



## To Mask, or Not to Mask

### Description

By Andy Kramek, April 21, 2020

Let me emphasize that I am not a doctor, nor am I a virologist or epidemiologist. However, I do have degrees in microbiology and chemistry so I do understand a little more of the underlying issues.

There is much controversy around, and conflicting advice abounds, about the wearing of personal protective equipment (PPE) – especially masks. It is important to stress that there are huge differences between medical-grade respirator masks and the homemade, improvised masks that are widely available. It has been suggested that, even if an improvised mask will not stop you catching the [virus](#), it can help prevent spreading and therefore should be worn, or that it reminds you not to touch your face.

However, the danger in this view, as we have already seen, is that people think they are safe because they are wearing a home-made mask. As a result, they tend to ignore the precautions that do keep them safe. Maintaining proper distance in public, and practicing good hygiene, are far more important than wearing a mask whose holes are more than 60 times larger than the virus particles. Even an N95 mask will catch only 95% of virus sized particles (which is why medical staff who know how to wear them, and how to use them, can still get infected). Improvised masks are totally ineffective from a medical perspective because, even though they may hinder the spread of droplets, they will not prevent the passage of free virus particles that are shed from mucous membranes when you sneeze or cough.

However, there are a number of other well-documented issues associated with wearing improvised masks – especially for long periods. First, bacteria, mucus, and dirt get caught in your mask when you breathe out. Then, when you breathe in, you re-inhale them. It's like blowing your nose in a handkerchief and wearing it all day on your face!

Second, when wearing a mask about 30% of the exhaled CO<sub>2</sub> from your lungs is drawn back into your lungs with each new breath. Inhaling CO<sub>2</sub> mixed with fresh air results in a depleted oxygen mixture that passes into the blood in the alveoli. The presence of such dissolved CO<sub>2</sub> in the blood causes mild

hypoxia; reflexes and reactions slow down, and senses are dulled. So when driving you should definitely remove your mask.

Third, an additional effect occurs when people use masks that, effectively, force extra CO<sub>2</sub> into their bodies. The excess CO<sub>2</sub> in the lungs dissolves in pulmonary fluid producing carbonic acid which then diffuses into the blood. The result is that the acid causes blood pH to fall (blood acidosis). The body responds with compensatory mechanisms to reduce blood acidity, especially widening arteries and closing down less important veins and capillaries. The consequences are not normally serious, and are transitory, but can result in a feeling of light-headedness or mild dizziness.

All of the above are multiplied when the wearer has underlying respiratory issues – COPD, pneumonia, chronic bronchitis or asthma or a compromised immune system. However, many other medical conditions make individuals more susceptible to both hypoxia and acidosis, including diabetes and obesity.

The bottom line is that there are certainly people who need, for medical reasons, to wear masks when out in public. Such people should be getting proper medical grade masks and not be relying on improvised face cloths.

For the rest of us, the most important thing to do is to maintain your distance when in public, and practice good hygiene at all times. By all means, wear a mask if you feel it helps you, but be aware of the issues associated with doing so.

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