

COVID-19's Challenges to Infection Control Dogma

Webber Trainings
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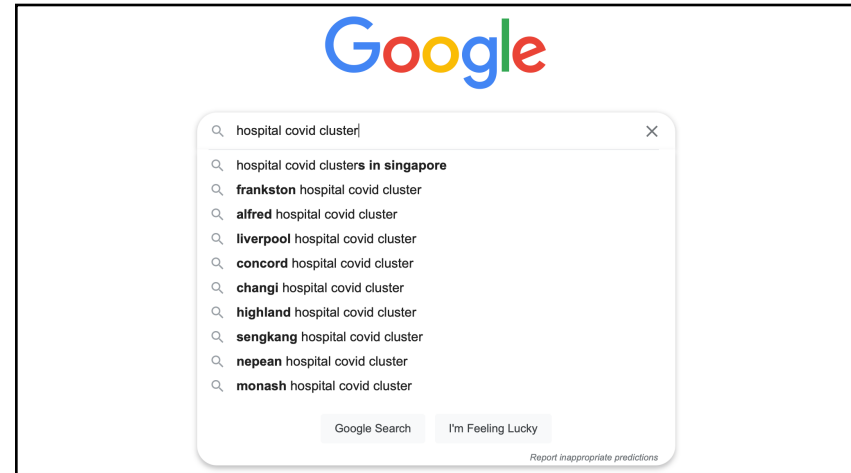
Disclosures

- **Grant funding**
 - Centers for Disease Control and Prevention
 - Massachusetts Department of Public Health
 - Agency for Healthcare Research and Quality
- **Royalties**
 - UpToDate Inc.

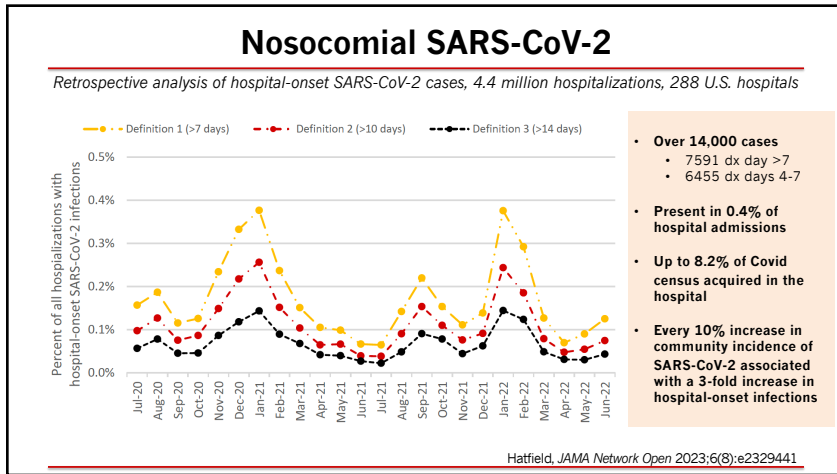
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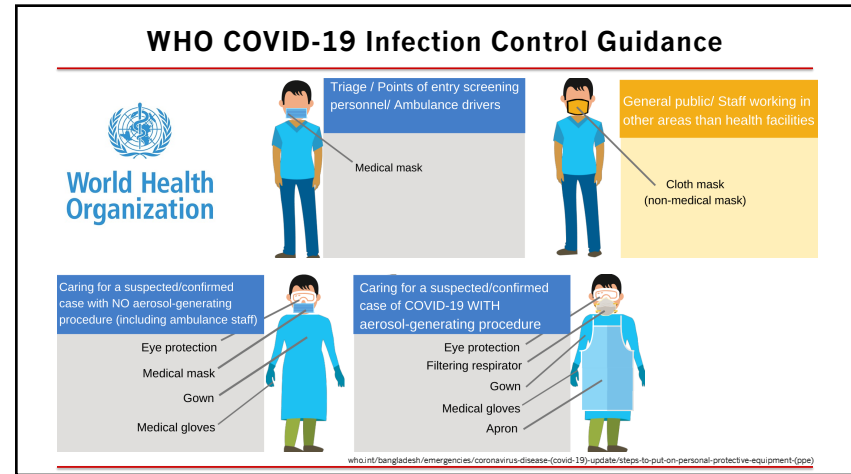
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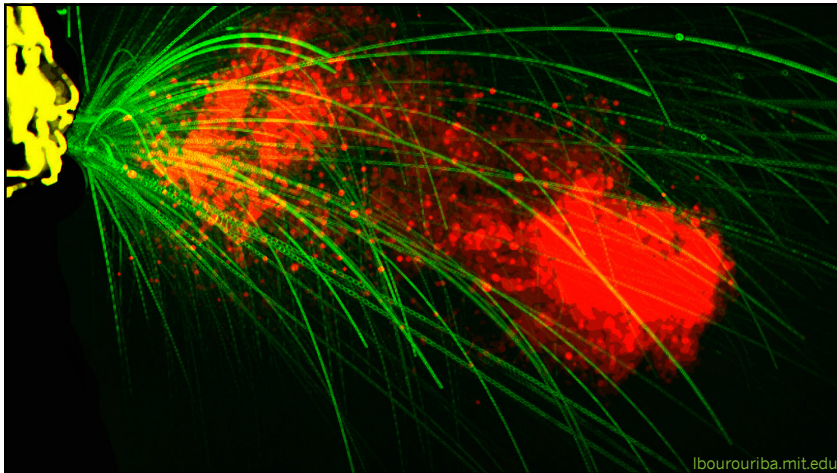
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- ### Traditional Dogma
- **Most respiratory viruses are spread via droplets**
 - Short-range spread = droplets; long-distance spread = aerosols
 - **Surgical masks provide adequate protection against most respiratory viruses under most conditions**
 - **Selected procedures increase aerosol generation; these procedures merit higher level respiratory protection**
 - N95 respirators, airborne infection isolation rooms

