With us you are Number One | ENGEN

Garth Hunter
Transmission mechanisms COVID-19

IH Specialist

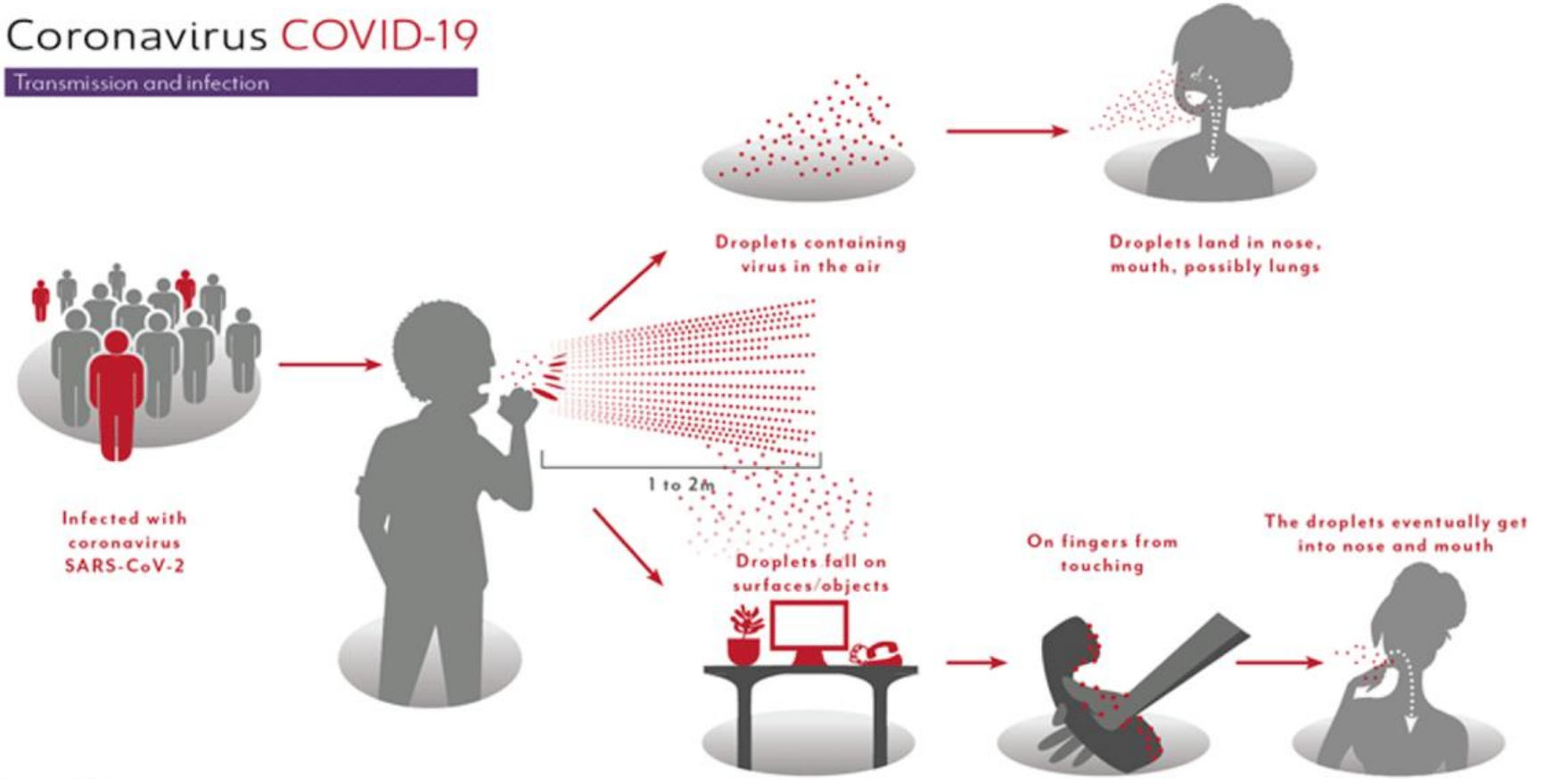
MSc, ROH SAIOH, CMSaiosh

PETRONAS

ENGEN

Coronavirus COVID-19

Transmission and infection



WORLD HEART FEDERATION

