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Fangcang shelter hospitals: a novel concept for responding to public health emergencies

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Chinese Academy of Medical Sciences & Peking Union Medical College, China
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18 Dec 2020

Outline

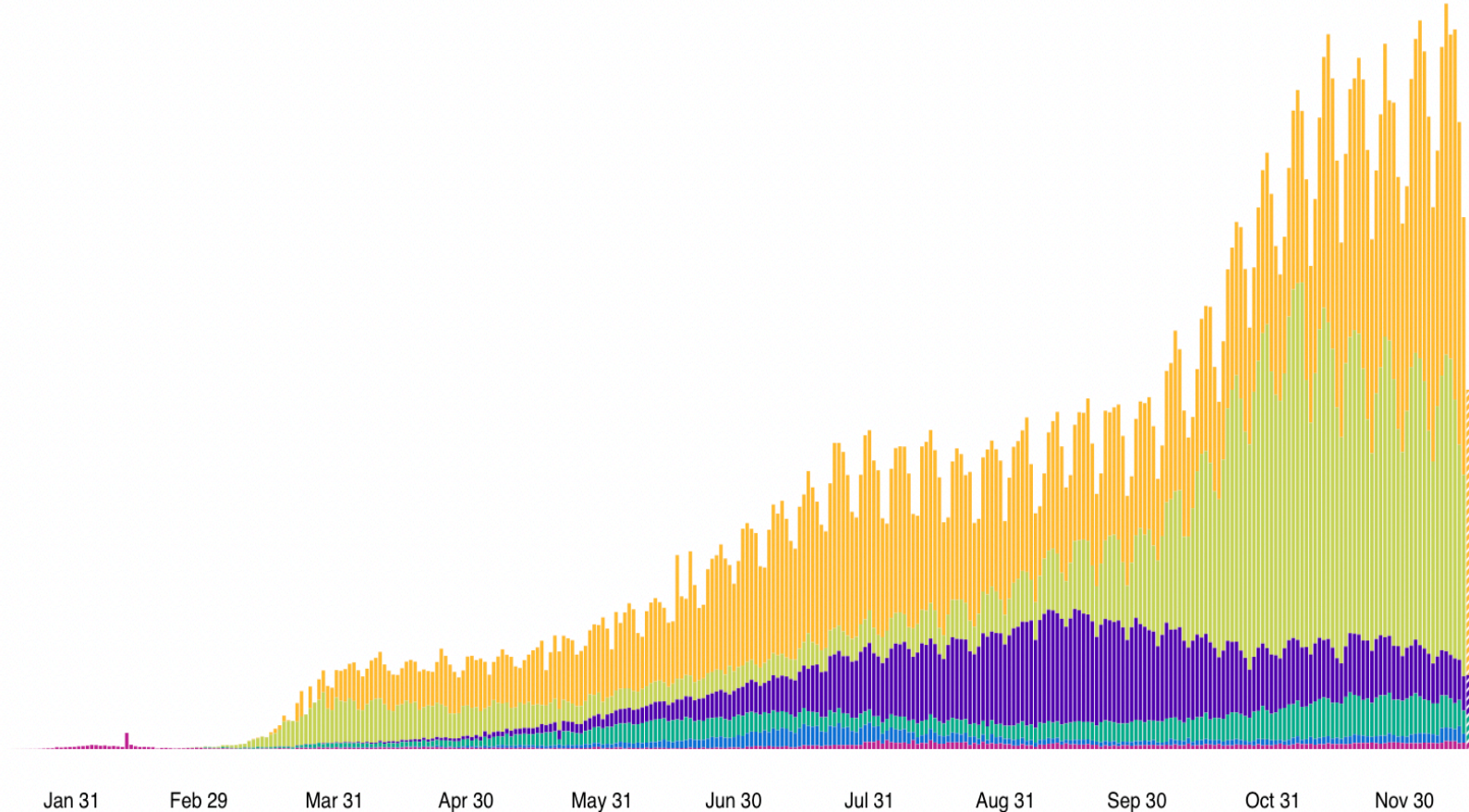
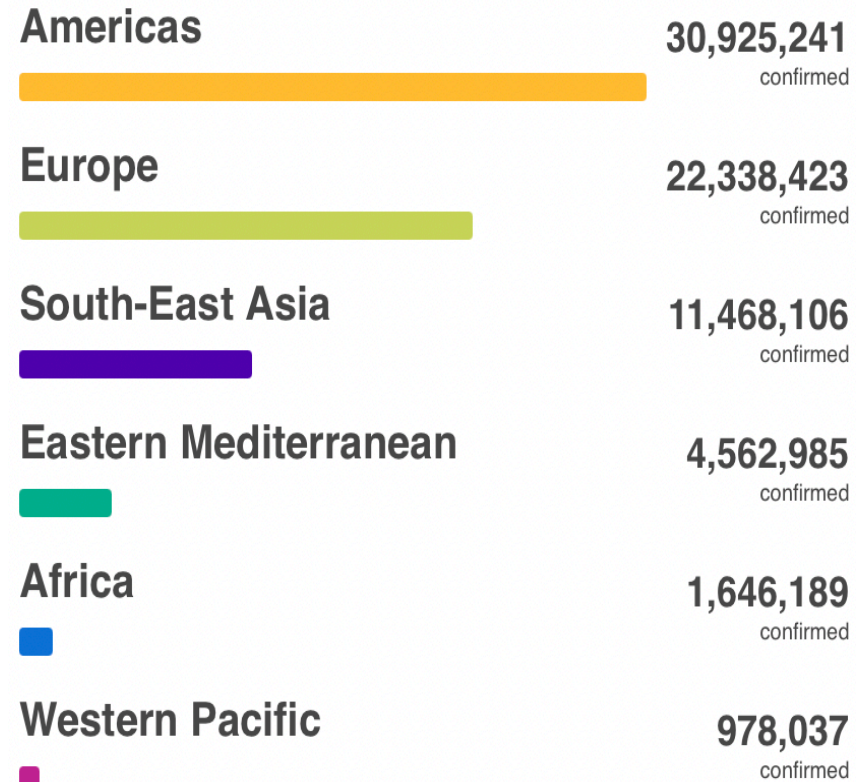
- Why do we need *Fangcang* shelter hospitals?
- Concept of *Fangcang* shelter hospitals
- Impact of *Fangcang* shelter hospitals

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Pandemic situation

Situation by WHO Region



Source: World Health Organization
Data may be incomplete for the current day or week.

