

在COVID-19疫情下 如何保護醫療同仁的健康

Dr. Sung-Ching Pan

National Taiwan University Hospital

May 18, 2021

Updated Aug. 17, 2021

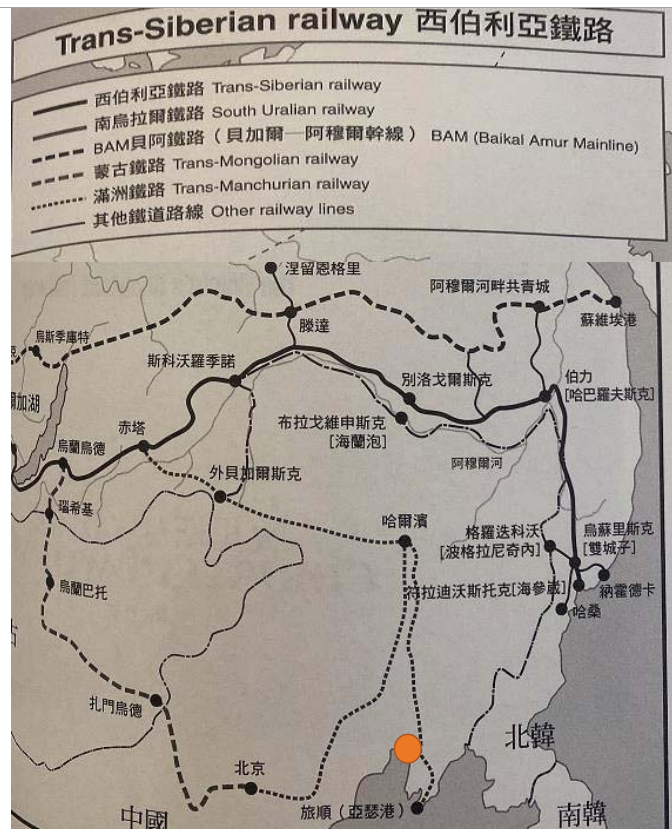


鼠疫

- 1898年6月，中東鐵路全線開工
- 1899年7月25日山海關醫官英國人戴利（Burgh Daly）正式宣告營口第一個病例

西伯利亞鐵路

近代中國地方衛生行政的誕生



鼠疫

- 1899年8月17日，戴利參加各國領事團公共會議建議相關章程
 - 必須對來自有疫港口的船隻及人員進行查驗；
 - 在遼河口設立檢疫局查驗進入內陸的船隻與人員；
 - 禁止運輸靈柩；
 - 開設衛生局辦理衛生行政

Border control

鼠疫

- 衛生局由 10 人組成的衛生委員會管理，包括 3 名中國人、3 名英國人、2 名日本人、俄國人和美國人各 1 人。
 - 派醫查找病人
 - 將患疫者送往五臺子養病院收容醫治，
 - 其他病患送往普濟醫院醫治強迫集中，
 - 對患疫者房屋消毒，
 - 在土圍各門派兵查驗有無病人通過，
 - 患疫病癒者須有醫生執照，始得放行阻擋通行；
 - 各義莊、義地的暴露棺木一律瘞埋，不准再厝不准厝放，
 - 患疫死者只能經揚武門送五臺子義地瘞埋
 - 將圍內糞廠遷到圍外。

Cohort

Disinfection

Dis-isolation

Contact isolation

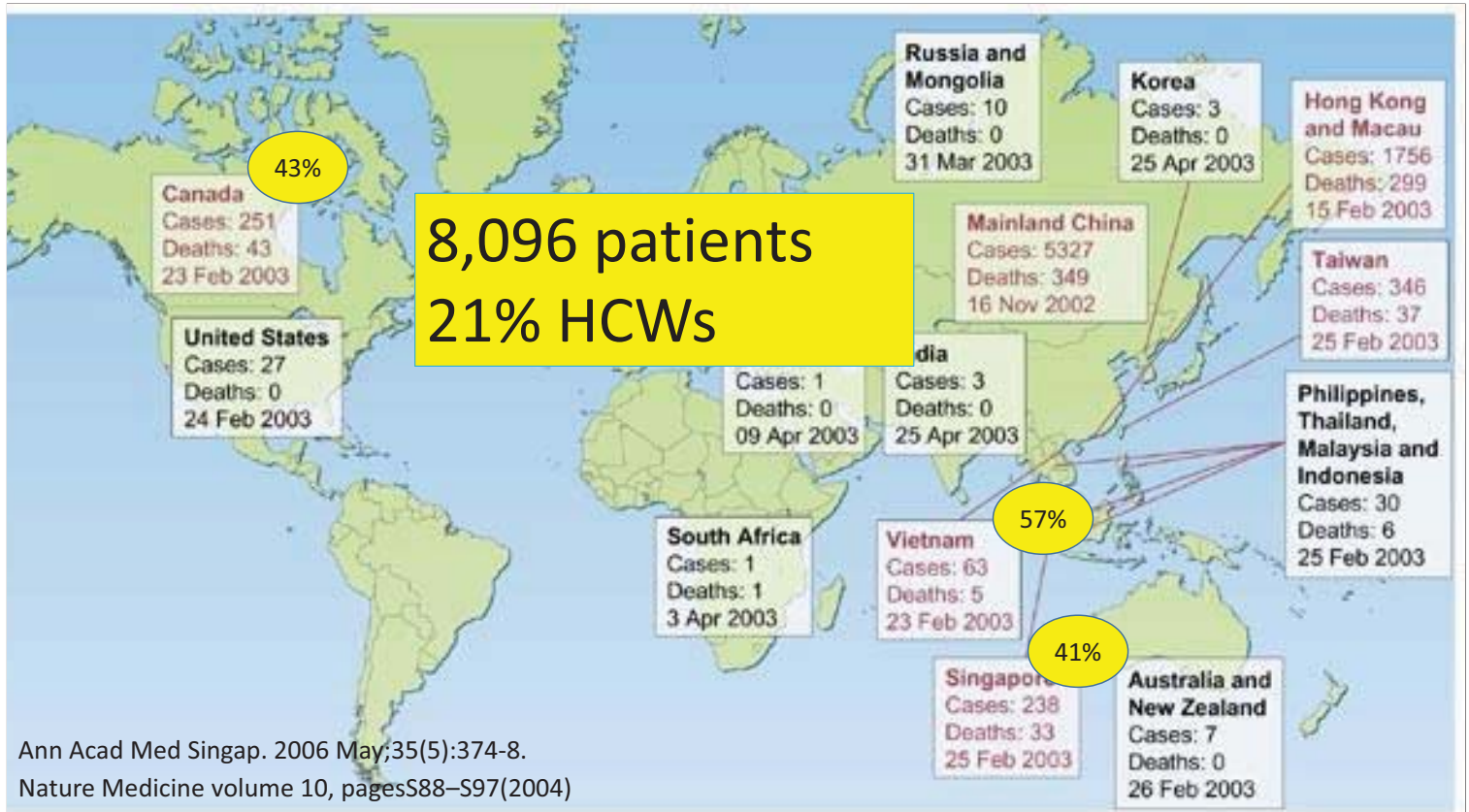
The protection of healthcare workers?



EPISODE I
SARS



Nature Medicine volume 10, pagesS88–S97(2004)



Ann Acad Med Singap. 2006 May;35(5):374-8.

Nature Medicine volume 10, pagesS88–S97(2004)

November 2002: atypical pneumonia from people contacts with wet markets at Guangdong Province, China

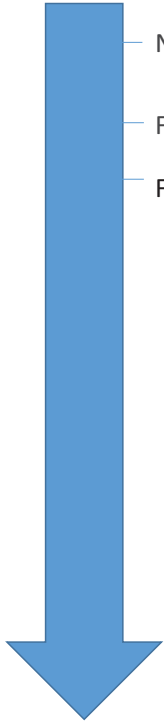


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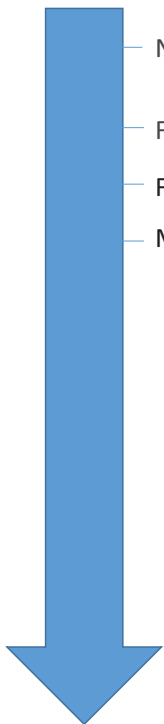
Feb. 28, 2003: cluster of atypical pneumonia in Vietnam, reported to WHO

- quarantining the Vietnam French Hospital,
- introducing infection-control procedures in other hospitals,
- issuing an international appeal for expert assistance





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- Feb. 28 2003: cluster of atypical pneumonia in Vietnam, 20-30 cases, reported to WHO
- Feb/March 2003: cluster infection in Hong Kong



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- March 12, 2003: WHO announce warning

World Health Organization issues emergency travel advisory

Severe Acute Respiratory Syndrome (SARS) Spreads Worldwide

GENEVA, 15 MARCH 2003 - During the past week, WHO has received reports of more than 150 new suspected cases of Severe Acute Respiratory Syndrome (SARS), an atypical pneumonia for which cause has not yet been determined. Reports to date have been received from Canada, China, Hong Kong Special Administrative Region of China, Indonesia, Philippines, Singapore, Thailand, and Viet Nam. Early today, an ill passenger and companions who travelled from New York, United States, and who landed in Frankfurt, Germany were removed from their flight and taken to hospital isolation.

