

# Diagnostik Laboratorium pada COVID 19

**July Kumalawati**

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# Pokok bahasan

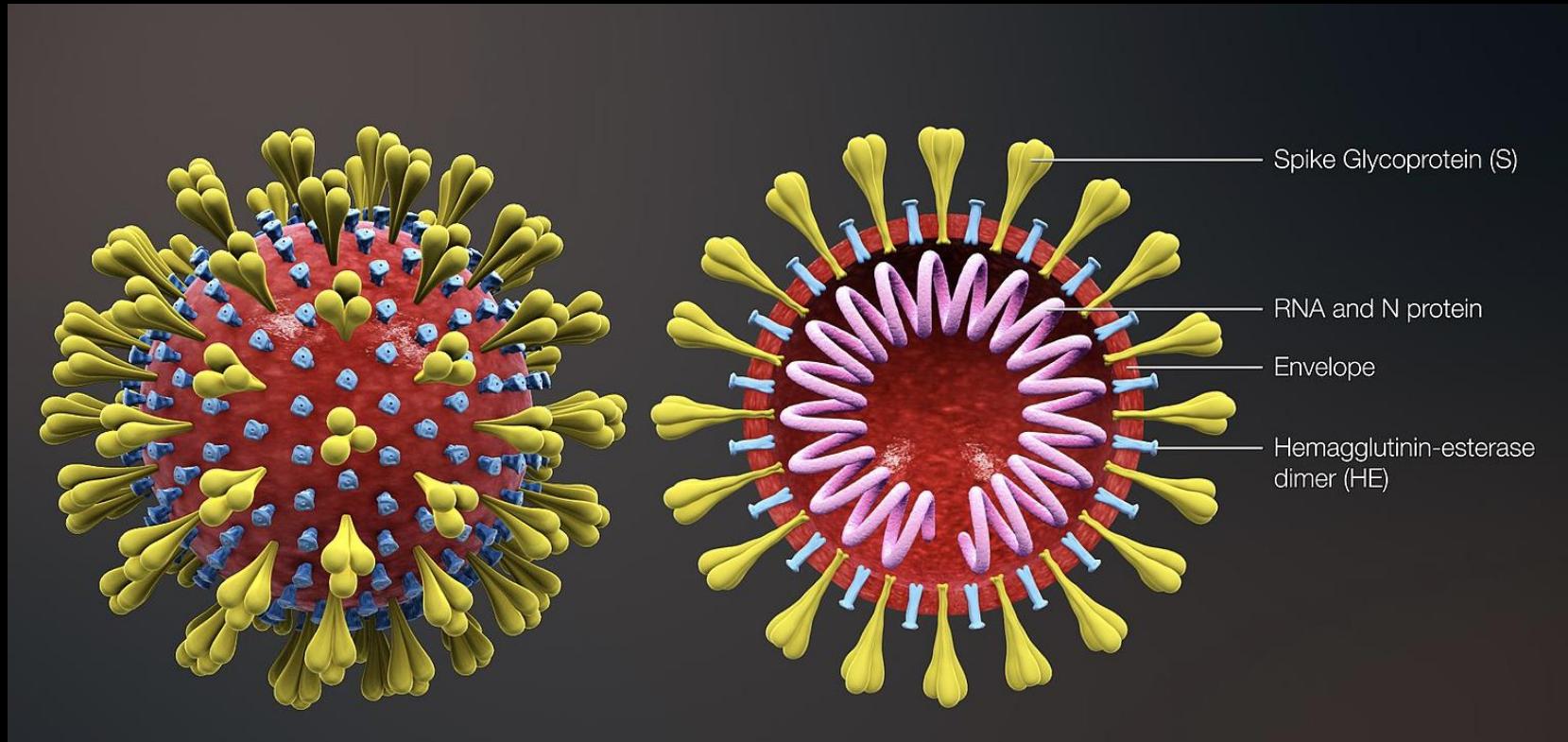
- Struktur virion SARS CoV 2
- Genom SARS Co V 2
- Cara penularan
- Gambaran klinis
- Pola deteksi RNA virus pada COVID 19
- Pola serokonversi pada COVID 19
- Jenis-jenis pemeriksaan laboratorium untuk COVID 19
- Alur pemeriksaan antigen dan antibodi pada COVID 19 (usulan PDSPatKLIn)
- Pemeriksaan laboratorium lain

