# Practical Preparations for a Coronavirus Pandemic

*by James A. Marusek*

## I. INTRODUCTION

### A. PURPOSE

The purpose of this paper is to provide a practical guide for the preparation of a coronavirus pandemic. The current coronavirus COVID-19 is not the first one to produce a pandemic (i.e. SARS, MERS) nor will it be the last. The coronavirus is a type of influenza virus. This plan represents in my humble opinion the best practices from an individual rather than a governmental perspective.

Panic and trauma are caused when an individual is trapped by a threat and unable to do anything about it. It is natural to fear. It is how the human species survives. But the answer to panic and trauma is "to do something about it" and not let yourself be trapped without any solutions.

Therefore taking a proactive approach is a better solution than doing nothing at all. Worrying helps no one. So just look at the problem, look at potential solutions (big and small), the things you can do and then implement these solutions and the act of implementation will ground you and make you strong.

This is an opinion paper. I am not a medical doctor nor tied to the medical field in any way.

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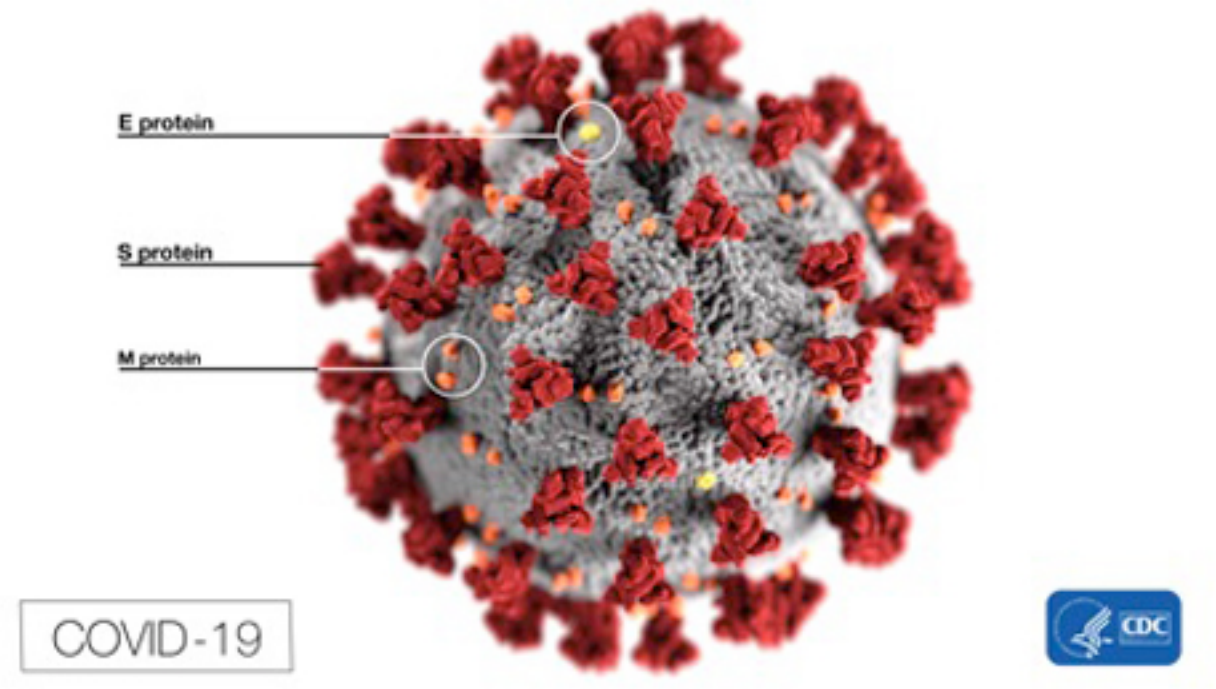
## B. THREAT

The term "coronavirus" refers to the family of viruses. Corona means crown, which refers to the so-called spikes that stick out from the protein. These are the things that are used by the virus to attach to a human cell. If you could block or damage these spikes, then it would have nothing to attach and stick to the human host cell and it would be rendered noninfectious.




## C. VULNERABILITY

Anyone can become infected. Based on existing data, the disease is said to have around a 2% mortality rate. That means in general for every hundred people who contract the disease 2 will die and 98 will survive.

Most of the deaths due to the coronavirus were elderly patients. In one study, most patients were men, with a mean age of 55.5 years. Also 51% of the patients had chronic diseases, including cardiovascular and cerebrovascular diseases, endocrine system disease, digestive system disease, respiratory system disease, malignant tumor, and nervous system disease.[1] In other words, the coronavirus infections in the most vulnerable of people were causing their natural immune systems to break down, making them more susceptible to a host of other fatal conditions, especially pneumonia.

## D. GOVERNMENT RESPONSE

Generally the governmental approach focuses on surveillance, infection control and isolation.

Several years ago, the U.S. Government authored a 227-page plan. It is titled “Implementation Plan for the National Strategy for Pandemic Influenza from May 2006”. [2] I skimmed through the document and some of the key words I locked onto were "snow day", "social distancing measures" and "spatial

separation". A snow day generally is a day on which a school or other institution is closed due to heavy snowfall or other extreme winter weather. From my perception a "snow day" in this document refers to a shelter-in-place approach. "Spatial separation" refers to the minimum distance or separation between people to avoid transmission of the virus, which is the distance of less than 6 feet. "Social distancing measures" are measures to limit the disease spread through a community (enforcing spatial separation). Some examples of "social distancing measures" are school closures, snow days, and quarantines. Social distancing makes a difference. Cities that implemented social distancing had a much lower incidence of infection spread than cities that did not. This approach limits the frequency of and closeness of contact between individuals in a public setting.

