#SemuaPakaiMasker

Menghadapi yang tak kasat mata:

"... even if it is small and seems to be irrelevant. It is better than do nothing..."

Pratiwi P. Sudarmono

Guru Besar/Profesor Kehormatan Ilmu Mikrobiologi
Fakultas Kedokteran Universitas Indonesia

Safety First

Fungsi masker:

1. Proteksi terhadap diri sendiri. Melindungi diri sendiri dari terhirupnya partikulat dari luar.

2. Proteksi terhadap orang lain. Pencegahan penularan dari diri sendiri ke orang lain.

3. Sebagai pembatas fisik antara tangan dan wajah (mulut, hidung).

Rekomendasi:

- Masker non medis berbahan **2 lapis kain katun dengan ditambahkan tissue** di sisi sebelah dalam: layak dipergunakan.

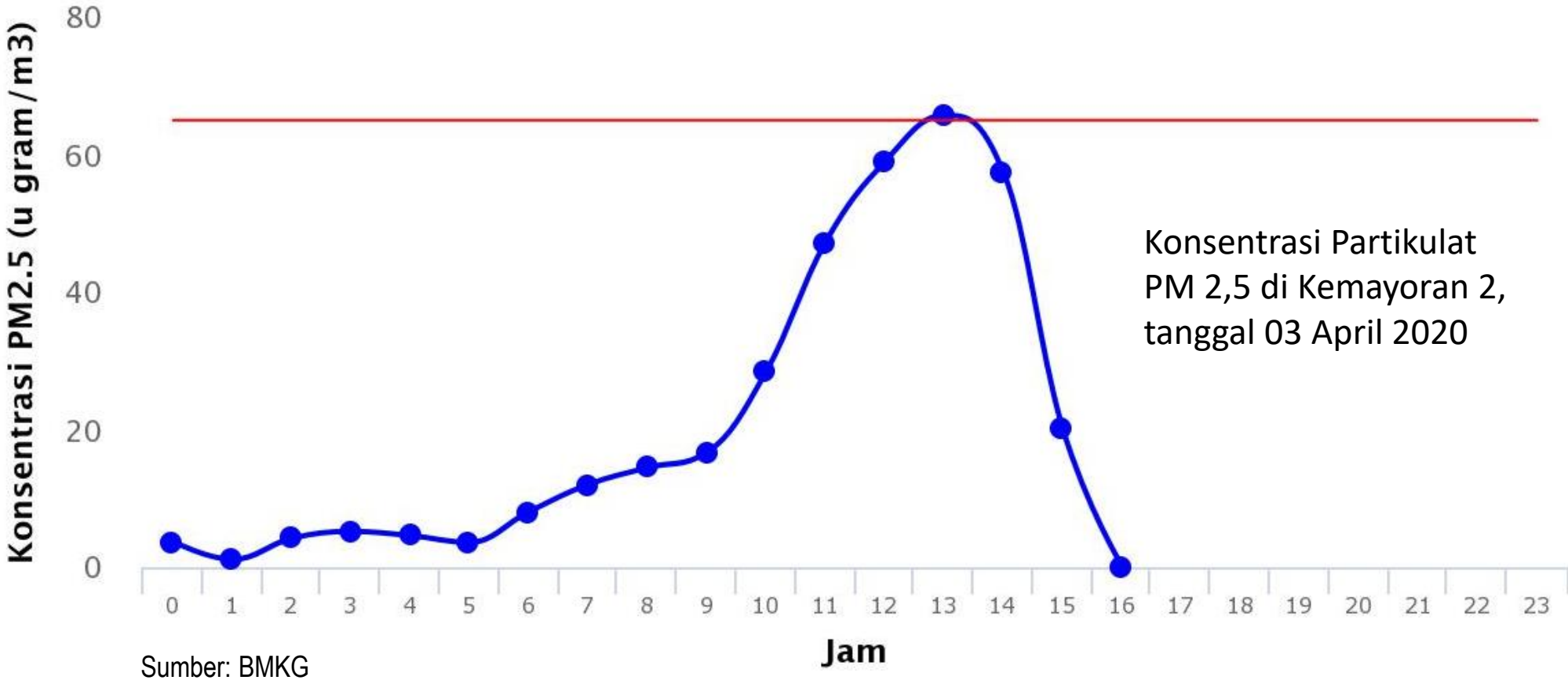
- Masyarakat yang membuat sendiri maskernya diharapkan mengikuti petunjuk desain dan memakai bahan seperti yang disarankan.