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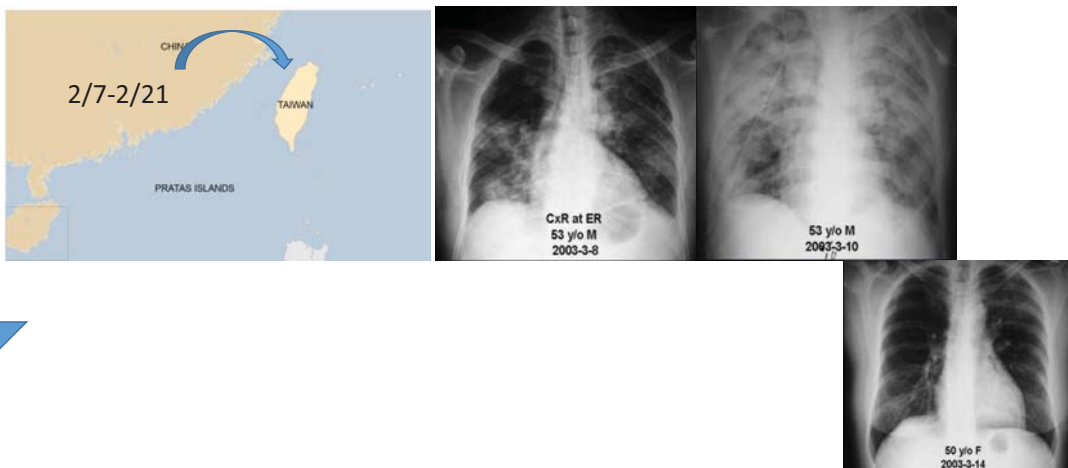
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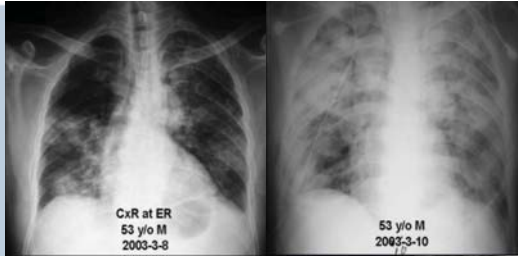
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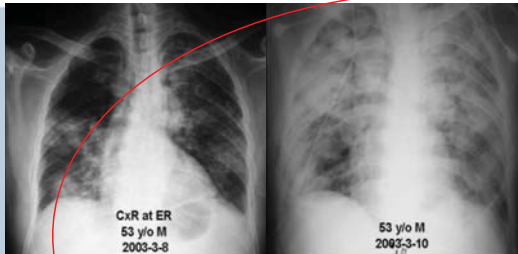
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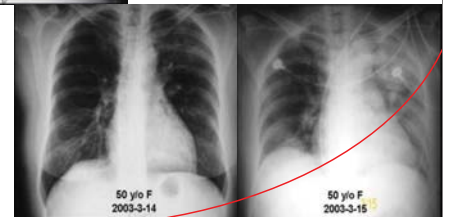
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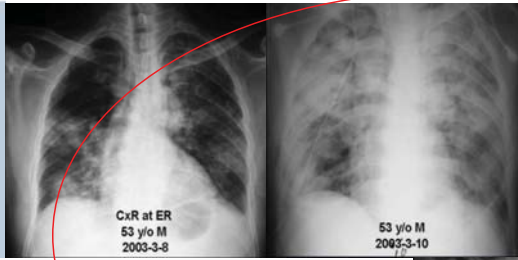
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Cluster infection

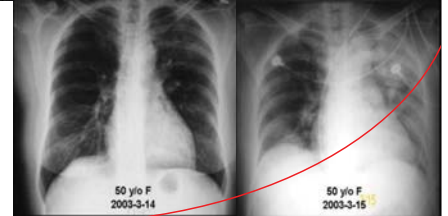


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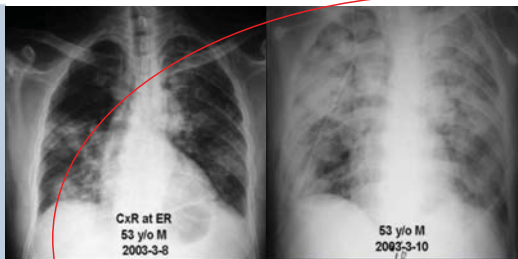
Cluster infection

Influenza
Parainfluenza
RSV
Adenovirus
HSV
Avian influenza
metapneumovirus



全球SARS風暴之台灣經驗. 疫情報導
2003/06/25

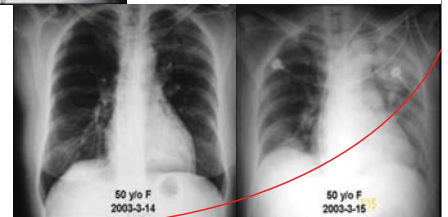
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Cluster infection

Confirmed as a new coronavirus by PCR

Influenza
Parainfluenza
RSV
Adenovirus
HSV
Avian influenza
metapneumovirus



全球SARS風暴之台灣經驗. 疫情報導
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Symptoms
Infectious period
Symptom onset



Screen patients with fever

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- April 24, 2004: outbreak in Ho-Pin hospital and closed the hospital

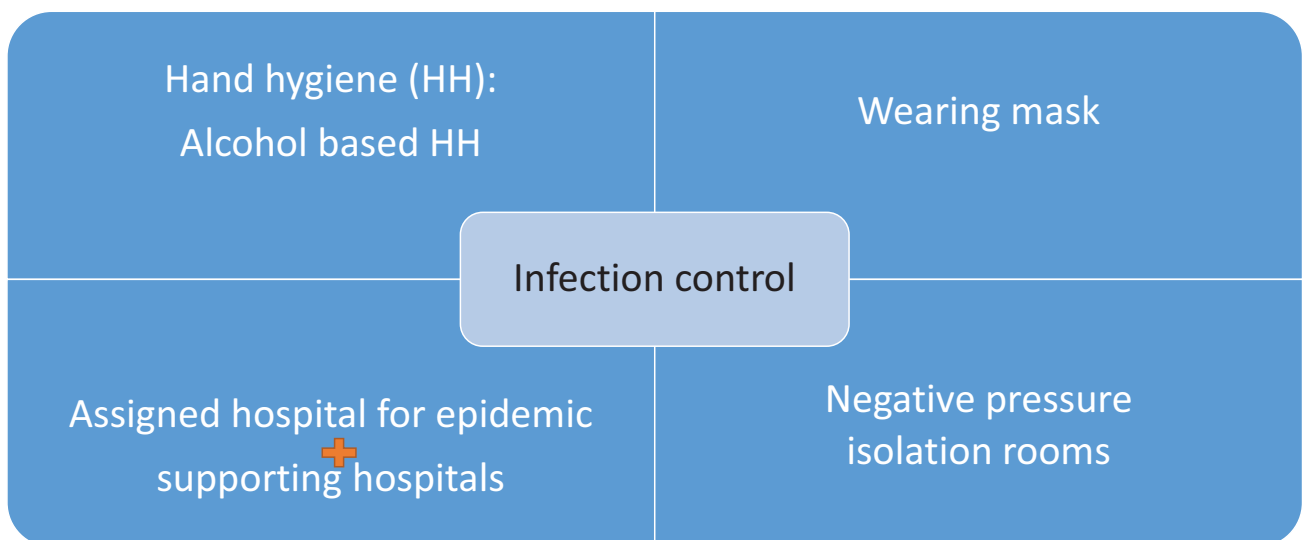


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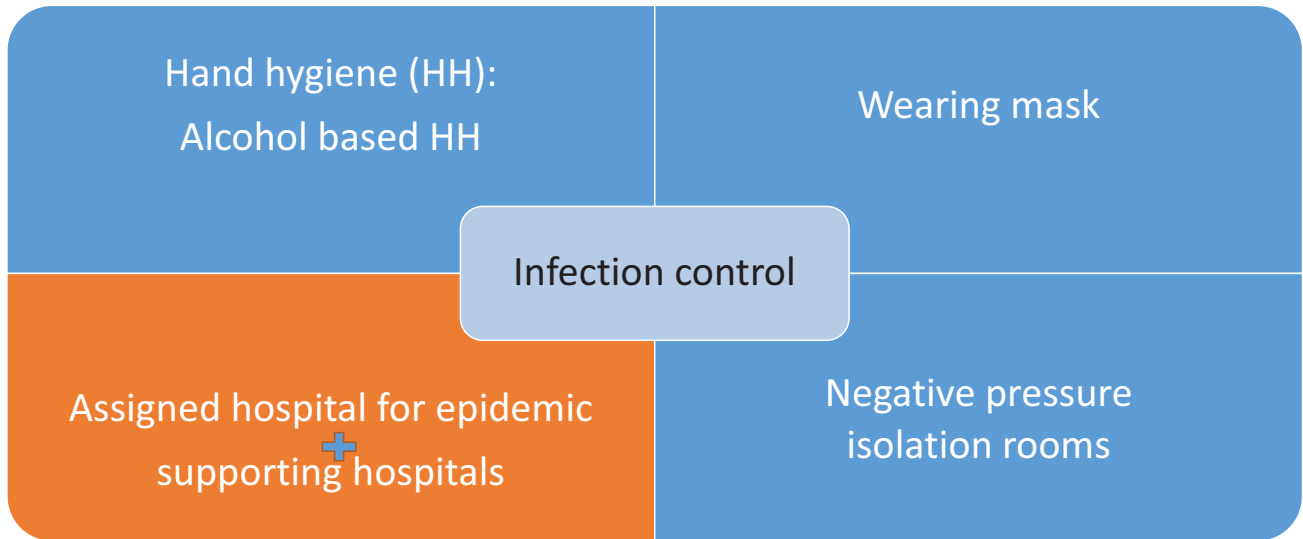