Source: World Health Organization (<https://covid19.who.int>) as of Dec 16

The most critical issues many countries face

- **Surge of infections**
- **Run out of hospital beds**
- **Health system on the brink**
- **Deaths mount**



Wuhan faced the same problems in early February

- **Home isolation** for mild cases is undesirable
 - Puts patients' **family members at risk**: 75-80% of all clustered infections are within families (WHO)
 - Puts **community members at risk**
 - Makes **medical care**, frequent monitoring of disease progression and timely referral to hospital **care difficult to organize**



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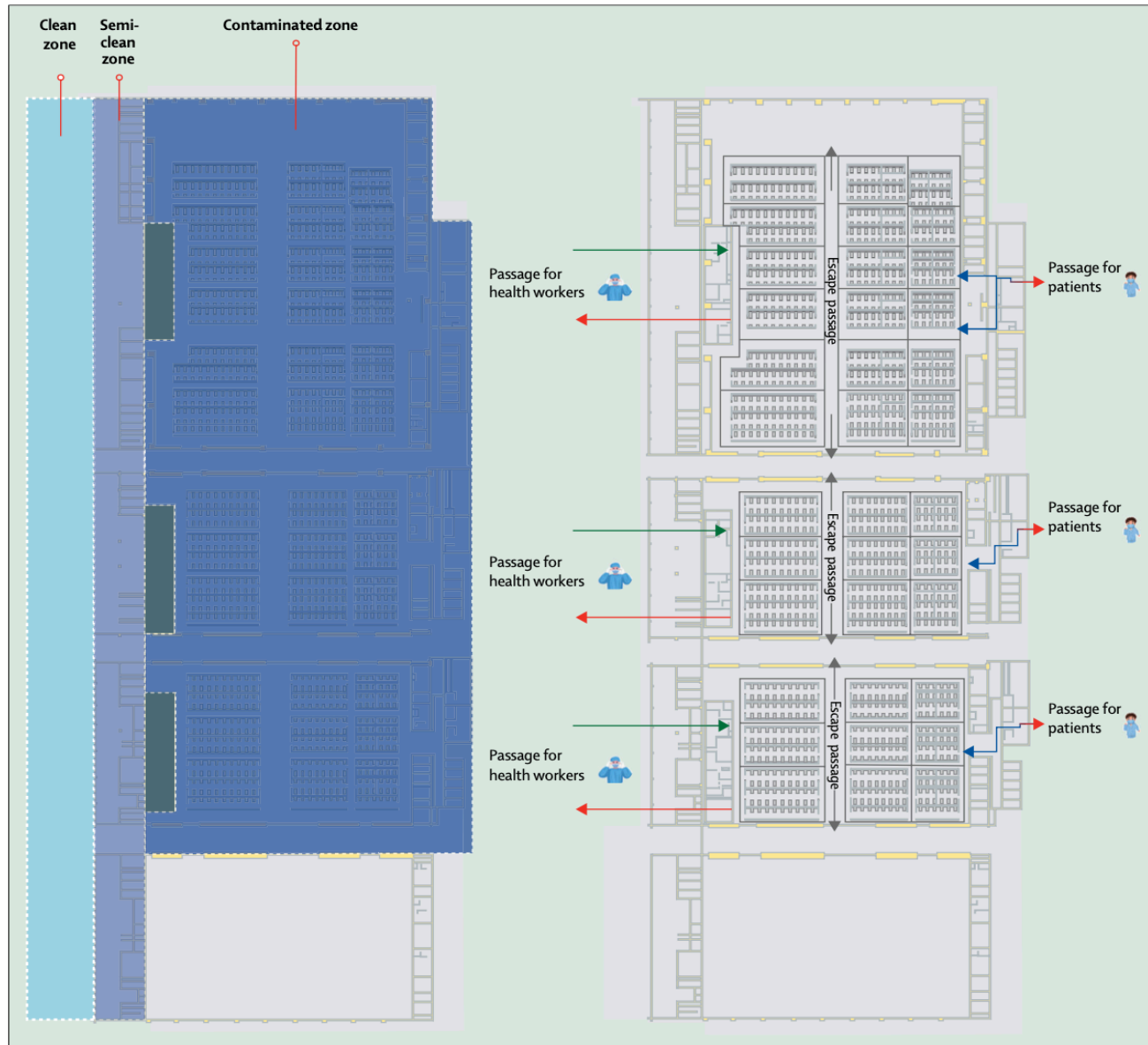
Fangcang shelter hospital: concept