# Penyebab

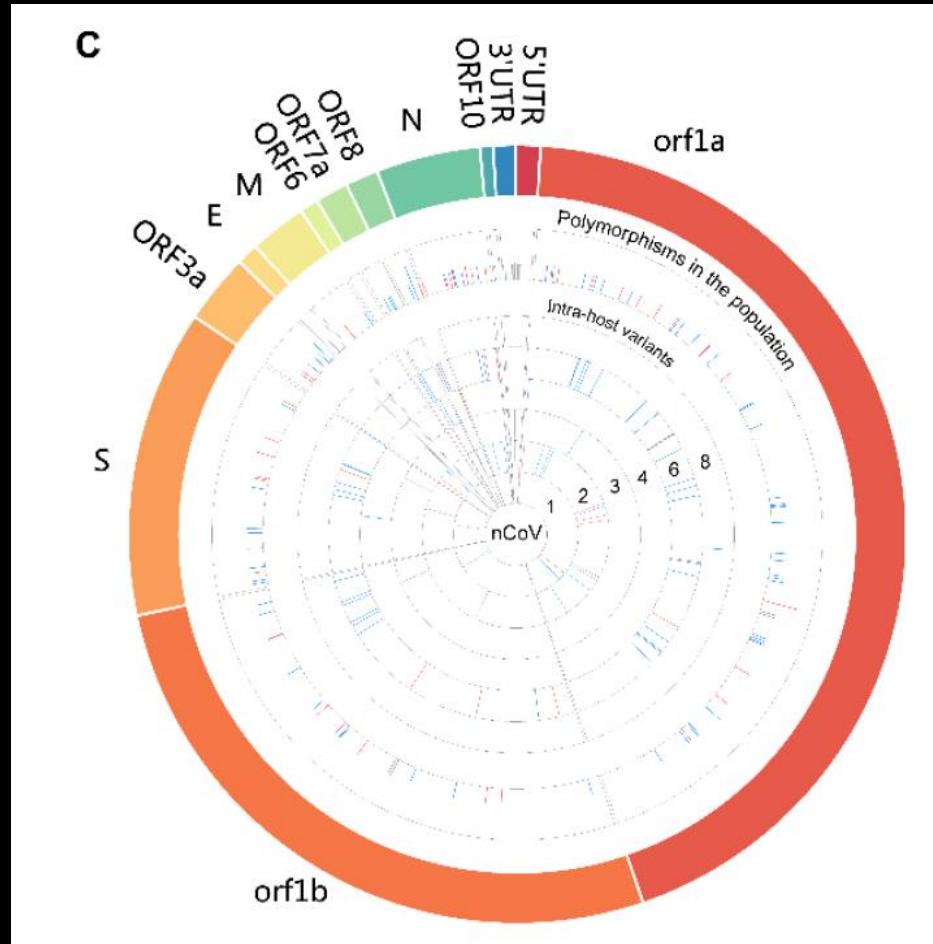


- **SARS CoV 2 (Severe Acute Respiratory Syndrome Coronavirus 2)**
  - Berbentuk sferis
  - Genom: satu ss-RNA
  - 4 protein structural utama:
    - S (*spike*)
    - M (*membrane*)
    - E (*envelope*)
    - N (*nucleocapsid*)

# Struktur virion SARS CoV 2



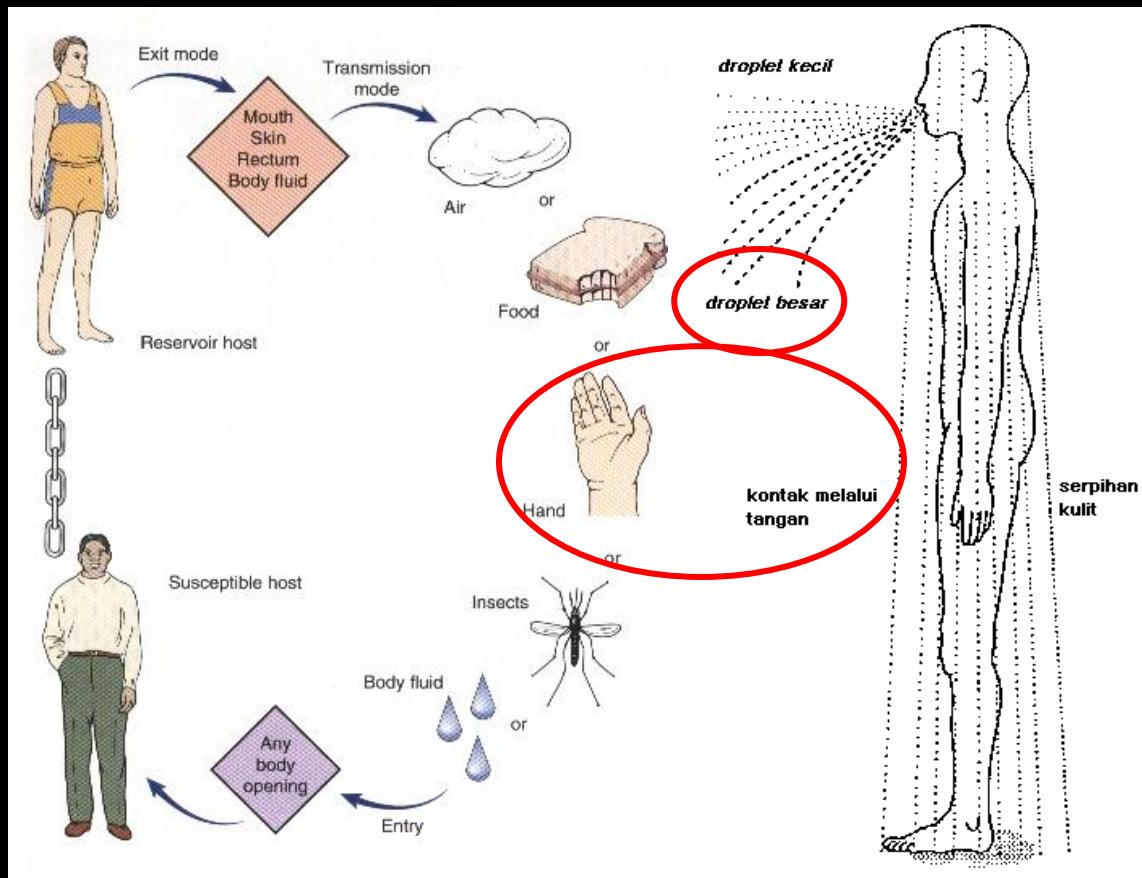
# Genome SARS CoV 2



Zijie Shen, Yan Xiao, Lu Kang, Wentai Ma, Leisheng Shi, Li Zhang, Zhuo Zhou, Jing Yang  
July Kumalawati et al. Genomic diversity of SARS-CoV-2 in Coronavirus Disease 2019 patients

