inlets have half or full facepieces. Types with loose-fitting respiratory inlets can be hoods or helmets that cover the head and neck, or loose-fitting facepieces with rubber or fabric side shields. These are supplied with air through airlines.

Examples of Supplied-air respirators (SARs) include:

- self-contained breathing apparatus (SCBA)
- airline supplied-air respirators
- protective suits that totally encapsulate the wearer's body and incorporate a life-support system

There are some combinations of airline respirators and SCBAs that allow workers to work for extended periods in oxygen-deficient areas or where there are airborne toxic contaminants. The auxiliary or backup SCBA source allows the worker to escape with an emergency source of air if the airline source fails.

There are also combination air-purifying and atmosphere supplying respirators. These devices will offer worker protection if the supplied-air system fails when the appropriate air-purifier units are selected. These cannot be used in oxygen-deficient areas or where the air concentration of a contaminant exceeds the IDLH level (i.e., immediately dangerous to life or health).

Since filters capture particles, caution must be exercised to always check that these filters are not clogged as it makes it harder for air to pass through. Cartridges can also become "full" or saturated. It will stop working and "breakthrough" will occur – this term means that the gases or vapours will leak through the cartridge. Both cartridges and filters must be replaced on a regular basis by using the manufacturer's recommendations (usually determined by using warning properties or end-of-service indicators).

There are different classes of particulate filters, depending on the particulate material. They are also classified based on levels of oil resistance and filter efficiency. Oil can break down certain types of filters which means it is important to know the materials you are working with at all times and always select the right cartridge for your respirator.

The main categories are:

N series (Not resistant to oil) - May be used in any atmosphere where there is no oil particulate.

- R series (Resistant to oil) - May be used in any atmosphere where there is no oil particulate, or up to one shift where there is oil particulate present. "One shift" means eight hours of continuous or intermittent use.
- P series (Oil-Proof) - May be used in any atmosphere, including those with oil particulates, for more than one shift. If the filter is used in atmospheres with oil particulates, contact the manufacturer to find out the service life of the filter.

#### *Different types of cartridges and filters*<sup>25</sup>

Equally important is the selection of the correct type of cartridge or filter.

Filters are made of material that is designed to trap particles as you breathe. Cartridges contain a material that absorbs gases and vapours. It is very important to make sure you are using the right filter or cartridge for the chemicals or substances present in the workplace.

#### *Selection of the right respirator*<sup>25</sup>

Choosing a respirator is a complicated matter. Experienced safety professionals or occupational hygienists, who are familiar with the actual workplace environment, are the staff who should select the proper respirator. They can choose a suitable respirator only after they have evaluated all relevant factors. This decision includes considering the limitations of each class of respirator.

Before the proper respirator can be selected for a job, be sure you have already:

- identified the respiratory hazard
- evaluated the hazard
- considered whether engineering controls are feasible

There are too many types of situations to cover them all fully here. However, the following questions represent part of "decision logic" that a safety professional or occupational hygienist can use when selecting a respirator:

- Is it to be used in firefighting or emergencies?
- Is it to be used in oxygen-deficient atmospheres (less than 18% oxygen in air; some jurisdictions say below 19.5%)?
- What is the nature of the hazard (chemical properties, concentration in the air, warning properties)?
- Is there more than one contaminant (i.e. a mixture or more than one chemical is present)?
- Is the airborne contaminant a gas, vapor or particulate (mist, dust or fume)?

- Are the airborne levels below or above the exposure limit, or are they above levels that could be immediately dangerous to life or health?
- What are the health effects of the airborne contaminant (carcinogenic, potentially lethal, irritating to eyes, absorbed through the skin)?
- What are the characteristics of the operation or the process (e.g., hot temperature, confined space)?
- What activities will the worker be doing while wearing the respirator (e.g., strenuous work)?
- How long will the worker need to wear the respirator?
- Does the selected respirator fit the worker properly?
- Where is the nearest safe area that has respirable air?

Use the SDS for guidance on requirements of the particular respiratory hazard. The CSA Standard Z94.4-11 (R2016) Selection, Use and Care of Respirators outlines a respirator selection decision logic model in more detail.




Contact the governmental occupational health and safety agencies in your jurisdiction to find out additional information on regulatory requirements for respiratory protection.

Difference between mask and respirator <sup>26</sup>

Selection of respiratory protection for Pollution hazards is typically based upon the airborne concentration of the substance that the wearer is exposed to, fit of the respirator and the hazard exposure limit of that substance.

Selection of respiratory protection for Pollution hazards is typically based upon the airborne concentration of the substance that the wearer is exposed to, fit of the respirator and the hazard exposure limit of that substance.

Key Differences between Masks and Respirators <sup>26</sup>

Particulate Respirators	Surgical Masks	Comfort Masks
		
<ul style="list-style-type: none"> <li>• Filter particles from the air when properly fitted, helping reduce the number of particles or germs the</li> </ul>	<ul style="list-style-type: none"> <li>• Cleared by the FDA for use as a surgical mask and are not designed to protect your lungs from airborne hazards like</li> </ul>	<ul style="list-style-type: none"> <li>• Not cleared by the FDA for use as a surgical mask and are not designed to protect your lungs from airborne hazards like</li> </ul>

wearer breathes in. <ul style="list-style-type: none"> <li>• Ideal for protection from PM2.5</li> <li>• Have the word NIOSH / EN / ISI and the approval type (i.e. N95; FFP1 etc.) printed on the product.</li> <li>• Are secured tightly to the face, with 2 head straps and a nose adjustable clip over the nose to allow for a more custom fit.</li> </ul>	PM2.5. <ul style="list-style-type: none"> <li>• Do not have the word NIOSH / EN / ISI and the approval type (i.e. N95; FFP2 etc.) printed on the product.</li> <li>• Typically donned for a specific procedure (eg: surgery by a surgeon) and disposed of afterward.</li> <li>• Prevent large particles expelled by the wearer, such as spit or mucous, from entering the environment. If the wearer coughs or sneezes, the surgical mask will help collect the larger particles expelled.</li> <li>• Usually do not fit tightly to the face as there might be gaps around the edges.</li> </ul>	PM2.5. <ul style="list-style-type: none"> <li>• Do not have the word NIOSH and the approval type (i.e. N95) printed on the product.</li> <li>• Not tested for any government performance standards for filtration.</li> <li>• Usually have only 1 head strap.</li> <li>• Do not fit tightly to the face as there might be gaps around the edges.</li> </ul>
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Who will benefit from wearing a respirator? <sup>26</sup>

- People with respiratory complications such as asthma or lung disease
- People who are obese or have diabetes
- People who have been diagnosed with a cardiovascular disease
- Children, teenagers and the elderly
- Expectant women and new mothers

### III. CONCLUSIONS

Some diseases like COVID-19 spreads mainly from person to person through respiratory droplets produced when an infected person coughs, sneezes, or talks. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. Studies and evidence on infection control report that these droplets usually travel around 6 feet (about two arms lengths).

Face mask can be very useful to get protection from COVID-19 types of viruses. While selecting face mask, user should consider of its capacity of Filtration, Fluid resistance, features and suitable fit.

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