



## Editorial

**SPECIAL ARTICLE COVID-19****COVID-19: Priority Use of N95 Mask or Double Mask**Geraldo Pereira Jotz<sup>1</sup> Fatima Cristina Mendes de Matos<sup>2</sup><sup>1</sup> Dean of Innovation and Institutional Affairs, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, RS, Brazil<sup>2</sup> Head and Neck Department, Universidade de Pernambuco (UPE), Recife, PE, Brazil

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The COVID-19 pandemic has lasted a year by March 2021. The recommendations for its control, which include social distancing, hand hygiene with water and soap and/or hand sanitizer, and the use of masks have remained valid from 2020 till now. Correct and consistent use of masks is a critical step that everyone can take to avoid infection and the spread of COVID-19. The use of face masks contributes to reduce the spread of COVID-19 in the community by reducing the release of respiratory droplets from infected but asymptomatic individuals; therefore, masks work best when everyone wears them.

Not all masks provide the same degree of protection. When choosing a mask, one must check if it fits the face, covering the nose, mouth, and chin (there cannot be air leaks), and if it has two or more layers of washable and breathable fabric. The wearer's exposure is reduced to the minimum (protection >95%) when they are using a medical procedure mask. The use of N95 masks (or PFF2®) is essential for health professionals, especially among those who are in contact with patients' secretions and aerosols. Its use alongside 'Face Shields' is recommended as they promote a reduction in the risk of contact of eyes and masks with saliva droplets or secretions. In a study conducted in 2006, the Institute of Medicine (IOM) evaluated the potential for reuse of N95® in the case of an influenza pandemic. The IOM stated that the simultaneous use of an N95® and a surgical mask as an external barrier, or a washable face shield, could extend the duration of its usefulness, acting as a physical barrier to potentially infectious fluids and a block of larger particles.<sup>1</sup> They also discovered that the use of a single cloth or surgical mask blocked only ~42–44% of the particles of a simulated cough. However, when a cloth mask was worn over a surgical mask, 92.5% of the cough particles were blocked.<sup>1</sup>

According to the Centers for Disease Control and Prevention (CDC), we should neither combine two disposable masks nor a N95 mask with any other mask. The ideal is to use N95 masks® or PFF2®. Alternatively, a disposable mask overlaid by a cloth can also be used.<sup>2</sup> Decontamination of the N95® can be considered a part of the reuse strategy. Ultraviolet germicidal irradiation with hydrogen peroxide plasma gas or moist steam, among other methods, are considered effective forms of inactivating viruses during a health crisis with shortage of ideal masks.<sup>1,2</sup>

The prolonged use of N95® masks can also be considered as part of the reuse strategy. CDC recommends limiting the number of reuses to no more than five per device, provided the mask is not damaged or contaminated with blood or secretions. Each respirator should be used on a certain day and stored in a breathable paper bag (or in a plastic pot with a lid with several drilled holes) until the next week, which means each worker needs a minimum of five N95 respirators® and their viability is increased if they are put in, took out, cared for, and stored properly every day. The period between uses should exceed the expected survival time of 72 hours for SARS-CoV-2.<sup>1,3–5</sup>

As the virus variants found circulating around the world (B.1.1.7, from the United Kingdom; B.1.351, from South Africa, and P.1, from Brazil) spread more easily and quickly, the population is advised to use two masks (a surgical mask and a cloth mask as the external layer), and health professionals should use PPEs (personal protective equipment) (N95® or PFF2® without respirator, face shields, goggles, cloaks with a weight of 40ng, gloves). The main reason for these recommendations is that the use of two simultaneous masks can increase protection against pathogen-containing aerosols.<sup>6–8</sup>

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Several studies have been conducted with fabrics with antiviral properties. The Brazilian e-commerce already offers clothes, masks, and fabrics with these characteristics. Bio Manguiños, Unifesp, UFRGS, UFRJ, PUC RJ, among others, are among the institutions that conduct studies on these fabrics.<sup>8</sup> Several metal nanoparticles and metal oxides (such as silver, copper, titanium, gold, and zinc) have been introduced as antiviral agents.<sup>9</sup> TECHNICAL NOTE 202/2020/SEI/GE-MAT/GGTPS/DIRE3/ANVISA was published, providing clarifications on the sanitary classification of textile products with antiviral and antibacterial properties as health products.<sup>10</sup> Thus, although the use of clothing made with fabrics with antiviral properties can contribute to provide a certain level of virus inactivation on the surface of these objects and potentially minimize the probability of indirect contamination by contact, it does not guarantee total protection against the new coronavirus. The two major advantages of masks from these fabrics are the comfort (softness) provided by them, and the property of viral inactivation, not only of the coronavirus, but also of the mumps and measles viruses, which according to studies, reaches 99.9%.<sup>9</sup>

Until vaccine-induced population immunity is achieved, the use of masks, along with other protective measures such as physical distancing, avoidance of crowds and poorly ventilated indoor spaces, and good hand hygiene, is a highly effective means of delaying the spread of SARS-CoV-2.

Innovative efforts to improve quality, mask fit, and performance warrant attention and the joint effort of the entire scientific community<sup>3</sup> to ensure that the medical practice during this critical period does not become exhausting and dangerous. As always, the greatest medical and technological advances emerge in times of war. May this be the legacy of this pandemic!

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