- Semua warga yang sehat (tidak terpapar wabah) menggunakan masker jika keluar rumah. Jika tidak tersedia, dapat menggunakan masker non medis buatan sendiri tersebut.

- OTG (Orang Tanpa Gejala), ODP (Orang Dalam Pemantauan) wajib mengenakan masker.

Particulate Matter (PM) 2,5 adalah partikel halus di udara yang ukurannya 2,5 mikron atau lebih kecil dari itu. PM 2,5 memiliki lebar sekitar 2 sampai 1,5 mikron. Ukuran PM 2,5 membuatnya bisa masuk hingga ke dalam paru-paru. Indonesia memiliki ambang batas paparan PM 2,5 adalah 65 mikrogram/m3.

Sumber:
https://kumparan.com/kumparansains/memahami-pm-2-5-dan-pm-10-yang-jadi-indikator-tingkat-polusi-udara-1rLoUvBof0M



Konsentrasi Partikulat PM 2,5 di Kemayoran 2, tanggal 03 April 2020

Sumber: BMKG

Ukuran Coronavirus = 125 nm jauh lebih kecil dari PM 2,5

Coronavirus virions are spherical with diameters of approximately 125 nm as depicted in recent studies by cryo-electron tomography and cryo-electron microscopy [2, 3]. The most prominent feature of coronaviruses is the club-shaped spike projections emanating from the surface of the virion. These spikes are a defining feature of the virion and give them the appearance of a solar corona, prompting the name, coronaviruses. Within the envelope of the virion is the nucleocapsid. Coronaviruses have helically symmetrical nucleocapsids, which is uncommon among positive-sense RNA viruses, but far more common for negative-sense RNA viruses.

Sumber:
Coronaviruses, An Overview of Their Replication and Phatogenesis
(Anthony R Fehr, University of Kansas)

Spesifikasi Masker berdasarkan EN 14683:2005

This European Standard specifies construction and performance requirements, and test methods for surgical masks intended to limit the transmission of infective agents from staff to patients and (in certain situations vice-versa) during surgical procedures in operating theatres and other medical settings with similar requirements. This European Standard is not applicable to masks intended exclusively for the personal protection of staff.
This standard is intended to help facilitate the choice of surgical face masks in the European Market by standardizing the information and performance data required for the masks.
There are three test methods used to classify surgical masks:

1. Bacterial Filtration Efficiency in vitro (BFE) (ASTM F2101-07**)**
This test is used to determine the amount of infective agent that is retained by the surgical facemask, which is directly related to the amount of bacteria released through the mask into the air of the surgical theatre.
Classification:
BFE => 95% TYPE I
BFE => 98% TYPE II

2. Breathing Resistance (Delta P)
This test is used to determine the resistance airflow of the facemask.
Classification:
TYPE I & II (non splash resistant) = < 29.4 Pa/cm2
TYPE IR & IIR (splash resistant) = < 49.0 Pa/cm2

3. Splash Resistance (ASTM F1862-07**)**

This test is used to determine the resistance penetration of potentially contaminated fluid splashes.

Classification:

TYPE I & TYPE II not applicable

TYPE IR & TYPE IIR >120 mmHg

120 mmHg is a minimum value. It corresponds to the average systolic arterial blood pressure, and intends to protect against ruptures in small arteries causing small sprays of blood. Some products off protection even in excess of the 120 mmHg.

Minimum Performance Requirements According to the New Facemask Standard EN14683

EU Standard Class	Bacterial Filtration Efficiency	Breathing Resistance (Pa/cm2)	Splash Resistance (mmHg)
Type I	95%	< 29.4	NA
Type IR	95%	< 49.0	> 120
Type II	98%	< 29.4	NA
Type IIR	98%	< 49.0	> 120

Benchmarking: Masker N95

Kode angka 95: masker mampu menyaring PM2,5 hingga 95%

DESCRIPTION

The Health Care Particulate Respirator and Surgical Mask is designed to help provide respiratory protection for the wearer. This product has a filter efficiency level of 95% or greater against particulate aerosols free of oil[1]. It is fluid resistant, disposable and may be worn in surgery. It can fit a wide range of face sizes.

This product contains no components made from natural rubber latex.

INTENDED USE: This product meets CDC guidelines for *Mycobacterium tuberculosis* exposure control. As a respirator, it is intended to reduce wearer exposure to certain airborne particles in a size range of 0.1 to >10.0 microns, including those generated by electrocautery, laser surgery, and other powered medical instruments. As a surgical mask, it is designed to be fluid resistant to splash and spatter of blood and other infectious materials; when worn properly and in combination with protective eyewear, it complies with the OSHA Bloodborne Pathogens Standard. It also provides >99% BFE[2] against wearer generated micro-organisms.

