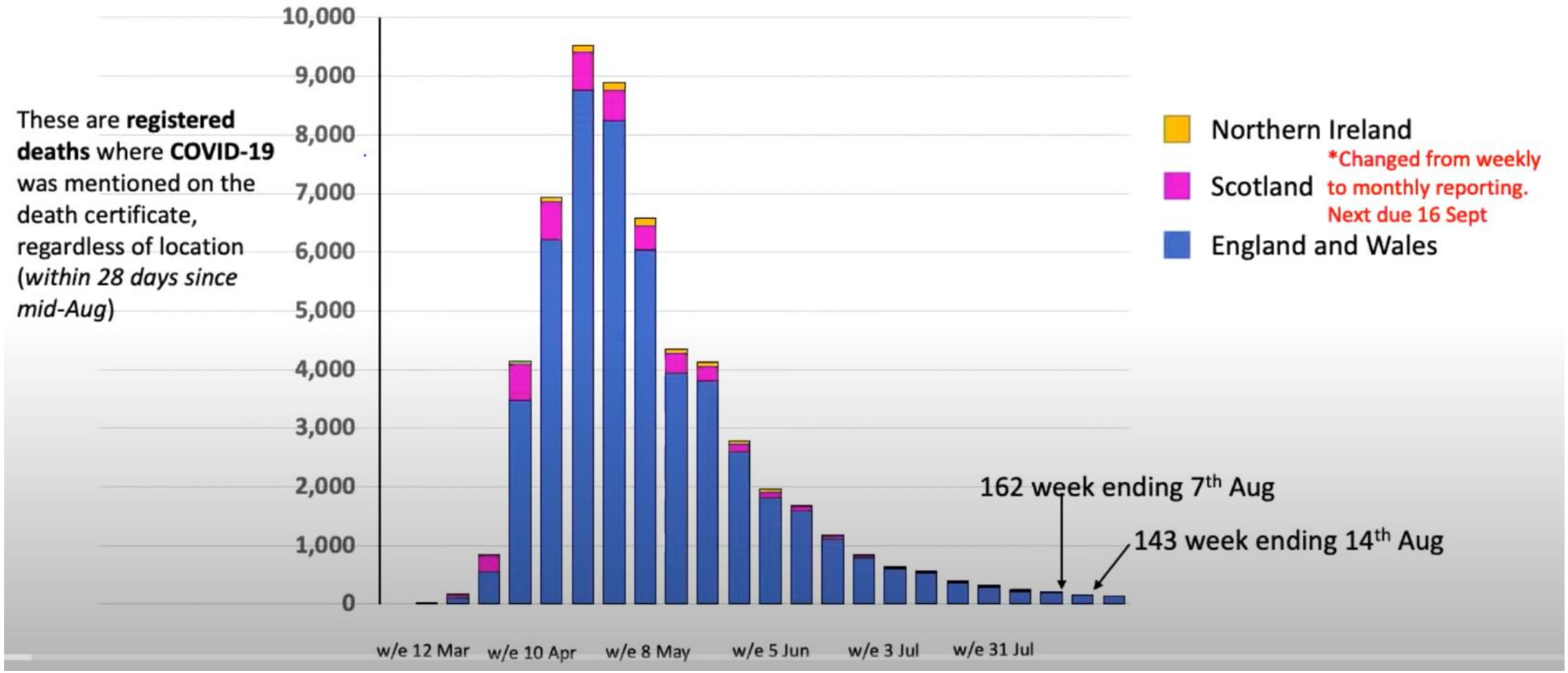
AIRBORNE SPREAD OF COVID-19

AND IMPLICATIONS FOR THE WORKPLACE

Dr Jonathan Fluxman 3 September 2020

indie_SAGE

Number of new UK deaths from COVID-19 per week



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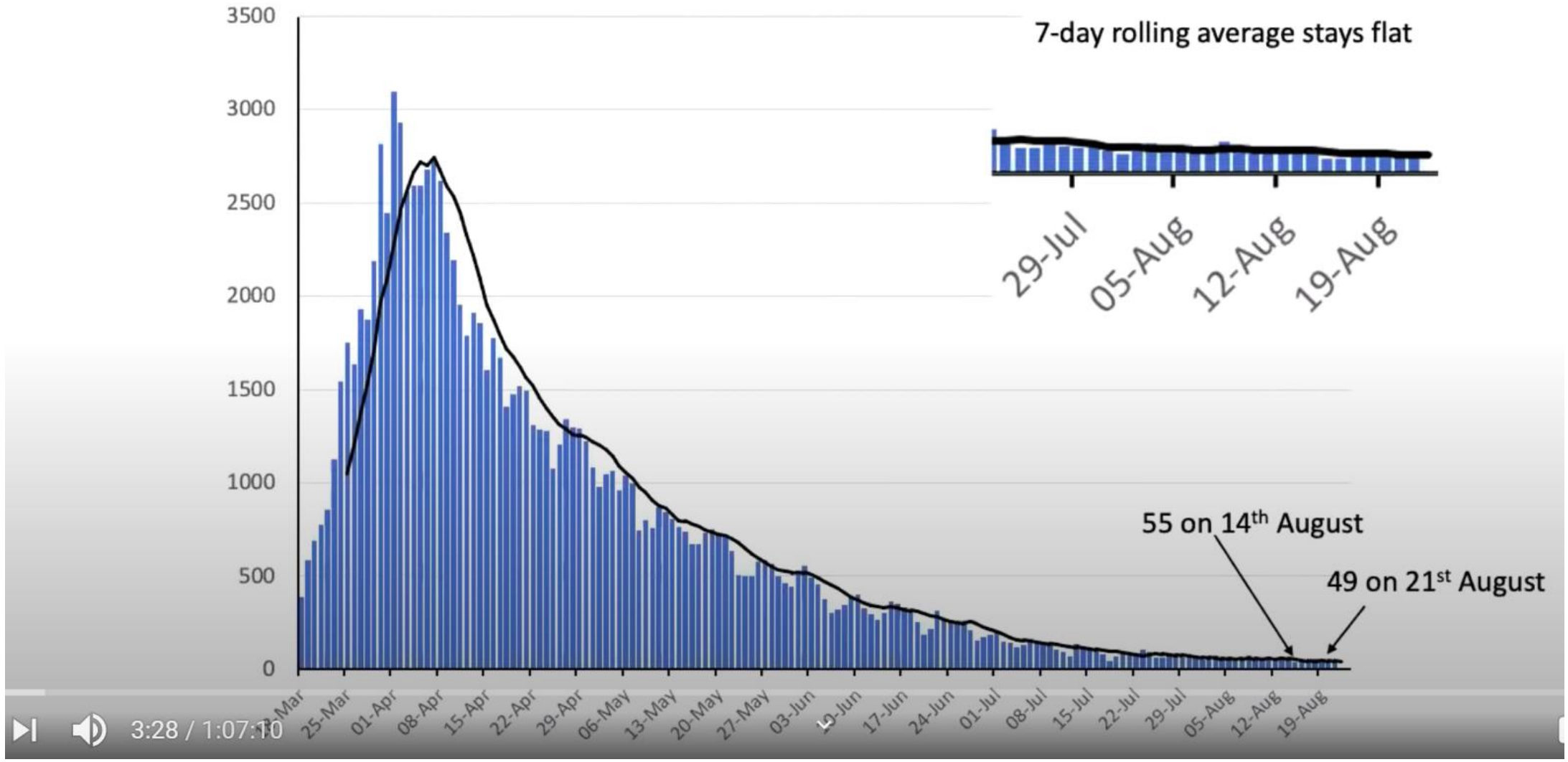
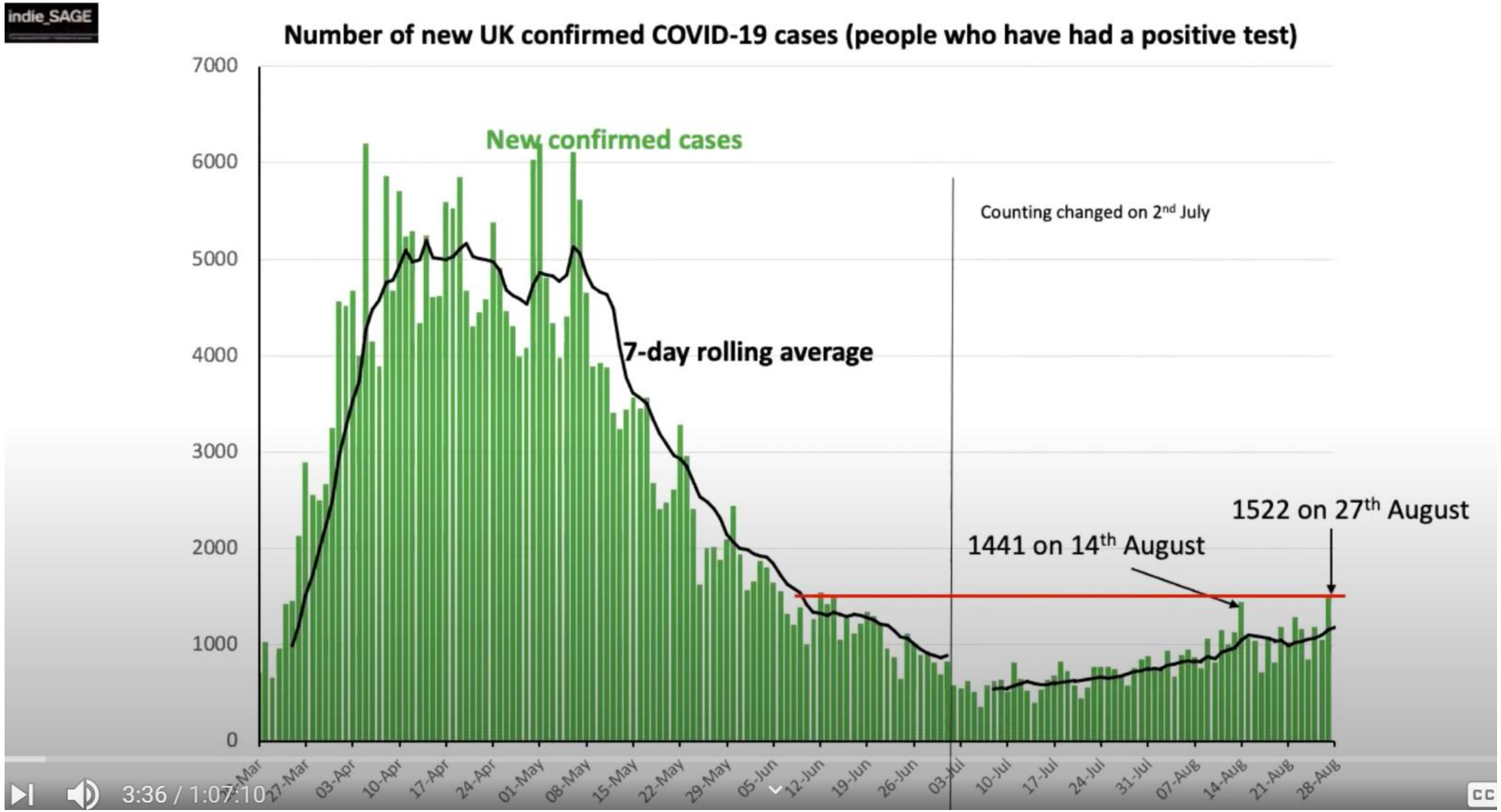
Number of new hospital admissions with COVID-19 per day in England