One of the key elements of surveillance for the Centers for Disease Control and Prevention (CDC) is to develop and roll out coronavirus test kits. They are at the verge of introducing these kits and protocols in the next couple weeks. But they ran into some problems. These kits will be able to separate out those individuals infected with this coronavirus from the individuals infected the general flu.

## E. INDIVIDUAL RESPONSE

There is some guidance within the “Implementation Plan for the National Strategy for Pandemic Influenza from May 2006” at the personal level beginning on page 170 in the subhead "Protecting Personnel during a Pandemic", but most of the document relates to governmental responsibilities rather than individual responsibilities.

During "snow days," many individuals would be asked to stay at home. Many schools and businesses would be closed. This is essentially a shelter in place approach. This plan would be instituted for around an initial 10-day period. Anyone who has been infected with influenza should develop symptoms during that period without transmitting it to anyone outside their home, thereby slowing the spread of influenza in a community. Depending upon the new virus's incubation period and period of contagiousness, the period of snow days could be made longer or shorter. During snow days, each household would need a sufficient stockpile of food and other provisions. Emergency and essential workers would continue to work.

China is currently the hot spot; so their level of containment protocols are in full force. Generally people have sheltered-in-place for isolation. Transportation is severely curtailed. So if you look at what is happening in Wuhan, China at this time, individuals are directed to remain in their homes in the infection hotspots. So observing what is taking place in China can provide some valuable information. The Chinese government started to impose quarantine controls a couple days before the Lunar New Year celebrations were about to begin. On January 23 Chinese authorities put Wuhan, China under quarantine shutting down the city's public transportation, including buses, trains, ferries, and the airports. They also began sealing off transportation on the highways. Currently the spread of the virus is not completely under control in Wuhan, China at this time, 5 weeks later. Therefore a more realistic timeframe for sheltering-in-place is probably around 2 months.

So from my perspective if the coronavirus breaches the firewalls that individual nations have put in place and the spread of the contagion becomes uncontrolled regionally; the government will adopt a shelter-in-place approach at the community level.

Generally the safe exposure distance of person-to-person contact is around 6 feet; and outside their homes, individuals should maintain this distance. The mission is containment. So all group activities will be put on hold. Many businesses will be affected. Life as usual will come to a halt. Anyone leaving the

shelter of their homes will risk infection. Infected individuals will be quarantined and cared for within their homes. Those in a dire medical state might be moved to overcrowded hospitals.

# II. PREPARATION

## A. INDIVIDUAL PLANNING

It is a funny thing about panic. It is like a herd of buffalo. One buffalo senses danger and signals it to the herd. The whole herd can be grazing and all of a sudden one buffalo "on watch" smells, hears, or sees something. That buffalo "sets a point" with a tail signal and the whole herd comes to immediate attentions, starts slowly to form a tight formation and sounds the alarm.

Then the herd may panic and stampede. So when a panic sets in, there is not much to be done except go along with the herd.

So in some places such as Wuhan, China, they are in an action mode. The herd of buffalo is on the move. The streets are deserted, many store shelves are empty, and transportation is at a standstill. They have adopted a shelter-in-place approach. In other places, people are taking precautions such as buying up face mask, quietly stockpiling food, medicine, drinks, pet food, toilet paper, vitamins, etc. in preparation for what may be turned into a global panic.

So although for the most part I am not concerned about this particular threat, I understand the tendency of the herd to panic. It can be prudent to take precautions early because many options will be rather limited if the herd of buffalo decides to stampede.

So in a proactive approach rather than a reactive (panic) approach, individuals should probably obtain sufficient supplies to shelter-in-place for 2 months. So the next question is what supplies?

## B. CHECKLIST

Preparing for a pandemic is a little bit like a scavenger hunt. Below is a list of things shelter-at-home individuals may need in order to survive and remain in place:

* Food
* Fluids
* Two Months Supply of Prescription Medicine
* Over-the-counter cold and flu medication
* Hand Sanitizers Gel
* Household cleaning agents (i.e., Bleach, floor cleaner, toilet cleaner, surface cleaning spray, laundry detergent, dishwasher soap, hand soap, anti-bacterial soaps, shampoo)
* Toilet Paper
* Paper Towels
* Tissues
* Heavy Duty Trash Bags
* Batteries for anything that needs batteries
* Multivitamins
* Digital temperature/humidity meter
* Oral Thermometer

* PPE (face mask, surgical gloves, goggles/safety glasses)
* Pulse Oximeter
* Manual Can Opener
* Full Tank of Gasoline
* (for women) Feminine hygiene products
* (for infants) baby formula, baby foods
* (for pets) Pet Food, Kitty Litter

In deriving this list I have made one important assumption. The government's plan is to maintain essential services (such as providing electricity, natural gas, water, sewage).

## C. DETAILS

**Food** – An individual generally needs 75-90 grams of protein each day. Protein is extremely important because it is used to build, repair and maintain tissues including your body's major organs (such as the heart) and skeletal muscles. Protein deficiency, when continued over a long period of time can cause a disease know as protein calorie malnutrition (PCM). Common symptoms of PCM are poor healing, fatigue, hair loss and muscle wasting.

Protein bars and protein shakes can be used as a supplement to ensure proper protein levels are maintained.

Medium term storage (2 months shelter-in-place) requires some extra considerations. Many foods such as fresh fruits, vegetables, and milk may not survive 2 months of storage; even refrigerated storage without spoiling. In modern society, there are several options available. One might substitute canned fruits and vegetables. Another approach is that several foods can be dehydrated and rehydrated when needed. Examples are powdered milk, butter, and eggs. I have dehydrated kale and the used it months later in soups without any loss of flavor. Bread and meats will store in a freezer.

