

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

Aug 20, 2022

I have no conflict of interest.

重症照護 = 嚴謹的支持性治療



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Supportive care is much less exciting than the idea of a single magic bullet to “cure” covid-19, but such a panacea has never existed in critical illness. #COVID19 will not be different. Steroids & #Remdesivir may be helpful, but they’ll be useless w/o meticulous supportive care.

<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
- Systemic symptoms
 - Fever / chills
 - Headache
 - Myalgia
 - Malaise / anorexia
 - Dyspnea
 - Altered mental status
- Other symptoms
 - Photophobia
 - Conjunctivitis
 - Anosmia (COVID-19)

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 . 第十九版 . 2022-05-26.

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

只採檢鼻咽或下呼吸道 會漏掉 20-30% 的呼吸道病毒感染

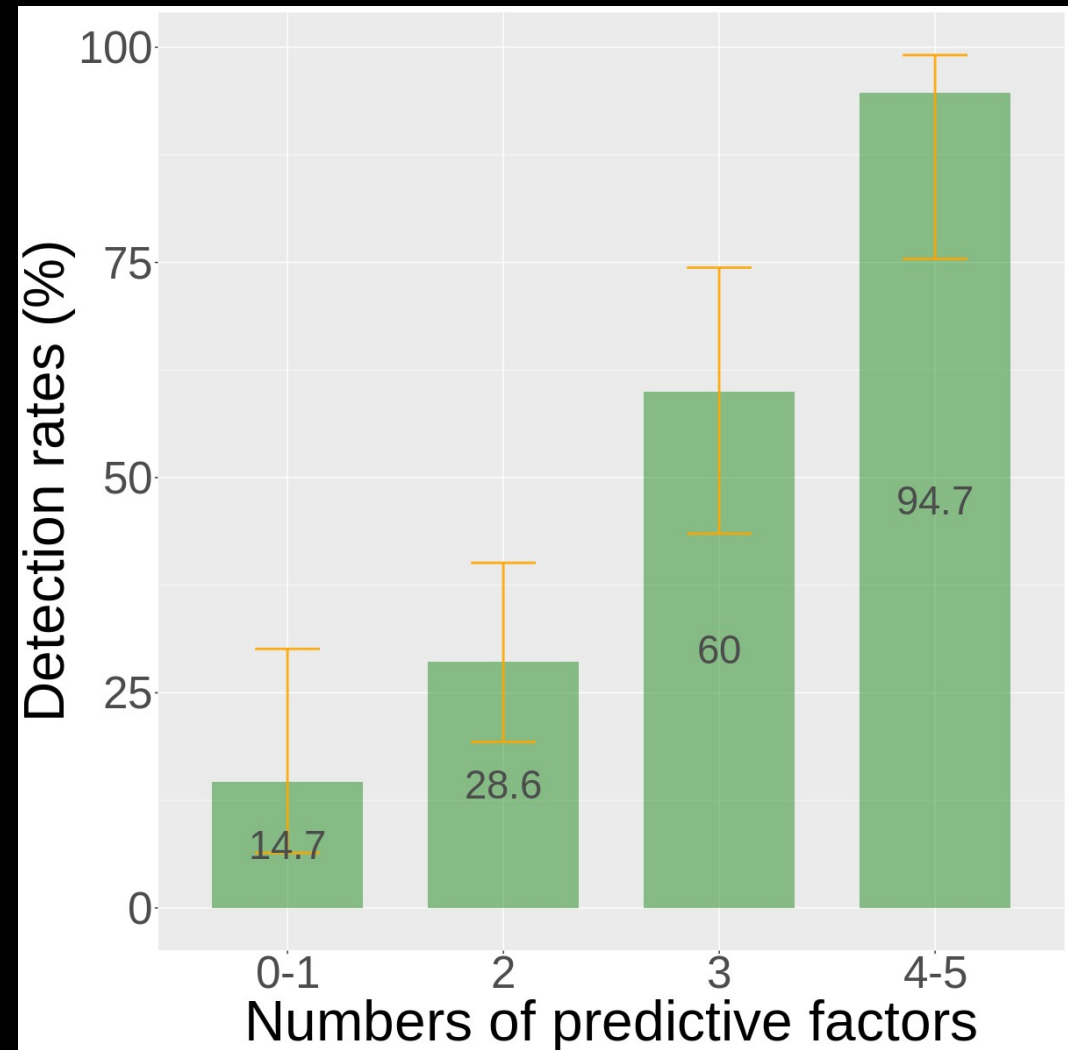
TABLE 2. Site of Virus Detection

Site of Virus Detection	SARI, <i>n</i> = 45 (%)	Non-SARI, <i>n</i> = 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.

哪些重症病人比較驗得到呼吸道病毒？

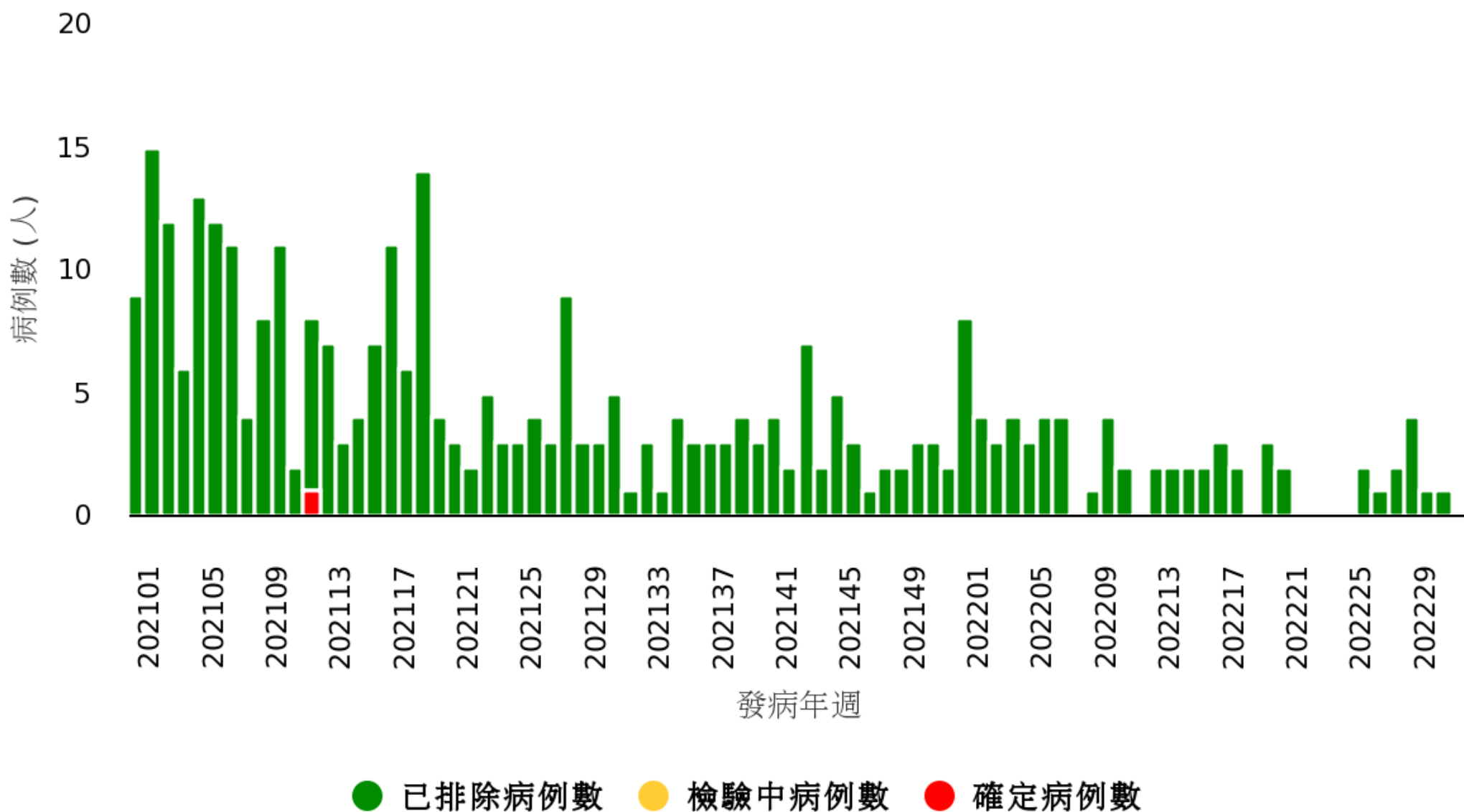
Predictive factor	Odds Ratio
Age < 65 years	3.98
Clustered URI	3.93
Fever	2.89
Cough and sputum production	3.24
Sore throat	3.70



