

新冠感染2023 - 回顧與前瞻

Covid-19 2023 - Review and Outlook

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Happy New Year 2023 新年快樂 身體健康

祝

精神爽利
氣揚眉



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- Due to the different physical conditions of each person, you are responsible for your individual health and health related decisions, in this case, whether to be vaccinated or not.

Review and Outlook 2020 – 2022 回顧與前瞻

1. How have the COVID **disease and the virus** evolved?
2. How effective are the COVID **vaccines and drugs**?
3. Where to **go from here**?

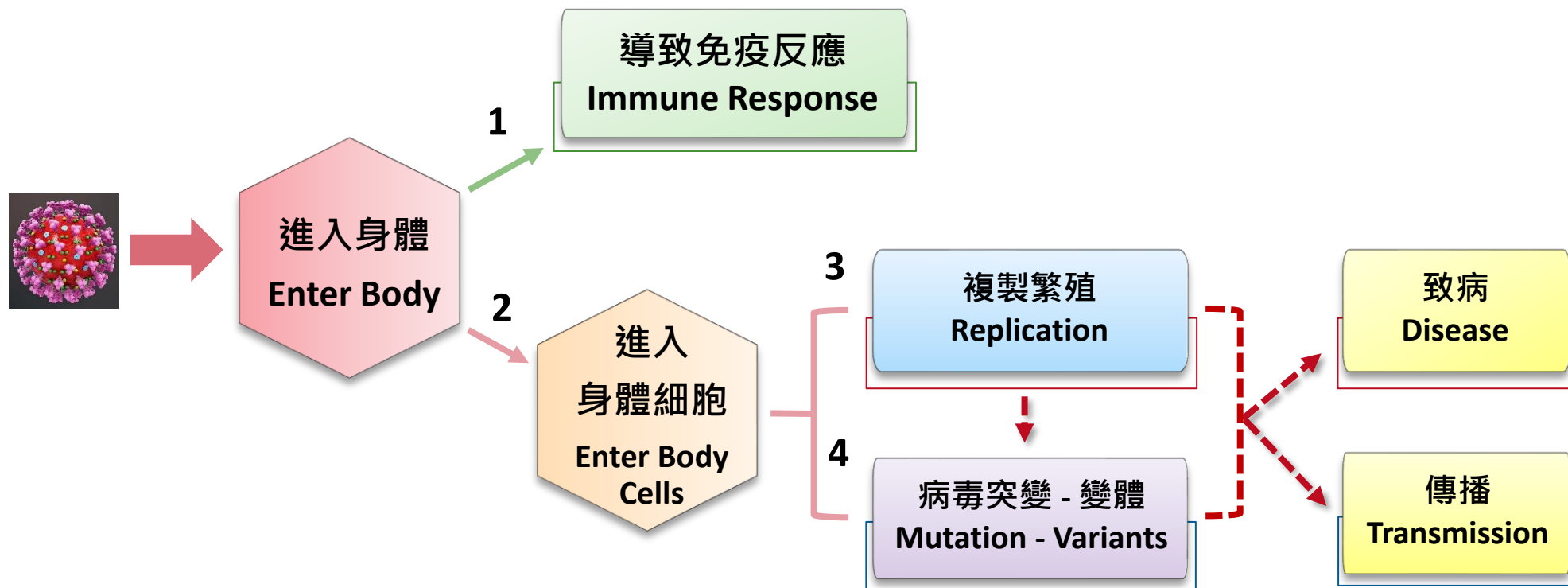
1. 新冠感染的**病情和病毒**如何演變？
2. 新冠**疫苗和藥物**的功効究竟有多少？
3. 今後**何去何從**？

Current hot topics 當前熱門話題

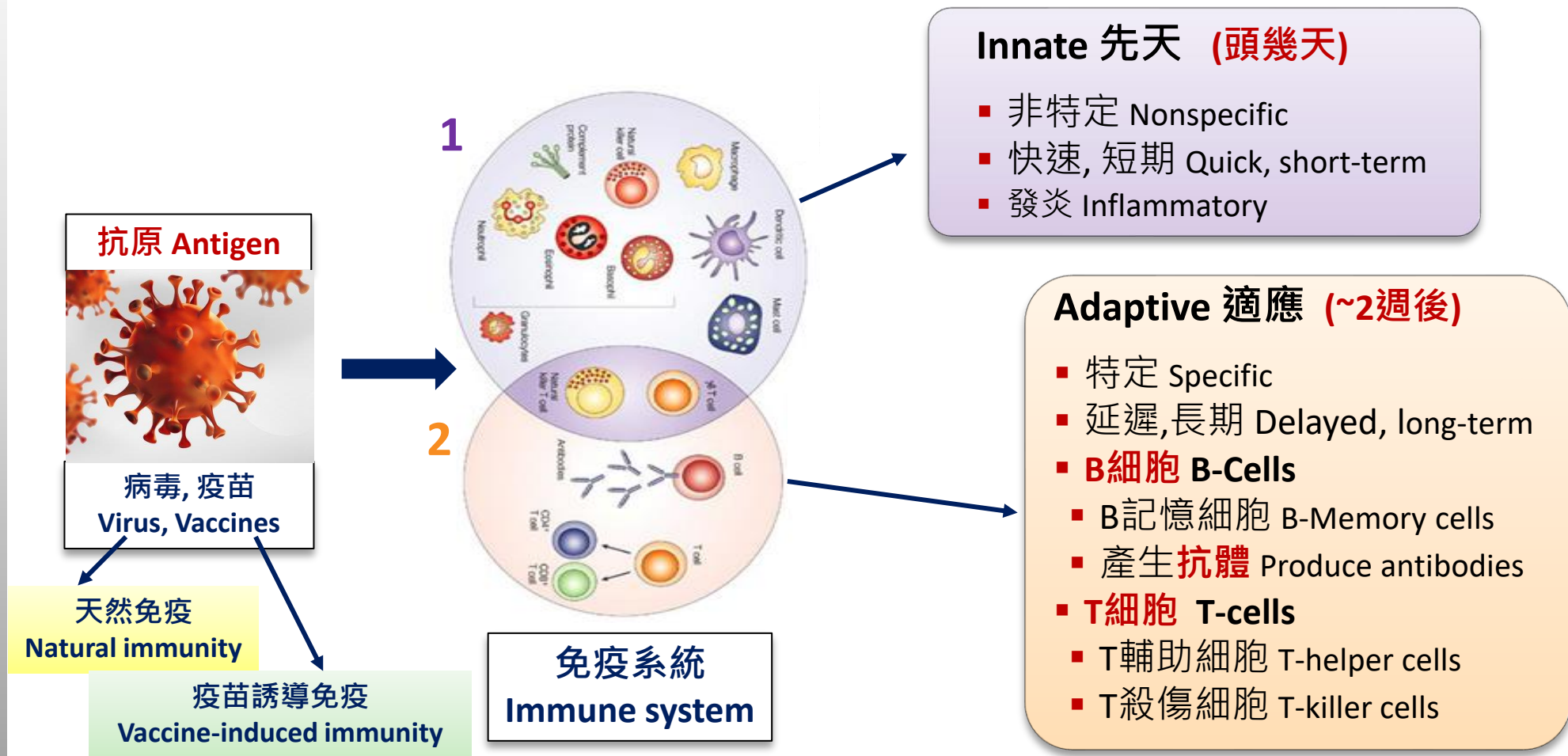
1. 新冠感染的病情和病毒如何演變?