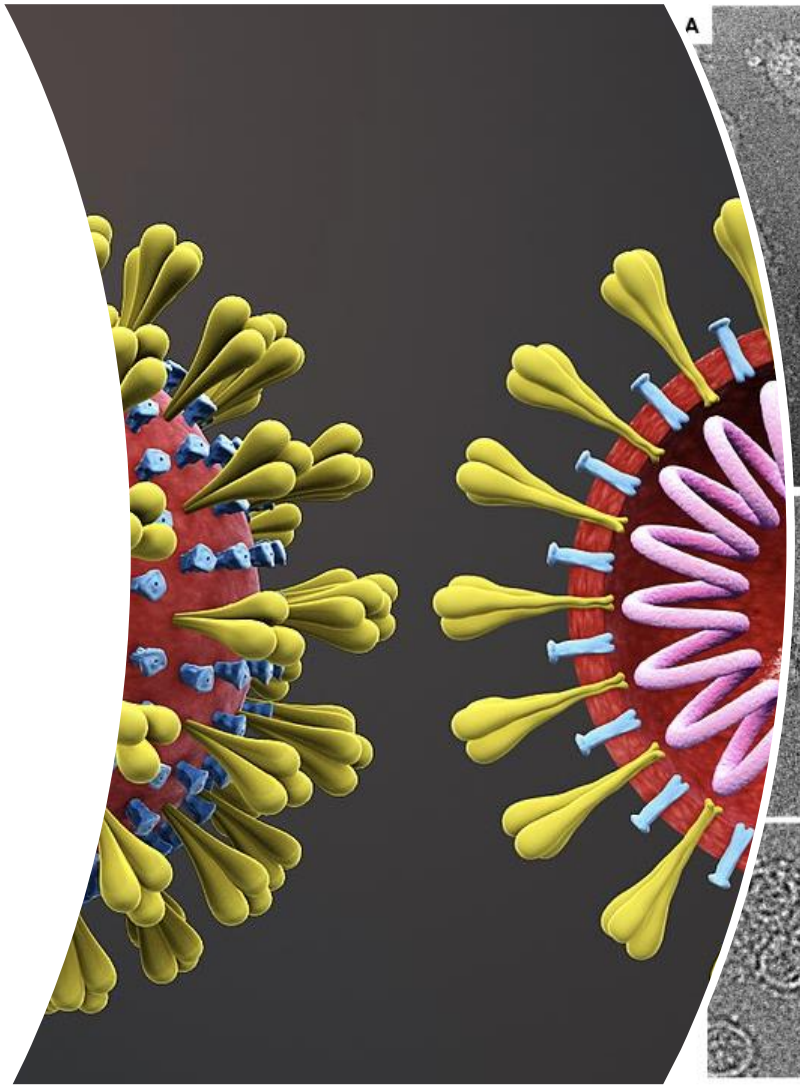
UNIVERSITY OF CAPE TOWN

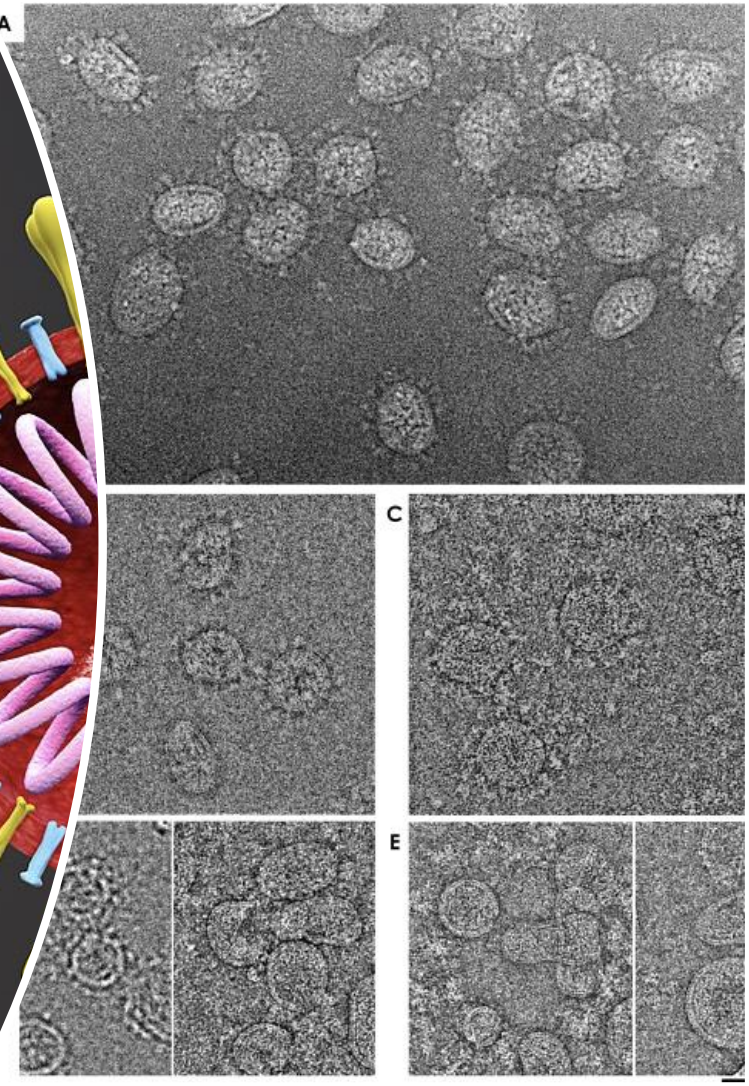
Size 0.05-0.15µm

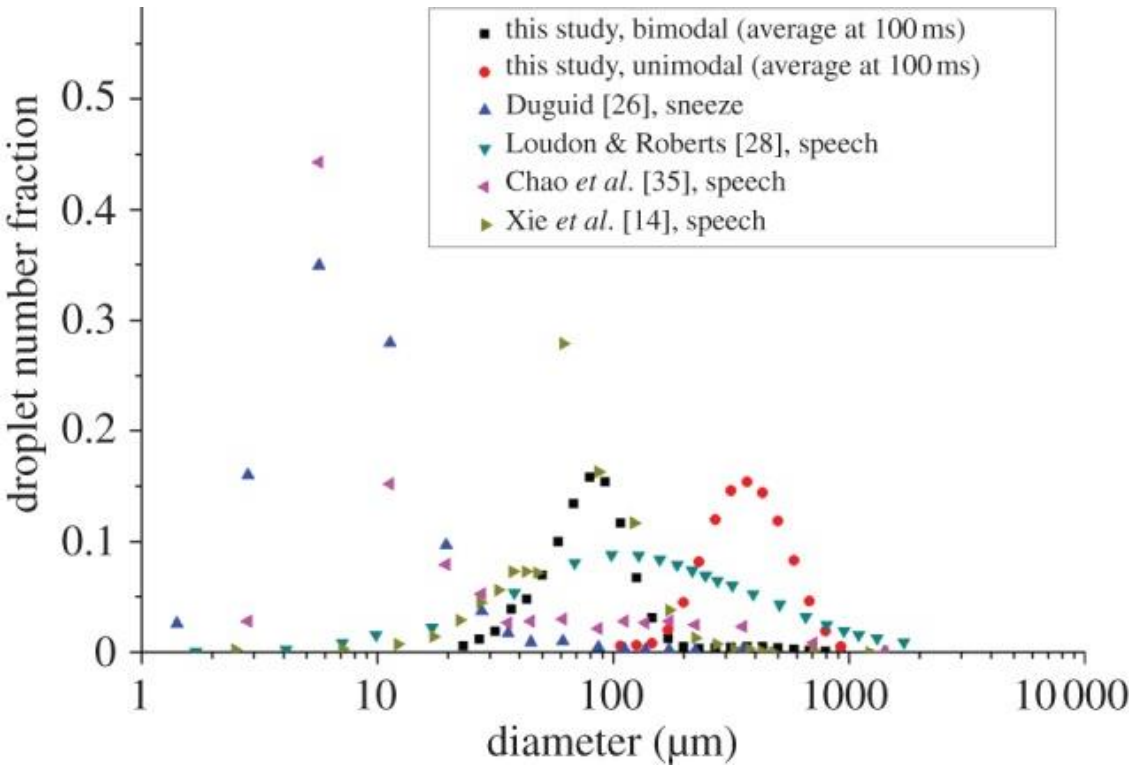
- **Practically 0.1 µm**

Dies at 56 C°

Lives for up to 72 hrs on plastic & steel





