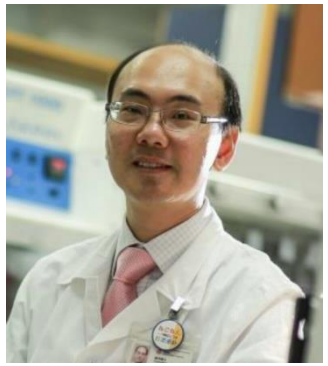
Infectious Disease and Infection Control Management of Patients with Multi-Drug Resistant Organisms

Co-organised by Infectious Disease Control Training Centre, Hospital Authority/ Infection Control Branch, Centre for Health Protection and Chief Infection Control Officer's Office, Hospital Authority

Epidemiology of Multi-Drug Resistant Organisms before and during COVID-19 in Hong Kong



Vincent CHENG

Infection Control Officer, Queen Mary Hospital
Chief of Service, Department of Microbiology, Queen Mary Hospital
Honorary Professor, Department of Microbiology, The University of Hong Kong

Infectious Disease and Infection Control Management of Patients with Multi-Drug Resistant Organisms

Co-organised by Infectious Disease Control Training Centre, Hospital Authority/ Infection Control Branch, Centre for Health Protection and Chief Infection Control Officer's Office, Hospital Authority

Epidemiology of Multi-Drug Resistant Organisms before and during COVID-19 in Hong Kong

Shuk Ching WONG

Senior Nursing Officer, Infection Control Team, Hong Kong West Cluster

Honorary Associate Professor, Department of Microbiology, &
Honorary Associate Professor, School of Nursing,
The University of Hong Kong

Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

*Antimicrobial Resistance Collaborators**

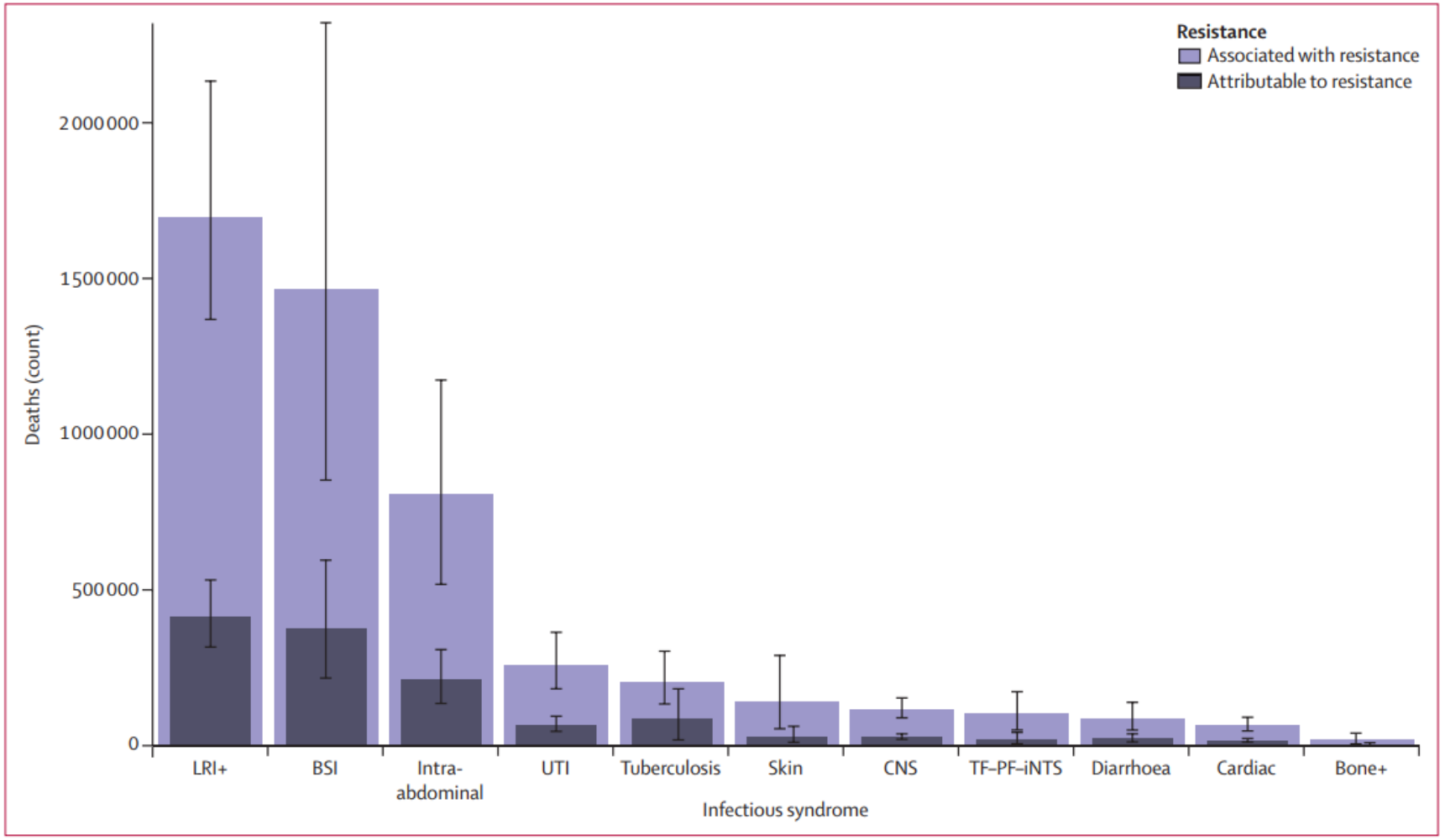


Figure 3: **Global deaths (counts) attributable to and associated with bacterial antimicrobial resistance by infectious syndrome, 2019**

Antimicrobial Resistance Collaborators. Lancet. 2022 Feb 12;399(10325):629-655.

Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

*Antimicrobial Resistance Collaborators**

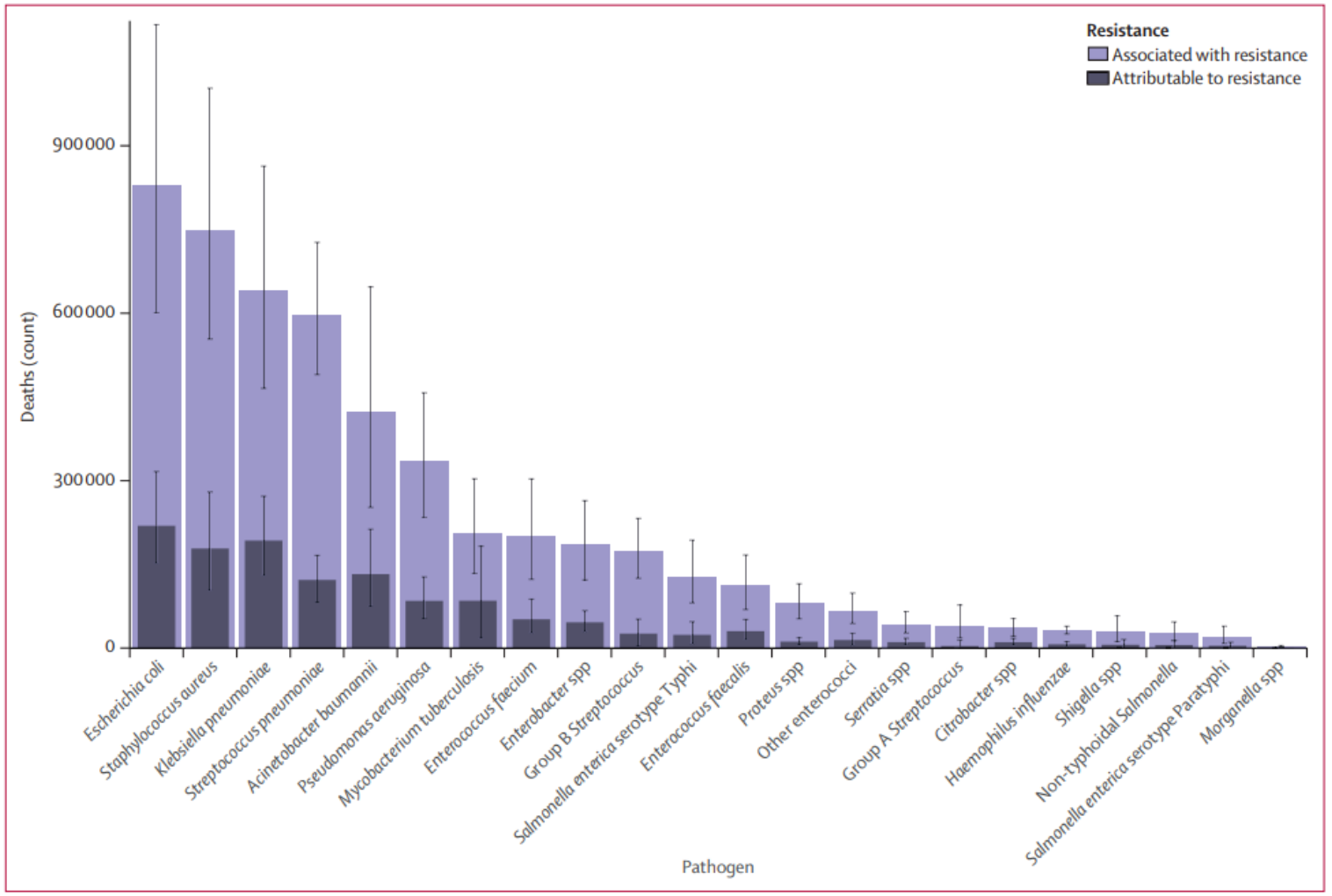
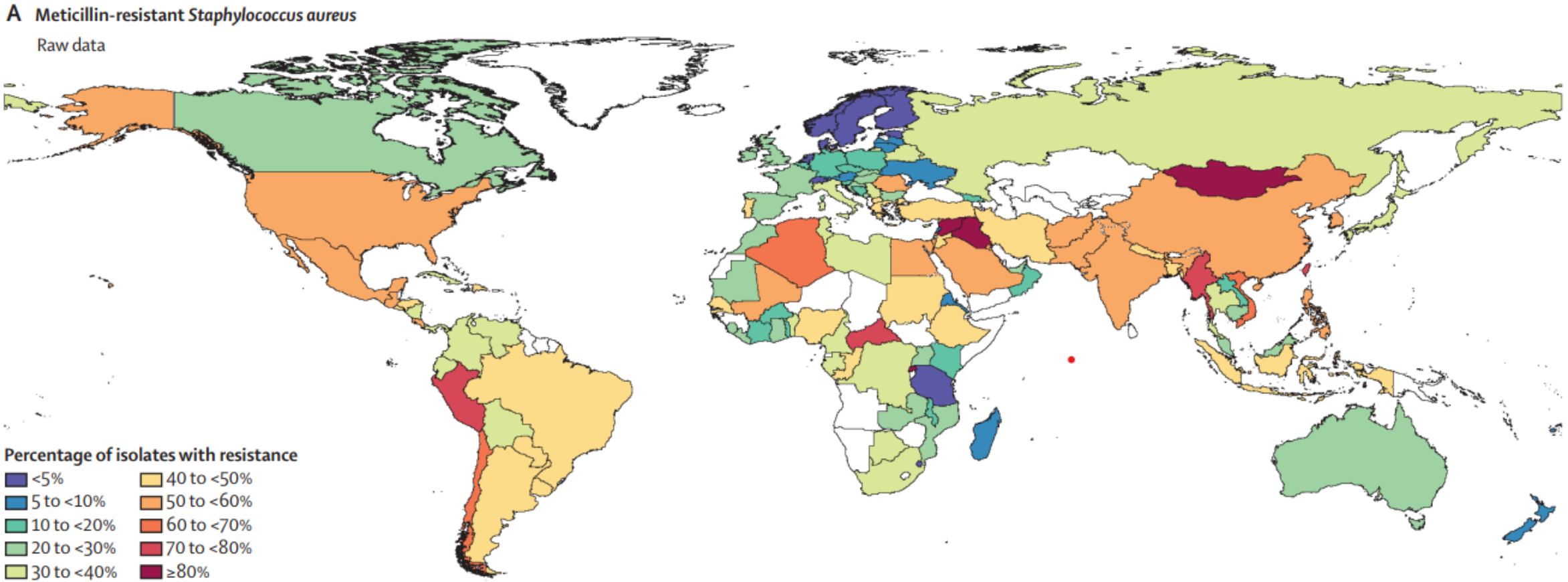


Figure 4: **Global deaths (counts) attributable to and associated with bacterial antimicrobial resistance by pathogen, 2019**

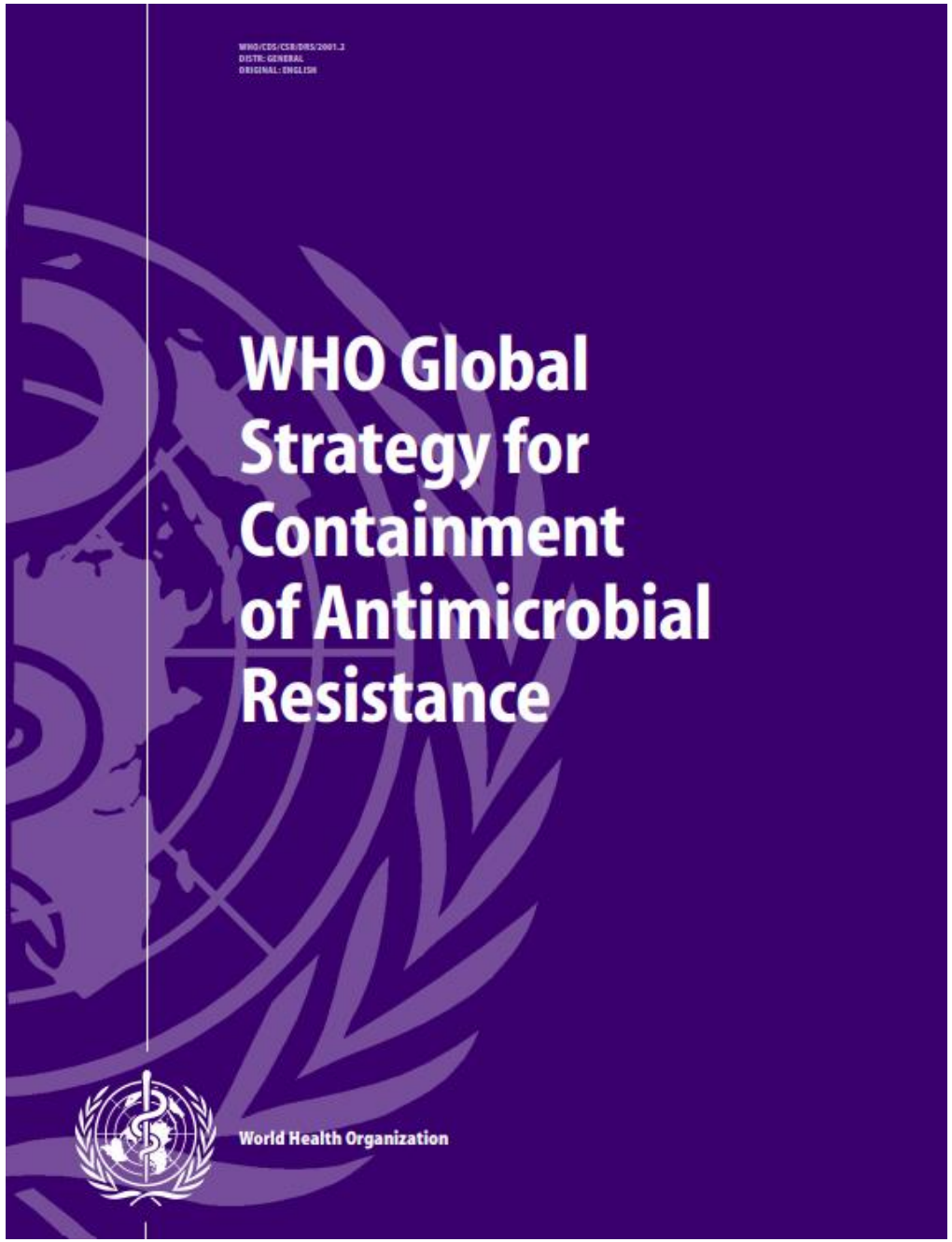
Antimicrobial Resistance Collaborators. Lancet. 2022 Feb 12;399(10325):629-655.

Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

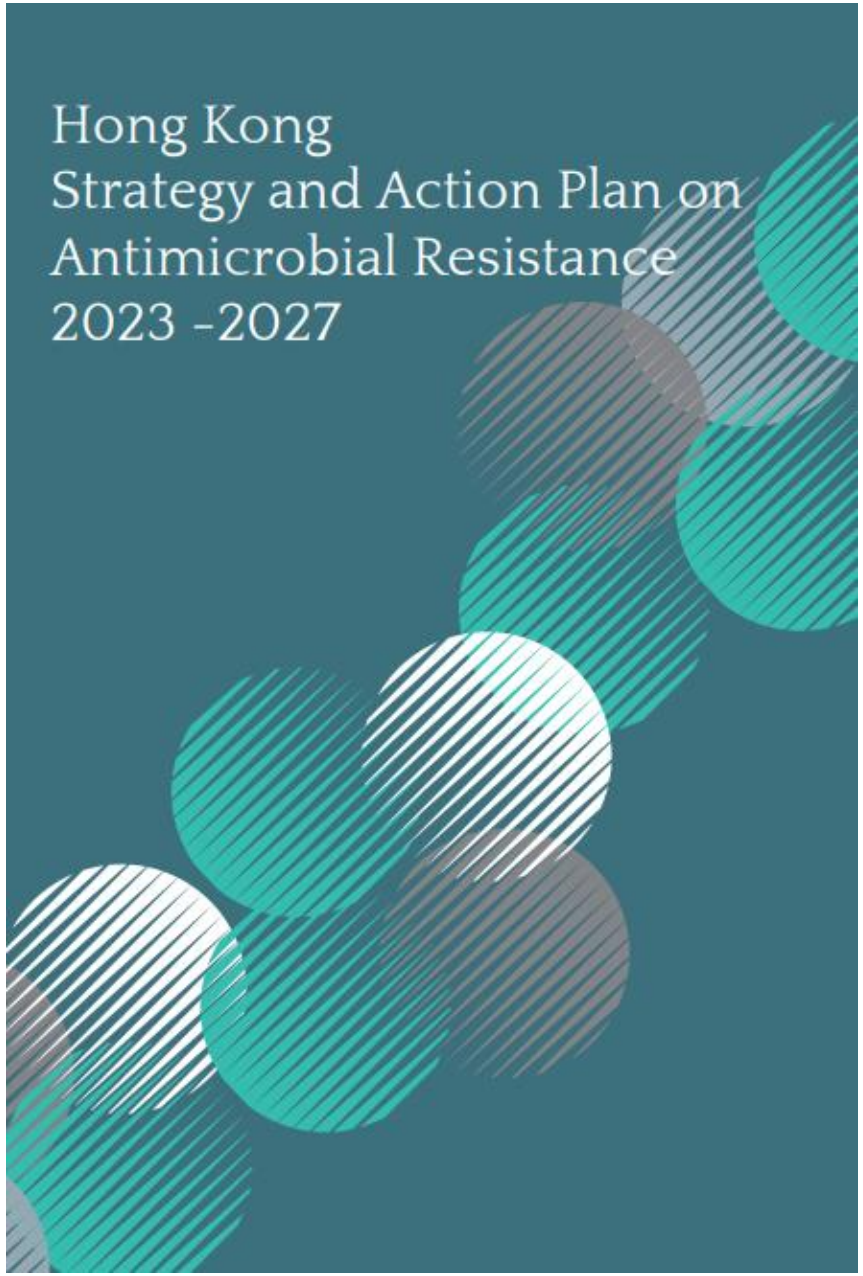
*Antimicrobial Resistance Collaborators**



Antimicrobial Resistance Collaborators. Lancet. 2022 Feb 12;399(10325):629-655.

