Mondmaskers
en hoestetiquette

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UNIVERSITEIT STELLENBOSCH UNIVERSITY

Radboud University Nijmegen

ESPID

UBC

Koningin Mathilde Moeder- en kindcentrum

UZA

No conflicts of interest

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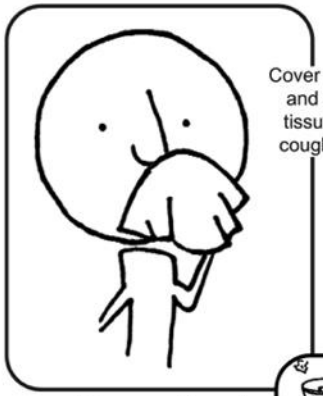
UZA

Stop the spread of germs that make you and others sick!

Cover your Cough



Cover your mouth and nose with a tissue when you cough or sneeze *or* cough or sneeze into your upper sleeve, not your hands.

Put your used tissue in the waste basket.

You may be asked to put on a surgical mask to protect others.

Clean your Hands

after coughing or sneezing.

Wash hands with soap and warm water for 20 seconds *or* clean with alcohol-based hand cleaner.

CDC

MINNESOTA MDH DEPARTMENT OF HEALTH
Minnesota Department of Health
717 SE Delaware Street
Minneapolis, MN 55414
612-676-5414 or 1-877-676-5414
www.health.state.mn.us

Minnesota Antibiotic Resistance Collaborative

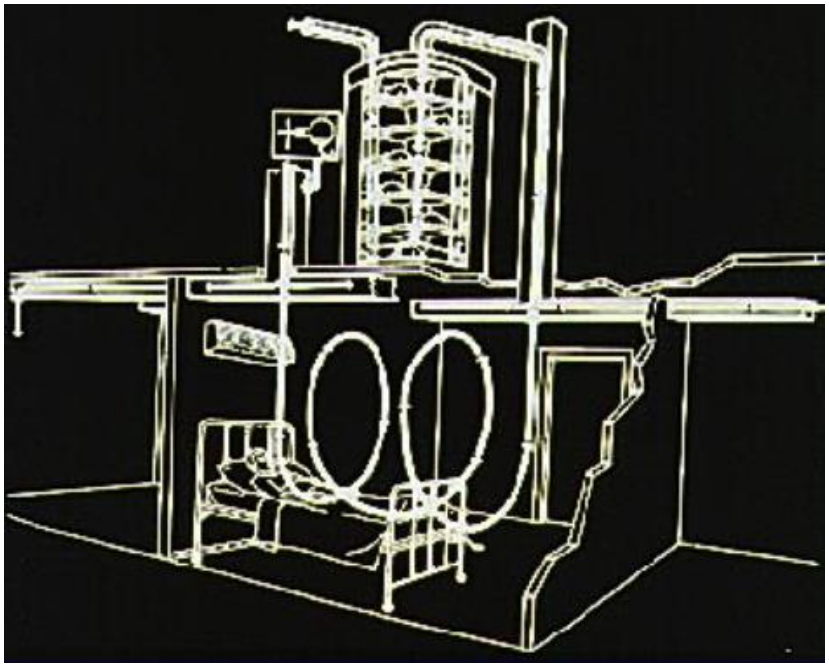
APIC

AERIAL DISSEMINATION OF PULMONARY TUBERCULOSIS

A TWO-YEAR STUDY OF CONTAGION IN A TUBERCULOSIS WARD [1]

By

R. L. RILEY, C. C. MILLS, W. NYKA, N. WEINSTOCK, P. B. STOREY



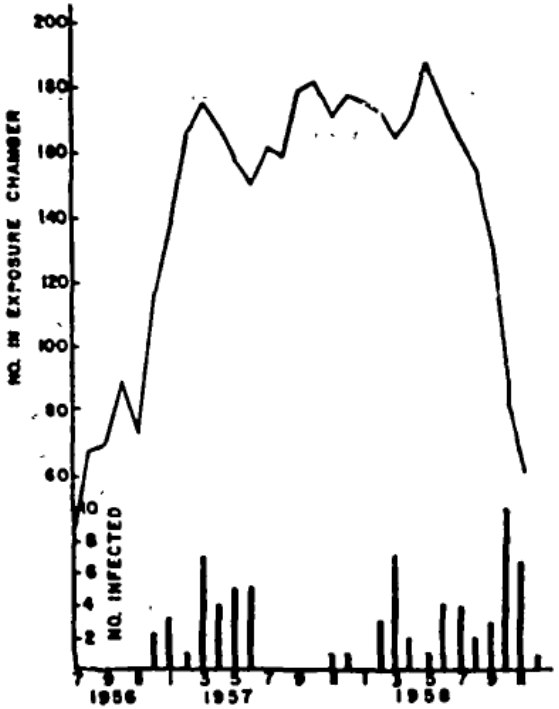
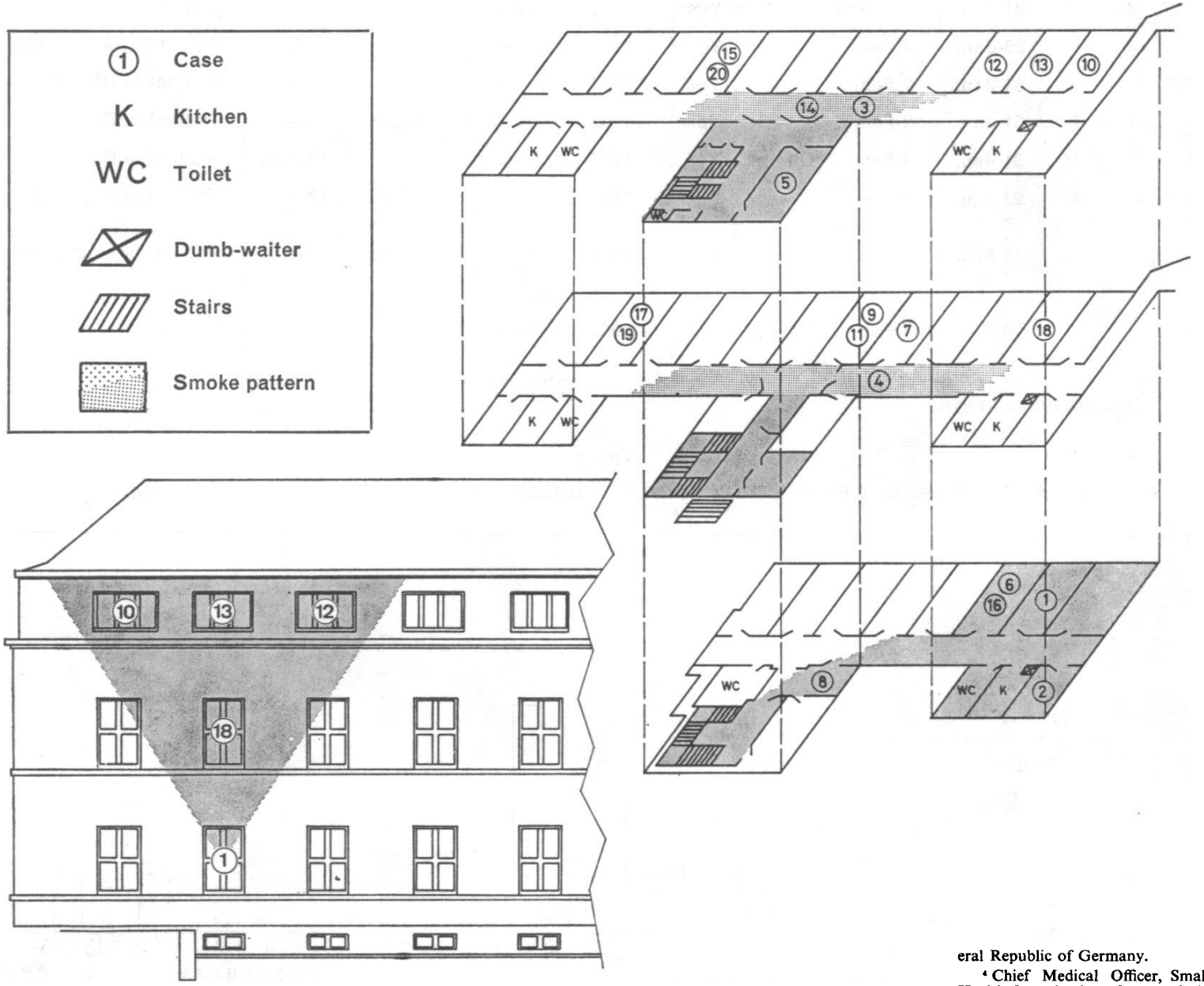


FIGURE 1. Average number of guinea pigs in exposure chamber each month and number identified as having tuberculosis each month. Note that the scale of the ordinate differs in each case. Note also that the date of infection was, on the average, about 6 or 7 weeks earlier than the date of identification of infection. The vertical bars in the figure are placed at the latter date.

AM. J. HYG. 1959, VOL. 70: 185–19


23

FLOOR PLAN AND REAR ELEVATION OF MESCHEDE HOSPITAL SHOWING LOCATIONS OF ALL SMALLPOX CASES



eral Republic of Germany.

[4] Chief Medical Officer, Smallpox Eradicat
Health Organization, Geneva, Switzerland.

EPIDEMIOLOGY

Smallpox in Birmingham

The following notes are compiled by the Communicable Disease Surveillance Centre (Public Health Laboratory Service) from reports submitted by microbiologists, community physicians, and environmental health officers.

A woman aged 40 developed symptoms of smallpox on 11 August and died on 11 September. She worked as a medical photographer in the department of anatomy at Birmingham University Medical School. Her rash first appeared on 13 August. She had been vaccinated in 1966 and had not been abroad recently. On 12 August she went out for a brief walk and on 13 August she visited a close neighbour. Apart from these outings she did not leave home throughout the period of her illness before admission to hospital and did not travel on public transport at any time. She was cared for at home between 11 and 21 August, when she was moved in her parents' car to their home in King's Heath, Birmingham, where she remained until admitted to East Birmingham Hospital on 24 August. The ward in which she had a cubicle is the upper floor of a two-storey block; the lower ward is a children's ward with a separate entrance. Smallpox was suspected and electron microscopy of vesicle fluid showed brick-shaped particles suggestive of pox viruses. She was transferred to the smallpox hospital at 10 pm on the same day. The results of egg culture were positive for variola major virus on 27 August.

The patient worked in a photographic room and connecting dark room in the department of anatomy on the first floor of the east wing of the medical school, above the department of medical microbiology, but she had never been in the department of medical microbiology, which is one of two laboratories in the United Kingdom still holding variola virus. No defect in the ventilation and air filtration systems has yet been identified to explain the incident. The smallpox laboratory was closed on 25 August and work on pox viruses ceased. The photographic room and dark room were disinfected and closed.

There were eight close contacts who either worked in the same room as the patient or used the dark room and about 25 other people who were working in the department of anatomy; 12 close contacts at home; 19 close contacts in hospital, including ambulance personnel, and about 150 others and visitors who were in the same hospital block on the afternoon of 24 August.

On 28 August two suspect cases among contacts of the patient were admitted to the smallpox hospital for observation, but they have since been discharged home. On 2 September two further contacts under surveillance were admitted—the patient's father, who had nausea, malaise, and slight fever; and an engineer at the East Birmingham Hospital, who had a brisk vaccination reaction. The patient's father died suddenly on 5 September, presumably from a heart attack (there was no evidence of smallpox); the engineer was discharged on the same day. Three more contacts under surveillance—a laboratory technician, an ambulance driver, and the mother of the patient—have since been admitted with rashes, and laboratory investigations are under way. All other contacts have remained well, and quarantine ceased on 10 September.


Apocalipses
Ерқош
Батя
eurasianet.org


The smallpox formulation—400 g of which was exploded on the island—“got her” and she became infected

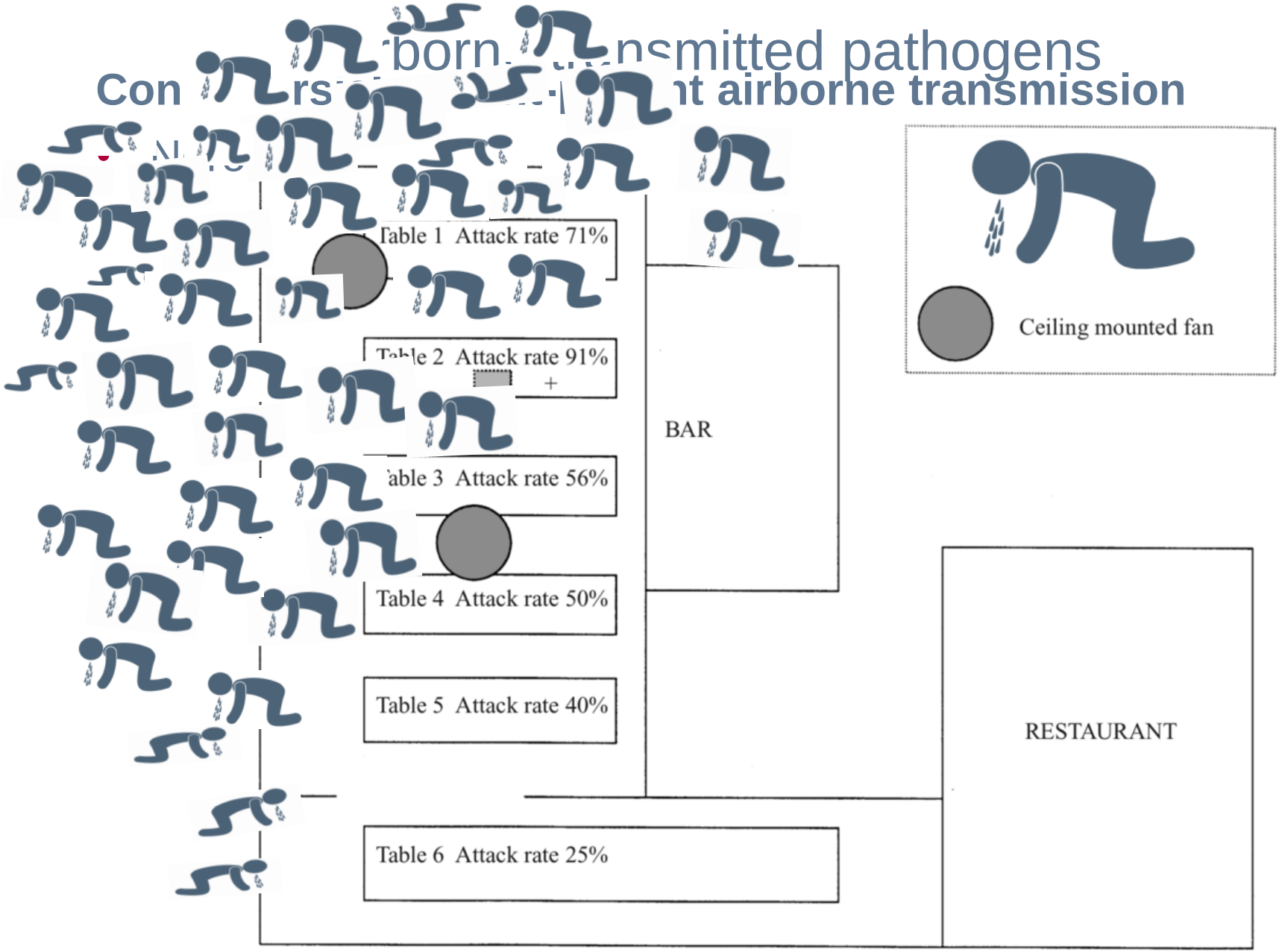
16th Day

16th Day

http://www.sheknows.com

Airborne transmitted pathogens

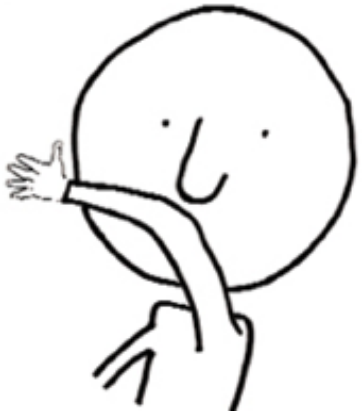
Con rs[illegible] nt airborne transmission