1. How have the COVID disease and the virus evolved?

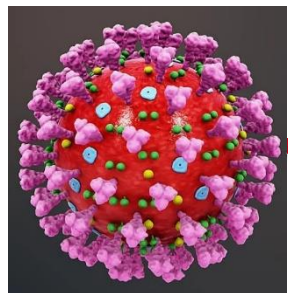
Virus: After Entering Body 病毒: 進入身體後



Immune Response 免疫反應



SARS-CoV-2 新冠病毒

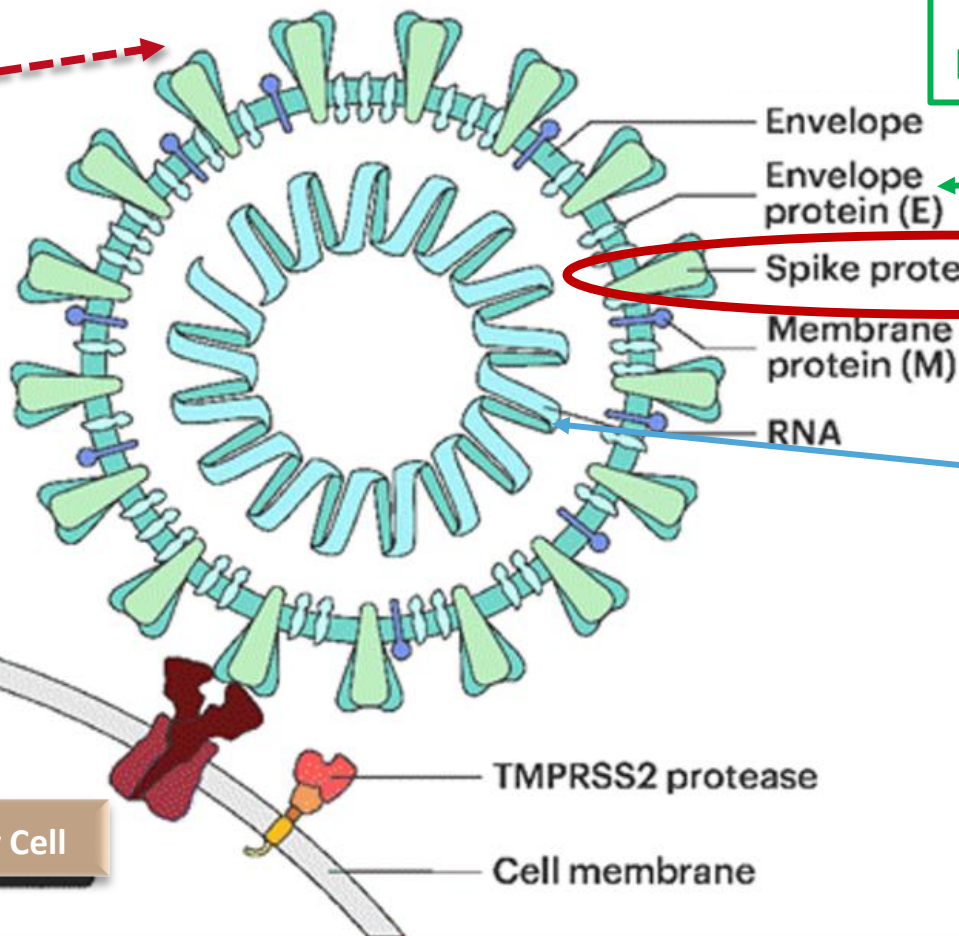


ACE2 受體

ACE2 receptor

- Pharynx 鼻咽
- Lungs 肺
- Arteries 動脈
- Heart 心
- Kidney 腎
- Intestines 腸

身體細胞 Body Cell



Envelope

Envelope protein (E)

Spike protein (S)

Membrane protein (M)

