Masking the Truth

Caoimhín P Connell
Forensic Industrial Hygienist
May 2, 2020

Listening to people speaking in shops and walking around reflects what the general population is thinking.

The latest discussions have been surround "masks" and their use.

The Zeitgeist

The lesser informed Joe-on-the-street speaks about how they're wearing masks to protect them against the "coronavirus." Then a "better informed" individual corrects them and explains with aplomb that they are wearing a mask to protect everyone else. Neither position is correct.

Invariably, if someone who actually knows the dynamics and limitations of respiratory protection and the dynamics of exposure and infection control foolishly enters the discussion to provide facts, they are ridiculed by the mask wearers who engage in "*argumentum ad populum*" and responds with "*…everybody knows that wearing masks saves lives and prevent the spread of the virus.*"

Perhaps everybody does think that, but does that make it true? Usually the response to that question is "*Well, the CDC and other authorities say it's so, and therefore it must be true."*

But does the CDC actually say that? On Thursday, February 27, 2020, the Director of the US Centers for Disease Control (CDC), Dr. Robert Redfield, told Congress "*There is no role for these masks in the community."*

On Friday, February 28, 2020, Dr. Michael Ryan, the executive director of the health emergency program at the World Health Organization stated, *"There are limits to how a mask can protect you from being infected,"* he added *"The most important thing everyone can do is wash your hands, keep your hands away from your face and observe very precise hygiene."*

These sentiments were repeated one day later by the US Surgeon General, Dr. Jerome Adams who said (his emphasis): *"Seriously people- STOP BUYING MASKS! They are NOT effective in preventing general public from catching #Coronavirus,…"* Dr. Adams went on to say (the emphasis is mine): *"The best way to protect yourself and your community is with everyday preventive actions, like staying home **when you are sick** and washing hands with soap and water, to help slow the spread of respiratory illness. "*

These thoughts are not found in just the public sector, Dr. Jeffrey Klausner, Professor of Medicine and Public Health at University of California, Los Angeles stated *"I don't think there's any evidence that wearing a surgical mask has any benefit to protect someone in general from exposure, or from being infected,…"* Dr. Klausner went on to say that wearing masks is kind of a psychological tool to be used to keep awareness at an elevated level, but offering no actual protection to people or the community. "*So it may be kind of an awareness tool, but in terms of its direct benefits, there's no data."* Dr. Klausner added.

Similarly, Dr. William Schaffner of the Vanderbilt University School of Medicine, told CNN that buying masks is a "psychological thing" rather than a viable defense. *"The coronavirus is coming, and we feel rather helpless,"* he said. "*By getting masks and wearing them, we move the locus of control somewhat to ourselves.*"

Dr. Lisa Brosseau, a national expert on respiratory protection and infectious diseases and former professor at the University of Illinois at Chicago, and Dr. Margaret Sietsema an assistant professor at the University of Illinois at Chicago and also an expert on respiratory protection stated:

> *We do not recommend requiring the general public who do not have symptoms of COVID19-like illness to routinely wear cloth or surgical masks because:*
> *There is no scientific evidence they are effective in reducing the risk of SARS-CoV-2 transmission.*
>
> *Sweeping mask recommendations—as many have proposed—will not reduce SARS-CoV-2 transmission, as evidenced by the widespread practice of wearing such masks in Hubei province, China, before and during its mass COVID-19 transmission experience earlier this year. Our review of relevant studies indicates that cloth masks will be ineffective at preventing SARS-CoV-2 transmission, whether worn as source control or as PPE.*

We don't have to go very far from home to find other experts saying the same things. Today, (May 2, 2020) I was out diligently violating the "stay-at-home orders (and simultaneously violating the mandatory "face mask" rule) at a large super-store. The masked couple next to me were struggling to free a shopping cart when the woman grabbed her mask and ripped it off and said *"I don't need this stupid thing!"*

I calmly said to her "Ma'am, I'm a scientist, and an expert in respiratory protection and you really don't need a mask." She locked me in her gaze and said "*I'm a registered respiratory nurse, and I KNOW I don't need this mask!*"

Airborne Transmission vs. Airborne Transmission

In the "Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)" The World Health Organization states something that some people may find confusing: "*Airborne spread has not been reported for COVID-19 and it is not believed to be a major driver of transmission based on*

available evidence; however, it can be envisaged if certain aerosol-generating procedures are conducted in health care facilities."

Well, demmit… is it airborne or isn't airborne?

When discussing transmission of a disease, there is a difference between "airborne transmission" and "droplet transmission."

At the moment, the general thought is that SARS-CoV-2 is not transmitted via the airborne route, but is transmitted via airborne droplets. Airborne droplets are not necessarily the same as "airborne transmission."

"Aerosols" come in a wide range of particle sizes. When we speak or sneeze or cough, we produce droplets which enter the surrounding air. In the late 1800's Carl Flügge demonstrated that microorganisms could exist in those droplets and could result in the transmission of those infectious entities to another person. The term "Flügge particles" are those particles that are large enough to drop out of the air quickly.

