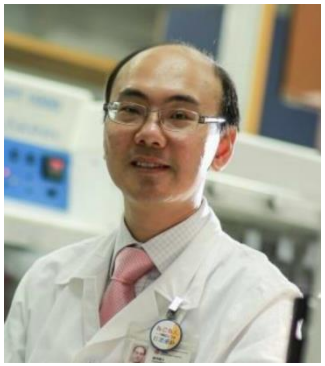
Control of Multi-drug Resistant Organisms in Ambulatory and Long Term Care Facilities with of COVID-19 Pandemic

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



Emerging MDROs 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

Control of Multi-drug Resistant Organisms in Ambulatory and Long Term Care Facilities with of COVID-19 Pandemic

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

Emerging MDROs in Hong Kong

Shuk-Ching WONG

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

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

Control of Multi-drug Resistant Organisms in Ambulatory and Long Term Care Facilities with of COVID-19 Pandemic

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

DISCLOSURES

Conflicts of interest: None to report.

Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance

TABLE 6. Definitions for multidrug-resistant (MDR), extensively drug-resistant (XDR) and pandrug-resistant (PDR) bacteria

Bacterium	MDR	XDR	PDR
Staphylococcus aureus	The isolate is non-susceptible to at least 1 agent in ≥3 antimicrobial categories listed in Table 1[a]	The isolate is non-susceptible to at least 1 agent in all but 2 or fewer antimicrobial categories in Table 1.	Non-susceptibility to all agents in all antimicrobial categories for each bacterium in Tables 1–5
Enterococcus spp.	The isolate is non-susceptible to at least 1 agent in ≥3 antimicrobial categories listed in Table 2	The isolate is non-susceptible to at least 1 agent in all but 2 or fewer antimicrobial categories in Table 2.	
Enterobacteriaceae	The isolate is non-susceptible to at least 1 agent in ≥3 antimicrobial categories listed in Table 3	The isolate is non-susceptible to at least 1 agent in all but 2 or fewer antimicrobial categories in Table 3.	
Pseudomonas aeruginosa	The isolate is non-susceptible to at least 1 agent in ≥3 antimicrobial categories listed in Table 4	The isolate is non-susceptible to at least 1 agent in all but 2 or fewer antimicrobial categories in Table 4.	
Acinetobacter spp.	The isolate is non-susceptible to at least 1 agent in ≥3 antimicrobial categories listed in Table 5	The isolate is non-susceptible to at least 1 agent in all but 2 or fewer antimicrobial categories in Table 5.	

MDR: The isolate is non-susceptible to at least 1 agent in ≥3 antimicrobial categories

XDR: The isolate is non-susceptible to at least 1 agent in all but 2 or fewer antimicrobial categories

PDR: The isolate is non-susceptibility to all agents in all antimicrobial categories

Magiorakos AP, et al. Clin Microbiol Infect. 2012 Mar;18(3):268-81.

Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance

Acinetobacter spp.;
antimicrobial categories and agents used to define MDR, XDR and PDR

Antimicrobial category	Antimicrobial agent
Aminoglycosides	Gentamicin
	Tobramycin
	Amikacin
	Netilmicin
Antipseudomonal carbapenems	Imipenem
	Meropenem
	Doripenem
Antipseudomonal fluoroquinolones	Ciprofloxacin
	Levofloxacin
Antipseudomonal penicillins + β-lactamase inhibitors	Piperacillin-tazobactam
	Ticarcillin-clavulanic acid
Extended-spectrum cephalosporins	Cefotaxime
	Ceftriaxone
	Ceftazidime
	Cefepime
Folate pathway inhibitors	Trimethoprim-sulphamethoxazole
Penicillins + β-lactamase inhibitors	Ampicillin-sulbactam
Polymyxins	Colistin
	Polymyxin B
Tetracyclines	Tetracycline
	Doxycycline
	Minocycline

Magiorakos AP, et al. Clin Microbiol Infect. 2012 Mar;18(3):268-81.

HEALTHCARE EPIDEMIOLOGY INVITED ARTICLE

Robert A. Weinstein, Section Editor

The Global Spread of Healthcare-Associated Multidrug-Resistant Bacteria: A Perspective From Asia

James S. Molton,[1,2] Paul A. Tambyah,[1,2] Brenda S. P. Ang,[3] Moi Lin Ling,[4] and Dale A. Fisher[1,2]

[1]Division of Infectious Diseases, National University Health System; [2]Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore; [3]Department of Infectious Diseases, Tan Tock Seng Hospital; and [4]Department of Infectious Diseases, Singapore General Hospital, Singapore