RNA

TMPRSS2 protease

Cell membrane

快速檢測

Rapid Antigen Test

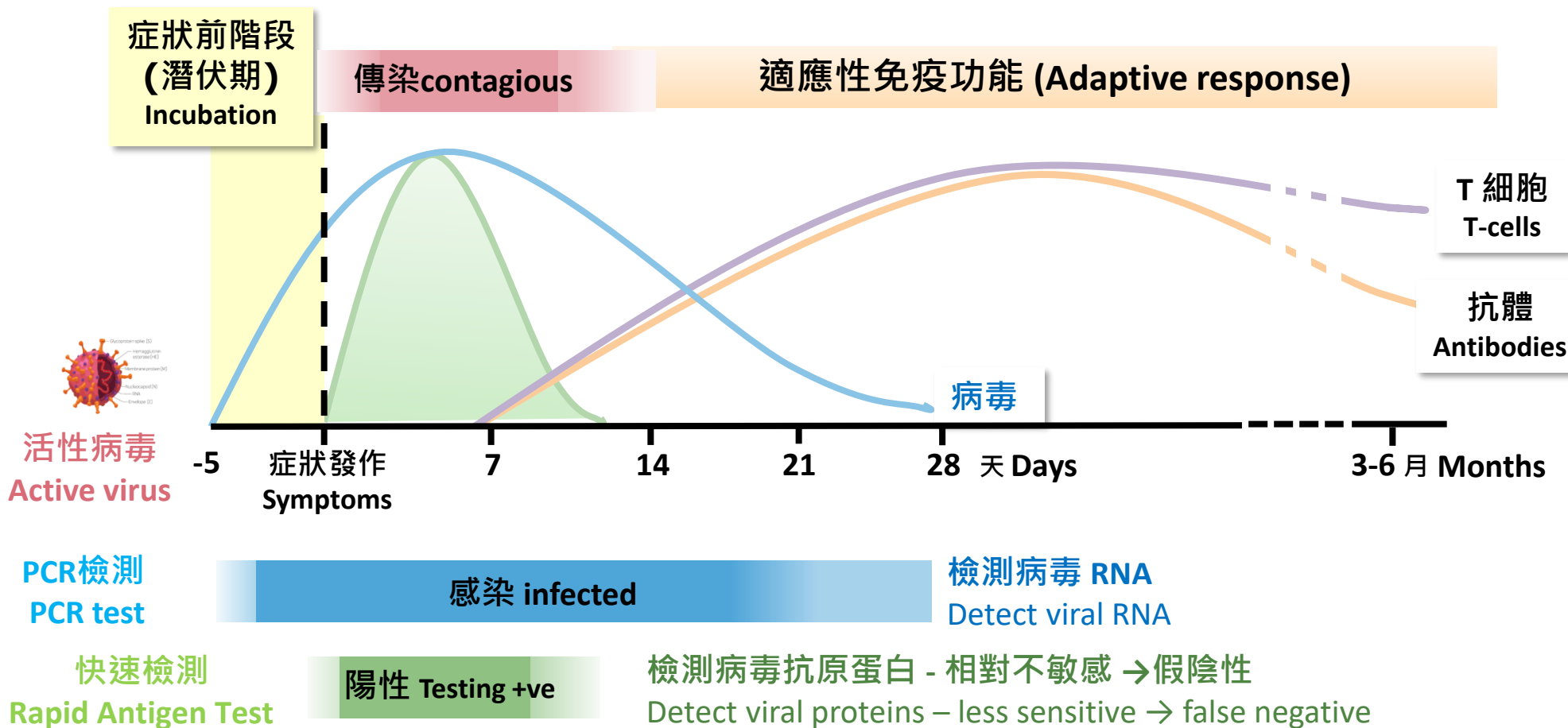
衣殼蛋白

尖刺蛋白

核糖核酸

PCR 檢測

Covid-19 Clinical Course In General 新冠病毒一般臨床演變過程



Virus Mutation – Variants 病毒突變 - 變體

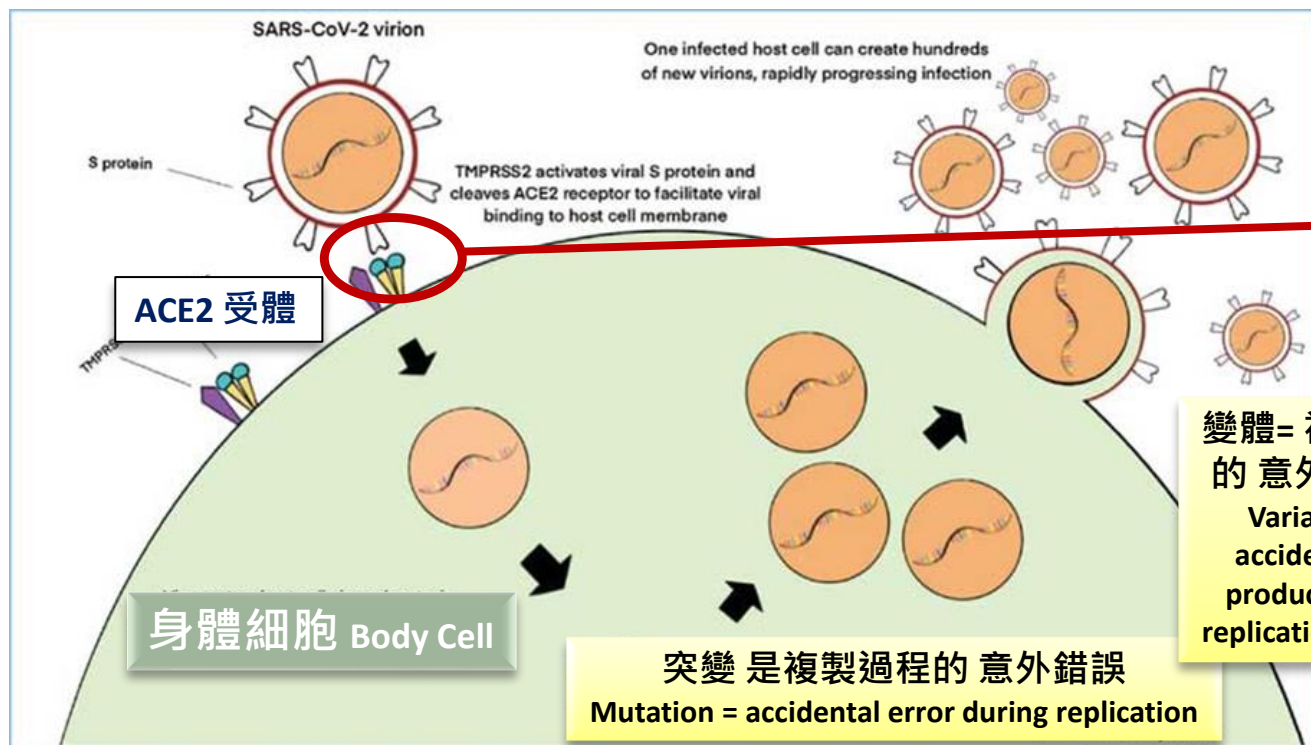
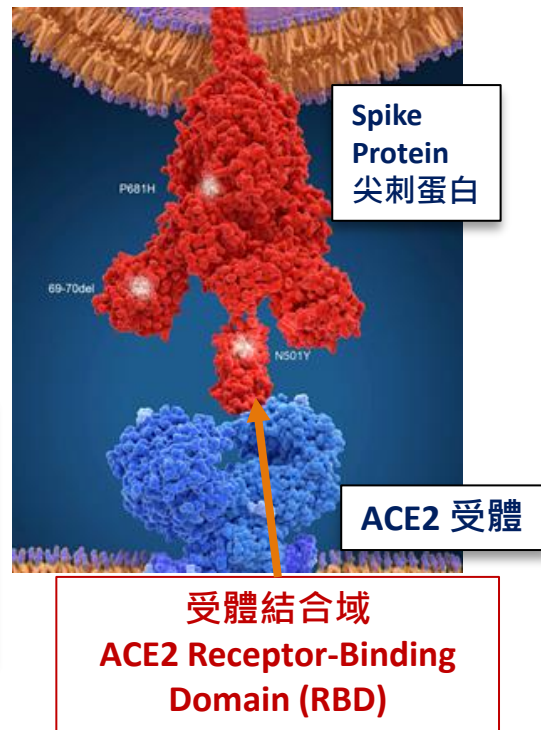


