How Wearing a Mask Can Prevent Airborne COVID-19 Infection

and why you should take it seriously...

The Cause Map™ diagram below is an effective tool for providing a thorough explanation for how airborne contact can result in a COVID-19 Infection. The *Cause Map* diagram also shows how a face mask provides two ways to reduce risk of transmission.

1. Wearing a mask can reduce risk of infection from inhaling respiratory droplets suspended in air.

2. Wearing a mask can significantly mitigate the spread by those people who are already infected. Even low quality masks have been shown to catch small droplets. This application of the mask is extremely critical given that an infected person who is asymptomatic may not be aware that they are spreading the virus.

Cause Mapping® Method

Why?   *Because...*

Effect	←	Cause

Basic Cause-and-Effect Relationship

Solution: Avoid going out into public if possible

Person in area (public location)

AND

1. **Solution**: Wear a mask or facial covering to reduce risk of exposure from virus suspended in air

Target
Exposed face of Person in vicinity (location)

Unprotected face

Viral Shedding

Person infected has minor symptoms or is asymptomatic

Evidence: CDC estimates that 25% of those testing positive were asymptomatic.

AND

COVID-19 ability to shed in spite of being asymptomatic

Unaware of infection and ability to shed

Evidence: Study found the viral load that was detected in asymptomatic patients was similar to that in the symptomatic patients.

Infected person breathes, sneezes, or coughs

AND

Virus projected into air on respiratory particle

2. **Solution**: Wear a mask or facial covering to prevent spread of respiratory particles

Viral projection not contained

Face not covered

AND

Solution: More testing

Lack of adequate testing

Evidence: 2013 Study is the first to provide data showing that using a surgical mask can reduce the release of even the smallest droplets containing infectious virus.

Solution: Create a makeshift mask with scarf or other clothing

Limited # of masks available

Introduction of the virus into your system is not sufficient for infection. The viral load (# of viruses) AND the ability of the virus to connect with the cells is also required. The AND relationship indicates that all three causes are required for an infection to take place.

Virus contact with cells in Respiratory Tract

Virus containing particles inhaled through nose or mouth

AND

Hazard
Virus suspended in air via respiratory particles (for significant time and distance)

Evidence: MIT research has shown that small droplets carrying coronavirus can travel up to 27 feet in the air.

AND

Virulence

COVID-19 Infection in respiratory tract

Virus is "live" (able to infect)

AND

Safety Impact

Severity of infection (potential for complications)

AND

# of viral pathogens inhaled

Size of airborne droplet (smaller can contain more virus?)

Evidence: For comparison, a study of the influenza virus revealed that small respiratory particles (< 5μm) from the breath of flu patients carried 8.8 times more flu virus than the larger respiratory droplets.

Evidence: Compared with upper respiratory tract infections, lower respiratory tract infections are associated with increased severity, morbidity and fatality. *2020 Study*

Virus able to penetrate deeper into respiratory tract

Size of airborne particle carrying viruses (<10 μm)

Evidence: Deposition models have concluded that particles <10 μm in diameter are more likely to penetrate deeper into the respiratory tract.

While many experts believe that airborne infection is not the most common source of transmission, the consequence of an airborne infection can be more severe given its ability to penetrate deeper into the respiratory tract and affect the lungs.

Ability to remain Airborne

Size of droplet carrying viruses (<10 μm)

Type of respiratory activity - cough, sneeze, breath

AND

Rapid evaporation of respiratory droplets

Dry air, Low humidity

Length of time and distance travelled in air

Evidence: A study from 2013 of the influenza virus revealed that even a 50μm droplet can completely lose all of its moisture within 0.5 seconds. (Environmental factors like relative humidity can affect the rate moisture loss).

Air movement, ventilation