Not an endorsement

COVID-19 Fact Sheet #3
Respirators and Face Masks

First and most important: these are two different things: respirators and face masks.

Respirators, up there in the photo on the left, whether they are disposable or non-disposable, are designed to protect the wearer. The disposable respirators are sometimes called “dust masks” and OSHA likes to call them “filtering face-pieces”. OSHA does consider them to be “respirators”.

Face masks, the orange and striped one on the photo, intended to be disposable, are designed to protect others, typically patients, or, in some cases, protect products.

RESPIRATORS

What Does N-95 Mean?

All respirators worn in the workplace must be certified by testing designed by NIOSH. (NIOSH, the National Institute for Occupational Safety and Health, is part of CDC.) Manufacturers must arrange to have this testing performed by a third party. (Other types of safety equipment do not have this requirement; manufacturers can do their own testing.) Due to the pandemic, some of the respirators that have been tested and approved by other countries have been approved for use in the U.S. Manufacturers can make masks that are not tested (and unfortunately, I often see them in the workplace) but these nuisance odor masks and others that you could find in the hardware stores do not meet the criteria established by NIOSH. Respirators that meet the criteria will be labeled as N95 and will have a “TC” number (for tested and certified) on the mask, the straps, the box or on paperwork that accompanies the respirator.

NIOSH has three designations for filter material: N, P, and R. These designations refer to whether the filter material will perform as desired when exposed to an oil mist. The “N” designation is filter material that is not approved for use around an oil mist. “R” means “Restricted”; you can use the mask for only 8 hours around a mist and “P” is “Permitted” - these can be worn with no restrictions. The ”N” filter material is used in healthcare since there is no concern about an oil mist in that environment.

There are also 3 levels of filter efficiency: 95, 99, and 100. The filter material is tested with a 0.3 micron particle. An N95 captures 95% of 0.3 micron particles. The “100” designation is actually 99.97% since, at 100%, you would not be able to suck air through the filter. The 0.3 micron particles are selected because research in aerosol technology has found that particular diameter to be the most difficult to capture, even more difficult than smaller particles.

But, wait a minute – COVID-19 is only 0.12 microns – why is it ok to wear an N95 if 5% would not be captured????
That's because, as discussed in Fact Sheet #2 – the virus is always surrounded by saliva/sputum which makes it a bigger particle.

What is the Difference Between a Healthcare Mask and an "Industrial" Mask?
If you are a news hound, you heard a few weeks ago about construction companies and others donating "industrial" masks. FDA regulates the use of masks when they are used for a medical purpose – protecting the healthcare worker or patient or both. The blue mask in the photo is an N95 approved for healthcare, the white mask above it is certified by NIOSH but not approved by FDA. The FDA approval is in addition to the requirement for NIOSH certification. The primary difference is whether the filter material has a fluid resistant claim. An FDA regulated Surgical Face Mask is considered a barrier to blood and body fluids, particulate material and *droplets*. The FDA regulated N95 NIOSH certified Surgical Mask is considered to be a barrier to blood and body fluids, particulate material and *aerosols*. In March, due to the announcement of a public health emergency, FDA gave clearance for healthcare workers to wear masks that are not designated for healthcare. This clearance is temporary and will end when it is no longer needed. In addition, there was legislation that provided immunity from liability for manufacturers who released "industrial" masks for healthcare use.

Note that the white mask also has an exhalation valve. This mask can be worn only to protect the wearer.

Fit Testing
These disposable respirators are also called "negative-pressure" respirators. Every time the wearer takes a breath, negative pressure is created. If there are leaks around the edges of the mask, air (and droplets with viral particles) will rush in, bypassing the filter material. OSHA requires fit testing for all negative pressure respirators to ensure an adequate face seal. The fit testing is required to select the right mask and then repeated annually. Due to the shortage of masks, OSHA has suspended enforcing the requirement for annual testing to avoid wasting masks to perform the test.

But What About Those Beards?
Unfortunately, and despite vociferous claims by deer hunters in November, a beard does not act as a filter. During quantitative fit testing, where a tube is threaded into the mask to take a particle count, even a single hair causes a leak that leads to failure of the fit test. The diameter of a hair can be much bigger than the virus-containing particles that are airborne. Some facilities, as an option for facial hair, have powered air-purifying respirators or PAPRs which have a battery pack with a blower that pulls air through a filter then into a hood worn over the head. In an ideal world, the hoods are disposable but at this time they are being disinfected for reuse.

Bottom Line with Respirators
They are regulated and tested and designed to protect the wearer. And while the disposable does not provide the face seal of a non-disposable, they do a reasonable job protecting the wearer.

FACE MASKS

These masks are not tested and certified by NIOSH. Surgical face masks used in healthcare are regulated by FDA. Testing for these masks that act as a physical barrier to blood and body fluids and particulates may include bacterial infiltration, flammability, and pressure drop across the mask. The material does provide some filtration but it is *not as efficient for collection of small particles as an N95 mask*. These masks *do not provide a face seal* and there is no fit testing requirement. The need to substitute these masks for N95 respirators may be one of the reasons that we see so many healthcare personnel becoming ill.

One note of caution: face masks, surgical or homemade, should not be worn by welders. If a mask is needed, an N95 approved for welding with a fire retardant should be worn.

HOMEMADE FACE MASKS

CDC recommends the use of a cloth face covering where it is difficult to maintain social distancing. The face mask is recommended to prevent the spread of virus from individuals who do not have symptoms. Important Facts:

1. Reserve N95s for healthcare personnel.
2. Understand that the face masks do not provide protection for the wearer from very small droplets or aerosols. The mask materials have not been tested – we do not know how well they will capture small droplets. More importantly, without a face seal, leakage will occur around the edges of the mask. These face masks provide protection for the wearer that is only better than *nothing*!
3. Cover nose and mouth. (You will see scenes where an individual has their nose uncovered – this is not ok!)
4. Maintain social distancing – at least six feet – when you can.
5. Avoid touching your nose or mouth underneath your mask. The minute you put a mask on – I guarantee this – your nose will itch. Keep your hands away from the "T" zone of your face: your eyes, nose and mouth.
6. Touch only the straps when you remove the mask. Diseases are sometimes transmitted by contaminated masks. A typical scenario is when you get back in the car after grocery shopping. Remove the mask with the straps, place the mask on a paper towel or tissue. Carry the mask without touching it into the laundry basket.
7. Wash the masks with normal laundry.
8. Continue to wash your hands with soap and water. Use hand sanitizer when you do not have access to running water.
9. Stay isolated if you are in a high risk category. A face mask does not provide the protection that you need.

One final note: There is a lot of misinformation on COVID-19 that is being broadcast on a daily basis. Stick with the science. Listen to the experts: physicians and others with expertise in infectious disease.

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