Webinar Pusat Teknologi Sumberdaya Energi dan Industri Kimia
Badan Pengkajian dan Penerapan Teknologi
Jumat 26 November 2020

RSUI
We Provide Outstanding Care

Menjaga Kesehatan

Masa Wabah COVID-19

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- Satgas COVID-19 Rumah Sakit UI
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Garis besar presentasi

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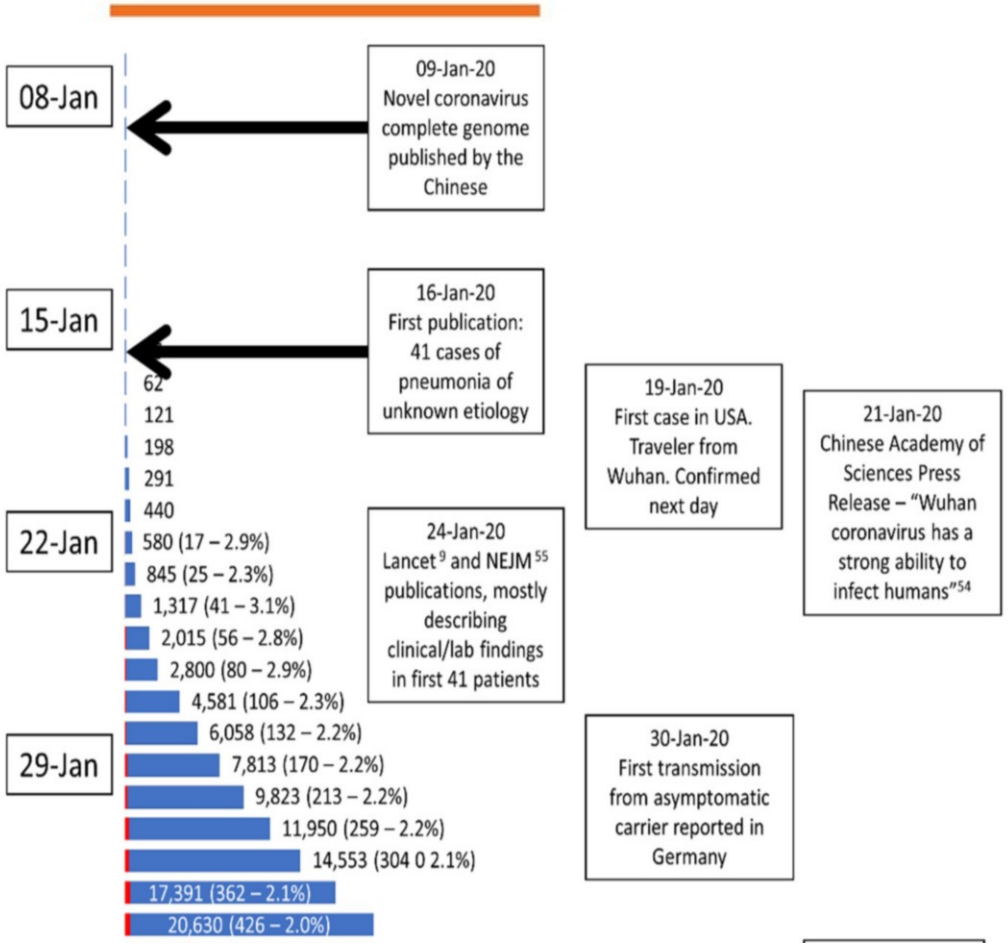
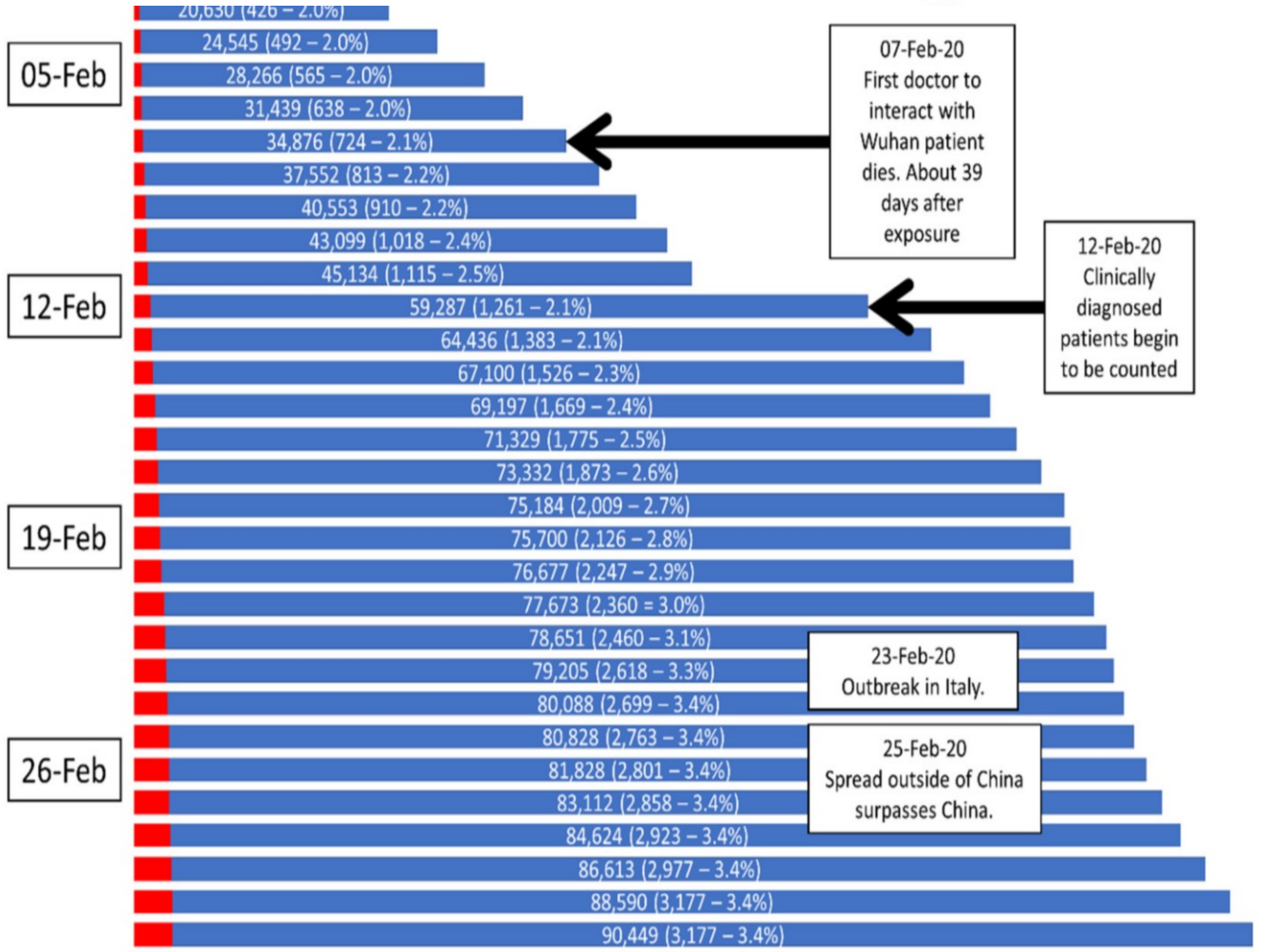
- Sekilas virus SARS-CoV-2 dan penyakit COVID-19
- Gambaran epidemiologis wabah COVID-19 (per Nov 2020)
- Penularan dan pencegahan COVID-19