indie_SAGE
Number of new UK confirmed COVID-19 cases (people who have had a positive test)
New confirmed cases
7-day rolling average
Counting changed on 2nd July
1441 on 14th August
1522 on 27th August
7000
6000
5000
4000
3000
2000
1000
0
27-Mar
03-Apr
10-Apr
17-Apr
24-Apr
01-May
08-May
15-May
22-May
29-May
05-Jun
12-Jun
19-Jun
26-Jun
03-Jul
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17-Jul
24-Jul
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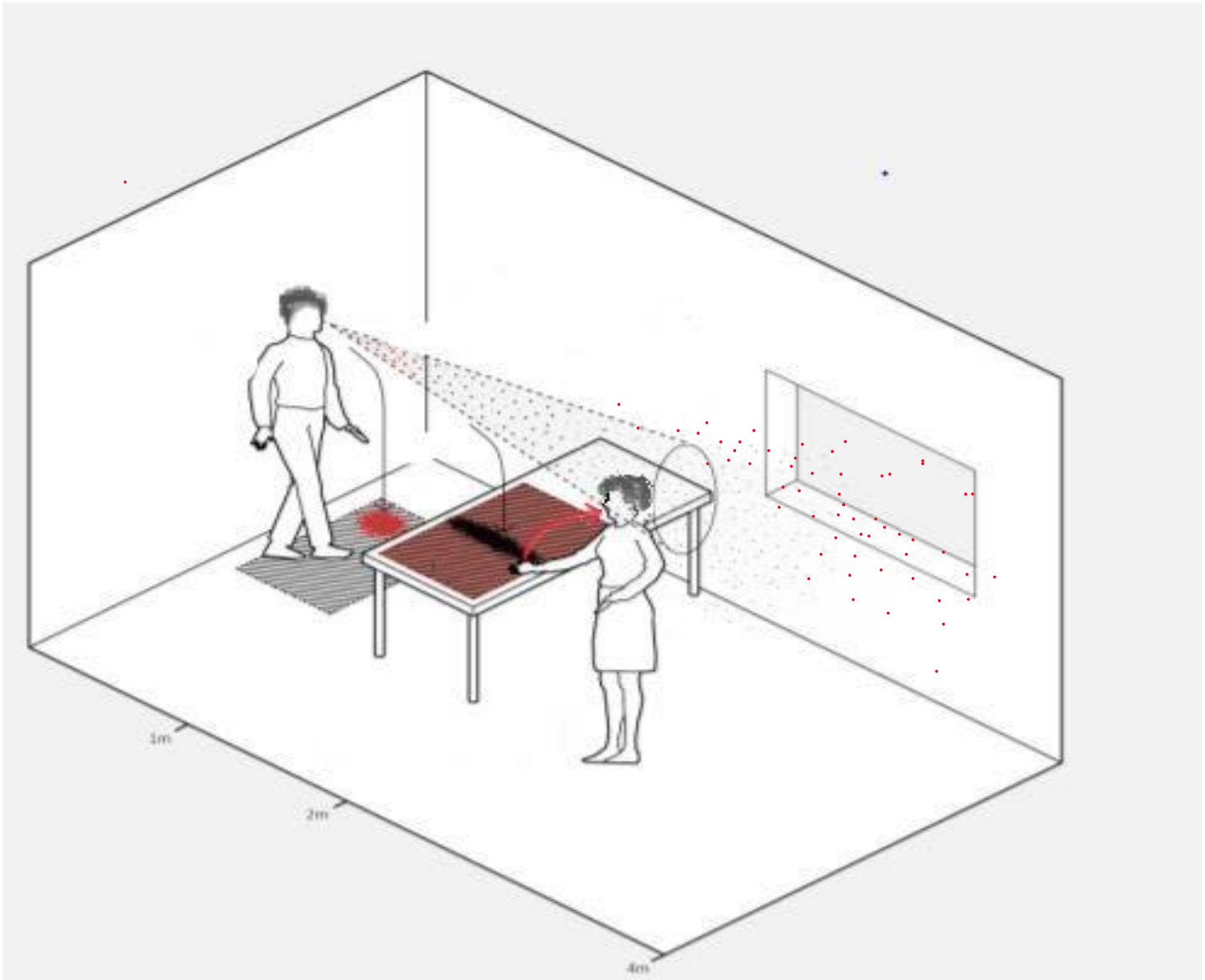
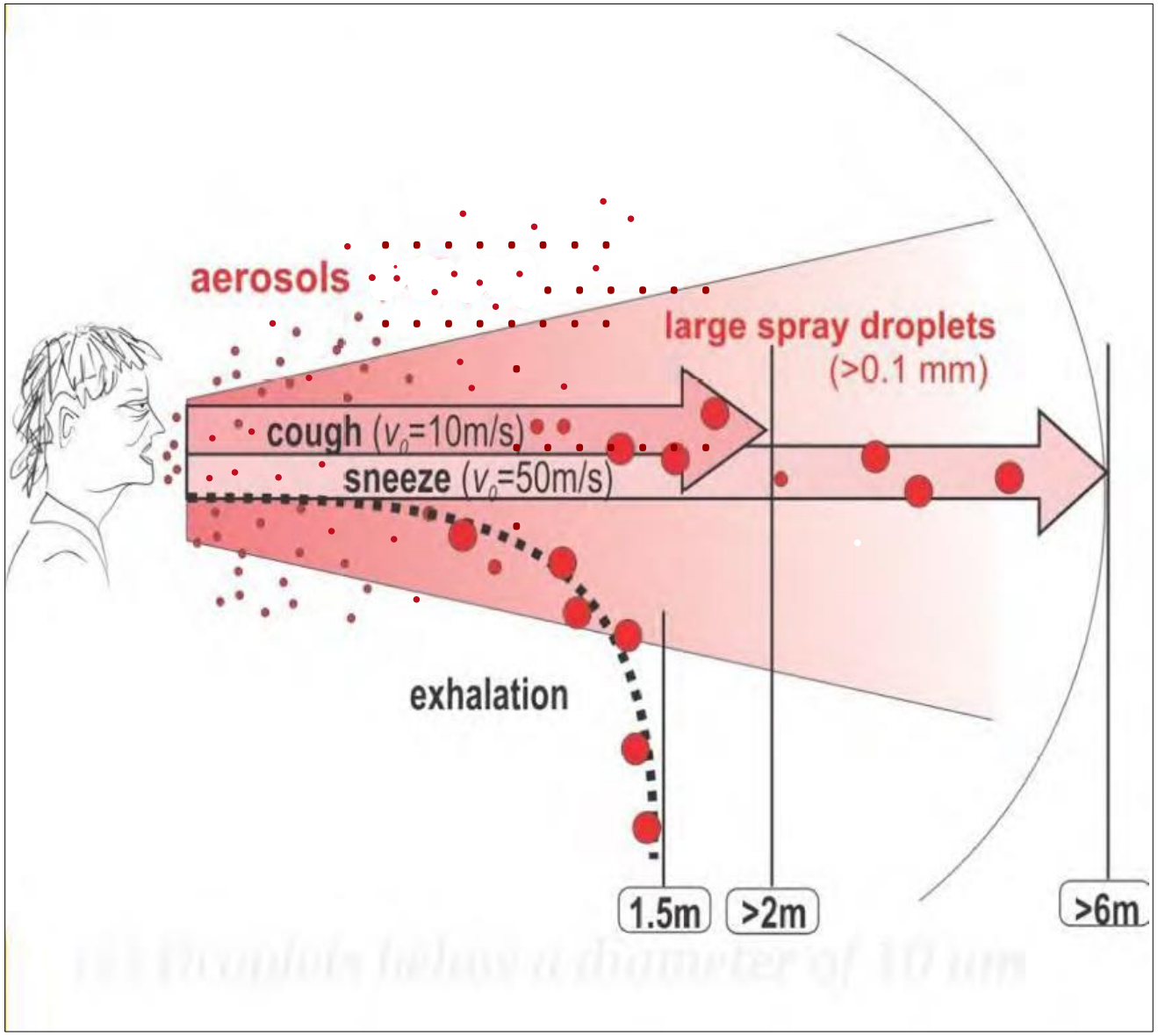
07-Aug
14-Aug
21-Aug
28-Aug
3:36 / 1:07:10
CC