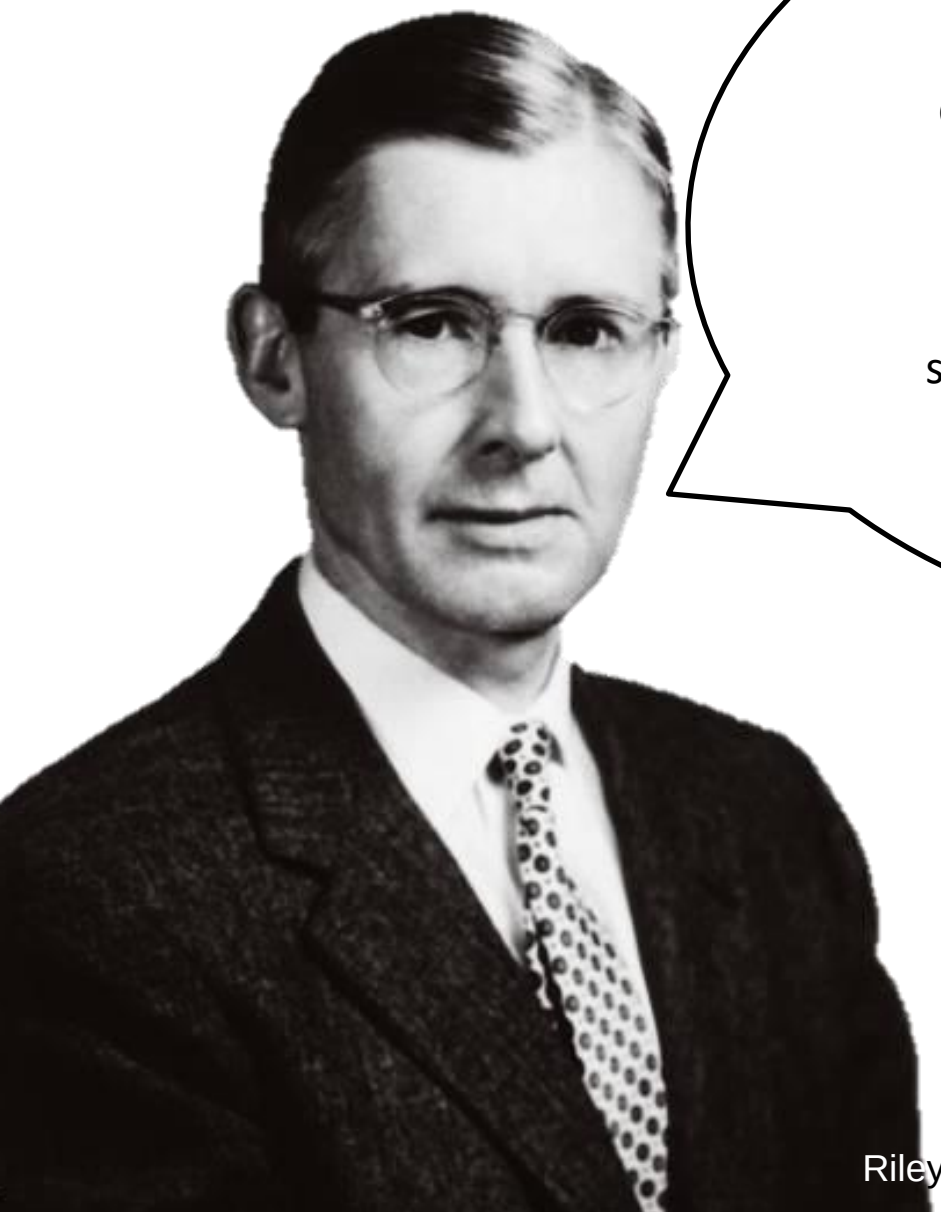


Epidemiol Infect. 2000;124:481–487


livekindly.com

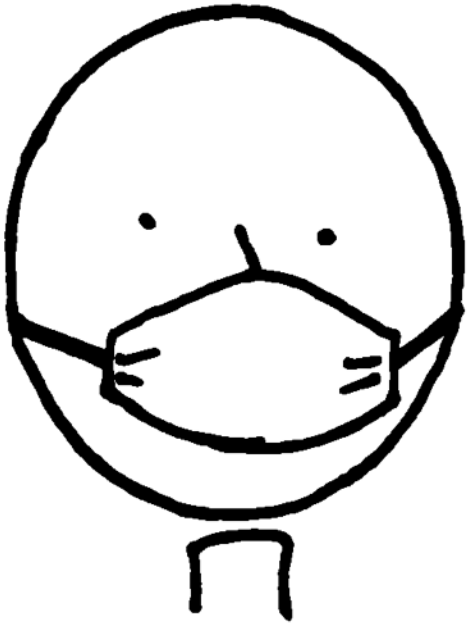
THE LANCET Vol 346 • December 23/30, 1995



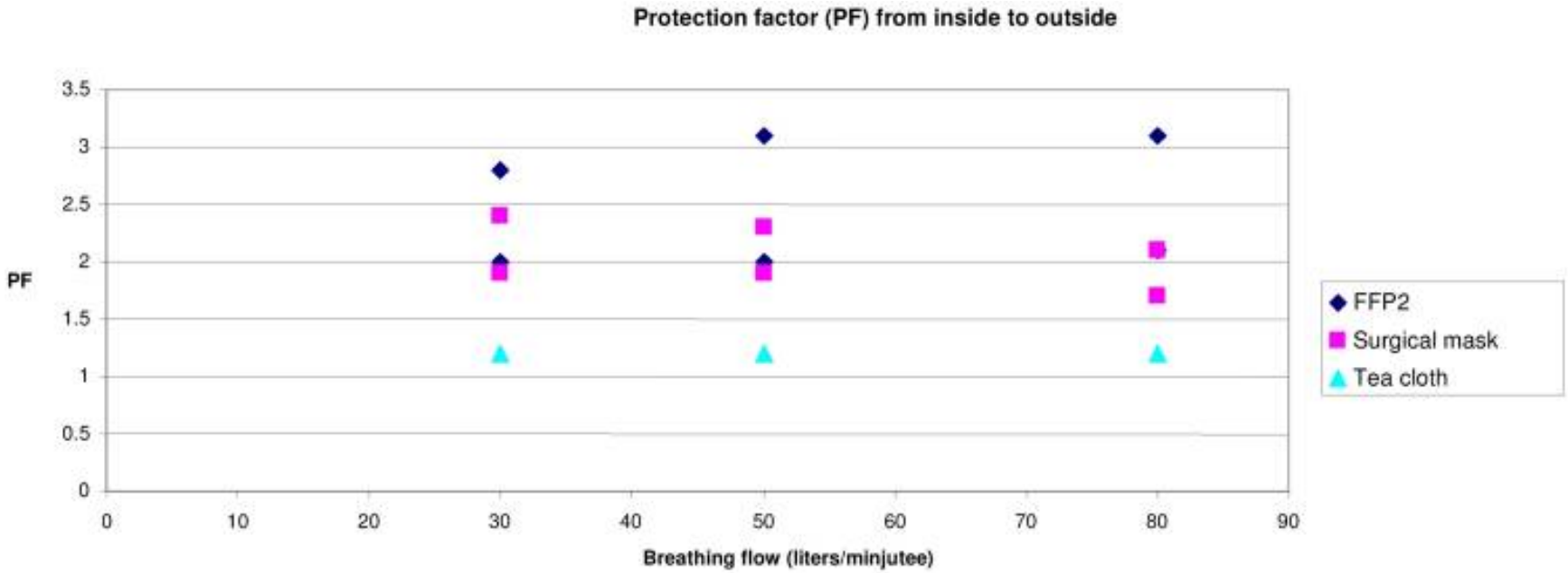


Covering your cough should be reasonably effective since infectious droplets forcefully expelled from the mouth have not yet evaporated to smaller airborne droplet nuclei and should stick to an obstructing surface, such as the hand, on impact

Jennison M et al. *Aerobiology.* 1942;17:106-128
Riley RL et al. Airborne infection. *Am J Med*. 1974;57:466-475



Van der Sande et al. 2008 Plos One



Van der Sande et al. 2008 Plos One

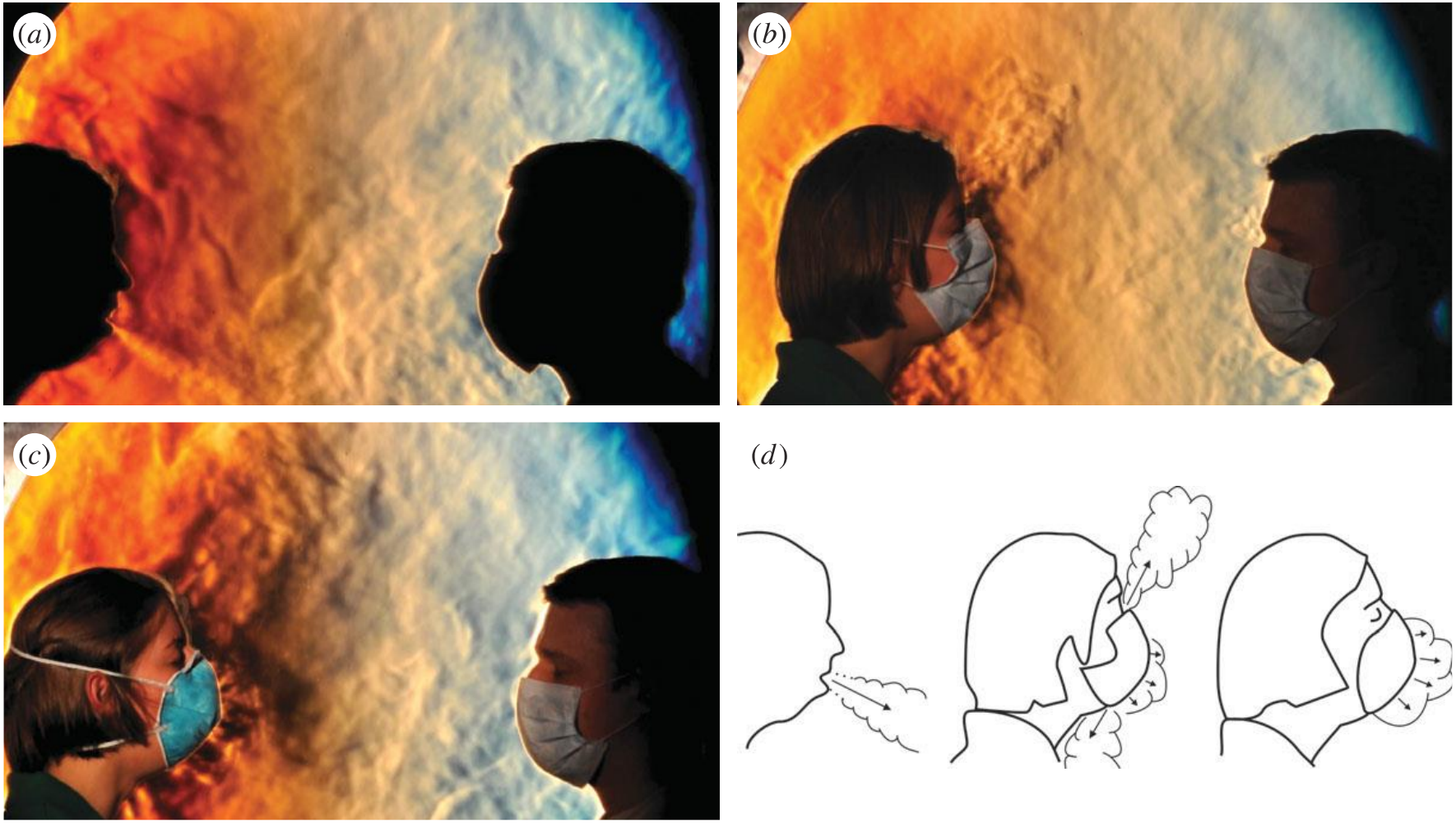
DeMorgen.

Mondmaskers verplichten, is dat een goed idee of juist niet?