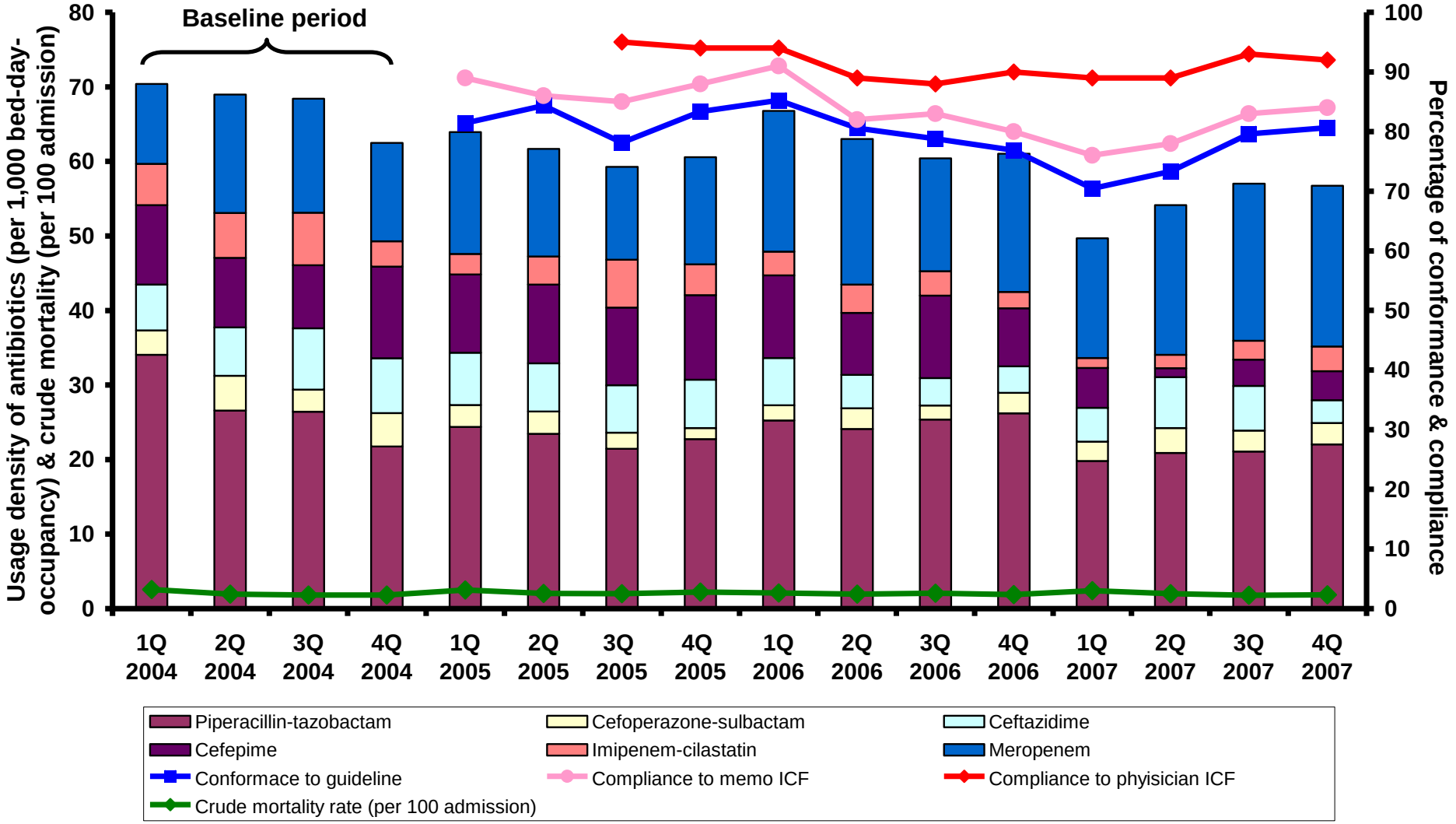


https://www.who.int/publications/i/item/who-global-strategy-for-containment-of-antimicrobial-resistance
https://www.who.int/publications/i/item/9789241509763



https://www.chp.gov.hk/files/pdf/amr_ac- 490 tion_plan_eng.pdf
https://www.chp.gov.hk/files/pdf/amr_action_plan_eng_2023.pdf

Overview of the ASP in a 3-year study period (2005 – 2007)



Cheng VC, et al. Eur J Clin Microbiol Infect Dis. 2009 Dec;28(12):1447-56.

Hand hygiene promotion in Hong Kong since 2007

協力 HASlink 通訊

2008/02/05

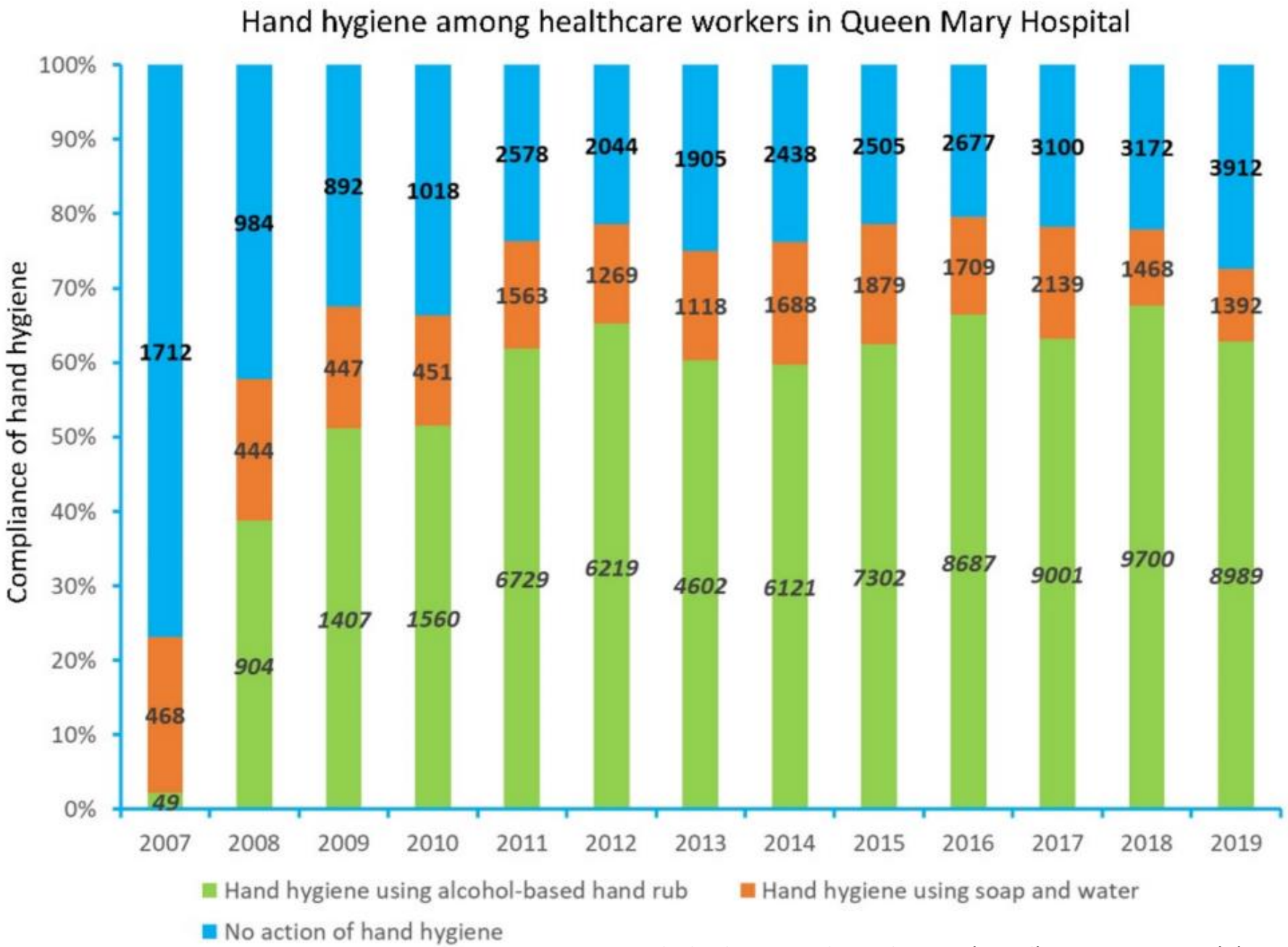
Join hands • Clean hands

Join hands • Clean hands

We have recently kicked off a patient care campaign to promote the practice of "Clean Hands for Health". The ceremony held on 21 September was officiated by Chairman Anthony Wu, Chief Executive Shane Solomon, and Professor Didier Pittet of the World Health Organisation. Centre for Health Protection Controller Dr Thomas Tsang, Director (Quality & Safety) Dr P Y Leung, Chief Infection Control Officer Dr W H Seto, all Cluster Chief Executives, together with many colleagues from the Clusters, also attended the kick-off.

This "Clean Hands for Health" campaign aims to encourage our healthcare colleagues to use an alcohol-based hand rub on WHO formulation and clean their hands at the point of patient care. This hand hygiene practice can reduce cross infection and enhance patient safety.

2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023



Wong Shuk-Ching, et al. Antibiotics (Basel). 2022 Aug 8;11(8):1076.

Introduction of an electronic monitoring system for monitoring compliance with Moments 1 and 4 of the WHO "My 5 Moments for Hand Hygiene" methodology

Vincent CC Cheng[1,2], Josepha WM Tai[2], Sara KY Ho[2], Jasper FW Chan[1,2], Kwan Ngai Hung[3], Pak Leung Ho[1] and Kwok Yung Yuen[1*]

HH compliance:
88.9% with ICN observation
31.5% without ICN observation !

MedSense devices including badges in beacon (left), pump bottle sensor (center), charger (right)

Cheng VC, et al. BMC Infect Dis. 2011 May 26;11:151.

Promotion & Implementation of Patient Empowerment in Hand Hygiene

Cheng VC, Wong Shuk-Ching, et al. Am J Infect Control. 2017 May 1;45(5):562-565.

手衛生,要做到
你我齊參與
有你提示會更好

瑪麗醫院 感染控制組

Directly observed hand hygiene – from healthcare workers to patients

V.C.C. Cheng [a,b], S-C. Wong [b], S.C.Y. Wong [a], K-Y. Yuen [c,*]

[a] Department of Microbiology, Queen Mary Hospital, Hong Kong Special Administrative Region, China
[b] Infection Control Team, Queen Mary Hospital, Hong Kong West Cluster, Hong Kong Special Administrative Region, China
[c] Department of Microbiology, The University of Hong Kong, Hong Kong Special Administrative Region, China

J Hosp Infect. 2019 Apr;101(4):380-382.

Directly observed hand hygiene (DOHH) before taking meals & drugs
進餐吃藥前潔手　超級惡菌難入口

服藥前，請用酒精搓手液潔手。
Hand hygiene before taking drugs.


進餐前，請用酒精搓手液潔手。
Hand hygiene before taking meals.


請用梘液洗手後才盛水漱口/刷牙。
Wash your hands with soap and water before mouth rinsing/tooth brushing.

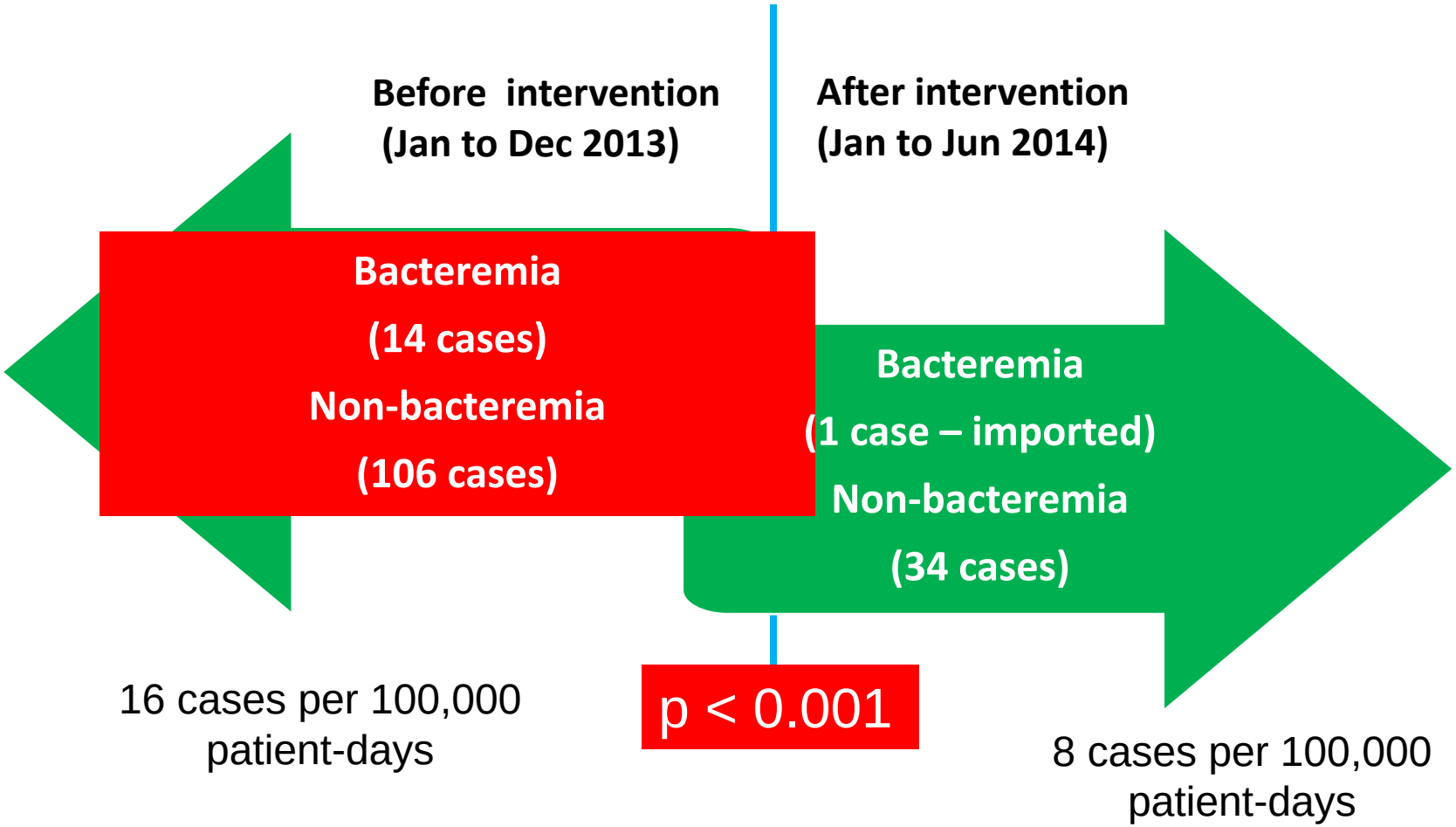

Personal hygiene in toilet
如廁衛生要遵守　預防惡菌莫留手

如廁前，請用沾有消毒劑的紙巾清潔廁板。
Wipe the toilet seat with disinfectant before use.


如廁後，請用梘液洗手。
Wash your hands with soap and water after toileting.


使用便盆或尿壺後，請用濕紙巾抹手，然後再用酒精搓手液潔手。
Use cleansing wipes to clean your hands after using bedpan or urinal. Then disinfect your hands with alcohol-based hand rub.

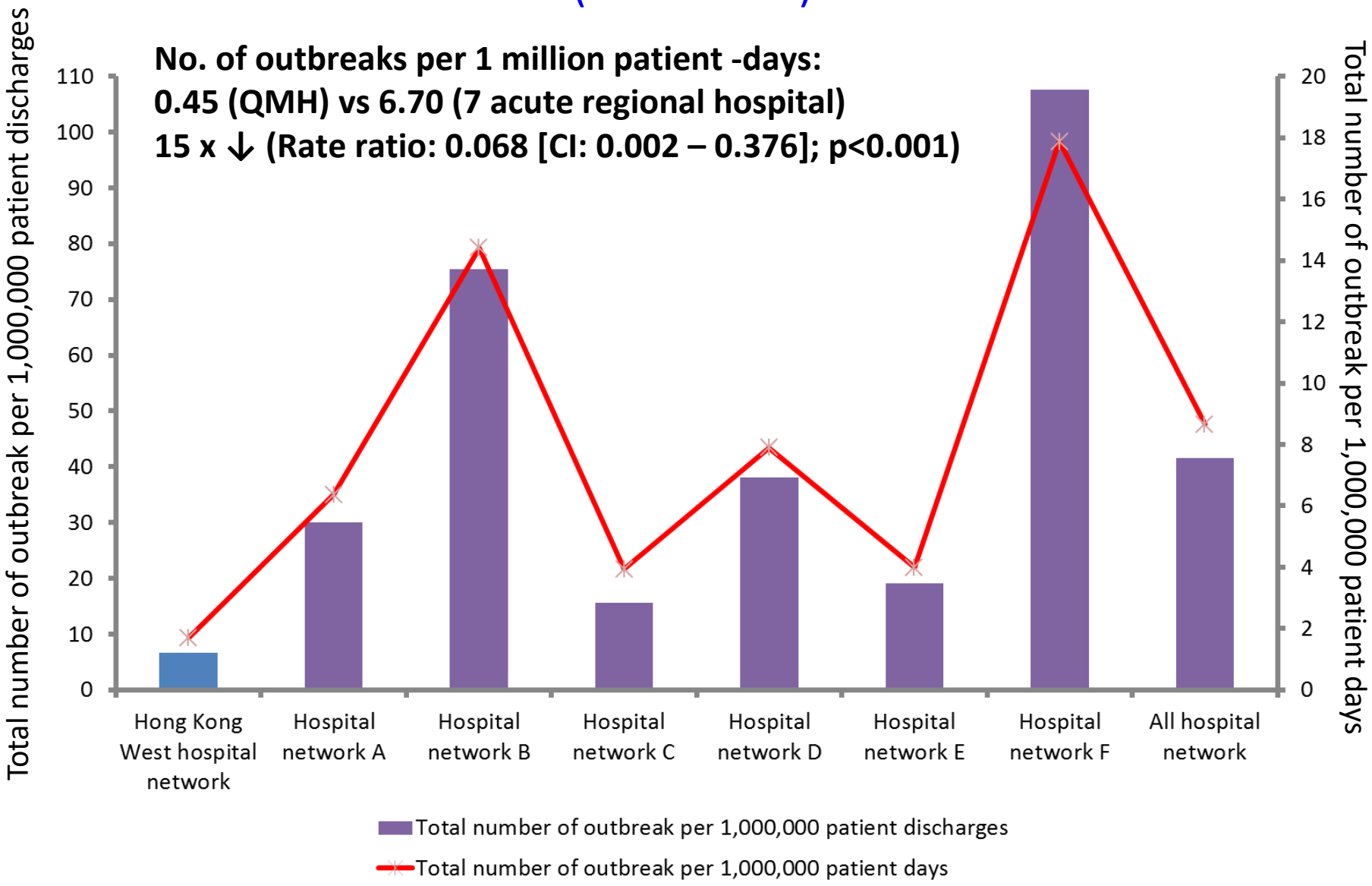

Control of hospital endemicity of multiple-drug-resistant *Acinetobacter baumannii* ST457 with directly observed hand hygiene



Prevalence of multiple-drug resistant *A. baumannii* in HKWC

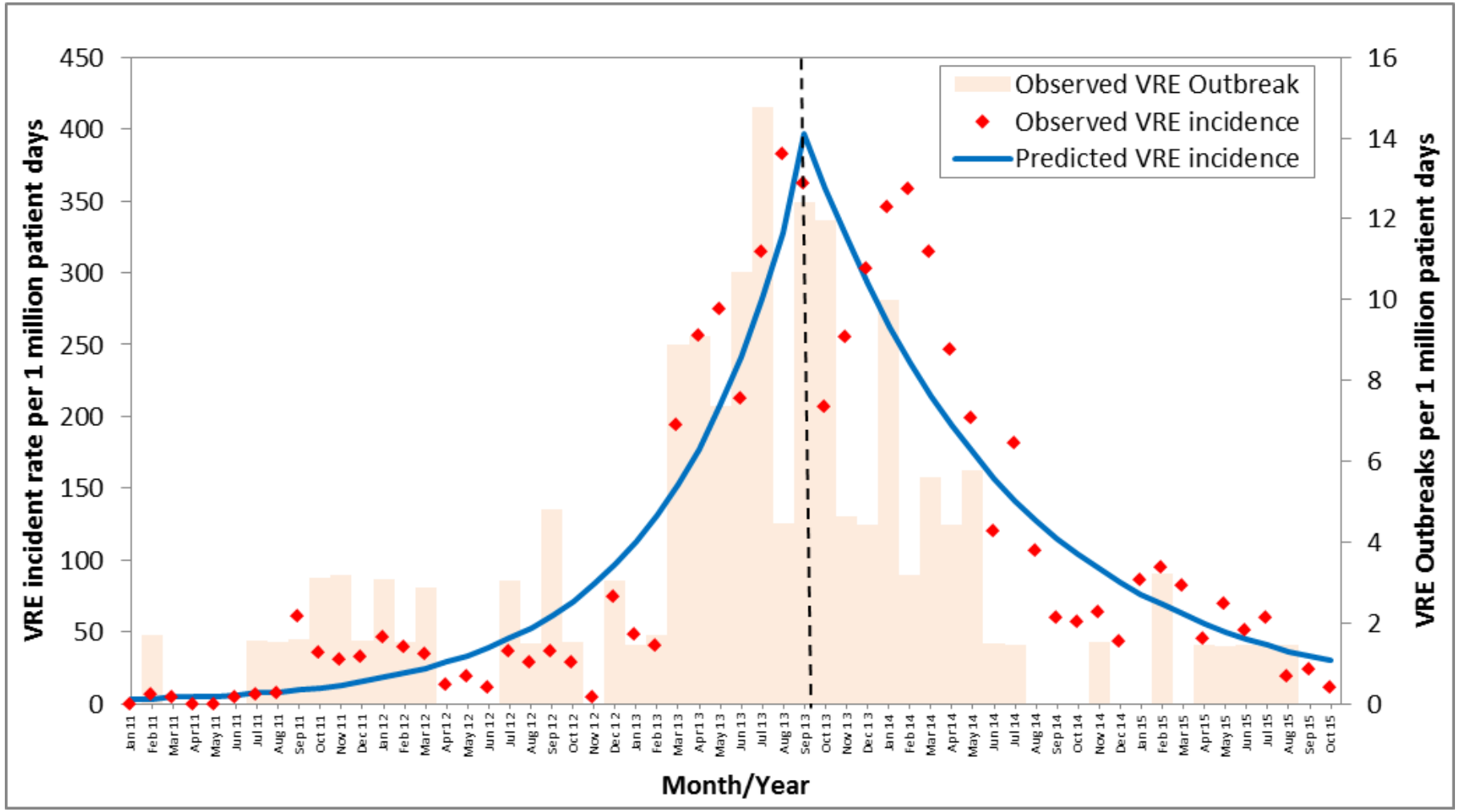
Cheng VC, et al. Eur J Clin Microbiol Infect Dis. 2015 Apr;34(4):713-8.