# Penularan

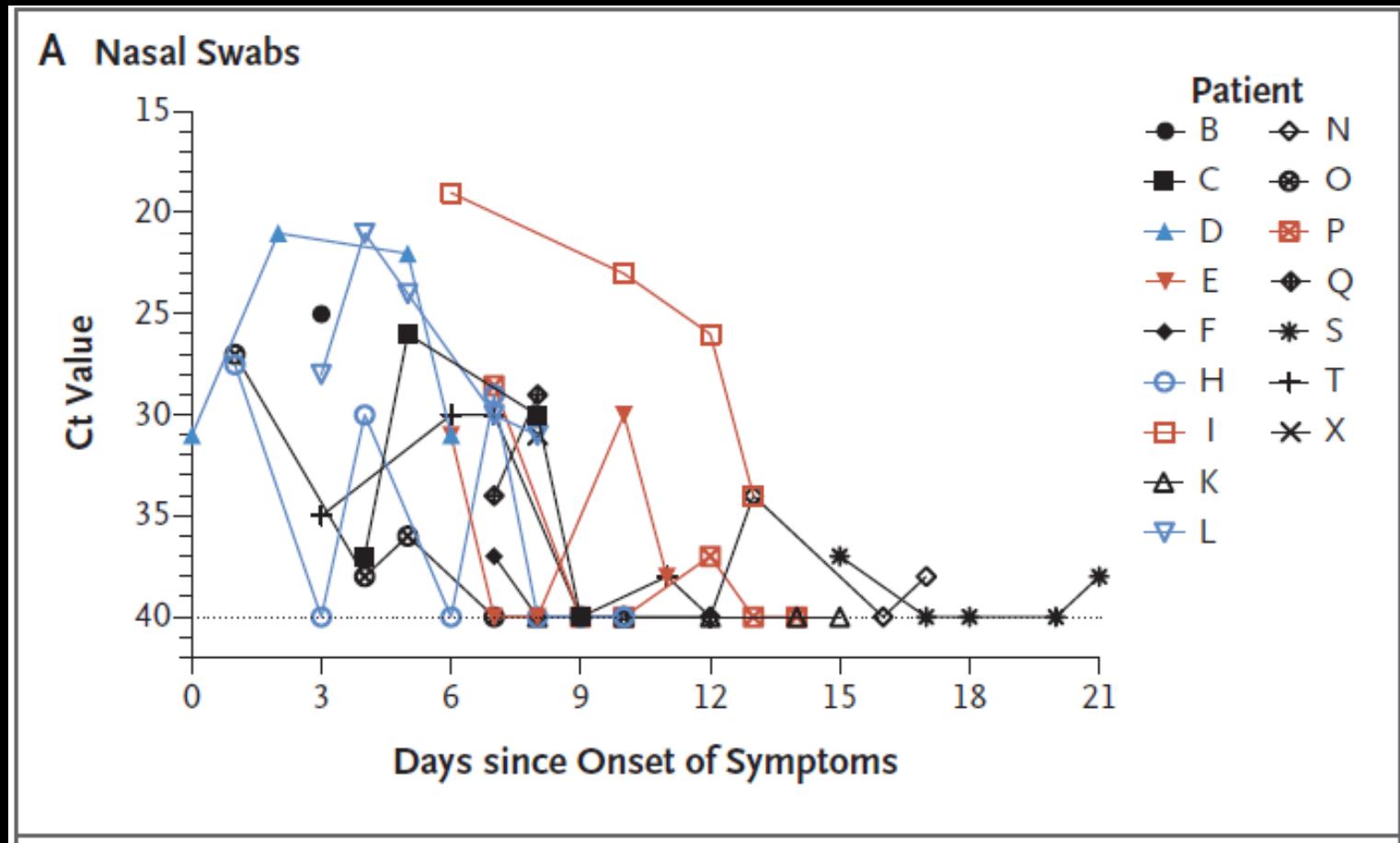
- Melalui droplet dan kontak



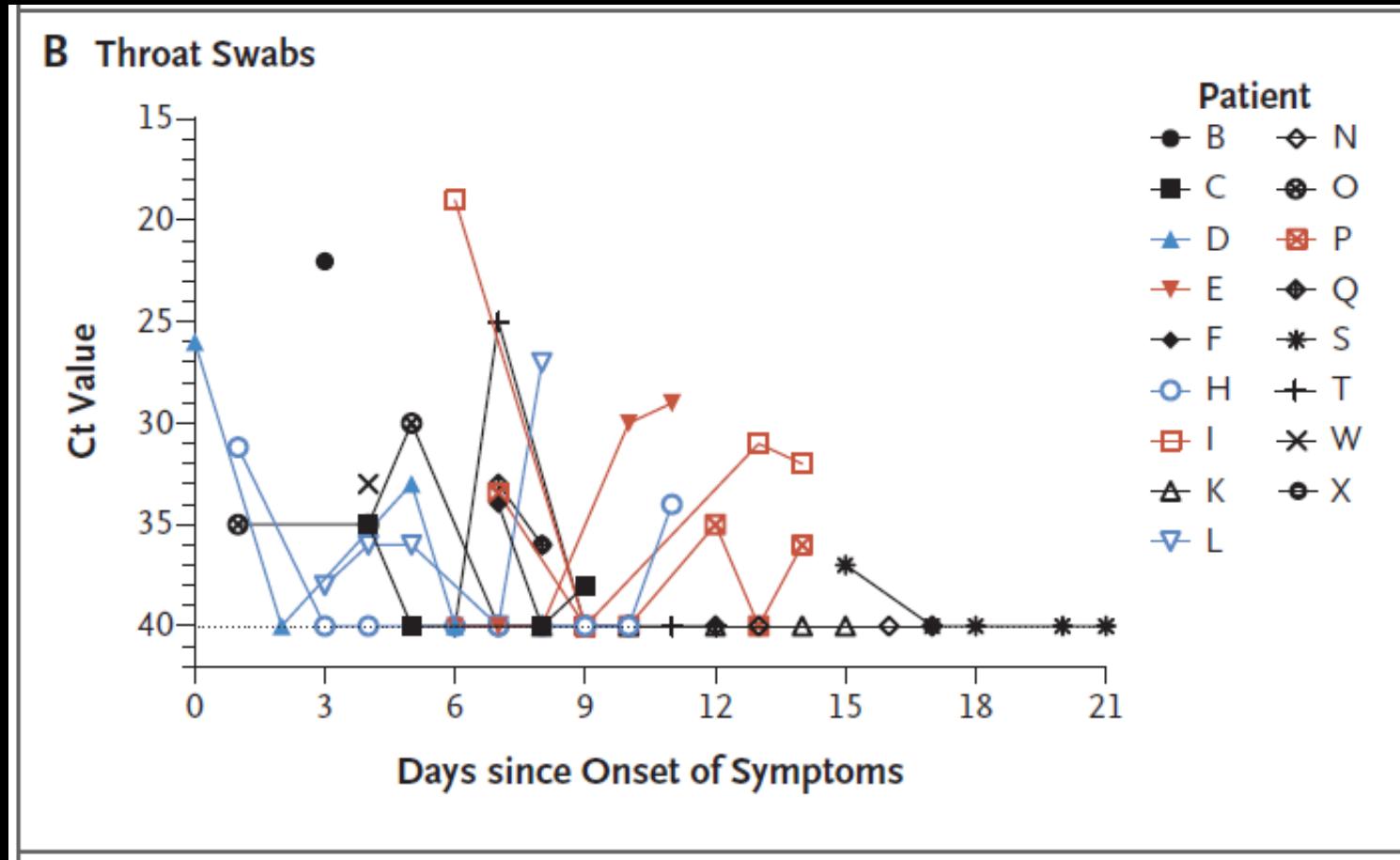
# Gambaran klinis

- Masa inkubasi: 2-14 hari (median: 4-5 hari)
- Gambaran klinis:
  - Ringan: batuk, pilek, demam  $\geq 38^{\circ}\text{C}$ , lelah,