These are the droplets that are the primary concern for Health Care Workers (HCW) since they are in close proximity with infectious (or potentially infectious) individuals, and their risk of infection is therefore higher. Except, importantly, initial data from China, as reported by the WHO, showed that even among HCW, the primary route of infection occurred in the home of the HCW, not in the occupational setting.

William F. Wells further differentiated between large and small droplets (I have a copy of Wells' classic 1955 book, "Airborne Contagion and Air Hygiene"). Wells thus makes the distinction between airborne transmission and droplet transmission. A discussion of particle size issues are found in my earlier write-up titled "Size Matters" (http://www.forensic-applications.com/misc/Size_Matters.pdf). Droplets larger than about one micron (µm) can be generally thought to fall to the ground within a few seconds in still air. Or, similarly, they can impact on another surface before eventually evaporating.

Aerosolized droplets smaller than about one µm may evaporate more quickly, leaving behind the infectious particles that were contained in that droplet along with a soup of proteins, salts and other biological goo.

These remaining constituents are the droplet nuclei. They can remain airborne for hours and they can be transmitted for very long distances- much further than the 6 feet endorsed by the other anti-scientific fad "social distancing" or even further than the some 26 feet recently reported by a group of researchers at MIT.

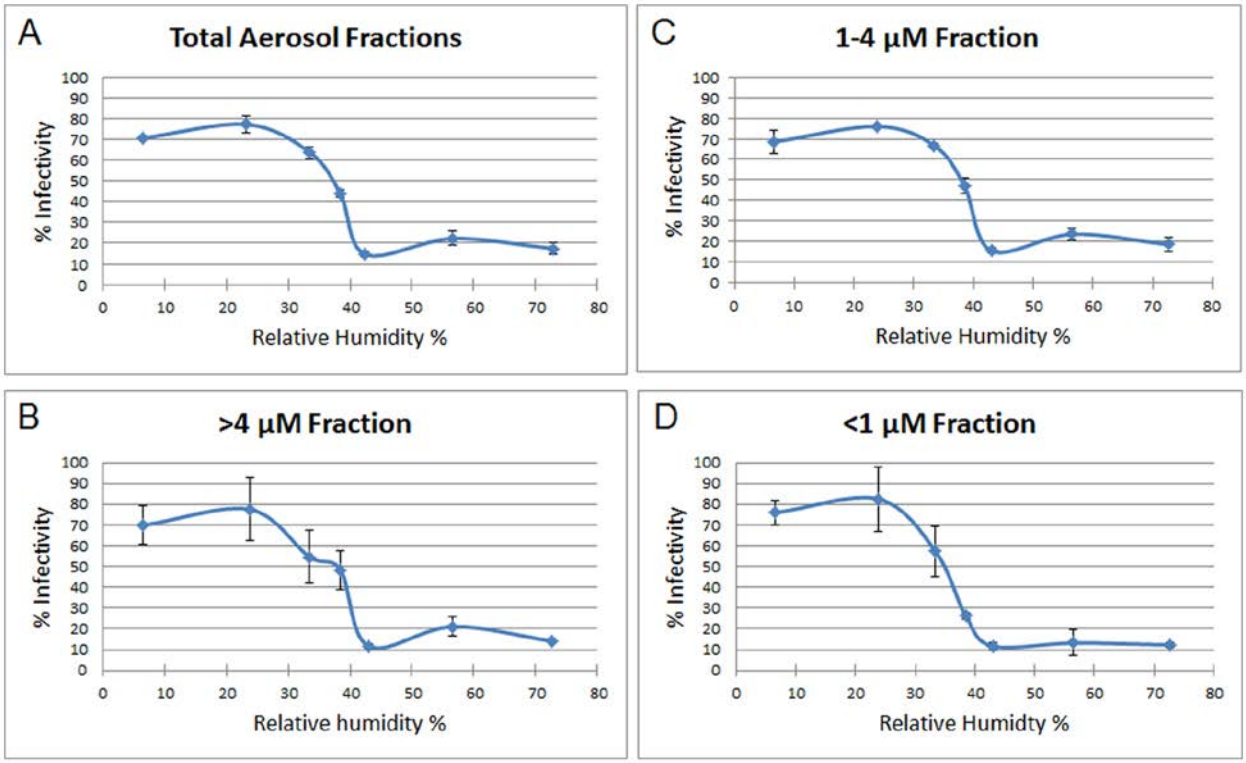
Now, I hate to be gross, but… actually, that's a lie - boys like being gross - according to the WHO-China joint report, viral shedding was reported via the fecal from some patients, and viable virus has been identified in a number of cases. So what happens during the violent "whoosh!" of a toilet full of poop being flushed? Yep… a massive cloud of aerosols. I will leave the rest up to your imagination.

The problem that we run into is that the working definition of an "aerosol" is a term of art, and may be used by different professionals in different ways.