The goal of shelter in place is isolation. This will disrupt normal life including school, work, entertainment, shopping, visiting restaurants, etc. Eating out at restaurants will be very risky. Take out food also is risky. Some individuals have not learned the art of cooking and may find shelter-in-place difficult. In today's world there are cookbooks, YouTube videos and Pinterest that can provide excellent instructions on cooking. But other options such as MREs (Meal, Ready-to-Eat) are available.

**Fluids** – An individual generally needs to drink between 64-80 ounces of liquid daily. One can meet fluid requirements using tap water. But most people will rather choose other options such as using water to make tea, coffee, cocoa, flavored powders such as crystal light or buy sodas, fruit drinks, bottled water, drinks with electrolytes etc. Filtered water pitchers can enhance the taste of tap water by removing impurities in the water.

**Prescription Medicine** – Get an extra supply of your regular prescription drugs. Ask your healthcare provider for a prescription. If your insurance will not agree to cover the extra supply, you may need to pay out-of-pocket. Keep health supplies and nonprescription drugs on hand. Work with your personal doctor or general practitioner (GP) to obtain the extended supply.

**Household Cleaning Agents** – (i.e., Bleach, floor cleaner, toilet cleaner, surface cleaning spray, laundry detergent). If someone in the household becomes infected, much of the chores will involve sanitizing the home.

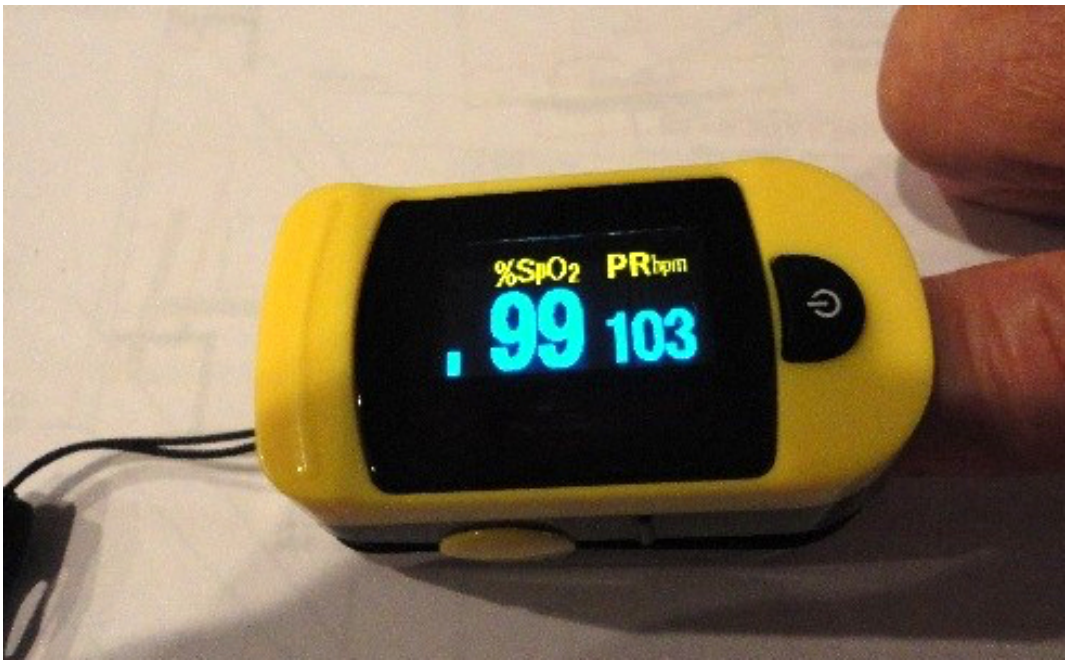
**Toilet Paper** – About 50 years ago, I experienced a panic in California. The news announced over the radio that many of the companies that manufacture toilet paper were temporarily shutting down and that there would be a shortage of toilet paper. After work I went into the grocery store to buy some food and I notices many old ladies with shopping carts completely full of toilet paper pushing them to the checkout lanes. I walked by the aisles that held the toilet paper and they were empty. The shelves were completely bare. I went home and a day latter there was an announcement that the toilet paper scare was fake news that spun out of control.

**Heavy Duty Trash Bags** – Large garbage bags are needed because if someone in the household becomes infected, a large amount of biomedical waste (potentially infectious materials) will be generated.

**Multi-Vitamins** – Shortages may limit the normal intake of proper nutritional foods and produce deficiencies in the diet. Vitamins can supplement these deficiencies.

**Digital Temperature/Humidity Meter** – In order to minimize the transmission of infections within the home it is critical to maintain the relative humidity levels between 40% and 60%. This type of inexpensive meter will allow individuals to monitor their in-home or workplace humidity levels.

**Pulse Oximeter** – Pulse oximeters have become common in the modern world. Just as thermometers measure your temperature. Pulse oximeters clamp onto your fingertip and measure the oxygen in your blood. They are available on Amazon for under $20.




The pulse oximeter, or Pulse Ox, is an electronic device that measures the saturation of oxygen carried in your red blood cells. The device uses a cold light source that shines a light through the fingertip, making the tip appear to be red. By analyzing the light from the light source that passes through the finger, the device is able to determine the percentage of oxygen in the red blood cell.

If you are wearing dark fingernail polish, long, artificial nails or if your fingers are not clean, the pulse oximeter may not work properly.