Benchmark of 317 hospital outbreaks in 7 hospital networks in HK (2010-2014)



Cheng VC, et al. Am J Infect Control. 2015 Jun 6. pii: S0196-6553(15)00469-1.

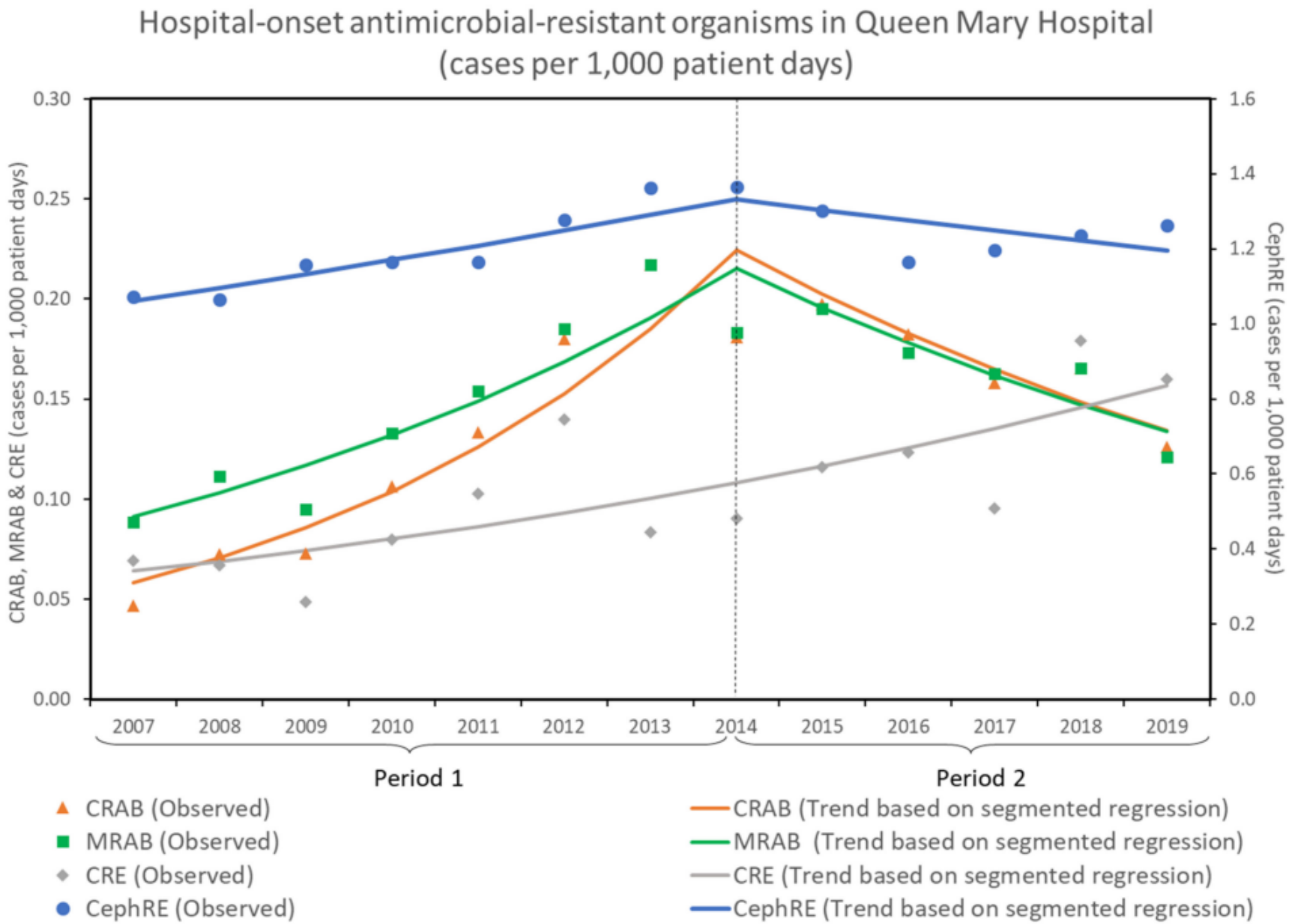
The observed incidence and the predicted incidence of VRE based on the segmented Poisson regression before and after the territory-wide implementation of the directly observed hand hygiene-based infection control measures



Cheng VC, et al. Am J Infect Control. 2016 Oct 1;44(10):1168-1171.

Patient participation in infection control

Yves Longtin (CA)



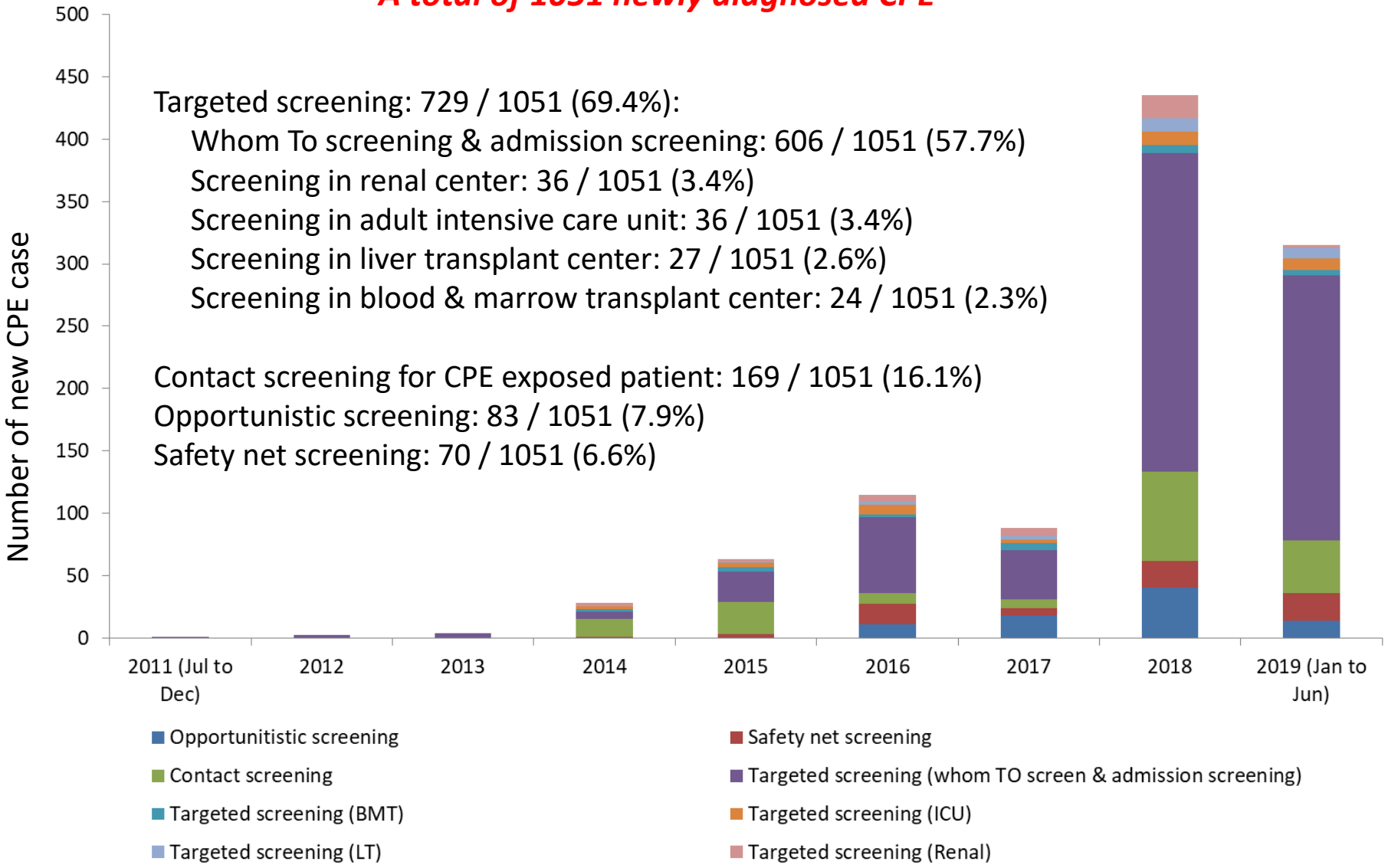
Wong Shuk-Ching, et al. Antibiotics (Basel). 2022 Aug 8;11(8):1076.

Multi-pronged screening strategy for early recognition of gastrointestinal colonization of CPE in Hong Kong West Hospital Network (1 July 2011 to 30 June 2019)

A total of 1051 newly diagnosed CPE

Targeted screening: 729 / 1051 (69.4%):
- Whom To screening & admission screening: 606 / 1051 (57.7%)
- Screening in renal center: 36 / 1051 (3.4%)
- Screening in adult intensive care unit: 36 / 1051 (3.4%)
- Screening in liver transplant center: 27 / 1051 (2.6%)
- Screening in blood & marrow transplant center: 24 / 1051 (2.3%)

Contact screening for CPE exposed patient: 169 / 1051 (16.1%)
Opportunistic screening: 83 / 1051 (7.9%)
Safety net screening: 70 / 1051 (6.6%)



Wong Shuk-Ching, et al. Eur J Clin Microbiol Infect Dis. 2021 Sep;40(9):2017-2022.

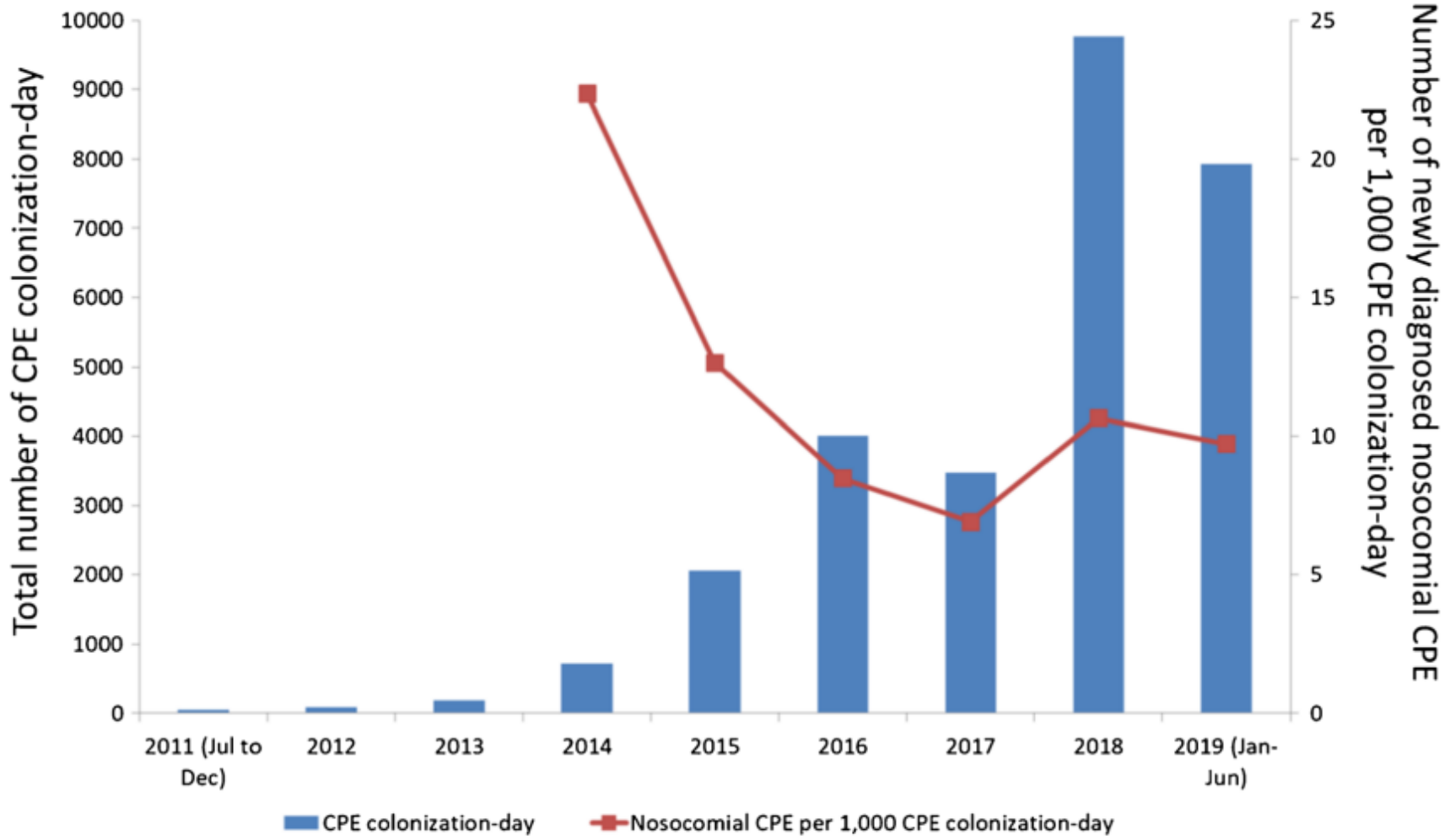
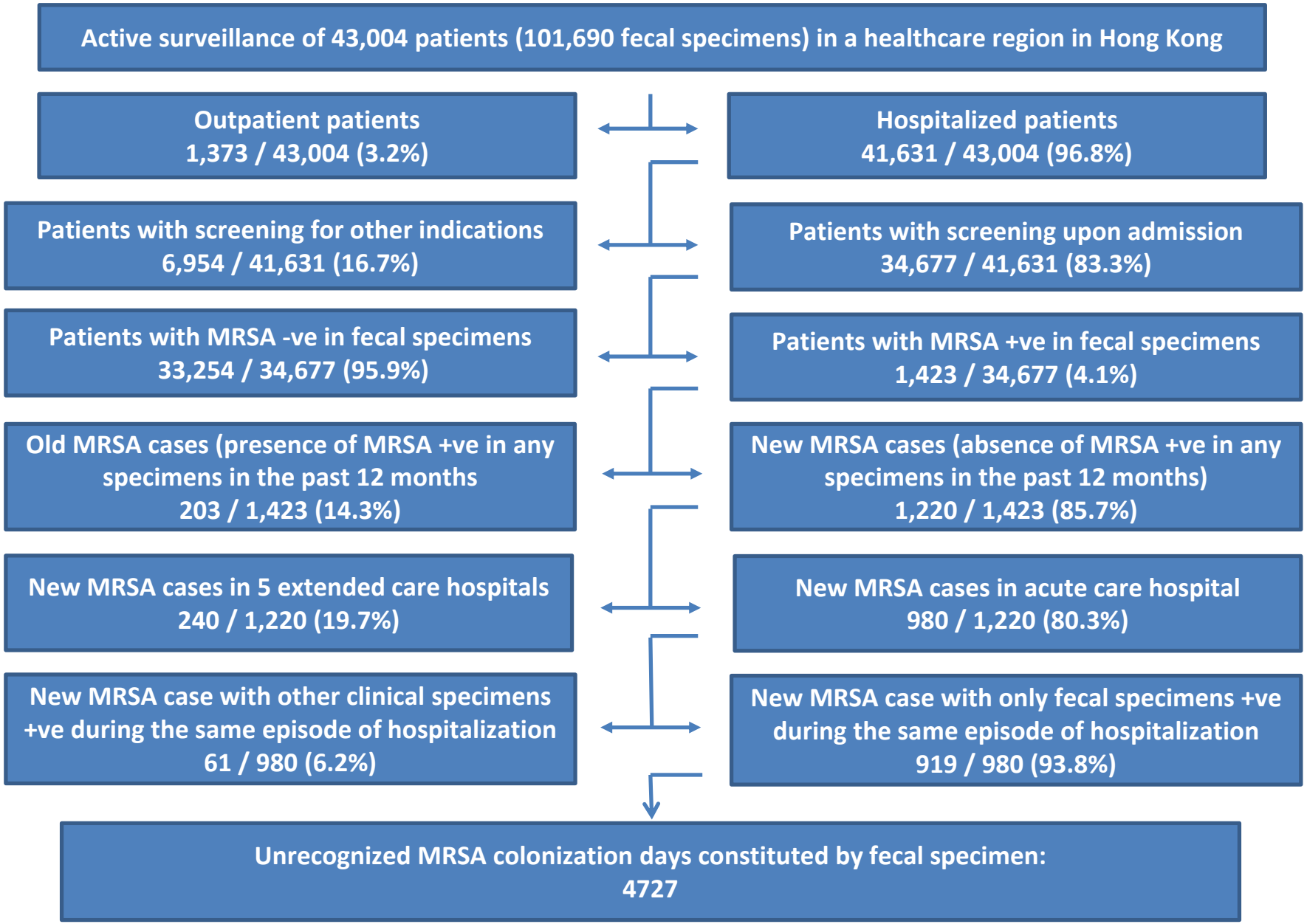


Fig. 2 Nosocomial acquisition of carbapenemase-producing Enterobacteriaceae in Queen Mary Hospital. Note. The first nosocomial carbapenemase-producing Enterobacteriaceae case was detected in 2014

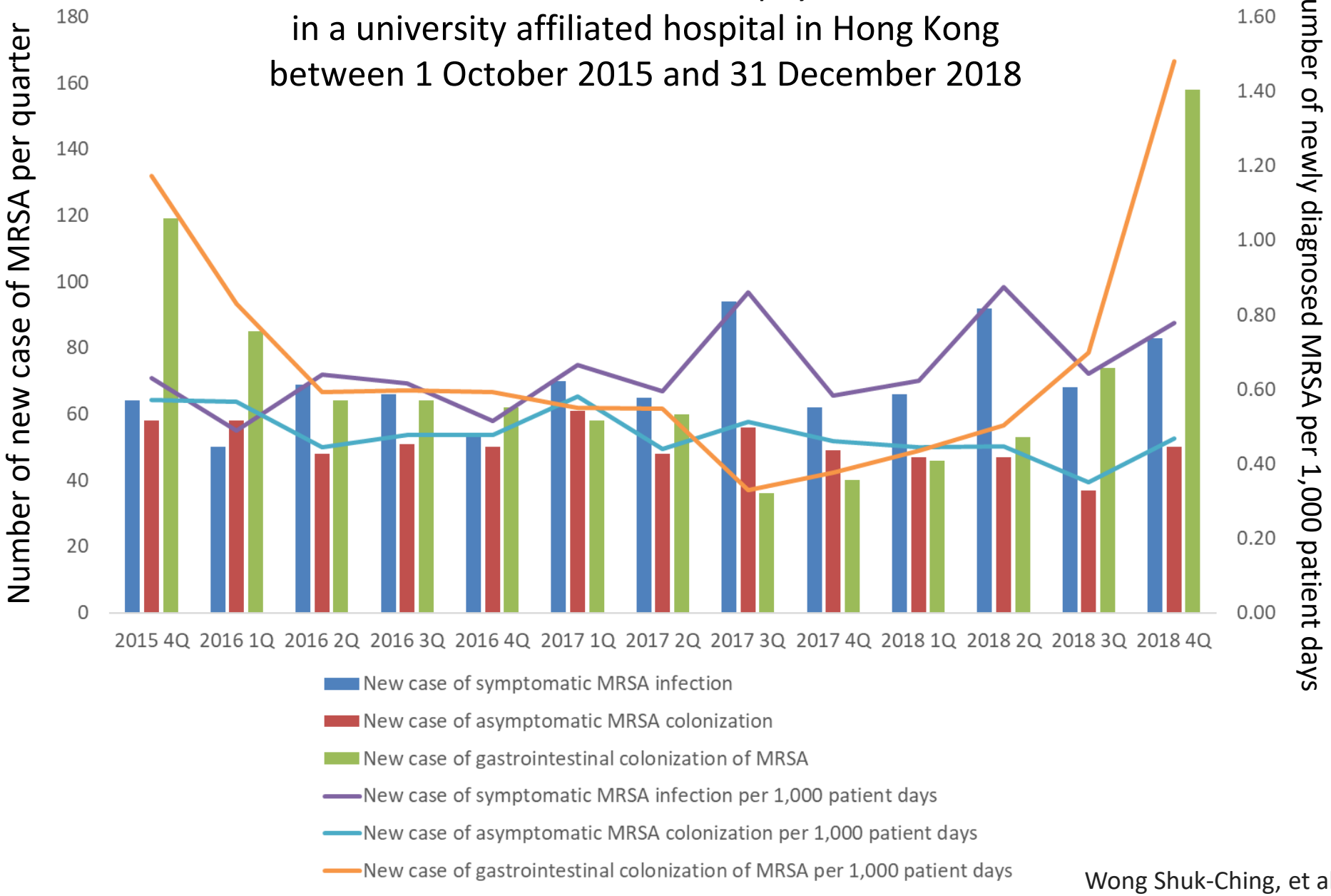
Wong Shuk-Ching, et al. Eur J Clin Microbiol Infect Dis. 2021 Sep;40(9):2017-2022.