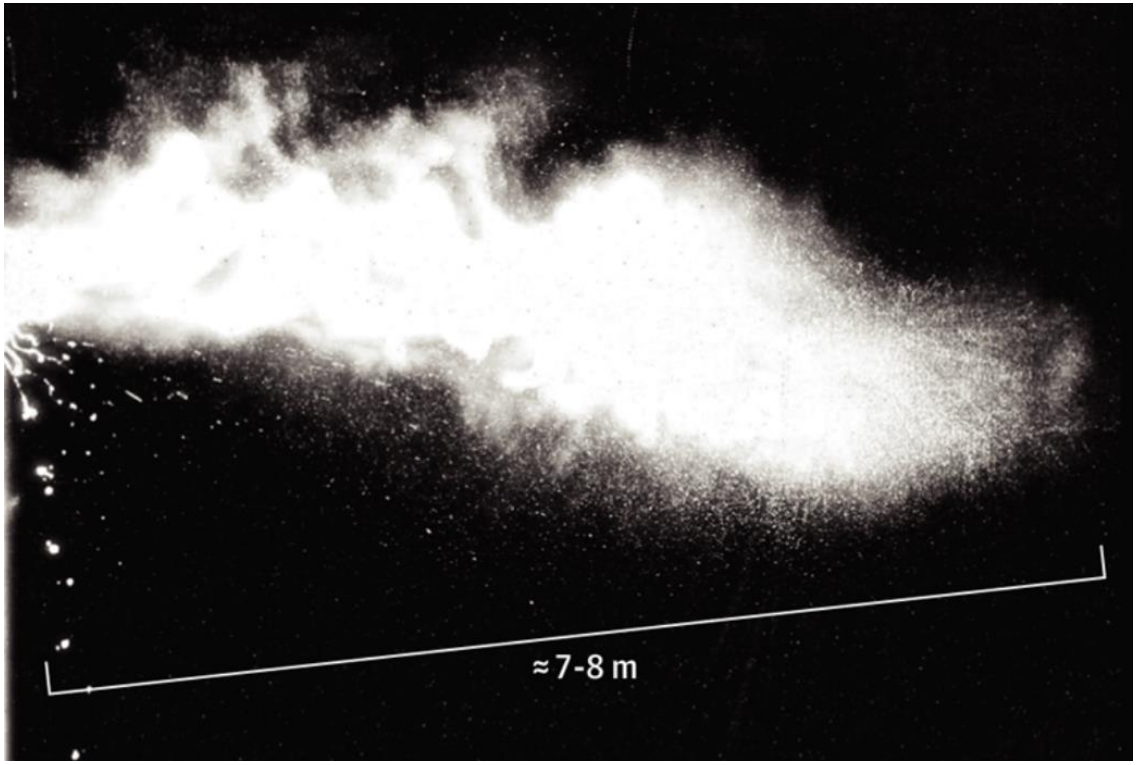


Normal speaking produces thousands of oral fluid droplets (1 μm to 500 μm), and can cause transmission in confined environments.

Medium-sized (10 μm to 100 μm) droplets, a fraction of which remain airborne for at least 30 s

Larger droplets, which are also abundant but associated with close-proximity direct virus transfer or fomite transmission

FFP2 masks filter 94% of all particles that are 0.3 μm in diameter or larger
Lifetime of droplet from a fraction of a second to minutes.