Figure 1. COVID-19 mechanism of infection (adapted from Wiersinga et al²²)

儘早接種疫苗 可以阻止 新變體的形成
Early vaccination can stop formation of new variants



某些突變大大增加了與 RBD 的結合
造成“令人憂慮的變體”
Certain mutation greatly increase binding to RBD, resulting in “Variants of Concern”

Covid Variants Dominance Timeline 新冠病毒主導地位時間表

十二月 Dec 2019 二月 2Feb 2020 一月 Jan 2021 六月 Jun 2021 一月 Jan 2022 一月 Jan 2023

原始病毒
Ancestral

D614G

Alpha

Delta

Omicron

D614G
2020

Alpha
2021

Delta
2021

Omicron
2022

症狀
Symptoms

無症狀 (30-40%) 或
輕度到中度症狀 (~50%)

[Fever 發熱, Cough 咳嗽, Headache 頭痛, Appetite loss 食慾不振, Fatigue 疲勞, Muscle ache 肌肉酸痛, Loss of taste/smell 味覺嗅覺消失 Shortness of breath 氣促], **brain fog 頭昏腦漲**

嚴重症狀 (10-20%) – Pneumonia, etc. 肺炎 等

*Long covid may last 9-12 m after tested negative

*檢測呈陰性後，長期性症狀可能會持續 9-12 個月

類似症狀

+流感

(上呼吸道感染)

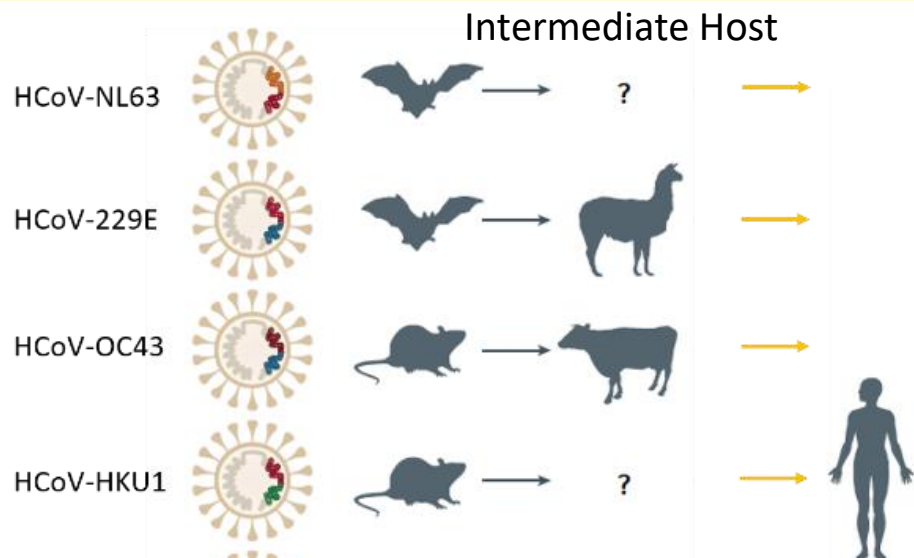
Sniffle 打噴嚏, Runny nose 流鼻涕, Nasal congestion 鼻塞, Sore throat 咽喉痛

Omicron 與早期變體相比 compared to earlier variants

- 縮短潛伏期 shortened incubation period (~2 days)
- 大幅增加傳播性 more transmissible (>6-10X)
- 加多了流感或普通感冒症狀 (>50%) Flu or common cold
- 較多輕微症狀 More milder symptoms
- 較少嚴重疾病 (住院 , 死亡) Less severe disease (Hospitalization, death)