The 3 methods of spread

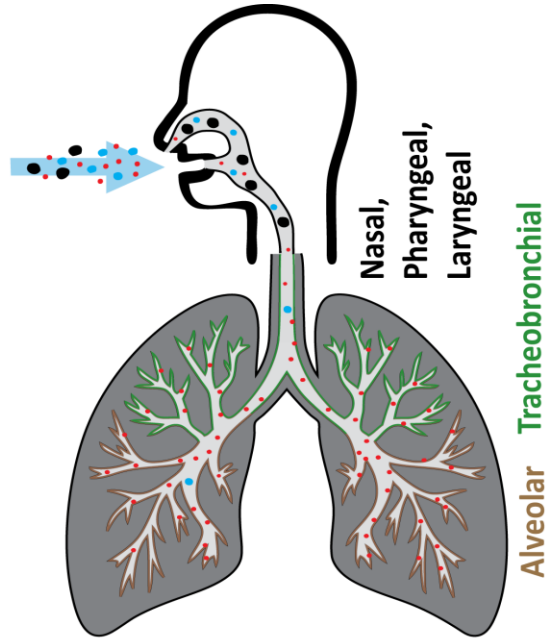
- Aerosols
- Droplet
- Contact

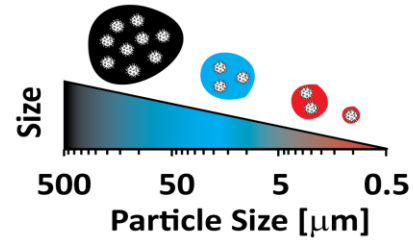


Thanks to Dr Sayan Sen of the One Heart Clinic for image

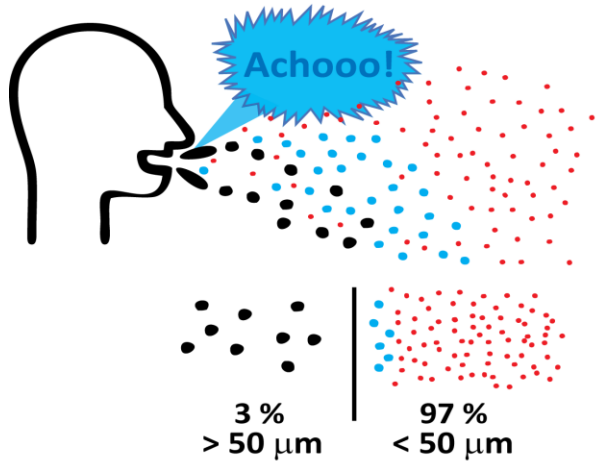
Covid-19 is spread indoors

Its not only about 2m social distancing

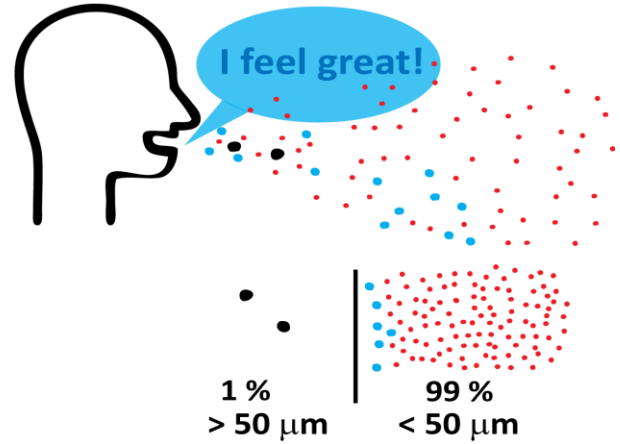


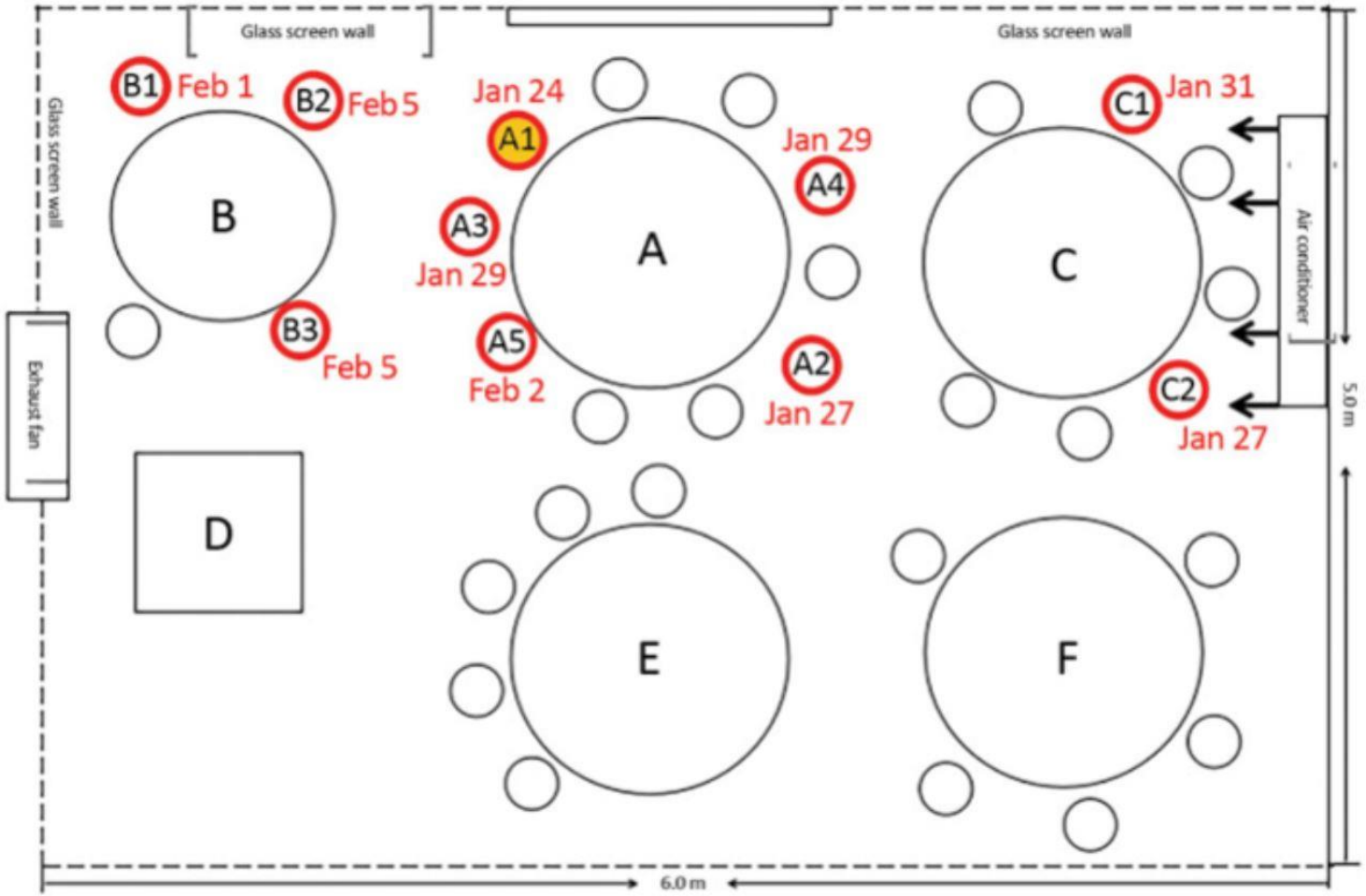


Cough/Sneeze



Talking/Singing

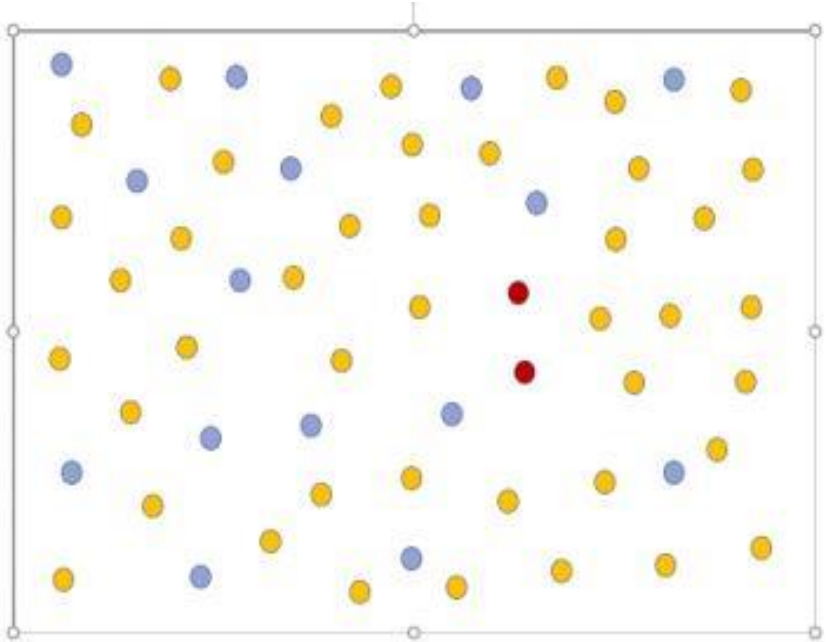




Restaurant in Ghangzhou in China, late January

- Tables 1m apart
- ~1 hour contact time
- Room size large – this part of larger room
- Air flow from right to left