Gastrointestinal colonization of methicillin-resistant *Staphylococcus aureus* in Hong Kong (1 October 2015 to 31 December 2018)

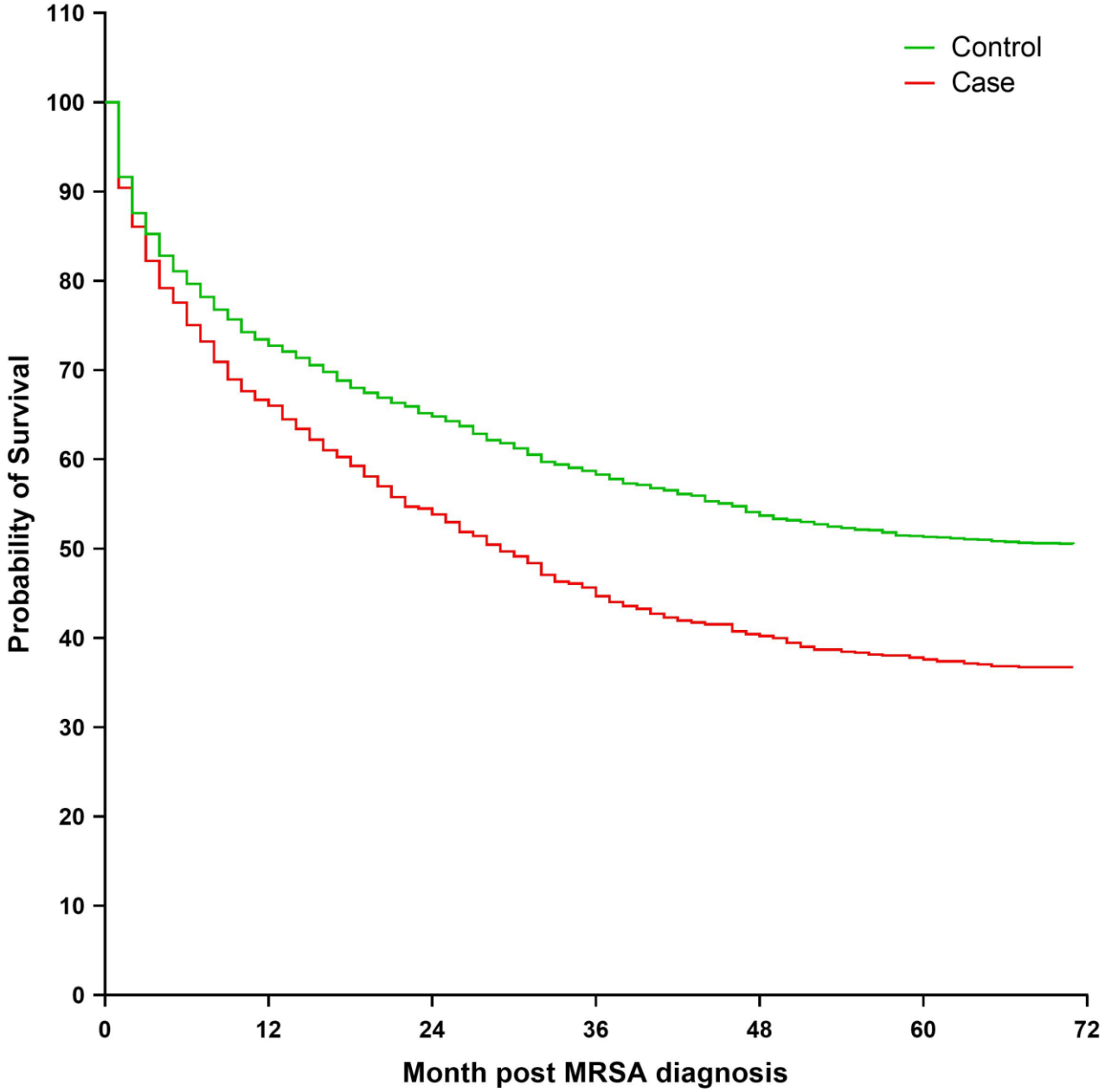


Wong Shuk-Ching, et al. J Hosp Infect. 2022 Mar;121:65-74.

Burden of methicillin-resistant *Staphylococcus aureus* in a university affiliated hospital in Hong Kong between 1 October 2015 and 31 December 2018



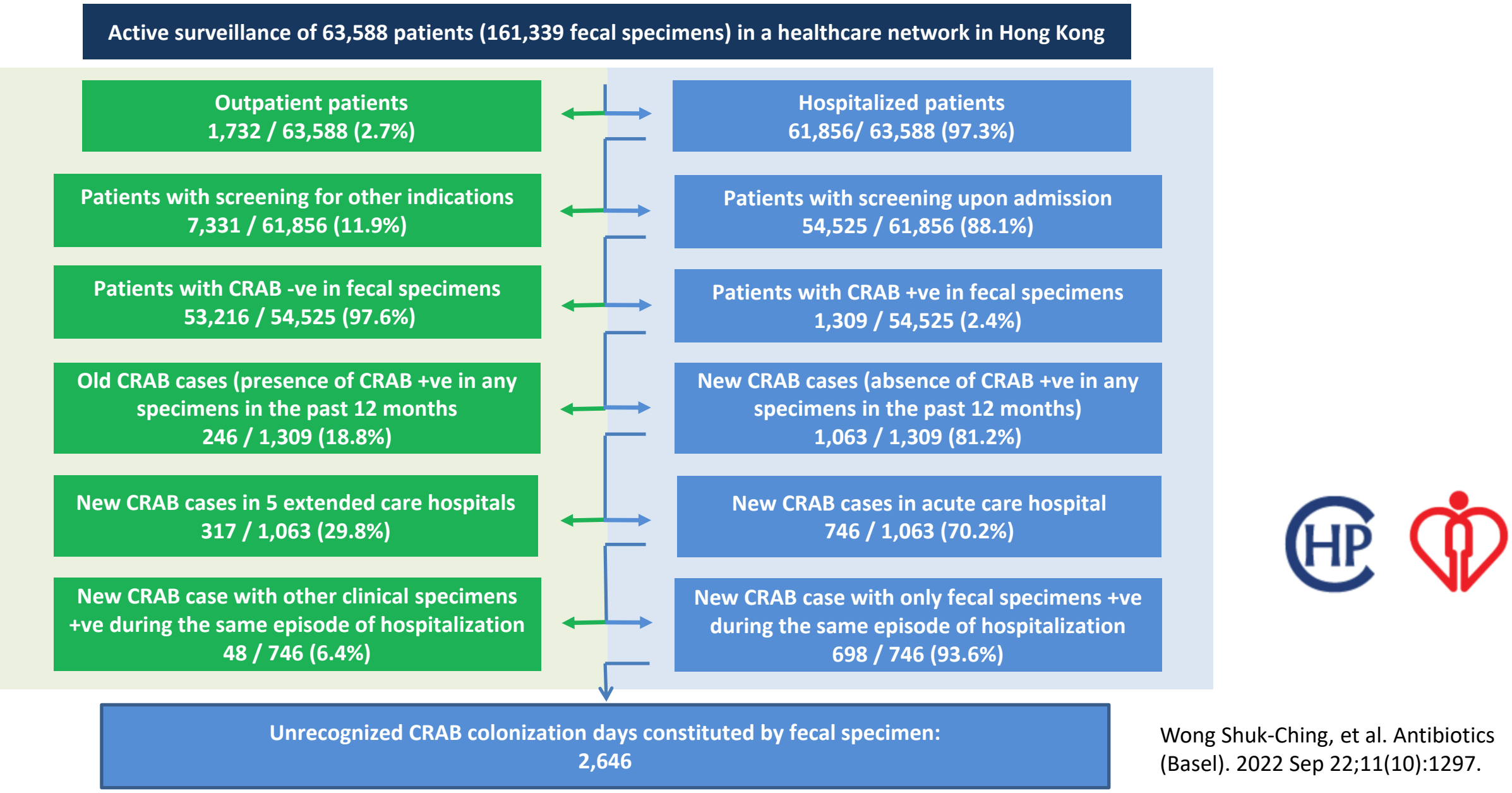
Wong Shuk-Ching, et al. J Hosp Infect. 2022 Mar;121:65-74.



Kaplan-Meier survival analysis of patients with or without gastrointestinal colonization of MRSA. Kaplan-Meier survival analysis was performed for the cases (red) and controls (green) from October 1st, 2015 and followed up until September 30th, 2021.
Log-rank test was used to compare the statistical difference between the survival curves of cases and controls ($P < 0.001$).

Wong Shuk-Ching, et al. J Hosp Infect. 2022 Mar;121:65-74.

Gastrointestinal colonization of carbapenem-resistant *Acinetobacter baumannii* in a healthcare network in Hong Kong (1 October 2015 to 31 December 2019)



Wong Shuk-Ching, et al. Antibiotics (Basel). 2022 Sep 22;11(10):1297.

Article

Gastrointestinal Colonization of Carbapenem-Resistant *Acinetobacter baumannii*: What Is the Implication for Infection Control?

Epidemiological characteristics for patients with or without gastrointestinal colonization of carbapenem-resistant A. baumannii (CRAB) in the age- and sex-matched controls

Characteristics	Patients with GIC of CRAB (n = 534) [b]	Patients without GIC of CRAB (n = 1068) [c]	Bivariate Analysis [d]		Multivariable Analysis [d]	
			Odds Ratio (95% CI)	p-Value	Odds Ratio (95% CI)	p-Value
Patient referred from RCHE	373 (69.9%)	184 (17.2%)	11.1 (8.7–14.2)	<0.001	16.0 (11.6–22.0)	<0.001
Presence of indwelling device [e]	248 (46.4%)	231 (21.6%)	3.1 (2.5–3.9)	<0.001	1.5 (1.1–2.1)	0.007
Charlson comorbidity index (mean ± SD)	4.3 ± 2.1	4.3 ± 2.3	1.0 (1.0–1.1)	0.876	NA [f]	NA [f]
Use of antibiotics in preceding 6 months [g]						
Beta-lactam/beta-lactamase inhibitors	183 (34.3%)	86 (8.0%)	6.0 (4.5–7.9)	<0.001	2.3 (1.6–3.5)	<0.001
Cephalosporins	38 (7.1%)	27 (2.5%)	3.0 (1.8–4.9)	<0.001	NA [f]	NA [f]
Carbapenems	106 (19.9%)	29 (2.7%)	8.9 (5.8–13.6)	<0.001	4.2 (2.5–7.3)	<0.001
Fluoroquinolones	69 (12.9%)	56 (5.2%)	2.7 (1.9–3.9)	<0.001	NA [f]	NA [f]
Use of PPI in preceding 6 months [h]	296 (55.4%)	247 (23.1%)	4.1 (3.3–5.2)	0.001	1.7 (1.3–2.4)	<0.001
Hospitalization in the past 6 months	456 (85.4%)	515 (48.2%)	6.3 (4.8–8.2)	<0.001	3.5 (2.4–4.9)	<0.001

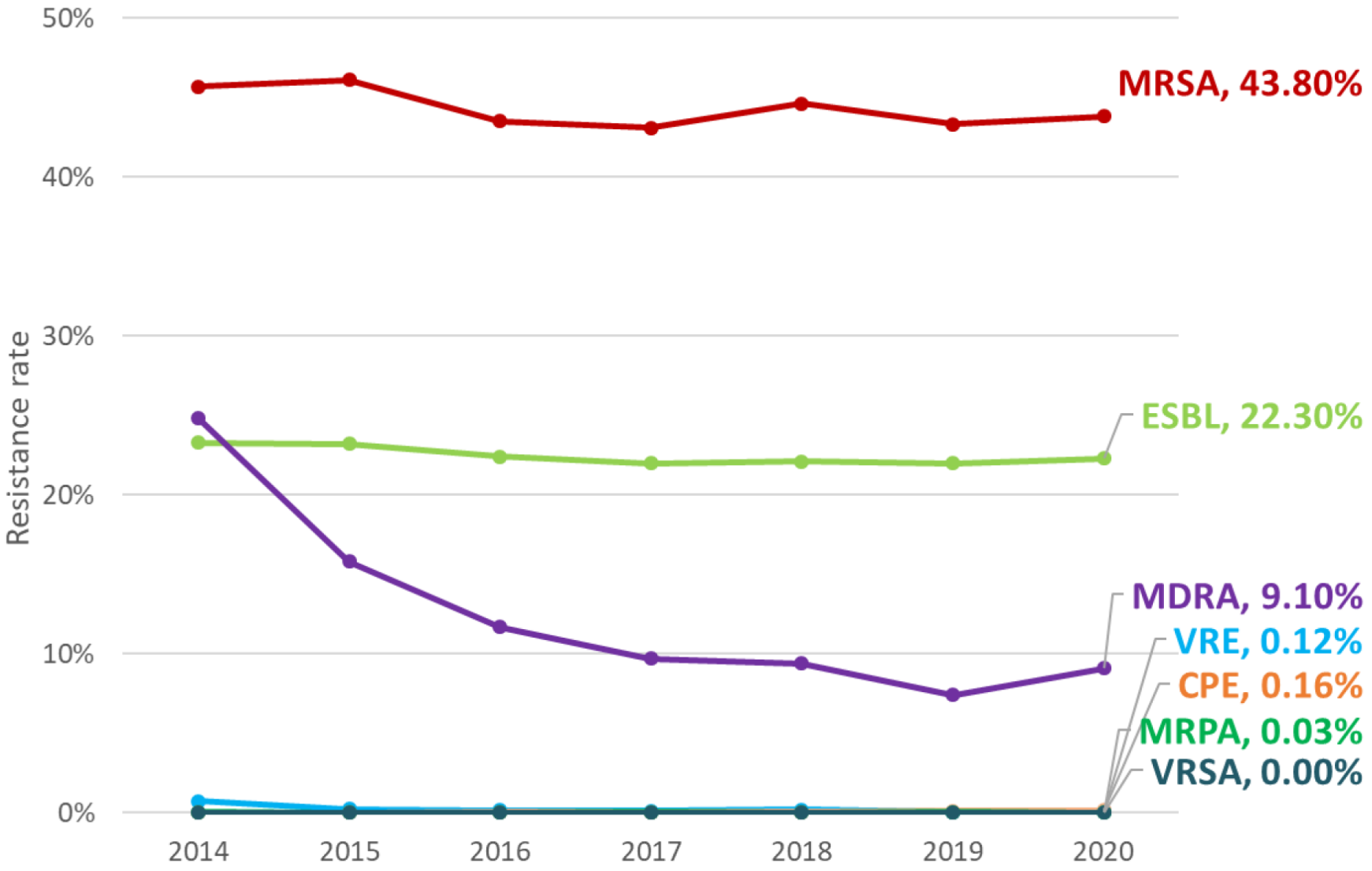
Wong Shuk-Ching, et al. Antibiotics (Basel). 2022 Sep 22;11(10):1297.

Number of patients with newly diagnosed MDROs in Hospital Authority

		2014	2015	2016	2017	2018	2019	2020
Methicillin-resistant *Staphylococcus aureus*	MRSA	8220	8543	8566	9213	9743	9593	8770
ESBL producing *Enterobacteriaceae*	ESBL	12652	13321	13233	13420	13590	13936	12827
Multidrug-resistant *Acinetobacter* species	MDRA	1548	976	657	553	549	445	515
Vancomycin-resistant *Enterococcus* (clinical + screening specimen)	VRE	88 (1203)	30 (378)	27 (182)	20 (281)	31 (302)	9 (92)	14 (70)
Carbapenemase producing *Enterobacteriaceae* (clinical + screening specimen)	CPE	11 (108)	20 (134)	45 (340)	46 (473)	88 (972)	168 (1584)	182 (1574)
Multidrug-resistant *Pseudomonas aeruginosa*	MRPA	10	3	6	8	3	8	5
Vancomycin-resistant *Staphylococcus aureus*	VRSA	0	0	0	0	0	0	0

Data from Hospital Authority; Courtesy of Dr. Vivien Chuang

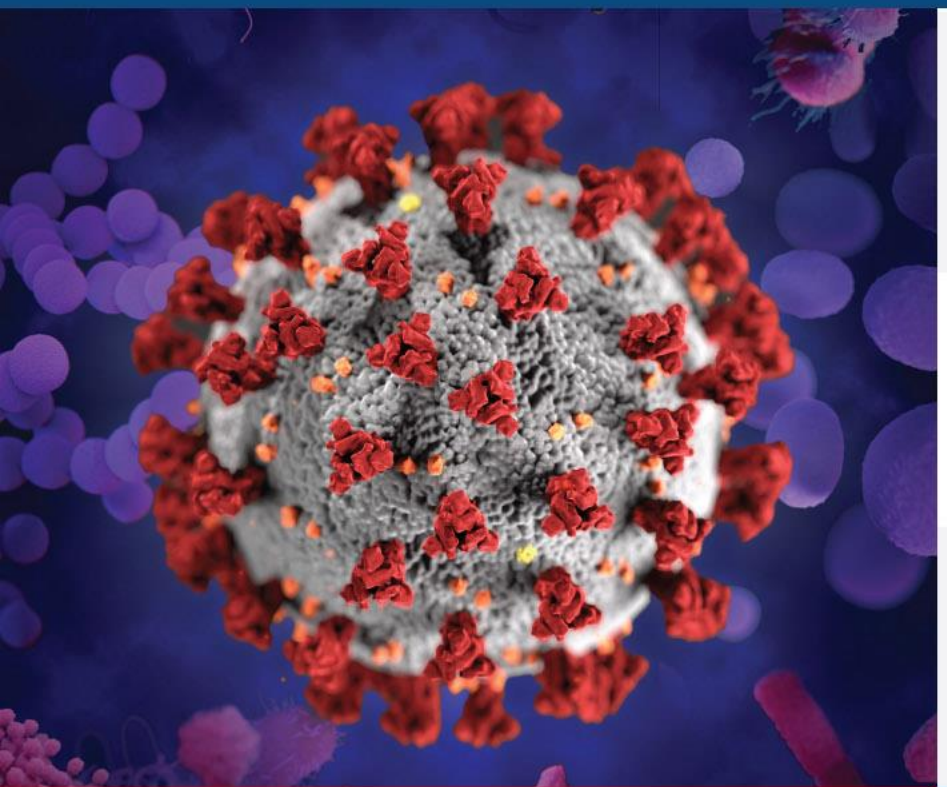
Resistance rate of MDROs in Hospital Authority



Data from Hospital Authority; Courtesy of Dr. Vivien Chuang

COVID-19 CREATED A PERFECT STORM

The U.S. lost progress combating antimicrobial resistance in 2020



↑15% Antimicrobal-resistant infections and deaths increased in hospitals in 2020.