7 Coronavirus can cause infections in human 七種冠狀病毒可感染人類

Common
Cold Virus
普通感冒
冠狀病毒

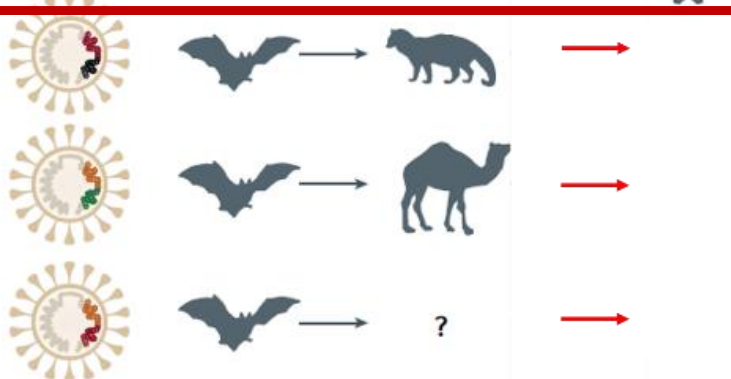


傷風感冒
Common Cold-like Symptoms

2002 SARS-CoV

2012 MERS-CoV

2019 新冠病毒
Sars-CoV-2



Confirmed
infection 確診

Death
死亡率

> 8,000

9.6%

> 2,000

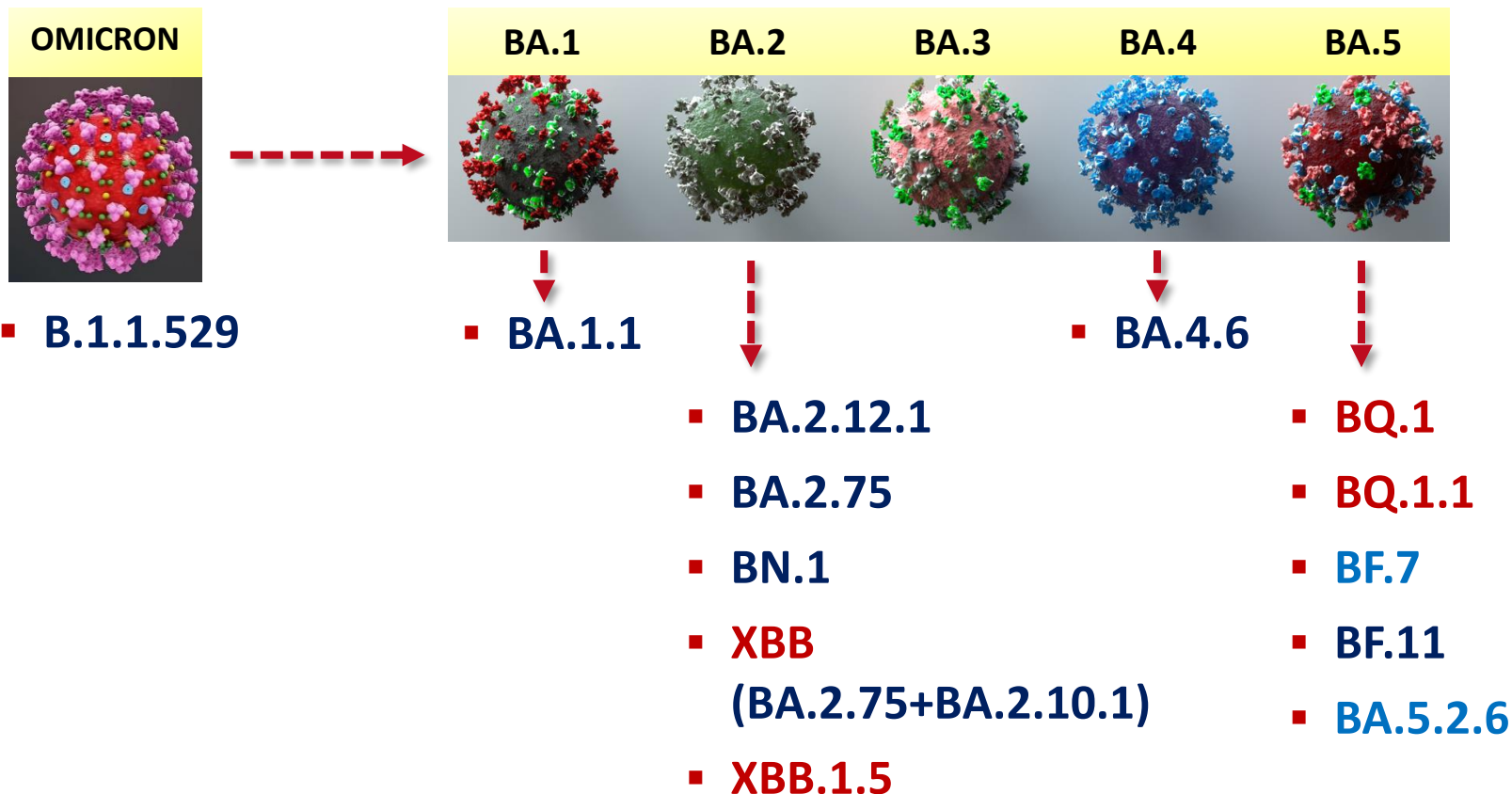
35%

> 6,700,000

~0.1-2%

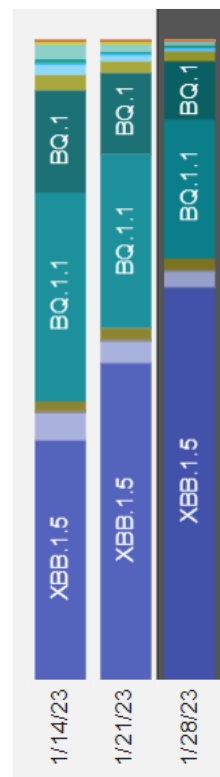
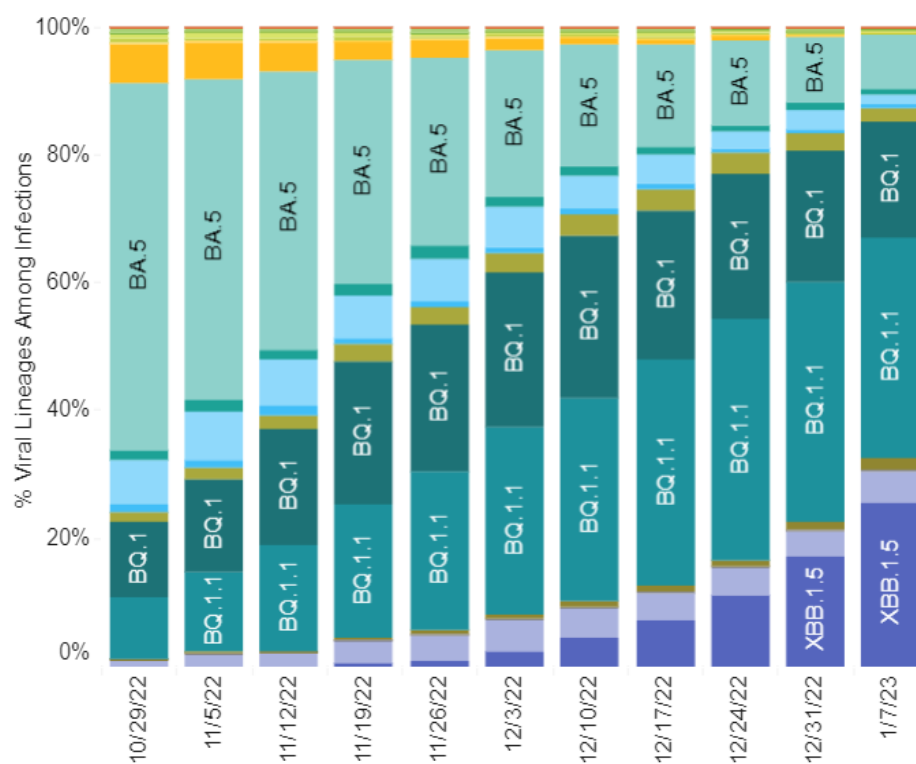
As of Jan 2023

OMICRON Sub-Variants Of Concern (2022) 令人憂慮的病毒變體



Current Variants Proportion (US CDC) 當前變體比例 (美國)

United States: 10/29/2022 – 1/28/2023



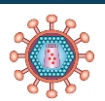