  - Berat: Ringan + sesak nafas, hipoksia, foto toraks: pneumonia, CT toraks: *ground glass appearance*
  - Kritis: gagal nafas, syok (renjatan), disfungsi multiorgan
- Tanpa gejala

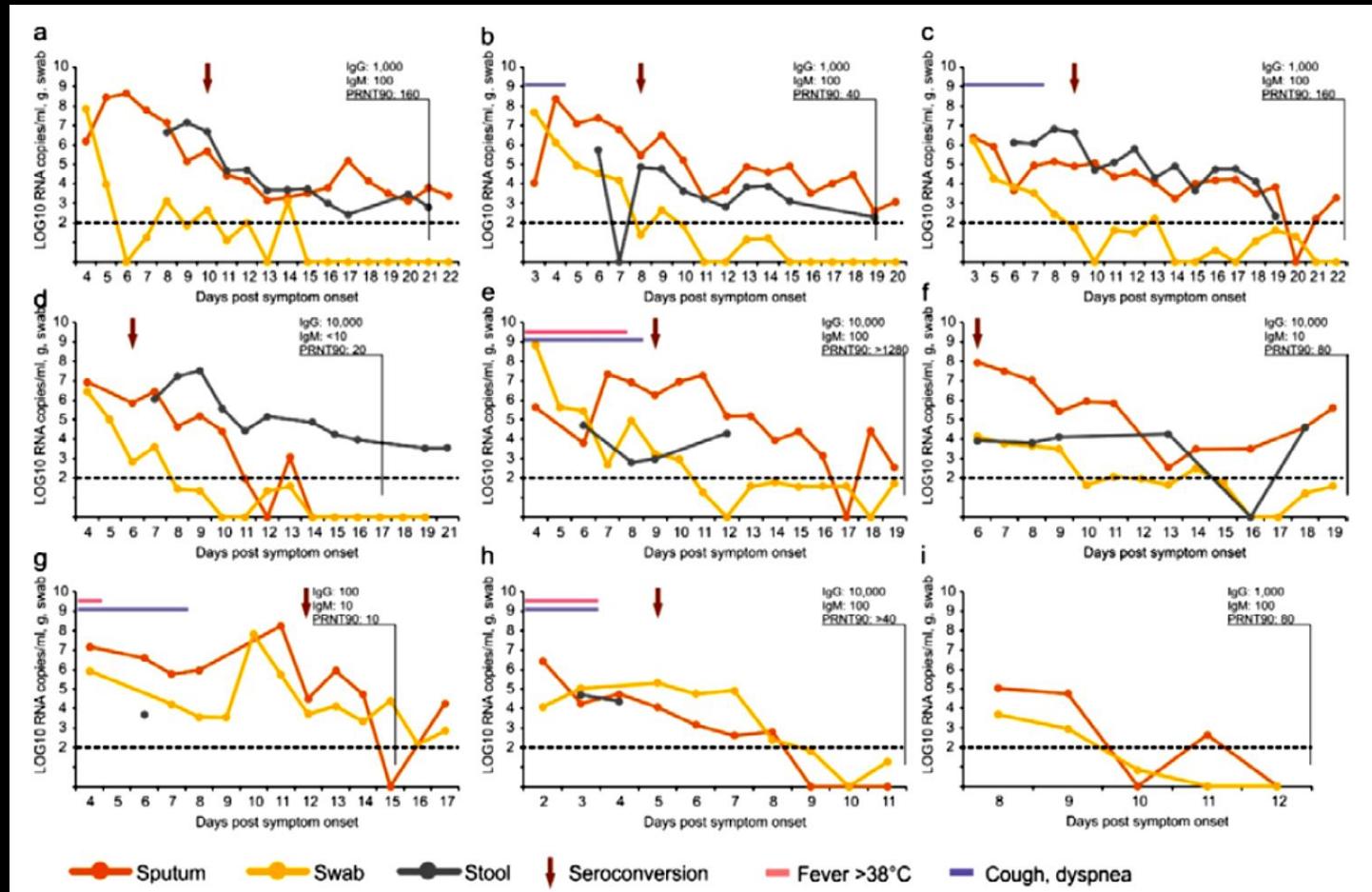
# Pola deteksi RNA virus pada pasien COVID 19



