COVID-19 疫情下針對流感等呼吸道重症之照護

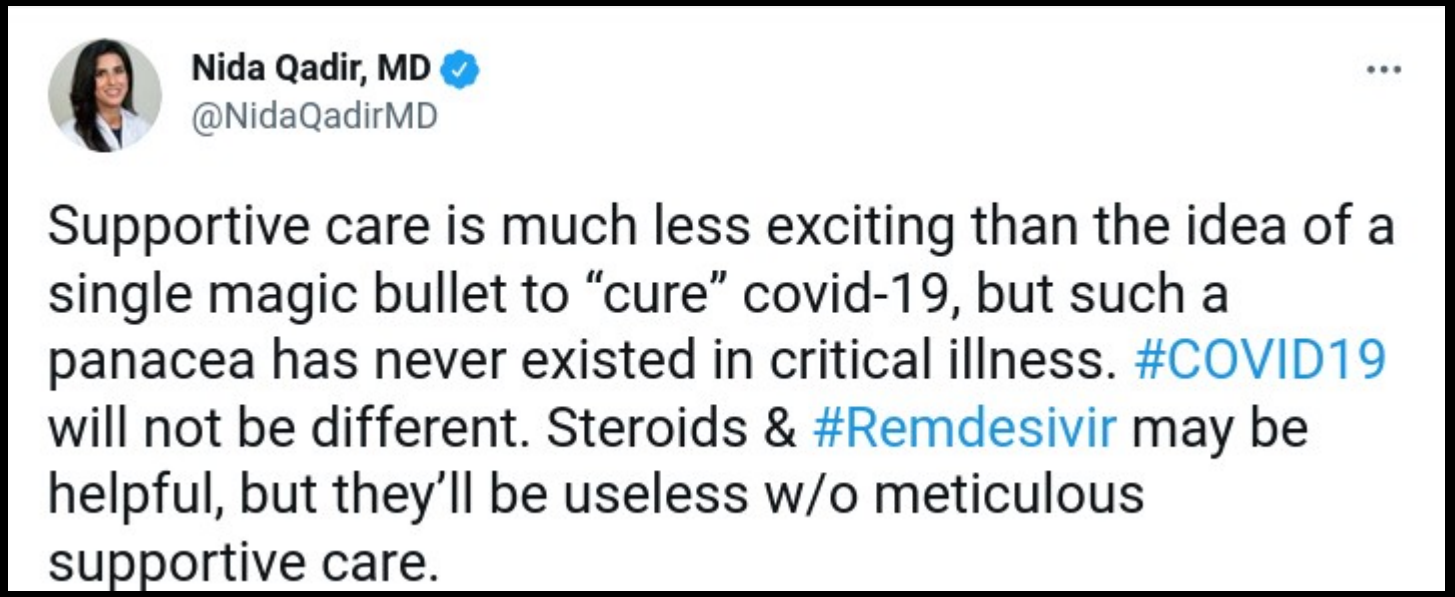
謝宗達

成大醫院 重症加護科 / 感染管制中心

Jul 26, 2025

I have no conflict of interest.

重症照護 = 嚴謹的支持性治療



https://twitter.com/NidaQadirMD/status/1287443875167051776

- 密切監測
  - 心律 / 血壓 / 血氧
  - 動脈導管 / 心輸出
  - 隨時有人看
- 器官支持
  - 氧氣 / 呼吸器 / 俯臥
  - 升壓劑 / 強心劑
  - IABP / ECMO
  - 腎臟替代療法

呼吸道病毒感染的症狀

- Respiratory symptoms
  - Cough
  - Sputum production
  - Nasal discharge
  - Sore throat
- Other symptoms
  - Photophobia
  - Conjunctivitis
  - Anosmia (COVID-19)
- Systemic symptoms
  - Fever / chills
  - Headache
  - Myalgia
  - Malaise / anorexia
  - Dyspnea
  - Altered mental status

Paules C. *Lancet*. 2017;390:697-708.
https://www.cdc.gov/flu/about/qa/coldflu.htm
新型冠狀病毒 (SARS-CoV-2) 感染臨床處置指引 . 第 29 版 . 2025-05-15.

呼吸道病毒的診斷工具

TABLE 3 Sensitivity of respiratory viral detection from different specimen types[a]

Specimen type	Sensitivity of detection[b] of:						
	FLUA/B[c]	RSV	RV/EV	ADV	hMPV	PIVs	CoVs[c]
NPS	++	++	++	++	++	+++	++
NPA	+++	+++	+++	+++	+++	+++	+++
OPS	++(+)[d]	++	+	++	+	+	+
TS	++	++	+	++	+	++	++
Sputum[f]	+++	+++	+++	+++	++	+(+)	++(+)[e]
BAL fluid	+++	+++	++	++	++	+(+)	++
Lung biopsy specimen	++	++	+	+	+	o	+++

- Nucleic acid detection
- Rapid antigen tests
- DFA/IFA assays
- Cell culture

Rapid antigen test 敏感度 60-90%，
如陰性但臨床有仍有懷疑請驗核酸。

Charlton CL. *Clin Microbiol Rev*. 2018;32(1):e00042-18.

只採檢鼻咽或下呼吸道
會漏掉 20-30% 的呼吸道病毒感染

TABLE 2. Site of Virus Detection

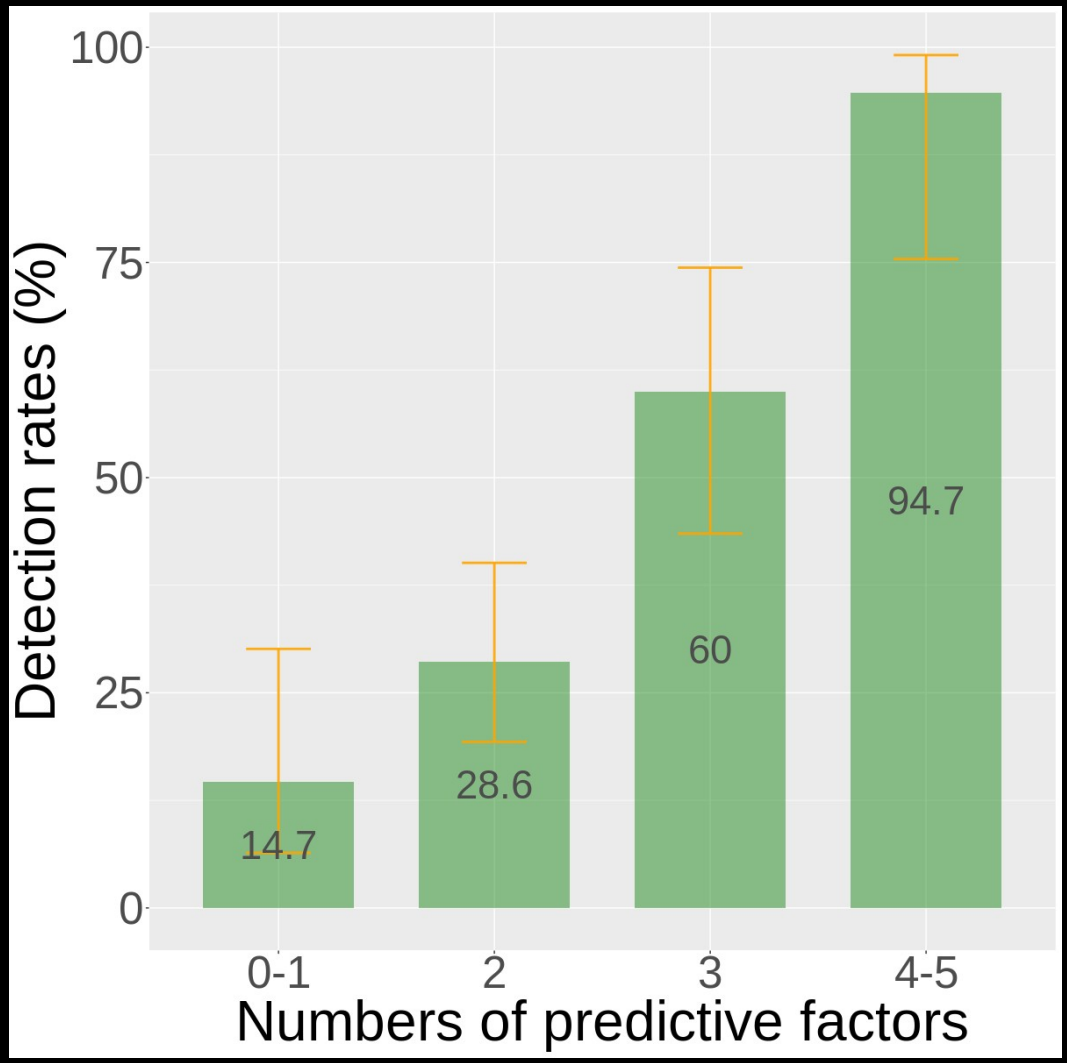
Site of Virus Detection	SARI, *n* = 45 (%)	Non-SARI, *n* = 213 (%)
Nasopharyngeal swab	32 (71)	133 (62)
TA	36 (80)	136 (64)
Exclusive nasopharyngeal	9 (20)	77 (36)
Both nasopharyngeal/TA	23 (51)	56 (26)
Exclusive TA	13 (29)	80 (38)

SARI = severe acute respiratory infection (at ICU admission), TA = tracheobronchial aspirate.

van Someren Gréve. *Crit Care Med*. 2018;46(1):29-36.

哪些重症病人比較驗得到呼吸道病毒？

Predictive factor	Odds Ratio
Age < 65 years	3.98
Clustered URI	3.93
Fever	2.89
Cough and sputum production	3.24
Sore throat	3.70

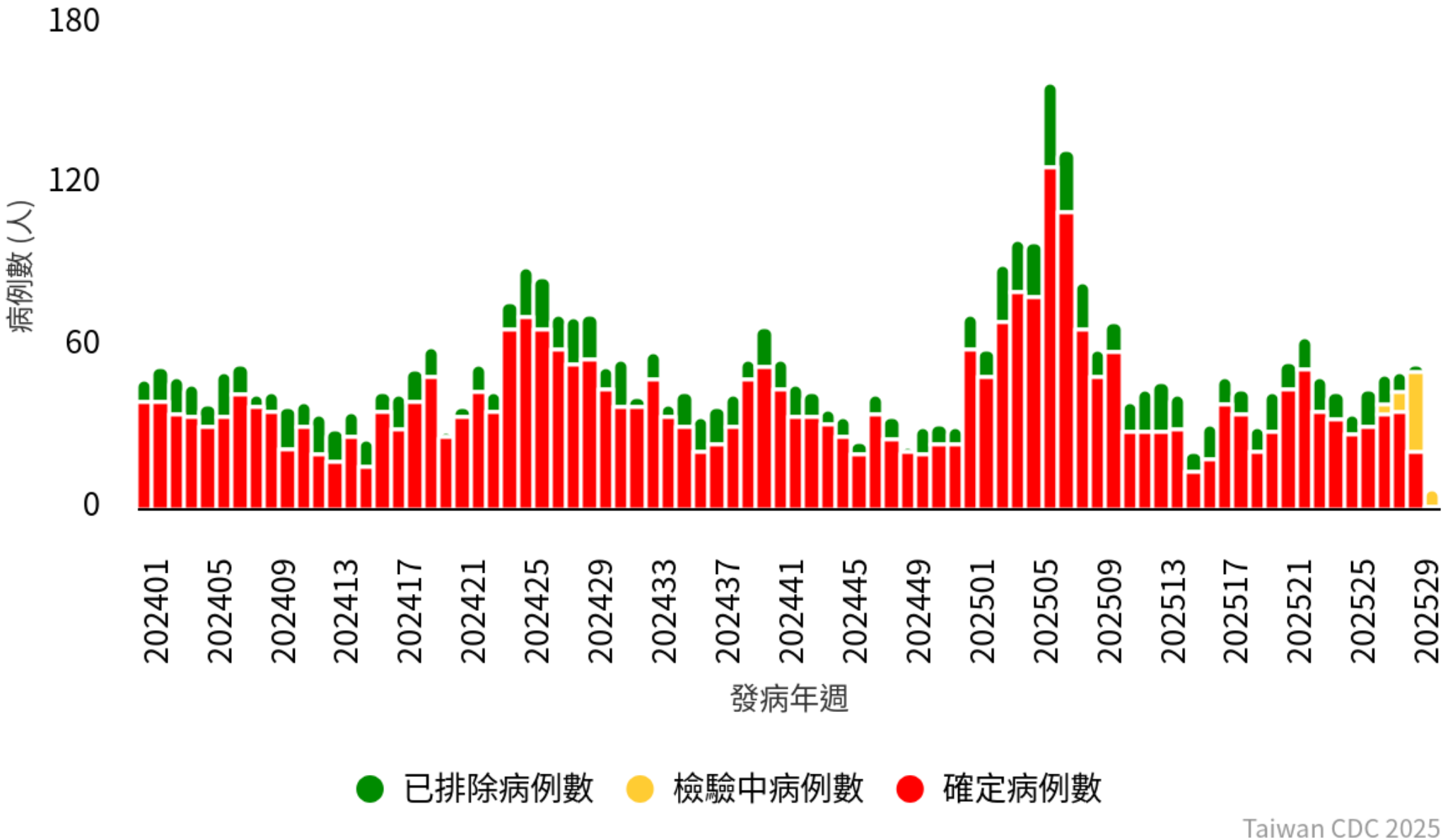


Cia CT. *Sci Rep*. 2021;11(1):20058.