United States: 1/28/2023

WHO label	Lineage #	US Class	%Total	95%PI
Omicron	XBB.1.5	VOC	61.3%	51.5-70.3%
	BQ.1.1	VOC	21.8%	16.6-27.9%
	BQ.1	VOC	9.3%	6.9-12.3%
	XBB	VOC	2.8%	2.2-3.5%
	CH.1.1	VOC	1.3%	1.1-2.1%
	BN.1	VOC	1.4%	1.0-1.8%
	BA.5	VOC	0.7%	0.5-1.0%
	BF.7	VOC	0.6%	0.5-0.9%
	BA.5.2.6	VOC	0.2%	0.2-0.3%
	BA.2	VOC	0.1%	0.1-0.2%
	BF.11	VOC	0.1%	0.1-0.2%
	BA.2.75	VOC	0.1%	0.0-0.1%
	BA.4.6	VOC	0.0%	0.0-0.0%
	BA.2.75.2	VOC	0.0%	0.0-0.1%
	B.1.1.529	VOC	0.0%	0.0-0.0%
	BA.4	VOC	0.0%	0.0-0.0%
	BA.1.1	VOC	0.0%	0.0-0.0%
	BA.2.12.1	VOC	0.0%	0.0-0.0%
Delta	B.1.617.2	VBM	0.0%	0.0-0.0%
Other	Other*		0.0%	0.0-0.1%