Chen, Zhang, Yang, Wang, Zhai,
Bärnighausen & Wang *Lancet*
2020

Chen, Yang, Zhang, Wang &
Bärnighausen *Lancet* 2020

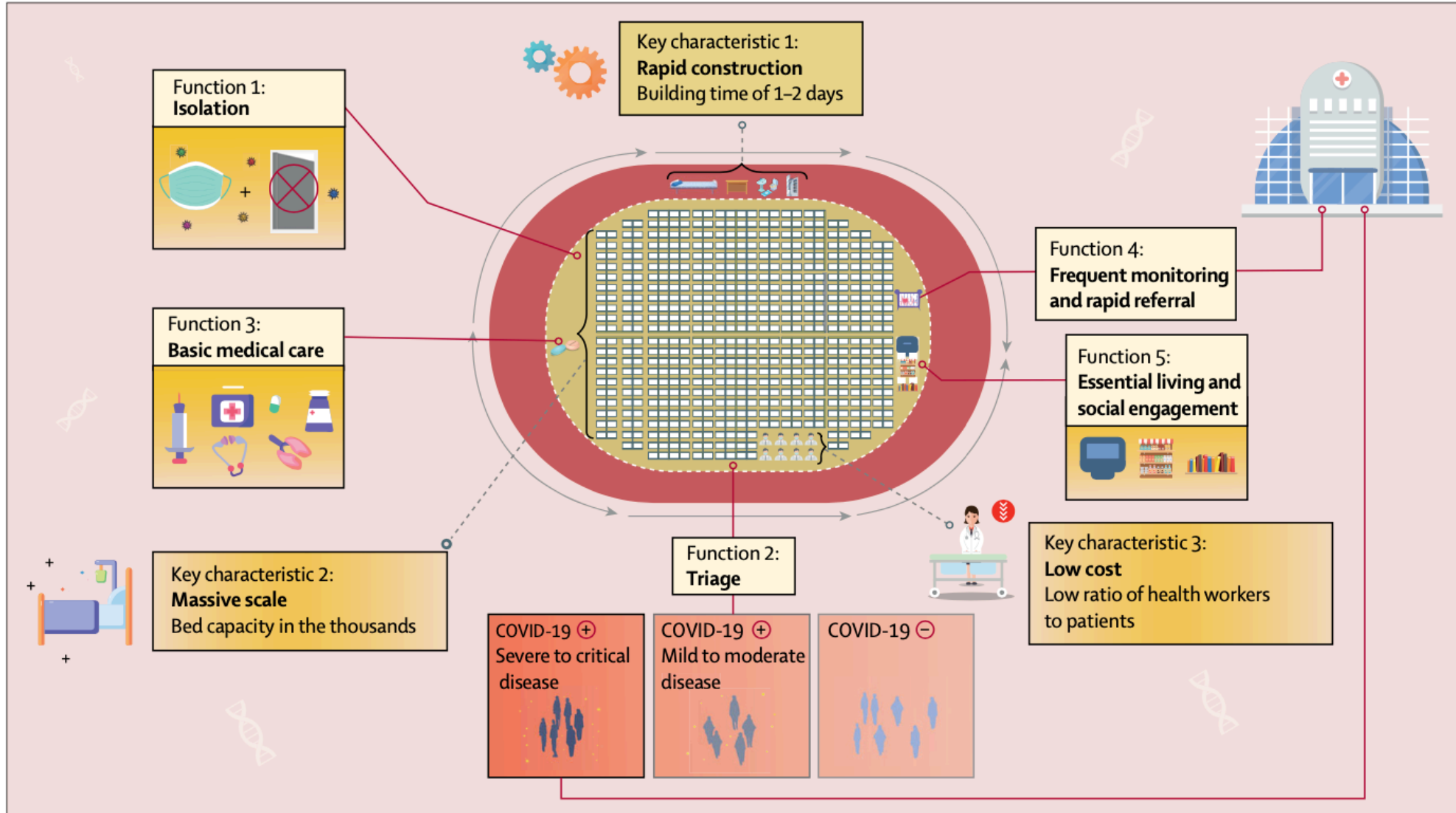
Fangcang shelter hospital: Layout



➤ Install beds, sheltered space, and the "three zones and two passages" of hospital isolation wards in existing public infrastructures

Chen, Zhang, Yang, Wang,
Zhai, Bärnighausen &
Wang *Lancet* 2020

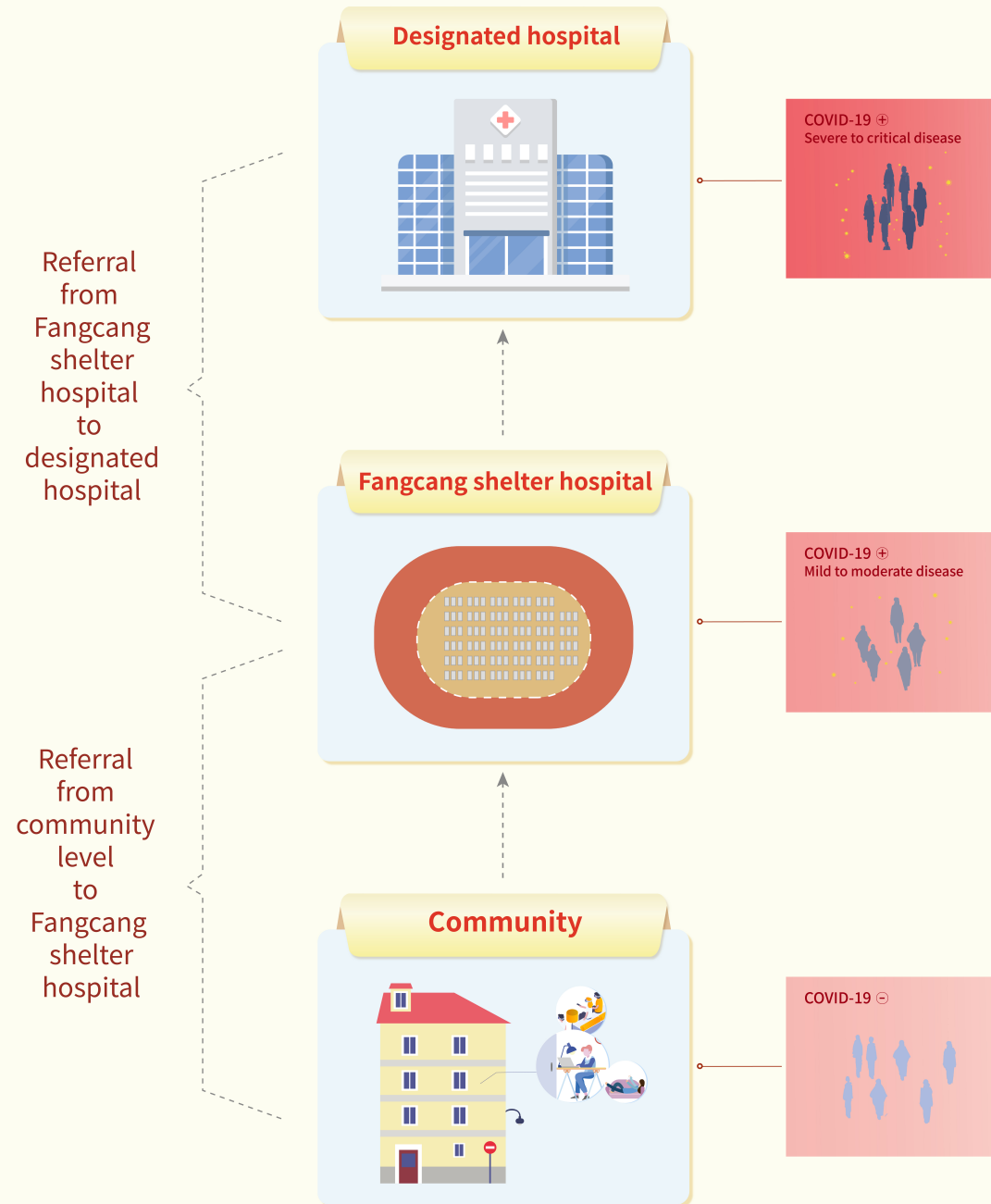
Fangcang shelter hospital: characteristics and functions



Chen, Zhang,
Yang, Wang,
Zhai,
Bärnighausen
& Wang
Lancet 2020

Strategic Triage

- Reconstruct health system
- Insert an additional level of care into the health system
- Released pressure on designated hospitals



***Fangcang* shelter hospital vs Emergency field hospital**

***Fangcang* shelter hospital in Wuhan**



Emergency field hospital in New York



Emergency field hospitals in New York do not have isolation and triage function

HOME > SCIENCE

Why NYC's largest emergency hospital is pretty much empty

Abby Narishkin, Steve Cameron and Libertina Brandt 6 hours ago

Source: Business Insider

Cuomo says it's 'shocking' most new coronavirus hospitalizations are people who had been staying home