Journal of Microbiology, Immunology and Infection (2011) 44, 157–165

ELSEVIER

available at www.sciencedirect.com

ScienceDirect

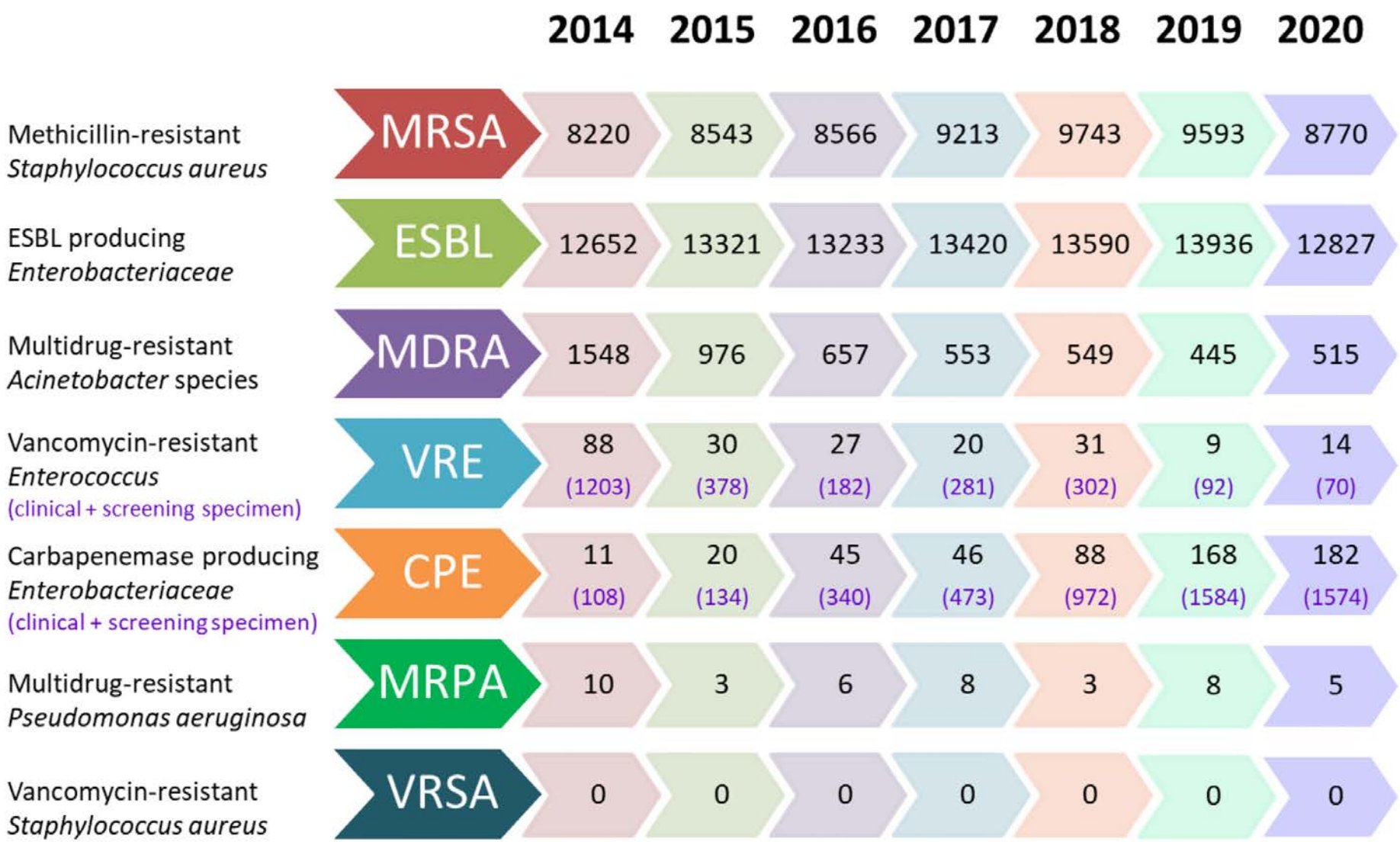
journal homepage: www.e-jmii.com

PERSPECTIVES

Emergence and spread of multi-drug resistant organisms: Think globally and act locally

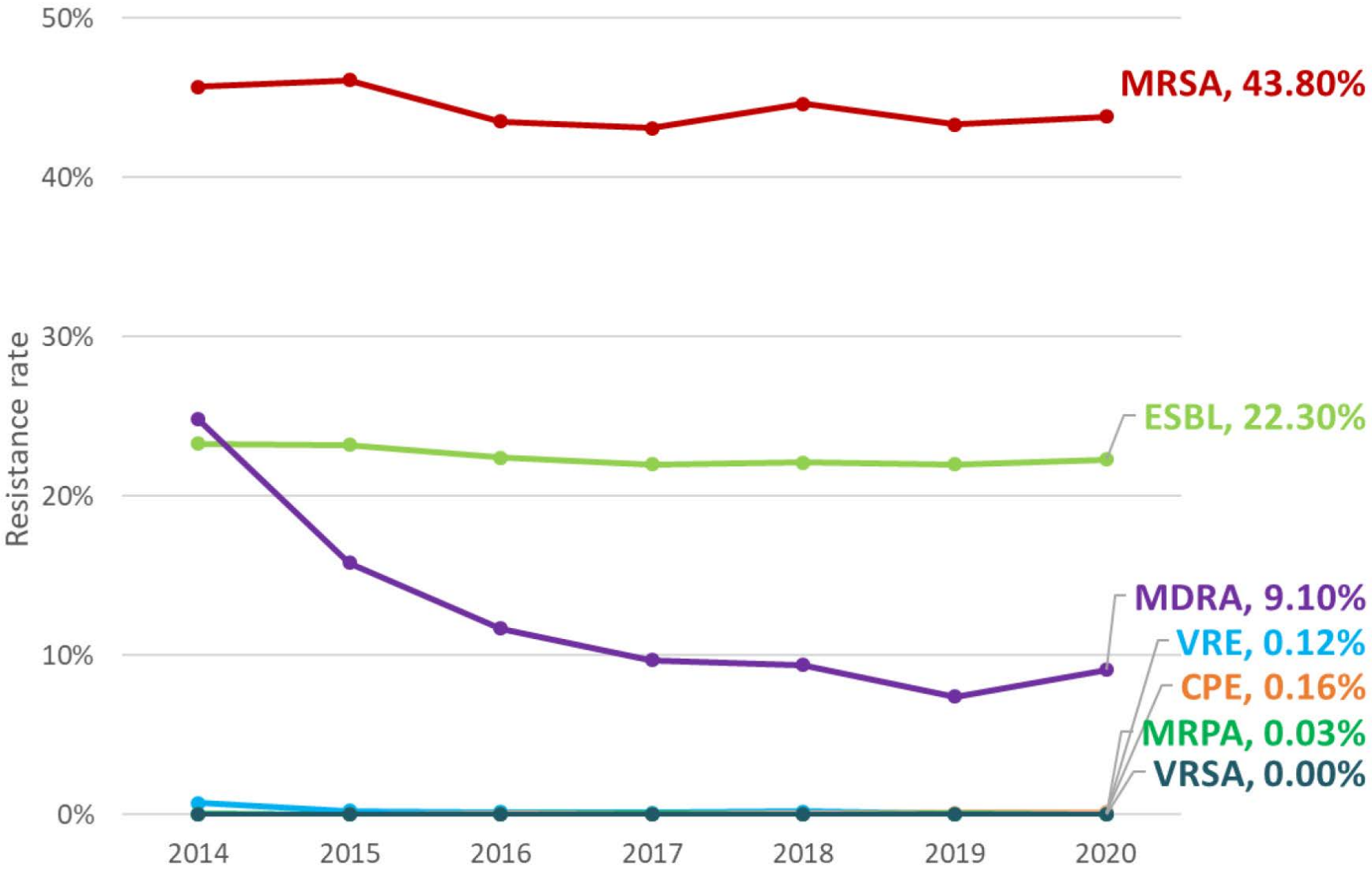
Shu-Hui Tseng [a], Chun-Ming Lee [b], Tzou-Yien Lin [c], Shan-Chwen Chang [d], Feng-Yee Chang [a,e,*]

Number of patients with newly diagnosed MDROs in Hospital Authority



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 & ANTIMICROBIAL RESISTANCE: DUAL HEALTH THREATS

IT IS ESTIMATED THAT BY THE END OF 2020:

2,000,000+
people will have died due to COVID-19[1]

700,000+
people will have died due to drug-resistant infections[2]

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.