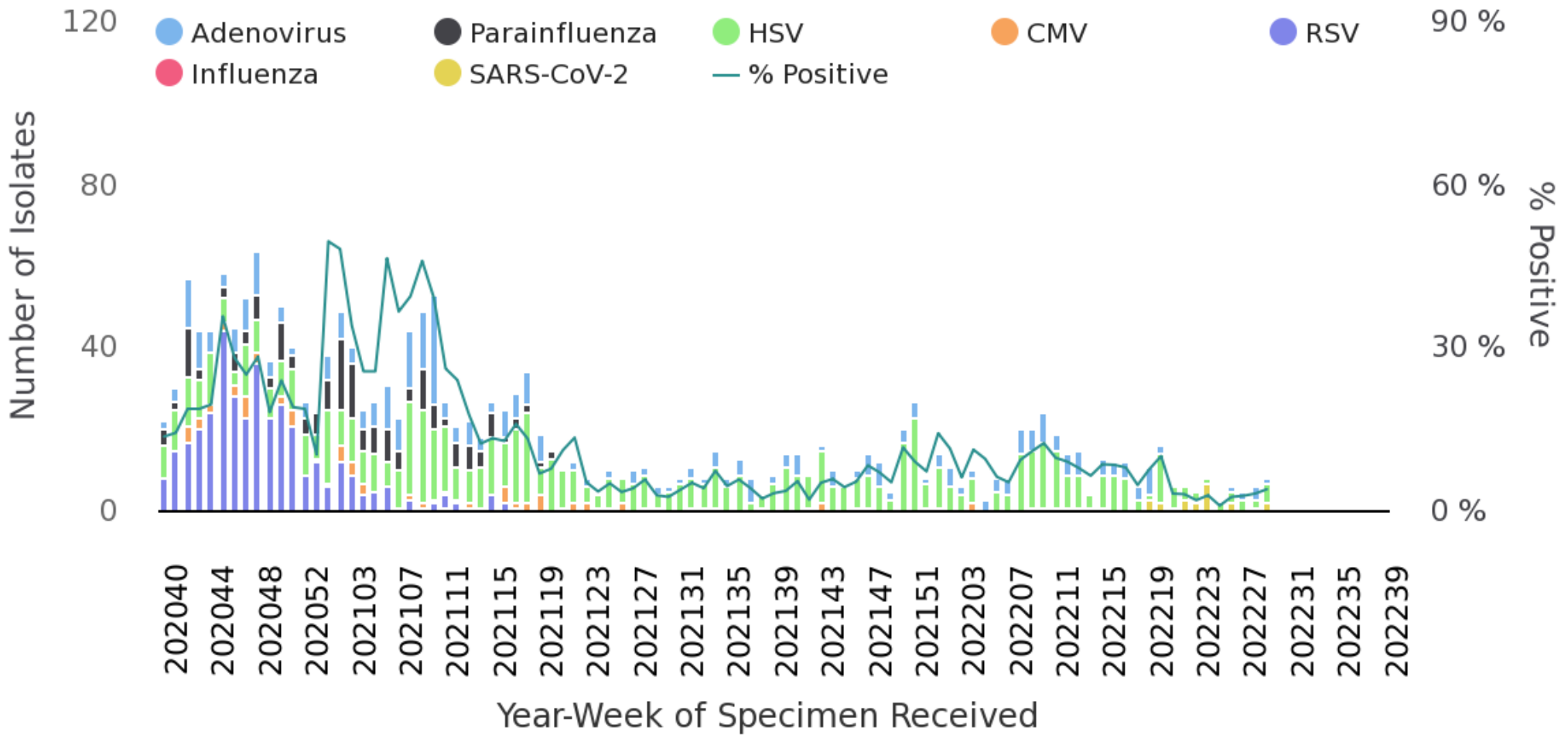
感染症：流行什麼很重要

全國 流感併發重症 本土病例及境外移入病例 趨勢圖 (2021年1週-2022年32週)

[發病日 2021/01/03-2022/08/13]



Taiwan CDC 2022

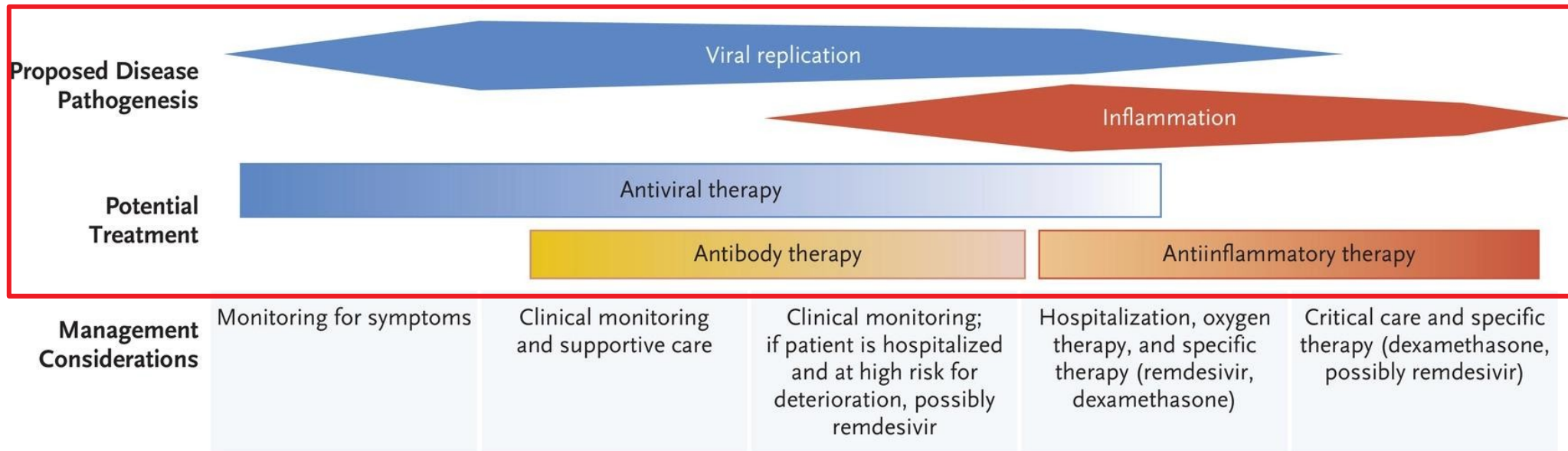


Taiwan CDC 2022/08/05

COVID-19 重症和 其他呼吸道病毒重症 不同的地方

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 $\geq 94\%$	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



Critical COVID-19 (before omicron)

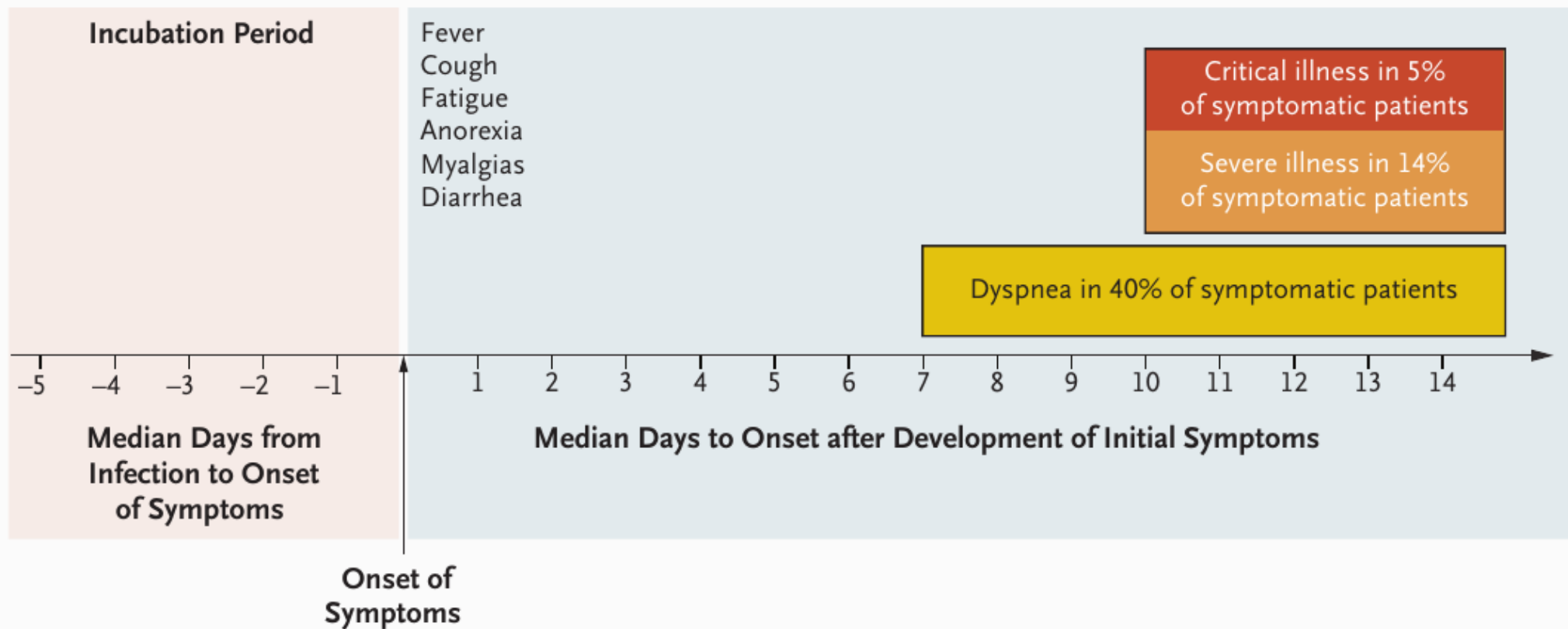


Figure 1. Timeline of Symptoms of Severe Coronavirus Disease 2019 (Covid-19).

~10 days after symptom onset
Inflammation >> viral replication



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)

COVID-19 病人死亡率

2020 國外
住院病人死亡率

15 – 20%

2020-2021 台灣
通報個案死亡率

4.99%

英國 omicron 感染的
死亡風險為 delta 的

0.31 倍

2022 台灣
通報個案死亡率

0.17%

Wiersinga WJ. *JAMA*. 2020. 2020;324(8):782-793.

中央流行疫情指揮中心 . [2022/01/01新聞稿](#).

Nyberg T. *Lancet*. 2022;399(10332):1303-1312.

中央社 . 台灣 COVID-19 疫情總覽 <https://www.cna.com.tw/topic/newstopic/3829.aspx>

2020 COVID-19 重症病人樣態

- 平均年齡 62.6 歲
- 男性佔 65.6%
- HTN 49.5%
- DM 26.6%
- 使用升壓劑 65.9%
- 腎臟替代療法 16.9%
- ARDS 比率 76.1%
- 侵入式呼吸器 67.6%
- EMCO 6.4%
- ICU 停留 10.8 天
- 住院天數 19.1 天
- 院內死亡率 28.1%

2021 年台灣北部某醫學中心 COVID-19 重症病人樣態

- 年齡中位數 66 歲
- 男性佔 65%
- DM 35%
- 侵入式呼吸器 67%
- Prone positioning 24%
- ECMO 6%
- 腎臟透析治療 8%
- ICU 停留 17 天
- 住院天數 31 天
- 院內死亡率 19%

COVID-19 Grand Rounds

新冠病毒重症個案臨床處置線上教學病例研討會

In-hospital mortality in IMV: **37.6%**

- 2021/5/11-7/26; 46 Hospitals in Taiwan, **IMV** patients
- **N=744** (Age **66.6 y/o**); **64.9%** in male
 - With comorbidity: **73.7%** (HTN > DM > CVD > CKD...)
- Outcomes:
 - **In-hospital mortality: 37.6%** (n=280)
 - Age: 70.2 y/o; 67.9% in male
 - Discharge: 45.3% (n=337)
 - Age: 63 y/o; 60.5% in male
 - **Remained In hospital: 17.1%** (n=127)
 - Age: 67.8 y/o; 69.6% in male