Why might this simple electronic device be useful when sheltering-in-place at home? Normal pulse oximeter levels should be 96% or higher. A reading below 90% indicates hypoxemia—a condition in which there is a deficiency of oxygen in the blood, which is normally associated with severe pneumonia. Most individuals that die from this coronavirus infection are dying because they contract pneumonia and that is what kills them. Therefore this gives a quick quantitative assessment of imminent danger (pneumonia) and when to break quarantine and immediately rush an individual to the hospital.[13]

## III. PREVENTION

What are the things individuals can do to reduce their risk from a coronavirus infection?

* Distance yourself from or avoid people and crowds. If you must go out, stay at least six feet away from individuals. Stay out of crowded places.
* Wash your hands for at least 20 seconds using soap and water frequently, but especially after using the bathroom, before cooking, and after shopping, opening doors, touching elevator button and grocery carts.
* Self-quarantine.
* Cover your mouth when you cough or sneeze—preferably into your arm or elbow, not your hands.
* Wash your sheets and pillowcases every few days in hot water.
* Germs can live on surfaces for days. Disinfect surfaces regularly with bleach. Wipe down your desk, doorknobs, handles, light switches, and elevator buttons at the office regularly with cleaning wipes.
* Do not go to the hospital unless it is an emergency. Medical resources will deplete. Hospitals and doctor's offices are hot beds of contagion.

### A. MAINTAIN YOUR DISTANCE

Stay at least 6 feet away from obviously sick people. Avoid receiving a cough/sneeze in the face, shaking hands, or being in the range of droplet splatter and the "drop zone".

### B. ISOLATION

The vast majority of individuals will isolate themselves at home in self-quarantine.

## C. Washing Hands


General guidelines are to wash your hands with soap and water for 20 seconds and then dry. Then apply a hand sanitizing gel, rub it in and then let it air dry.

In one study, washing with water alone reduced contamination down to 23%. Washing with plain soap and water reduced those at-risk to 8% - a five-fold reduction.[3]

Try not to touch your face. There is a chance your unwashed fingers will have a virus on them and if you touch/rub your mouth, nose or eyes, you may introduce the virus and accidentally infect yourself. In general, most people touch their face around 500 times per day.

Hand sanitizing gel is an evaporating gel that kills 99.99% of the germs in 15 seconds. Rather than just trying to wash away the germs I am more focused on killing them (or deactivating them). Besides it is fairly inexpensive. I would recommend obtaining a large bottle and then a small size individual bottle that one can carry around in their pockets when they are on the go. When the small bottle is empty it can be refilled using the large bottle. It is probably a good routine to use this gel every time one gets the urge to touch their face in public.

## D. Wearing Personal Protective Equipment (PPE)

Individuals should minimize excursions outside the home in order to avoid the risk of infections. PPEs (such as face mask, goggles, surgical gloves, surgical/isolation gowns) can provide an extra layer of protections if properly used to protect an individual from becoming infected.

### 1. Face Mask

A person who is infected should wear a mask (to help catch respiratory droplets as he or she exhales), and a person who is in close proximity to a sick person should also wear a mask. Doctors, nurses, hospital staff, ambulance drivers, and other health care workers need to wear face masks. But an uninfected person walking around outside probably won't benefit much from wearing a mask. The CDC doesn't recommend it, either. The CDC says individuals showing symptoms such as fever and shortness of breath should wear masks to avoid spreading it to others.

So when should a normal individual wear a face mask. Any time a person is infected or showing signs of infection, they should wear a mask. Anytime a person is caring for a loved one infected with the coronavirus, they should wear a mask while they are in close proximity. Anytime a person is being transported who is infected, both the infected person and the transporter should wear masks. Anyone infected with the coronavirus or showing symptoms of infection should remain at home under quarantine, or in a hospital but definitely not travel using public transportation.

But the world being what it is, many people acting irresponsible, spreading the coronavirus about, I can understand the desire of people to try and protect themselves. So if someone desires to add a little extra protection while they leave their homes, I can understand that desire.

The other issue at play here is if normal individuals buy up all the stocks of face masks in a panic mode, how will those that really need them such as doctors and nurses be supplied?

**Proper Type of Face Mask** – There are many types of face masks and many people are simply buying the wrong type.

My wife was in Lowes Home Improvement Store a few days ago and a woman had a clerk pull down a box of face masks from a high shelf. She went off and bought the entire box. But what she bought was construction face mask that cannot filter out fine particles. They are absolutely useless against this type of threat. It is like trying to filter out fine grains of sand using a screen made out of chicken wire. All the sand will easily pass through the screen.

Some people are buying surgical type masks made of paper or cloth which are also near useless against this kind of virus since the material isn't fine enough to filter our the sub-micron virus nor do those masks form a seal. Viruses are extremely small and will readily pass through this type of mask.


There are several types of disposable mask that are designed for this threat. They are N95, N100, P100 and OUK face masks that will filter out most of the virus particles. An N95 respirator is a respiratory protective device designed to achieve a very close facial fit and very efficient filtration of airborne particles. The N95 designation means that when subjected to careful testing, the respirator blocks at least 95 percent of particles as small as 0.3 micron. N95's are the most common but other types will also work. Face Mask are identified by a single letter that indicates particle type rating and a two-digit number indicating filtration level. The rating use 3 letters – N (not oil resistant), R (resistant to oil), and P (oil proof). "P" ratings can block off both chemical and organics. The rating use three types of numbers – 95 (removes 95% of all particles that are at

least 0.3 microns in diameter), 99 (removes 99% of particles that are at least 0.3 microns in diameter), 100 (removes 99.97% of all particles that are 0.3 microns in diameter or larger).

Another option is to buy a more expensive new respirator or perhaps a used military surplus respirator with replaceable filter cartridges. Insert a new filter cartridge of the proper size and type (N95, N100, P100) and the unit is very useable.

