

# COVID-19 等新興傳染病對醫療的衝擊與因應

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31 Aug 2021 Dr. Feng-Yee Chang

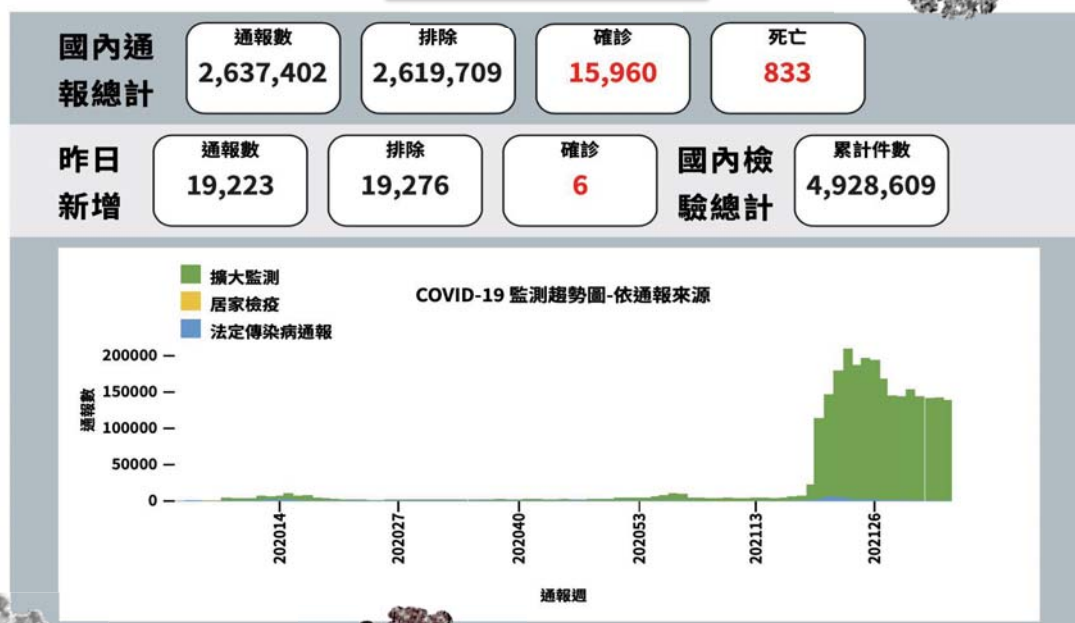
## 流行現況

### COVID-19



更新時間：2021-08-29 09:20

## 流行現況



更新時間：2021-08-29 00:30

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## COVID-19 疫情對公衛醫療之挑戰

### 預防為主 VS. 治療為主

- 🕒 社區防疫網：民眾集體智慧投入建構和推動
- 🕒 由上而下/由下而上
- 🕒 其他疾病防治如結核病、愛滋病、常規疫苗施打
- 🕒 擴大貧富差距
- 🕒 Surge capacity（突發大量之容納能力）
- 🕒 疫情會排擠、影響其他疾病之常規醫療
- 🕒 疫情失控，會產生醫療體系崩潰
- 🕒 Morbidity and Mortality 增加

## Expanding surveillance

### Preparedness and response on Infection Prevention and Control in health-care facilities

Audit on Infection Control, Hospital Accreditation, esp., after SARS.

Emphasize on : 1) Patient diversion (轉送), 2) Patient ward segregation (隔離), 3) Visitor management, 4) Personnel management, e.g., PPE, standard precautions.

## Healthcare Response actions: testing and triage

### 134 healthcare facilities for response and isolation for mild cases

Availability of negative pressure isolation beds: 58%

578 available beds/1000 beds in total

### 167 healthcare facilities for testing

#### 50 regional, medical centers for severe cases

Availability of negative pressure isolation beds: 51%

273 available beds/537 beds in total

院內感染的發生，成為疫情擴散及社區化的關鍵因素，也是疫情防治的決勝關鍵，突顯出醫療院所感染管制人員和作為在防疫的重要性。

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## HCW 安全健康問題

- 迄2020/9/4 全世界>7000人死亡
- Mexico >1300人, Infected HCW 97632 (among 610000)
- US 1077人, UK 649人, Brazil 634人, Russia 631人, India 573人

國際特赦組織

## 病人醫療需求及安全

- COVID-19
- Non-Covid-19 Infectious Diseases
- Other Co-morbid illness
- Regular Healthcare Activities under COVID-19 Pandemic:  
增加就醫之擔心, 降低常規醫療活動, 可能延誤疾病治療, 或疾病惡化