Unpublished data



中央流行疫情指揮中心
Central Epidemic Command Center



林口長庚紀念醫院內科部

高國晉 副部長

▶ ◀ ⌂ 33:52 / 41:23

OVID-19 omicron variant 重症病人死亡率

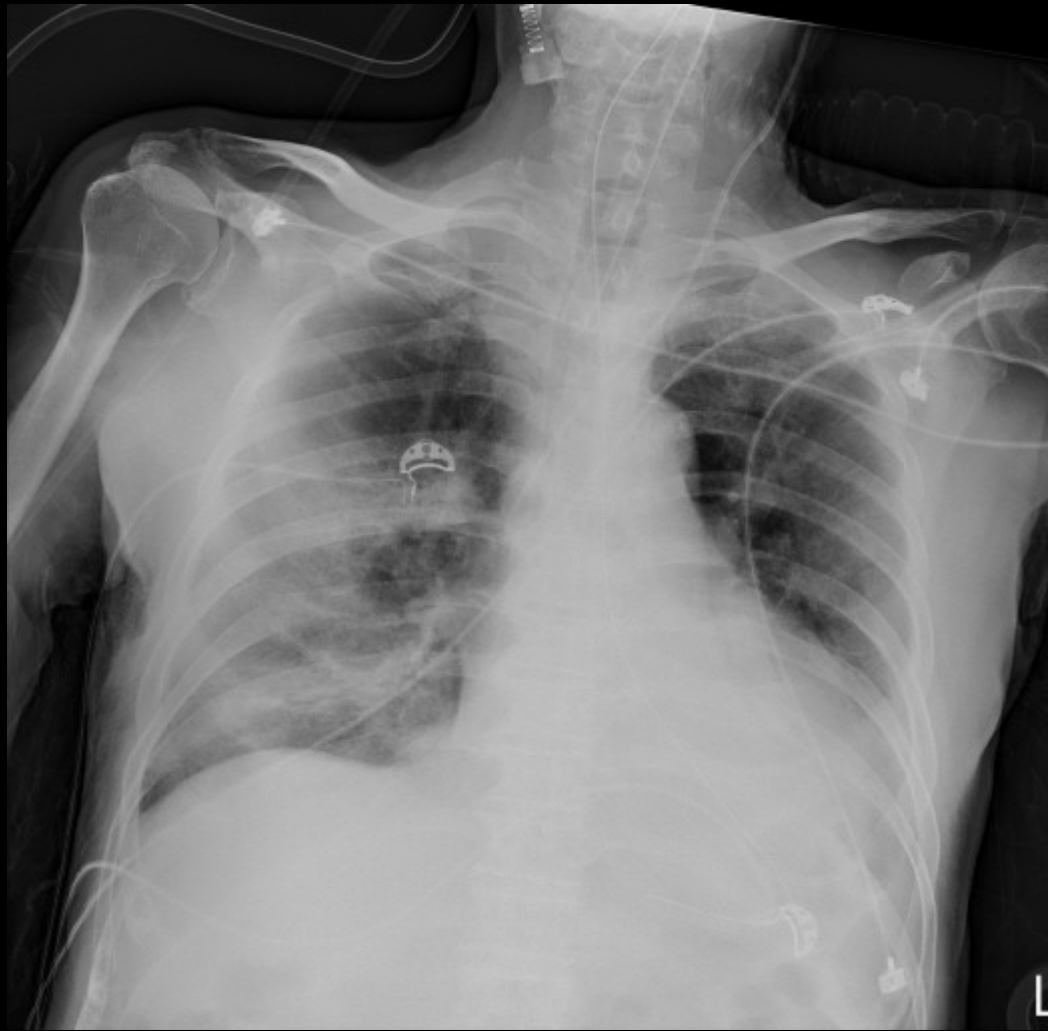
本院確診重症病人
使用呼吸器 56.7%

法國 AP-HP 體系 ICU
使用呼吸器 41%

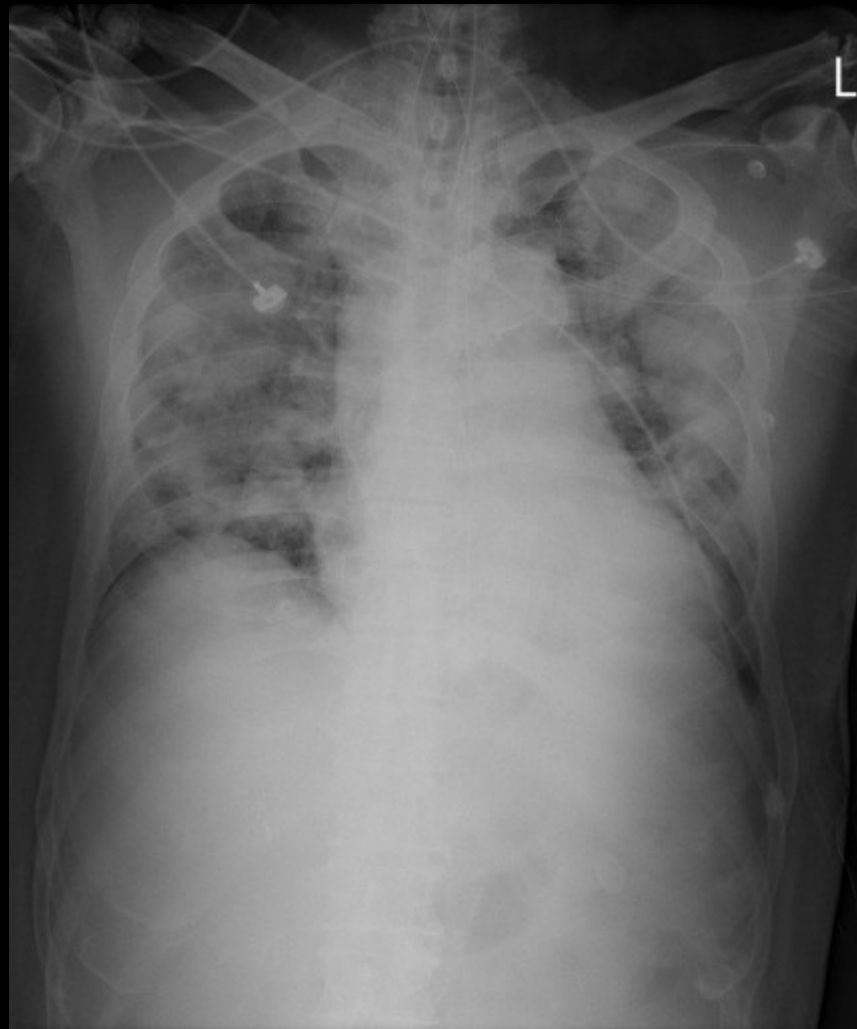
ICU 死亡率
17.7%

ICU 死亡率
20.0%

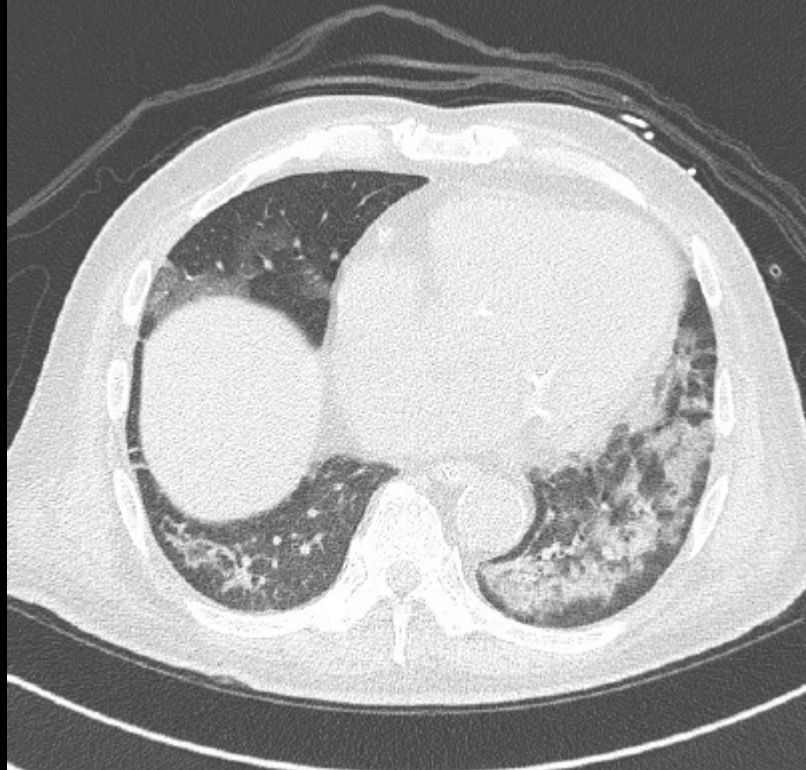
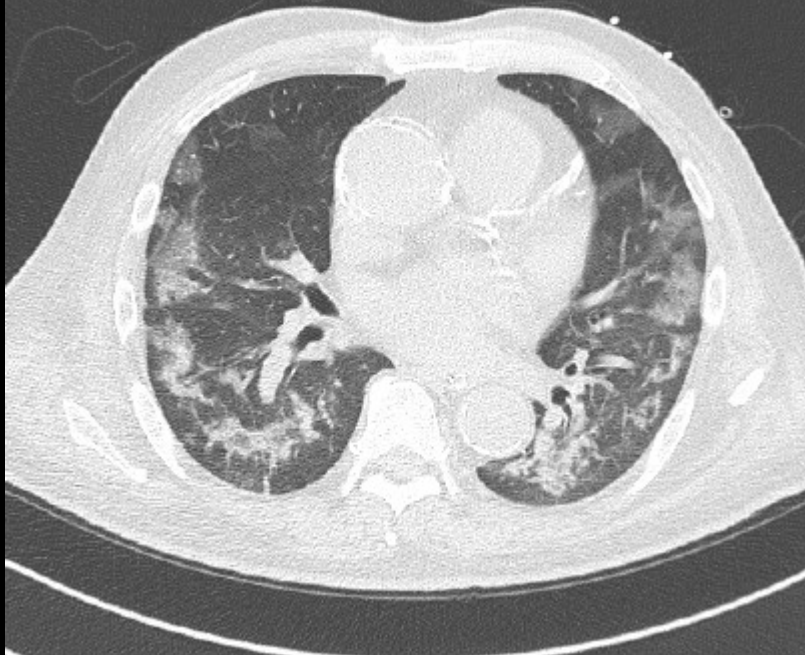
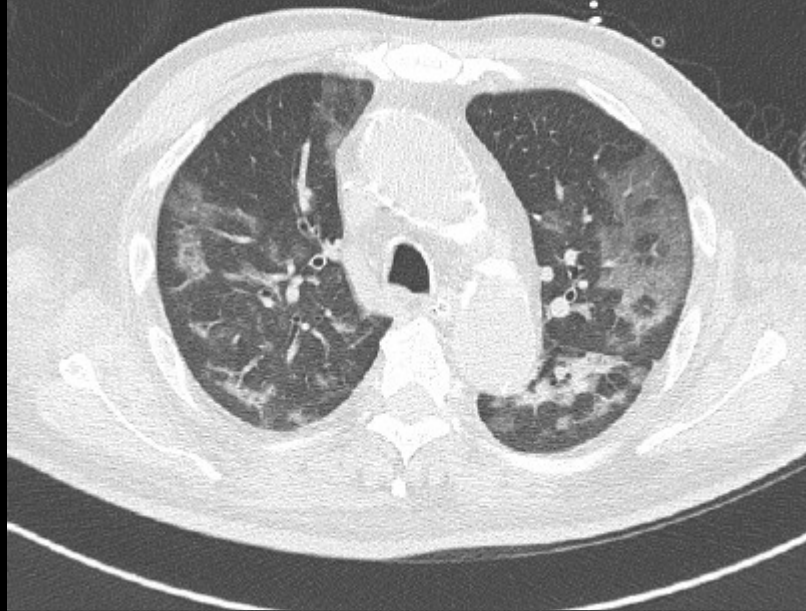
典型的武漢肺炎