Sumber:
https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource3surgicaln95.html

Kinerja Masker Biasa dengan penambahan Tissue

Penelitian yang dilakukan oleh Prof. Usanee Vinijketkamnuan & Khanittha Punturee (Biochemistry and Clinical Chemistry, Chiang Mai University, 2008) menemukan:

- Masker biasa yang ditambahkan kertas tissue (atau sapu tangan, serbet) di sisi sebelah dalam dapat menyaring sebanyak 75 ~ 90% $PM_{2.5}$

- Masker biasa tanpa penambahan tissue atau serbet di sisi sebelah dalam, hanya bisa menyaring 48% $PM_{2.5}$.

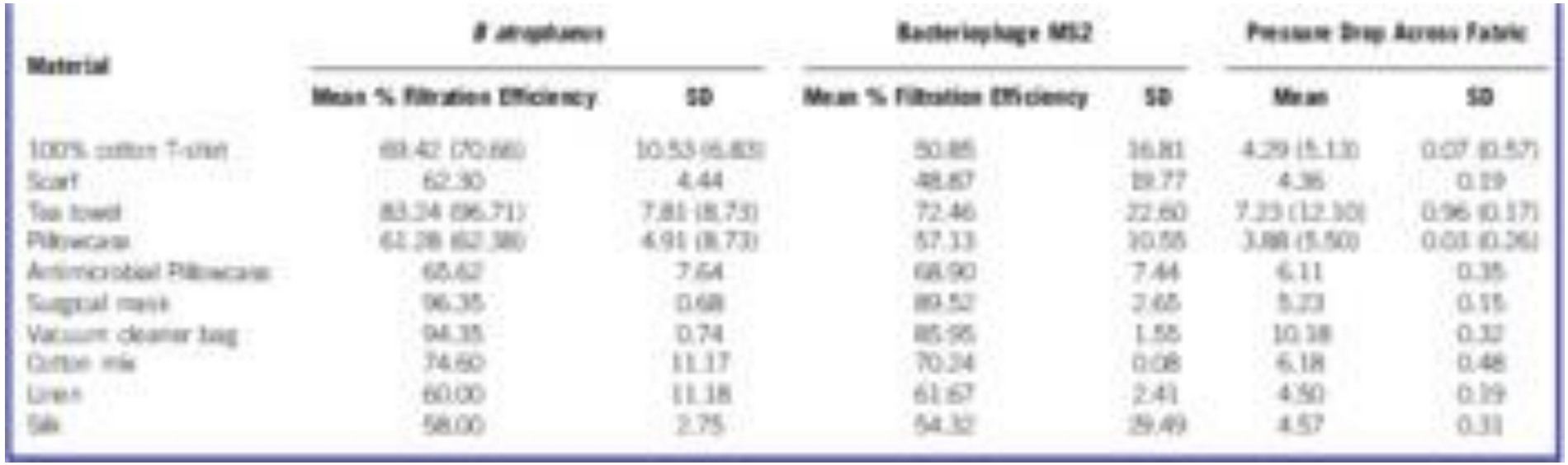
- Masker kualitas tinggi yang direkomendasikan oleh otoritas (seperti: N95, 3M 8210, & 3M 9002A), dapat menyaring sebanyak 87 ~ 96% $PM_{2.5}$

Dr Amporn Benjaponpitak (Department of Health Deputy Director-General) merekomendasikan penggunaan 2 layer masker biasa jika tidak ada masker N95

Sumber:
https://www.nationthailand.com/national/30362393

Telaah *Home made mask* dengan menggunakan berbagai macam bahan

Material	Filtration Efficiency 1	Filtration Efficiency 2
Katun 100%	+/- 70.66%	+/- 50.85%
Scarf	+/- 62.30%	+/- 48.57%
Surgical Mask	+/- 96.35%	+/- 89.52%
Vacuum Cleaner Bag	+/- 94.35%	+/- 85.95%