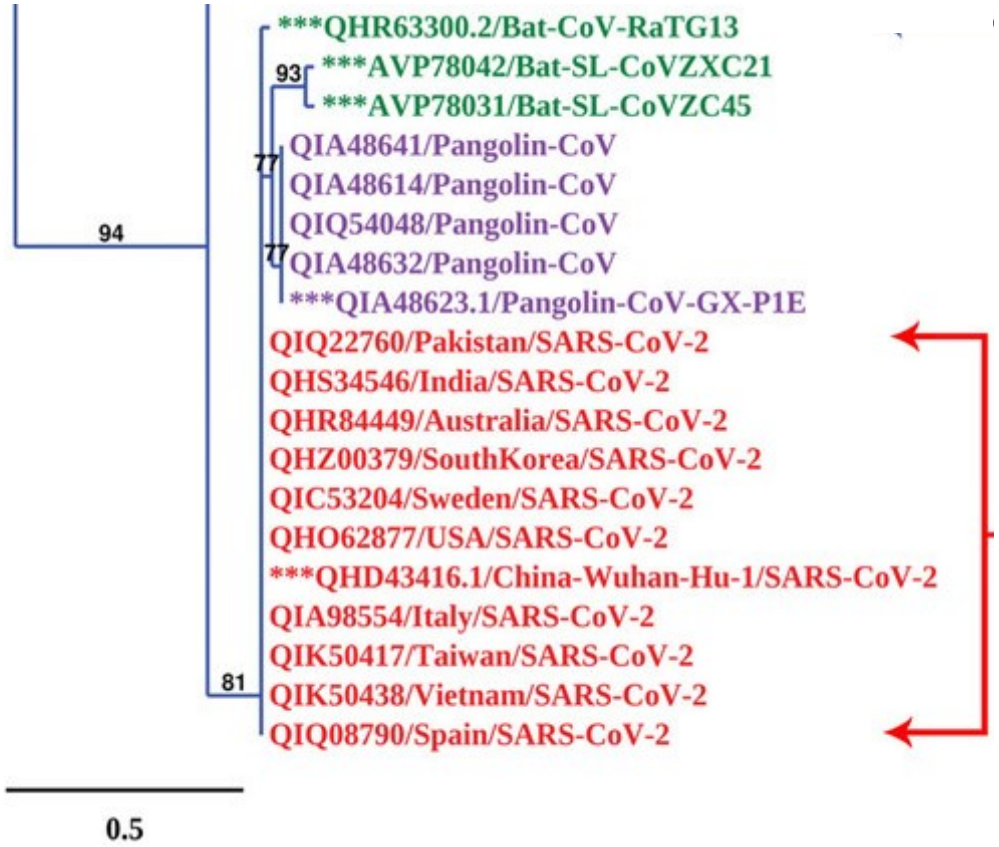
Sekilas virus SARS-CoV-2 dan penyakit COVID-19