78M. HTN. Dyslipidemia. CKD. Old SAH.
COVID-19 pneumonia
SARS-CoV-2 Ag+ on 5/21. Dyspnea on 5/29.



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



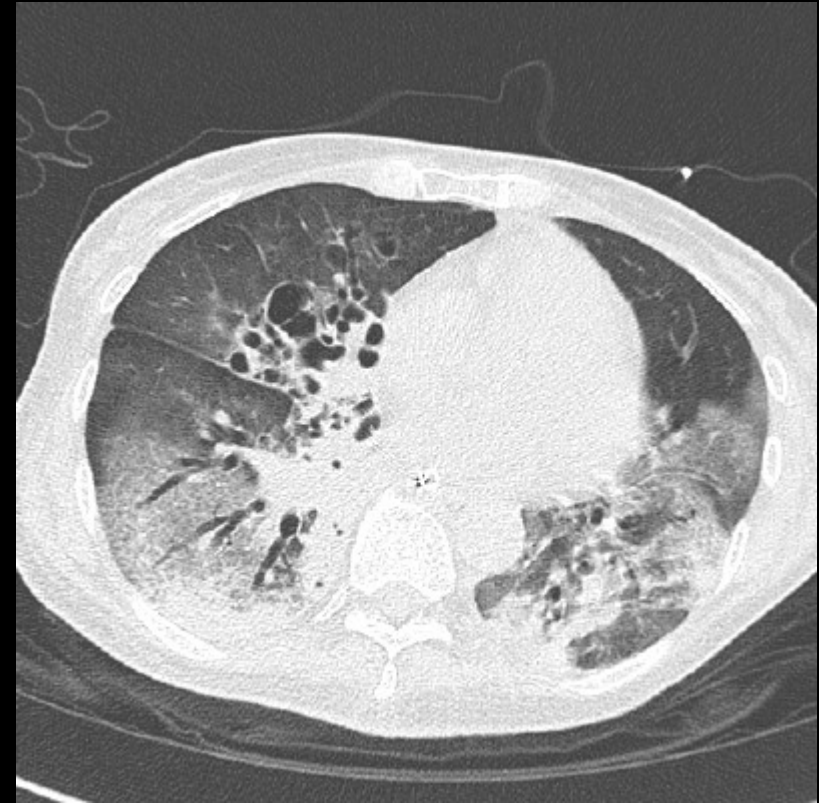


68M. DM. HTN. CAD.
Dyspnea for one day.
COVID-19 pneumonia.

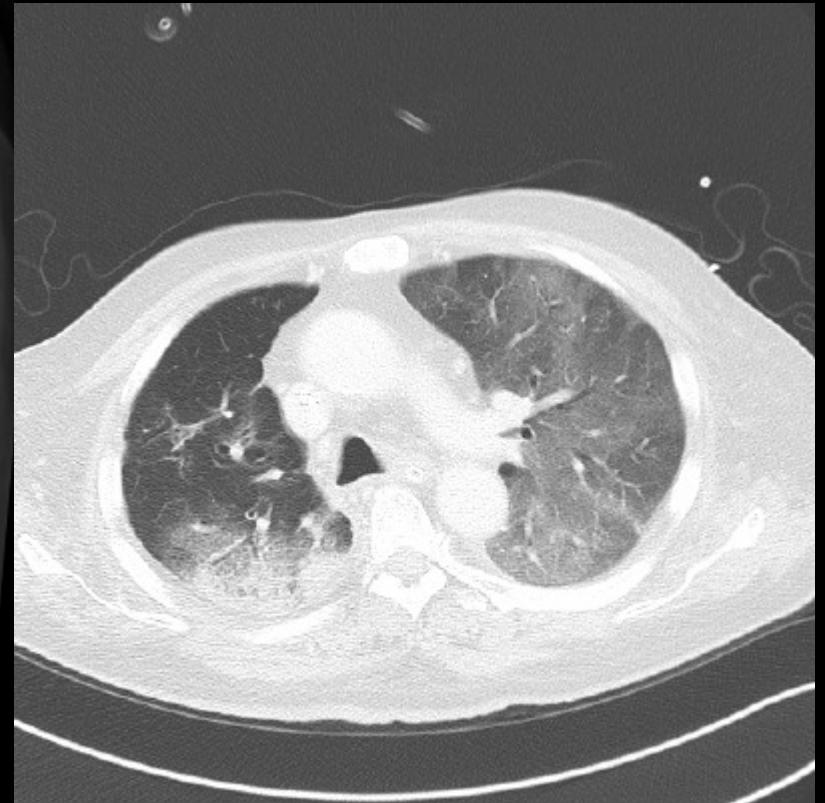
Typical presentation of COVID-19 pneumonia on CXR

- 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%).

COVID-19 合并其他肺部感染



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, Staphylococcus aureus, and
Pneumocystis jiroveci pneumonia*

COVID-19 引起慢性疾病惡化



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



68 M. COPD. ESRD on HD. Alcoholism.
Admission due to OHCA related to AECOPD.
Got COVID-19 during the ICU stay.
AECOPD, worse respiration requiring all-day NIV

所有呼吸道病毒都會引起 慢性疾病惡化導致重症

Chronic disease with acute exacerbation	Proportion of respiratory virus detection
Heart failure	46.8% (22/47)
COPD	29.2% (7/24)
Asthma	50% (2/4)

此研究納入無明顯細菌感染的重症病人

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
 - 腎臟不好不可用，不可管灌，藥物交互作用多
- Molnupiravir (Lagevrio®)
 - 口服 5 天
 - 腎臟不好可用，可管灌
- Remdesivir (Veklury®)
 - 靜脈注射 x3 天
- 單株抗體：常常新變種出來就沒效了

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
+/- tocilizumab OR baricitinib

使用 HFNC
或是 NIV Dexamethasone + remdesivir
+ baricitinib OR tocilizumab

插管 IMV Dexamethasone + tocilizumab

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.
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

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

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 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 Anesthesiol 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.

COVID-19 病人使用 HFNC 及 NIV

- For adults with COVID-19 and acute hypoxemic respiratory **failure despite conventional oxygen therapy, the Panel recommends starting therapy with HFNC oxygen**; if patients fail to respond, NIV or intubation and mechanical ventilation should be initiated (BIIa).
- For adults with COVID-19 and acute hypoxemic respiratory failure who **do not have an indication for endotracheal intubation and for whom HFNC oxygen is not available**, the Panel recommends performing a **closely monitored trial of NIV** (BIIa).

A systematic review & meta-analysis before the COVID-19 era

- HFNC decreased tracheal intubation
 - OR 0.62 (compared to conventional O2 therapy)
 - OR 0.48 (compared to NIV)
- HFNC decreased ICU mortality
 - OR 0.47 (compared to conventional O2 therapy)
 - OR 0.36 (compared to NIV)
- No effect on ICU length of stay (LOS)

全罩式 NIV v.s. HFNC (COVID-19)



QUESTION Among patients in the intensive care unit with COVID-19-induced moderate to severe hypoxemia, does early continuous treatment with helmet noninvasive ventilation increase the number of days free of respiratory support at 28 days vs high-flow nasal oxygen?

CONCLUSION This randomized trial found that in patients with COVID-19-induced moderate to severe hypoxemia, helmet noninvasive ventilation, vs high-flow nasal oxygen, resulted in no significant difference in the number of days free of respiratory support within 28 days.

POPULATION

88 Men
21 Women



Adults in the intensive care unit with COVID-19 and moderate to severe hypoxemic respiratory failure

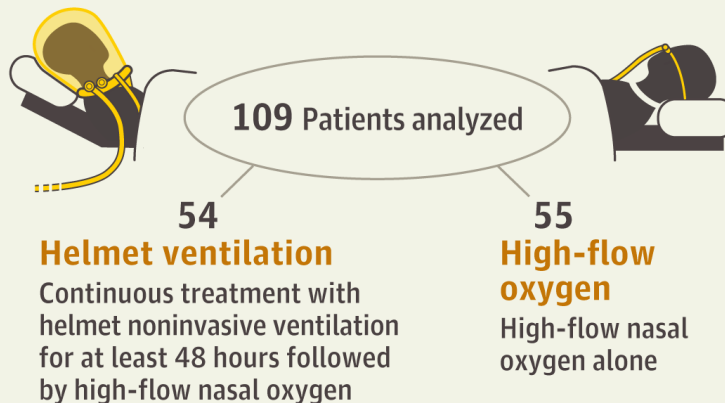
Median age: 65 years

LOCATIONS

4
ICUs in Italy



INTERVENTION

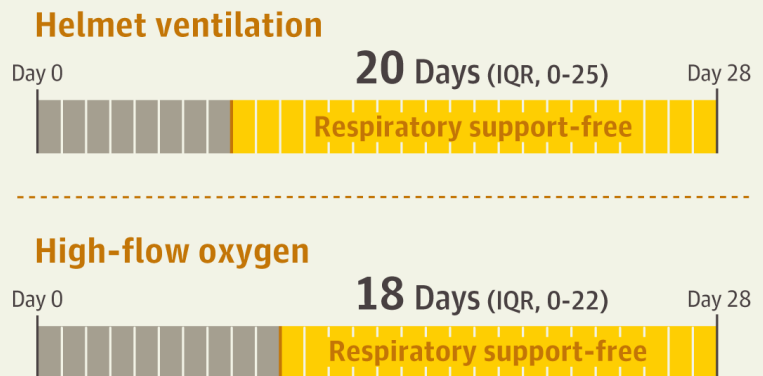


PRIMARY OUTCOME

Median number of days free of respiratory support within 28 days after enrollment

FINDINGS

Median respiratory support-free days



Mean between-group difference was not statistically significant:

2 days (95% CI, -2 to 6)

NIV v.s. HFNC v.s. 一般給氧 (COVID-19)

JAMA[®]

QUESTION What is the effect of continuous positive airway pressure (CPAP) or high-flow nasal oxygen (HFNO) vs conventional oxygen therapy on the risk of tracheal intubation or mortality in patients with acute hypoxemic respiratory failure due to COVID-19?