<https://health.udn.com/health/story/10553/4314333>

Impact of experiencing of SARS at Taiwan



Impact of experiencing of SARS at Taiwan





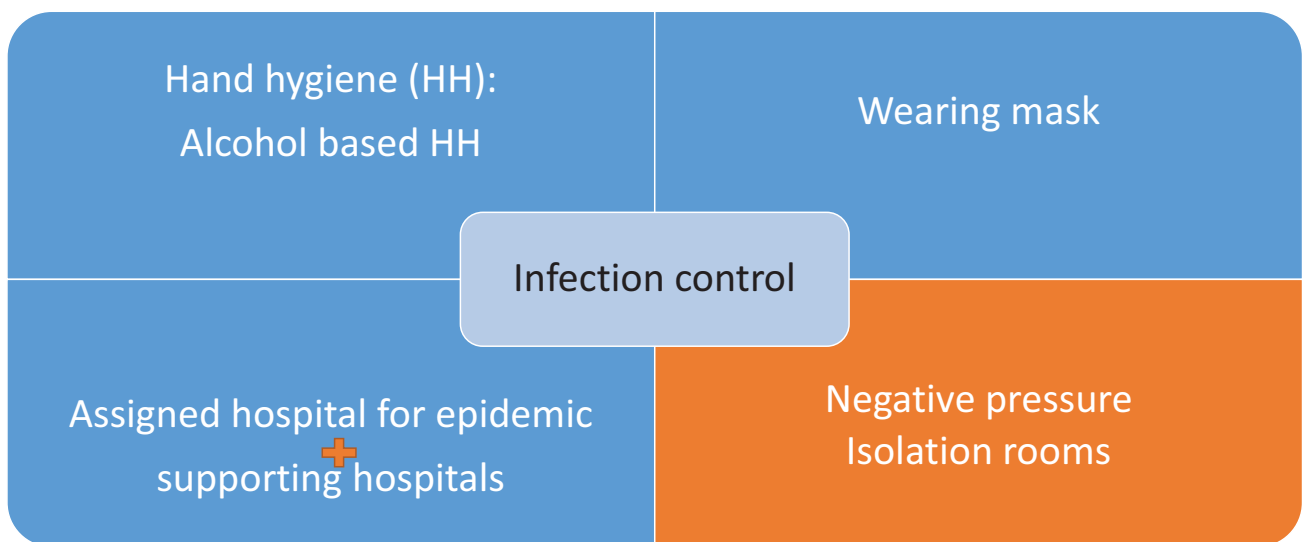
Assigned hospital for epidemic
 supporting hospitals



Commander

Vice principal of NTUH
 Professor Cheng

Impact of experiencing of SARS at Taiwan

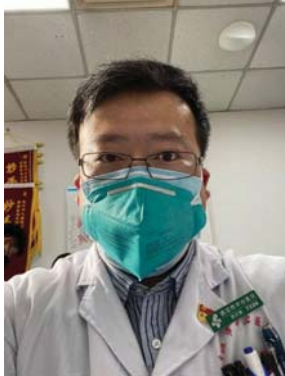




EPISODE II

COVID-19

20191230 Dr. Li post the message of some possible SARS patients in Wuhan



Dr. Wenliang Li

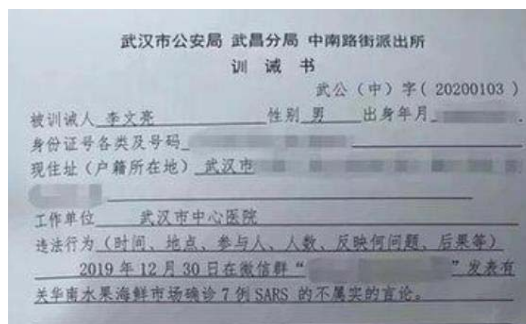


The importance of Wuhan city

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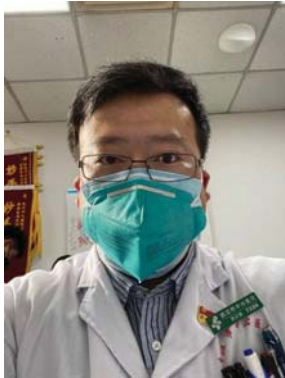


Dr. Wenliang Li

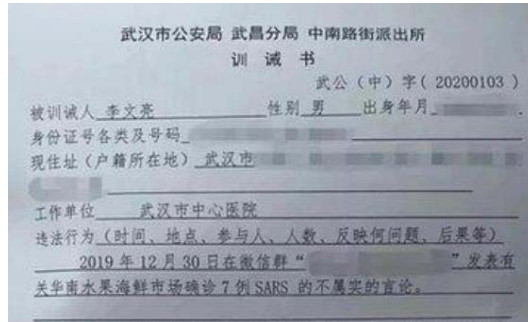


exhortation letter

20191230 Dr. Li post the message of some possible SARS patients in Wuhan



Dr. Wenliang Li



exhortation letter



World Health Organization (WHO) ✓

@WHO

Replying to @WHO @DrTedros and 2 others

We are deeply saddened by the passing of Dr Li Wenliang. We all need to celebrate work that he did on

#2019nCoV - @DrMikeRyan

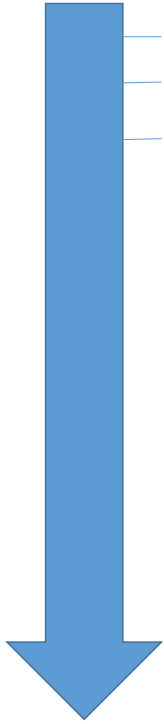
2020/02/07

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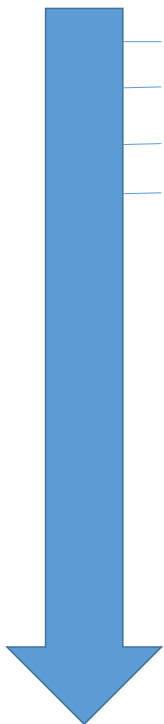
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Deputy Director of CDC, TW



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- 20200120 Several countries reported suspected cases to WHO
Central Epidemic Command Center / CECC started



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| 日 | 一 | 二 | 三 | 四 | 五 | 六 |
|----|----|----|----|----|----|-----|
| | | | 1 | 2 | 3 | 4 |
| | | | 初七 | 初八 | 初九 | 初十 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 十一 | 小寒 | 十三 | 十四 | 十五 | 十六 | 十七 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 十八 | 十九 | 二十 | 廿一 | 廿二 | 廿三 | 廿四 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 廿五 | 大寒 | 廿七 | 廿八 | 廿九 | 三十 | 正月小 |
| 26 | 27 | 28 | 29 | 30 | 31 | |
| 初二 | 初三 | 初四 | 初五 | 初六 | 初七 | |

Chinese New Year



Estimated 3,000,000,000 people traveling around in Chinese new year in China

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Specific Ward



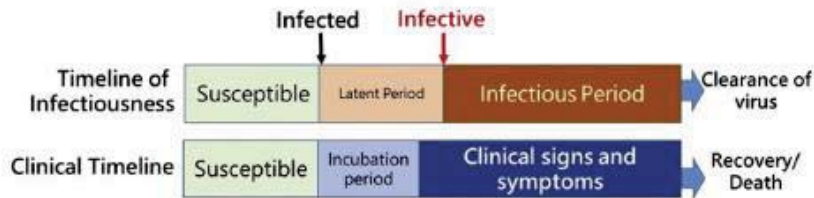
Specific Clinic



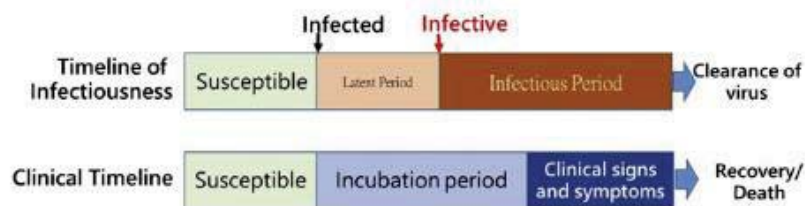
checkpoints

Timelines for infectiousness and clinical states of SARS and COVID-19.

(a) SARS



(b) COVID-19



JFMA. Volume 120, Supplement 1, 2021, Pages S6-S18,

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Specific Ward



Specific Clinic



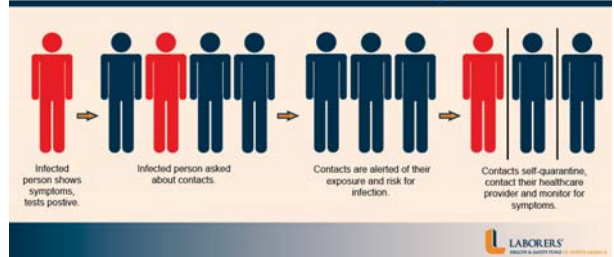
checkpoints



National Health Insurance (NHI)
Smart card
Traveling history
Occupation, eg: health care workers (HCWs)

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How Contact Tracing Works



Index case → isolation

Close contact → quarantine

醫療機構因應COVID-19 感染管制措施指引

新加坡的研究 確診者的病室 病毒存在何處？

1. 廣泛存在環境中
2. 環境消毒可以有效去除病毒
3. 生病的人要戴口罩！
良好個人衛生習慣才能保護別人
4. 接觸污染的環境要勤洗手

ICU醫生陳志金整理

<https://jamanetwork.com/journals/jama/fullarticle/2762692>



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Personal protective equipment (PPE) education

Please record temperature and symptoms daily-

| | | | |
|--|------------------------------------|-----------------------------------|----------------------|
| Name- | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Date- | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Do you have fever (>38°C)- | <input type="button" value="Yes"/> | <input type="button" value="No"/> | |
| Do you have any of these symptoms- | | | |
| Cough with unknown cause \geq 5 days - | <input type="button" value="Yes"/> | <input type="button" value="No"/> | |
| Continuous diarrhea >12 hours - | <input type="button" value="Yes"/> | <input type="button" value="No"/> | |
| Skin rash > 2 days- | <input type="button" value="Yes"/> | <input type="button" value="No"/> | |

Health surveillance among HCWs



Lecture at NTUH



N95 fit test



Seal test

進負壓隔離病室時應戴大小適合的N95口罩

佩戴前確認口罩完整性、乾燥性



- 戴好口罩用手蓋住口罩作seal check，檢查是否密合。
- 照顧同一病人同一口罩連續使用不超過4小時，間歇使用不超過8小時為原則，離開隔離室前室後脫除。
- 重複使用之N95口罩應存放於乾淨透氣紙袋內，標示日期及姓名，放置於指定處。（紙袋不重覆使用）
- 若口罩潮濕、變型、影響氣密時即應予更換。

Fit test

- https://youtu.be/pl_wtU-wJp0



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Health surveillance among HCWs