https://wwwnc.cdc.gov/eid/article/26/7/20-0764_article#tnF1

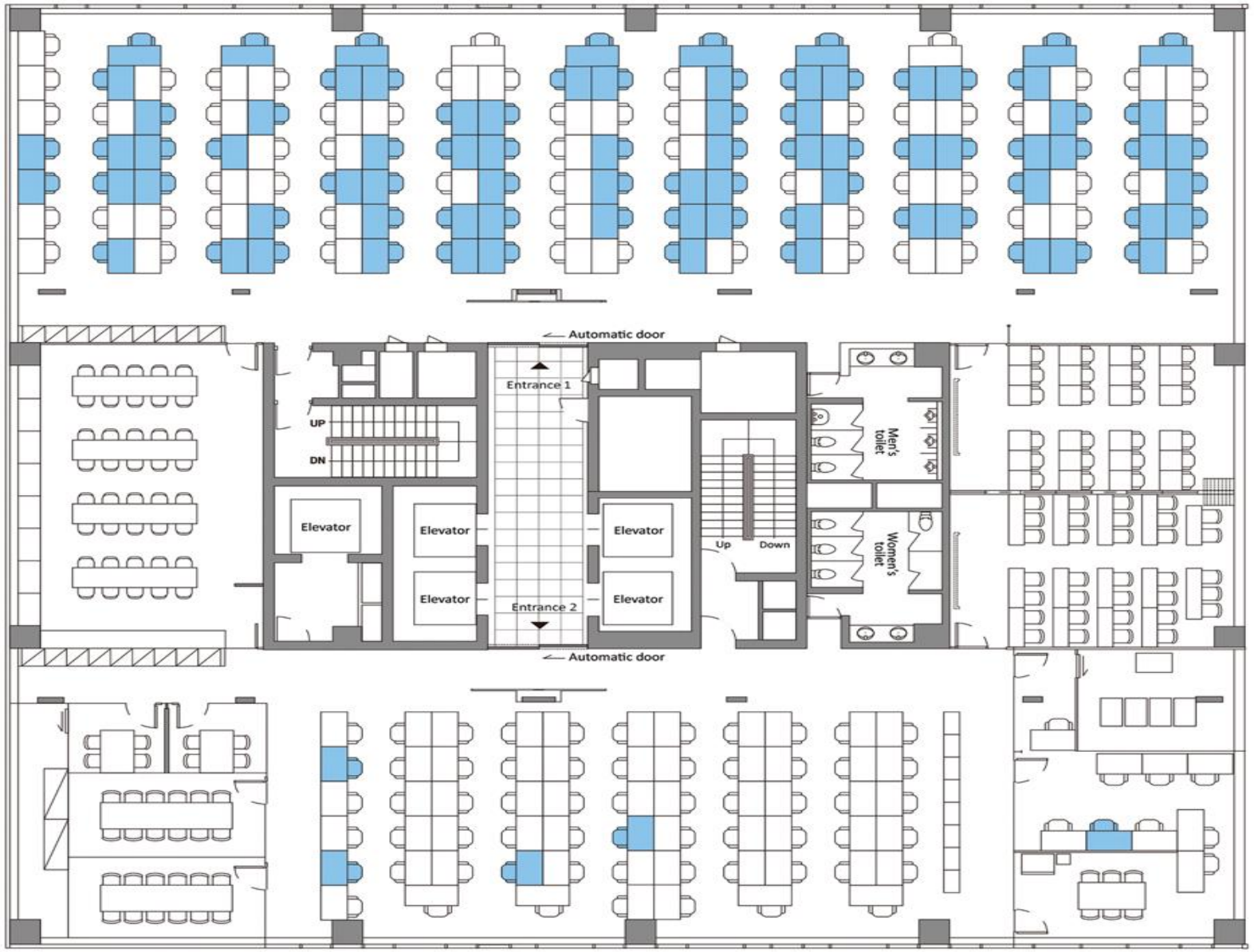


Singing
Laughing
Shouting
Exercising
Coughing
Sneezing

These are high risk indoors in enclosed spaces

Choir practice in a hall in Washington State, early March

- 2.5 hours choir practice 61 people in a hall
  - × Social distancing not observed very well
  - ✓ Sanitiser at front door
  - ✓ No sharing of sheet music
  - ✓ No one symptomatic should attend
- Over next 4 days 53 people developed symptoms, 2 people died.
- Likely 1-2 “super-spreaders” responsible
- Time in enclosed space very important