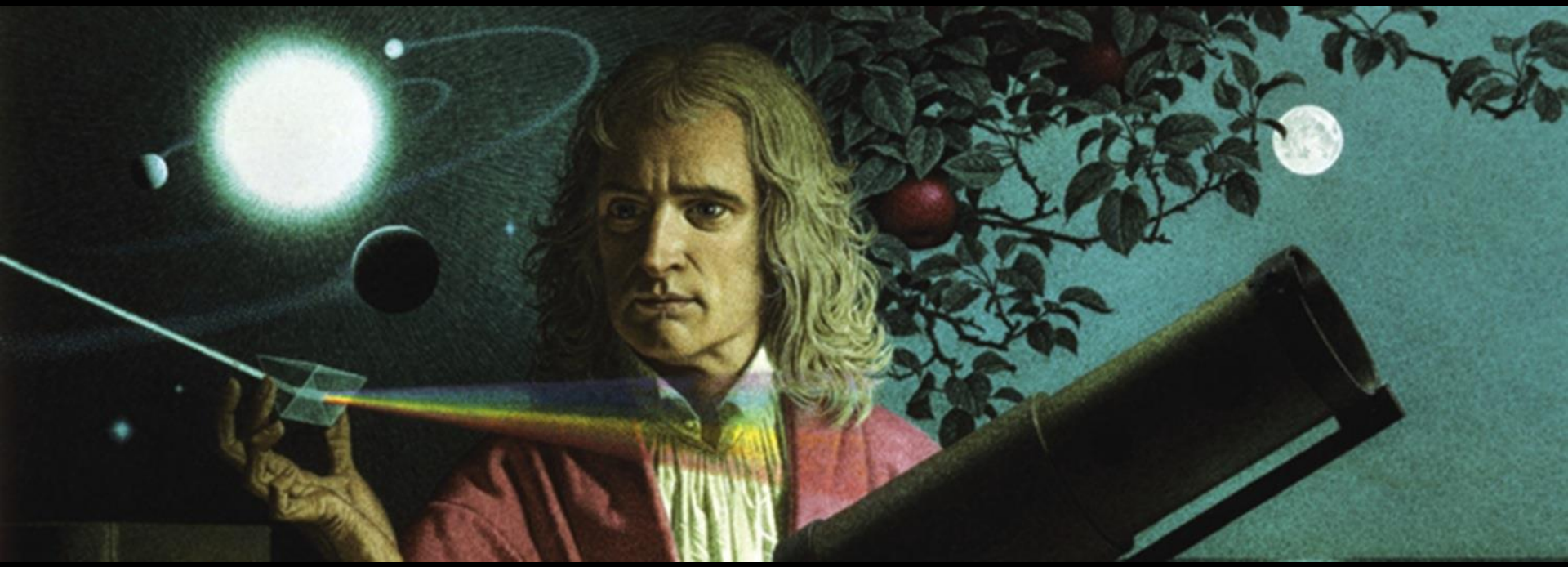
Koen Vanden Driessche en Marianne van der Sande. Beeld © Stefaan Temmerman

CATHY GALLE 8 mei 2020, 14:00

Eer je iets heel dwingends gaat opleggen, zou je eerst zeker willen zijn dat er geen mogelijke schade kan zijn door maskers te dragen. Die zekerheid is er ook niet. Het is bijvoorbeeld mogelijk dat, bij onoordeelkundig op- en afzetten, het risico groter is om jezelf of anderen te besmetten.

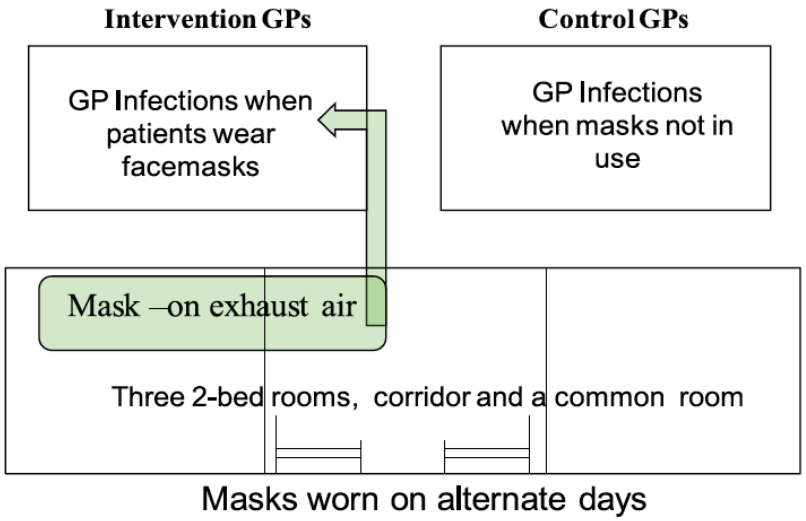


Tang JW et al. *J R Soc Interface*. 2009;6 Suppl 6:S727-736.



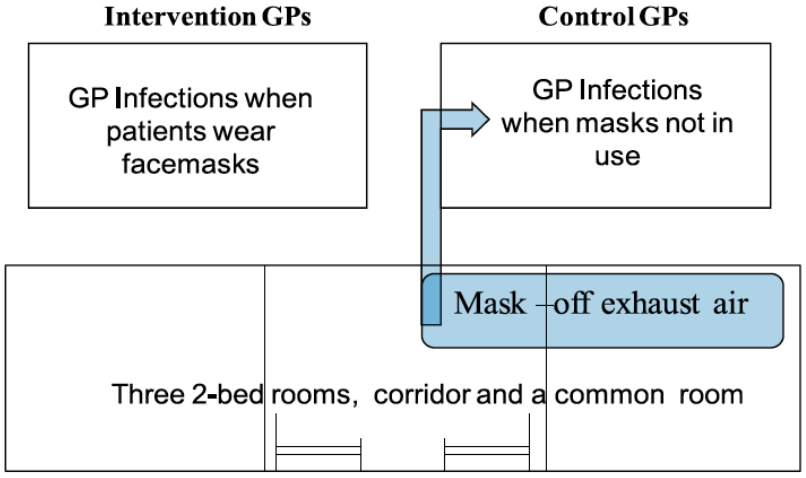
#1 Inertia

A AIR Facility and Mask Study Experimental Plan



Masks worn on alternate days

B AIR Facility and Mask Study Experimental Plan



Masks worn on alternate days

56% (95% CI: 33-71%) reduction in infectious aerosol production, as measured by fewer guinea pigs becoming infected, when TB patients wore surgical masks

AMERICAN JOURNAL OF Respiratory and Critical Care Medicine® 2012

OPEN ACCESS Freely available online

PLOS | PATHOGENS

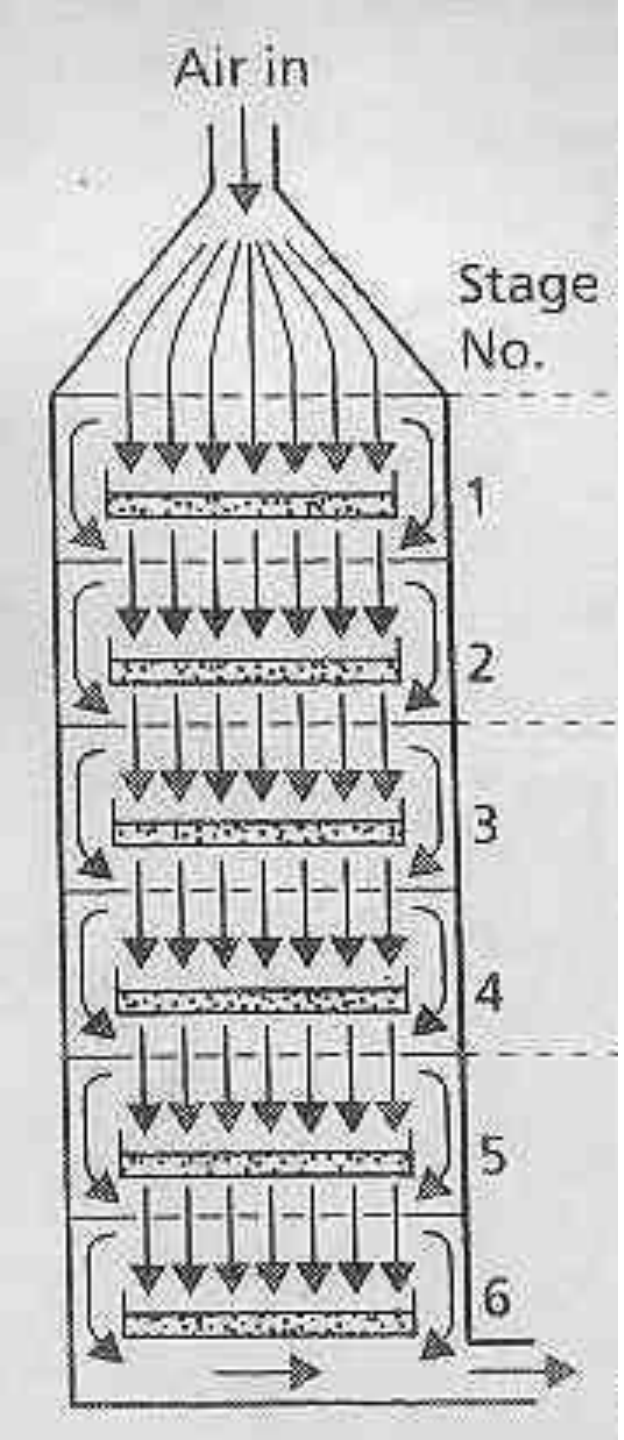
Influenza Virus Aerosols in Human Exhaled Breath: Particle Size, Culturability, and Effect of Surgical Masks

Donald K. Milton[1,2]*, M. Patricia Fabian[2,3]*, Benjamin J. Cowling[4], Michael L. Grantham[1], James J. McDevitt[2]*

Masks prevented the release of **64%** of Influenza virus in aerosol particles smaller than 5 micron

95% CI 33% to 81%

Vanden Driessche K, Marais BJ, Wattenberg M, Magis-Escurra C, Reijers M, Tuinman IL, Boeree MJ, van Soolingen D, de Groot R, Cotton MF. Int J Tuberc Lung Dis. 2013;17:46-53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UCCZ Dekkerswald

Radboud University

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Vanden Driessche K, Marais BJ, Wattenberg M et al. Int J Tuberc Lung Dis. 2013;17:46-53

INT J TUBERC LUNG DIS 17(1):46–53

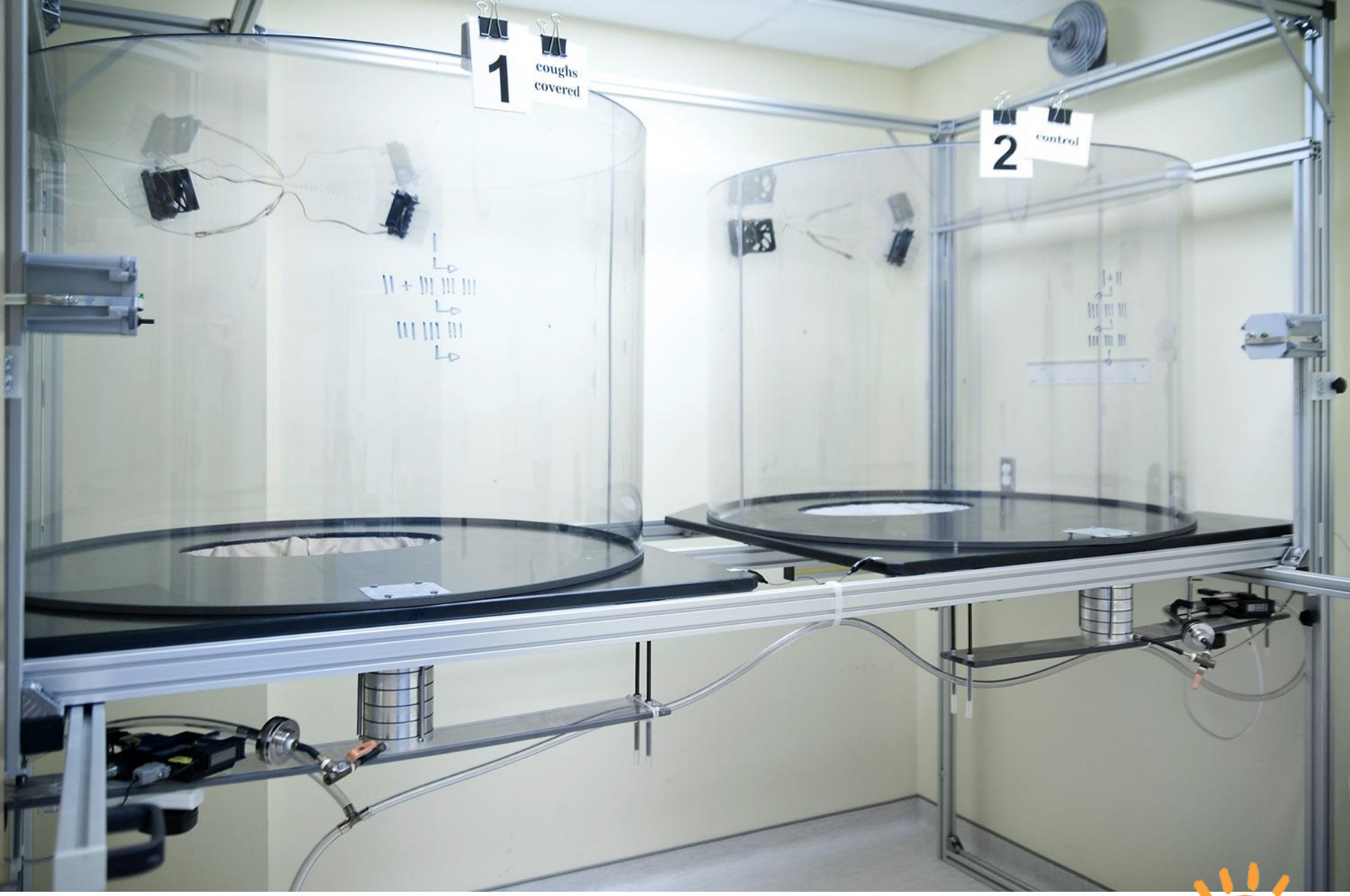
http://dx.doi.org/10.5588/ijtld.12.0289

The Cough Cylinder: a tool to study measures against airborne spread of (myco-) bacteria

K. Vanden Driessche,* B. J. Marais,† M. Wattenberg,‡ C. Magis-Escurra,§ M. Reijers,§ I. L. Tuinman,¶ M. J. Boeree,§ D. van Soolingen,‡# R. de Groot,* M. F. Cotton**