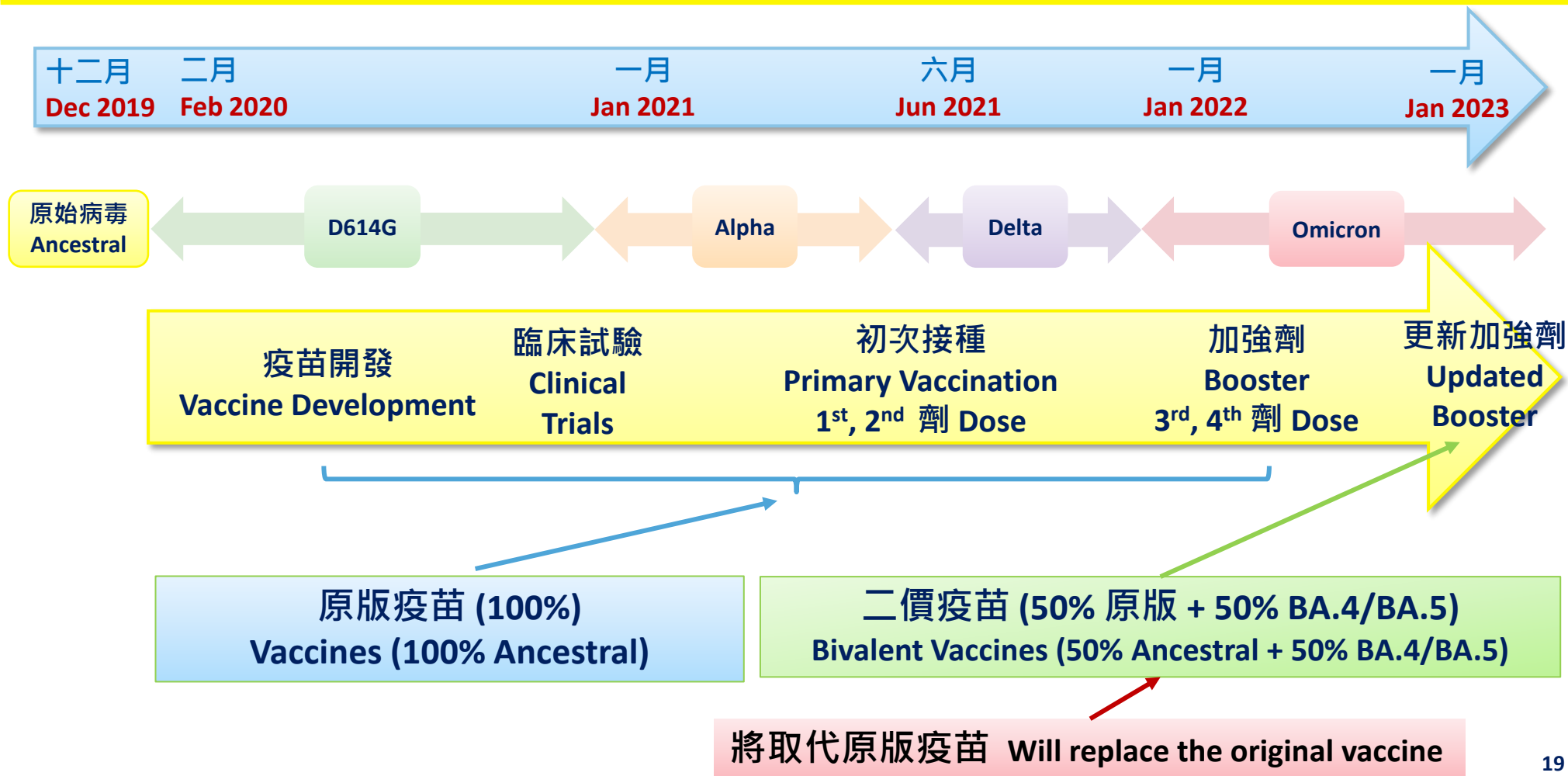
2. 新冠疫苗和藥物的功效究竟有多少？

2. How effective are the COVID vaccines and drugs?

Covid Vaccine Types Available 現今可用的新冠疫苗類型

 核糖核酸 mRNA	 刺突蛋白 Spike Protein	 病毒載體 Viral Vector	 滅活病毒 Inactivated Virus
▪ Pfizer/BioNTech/Fosan 輝瑞/復必泰/復星 ▪ Moderna/NIH 莫德納	▪ Novavax	▪ AstraZeneca 阿斯利康 ▪ J & J 強生	▪ Sinovac 科興
▪ 防止病毒傳播 Prevent Transmission	▪ Not very effective	▪ 不是很有效	
▪ 安全性 Safety	▪ Generally well-tolerated side effects ▪ Rare: myocarditis with mRNA vaccines ▪ Rare: Blood clots with Viral Vector vaccines	▪ 通常副作用可以接受 ▪ 罕見：mRNA 疫苗與心肌炎 ▪ 罕見：病毒載體疫苗引起的血塊	
▪ 降低感染風險 Reduce Risk of Infection	▪ ~80-95% Effective ▪ Last for ~4 months	▪ ~80-95%有效 ▪ 持續約 4 個月	
▪ 降低住院和死亡風險 Reduce Risk of Hospitalization / Death	▪ >90% Effective ▪ Last >6 months	▪ >90%有效 ▪ 持續 >6 個月	
▪ 加強劑 Booster	▪ Mix-and-Match works ▪ mRNA vaccines preferred	▪ 可注射不同類型的新冠疫苗 ▪ 首選mRNA疫苗	

mRNA Vaccines Development & Utilization 新冠mRNA疫苗開發和運用



Variants on Original Pfizer Vaccine 病毒變體對 原版復必泰疫苗 功效的影響

原版疫苗有效率 Vaccine Effectiveness	Alpha	Delta	Omicron
中和抗體 Neutralizing antibodies	有效 Effective	相對減弱 Reduced ↓↓	相對大減 Reduced ↓↓↓
T 細胞免疫功能 T-Cell immunity	有效 Effective	相對微減 Small ↓	相對微減 Small ↓
↓ 確診病例 ↓ Confirmed Covid cases	80-90%	70% - 80% (↓ ~15-20%)	~35% (↓ ~50%)
↓ 嚴重疾病 ↓ Severe Covid	>90%	93% - 96% (~same)	~75% (↓ ~20%)

隨著 Delta 和 Omicron 的出現，新冠原版疫苗對防止確診病例的功效顯著下降
對嚴重新冠疾病的有效性微減 但仍然很高

Effectiveness against confirmed cases is reduced with variants

Effectiveness against severe disease is reduced also but remains quite high

加強劑的功效
Booster effects

提升中和抗體 和 T 細胞 的免疫功能
Elevate neutralizing antibodies and T-cell

Bivalent Vaccines (Ancestral + BA.4/BA.5) 二價疫苗(原版 + BA.4/BA.5)

支持數據 Supporting evidence

■ 實驗室數據 Lab data	■ Increase more neutralizing antibody (by 1,500%) and T-cells than the original mRNA vaccine	■ 比原版 mRNA 疫苗增加更多的中和抗體 (增加 1,500%) 和 T 細胞
■ 真實世界的安全數據 Real world safety data	■ No unexpected or serious safety issues	■ 沒有意料之外或嚴重的安全問題
■ 真實世界療效數據 Real world efficacy data (Sep-Dec 2022, Israel)	■ Hospitalization (↓81%) and death (↓86%) in age 65+	■ 65 歲以上的住院率 (↓81%) 和死亡 (↓86%)
■ 與 “未接種加強劑” 相比 Compared to “not boosted” in the US (Dec 2022)	■ ↓73-84% against COVID-19 hospitalization	■ 住院治療↓73-84%