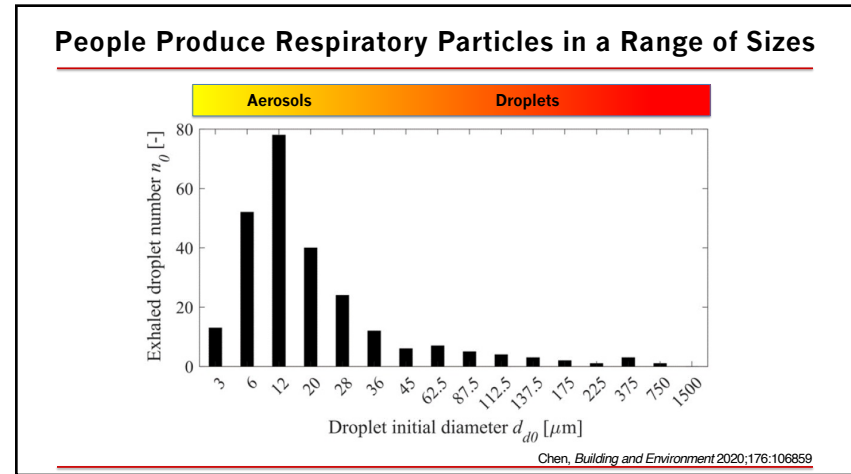
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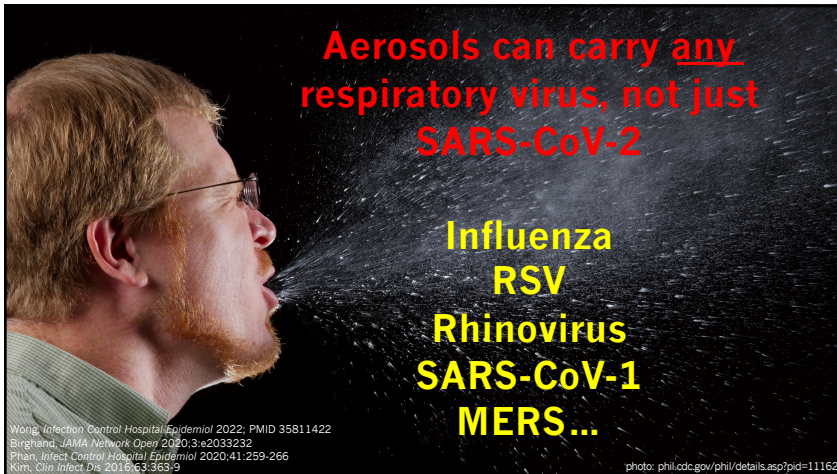
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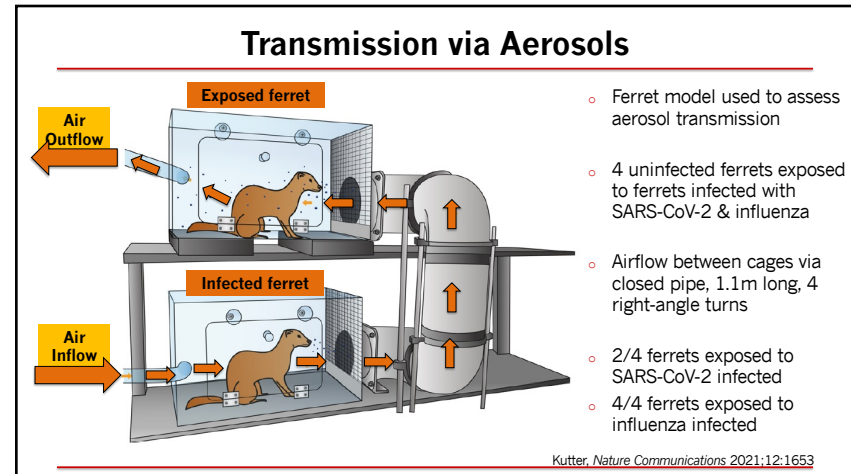
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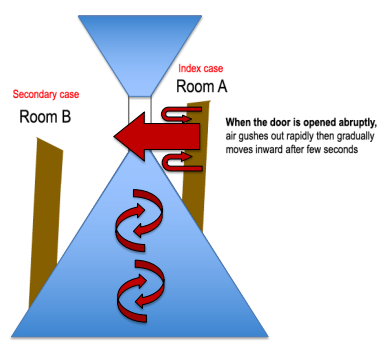


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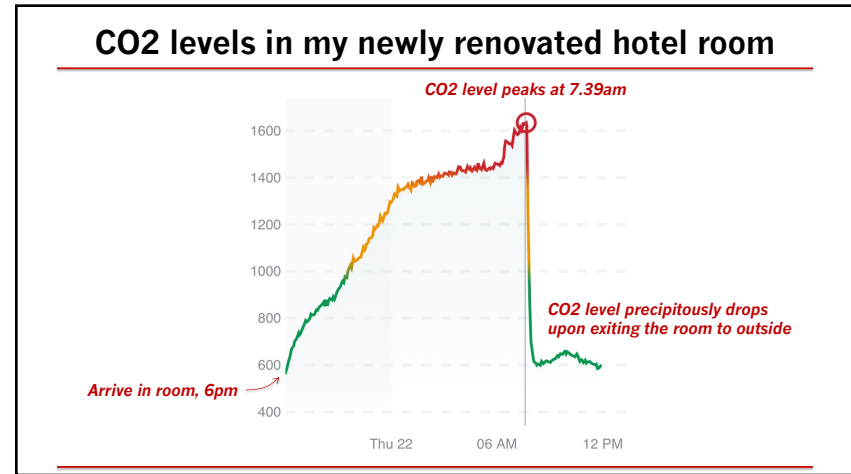
Aerosol Transmission in Humans: Quarantine Hotels



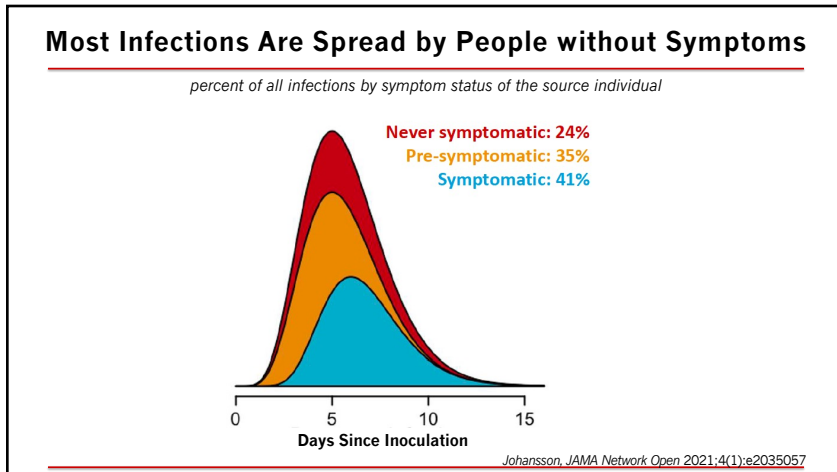
- Multiple case reports of transmission between unrelated travelers staying in quarantine hotels in Hong Kong, Singapore, New Zealand...
- Quarantine hotels have very strict rules in hotels requiring guests to stay in their own room at all times (video monitoring)
- Transmission presumed due to
 - Prolonged dwell time in poorly ventilated room leading to high concentration of virus in the air
 - Escape of virus laden air into stagnant corridors when room door is opened
 - Entry of virus laden air into nearby rooms when their residents subsequently open their doors