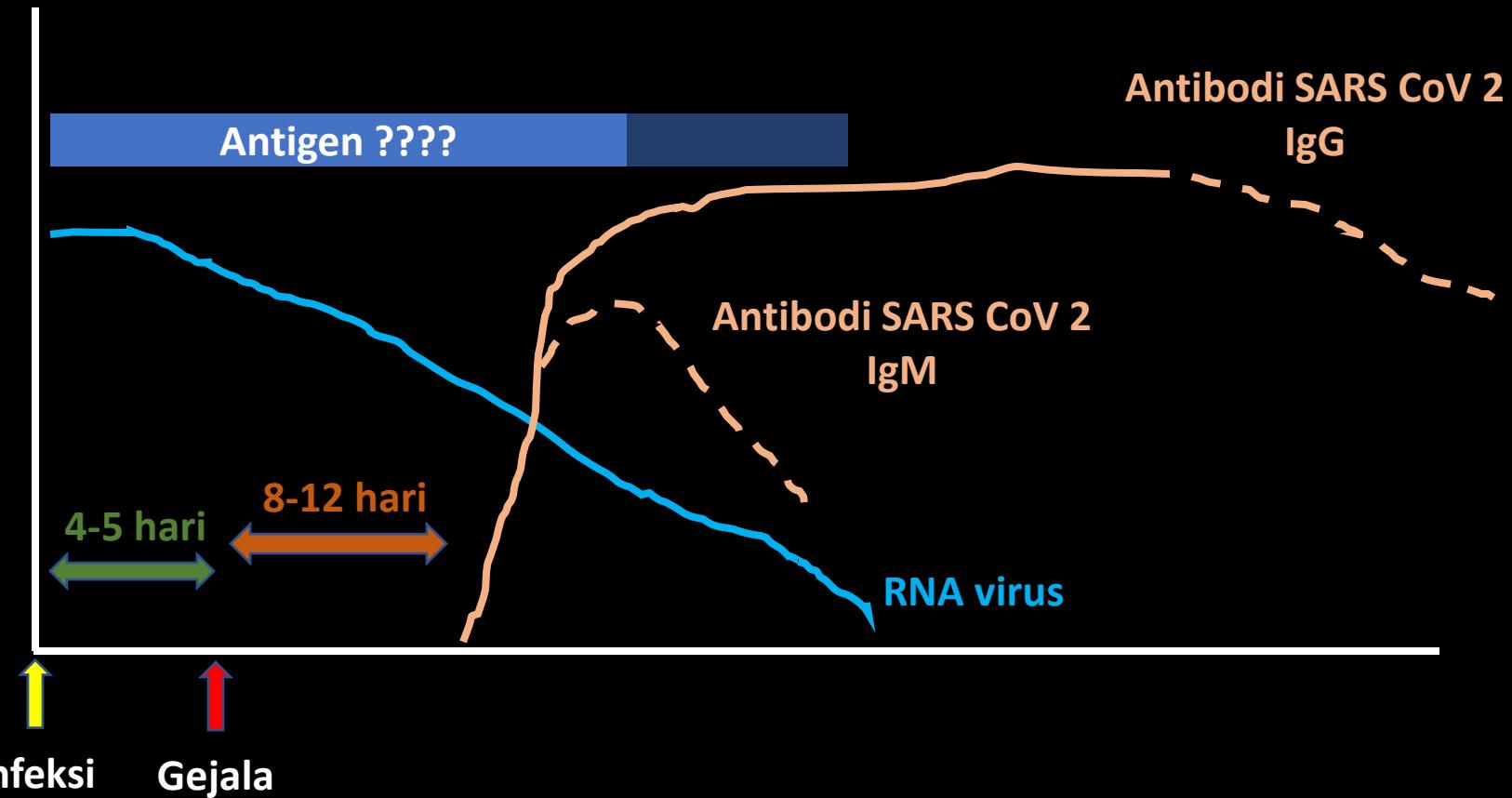
# Pola deteksi RNA virus pada pasien COVID 19