Material	# [illegible]		Bacteriophage MS2		Pressure Drop Across Fabric	
	Mean % Filtration Efficiency	SD	Mean % Filtration Efficiency	SD	Mean	SD
100% cotton T-shirt	69.42 (70.66)	10.53 (6.83)	50.85	16.81	4.29 (5.13)	0.07 (0.57)
Scarf	62.30	4.44	48.67	19.77	4.36	0.19
Tea towel	83.24 (86.71)	7.81 (8.73)	72.46	22.60	7.23 (12.10)	0.96 (0.17)
Pillowcase	61.28 (62.38)	4.91 (8.73)	57.13	10.55	3.88 (5.50)	0.03 (0.26)
Antimicrobial Pillowcase	65.62	7.64	68.90	7.44	6.11	0.35
Surgical mask	96.35	0.68	89.52	2.65	5.23	0.15
Vacuum cleaner bag	94.35	0.74	85.95	1.55	10.38	0.32
Cotton mix	74.60	11.17	70.24	0.08	6.18	0.48
Linen	60.00	11.18	61.67	2.41	4.50	0.19
Silk	58.00	2.75	54.32	29.49	4.57	0.31

Sumber:
https://www.cambridge.org/core/journals/disaster-medicine-and-public-health-preparedness/article/testing-the-efficacy-of-homemade-masks-would-they-protect-in-an-influenza-pandemic/0921A05A69A9419C862FA2F35F819D55/core-reader

Artikel: Physical interventions to interrupt or reduce the spread of respiratory viruses

Implementasi pembatas (spt: masker) efektif dalam menangkal virus

We included 67 studies including randomised controlled trials and observational studies with a mixed risk of bias. A total number of participants is not included as the total would be made up of a varied set of observations: participant people and observations on participants and countries (the object of some studies). Any total figure would therefore be misleading. Respiratory virus spread can be reduced by hygienic measures (such as handwashing), especially around younger children. Frequent handwashing can also reduce transmission from children to other household members. Implementing barriers to transmission, such as isolation, and hygienic measures (wearing masks, gloves and gowns) can be effective in containing respiratory virus epidemics or in hospital wards. We found no evidence that the more expensive, irritating and uncomfortable N95 respirators were superior to simple surgical masks. It is unclear if adding virucidals or antiseptics to normal handwashing with soap is more effective. There is insufficient evidence to support screening at entry ports and social distancing (spatial separation of at least one metre between those infected and those non-infected) as a method to reduce spread during epidemics.

Sumber:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6993921/

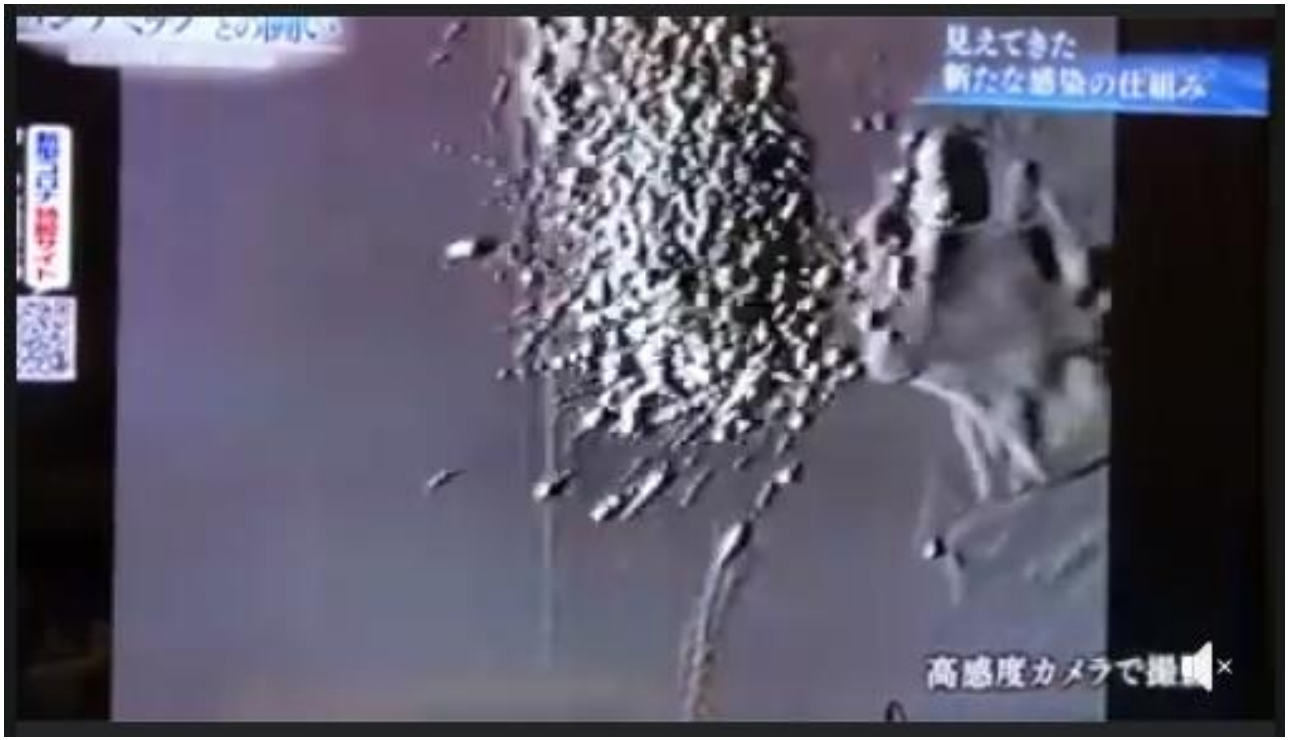
Artikel: Risk Factors for SARS among Persons without Known Contact with SARS Patients, Beijing, China

