



SPECIAL ARTICLE COVID-19

Why We Need to Use and which Mask Types are Effective against the Novel Coronavirus (COVID-19)?

Geraldo Pereira Jotz¹ Aline Gomes Bittencourt²

¹ Morphological Sciences Department, Instituto de Ciência Básica de Saúde, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil

² Medicine Department, Universidade Federal do Maranhão, São Luis, MA, Brazil

Int Arch Otorhinolaryngol 2020;24(3):e255–e257.

Transmission of coronavirus generally occurs through respiratory droplets and contact. Current evidence suggests that SARS-CoV-2 may remain viable for hours to days on surfaces made from a variety of materials. In the house, care must be taken for open outside doors and windows and the use of ventilating fans to increase air circulation. We recommend using masks to self-protect and to protect others around, during the COVID-19 pandemic, mainly in inside closed spaces as buildings and malls. Also, maintaining distance between each person helps us to control the transmission of coronavirus.

There is much to learn about the novel coronavirus (SARS-CoV-2) that causes coronavirus disease 2019 (COVID-19). Based on what is currently known about the virus and about similar coronaviruses that cause SARS and MERS, spread from person-to-person happens most frequently among close contacts (within about 6 feet). This type of transmission occurs via respiratory droplets, but disease transmission via infectious aerosols is currently uncertain.^{1,2}

Respiratory droplets are generated when an infected person coughs or sneezes. Any person who is in close contact (within 1 meter) with someone who has respiratory symptoms (coughing, sneezing) is at risk of being exposed to potentially infective respiratory droplets. Droplets may also land on surfaces where the virus could remain viable; thus, the immediate environment of an infected individual can serve as a source of transmission (contact transmission).³

The incubation period for COVID-19, which is the time between exposure to the virus and symptom onset, is on average 5–6 days, but can be as long as 14 days. During this period, also known as the “presymptomatic” period, some infected persons can be contagious and therefore transmit the virus to others.^{4–9}

The United States National Institute for Occupational Safety and Health (NIOSH) has standardized N95 face masks (→ **Figure 1**). The “N” stands for “not resistant to oil,” while “95” represents its minimum 95 percent filter capacity for catching viruses as small as 0.3 microns. The Face Filtering Piece (FFP) face masks are a rage in Europe, divided into three categories: FFP1, FFP2 and FFP3. According to the European standards, each type can filter 80, 94 and 99.95 particles down to 0.3 microns. They are equivalent to N95 in Europe.^{1,2} Homemade Masks need to be fabric with 100% cotton (→ **Figure 2**), because it is most effective.¹⁰ In the hospital, in low-risk areas to COVID-19, the surgical masks is a good option (→ **Figure 3**).

Masks can be made of different materials and designs which influence on their filtering capability. Masks can also be used for source control, which refers to blocking droplets ejected by the wearer. It is hypothesized that if everyone is wearing masks to decrease the chance that they themselves are unknowingly infecting someone, everyone ends up being more protected.¹¹

There are, however, large gaps in the scientific literature as to the effectiveness of facemasks in reducing community

Address for correspondence
Geraldo Pereira Jotz, MD, PhD,
Morphological Sciences
Department, Instituto de Ciências
Básicas da Saúde (ICBS),
Universidade Federal do Rio
Grande do Sul (UFRGS), Avenida
Paulo Gama 110–Farroupilha,
Porto Alegre, RS, 90040-060,
Brazil
(e-mail: geraldo.jotz@terra.com.br).

DOI <https://doi.org/10.1055/s-0040-1713588>.
ISSN 1809-9777.

Copyright © 2020 by Thieme Revinter
Publicações Ltda, Rio de Janeiro, Brazil

License terms





Fig. 1 N95 Respirators 3M (With and Without Valve - Disposable).



Fig. 2 Handmade Mask (100% cotton - Washable).

transmission of COVID-19. Although there is experimental evidence that facemasks are capable of retaining infectious droplets and potentially reduce transmission, as well as reports of transmission reduction by using facemasks, there is no evidence that such reduction occurs in community environments. Epidemiological studies are needed to eluci-

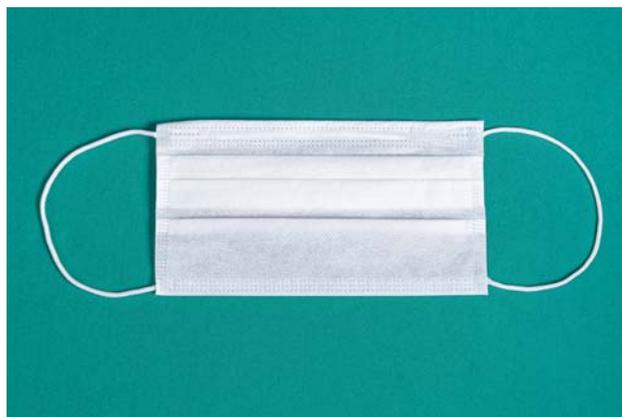


Fig. 3 Surgical Masks (Disposable). Source: Freepik.com.

date this issue. They must be conducted following consistent protocols, with sufficient sample sizes, as well as respecting research ethics principles.¹²

The use of medical masks in the city, nonetheless, may create a false sense of security, with neglect of other essential measures, such as hand hygiene practices and physical distancing, and may lead to touching the face under the masks and under the eyes. There is also the issue of difficulting access to the medical masks to supply the health workers.

The use of nonmedical masks made of other materials (e.g., cotton fabric) in the community has not been well evaluated. There is no current evidence to make a recommendation for or against their use in this setting.¹³ Unfortunately, MacIntyre et al evaluated the use of cloth masks in a health care facility and found that health care workers using cotton cloth masks were at increased risk of infection compared with those who wore medical masks.¹⁴ In the interim, when advising the use of nonmedical masks, the following features should be taken into consideration: numbers of layers of fabric/tissue, breathability of the material used, water repellence/hydrophobic qualities, shape of mask and fit of mask.¹³

For any type of mask, appropriate use and disposal are essential to ensure that they are effective and to avoid any increase in transmission.