Wong, Lancet Regional Health – Western Pacific 2022;18:100360

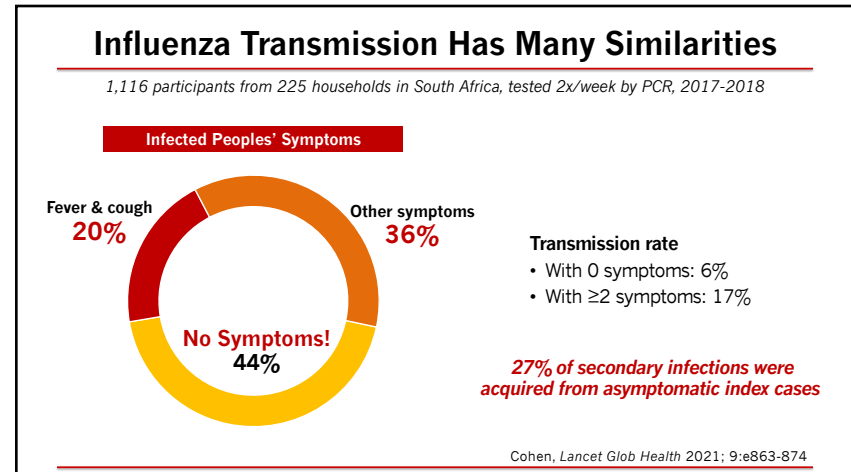
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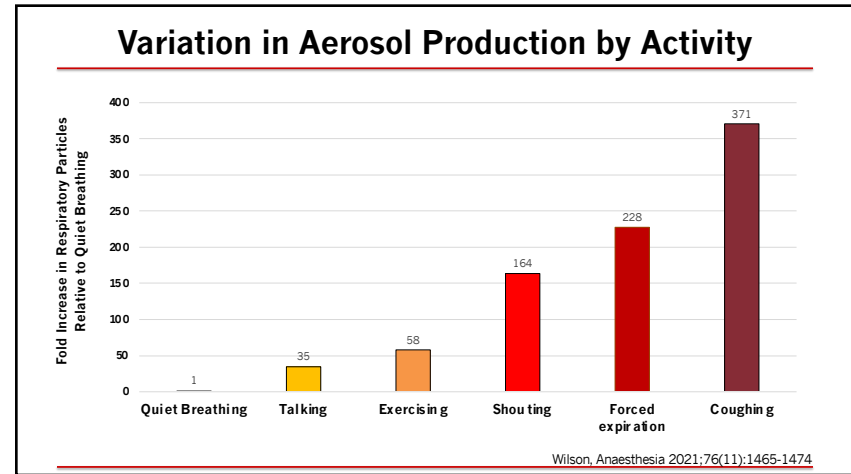
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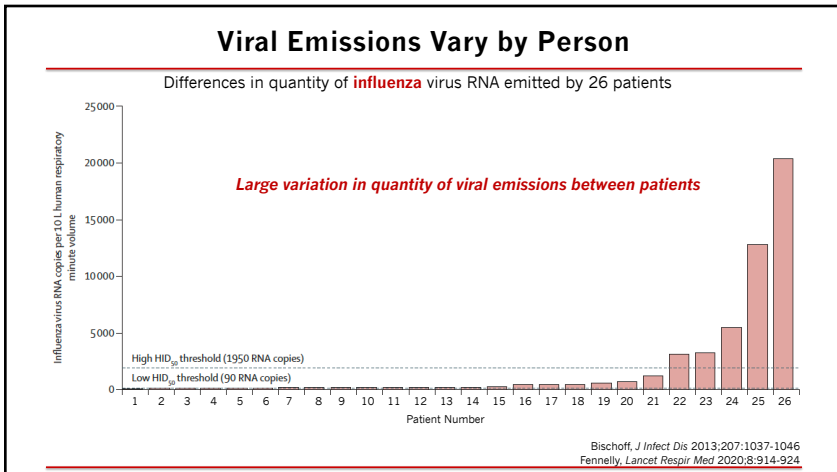
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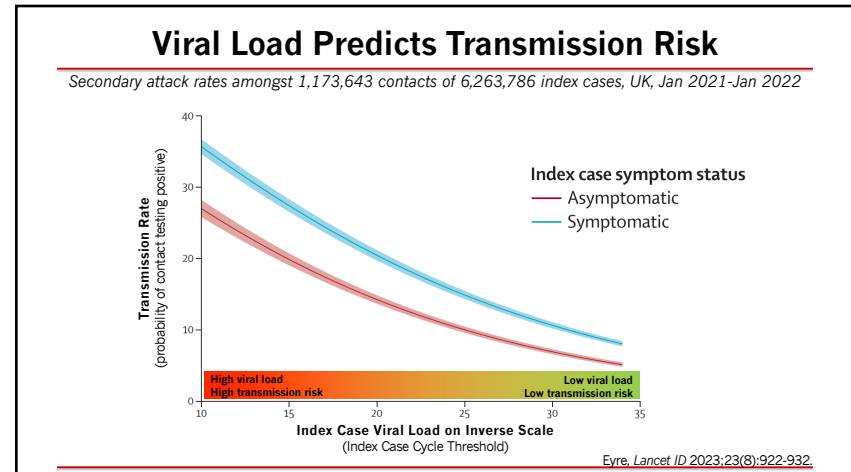
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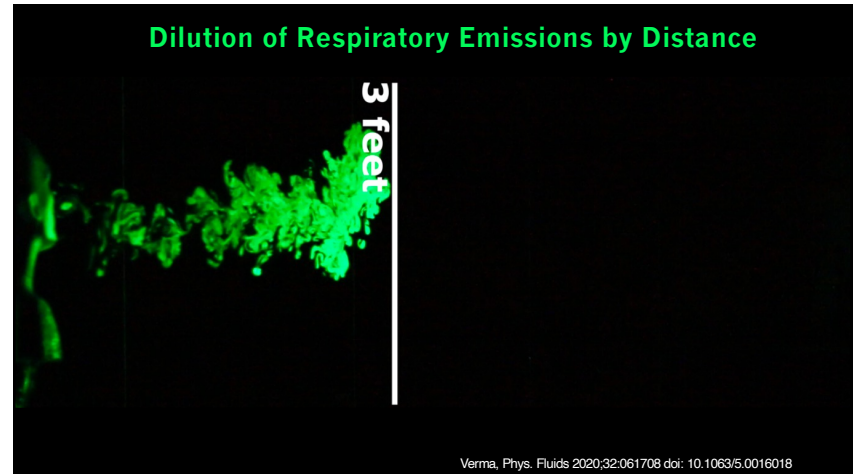
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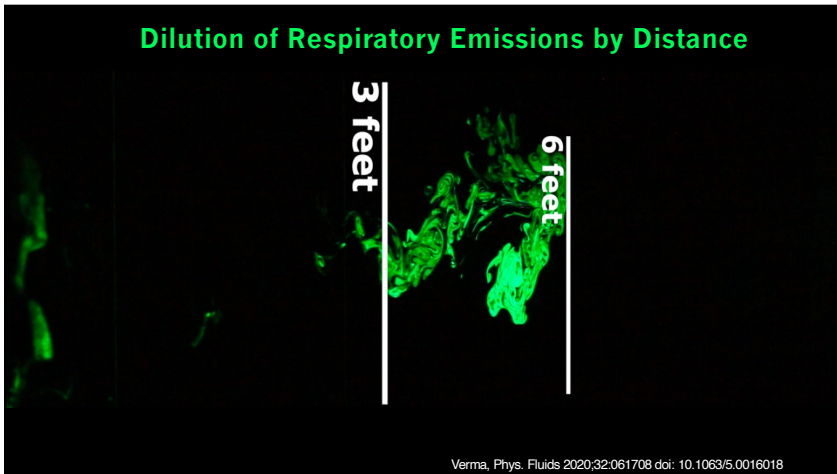
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If SARS-CoV-2 is spread by aerosols, how come we rarely see transmission over long distances?