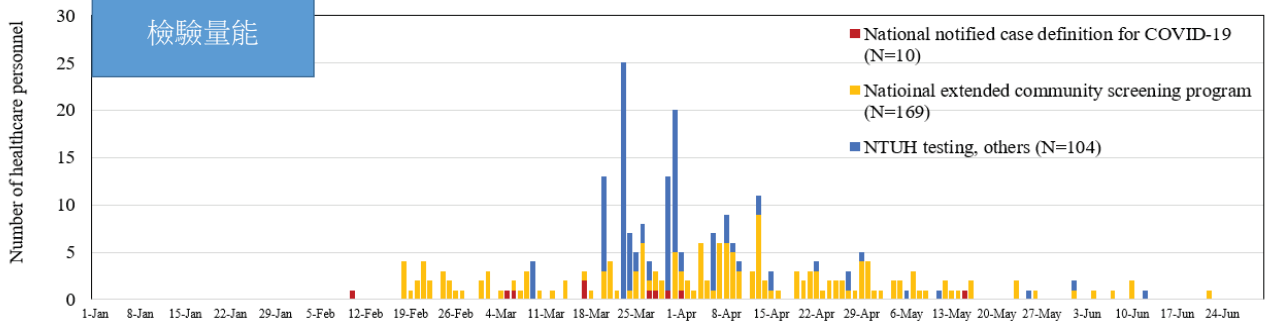
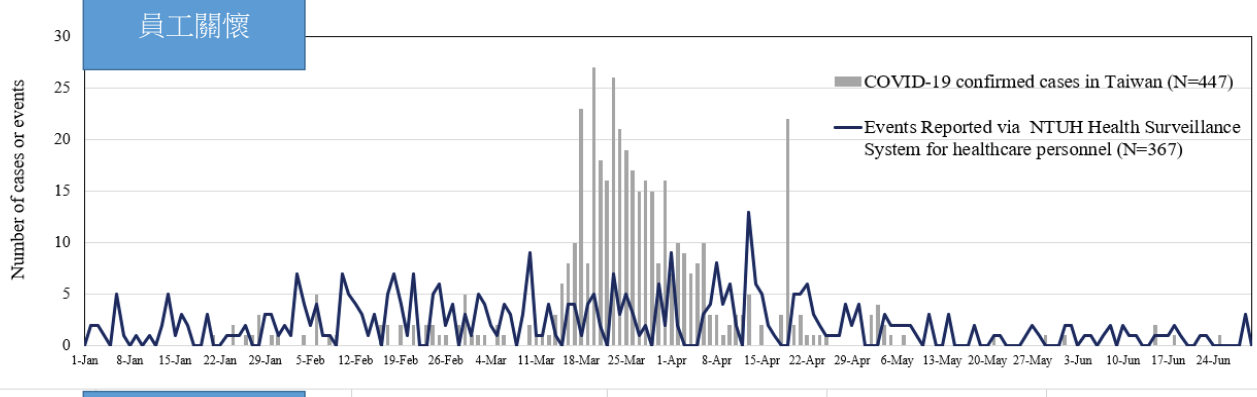
Lecture at NTUH



N95 fit test



Seal test



J Formos Med Assoc. 2021 Jul 23;S0929-6646(21)00349-1.

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Health surveillance among HCWs



Lecture at NTUH



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CECC Press conference



<https://m.facebook.com/mohw.gov.tw/photos/a.484593545040402/1853534838146259/?type=3>

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CECC Press conference

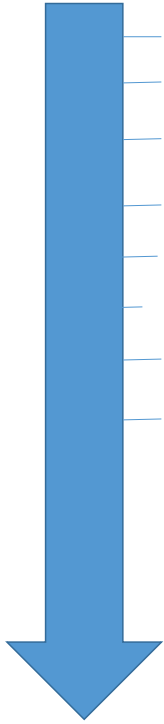


海軍取得艦機偵察案例，與官兵足跡重疊（右圖標示處）且超過 15 分鐘以上的民眾，即使離開該區域仍會收到警示訊息。（Photo Credit: Einc60130, [https://commons.wikimedia.org/wiki/File:ROCN_Panah_\(AOE-532\)_at_Zuying_Naval_Base_20151024.jpg](https://commons.wikimedia.org/wiki/File:ROCN_Panah_(AOE-532)_at_Zuying_Naval_Base_20151024.jpg); Google Map）

Short Message Service, SMS

Intelligent Electronic Fences System (IEFS): GPS

<https://www.pthg.gov.tw/Upload/2015pthg/113/refile/12839/469999/ffe7ebef-1337-4e40-bf3b-4b4709f86a5f.pdf>



- 20191230 Dr. Li post the message of some possible SARS patients in Wuhan
- 20191231 Dr. Lo (CDC, TW) found the news from PTT and shared the information within CDC, TW
- 20200120 Central Epidemic Command Center / CECC started
- 20200122 set specific ward for suspected and confirmed COVID-19 patients
- 20200123 first cases in NTUH, the virus was isolated (SARS CoV-2)
- 20200123 Wuhan city announced traffic ban since 10:00am
- 20200129 set specific clinic for COVID-19 PCR test for suspected patients
- 20200311 WHO announced it's a pandemic



