RWI

RUNWITHIT Synthetics

Alberta, Canada

# Why Masks Should Be Mandatory

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Synopsis

- To stop the transmission of COVID-19 the WHO recommends individuals stay a distance of 1 meter apart.

- To stop the transmission of COVID-19 the CDC advises individuals stay a distance of 2 meters apart.

- Both the CDC & WHO's recommendations are based off a scientific study conducted in 1930. At this time scientific equipment could not detect sub-micron aerosol particles. COVID-19 particles are sub-micron particles, which makes social distancing recommendations inaccurate.

- Current studies have found that COVID virus aerosol particles can actually **travel 8 to 20 feet.**

- COVID-19 aerosol particles can remain in the air for up to **15 minutes** after expulsion.

- RWI conducted an experiment, which found **if the entire population wore masks, it would reduce the risk of COVID-19 exposure by 90%.**

- The IZA Institute of Labor Economics conducted research that showed **making masks mandatory reduced COVID cases by 40%**.

- The bottom line is that masks work.
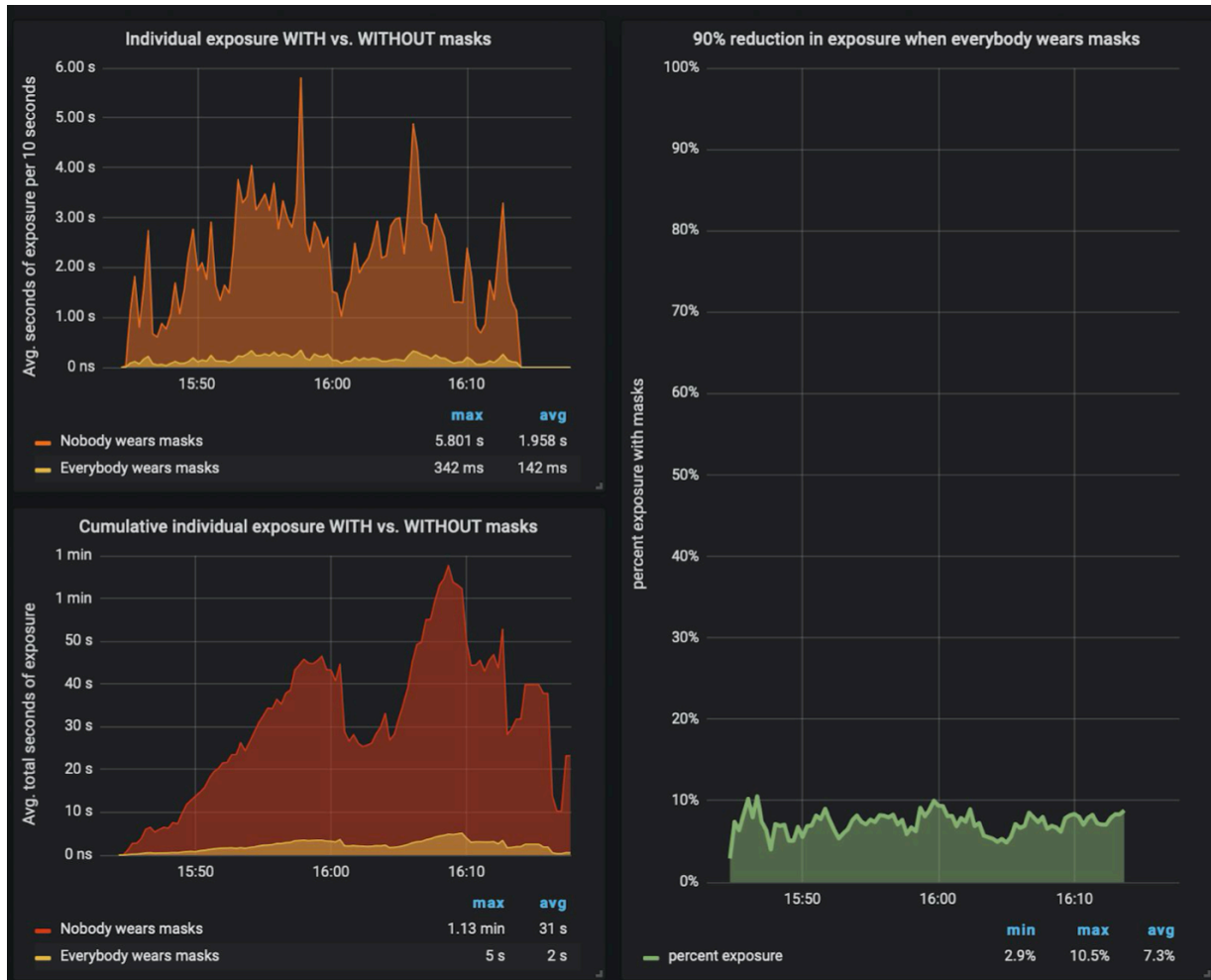
Employers have a responsibility to provide their employees with a safe working environment. However, an office environment now presents employees and employers with varying levels of exposure risk to COVID-19. It is now a necessity for employers to ask questions as to how they will keep their employees safe in a post COVID-19 world.