~80% Patients hospitalized with COVID-19 who received an antibiotic March-October 2020.

! Delayed or unavailable data, leading to resistant infections spreading undetected and untreated.

INVEST IN PREVENTION.

Setbacks to fighting antimicrobial resistance can and must be temporary.

Learn more: https://www.cdc.gov/drugresistance/covid19.html

Increase in Hospital-Acquired Carbapenem-Resistant *Acinetobacter baumannii* Infection and Colonization in an Acute Care Hospital During a Surge in COVID-19 Admissions — New Jersey, February–July 2020

Weekly / December 4, 2020 / 69(48);1827–1831

On December 1, 2020, this report was posted online as an MMWR *Early Release.*

Stephen Perez, PhD[1,2]; Gabriel K. Innes, VMD, PhD[2]; Maroya Spalding Walters, PhD[3]; Jason Mehr, MPH[2]; Jessica Arias[2]; Rebecca Greeley, MPH[2]; Debra Chew, MD[4] (View author affiliations)

MMWR Morb Mortal Wkly Rep. 2020 Dec 4;69(48):1827-1831.

Absence of nosocomial influenza and respiratory syncytial virus infection in the coronavirus disease 2019 (COVID-19) era: Implication of universal masking in hospitals

Shuk-Ching Wong MNurs[1], Germaine Kit-Ming Lam MNurs[1], Christine Ho-Yan AuYeung MNurs[1], Veronica Wing-Man Chan MPH[1], Newton Lau-Dan Wong MNurs[1], Simon Yung-Chun So MMedSc[2], Jonathan Hon-Kwan Chen PhD[2], Ivan Fan-Ngai Hung MD[3], Jasper Fuk-Woo Chan MD[4], Kwok-Yung Yuen MD[4] and Vincent Chi-Chung Cheng MD[1,2]

[1]Infection Control Team, Queen Mary Hospital, Hong Kong West Cluster, Hong Kong Special Administrative Region, China, [2]Department of Microbiology, Queen Mary Hospital, Hong Kong Special Administrative Region, China, [3]Department of Medicine, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Pokfulam, Hong Kong Special Administrative Region, China and [4]Department of Microbiology, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong Special Administrative Region, China

Infect Control Hosp Epidemiol. 2021 Feb;42(2):218-221.

Announcement of an outbreak of community acquired pneumonia in Wuhan, China (31 December 2019) (Day 1)

Evolution and Control of COVID-19 Epidemic in Hong Kong

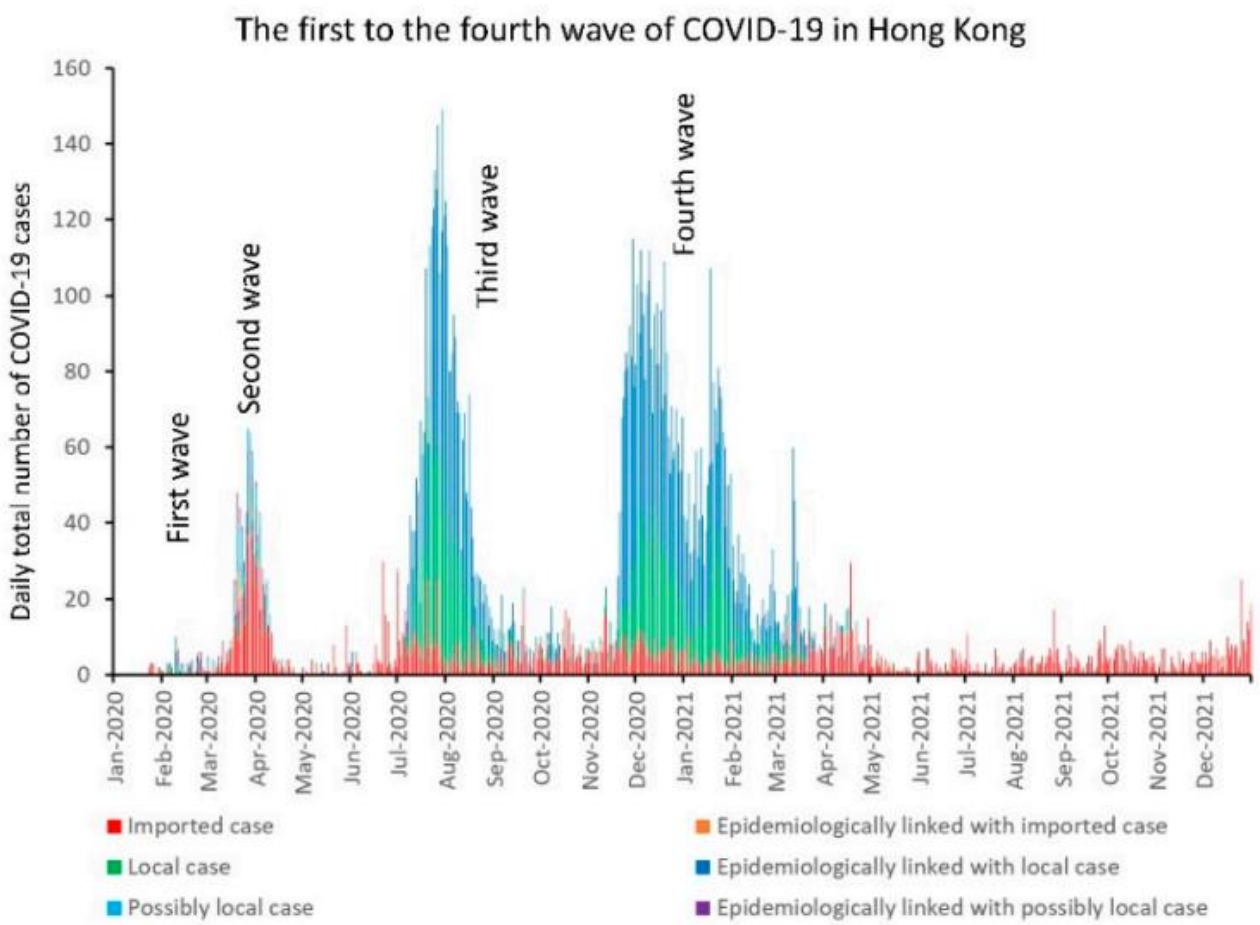
Shuk-Ching Wong [1], Albert Ka-Wing Au [2], Janice Yee-Chi Lo [2], Pak-Leung Ho [3,4], Ivan Fan-Ngai Hung [5], Kelvin Kai-Wang To [3], Kwok-Yung Yuen [3] and Vincent Chi-Chung Cheng [1,6,*]

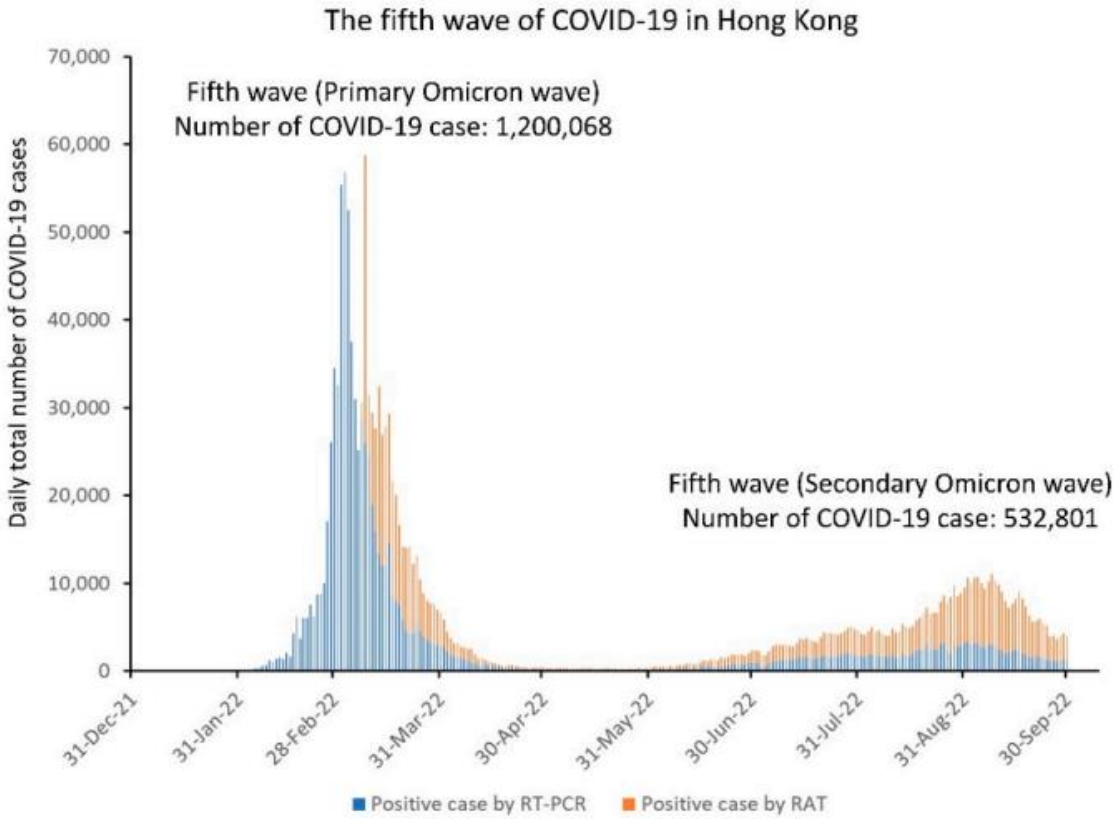
Wave of COVID-19	Period (Duration of Each Wave, Day) [a]	Total Number of Cases [b] (Death, Case Fatality rate)	Number (%) of Cases in (Episodes of) Community Outbreaks [c]	Number (%) of Imported Cases (Remark)	Predominant Virus Strain
1st	23 January 2020 (day 24) to 14 March 2020 (day 75) (51 days)	142 (4, 2.8%)	53 (37.3%) (4)	56 (39.4%) (mainly from China)	NA
2nd	15 March 2020 (day 76) to 30 June 2020 (day 183) (108 days)	1064 (4, 0.38%)	130 (12.2%) (3)	739 (69.4%)	NA
3rd	1 July 2020 (day 184) to 31 October 2020 (day 306) (123 days)	4118 (103, 2.5%)	681 (16.5%) (23)	678 (16.5%)	B.1.1.63
4th	1 November 2020 (day 307) to 30 April 2021 (day 487) (181 days)	6451 (101, 1.6%)	1480 (22.9%) (24)	960 (14.9%)	B.1.36.27
Window phase [d]	1 May 2021 (day 488) to 30 December 2021 (day 731) (244 days)	861 [e] (1, 0.12%)	No	854 (99.2%) (without community outbreak	NA
5th (primary Omicron)	31 December 2021 (day 732) to 31 May 2022 (day 883) (152 days)	1,200,068 (9318, 0.78%) [f]	NA [g]	2292 (0.19%)	Omicron BA.2
5th (secondary Omicron)	1 June 2022 (day 884) to 25 September 2022 (day 1000) (117 days)	532,801 (585, 0.11%) [f]	NA [g]	20,519 (3.9%)	Omicron BA.5

Wong Shuk-Ching, et al. Viruses. 2022 Nov 14;14(11):2519.

Evolution and Control of COVID-19 Epidemic in Hong Kong

Shuk-Ching Wong [1], Albert Ka-Wing Au [2], Janice Yee-Chi Lo [2], Pak-Leung Ho [3,4], Ivan Fan-Ngai Hung [5], Kelvin Kai-Wang To [3], Kwok-Yung Yuen [3] and Vincent Chi-Chung Cheng [1,6,*]





Wong Shuk-Ching, et al. Viruses. 2022 Nov 14;14(11):2519.

24 Nov 2021
South Africa confirmed its first report of B.1.1.529 to WHO
01

26 Nov 2021
WHO on SARS-CoV-2 Virus Evolution designated B.1.1.529 a variant of concern (VOC)
02

29 Nov 2021
World Health Assembly WHO presented the variant as having a very high global risk in a special session
03

1 Dec 2021
WHO advised the COVID-vulnerable, including those over 60, not to travel
04

7 Dec 2021
Globally, more than twenty countries had reported cases
05

8 Dec 2021
WHO announced that the variant had been detected in 57 countries
06

9 Dec 2021
Cases in South Africa raised by 110% in one week
07

11 Dec 2021
In the U.S. the variant was responsible for 2.9% of cases
08

13 Dec 2021
In UK, the first death with the Omicron variant was reported
09

16 Dec 2021
New Zealand, Indonesia, Malaysia and Poland confirmed its first case of Omicron variant
10

17 Dec 2021
A/C to CDC Omicron will peak in January 2022, case load having increased 7-fold in one week
11

18 Dec 2021
WHO reported that given community transmission the number of cases doubles every 1.5 to three days
12

20 Dec 2021
CDC estimated that Omicron accounts for 73% of COVID-19 cases in the U.S.
13

26 Dec 2021
As per WHO, Omicron is in at least 115 countries
14

29 Dec 2021
Omicron is estimated to account for 59% of all Covid cases in USA, A/C to the CDC
15

31 Dec 2021
Israel has become one of the first countries in the world to approve a fourth Covid vaccination
16

01 Jan 2022
French Health officials acknowledged the Omicron variant as the country most dominant variant.
17

04 Jan 2022
As per WHO, Omicron has emerged in 128 countries
18

05 Jan 2021
U.S. reports nearly 1 million COVID-19 cases in a day, setting global record
19

06 Jan 2022
Omicron variant had been identified in 149 countries across all six WHO Regions
20

12 Jan 2022
As per WHO, 50% of Europe Will Get Omicron Infection Within Weeks
21

13 Jan 2022
As per WHO, Omicron less severe than Delta but still poses danger for unvaccinated
22

14 Jan 2022
WHO recommended the use of two drugs by Eli Lilly, and GlaxoSmithKline & Vir Biotechnology for COVID-19 patients.
23

18 Jan 2022
As per WHO, Vaccines must be central strategy to fight COVID-19 pandemic
24

Sharma V, et al. J Med Virol. 2022 May;94(5):1876-1885.

Transmission of Omicron (B.1.1.529) SARS-CoV-2 Variant of Concern in a designated quarantine hotel for travelers: a challenge of elimination strategy of COVID-19

On-site investigation (22 November 2021)
High-level non-reachable surfaces
(wall or ceiling of 50 x 20 cm in size):
1 (12.5%) of 8 samples: RT-PCR positive (Ct value: 39)

Commonly touched surfaces in room:
21 (53.8%) of 39 samples: RT-PCR positive

Wong Shuk-Ching, et al. Lancet Reg Health West Pac. 2021 Dec 23:100360.

South China Morning Post

Cap 599C (Compulsory Quarantine of Certain Persons Arriving at Hong Kong Regulation)

Hong Kong / Law and Crime

2 former Cathay Pacific flight attendants convicted of breaching Hong Kong's Covid quarantine rules while infected at start of fifth wave

- Pair's actions late last year were thought to be the likely cause of the first Omicron cluster in city's fifth wave of infections, its deadliest by far
- Carrier at the time came under fire and was accused of exploiting loophole, allowing staff on commercial flights to return on cargo ones and isolate at home

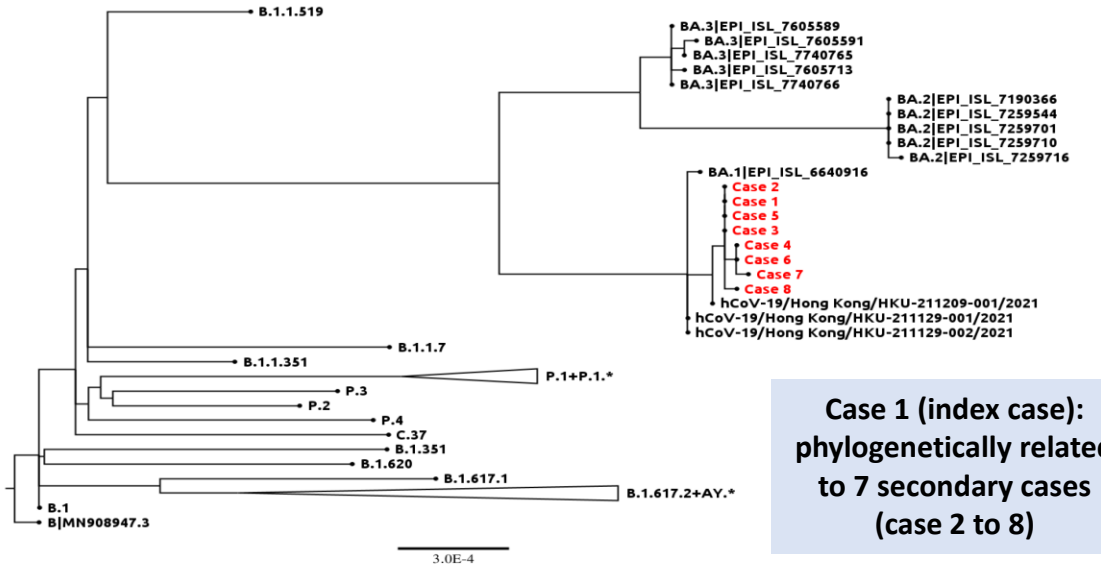
News 17 November 2022

2 former Cathay Pacific flight attendants jailed for 8 weeks for breaching Hong Kong's Covid quarantine rules

- Duo thought to be responsible last year for sparking cluster in city's fifth and most severe wave of infections
- Wong's claims that carrier's guidelines were misleading dismissed by judge who called their reasons for leaving home before receiving test results 'incredible'

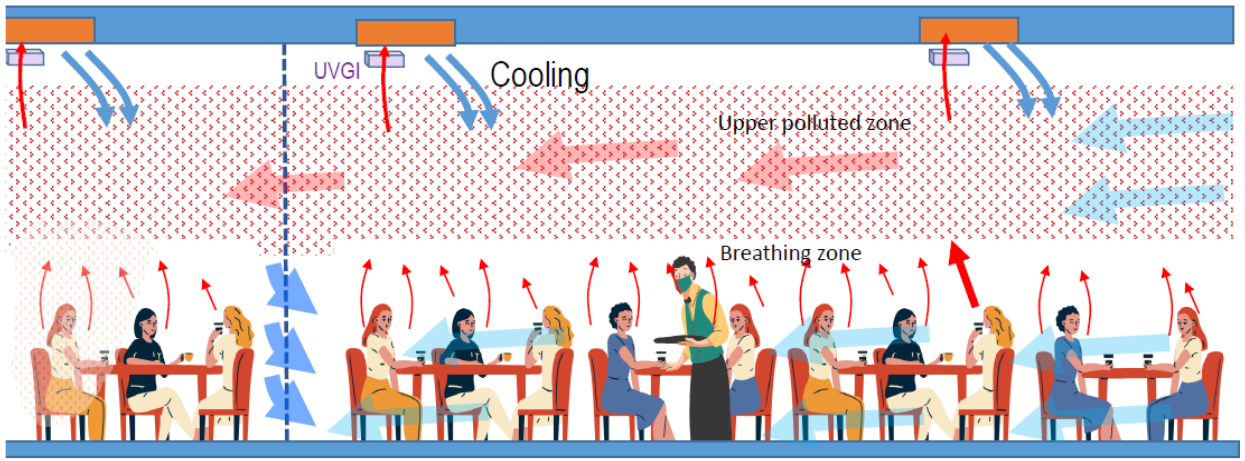
News 1 December 2022

Outbreak investigation of airborne transmission of Omicron (B.1.1.529) - SARS-CoV-2 Variant of Concern in a restaurant: implication for enhancement of indoor air dilution