Pemakaian masker secara konsisten ketika berada di luar ruang dapat mengurangi resiko terkena SARS sebesar 70%

Factors associated with SARS in multivariable analysis are presented in Table 2. After other factors were controlled for, visiting a fever clinic and having a chronic medical condition remained significantly associated with a risk for SARS. After other variables were adjusted for, having visited a hospital was not associated with acquiring SARS. Other factors associated with an increased risk for SARS were eating outside the home and taking taxis more than once a week. Always wearing a mask when going out was associated with a 70% reduction in risk compared with never wearing a mask. Wearing a mask intermittently was associated with a smaller yet significant reduction in risk. Going to the farmer's market and owning a pet were both protective factors.

Sumber:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3322931/

Video tentang sebaran partikel mikroskopis ketika bersin dan bercakap



Sumber:
https://www.youtube.com/watch?v=hm7BmIJrLZE

Penelitian dari Jepang tentang sebaran (cipratan) partikel mikroskopis ketika bersin dan bercakap.

Video ini tentang percobaan menggunakan kamera kecepatan tinggi tercanggih di dunia saat ini yang bisa menangkap pergerakan partikel 0.1 micrometer = 1/10000 mm.

[Adegan bersin]
Percobaan awal, bersin. Cipratan partikel yang terbang terlihat kasat mata adalah droplet sebesar 1 mm, langsung jatuh ke lantai.
Saat lihat bersin tadi dengan kamera berkecepatan tinggi, titik-titik cipratan partikel yang terlihat sebesar 1/100 mm. Dilihat dari sudut yg berbeda, karena sangat kecil dan ringan, terlihat partikel mengambang di udara. Ini adalah wujud cipratan mikroskopik (microsplash).

[Adegan dua orang berbincang-bincang]
Seperti kita tahu cipratan mikroskopik dikeluarkan pada saat bersin. Saat kedua orang berbincang seru, bisa terlihat bahwa banyak cipratan mikroskopik yang beterbangan. Dapat terlihat di antara dua orang yang terus berbicara, cipratan mikroskopik tersebut tidak menghilang begitu saja.
Masih belum ada yang mengetahui seberapa besar peran cipratan mikroskopik ini dalam penyebaran penyakit. Namun menurut Prof. Tateda untuk menyatakan **PENGARUH CIPRATAN MIKROSKOPIK INI TIDAK DAPAT DIABAIKAN**.

Profesor Kazuhiro Tateda (Toho University): “Di dalam cipratan mikroskopik terdapat virus-virus yang hidup. Jadi saat kita melakukan percakapan jarak dekat dengan suara keras seperti di video percakapan, cipratan mikroskopik berpindah dari seseorang dan bisa terhirup oleh lawan bicaranya dan memperluas penularan“

[Adegan dua peneliti di ruangan di Kyoto Institute of Technology]
Dalam ruangan tertutup dengan berventilasi buruk, resiko penularan lewat cipratan mikroskopik bertambah tinggi. Ruang penelitian ini mencoba membuat simulasi pergerakan cipratan mikroskopik di ruangan dengan ventilasi yang buruk.

