

COVID-19 檢測開發- 從理論到實務

陳宜君

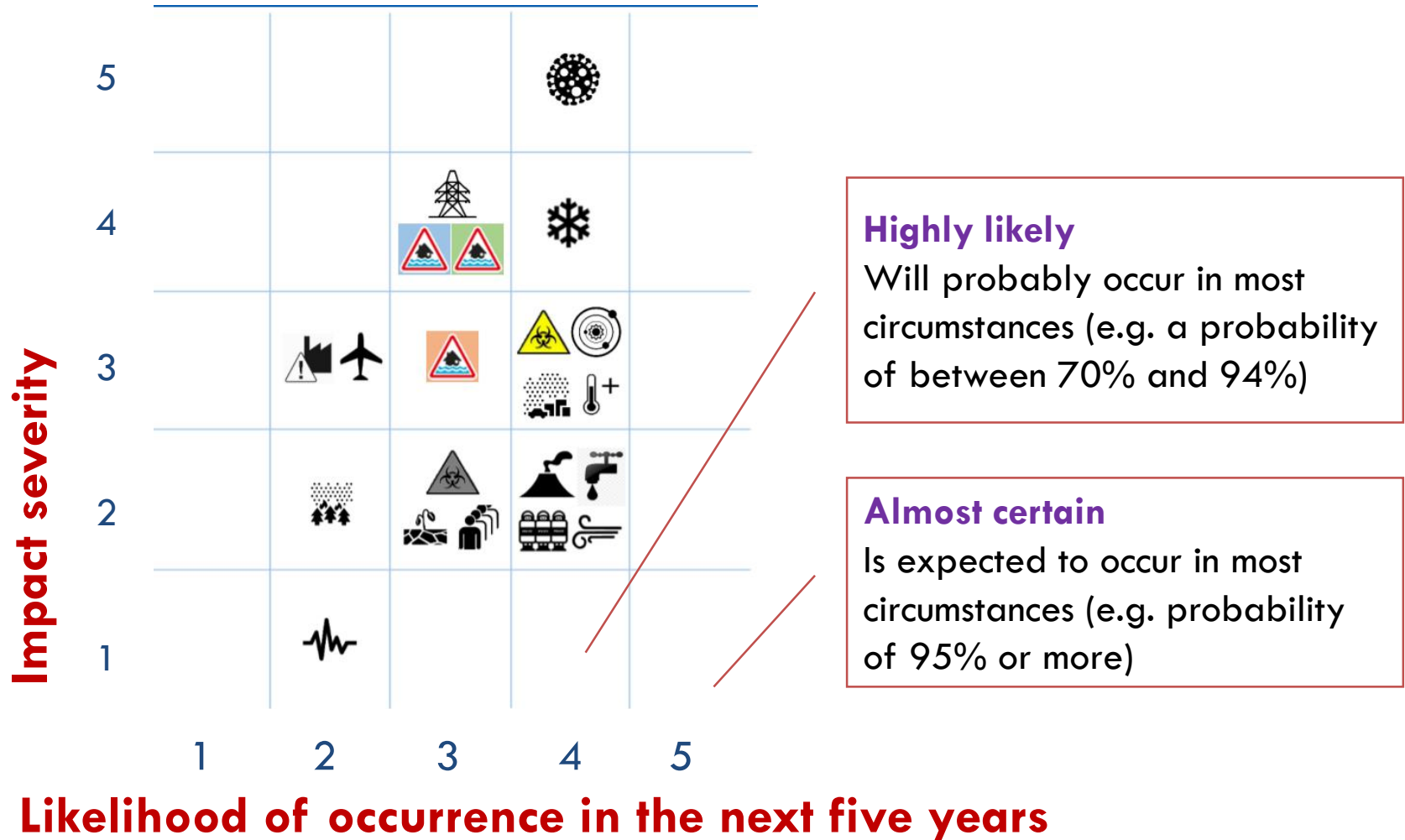
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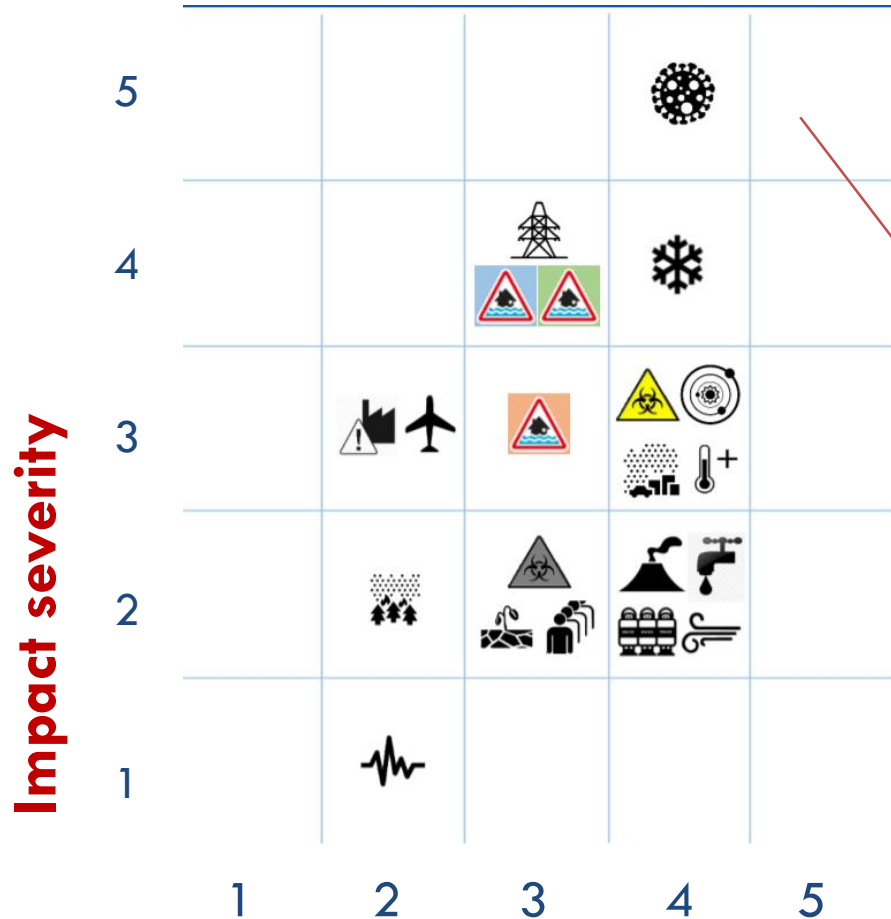