Boards and Committees

< Back

High Level Steering Committee on Antimicrobial Resistance

Centre for Health Protection
Department of Health
The Government of the Hong Kong Special Administrative Region

Expert Committee on Antimicrobial Resistance

Control of MRSA in Hong Kong

人類健康 Human Health
環境衛生 Environmental Health
動物健康 Animal Health

Visit old age homes by CHP & ICT, QMH
(23 Sep to 25 Oct 2021)

SET a mission impossible: **S**creening / **S**ampling, **E**ducation & **T**raining

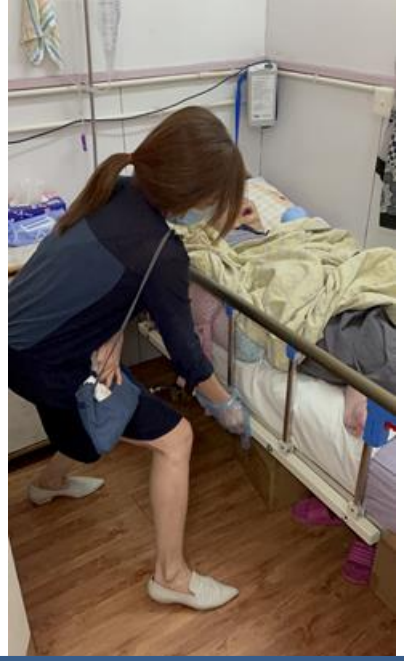

Education and training of old age home staff by CHP


120A

Collection of nasal, axilla, groin, and rectal swabs for each resident by our nurses

(Infection Control Team, QMH, and Infection Control Branch, CHP)

Special thanks to Dr. Janice LO





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.

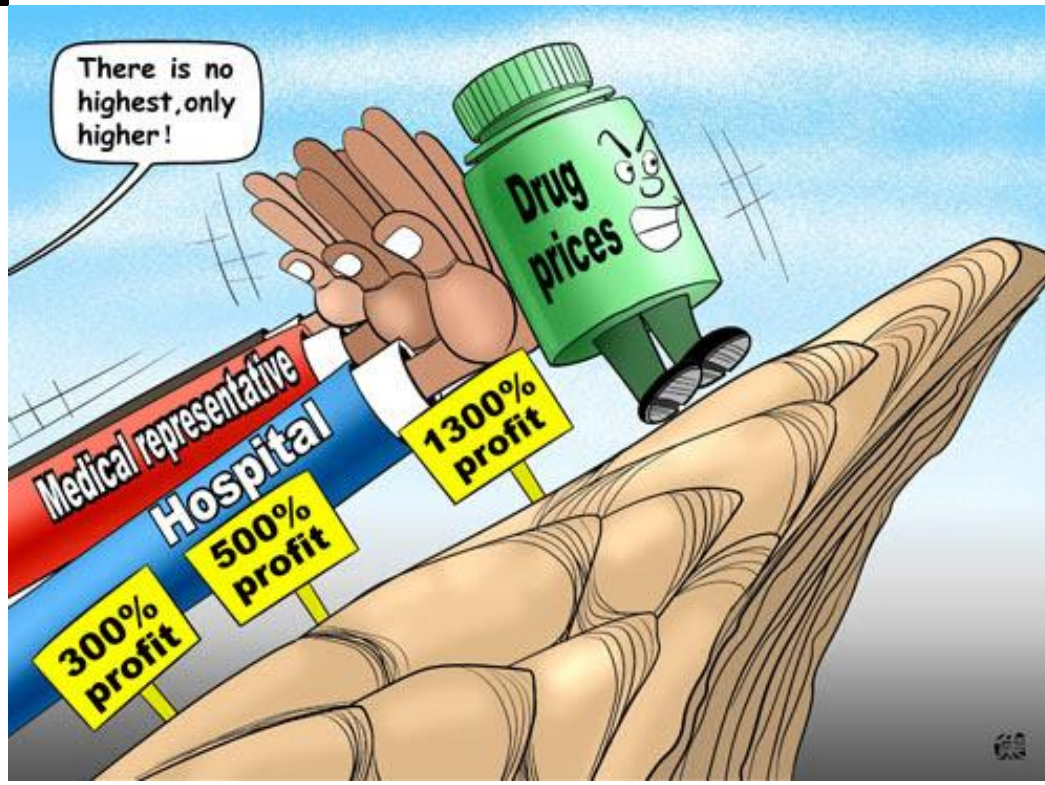
Multidrug-resistant organism carriage among residents from residential care homes for the elderly in Hong Kong: a prevalence survey with stratified cluster sampling

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.

The prevalence of MRSA in old age home

There is no highest, only higher !