感染症：流行什麼很重要

全國 流感併發重症 本土病例及境外移入病例 趨勢圖 (2024年1週-2025年30週)

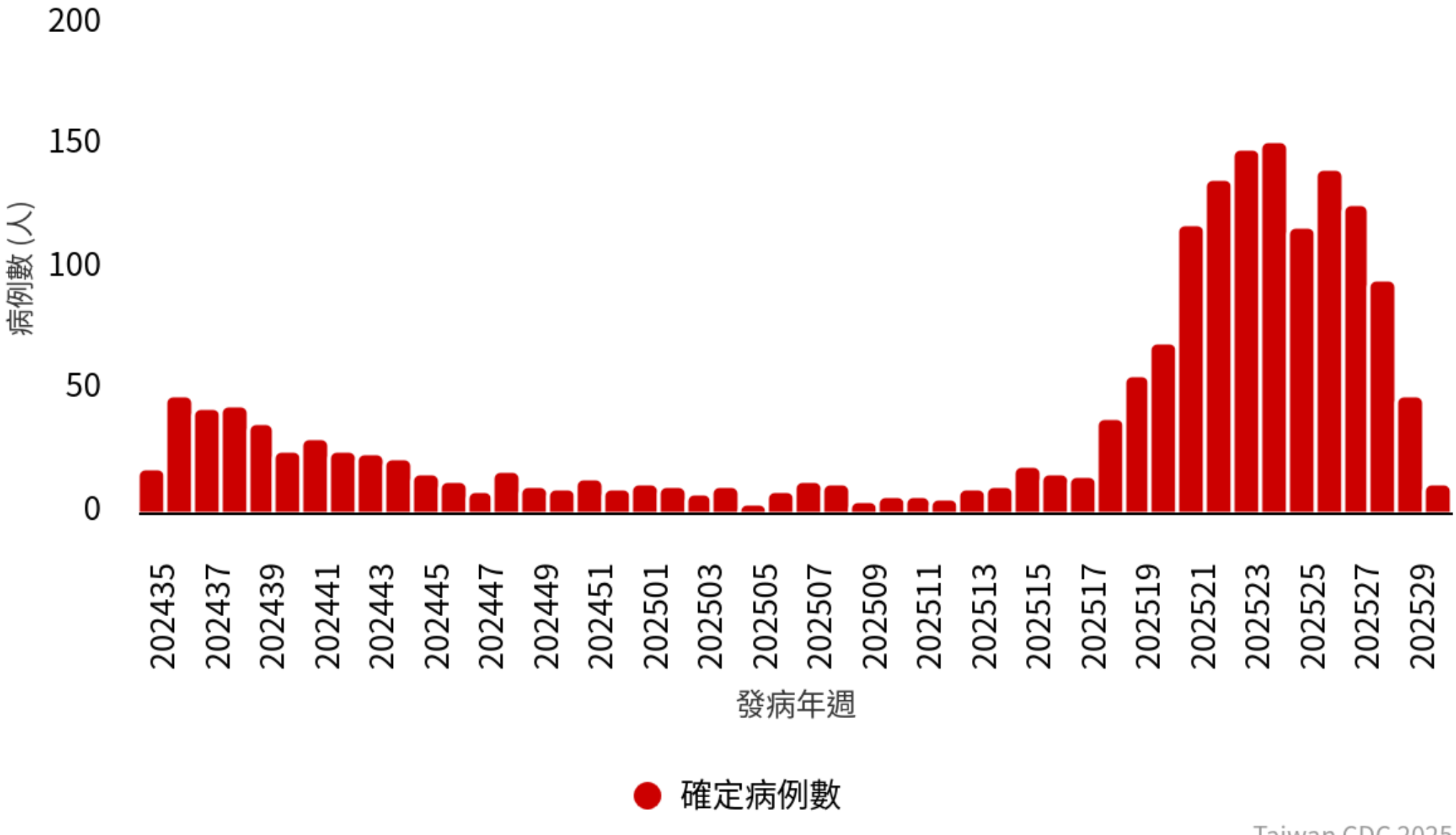
[發病日 2023/12/31-2025/07/26]



Taiwan CDC 2025

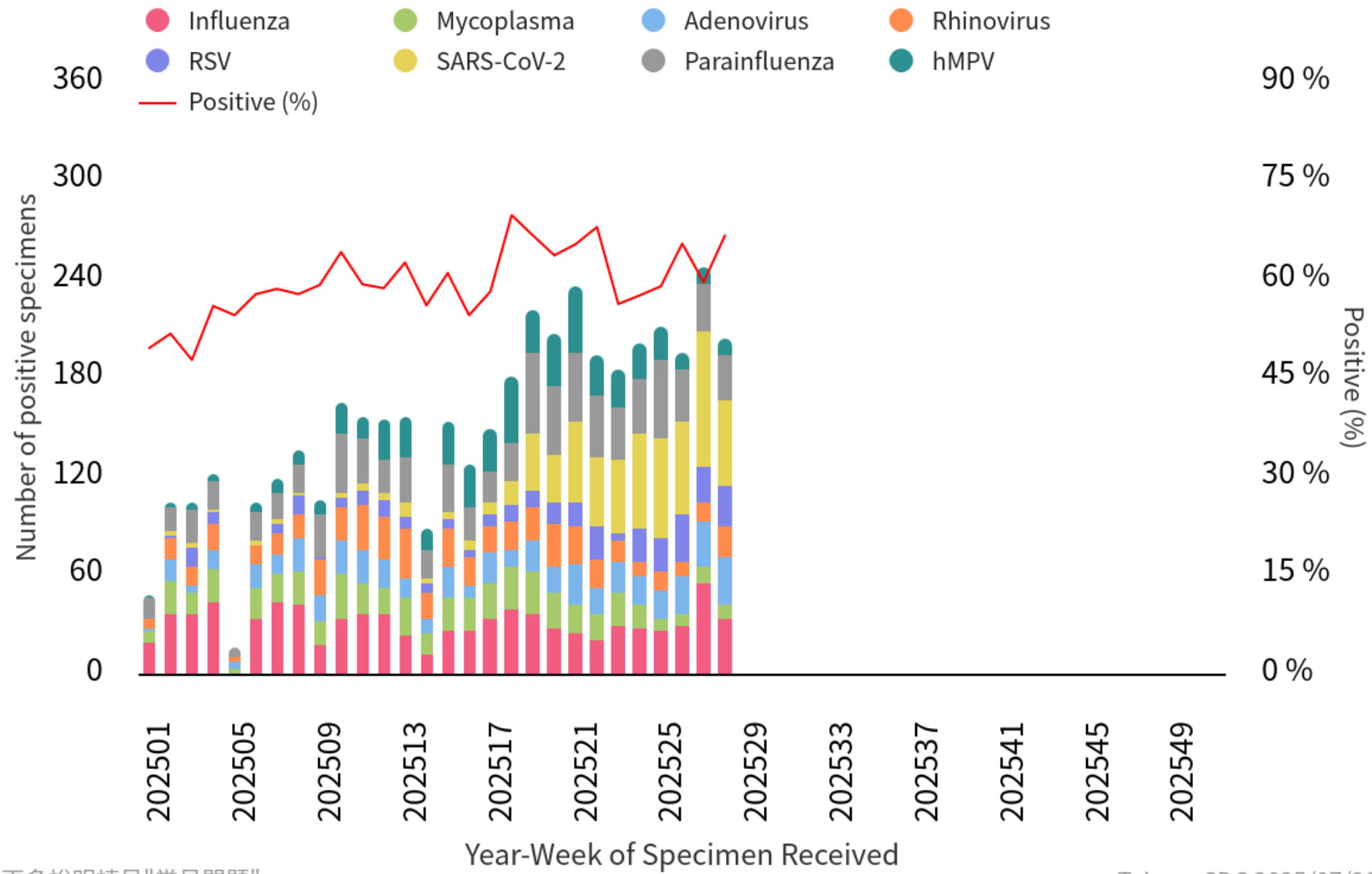
全國 新冠併發重症 本土病例及境外移入病例 趨勢圖 (2024年35週-2025年30週)

[發病日 2024/08/25-2025/07/26]



Taiwan CDC 2025

每週呼吸道檢體病原分子生物學檢出



更多說明請見"常見問題"

Taiwan CDC 2025/07/20

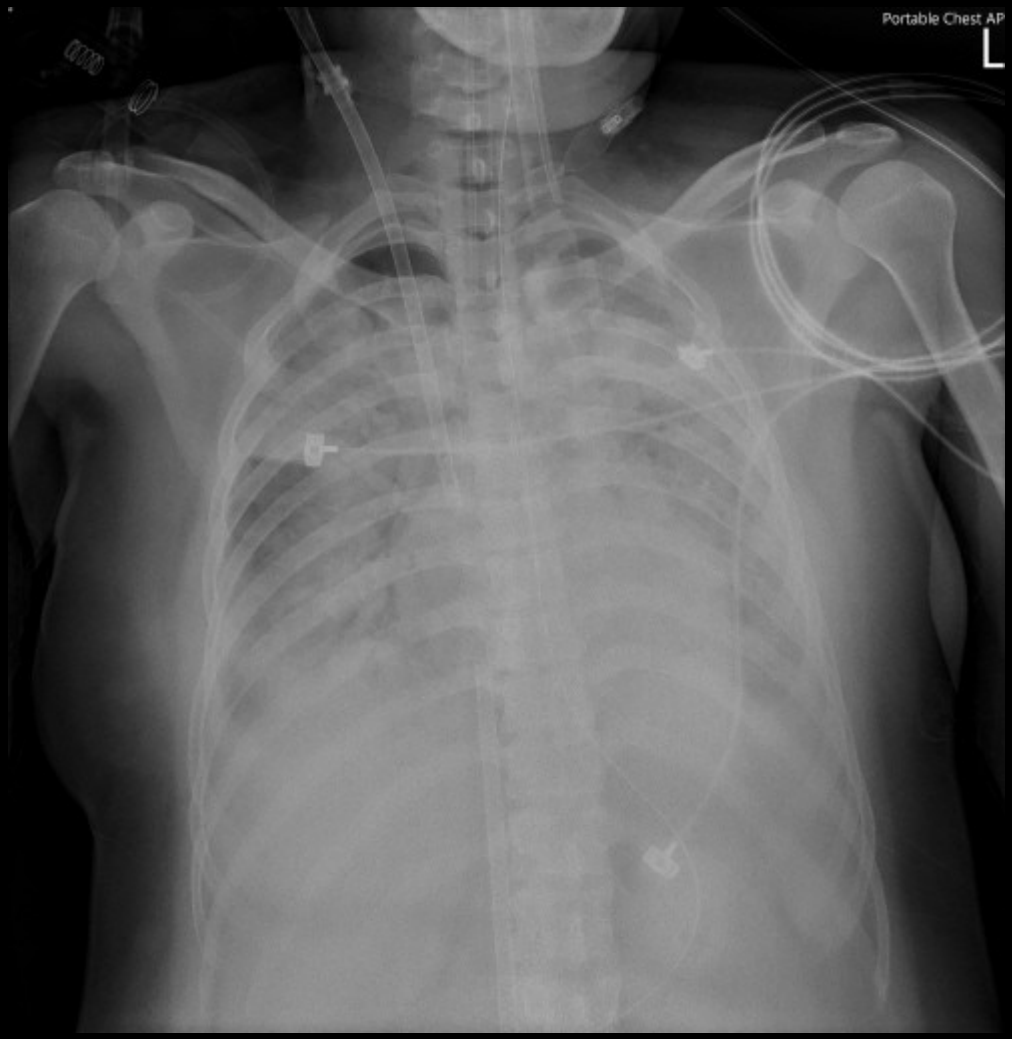
流感併發重症

Severe influenza in Taiwan, 2016

Taiwan Severe Influenza Research Consortium

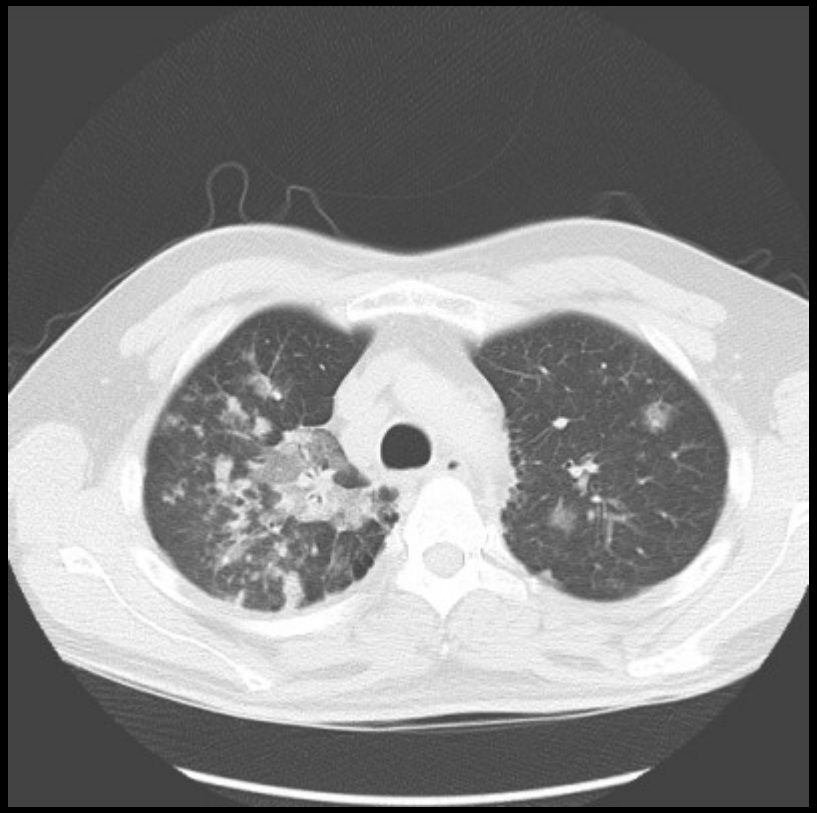
- 336 patients admitted to ICUs in 8 hospitals
  - Age 61.4 y; Male 62.8%
  - IMV 288 (85.7%); ARDS in 263; ECMO in 50 pts
- Mortality ~ 18.6%
- Predictors of better survival
  - negative day 1-4 cumulative fluid balance
- Associated with worse survival
  - high driving pressure; high tidal volume
  - Earlier treatment and higher dose corticosteroid

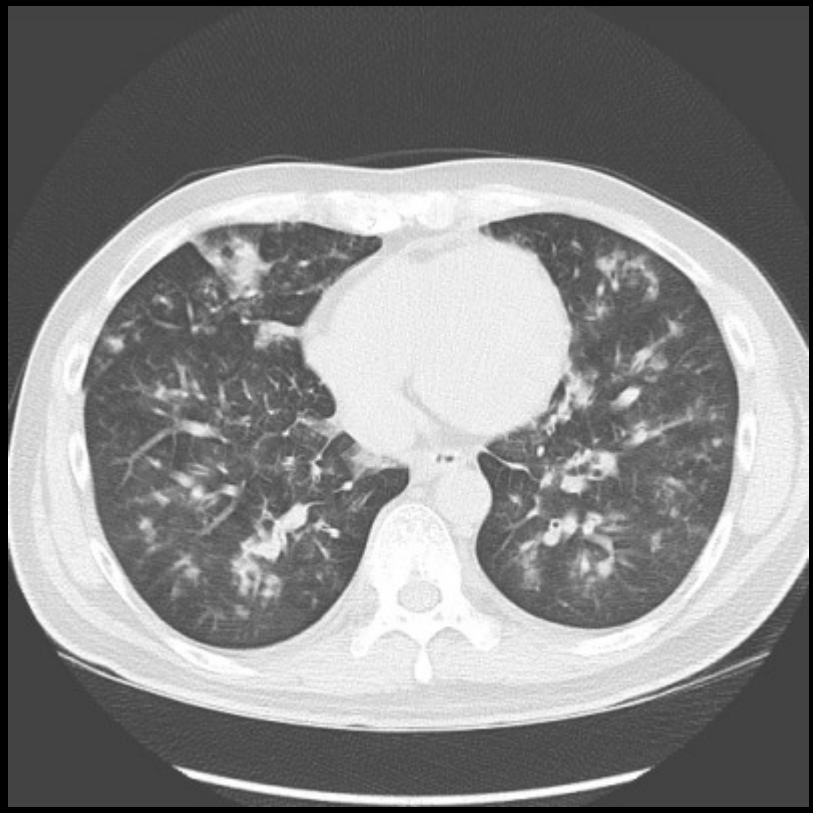
Chao WC. *PLoS One*. 2018;13(1):e0190952.
Chan MC. *J Formos Med Assoc*. 2019;118:378-385.
Tsai MJ. *Ann Intensive Care*. 2020;10(1):26.
Kao KC. *Ann Intensive Care*. 2018;8(1):94.



42 F. no known chronic disease.
Productive cough and rhinorrhea for one week.
Fever and chills for 4 days.
Severe Influenza A (H1). 快篩陰性！
Severe ARDS. s/p V-V ECMO

66 M. DM. HTN.
Dry cough, rhinorrhea, sore throat for one week.
Severe Influenza A (H1). 快篩陰性！
Severe ARDS. Prone positioning





32 M. No chronic disease
Fever, productive cough. Dyspnea for 3 days
Severe Influenza B. 快篩陰性！
ARDS. Aspergillosis. VAP. V-V ECMO. Expired.