CONCLUSION Among patients with acute hypoxemic respiratory failure and COVID-19, an initial strategy of CPAP significantly reduced the risk of tracheal intubation or mortality vs conventional oxygen therapy but there was no significant difference with HFNO.

POPULATION

844 Men
429 Women



Adults with
COVID-19-related
acute hypoxemic
respiratory failure

Mean age: 57 years

LOCATIONS

48 Acute care
hospitals in the
UK and Jersey



INTERVENTION



380

CPAP
Administered
per local
protocols

1273 Patients randomized
1260 Patients analyzed

418

HFNO
Administered
per local
protocols



475

**Conventional
oxygen therapy**
Standard of care;
oxygen via
nasal cannula

PRIMARY OUTCOME

A composite of tracheal intubation or mortality within 30 days

FINDINGS

Tracheal intubation or mortality within 30 days

CPAP: 36.3% (137 of 377 patients)

HFNO: 44.3% (184 of 415 patients)

Conventional oxygen therapy
vs **CPAP: 44.4%** (158 of 356 patients)
vs **HFNO: 45.1%** (166 of 368 patients)

CPAP vs conventional therapy was significant.
Absolute difference, **-8%** (95% CI, -15% to -1%)

HFNO vs conventional therapy was not significant.
Absolute difference, **-1%** (95% CI, -8% to 6%)

HFNC v.s. 一般給氧 (COVID-19)

- A RCT including 220 patients with P/F < 200.
 - Lower intubation rate in the HFNC group
34.3% v.s. 51.0%, HR 0.62 (0.39 – 0.96)
 - Shorter median time to recovery
11 days v.s. 14 days, HR 1.39 (1.00 – 1.92)
- A RCT including 364 patients with SpO₂ ≤ 92%
 - No significant difference in escalation of oxygen device, clinical recovery, ICU admission, LOS.

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

Crimi C. *Thorax*. 2022 May. doi: 10.1136/thoraxjnl-2022-218806.

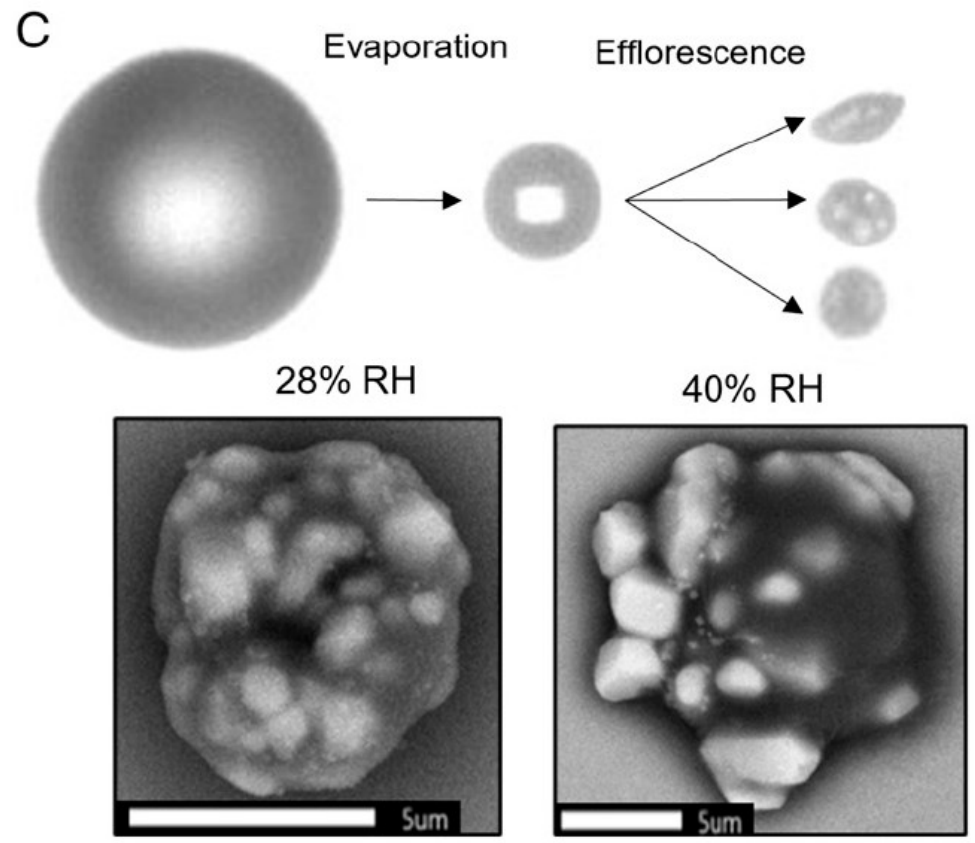
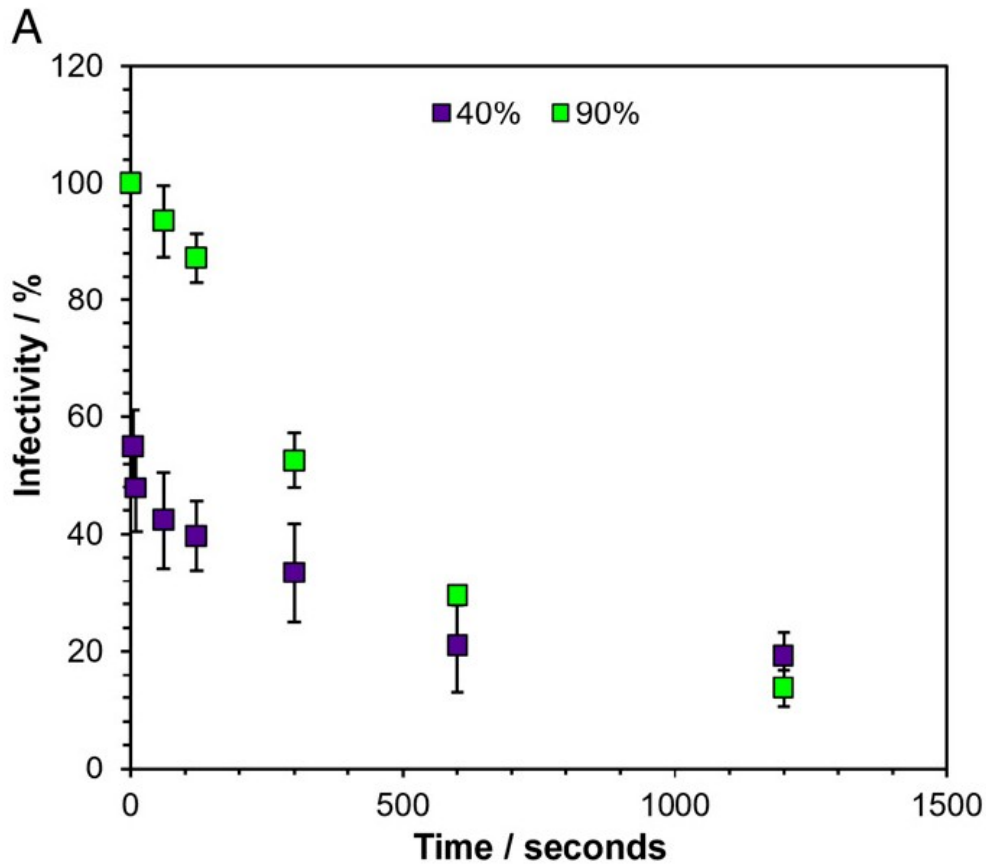
用這些高流量設備 會產生可能具感染性的氣溶膠嗎？

- 觀察性研究：在病人口腔前後 50 公分處採空氣進行核酸檢測。
- 75 位病人，8 人附近空氣陽性，67 人陰性。
- 病人 PCR 的 Ct 值 22 v.s. 26, $p = 0.02$
- 使用 nasal cannula 比較容易偵測到病毒，HFNC 風險不特別高。

Table III
Air sample positivity risk: comparison between oxygen-delivery systems

	Odds ratio [†]	95% CI	<i>P</i> [*]
HFNC (N=39) vs. non-HFNC (N=36)	0.52	0.11–2.34	0.39
HFNC (N=39) vs. nasal cannula (N=20)	0.25	0.05–1.18	0.11
HFNC (N=39) vs. air-entrainment/NRM (N=13)	–	–	0.55
Nasal cannula (N=20) vs. non-nasal cannula (N=55)	5.78	1.24–27.01	0.03
Nasal cannula (N=20) vs. air-entrainment/NRM (N=13)	–	–	0.05
Air-entrainment/NRM (N=13) vs. non-air-entrainment/NRM (N=62)	–	–	0.19
ICU (N=23) vs. non-ICU environment (N=52)	0.73	0.14–3.92	0.14
HFNC: ICU (N=21) vs. non-ICU (N=18)	1.79	0.15–21.54	0.64