PUBLISHED WED, MAY 6 2020-12:25 PM EDT | UPDATED THU, MAY 7 2020-11:22 AM EDT



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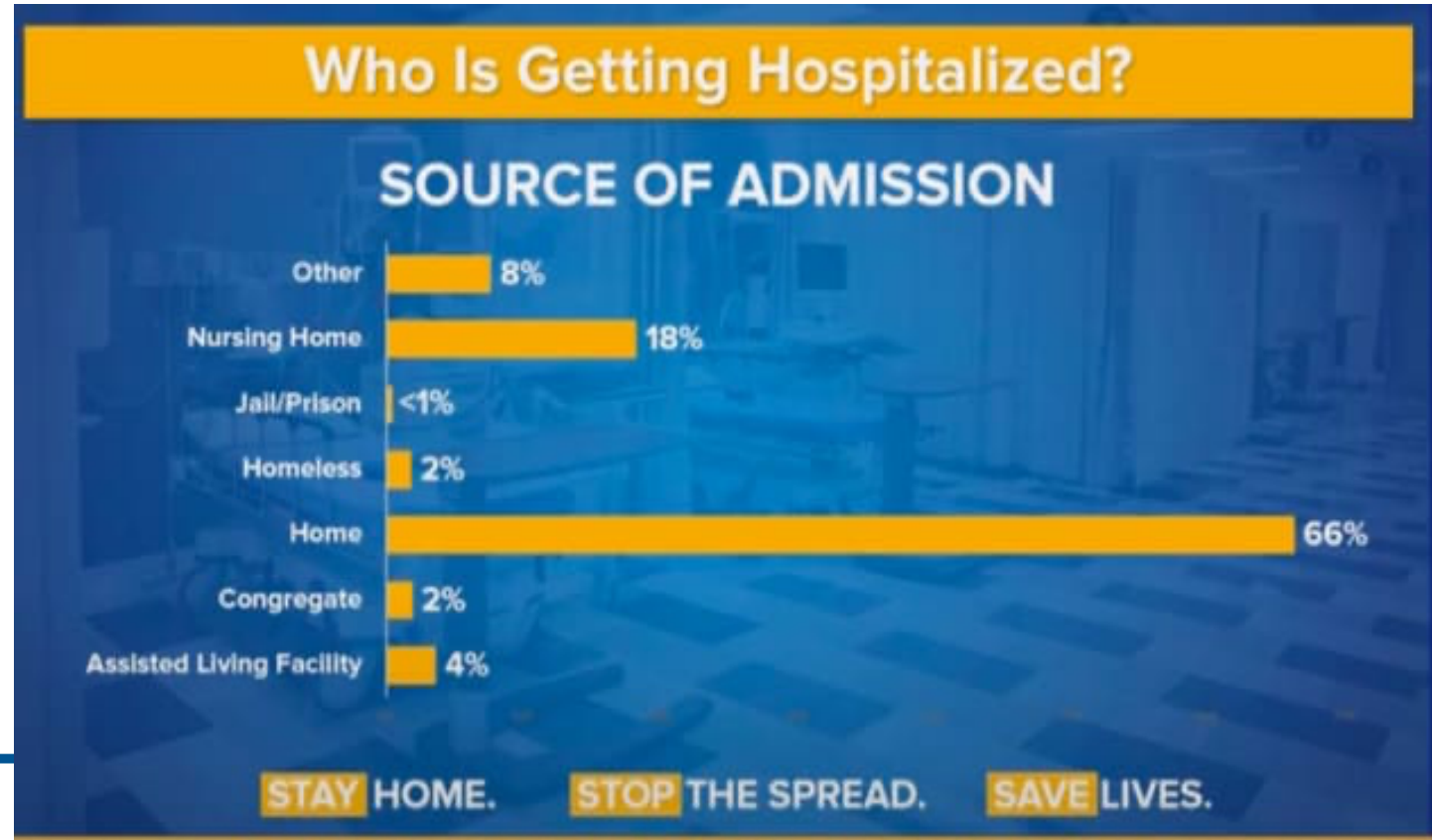
Kevin Breuninger
@KEVINWILLIAMB

SHARE

KEY POINTS

- Early look at data from 100 New York hospitals shows that 66% of new admissions related to the virus are people who were at home, Cuomo said.