Influenza 重症病人處置

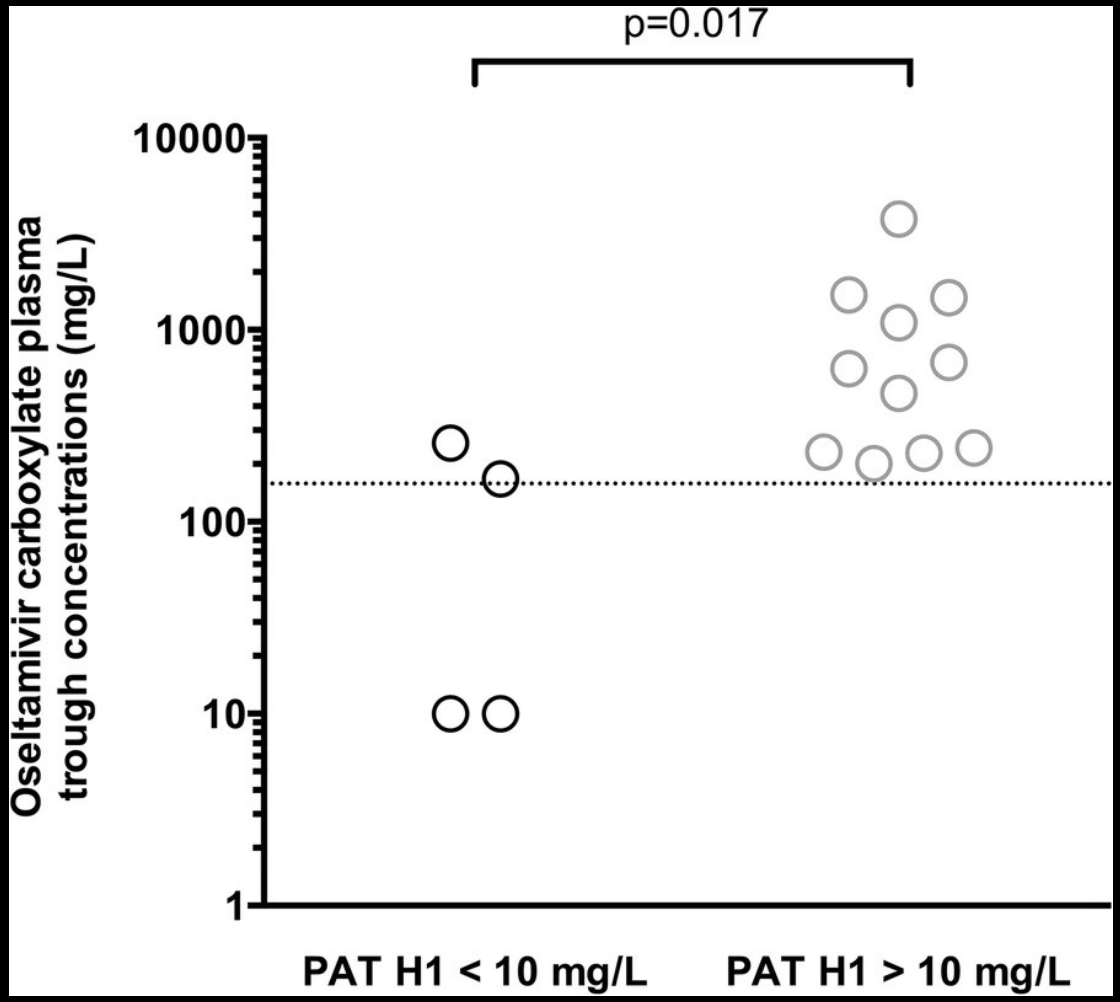
流感重症病人使用抗病毒藥物

- 首選：口服 osetlmamivir
  - 資料最多（但無 v.s. placebo 的 RCT)
  - meta-analysis 顯示住院及重症病人死亡率下降

    OR 0.81 (0.70-0.93) 及 0.72 (0.56-0.94)
  - 多數重症病人腸道吸收血中藥物濃度和一般病人接近
- 消化功能明顯不良的病人： permamivir (IV)
  - 療效和副作用與口服 oseltamivir 無差異

Muthuri SG. *Lancet Respir Med*. 2014;2(5):395-404.
Ariano RE. *CMAJ*. 2010;182(4):357-63.
Nakamura S. *Open Forum Infect Dis*. 2017;4(3):ofx129.

用 acetaminophen 來測 oseltamivir 吸收效果



口服 acetaminophen 一小時候抽血中濃度超過 10 mg/L

oseltamivir 血中濃度就會達到治療標準

May F. *Intensive Care Med*. 2019;45(10):1484-1486.

No routine corticosteroid use for critically ill patients with influenza

- IDSA guideline 2018: Clinicians should not administer corticosteroid adjunctive therapy for the treatment of adults or children with suspected or confirmed seasonal influenza, influenza-associated pneumonia, respiratory failure, or ARDS, unless clinically indicated for other reasons (A-III).
- No RCT, but nearly all observational study show possible harm.

Chow EJ. *Crit Care*. 2019;23(1):214.
Lansbury L. *Cochrane Database Syst Rev*. 2019;2(2):CD010406.
Tsai MJ. *Ann Intensive Care*. 2020;10(1):26.

Bacterial co-infections in influenza

- 0.5% in young healthy individuals
- At least 2.5% in older individuals and those with predisposing conditions
- 34% of ICU patients

- High risk patients
  - Age ≥ 65 y or < 5 y
  - Pregnant woman
  - Morbid obesity
  - Pre-existing medical conditions

Metersky ML. *Int J Infect Dis*. 2012;16(5):e321-31.
Chertow DS. *JAMA*. 2013;309(3):275-82.
Rouzé A. *Am J Respir Crit Care Med*. 2021;204(5):546-556.

Co-pathogens in the US

- 2003-04
  - 959 adults with influenza
  - 125 needed intubation
  - 97 with co-infection
    - *S. aureus* 31
      - MRSA 24
    - *S. pneumoniae* 16
    - *S. pyogenes* 2
    - Other 4
- 2009-10
  - Bacterial infection in 13 – 55% fatal cases
  - 77 lung tissue specimens
    - *S. pneumoniae* 10
    - *S. aureus* 7
      - MRSA 5
    - *S. pyogenes* 6
    - *S. mitis* 2
    - Other 5

Metersky ML. *Int J Infect Dis*. 2012;16(5):e321-31.

Co-pathogens in Spainish ICUs

- 2009 – 2015, 184 ICUs in Spain, 2901 patients
- Patients with co-infections: 482 (16.6%)

Streptococcus pneumoniae	246	51.0%
Pseudomonas aeruginosa	55	11.4%
MSSA	42	8.7%
Aspergillus spp	35	7.2%
Haemophilus influenzae	17	3.5%
Acinetobacter baumannii	14	2.9%
MRSA	12	2.4%
Klebsiella pneumoniae	12	2.4%

Martin-Loeches I. *Intensive Care Med*. 2017;43(1):48-58.

Co-infections in Taiwan

- 7 centers, 2016/01 – 03: 39%
  - Methicillin-sensitive *Staphylococcus aureus* 12

- Chi-Mei H 2015/01 – 2016/03: 31% within 48h
  - *Klebsiella pneumoniae* 14
  - *Staphylococcus aureus* 12 (MRSA: 9)
  - *Pseudomonas aeruginosa* 12
  - *Aspergillus* spp 21 (beyond 48 h)

Chen WC. *Am J Respir Crit Care Med*. 2017;195:A6066.
Ku YH. *J Formos Med Assoc*. 2017;116(9):660-670.

Co-infections at NCKUH

- NCKUH 2017/01 – 2018/06: 43% within 7 days.

Klebsiella pneumoniae	12
Staphylococcus aureus	8 (MRSA: 4)
Aspergillus spp	8
Pseudomonas aeruginosa	5

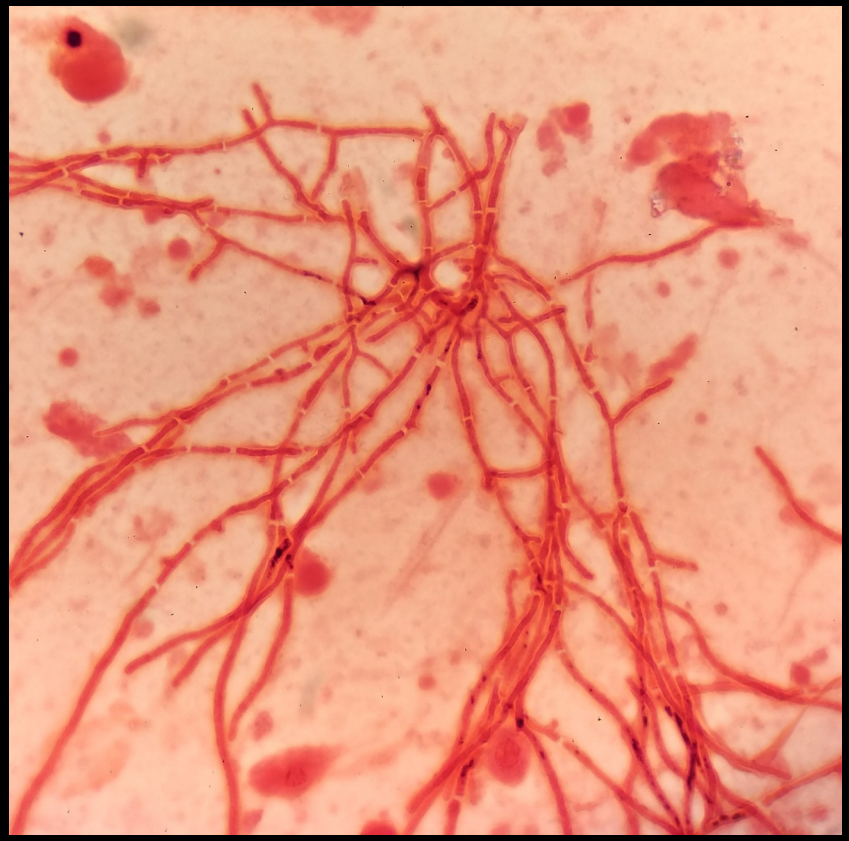
- NCKUH 2023/04 – 2025/06: 37% within 7 days.

Aspergillus spp	15
Staphylococcus aureus	12 (MRSA: 6)
Klebsiella pneumoniae	11
Pseudomonas aeruginosa	8

CT Cia. Unpublished data.

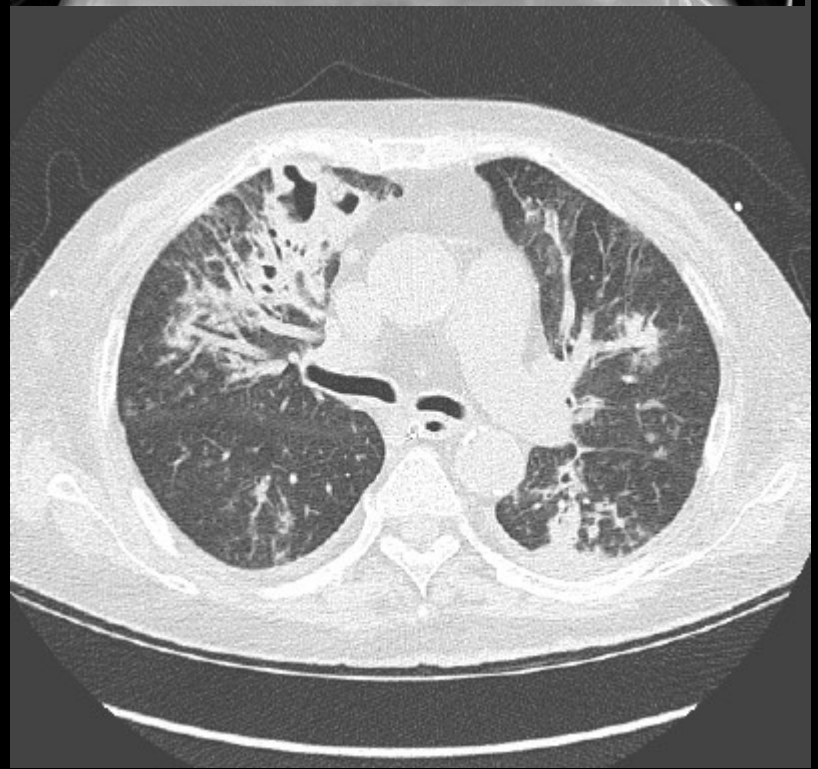
Influenza-associated pulmonary aspergillosis

- Prevalence 5-19% among critically ill patients with influenza
- Short interval from diagnosis of influenza to pulmonary aspergillosis
  - Prophylaxis not practicable
- Risk factors: malignancy, compromised immunity
- Associated with high mortality: 49-61%



endotracheal aspirate, Gram stain. 1,000x

Wu CJ. *J Fungi* (Basel). 2022;8(1):49.
Vanderbeke L. *Intensive Care Med*. 2021;47(6):674-686.
Feys S. *Lancet Respir Med*. 2024;12(9):728-742.



- 76-year-old woman
- ESRD s/p kidney transplantation, DM
- Influenza A (H1)

- Concurrent infections
  - *Staphylococcus aureus*
  - *Klebsiella pneumoniae*
  - *Aspergillus tereus* complex
  - *Cunninghamella* spp.
  - Cytomegalovirus

有肺炎的流感重症病人
建議經驗性抗生素需涵蓋

Methicillin-sensitive *Staphylococcus aureus*

Streptococcus pneuomniae

Klebsiella pneumoniae

重症病人亦需考慮，應努力尋找相關證據

MRSA, *P. aeruginosa*, *Aspergillus* spp

Extrapulmoary complications of influenza

- Cardiac
  - Myocarditis and cardiomyopathy
  - Heart failure
  - Pericadial effusion
  - Myopericarditis
  - Arrythmia
- Neurologic
  - Encephalopathy, encephalitis, meningitis
  - Seizure
  - Guillains–Barre syndrome
- Other
  - Rhabdomyolysis
  - Acute kidney injury
  - Miscellaneous

Sarda C. *Curr Opin Crit Care*. 2019;25(5):449-457.