### 110-06 單月同區 醫學中心 健保醫院總額(門住)統計

醫院名稱	門診平均 單價	門診件 數成長	門診點 數成長	門診 成長 排名	住院平均 單價	住院件數 成長	住院點數 成長	住院 成長 排名	109年門住點數合 計	110年門住點數合 計	總點數 成長率	門住成 長排名	醫院名稱
	5,629	-36.43%	-14.7%	1	118,370	-43.30%	-32.2%	2	1,673,859,977	1,278,524,918	-23.6%	1	
	6,099	-49.31%	-24.8%	3	157,283	-70.73%	-54.7%	8	1,813,950,355	1,122,044,721	-38.1%	7	
	4,536	-37.75%	-17.5%	2	115,125	-46.39%	-30.4%	1	876,903,189	664,871,807	-24.2%	2	
	4,062	-46.45%	-31.4%	7	102,059	-57.95%	-46.3%	6	1,051,250,098	656,168,419	-37.6%	6	
	4,326	-50.50%	-32.0%	8	109,931	-63.52%	-52.3%	7	759,588,868	447,712,080	-41.1%	8	
	3,645	-40.93%	-28.7%	6	89,826	-52.61%	-44.8%	4	457,230,513	295,488,870	-35.4%	4	
	3,270	-40.24%	-26.2%	4	105,116	-55.93%	-40.5%	3	366,717,252	247,999,641	-32.4%	3	
	3,690	-49.74%	-28.0%	5	120,018	-64.03%	-45.7%	5	340,139,026	219,660,789	-35.4%	5	
台北醫中	4,737	-44.24%	-24.2%		117,637	-56.13%	-42.8%		7,339,639,278	4,932,471,245	-32.8%		台北醫中

### 110Q2 同區 醫學中心 健保醫院總額(門住)統計

醫院名稱	門診平均 單價	門診件 數成長	門診點 數成長	門診 成長 排名	住院平均 單價	住院件數 成長	住院點數 成長	住院 成長 排名	109年門住點數合 計	110年門住點數合 計	總點數 成長率	門住成 長排名	醫院名稱
	4,859	-10.02%	1.1%	1	109,653	-13.37%	-3.5%	1	4,769,921,821	4,712,935,138	-1.2%	1	
	4,822	-20.33%	-9.1%	7	117,705	-29.23%	-18.9%	8	5,271,026,982	4,559,883,877	-13.5%	8	
	3,531	-13.09%	-5.0%	5	88,449	-13.83%	-6.9%	5	2,954,358,364	2,782,435,884	-5.8%	5	
	3,899	-11.24%	-2.4%	2	101,731	-15.88%	-5.1%	4	2,550,774,003	2,453,002,728	-3.8%	2	
	3,512	-20.08%	-11.5%	8	94,055	-21.01%	-14.2%	7	2,158,648,006	1,884,189,200	-12.7%	7	
	3,208	-11.84%	-6.8%	6	84,364	-19.48%	-12.2%	6	1,261,307,352	1,146,639,301	-9.1%	6	
	2,905	-11.16%	-4.3%	3	90,429	-15.99%	-4.2%	3	1,034,758,959	990,836,809	-4.2%	4	
	2,990	-15.10%	-4.4%	4	91,856	-16.32%	-4.0%	2	954,286,498	913,968,189	-4.2%	3	
台北醫中	3,970	-14.68%	-5.2%		101,678	-18.69%	-9.5%		20,955,081,985	19,443,891,126	-7.2%		台北醫中

# Impact of COVID-19 in acute chest pain and AMI

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## Less patients but longer waiting time Prolong D2B time in STEMI cases

**Table 2. Comparison of Symptom Onset-to-Door Time (O2D), Door-in to Door-out Time (DIDO), Ambulance Transport Time (D1toD2), Receiving Hospital Door-to-Balloon Time (D2toB), First Door-to-Balloon Time (D1toB), and Study Outcomes for Patients With STEMI Undergoing Primary PCI, Before and During COVID-19 Outbreak Response (n=303)**

	Presentation: direct visit or EMS (n=215)						Presentation: interhospital transfer (n=88)		
	All cases (n=215)			Excluding cases of non-system delay (n=139)			BOR (n=57)	DOR (n=31)	P value
	Before	After	P value	Before	After	P value			
<b>Duration, min</b>									
O2D	126 (73–259)	121 (70–229)	0.587	107 (62–197)	124 (75–236)	0.319	231 (125–510)	242 (140–353)	0.333
DIDO							39 (28–76)	43 (32–63)	0.493
D1toD2							10 (7–14)	11 (8–16)	0.252
D2toB	52 (39–74)	55 (39–74)	0.426	42 (35–52)	43 (33–55)	0.717	30 (26–39)	32 (23–42)	0.556
D1toB							85 (71–114)	94 (76–123)	0.493
Receiving hospital D2toB <60min	98 (64.4)	35 (55.6)	0.126	85 (87.6)	30 (78.9)	0.202	52 (98.1)	26 (86.7)	0.035*
Receiving hospital D2toB <90min	123 (80.9)	45 (71.4)	0.042*	93 (95.9)	31 (81.6)	0.006*	57 (100)	31 (100)	NA
D1toB <120min							42 (75.0)	22 (71.0)	0.683
<b>Study outcomes</b>									
Cardiogenic shock	20 (13.2)	10 (15.6)	0.658	3 (3.0)	1 (2.6)	0.890	4 (7.1)	3 (9.7)	0.677
Readmission within 30 days	30 (19.7)	4 (6.3)	0.012*	22 (22.0)	1 (2.6)	0.006*	12 (21.1)	4 (12.9)	0.344
In-hospital death	12 (7.9%)	4 (6.3%)	0.665	2 (2.0)	1 (2.6)	0.837	6 (10.5)	1 (3.2)	0.227

\*P<0.05. Continuous variables presented as median (interquartile range) in minutes. Categorical variables presented as n (%). Abbreviations as in Table 1.

