
Covid-19s Challenges to Infection Control Dogma

Dr. Michael Klompas

Healthy People, Healthy Saskatchewan

The Saskatchewan Health Authority works in the spirit of truth and reconciliation,
acknowledging Saskatchewan as the traditional territory of First Nations and Métis People.



www.saskhealthauthority.ca

Michael Klompas

Hospital Epidemiologist in Boston

Dr. Klompas works on enhancing public health surveillance. He reviews electronic health information in hospital surveillance for nosocomial complications and community surveillance for infectious diseases and chronic conditions.



Discussion focus

Current insights into respiratory virus transmission (Droplet versus aerosol versus airborne) and the potential impact of the current evidence on IPAC programs and the future of respiratory protection. In light of what we have learned regarding COVID 19 transmission, will IPAC recommendations in the future change?

During his introduction he questioned early WHO recommendations related to what we know now

For the first year of the Pandemic, COVID 19 was believed to spread primarily via large respiratory droplets generated by symptomatic individuals.

Early in the COVID 19 pandemic, the WHO recommended the use of surgical masks, gowns, gloves and N95 respirators for AGMPs. Based on what we know now; would these recommendations be the same?

A study out of the UK identified that 5 to 15% of COVID cases in hospital are acquired while in hospital. Why is this occurring???

Dogma

Public Health view during pandemic

# 1 Dogma	Most respiratory viruses are spread by droplet
# 2 Dogma	Surgical masks provide good protection of respiratory viruses under most conditions
# 3 Dogma	Selected procedures increase aerosol generation, therefore these procedures merit a higher level of respiratory protection. AKA respirators, airborne infection isolation rooms.

Dogma – defined by Merriam Webster dictionary

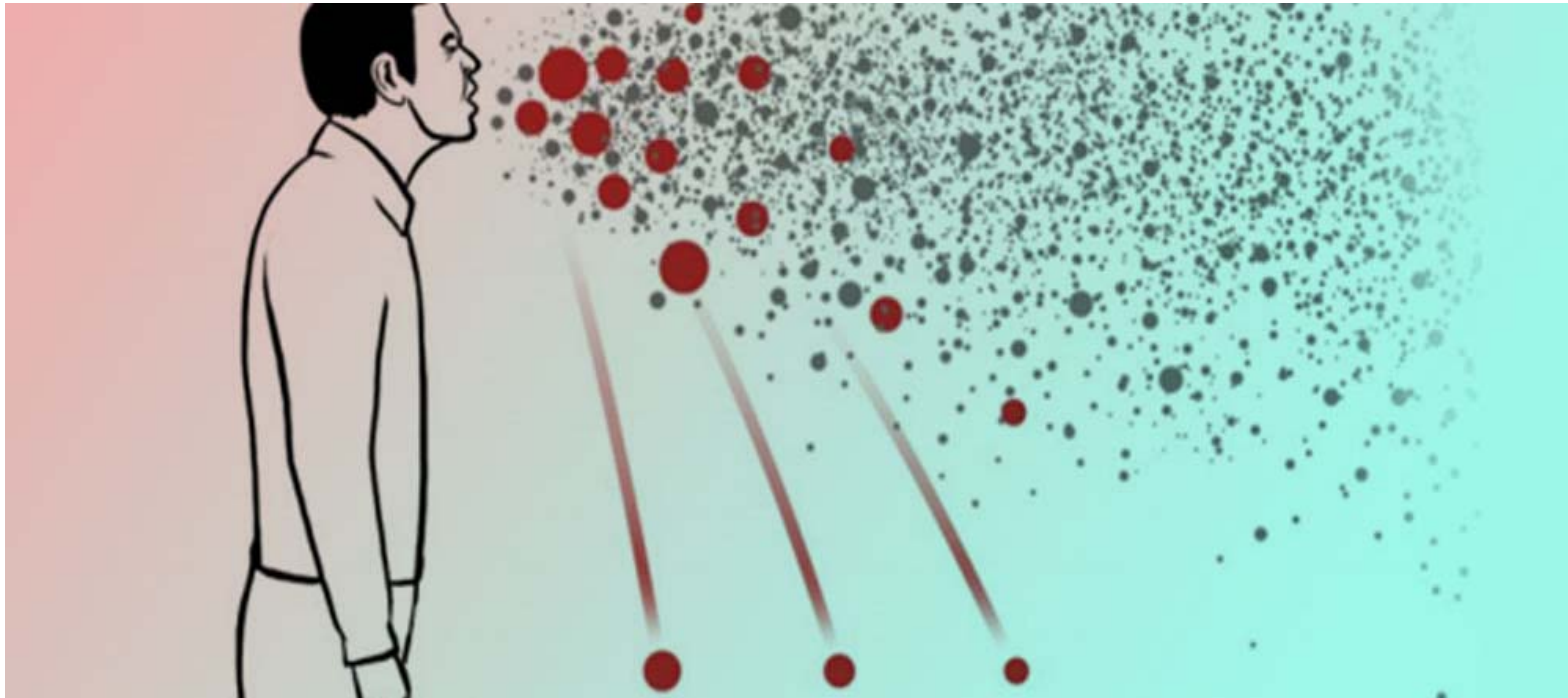
“something held as an established opinion”