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National Risk Register of Civil Emergencies



National Risk Register of Civil Emergencies

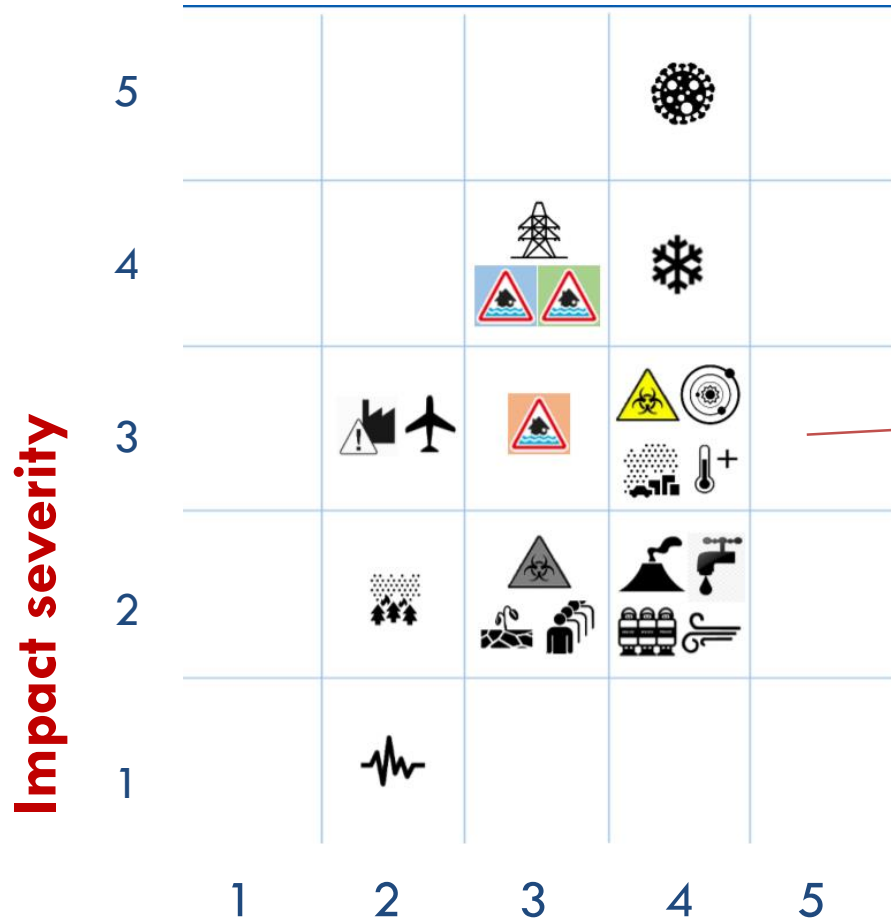


Severe

- Severe impact for a large population or at-risk group
- Severe disruption to normal activities and services
- A large number of additional control measures will be needed and most of these require significant resources to implement
- Serious increase in costs for authorities and stakeholders