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# Experiment settings

## Non-COVID-19 visits in ED



### Tri-Service General Hospital

~1,700 beds in Taipei City  
100,000 annual ED volume

#### Provides...

1. Triage station database
2. Electronic medical records
3. Laboratory information system
4. Hospital information system

#### Retrospectively reviews...

Jan 1, 2018 – Sep 30, 2020  
Establish fever screening station at Feb 6, 2020

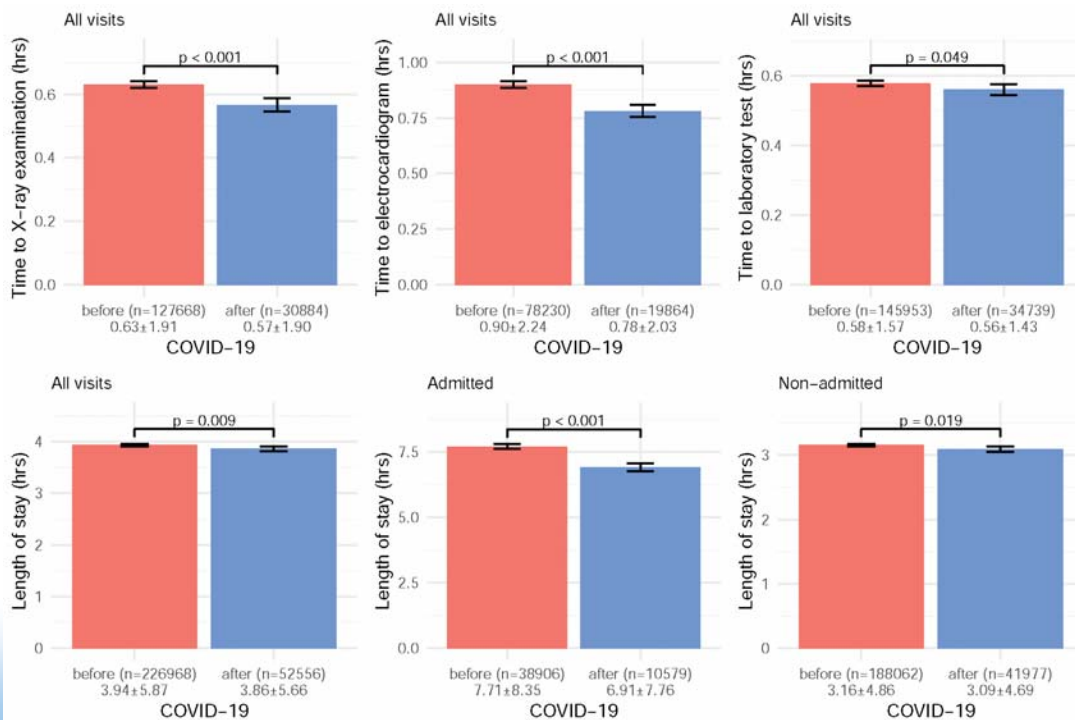
### ED quality indicators

1. Number of daily visits
2. Time to examination
3. Length of stay
4. Prognosis

### Subgroup analysis

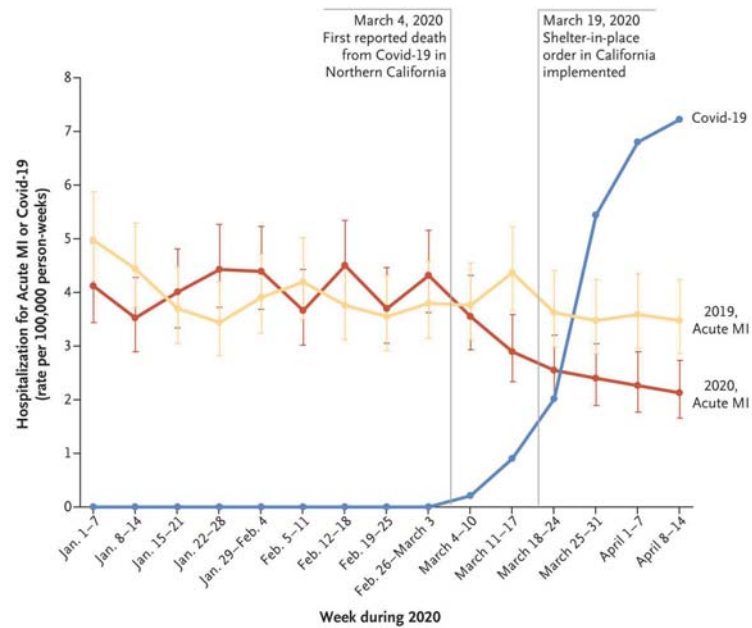
1. Admitted and non-admitted
2. Triage code (excluding lvl-5)
3. Disease tags
  - ✓ Coma, Chest pain, Abdomen pain, Trauma, and Fever

