DROWN CONSULTING, LLC
Environmental Health and Safety

Mask and Respirator Use During the COVID-19 Outbreak

Contents

Purpose and Introduction

Should you wear a mask or respirator to reduce the potential for occupational or non-occupational exposure to coronavirus? This document is meant to serve as a guide in lay terms to help people make the best exposure control decisions for their situations relative to the coronavirus outbreak. This is not detailed technical/professional work as normally produced by Drown Consulting, LLC. It is however, based on facts, scientific principles, and common applications. I welcome criticism. Address it to my email dan@drownehs.com to minimize social media clutter. Forward or use this document as you wish.

The purpose of this write up is education on mask & respirator use aimed at reducing the rate of spread of COVID—19. I'm using my website platform instead of just yelling at the television. The target audience is anyone willing to read 5 pages to either reinforce what they know or to dispel misinformation which is prevalent in the social and journalistic media. My editor says this is too long, I think it's too short. There is talk in the news today (4/2/20) of various government bodies enacting mandatory and voluntary face mask and respirator use requirements in California and other states. You should follow the law but be informed and listen to the science. Keep in mind, ignorance is a choice.

This link to the FDA is helpful: FDA Mask vs. Respirator.

Definitions

Airborne virus – virus particles suspended in the air we breathe that may be produced by infected individuals as a result of coughing, sneezing, spitting, talking, or just breathing. Viruses are not living organisms and require host cells to reproduce.

Bioaerosol—finely divided material suspended in air comprised of particles of biological origin which can affect living things by causing illness, allergy, or other toxic effect including COVID—19. Bioaerosols include particles that are large and visible which settle and deposit immediately or microscopic particles invisible to the eye that can remain suspended, potentially for hours. Examples of aerosol composition include saliva, mucus, and even food or beverages that can be sprayed during coughs, sneezes, talking, and breathing.

Deposited virus particles – viable virus units that are capable of causing infection that can be introduced into the body where they can attach to and invade living cells allowing viruses to replicate, spread, and disrupt normal body functions.

Physical deposition – saliva, mucous, or other material ejected from an infected individual when they sneeze, cough, or spit that lands on another individual or surface almost immediately.

Slow the Spread

The novel (new in humans) coronavirus that is spreading globally causes a disease with symptoms referred to as COVID–19. It is a respiratory illness spread by close physical contact between people. Airborne or deposited virus particles are shed by an infected individual who may, or may not, be aware of their infection. The virus particles are introduced to the new host body by inhalation, direct physical deposition of bioaerosols (sneezing or coughing on someone), or by touching points of entry such as eyes, nose, and mouth. This often occurs from contaminated hands or objects such as cups, doorknobs, and any of hundreds of other examples of everyday touch surface. According to numerous media reports from medical professionals and epidemiologists, some infected individuals may never show signs or symptoms of COVID—19 even though they can transmit the disease. This is why mask use is gaining momentum.

Our collective global goal at this time is to avoid creating infective bioaerosols and where they exist, to avoid inhaling them or introducing them from our hands or objects/surfaces into our body through sensitive points of entry – eyes, nose, and mouth.

Social distancing is the most effective way to avoid the production of infective bioaerosols and their subsequent deposition or inhalation by uninfected individuals. This means stay home, shop only for food or medicine, and keep a 6-foot distance from anyone you do not live with. It also means that you need to isolate yourself if you know or suspect you have COVID—19. Isolation means no contact with anyone—even those sharing the household.

Employees of stores, gas stations, and businesses designated as critical need protection too. This is one of the reasons stated by government officials that face coverings are being considered and will be mandatory or strongly suggested. Employers should develop social distancing rules and procedures for identifying risks to their employees. High risk individuals and sick employees should be required to stay home. This aspect of our new reality is a vast discussion on its own aside from mask or respirator use.

N-95 Respirators

Air-purifying respirators remove air contaminants by filtration or adsorption on specially prepared filter materials.

The Food and Drug Administration (FDA) definition of N-95 Respirator:

> *An N-95 respirator is a respiratory protective device designed to achieve a very close facial fit and very efficient filtration of airborne particles. The edges of the respirator are designed to form a seal around the nose and mouth. Surgical N-95 Respirators are commonly used in healthcare settings and are a subset of N95 Filtering Facepiece Respirators (FFRs), often referred to as N95s.*

N-95 respirators are presently in short supply when they are most needed and for this reason, they should only be used by individuals with occupational exposure including: medical workers, healthcare, emergency services (law enforcement, fire fighters, paramedics, etc.), nursing home or home health care providers. These people will have close physical contact with known infected individuals. If we don't protect these people then they are more likely to become infected while they tend to our medical needs. That would be tragically unfair and potentially leave us without a functioning health care system when it's most needed. They are the soldiers on the front line—support them by leaving the scarce N-95 respirators for them to use. John and Jane Public do not need N-95 respirators to protect themselves as they go about normal daily activities unless they are caring for COVID—19 infected individuals.