Source: CNBC



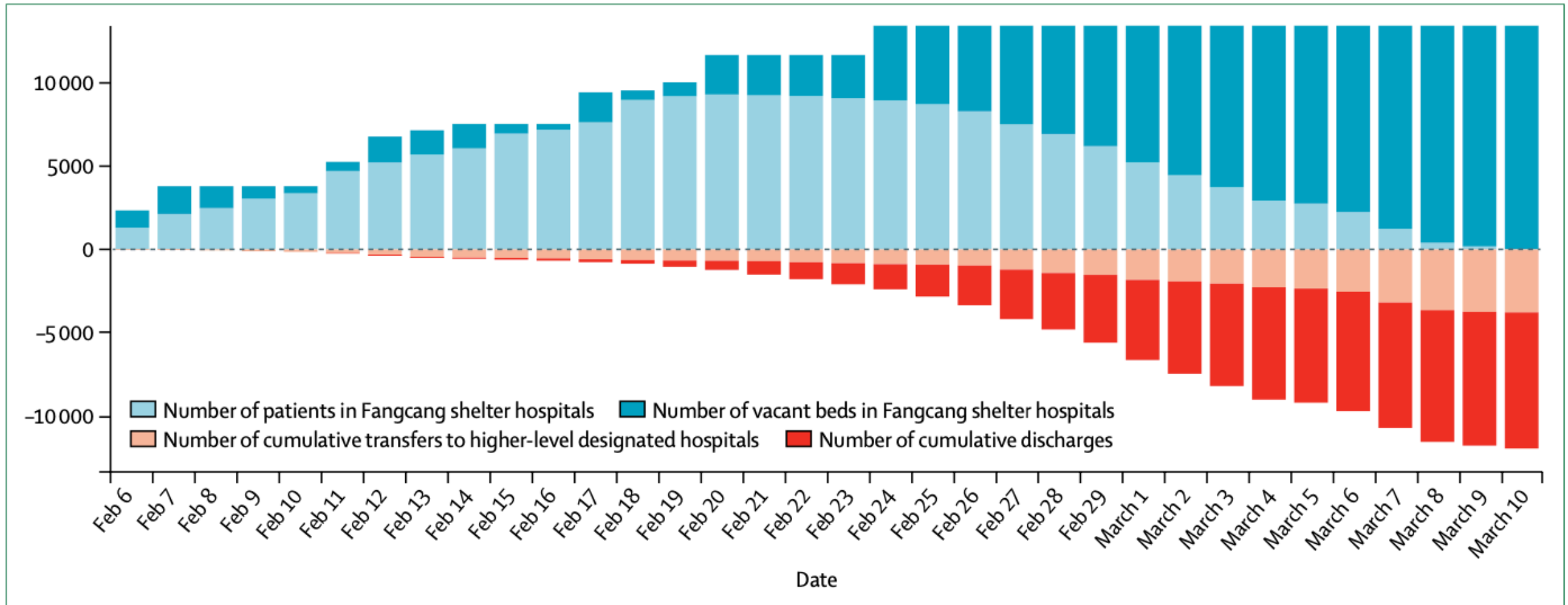
Source: New York State

High rate of intra-family transmission

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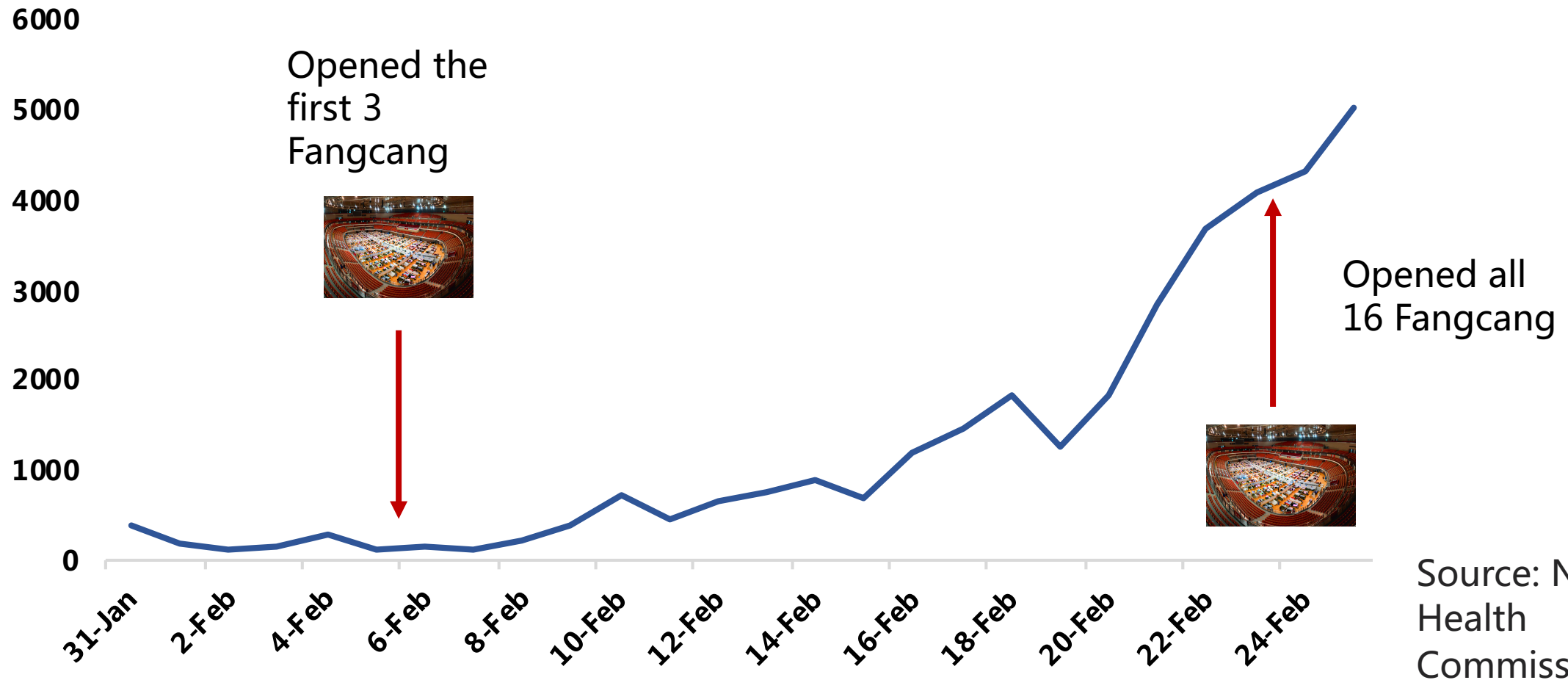
Patient flows in and out of *Fangcang* shelter hospitals in Wuhan, China



Chen, Zhang, Yang, Wang, Zhai, Bärnighausen & Wang *Lancet* 2020

Released pressure on designated hospitals

Vacant beds in designated hospitals



Source: National Health Commission

Impact of *Fangcang* shelter hospitals

- Associated with reduced number of infections and mortality
- Advanced the terminal phase of COVID-19 in China
- Facility-based isolation and quarantine in Wuhan averted about 70% of infections in total

Community care facility in Singapore



Modeled after *Fangcang* shelter hospitals, community care facilities in Singapore provided 3200 beds and admitted a total of 3758 patients.

COMMUNITY CARE FACILITY (CCF)
@ SINGAPORE EXPO

SINGAPORE
EXPO
CONVENTION AND EXHIBITION CENTRE

Chia et al. (2020) Managing COVID-19 in a novel, rapidly deployable community isolation quarantine facility. *Annals of Internal Medicine*

