



Staying Safe after Circuit Breaker

Dancing with COVID-19

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Speaker's notes

- Singapore underwent lockdown (CB) from 7 April to 1 June 2020 (54 days) to stop the escalating rise in COVID-19 cases
- COVID-19 virus transmission rate ($=R$) was estimated to be 2.4 i.e. 1 person can infect 2-3 persons, who go on to infect 4 to 9 persons, in exponential pattern.
- CB succeeded in bringing down the transmission rate.



After the Circuit Breaker ‘hammer’

What’s next?

Phase 1: Safe Re-opening

*“Singapore has **hidden reservoirs of coronavirus infections** in the community: Experts” “..**People need to be reminded constantly that the outbreak is ONGOING..**”*

(The Straits Times, June 4, 2020)

Phase 2: Safe Transition

*“**We have long forgotten about Dorscon Orange.** My family and friends just keep mentioning that we are in phase 2 and waiting for phase 3 to come.”*

*“..**some don’t even bother to wear masks anymore..** There are many inconsiderate people who come too near my parents or me, and yet **they told us off when we asked them to keep an appropriate distance.**” “**Just tell us what to do, we will follow.**”*

(The Sunday Times, Sun, June 28, 2020)

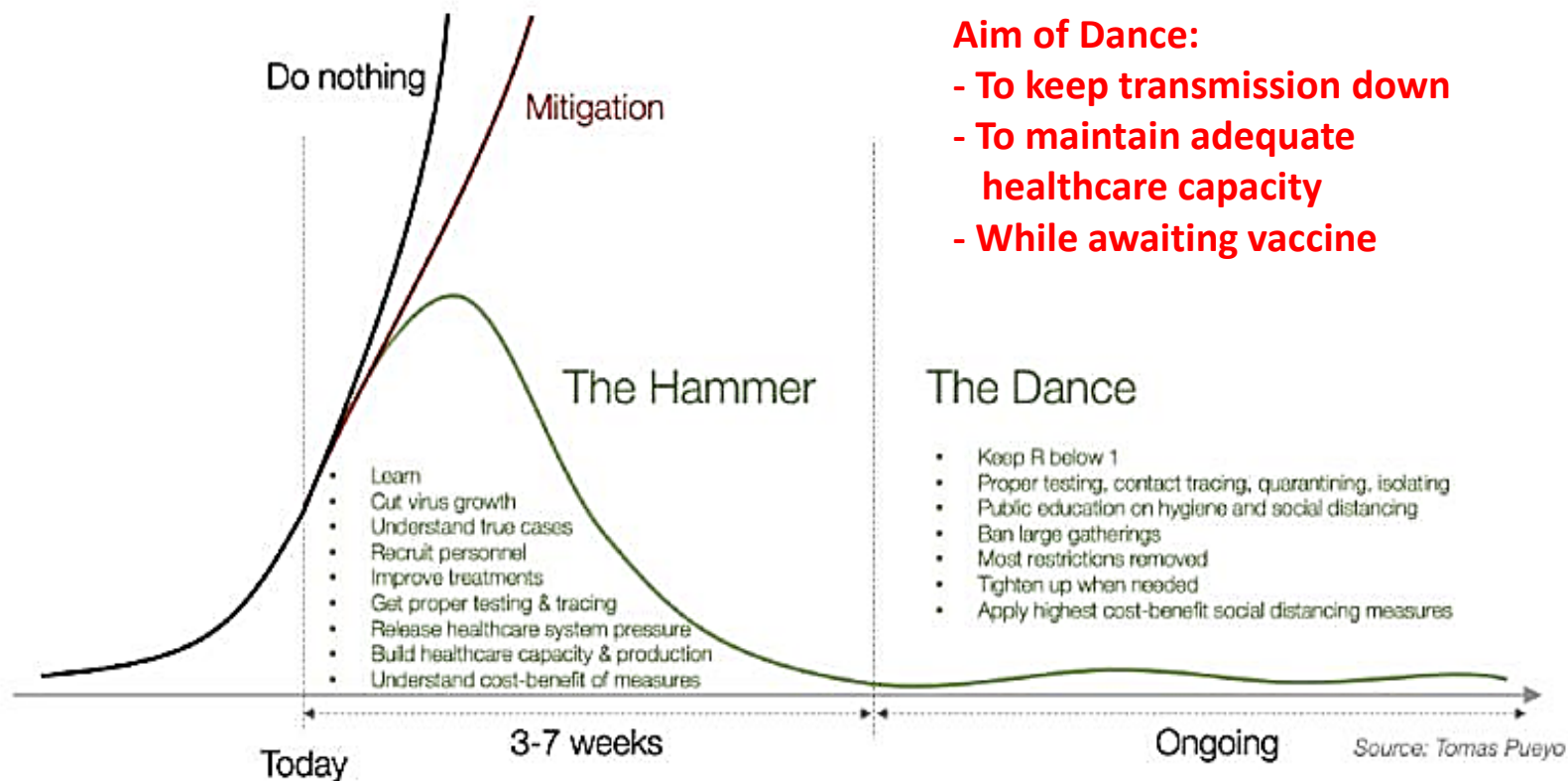
Speaker's notes

Public education is needed to remind people that the Covid-19 crisis is not over yet.

Doctors , as an authoritative voice, can help to disseminate the needed education, e.g. GPs to their patients in the community. One taxi driver said, on people not wearing masks: “ We don’t understand why it is so important.. E.g. Can you get the virus through the skin? “

Next Phase: the *Dance* with Covid-19

The 'Hammer' followed by the 'Dance'



The *Dance* to keep $R < 1$

Watch the
Transmission Rate

CASES



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**Hygiene Measures
& Safe Distancing**
Testing, Contact Tracing,
Isolation & Quarantine

CASES



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Travel Ban
Ban on Social Gatherings

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School Closures
Business Closures

Speaker's notes

What are the dance steps?

- “Any country can follow a series of measures that are very cheap and can dramatically reduce the epidemic: mandate wearing home-made masks, apply physical distancing and hygiene everywhere, and **educate the public** ” -Tomas Pueyo.
- The aim is to keep the transmission rate below 1 ($R < 1$) i.e. to make sure 1 infected case infects less than one person and avoid exponential (1 infect 3, 3 infect 9, 9 infect 27..) rate of spread
- THIS IS THE GOAL OF THIS SHOW- TO EDUCATE THE PUBLIC TO GO FOR THE CHEAP MEASURES - WHAT ARE THESE?