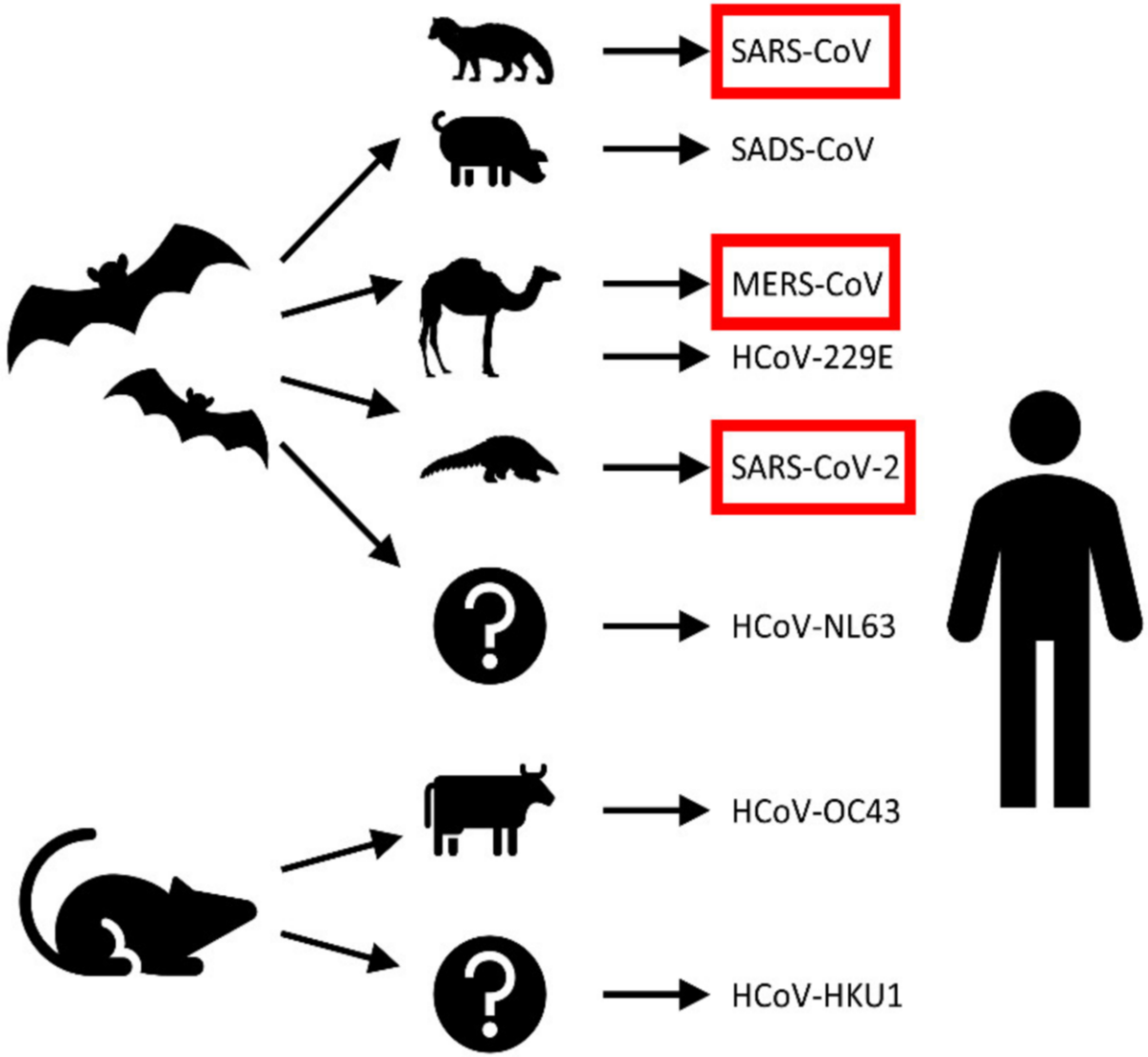


https://doi.org/10.3390/pathogens9030231

Sekilas virus SARS-CoV-2 dan penyakit COVID-19



https://doi.org/10.1002/jmv.26261



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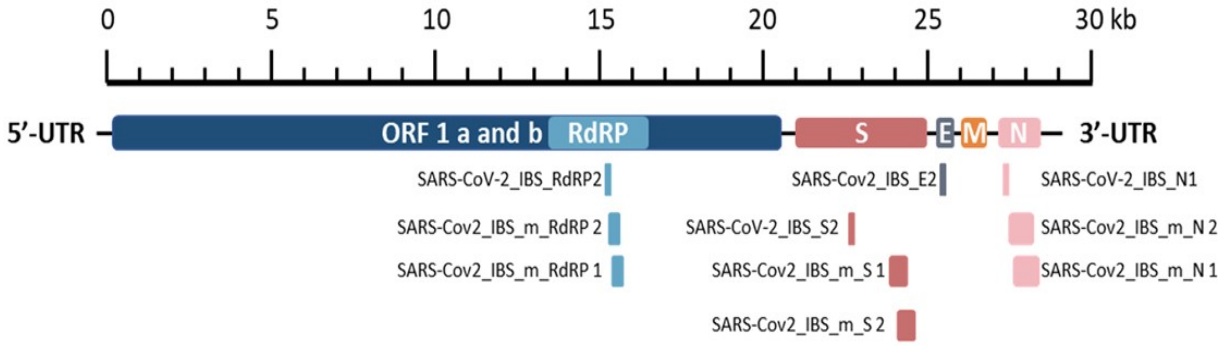
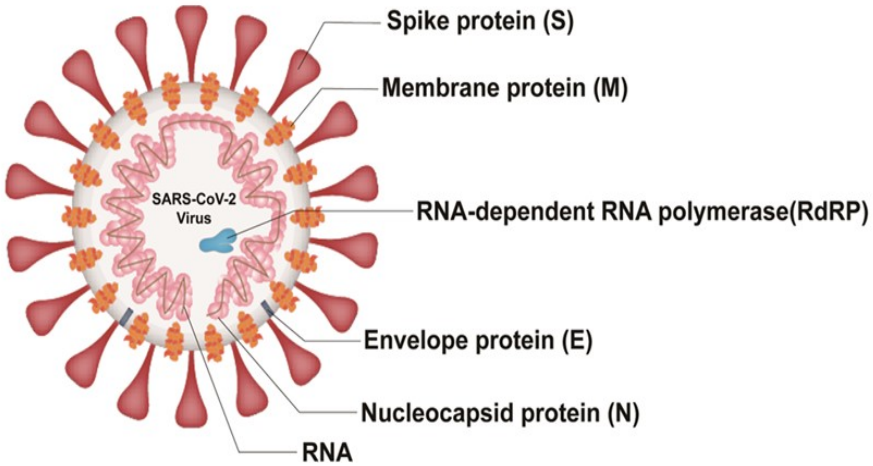
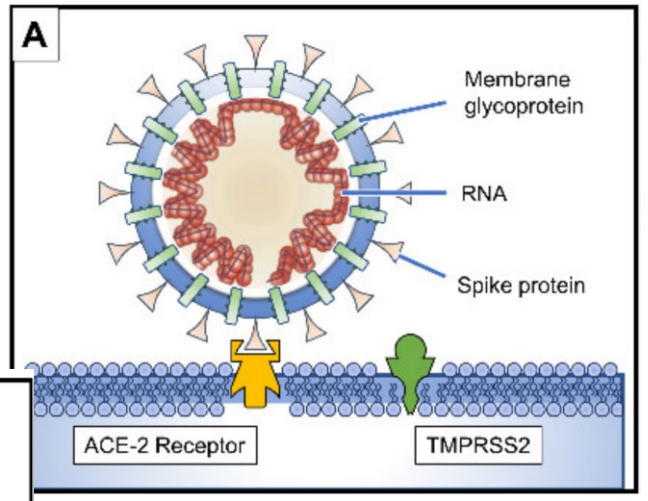
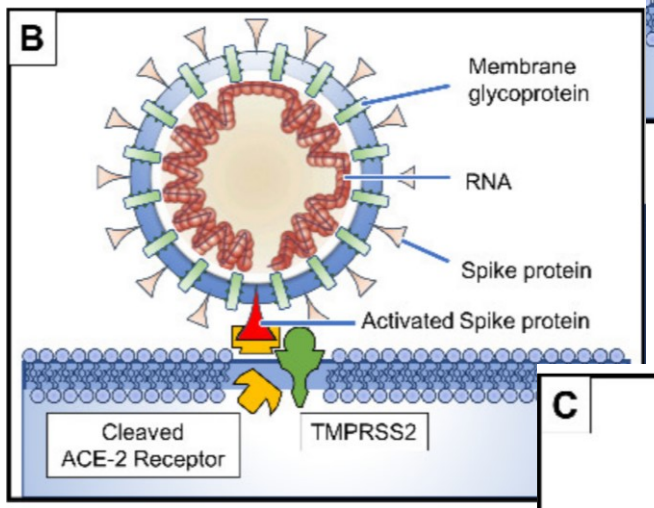
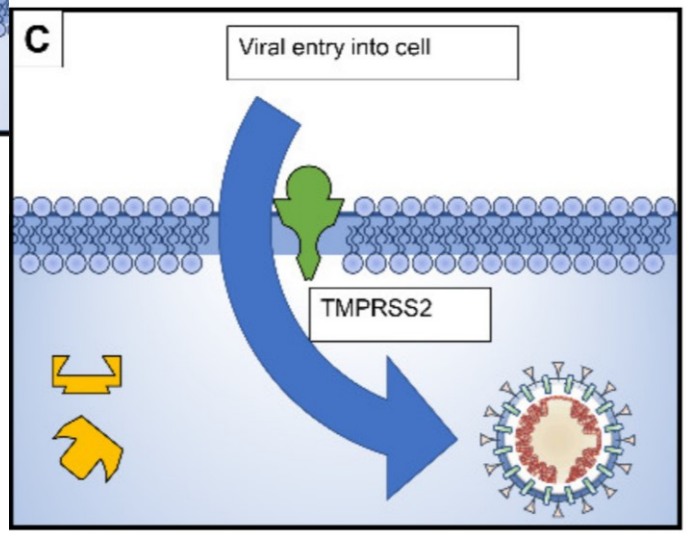
Sekilas virus SARS-CoV-2 dan penyakit COVID-19











https://doi.org/10.1038/s12276-020-0452-7

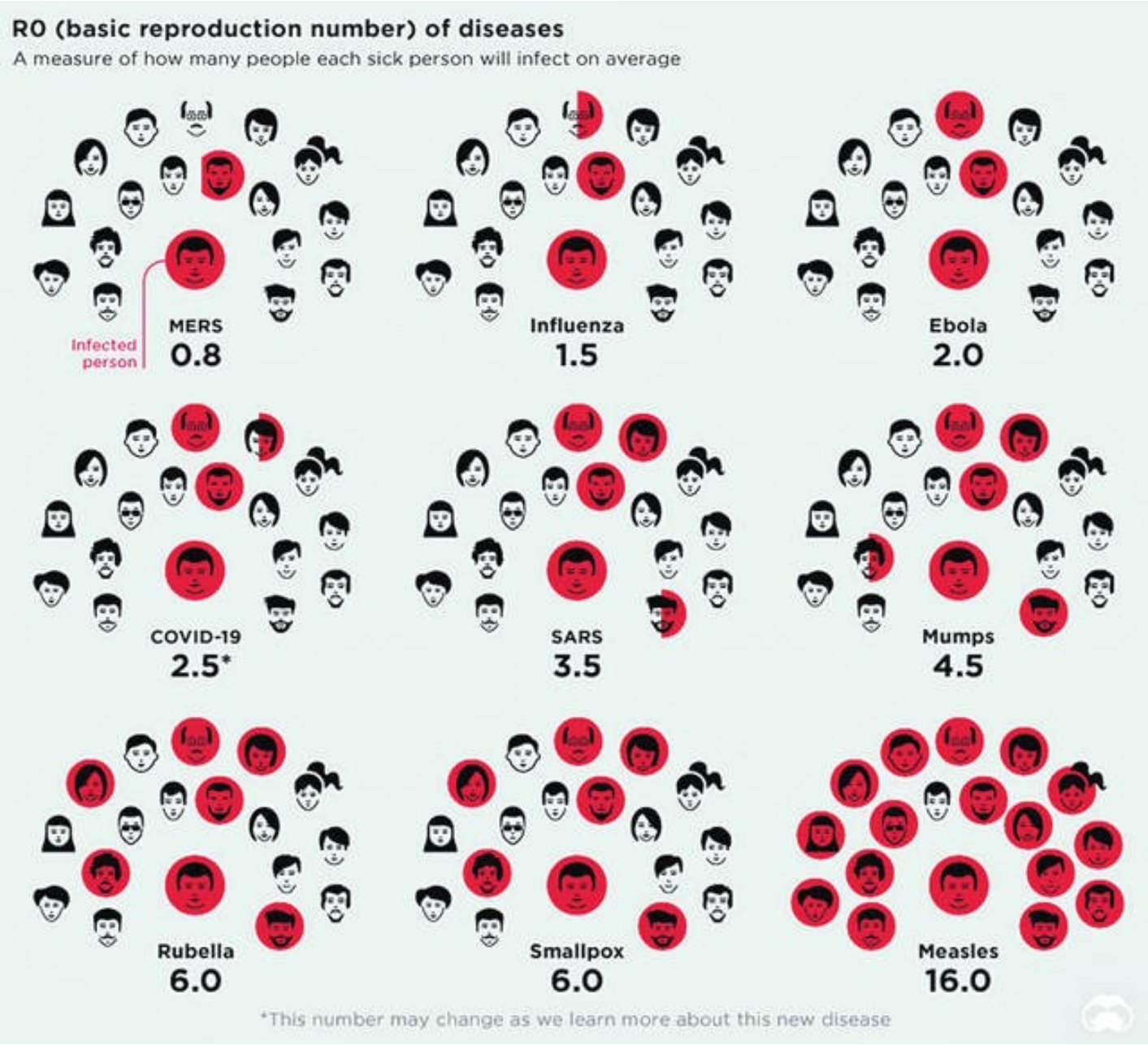
https://doi.org/10.3390/pathogens9030231

Mengapa COVID-19 mematikan?

Gejala (Ringan) COVID-19:

1. Demam
2. Batuk (kering, berdahak)
3. Sesak atau napas pendek
4. Rasa letih
5. Nyeri otot atau sendi
6. Sakit kepala
7. Hilang kemampuan menghidu & mencicip
8. Sakit tenggorokan atau menelan
9. Hidung mampet atau berair
10. Mual dan atau muntah
11. Diare

https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html



https://www.sidneydailynews.com/news/174005/covid-19-by-the-numbers

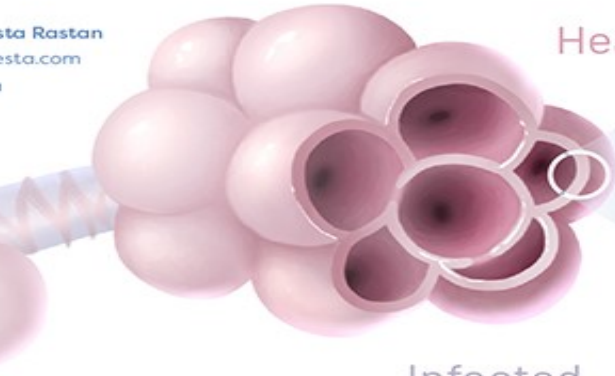
COVID-19

HOW DOES IT AFFECT YOU?