From my perspective the best type of face mask has the OUK rating. These are very unique mask incorporating metal salts into the design. They will not only filter out viruses but also kill (deactivate) them at the same time. This mask is manufactured by RespoKare. It is described in **How RK RespoKare Anti-Viral Mask Works.**[4]

It is the only face mask that has demonstrated its anti-viral properties via extensive laboratory testing on airborne viruses. Accepted formally by the FDA, they created a brand new medical device classification ("OUK") to accommodate RespoKare's innovations in infection control and respiratory protection. RespoKare Anti-Viral Mask is the first and only anti-viral mask to receive 510(k) clearance for sale in USA (May 26, 2011). This face mask will inactivate 99.99% of 18 flu viruses and 12 airborne diseases. When tested against coronavirus (SARS and MERS), the mask kills (inactivates) greater than 99.99% of those viruses within 1 minute.

**Proper Fit** – Many individuals do not wear face mask properly. They must fit over both the mouth and the nose. Having a tight seal is important; facial hair can interfere. As a result, beards need to be shaved to obtain a proper seal.

**Proper Usage** – Face masks contain filters that prevent germs from being spread. For hygiene reasons, use disposable masks and replace them when they get moist. Masks can only be worn for a maximum of eight hours and it is best to change them regularly so they can remain effective.

Most of the face masks are designed as throw away items. Use them once and then toss them. But that is the heart of another problem. As people throw them away, they need to buy replacements. Due to demand, stocks are quickly depleted. Store selves empty and they become an out-of-stock item. Try buying an N95 mask today and the virus is not even endemic in the U.S. yet! Some people have resorted to washing the used mask in water but that destroys the mask integrity.

In my opinion it is probably best to use these mask during times of greatest exposure. An example might be a person riding a subway train on their daily commute into New York City; when people are packed like sardines on a train. Then remove and store them during times of minimal exposure. Intermittent use can extend the time between replacements.

## 2. EYE PROTECTION

Another type of PPE is eye protection. This would include Goggles, Face Shield, and Safety Glasses.

Eye protection provides a barrier to infectious materials entering the eye and is often used in conjunction with other personal protective equipment (PPE) such as gloves, gowns, masks or respirators.

While respiratory transmission is the most common mode of transmission for influenza virus and typically results in respiratory infections, researchers are emphasizing that respiratory exposure is just one of several potential routes of influenza virus infection in human beings. The surface of the eye is

overlooked as a site of transmission, capable of leading to both ocular and respiratory infections. The ocular surface is a mucosal surface with permissive receptors for influenza virus, and the authors note that roughly 80% of documented human infections with H7 viruses have been associated with ocular complications such as conjunctivitis, often with concurrent mild respiratory illness, and influenza-positive eye swabs.[5]

According to the CDC, many safety goggles or plano (non-prescription) safety glasses fit comfortably over street eyewear and can provide satisfactory protection without impairing the fit of the prescription eyewear.[6]

I suspect many people wear contacts lenses. One contamination threat is bringing your contaminated fingers to your eyes in removing or installing contact lenses. I believe the CDC agrees. "Contact lenses, by themselves, offer no infection control protection. However, contact lenses may be worn with any of the recommended eye protection devices, including full-face respirators. Contact lens users should rigorously adhere to hand washing guidelines when inserting, adjusting, or removing contact lenses." [6]

As a side note, I have a pair of swim goggles that have one unique feature.


These goggles are not ordinary goggles. If you notice they have numbers on each lens. That is because they are prescription goggles. I picked them up from a local scuba store a few years ago. I am almost blind as a bat and these goggles are similar to wearing a pair of glasses. So if I ever need to wear eye protection for this type of coronavirus threat, either the current one or the next one down the pike, at least I will not be stumbling around in the dark like Mr. Magoo.