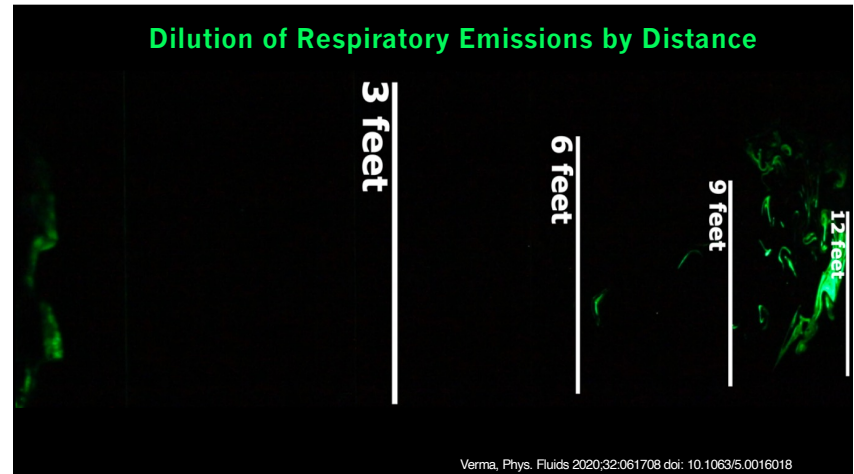
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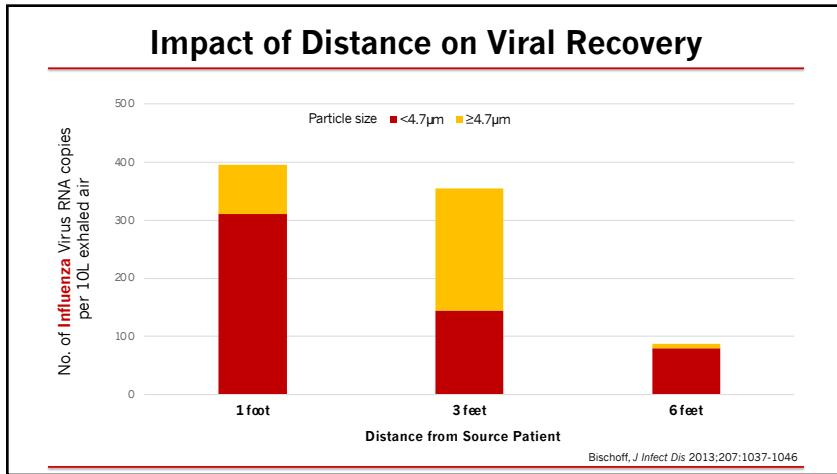
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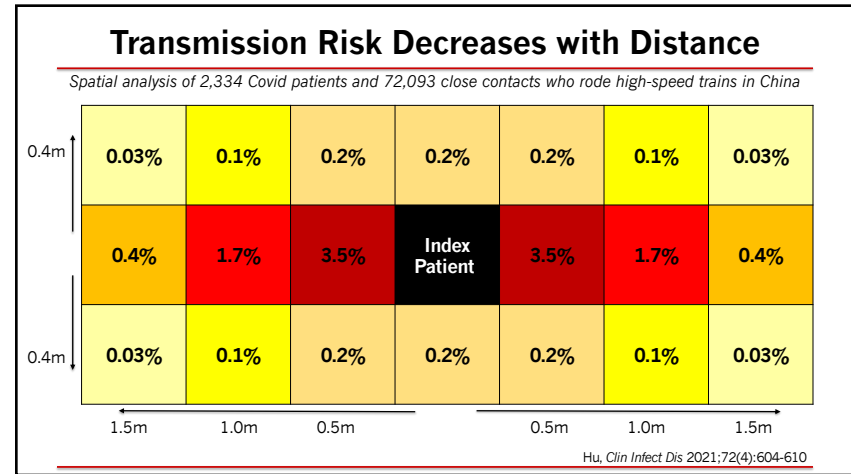
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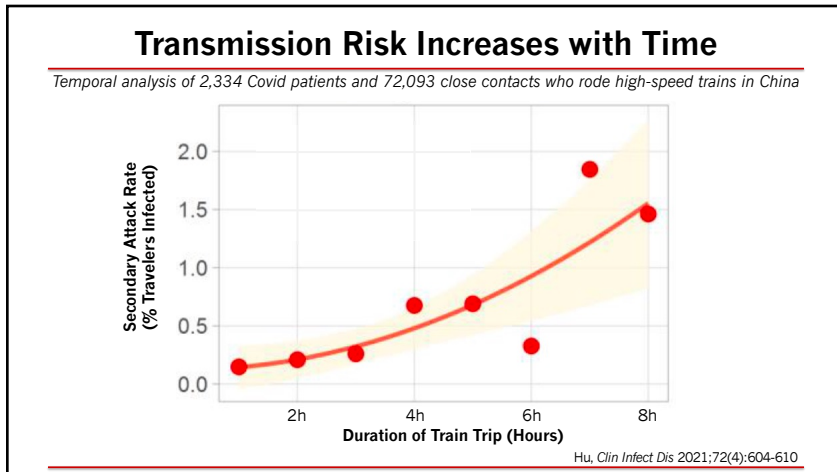
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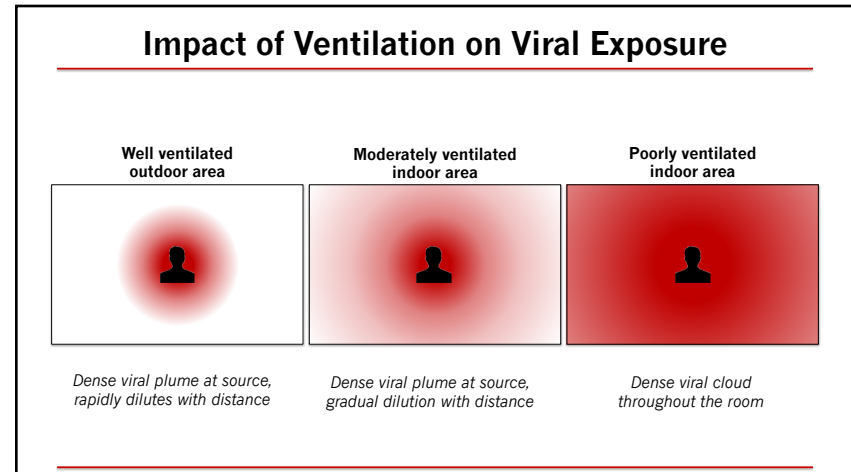
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Transmission Risk in Shared Hospital Rooms

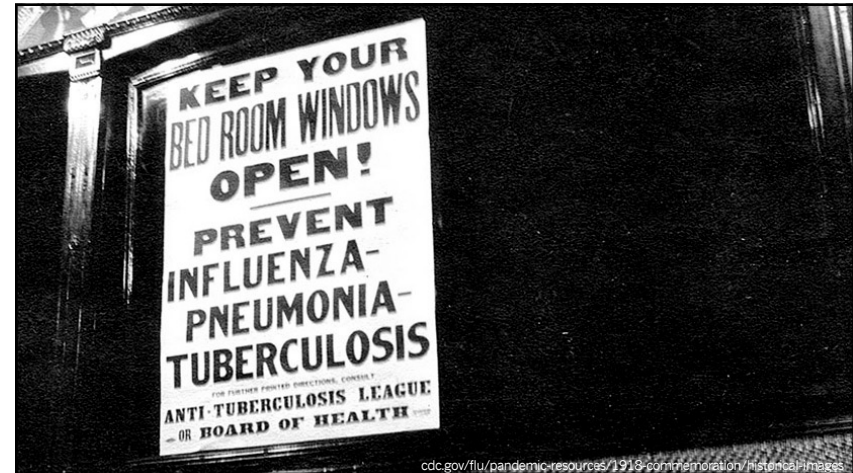


**39% of exposed roommates
were infected**

- Brigham & Women's Hospital, Sept 2020 - April 2021
- 25 patients diagnosed with SARS-CoV-2 after admission to a shared room
- 31 potentially exposed roommates
- Roommates ~7 feet apart and separated by a curtain
- ≥ 6 air changes per hour
- Median duration of exposure: 18 hours (IQR 12-47 hours)
- 12/31 (39%) roommates infected

Karan, *Clin Infect Dis* 2022;74(6):1097-1100

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cdc.gov/flu/pandemic-resources/1919-commemoration/historical-images