Surveillance among HCWs in Taiwan

Tri-Service General Hospital



February 4, 2020 to July 6, 2020

29 confirmed COVID-19 cases

195 HCWs PCR negative

National Taiwan University hospital

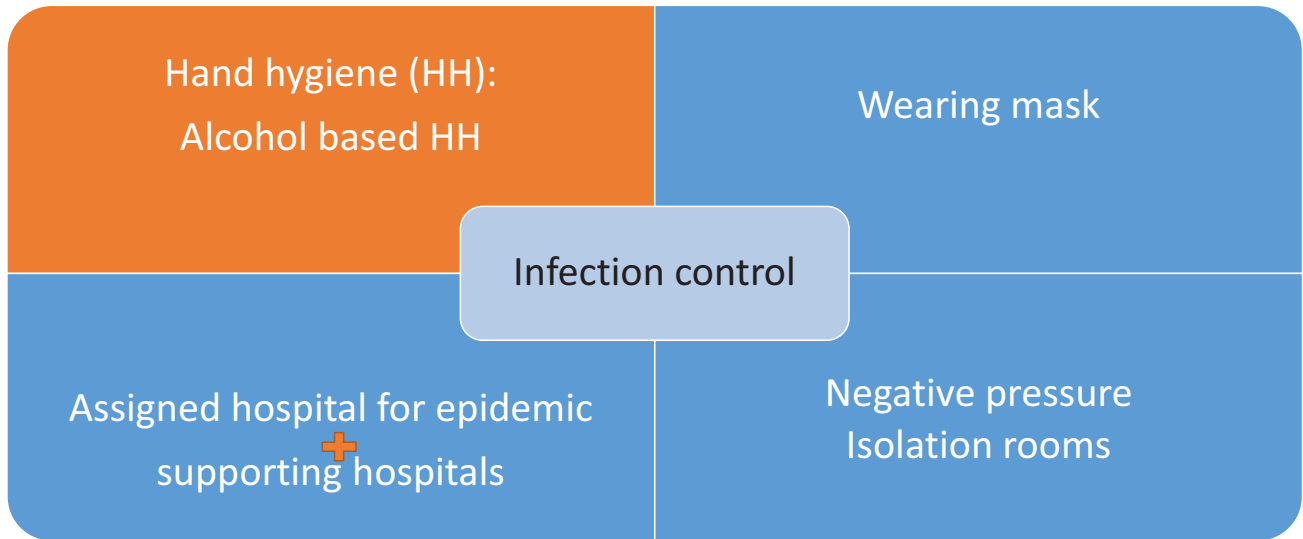


Up to August 31, 2020

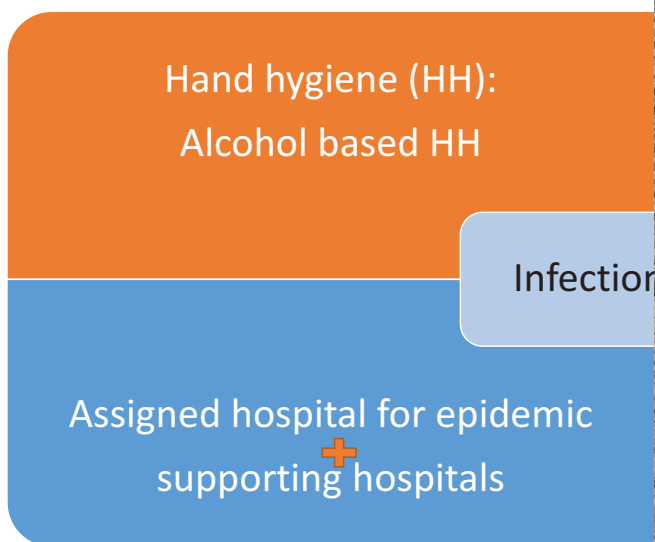
18 confirmed COVID-19 cases

194 HCWs serology negative (ELISA/western blot)

Impact of experiencing of SARS at Taiwan

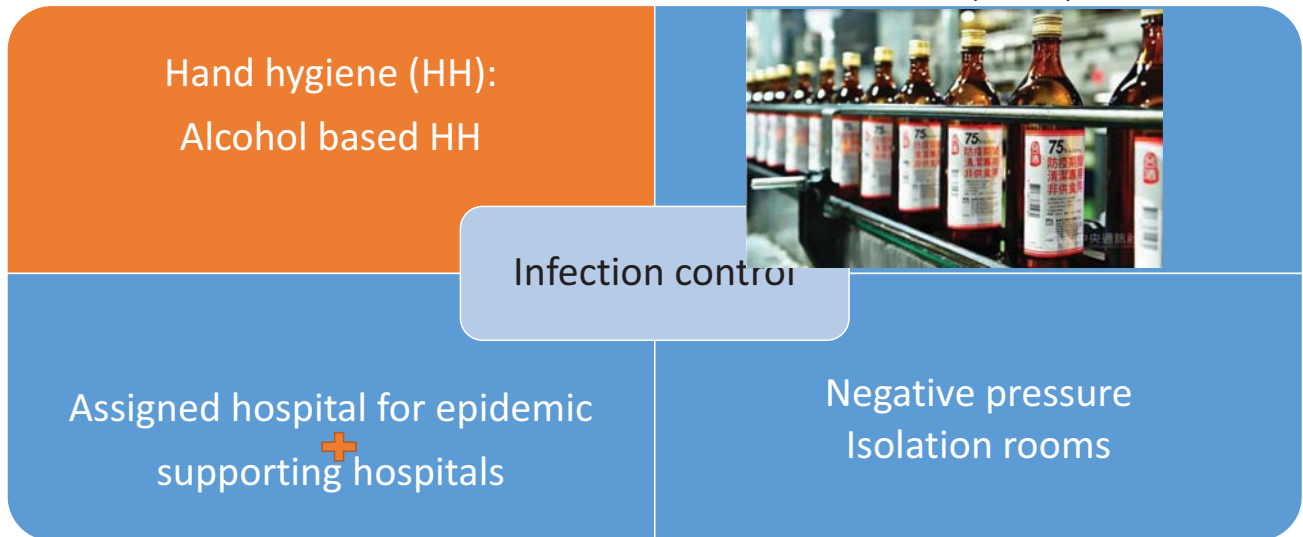


Impact of experiencing

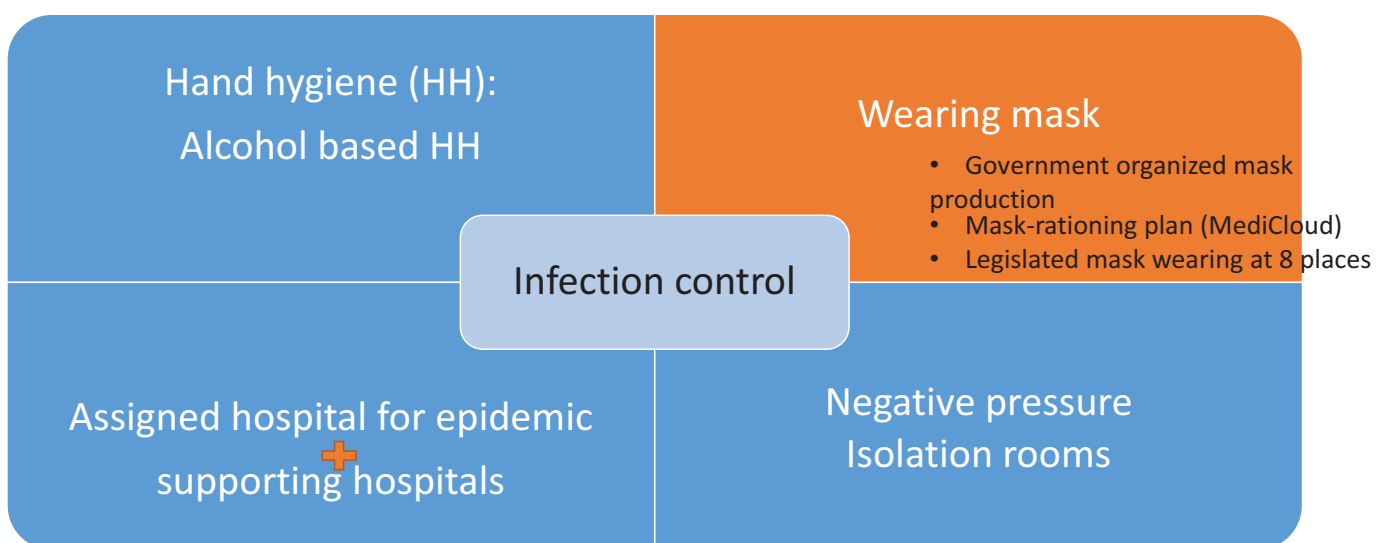


Impact of experiencing of SARS at Taiwan

Taiwan Tobacco & Liquor Corporation

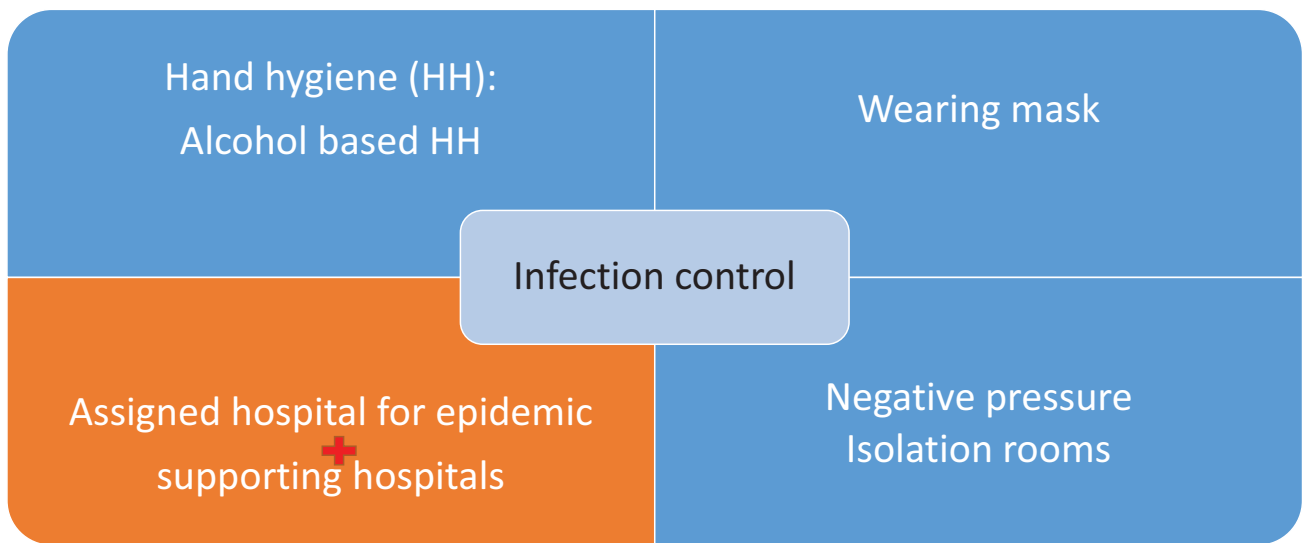


Impact of experiencing of SARS at Taiwan

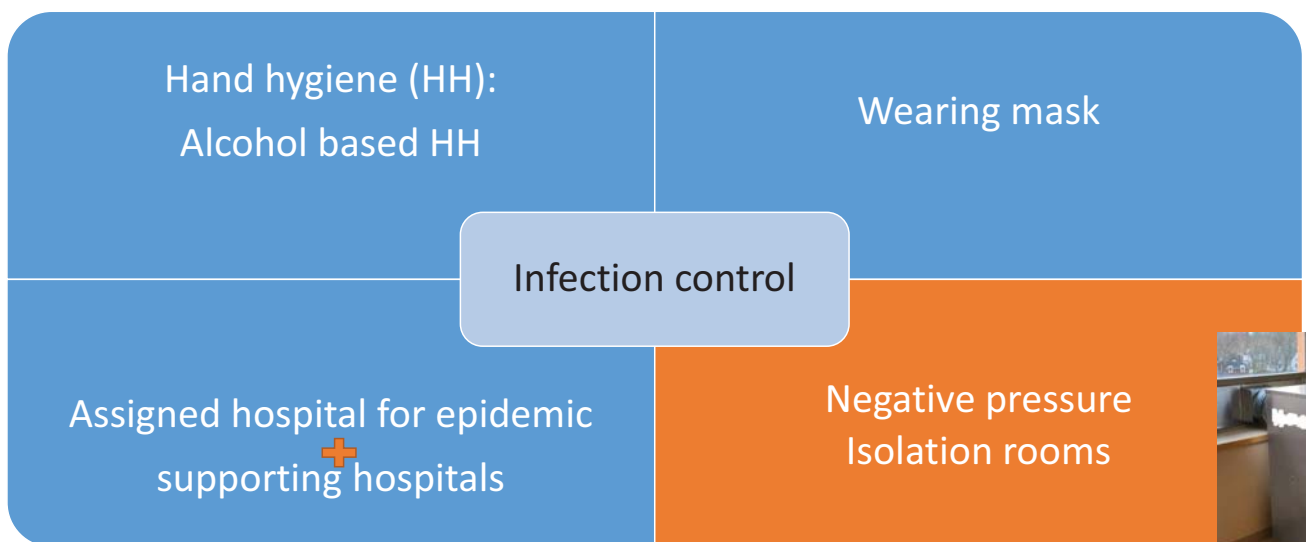


<https://blogs.bmj.com/bmj/2020/07/21/whatwe-can-learn-from-taiwans-response-to-the-covid-19-epidemic/>

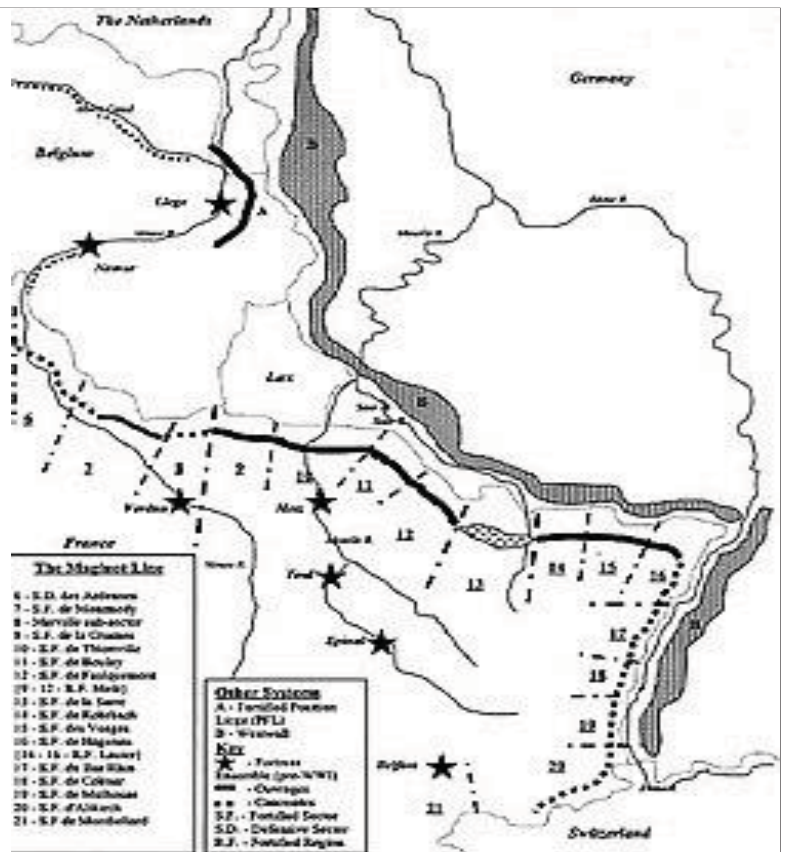
Impact of experiencing of SARS at Taiwan