3 Things to Do

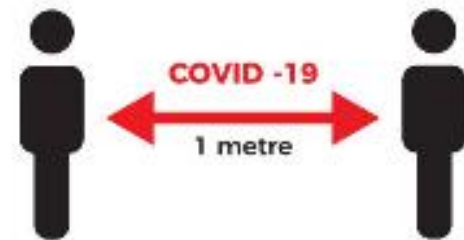
A. Wear a mask at all times



B. Hand Washing



C. Safe Distancing



Speaker's notes

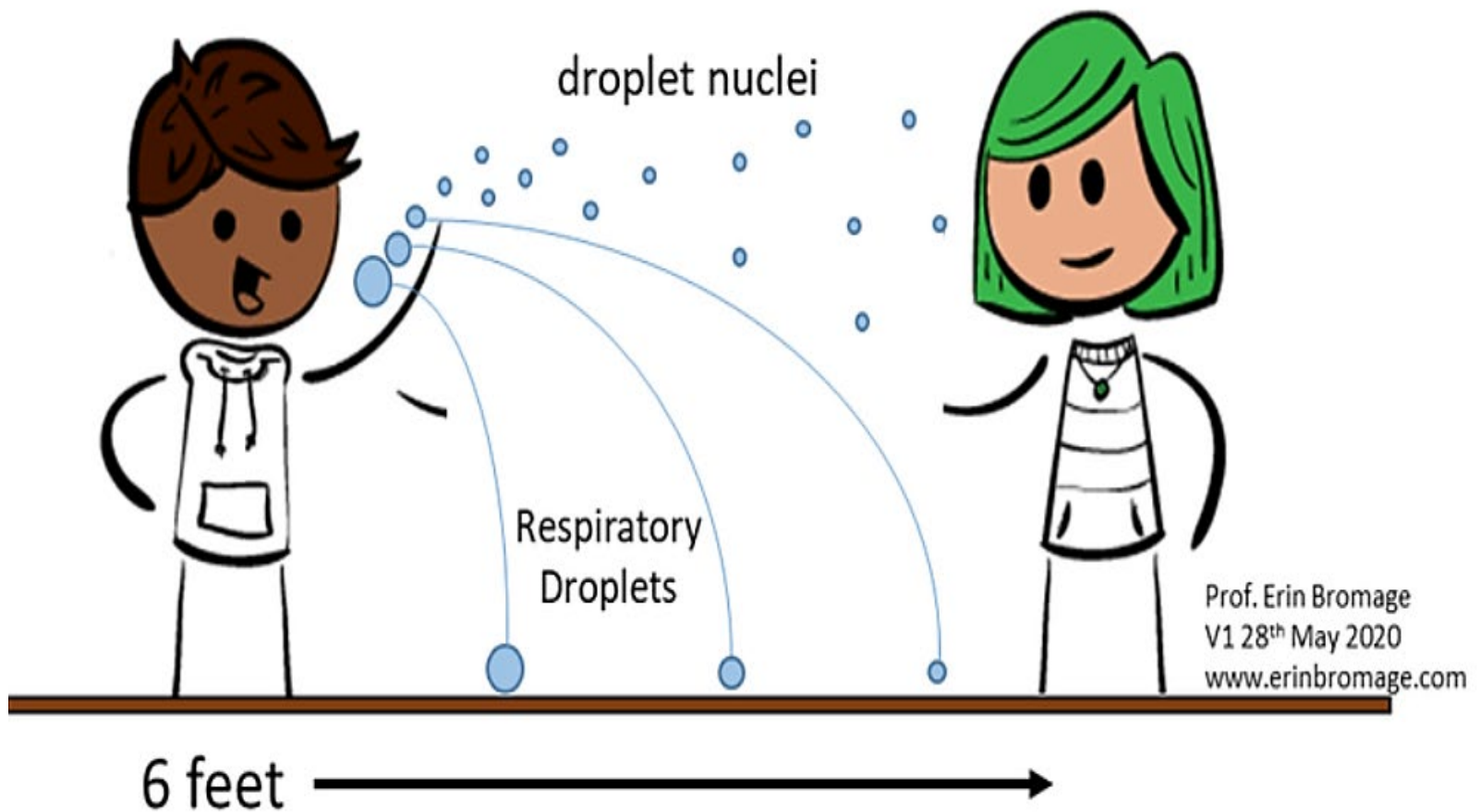
These are the cheap and very effective measures.

Nevertheless, they will work ONLY if EVERYONE does them!

This presentation aims to explain WHY these measures are important in order to achieve control of the current COVID-19 pandemic.

Let's look at them:

A. Why Mask Up?



Speaker's notes

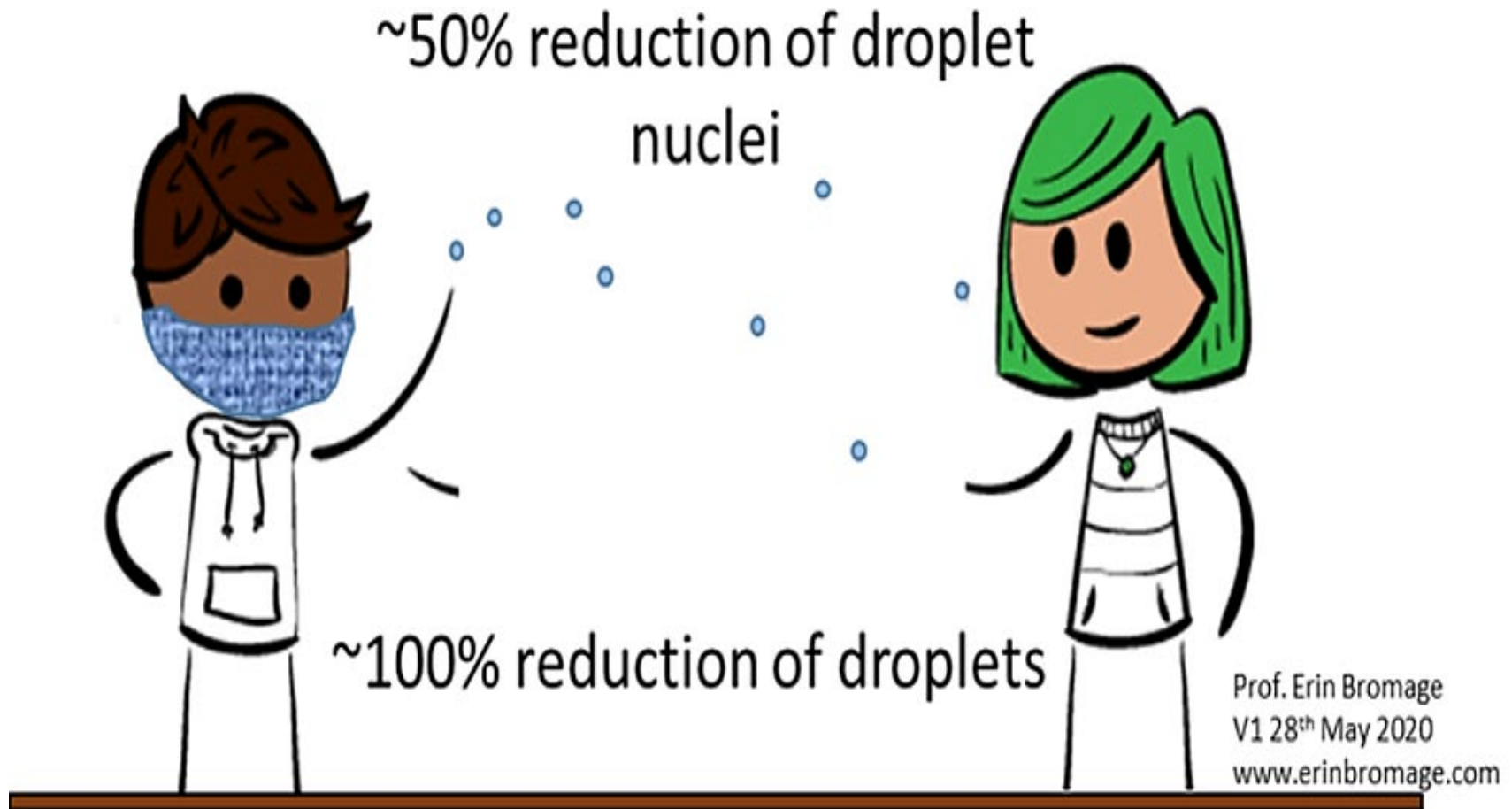
Why mask up?

Virus is spread through the saliva droplets of an infected person – through

- coughing
- sneezing
- singing
- Talking and
- breathing

.

A Mask reduces dissemination effectively



Speaker's notes

Why mask up?

A mask reduces dissemination of saliva effectively:

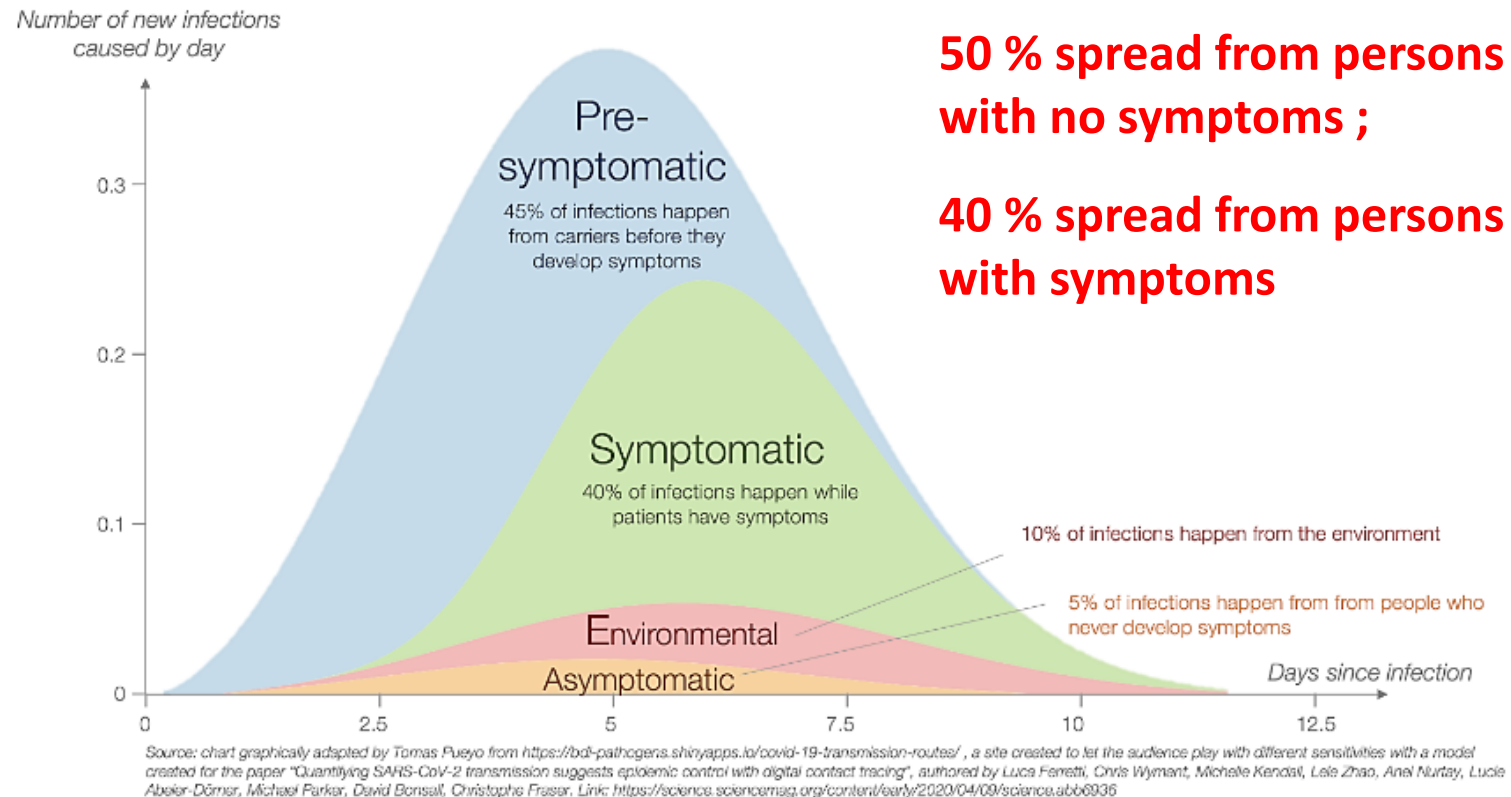
50% reduction of small droplet nuclei

100% reduction of big saliva droplets

This is significant in the light of what we now know about who is spreading the infection (next slide)

The Virus is shed by people with **NO Symptoms**

Chart 15.a: How Do Coronavirus Carriers Infect Other People?



Speaker's notes

People with no symptoms are spreading the virus --
NOTE that

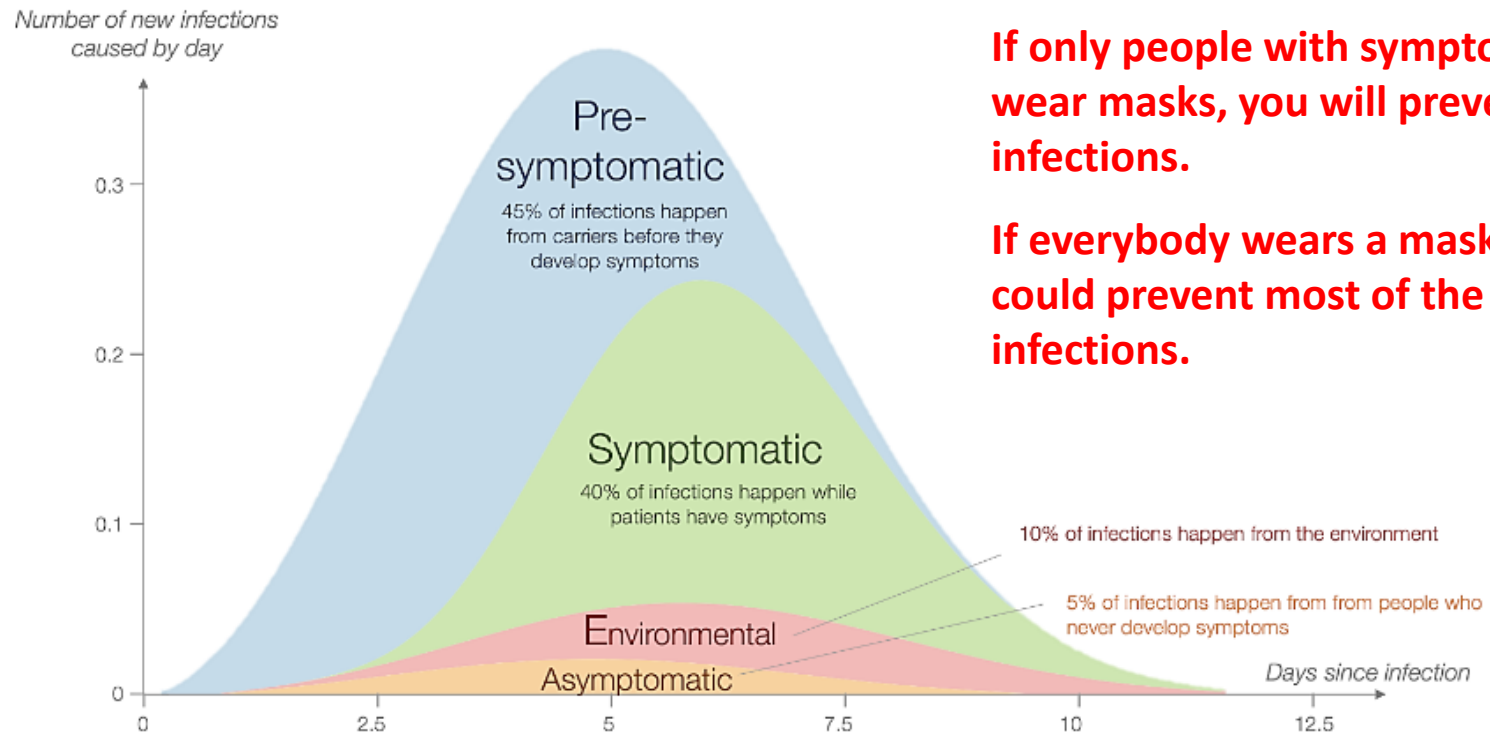
**50 % spread from persons
with no symptoms ;**

**40 % spread from persons
with symptoms**

An infected person can be shedding the virus into the environment for up to 5 days before symptoms begin. And some people never develop any symptom throughout their infection.

The Virus is shed by people with **NO Symptoms**

Chart 15.a: How Do Coronavirus Carriers Infect Other People?



Source: chart graphically adapted by Tomas Pueyo from <https://bd-pathogens.shinyapps.io/covid-19-transmission-routes/>, a site created to let the audience play with different sensitivities with a model created for the paper "Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing", authored by Luca Ferretti, Chris Wymant, Michele Kendall, Lele Zhao, Anel Nurtay, Lucile Abeler-Dörner, Michael Parker, David Bonsall, Christophe Fraser. Link: <https://science.sciencemag.org/content/early/2020/04/09/science.abb6936>

If only people with symptoms wear masks, you will prevent <1/2 infections.

If everybody wears a mask, you could prevent most of the infections.

Speaker's notes

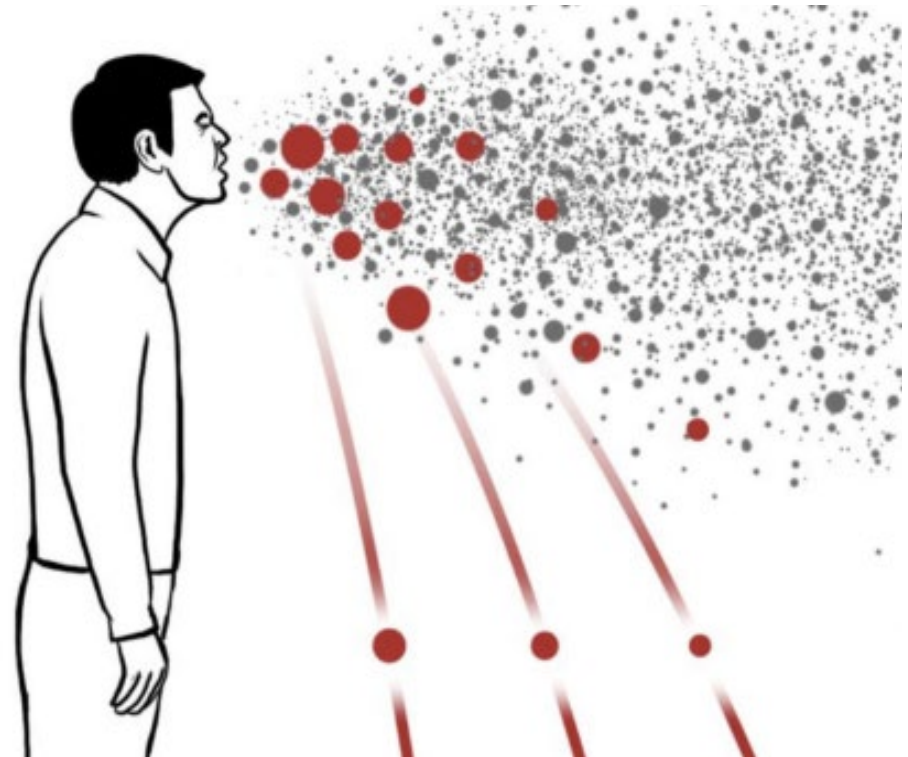
TWO points to note

- If only people with symptoms wear masks, you will only prevent less than half ($< \frac{1}{2}$) the infections.
- BUT If everybody wears a mask, you could prevent most of the infections.