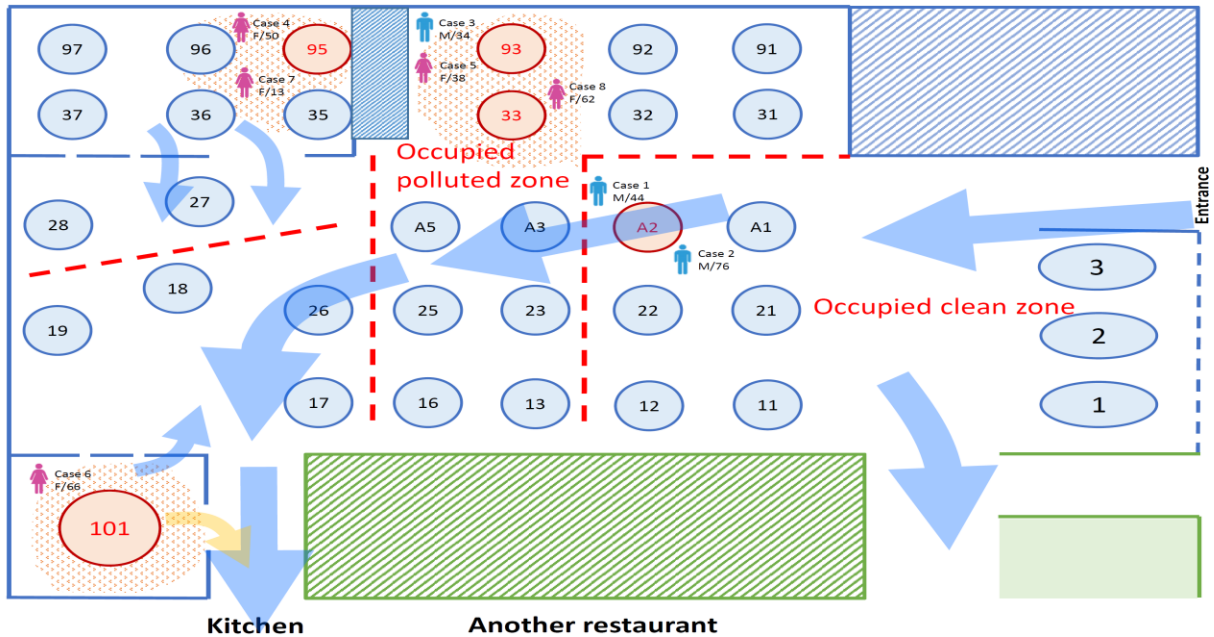


Case 1 (index case): phylogenetically related to 7 secondary cases (case 2 to 8)

Vertical airflow in the restaurant & fan coil units with upper-room ultraviolet germicidal irradiation



Floor plan of the restaurant & horizontal airflow in the upper & occupied zones

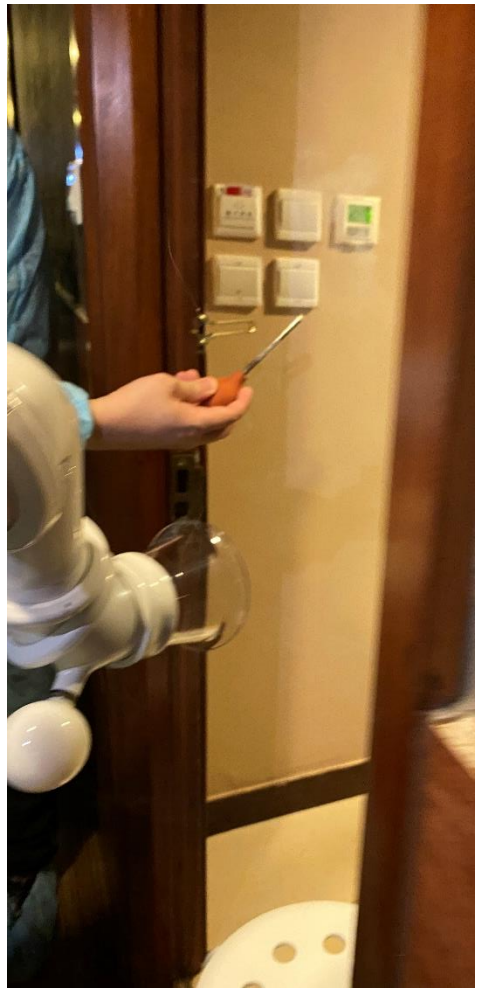


Cheng VC, Lung DC, Wong Shuk-Ching (co-first author), et al. J Hazard Mater. 2022 May 15;430:128504.

Elimination strategy – aiming at “zero COVID-19” in Hong Kong

https://www.coronavirus.gov.hk/eng/designated-hotel.html

Transmission of SARS-CoV-2 in quarantine hotel (23 April 2021)

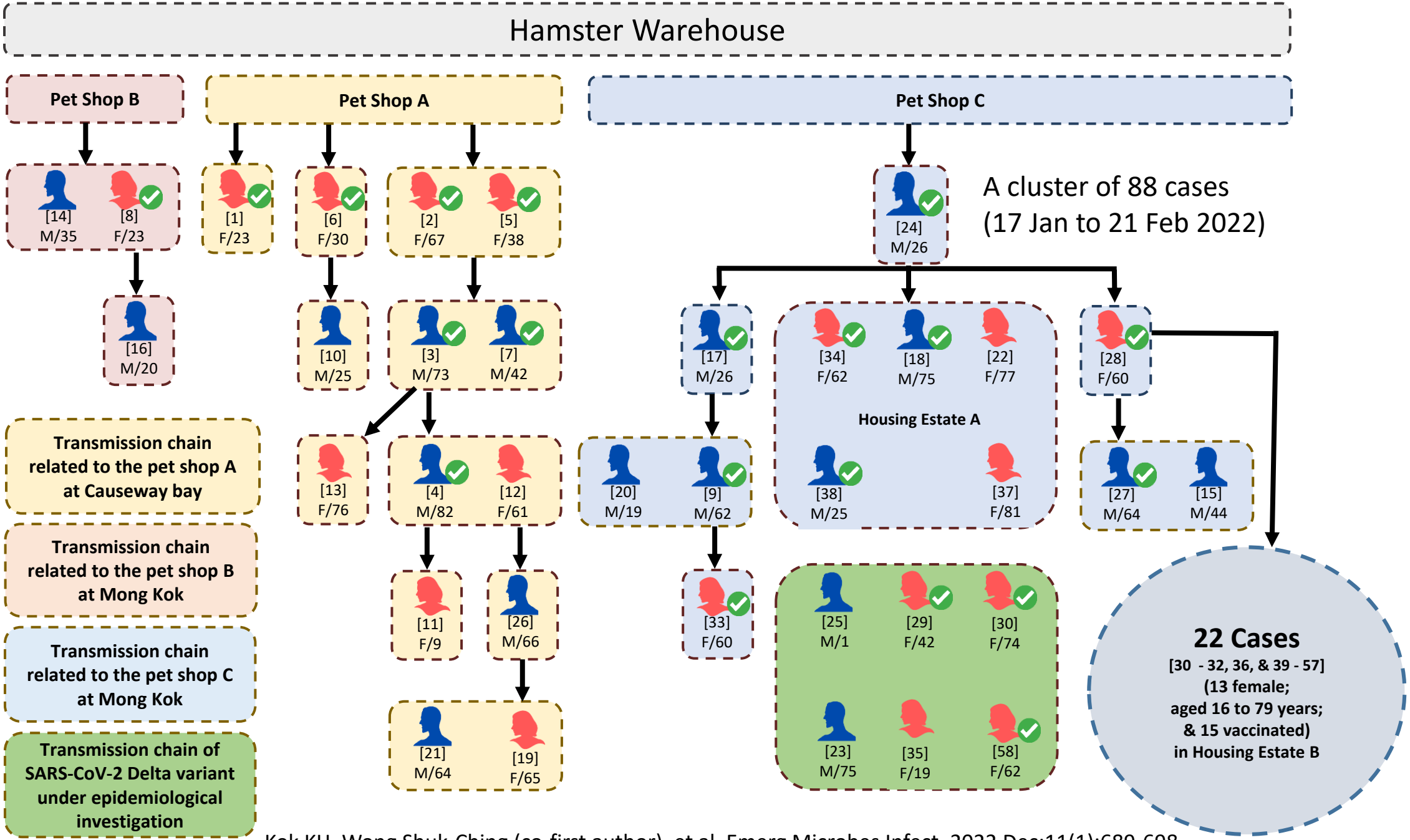


EDITORIAL

WILEY

To prevent SARS-CoV-2 transmission in designated quarantine hotel for travelers: Is the ventilation system a concern?

Wong Shuk-Ching, et al. Indoor Air. 2021 Sep;31(5):1295-1297.



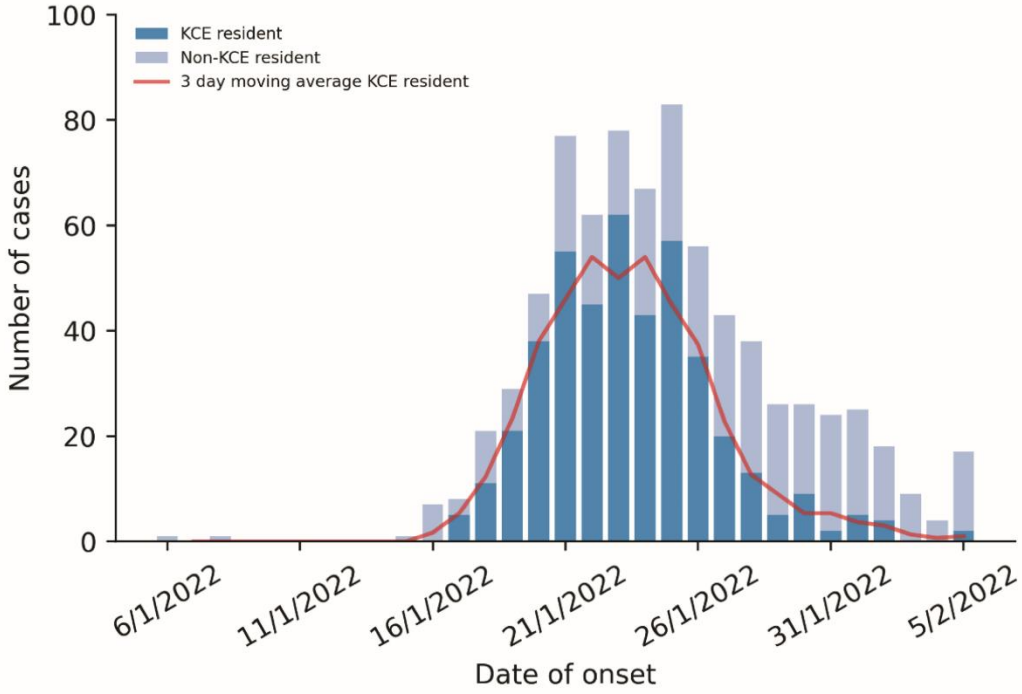
Kok KH, Wong Shuk-Ching (co-first author), et al. Emerg Microbes Infect. 2022 Dec;11(1):689-698.

Rapid spread of SARS-CoV-2 Omicron subvariant BA.2 in a single-source community outbreak

The outbreak involved a total of 768 individuals as of 5th February 2022,

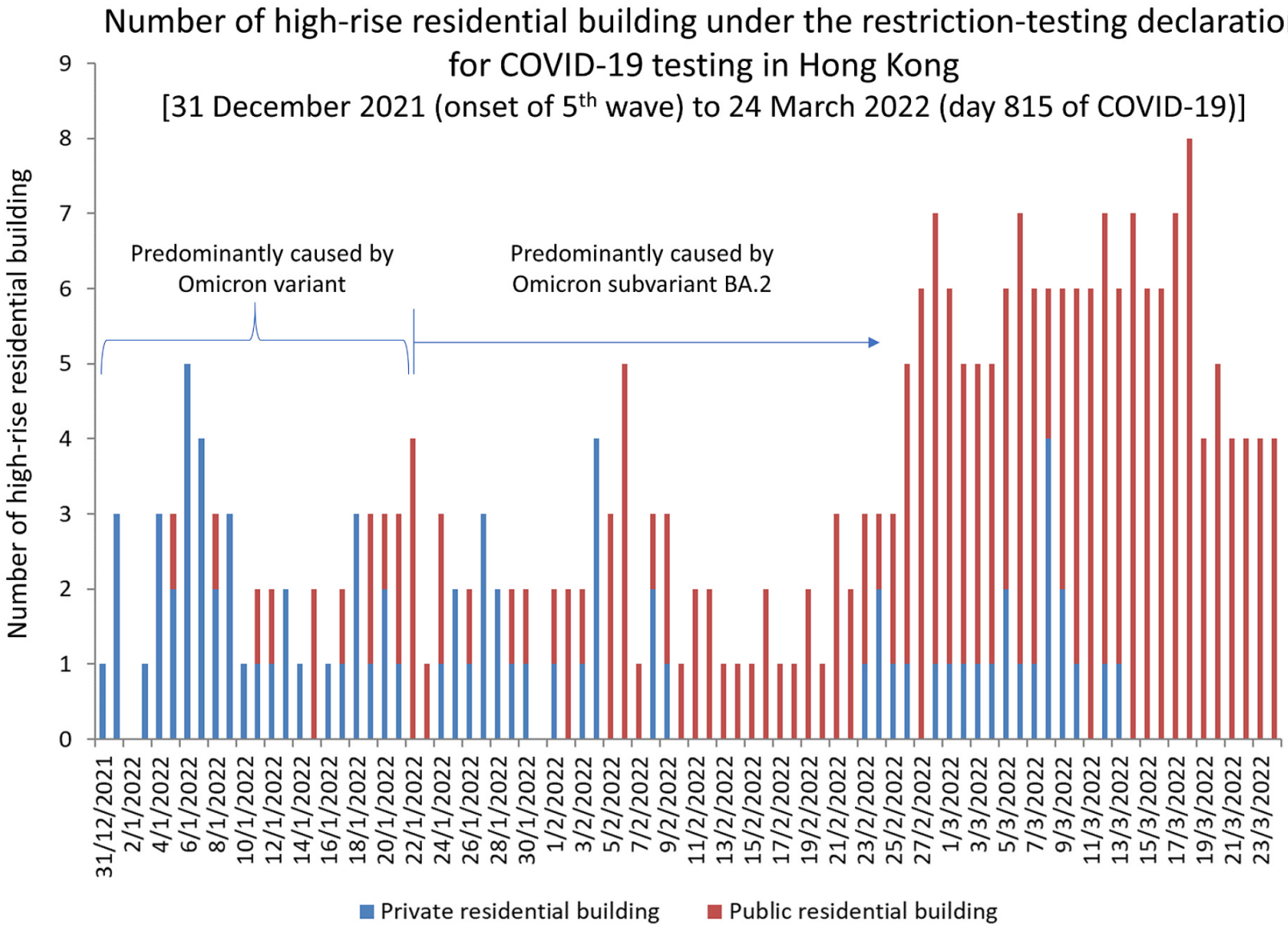
including 432 residents, visitors or staff (56.3%)
from a single housing estate (KC Estate).

The outbreak at the KC Estate has a short doubling time of 1.28 days
(95% confidence interval: 0.560-1.935).



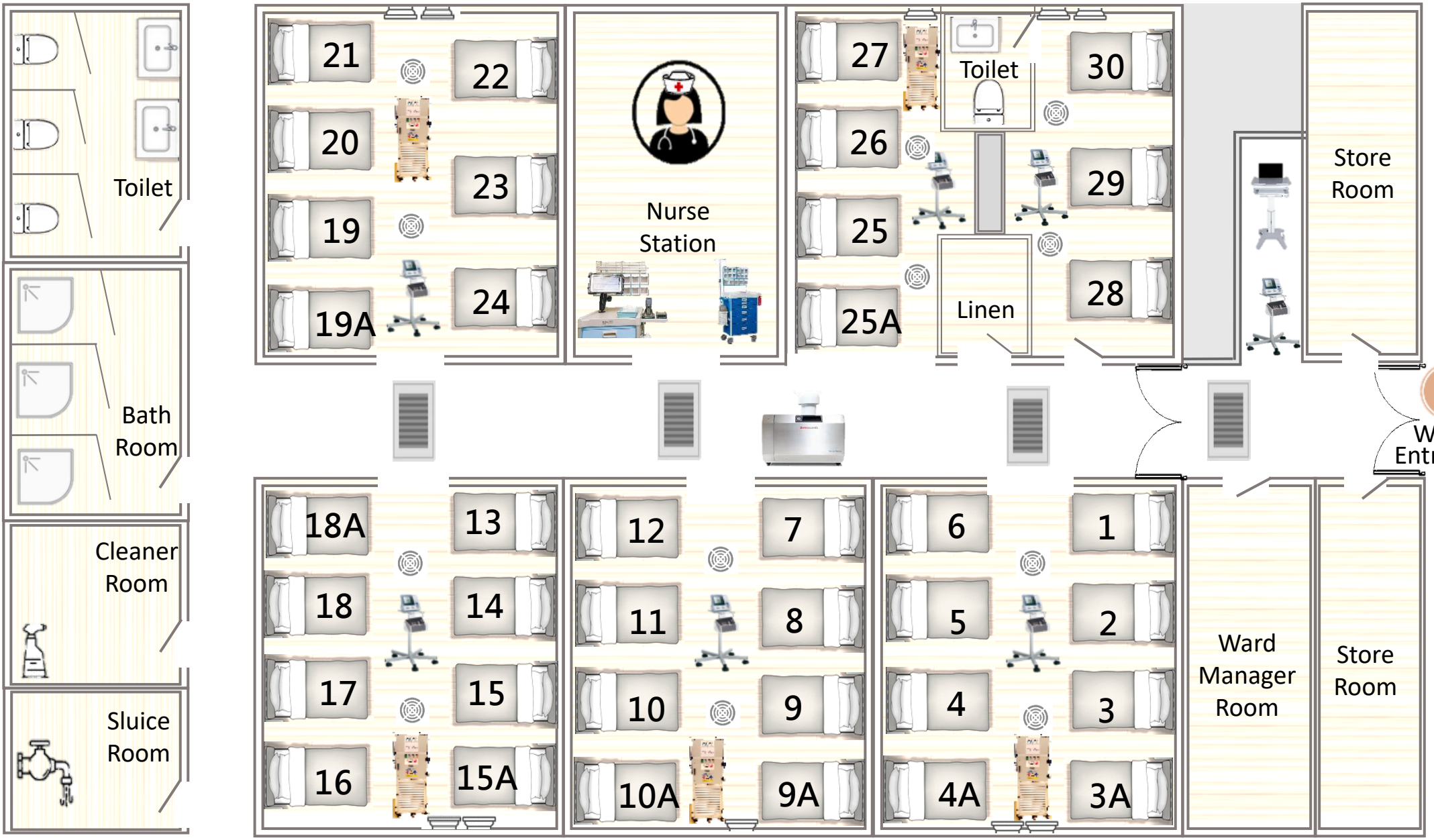
Cheng VC, and Wong Shuk-Ching, et al. Clin Infect Dis. 2022 Mar 10:ciac203. doi: 10.1093/cid/ciac203.