# IV. INDOOR AIR ENVIRONMENTAL CONTROL

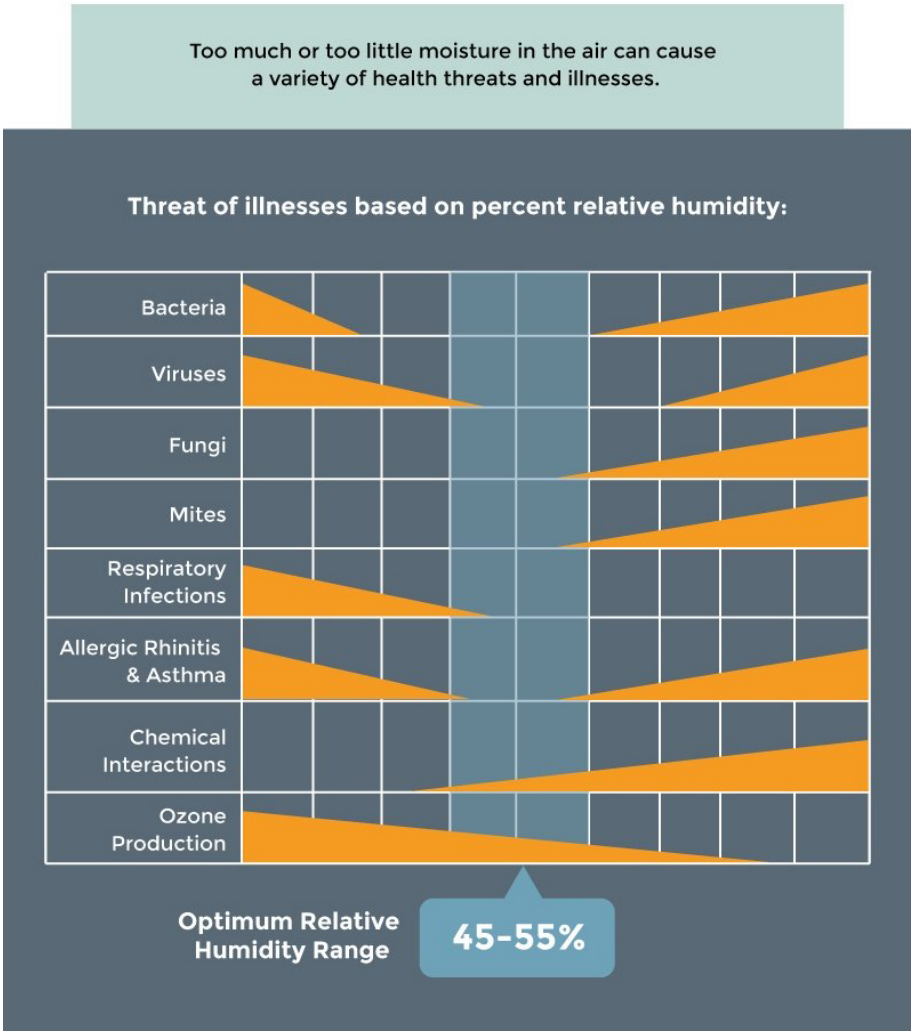
## A. HUMIDITY

One of the latest strategies for combating the coronavirus is controlling the indoor humidity levels. The air should be maintained between 40% and 60% relative humidity within indoor (enclosed) environments (homes, businesses, hospitals, malls, shopping centers, grocery stores, restaurants, aircraft, cruise ships, etc).

This approach was derived from a research study by a practicing pediatric oncologist, Stephanie Taylor, who analyzed the variable associated with infectious control and localized the main weakness/cause, humidity levels. The findings were discussed in the following article: This Inexpensive Action Lowers Hospital Infections And Protects Against Flu Season.[7]

> The one factor most associated with infection was dry air. At low relative humidity, indoor air was strongly associated with higher infection rates. When we dry the air out, droplets and skin flakes carrying viruses and bacteria are launched into the air, traveling far and over long periods of time. The microbes that survive this launching tend to be the ones that cause healthcare-associated infections. Even worse, in addition to this increased exposure to infectious particles, the dry air also harms our natural immune barriers, which protect us from infections.
>
> Scientists attribute the influence of dry air to a new understanding about the behavior of airborne particles, or "infectious aerosol transmissions." They used to assume the microbes in desiccated droplets were dead, but advances in the past several years changed that thinking. "With new genetic analysis tools, we are finding out that most of the microbes are not dead at all. They are simply dormant while waiting for a source of rehydration," Taylor explained. "Humans are an ideal source of hydration, since we are basically 60% water. When a tiny infectious particle lands on or in a patient, the pathogen rehydrates and begins the infectious cycle all over again."

Generally it takes about 17 years on average for scientific evidence to be put into medical practice. This is a very simple and inexpensive fix. At the individual level, this finding can be implemented within days.