COVID-19 重症

Critical COVID-19 (before Omicron)

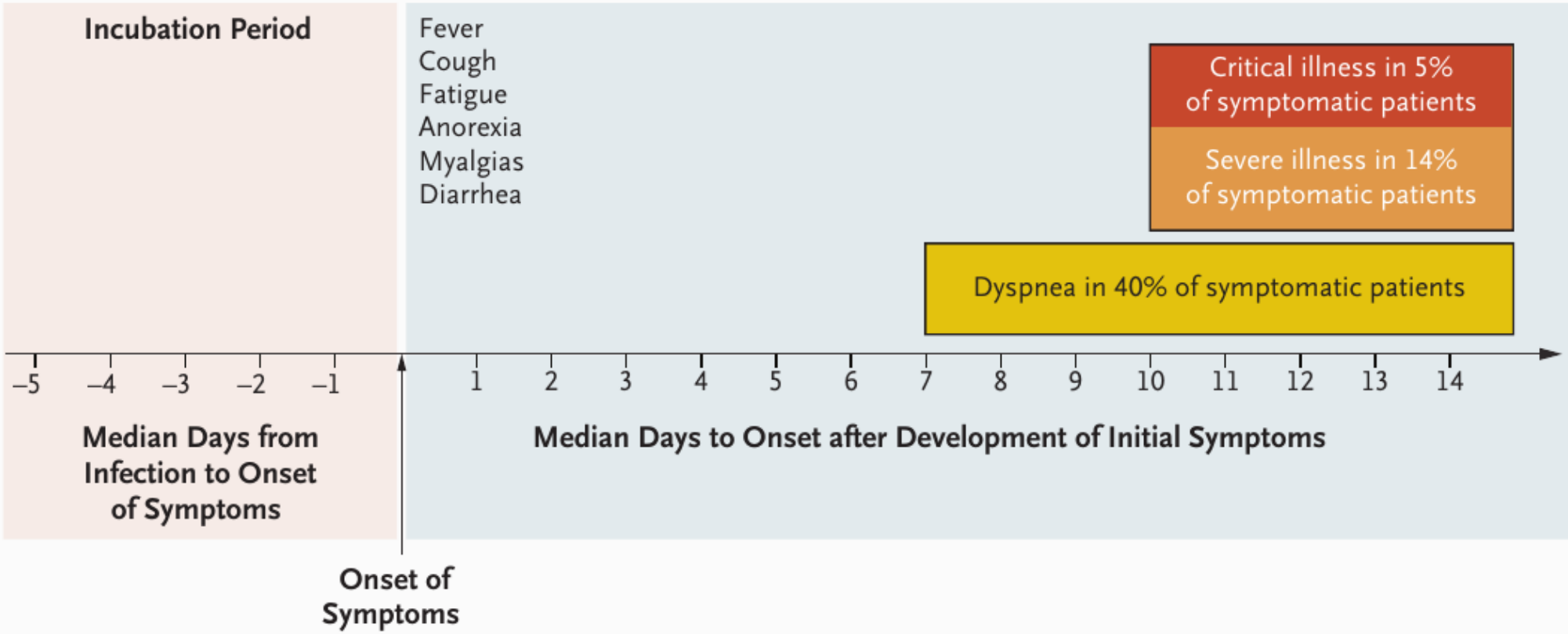


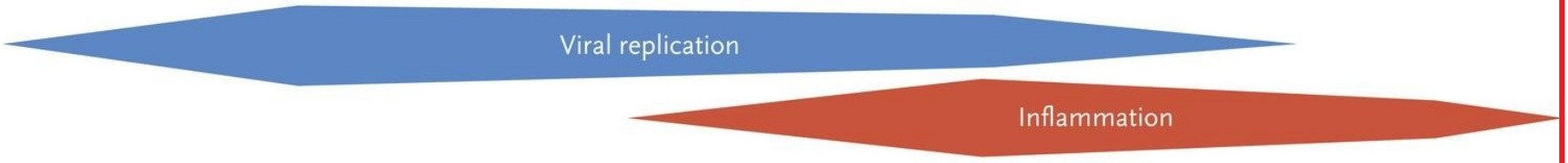
Figure 1. Timeline of Symptoms of Severe Coronavirus Disease 2019 (Covid-19).

~10 days after symptom onset

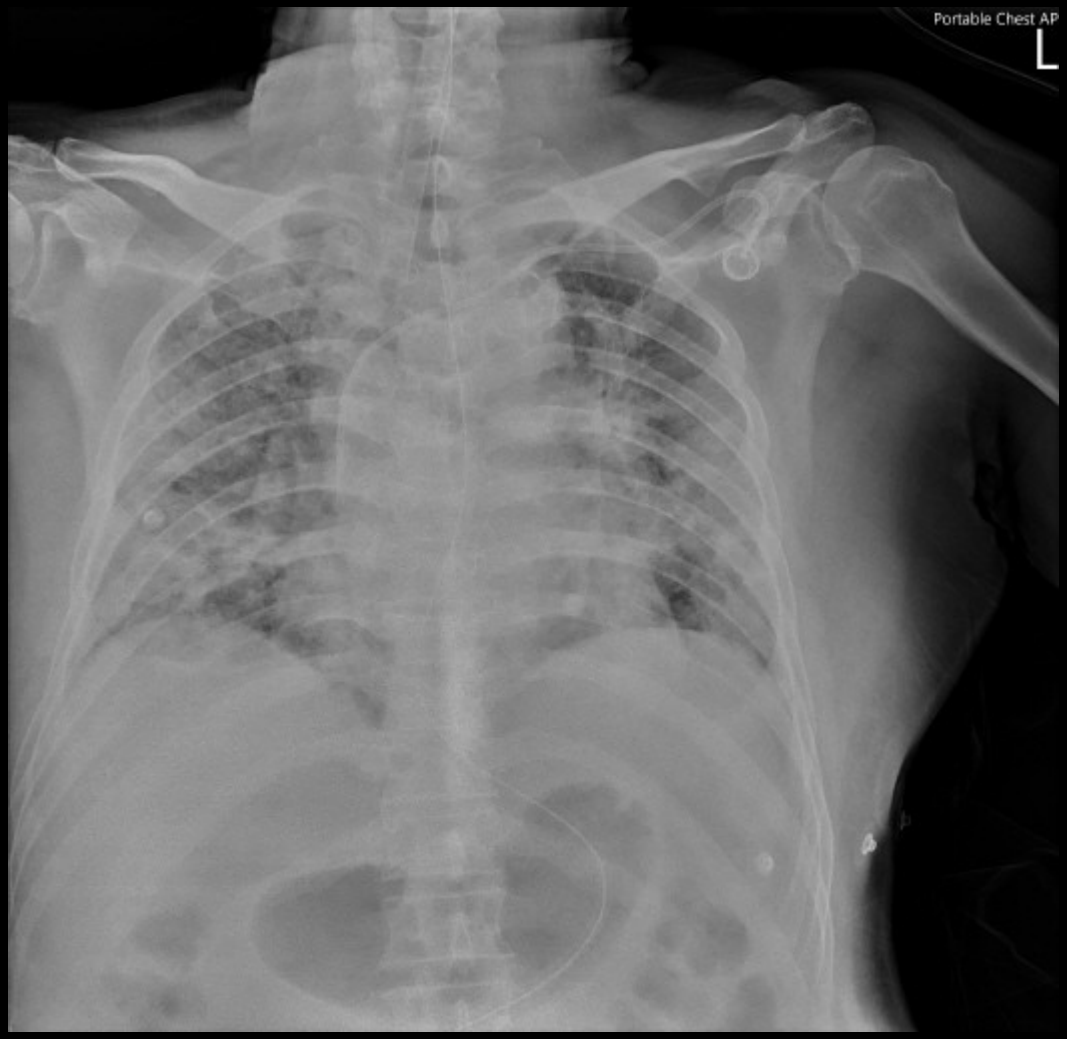
Inflammation >> viral replication

Berlin DA. *N Engl J Med*. 2020;383(25):2451-2460.

Stages / severities of COVID-19

	Asymptomatic or Presymptomatic	Mild Illness	Moderate Illness	Severe Illness	Critical Illness
Features	Positive SARS-CoV-2 test; no symptoms	Mild symptoms (e.g., fever, cough, or change in taste or smell); no dyspnea	Clinical or radiographic evidence of lower respiratory tract disease; oxygen saturation ≥94%	Oxygen saturation <94%; respiratory rate ≥30 breaths/min; lung infiltrates >50%	Respiratory failure, shock, and multiorgan dysfunction or failure
Testing	Screening testing; if patient has known exposure, diagnostic testing	Diagnostic testing	Diagnostic testing	Diagnostic testing	Diagnostic testing
Isolation	Yes	Yes	Yes	Yes	Yes
Proposed Disease Pathogenesis					
Potential Treatment					
Management Considerations	Monitoring for symptoms	Clinical monitoring and supportive care	Clinical monitoring; if patient is hospitalized and at high risk for deterioration, possibly remdesivir	Hospitalization, oxygen therapy, and specific therapy (remdesivir, dexamethasone)	Critical care and specific therapy (dexamethasone, possibly remdesivir)

Gandhi RT. *N Engl J Med*. 2020;383(18):1757-1766.



69 y/o M. Lung SqCC on chemotherapy.
DM. CKD. HTN. Independent ADL.
COVID-19 Ag+ on 7/20. Cough with sputum
Dyspnea 7/29-. Respiratory failure on 8/05

RV study at NCKUH ICU 2017-2018
From symptom onset to ICU admission

Median: 3 days

(1st & 3rd quartile: 2 & 5 days)

Cia CT. *Sci Rep*. 2021;11(1):20058.

OVID-19 omicron variant
重症病人死亡率

法國 AP-HP ICUs	成大醫院 2022.04-2023.04
n = 229	n = 397
Median age 63 y	Median age 74 y
Mechanical ventilatoin 41%	Mechanical venilation 65%
ICU mortality	ICU mortality
20.0%	19.1%

Vieillard-Baron A. Am *J Respir Crit Care Med*. 2022;206(3):349-363.
Cia CT. Unpublished data.

插管使用侵入式呼吸器 (IMV) 病人
Alpha v.s. Omicron variant in Taiwan

台灣 TSCCC 2021	成大醫院 2022.04-2023.04
Alpha variant	Omicron variant
Mean age 66.8 y	Mean age 72.4 y
In-hospital mortality	In-hospital mortality
36.8%	33.9%

Kao KC. TSCCC study results (unpublished). https://www.youtube.com/watch?v=YACvQb9FQV0
Cia CT. Unpublished data.

Characters of critically ill adults with COVID-19 at NCKUH, n=397

Pneumonia upon ICU admission	225 (56.7%)
Typical COVID-19 pneumonia	91 (22.3%)
Acute decompensated heart failure	122 (30.7%)
Acute coronary syndrome	27 (6.8%)
Acute exacerbation of chronic lung disease	26 (6.6%)
Non-respiratory tract infection	80 (20.2%)

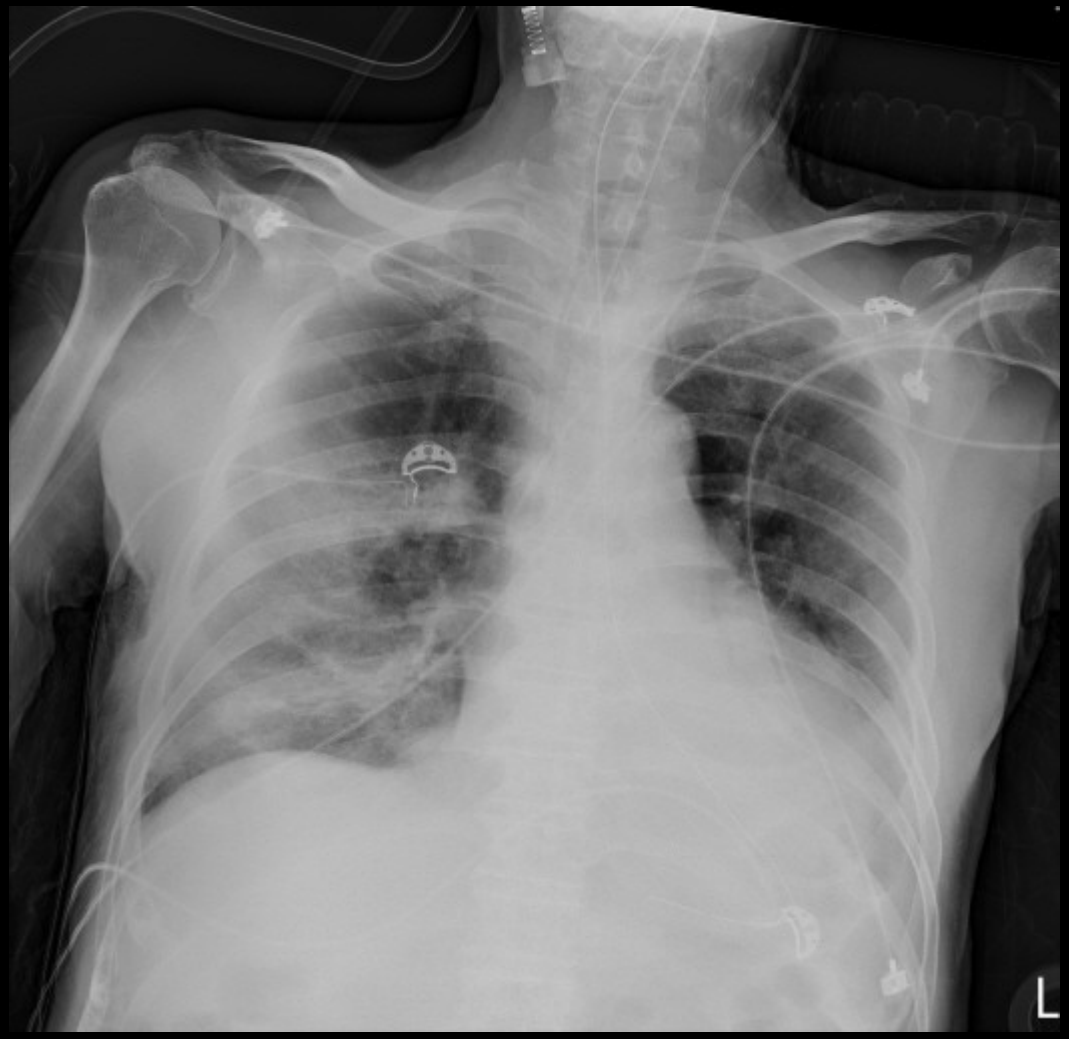
Cia CT. Unpublished data.

同樣 COVID-19 住進本院 ICU 有沒有打疫苗結果有差距

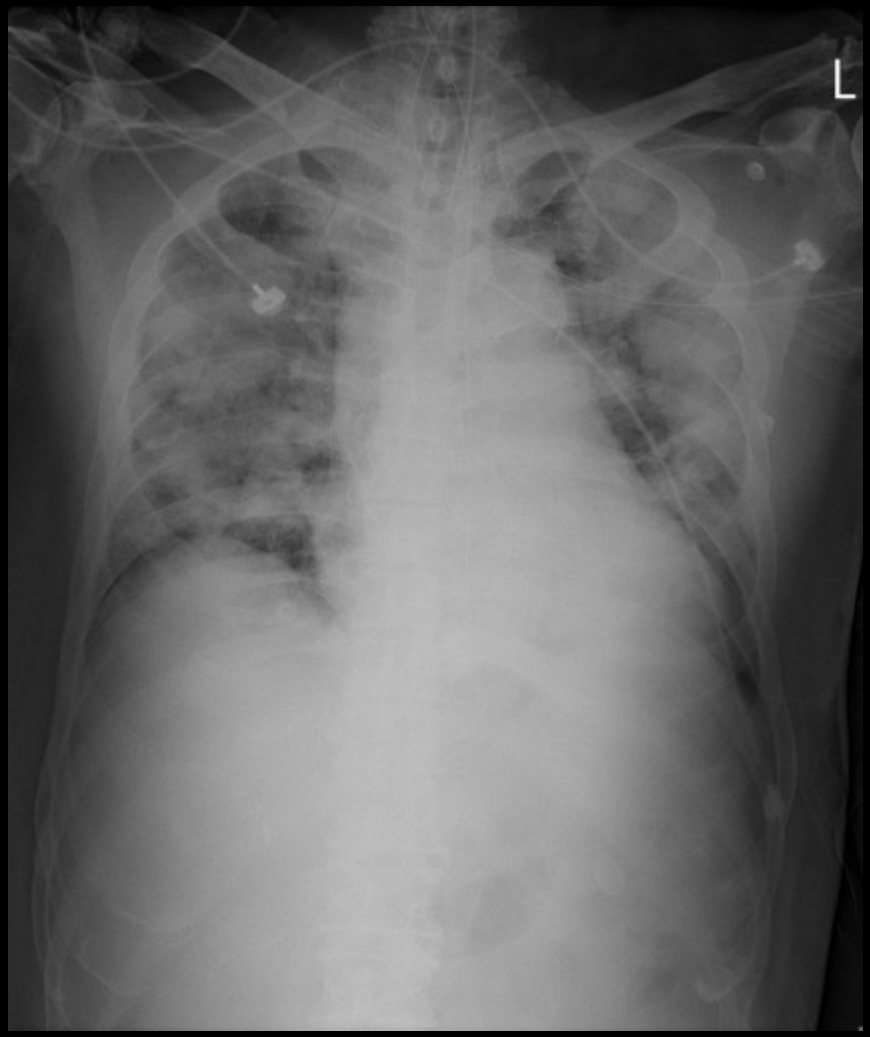
	Vaccine dose ≤ 1 n = 194	Vaccine doses ≥ 2 n = 203	p value
Age	73.7 ± 14.3	70.9 ± 13.7	0.0541
Sex (female)	36.6%	37.4%	0.8624
ICU stay (days)	8 (3.25–19.0)	5 (3–11.5)	0.0029
ICU mortality	22.2%	16.3%	0.1347
Hospital stay (days)	21.5 (12–36)	18 (8–31)	0.0181
In-hospital mortality	34.5%	24.6%	0.0305
Ventilator-free days at 28 days	18.5 (2–28)	24 (7–28)	0.0104

Cia CT. Unpublished data.

