Guidelines for public mask, purchased or DIY

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General principles

- Have the front of your face (your nose and mouth) covered as effectively as possible. This is where the virus gets into our body from talking to people face to face, or walking with our head facing forward into a new (potentially contaminated) airspace.

- Have at least one layer of your mask made from non-woven material. Most fabrics are woven, with a criss-crossed porous grid of fibers that the respiratory droplets can go straight through to your face. Woven materials are effective when in multiple layers but better yet, use material where the fibers are randomly bonded, in an amorphous tortuous pattern. The ideal filter for DIY masks is a shop towel of the type used to remove grease by mechanics, because it is both nonwoven and hydrophobic (repels water and respiratory droplets). Shop towels still work well after washing with soap unlike medical masks filters that lose filtration efficiency with soap.

- Purchased masks contain a middle filter that is comprised of meltblown polypropylene, an electret with efficient filtration conferred by electrostatic properties that bind to respiratory droplets and prevent them from going all the way through the mask. This material is not commonly available.

- Take care not to use materials that might have dangerous chemicals in them. These could be a respiratory hazard and it is important that lung function be at its best to withstand coronavirus infection. On a side note, beware of using harsh sanitizers that might also inflame your lungs.

DIY Sites

These DIY instructional sites generally adhere to the scientific principals above. A double-layer of T-shirt is okay, with bonded material as the middle layer (ideally, ToolBox's shop towel or ZEP's industrial blue towel). After each use, immediately put the mask in a place where it cannot contaminate other things, in case it has virus on the outside. The virus degrades with washing in soap, heat (155F for 30 min), exposure to UV light (eg in sunshine) and with time over the course of several days. Remember that the outside of the mask, which might contain virus after wearing out, should never touch your face!! Wash hands before and after touching your mask. Wash your face, especially nose area, after you get home.

- This is the best resource that I know of, scientifically sound, co-written by an MD on the front-lines and with all the practical information and details for DIY: https://docs.google.com/document/d/1_BprF9r_WN53puWHko2IsAjINtRsH1F_iirjacn20bA/edit

- This one starts with a supportive data presentation and simple mask-making video instruction starts at 7 min. It is a washable mask made from a T-shirt, with a pocket within which you can insert a filter. Instead of a paper towel that is hydrophilic and will absorb respiratory droplets, use a washable shop towel, for the reasons described above: https://www.youtube.com/watch?v=hVEVve-3QeM#Masks4All,%20and%20how%20to%20make%20your%20own%20mask

- This one describes data supporting ToolBox's shop towel or ZEP's industrial blue towel and promises to provide a pattern soon: https://www.businessinsider.com/homemade-mask-using-hydro-knit-shop-towel-filters-better-2020-4

Quality tests for purchased masks

- More effective protection is offered by an ordinary grade, disposable medical mask. During the PPE shortage, only purchase these from vendors that will not deplete the stock for hospitals. Whenever possible, dispose of mask after use. If in short supply, contact me for instructions about safer reuse.

- Look for masks that have, in the order of importance 1) three layers with a melt-blown polypropylene middle layer, 2) a water-proof outer layer, 3) a wire in the nose bridge to bend to shape your face, 4) strongly attached ear-loops, and 5) are sided so that the outside is different from the inside.

- How to test your mask for (1) and (2):
    - Cut open an example mask and check for three layers. The middle layer is usually white and fuzzy. Check to see that it is staticky by seeing whether it will pick up a tiny piece of paper.
    - Test whether the layers melt or catch flame when lit with a lighter- it should melt. Do this over the sink!
    - Put a drop of water on the outside layer to see whether it beads up or sinks in- it should bead up.

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