Call centre in Seoul, South Korea, early March

- 94 of 216 people infected over a period of 5 days (44%) by 1 person
- Note distance of infection spread
- Time in enclosed space very important
- All on one floor, apart from 1-2 people

https://wwwnc.cdc.gov/eid/article/26/8/20-1274_article

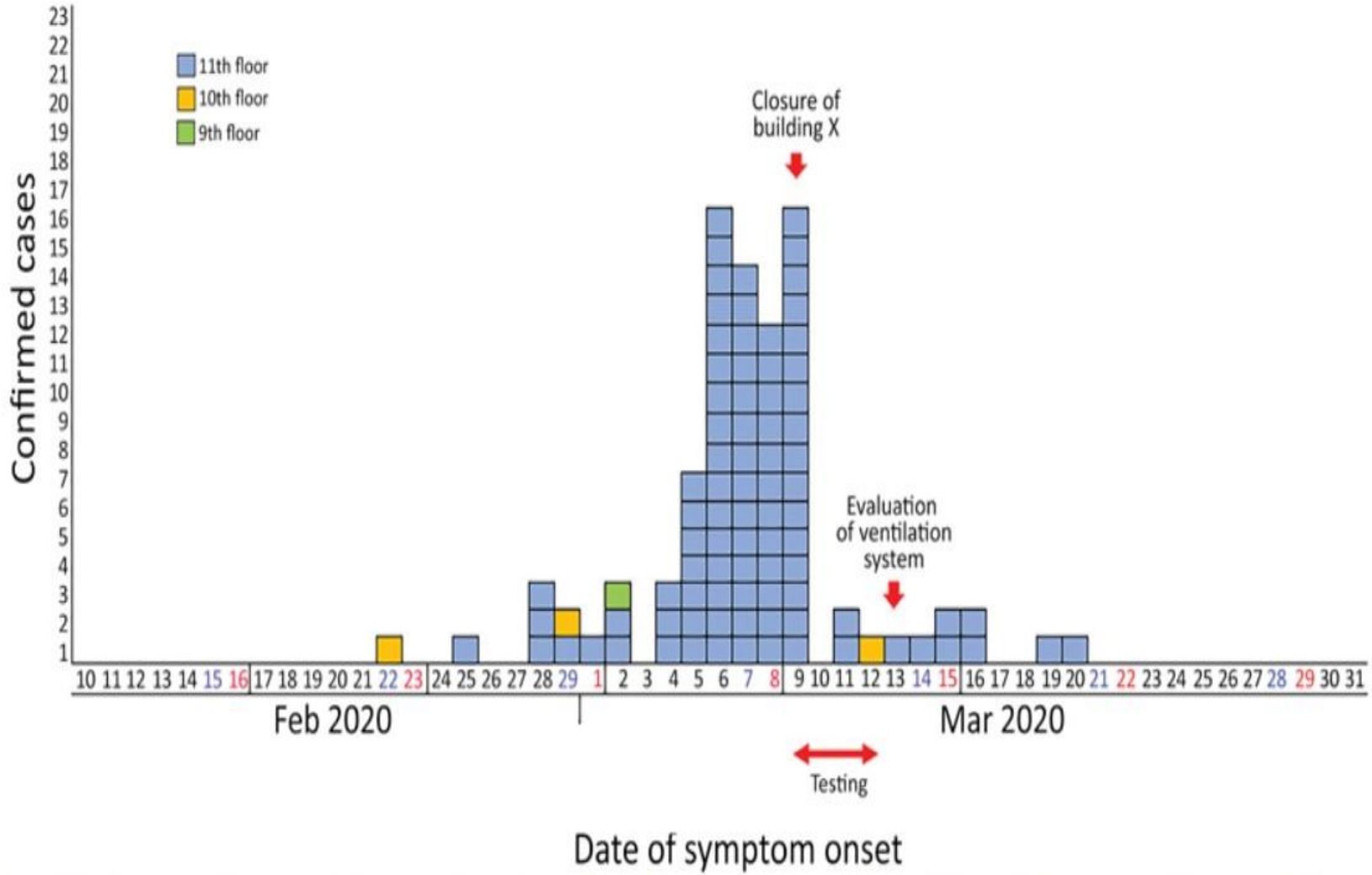
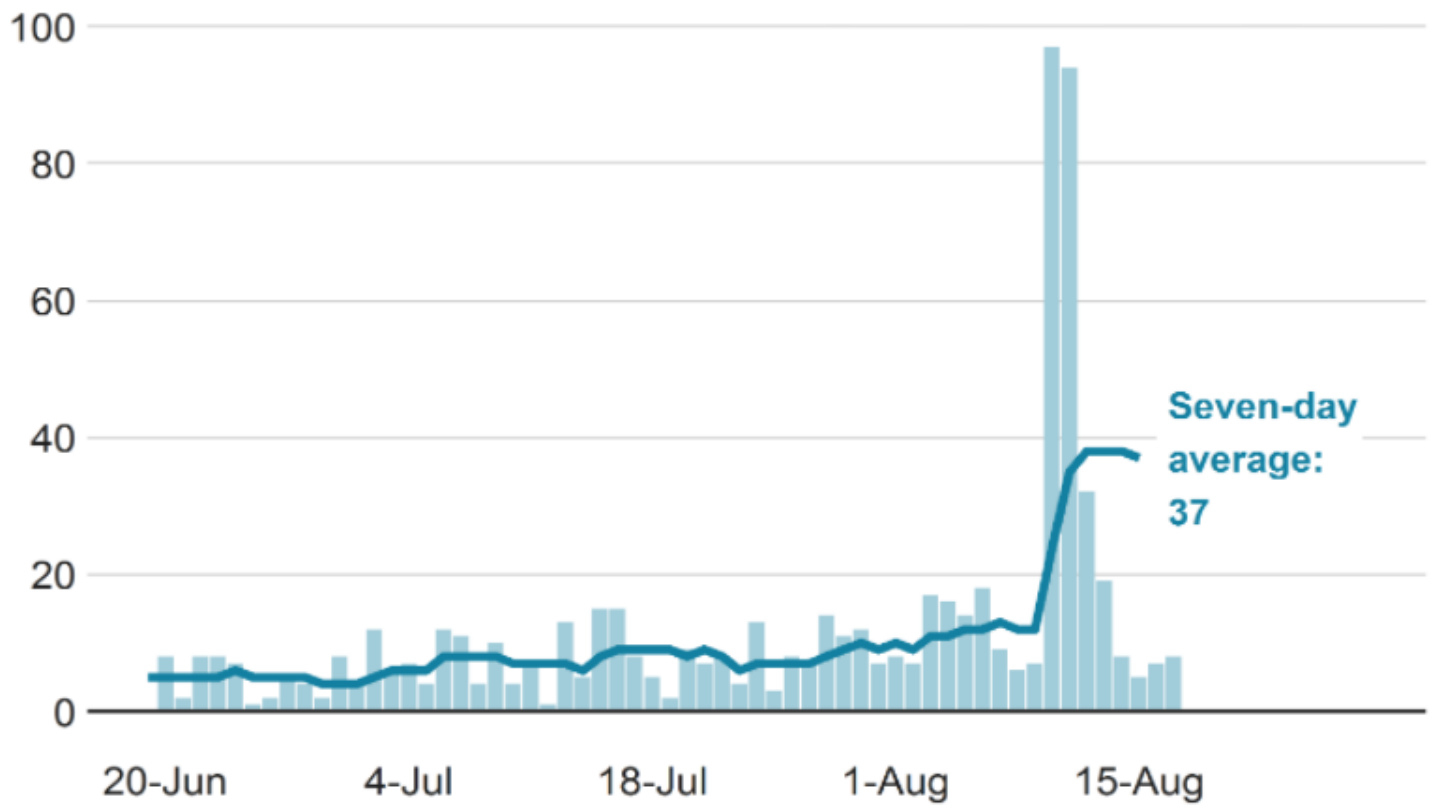


Figure 1. Epidemic curve of a coronavirus disease outbreak in a call center, by date of symptom onset, Seoul, Korea, 2020. Asymptomatic cases are excluded.