Demographic characteristics of 2020 residents with or without MRSA colonization in 40 RCHEs in Hong Kong

	MRSA carrier (n=436)	Non-MRSA carrier (n=1584)	p value
Age (mean ± SD)	84.1 ± 9.2	83.5 ± 9.4	0.255
Sex (male)	165 (37.8%)	563 (35.5%)	0.376
History of hospital admission in the past 12 months	**315 (72.2%)**	**851 (53.7%)**	**<0.001**
Cumulative day of hospitalization in the past 12 months	**18.8 ± 29.5**	**9.8 ± 19.2**	**<0.001**
Underlying diseases			
Chronic cerebral conditions	140 (32.1)	341 (21.5%)	<0.001
Chronic cardiac conditions	69 (15.8%)	172 (10.9%)	0.005
Chronic pulmonary conditions	35 (8.0%)	76 (4.8%)	0.009
Chronic renal failure	19 (4.4%)	35 (2.2%)	0.014
Diabetes mellitus	80 (18.3%)	196 (12.4%)	0.001
Malignancy	26 (6.0%)	48 (3.0%)	0.004
Presence of			
Nasogastric tube	83 (19.0%)	193 (12.2%)	<0.001
Urinary catheter	80 (18.3%)	153 (9.7%)	<0.001
Wound or ulcer	41 (9.4%)	39 (2.5%)	<0.001
Received antibiotics 3 months before admission (yes / no)	160 (36.7%)	307 (19.4%)	<0.001

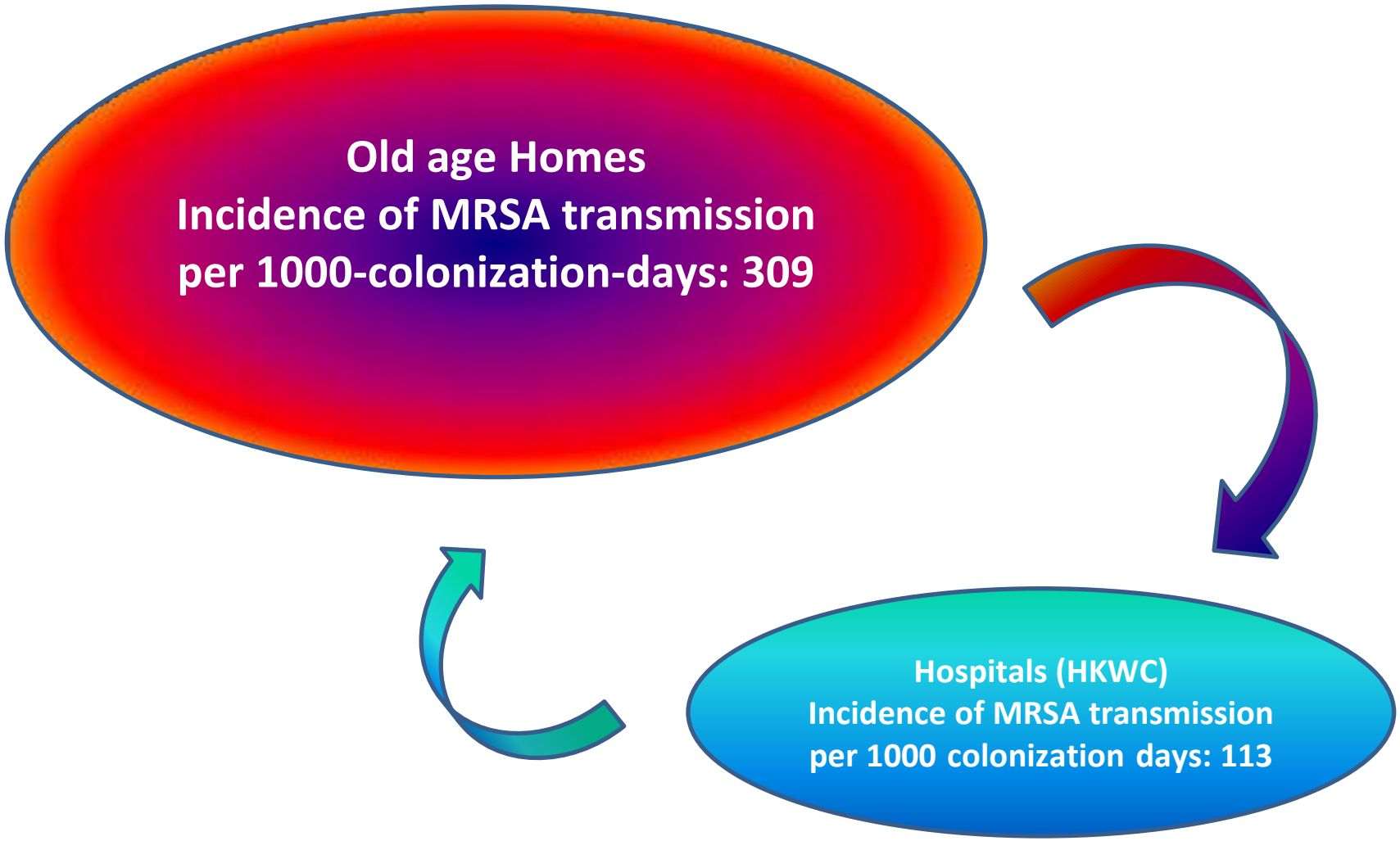
Cheng VC, et al. BMC Infect Dis. 2013 May 6;13:205.

Risk factors for gastrointestinal colonization of methicillin-resistant *Staphylococcus aureus* (MRSA) in age and sex matched controls

Characteristics	Patients with gastrointestinal colonization of MRSA (n=919) [a]	Patients without gastrointestinal colonization of MRSA (n=1,838) [b]	Bivariable analysis		Multivariable analysis [c]	
			Odds ratio (95% CI)	p value	Odds ratio (95% CI)	p value
Patient referred from RCHE	**460 (50.1%)**	**366 (19.9%)**	**4.03 (3.39-4.79)**	**<0.001**	**4.18 (3.50-4.99)**	**<0.001**
Presence of indwelling device [d]	235 (25.6%)	441 (24.0%)	1.09 (0.91-1.31)	0.364		
Presence of chronic diseases [e]	367 (39.9%)	735 (40.0%)	1.00 (0.85-1.17)	0.978		
Co colonization in gastrointestinal tract						
Clostridioides difficile	3 (0.3%)	11 (0.6%)	0.54 (0.15-1.96)	0.351		
CPE	18 (2.0%)	24 (1.3%)	1.51 (0.82-2.80)	0.190		
MRAB	11 (1.2%)	18 (1.0%)	1.23 (0.58-2.60)	0.598		
VRE	2 (0.2%)	4 (0.2%)	1.00 (0.18-5.47)	1.000		
Use of antibiotics in preceding 6 months						
BL/beta lactamase inhibitors	197 (21.4%)	286 (15.6%)	1.48 (1.21-1.81)	<0.001		
Cephalosporins	61 (6.6%)	81 (4.4%)	1.54 (1.10-2.17)	0.013	1.61 (1.11-2.31)	0.011
Carbapenems	76 (8.3%)	113 (6.1%)	1.38 (1.02-1.86)	0.038		
Fluoroquinolones	134 (14.6%)	144 (7.8%)	2.01 (1.56-2.58)	<0.001	1.76 (1.34-2.30)	<0.001
Use of proton pump inhibitors in preceding 6 months [f]	510 (55.5%)	813 (44.2%)	1.57 (1.34-1.84)	<0.001	1.31 (1.10-1.56)	0.002
History of hospitalization in the past 6 months	705 (76.7%)	1121 (61.0%)	2.11 (1.76-2.52)	<0.001	1.90 (1.56-2.30)	<0.001