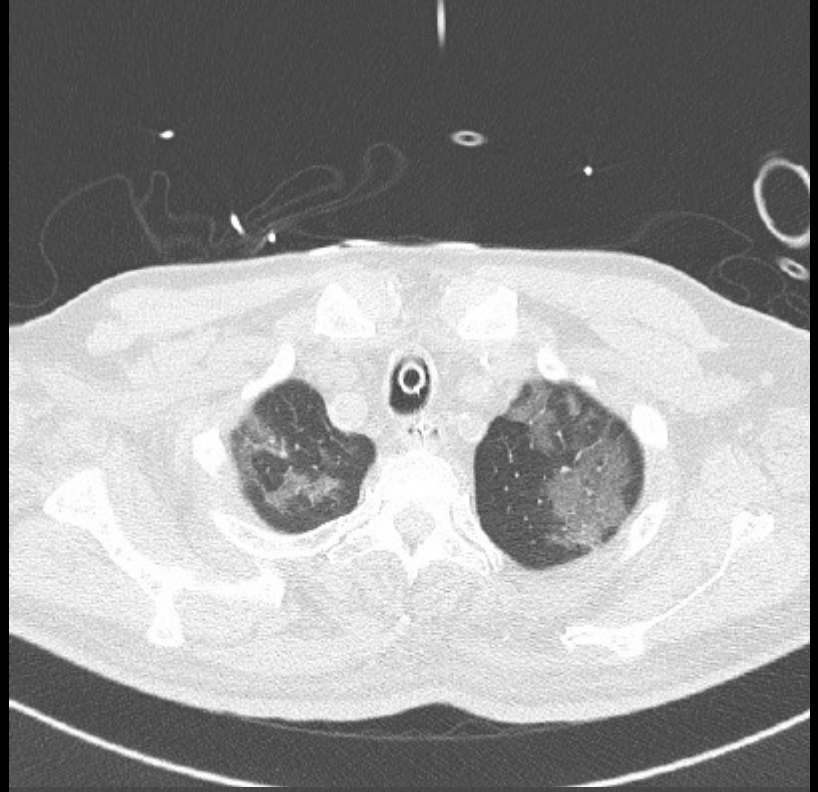
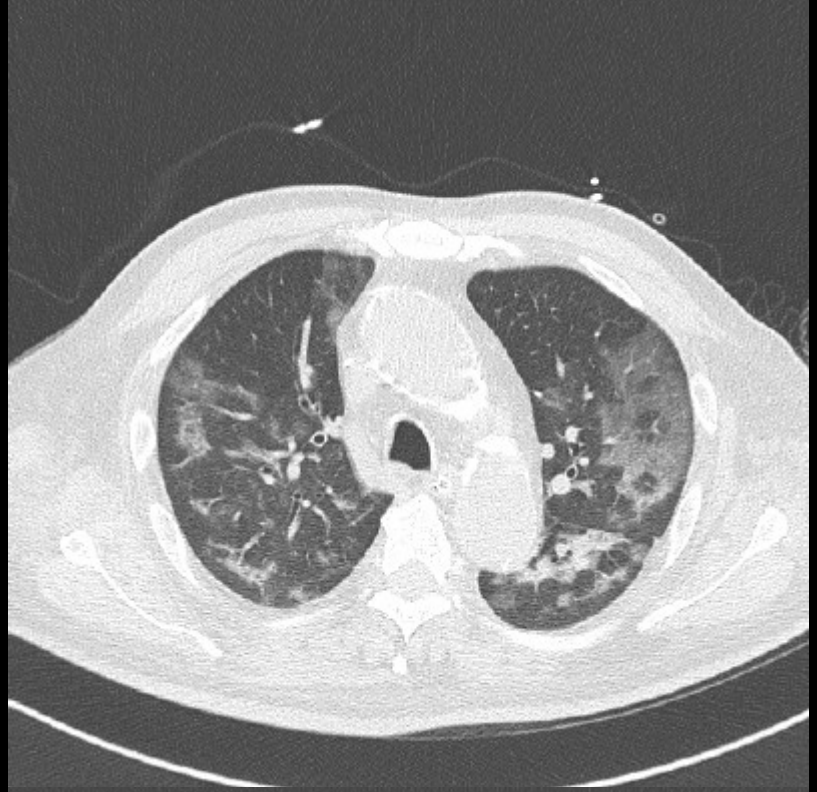
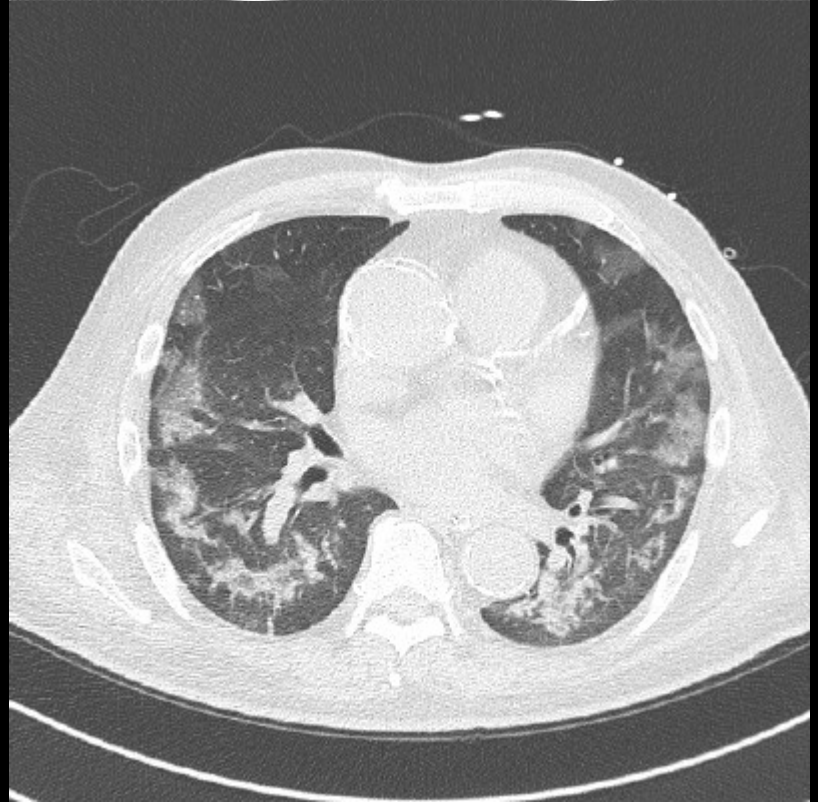
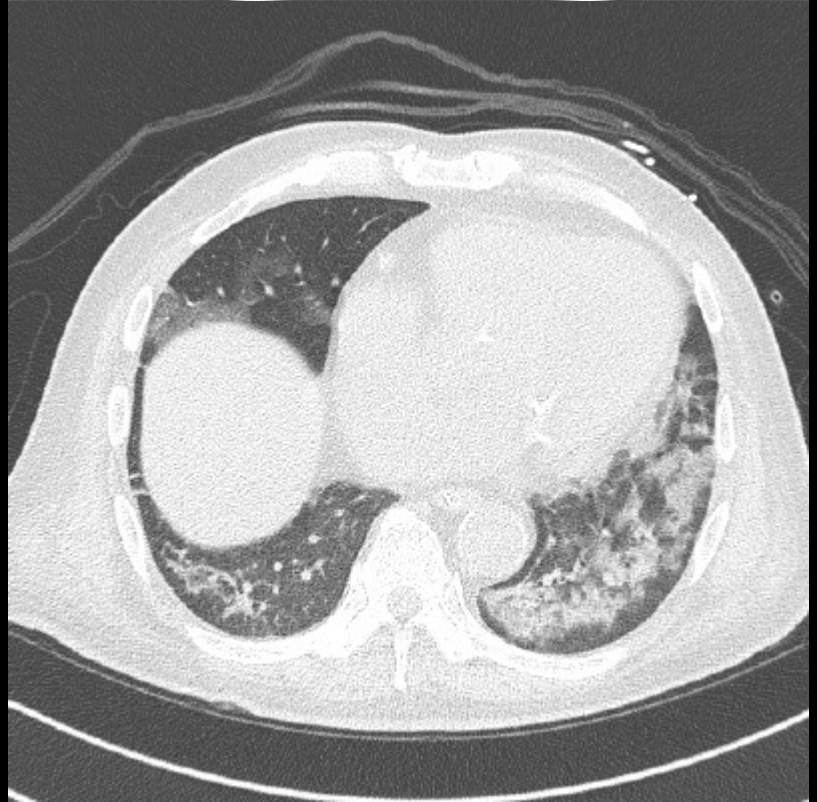
典型的武漢肺炎

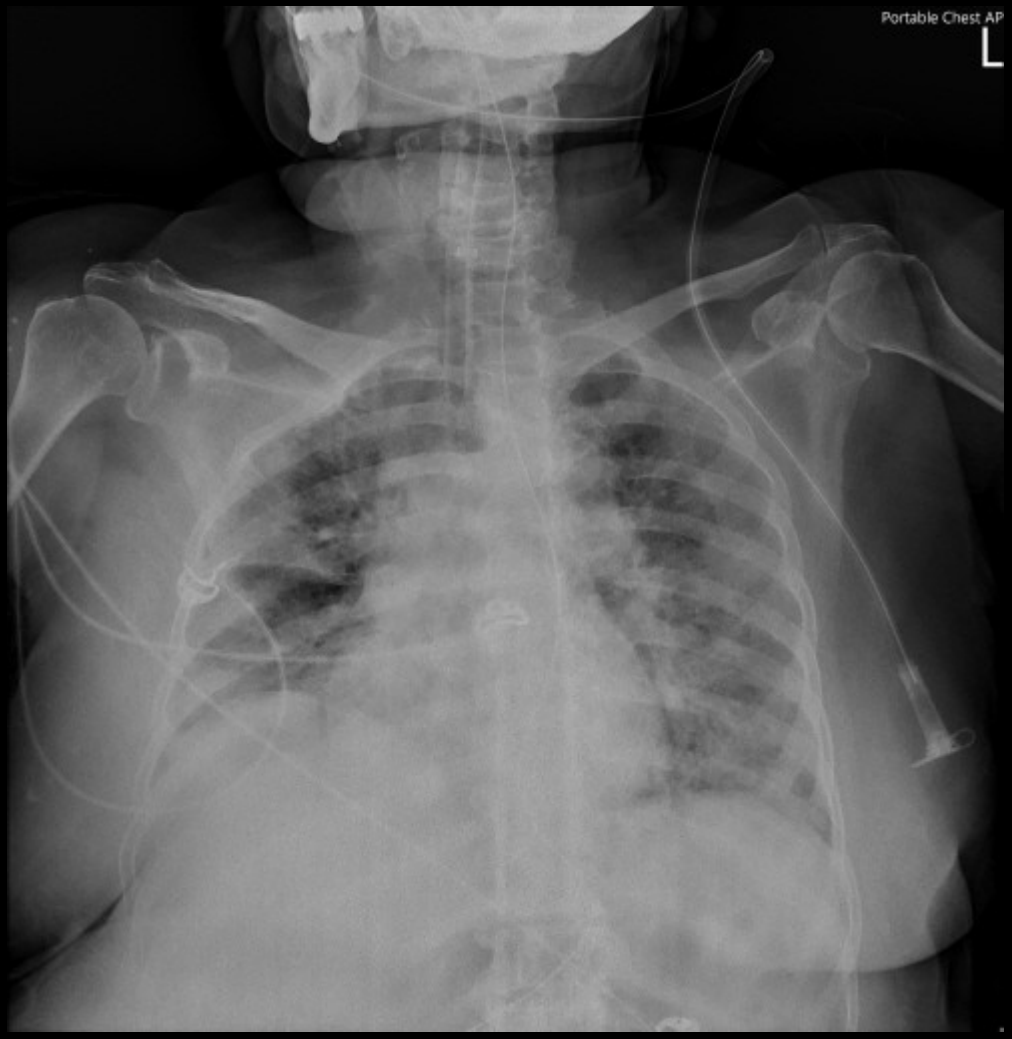


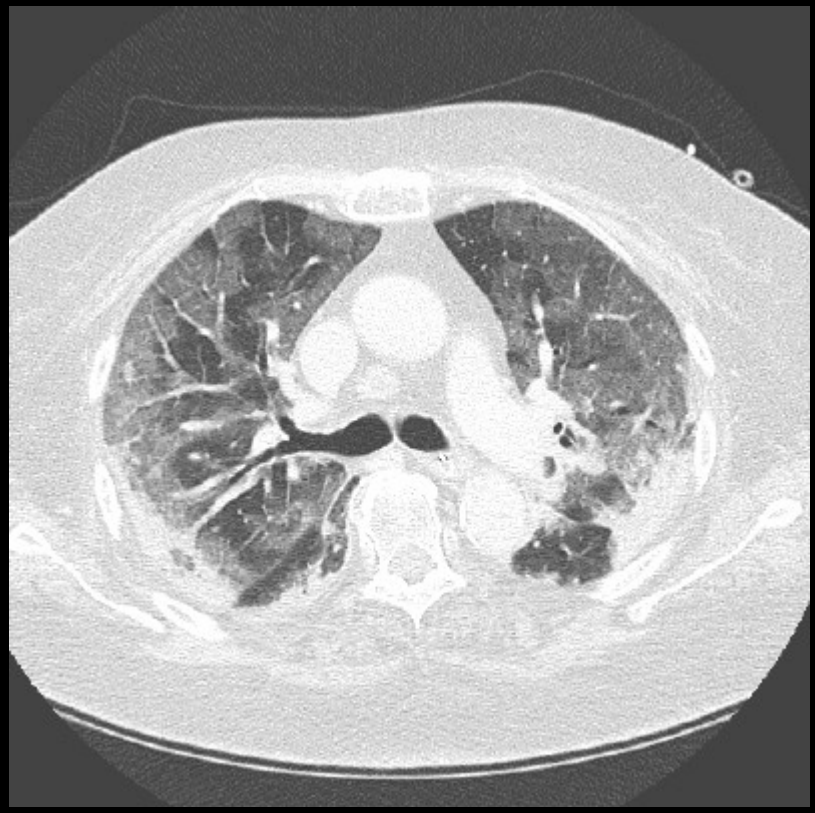
78M. HTN. CKD. Old SAH. Vaccine x0
SARS-CoV-2 Ag+ on 5/21. Dyspnea on 5/29.



