Personnel protective equipment have become scare around the globe and are life-saving essentials in the current COVID-19 war.

As the mode of transmission is due to air droplet transmission as well as people-to-people contact in spreading the contamination, filters, varied levels of face masks and wipes have become the first line of defense.

The highly efficient N95 masks that can effectively remove 95% of fine particles are best in the fight and are needed by healthcare personnel who are treating COVID-19 patients.

What makes N95 efficient? Among other factors, the nonwoven structure of the filtration medium that has random arrangement of fine fibers that gives tortuous flow path to air and its design factor aide with its filtration capability. In addition, design aspects of the mask itself, such as shape conformity and tight fit, make it highly efficient.

Hospital settings normally use the 3-ply spunmelt nonwoven fabrics during general medical procedures. These may not be that efficient as high-level aerosol filters, but they can protect the environment. A preliminary study in our laboratory has shown that additional filter medium is needed to enhance its protection capabilities.

Recently, there have been a lot of discussion on a third medium, “face covers.” Face covers made of ordinary cloth may not have aerosol protection capabilities but serve two important functions. They will help prevent unintentional spread of air droplets, which may or may not contain airborne toxic microbes such as virus particles, and secondly, they give a sense of confidence and comfort among the public.

Face covers help to prioritize the allocation of high-level particle filters such as N95s to caregivers treating COVID-19 patients. Secondly, it will also enable surgical grade polypropylene masks for the use by hospital employees who are not handling high-risk patients such as those in isolation wards and can be used by other sick patients to prevent infection in hospital settings.

An important point from a few recent studies and discussions by the medical community on the surface stability of viruses such as SARS-CoV-1 on diferent substrates indicates the nature of the surface and the structure of the protection medium such as hard or porous, influence the stability, which has to be taken into consideration while developing face masks and face covers.

Face covers’ material make up, structure and design aspects will be determining factors. Face covers boost psychological comfort and to an extent help to contain one’s exhalations. Face covers do certainly enhance social distancing.

Dr. Seshadri Ramkumar is a professor in the department of environmental toxicology at the Texas Tech University Health Sciences Center.