PCR 陽性 \neq 具傳染力 氣溶膠傳染的環境條件



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

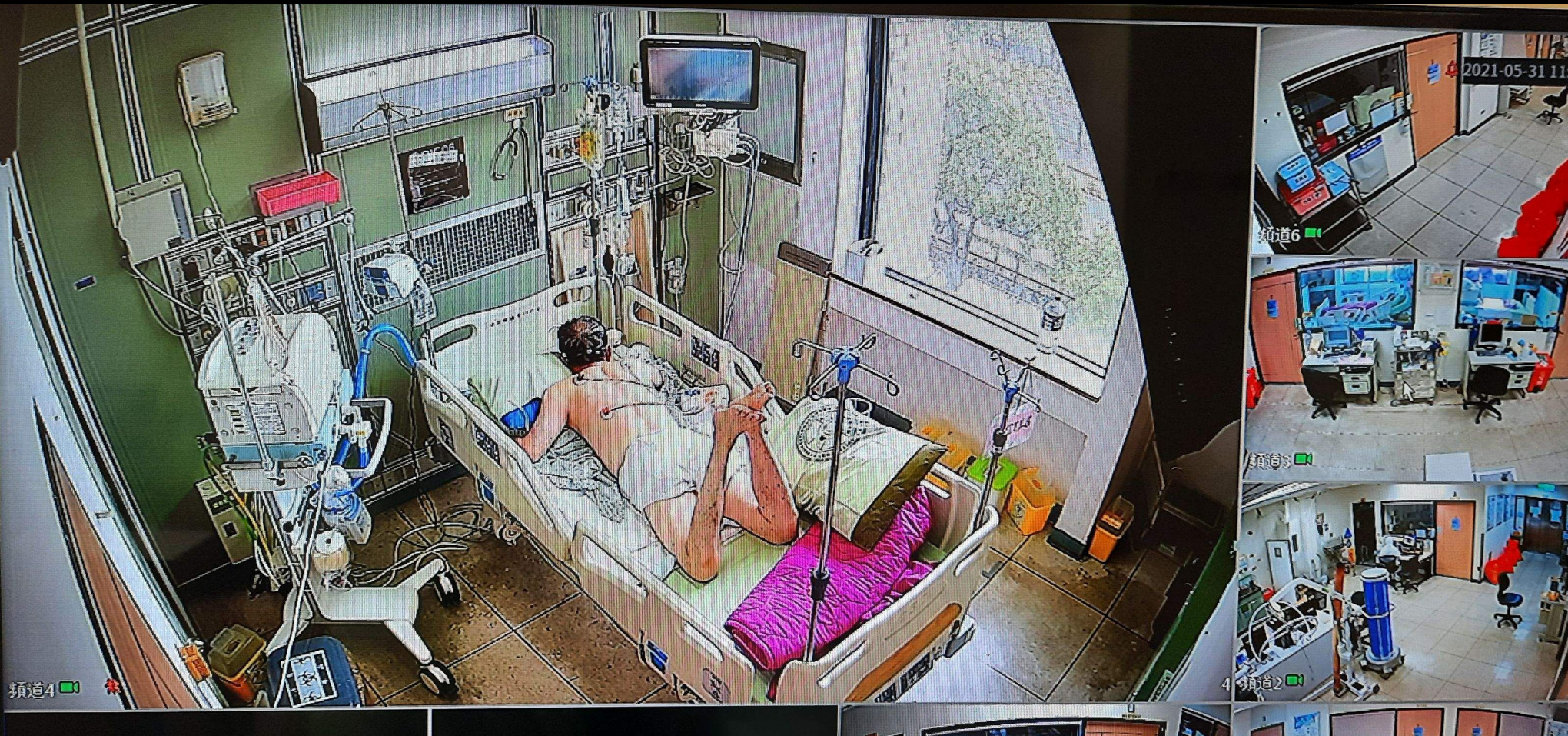
NIH 建議：還沒面臨插管的病人可嘗試

Ehrmann S. *Lancet Respir Med.* 2021;9(12):1387-1395.

Alhazzani W. *JAMA.* 2022; doi: 10.1001/jama.2022.7993.

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

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



COVID-19 病人通氣策略 1

- 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) 進行機械通氣輔助。
 - 最初的潮氣量建議為 6 ml/kg PBW。如果發生不良反應 (例如, 病患與呼吸器不同步、pH < 7.15), 則允許調升使用潮氣量至 8 ml/kg PBW, 亦可以容許高二氧化碳血症 (permissive hypercapnia)
- 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。

COVID-19 病人通氣策略 2

- 在中度或重度 ARDS 患者中，建議使用較高的 PEEP 而不是較低的 PEEP。
- 對於中度至重度 ARDS($\text{PaO}_2 / \text{FiO}_2 < 150$) 的患者，不建議常規使用神經肌肉阻斷劑持續輸注。
- 對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。
- 建議使用密閉式抽痰管，並在需要斷開呼吸管路時，須在氣管內管連結高效能氣體過濾器。

PPE 選擇

CDC 的 規定

場所	處置項目	呼吸防護		手套	隔離衣		護目裝備 (A 護目鏡 B 全面罩)	髮帽
		醫用/外科口罩	N95 或相當等級(含)以上口罩		一般隔離衣	防水隔離衣		
公共區域	入口服務人員、掛號、批價、傳送等	V						
一般門診	詢問相關主訴及 TOCC	V						
急診檢傷區	詢問相關主訴及 TOCC	V						
病人轉送	病室到院內其他單位		V	V	V			
分流看診區 或收治病室 (如：具負壓或獨立檢查室)	一般性接觸病人之醫療照護行為 (如：量體溫、血壓、照 X 光)		V	V	V ^{#1}		V(A)	∇
	執行發藥、更換輸液等未直接接觸病人之醫療照護行為		V	V	V ^{#1}		V(A)	∇
	接觸病人血液、體液、排泄物等風險之醫療照護行為		V	V		V	V(B)	V
	呼吸道檢體採集 (如：咽喉拭子)		V	V		V	V(B)	V
	執行可能產生飛沫微粒 (aerosol) 的醫療處置		V	V		V	V(B)	V
	環境清潔消毒		V	V		V	V(B)	V

<https://www.cdc.gov.tw/Uploads/e053a14c-7d9e-4b7f-9d89-f5383cee2dc7.pdf>



個人在專責 ICU
使用的 PPE
(插管時相同)



Dr. Zafia Anklesaria, 35, who is seven months pregnant, attends to a COVID-19 patient.
California, U.S., May 18, 2020.

<https://www.cnbc.com/2020/10/27/covid-hospitalizations-rising-in-36-states-as-us-hits-another-record-for-average-new-cases.html>



"Percutaneous dilational tracheostomy for patients with COVID-19"
Early tracheostomy (7-12d) ~ discontinuation from MV & lower mortality

Tracheal intubation

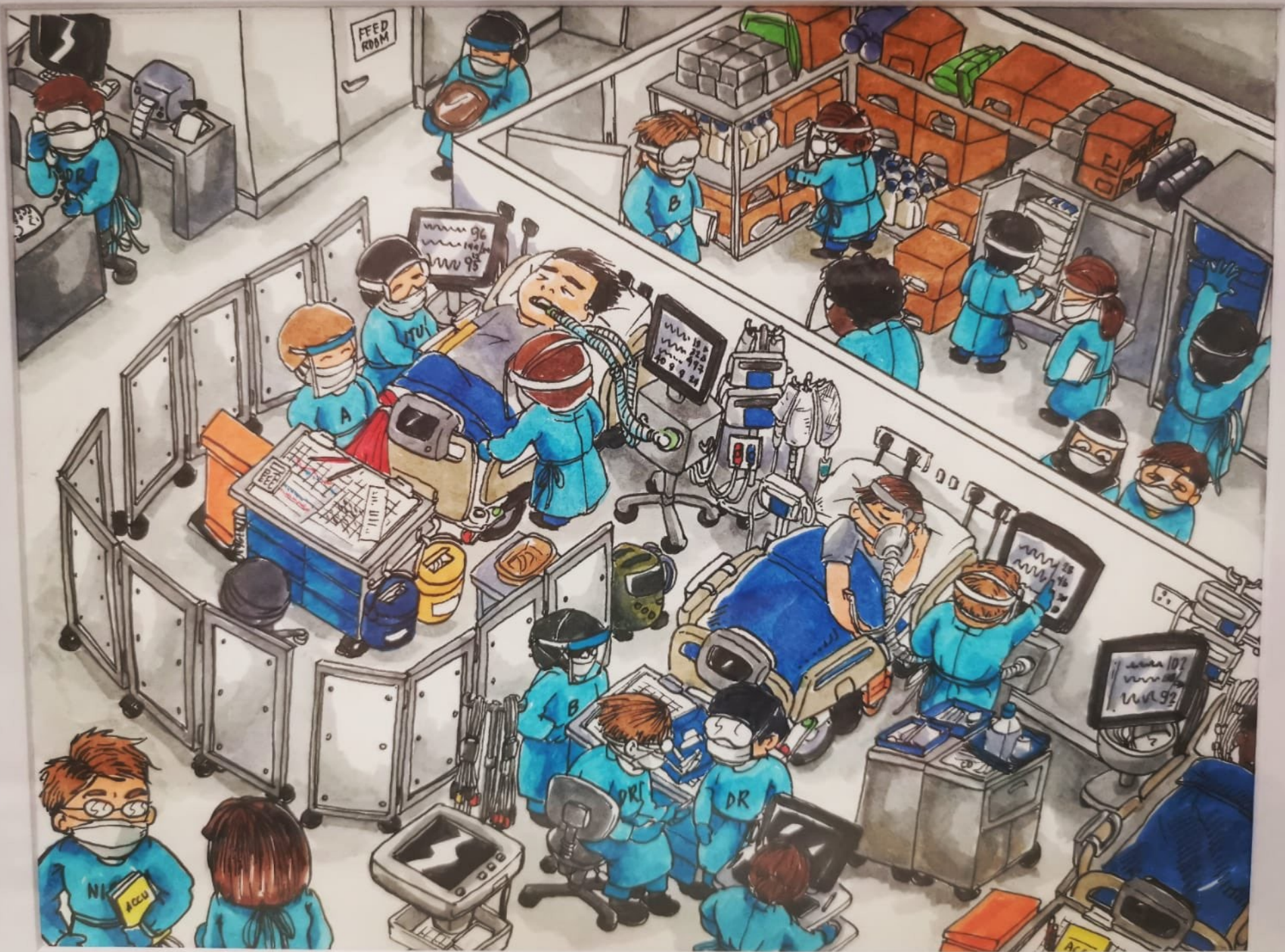
- 防水隔離衣
- 面罩 + N95 or PAPR
- 負壓環境
- 儘量避免手動通氣
(請成功率最高者上場)
- Paralytics
- 影像式喉頭鏡
- 使用 EtCO₂ 偵測器確認位置
- 備妥 SGA 及 FONA