THE SPECTRUM OF AEROSOL TRANSMISSION

Aerosol transmission is traditionally classified as either airborne or droplet spread. Droplets refer to larger sized particles that precipitate quickly, implying a need for close physical contact or spread via fomites onto peripheral respiratory epithelium for efficient transmission. Airborne transmission refers to minute particles that are more likely to remain suspended in the air for long periods of time and are inhaled into the distal airways. The World Health Organization (WHO) employs a 5 μm cut-off to distinguish between airborne and droplet transmission.[1] Numerous pathogens, such as the coronavirus, which causes severe acute respiratory syndrome, the influenza virus, *Pseudomonas* and *Mycobacterium tuberculosis*, have been isolated from the air,[2–4] which supports airborne transmission as a mode of patient-to-patient spread. *P. aeruginosa* is the predominant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A2-217
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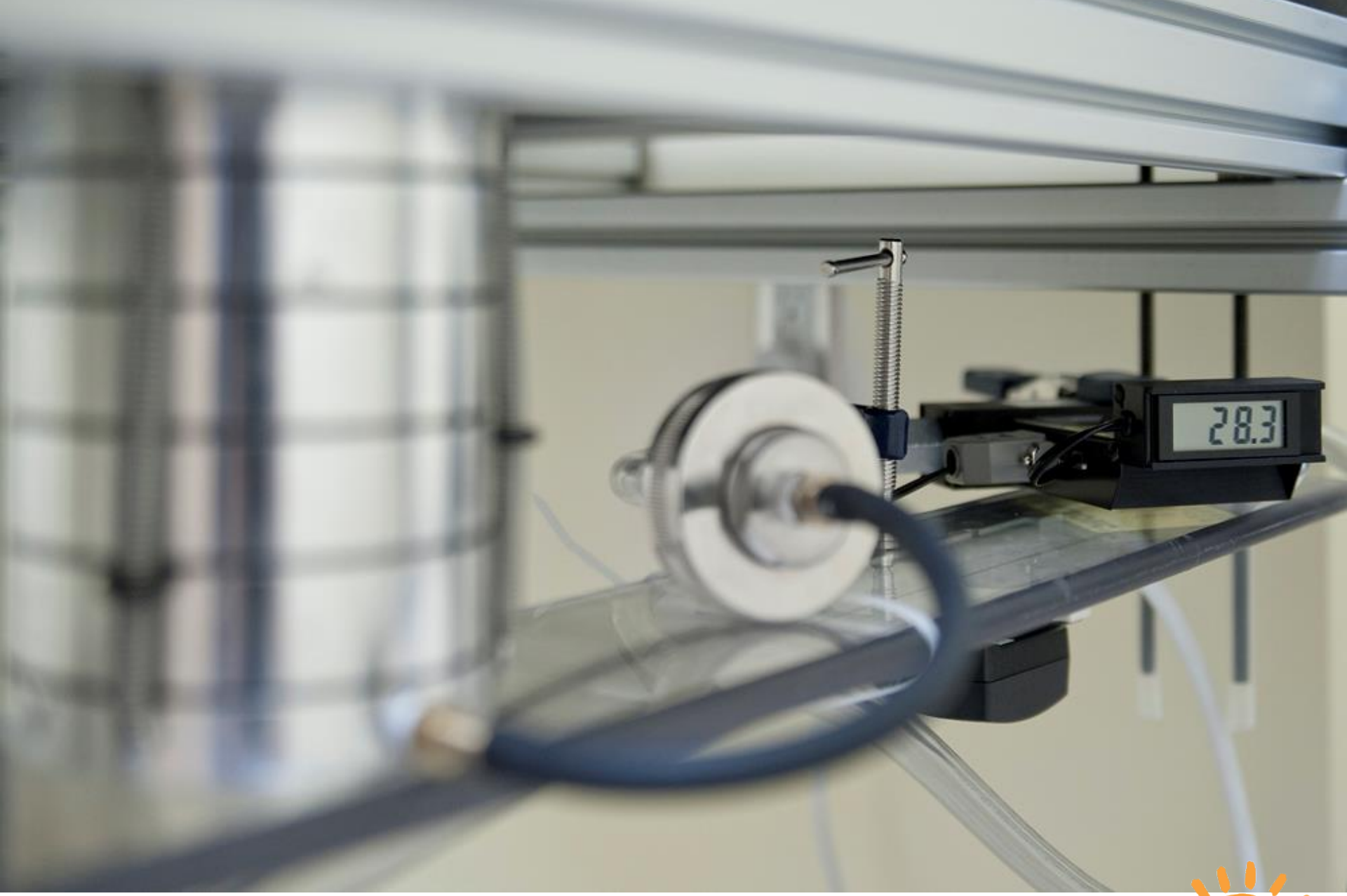
a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

BC CHILDREN'S HOSPITAL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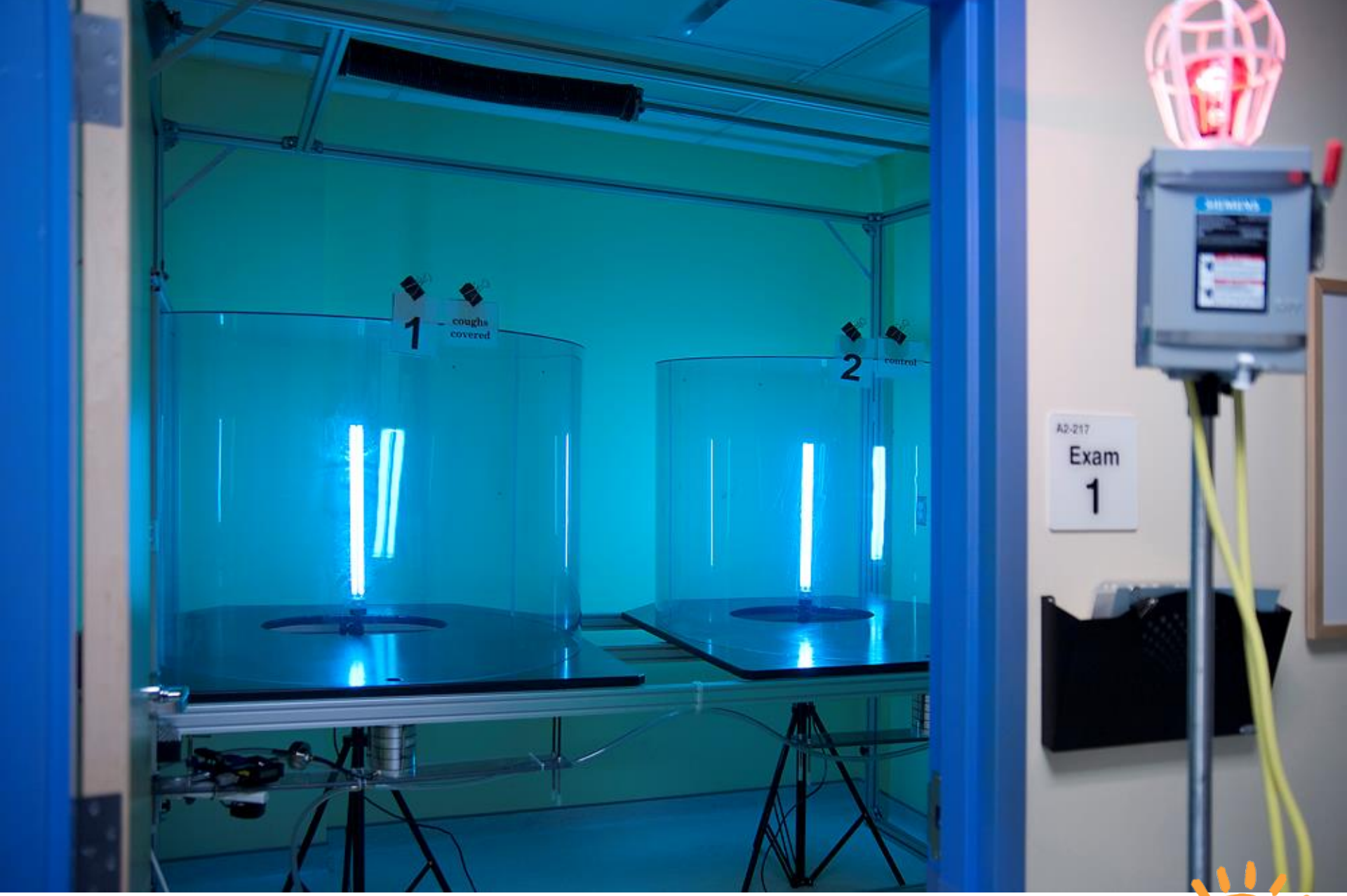
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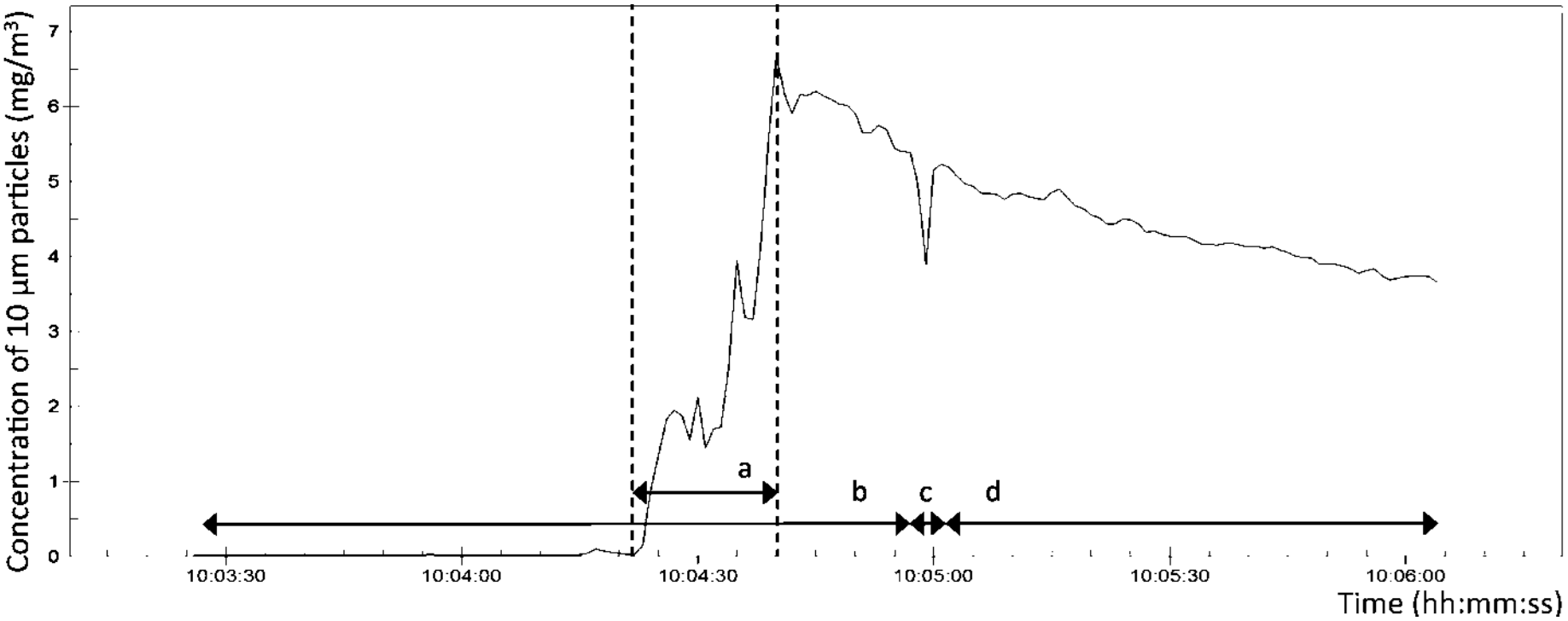
Concentration of 10 µm particles (mg/m³)
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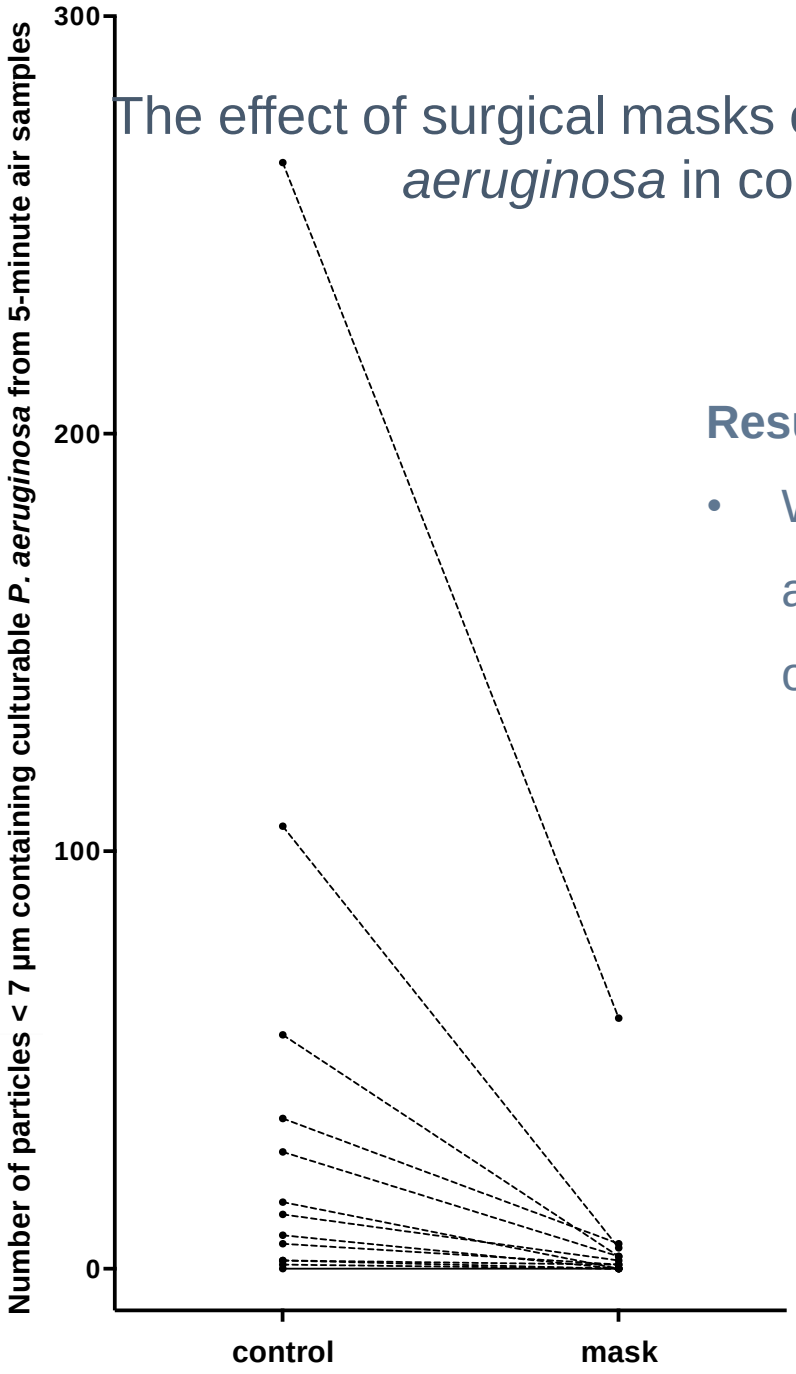
10:04:30
10:05:00
10:05:30
10:06:00
Time (hh:mm:ss)

The effect of surgical masks on airborne spread of *Pseudomonas aeruginosa* in colonized patients with CF

St Paul's Hospital

Koen Vanden Driessche, Niel Hens, Peter Tilley, Bradley S. Quon, Mark A. Chilvers, Ronald de Groot, Mark F. Cotton, Ben J. Marais, David P. Speert, James E. A. Zlosnik. The American Journal of Respiratory and critical Care Medicine. 2015 Oct 1

The effect of surgical masks on airborne spread of *Pseudomonas aeruginosa* in colonized patients with CF



