COVID-19
Routes of Transmission & Implications for Worker Protection

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Aerosols can be generated by natural processes:

- Vomit
- Hemorrhage
- Diarrhea (toilet flushing)
- Coughing
- Sneezing
- Talking

Aerosols can be generated by medical procedures:

- Intubation
- Bronchoscopy
- Drug delivery
- Respiratory support

**Inhalation can occur at the time and near the point of generation**

At time = 0, an aerosol is generated by person A. Person B receives droplet spray and inhales particles. Person C has no exposure.
Inhalation is possible near and further from the point of generation.

Inhalation continues to be possible near the source as settling and diffusion take place.

Aerosol transmission (inhalation) is possible further from the source over time.

Infection depends on organism viability and dose (concentration of organisms in aerosol).
AEROSOL DIFFUSION AND SETTLING

Aerosol transmission (inhalation) is possible throughout the space.

Infection depends on organism viability and dose (concentration of organisms in aerosol).

At time = 2, the aerosol is dispersed, and many larger particles have deposited on the floor. Persons B and C inhale particles.
Aerosol Transmission

Establish biological plausibility*

- Aerosols are generated at a source
- Organism remains viable in air at environmental conditions along a path
- Receptors are accessible following inhalation or impaction

Overall weight of evidence = 7 – 8 for COVID-19
Risk group = 3 (like SARS)
High level of concern for aerosol transmission
Explains rapid transmission from one person to the next
Masks and Respirators for COVID-19 Aerosols

**Healthcare Workers Have Highest Risk**
- Masks as source control on patients
- Airborne infection isolation rooms for suspected cases
- N95 filtering facepiece respirators for healthcare workers
- Respirators with higher levels of protection for patients with severe symptoms and aerosol-generating procedures

**Workers with High Risk Not in Healthcare**
- Implement as many source and path controls as possible before using PPE

**Workers with Moderate or Low Risk**
- Source and path controls
- No PPE

**Public**
- Stay home!
- No masks or respirators
All Disease Transmission Routes are Possible for COVID-19

- **Contact**: Transfer from infectious source or object to mucous membranes
- **Droplet**: Large droplets “propelled” onto face and mucous membranes (no inhalation)
- **Airborne**: Droplet nuclei inhaled ONLY when susceptible person is far from infectious source
- **Aerosol**: Aerosols inhaled near the source
Protecting Healthcare Workers

Have healthcare and public health organizations implemented all possible engineering and administrative controls?

CDC checklist

What about elastomeric respirators?

Donations from companies
Give every healthcare worker their own respirator
Ask H&S professionals to assist with fit testing

Asking the public to wear surgical masks won’t stop transmission

What year is this?

1918?
Cloth masks do NOT work!