Greencore 1

Coronavirus in Northampton, last eight weeks

Lab-confirmed cases by date of specimen



Data for the past few days may be revised

Source: Gov.uk dashboard, data as of 19 August 2020

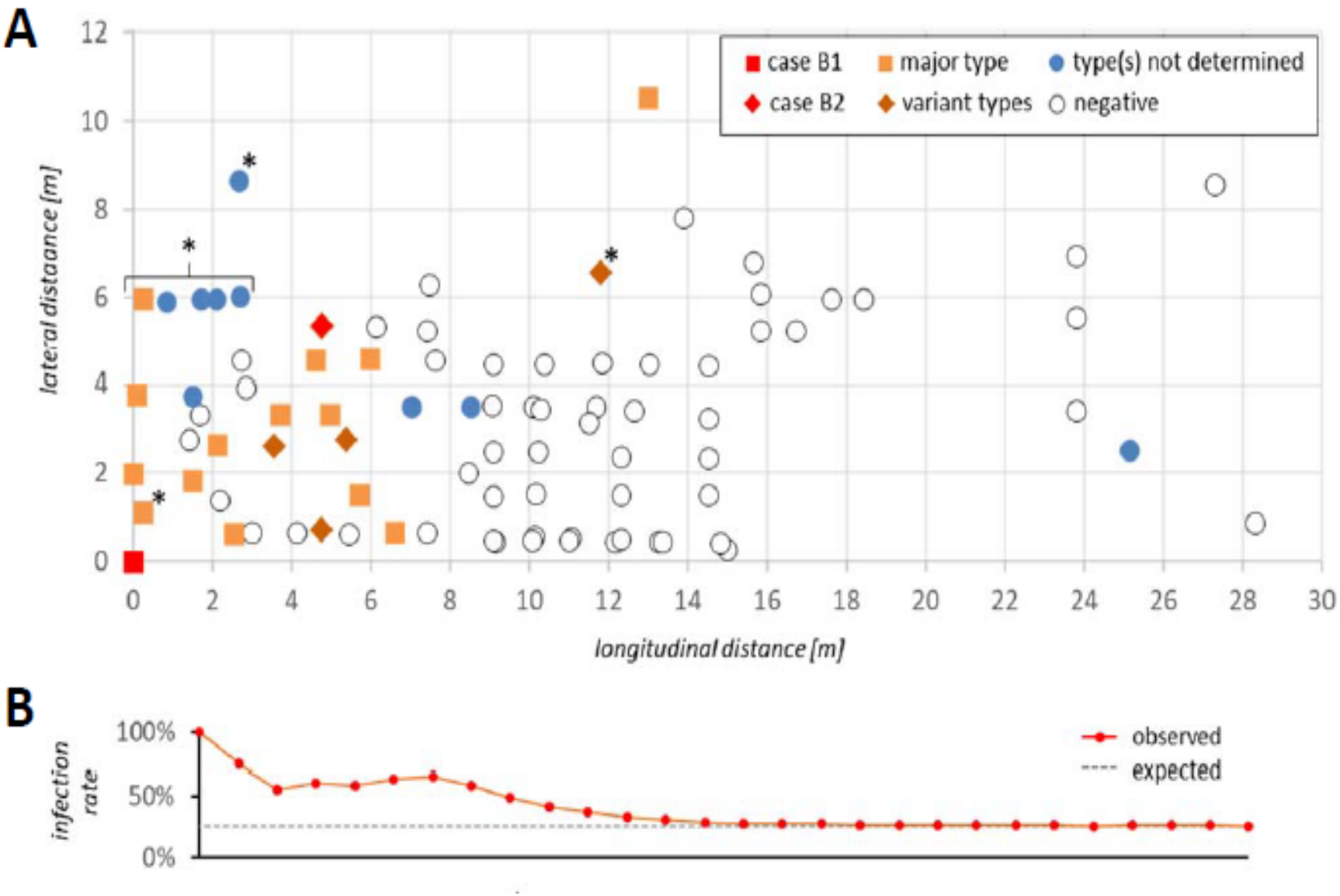
BBC

Greencore 2

▲ Greencore sandwich factory in Northampton. Photograph: greencore

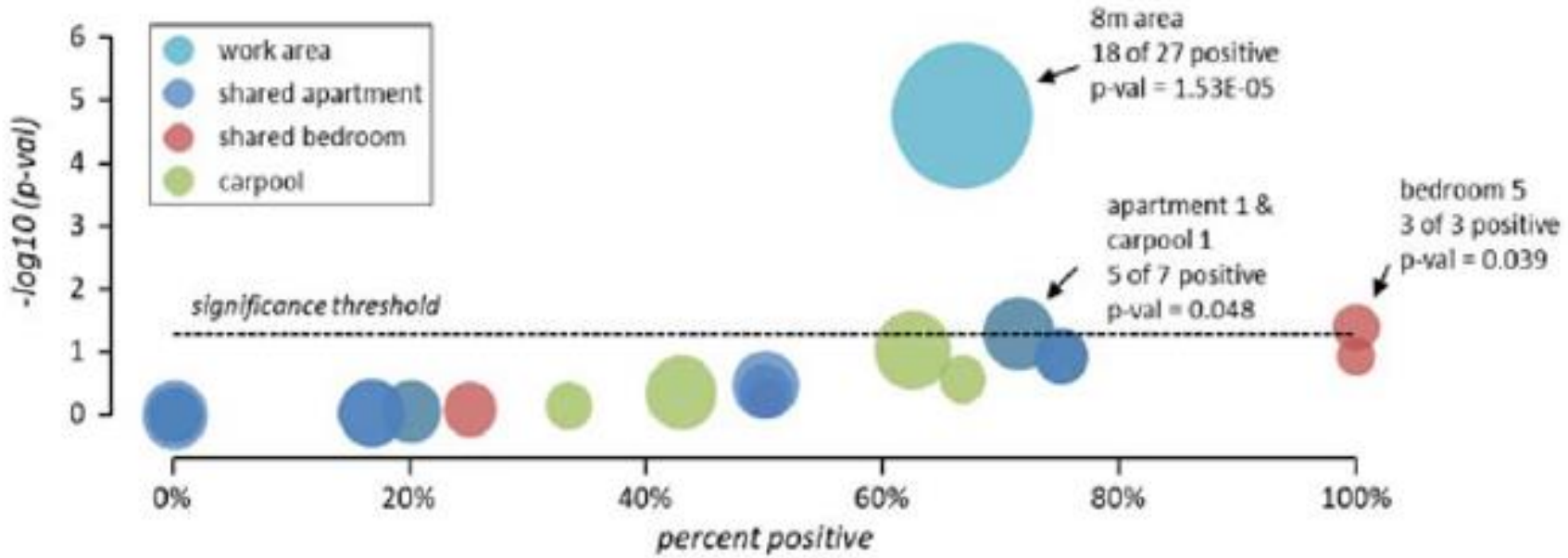
Tönnies outbreak In June, Germany

- 29/147 workers infected initial outbreak
- 60% of workers within an 8m radius infected
- secondary outbreak over 1500 workers becoming infected in the Tönnies factories overall
- This led to a lockdown of a large area in the North Rhine-Westphalia region in western Germany



Tönnies outbreak - how did infection spread?