Humidity and Longevity

Knowledge concerning the lability of viruses in the air, and viability of bacterium in the air is not new. In 1934, the Massachusetts Department of Public Health[1] reported that humidity was an important factor in the longevity of organisms that were experimentally aerosolized. They found the same reduction of *E. coli* from a spray humidified air conditioned room after 35 minutes, as in 165 minutes when the spray humidifier was turned off (they controlled for other alternative explanations). They went on to discover that when they increased the relative humidity from 45% to 90% under the same conditions, they could double the reduction of viable airborne *E. coli*.

Soon it was reported[2] that low relative humidities favored longevity for other airborne bacteria. Shortly thereafter (1943), researchers[3] working with the Ectromelia Orthopoxvirus (mousepox) and Orthomyxovirus (influenza) reported that the influenza virus lost virulence faster in humid air than in air with lower relative humidity. In what some may consider "porcupine science" other, more recent (2013) researchers[4] have confirmed the relationship between relative humidity (or absolute humidity) and virulence:



Noti JD, Blachere FM, et al. (2013)

I have not seen anyone address the ramifications of these issues in the current hysteria surrounding the SARS-CoV-2 pandemic. Especially in states like my State, Colorado, with very low atmospheric relative humidity. I challenge my colleagues to think about aerosol dynamics and what is going on at the user-mask interface.

Imagine if you will, the rare case of an infectious individual in public who is capable of shedding the disease. The individual coughs (or speaks or sneezes), releasing infectious aerosols. That person is wearing a "mask" (and it really doesn't matter if it is one of the useless home-made bandanas, or one of the more sophisticated, (but equally useless) loose fitting NIOSH Approved N95 masks). That infectious person coughs/sneezes/speaks into the mask. A certain, portion of the aerosols are trapped in the filter matrix of the mask. Those aerosols trapped in the fabric of the mask WILL dry out (some faster, some slower, depending on the relative humidity in the ambient air and what the wearer does with the mask).

Watch these people with their "masks;" they reach up and touch the mask to put them on; they reach up and remove it to speak on their phone, they reach up and put it back on,, they reach up to adjust it, they handle vegetables, they put the mask on their forehead to scratch their nose, they shove the mask up to take a drag off their cigarette, they touch the mask to put the mask around their neck (which is where the really cool people wear a mask), they take the mask off and put the mask in a purse (with their money and credit cards they are going to give to someone to touch), etc.

Whether it is an infectious person or not, as a person wears that mask throughout the day (and then wear the same one tomorrow and the next day, and the next), they are concentrating the infectious particles inside and outside that mask. Every time a person inhales through that useless mask, to some extent, they are filtering out a portion of the airborne contagion around them (including TB, poliovirus, influenza virus, measles virus, not to mention an host of bacteria). Each time they manipulate the mask (which, being a keen observer, I watch with great amusement the wearing practices of "mask-wearers), they are disturbing that infectious reservoir which they are then sharing at highly concentrated particle numbers with you, me, and all the other mask-wearing people.

But such is not the case of healthy people who are smart enough to not wear masks. They are not walking around town developing their own private collections of pathogenic microorganisms.

Now, imagine the infectious person coughs, speaks or sneezes without a mask. Often, those infectious particles are going to be released and dispersed into the air (a large percentage will be quickly diluted and carried away on drafts) and the remaining aerosols will fall out of circulation.

Which is the better situation?

Considering that the wearing of masks absolutely does not protect the general public wearer, what really is the percentage of infectious carriers that concern us? Being infected by SARS-CoV-2 is not the same thing as being sick or even being infectious. With only 0.4% of the US population being a confirmed case, what percent of those are actually infectious? Certainly less than 0.4%.

The general wearing of masks is not only lacking in any kind of evidence to justify its practice, but there is all the reason to conclude that the general wearing of masks has an higher probability of making matters worse.

Most of my colleagues know my unchanging position on the use of (useless) masks, in fact four years ago I wrote a piece on such practices (see http://www.forensic-applications.com/misc/Respirators_on_Pig.pdf), and so two nights ago when I was rummaging through a house looking for a dead body that had been there for about six days, some of my colleagues were surprised to see me wearing an half-face APR with HEPA cartridges. When asked why I was wearing a "mask," I answered blithely - "…endotoxins, m'lad, endotoxins."

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[1] Massachusetts State Department of Health, *Annual Report for 1934* (1934, pp 166-167)

[2] Williamson AE, Gotaas HB, *Aerosol sterilization of airborne bacteria* (Industrial Medicine 1942, 11- 40-45)

[3] Edward DG, Elford WJ, et al *Studies on air-borne virus infection* … (Journal of Hygiene, 1943, 43:1010)

[4] Noti JD, Blachere FM, et al *High humidity leads to loss of infectious influenza virus from simulated coughs* PLoS ONE 8(2): e57485. https://doi.org/10.1371/journal.pone.0057485

Other references available on demand.