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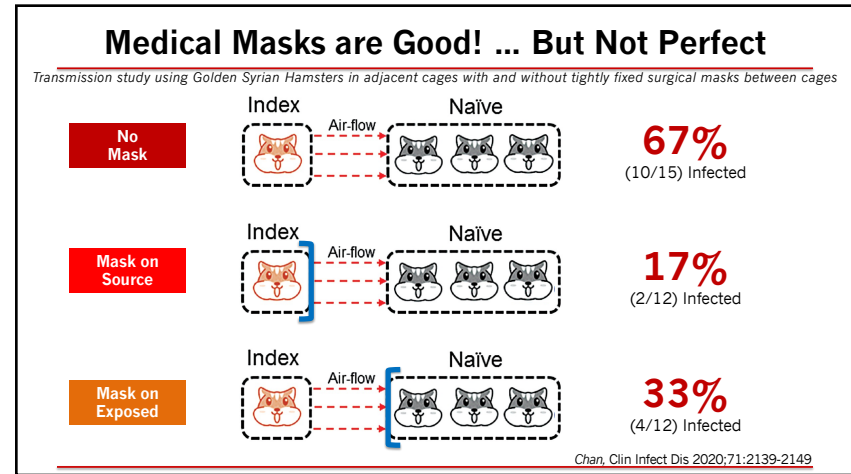
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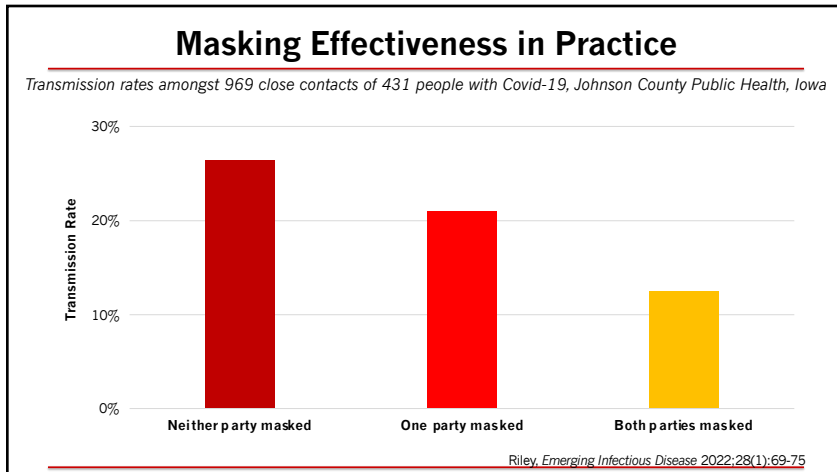
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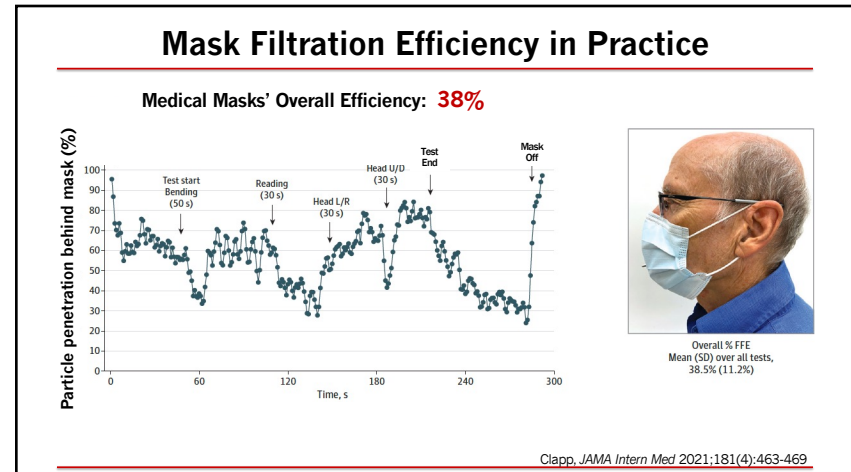
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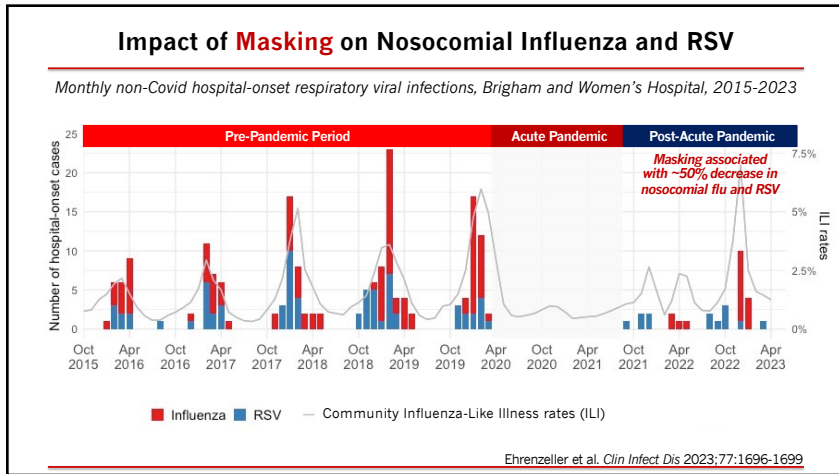
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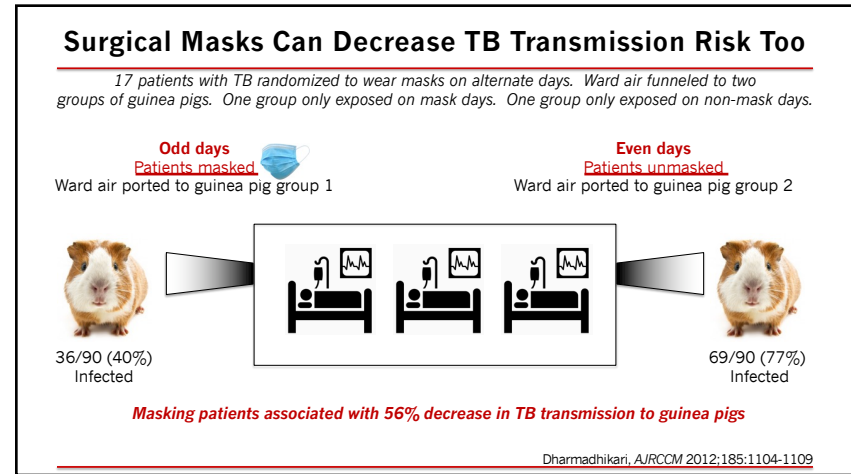
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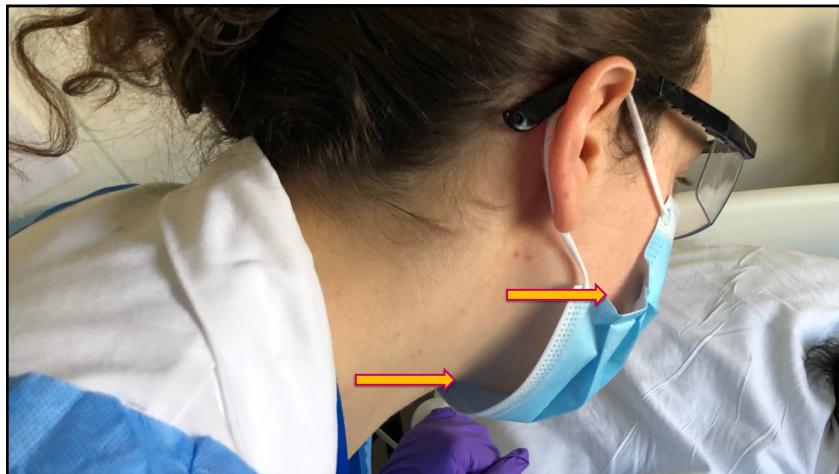
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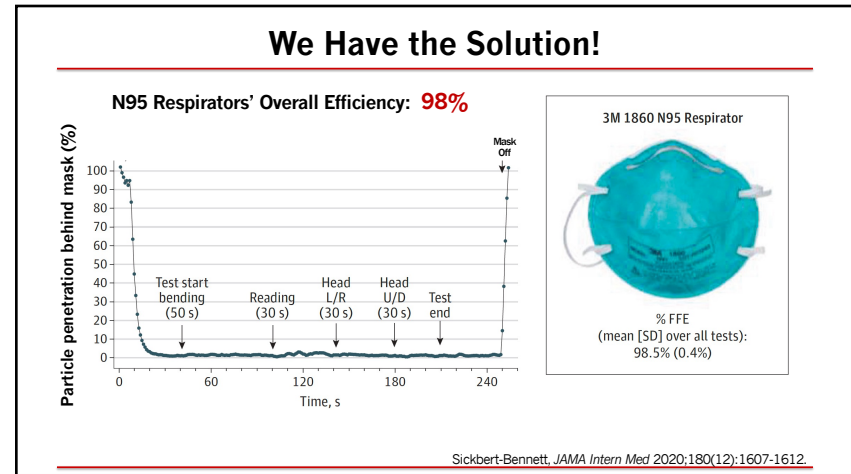
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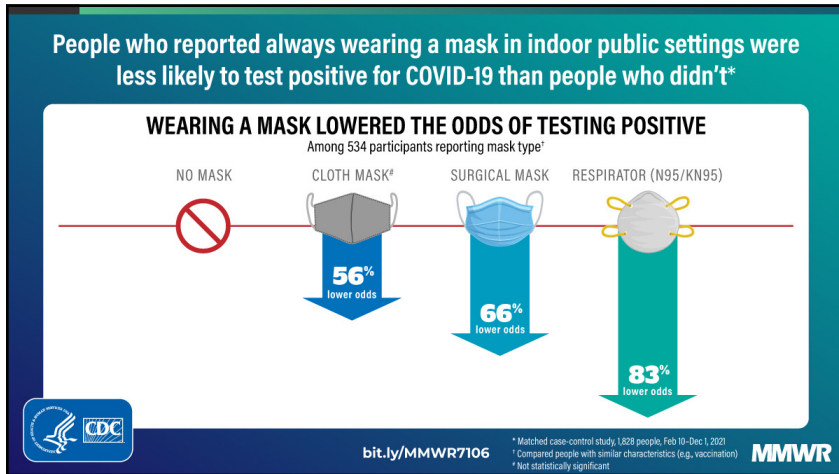
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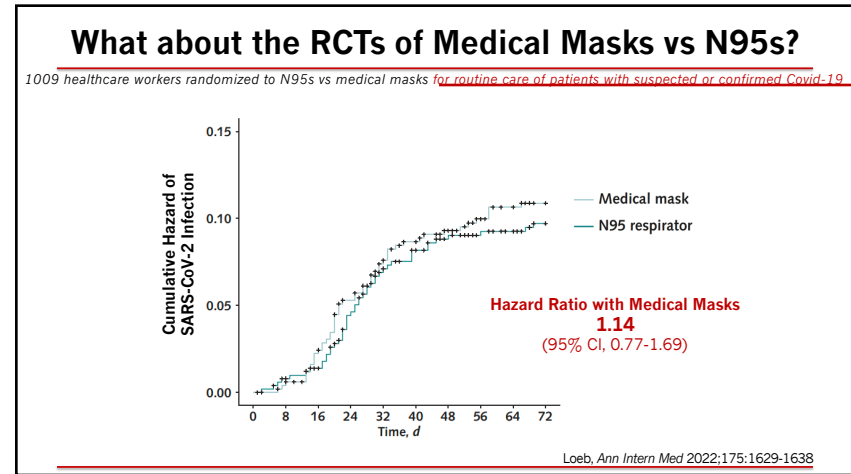
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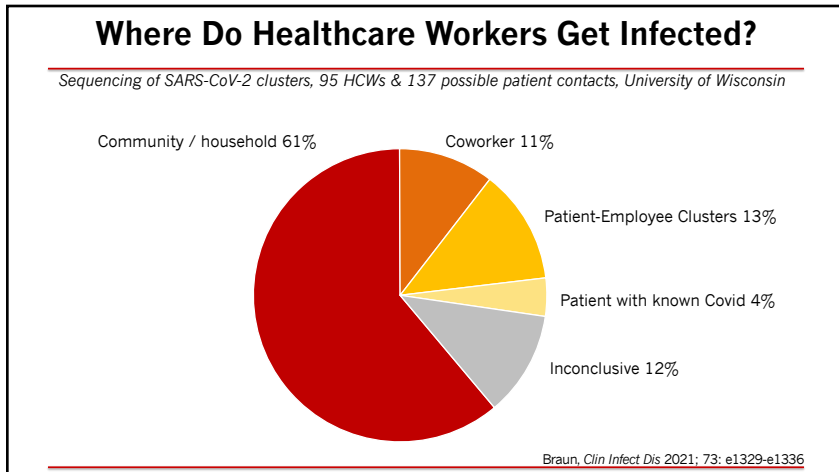
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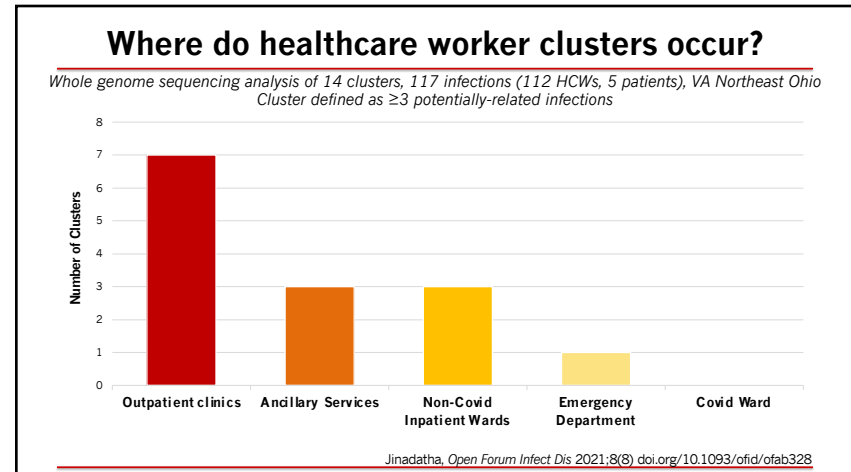
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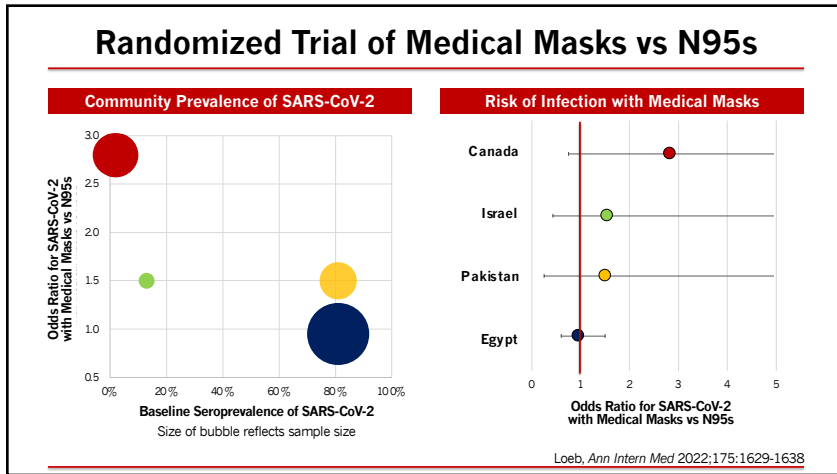
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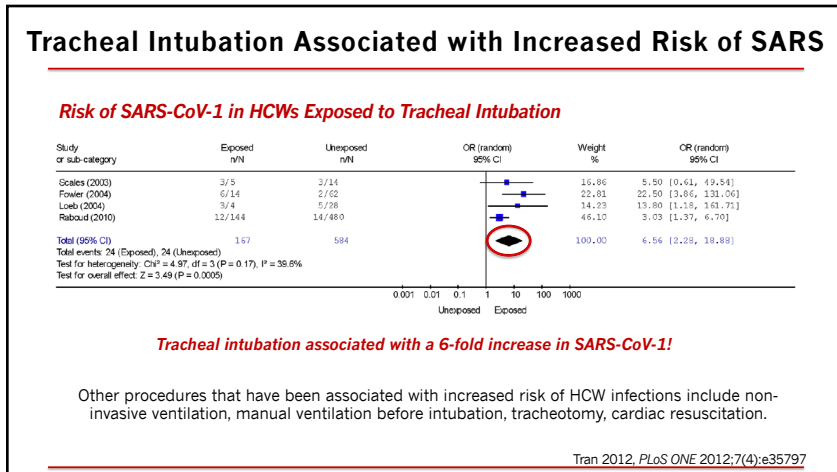