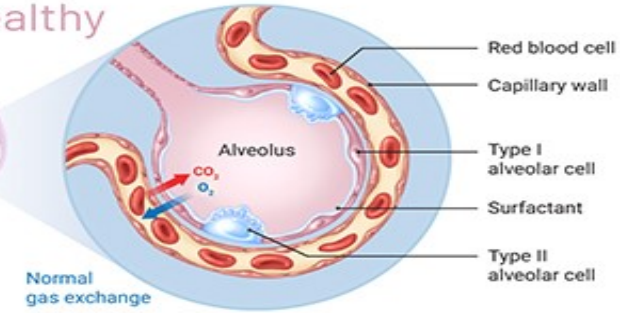
Designed by Avesta Rastan
www.azuravesta.com
@azuravesta
@azuraviz

Coronavirus Disease 2019 (COVID-19) is a pandemic caused by Severe Acute Respiratory Syndrome Coronavirus 2, also called SARS-CoV-2. Despite the widespread awareness regarding COVID-19, many are still unaware about how it affects the human body.

SARS-CoV-2 starts its journey in the nose, mouth, or eyes and travels down to the alveoli in the lungs. Alveoli are tiny sacs of air where gas exchange occurs.

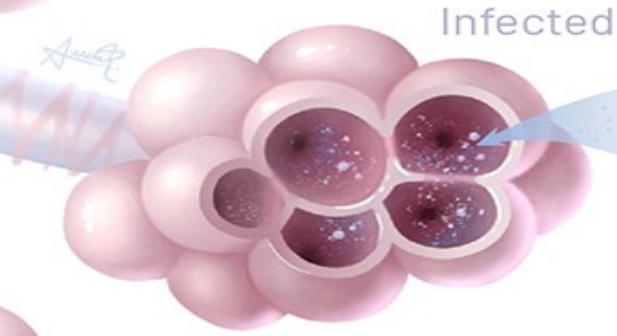


Healthy



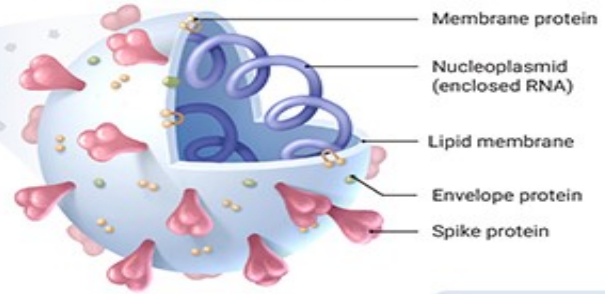
Gas Exchange

Each sac of air, or alveolus, is wrapped with capillaries where red blood cells release **carbon dioxide** (CO_2) and pick up **oxygen** (O_2). Two alveolar cells facilitate gas exchange; **Type I** cells are thin enough that the oxygen passes right through, and **Type II** cells secrete **surfactant** – a substance that lines the alveolus and prevents it from collapsing.



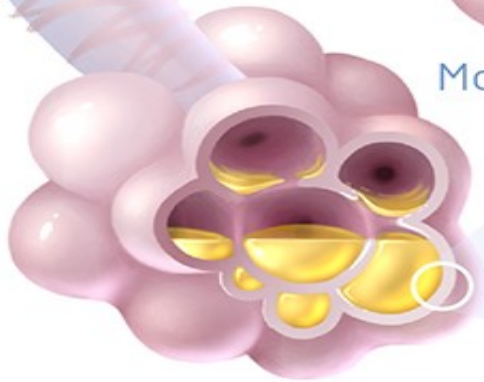
Infected

SARS-CoV-2 Structure

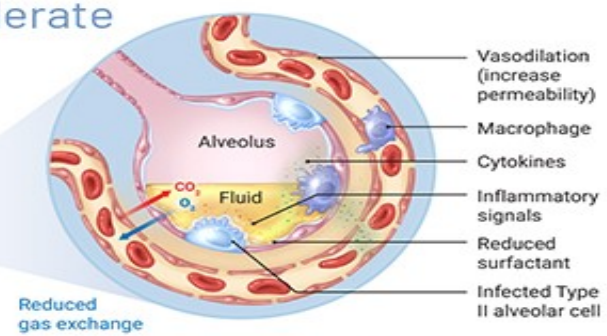


Viral Infection

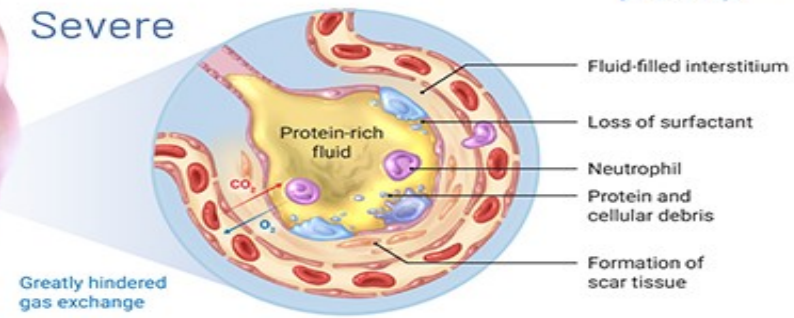
The spike proteins covering the coronavirus bind ACE2 receptors primarily on type II alveolar cells, allowing the virus to inject its RNA. The RNA "hijacks" the cell, telling it to assemble many more copies of the virus and release them into the alveolus. The host cell is destroyed in this process and the new coronaviruses infect neighbouring cells.



Moderate



Severe



Impaired Gas Exchange

When the immune system attacks the area of infection it also kills healthy alveolar cells. This results in three things that hinder gas exchange:

1) Alveolar collapse due to loss of surfactant from Type II cells
2) Less oxygen enters the blood-stream due to lack of Type I cells
3) More fluid enters the alveolus

Stay Home

Symptoms may start to show (e.g. dry cough, fever, etc.)

Pneumonia develops

Shortness of breath

Hospitalization

Dangerous for high-risk individuals; secondary infections may occur

Intensive Care (ICU)

Patients may require ventilators and life-support

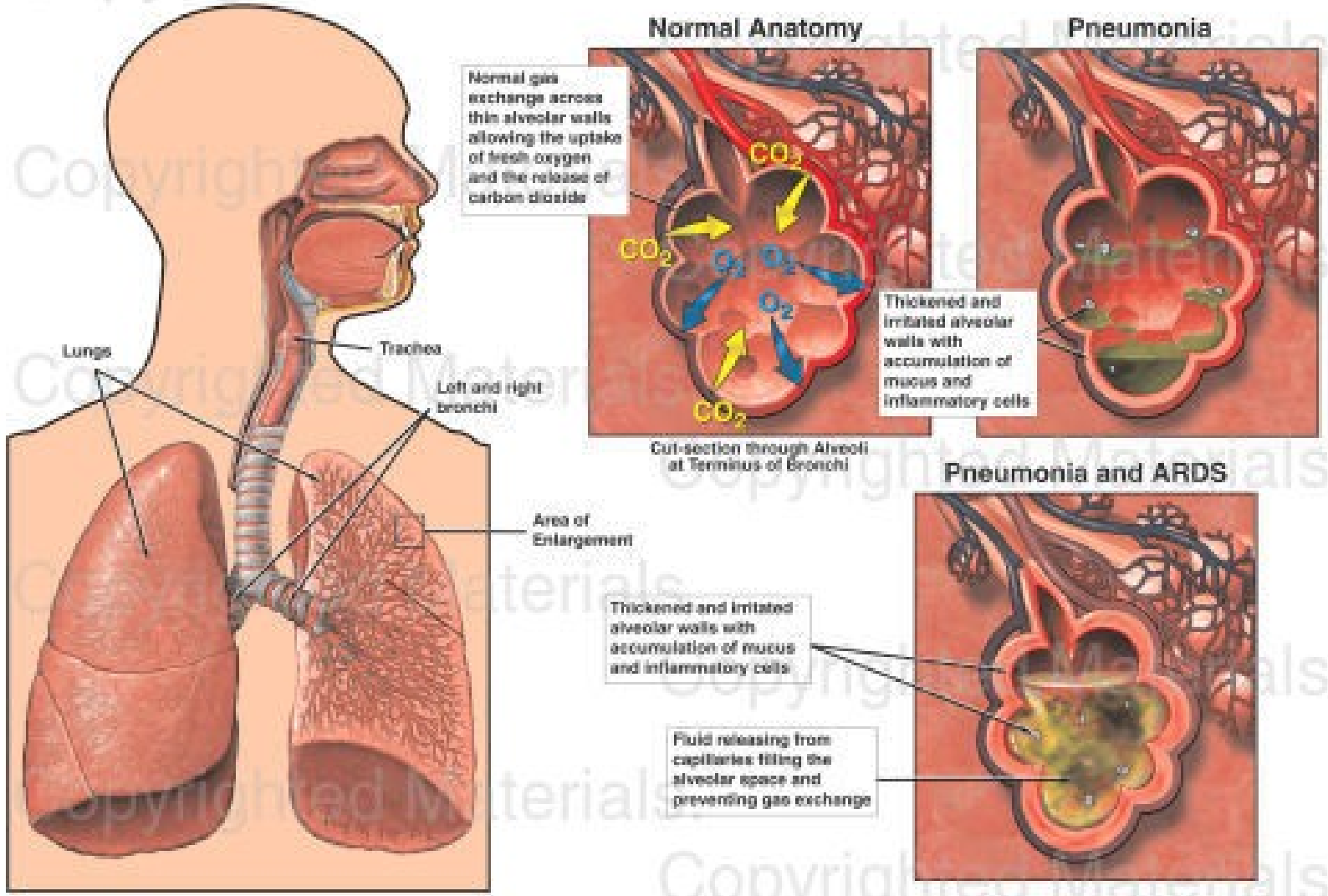
Complications unrelated to COVID-19 may occur