Successful Infection = **Viral Load** accumulated over **Time**

Viral load disseminated
when you

- cough
- sneeze
- sing
- **talk (200 copies/min)**
- **breathe (20 copies/ min)**



Speaker's notes

FOR “successful infection” :

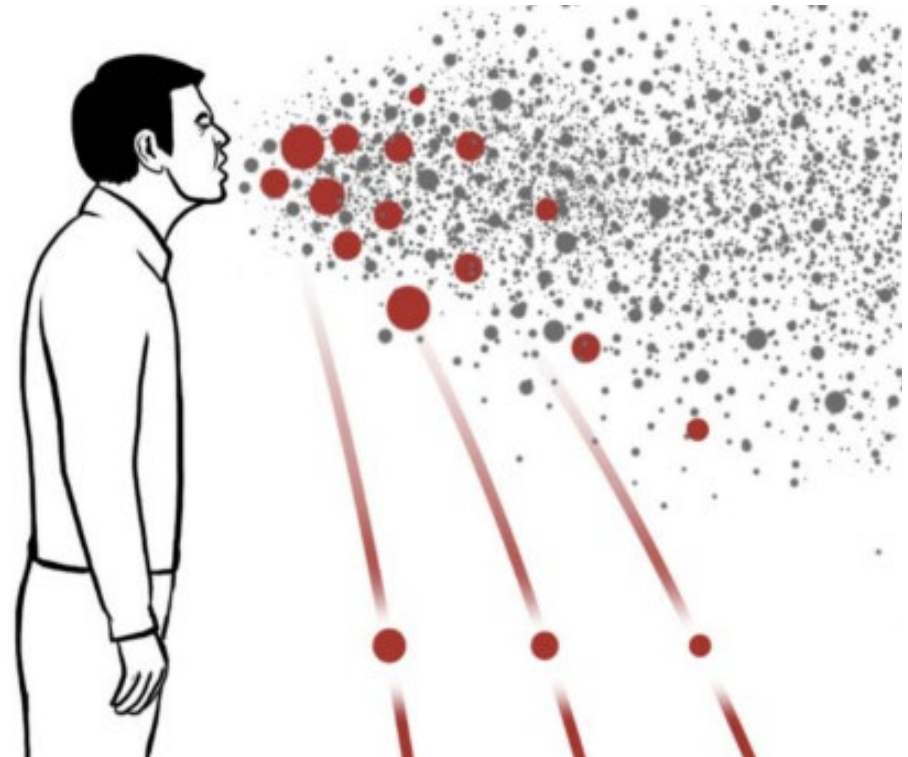
1. You need to receive a big enough dose of virus (minimum viral load) to get sick
2. The time needed for you to collect enough viral load to get sick depends on the activity you are engaged in :
Talking, singing, shouting, or just sitting there breathing
 - a. A talking infected person can give you 200 viral copies every minute you are in conversation with him
 - b. If he is sitting and breathing quietly next to you, you are receiving 50 viral copies per min.



Successful Infection = 1000 viral copies received

Infection occurs with:

- 5 min (x 200/ min) talk in face to face encounter
- 50 min (x 20/min) breathing in enclosed space



Speaker's notes

Successful infection = 1000 viral copies received

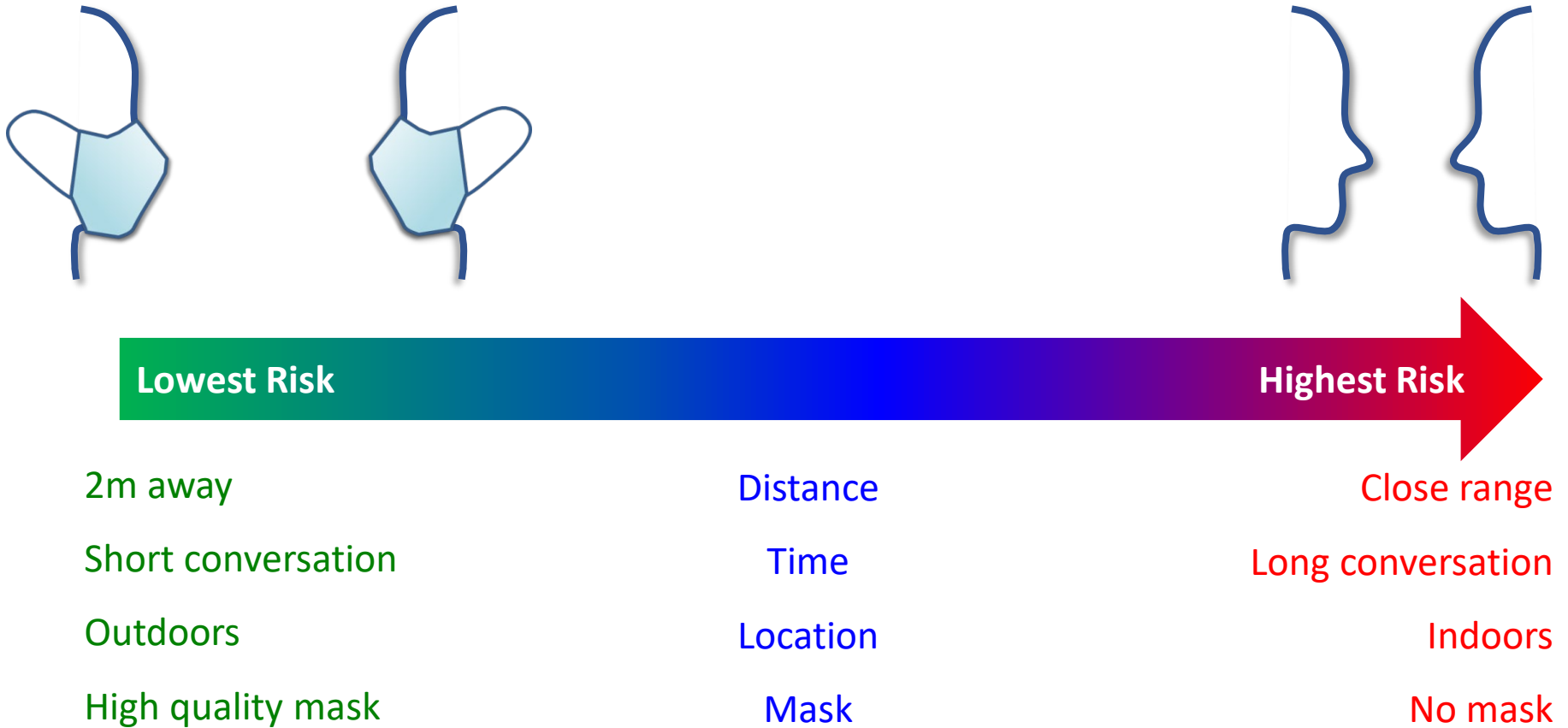
This means that:

If you spend > 5 min in a face to face encounter with an infected person , you can potentially get infected.

If you are in an enclosed space (e.g. an air conditioned office), where there is an infected person, for > 50 min, you can potentially get infected.