69M. ESRD on HD. HTN. DM. Vaccine x0
Chest tightness. Dyspnea. STEMI.
COVID-19 pneumonia.





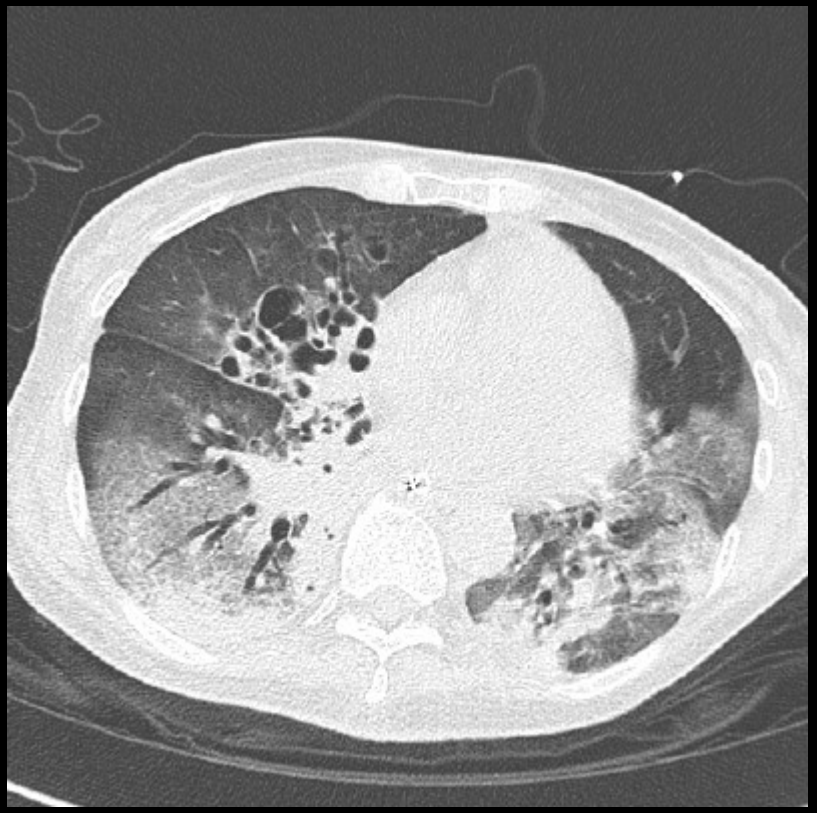
76F. CKD. HTN. DM. Dyslipidemia. Vaccine x1. Sore throat initially. Dypsnea & weakness one week later. Worse respiration for two days. SARS-Cov-2 Ag-, ETA Ct 27.5

Typical presentation of COVID-19 pneumonia on CXR

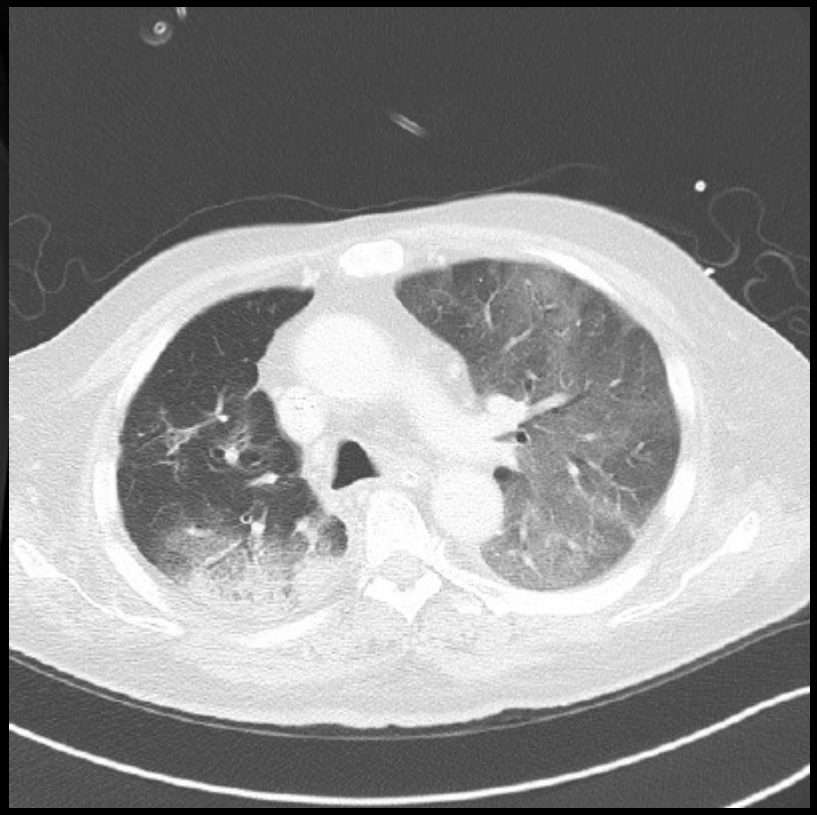
- airspace opacities, whether described as consolidation or, less commonly, GGO.
- Distribution: often bilateral, peripheral, and lower zone predominant.
- In contrast to parenchymal abnormalities, pleural effusion is rare (3%).

https://radiopaedia.org/articles/covid-19-

COVID-19 合併其他肺部感染



60 F. Cervical ca. DM. Depression.
Fever. Dyspnea.
SARS-CoV-2 & *Streptococcus pneumoniae* pneumonia



60 F. Lung ca. CKD. HTN.
Dyspnea for 2 days.
SARS-CoV-2, *Staphylcococcus aureus*, and *Pneumocysitis jiroveci* pneumonia

COVID-19 引起慢性疾病恶化

68 M. CAD. HFrEF. DM. Dyslipidemia. CKD.
Fever and altered mental status.
Acute decompensated heart failure related to COVID-19

Prevalence of cardiovascular manifestations among patients with COVID-19

- Myocardial injury
  - 住院病人 15-42%
  - Associated with death
- Acute coronary syndrome
  - Case series
  - Cohort study including 924 patients with STEMI
  - 3% in pts having TTE
- Arrythmias
  - 住院病人 10-30%
  - ICU 病人 30-50%
- Cardiomyopathy / AHDF
  - 住院病人 23-25%
  - TTE: LV 39%, RV 33%, myocarditis 3%, takotsubo 2%

Fauvel C. *Respir Med Res*. 2022;81:100904.
Maitz T. *Curr Probl Cardiol*. 2022;101186.
Dweck MR. *Eur Heart J Cardiovasc Imaging*. 2020;21(9):949-958.

COVID-19 重症病人處置

COVID-19 藥物治療
預防重症需在發病後 5 天內給予

- Nirmatrelvir/ritonavir (Paxlovid®)
  - 口服 5 天，藥物交互作用多
- Molnupiravir (Lagevrio®) 沒藥了
  - 口服 5 天，效果差
- Ensitrelvir (Xocova®)
  - 口服 5 天，交互作用比 NMV/r 少，管灌資料稍多
- Remdesivir (Veklury®)
  - 靜脈注射 x3 天
- 單株抗體：沒跟上新變種，沒效了

COVID-19 肺炎住院病人藥物治療

住院不用氧氣	不需要給類固醇或抗病毒藥
使用一般氧氣設備	dexamethasone + remdesivir 5d +/- tocilizumab OR baricitinib
使用 HFNC 或是 NIV	dexamethasone + remdesivir 5d + baricintinib OR tocilizumab
插管 IMV	dexamethasone + baricitinib OR tocilizumab

NIH. COVID-19 Treatment Guidelines. https://www.covid19treatmentguidelines.nih.gov/

請先確定真的是武漢肺炎

- 典型的 COVID-19 pneumonia 發生在開始有症狀之後的第 2 週，所以剛發病沒幾天就來住 ICU 的，不是 COVID-19 pneumonia 。
- COVID-19 pneumonia 專屬的治療 (dexamethasone, tocilizumab, baricitinib) ，都真的是在處理第 2 週以發炎為主的 COVID-19 pneumonia ，還沒發生或根本沒有 COVID-19 pneumonia 就用，只是讓病人增加併發症的風險而沒有好處。

COVID-19 住院病人如不需氧氣使用類固醇會增加死亡率！

Outcome	No. of Glucocorticoid Patients	No. of Control Patients	Odds Ratio (95% CI)
Mortality	509/3704 (14%)	294/2930 (10%)	1.56 (1.27 – 1.92)
Mechanical ventilation	98/550 (18%)	160/1088 (15%)	1.32 (1.00 – 1.74)

Covello RD. *NEJM Evid*. 2023;2(5):EVIDoa2200283.

病人有 COVID-19 但無肺炎
如因其他因素插管使用呼吸器，不應使用類固醇！

COVID-19 重症病人
Bacterial co-infection rate

5.5 – 28%

研究多為 2020-2021, Omicron 未出現

Lansbury L. *J Infect*. 2020;81(2):266-275.
Kreitmann L. *Intensive Care Med*. 2020;46(9):1787-1789.
Contou D. *Ann Intensive Care*. 2020;10(1):119.
Elabbadi A. *Infection*. 2021;49(3):559-562.
Saade A. *Ann Intensive Care*. 2021;11(1):83.
Baskaran V. *J Med Microbiol*. 2021;70(4):001350.
Musuuza JS. *PLoS One*. 2021;16(5):e0251170.
Rouzé A. *Am J Respir Crit Care Med*. 2021;204(5):546-556.
Morris AC. *Crit Care*. 2022;26(1):236.

COVID-19 重症病人要不要用抗生素？個人作法

不用

- 典型 COVID-19 肺炎
  - 發病後 7-14 天呼吸喘
  - 沒有黃痰
  - 影像典型 (週邊 GGO)
- 單純 COVID-19 引起慢性病急性惡化
- Procalcitonin < 0.5 μg/L

用

- 肺炎但不像武漢肺炎
  - 太早 (5 日內) 出現
  - 黃痰
  - 影像不典型
- 休克需使用高劑量生壓劑，須懷疑非呼吸道感染

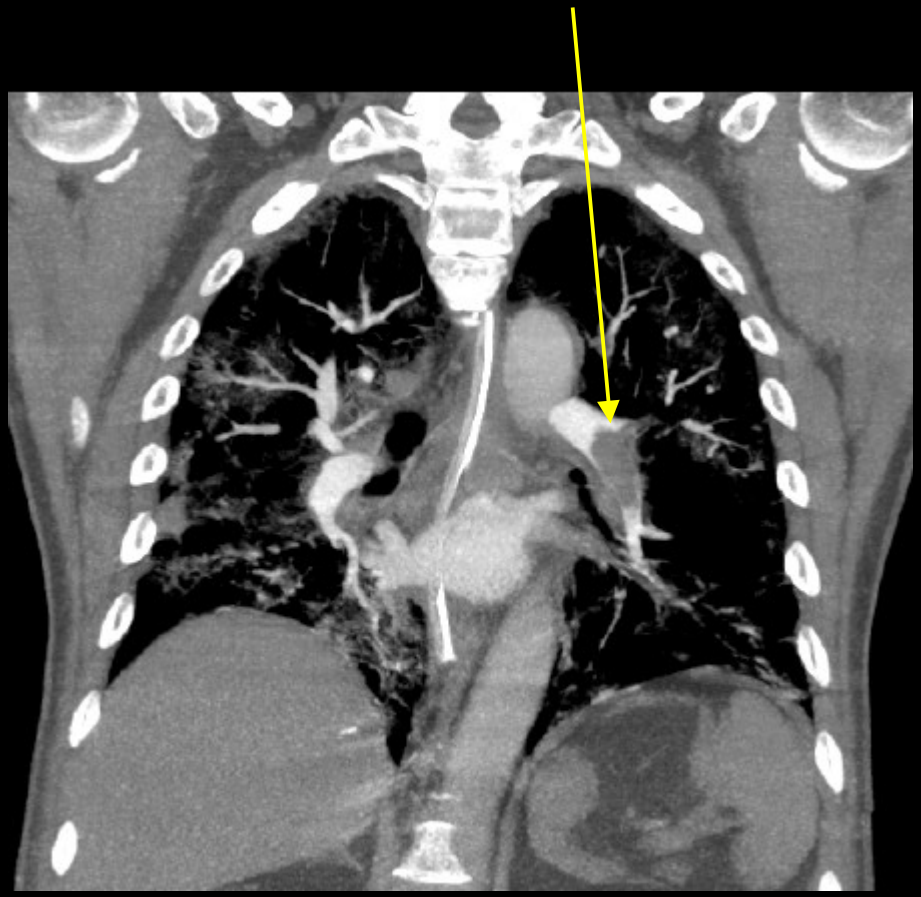
Wei S. *Virol J*. 2023;20(1):92.

COVID-19 重症病人靜脈血栓發生率高
如無出血，建議給抗凝血劑

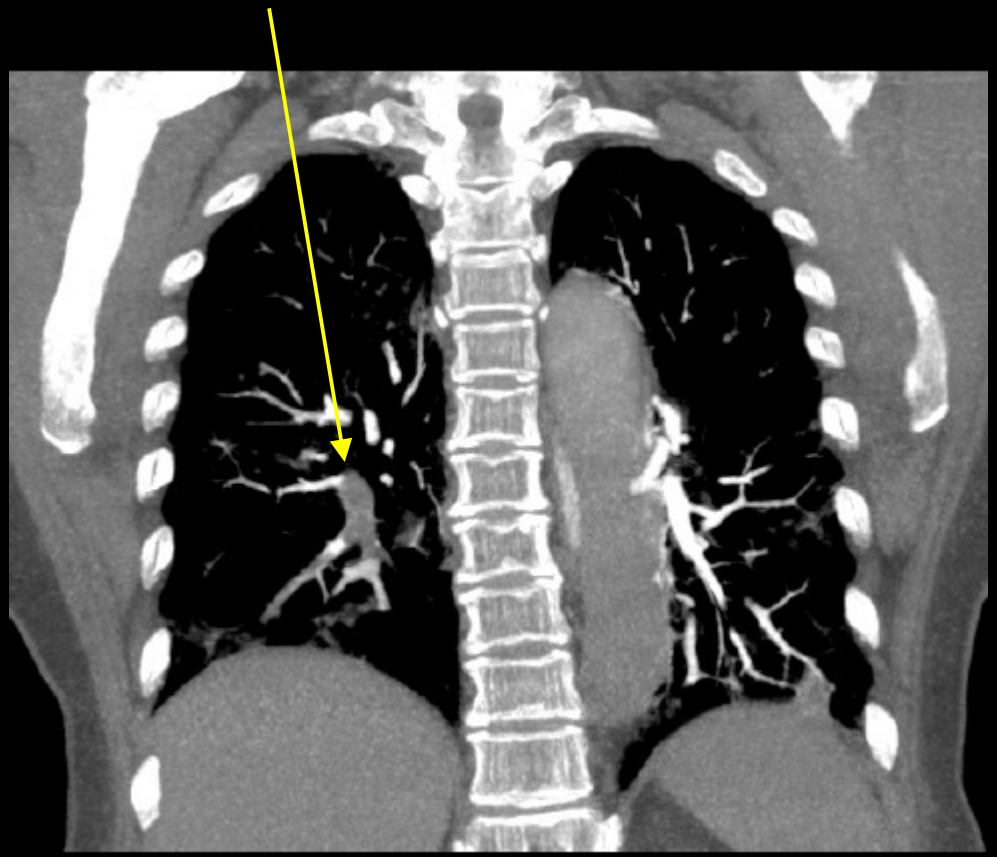
All VTE	Pulmonary embolism
14.3 –27.9%	8.6–24.7%

Suh YJ. *Radiology*. 2021;298(2):E70-E80.
Porfidia A. *Thromb Res*. 2020;196:67-74.
Tan BK. *Thorax*. 2021;76(10):970-979.
Ng JJ. *J Intensive Care*. 2021;9(1):20.
Fujiwara S. *J Infect Chemother*. 2021;27(6):869-875.

