

**MASK: “Effective Armour” while awaiting COVID-19 vaccine**

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**Abstract**

COVID -19 is a disease caused by Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2) that can trigger respiratory tract infection. The best way to prevent and slow down transmission is to be well informed about the virus, the disease and its mode of transmission. With no vaccine available and no specific treatment, prevention seems to be the only ray of hope at the moment. Among all the other modes of prevention, donning of face mask is economical and effective armour in the battle against COVID-19. Unfortunately, lack of knowledge, ignorance and injudicious use of mask and respirators, among the general public or health care workers have made them more vulnerable to infections. Awareness regarding the type of mask, how to use, reuse policy and discarding protocol is important to reduce the infection transmission.

**Keywords:** Coronavirus, COVID-19, Masks, Respirators, N95, FFP.

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**Introduction**

Corona Virus Disease 2019 (COVID-19) is the disease caused by Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2) by World Health Organization (WHO), which was previously named as a novel Corona virus 2019 (2019- nCoV) and causes acute respiratory infections.<sup>1</sup> SARS-CoV-2 is mainly transmitted through respiratory droplets (diameter < 5–10 µm) and touching the contaminated surfaces fomites.<sup>2,3</sup> Respiratory droplets are generated by coughing, sneezing and even talking loudly. With no available vaccine and no specific treatment, protection from respiratory droplet seems to be the only way to prevent human to human transmission. Unfortunately, even after almost a year, the battle against COVID-19 is still unending and as per WHO it is still too soon to tell how long this pandemic will continue.<sup>4</sup> Despite the best of efforts at the administration level such as complete lockdown and restriction of movement in containment zones, the cases of COVID-19 are still increasing globally and in India.<sup>5</sup> The main reason for the rise in cases could be due to the lack of awareness and/or lack of sensitization about the seriousness of the situation. Thus the best way to prevent and slow down transmission is to be well informed about the virus, the disease and its spread. As per CDC recommendation a number of mitigation behaviours to prevent the spread of SARS-CoV-2

includes i) wearing of a mask covering the nose and mouth to protect yourself and others from possible infection when in public settings or around ill household members ii) maintaining at least 6 feet (2 meters) of distance from persons who live outside one's household, and from persons who are ill; and iii) washing hands often with soap and water for at least 20 seconds, or, if soap and water are not available, using hand sanitizer containing at least 60% alcohol.<sup>6</sup> All these 3 behavioural changes are cost effective measures which needs to be incorporated in our daily lives as the “new normal” to break the chain of transmission of virus. Mask up is the only way of protection right now in a battle against COVID-19 if used judiciously.<sup>7</sup> The aim of this paper is to highlight all you need to know about MASK (use/ reuse / discard policy) in a simplified manner for the benefit of health-care workers and general public to reduce the infection transmission.

**Types and purpose of different masks**

Donning a “mask” covering both nose and mouth is the best preventive measure available for respiratory protection till the wait for vaccine continues. However, inappropriate use may cause harm and also lead to wastage of resources.<sup>6</sup> A medical mask can be applied properly for a maximum of 6–8 hours or until it becomes damp; whichever is earlier.<sup>8, 9</sup> Centre for

disease control (CDC) recommends use of facemasks everywhere; in public transportation, at events and gatherings. Mask etiquettes these days are as important as coughing etiquettes!! Facemasks should fit snugly against the sides of the face covering the nose and mouth up to the chin and should never be pulled down to the chin for drinking or eating. Knowledge regarding correct way of doffing as per CDC is more important.<sup>10</sup> Though surgical mask and respirators, commonly known as “masks”, are both used for respiratory droplet precautions they differ in their design, performances and purpose. The markets are flooded with varieties of masks; therefore, knowledge regarding different types of masks as per the need for healthcare worker or general public is important. Comparison of different types of masks and respirators their recommendations as per ICMR are given in Table 1. COVID-19 spreads mainly among people who are in close proximity to one another (within 6 feet) therefore the use of mask is particularly important in settings where social distancing is difficult to maintain. Moreover, due to large number of asymptomatic spreaders in the community it's important for everyone to wear masks in public places. The ideal mask for a health care worker is i) N95 (NIOSH) USA ii) FFP2 (EN 149) EUROPE. The detail of the mask and its use are shown in Table 2 & Table 3.

|                           | <b>SURGICAL MASK</b>  | <b>RESPIRATOR</b>                           |
|---------------------------|---|---|
| Synonyms                  | Face mask, medical mask   | N95respirator, FFP                          |
| Characteristics           | Pleated face<br>2-3 layers  | Raise dome<br>4-5 layers<br>(polypropylene) |
| Intended use              | For HCWs and Patients   | For HCW                                     |
| Fit testing and fit check | Not required  | Both are required                           |
| Common to both            | <ul style="list-style-type: none"> <li>• The front of the mask should never be touched by hands while being worn and must be removed by untying and handling only by the ties.</li> <li>• Should not be worn loosely around the neck or pulled down to the neck.</li> <li>• Not to be discarded as clinical waste after use.</li> </ul> |   |

**Table1 Comparison between surgical masks and respirators<sup>11</sup>**

| Respirators | USA:<br>NIOSH<br>* | #N95<br>0.3<br>microns<br>:>95%   | N99<br>0.3<br>microns<br>:>99%  | N100<br>0.3<br>microns<br>:>99.9% |
|-------------|--------------------|-----------------------------------|---------------------------------|-----------------------------------|
|             | EURO<br>PE 149     | ##FFP1<br>0.3<br>microns<br>:>80% | FFP2<br>0.3<br>microns<br>:>94% | FFP3<br>0.3<br>microns<br>:>99%   |

\*NIOSH: National Institute for Occupational Safety and Health.