Risk Factors for viral load build up in Face to Face Conversations

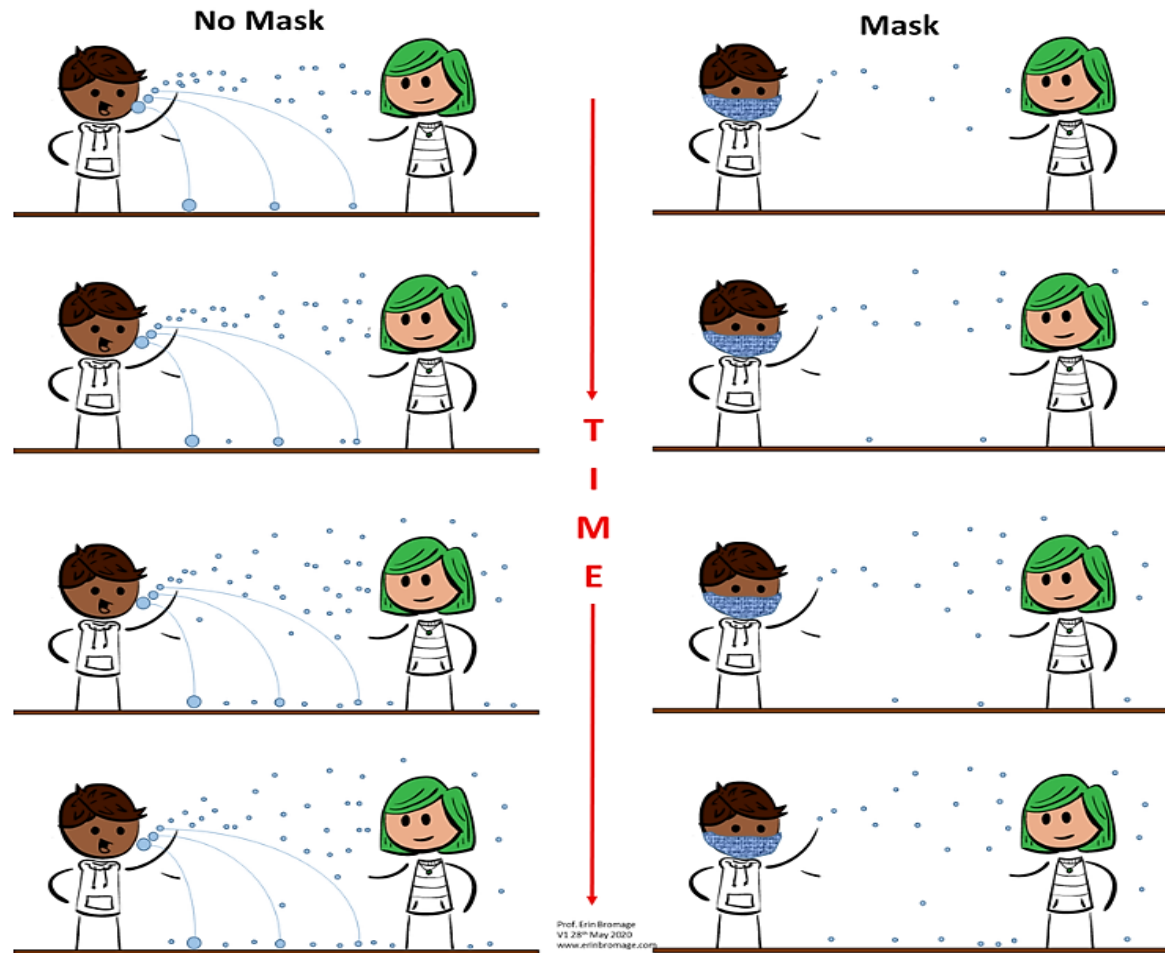


Speaker's notes

Therefore, infection risk is highest when there is much **social interaction**

- Major infection events were indoors, with people closely-spaced, with lots of talking, singing, or yelling.
- The main sources for infection are home, workplace (call centres, open offices, meat packing factories), public transport, social gatherings (church services, weddings and funerals), and restaurants.
- High risk situations account for 90% of all transmission events.

Saliva Droplets accumulate over Time in Enclosed Spaces with Low Air Exchange

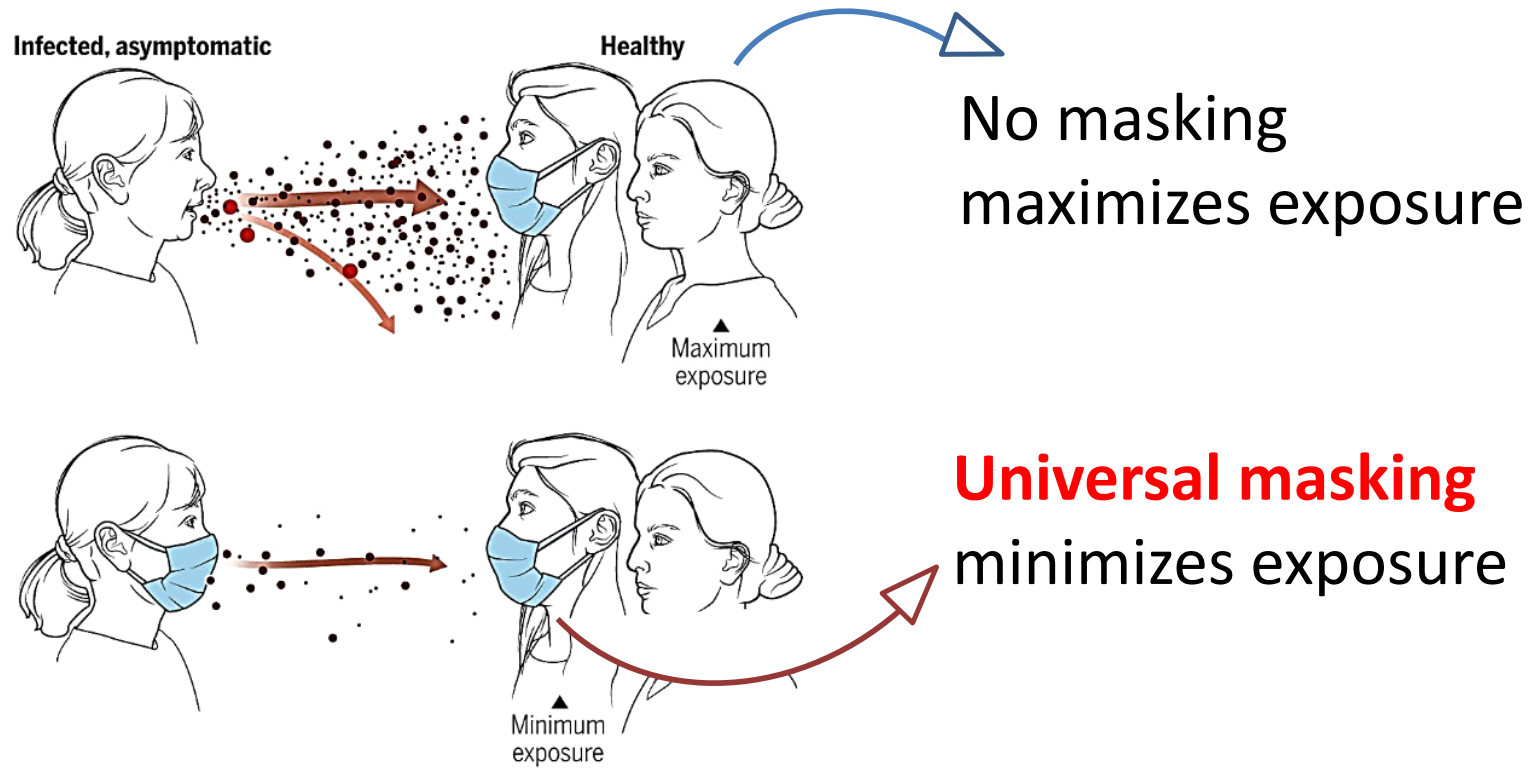


Speaker's notes

Infection risk is highest in **enclosed spaces with low air exchange**

- Any environment that is enclosed, with poor air circulation and high density of people, carries a high risk of transmission e.g. malls, auditoriums, meat packing factories, churches and other religious centres.
- Any indoor event where there is close contact and talking over extended period of time e.g. indoor sports events, weddings and funerals are high risk activities.
- If you are in an **open floor plan office**, you need to critically assess the risk (volume, people, and airflow) **AND wear a mask at all times.**

6. Universal Masking minimises exposure



GRAPHIC: V. ALTOUNIAN/SCIENCE

Speaker's notes

THE MESSAGE IS CLEAR:

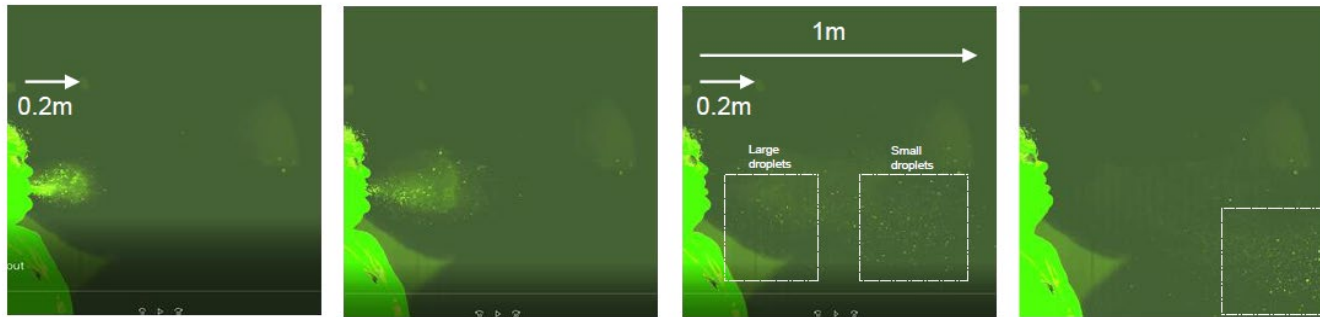
Universal masking minimises exposure

- All need to be masked, for maximum protection.