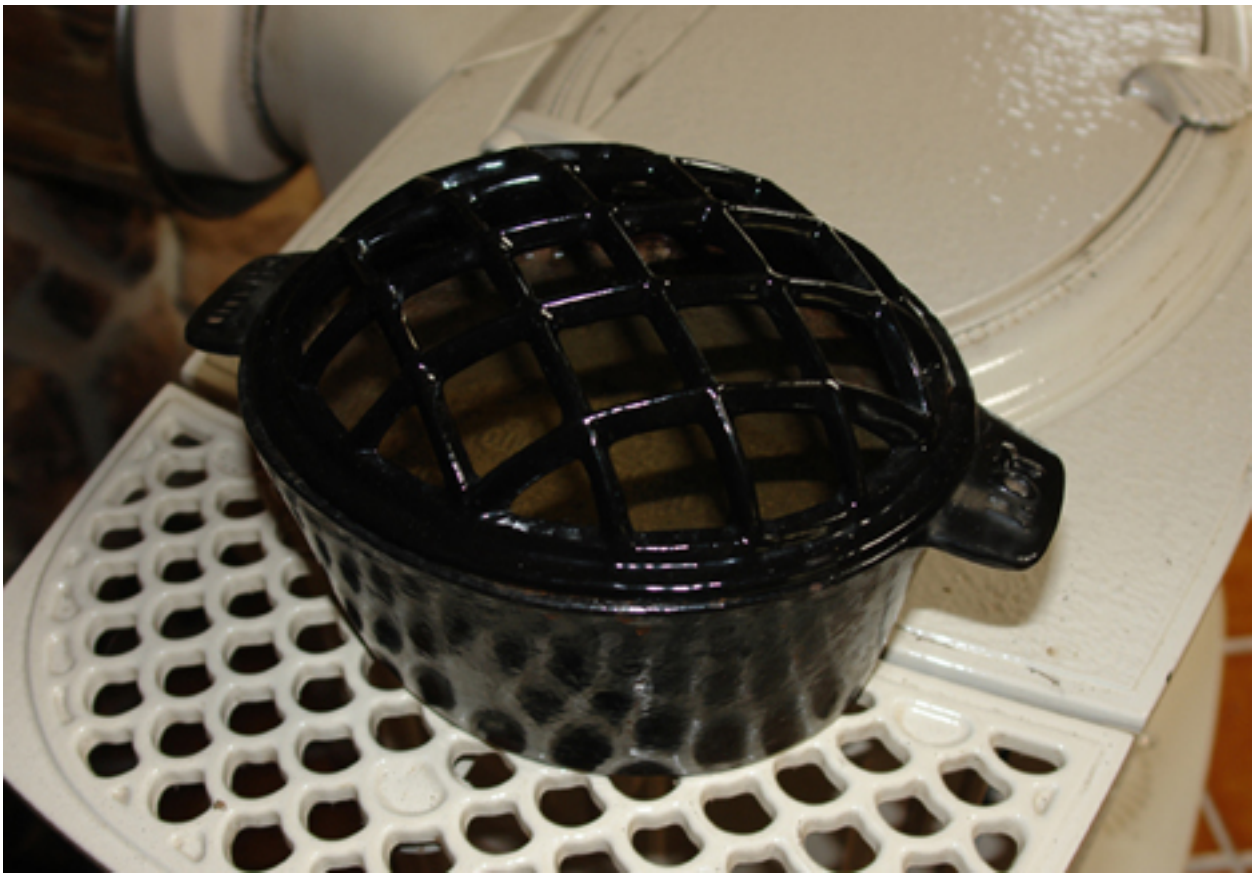



Effect of Relative Humidity on Virus Transmissiblity.[12]

The coronavirus is a type of influenza virus. In general, these virus infections roar into existence during the cold winter months when humidity levels are at their lowest and then die in the spring when humidity levels return back to normal.

To implement this finding, two elements are required. The first is an inexpensive but accurate temperature/humidity thermometer so you can measure the indoor humidity levels and the second is a means of interjecting moisture into the air. Here is an example of the first item:


The second element contains a range of options. Most individuals will use a humidifier. A whole house humidifier can range from $100 and up. Room humidifiers can cost around $50. But then there are a multitude of other options. I heat with a wood stove and a simple pot that you periodically fill with water will do the trick.



At work, I would bring in an empty spray bottle and fill it up with tap water. I would set it for fine mist and whenever I detected the humidity levels were extremely low, I would pull it out of my desk and spray the area I worked in.

One could also use an ultrasonic essential oil diffuser. Just bring it into work and plug it in. Fill it with water and turn it on. It will bring up the humidity levels near your desk.


At home, one could even put a pot of water on the stove and bring it to a boil to add moisture to the house or use a teapot. There are many simple ways to insert moisture into the air.

## B. AIR PURIFICATION

The second approach is to kill the microbes freely moving about in the air using ultraviolet light. This can be done using off-the-shelf far ultraviolet (UVC) technology that has been around since mid-20th century. It is commonly referred to as ultraviolet germicidal irradiation, (UVGI) technology.

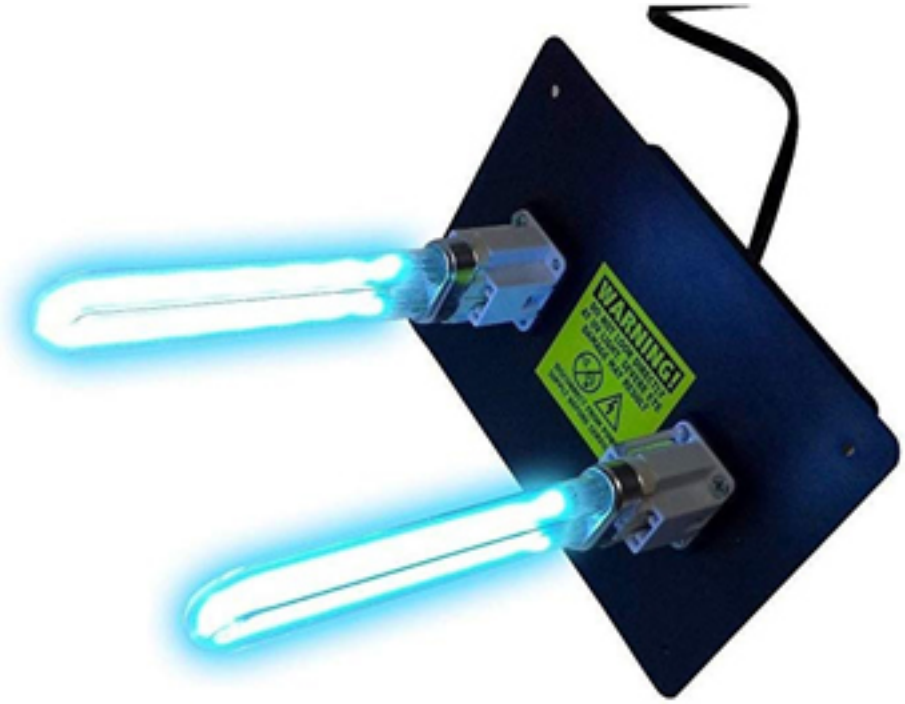
UVC radiation (100nm-290 nm) has germicidal properties. UVC light is well known to possess a very powerful germicidal effect capable of inactivating a wide spectrum of microorganisms, such as viruses, bacteria, protozoa, fungi, yeasts, and algae, through the formation of pyrimidine dimers, the photoproducts of genetic materials.

Some homes and business currently are equipped with this technology built into their HVAC (heating, ventilation, and air conditioning) systems. Ultraviolet light can eliminate many types of fungi, bacteria, germs, viruses and pathogens. This dramatically reduces the level of the viruses within buildings.[8]

The goal of such UV tools isn't to kill every virus. The human body has a built-in immune system that deals with most of the threat. But it is important to not overload the immune system and allow the body time to develop the antibodies that will be needed to provide protection. So basically the desire is to minimize the exposure level. This technology will reduce the number of viruses by a number of orders of magnitude so that the remaining viruses can be killed by the immune system.