# Pola deteksi RNA virus dan serokonversi pada pasien COVID 19



# Pola berbagai petanda (*marker*) infeksi SARS CoV 2



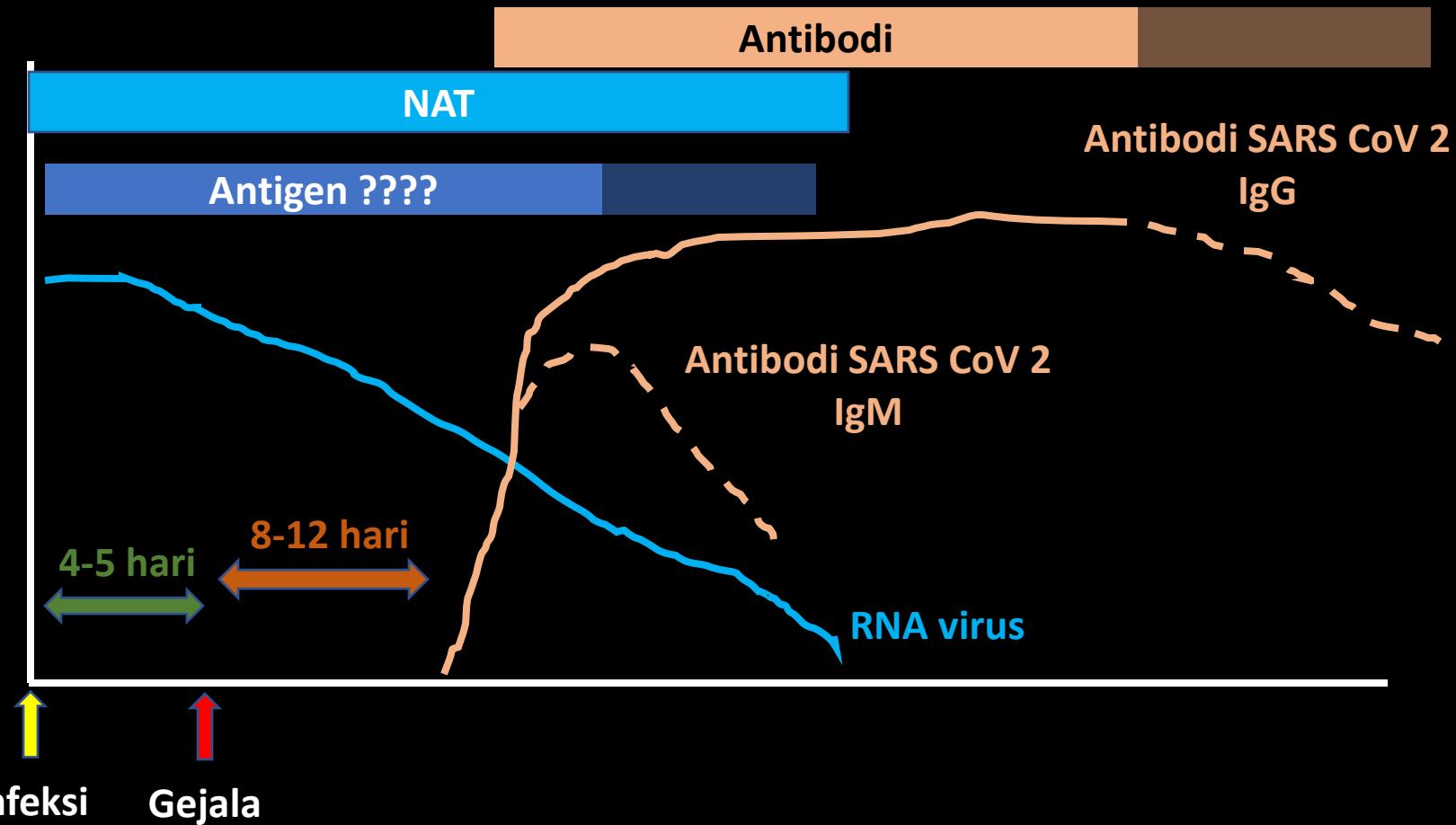
# Berbagai jenis pemeriksaan laboratorium untuk mendeteksi SARS CoV 2

- Deteksi asam nukleat (NAT): PCR
  - Mendeteksi gen SARS CoV 2
    - N
    - E
    - S
    - RdRP
    - ORF
  - Bahan pemeriksaan:
    - *Swab* nasofaring &/ orofaring