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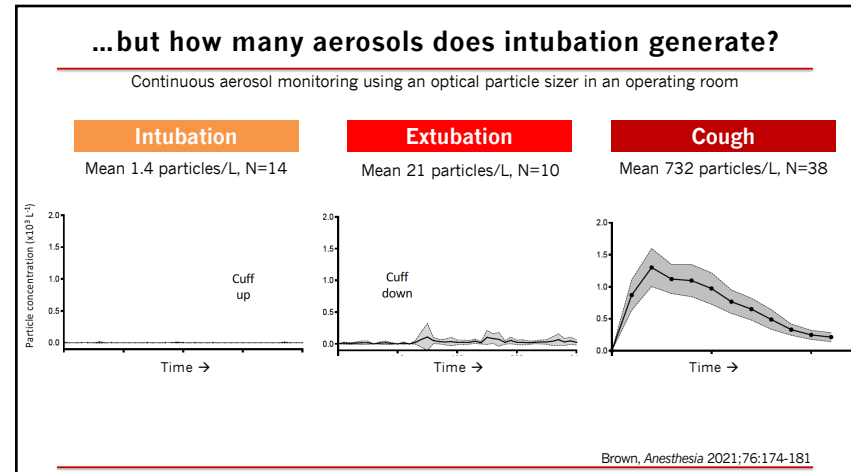
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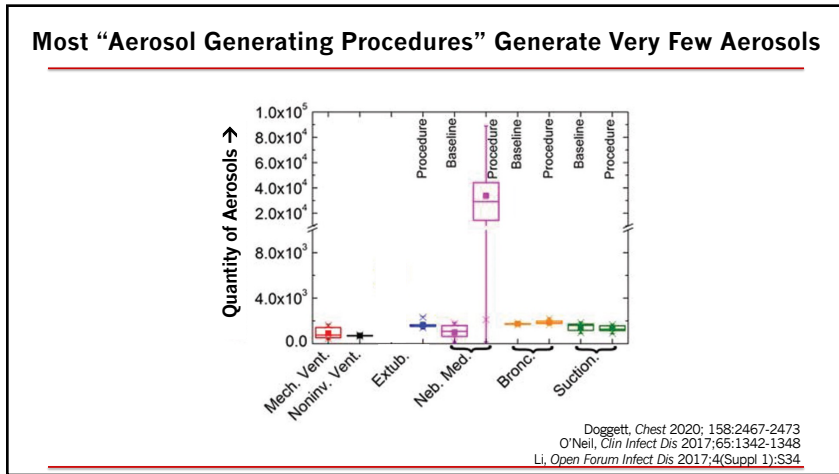
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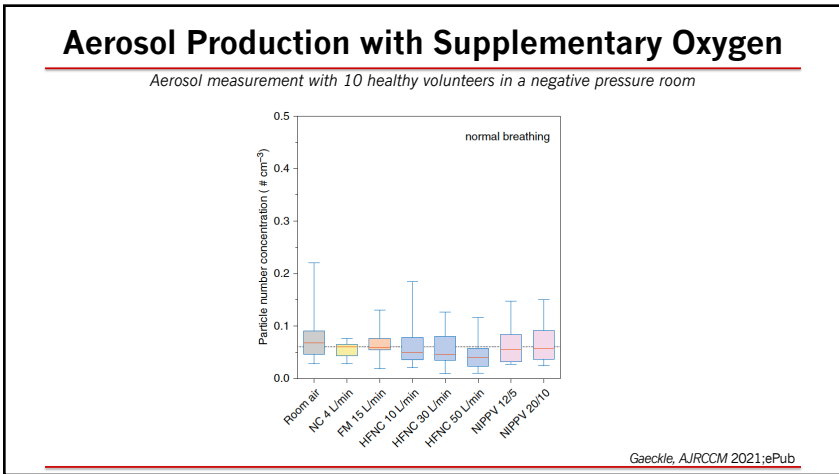
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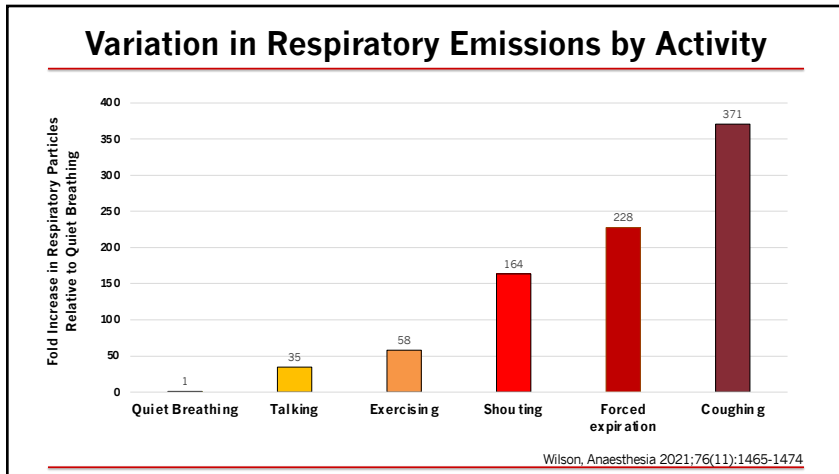
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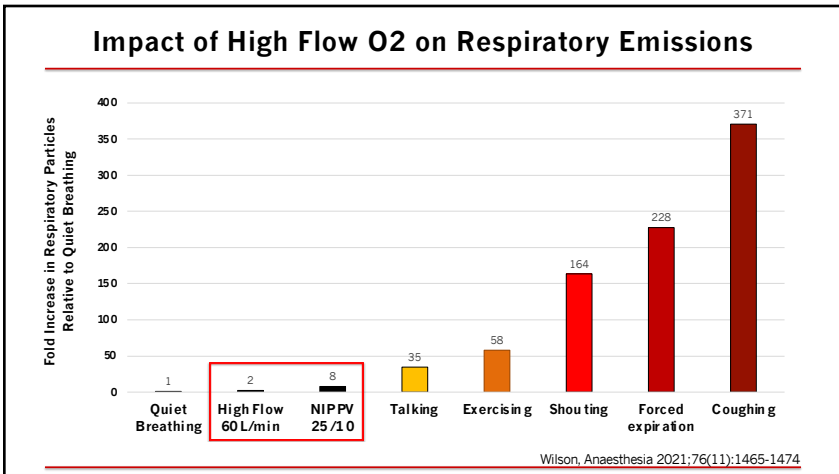
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The Intubation Paradox