Impact of experiencing of SARS at Taiwan



Portable hepa



Engineer control

Negative pressure isolation room

PPE
mask

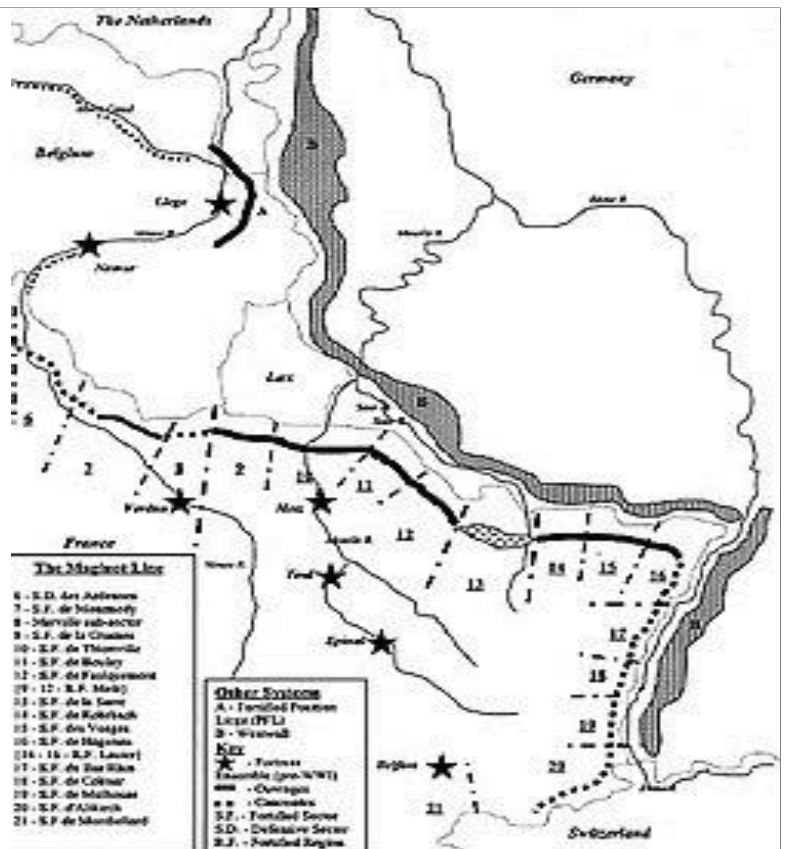
Personnel control

TOCC
HCWs surveillance

Contact tracing
Extended test
通報 (大通報小通報)

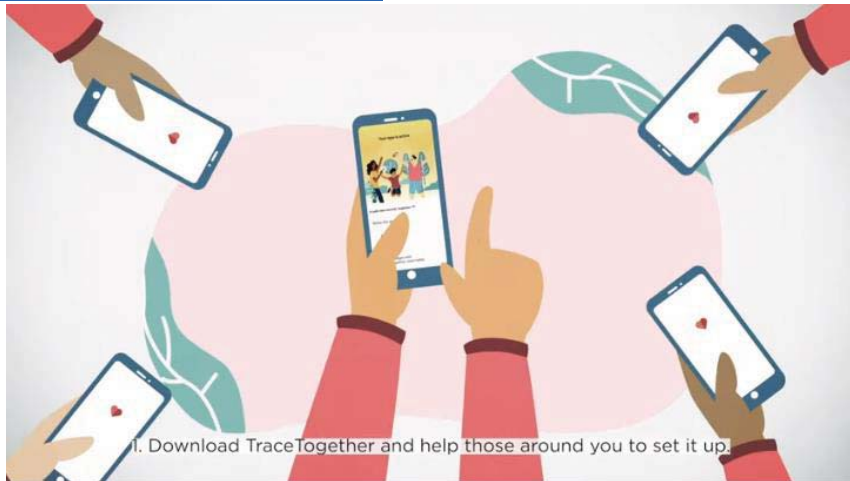
Administration control

Cough and Sneeze Etiquette
Proper Hand Hygiene
Social Distancing Requirements



Tracetogether (Singapore)

- <https://youtu.be/TA1qx9fvWnY>



Courtesy of Professor Huang

共同防疫守護臺灣 立即下載 臺灣社交距離App

不需註冊帳號 不會擷取使用者資訊 不用上傳個人資料

臺灣社交距離App藉由藍牙訊號強弱，掌握與COVID-19病例接觸情形，且不會追蹤使用者足跡，隱私保護優於歐盟一般資料保護規範(GDPR)，可安心下載使用。

- 「臺灣社交距離App」是由台灣人工智慧實驗室開發，並與行政院及疾病管制署合作的防疫App。
- 此App以保護隱私且尊重使用者意願為最高原則。由使用者自主下載及隨時刪除，程式中相關接觸編碼資料僅儲存於手持裝置14天。

使用者 手機畫面 (1)



使用者手機畫面(2)

若「確診者」

- 1)已使用此APP
且
- 2)主動分享隨機ID
且
- 3)登錄衛生局給的**驗證碼**到APP

透過APP通知
有**2公尺且2分鐘**的
接觸者(亦為APP用戶)

< Back 上傳隨機 ID

請輸入起訖日期

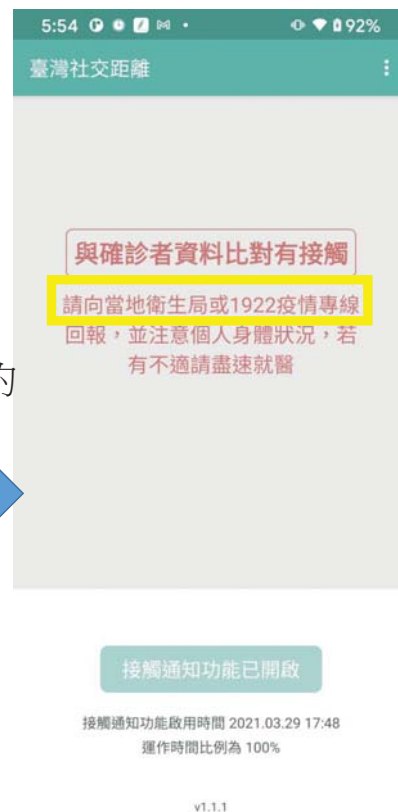
2021/04/22

2021/05/06

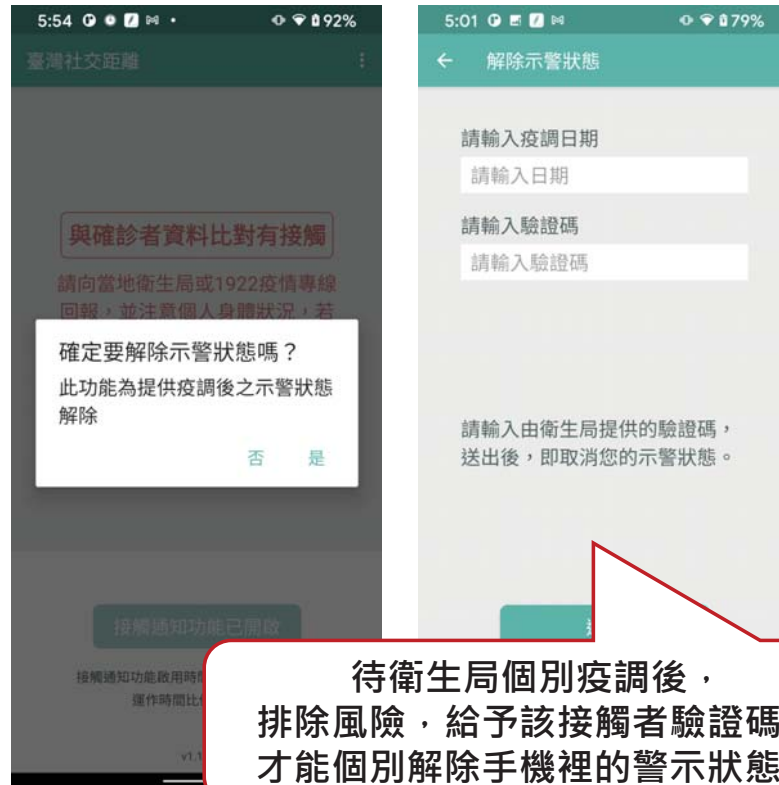
請輸入驗證碼

請輸入驗證碼

請輸入由衛生局提供的驗證碼，送出後，會上傳您的隨機 ID，這些資料會保存在衛生福利部疾病管制署，並於 10 天後自動刪除。



使用者 手機畫面 (3)