Likelihood of occurrence in the next five years

National Risk Register of Civil Emergencies

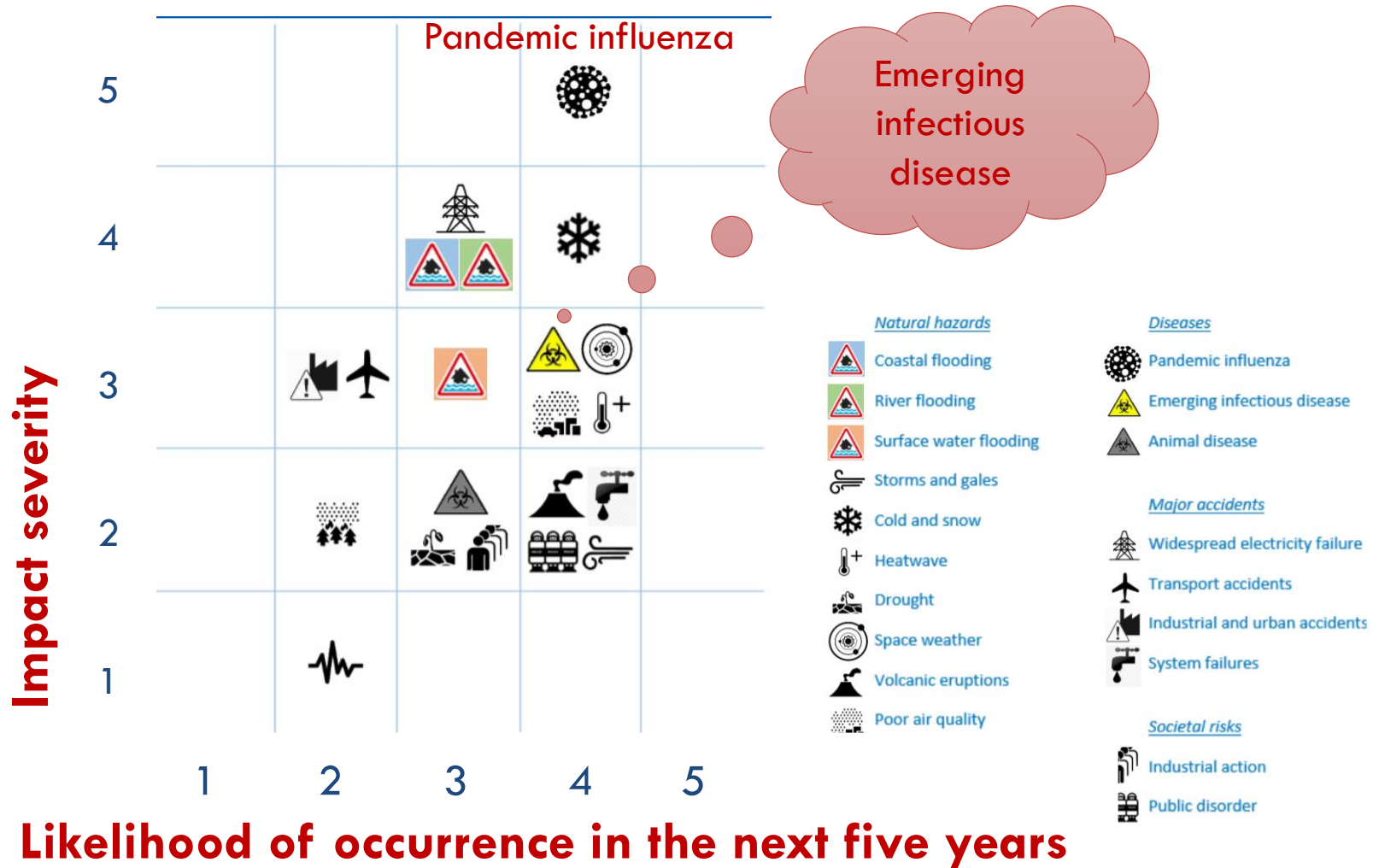


Moderate

- Moderate impact as a large population or at-risk group is affected
- Moderate disruption to normal activities and services