# Less waiting time in all results



# Puzzling decreases in critical demands

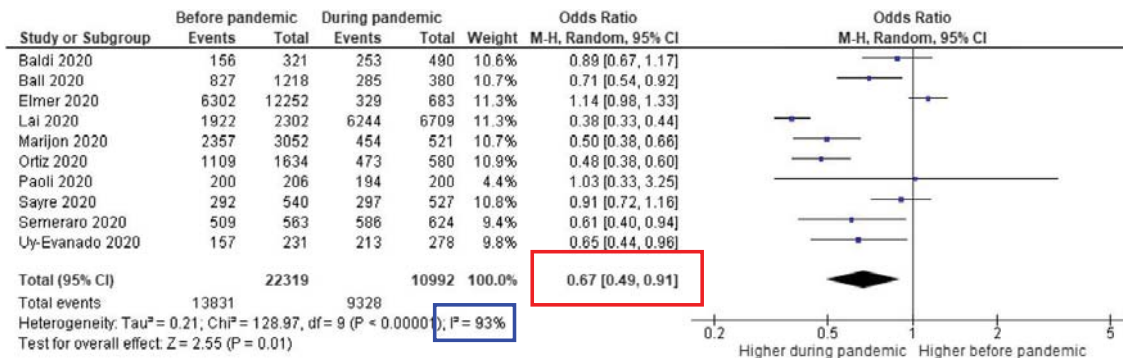
## Life-threatening acute myocardial infarction



Solomon MD et al. *The New England journal of medicine*. 2020;383(7):691-3.

# Change of medical service usage

## Impact of public panic and the fear



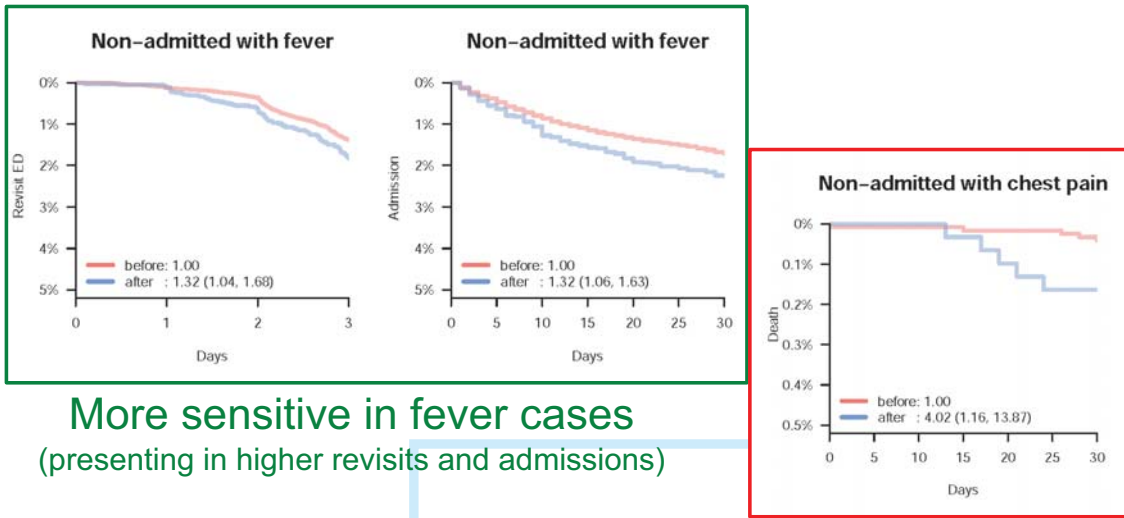
**Increased out-of-hospital cardiac arrest (OHCA) events after pandemic (50%↑)!**