DOGMA # 1

Most respiratory viruses are spread by droplet

Transmission

Droplet/aerosol



Most respiratory viruses are spread by droplet

Dr. Klompas referenced three studies

Study of individuals that were quarantined in rooms for two weeks. They discovered that individuals outside of the quarantined room were becoming ill. The theory was that the virus continued to accumulate in the room and spread outside the room when the door was opened. Therefore, if the virus was transmitted by droplet how did it move into the hallway and turn into the next room.

Study of roommates of COVID patients in a hospital.

The roommates in hospital rooms were 7 feet apart and had a curtain between them. After a medium time of eighteen hours of exposure 39% of roommates were infection with the COVID virus. If the virus is indeed spread by droplet; how did this occur?

Most respiratory viruses are spread by droplet

Study (done in China) of transmission of COVID 19 virus on a train.

There was a 3 ½ percent risk if you sat next to the infected person. If you were one seat away your risk decreased by half. If you were 2 seats away there was a 0.4% risk. The shorter the trip the less risk of becoming ill. The quality of ventilation affected risk of becoming ill. The greater the turn over of air the less chance of becoming ill.

The study concluded that where you sat on the train determined your chances of getting COVID.

Most respiratory viruses are spread by droplet

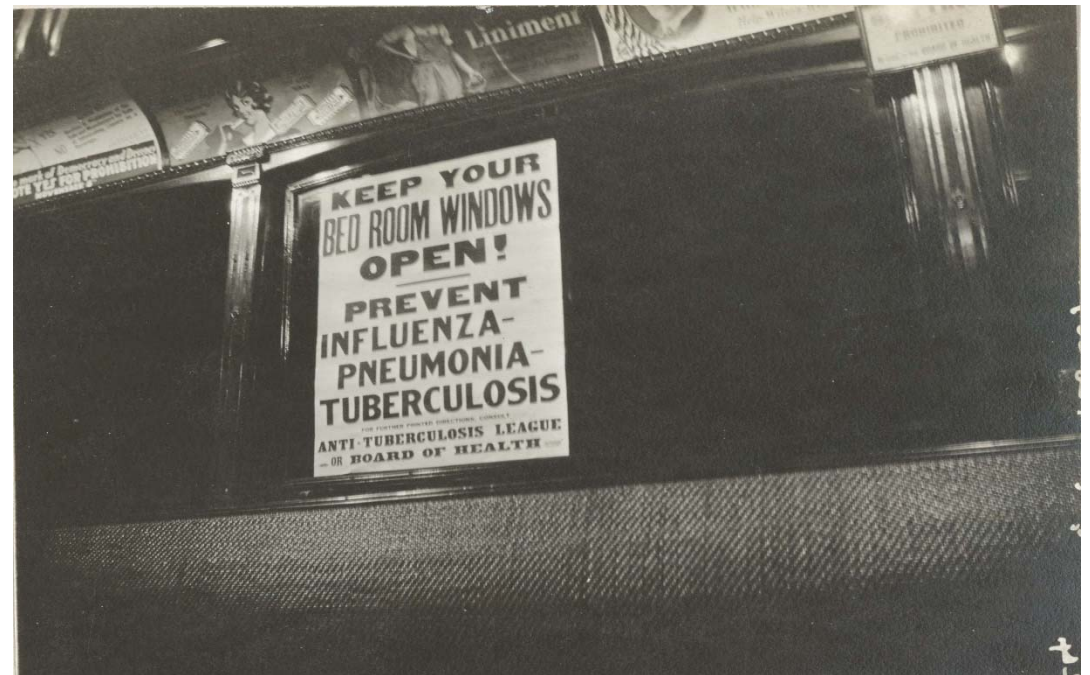
Key findings....