Masks and Surgical Masks

A mask is not a respirator. It does not form a tight seal with the face. It is not designed to stop inhalable particles from reaching the mouth, nose, nasal cavity, or lungs of the wearer. The main purpose of a mask is to keep the larger particles or droplets from the wearer's nose and mouth from being spread. They are essentially a sneeze or cough guard. Smaller dimension droplets of bioaerosols from a sneeze or cough can go around the non-sealing edges of a mask and become airborne. Masks do help to control larger ejected virus particles mixed with saliva and mucous by keeping them inside of the mask. Masks can also keep the wearer from touching their face. So, masks do serve a useful purpose.

Excerpts from the Food and Drug Administration (FDA) definition of Surgical Masks (Face Masks):

> *A surgical mask is a loose-fitting, disposable device that creates a physical barrier between the mouth and nose of the wearer and potential contaminants in the immediate environment. If*

worn properly, a surgical mask is meant to help block large-particle droplets, splashes, sprays, or splatter that may contain germs (viruses and bacteria), keeping it from reaching your mouth and nose. Surgical masks may also help reduce exposure of your saliva and respiratory secretions to others.

While a surgical mask may be effective in blocking splashes and large-particle droplets, a face mask, by design, does not filter or block very small particles in the air that may be transmitted by coughs, sneezes, or certain medical procedures. Surgical masks also do not provide complete protection from germs and other contaminants because of the loose fit between the surface of the face mask and your face.

Homemade Masks or Bandanas

Wearing a face covering such as a bandana or home-fabricated mask is the last category for discussion. These devices are as variable as the possible materials of construction and would be expected to offer little to no protection from bioaerosol inhalation. They may somewhat contain the wearer's sneezes or coughs but would not stop microscopic aerosols. As with masks and respirators they could prevent the wearer from touching their face. It appears in the latest (4/2/2020) media broadcasts that some local, state, and even the federal government are poised to require or strongly suggest homemade mask use for all people who venture out in public. This is a developing issue that needs to be followed. The most that can be said about the effectiveness of homemade masks is that they are better than nothing and that more layers is better than fewer layers.

Use of Masks, Respirators, and Social Distancing

- They reduce but do not eliminate potential exposure. You are not virus-proof with a mask or respirator so don't be overconfident.
- Don't be critical of people who wear masks or respirators. If they have made the decision to wear protective equipment then just respect it. Maybe learn from it.
- Use of respirators in the work place requires training, medical evaluation, and fit testing.
- Using a respirator or mask can cause stress on your body due to breathing through filter media—make sure mask & respirator users are medically able to use them.
- If you're outside and casually pass someone on the sidewalk don't jump out onto the street just to keep 6 feet of distance. In passing someone, both walking at 3+ miles per hour, your interaction would not be considered close physical contact unless one of you is actively coughing or sneezing.
- Stopping to chat with friends and neighbors you meet while walking is fine as long as you keep a safe distance. Stand so the wind blows from the side of both of you. If you are downwind of someone infected who is coughing, the 6-foot distance might not be enough.

- Reusing masks or respirators is generally not a good idea. They can become collection points for saliva, mucous, perspiration, and other microorganisms causing an amplification effect.
- If you use a homemade mask be sure there is a way to clean and dry it between uses.
- Do the best you can to seal the mask or respirator around your nose. Wearing a mask or respirator with your nose peeking out above it is a wasted effort.
- Respirators don't work if you have facial hair or jewelry that interferes with the sealing surfaces.
- One of the main benefits of masks or respirators is that they keep you from touching your nose and mouth.
- Microscopic bioaerosols can travel around the outside of a mask or respirator and possibly right through a bandana.
- Be aware that you may develop skin rashes from prolonged mask or respirator wear. Wash your hands and then wash your face. Consult a physician or healthcare provider if it seems serious.
- Don't share masks or respirators.

I hope this information is helpful. Feel free to contact me with comments or questions.

Stay well,

Dan Drown, CIH, CSP