**High heterogeneity between countries!**



# Subgroup analysis (reverse scale)

## Significant finding in fever and chest pain

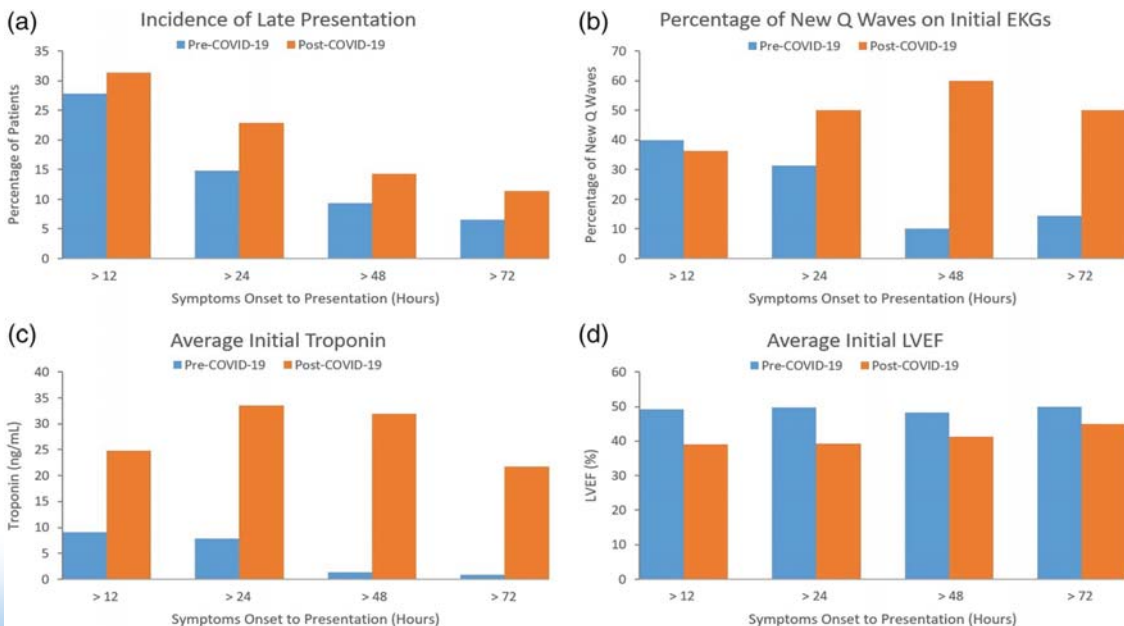


More sensitive in fever cases  
(presenting in higher revisits and admissions)

Higher mortality in non-admitted  
life-threatening cases

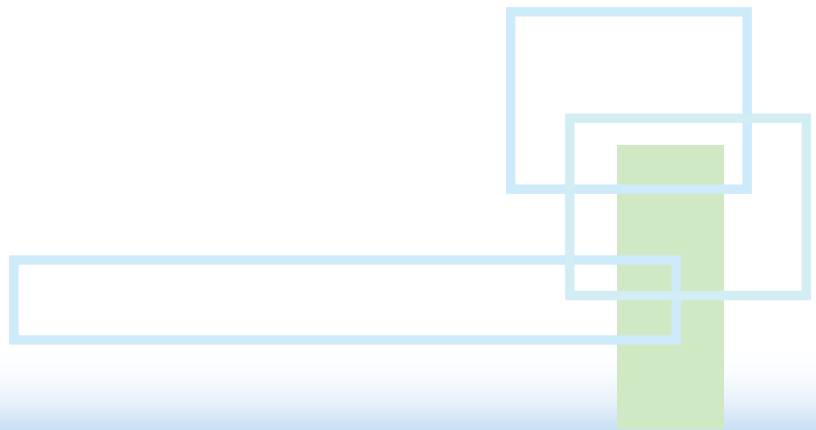
# Pandemic impact on chest pain cases

## Delayed symptom-onset to ED



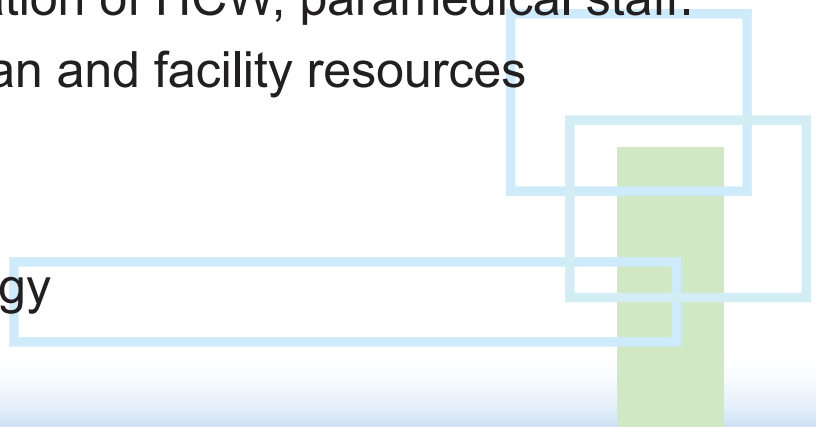
## Healthcare Economic Issues

- National level
- City level
- Institutional level



## Preparedness and Response

- Training and vaccination of HCW, paramedical staff.
- Reallocation of human and facility resources
- Surge capacity
- Infection Control
- Information technology



- 專家諮詢小組，參與策劃和協調防疫與醫護措施，醫療設備庫存等。
- 醫療照護量能和資源受限，就會衝擊到各項常見疾病的就醫。協調地區醫院和診所增加對各項疾病的處置收容與醫護能力，並協助其取得所需的醫療資源和適當的防護措施，是政策上必須正視的事項。

- 對偏遠地區的醫療需求，如慢性病藥品、常備藥品和簡易醫護材料之儲備。
- 緊急需就醫之情形，更需要地方政府能夠事先規劃安排急救運送的相關機制。
- 疫情爆發後大幅增加醫療照護人員的工作量，需緊急措施以鬆綁醫護加班和強化病床收容能力，也須緊急調度更多的醫護人員，並提供對應的補償措施和心理安撫機制。

## 醫療照護

- 積極篩檢: 高效度的主動篩檢設備和方法, 以維持各項醫療作為
- 早期治療: 抗體、抗病毒藥
- 重症治療: dexamethasone、IL6ra、JAK inhibitor, 呼吸治療
- Post-acute covid19 syndrome

### 重症危險因子

- 年紀大於65歲
- 肥胖(BMI  $\geq 25$ ; 12-17歲兒童BMI超過同齡第85百分位)
- 共病症
  - 心血管疾病 Cardiovascular disease
  - 糖尿病 Diabetes mellitus
  - 慢性肺病 COPD and other lung diseases
  - 癌症 Cancer
  - 慢性腎病變 Chronic kidney disease
  - 移植術後 Solid organ or hematopoietic stem cell transplantation
- 發炎指標上升(CRP; IL-6; Ferritin elevation)