**共同防疫守護臺灣 立即下載
臺灣社交距離App**

不需註冊帳號 不會擷取使用者資訊 不用上傳個人資料

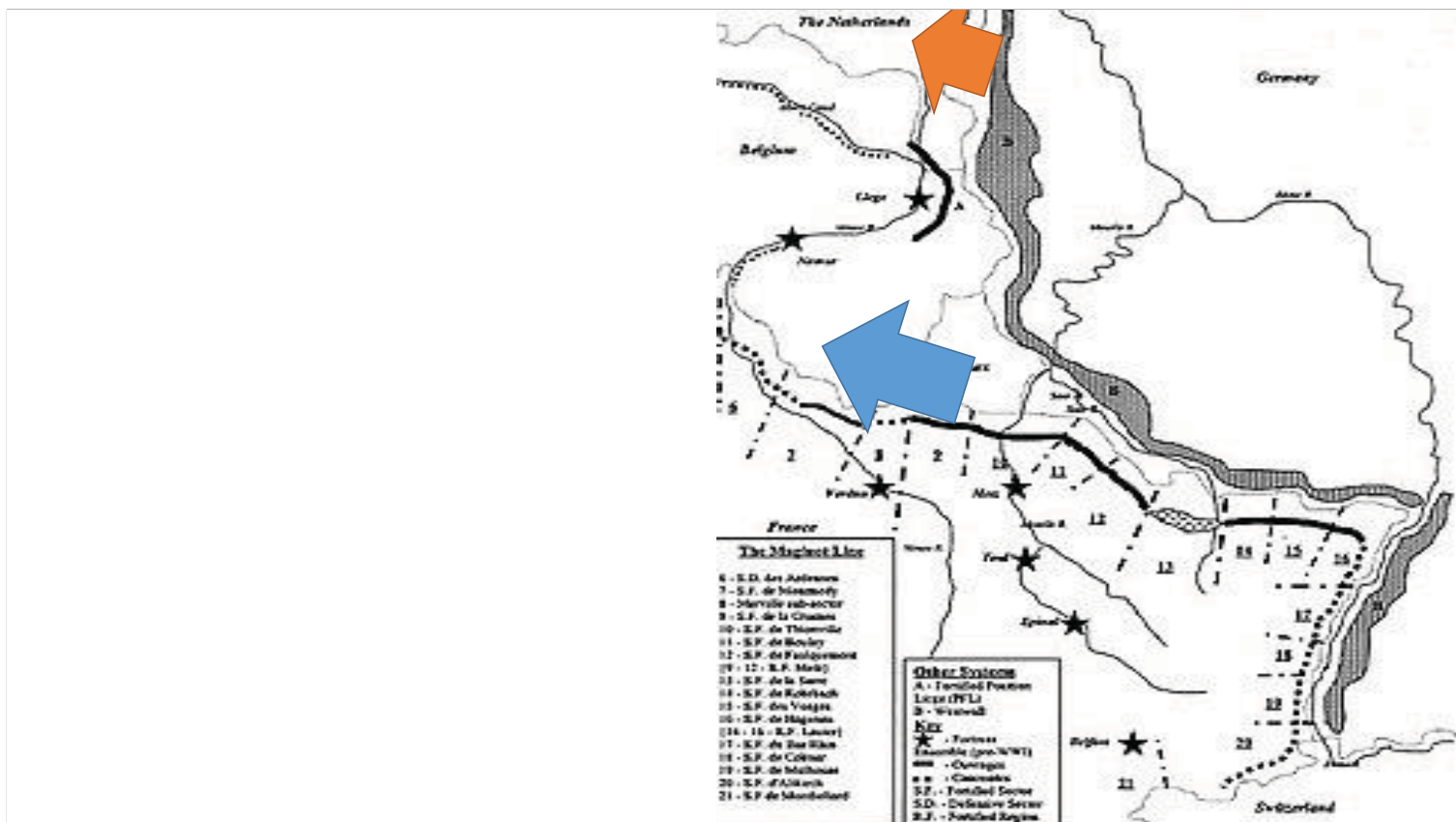
臺灣社交距離App藉由藍牙訊號強弱，掌握與COVID-19病例接觸情形，且不會追蹤使用者足跡，隱私保護優於歐盟一般資料保護規範(GDPR)，可安心下載使用。

**保護您與您的家人
減少疫情擴散機會**

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

App Store Google Play

- ◆敬請鼓勵所屬同仁使用此APP。
- ◆如使用者同仁有接獲「與確診者資料比對有接觸」，可諮詢感管中心，另個人需回報北市衛生局。



2021.5 全面提升因應-擴大篩檢

COVID-19篩檢情境及檢測方式-社區高流行期(尚無疫苗群體保護之第三級疫情)」

維持 有症狀之病人/員工即採檢

維持 居隔/居檢/自主健康管理身分之病人/探病人採檢

住院中 肺炎病人

住院中 有COVID-19其他相關症狀病人

排程住院/檢查病人 有疑似症狀或風險足跡者

疫調相關病人/陪病人/員工

全體員工普篩

排程住院 **所有病人及陪病人**

住院中 **所有病人及陪病人**

高危單位員工 定期檢測

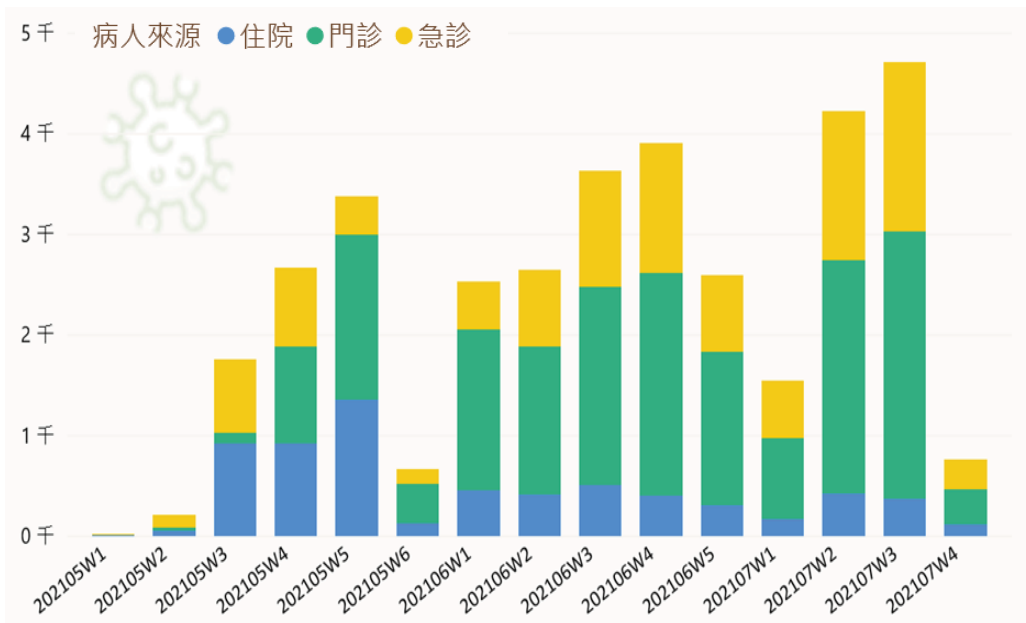
特殊門診單位 病人及陪病人(如**血液透析**...等)

特殊緊急探病人(非居隔/居檢/自主健康管理身分)

非專責病房曾照顧確診病例之風險員工

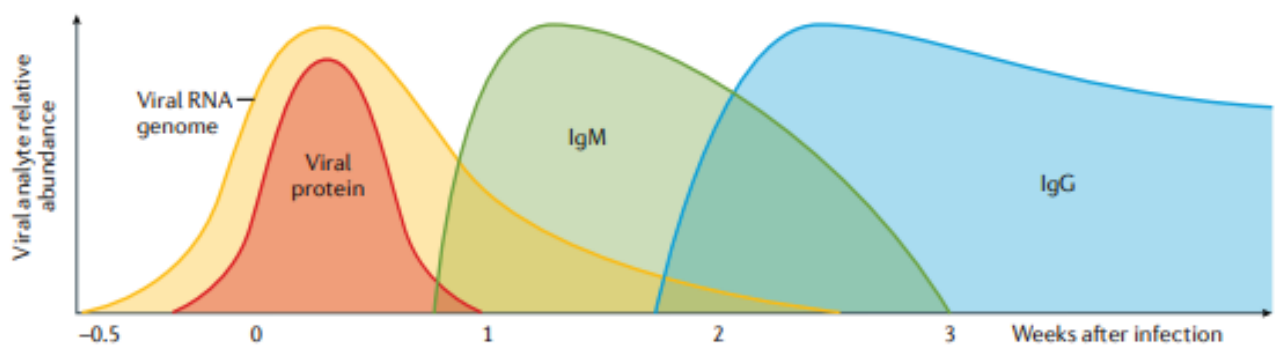
**快速調整
立即執行**

SARS CoV-2 抗原快篩/核酸檢測 每日維持高檢驗量



PCR? Antigen? Antibody?

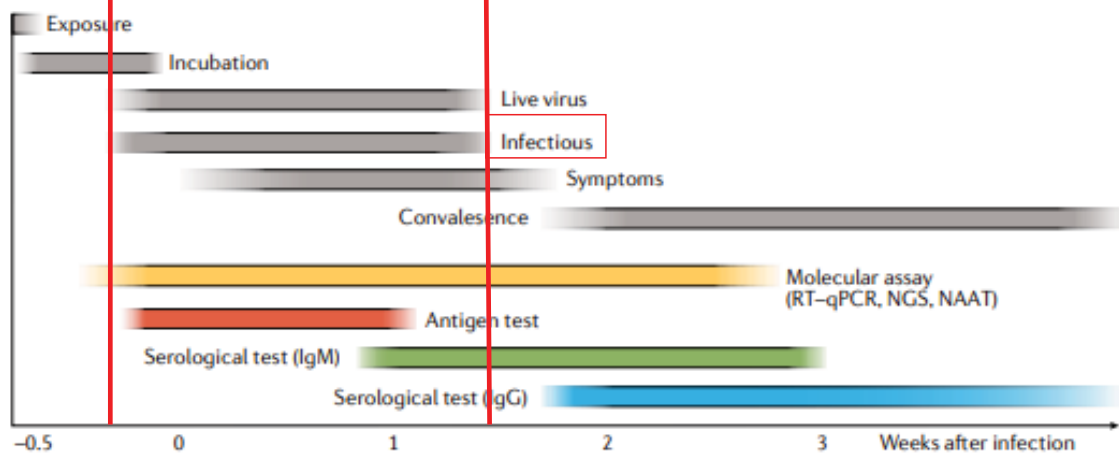
a Viral analyte (RNA, protein and antibody) dynamics