Simulasi dilakukan dengan situasi ruangan tertutup layaknya kelas dan di dalamnya ada 12 orang. Dibuat simulasi dengan kondisi satu orang batuk sekali. Terlihat kurang lebih 10.000 partikel terbang bebas dengan ukuran yang berbeda-beda. Untuk cipratan yang berukuran lebih besar (gambar hijau), bisa terlihat dalam satu menit jatuh. Namun seperti yang terlihat di layar, **CIPRATAN MIKROSKOPIK YANG BERUKURAN JAUH LEBIH KECIL BERWARNA MERAH TETAP MELAYANG-LAYANG DI UDARA.**

Simulasi berikutnya hanya melihat pergerakan mikropartikel berukuran kecil saja. Dalam 5 menit, 10 menit, setidaknya dalam 20 menit partikel mikroskopik masih bertahan di dalam ruangan.
Associate Prof. Masashi Yamakawa (Kyoto Institute of Technology) : ”Dalam ruangan tertutup, pergerakan udara bisa dikatakan minim, sehingga dalam waktu yang lama mikropartikel tidak bisa bergerak kemana-kemana, jadi tetap berada di dalam ruangan.”

Ada langkah-langkah yang dapat diantisipasi untuk menekan pergerakan cipratan mikroskopik.
Untuk hasil yang efektif, buka jendela lebar-lebar untuk mengganti udara . Saat membuka jendela lebar, cipratan mikroskopik yang ringan dan berukuran kecil akan mengalir keluar.
Prof Tateda “Sangatlah penting untuk sedapat mungkin membuka dua bukaan jendela agar udara dapat mengalir di antaranya. Setidaknya lakukan sejam sekali agar dapat mengalirkan udara dan meringankan kemungkinan terjadinya resiko penularan ruangan tertutup.”

[Terjemahan oleh: Rizqi Fitrasha N. , alumni Kyoto University, Tokyo, 26 Maret 2020,]

Maksimalkan fungsi masker dengan mengenakannya secara benar

Application

Remove the respirator from its packaging and hold with straps facing upward. Place the bottom strap under the center flaps next to the "WARNING" statement.

Fully open the top and bottom panels, bending the nosepiece around your thumbs at center of the foam. Straps should separate when panels are opened. Make certain the bottom panel is unfolded and completely opened.

Place the respirator on your face so that the foam rests on your nose and the bottom panel is securely under your chin.

Pull the top strap over your head and position it high on the back of the head. Then, pull the bottom strap over your head and position it around your neck and below your ears.

Adjust for a comfortable fit by pulling the top panel toward the bridge of your nose and positioning the bottom panel under your chin.

Place fingertips from both hands at the top of your nose and mold the nosepiece around your nose to achieve a secure seal.

Please Note:

Check the seal of your three-panel facepiece respirator each time you don the respirator.

Place one or both hands completely over the middle panel. Inhale and exhale sharply. If air leaks around your nose, readjust the nosepiece. If air leaks between the face and facesseal of the respirator, reposition it by adjusting the panels and straps. If you cannot achieve a proper seal, do not enter the contaminated area. See your supervisor.

Contoh-Contoh Masker

Masker non medis dibuat sendiri dari **kain katun (2 lapis)**, dapat dicuci (pakai ulang). Penggunaannya dengan menambahkan **1 lapis tissue** dibagian dalam

Surgical Mask

Kutipan pernyataan yang kurang pas, seharusnya tidak perlu disampaikan ke publik

…arahan resmi dari Organisasi Kesehatan Dunia (WHO) sudah sangat jelas. Hanya ada dua jenis orang yang harus mengenakan masker: mereka yang sakit dan menunjukkan gejala Covid-19, dan mereka yang merawat orang yang terduga terinfeksi virus corona. Lainnya tidak perlu mengenakan masker…

Sumber:
https://news.detik.com/bbc-world/d-4955648/mengapa-ada-negara-yang-warganya-wajib-pakai-masker-dan-ada-yang-tidak

Dewan Riset Daerah Provinsi DKI Jakarta

Ged. Dinas Perumahan 8th Floor Jl. Taman Jatibaru No. 1
Jakarta 10150 Indonesia

phone: +62-21 202689 email: mail.drd@jakarta.go.id

Task Force Mitigasi Dampak Covid-19

Ketua: Erick Yusuf

Anggota:

1. Pratiwi P. Sudarmono
2. Kemas R. Kurniawan
3. Sunarsip
4. Aisa D. Tobing
5. Heru Susetyo
6. Emir Riza
7. Teddy R. Bachtiar
8. Isroil Samihardjo
9. Anang K. Umaedi
10. Arie Mufti
11. Faransyah AJ
12. Sukma Widyanti
13. Chotib
14. Khoirunurrofik
15. Andi Rahmah
16. Suwardi Hagani
17. Djoni Hartono
18. Iwan Setiawan

#DiRumahAja

#KeluarWajibPakaiMasker