COVID-19 with pulmonary embolism



66M. HTN.
CAPA+



70F. HTN.
CAPA+

如果要做 chest CT ，就直接排 CT angiogram 吧

COVID-19 合併肺麴菌症（CAPA)

- COVID-19 重症病人發生 CAPA 比率 5-28%
- 發生時間比 IAPA 晚一些（ 中位數 6-8 天)
- 風險因子：慢性肝病、血液惡性疾病、COPD 、先前中風、插管、洗腎、 IL-6 阻斷治療、使用類固醇
- 死亡率 ~50%

Feys S. *Lancet Respir Med*. 2024;12(9):728-742.
Bay P. *Ann Intensive Care*. 2024;14(1):65.
Gioia F. *Lancet Respir Med*. 2024;12(3):207-216.

COVID-19 重症病人院內感染機會大
住院過程需小心處理

呼吸器相關肺炎　　血流感染

26 – 50%　15 – 26%

Rouzé A. *Intensive Care Med*. 2021;47(2):188-198.
Ferreira FC. *Ann Intensive Care*. 2021;11(1):92.
Giacobbe DR. *J Clin Med*. 2021;10(4):555.
Ferrando C. *Rev Esp Anestesiol Reanim (Engl Ed)*. 2020;67(8):425-437.
Buetti N. *Intensive Care Med*. 2021;47(2):180-187.
Grasselli G. *Chest*. 2021;160(2):454-465.

VAP after COVID-19 is very common in french ICUs

Number of VAP episodes	All patients (n=259)	Delta (n=111)	Omicron (n=148)
0	42 (33.07%)	16 (26.67%)	26 (38.81%)
1	42 (33.07%)	22 (36.67%)	20 (29.85%)
2	28 (22.05%)	10 (16.67%)	18 (26.8%)
3	15 (11.81%)	11 (10.09%)	3 (4.48%)
CAPA	18 (7.06%)	11 (10.09%)	7 (4.79%)

CAPA: COVID-19 associated pulmonary aspergillosis

de Prost N. *Nat Commun*. 2022;13(1):6025.

本院加護病房資料 2022.04-2023.04

- 合併其他肺部感染病原 26.4%
- 肺栓塞 2.5%
- CAPA 5.5%
- 後續肺炎 (VAP/HAP) 25.4%

CT Cia. Unplished data.

其他呼吸道病毒重症

其他呼吸道病毒

- Respiratory syncitial virus (RSV)
  - A & B
- Human metapneumovirus
  - A & B
- Enterovirus
- Rhinovirus
- Adenovirus
- Parainfluenza virus
  - 1-4
- Coronavirus
  - SARS, MERS
  - NL63, OC43, HKU1, 229E
- Bocavirus

在國外的 ICU 比 influenza 多

Clin Infect Dis. 2014;59:62-70.

rhinovirus

adenovirus

coronavirus

Critical Care. 2016;20:375

influenza virus

rhinovirus

coronavirus

Chest. 2018;154:84-90.

rhinovirus

influenza A

RSV

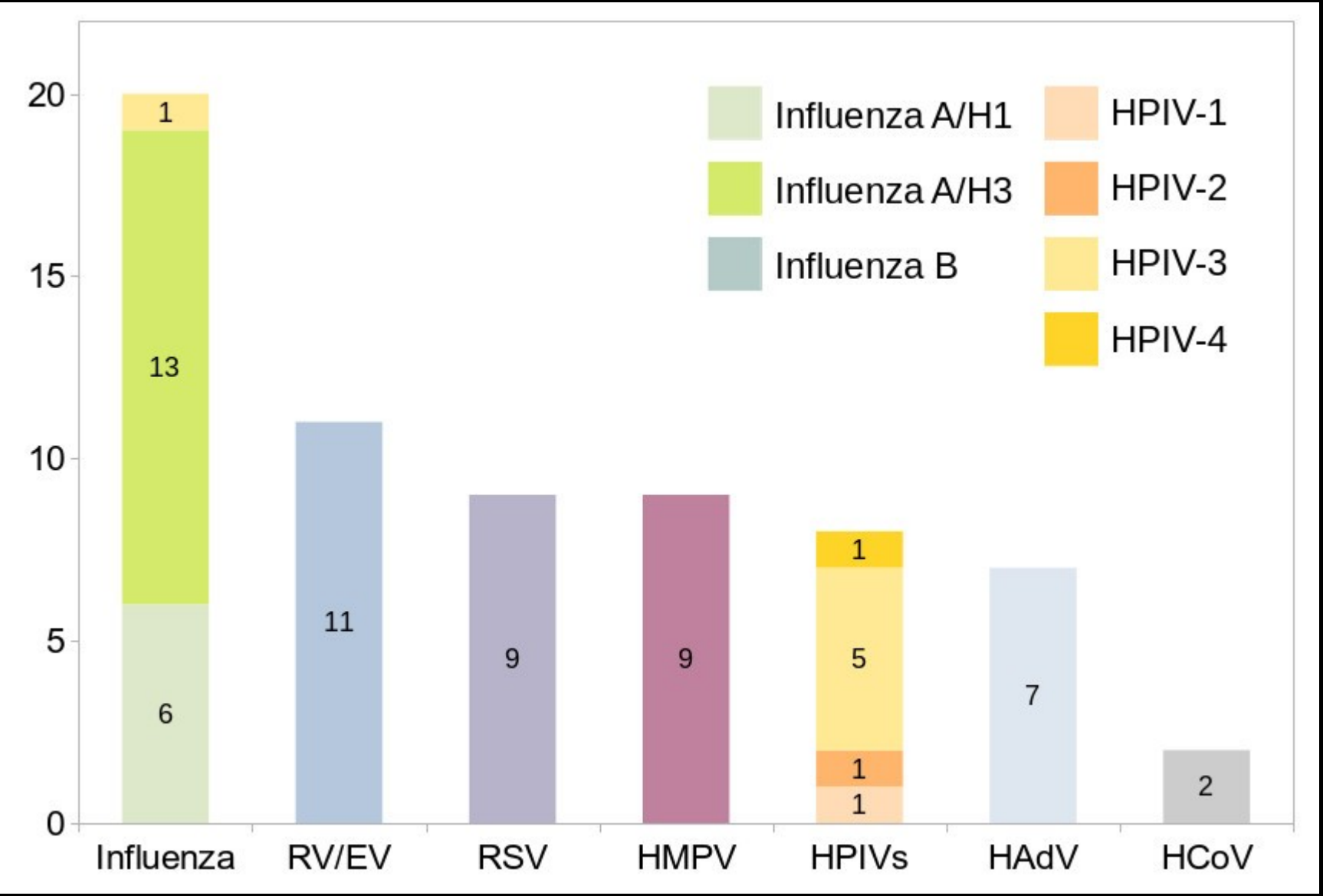
Crit Care Med 2018;46:29–36

parainfluenza virus 3

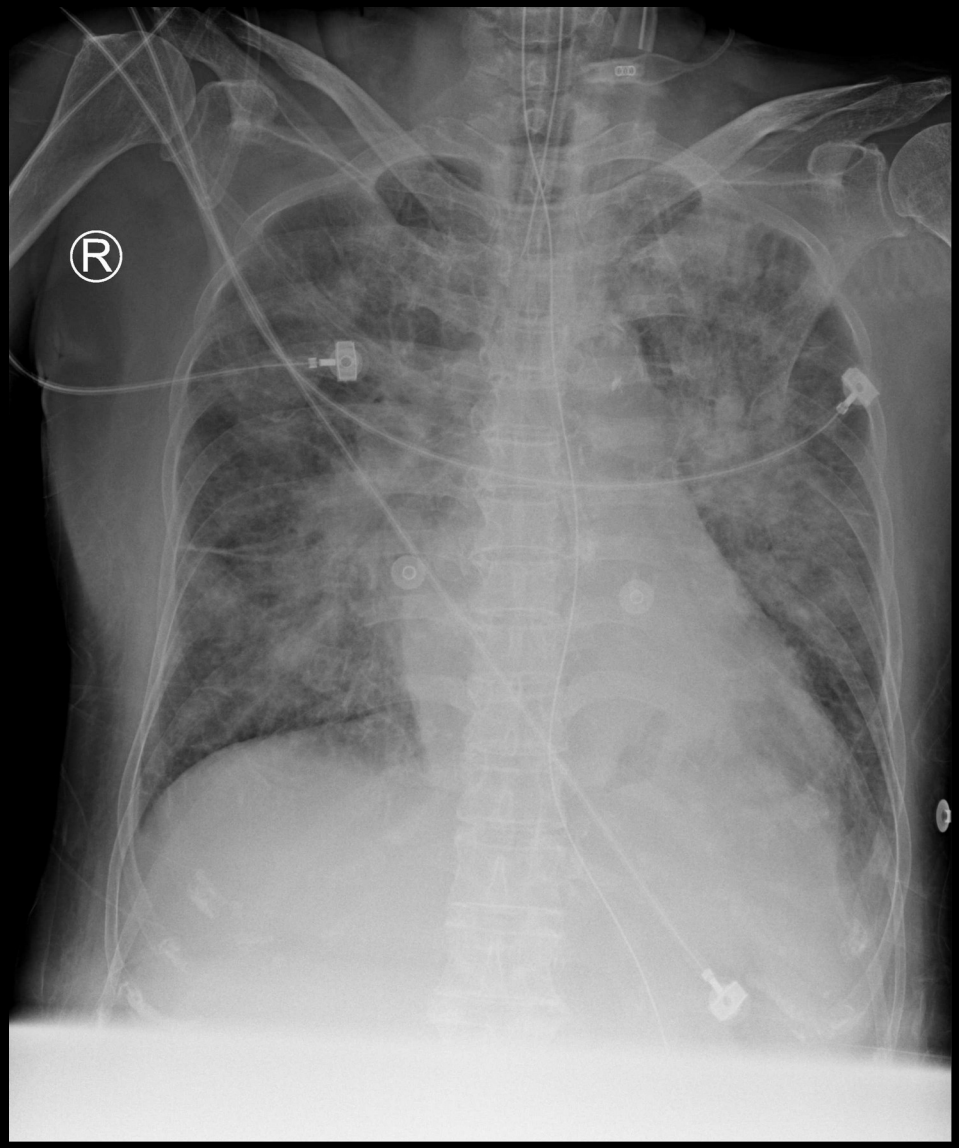
rhinovirus

coronavirus

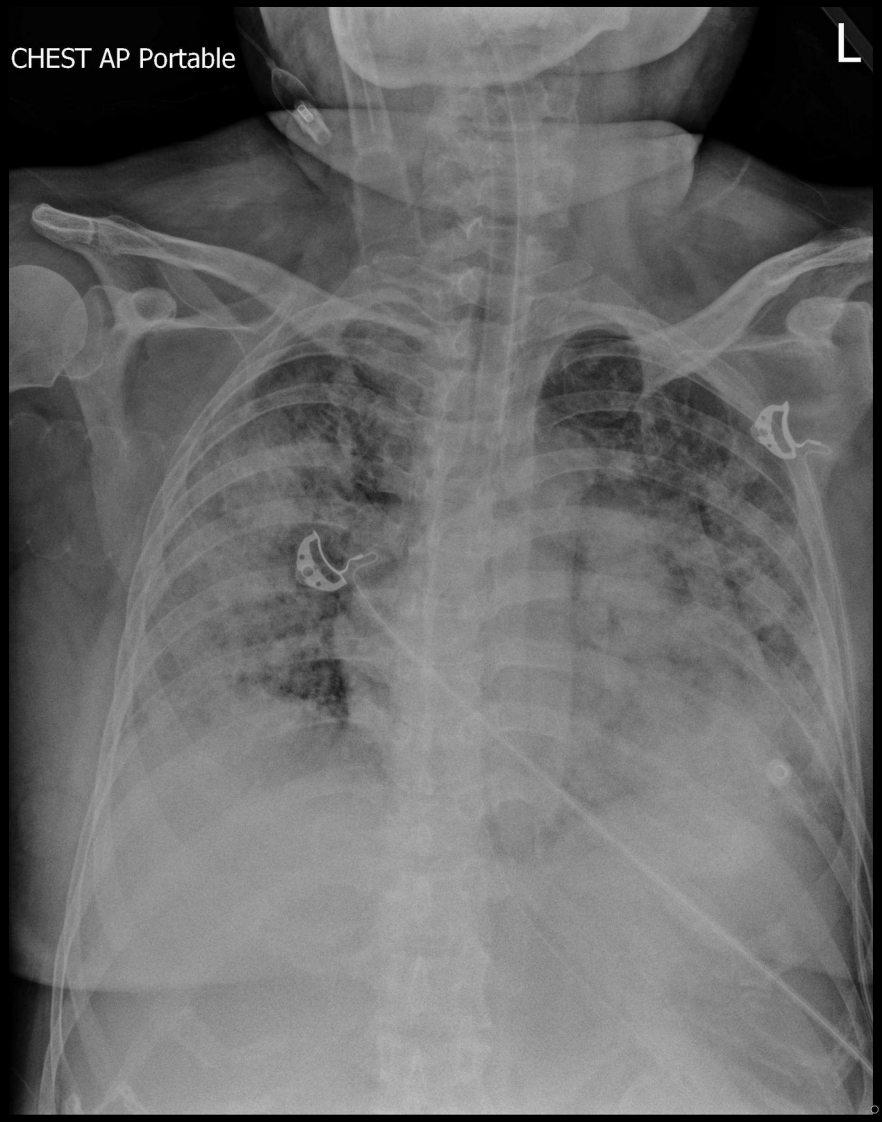
在台灣 ICU 也不少見



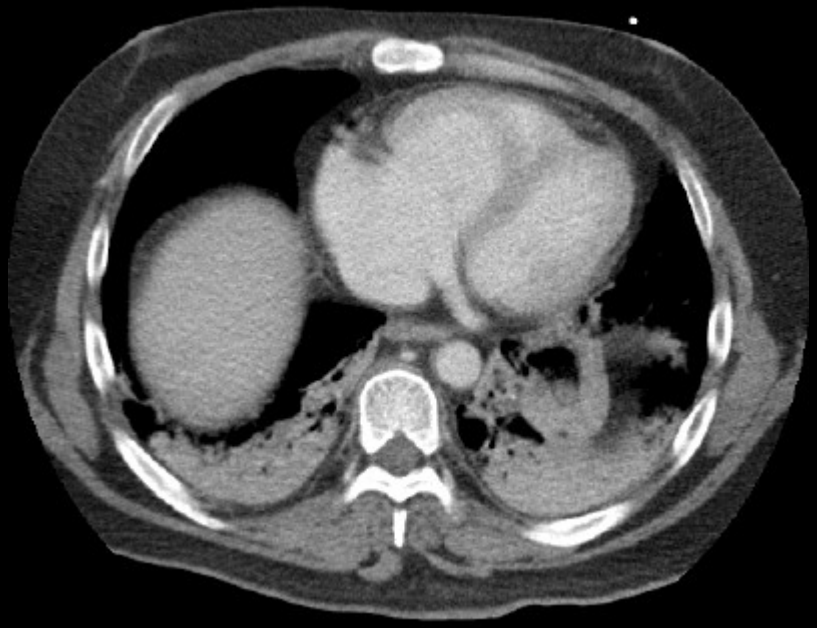
Cia CT. *Sci Rep*. 2021;11(1):20058.