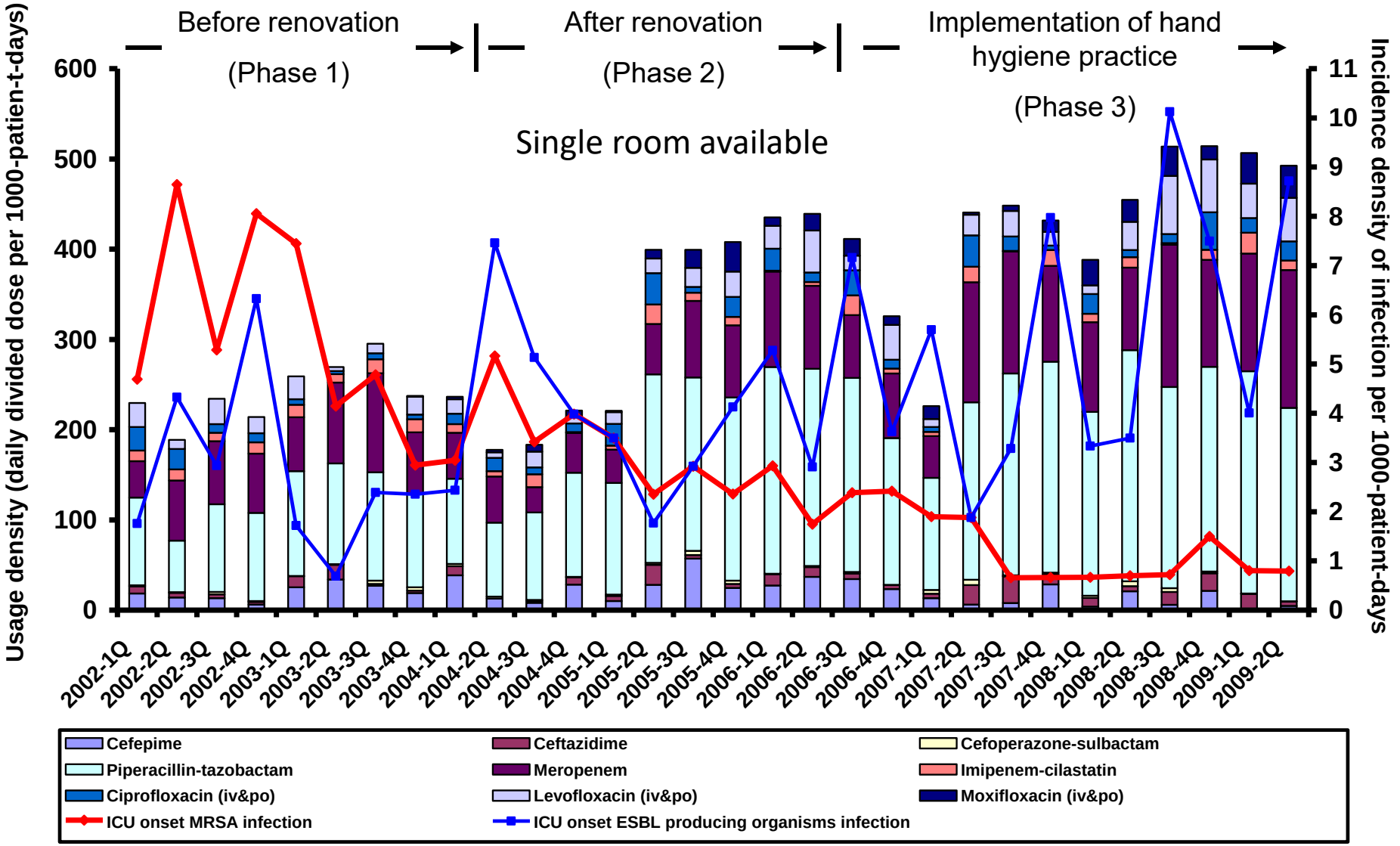
Wong Shuk-Ching, et al. (Manuscript submitted & under review)

Transmission dynamic of MRSA between old age homes and HA hospitals



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

The trend of usage density of broad-spectrum antibiotics & fluoroquinolones and incidence density of ICU onset MRSA infection



Cheng VC, et al. BMC Infect Dis. 2010 Sep 7;10(1):263.