Facility, not home, isolation, for Singapore

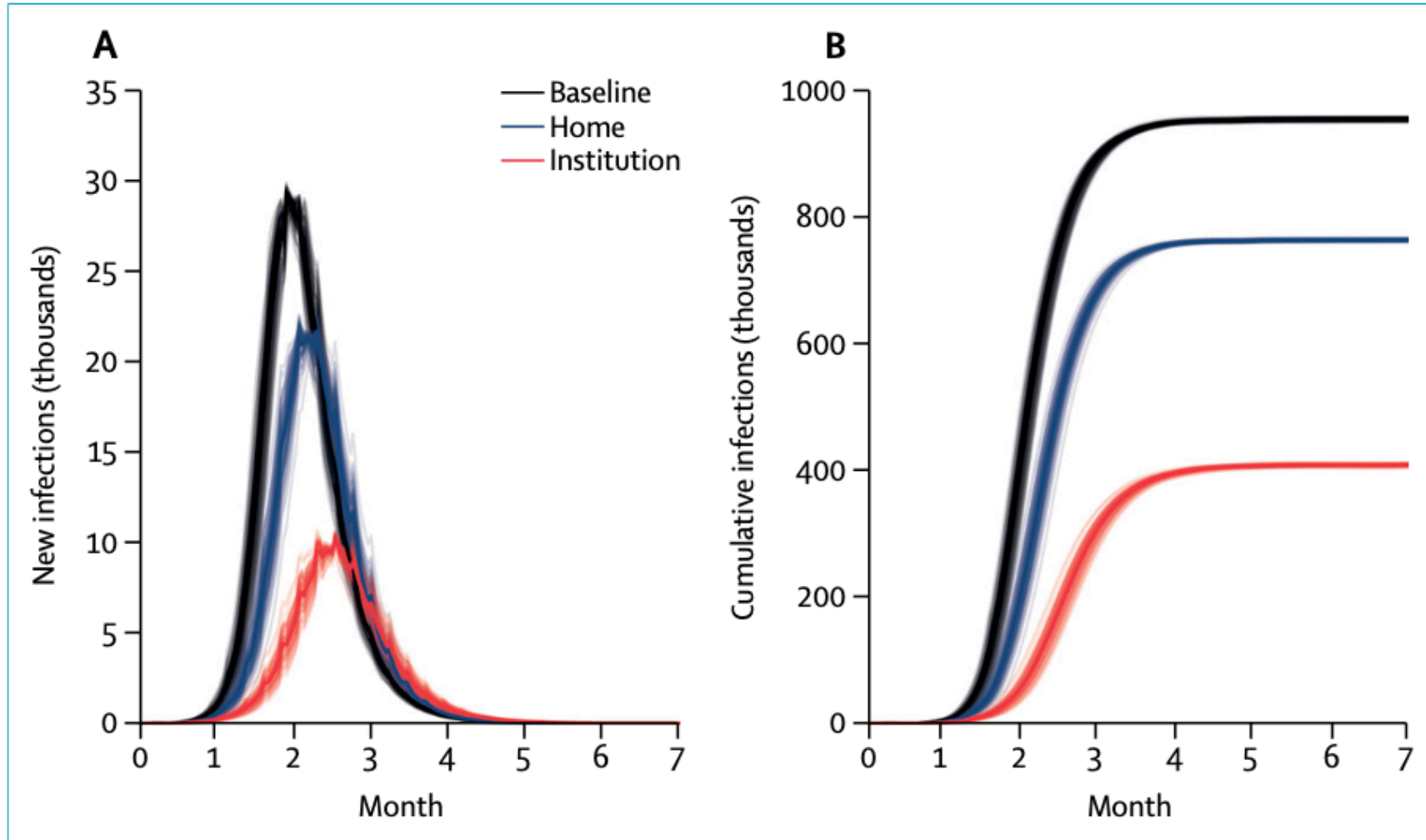
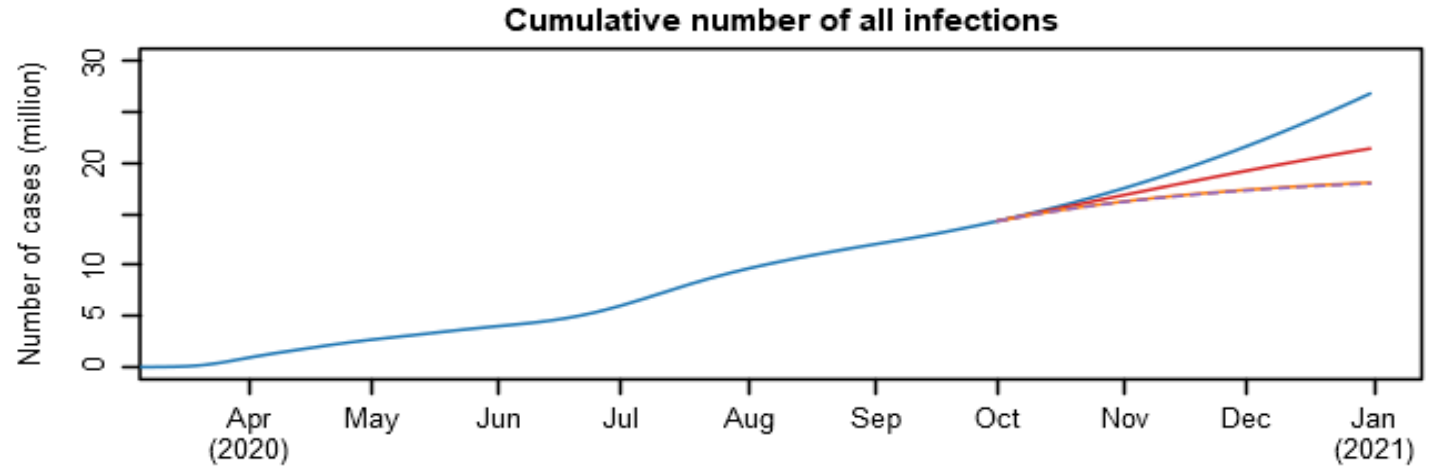
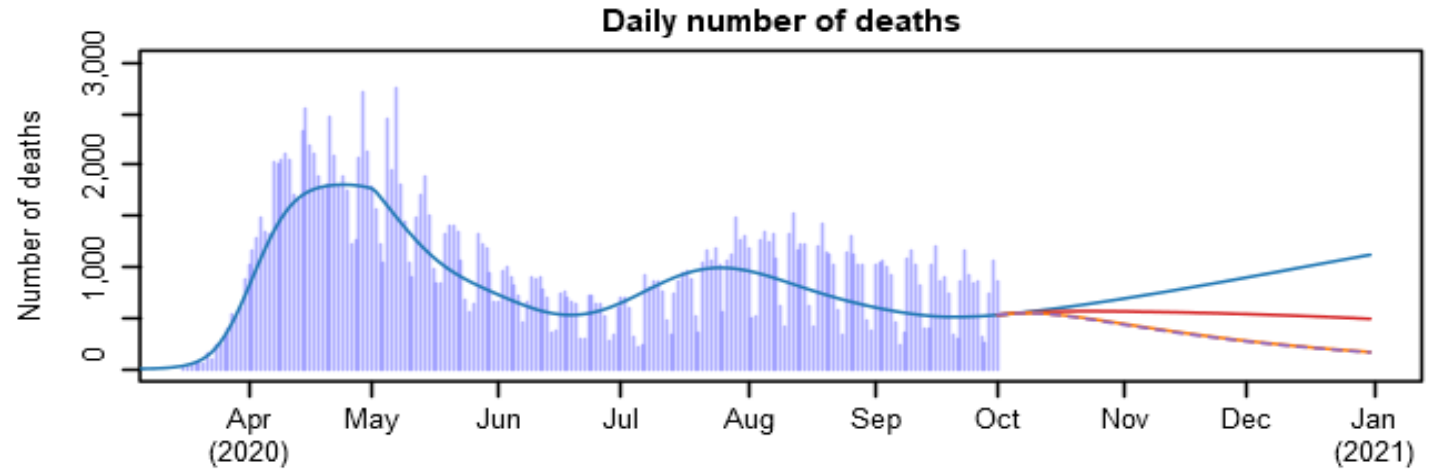
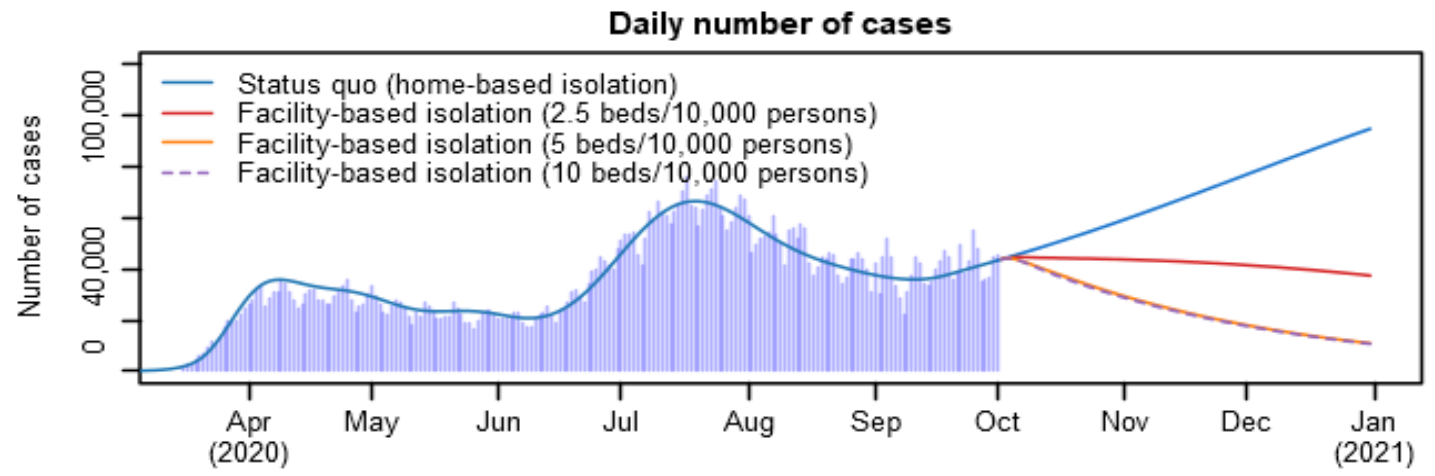