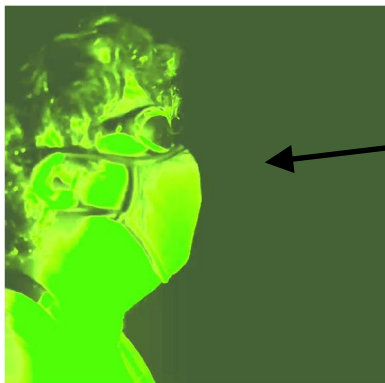


Effectiveness of Masks depends on **Correct Usage**

Subject does NOT wear a mask

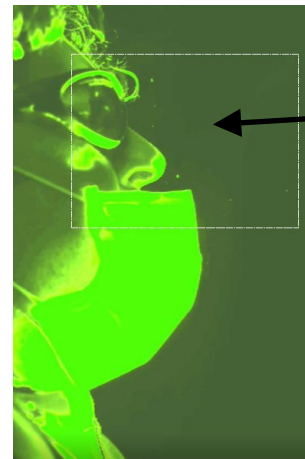


Subject wears a mask properly



NO droplet

Subject does not wear a mask properly



Some droplets

Speaker's notes

The effectiveness of masking depends on correct usage

An experiment, conducted by our local A-Star scientists with Singhealth doctors, showed :

- No mask: droplets filled the room
- Use of mask: no droplet in the air
- Mask below nose: some droplets seen

<https://www.a-star.edu.sg/News-and-Events/a-star-news/news/covid-19/why-is-it-important-to-wear-a-mask-to-prevent-the-spread-of-covid-19>

Any mask is better than no mask

Rationale behind use of mask

- Protect yourself from other people's saliva droplets
- Protect others from your saliva droplets

Surgical mask

- **Wear the right way**
 - Blue side repels liquid, faces outwards
 - Inner layer absorbs your saliva
- **Fit mask to your face** (mould metal piece over nose bridge, no gap at sides or chin) So that you **breathe through the mask**
 - Middle layer filters air



Cloth mask

- reduces droplet transmission
- A more Fitted mask with Filter confers more protection but..

ANY MASK IS BETTER THAN NO MASK

Speaker's notes

In use of a mask, firstly : Surgical or cloth type, any mask is better than no mask

- Use correctly
- A mask that fits confers protection
- Wash or sanitise hands before and after touching a mask.
- Recyclable cloth mask must be washed with soap and water after daily use.

Who, When and Where to wear a Mask?

EVERYONE!

ALL THE TIME!

(except when eating / drinking)

EVERYWHERE!

- Once you leave your house
- On public transport
- Malls and supermarkets
- Packing rooms
- Open offices
- While waiting for food, and after meal in restaurants



Speaker's notes

- Everyone to wear a mask
- Wear a mask Everywhere, especially where safe distancing cannot be observed e.g. on train, in crowded supermarket
- Wear it All the time (except when eating and drinking) – mask up till your food arrives and talk only after your meal, with your mask on.

The Use of a Mask is a Social Contract

**My mask protects you,
Your mask protects me!**



Speaker's notes

Use of mask is a social contract for mutual safety:

“My mask protects you, your mask protects me!”



B. How **Hands** can spread Covid-19

<https://www.youtube.com/watch?v=l5dl74zxPg&authuser=0>

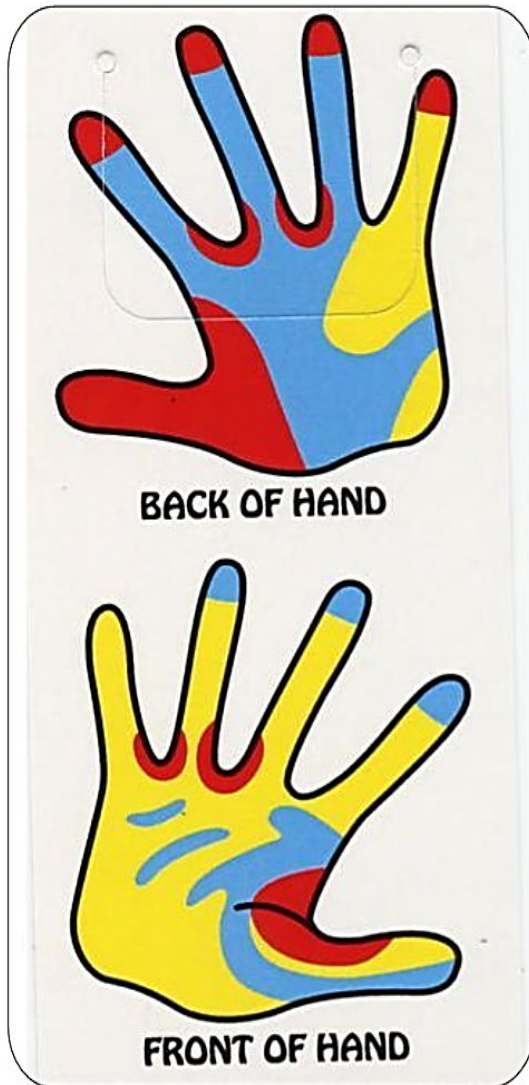
Washing your hands with soap and water or using alcohol-based hand rub kills viruses that may be on your hands (WHO)

Speaker's notes

WASHING HANDS

- The Covid-19 virus is easily killed by soap.
- Requirement : wash your hands with soap and water THOROUGHLY for at least 20 seconds (the time it takes to sing “Happy Birthday” song 2X).

How **Hands** can spread Covid-19



**Areas most frequently
missed during hand
hygiene**

Less frequently missed

Not Missed

(Adapted from Taylor L (1978), An evaluation of
Hand washing techniques-1, Nursing Times, 12 Jan p54-55)

Speaker's notes

Most people wash their hands hurriedly.

- Areas most frequently missed are in red –thumb, finger webs; less frequently missed are in blue –dorsum of hand
- SO: Take time – 20 seconds!- to wash all parts of your hands!
- Washing hands adequately can prevent COVID-19 infection

Protecting yourself and others from the spread COVID-19 (WHO)

Wash your hands

Wash your hands with soap and running water when **hands are visibly dirty**



If your **hands are not visibly dirty**, frequently clean them by using alcohol-based hand rub or soap and water



Protect yourself and others from getting sick

Wash your hands



- after coughing or sneezing
- when caring for the sick
- before, during and after you prepare food
- before eating
- after toilet use
- when hands are visibly dirty
- after handling animals or animal waste



Speaker's notes

WHO tagline is

“Save lives- Clean your hands!”