- Some additional control measures will be needed and some of these require moderate resources to implement
- Moderate increase in costs for authorities and stakeholders

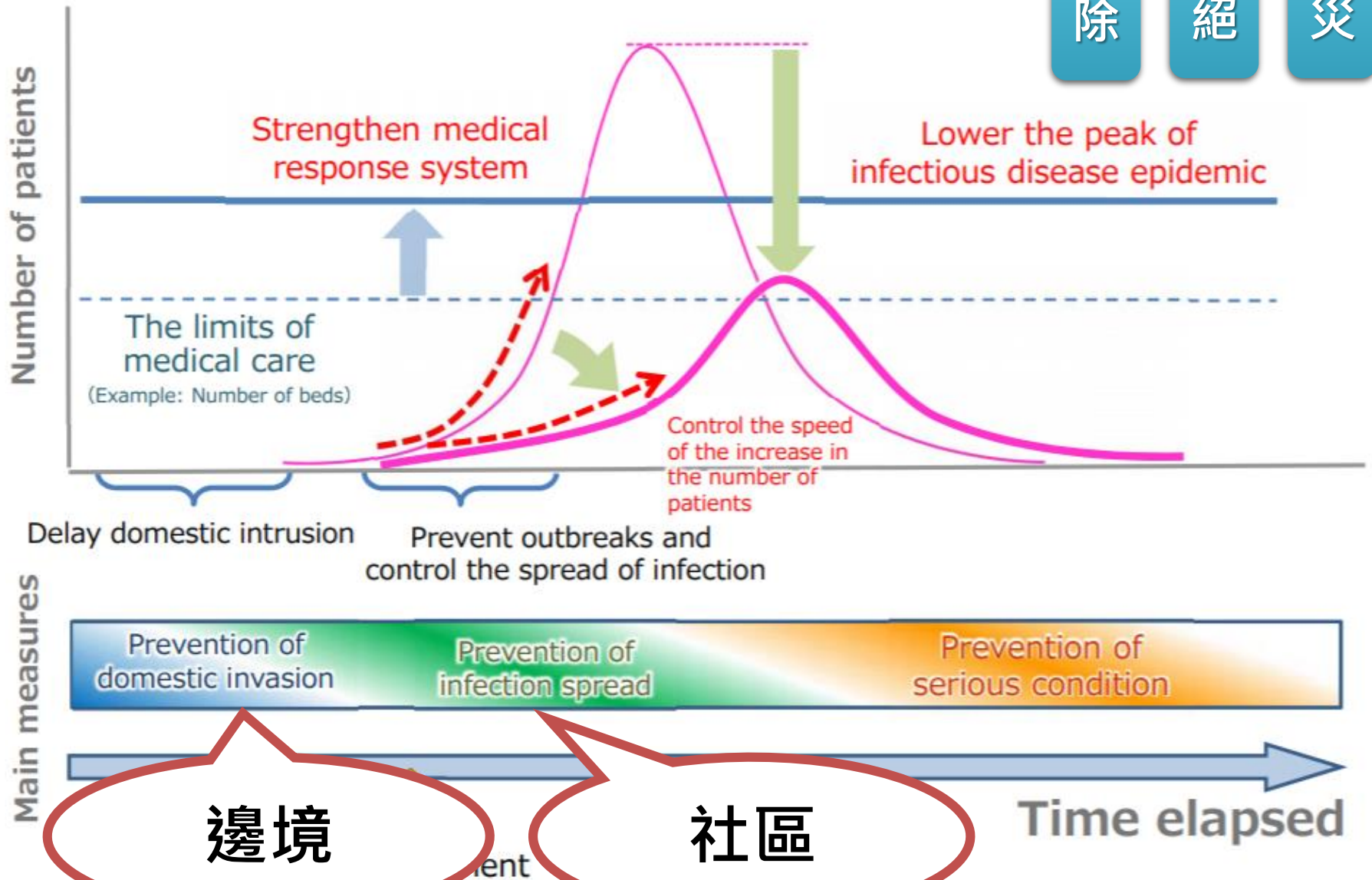
Likelihood of occurrence in the next five years