- Risk of becoming infected with the virus is dependent on the proximity to the infectious person
- There is an increased risk of transmission of the virus when the infected person has a high viral load (and is asymptomatic)
- Asymptomatic and pre-symptomatic people were found to be the greatest risk group of transmission
- The risk of transmission increases with activities like exercising, shouting and coughing
- Poorly ventilated air increases the risk of transmission of the virus

Most respiratory viruses are spread by droplet

Risk found to be dependent on air quality and amount of virus in the room

11/08/1918 – images – Spanish Flu start was February 1918.



DOGMA # 2

Surgical masks provide good protection of respiratory viruses under most conditions

Surgical masks provide good protection of respiratory viruses under most conditions

Animal study – exposure to COVID virus

Hamsters exposed to virus. There was no mask filter – 67% infection rate. The source wore a mask filter– 17% infection rate. The exposed wore a mask filter– 34% infection rate

Guinea pigs. There was no mask filter– 80% infection rate. Mask filter when exposed to the virus – 40% infection rate.

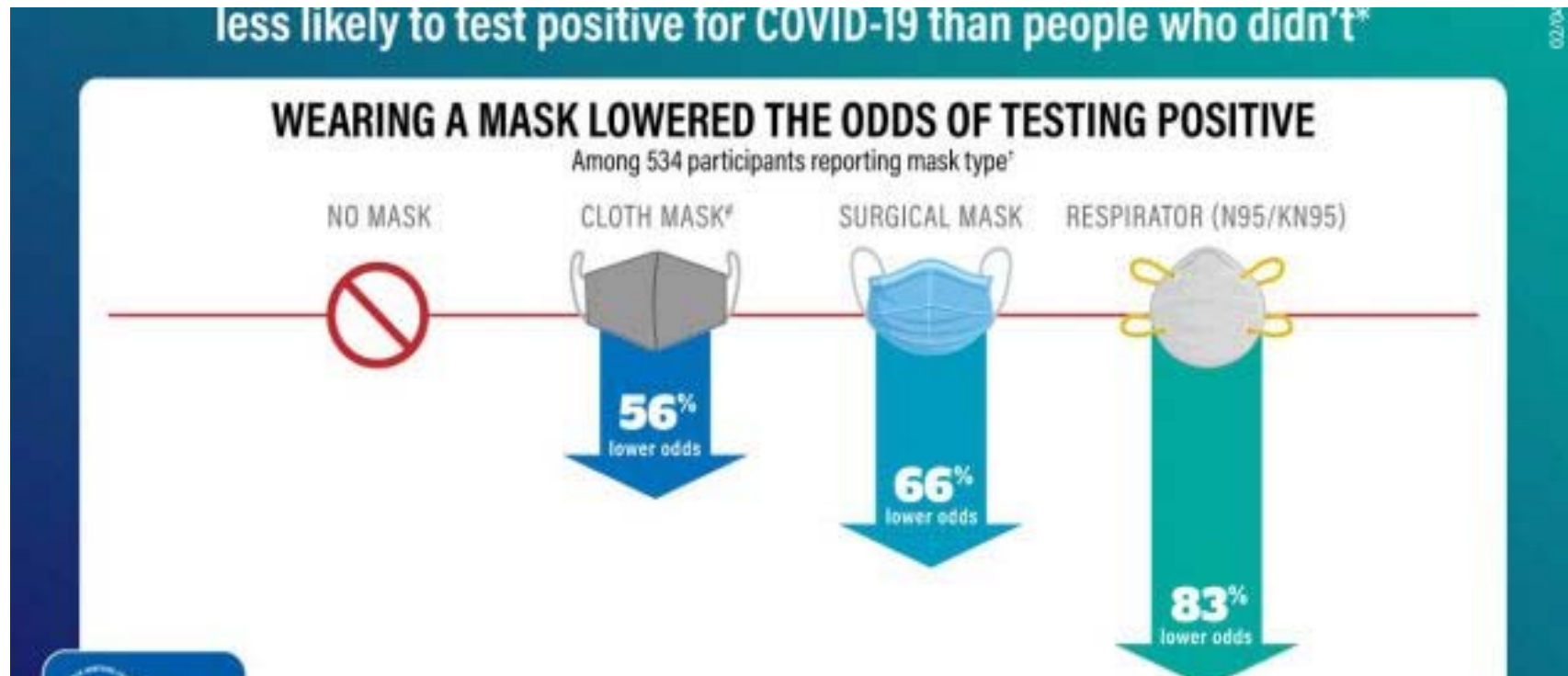
Human study – exposure to tuberculosis

South Africa study – tuberculosis

If patients were wearing a mask when exposed to tuberculosis – 40% infection rate. If patients not wearing a mask when exposed – 77% infection rate

CDC

Effectiveness of Face Mask or Respirator



Surgical masks provide good protection of respiratory viruses under most conditions

Key findings

- **Greatest transmission occurs outside of hospital. When we see an increased transmission in the community there will also be an increased transmission in healthcare facilities. Employees in healthcare should mask during community surges.**
- **The protection afforded by face coverings is proportional to filtration and fit: surgical masks reduce viral exposure by 40 to 60%, and fitted N95 respirators by 95 to 98%.**
- **Many patients with severe symptoms of COVID are due to inflammation rather than active viral replication and therefore the sickest patients are often the least contagious (exception of some immune compromised patients with prolonged shedding).**
- **Clusters of infected healthcare workers were found outside of COVID wards. The rationale for this is that patients with COVID are infectious when they are asymptomatic and their viral load is the highest. In this scenario the care provider would not be taking precautions (wearing a mask) as the patient is asymptomatic. Patients who feel well and have a high viral load in a poorly ventilated room can be a super spreader.**