Results

- Wearing a surgical mask reduced the airborne *P. aeruginosa* load by an average of 88% (95% CI 81-96%)

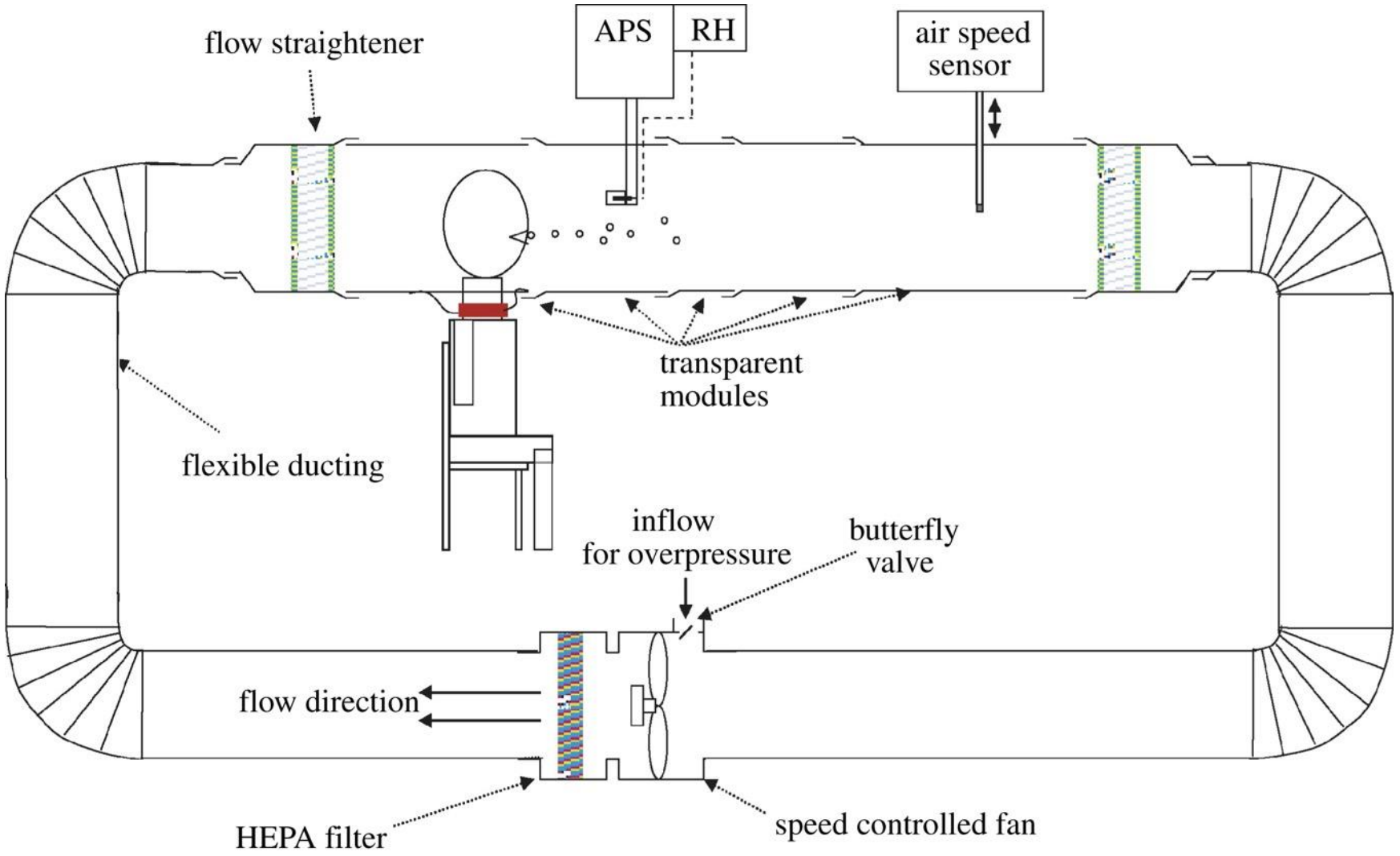
ESPID

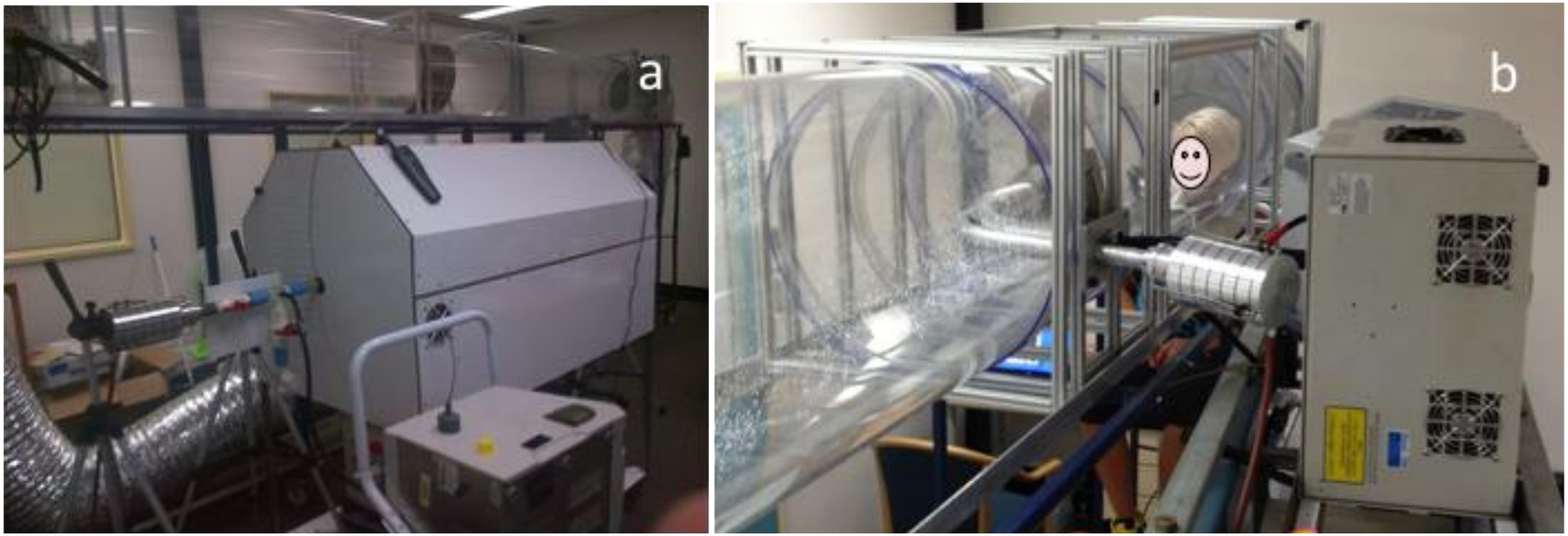
BC CHILDREN'S HOSPITAL

Table 2. Number of Participants with Detectable Aerosol *Pseudomonas aeruginosa* Colony-Forming Unit Counts across Each Study Maneuver*

Maneuver	Participants with detectable *Pseudomonas aeruginosa* CFUs (*n* [%])	Stratification of Participants with Detectable *Pseudomonas aeruginosa* CFUs into High and Low Viable Aerosol Production	
		<10 CFUs*	⩾10 CFUs*
Uncovered coughing (reference)	19/25 (76.0)	5/5	14/14
Talking†	1/24 (4.2)	0/5	1/13
Talking wearing a surgical mask†	1/24 (4.2)	0/5	1/13
Coughing wearing a surgical mask	2/25 (8.0)	0/5	2/14
Coughing wearing an N95 mask‡	4/24 (16.7)	1/5	3/14
Cough etiquette	13/25 (52.0)	2/5	11/14

Definition of abbreviation: CFUs = colony-forming units.
*Participants were stratified according to a predefined definition of high (⩾10 CFU) and low (<10 CFU) viable aerosol production of detectable *Pseudomonas aeruginosa* CFUs during the uncovered cough maneuver.
†One participant did not complete the maneuver (insufficient culture media available).
‡One participant did not complete the maneuver (owing to adverse event).





Queensland University of Technology

The New York Times

239 Experts With One Big Claim: The Coronavirus Is Airborne

The W.H.O. has resisted mounting evidence that viral particles floating indoors are infectious, some scientists say. The agency maintains the research is still inconclusive.

By Apoorva Mandavilli

Published July 4, 2020


武汉华南海鲜批发市场
WUHAN HUANAN HAIXIAN PIFA SHICHANG
杨智辉大闸蟹
武汉卫生应急队

LE CORONAVIRUS

Comment éviter une contamination ?

Lavez-vous régulièrement et soigneusement les mains à l'eau et au savon. Comptez entre 40 et 60 secondes par lavage.

Toussez ou éternuez dans un mouchoir en papier ou dans le pli de votre coude.

Utilisez des mouchoirs en papier et jetez-les dans une poubelle fermée.

Si vous êtes malade, restez chez vous.

Évitez autant que possible de vous toucher le visage avec les mains.

Évitez les poignées de main.

Évitez les contacts rapprochés.

PRENEZ SOIN DE VOUS, MAIS AUSSI DES AUTRES.

Wallonie · Fédération Wallonie-Bruxelles · Francophones Bruxelles

Plus d'infos sur **www.info-coronavirus.be**
Ou appelez le numéro gratuit **0800 14 689**

Vlaanderen
is zorg

HET CORONAVIRUS

Hoe kan je een besmetting voorkomen?

Was je handen regelmatig en grondig met water en zeep. Reken zo'n 40 à 60 seconden per wasbeurt.

Hoest of nies in een papieren zakdoekje of in de binnenkant van je elleboog.

Gebruik papieren zakdoekjes en gooi ze weg in een afsluitbare vuilbak.

Blijf zo veel mogelijk thuis. Ziek? Blijf dan in isolatie.

Raak je gezicht zo weinig mogelijk aan met je handen.

Vermijd handen geven.

Vermijd nauw contact. Hou voldoende afstand (1,5 m).

DRAAG ZORG VOOR JEZELF EN ZO OOK VOOR ANDEREN.

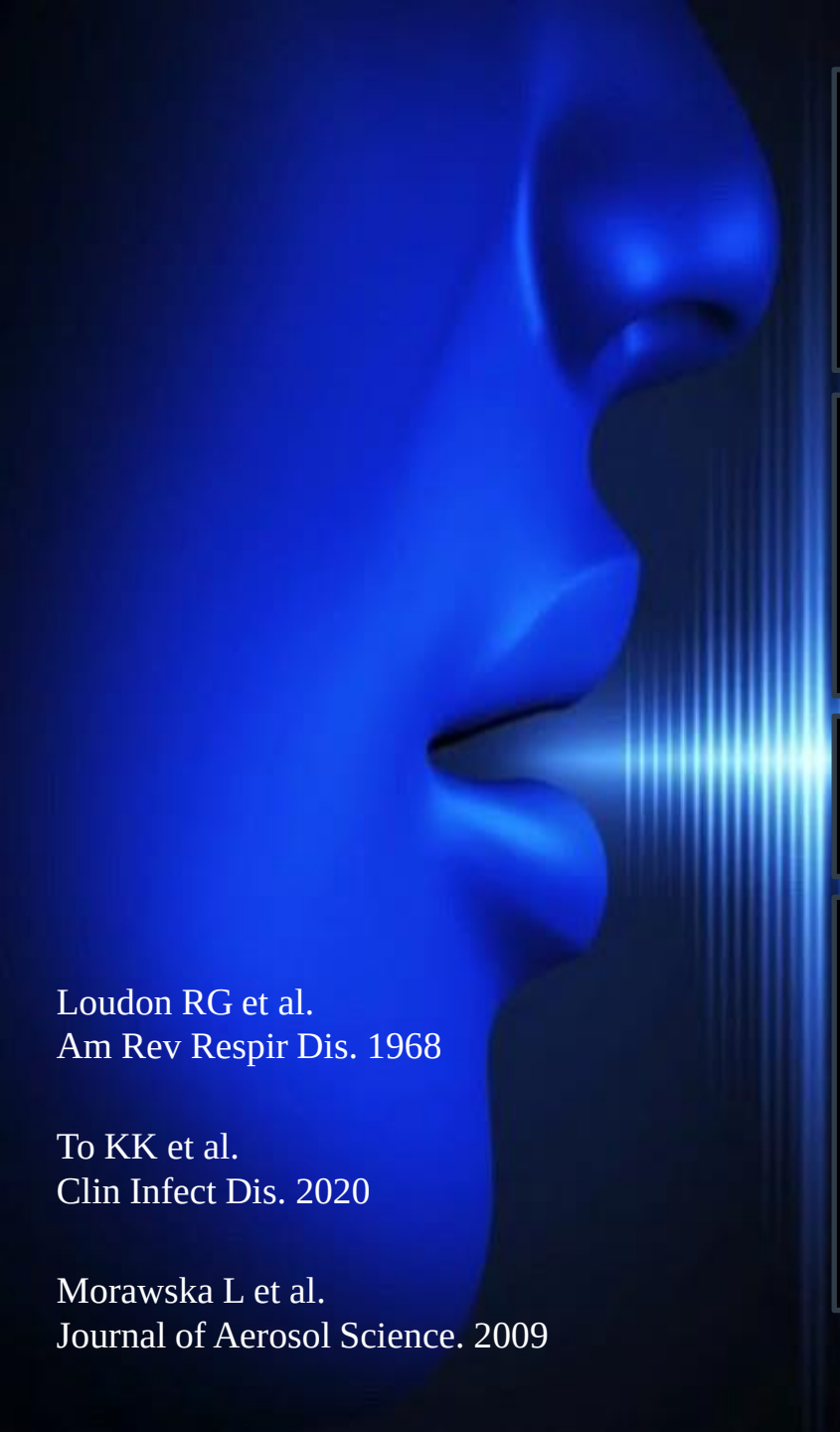
AGENTSCHAP
ZORG &
GEZONDHEID

Meer info op
www.info-coronavirus.be


facebook.com/Kitzloch


concertgebouw.nl


charlotteagenda.com



10 seconds saying “Aa” produced the same number of 0,3-20 micrometer particles as coughing for 10 seconds

These aerosols produced when talking originate from saliva being aerosolized by trembling of the vocal cords

Saliva contains enormous quantities of SARS-CoV-2

Talking produces 10X more microdroplets compared to breathing, and talking with a loud voice and singing produces up to 50X more compared to talking with a quiet voice