COVID-19 – Drug Therapy for Various Patients

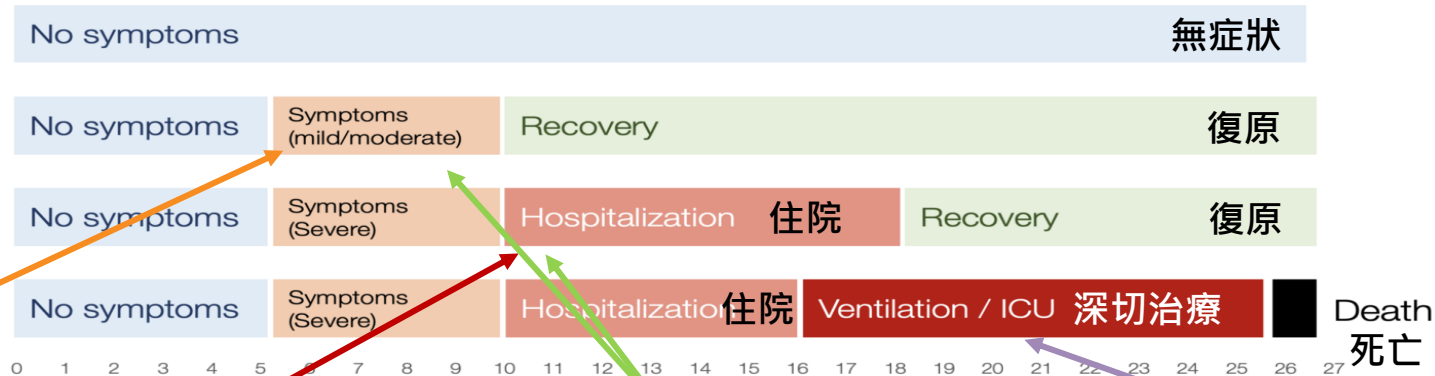
各種患者的藥物治療

Asymptomatic (30%)
無症狀

Mild / Moderate (56%)
輕度 / 中度

Severe (10%)
嚴重

Critical (4%)
致命



A. 緩解症狀 Symptoms relief

- Advil, Aleve, Tylenol (Panadol), Aspirin
- Flu medicines

感冒藥

B. 阻止病毒進入細胞 Block Entry To Cells

- 人造單克隆抗體
Monoclonal Antibodies (e.g., Evusheld): ↓↓ effectiveness vs Omicron

抗體

C. 阻止病毒複製 Block Replication

- Anti-viral agents
✓✓✓ Paxlovid (口服 oral)
✓ Molnupiravir (口服 oral)
✓ Remdesivir (注射 IV)

抗病毒藥

D. 抗炎 Anti-Inflammation

- Steroids (**Dexamethasone**)
- Interleukin-6 inhibitors: tocilizumab or sarilumab
- Janus kinase (JAK) inhibitors

類固醇

免疫抑制

Other : ~~chloroquine, hydroxychloroquine, ivermectin, immunoglobulins, convalescent plasma, interferons~~

Current hot topics 當前熱門話題

3. 今後何去何從?

3. Where to go from here?

COVID-19 Current Status 新冠感染現狀

大流行病成為地方性風土病

Pandemic → Endemic,
(一種始終存在於人群中的疾病)
(A disease that always exists in the population)

- 非常**有效**的疫苗可以**減除新冠重症** Very **effective vaccine** can reduce the **severity** of COVID-19
- **Omicron** 症狀“較輕”，幫助更多人獲得**天然免疫力** **Omicron**, with “milder” symptoms, help more people to gain natural immunity
- 疫苗接種 + 天然免疫 → 達到 **>90% 群體免疫** (大流行病成為地方病) **Vaccination + natural immunity → reach >90% herd immunity** (pandemic becomes endemic)
- **mRNA** 疫苗加強劑可以**容易修改** 以應對病毒變種 mRNA booster vaccines can be easily **modified** to deal with virus variants
- 有特效的**抗新冠病毒藥物** effective **anti-virus drugs**

Live With SARS-CoV-2 與新冠病毒共存

共存之道: 盡量獲得免疫力, 不傳播病毒
目標: 減少住院死亡

Principle: acquire immunity against infection soon, not pass the virus around

Goal: minimize hospitalization and death

新常態 New normal

- 需要季節性接種疫苗加強針 Seasonal booster shots
- 習慣性戴口罩、保持社交距離、等 habitual face-mask, social distancing, etc.
- 應對局部爆發 Deal with local outbreak

未來的問題 Questions for the future

- | | |
|---|--|
| <ul style="list-style-type: none">■ Is a 100% variant-specific monovalent vaccine better than a bivalent vaccine?■ How frequently should boosters be given, and to whom? | <ul style="list-style-type: none">■ 單價疫苗 (100% 變體) 是否優於二價疫苗 (50% 原版 + 50% BA.4/BA.5)?■ 加強劑應該多久注射一次? 給誰注射? |
|---|--|

New vaccination program is coming! 新的疫苗接種計劃即將來臨！

Now we know:

- >80-90% of the population have immunity against severe Covid-19 (by vaccination or Covid infection)
- Antibodies would wane after ~4 months, but T-cells immunity persists much longer (~ 9 months)
- Hospitalization and death rates due to Covid have been decreasing in recent months
- People are tired of the pandemic, including frequent vaccinations

New program to be approved:

- A single annual Covid shot with a variant-specific vaccine selected in June
- A Covid shot in the fall (together with a flu shot)
- Older, with medical complications, or immunocompromised people may need more than one booster

我們現在知道:

- >80-90% 的人口對嚴重新冠病毒感染具有免疫力（通過接種疫苗或新冠病毒感染）
- 抗體會在約 4 個月後減弱，但 T 細胞免疫力會持續更長時間（約 9 個月）
- 近幾個月來，新冠肺炎的住院率和死亡率一直在下降
- 人們厭倦了大流行，包括頻繁接種疫苗

有待批准的新計劃：

- 每年注射一次變體特異性疫苗（每年6月評選疫苗）
- 秋季注射新冠疫苗（連同流感疫苗）
- 年齡較大、有其他嚴重疾病、或免疫功能低下的人可能需要注射多過1次加強劑

Questions