Controlling nosocomial transmission of MRSA in Queen Mary hospital, HK

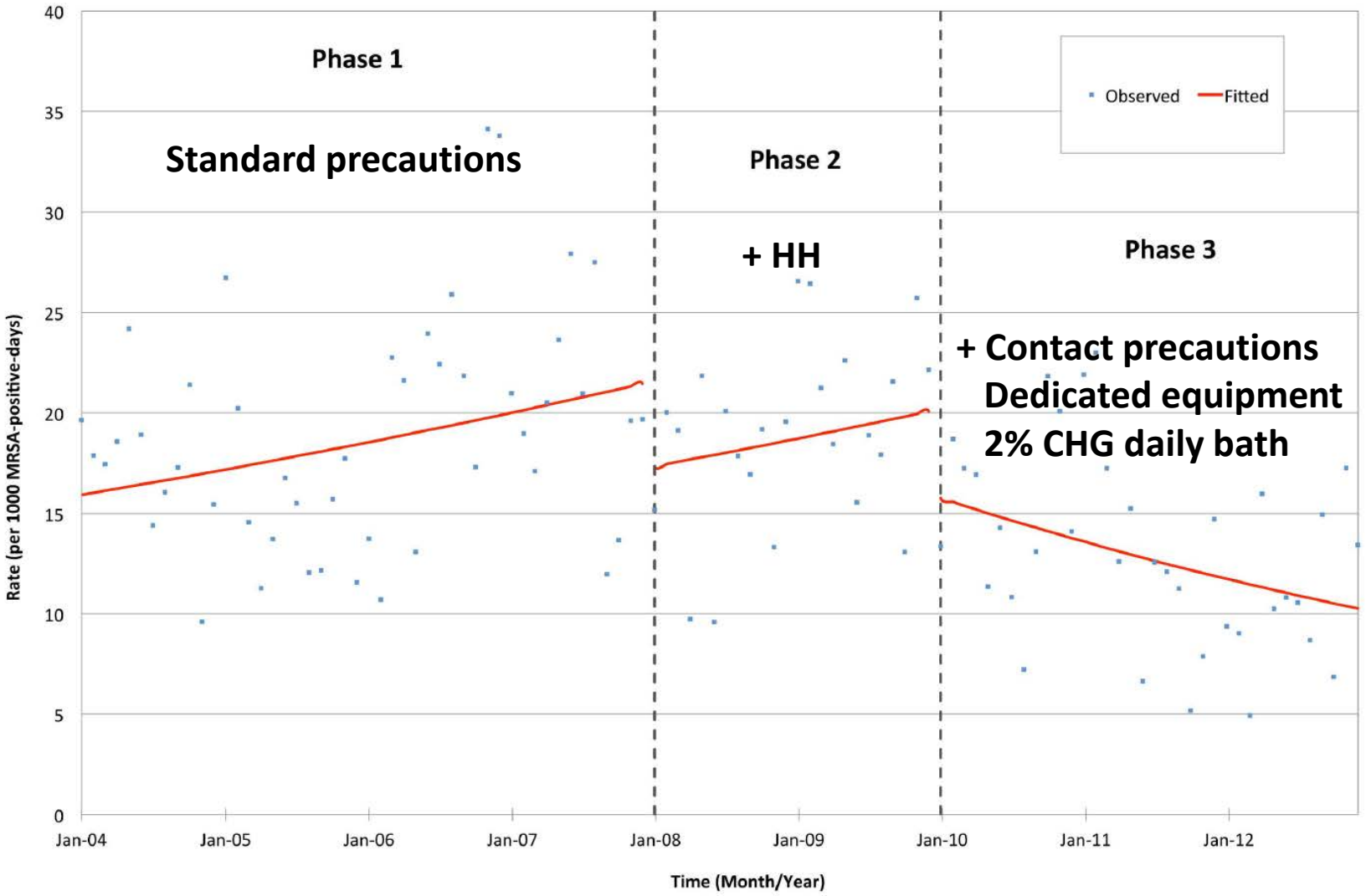


Figure 3. Incidence rate of hospital-acquired MRSA per 1000 MRSA-positive-days in three different phases of intervention.

Cheng VC, et al. PLoS One. 2014 Jun 19;9(6):e100493.

Single- patient use Devices in HKWC

	Proposal A	Proposal B	Proposal C		
	BP monitor with cuff	Oximeter	Vendor set with Cloud-to-cloud integration with HA e-HR	Tourniquet	Thermometer Probe covers
	Oximeter	Equipped with Bluetooth BP monitor	Oximeter		
						
	HK$2,500	HK$980	HK$3,200	HK$7,600		
	Reusable	Reusable	Reusable	Reusable	Dispose after Patient Discharge	Disposable
	20	60	20	60		
				HK$456,000		
Remarks	/	BP Monitor to Oximeter ratio 3: 1	Color Coding (CICO) Green General Patient Yellow – Case required contact precautions			

Started from Mid Jan 2021

Low education level of old age home staff in Chinese nursing homes
(Cross-sectional study conducted in December 2012 – 58 nursing homes at HKWC)

Characteristics of 1300 Respondents

	Staff of Nonprofit Nursing Homes, n = 554	Staff of For-Profit Nursing Homes, n = 746	*P* Value
Age, y, mean ± SD	43.8 ± 10.6	49.8 ± 11.5	<.001
Gender, male, n (%)	11.4 (85)	13.0 (72)	.38
Level of education, n (%)			<.001
Tertiary level*	15.7 (87)	6.4 (48)	
Secondary level*	62.5 (345)	45.0 (345)	
Primary level*	18.1 (100)	40.3 (301)	
No formal education	2.3 (13)	6.0 (45)	
No opinion	1.6 (9)	2.3 (17)	
Staffing ratio, mean ± SD			
No. of staff per 100 residents	40.3 ± 13.5	21.8 ± 8.8	<.001
Converted to HPRD	2.8 ± 0.9	1.5 ± 0.6	
Tertiary staff ratio, mean ± SD			
No. of staff with tertiary level per 100 residents	1.3 ± 1.1	1.3 ± 1.1	<.001
Converted to HPRD	0.4 ± 0.2 HPRD	0.09 ± 0.07 HPRD	

HPRD, hour per resident day.