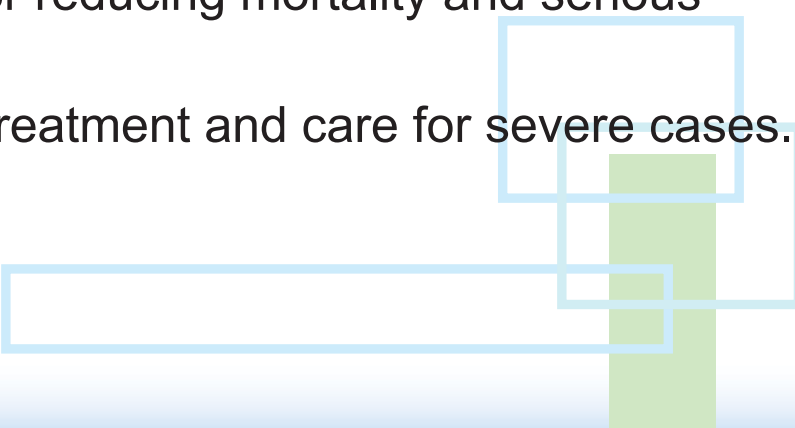


➤ SARS-CoV-2 治療

- ▶ 抗病毒---Remdesivir; monoclonal antibody
- ▶ 抗發炎---Steroid; Tocilizumab; JAK inhibitor
- ▶ 抗血栓---Enoxaparin
- ▶ 抗微生物製劑---Antibacterial; antifungal

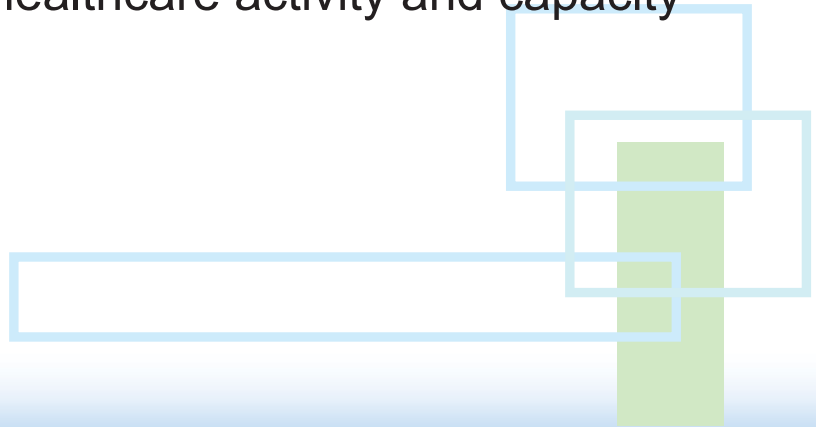
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## COVID-19 集中式 vs. 分散式醫療照護

- 集中式: 大型收治 institution, mild to moderate, early treatment modality for reducing mortality and serious morbidity.
  - 分散式: institutions, treatment and care for severe cases.
  - 混合式:
- 

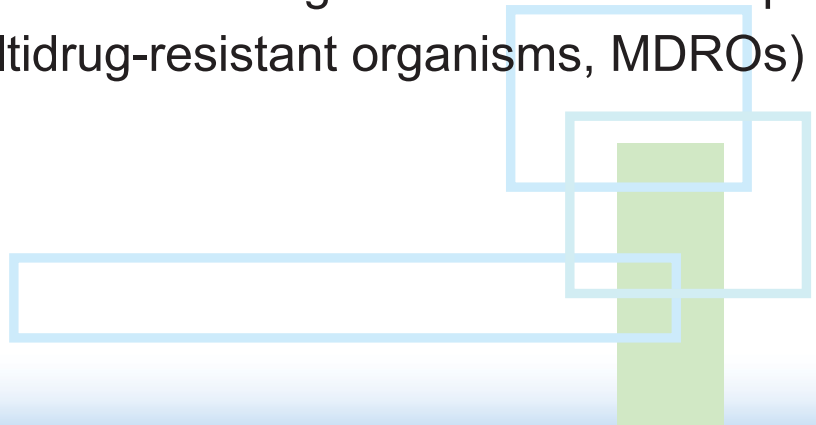
## Active surveillance

- For avoiding nosocomial COVID-19
- For maintaining the healthcare activity and capacity



## New Emerging Infectious Diseases are Ongoing Evolution

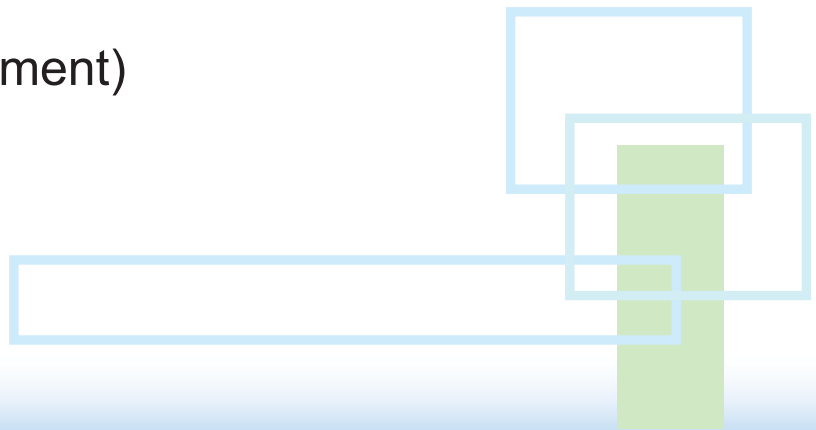
- When the overwhelming COVID-19 diseases are ongoing, the emergence of other devastating diseases never stops.
- 多重抗藥性病原 (Multidrug-resistant organisms, MDROs)