- Accommodation and shared transport (carpool) looked at in detail
- Spread occurred in one apartment and one carpools from index case <u>after</u> quarantined
- *"…our collective data strongly suggest that the majority of transmissions occurred within the beef processing facility, with (index) case B1 being at the root of the cluster."*



The company told NorthantsLive: "Pubic Health England has endorsed our measures as being 'highly effective' and have noted that we 'continue to work extremely hard to exceed the requirements needed to be COVID-19 secure within the workplace'.

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3654517.

What happens when you don't know about airborne spread of Covid-19, or you ignore the evidence for it, and when official guidance fails to recognise it:

"Through investigations by local Environmental Health Officers, Public Health England and NCC Public Health it is evident that Greencore has highly effective measures in place and they continue to work extremely hard to exceed the requirements needed to be COVID-19 secure within the workplace. As part of our processes to aid our understanding about how COVID-19 is being transmitted in the county, we undertake outbreak control meetings with employers, Trade Unions, various Public Health experts and communications partners. Insights provided by Trade Unions and employers has helped us identify activities and circumstances outside of the workplace that may be contributing to onward transmission of COVID-19, such as car sharing, congregation at smoking shelters and shared accommodation."

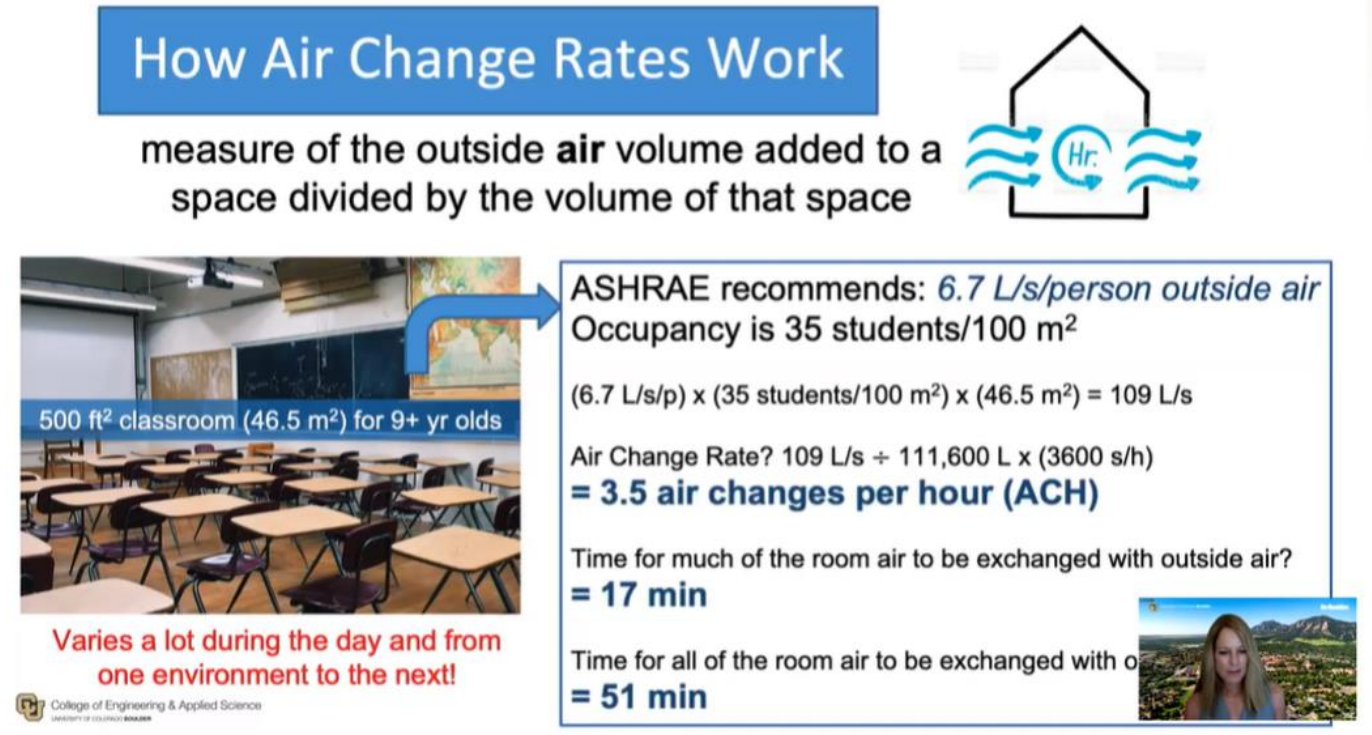
The DPH added that there were "no red flags" in Greencore's premises and that PHN are now "pushing through" the messages relating to government guidelines.

Asked why the factory was not closed when the outbreak was first uncovered, she said: "All evidence is that the setting (factory) is not the risk factor."

https://www.northantslive.news/news/northamptonshire-news/greencore-staff-lift-lid-fears-4443310?fbclid=IwAR3ZzlExqOP-JzOXanlJgmeQTr7zqmhomNfEtjdRm3bSCigTKRxfyioYxig 20/08/2020 and https://www.bbc.co.uk/news/uk-england-northamptonshire-53860426 BBC news 21/08/2020

Ventilation and air filtering

- Air exchange with fresh air is important
- CO2 level can be used as a proxy measure
- Portable air filters work quite well – spec is important but not very expensive



Aerosol scientists gurus on twitter:

@jljcolorado
@linseymarr
@ShellyMBoulder
@j_g_allen
@Don_Milton
@kprather88

A trade union programme

- Employers must recognise airborne spread as a covid-19 risk and take action to assess and minimise risk.

- Improved ventilation and airflow, installation of filtering devices, and use of face masks are required to reduce the infection risk in these environments, alongside other safety measures against Covid-19.

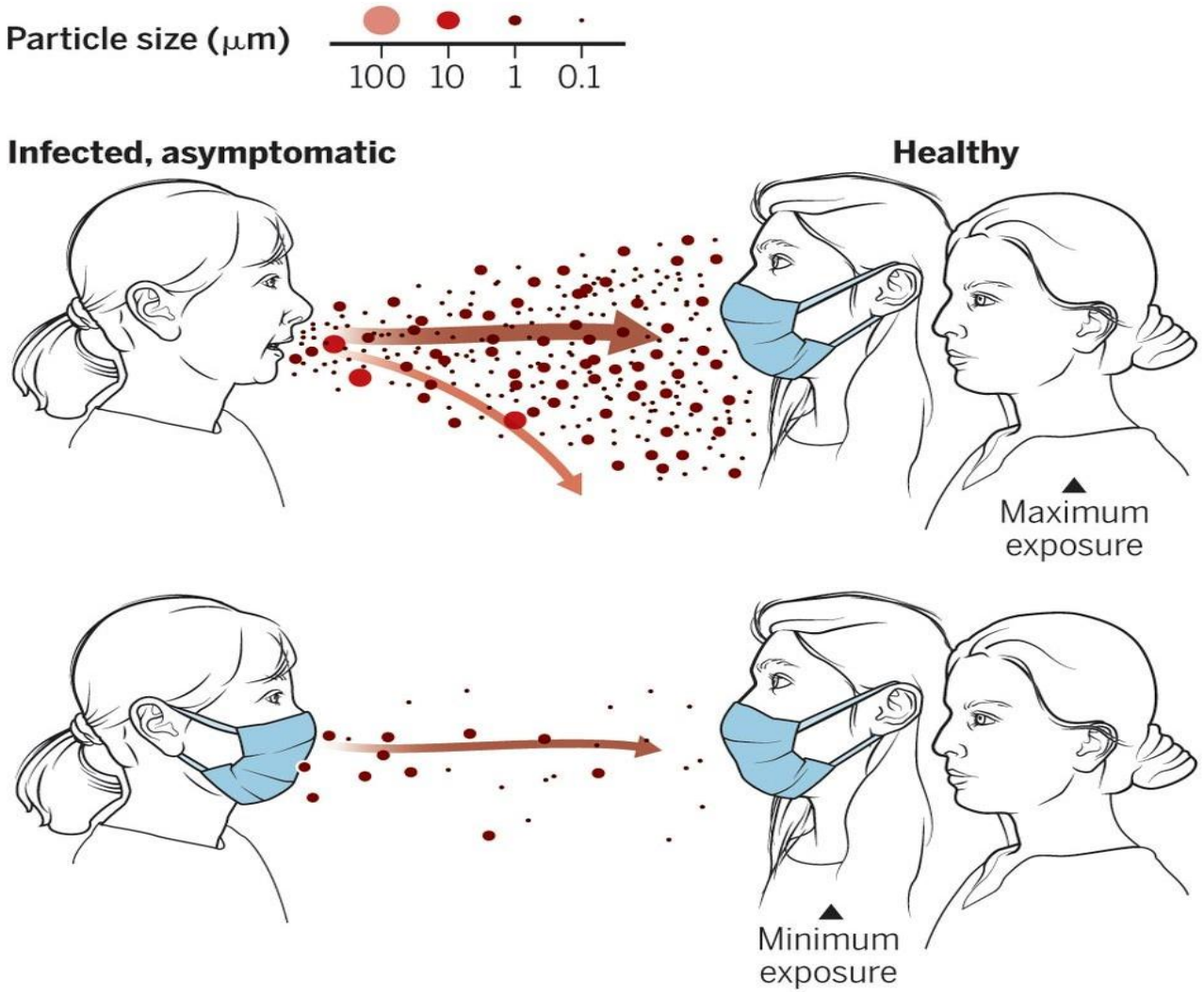
- Trade union supervision and control of workplace safety.