- It's not the procedure, it's the patient!
- Associations between procedures and healthcare worker infections more likely due to the circumstances surrounding procedures rather than the procedures themselves
 - Severe illness (high viral loads)
 - Significant symptoms (tachypnea, heavy breathing, coughing)
 - Profound proximity to the respiratory tract
 - Sustained exposure

Klompas, JAMA Surgery 2021;156:113-114

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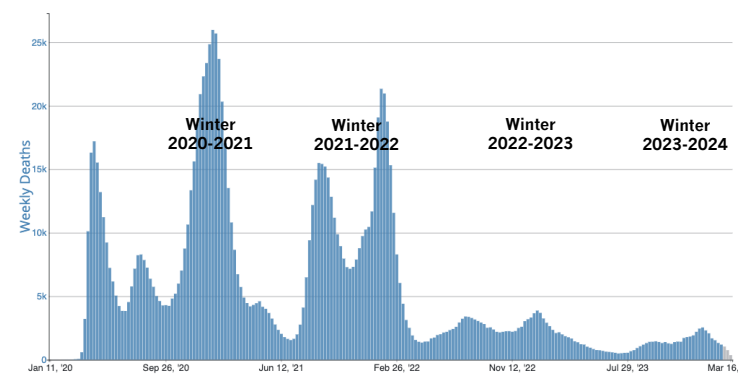
Where does this leave us?