With proper care, patients may recover at any point during this process

Immune Response

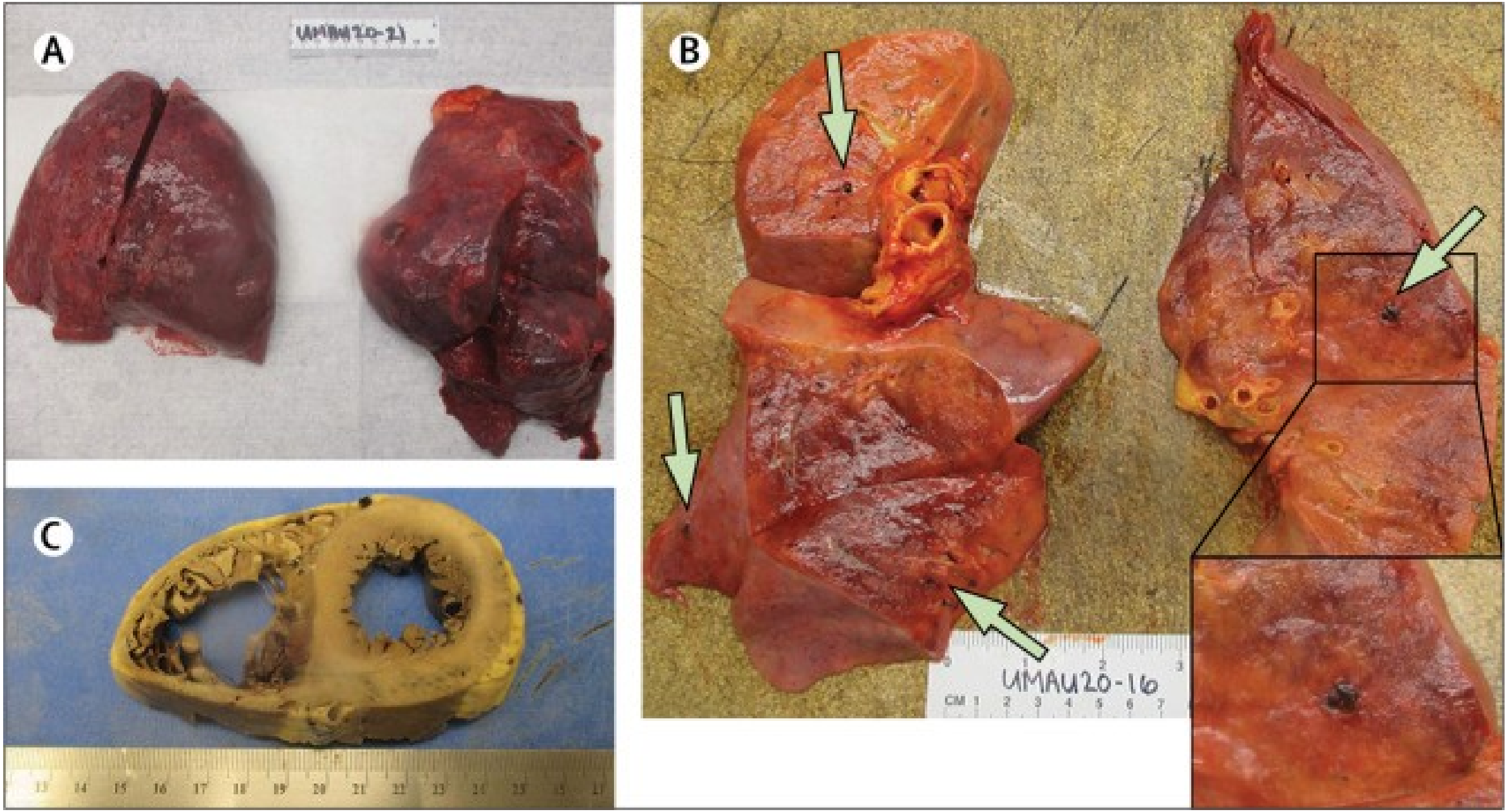
1. After infection, Type II cells release **inflammatory signals** that recruit **macrophages** (immune cells).
2. Macrophages release **cytokines** that cause vasodilation, which allows more immune cells to come to the site of injury and exit the capillary.
3. Fluid accumulates inside the alveolus.
4. The fluid dilutes the surfactant which triggers the onset of alveolar collapse, decreasing gas exchange and increasing the work of breathing.
5. **Neutrophils** are recruited to the site of infection and release Reactive Oxygen Species (ROS) to destroy infected cells.
6. Type I and II cells are destroyed, leading to the collapse of the alveolus and causing **Acute Respiratory Distress Syndrome** (ARDS).
7. If inflammation becomes severe, the protein-rich fluid can enter the bloodstream and travel elsewhere in the body, causing **Systemic Inflammatory Response Syndrome** (SIRS).
8. SIRS may lead to **septic shock** and **multi-organ failure**, which can have fatal consequences.

Pneumonia and Acute Respiratory Distress Syndrome (ARDS)