Figure: Number of new infections (A) and cumulative infections (B) within 7 months under the baseline control measures (black), home-based isolation (blue), and institution-based isolation (red)

➤ A reduction of 57% infections throughout the epidemic

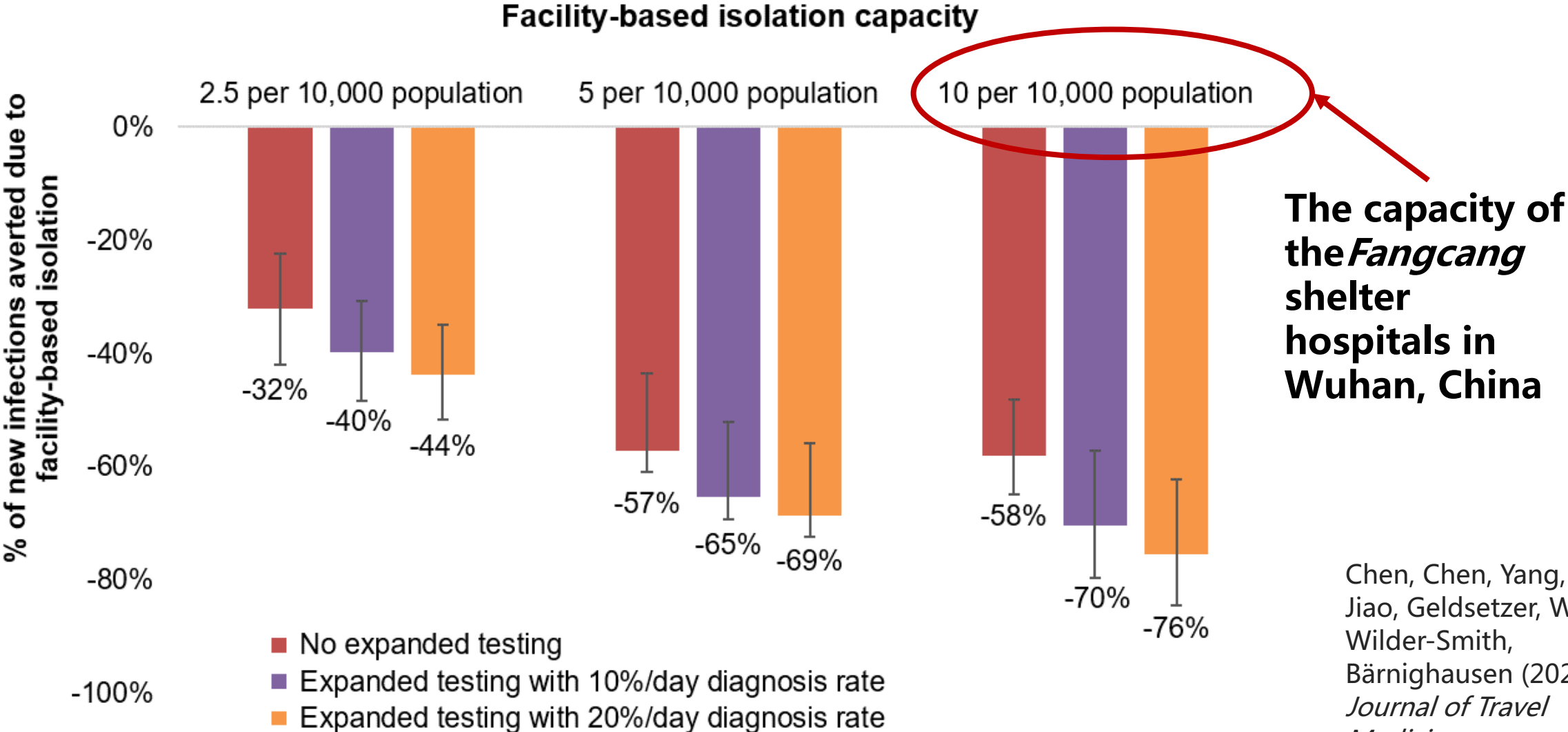
Dickens BL, Koo JR, Wilder-Smith A, Cook AR *Lancet* 2020

U.S. could avert millions of infections and thousands of deaths by isolating mild cases



Chen, Chen, Yang, Lin, Li, Jiao, Geldsetzer, Wang, Wilder-Smith, Bärnighausen (2020). Positive impact of facility-based isolation of mild COVID-19 cases on effectively curbing the pandemic. *Journal of Travel Medicine*.