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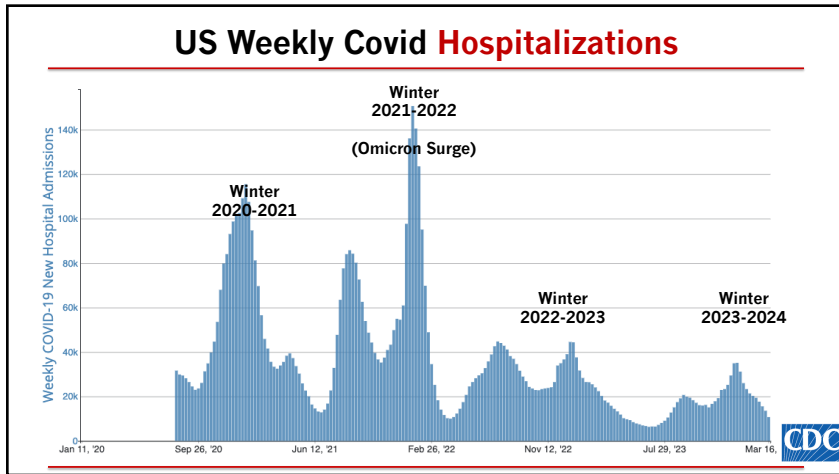


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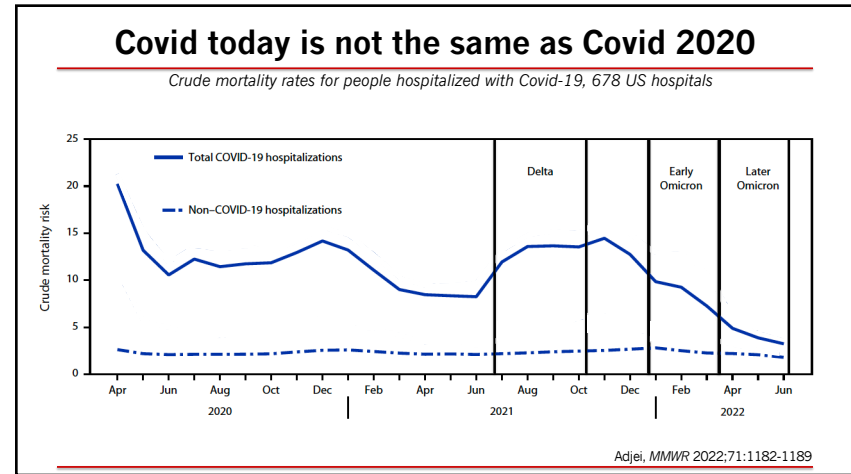
US Weekly Covid Deaths



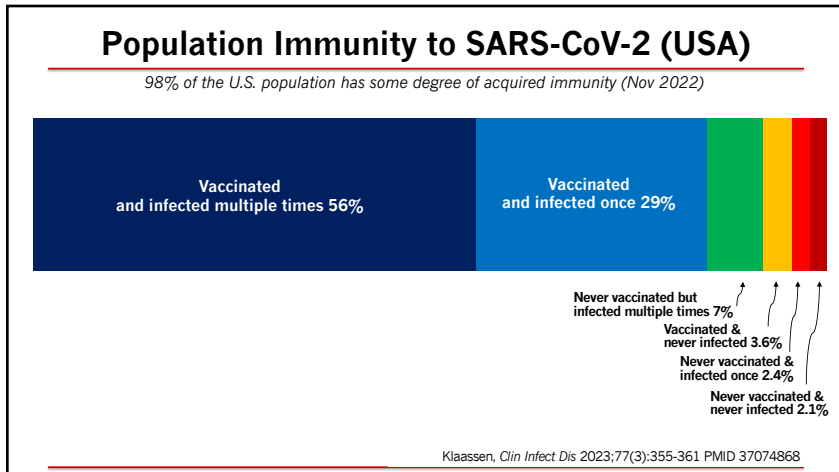
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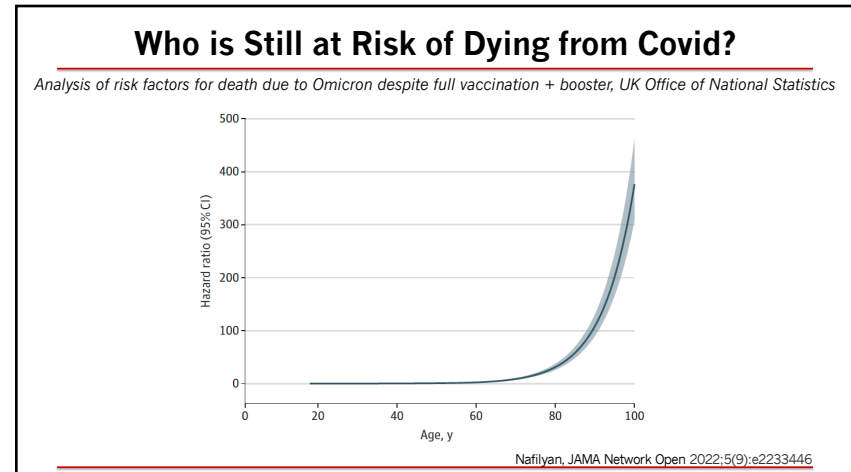
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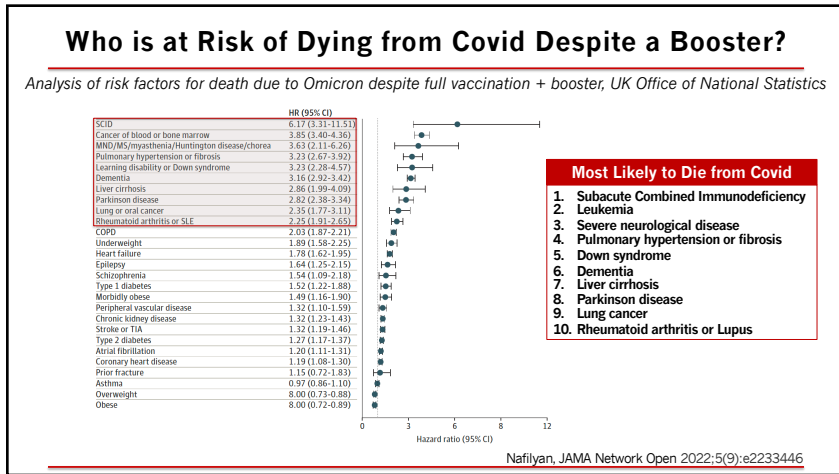
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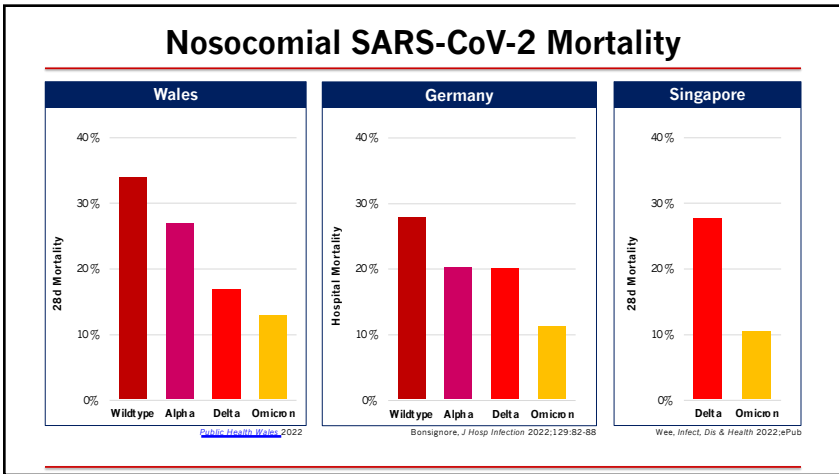
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Risk & Protection Exists on a Continuum

Factors That Increase Risk

- High community incidence
- Higher viral load
- Symptoms
- Proximity
- Longer exposure
- Poor ventilation
- Lack of masking
- Lack of vaccination

Factors That Decrease Risk

- Low community incidence
- Lower viral load
- Lack of symptoms
- Distance
- Brevity
- Good ventilation
- Mask on patient
- Mask on provider
 - N95 > KN95 > facemask
- Vaccination

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Summary

- SARS-CoV-2 and other respiratory viruses are transmitted by respiratory particles in a range of sizes, mostly aerosols
- Surgical masks decrease transmission but do not eliminate it. N95s are more effective.
- Most “aerosol generating procedures” do not generate aerosols
- There is now a high level of acquired immunity. Covid thus mild for most But hospitals concentrate the small subset of society still vulnerable to severe infection & death from SARS-CoV-2 and other respiratory viruses. Measures to protect patients still needed, particularly when community viral activity elevated.
- Stay humble!

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