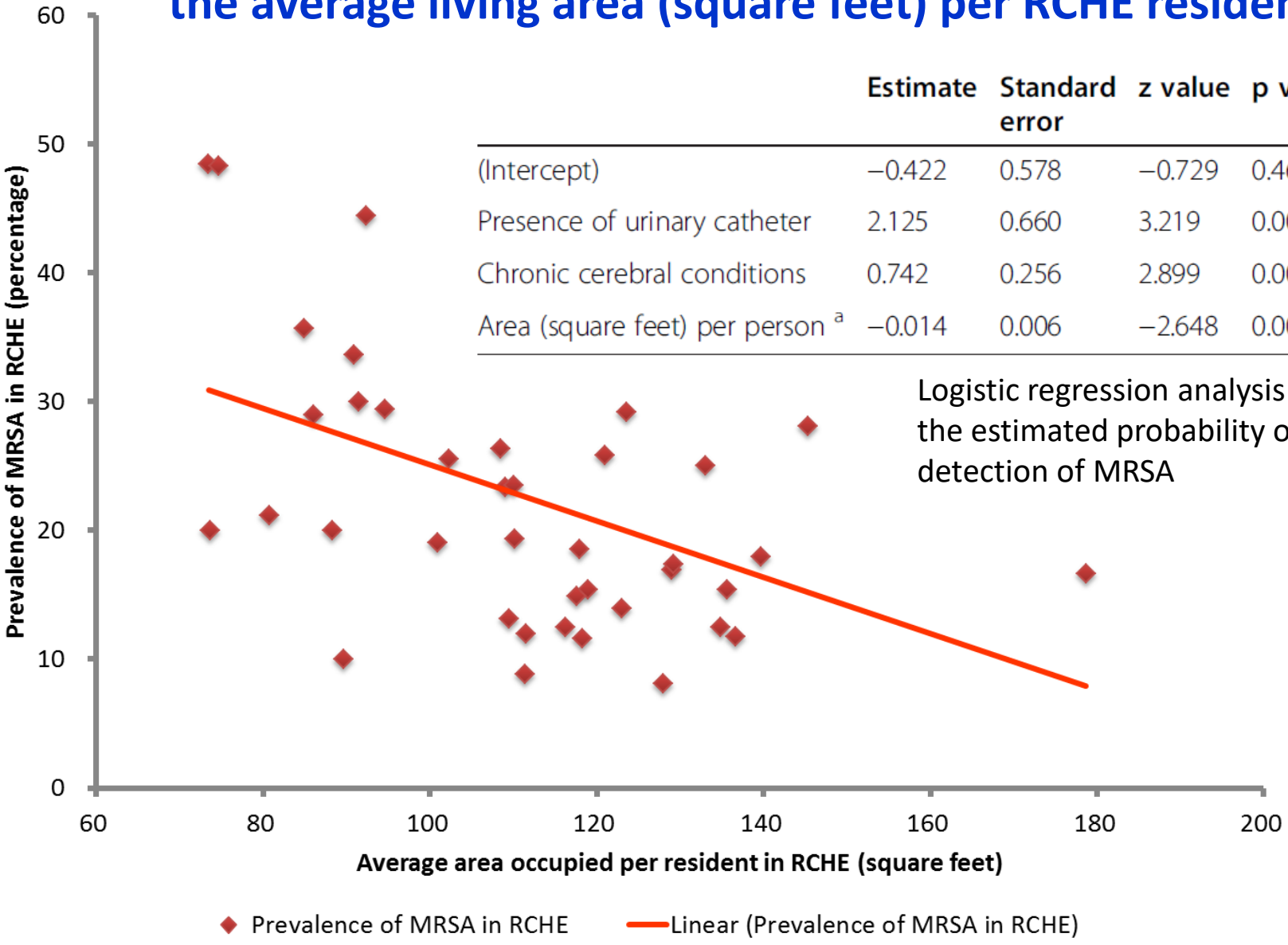
*Tertiary level: >grade 12; secondary level: grade 7–12; primary level: grade 1–6.

Chant TC, et al. J Am Med Dir Assoc. 2013 Nov;14(11):849-50.

Relationship between the MRSA prevalence per RCHE and the average living area (square feet) per RCHE resident

	Estimate	Standard error	z value	p value
(Intercept)	−0.422	0.578	−0.729	0.46588
Presence of urinary catheter	2.125	0.660	3.219	0.00129
Chronic cerebral conditions	0.742	0.256	2.899	0.00374
Area (square feet) per person [a]	−0.014	0.006	−2.648	0.0081

Logistic regression analysis for the estimated probability of detection of MRSA



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

Population density of Hong Kong Special Administration Region, China (2015)
6940 people per sq. km (Rank 4th in the world)
(c.f United States: 35 people per sq. km - rank 176th in the world)

How can we control MDROs in the overcrowding environment?
Endemic vs Emerging MDROs !

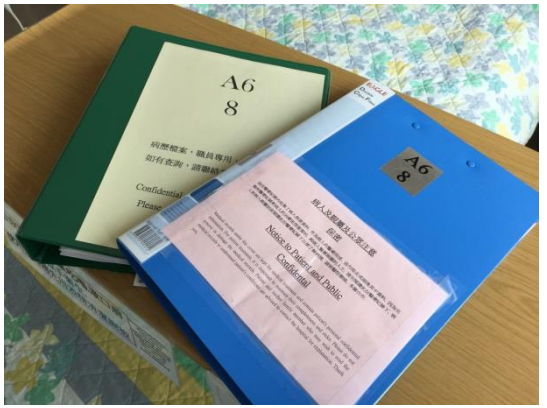
Data from Department of Economic and Social Affairs, UN (http://esa.un.org/unpd/wpp/Download/Standard/Population/)

Environmental Cleaning and Disinfection

High-touch and mutual-touch surfaces or items in acute wards, Queen Mary Hospital
Contact-episodes per hour per a 6-bedded cubicle

14 contact-episodes / h

12 contact-episodes / h



9 contact-episodes / h

1107 person-episodes involving in 6144 contact-episodes in 33 working days

6 contact-episodes / h

4 contact-episodes / h

1 contact-episodes / h

Cheng VC, et al. J Hosp Infect. 2015 Jul;90(3):220-5.

Role of Hand Hygiene Ambassador and Implementation of Directly Observed Hand Hygiene Among Residents in Residential Care Homes for the Elderly in Hong Kong

Vincent C. C. Cheng, MD;[1,2] Hong Chen, MD;[3] Shuk-Ching Wong, MNurs;[2] Jonathan H. K. Chen, PhD;[1] Wing-Chun Ng, MNurs;[4] Simon Y. C. So, MMedSc;[1] Tuen-Ching Chan, MD;[4] Sally C. Y. Wong, FRCPath;[1] Pak-Leung Ho, MD;[1] Lona Mody, MD;[5] Felix H. W. Chan, MD;[4] Andrew T. Y. Wong, MD;[3] Kwok-Yung Yuen, MD[1]

Infect Control Hosp Epidemiol. 2018 May;39(5):571-577.