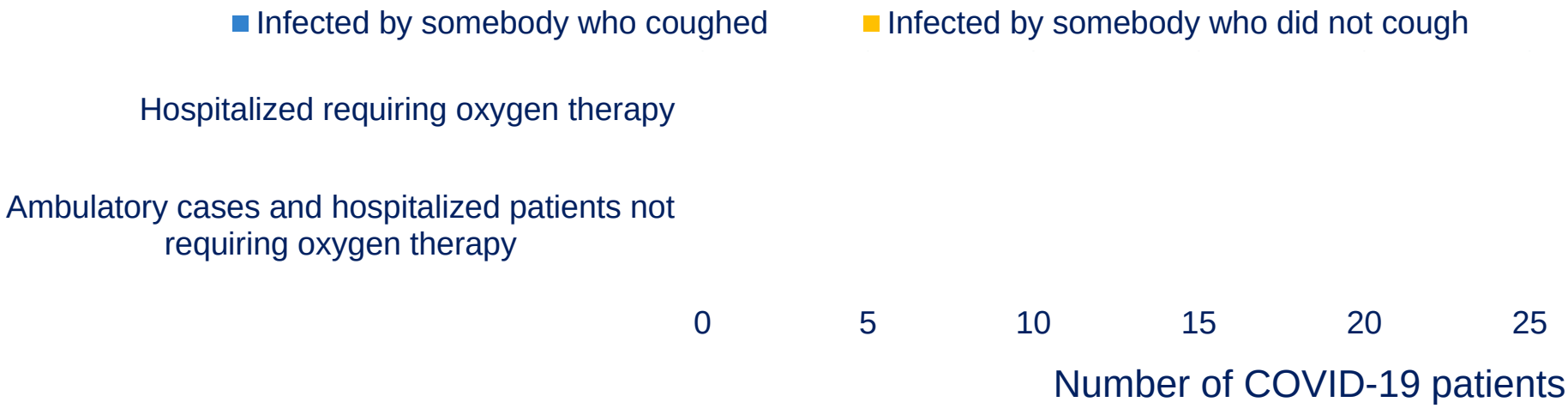
Loudon RG et al.
Am Rev Respir Dis. 1968

To KK et al.
Clin Infect Dis. 2020

Morawska L et al.
Journal of Aerosol Science. 2009


10 seconden « aa » zeggen =
evenveel microdruppels als 10
seconden hoesten

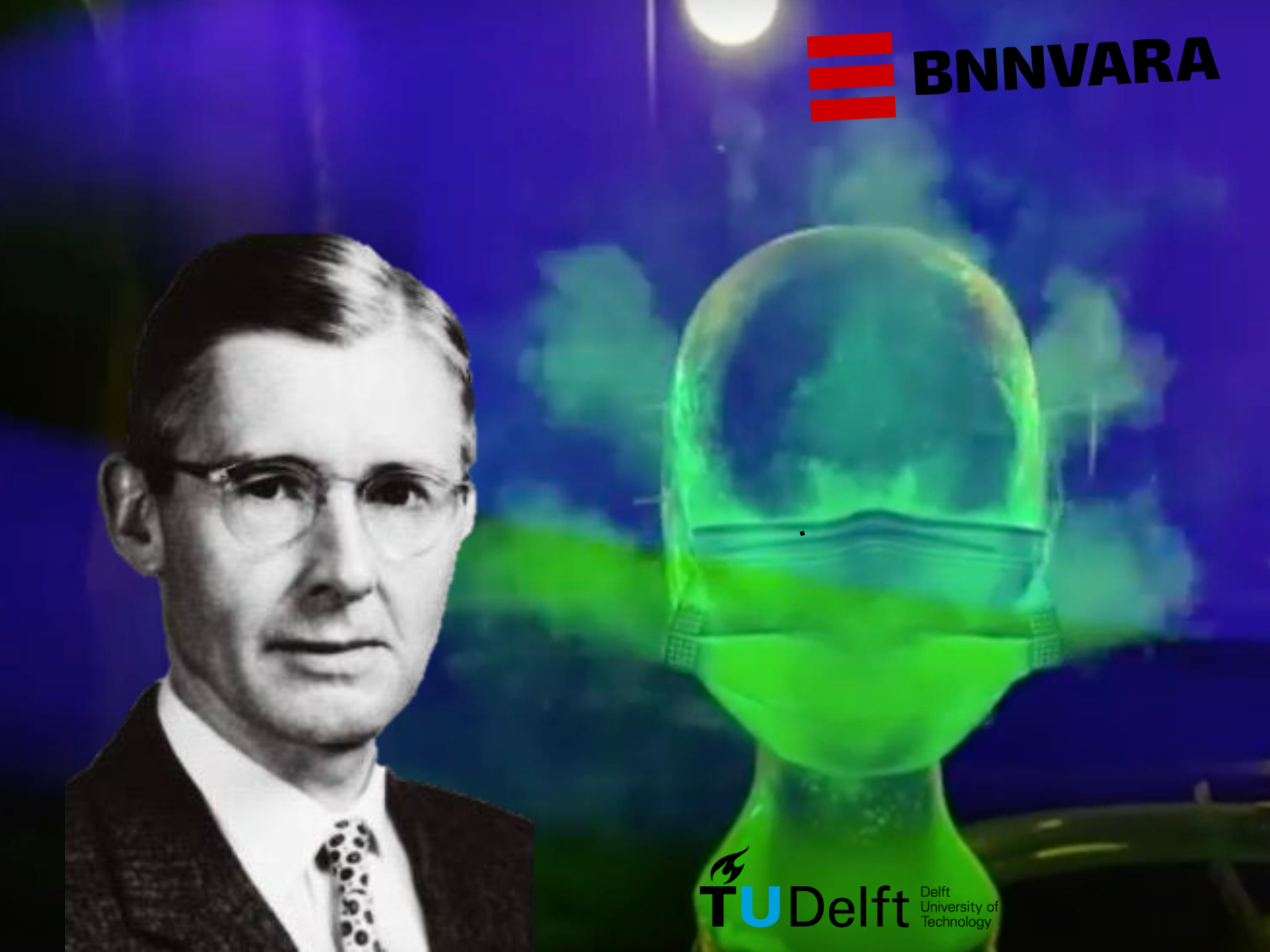
One



Vanden Driessche K, Nestele J, Grouwels J, Duval E.
Journal of Breath Research. Published online August 2020 and as a pre-print on medRxiv. 2020 June 4 .

BNNVARA

TU Delft Delft University of Technology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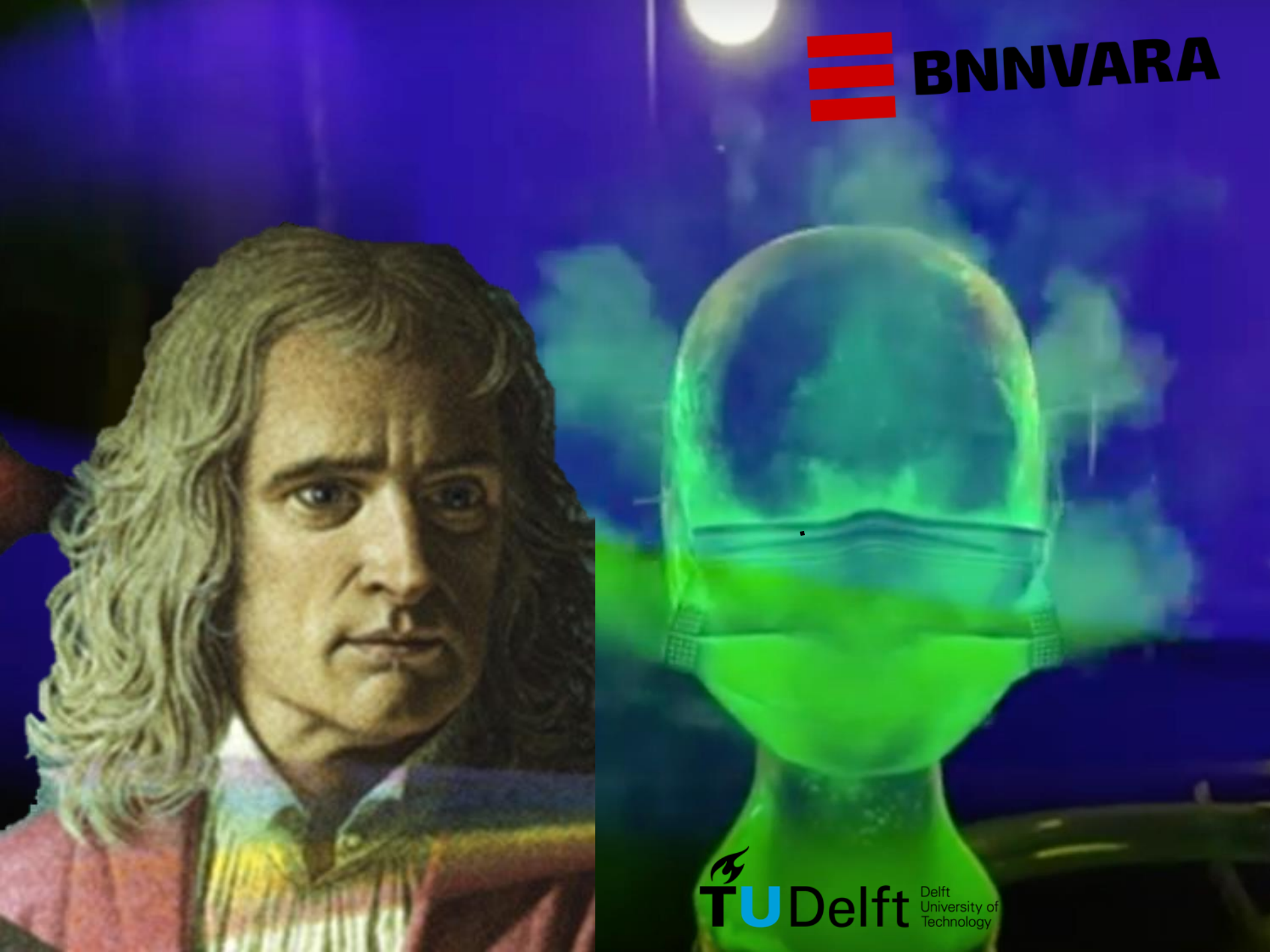
TU Delft
Delft University of Technology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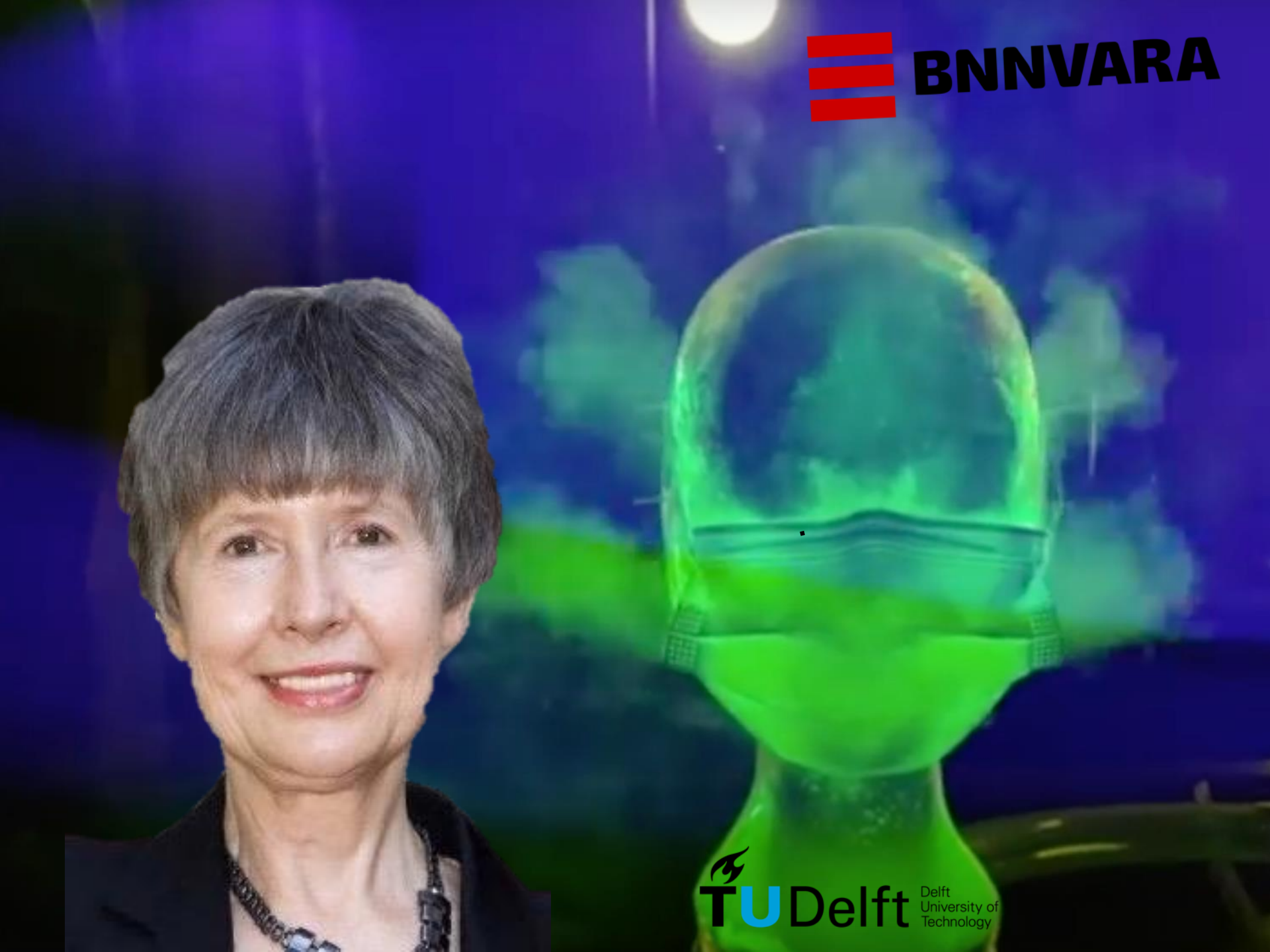
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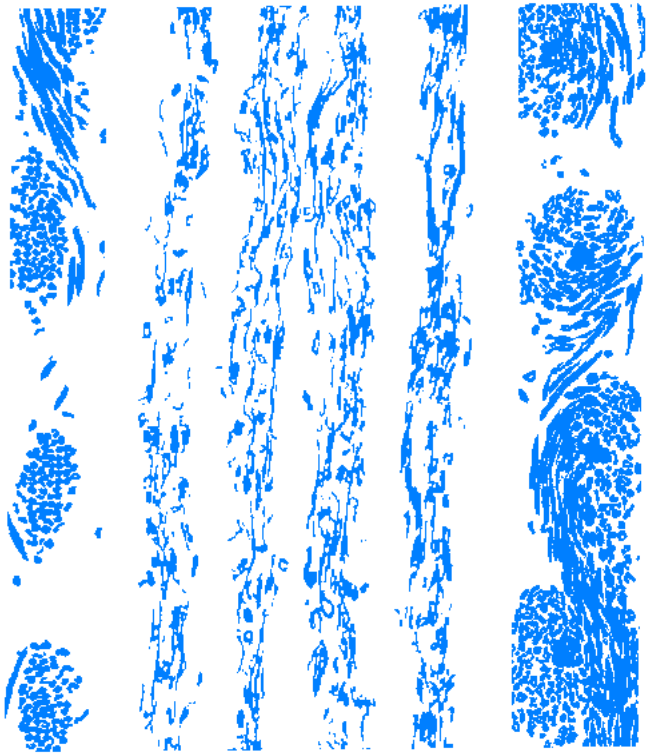


Knack
22 september 2020 ·

Lang voor corona testte dokter Koen Vanden Driessche al mondmaskers.