Nature Reviews Genetics volume 22, pages415–426 (2021)

The goal of screening

b Infection stage and applicable test modalities



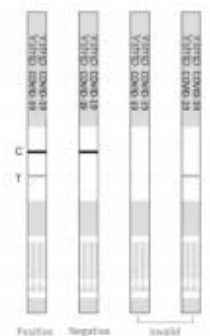
The pros and cons of antigen/PCR test

PCR

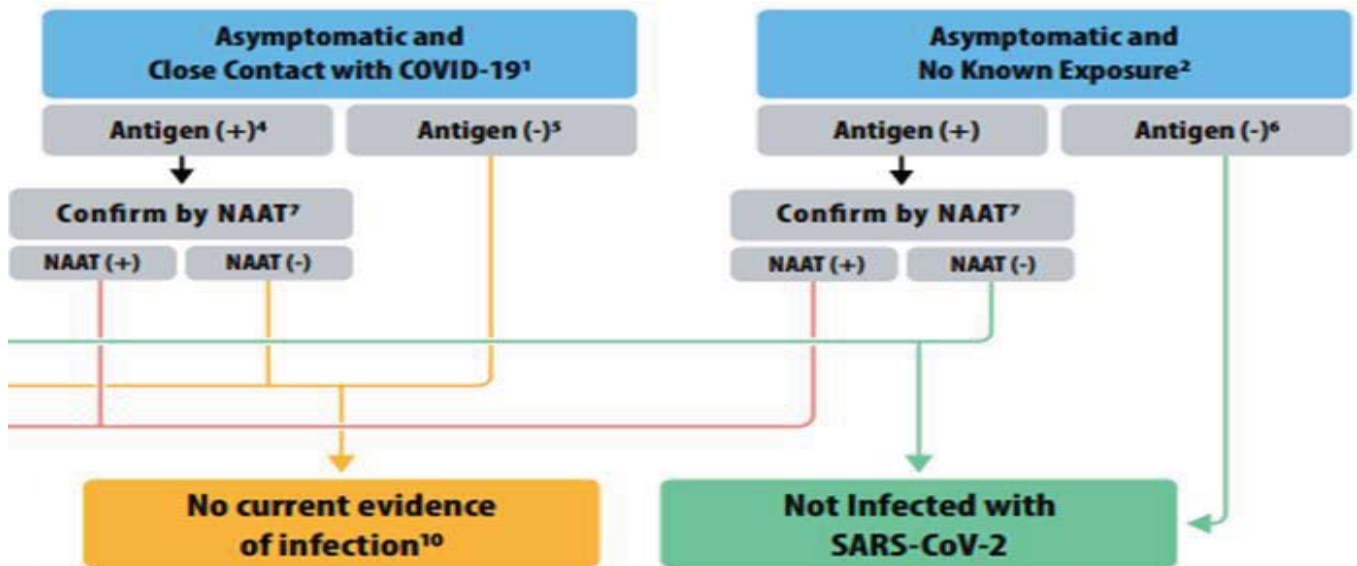
- High sensitivity
- High specificity
- High cost
- Longer waiting time

Antigen

- Lower sensitivity
- Lower specificity
- Lower cost
- Shorter waiting time
- Need to handle **false positive** events



Antigen Test Algorithm



https://www.cdc.gov/coronavirus/2019-ncov/lab/resources/Antigen_Testing_Algorithm_2020-12-14_v03_NO_DRAFT_SPW_508.pdf

Saliva test Versus NP/OP

Table 2. Parallel testing of anterior nares/oropharyngeal swabs and saliva from NBA players, staff, and contractors

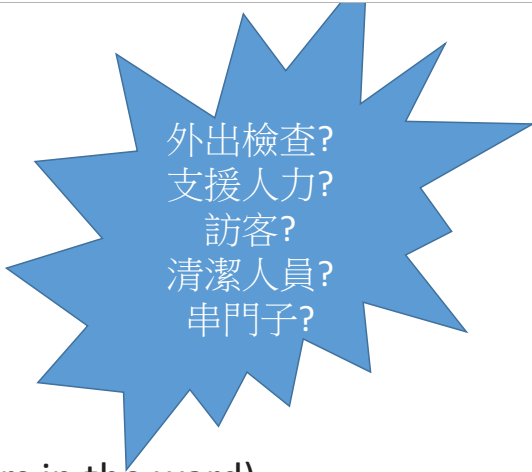
| | | Quest/BioReference | |
|---------------------|----------|--------------------|----------|
| | | AN/OP Swab | |
| | | Positive | Negative |
| SalivaDirect Saliva | positive | 17 | 2 |
| | negative | 2 | 3,746 |
| | invalid | 0 | 12 |
| Total | | 19 | 3,760 |

Invalid samples = 0.3% (12/3,779). Positive agreement = 89.5% (17/19). Negative agreement = 99.9% (3,746/3,748 valid samples). Overall agreement = 99.9% (3,763/3,767 valid samples).

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7836249/pdf/main.pdf>

Cluster management

- Case identification
- Close contactors
 - 15 mins contact with 24 hours
 - Without adequate protection (surgical masks)
- Risk group (other HCWs and patients/care givers in the ward)
- 病房清空
- 環境採檢
- 情緒支持
- 醫療花費



外出檢查?
支援人力?
訪客?
清潔人員?
串門子?

Mental health among HCWs during COVID-19 in Asia

- Prevalence of mental status
 - Fear 77.1%
 - Insomnia 35.0%
 - Depression 27.2%
 - Anxiety 25.9%

Mental health among HCWs during COVID-19 in Asia

- Risk factors of mental status disorder
 - Female
 - Frontline HCP
 - Nurse
 - Divorced
 - Direct contact treating infected patients
 - Worker for fewer year
 - Longer working time
 - Lack IPC knowledge
 - Lack of PPE

JFMA 120(2021) 1296-1304

台大醫院  **互相關懷 · 安心工作**
自我照顧與關懷同事

掃描QR code, 取得你需要的資源

| | | |
|--|--|--|
| 壓力山大想找人談談  臨床心理中心 桌機 67171 簡碼 53405 | 隔離中想找人聊聊  社會工作室 桌機 65681 | 躁動、自傷意念  精神醫學部 桌機 62142 |
| 差勤管理、補償權益  人事室 桌機 61584 | 實習訓練  教學部 桌機 67525 | 隔離天數  感染管制中心 桌機 63014 |

我的專責人員：_____ 簡碼：_____

減壓 · 抗壓 · 增能 · 權益

疫災應變功能群組
關懷工作組

疫情間，感到壓力、身心變化，是常見的，通常能自我調節並修復。若以下感覺持續，已影響社交、工作、生活，情況特殊則需注意了解，協助啟動員工關懷。

臨床心理師
陪你一起
專注呼吸

焦慮 不安 憂慮 難過
疲倦 失眠 敏感 無助
孤立 疏離 否認 易怒
躁動 攻擊 混亂 分心

情緒壓力分數 ≥ 7

0 1 2 3 4 5 6 7 8 9 10

0: 完全沒有壓力
10: 壓力大到受不了

2021/6

What are we lagging behind?

COVID-19 vaccination rate in Taiwan

疫苗接種

來源：Our World In Data · 上次更新時間：2 天前

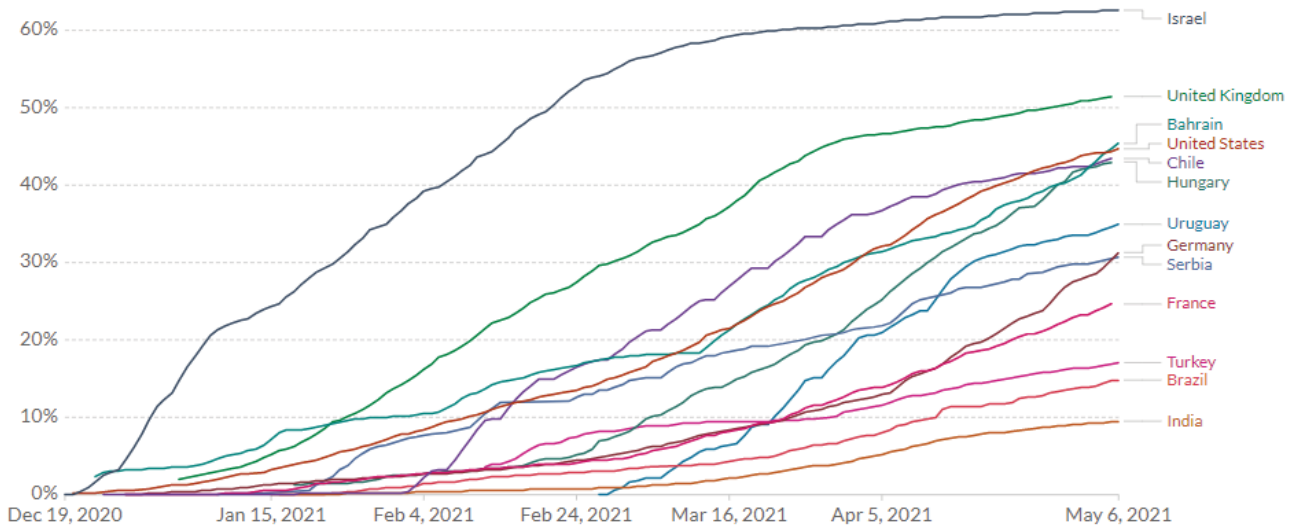


Share of people who received at least one dose of COVID-19 vaccine

Share of the total population that received at least one vaccine dose. This may not equal the share that are fully vaccinated if the vaccine requires two doses.

Our World in Data

LINER LOG



Source: Official data collated by Our World in Data

CC BY

<https://ourworldindata.org/covid-vaccinations>. Accessed May 8, 2021

疫苗接種

來源：Our World In Data · 上次更新時間：2 天前

總計

台灣

不限時間



95,667

臺大醫院 COVID-19 疫苗開打
累積至今 (7/29) 之施打人次

Cumulative number of COVID-19 vaccinations in NTUH (as of July 29, 2021)

Protection of HCWs in the COVID-19