From the beginning of the pandemic it has been stressed repeatedly that social distancing is crucial to "flatten the curve" by keeping transmission rates of the virus low. To minimize spread, the World Health Organization (WHO) recommends that individuals stay a distance of 1 meter apart. The Centers for Disease Control and Prevention (CDC) advises that to maintain proper social distance, individuals keep a distance of 2 meters apart. However, even if proper social distance is maintained, studies have shown that once the virus is expelled into the environment it can remain in the air for up to 15 minutes.

Droplet Size	Time in Air
100 μm	10s
20 μm	4min
10 μm	17min
5 μm	62min
< 3 μm	Does not settle

What has not been as widely discussed is the fact that the WHO and CDC social distancing guidelines are based off a study conducted in 1930. In this study, aerosolized particles were investigated and said to travel 6 feet from the source. Current studies from reputed sources have used advanced technology to detect the movement of submicron aerosol particles, the size of COVID virus, and they found that aerosol particles can actually travel 8 to 20 feet.

Activities that cause the spread of aerosol particles include: Sneezing, coughing, talking loudly, breathing heavily, flushing the toilet, sharing touch surfaces like doorknobs or faucets etc. In fact, it is known that sneezing causes particles to travel at 200mph and coughing causes them to travel at 50mph.

It is also known that the bigger the droplets, the faster they settle and shorter the time they hang in the air. Coughing for example, produces larger droplets compared to breathing or talking. At the bottom of the page, there is a breakdown of aerosol spreading activities and their transmission rates.

The research conducted on transmission rates below, highlights the importance of having flowing air instead of stagnant air in a room. We breath to survive and in a post COVID-19 office environment, people will be breathing collectively and aerosols potentially containing COVID will accumulate, increasing exposure risk.

Which brings us to the question: how do employers keep their employees safe in a post COVID-19 work environment?

Aerosol Spreading Activities & Transmission Rates					
Action	**Droplet #**	**Size**	**Velocity**	**Movement**	**Virus Particles**
Sneezing	30,000	Small (>10 μm)	200 mph	Travel fast & long distances	200 million/min
Coughing	3,000	Mostly large (< 10 μm) & some small	50 mph	Most settle & some travel fast	200 million/min
Breathing	50 - 5,000	—	Low	—	20-33 particles/min
Bathroom	—	—	—	Aerosolized particles stay in the air or settle on surfaces	—

It has been suggested that a simple and effective way employers can minimize their employee's exposure risk to COVID-19 is to implement social distancing guidelines and wear a mask while in the office. However, information distributed through public health channels on wearing masks has been mixed and unclear and the question of to mask or not to mask has remained.

As a starting point, RWI conducted an experiment to measure the difference masks can make in exposure rates if individuals wear masks during their morning commute.
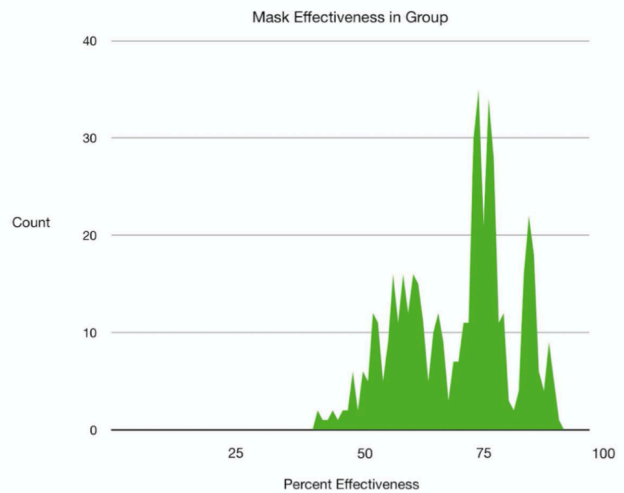
We began by creating a Synthetic Environment of Downtown Edmonton and added a diverse group of 500 individuals walking to work over a 40-minute period. We then ran multiple scenarios in our Synthetic Environment varying the total number of individuals wearing masks.

Each person and group in our model navigated their way to work while attempting to distance from surrounding people through the regular turns, constraints, walk lights, and other obstacles encountered on the walk to work. The group represents a group typical to a workplace: each with an age, gender, health, movement capability, and even a name.

Mask Effectiveness in Group

Mask Types, Proportion, Distribution

Mask	Pct	Min	Med	Max	Number
N95	10	90	92.5	95	50
Single Use	25	65	75	85	125
Surgical	20	80	85	90	100
Home made	20	30	60	85	100
Knock-off	15	40	60	70	75

We also took into account the varying types of masks individuals wear. The mask types included: N95, single use, surgical, homemade and knock-offs. Every time people were closer than 2m or 6ft from each other for a certain period of time, an exposure event was tagged. This is how the percentage of exposure risk was measured in seconds.

RWI's Synthetic Model showed that if the entire population wore some type of mask, **the risk of COVID-19 exposure decreased by 90%**.

Furthermore, a field study conducted in Jena, Germany, by the IZA Institute of Labor Economics showed that **making masks mandatory reduced COVID-19 cases by 40%.** Comparing countries like South Korea, Taiwan and Singapore to the rest of the world, like the USA and UK, where masks were not mandated during the peak period of the pandemic, it is evident that masks make a vast difference.

Even if an individual has a mask that is only 50% effective and you have a mask that is only 50% effective, it means that you both are collectively reducing our exposure risk by at least 75%.

The bottom line is that masks work. The question is no longer whether to mask or not to mask. **The question is why are there not more people wearing masks while navigating in a post COVID-19 world?**