National Risk Register of Civil Emergencies



新興傳染病防治策略及目的

根除 阻絕 減災



傳染性疾病防治 – 4T

Transmissible

Treatable

Timing

Trust/team

COVID-19疫情的挑戰

- 多數症狀無特異性，無法與流感或其他病毒區分
- 發病前及發病初期具高傳染性，有“無症狀感染”
- 病毒釋放(核酸檢查)持續長，平均20天
- 可能重症，甚至死亡
- 世界各國持續社區散播

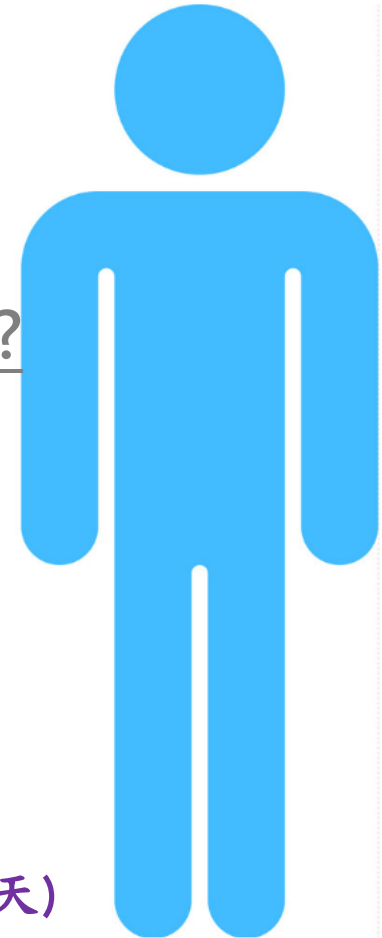
檢測開發考慮因素

- 檢測的分子：核酸、抗原、抗體
- 疾病病理機轉
- 採檢部位：上呼吸道、下呼吸道；血液；尿液、糞便；環境
- 檢體：鼻咽拭子、咽喉拭子；gargling (上呼吸道)
- 儲存、運送；前處理；單支、批次/設備
- 判讀
- 目的