- Weekly surveillance testing on site of all workers, including management, in addition to easily accessible testing for anyone with symptoms or in contact with Covid-19.

- All workers forced to take time off due to having Covid-19 or having been in contact with it should receive full pay while isolating. No-one should have to work while awaiting test results for symptomatic or contact testing.

Masks reduce airborne transmission

Infectious aerosol particles can be released during breathing and speaking by asymptomatic infected individuals. No masking maximizes exposure, whereas universal masking results in the least exposure.



GRAPHIC: V. ALTOUNIAN/*SCIENCE*

Mask effectiveness

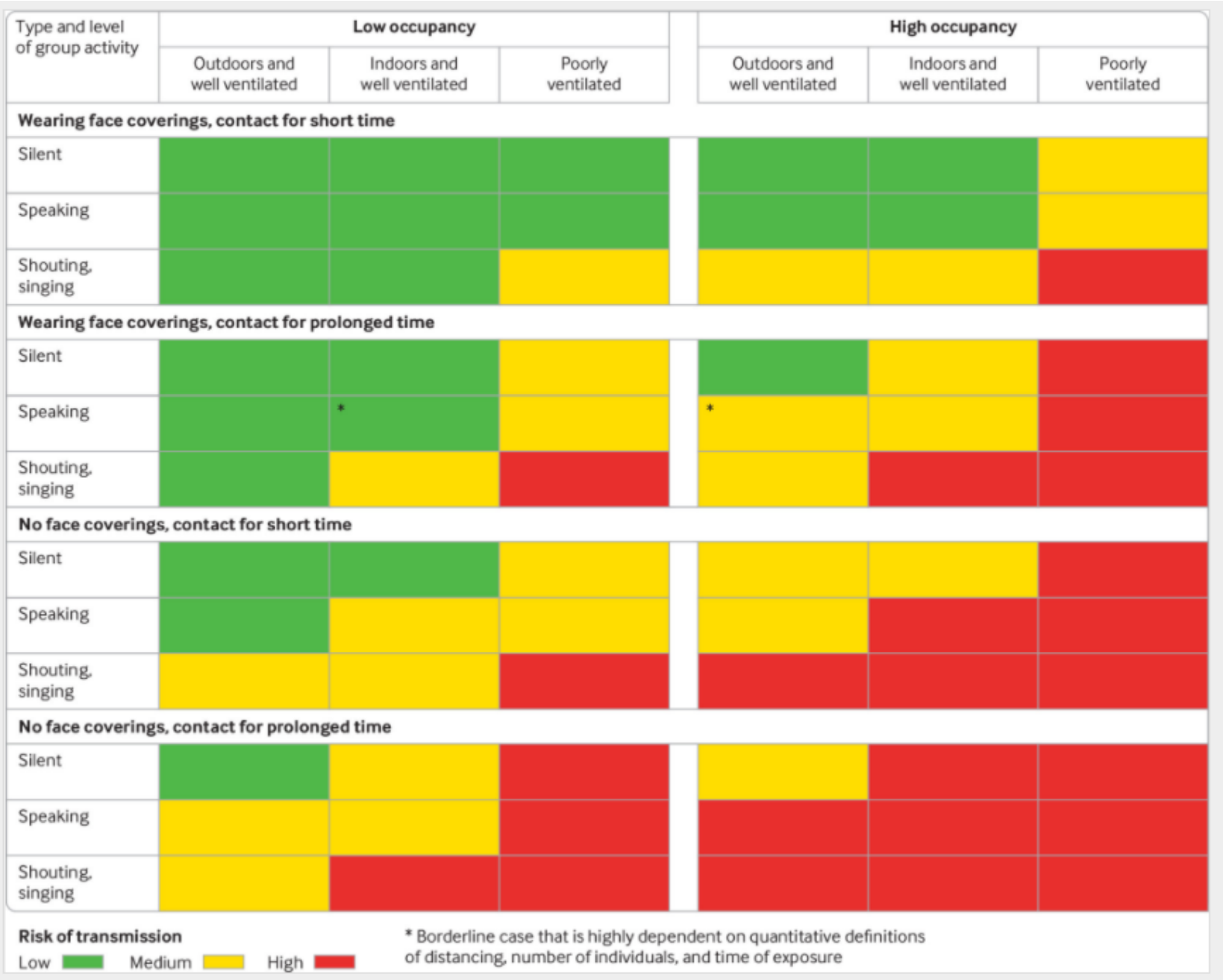
- MASKS WORK!
- ~50% reduction in exhaling virus
- ~30% reduction in inhaling virus
- Average figures; if fit is good even better
- Don’t take it off to talk!
- Wear at all times indoors with other people NOT ONLY when you can’t social distance
- 2-3 layers material better, but something always better than nothing

What should I do myself

- ✓ Distancing - 2m or more
- ✓ Wear a face covering, and encourage others to
- ✓ Open all windows – mini-cabs, bus, train
- ✓ Avoid enclosed spaces with other people
- ✓ Avoid people who are being loud - >> 2m away
- ✓ Keep encounter time short in enclosed space
- ✓ Try not to touch your face
- ✓ Wash your hands when you get home

Good video about masks:

https://www.facebook.com/341163402640457/posts/3430149270408506/?vh=e



https://www.bmj.com/content/370/bmj.m3223

Outdoors walking in the park >2m

Passing someone in the street >2m

Talking to someone outdoors >2m

Supermarket trip (people wearing masks)

Corner shop 2-3 mins

Outdoor gathering 10 people <2m

Football game 5-10 people in park

Small grocery shop, several people ~20 mins

Bus or tube commute 20-30 mins >2m

Taxi / Uber / minicab – windows closed, > 15 mins trip

Laughing, singing, shouting, coughing in enclosed space >2m apart

Indoor gym 30mins workout >2m apart

Small office, no windows, 3-4 people >2m apart

RISK FACTORS FOR SPREAD OF COVID-19

- Anyone can be infected; asymptomatic spread is common
- The distance you are from other people
- The number of people in any given place
- The amount of time you spend near to them
- What activity people are doing while in the space, eg sitting quietly, talking loudly, or coughing.
- The size of the space you and others are in
- The ventilation and airflow in the space you are in
- Are people wearing face covering or mask?
- Surface spread by touching.

And **D**o **N**ot **T**alk **A**loud
So **V**ery **M**uch **S**am

JDF

CONTACT SPREAD FROM SURFACES

Hands to mouth, nose or eyes – try to remember not to touch your face until you are back home and you have washed your hands.

Med students filmed during lectures – touched their faces 23 times per hour on average

https://pubmed.ncbi.nlm.nih.gov/25637115/

Risky places for contact spread

- Bathrooms and toilets
- Public transport
- Shopping trolleys

Hand-washing and sanitiser use are important