The Science behind the SING-SAFE Singer's Mask

Testing was conducted by the WVU Center for Inhalation Toxicology.

The WVU Center for Inhalation Toxicology tested the Sing-Safe mask using the Fit Test, which measures the ability of a mask to stop small (aerosol) particles from entering. While most types of masks are capable of stopping large droplets from moving through, the Sing-Safe singer's mask is capable of also blocking small aerosol particles. We measured the singer's mask and found it to have a fit factor of 4, consistent over three individuals of different sizes and shapes. A fit factor of 4 means that for every four small particles outside the mask, only one particle gets inside. This means that the Sing-Safe singer's mask is potentially much safer than many of the masks people are buying or making. As a comparison, a surgical mask, worn without any add-on braces, would likely have a fit factor of 1, meaning that there would be an equal number of small aerosol particles inside and outside the mask (no filtration). The reason for this low fit factor is not that the material used in surgical masks is bad - it is generally a pretty good filter- but rather that these masks fit loosely around the face. The gaps that exist between the mask and the wearer's skin allow air to easily move in and out of the mask. It is important to note that surgical masks are still very effective in blocking large droplets that are being released by the wearer and preventing droplets from others from landing on the wearer.

WVU's Center for Inhalation Toxicology has been involved in testing masks for a number of groups including the National Guard and hospitals. They have evaluated different designs and materials used for masks, and they worked with Kym Scott, the designer of the singer's mask, to evaluate the mask in comparison to other masks that have been tested in the past. During the testing phase, the design of the mask was altered to improve the fit of the mask, minimizing any air gaps, and the materials used were altered, increasing the overall fit factor approximately two-fold. The testing determined that these masks are an effective alternative to surgical masks for a variety of settings including performance, music therapy, and communication in any noisy setting such as in health care or on a factory floor.

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The "singer's mask" developed by Dr. Kym Scott is a truly novel development during the COVID-19 pandemic that truly exemplifies that necessity is the mother of invention.
The concept of the mask originates from the challenge that sound waves are altered by traditional masks and face covering that are mandatory at WVU during the COVID-19 pandemic. The outcome of singing with such a traditional mask is that the sound volume and quality are significantly compromised.
The "singer's mask" captures the spirit of innovation during the COVID-19 pandemic in that it incorporates widely available basic components, constructed in such a manner to form an effective face covering that doesn't impair performance voice quality. This is achieved by projecting the mask off the wearer's face. During fit testing in the HSC Center for Inhalation Toxicology and Occupational Medicine, the mask efficiency was improved. The mask is an effective barrier and containment system that decreases the likelihood that aerosolized droplets are transmitted between people. Used in conjunction with proper hygiene and social distancing, the mask is part of a series of behavior changes during the COVID-19 pandemic that protect our health and quality of life.

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