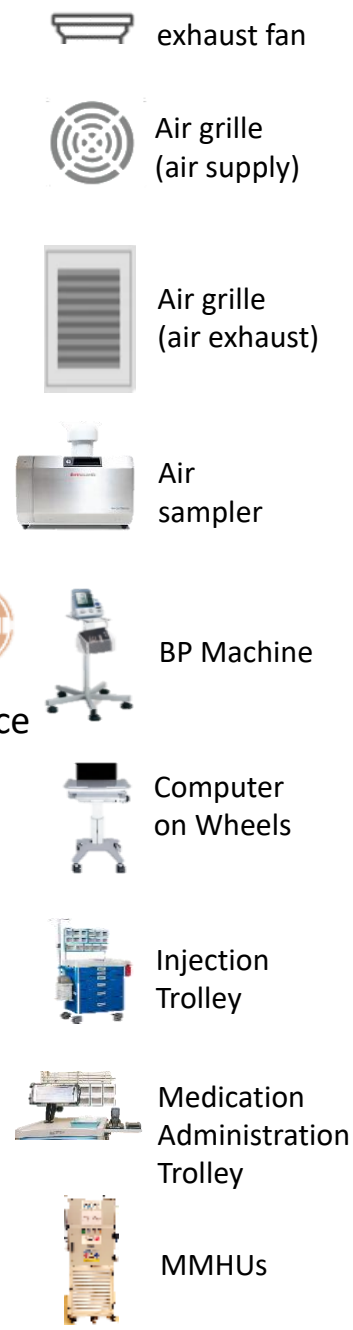
Explosive outbreak of SARS-CoV-2 Omicron variant is associated with vertical transmission in high-rise residential buildings in Hong Kong



Cheng VC, Wong Shuk-Ching (co-first author), et al. Build Environ. 2022 Aug 1;221:109323.

Air dispersal of severe acute respiratory coronavirus virus 2 (SARS-CoV-2)





Wong Shuk-Ching, et al. Infect Control Hosp Epidemiol. 2022 Oct 24:1-4.

Air dispersal of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) in the general wards

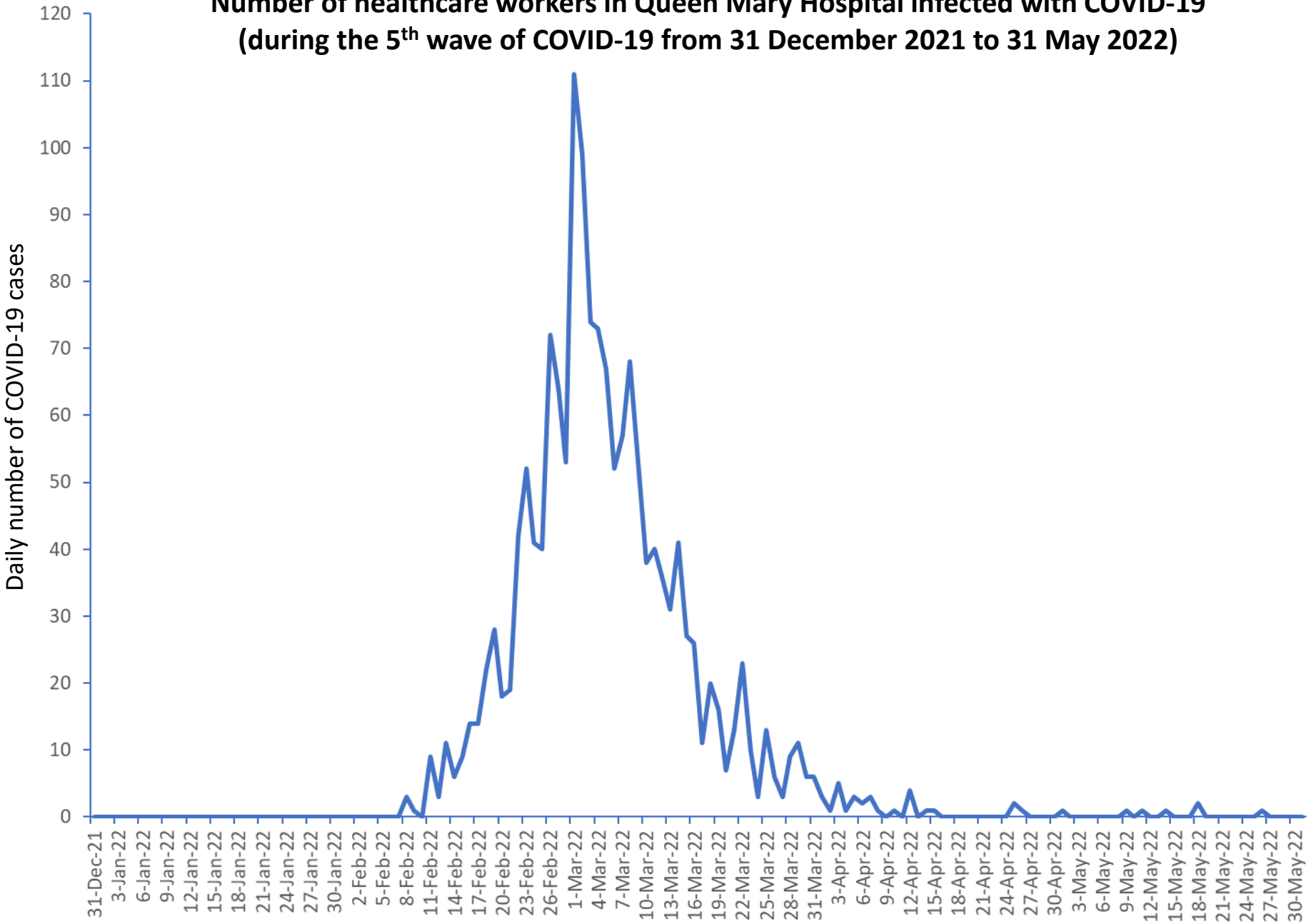
Table 1. Univariate and Multivariable Analysis on the Results of SARS-CoV-2 RNA in Air Samples

Variable	Univariate Analysis[a]			Multiple Linear Regression Model Predicting the Ct Value of All Air Samples [b]			
	Air Samples With Detectable SARS-CoV-2 RNA (n=19)	Air Samples Without Detectable SARS-CoV-2 RNA (n=5)	*P* Value	Unstandardized Coefficient B	Standard Error	Standardized Coefficient Beta	*P* Value
COVID-19 patients in ward during air sampling, mean no. ± SD	22.6±8.5	13.2±3.3	.027	−0.136	0.119	−0.368	.268
Age of COVID-19 patients per ward, mean y ± SD	79.0±4.6	78.6±4.4	.863	NA	NA	NA	NA
Ct value of COVID-19 patients, mean ± SD	25.8±2.1	28.7±1.0	.009	0.329	0.432	0.232	.456
Time interval between the clinical and air samples, mean d ± SD[c]	2.9±1.0	2.2±0.1	.121	NA	NA	NA	NA
Duration of air sampling, mean h ± SD	4.3±1.8	2.2±1.1	.021	−0.929	0.302	−0.537	.006
Timing of air sampling, mean d ± SD[d]	10.4±6.4	14.4±2.5	.042	−0.162	0.151	−0.304	.298

Note. COVID-19, coronavirus disease 2019; Ct, cycle threshold; NA, not applicable; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; SD, standard deviation.
[a]Student *t* test was used for 2-group comparison of continuous variables.
[b]Variables that were considered as statistically significant in univariate analysis were subjected to multivariable analysis using multiple linear regression to determine whether there is any correlation between Ct value of air samples and each variable. Any negative air samples were assigned with a Ct value of 45 for statistical analysis.
[c]Clinical sample of COVID-19 patients included deep throat saliva, combined nasal and throat swab, or nasopharyngeal swab.
[d]Timing of air sampling was defined as day of air sampling counting from the start of the study.

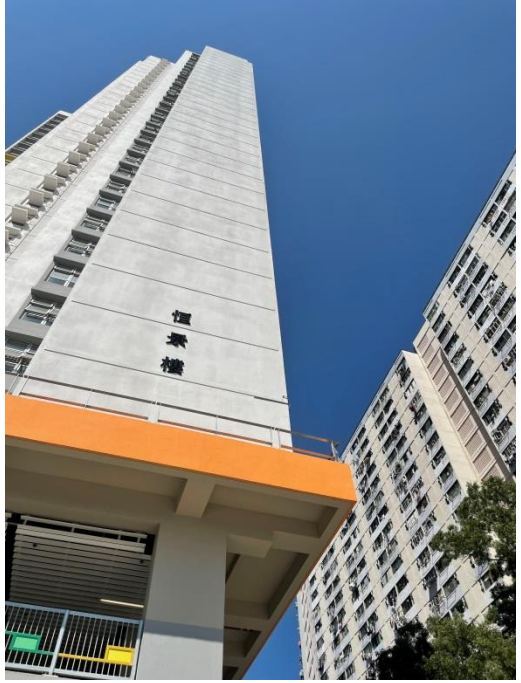
Wong Shuk-Ching, et al. Infect Control Hosp Epidemiol. 2022 Oct 24:1-4.

Number of healthcare workers in Queen Mary Hospital infected with COVID-19 (during the 5th wave of COVID-19 from 31 December 2021 to 31 May 2022)



Wong Shuk-Ching, et al. Infect Prev Pract. 2023 Mar;5(1):100261.

荔景邨



九龍灣國際展貿中心

石硤尾體育館

Community isolation facilities for COVID-19 patients

粉嶺皇后山邨

啟德郵輪碼頭 地下

啟德郵輪碼頭 二樓


青衣方艙


粉嶺馬屎埔方艙


洪水橋方艙

Community isolation facilities for COVID-19 patients
(1 March 2022 to 8 May 2022, 69 days)


元朗牛潭尾方艙

新田方艙


港珠澳大橋方艙

Community treatment facility at AsiaWorld-Expo

5th wave (BA.2):
2 Jan 2022 – 4 May 2022 (123 days)

What is the implication of MDROs transmission ?
Full PPE in the community treatment center, holding centers, and residential care homes for the elderly

Evolution of MRSA in the old age homes in HK

Epidemiology and Genetic Diversity of Methicillin-Resistant *Staphylococcus aureus* Strains in Residential Care Homes for Elderly Persons in Hong Kong

Pak-Leung Ho, FACP; Teresa K. F. Wang, MD; Patricia Ching, RN;
Gannon C. Mak, MPhil; Eileen Lai, MSc; Wing-Cheong Yam, PhD; Wing-Hong Seto, MD

Ho PL, et al. Infect Control Hosp Epidemiol. 2007 Jun;28(6):671-8.

Jan 2005
949 residents in
13 residential care homes
Nasal swab ± active skin lesions
MRSA colonization:
2.8% (27/949)

Molecular epidemiology of methicillin-resistant *Staphylococcus aureus* in residential care homes for the elderly in Hong Kong

Pak-Leung Ho[a,*], Eileen L. Lai[a], Kin-Hung Chow[a],
Louisa S.M. Chow[b], Kwok-Yung Yuen[a], Raymond W.H. Yung[b]
[a]*Division of Infectious Diseases, Department of Microbiology and Centre of Infection, Queen Mary Hospital, The University of Hong Kong, Hong Kong SAR, China*
[b]*Department of Health, Infection Control Branch, Center for Health Protection, Hong Kong SAR, China*
Received 11 October 2007; accepted 16 December 2007

Ho PL, et al. Diagn Microbiol Infect Dis. 2008 Jun;61(2):135-42.

Jun-Dec 2005
1563 residents in
487 residential care homes
Nasal swab ± active skin lesions
MRSA colonization:
5.1% (80/1563)

Transmission of methicillin-resistant *staphylococcus aureus* in the long term care facilities in Hong Kong

Vincent CC Cheng[1,2], Josepha WM Tai[2], Zoie SY Wong[3], Jonathan HK Chen[1], Kris BQ Pan[3], Yizhen Hai[3], Wing-Chun Ng[4], Denise MK Chow[5], Miranda CY Yau[1], Jasper FW Chan[1,2], Sally CY Wong[1,2], Herman Tse[1,6], Sophia SC Chan[5], Kwok-Leung Tsui[3], Felix HW Chan[4], Pak-Leung Ho[1,6] and Kwok-Yung Yuen[1,6*]

Cheng VC, et al. BMC Infect Dis. 2013 May 6;13:205.

Jul-Dec 2011
2020 residents in
40 residential care homes
Nasal swab
MRSA colonization:
21.6% (436/2020)

Evolution of MRSA in the old age homes in HK

Emergence of Carbapenem-Resistant *Acinetobacter baumannii* in Nursing Homes With High Background Rates of MRSA Colonization

1408 residents from 28 RCHEs (Jul to Aug 2015)
Prevalence of MRSA: 32.2%
Prevalence of CRAB: 6.5%

Cheng VCC, et al. Infect Control Hosp Epidemiol. 2016 Aug;37(8):983-986.

Multidrug-resistant organism carriage among residents from residential care homes for the elderly in Hong Kong: a prevalence survey with stratified cluster sampling

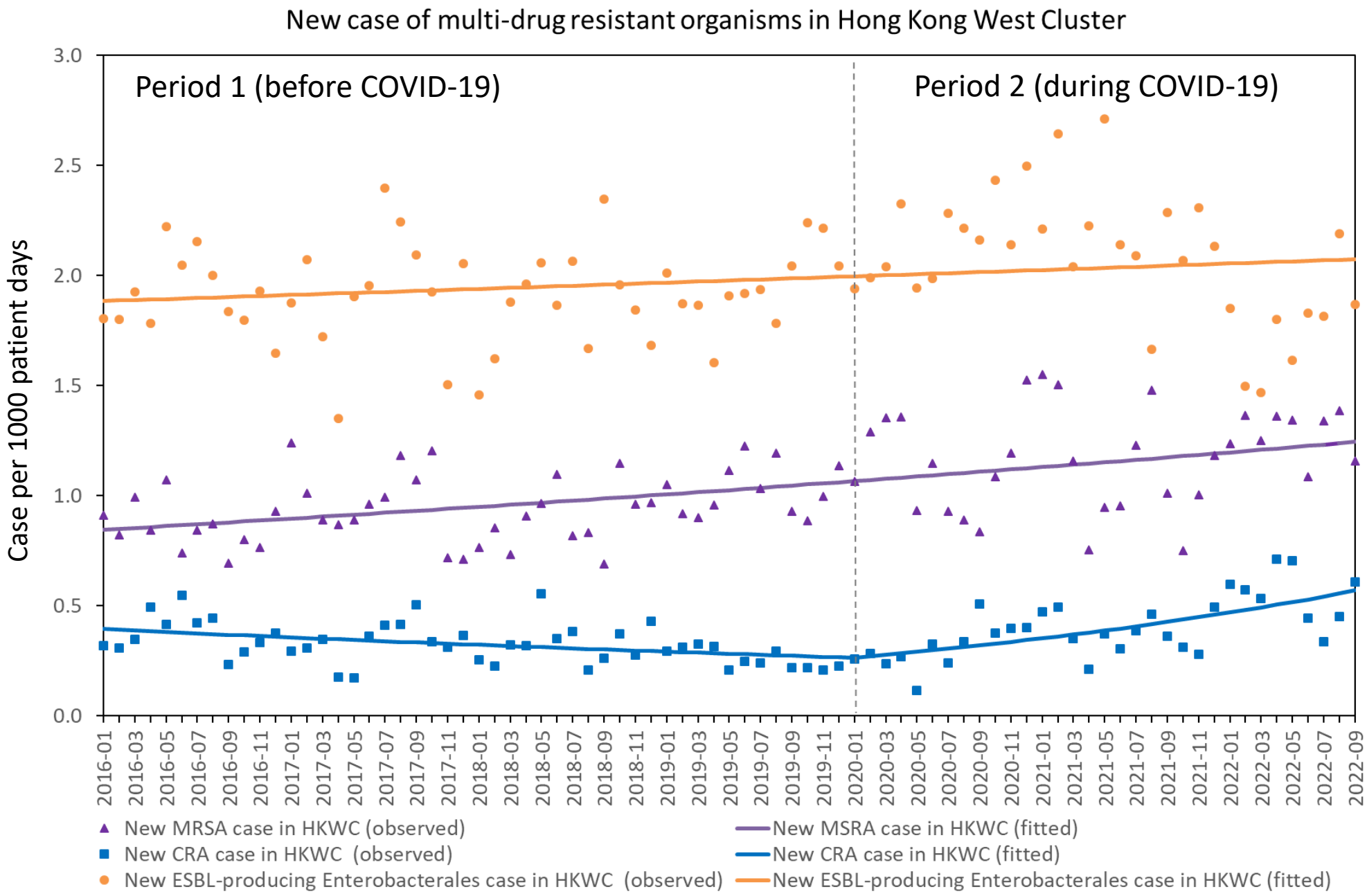
1028 residents from 20 RCHEs (Sep to Dec 2015)
Prevalence of MRSA: 30.1%
Prevalence of MDRA: 0.6%

Chen H, et al. Hong Kong Med J. 2018 Aug;24(4):350-360.

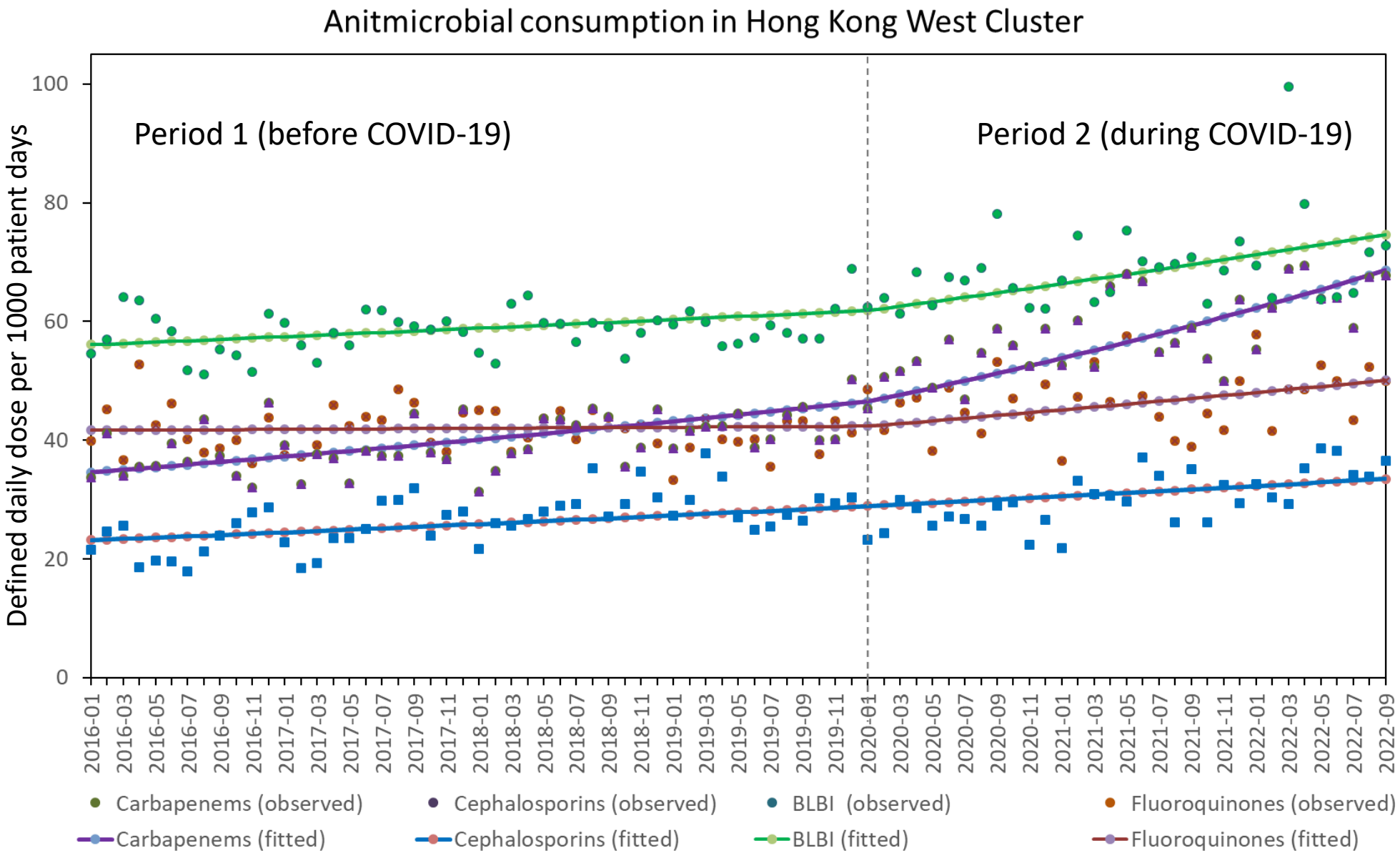
Prevalence of MRSA in residential care home for the elderly in Hong Kong West Cluster during COVID-19 (23 September 2021 to 25 October 2021)

RCHE	Licensing capacity [a]	No. of residents (% of occupancy)	No. (%) of residents with known MRSA by RCHE [b]	No. (%) of residents screened	No. (%) of residents with MRSA [c]	No. (%) of MRSA in environment
A [g]	70	46 (65.7%)	0	43 (93.5%)	19 (44.2%)	2/22 (9.1%)
B [g]	48	28 (58.3%)	1 (3.6%)	25 (89.3%)	13 (52.0%)	2/8 (25.0%)
C [g]	66	53 (80.3%)	0	46 (86.8%)	26 (56.5%)	3/12 (25.0%)
D [g]	68	40 (58.8%)	3 (7.5%)	33 (82.5%)	20 (60.6%)	4/20 (20.0%)
E [g]	296	204 (68.9%)	2 (1.0%)	187 (91.7%)	78 (41.7%)	4/26 (15.4%)
F [g]	56	45 (80.4%)	0	42 (93.3%)	18 (42.9%)	6/18 (33.3%)
G [g, h]	150	154 (102.7%)	15 (9.7%)	131 (85.1%)	79 (60.3%)	5/22 (22.7%)
H [g]	68	51 (75.0%)	0	42 (82.4%)	18 (42.9%)	10/25 (40.0%)
I [g]	58	48 (82.8%)	0	39 (81.3%)	30 (76.9%)	13/17 (76.5%)
J [h]	174	64 (36.8%)	0	56 (87.5%)	25 (44.6%)	3/21 (14.3%)
K [g, h]	40	29 (72.5%)	2 (6.9%)	25 (86.2%)	9 (36.0%)	12/19 (63.2%)
L [g, h]	179	121 (67.6%)	0	112 (92.6%)	44 (39.3%)	14/29 (48.3%)
Overall	1273	883 (69.4%)	23 (2.6%)	781 (88.4%)	380 (48.7%)	78/239 (32.6%)

Wong Shuk-Ching, et al. J Hosp Infect. 2022 May;123:52-60.