The impact of facility-based isolation of mild cases will be boosted by expanded testing



WHO guideline

Repurposing facilities for isolation and management of mild COVID-19 cases

1 June 2020



1. Introduction

1.1 Background

Current evidence shows that 80% of patients with coronavirus disease 2019 (COVID-19) exhibit mild symptoms and do not require hospitalization.¹

The World Health Organization (WHO) has issued guidance for care of patients with mild symptoms who can conduct self-isolation at home.²

However, under circumstances where safe and appropriate home care is not available, or where vulnerable people are present in the home,

2. Recommendations

2.1 Eligible patient groups

2.1.1 Definition of mild cases

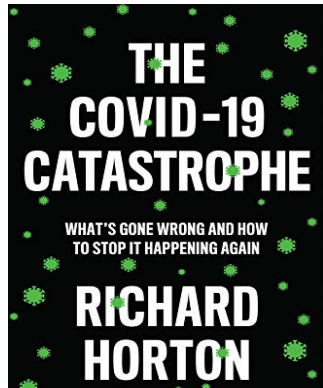
Mild cases may present with non-specific symptoms such as fever, fatigue, cough (with or without sputum production), anorexia, malaise, muscle pain, sore throat, shortness of breath, nasal congestion and headache. Rarely, patients may also present with diarrhoea, nausea or vomiting.⁴

World Health Organization. Repurposing facilities for isolation and management of mild COVID-19 cases. 2020.

Global recognition

THE LANCET

Editorial



Bloomberg

Forced Isolation May Be the Only Way to Stop Resurgence of Virus

Bloomberg News 13/08/2020



(Bloomberg) -- Flare-ups from Australia to Japan show the world hasn't learned an early lesson from the coronavirus crisis: to stop the

EDITORIALS

Covid-19: breaking the chain of household transmission

We urgently need new measures to protect household contacts

Shamil Haroon,¹ Joht Singh Chandan,^{1,2} John Middleton,³ Kar Keung Cheng¹

The UK is one of the countries most severely affected by covid-19. Recent outbreaks in English towns such as Oldham, probably involving transmission within large multigenerational households, highlight the importance of getting the right public health measures in place now to prevent further surges in infections.¹

Effective isolation

Effective isolation of index cases from household contacts

FEATURE

HOSPITAL PREPAREDNESS

Too little or too much? Missing the Goldilocks zone of hospital capacity during covid-19

Hastily constructed field hospitals in the US and UK have largely gone unused. Yet empty beds might provide important lessons on improving hospital preparedness and flexibility, writes **Bryn Nelson**

Bryn Nelson *science journalist*

The 17 March 2020 letter from Jay Inslee, the governor of Washington state, to US President Donald Trump, and similar scenarios played out around the country. By 11 May, US Army engineers had helped to build 37

BMJ

COVID-19 and China: lessons and the way forward

China has largely controlled COVID-19. A country of 1.4 billion people and a size similar to Europe or the USA now reports only clusters of cases rather than widespread community transmission. China has been widely criticised because of censorship, transparency, and human rights concerns. But the rest of the world can still learn from China's successes in bringing its outbreak under control.

China's response shows the importance of domestic research and public health capacity. Huge investments have left China much better prepared for COVID-19 than for severe acute respiratory syndrome (SARS). When SARS broke out in 2002, China was unprepared initially,

the decision to lockdown Wuhan on Jan 23. When Chen Wang, president of the Chinese Academy of Medical Sciences, and colleagues saw the need for Fangcang shelter hospitals, the government was quick to respond.

Third, achieving rapid and effective implementation of control measures for COVID-19 requires broad community engagement. Community solidarity has been unprecedented during the COVID-19 outbreak in China. Control measures that could sacrifice individual freedom, like mandatory mask-wearing in public areas, were accepted readily by the public. Millions of China's community workers have "built the first line of defence against COVID-19", according to Xinhua News Agency,



Wang Zhao/AP/Getty Images



Sustaining containment of COVID-19 in China



Feature China/Bazraf Media/Getty Images

See *Health Policy* page 1305

For the study by Prem and colleagues see [Articles](#) *Lancet Public Health* 2020; published March 25. [https://doi.org/10.1016/S2468-2667\(20\)30073-6](https://doi.org/10.1016/S2468-2667(20)30073-6)

For the study by Leung and colleagues see [Articles](#) *Lancet* 2020; published online April 8. [https://doi.org/10.1016/S0140-6736\(20\)30746-7](https://doi.org/10.1016/S0140-6736(20)30746-7)

On April 8, China lifted its 76-day lockdown of Wuhan, with trains and flights resumed and highways reopened. Shanghai will reopen its schools for many students from April 27. Given that most new COVID-19 cases in China are imported, the country is reopening businesses and schools gradually and cautiously.

The quick containment of COVID-19 in China is impressive and sets an encouraging example for other countries. What can be learnt from China? Aggressive public health interventions, such as early detection of cases, contact tracing, and population behavioural change, have contributed enormously to containing the epidemic. Kiesha Prem and colleagues found that a staggered relaxation of physical distancing measures in Wuhan in early April—such as school and workplace closures—is the most effective way to reduce the number of infections. To relieve the huge pressure on the health-care system, Fangcang shelter hospitals have also been crucial. Chen Wang and colleagues describe how these large temporary hospitals were built to

isolate, treat, and triage patients with mild to moderate COVID-19. Such hospitals, built within 3 weeks, have provided care to around 12 000 patients in Wuhan as of March 10, 2020.

However, China's success has come with huge social and economic costs, and China must make difficult decisions to achieve an optimal balance between health and economic protection. Can China maintain containment? Kathy Leung and colleagues argue that the over-riding public health priority for China is to closely monitor the instantaneous reproduction number (R_t) and confirmed case-fatality risk. Restrictions should be relaxed gradually so that the R_t does not exceed 1. Otherwise, cases would increase exponentially again, unleashing a second wave of infection.

Implementing a science-based lockdown exit strategy is essential to sustain containment of COVID-19. China's experience will be watched closely, as other countries start considering—and, in some cases, implementing—their own exit strategies. ■ [The Lancet](#)

Many Thanks!