- Wash with soap and water if hands visibly dirty
- If hands are not visibly dirty, clean them frequently with alcohol rubs, or soap and water
- Wash your hands after these seven actions: after coughing or sneezing ... handling animals (read list)

6-Step Hand Washing Technique (WHO)



Rub hands palm to palm



Right palm over left backhand with interlaced fingers and vice versa



Palm to palm with finger interlaced



Backs of fingers to opposing palms with fingers interlocked



Rotational rubbing of left thumb clasped in right palm and vice versa



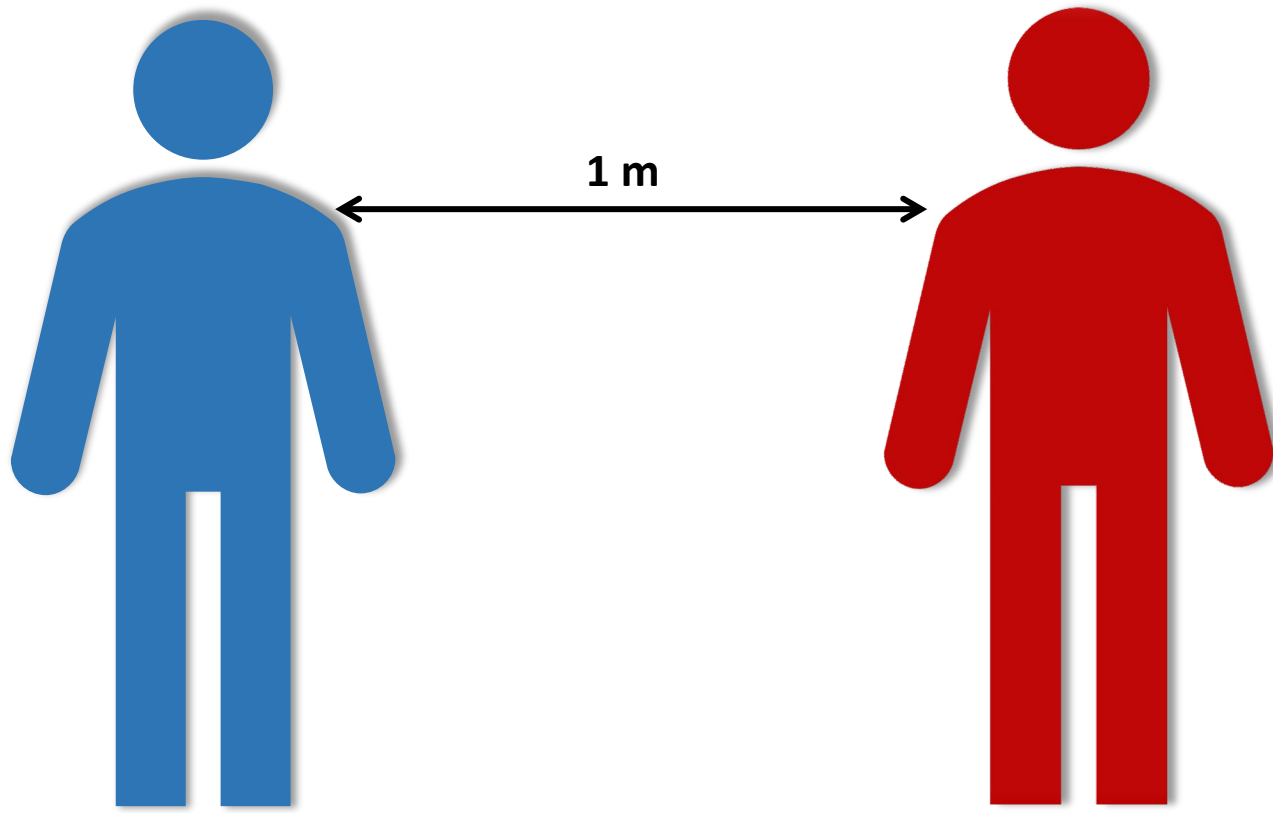
Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa

Speaker's notes

Let us revise the 6 steps of washing hands

- 20 seconds. Hum with "Happy Birthday" song from beginning to end twice.
 - Wet your hands with clean, running water (warm or cold), turn off the tap, and apply soap.
1. palm to palm
 2. Right palm over left backhand fingers interlaced and vice versa
 3. Palm to palm with fingers interlaced
 4. Back of fingers to opposing palms with fingers interlocked
 5. Rotational rubbing of left clasped in right palm and vice versa
 6. Rotational rubbing backwards and forwards with clasped fingers of right hand in left palm and vice versa
- Dry your hands using paper towel

C. Safe Distancing is Crucial!

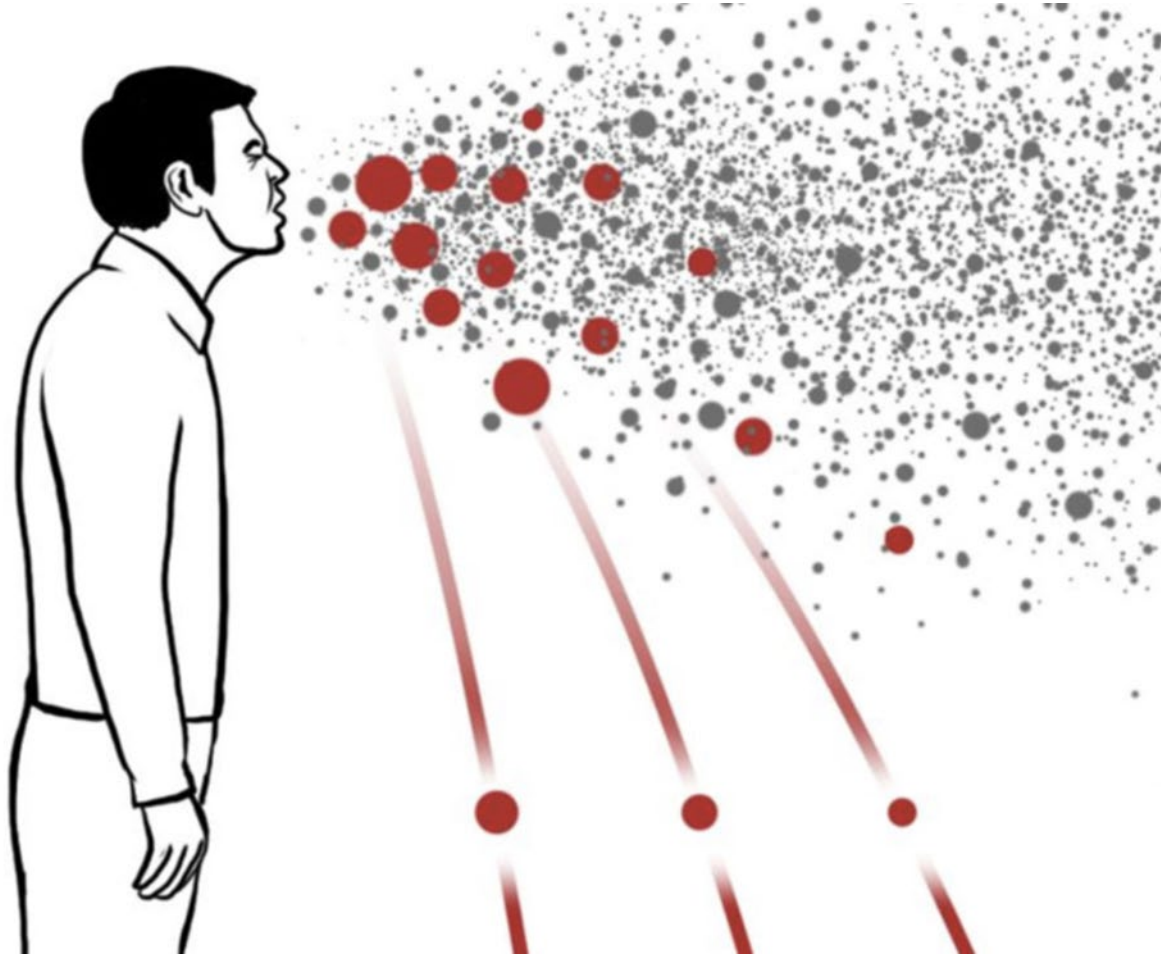


Speaker's notes

SAFE DISTANCING TIPS

- Singapore uses more than 1 m apart
- Ideally don't meet anybody – stay at home!
- If you must go out, stay at least 1 m away from anyone

Why must we stay $> 1\text{m}$ Apart?