#: NON-OIL RESISTANT. ##: FILTERING FACE PIECE.

**Table 2: Details of Respirators<sup>11</sup>**

| S. No. | Masks/ Respirators                       | Recommended Use  |
|--------|--|--|
| 1.     | N95 respirator without vent, FFP2, FFP3. | Only in healthcare setup, directly involved in the care of Covid19 positive patients (COVID wards, COVID ICUs), areas where aerosol producing procedure takes place (sample collection area, Molecular RTPCR Labs) |
| 2.     | Triple layer masks (cotton/ polyester)   | In health care setup, non-covid area.  |
| 3.     | Disposable cloth masks                   | In non-health care setup (general public area)   |
| 4.     | Face shields                             | Always use as an adjunct to face masks. Should not be used as replacement to face masks.   |

**Table 3: Different types of face masks & their use in different environment.<sup>12</sup>**

Though the mask is a protective gear it has certain contraindication. If not properly donned the mask may give a false sense of security to an individual. It should NOT be worn by children under the age of 2 years or anyone with breathing trouble, unconscious, incapacitated, or otherwise unable to remove the mask without assistance in such cases. The caregivers should use protective gear and practice preventive actions.<sup>13</sup> Universal facial masking might help reduce the severity of disease and ensure prevention of new infections.<sup>14</sup> On April 3, 2020 CDC recommended everyone to wear cloth face coverings in areas with high rates of community transmission, this recommendation has been unevenly followed across the United States and in India leading to surge of cases. The bottom line is that the mask has to be worn scientifically; nothing else will save you!<sup>15</sup>

### Use of faceshield

Though the main route of exposure to droplet is nose, mouth & eyes in decreasing order. The aerosolized heavy droplets can go upto 6-8 feet and in case of coughing, and powerful sneeze the droplet may go up to even 20 feet. Face shield is the best add-on for close nursing, aerosol generating procedures. It can protect approximately 90% of aerosol blasts at face. CDC does not currently recommend use of face shields as a substitute for masks as a preventive measure from corona virus infection. However, face shields that wrap around the sides of the wearer's face and extend below the chin and the hooded face shields may provide better source control than others. Plastic face shields for newborns and infants are NOT recommended.<sup>16</sup>

### For disinfection of masks and reuse<sup>17,18</sup>

It is always better to discard the mask after every use but, this becomes very expensive and is a burden on the health care services especially while using N95/

FFPs. Therefore, the frequent question that comes to our mind is how to disinfect N95 / FFP masks and when to discard? The point to remember is leaving masks out to dry should disinfect them from the corona virus, SARS, and influenza A in within 48 hours-72 hours. The AIIMS protocol of extended use of N95/ FFP2 respirators & masks, as per CDC guidelines,<sup>17</sup> is economical way of reuse of mask. Thus, keeping the AIIMS protocol<sup>18</sup> in mind we have revised an in-house protocol of extended use of N95/FFP2 masks for healthcare workers as well as general public which is simple to follow and understand.

### Revised protocol for extended use of masks/ respirators

Briefly,

- i) A total of 6, N95 or FFP2 masks need to be issued to each HCW along with 6 paper envelopes / bags.
- ii) Each mask is kept inside a separate labelled paper envelopes /bags (Labelled as Mondays, Tuesdays..... Saturdays)
- iii) Mondays, don the mask from bag labelled Monday before going to duty and replace the mask in the same paper bag after coming back from duty.
- iv) Similarly, Tuesdays, wear the mask from bag labelled Tuesday and put the mask back in the same paper bag after duty.
- v) Repeat the same for Wednesday, Thursday, Friday and Saturday.
- vi) On the 2nd week on Monday again wear the mask from the bag labelled Monday

This way, 6 masks are required in total, covering almost a month (24 days). Each mask is reused 4 times in a month (CDC recommends reuse upto 5 times) with a gap of 6 days for each mask with enough time for them to dry. As a backup policy one spare mask is issued along with other 6 masks to replace the damaged one as and when required. Our protocol of reuse of mask has the advantage of being easy to remember on the basis of days. The revised protocol of extended use of N95/FFP2 masks is shown in Table 4

| Mask No.. | Sequence of DAYS |           |           |           |
|-----------|------------------|-----------|-----------|-----------|
|           | 1st week         | 2nd week  | 3rd week  | 4th week  |
| 1         | Monday           | Monday    | Monday    | Monday    |
| 2         | Tuesday          | Tuesday   | Tuesday   | Tuesday   |
| 3         | Wednesday        | Wednesday | Wednesday | Wednesday |
| 4         | Thursday         | Thursday  | Thursday  | Thursday  |
| 5         | Friday           | Friday    | Friday    | Friday    |
| 6         | Saturday         | Saturday  | Saturday  | Saturday  |

**Table 4: Protocol of extended use of N95/FFP masks for personal safety..**

### Decontamination of used respirators:<sup>18</sup>

The most potential methods to decontaminate respirators are Ultraviolet germicidal irradiation, vaporous hydrogen peroxide, and moist heat.