台灣麻醉醫學會 . <https://www.anesth.org.tw/news/content.asp?ID=684>

George Kovacs. https://www.youtube.com/watch?v=pv_xyMolazA

<https://www.cdc.gov.tw/Uploads/e053a14c-7d9e-4b7f-9d89-f5383cee2dc7.pdf>



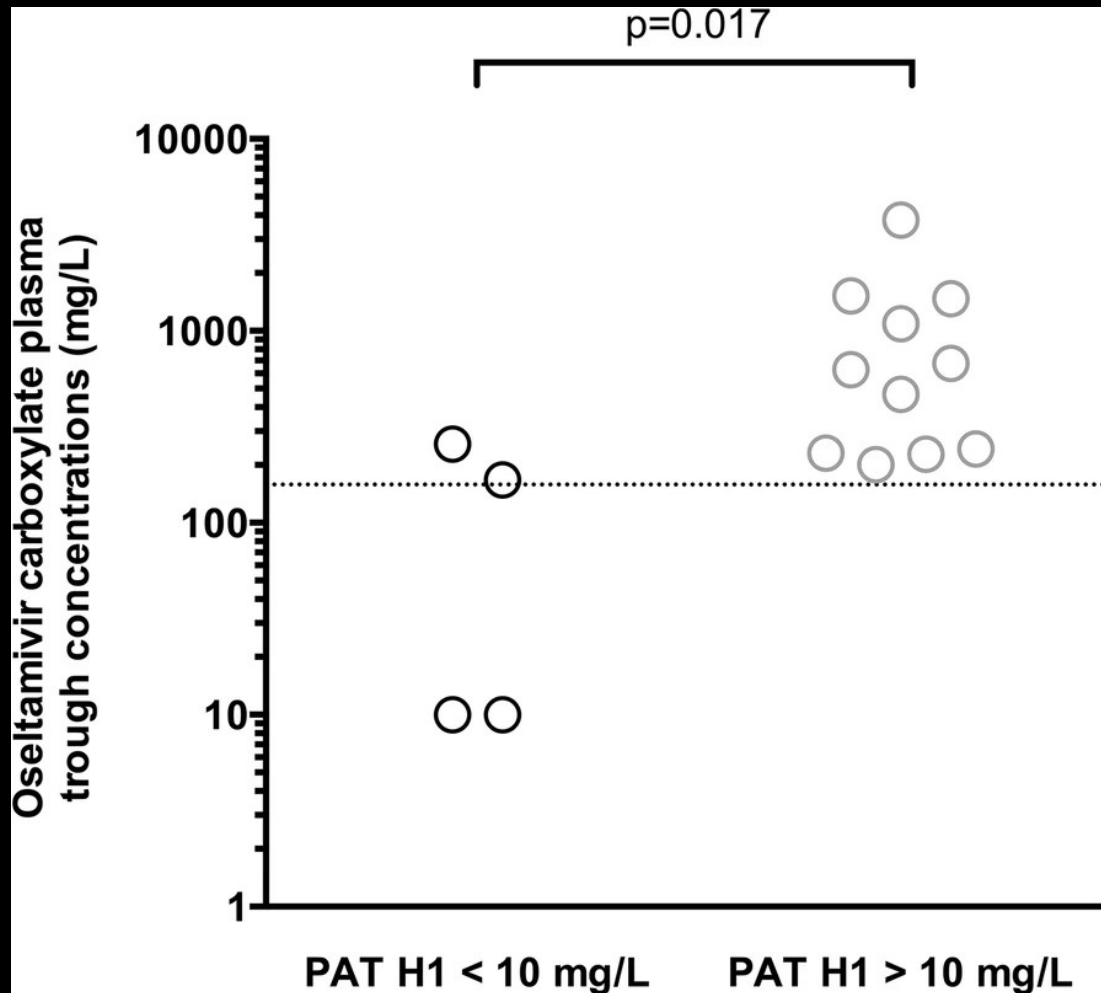


Influenza 重症病人處置

流感重症病人使用抗病毒藥物

- 首選：口服 oseltamivir
 - 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：peramivir (IV)
 - 療效和副作用與口服 oseltamivir 無差異

用 acetaminophen 來測 oseltamivir 吸收效果



口服 acetaminophen
一小時後抽血中濃度
超過 10 mg/L

oseltamivir 血中濃度
就會達到治療標準

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.

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



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



Co-pathogens in Spanish ICUs

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

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

Co-pathogens 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 *Pseudomonas aeruginosa* 12
 - *Staphylococcus aureus* 12 (MRSA: 9)
 - *Aspergillus* spp 21 (beyond 48 h)
- NCKUH 2017/01 – 2018/06: 43% within 7 days.
 - *Klebsiella pneumoniae* 12 *Aspergillus* spp 8
 - *Staphylococcus aureus* 8 (MRSA: 4)
 - *Pseudomonas aeruginosa* 5

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
- Associated with high mortality: 49-61%



endotracheal aspirate, Gram stain. 1,000x

流感病人有肺炎 建議經驗性抗生素需涵蓋

Methicillin-sensitive *Staphylococcus aureus*

Streptococcus pneumoniae

Klebsiella pneumoniae

部份病人需考慮，應努力尋找相關證據

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

通氣策略

同 COVID-19

Extrapulmonary complications of influenza

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

其他呼吸道病毒

- Respiratory syncytial 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. 2017 Dec 21.