Health care workers should:

- Wear a medical mask when entering a room where patients with suspected or confirmed COVID-19 are admitted.
- Use a particulate respirator at least as protective as a US National Institute for Occupational Safety and Health-certified N95, European Union standard FFP2, or equivalent, when performing or working in settings where aerosol-generating procedures, such as tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy are performed.

- Place the mask carefully, ensuring it covers the mouth and nose, and tie it securely to minimize any gaps between the face and the mask.
- Avoid touching the mask while wearing it.
- Remove the mask using the appropriate technique: do not touch the front of the mask but untie it from behind.
- After removal or whenever a used mask is inadvertently touched, clean hands using an alcohol-based hand rub or soap and water if hands are visibly dirty.
- Replace masks as soon as they become damp with a new clean, dry mask.
- Do not re-use single-use masks.
- Discard single-use masks after each use and dispose of them immediately upon removal.¹³

Kowalski et al published here the “Effect of the COVID-19 Pandemic on the activity of physicians working in the areas of head and neck surgery and otorhinolaryngology” and they demonstrated a direct impact of the COVID-19 pandemic on the clinical practice of specialties related to the treatment of patients with diseases of the head and neck region already in the beginning of the management of the illness in Brazil.¹⁵

In the first Editorial, Itzhak Brook discusses about prevention of COVID-19 infection in neck breathers, including laryngectomees, highlighting the hygiene care that these patients must have in order to prevent contamination with this disease.

We can observe in this journal some articles demonstrating the opinion and experience of the authors against COVID-19.

Finally, regardless of the scientific evidence, we recommend using any kind of masks to self-protect and to protect others, during the pandemic, mainly in public spaces, especially in closed ones. Keeping appropriate distance between each person helps us controlling the transmission of coronavirus disease. Hand hygiene is an uncontroversial point: it should always be done with 70% alcohol or washing hands with soap. Remember: my mask may protect you; your mask may protect us!

Conflict of Interests

The authors have no conflict of interests to declare.

References

- 1 United States National Institute for Occupational Safety and Health (NIOSH). <https://www.cdc.gov/niosh/index.htm>
- 2 RSG Safety BV. Total respiratory. <https://www.rsgsafety.com/en/en-standards-approvals>. 18 May, 2020
- 3 Water, sanitation, hygiene and waste management for COVID-19. <https://www.who.int/publications-detail/water-sanitation-hygiene-and-waste-management-for-covid-19>
- 4 Yu P, Zhu J, Zhang Z, Han Y. A familial cluster of infection associated with the 2019 novel coronavirus indicating possible person-to-person transmission during the incubation period. *J Infect Dis* 2020; 221(11):1757–1761. Doi: 10.1093/infdis/jiaa077
- 5 Huang R, Xia J, Chen Y, Shan C, Wu C. A family cluster of SARS-CoV-2 infection involving 11 patients in Nanjing, China. *Lancet Infect Dis* 2020;20(05):534–535. Doi: 10.1016/S1473-3099(20)30147-X
- 6 Pan X, Chen D, Xia Y, et al. Asymptomatic cases in a family cluster with SARS-CoV-2 infection. *Lancet Infect Dis* 2020;20(04):410–411. Doi: 10.1016/S1473-3099(20)30114-6
- 7 Tong Z-D, Tang A, Li K-F, et al. Potential Presymptomatic Transmission of SARS-CoV-2, Zhejiang Province, China, 2020. *Emerg Infect Dis* 2020;26(05):1052–1054. Doi: 10.3201/eid2605.200198
- 8 Wei WE, Li Z, Chiew CJ, Yong SE, Toh MP, Lee VJ. Presymptomatic Transmission of SARS-CoV-2 - Singapore, January 23–March 16, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69(14):411–415. Doi: 10.15585/mmwr.mm6914e1
- 9 Kimball A, Hatfield KM, Arons M, et al; Public Health – Seattle & King County; CDC COVID-19 Investigation Team. Asymptomatic and Presymptomatic SARS-CoV-2 Infections in Residents of a Long-Term Care Skilled Nursing Facility - King County, Washington, March 2020. *MMWR Morb Mortal Wkly Rep* 2020;69(13):377–381. Doi: 10.15585/mmwr.mm6913e1
- 10 Pennsylvania Department of Health. <https://www.health.pa.gov/topics/Documents/Diseases%20and%20Conditions/Homemade%20Mask%20Guidance.pdf>. 18 May, 2020
- 11 Howard J, et al. Face Masks Against COVID-19: An Evidence Review. Preprints. 2020;2020040203;. Doi: 10.20944/preprints202004.0203.v2
- 12 Garcia LP. Use of facemasks to limit COVID-19 transmission. *Epidemiol Serv Saude* 2020;29(02):e2020023. Doi: 10.5123/S1679-49742020000200021
- 13 Advice on the use of masks in the context of COVID-19. Interim guidance. World Health Organization. 6 April 2020
- 14 MacIntyre CR, Seale H, Dung TC, et al. A cluster randomised trial of cloth masks compared with medical masks in healthcare workers. *BMJ Open* 2015;5(04):e006577. Doi: 10.1136/bmjopen-2014-006577
- 15 Kowalski LP, Imamura R, Castro G Junior, et al. Effect of the COVID-19 Pandemic on the Activity of Physicians Working in the Areas of Head and Neck Surgery and Otorhinolaryngology. *Int Arch Otorhinolaryngol* 2020;24(03):. Doi: 10.1055/s-0040-1712169