## 醫療體系改革健保的角色

- 醫院評鑑
- 醫學教育
- 健保給付 (reimbursement)



### Healthcare policy and healthcare utilization behavior to improve hospital infection control after the Middle East respiratory syndrome outbreak

Kim Y. J Korean Med Assoc. 2015 Jul;58(7):598-605.

- To prevent future outbreaks of emerging infectious diseases similar to MERS-CoV, the Korean healthcare system should be reformed and healthcare-related patient behaviour must change. To improve the performance of hospital infection control, the National Health Insurance service should pay more for hospital infection control services and cover private patient rooms when medically necessary, including for infectious disease patients. To reduce risks of hospital infection related to private caregiving, the nurse staffing level should be increased and hospitals should take full responsibility for inpatient nursing care.

## Healthcare policy and healthcare utilization behavior to improve hospital infection control after the Middle East respiratory syndrome outbreak Kim Y. J Korean Med Assoc. 2015 Jul;58(7):598-605.

- To reduce hospital shopping, the National Health Insurance service should introduce a differential fee schedule which pays more when primary care providers care for patients with common conditions and tertiary care providers care for patients with severe conditions. To incentivize patients for appropriate health care use, lower patient out-of-pocket payments should be combined with a differential provider fee schedule.

## Korea “Novel reimbursement system for infection control”

- In 2015, a massive outbreak of Middle East respiratory syndrome coronavirus occurred in Korea; 97% of all cases were healthcare-associated infections. After the outbreak, **the Korean Government introduced a policy to enforce the employment of infection control professionals in hospitals. The new Korean Government policy for infection control is developing a novel reimbursement system regarding infection control activities.**

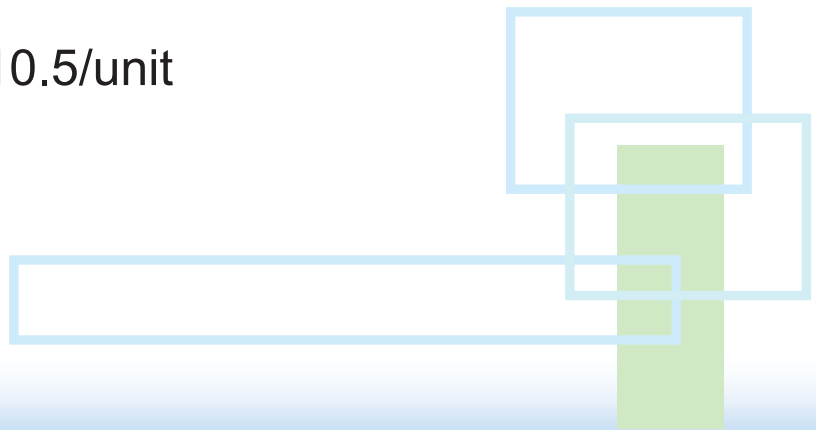
## Criteria for charging infection control fee

- In order to charge the “infection control fee”, the hospital must fulfill the following criteria: (1) having at least one infection control nurse per 150 inpatient beds; (2) having at least one infection control physician per 300 inpatient beds; (3) participating in Korean Nationwide Healthcare-associated infection surveillance system (KONIS); and (4) providing appropriate education for infection control professionals (> 18 h/year). The new policy was announced in December 2015 and implemented in September 2016.

- In September 2016, a control and prevention management fee for infectious diseases was added to insurance premiums. The service compensates the money spent on treatment materials for the prevention of infection and strengthens the evaluation criteria of hospitals and medical institutions in infection control and prevention.

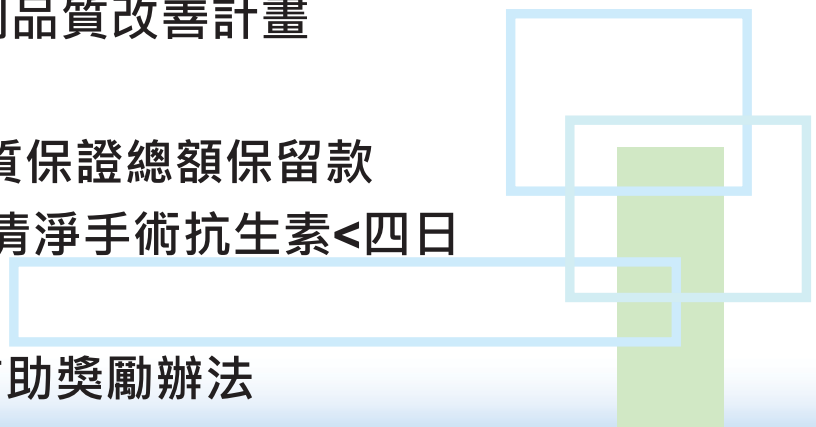
## Infection Control Fee in Japanese Hospitals