來源



易感宿主



COVID-19 傳染途徑

直接 - 接觸、飛沫，空氣?
間接 - 汙染環境

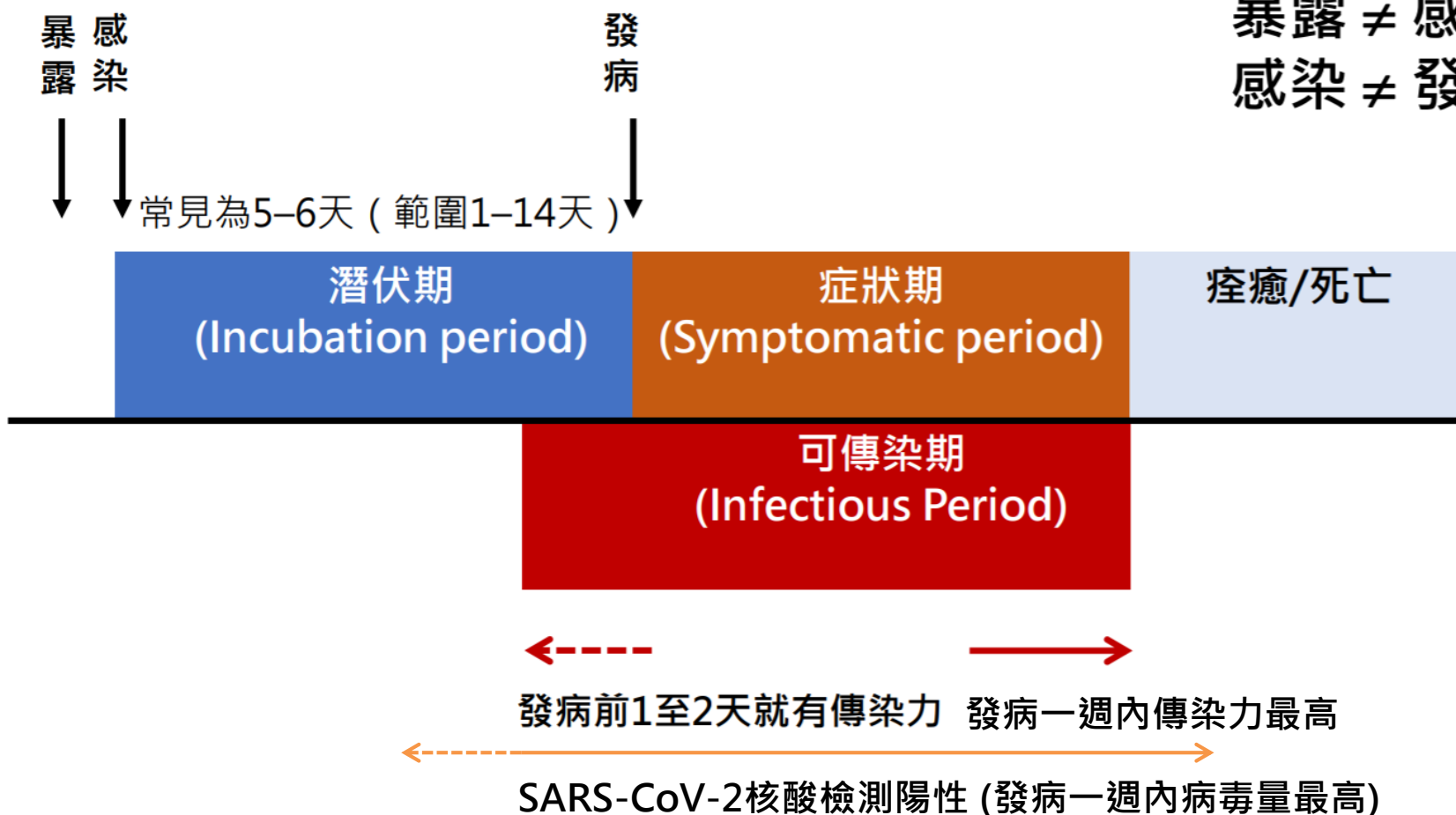
Prolonged viral shedding
Households >> other close contact

Exposure →
Infection → Disease →
Morbidity → Mortality

從暴露至發生症狀 14天內(5-6天)