DOGMA # 3

Selected procedures increase aerosol generation, therefore these procedures merit a higher level of respiratory protection. AKA respirators, airborne infection isolation rooms.

Selected procedures increase aerosol generation, therefore these procedures merit a higher level of respiratory protection. AKA respirators, airborne infection isolation rooms.

- **A measurement of the omissions during AGMP procedures revealed nothing**
- **While there was a six fold increase in COVID infections noted with the procedure tracheal incubation; it was found to be due to the close proximity to a symptomatic patient not the procedure itself.**
- **There was an increased risk of transmission noted with nebulization. This was related to the fact that the nebulization provided the vehicle to aerosolize the virus.**

Dr. Klompas asked the “should healthcare workers mask”?

He stated that while COVID today is not the COVID of 2020. This is a result of vaccination (herd immunity), natural immunity and better treatments. Nevertheless, we are still seeing deaths due to COVID.

We need to look at who these patients are that are dying from COVID???

They are the elderly (over 70 years) and the immune compromised. As this population represents our hospital patients, he concluded that healthcare workers should be masking when there is a surge of cases in the community as this is when we see increased transmission in healthcare.

The risk of COVID 19 transmission is over a continuum

There is higher risk when:

- There are increased cases in the community
- The person has a high viral load
- There is poor air quality
- There is increased exposure
- There is close proximity
- There is lack of masking
- There is lack of vaccination

Risk is over a continuum

There is a lower risk when

- Low community incident
- Low viral load
- Decreased exposure
- Increased distance
- Lack of symptoms
- Good air ventilation
- Mask on provider, mask on patient
- vaccination

In Summary

-
- Respiratory viruses come in a range of sizes and not one or the other (droplet and aerosol). Most are aerosol
 - Surgical masks decrease transmission by half – they do not eliminate the risk
 - Most AGMPs do not generate aerosols
 - People over 70 and immune compromised are at most risk. This population includes our hospitalized patients
 - Outdoor transmission risk is low unless close face to face exposure