KNACK.BE

Het ideale mondmasker: 'De beste filter blijkt een viscose dweil te zijn'

14 7 reacties 2 keer gedeeld

Delen

Alle opmerkingen

Raymond Vanbrabant Dus al voor corona bezig net als het fabriceren van één virus groot en gevaarlijk genoeg om de naam pandemie te mogen/kunnen dragen !?!?
37w 2

Peter Calbrecht Zo'n masker is voor de dokter, verpleegkundige, chirurg,... Ik ben geen van allen, dus niet voor mij.
37w 1

Lindsay Dierickx Erika Meynckens Van Langendonck misschien toch meer dragen op het werk 😉
37w

Callebert Koen Mijn ideaal mondmasker ligt in een vuilbak 🖕
37w 1

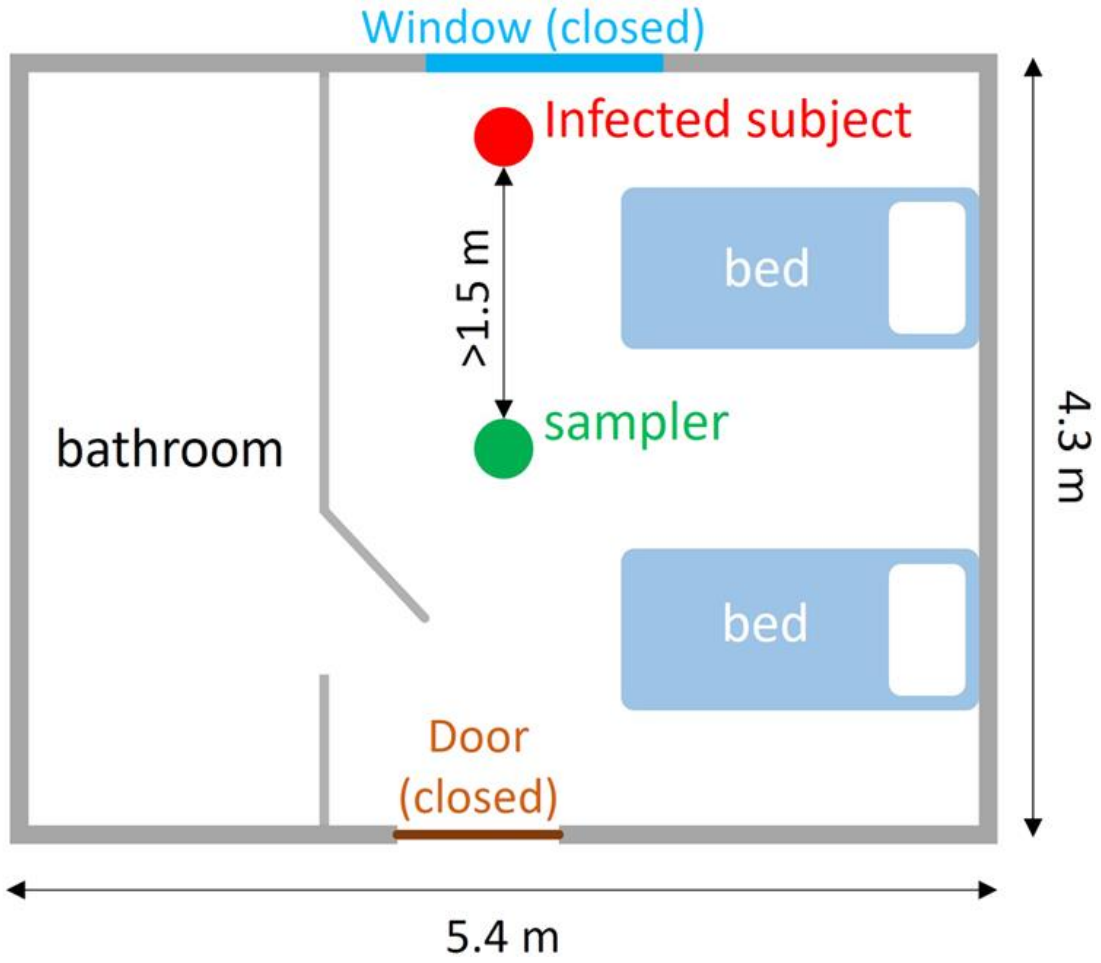

ww.downtoearth.org


https://www.breitbart.com/


https://www.reuters.com/

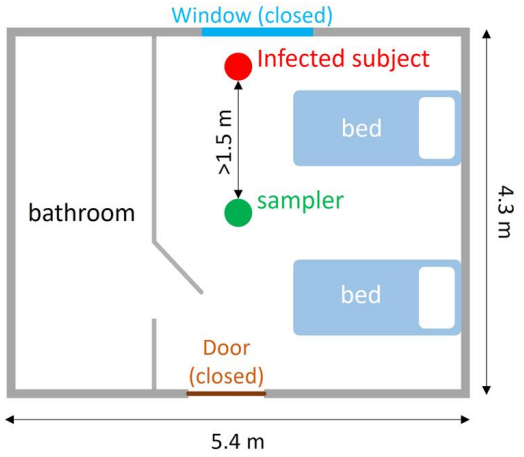

slpecho.com

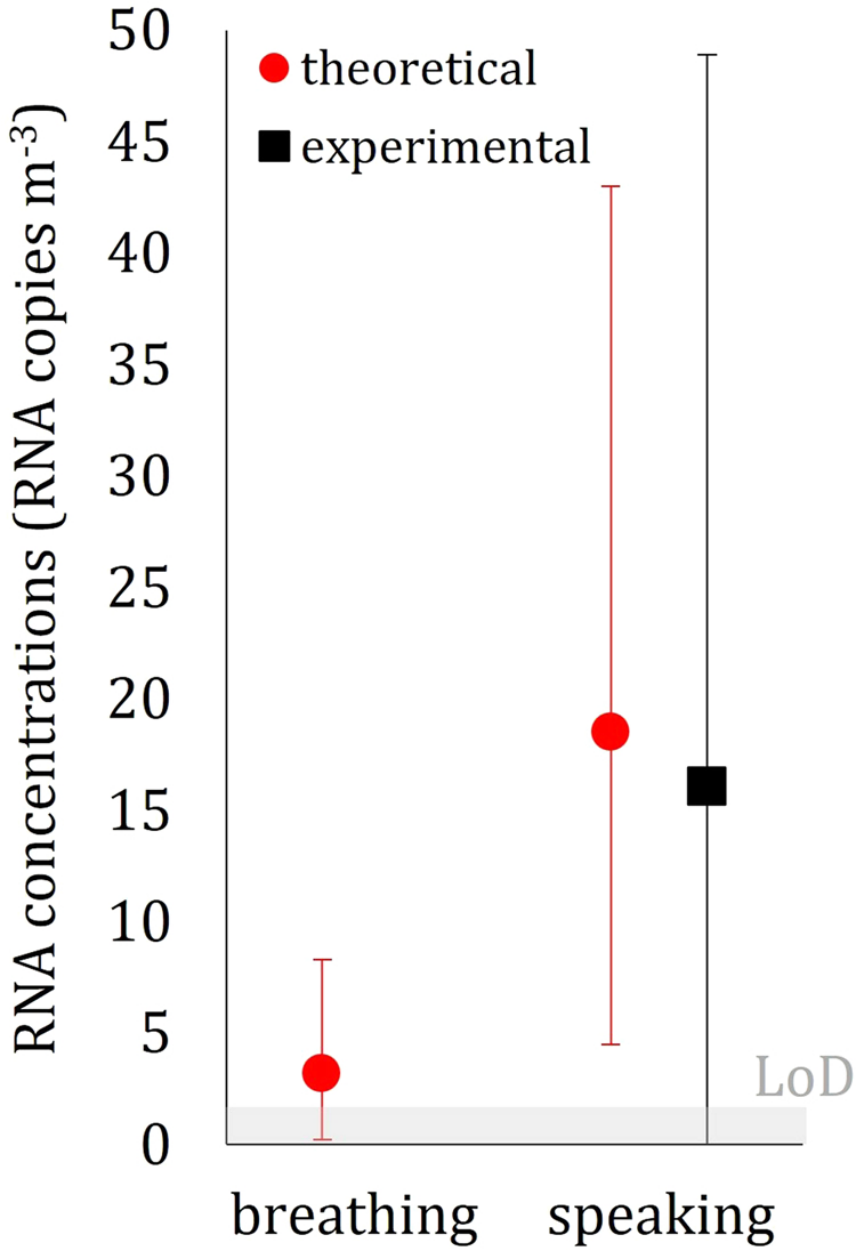

schoolsweek.co.uk



G Buonanno, A Robotto, E Brizio, L Morawska, et al. J Hazard Mater. 2022 Apr 15

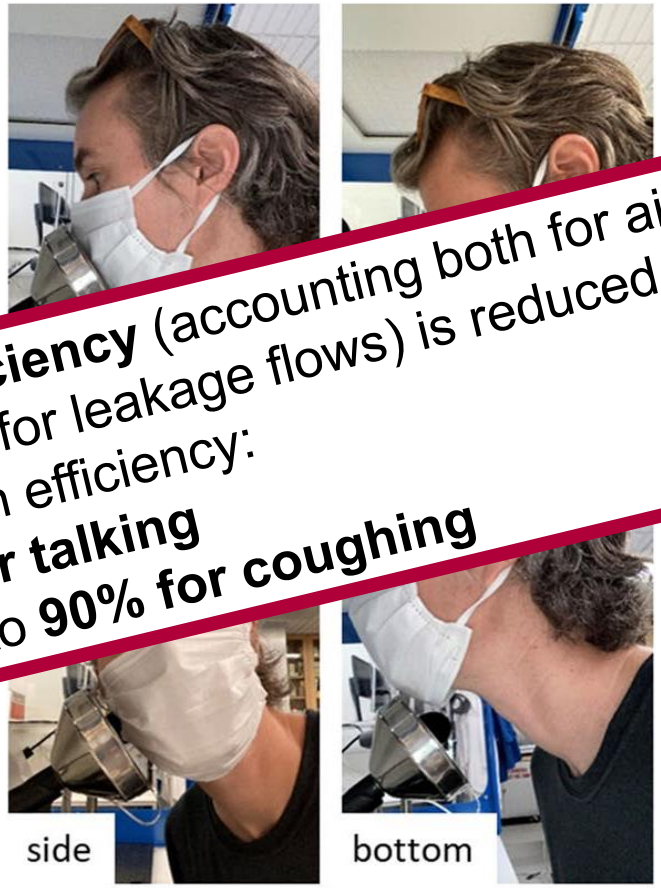
Queensland University of Technology





G Buonanno, A Robotto, E Brizio, L Morawska, et al. J Hazard Mater. 2022 Apr 15

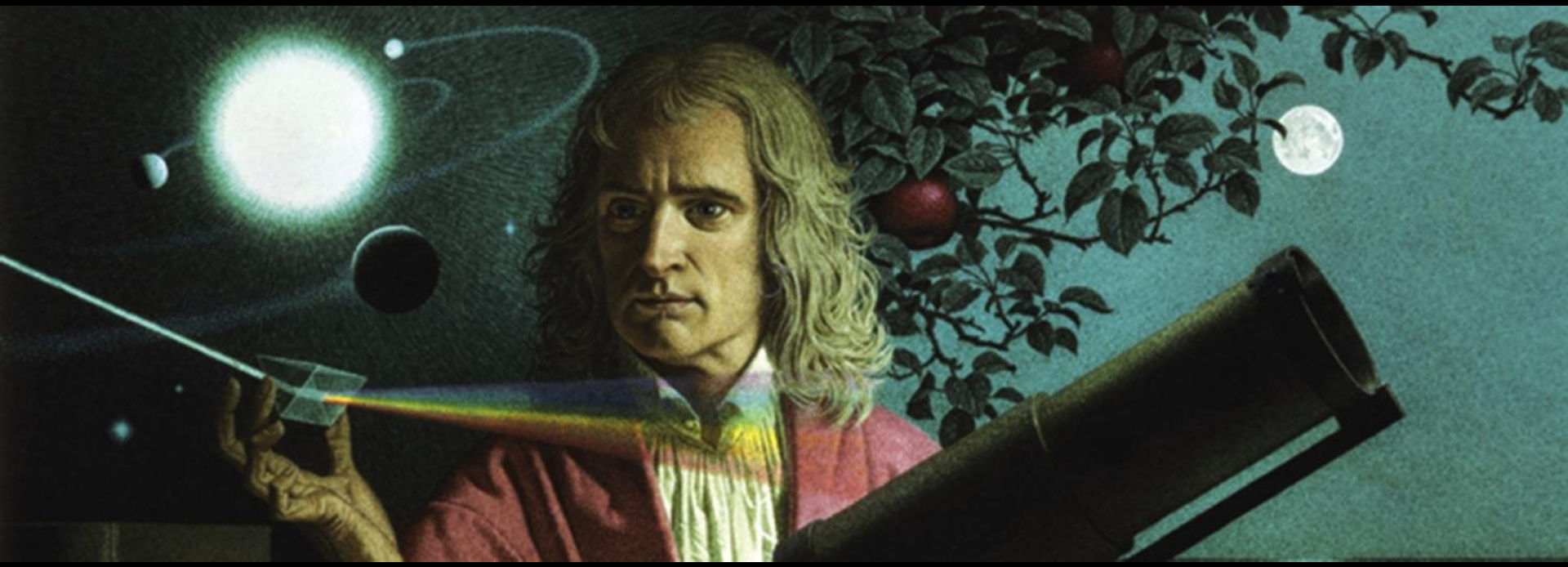
scientific reports



The **overall mask efficiency** (accounting both for air that passes through the mask and for leakage flows) is reduced compared to the through-mask filtration efficiency:

- from 93 to **70% for talking**
- but from only 94 to **90% for coughing**

Cappa CD, Asadi S, Barreda S, Wexler AS, Bouvier NM, Ristenpart WD. Sci Rep. 2021 Jun 8;11(1):12110