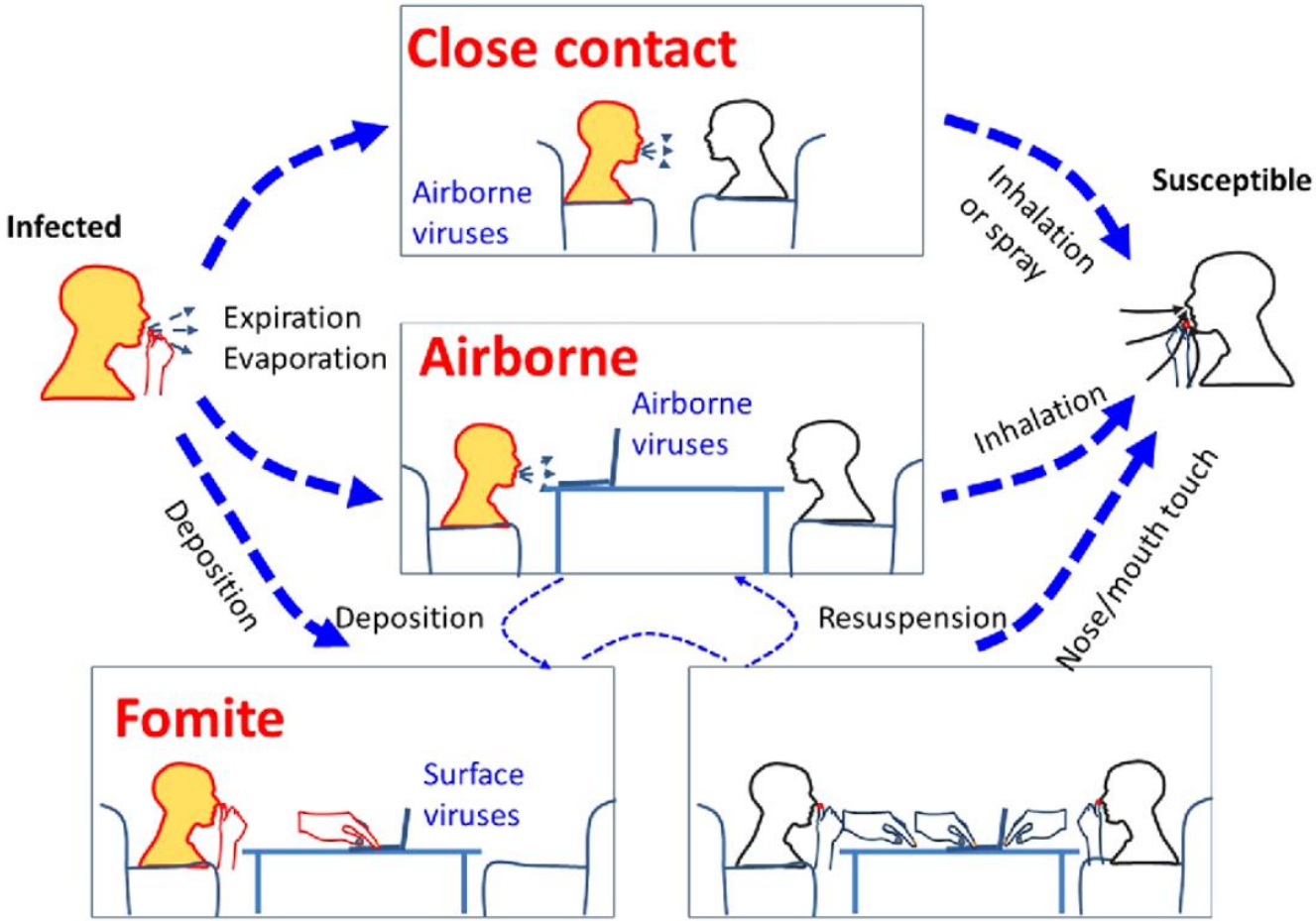
https://jamanetwork.com/journals/jama/fullarticle/2763852