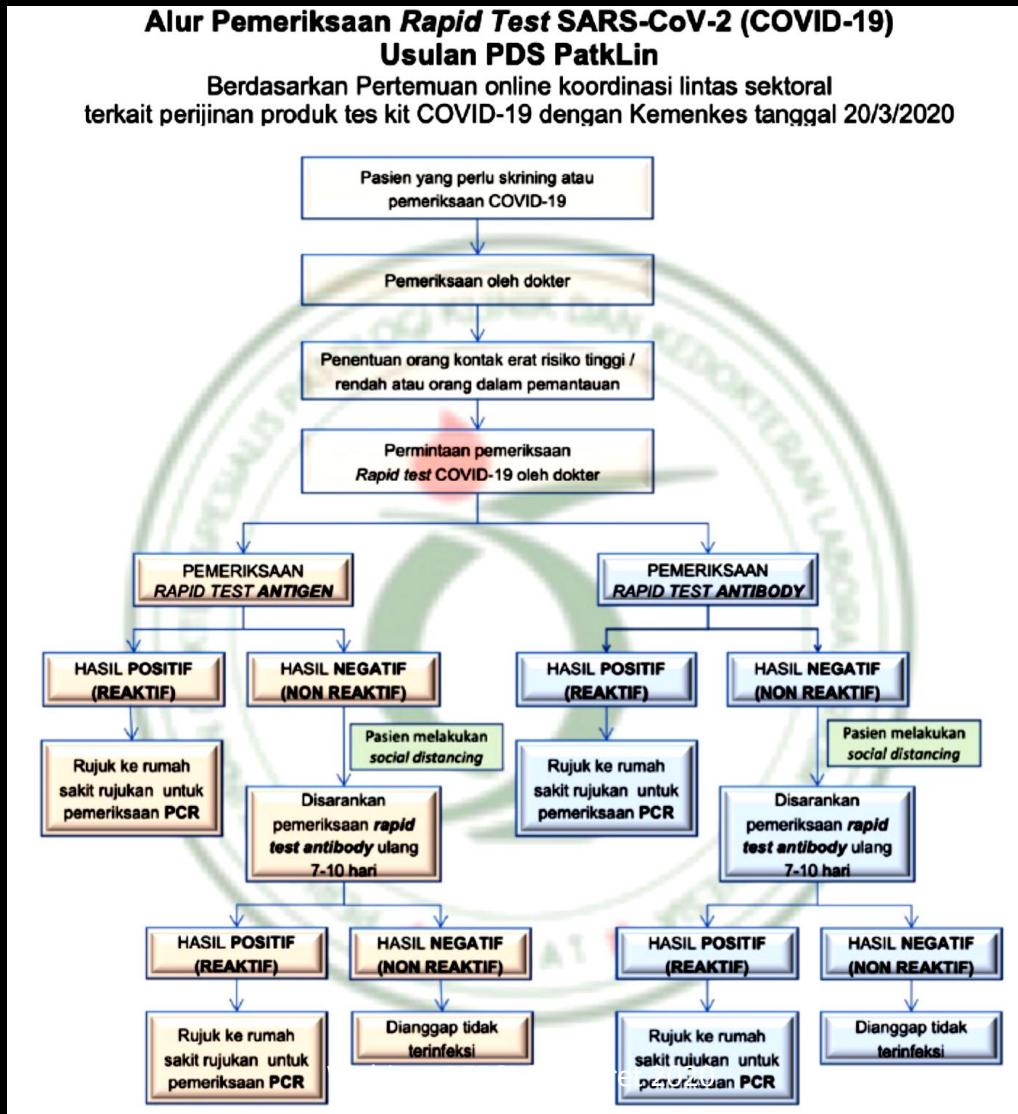
# Berbagai jenis pemeriksaan laboratorium untuk mendeteksi SARS CoV 2

- **Deteksi antigen:**
  - Jenis antigen yg dideteksi ????
  - Bahan pemeriksaan:
    - *Swab* nasofaring &/ orofaring
- **Deteksi antibodi:**
  - Jenis antigen yang dipakai????
  - Bahan pemeriksaan:
    - Darah / serum

# Masa deteksi berbagai petanda (marker) infeksi SARS CoV 2



# Usulan alur pemeriksaan untuk deteksi antigen dan antibodi SARS CoV 2 dari PDSPatKLIn



Versi  
tanggal 21  
Maret 2020,  
jam 22.00

# Parameter laboratorium lain pada penderita COVID 19

**Table 2.** Radiographic and Laboratory Findings.\*

Variable	All Patients (N=1099)	Disease Severity		Presence of Composite Primary End Point	
		Nonsevere (N=926)	Severe (N=173)	Yes (N=67)	No (N=1032)
<b>Radiologic findings</b>					
Abnormalities on chest radiograph — no./total no. (%)	162/274 (59.1)	116/214 (54.2)	46/60 (76.7)	30/39 (76.9)	132/235 (56.2)
Ground-glass opacity	55/274 (20.1)	37/214 (17.3)	18/60 (30.0)	9/39 (23.1)	46/235 (19.6)
Local patchy shadowing	77/274 (28.1)	56/214 (26.2)	21/60 (35.0)	13/39 (33.3)	64/235 (27.2)
Bilateral patchy shadowing	100/274 (36.5)	65/214 (30.4)	35/60 (58.3)	27/39 (69.2)	73/235 (31.1)
Interstitial abnormalities	12/274 (4.4)	7/214 (3.3)	5/60 (8.3)	6/39 (15.4)	6/235 (2.6)
Abnormalities on chest CT — no./total no. (%)	840/975 (86.2)	682/808 (84.4)	158/167 (94.6)	50/57 (87.7)	790/918 (86.1)
Ground-glass opacity	550/975 (56.4)	449/808 (55.6)	101/167 (60.5)	30/57 (52.6)	520/918 (56.6)
Local patchy shadowing	409/975 (41.9)	317/808 (39.2)	92/167 (55.1)	22/57 (38.6)	387/918 (42.2)
Bilateral patchy shadowing	505/975 (51.8)	368/808 (45.5)	137/167 (82.0)	40/57 (70.2)	465/918 (50.7)
Interstitial abnormalities	143/975 (14.7)	99/808 (12.3)	44/167 (26.3)	15/57 (26.3)	128/918 (13.9)
<b>Laboratory findings</b>					
Median Pao <sub>2</sub> :FiO <sub>2</sub> ratio (IQR)†	3.9 (2.9–4.7)	3.9 (2.9–4.5)	4.0 (2.8–5.2)	2.9 (2.2–5.4)	4.0 (3.1–4.6)
White-cell count					
Median (IQR) — per mm <sup>3</sup>	4700 (3500–6000)	4900 (3800–6000)	3700 (3000–6200)	6100 (4900–11,100)	4700 (3500–5900)
Distribution — no./total no. (%)					
>10,000 per mm <sup>3</sup>	58/978 (5.9)	39/811 (4.8)	19/167 (11.4)	15/58 (25.9)	43/920 (4.7)
<4000 per mm <sup>3</sup>	330/978 (33.7)	228/811 (28.1)	102/167 (61.1)	8/58 (13.8)	322/920 (35.0)
Lymphocyte count					
Median (IQR) — per mm <sup>3</sup>	1000 (700–1300)	1000 (800–1400)	800 (600–1000)	700 (600–900)	1000 (700–1300)
Distribution — no./total no. (%)					
<1500 per mm <sup>3</sup>	731/879 (83.2)	584/726 (80.4)	147/153 (96.1)	50/54 (92.6)	681/825 (82.5)