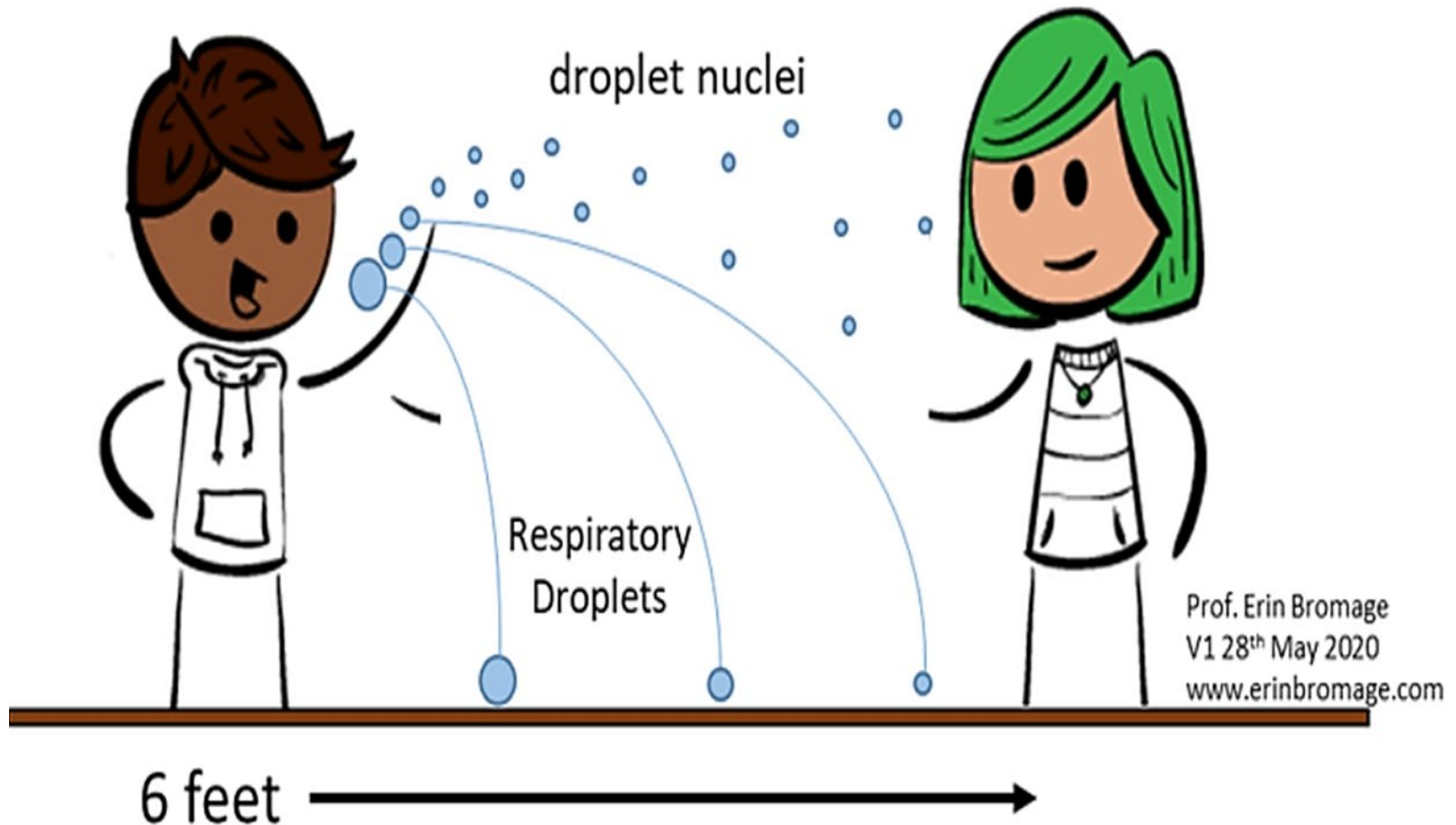


Speaker's notes

Why must we stay >1 m apart?

When you are close to an infected person you are exposed to MOST of his saliva droplets.

Biggest droplets will drop to the ground or on surfaces like furniture or on **YOU** if you are close enough!



Speaker's notes

- You don't want to get “rained on” by the biggest saliva droplets (with the highest viral loads) from a virus carrier!
- Stand at least 1 m apart

Safe Distancing

- Stand or sit at least 1m apart
- When eating, do not gather together
 - Sit apart, on alternate seats
 - Keep distance of at least 1m
- Do not socialise during and after work
 - Do not gather in groups as far as possible
 - Do not meet others unnecessarily, even after work

Speaker's notes

Practising Safe distancing essentially means minimise physical interaction with others :

- Do not socialise during or after work
- Do not gather in groups as far as possible
- Do not meet others unnecessarily, even after work
- Minimise the size of extended family gatherings

Meals at Work or in Public Places

- Sit > 1 m apart
- When mask is down, eat and drink only
- **Talk only
(before or after
your meal) with
mask on**



Speaker's notes

For meals at work and in public places..

- Mask up while queuing or waiting for your food.
- Eat quietly
- Mask up after you have finished eating before engaging in talking
- Saliva exchange is greatest when facing each other .
- Sit at least one m away from others

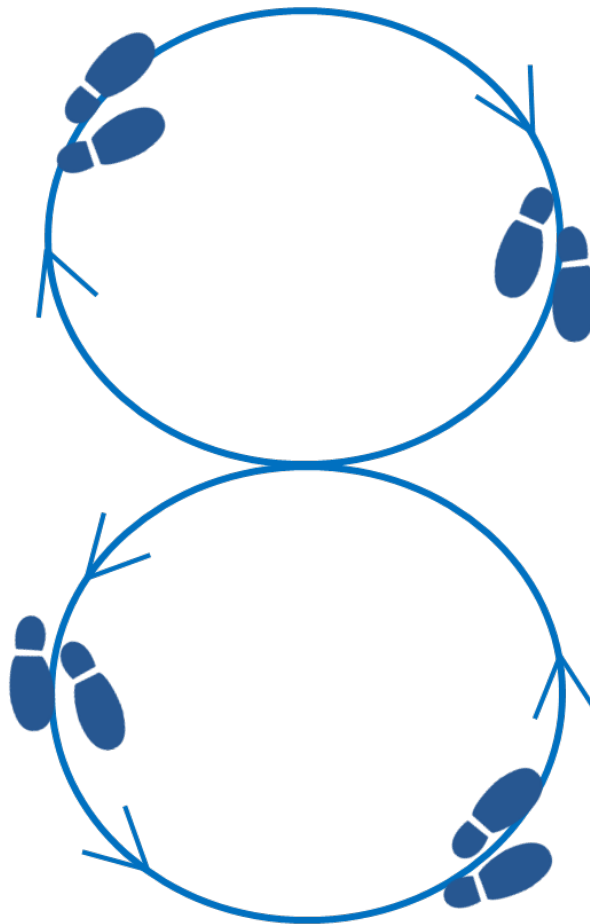
REMEMBER The *Dance* to keep $R < 1$

Watch the
Transmission Rate

CASES



CASES



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**Hygiene Measures
& Safe Distancing**

Testing, Contact Tracing,
Isolation & Quarantine

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Travel Ban

Ban on Social Gatherings

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School Closures

Business Closures

Speaker's notes

So dance correctly, to keep $R < 1$:

- Continue these cheap hygiene measures of mask use, hand washing and safe distancing
- Continue testing, contact tracing, isolation and quarantine

As we move into phase 2, we must NOT

- forget that the Covid-19 outbreak is ongoing.
- drop our defence guard.

Or the transmission rate will increase and expensive measures like business and school closures will be needed again.



**“The health of ALL depends on
EACH ONE of us!”**

Call to ALL Singaporeans/residents:

“We Need **EVERYONE to Cooperate..”**

- Minister Lawrence Wong (May 2 2020)

It is an offence to disobey safe distancing measures.

Speaker's notes

- Indeed **“the health of ALL depends on EACH ONE of us!”**

This is a call to every Singaporean/ resident to take responsibility for your life and your livelihood, and the lives and livelihoods of others.

- We have invested \$92 billion, the country does not have limitless resources. Let us do the **simple inexpensive measures** in order to allow the economy to rev up, and save jobs and livelihoods, and allow our children to be educated.
- **“We need EVERYONE to cooperate. Together we can overcome!”**

References and Acknowledgments

1. “The risks- know them – avoid them” – Erin Borage*

<https://www.wral.com/coronavirus/erin-bromage-virus-spread-the-risks-know-them-avoid-them/19094009/>

2. Coronavirus: Learning How to Dance - Tomas Pueyo* – Medium

<https://medium.com/@tomaspueyo/coronavirus-learning-how-to-dance-b8420170203e>

3. Coronavirus: The Basic Dance Steps Everybody Can Follow

<https://medium.com/@tomaspueyo/coronavirus-the-basic-dance-steps-everybody-can-follow-b3d216daa343>

4. Prather*, Wang and Schooley “Reducing transmission of SARS-Cov-2” , Science 27May20202.

(<https://science.sciencemag.org/content/early/2020/05/27/science.abc6197.full>)

5. Infection Prevention and Epidemiology Department and Safe Management Council, Singapore General Hospital

*Special thanks to Prof Erin Borage , Prof Kim Prather and Mr. Tomas Pueyo for their gracious permission to use their excellent illustrations

Thank You