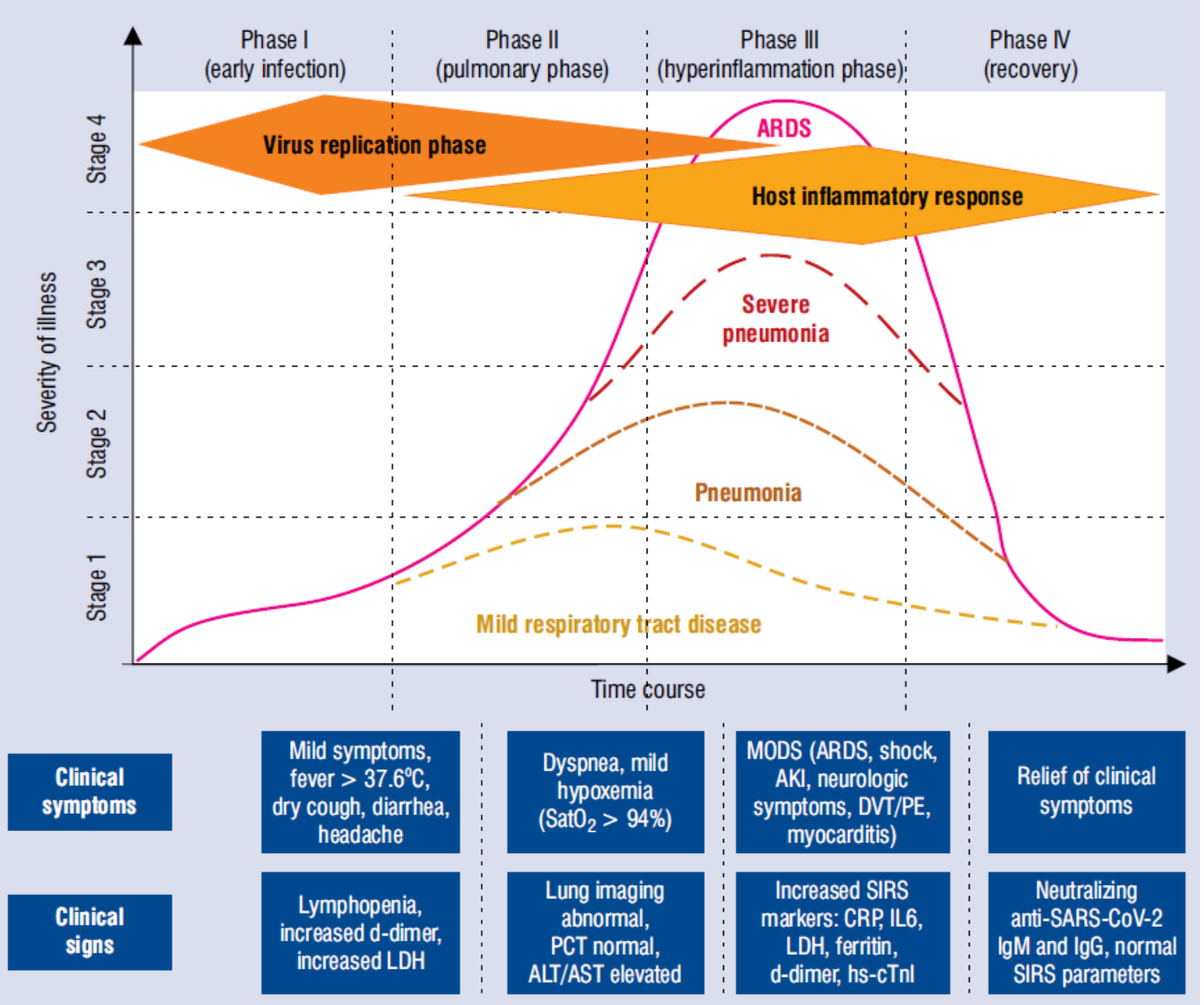


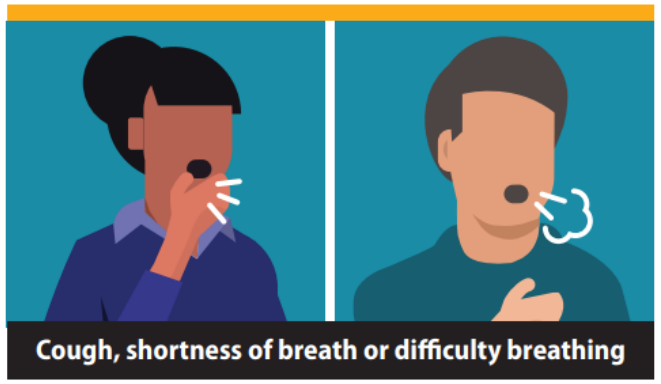
https://www.thejakartapost.com/

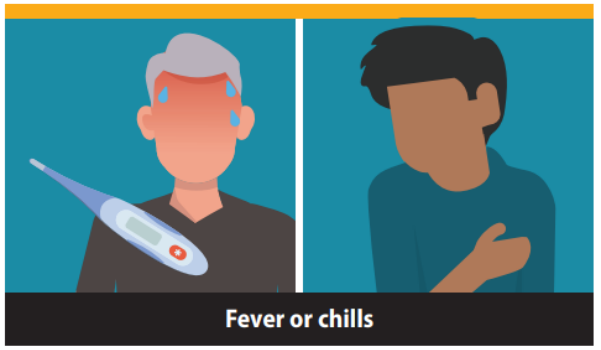
https://catalog.nucleusmedicalmedia.com/view-item?ItemID=1406

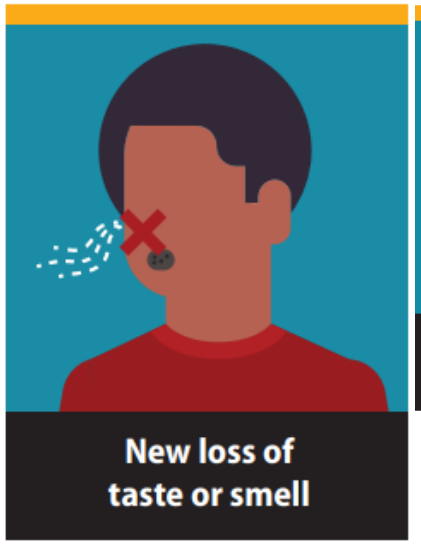


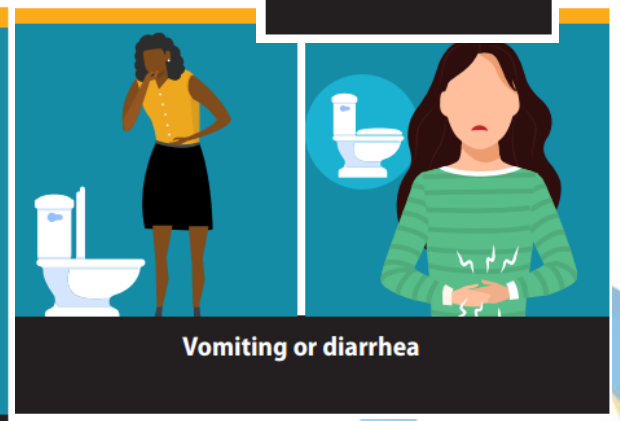
Lancet Respir Med. 2020 May 27;S2213-2600(20)30243-5https://doi.org/10.1016/S2213-2600(20)30243-5











https://cdc.gov/coronavirus

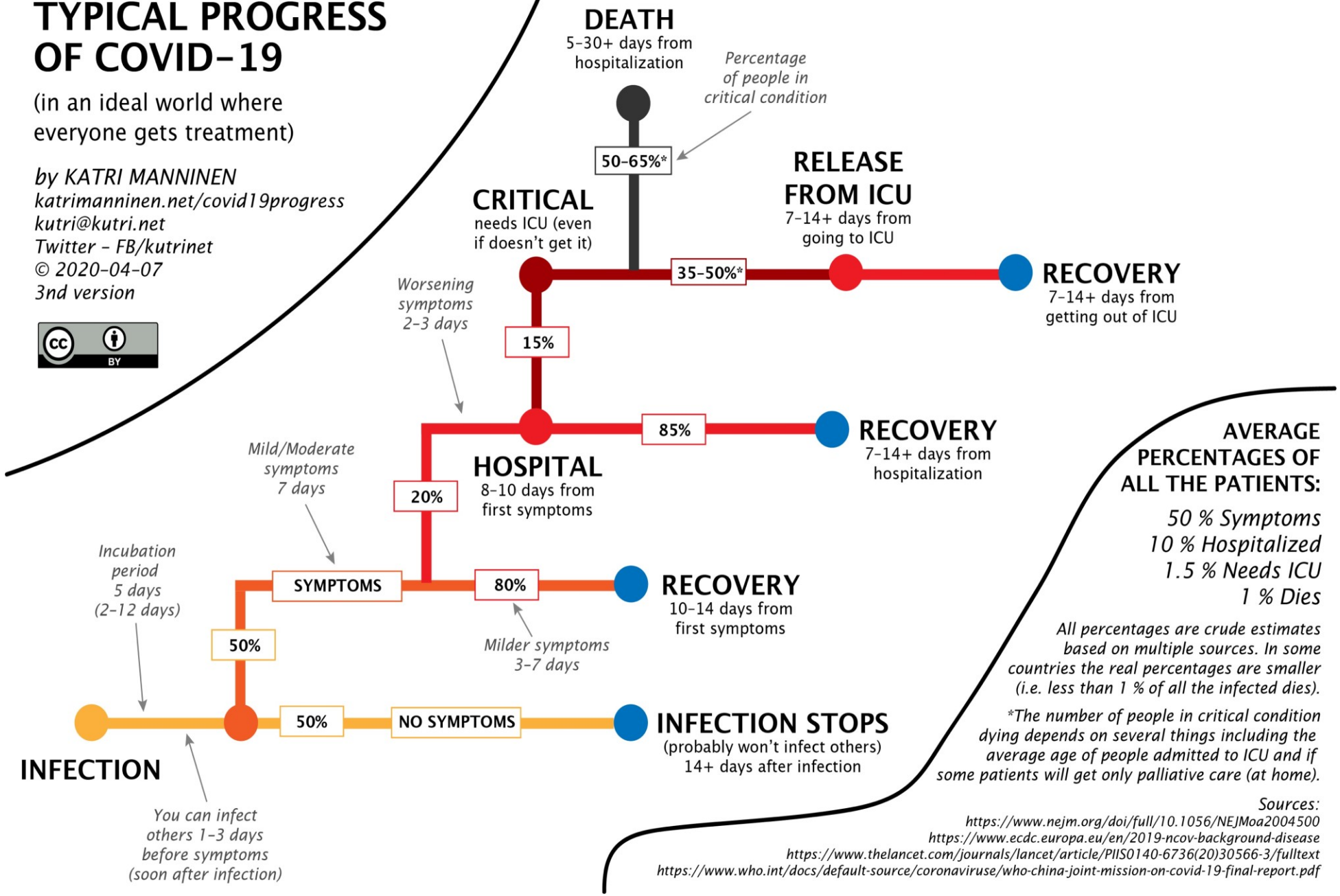
https://doi.org/10.5603/CJ.a2020.0065

TYPICAL PROGRESS OF COVID-19

(in an ideal world where everyone gets treatment)

by KATRI MANNINEN
katrimanninen.net/covid19progress
kutri@kutri.net
Twitter - FB/kutrinet

3nd version



AVERAGE PERCENTAGES OF ALL THE PATIENTS:

50 % Symptoms
10 % Hospitalized
1.5 % Needs ICU
1 % Dies

All percentages are crude estimates based on multiple sources. In some countries the real percentages are smaller (i.e. less than 1 % of all the infected dies).