# Parameter laboratorium lain pada penderita COVID 19

Platelet count					
Median (IQR) — per mm <sup>3</sup>	168,000 (132,000–207,000)	172,000 (139,000–212,000)	137,500 (99,000–179,500)	156,500 (114,200–195,000)	169,000 (133,000–207,000)
Distribution — no./total no. (%)					
<150,000 per mm <sup>3</sup>	315/869 (36.2)	225/713 (31.6)	90/156 (57.7)	27/58 (46.6)	288/811 (35.5)
Median hemoglobin (IQR) — g/dl‡	13.4 (11.9–14.8)	13.5 (12.0–14.8)	12.8 (11.2–14.1)	12.5 (10.5–14.0)	13.4 (12.0–14.8)
Distribution of other findings — no./total no. (%)					
C-reactive protein ≥10 mg/liter	481/793 (60.7)	371/658 (56.4)	110/135 (81.5)	41/45 (91.1)	440/748 (58.8)
Procalcitonin ≥0.5 ng/ml	35/633 (5.5)	19/516 (3.7)	16/117 (13.7)	12/50 (24.0)	23/583 (3.9)
Lactate dehydrogenase ≥250 U/liter	277/675 (41.0)	205/551 (37.2)	72/124 (58.1)	31/44 (70.5)	246/631 (39.0)
Aspartate aminotransferase >40 U/liter	168/757 (22.2)	112/615 (18.2)	56/142 (39.4)	26/52 (50.0)	142/705 (20.1)
Alanine aminotransferase >40 U/liter	158/741 (21.3)	120/606 (19.8)	38/135 (28.1)	20/49 (40.8)	138/692 (19.9)
Total bilirubin >17.1 µmol/liter	76/722 (10.5)	59/594 (9.9)	17/128 (13.3)	10/48 (20.8)	66/674 (9.8)
Creatine kinase ≥200 U/liter	90/657 (13.7)	67/536 (12.5)	23/121 (19.0)	12/46 (26.1)	78/611 (12.8)
Creatinine ≥133 µmol/liter	12/752 (1.6)	6/614 (1.0)	6/138 (4.3)	5/52 (9.6)	7/700 (1.0)
D-dimer ≥0.5 mg/liter	260/560 (46.4)	195/451 (43.2)	65/109 (59.6)	34/49 (69.4)	226/511 (44.2)
Minerals§					
Median sodium (IQR) — mmol/liter	138.2 (136.1–140.3)	138.4 (136.6–140.4)	138.0 (136.0–140.0)	138.3 (135.0–141.2)	138.2 (136.1–140.2)
Median potassium (IQR) — mmol/liter	3.8 (3.5–4.2)	3.9 (3.6–4.2)	3.8 (3.5–4.1)	3.9 (3.6–4.1)	3.8 (3.5–4.2)
Median chloride (IQR) — mmol/liter	102.9 (99.7–105.6)	102.7 (99.7–105.3)	103.1 (99.8–106.0)	103.8 (100.8–107.0)	102.8 (99.6–105.3)

\* Lymphocytopenia was defined as a lymphocyte count of less than 1500 per cubic millimeter. Thrombocytopenia was defined as a platelet count of less than 150,000 per cubic millimeter. To convert the values for creatinine to milligrams per deciliter, divide by 88.4.

† Data regarding the ratio of the partial pressure of arterial oxygen to the fraction of inspired oxygen (Pao<sub>2</sub>:Fio<sub>2</sub>) were missing for 894 patients (81.3%).

‡ Data regarding hemoglobin were missing for 226 patients (20.6%).

§ Data were missing for the measurement of sodium in 363 patients (33.0%), for potassium in 349 patients (31.8%), and for chloride in 392 patients (35.7%).

# Pesan penutup

- **COVID 19 adalah penyakit baru, masih banyak penelitian dibutuhkan, termasuk untuk menentukan parameter laboratorium yang dibutuhkan untuk menegakkan diagnosis atau mengetahui status seseorang sebagai pembawa virus atau bukan**
- **Reagensia yang dikembangkan juga masih dalam tahap awal, juga memerlukan banyak penelitian untuk menentukan gen yang akan dideteksi, bilamana melakukan pemeriksaan antigen atau antibodi, serta epitope yang dipakai.**
- **Apapun jenis pemeriksaan yang dipakai dalam menentukan diagnosis, diperlukan data gambaran klinis selengkapnya**

*hatur nuhun mauliate*  
*nerima kasih matur nuwuh*  
*amanai tampiaseh sakalakong*  
*makaseh epanggawang bujur*  
*tarimokasih teurimong gaseh beh*  
*kurrusumanga suksema*

# Terima Kasih