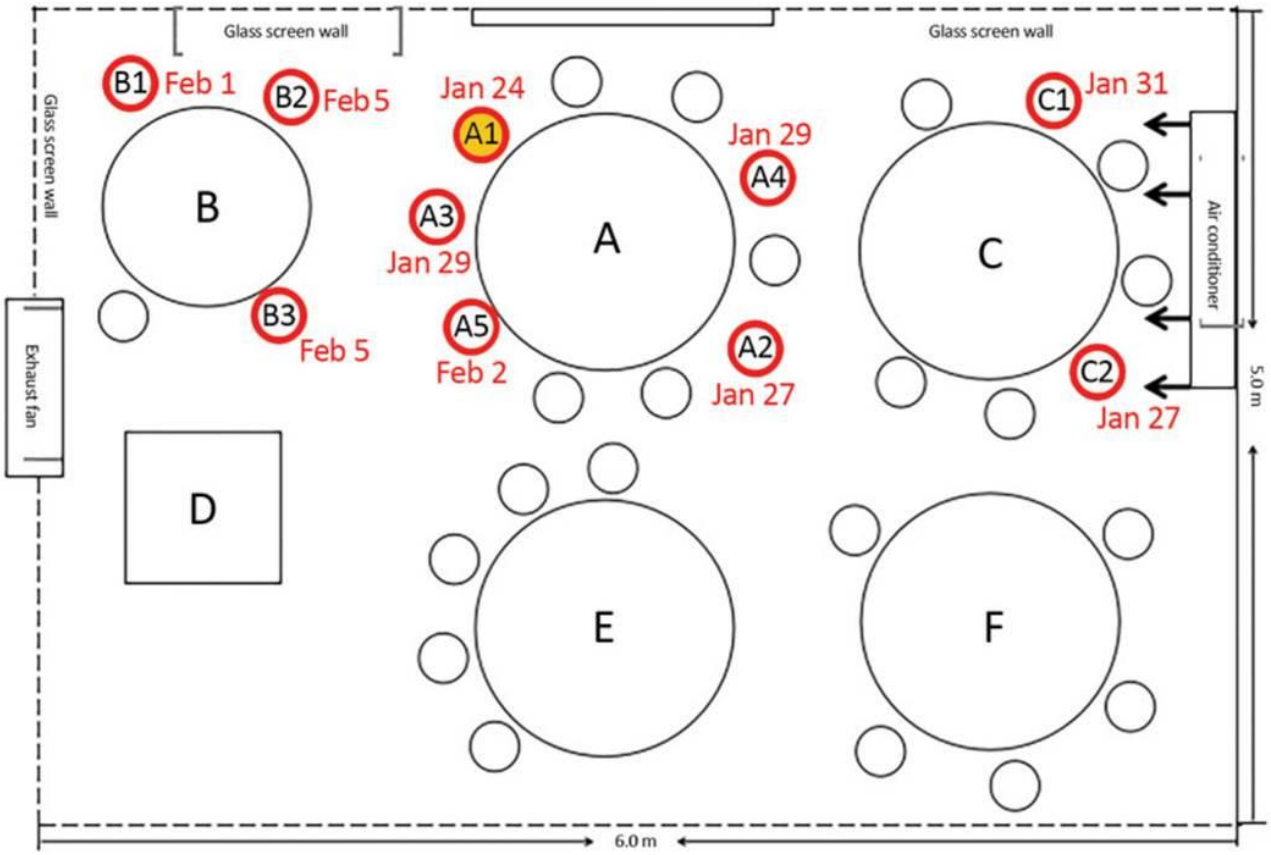
INFECTIOUS DOSE

- **The average number of viral particles needed to establish an infection is known as the infectious dose**
- **COVID-19 is clearly very contagious. May be:**
- **Infected people release a lot of virus in their environment J. F.-W. Chan *et al***
- **Few particles are needed for infection (the infectious dose is low)**
- **Exact COVID-19 Infectious Dose not known yet, but expected to relatively low – in the region of a few hundred or thousand particles**
- **Infectious Dose is not 1 virus**

CLOSE CONTACT

- **Means that you had face-to-face contact within 1 metre or were in a closed space for more than 15 minutes with a person with COVID-19**
- **This contact happened while the person with COVID-19 was still "infectious", i.e. from 2 days before to 14 days after their symptoms began.**
- **For example, you may be someone who:**
  - Lives in the same household as a person with COVID-19
  - Works closely in the same environment as a person with COVID-19
  - Sat in the same classroom as a person with COVID-19
  - Attended the same gathering as a person with COVID-19
  - Provided direct care for a person with COVID-19 in a healthcare setting without using the proper personal protective equipment
  - Sat within two seats (1 metre) in any direction of a person with COVID-19 case in any kind of vehicle including buses, minibus taxis, etc.
  - Sat close to a person with COVID-19 in an aircraft


Close contact
Airborne viruses
Infected
Expiration
Evaporation
Inhalation or spray
Susceptible
Airborne
Airborne viruses
Inhalation
Deposition
Deposition
Resuspension
Nose/mouth touch
Fomite
Surface viruses



Restaurant X is an air-conditioned, 5-floor building without windows.