#1 Inertia

#2 F=m.a

The New York Times

Tuberculosis, Like Covid, Spreads by Breathing, Scientists Report

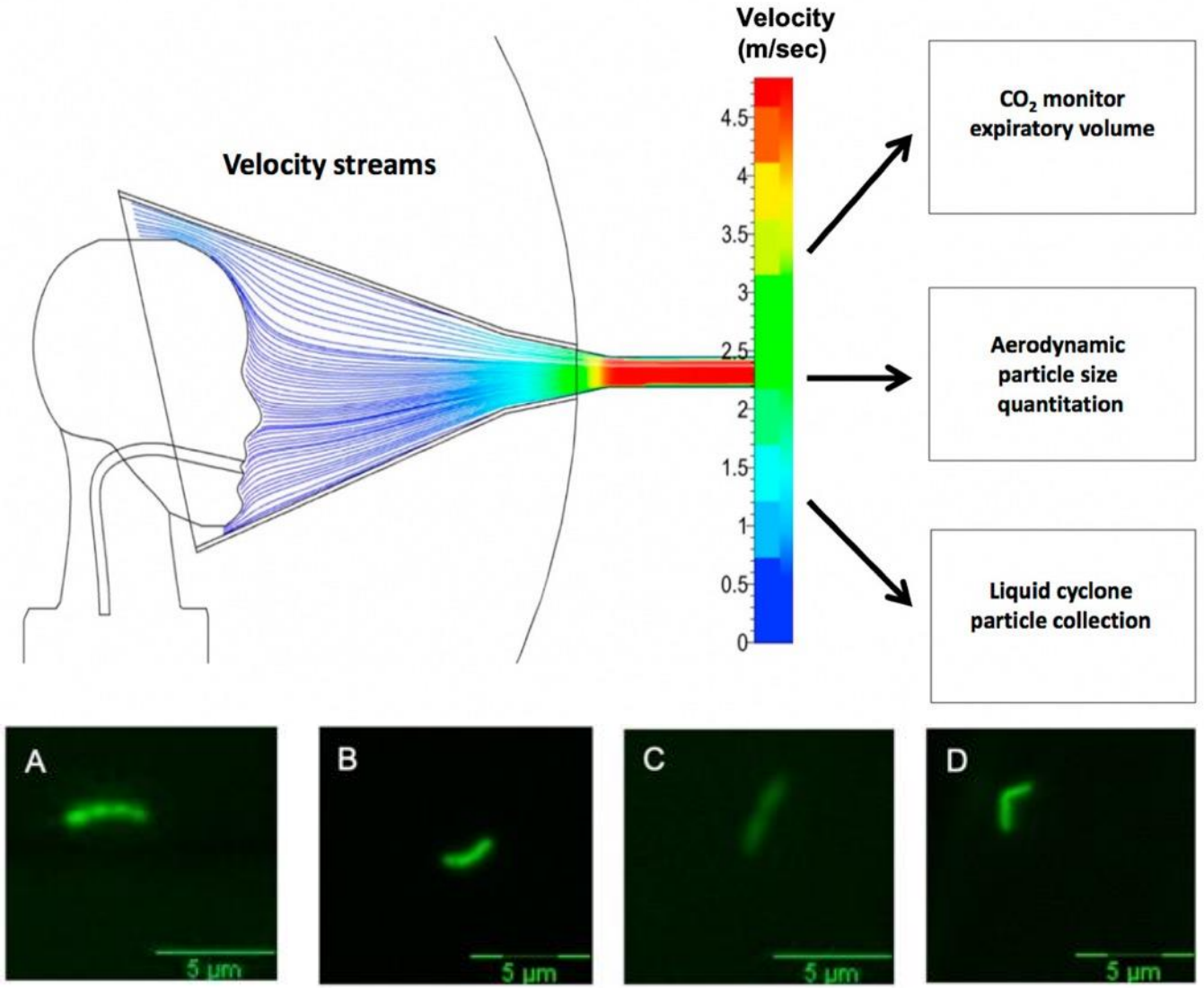
The finding upends conventional wisdom regarding coughing, long thought to be the main route of transmission.

A patient with tuberculosis receiving treatment at Sizwe Hospital in Johannesburg in 2019. Joao Silva/ The New York Times

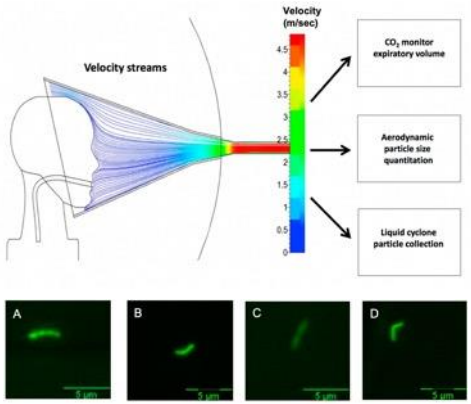
By Apoorva Mandavilli

Oct. 19, 2021

Upending centuries of medical dogma, a team of South African researchers has found that breathing may be a bigger contributor to the spread of tuberculosis than coughing, the signature symptom.



Dinkele R, et al. bioRxiv. 2021



	15 coughs	15 forced expirations	tidal breathing
Mean *Mtb* count	3.4	3.9	5.9

Dinkele R, et al. bioRxiv. 2021


CHINA SHIPPING
CHINA SHIPPING
CHINA SHIPPING
COSCO
COSCO
HANJIN
CAI
OOCL
ATTENTION
HIGH TRAFFIC AREA
SHIP TO 1 SMAL ST. BELLVILLE SOUTH AFRICA
SHIP TO 1 SMAL ST. BELLVILLE SOUTH AFRICA
FRAGILE

Patient number	Breathing: patients were asked to hold their coughs or alternatively cough in a paper tissue				natural coughing: spontaneous				forced coughing: as much as comfortable with			
	number of coughs	number of times sputum expectorated	*M. tuberculosis* culture		number of coughs	number of times sputum expectorated	*M. tuberculosis* culture		number of coughs	number of times sputum expectorated	*M. tuberculosis* culture	
			CFU's (impactor)	liquid culture (impinger)			CFU's (impactor)	liquid culture (impinger)			CFU's (impactor)	liquid culture (impinger)
1	52	0	0	NEG	51	0	0	NEG	81	0	0	NEG
2	0	0	0	NEG	30	3	0	NEG	138	6	0	NEG
3	0	0	0	NEG	41	3	0	NEG	126	15	0	NEG
4	24	0	0	NEG	24	0	0	NEG	193	0	0	NEG
5	0	0	0	NEG	7	0	0	NEG	66	0	**5**	**POS**
6	0	0	0	NEG	3	0	0	NEG	105	0	0	NEG
7	0	0	0	NEG	0	0	0	NEG	81	0	0	NEG
8	59	2	0	NEG	69	0	0	NEG	125	0	**1**	NEG
9	16	0	0	NEG	23	0	0	NEG	85	0	0	NEG
10	8	0	**17**	**POS**	14	0	**76**	**POS**	92	9	**405**	**POS**
11	72	4	**5**	NEG	82	5	**37**	**POS**	118	8	**75**	NEG
12	9	0	0	NEG	6	0	0	NEG	125	0	2	NEG
13	19	0	0	NEG	21	0	0	NEG	112	12	0	NEG
14	0	0	0	NEG	20	0	0	**POS**	74	7	**1**	NEG
15	0	0	0	NEG	6	0	0	NEG	118	0	**9**	NEG
16	5	0	0	NEG	16	0	0	NEG	127	0	0	NEG
17	27	0	0	NEG	22	0	**2**	NEG	121	0	0	NEG

Patient number	Breathing: patients were asked to hold their coughs or alternatively cough in a paper tissue				natural coughing: spontaneous				forced coughing: as much as comfortable with			
			M. tuberculosis culture				*M. tuberculosis* culture				*M. tuberculosis* culture	
	number of coughs	number of times sputum expectorated	CFU's (impactor)	liquid culture (impinger)	number of coughs	number of times sputum expectorated	CFU's (impactor)	liquid culture (impinger)	number of coughs	number of times sputum expectorated	CFU's (impactor)	liquid culture (impinger)
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5	0	0	0	NEG	7	0	0	NEG	66	0	**5**	**POS**
6	0	0	0	NEG	3	0	0	NEG	105	0	0	NEG
7	0	0	0	NEG	0	0	0	NEG	81	0	0	NEG
8	59	2	0	NEG	69	0	0	NEG	125	0	**1**	NEG
9	16	0	0	NEG	23	0	0	NEG	85	0	0	NEG
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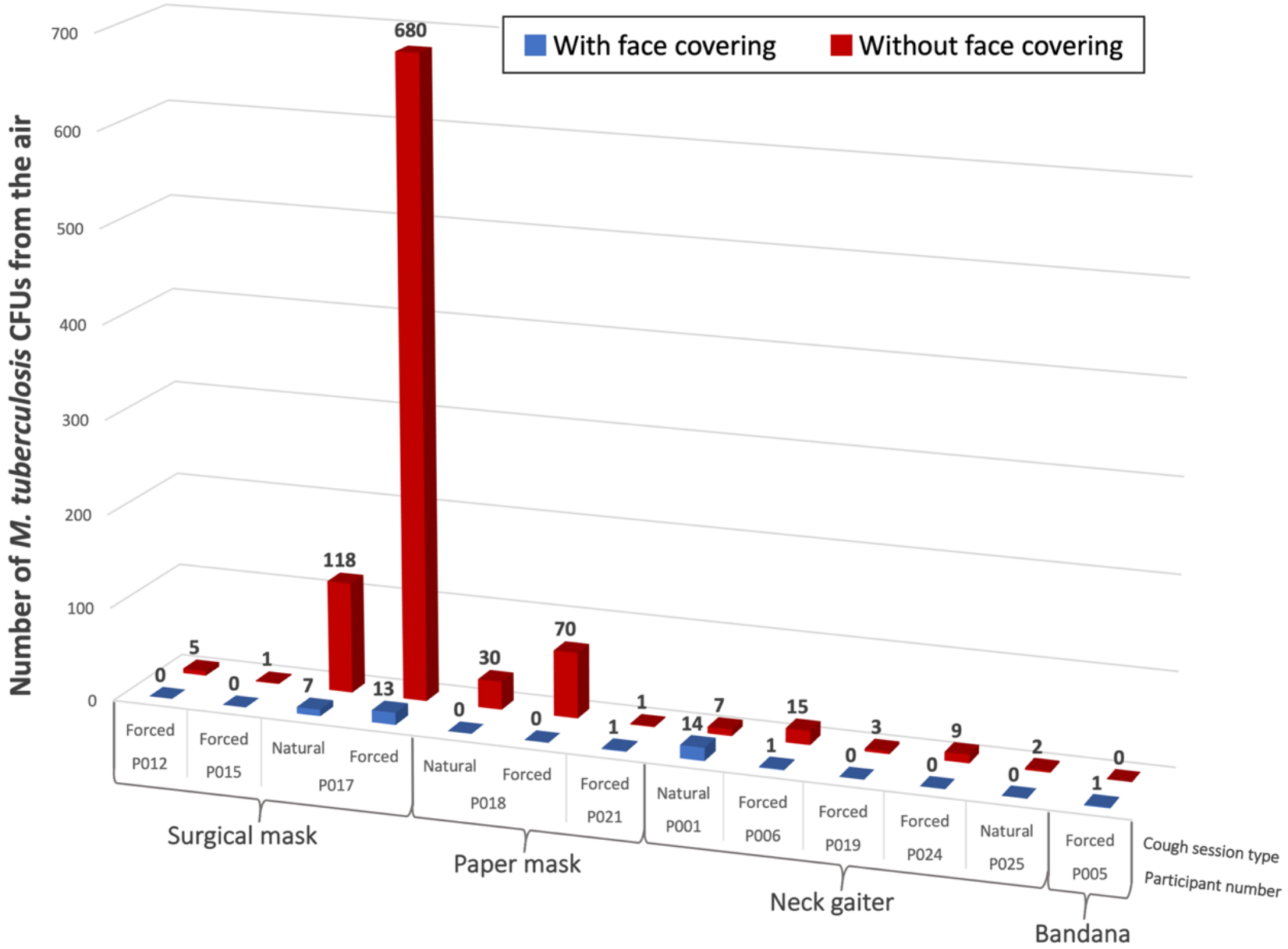
16	5	0	0	NEG	16	0	0	NEG	127	0	0	NEG
17	27	0	0	NEG	22	0	**2**	NEG	121	0	0	NEG

Radboud University Nijmegen

UNIVERSITEIT STELLENBOSCH UNIVERSITY

	Breathing: patients were asked to hold their coughs or alternatively cough in a paper tissue	natural coughing: spontaneous	forced coughing: as much as comfortable with
Average *Mtb* CFU count (positives only)	3	14	62



Koen Vanden Driessche, Precious Z Mahlobo, Rouxjeane Venter, et al. Lancet Respir Med. 2021

Face masks in the post-COVID-19 era: a silver lining for the damaged tuberculosis public health response?

	Recommendations	Justification	Challenges		Additional considerations
Who	• Coughers • Patients with tuberculosis awaiting results or recent treatment initiators (particularly drug-resistant tuberculosis) • People in high-risk congregate settings or hotspots • People with tuberculosis risk factors (eg, diabetes, HIV, previous tuberculosis)	• Most tuberculosis transmission probably requires coughing (co-occurrent non-specific cough possible) • Reinfection drives the tuberculosis epidemic, rather than reactivation	**Cross-cutting challenges:** Stigma, scepticism, discomfort, perceived liberty deprivation	• Cough not always self-recognised • Forced exhalation might produce infectious aerosols	• Social science and communication experts should provide policy guidance on how to receive buy-in from different users to promote high public face-mask uptake • Modellers should identify effects on tuberculosis incidence and mortality, and identify key users for whom mask adherence should be prioritised
When and where	• Closed environments (eg, vehicle) with people from different households • Health-care facilities	• Particles quickly dilute outside • Avoiding non-crowded areas is not possible for people requiring public transport		• Difficult for public to judge and influence ventilation (eg, public transport)	• Exceptions possible in well ventilated spaces: • Windows open in opposite walls • Sufficient air changes per hour and low rebreathed air fraction (CO_2 concentration)
What	• A three-layer cloth mask WHO recommended for COVID-19 transmission prevention • Surgical mask or other face covering	• Breathability to improve adherence • Good filtration for optimal protection • Non-conventional masks can minimise stigma		• Mask hygiene for reuse • Mask availability	• WHO recommends a hydrophobic fabric outer layer; if a middle layer with good filtration is used (eg, viscose mop), loosely woven cotton suffices for the inner and outer layers, which improves breathability

Koen Vanden Driessche, Precious Z Mahlobo, Rouxjeane Venter, et al. Lancet Respir Med. 2021


cracked.com

Take home message

Take home message

- Thank you