嚴重特殊傳染性肺炎 COVID-19

暴露 ≠ 感染
感染 ≠ 發病

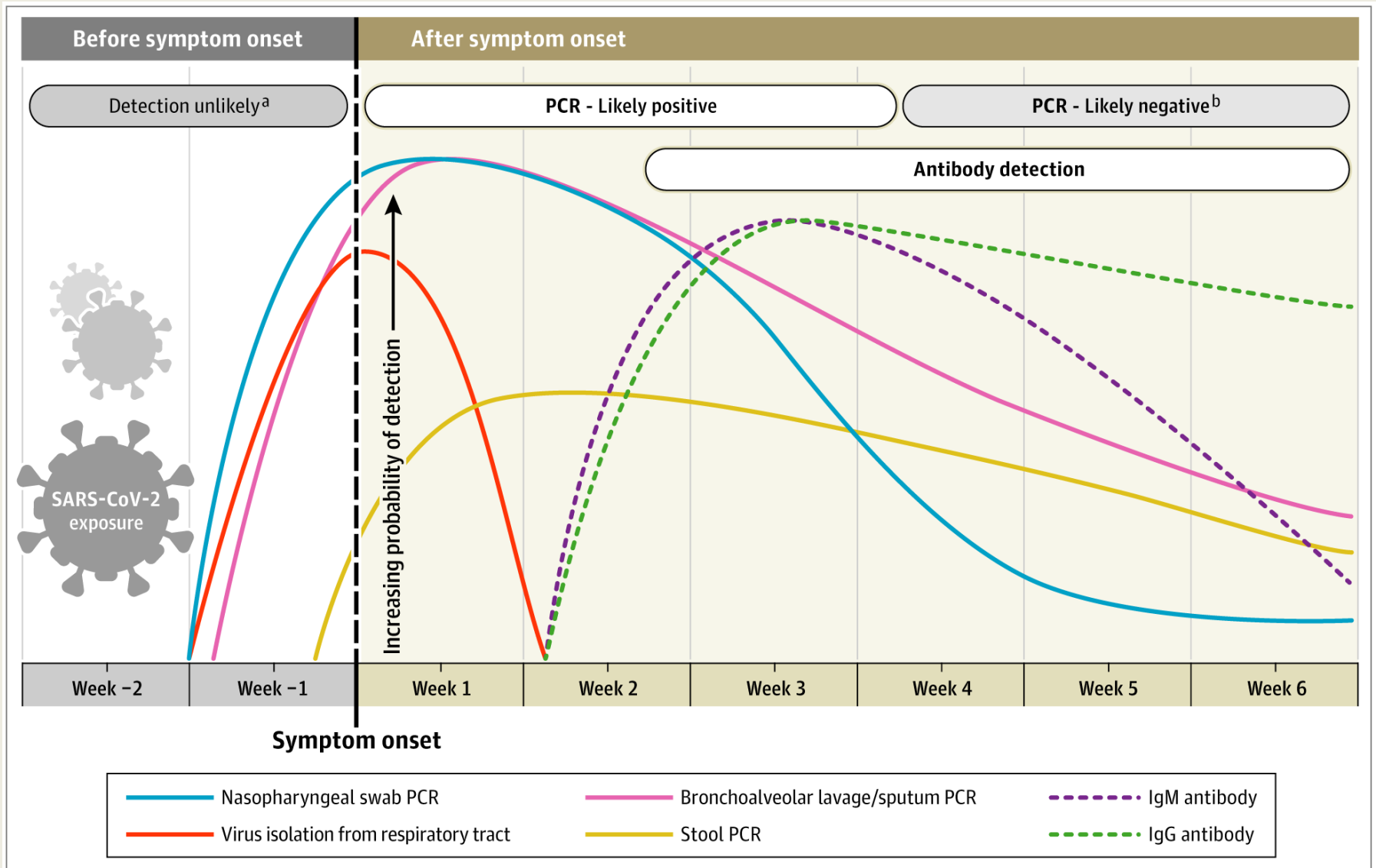


確診病人上呼吸道檢體可持續檢測SARS-CoV-2核酸陽性平均達兩週以上。
輕症確診病人發病第10日後即無法從呼吸道檢體培養出病毒。

疾病管制署 <https://www.cdc.gov.tw/Category/Page/vleOMKqwuEbIMgqaTeXG8A>

Wölfel R, et al. Nature. 2020;581:465; Arons MM, et al. N Engl J Med 2020; 382:2081

Estimated Variation Over Time in Diagnostic Tests for Detection of SARS-CoV-2 Infection Relative to Symptom Onset



檢測使用考慮因素-目的

- 國家防疫政策：
 - 減害：普篩，血清流行病學/盛行率
 - 阻絕、根除
- 個人檢測目的：
 - 篩檢(無症狀、風險評估、contact tracing)
 - 診斷(因症就醫)、
 - 嚴重度評估
 - 預後預測
- 時機 timing, turn-around-time
- 可行性
- 數據意義
- 檢測結果結合行動方案

Testing & Tracing

Confirmed case found



Inquiring activity during the 14 days prior to symptom onset.



Identifying contacts and establishing contact list



Contact tracing

2

Mandatory 14-day home quarantine from last contact with the case with daily health monitoring



Inquiring symptoms within 14 days before case's onset of disease



Searching the source for every locally-acquired case

1

asymptomatic



14-day home quarantine plus a 7-day health self-management

Symptomatic or high risk exposure



Referring to hospitals for testing +/- hospitalization



Symptomatic or possible source candidate



asymptomatic



Health education and follow up calls



Feasibility - 4A

Available

Accessible

Affordable

Accurate