Bacteria and viruses are of micrometer or smaller dimensions; far-UVC can penetrate and inactivate them. Research studies demonstrated that far ultraviolet UVC radiation can efficiently inactivates airborne aerosolized viruses, with a very low dose of 2 mJ/cm$^2$ of 222-nm light inactivating >95% of aerosolized H1N1 influenza virus.[9]

This is an example of the technology. This product is in the $90 price range. It is designed as an add-on to an existing HVAC system.




The product description reads: *All our units have an electronic ballast and has a sight glass to see if unit is on. All Our bulbs are germicidal UVC and put out 253.7NM, which means that they are 99% efficient on a single pass. Installation is very easy 15 min, just cut 2 holes of 1 inch in your duct-work (template included) slip the lamp inside and attach the aluminum strips (included in box) and plug it in, 9 ft cord.*

But modifying the ductwork in the HVAC system and inserting and sealing in a UVA light inside is not the only method available. Some homes do not have HVAC systems. Mine is an example, because I heat my house with wood all winter. I have been doing it for 40 years. And I really like the warmth that my wood stove provides. It is even a bit romantic. There are a variety of air purifiers on the market and some of them have incorporated UVA technology. These units normally purify a room rather than an entire house.

Some of these air purifiers have HEPA air filters that filter out 99.97 percent biological material efficient down to 0.3 microns of particle size. Similar to an N100 face mask. But then they combine this with UVA system that destroys airborne bacteria, mold spores, and viruses. Other air purifiers incorporate the array of HEPA, Ionic, UV and Carbon filters.

So I went out and ordered a small unit so I could experiment with it. Put an order in *Amazon* on Monday and it arrived on Friday. It is small enough that it could easily fit next to my desk at work and not blow a circuit breaker in the process.

It is a small little unit. I put a Coca-Cola glass next to it for size comparison. The unit includes an electrostatic collecting, ozone filter and activated carbon filter, powerful UV lamp and a negative ionizer. It uses very little electricity to operate - 600 milliamps. The fan is whisper quiet. I tried it out last night. I noticed that my breathing was a little better when I slept. I suspect that the unit reduced some of the smoke particles from the wood stove.

To sum this up - In My Humble Opinion (IMHO), the coronavirus threat can be controlled. You have to step out of the box a little to understand the process. In a way it falls under Engineering. When people are crammed close together in cruise ships, airplanes, buses,

offices, schools, hospitals, nursing homes, jails, etc. the virus is spread from one person to the next rapidly. Much of the virus contamination occurs in an indoor setting. If you can properly control the indoor environment you can minimize the transmission rates. There are two ways to dramatically lower the infection rate in the indoor environment. These are to control the indoor relative humidity levels between 40 and 60 percent. The second is to destroy the ability of the virus to infect a person. One method is to use far ultraviolet light (UVC) to destroy the virus.

**Both these techniques combined together IMHO will bring this pandemic to its knees.**

## V. PNEUMONIA VACCINATION

From my perspective, there is another option to protect one from dying from the coronavirus infection or even the common flu. Many of the most vulnerable, in this case the elderly and individuals with compromised immune systems should be vaccinated against pneumonia.

Several years ago, I looked at minimizing my vulnerability to pneumonia. Immunization shots became available for this condition, so I had my wife and I immunized against this vulnerability. It took 2 immunization shots and they needed to be spaced apart by a year. What drove me in this direction were the following facts:

* Older people have higher risk of getting pneumonia, and are more likely to die from it if they do. For U.S. seniors, hospitalization for pneumonia has a greater risk of death compared to any of the other top 10 reasons for hospitalization.
* Pneumonia is the most common cause of sepsis and septic shock, causing 50% of all episodes.
* Pneumonia can develop in patients already in the hospital for other reasons. Hospital-acquired pneumonia has a higher mortality rate than any other hospital-acquired infection.

My wife and I were over 65 years and in the high-risk group, so I felt the immunizations was a good idea. The shots were a little more severe than most immunization shots but not near as bad as the immunizations for the Bubonic Plague, which I was immunized against when I was a young adult.

While the Centers for Disease Control and Prevention estimate that about 900,000 Americans get pneumococcal pneumonia every year, most pneumonia-related deaths occur in adults age 65 and older. The American Lung Association reports that in 2013, those in the 65+ age group accounted for about 85 percent of all pneumonia deaths. Seniors are at greater risk because the immune system weakens as the body ages and cannot fight off infections as well. Seniors are also more likely to be suffering from other illnesses that make their body more susceptible to infection.

There are two vaccines for pneumonia that protect against different types of pneumonia bacteria.[10]
* Pneumococcal conjugate vaccine (PCV13 or Prevnar 13®) protects against 13 of the most common bacteria that cause pneumonia.
* Pneumococcal polysaccharide vaccine (PPSV23 or Pneumovax23®) protects against an additional 23 types of pneumonia bacteria.

Seniors should receive one dose of PCV13 first, followed by one dose of PPSV23 at least one year later.

There is currently no vaccine to prevent 2019-nCoV infections. That is a true statement but I feel it is misleading. Most individuals that are dying from this coronavirus die because they contract pneumonia. They are elderly, have compromised immune systems; and the coronavirus pushes them over the cliff. So

a proactive approach is to become immunized against the real threat - pneumonia. (Maybe the time is short to become immunized for this particular coronavirus, but there will always be another coronavirus down the road, and why not be prepared.)

I am no expert in this field, just an observer, but it seems like if one was immunized against the pneumonia bacteria that one might catch the coronavirus, and be sick like Hell for awhile, but not get pneumonia and thereby survive to live another day.

As a pulmonologist, Dr. Seheult stated, "The patient will get the flu, then they will feel better and then all of a sudden they will get a bacterial infection that will move in and rapidly decompensate the patient and these patients dies from an opportunistic bacterial infection." [11]

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