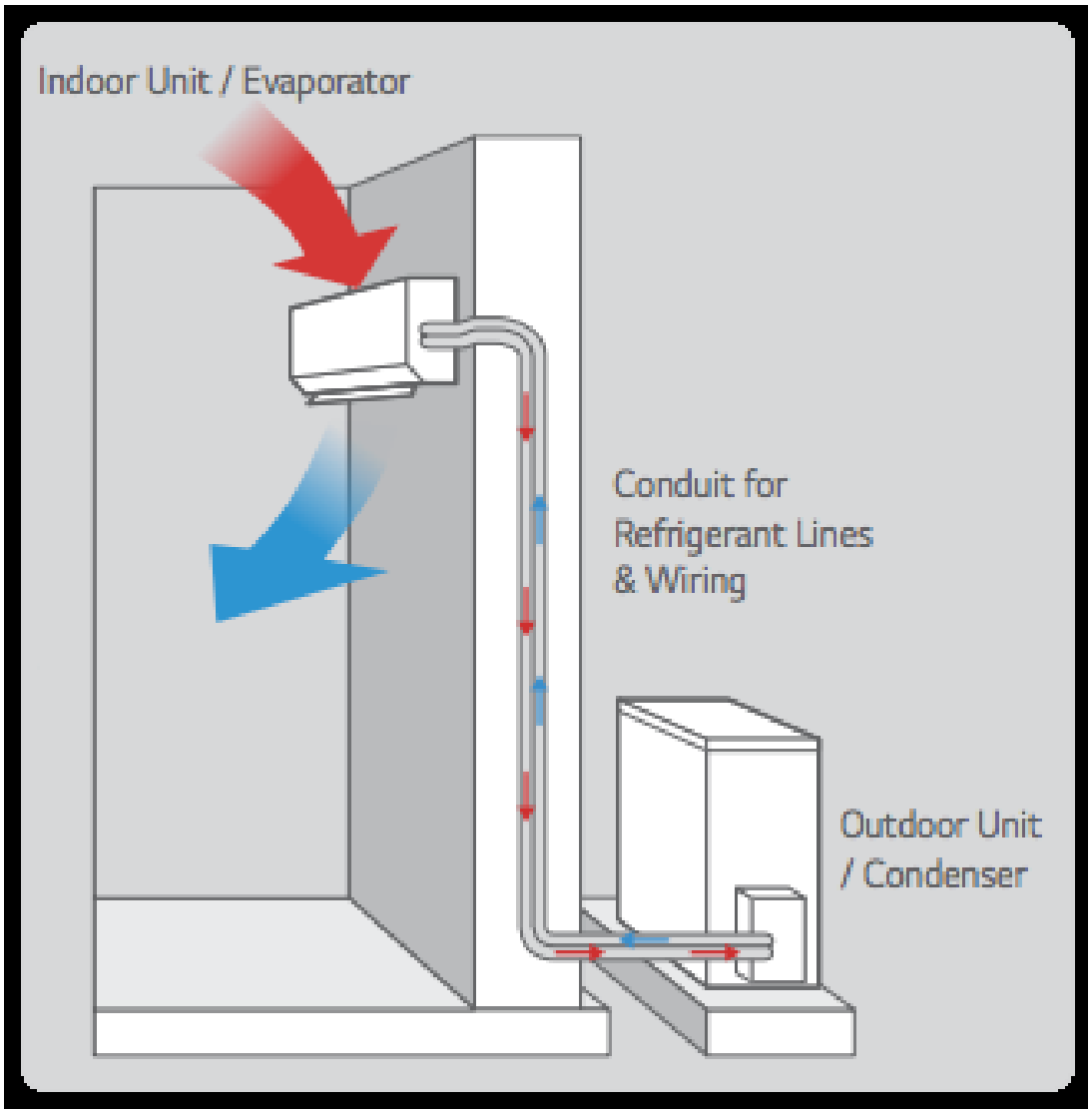
The third floor dining area occupies 145 m^2; each floor has its own air conditioner.

The distance between each table is about 1 m.