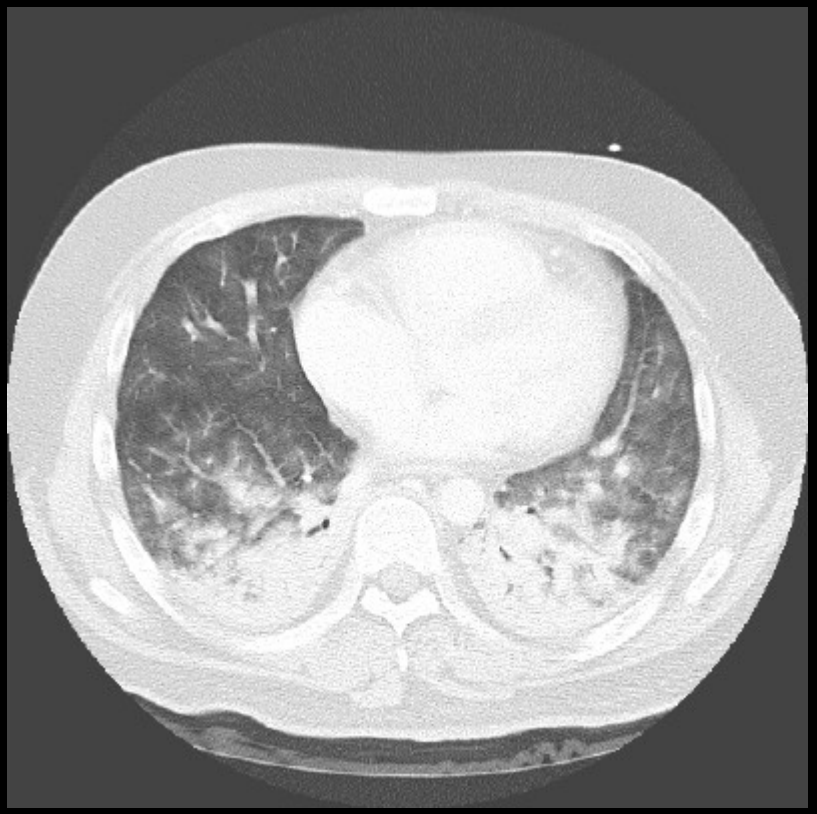
63 F. HTN. HFpEF. Dyslipidemia
Upper airway symptom for 3 days. Dyspnea.
Parainfluenza virus 3 pneumonia



55 F. DM. IDA. Dyslipidemia.
Fever and URI symptom for 5 days. Dyspnea.
Human metapneumovirus pneumonia



Dilated RA, RV



Bilateral GGOs
BLL consolidatoin

30 M. No chronic disease.
URI symptom for 4 days. Dyspnea.
IHCA at ED. Withdrawal of ECMO on D9.
RSV pneumonia

其他呼吸道病毒感染也可以很嚴重
Human metapneumovirus

- Shock 60.7%, IMV 50% MV, ICU mortality 14.3%

Vidaur L. *Ann Intensive Care*. 2019;9(1):86.

- Pressor use 23%, IMV 55%, mortaility 18%

Hasvold J. *J Crit Care*. 2016;31(1):233-7.

- 402 patients, 26 admitted to ICU
  in-hospital mortality 30.8%

Kapandji N. *Ann Intensive Care*. 2023;13(1):21.

其他呼吸道病毒感染也可以很嚴重
RSV

- IMV 36.6%, In-hospital mortality 23.9%
- No difference from severe influenza in ICUs

Coussement J. *Chest*. 2022;161(6):1475-1484.

- Septic shock 51%, IMV 89%, bacterial co-infeciton 28.3%, in-hospital mortality 45.5%
- 30d mortality 26.1%, in-hospital mortality 43.5%
- comparable to influenza-associated pneumonia.

Kim T. *Open Forum Infect Dis*. 2023;10(4):ofad131.

- IMV / death > vaccinated COVID-19 / influenza

Surie D. *JAMA Netw Open*. 2024;7(4):e244954.

其他呼吸道病毒感染
抗病毒藥物有限，資料也少

RSV

ribavirin

adenovirus

cidofovir

RNA viruses

favipiravir

Arabi YM. *Intensive Care Med*. 2020;46(2):315-328.

呼吸道病毒感染重症病人
呼吸通氣處置

HFNC 及 NIV

- 一般氧氣設備使用效果不佳，可使用 HFNC oxygen 。如果反應不好，改用 NIV 或插管使用侵襲性機械通氣。 (BIIa).
- 如果呼吸衰竭病人還沒到要插管，又沒有 HFNC 可用，可使用 NIV 並密切監測 (BIIa).

NIH. COVID-19 Treatment Guidelines. https://www.covid19treatmentguidelines.nih.gov/

COVID-19 出現前的研究

- HFNC 可減少插管
  - OR 0.62 (compared to conventional O2 therapy)
  - OR 0.48 (compared to NIV)
- HFNC 可減少加護病房死亡率
  - OR 0.47 (compared to conventional O2 therapy)
  - OR 0.36 (compared to NIV)
- HFNC 不影響加護病房住院天數

Ni YN. *Am J Emerg Med*. 2018;36(2):226-233.

HFNC & NIV (COVID-19)

- 氧氣較差的病人 (P/F < 200) ，使用 HFNC 比一般氧氣設備，插管率較低，恢復較快。

  Ospina-Tascón GA. *JAMA*. 2021;326(21):2161-2171.

- 看到 SpO2 ≤ 92% 就用上 HFNC ，沒有比一般氧氣設備好

  Crimi C. *Thorax*. 2023;78(4):354-361.

- 在氧氣不好的病人 (FiO2 0.4, SpO2 < 94%) 的病人， NIV 和 HFNC 都比一般氧氣設備好。

  Perkins GD. JAMA. 2022;327(6):546-558.

清醒俯臥 (awake self proning)

2020 年起 COVID-19 疫情時開始流行

血氧會上升

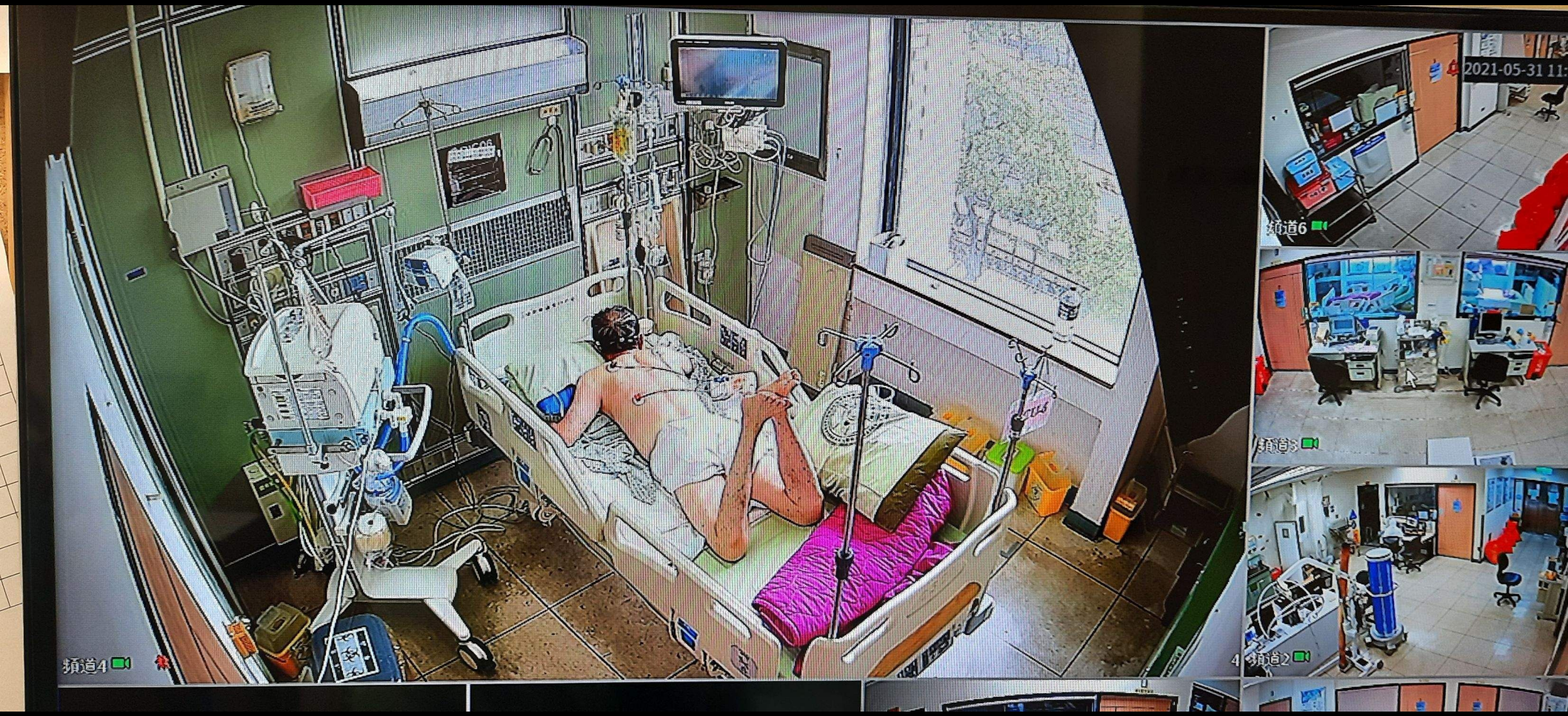
可以減少一點插管（↓6%)

死亡率沒差

NIH 建議：還沒面臨插管的病人可嘗試

Ehrmann S. *Lancet Respir Med*. 2021;9(12):1387-1395.
Alhazzani W. *JAMA*. 2022;327(21):2104-2113.
NIH. COVID-19 Treatment Guidelines. https://www.covid19treatmentguidelines.nih.gov/

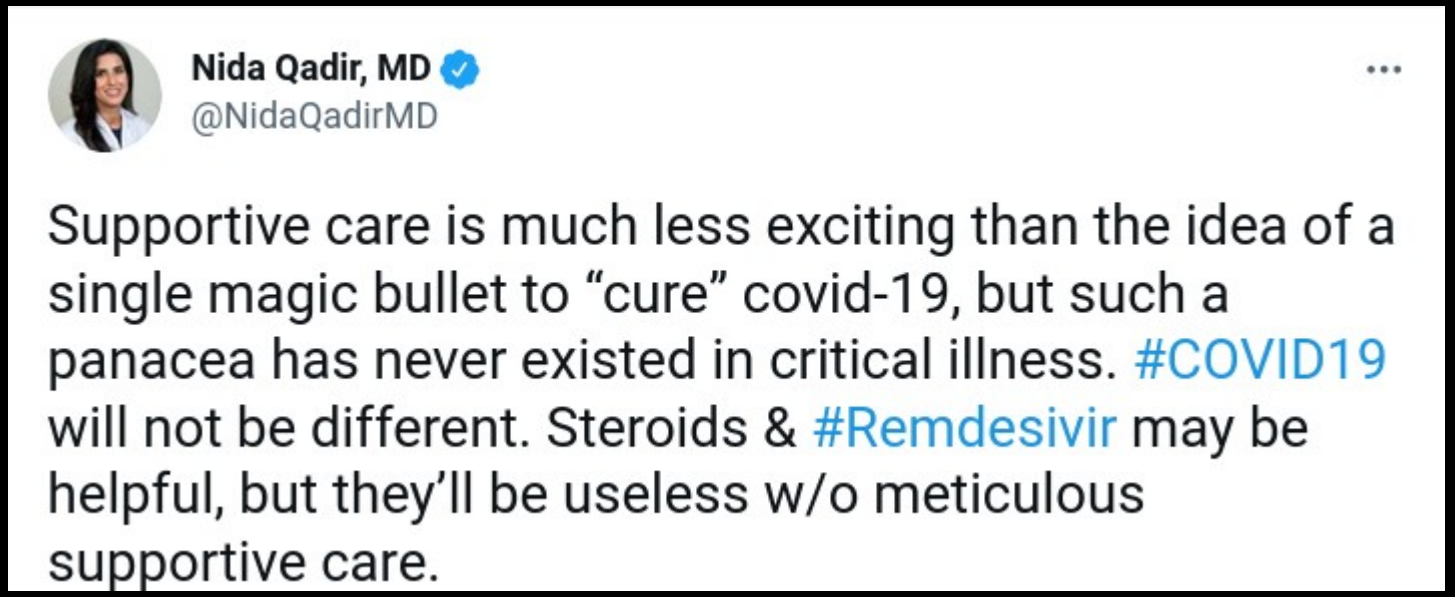
A patient on HFNC, awake prone positioning, up to 13.5 hr/d



呼吸道病毒病人通氣策略和一般重症病人相同

- 使用較低的潮氣量 (4–8 ml / kg PBW) 和較低的吸氣高原壓力 (plateau pressure < 30 cmH2O)
- 對於重度 ARDS 的成人患者，建議每天應進行至少 12-16 小時俯臥式通氣 (prone ventilation)
- 對沒有組織灌注不足的 ARDS 患者使用保守性的液體管理策略。
- 中度或重度 ARDS 患者，建議使用較高的 PEEP ，不建議常規使用 NMBA 持續輸注。
- 肺部保護性通氣後仍有低血氧症的患者，是否需使用 ECMO ，應由具有相關醫療專業的團隊評估。

重症照護 = 嚴謹的支持性治療



https://twitter.com/NidaQadirMD/status/1287443875167051776

- 密切監測
  - 心律 / 血壓 / 血氧
  - 動脈導管 / 心輸出
  - 隨時有人看
- 器官支持
  - 氧氣 / 呼吸器 / 俯臥
  - 升壓劑 / 強心劑
  - IABP / ECMO
  - 腎臟替代療法

Take Home Messages

- 呼吸道病毒感染的重症照護，最重要的是嚴謹的支持性療法
- 流行季、接觸史、上呼吸道症狀是重要線索，查不到原因的呼吸道重症也該檢驗呼吸道病毒
- 流感重症肺炎建議使用抗病毒藥物，目前不建議常規使用類固醇
- 典型 COVID-19 肺炎是在發病後第二週出現，發炎成份明顯，除了抗病毒藥之外也需使用類固醇/tocilizumab / bacricinitib 等免疫抑制劑
- 要小心 co-infection ，也不要因此濫用抗生素