**The number of people in critical condition dying depends on several things including the average age of people admitted to ICU and if some patients will get only palliative care (at home).*

Sources:
https://www.nejm.org/doi/full/10.1056/NEJMoa2004500
https://www.ecdc.europa.eu/en/2019-ncov-background-disease
https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30566-3/fulltext
https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf

COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns …

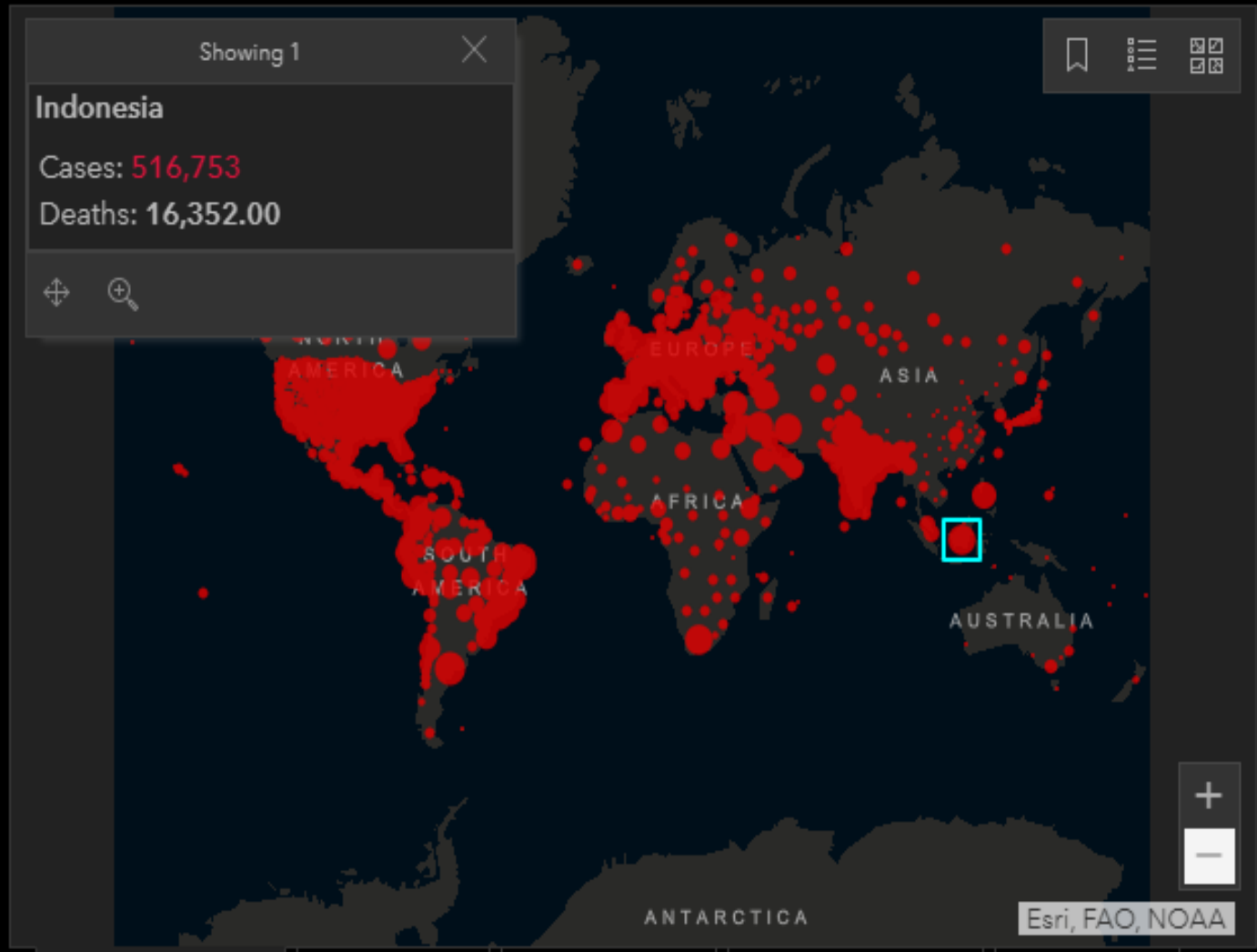
Global Cases
60,559,702

Cases by Country/Region/Sovereignty

- 12,780,410 US
- 9,266,705 India
- 6,166,606 Brazil
- 2,221,874 France
- 2,169,424 Russia
- 1,605,066 Spain
- 1,560,872 United Kingdom
- 1,480,874 Italy
- 1,380,388 Argentin…

Admin0

Last Updated at (M/D/YYYY)
11/26/2020, 9:26 PM



Cumulative Cases | Active Cases | Incidence Rate | Case-Fatality Ratio | Testing Rate

191
countries/regions

Lancet Inf Dis Article: Here. Mobile Version: Here. Data sources: Full list. Downloadable database: GitHub, Feature Layer.
Lead by JHU CSSE. Technical Support: Esri Living Atlas team and JHU

Global Deaths
1,424,470

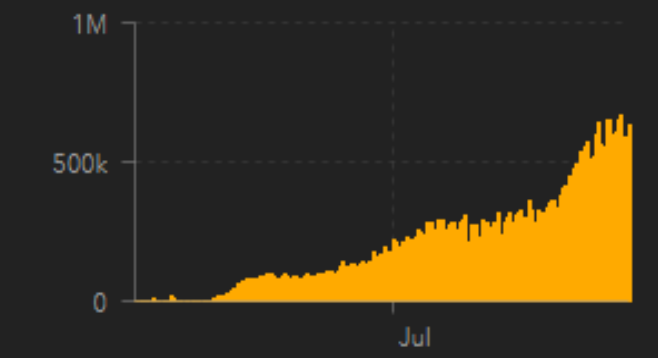
- 262,282 deaths US
- 170,769 deaths Brazil
- 135,223 deaths India
- 103,597 deaths Mexico
- 56,630 deaths United Kingdom

Global D…

US State Level
Deaths, Recovered

- 34,388 deaths, 84,001 recovered New York US
- 21,454 deaths, 935,011 recovered Texas US
- 18,984 deaths, recovered California US