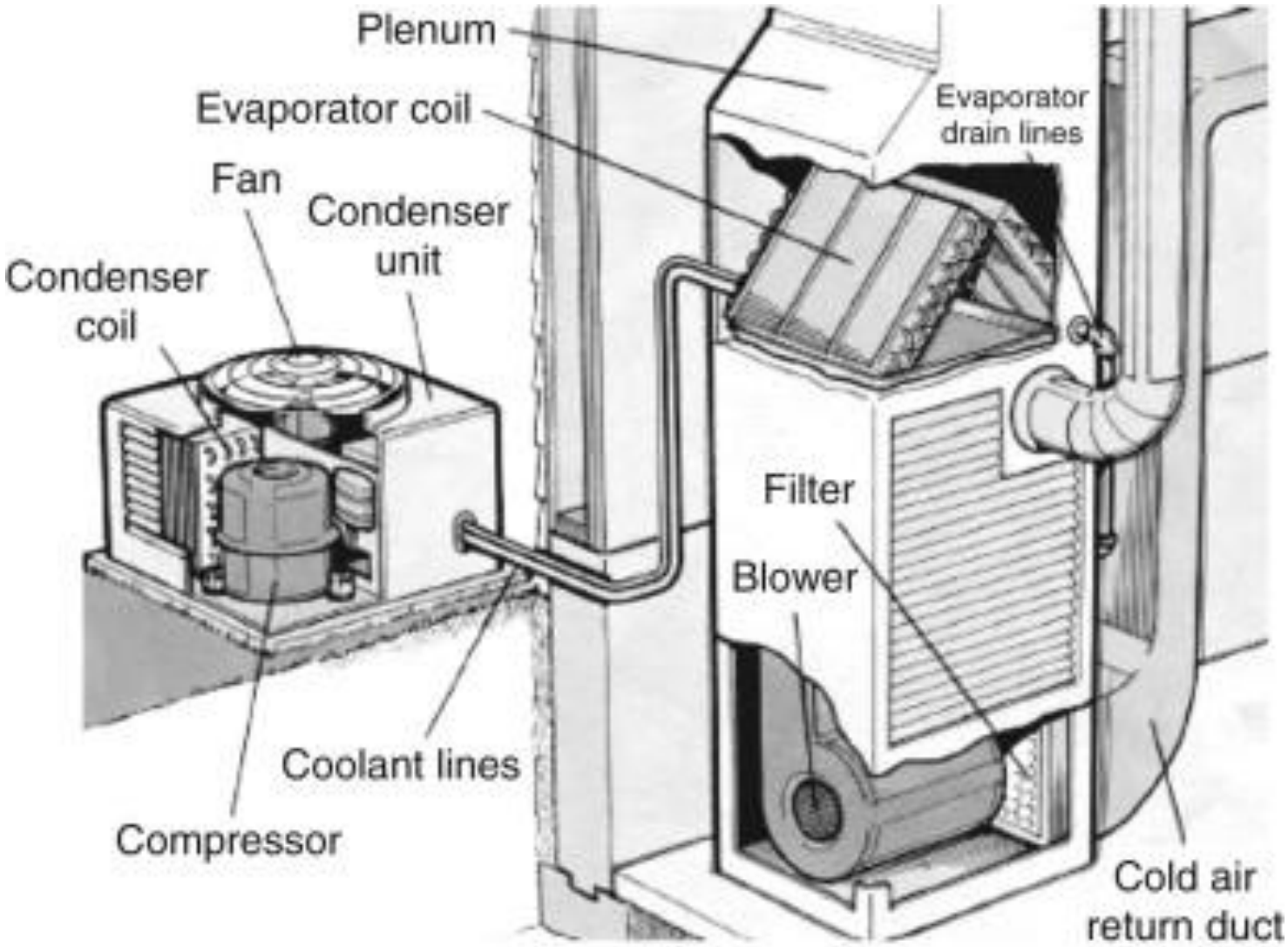
Families A and B were each seated for an overlapping period of 53 minutes and families A and C for an overlapping period of 73 minutes.

The air outlet and the return air inlet for the central air conditioner were located above table C

Mid wall split unit air conditioner



Central ducted air con with filter



Practical implications

- Droplet primary transmission / fomites secondary transmission
- To be at significant risk must be a close contact
- Close contact is not a person you walk past who has COVID-19
- Droplets are different to aerosols
- Air-conditioning systems transmit aerosols not droplets. Therefore not transmitted via ducted air-conditioning systems

Thank you