rhinovirus



influenza A

RSV

Crit Care Med 2018;46:29–36

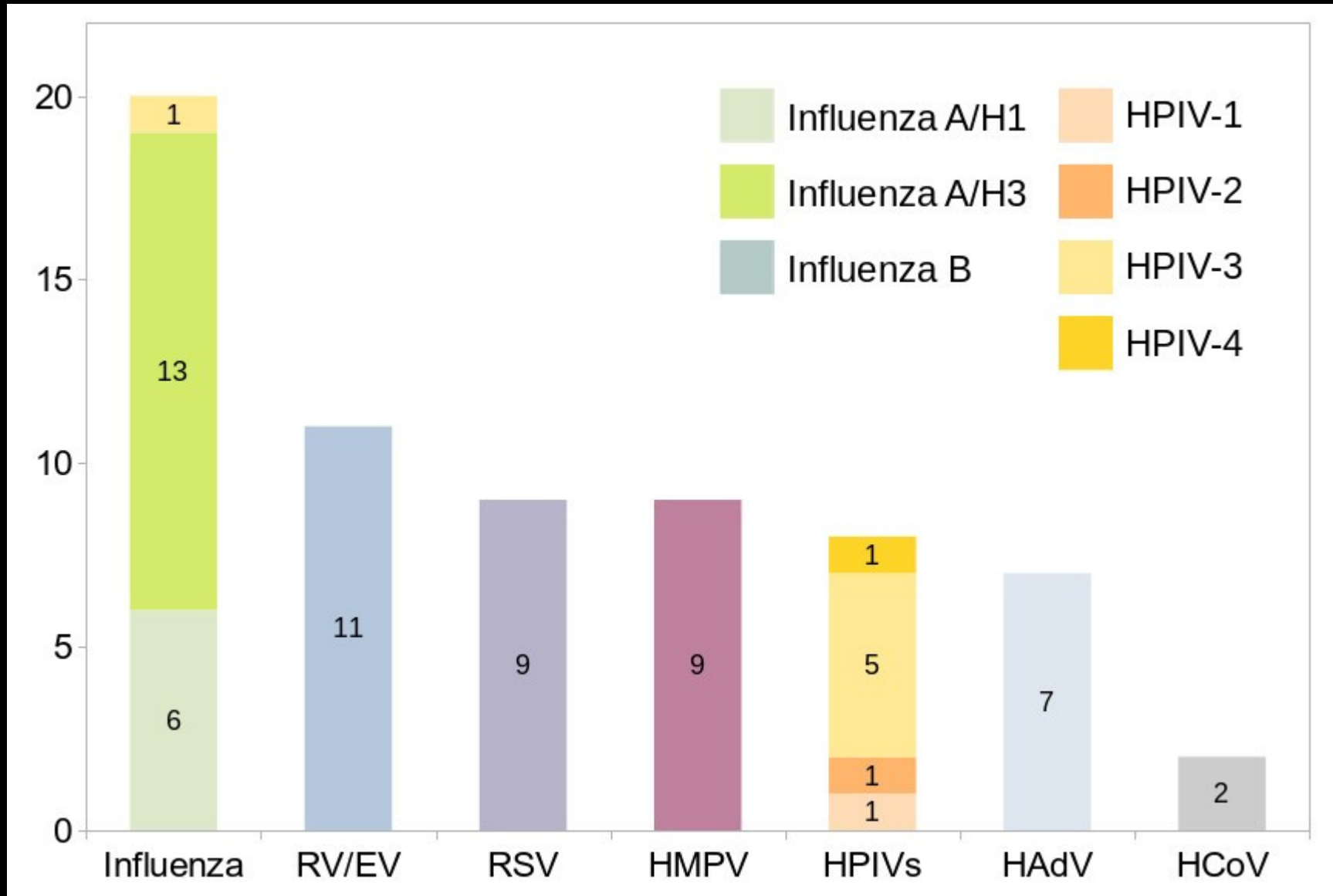
parainfluenza virus 3

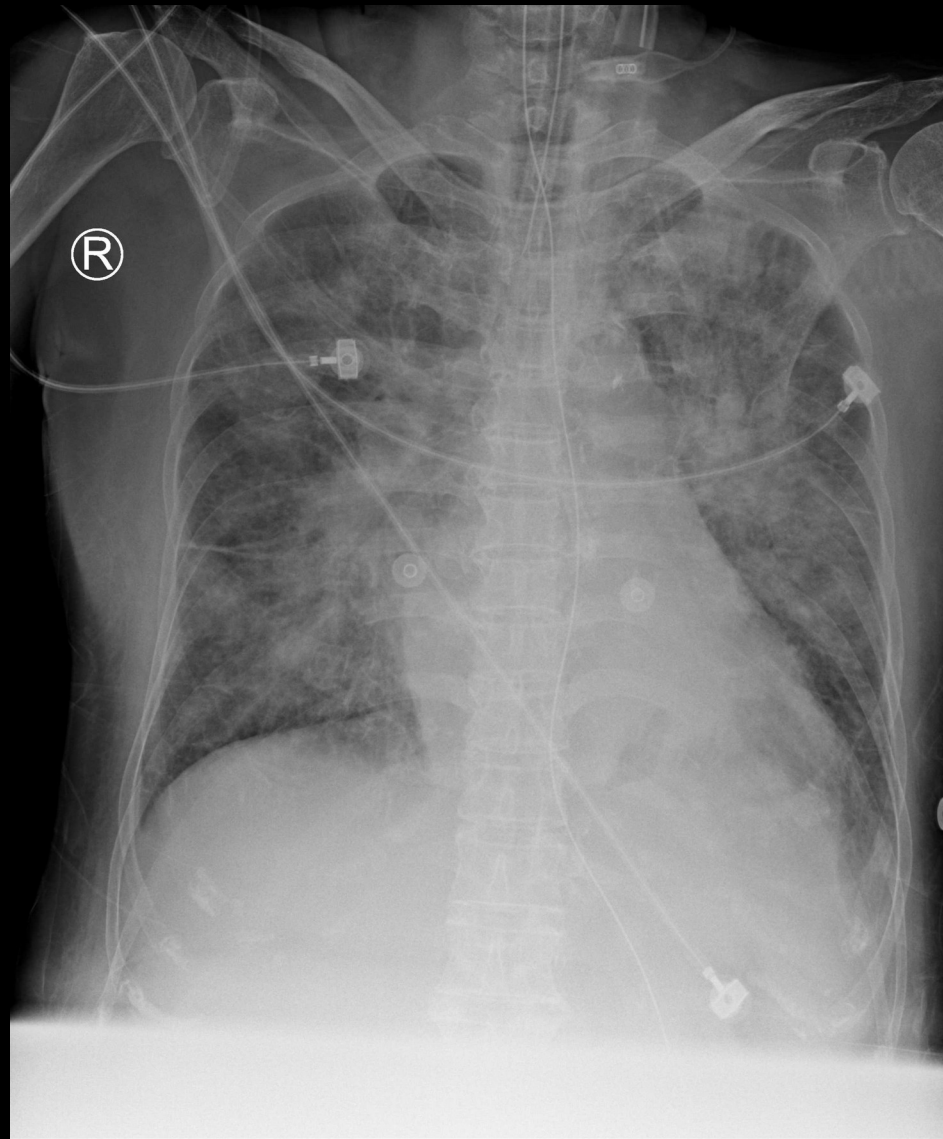


rhinovirus

coronavirus

在台灣 ICU 也不少見

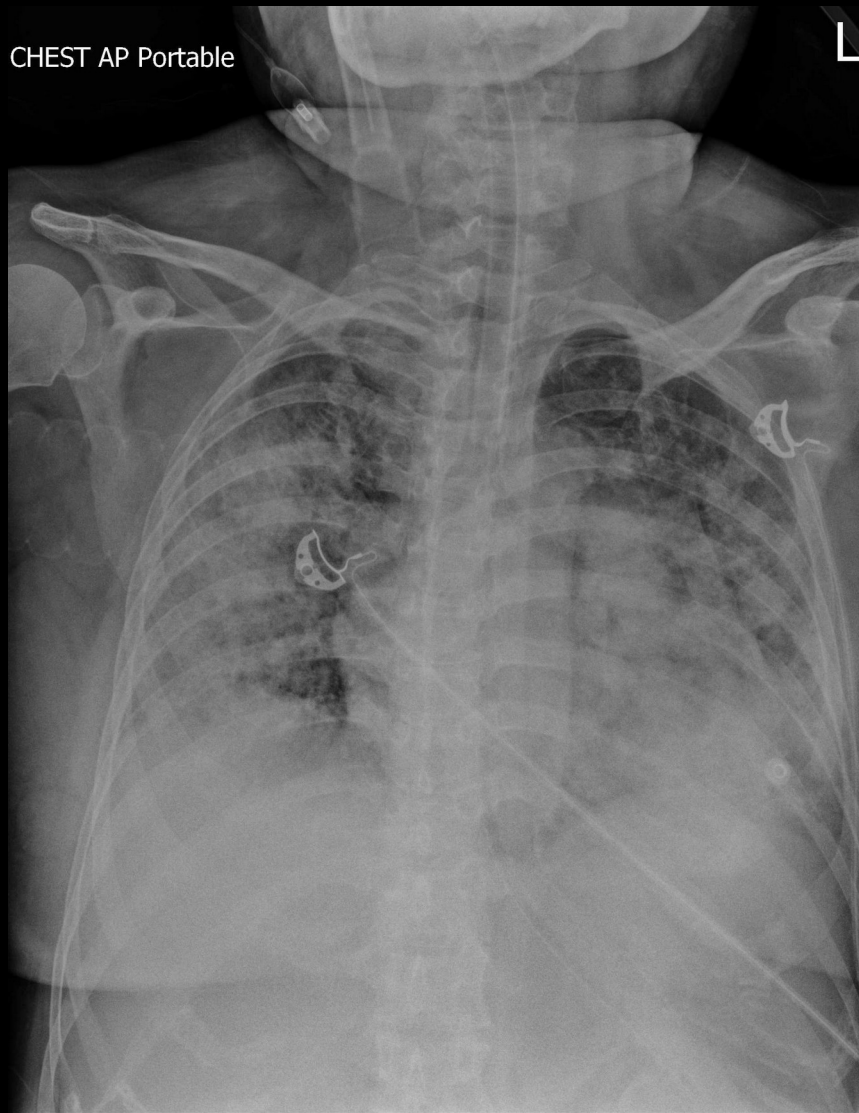




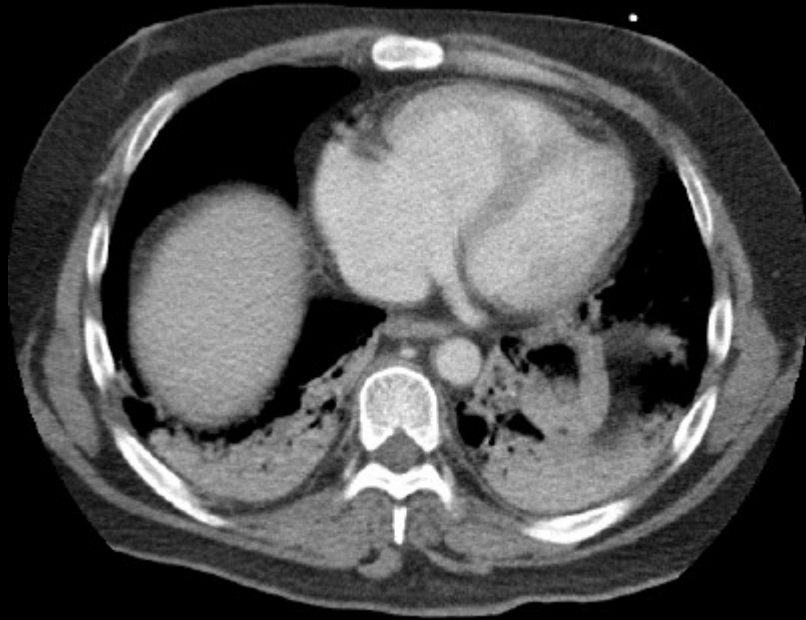
63 F. HTN. HFpEF. Dyslipidemia
Upper airway symptom for 3 days. Dyspnea.
Parainfluenza virus 3 pneumonia

CHEST AP Portable

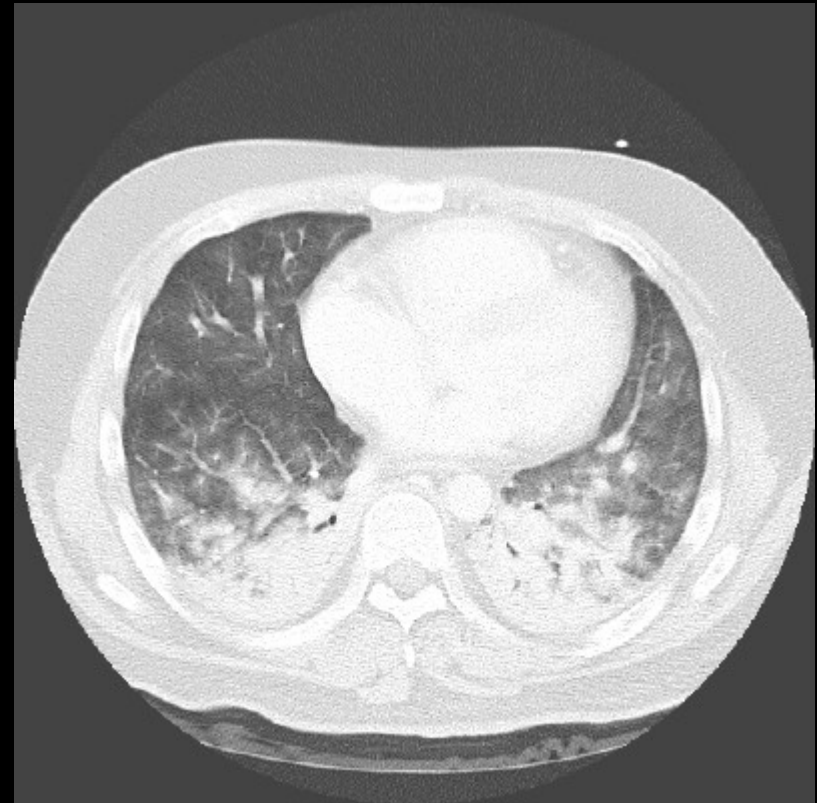
L



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%, mortality 18%



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

- RSV

- IMV 36.6%, In-hospital mortality 23.9%



- No difference from severe influenza in ICUs

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

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

血液動力
呼吸照護
俯臥通氣
ECMO 時機
與一般重症及 COVID-19 相同

重症照護 = 嚴謹的支持性治療



Nida Qadir, MD 
@NidaQadirMD

Supportive care is much less exciting than the idea of a single magic bullet to “cure” covid-19, but such a panacea has never existed in critical illness. #COVID19 will not be different. Steroids & #Remdesivir may be helpful, but they’ll be useless w/o meticulous supportive care.

<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
- 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
- 其他呼吸道病毒感染目前不建議常規使用類固醇
- 要小心 co-infection ，也不要因此濫用抗生素