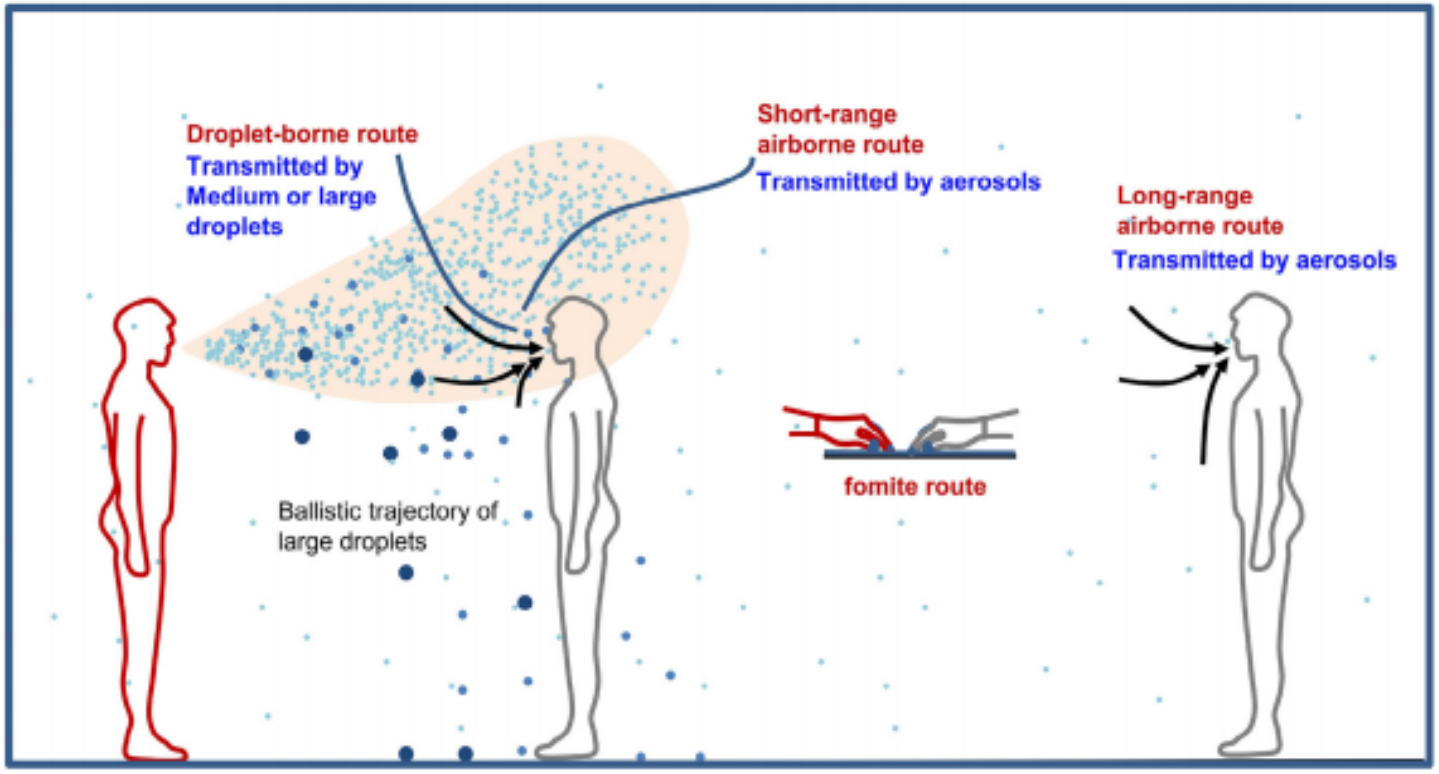
US Deat…



Daily Cases

Penularan dan Pencegahan COVID-19

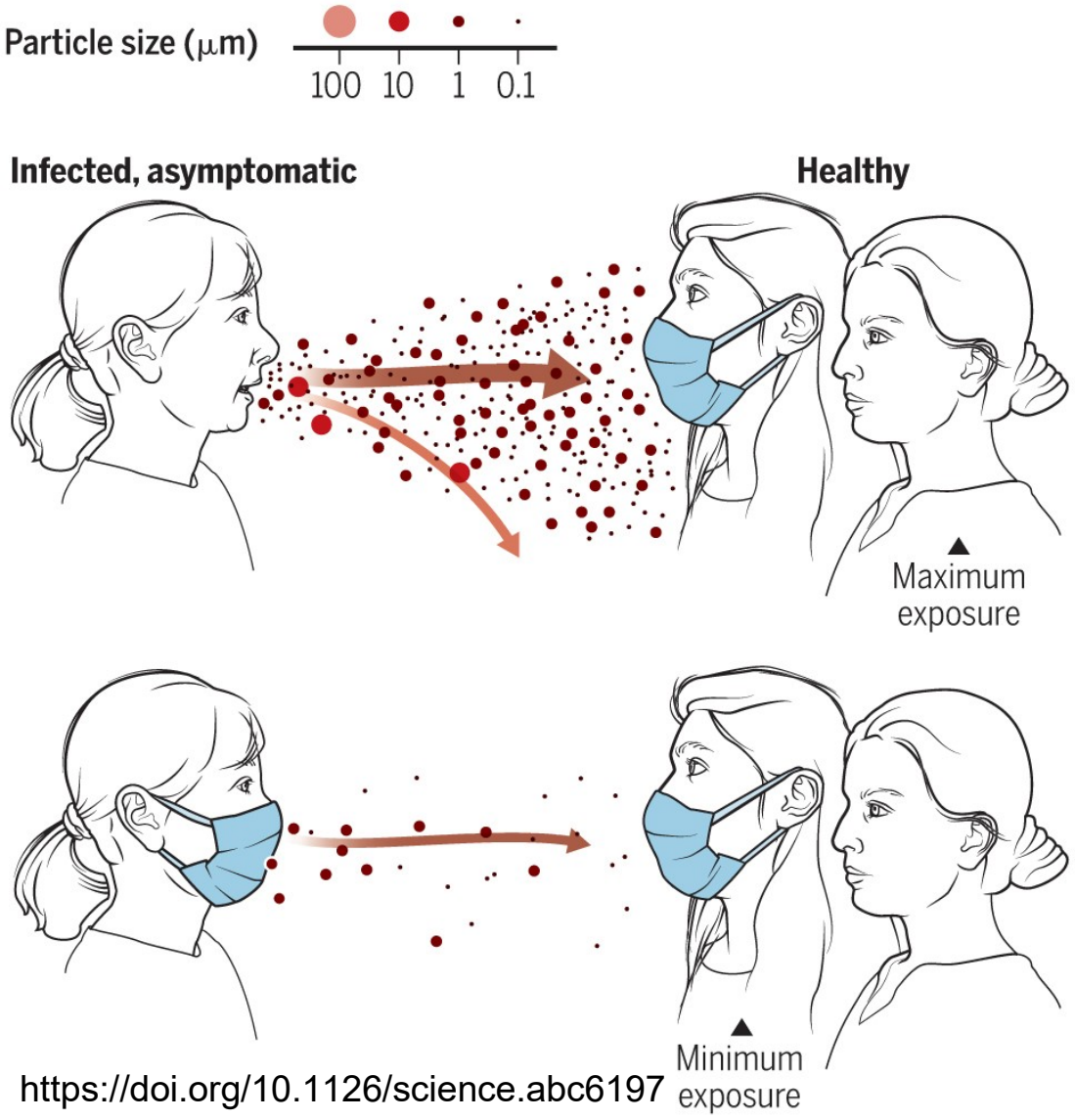
https://doi.org/10.1016/j.ajic.2016.06.003



- Large droplets (>100 μm) : Fast deposition due to the domination of gravitational force
- Medium droplets between 5 and 100 μm
- Small droplets or droplet nuclei, or aerosols (< 5 μm): Responsible for airborne transmission

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.



https://doi.org/10.1126/science.abc6197

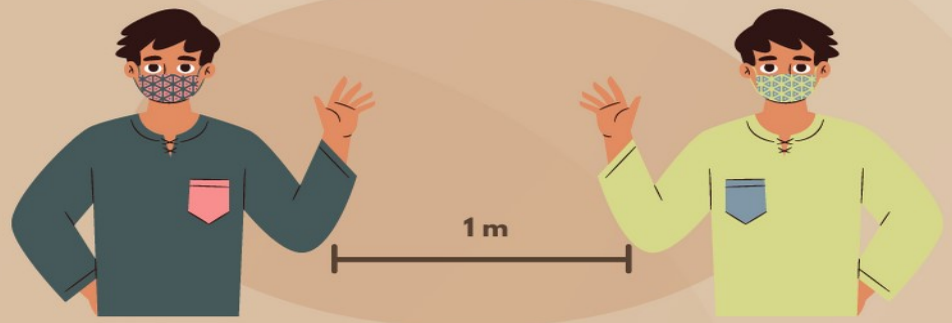
KONSIL KEDOKTERAN INDONESIA

yuk lakukan 3M

jangan lupa!

MEMAKAI MASKER

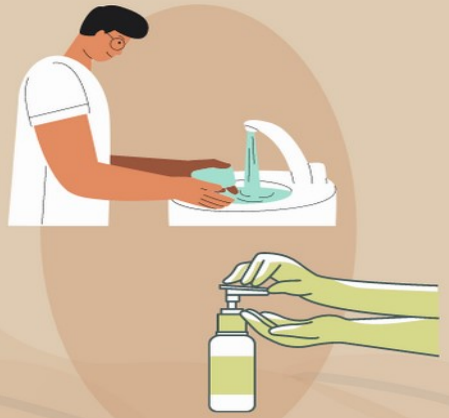
setiap ke luar rumah



selalu

MENJAGA JARAK

minimal 1 meter



Rutin

MENCUCI TANGAN

dengan sabun atau handsanitizer

Terima Kasih

#dirumahsaja

https://spesialis-paru.id/

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