### Disposal of used respirators/ masks:<sup>19</sup>

The personal used N95/ FFP2 masks after reuse for a period of 24 days as mentioned in Table 4 should not be treated further and reused. These masks are biomedical waste; therefore, it is collected and then discarded in double layered yellow bags as per the biomedical waste management protocol for COVID-19.

### Conclusion:

The COVID-19 pandemic has greatly impacted the basic lifestyle of people all over the world. SARS-CoV-

2 is mainly transmitted through respiratory droplets generated by coughing, sneezing and talking loudly. "Mask up" is the only effective armour right now till the wait for vaccine continues. Therefore, knowledge regarding the mask etiquette is the need of an hour to protect yourself and your loved ones and flatten the curve

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### References

1. World Health Organization. Naming the corona virus disease (COVID-19) and the virus that causes it. Available at [https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technicalguidance/naming-the-coronavirus-disease-\(covid-2019\)-and-the-virus-that-causes-it](https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technicalguidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it). Accessed April 19, 2020.
2. World Health Organization. Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. Available at <https://www.who.int/newsroom/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipcprecaution>
3. Luo C, Yao L, Zhang L, et al. Possible Transmission of Severe Acute Respiratory Syndrome Corona virus 2 (SARS-CoV-2) in a Public Bath Center in Huai'an, Jiangsu Province, China. *JAMA Network Open*. 2020;3: e204583.
4. Prasad H, Mahudeshwaran S, Arthanaari L, Mahalakshmi L. A Survey to Evaluate the Knowledge, Attitude and Practice on COVID – 19 among undergraduate dental students in Namakkal district (Tamil Nadu) during lockdown.. *University Journal of Surgery and Surgical Specialities, [S.I.]*, v. 6, n. 5, sep. 2020. ISSN 2455-2860.
5. <https://www.bing.com/search?q=icmr+statistics+of+covid&qsn&form=QBRE&sp=1&ghc=1&pq=icmr+statistics+of+covid&sc=0-24&sk=&cvid=957D8CB0AE7B47468758E4B3A2C86DB7>
6. Maharshi V, Puja P, Jakhar DK, Singh V. Awareness among general public of India towards COVID-19 pandemic: A questionnaire-based cross-sectional study. *Research Square*; 2020.
7. Maharshi V, Puja P, Jakhar DK, Singh V. Awareness among general public of India towards COVID-19 pandemic: A questionnaire-based cross-sectional study. *Research Square*; 2020.
8. Schünemann, H. J. et al. Use of facemasks during the COVID-19 pandemic. *The Lancet Respiratory Medicine* 0, (2020).
9. Ministry of Health & Family Welfare, Directorate General of Health Services (Emergency Medical

Relief). Novel Coronavirus Disease (COVID-19): Guidelines on use of masks by public.

10. World Health Organization. Advice on the use of masks in the context of COVID-19 (Interim guidance). Available at <https://apps.who.int/iris/rest/bitstreams/1274280/retrieve>.

11. COVID-19: Considerations for Wearing Masks | CDC

12. Occupational Safety and Health Administration. Hospital respiratory protection program tool kit. Washington: OSHA publication; 2015.

13. <https://search.cdc.gov/search/index.html?query=Consideration+of+wearing+mask+%28CDC%29&siteLimit=&utf8=%E2%9C%93&affiliate=cdc-main>

14. Centers for Disease Control and Prevention. Influenza. (Flu): 2009 H1N1 Pandemic (H1N1pdm09 virus). Available at <https://www.cdc.gov/flu/pandemic-resources/2009-h1n1-pandemic.html>.

15. Gandhi M, Rutherford GW. Facial Masking for Covid-19 - Potential for "Variolation" as We Await a Vaccine. N Engl J Med. 2020.

16. <https://deemagclinic.com/2020/07/17/masks-3/>

17. <https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html>

18. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/decontamination-reuse-respirators.html>

19. [https://www.aiims.edu/images/pdf/notice/SOP\\_N95\\_09\\_04\\_20.pdf](https://www.aiims.edu/images/pdf/notice/SOP_N95_09_04_20.pdf)

20. Guidelines For Handling, Treatment And Disposal Of Waste Generated During Treatment/ Diagnosis/ Quarantine Of COVID-19 (Revision 4) 21st July, 2020.

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