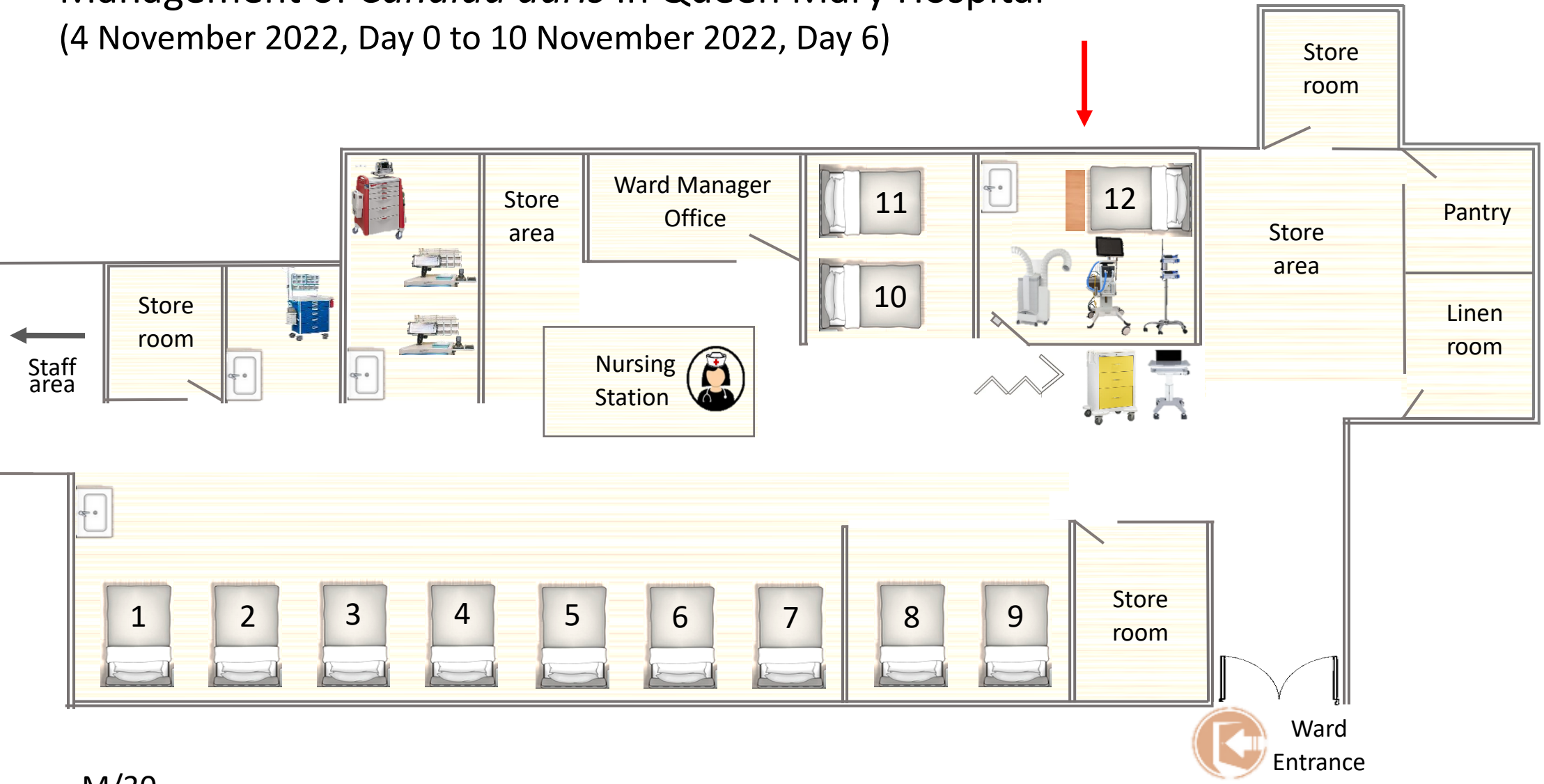
Wong Shuk-Ching, et al (manuscript in preparation)

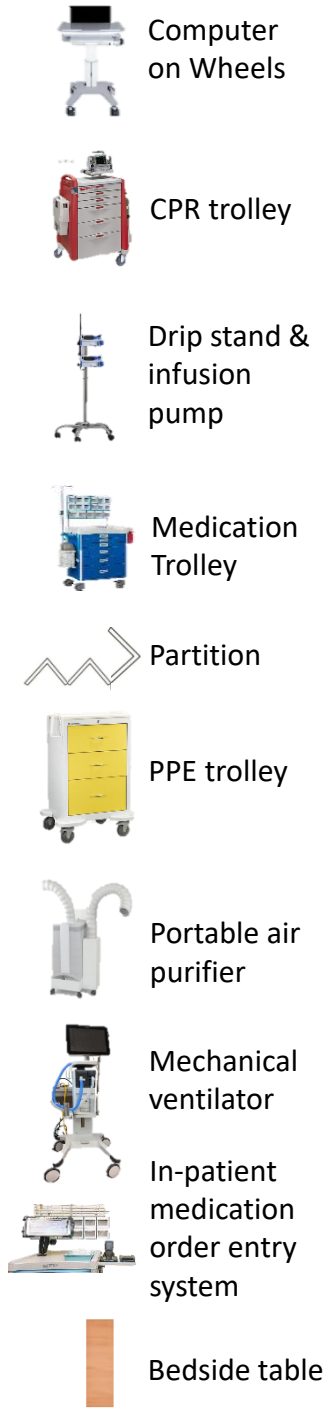


Wong Shuk-Ching, et al (manuscript in preparation)

Management of *Candida auris* in Queen Mary Hospital

(4 November 2022, Day 0 to 10 November 2022, Day 6)





M/30

Post-liver transplant recipient

Wong Shuk-Ching, et al. J Hosp Infect. 2023 Jan 13:S0195-6701(23)00011-7.

Environment contamination by *Candida auris* despite repeated decontamination by manual cleaning and non-touch technology

Items	Ad hoc sampling (D3)	Pre-environmental decontamination (D6)	Post 1st manual cleaning (D6)	Post ultraviolet-C (D6)	Post 2nd manual cleaning (D7)	Post 3rd manual cleaning (D8)
Open cubicle outside single room						
Nursing station	SPNF	SPNF	SPNF	NA	NA	NA
IPMOE	SPNF	SPNF	SPNF	NA	NA	NA
COWs	SPNF	Positive [e]	SPNF	NA	NA	NA
Trolley (blood taking)	SPNF	SPNF	SPNF	NA	NA	NA
Trolley (medication)	SPNF	SPNF	SPNF	NA	NA	NA
Trolley (PPE)	SPNF	SPNF	SPNF	NA	NA	NA
Trolley (CPR)	SPNF	SPNF	SPNF	NA	NA	NA
Partition (inward) [f]	SPNF	SPNF	SPNF	NA	NA	NA
Partition (outward) [f]	SPNF	SPNF	SPNF	NA	NA	NA
Door knob (outside) [g]	SPNF	Positive [e]	SPNF	NA	NA	NA
Inside single room						
Frequently-touched surfaces						
Bedside rail	NA	Positive [h]	Positive [e]	Positive [e]	Positive [e]	SPNF
Bedside table	NA	Positive [h]	SPNF	SPNF	NA	NA
Bedside panel	NA	Positive [h]	SPNF	SPNF	NA	NA
Bedside trolley	NA	Positive [h]	Positive	SPNF	NA	NA
Bedside cabinet	NA	Positive [h]	SPNF	SPNF	NA	NA
Monkey pull	NA	Positive [h]	SPNF	SPNF	NA	NA
Bair hugger	NA	Positive [h]	SPNF	SPNF	NA	NA
Mechanical ventilator	NA	Positive [h]	Positive [e]	Positive [e]	Positive [e]	SPNF
Portable air purifier	NA	Positive [h]	Positive [e]	Positive [e]	Positive [e]	SPNF
Drip stand & infusion pump	NA	Positive [h]	SPNF	SPNF	NA	NA
Non-frequently-touched surfaces						
Air exhaust grille	NA	SPNF	SPNF	SPNF	NA	NA
Air supply grille A	NA	SPNF	SPNF	SPNF	NA	NA
Air supply grille B	NA	SPNF	SPNF	SPNF	NA	NA
TV (hanging up in wall)	NA	SPNF	SPNF	SPNF	NA	NA
Electric switch	NA	SPNF	SPNF	SPNF	NA	NA

Wong Shuk-Ching, et al. J Hosp Infect. 2023 Jan 13:S0195-6701(23)00011-7.

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevier.com/locate/jhin

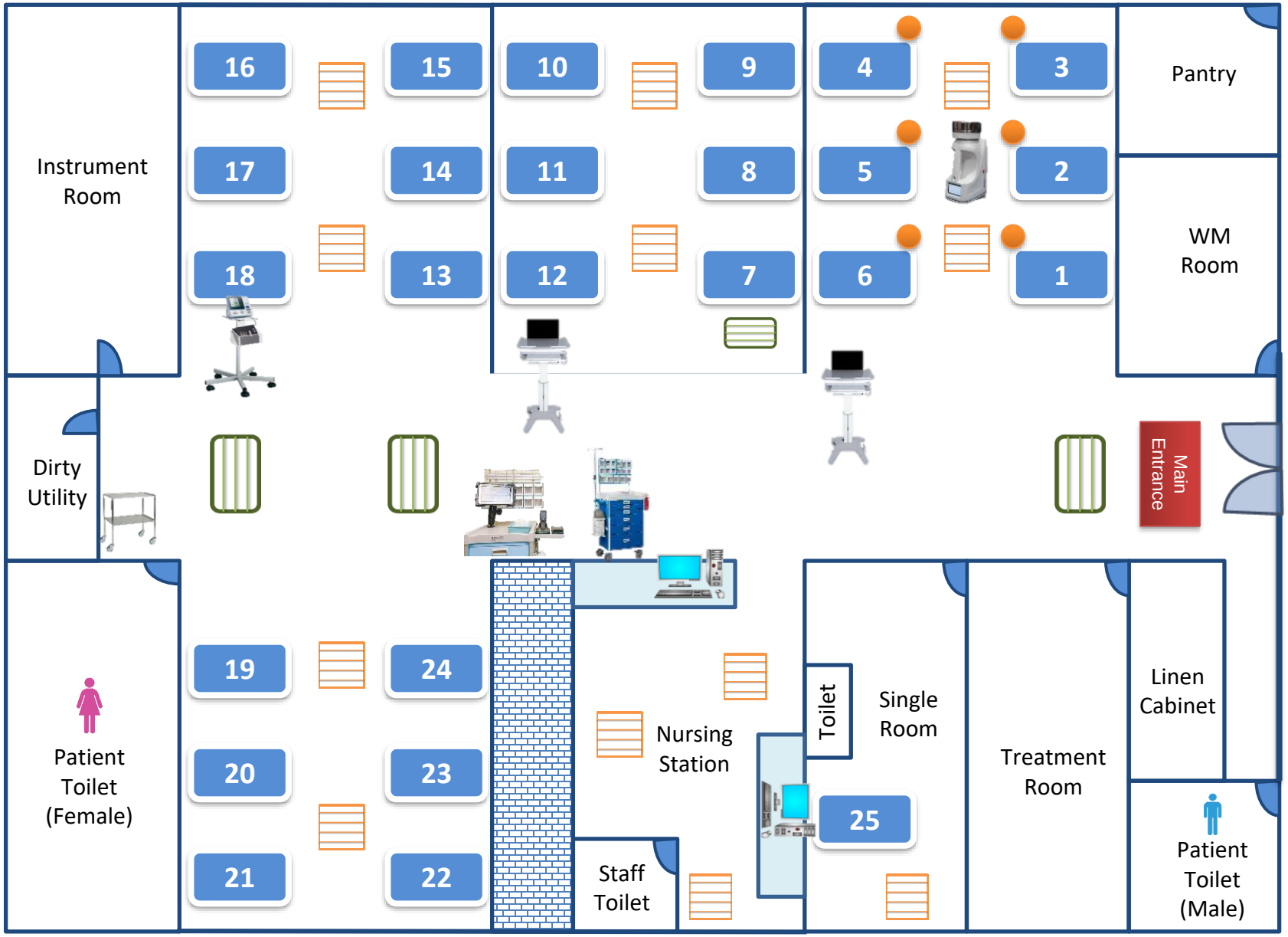
Air dispersal of multidrug-resistant *Acinetobacter baumannii*: implications for nosocomial transmission during the COVID-19 pandemic

S.-C. Wong [a], G.K.-M. Lam [a], J.H.-K. Chen [b], X. Li [b], F.T.-F. Ip [c], L.L.-H. Yuen [a], V.W.-M. Chan [a], C.H.-Y. AuYeung [a], S.Y.-C. So [b], P.-L. Ho [d], K.-Y. Yuen [d], V.C.-C. Cheng [a,b,*]

[a] *Infection Control Team, Queen Mary Hospital, Hong Kong West Cluster, Hong Kong, China*
[b] *Department of Microbiology, Queen Mary Hospital, Hong Kong, China*
[c] *Department of Medicine, Queen Mary Hospital, Hong Kong, China*
[d] *Department of Microbiology, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong, China*

Wong Shuk-Ching, et al. J Hosp Infect. 2021 Oct;116:78-86.

Air dispersal of multidrug-resistant *Acinetobacter baumannii*



Wong Shuk-Ching, et al. J Hosp Infect. 2021 Oct;116:78-86.

Collection of environmental and air samples for multidrug resistant *Acinetobacter baumannii* (MRAB) in the medical neurology ward

Type of samples	No. of sample	No. (%) of positive	Date (day [a]) of collection	No. of MRAB positive patients during sampling	Remark
Frequently-touched items by sponge swab	9	3 (33.3%)	Jul 3, 2020 (5)	1	Environmental sampling was initiated due to lab report of the 1st MRAB patient issued on Jul 2
	9	9 (100%)	Sep 2, 2020 (66)	1	Associated with subsequent diagnosis of 5 MRAB patients in the same ward
	9	0 (0%)	Sep 11, 2020 (75)	6	Post-disinfection sample collection as an audit of environmental cleaning
Subtotal	**27**	**12 (44.4%)**			
Air sample by air sampler	1	0 (0%)	Sep 14, 2020 (78)	6	Cubicle center 30 min before diaper change
	1	1 (100%)	Sep 14, 2020 (78)	6	Cubicle center: during diaper change
	1	0 (0%)	Sep 17, 2020 (81)	6	Cubicle center 30 min before diaper change
	1	1 (100%)	Sep 17, 2020 (81)	6	Cubicle center: during diaper change
	1	0 (0%)	Sep 18, 2020 (82)	6	Cubicle center 30 min before diaper change
	1	1 (100%)	Sep 18, 2020 (82)	6	Cubicle center: during diaper change
	1	0 (0%)	Sep 23, 2020 (87)	6	Cubicle center 30 min before diaper change
	1	1 (100%)	Sep 23, 2020 (87)	6	Cubicle center: during diaper change
Subtotal	**8**	**4 (50%)**			
Air sample by settle plate	6	0 (0%)	Sep 23, 2020 (87)	6	At beside table: 30 min before diaper change
	6	0 (0%)	Sep 23, 2020 (87)	6	At bedside table: during diaper change
	5	0 (0%)	Sep 25, 2020 (89)	6	At beside table: 30 min before diaper change
	5	2 (40%)	Sep 25, 2020 (89)	6	At bedside table: during diaper change
	6	0 (0%)	Sep 30, 2020 (94)	5	At bedside table: no patient care in day time
	14	0 (0%)	Sep 30, 2020 (94)	5	Inverted and adhered in ward ceiling
Subtotal	**42**	**2 (4.8%)**			

Wong Shuk-Ching, et al. J Hosp Infect. 2021 Oct;116:78-86.

Collection of environmental and air samples for multidrug resistant *Acinetobacter baumannii* (MRAB) in the medical neurology ward

Type of samples	No. of sample	No. (%) of positive	Date (day [a]) of collection	No. of MRAB positive patients during sampling	Remark
Exhausted air grills by sponge swab	3	3 (100%)	Sep 14, 2020 (78)	6	Al 3 exhausted air grills in ward were positive
	3	1 (33.3%)	Sep 23, 2020 (87)	6	Close proximity to cohort cubicle was positive
	3	1 (33.3%)	Sep 25, 2020 (89)	6	Close proximity to cohort cubicle was positive
	3	1 (33.3%)	Oct 20, 2020 (114)	3	Close proximity to cohort cubicle was positive
	3	0 (0%)	Oct 23, 2020 (117)	3	
	3	0 (0%)	Oct 27, 2020 (121)	3	
	3	0 (0%)	Nov 3, 2020 (128)	2	
	3	0 (0%)	Nov 17, 2020 (142)	1	
	3	0 (0%)	Nov 24, 2020 (149)	1	
Subtotal	**27**	**6 (22.2%)**			
Non-reachable surfaces at high levels by sponge swab	8	5 (62.5%)	Oct 20, 2020 (114)	3	Pre-disinfection
	8	2 (25%)	Oct 20, 2020 (114)	3	4 h post-disinfection
	8	1 (12.5%)	Oct 23, 2020 (117)	3	Pre-disinfection
	8	0 (0%)	Oct 27, 2020 (121)	3	Pre-disinfection
	8	0 (0%)	Nov 3, 2020 (128)	2	Pre-disinfection
	8	0 (0%)	Nov 17, 2020 (142)	1	Pre-disinfection
	8	0 (0%)	Nov 24, 2020 (149)	1	Pre-disinfection
Subtotal	**56**	**8 (14.3%)**			

[a] It represented the number of day after the first patient MRAB patient diagnosed in the ward.
Day 1 was denoted on June 29, 2020, as the date of specimen collection with positive MRAB culture.

Wong Shuk-Ching, et al. J Hosp Infect. 2021 Oct;116:78-86.

Epidemiology of MDROs (in HKWC)

Before COVID-19:
↑MRSA in old age homes for the Elderly
↑ CPE in community & hospital
↔↓ CRAB in hospital
↔ Ceph-RE in hospital

During COVID-19:
Non-significant ↑ in MRSA / Ceph-RE in hospital
Reverse the ↓ CRAB in hospital