- In-patient: \$10/day
- Out-patient: \$5/visit
- Emergency room: \$10.5/unit



## 感染管制重要性

- 疾病管制署醫院感染管制查核基礎
- 醫院評鑑感管條文
- 疾病管制署感染管制品質改善計畫
  
- 全民健康保險署 品質保證總額保留款  
門診抗生素使用率、清淨手術抗生素<四日
  
- 衛福部COVID-19 補助獎勵辦法



## 2021年醫院感染管制查核項目

大項	項目數
1 落實執行感染管制措施	7
2 確實執行衛材之清潔、消毒、滅菌及環境清消	3
3 落實抗生素抗藥性管理	3
4 配合主管機關政策對傳染病進行監測、通報及防治措施	8
5 員工保護措施	2
項目合計	23

2016年5月Jim O'Neil在"對抗全球抗藥性感染總結報告和建議"所提，現在每年全球有70萬人死於抗藥性病原感染；到2050年，死亡人數將高達每年1千萬人。如我們不採取行動，它對全球經濟的損失，累計到2050年將高達100兆美元(100 trillion USD)。

## Antimicrobial Resistance (AMR): Tackling a crisis for the health and wealth of nations

- We estimate that C/S contribute about 2% to world GDP. Joint replacements add about 0.65%, the vastly improved cancer drugs that have been created since the early 1970s add more than 0.75% and organ transplants add about 0.1%. **These are just a small number of the areas in modern medicine that risk being undermined if we do not have effective antibiotics in the future.** In aggregate they contribute almost 4% to the world's GDP, worth at least 120 **trillion (兆)** USD between now and 2050. While this total would not be completely lost, **when this is combined with the other effects of AMR it shows that the world's economy could lose more than 7% of its GDP by 2050, or a total of 210 trillion USD over the next 35 years.** The Review on AMR Chaired by Jim O'Neill (Dec 2014)

- 這份報告分五章，**第一章**先提出何以對抗抗藥性是必須的，點出抗藥性細菌現今造成的重大生命損失，成因是過去三十多年私人公司和政府投資不足，若今天我們不採取行動，未來的代價更難承受。我們現在已沒藉口不採取行動。**第二章**提出我們必須降低抗生素需求以延長現有藥物壽命，這一部份共有七項建議介入措施。**第三章**提出增加對抗藥性病菌有效的新微生物製劑之供應。這一章有兩項建議措施。**第四章**提出如何提供經費投資，以期對抗抗藥性可付得起。**第五章**則提到行動介入之想法和後續需要超越國家層級的國際機構和國家層級的行動作為。



## 十項具體建議之介入措施

- 推動全球大眾覺醒運動：尤其是國家位階的立法，禁止無處方販售抗生素以及跨國境之非法販售（如網路販售）。
- 促進整體衛生以預防感染擴散。
- 減少農業不需要的抗微生物製劑使用及其環境散布。
- 促進全球對抗藥性及抗微生物製劑於人和動物使用之監測。
- 促進新而快速之診斷，以減少不需要的抗生素使用。
- 促進發展和使用疫苗及其它替代方法。

- 以全球創新基金提供早期和非商業化之研發。
- 提供更好的誘因，以促進對新藥和改進舊藥之投資。
- 建立全球聯盟，透過G20和聯合國，以採取實際行動。

- 增加感染症領域從業的人數、待遇和重視：政府、醫療體系領導者和私人機構應增加經費和訓練機會，以增加第一線對抗抗藥性的人力和容量，以及科學研究人力。亦應在醫療照護、學術和商業社區等專業貢獻，提高待遇和重視。

## 感染管制人員

- 監測、資料收集者
- 品質促進者
- 教育者
- 發現問題、解決問題者
- 醫療機構的公衛人員

# 需要多元能力

- 專業知識及能力
- 跨領域知識整合的能力
- 溝通協調的能力
- 發現問題的能力
- 解決問題的能力
- 快速應變的能力
- 創新（及數位）應用的能力
- 連結個人醫療和公共衛生

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## 總結 (1)：感染管制專業是關鍵

- 訓練有素的感染管制專業人員 (ICP) 是醫療體系永續發展的基石
- 感染管制人員需要多元能力以因應疫情防治，兼顧醫療照護相關感染、抗藥菌危機等的挑戰
- 面臨人才短缺，醫療體系對感染管制專業仍然需要制度性的鼓勵措施

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## 總結 (2): 改革建議

- 1, Enough qualified infection control professionals.
- 2, Solid budget for infection control
- 3, Reimbursement on Infection Control (落實執行感染管制措施; 確實執行衛材之清潔、消毒、滅菌及環境清消; 落實抗生素抗藥性管理; 配合主管機關政策對傳染病進行監測、通報及防治措施; 員工保護措施)
- 4, Infection Control Fee



**“Reform the reimbursement of infection control and Sustain the healthcare system!**

感染管制作為納入健保給付, 以永續醫療照護體系’