	Environmental Sample Collected per Time Point in Intervention Arm, n/N (%)[a]	Environmental Sample Collected per Time Point in Nonintervention Arm, n/N (%)[a]	*P* Value
Contamination of MRSA			
Baseline (time point 0)	16/50 (32)[b]	17/50 (34)	.248
Week 1 (time point 1)	5/50 (10)	10/50 (20)	.161
Week 1 (time point 2)	5/50 (10)	15/50 (30)	.012
Week 2 (time point 3)	8/50 (16)	13/50 (26)	.220
Week 2 (time point 4)	6/50 (12)	14/50 (28)	.046
Week 3 (time point 5)	7/50 (14)	15/50 (30)	.053
Week 3 (time point 6)	4/50 (8)	18/50 (36)	.001
Week 4 (time point 7)	5/50 (10)	17/50 (34)	.004
Week 4 (time point 8)	5/50 (10)	14/50 (28)	.022
Week 5 (time point 9)	5/50 (10)	18/50 (36)	.002
Week 5 (time point 10)	3/50 (6)	13/50 (26)	.006
Week 6 (time point 11)	5/50 (10)	18/50 (36)	.002
Week 6 (time point 12)	5/50 (10)	15/50 (30)	.012
Weeks 1–6 (time points 1–12)	79/600 (13.2)[b]	197/600 (32.8)	< .001

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

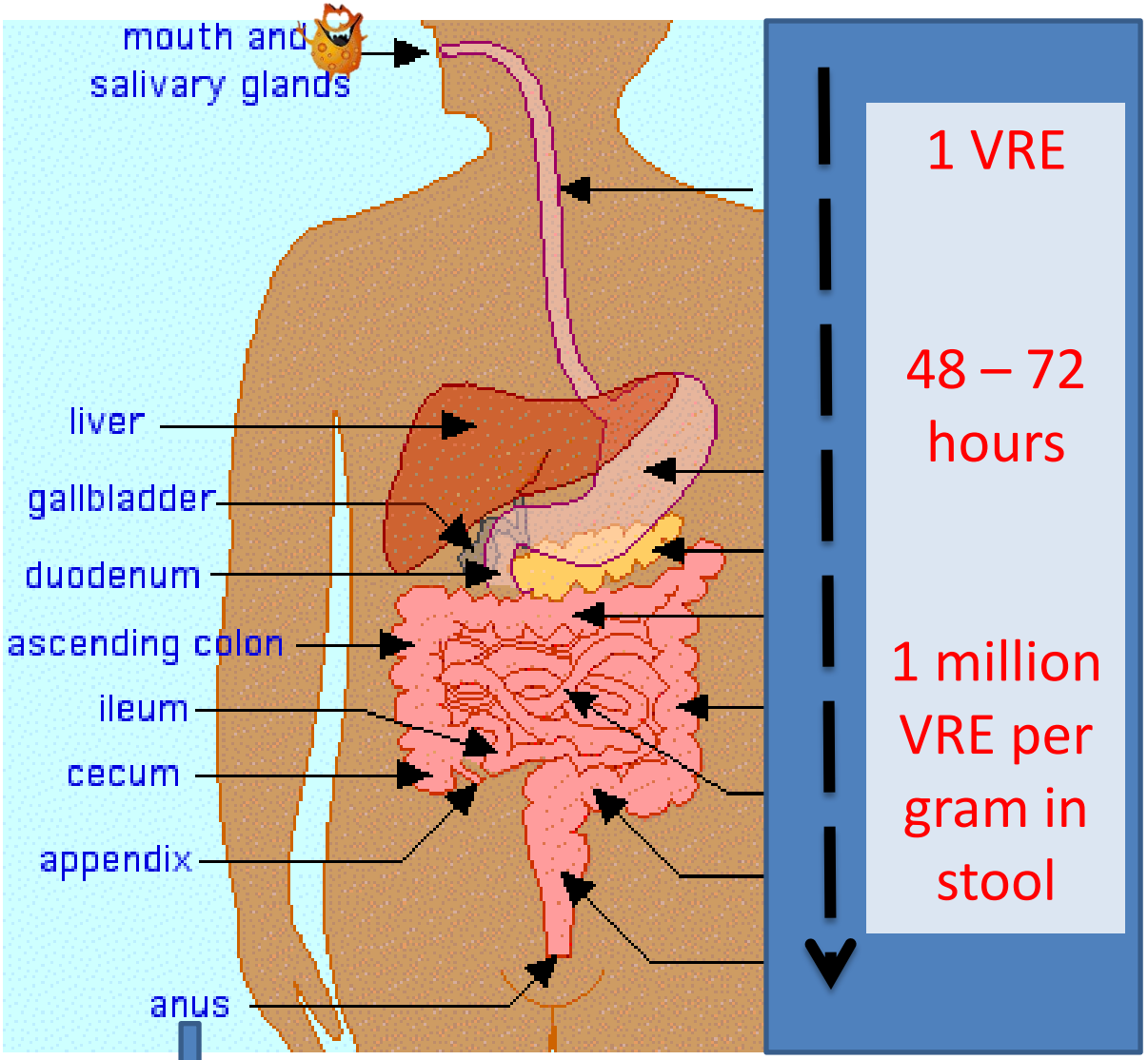
如廁前，請用沾有消毒劑的紙巾清潔廁板。
Wipe the toilet seat with disinfectant before use.


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.


Importance of “Exit & Entry Control”
“出入口管制”

Nurse gives tablet of 1 gm Augmentin to patient;
Patient - no hand hygiene !



Patient’s fingers & environment full of VRE

Compliance of self-initiated patient hand hygiene with respect to different age group (overall compliance ~ 38%)

	Observed Moment 1 (before snacks, drinks, prn drugs at the bedside)	Observed Moment 2 (after use of bedpan/urinal at the bedside)	Observed Moment 3 (after attending toilet facilities)	Overall P value
Patient aged				
≤ 34 years	**12.2% (6/49)**	**66.7% (4/6)**	**90.9% (20/22)**	**<0.001**
35 to 49 years	**21.0% (17/81)**	**33.3% (2/6)**	**86.4% (19/22)**	**<0.001**
50 to 64 years	**34.7% (33/95)**	**28.6% (4/14)**	**81.0% (17/21)**	**<0.001**
65 to 79 years	**32.7% (36/110)**	**30.8% (8/26)**	**95.7% (22/23)**	**<0.001**
≥ 80 years	**24.7% (20/81)**	**5.9% (1/17)**	**100% (9/9)**	**<0.001**
Overall	**26.9% (112 /416)**	**27.5% (19/69)**	**89.7% (87/97)**	**<0.001**

Between 14 January and 30 June 2015, a total of 582 conscious patients were observed for 114 working days, with an average of 5 patients per day.

Cheng VC, et al. Am J Infect Control. 2016 Jun 1;44(6):621-4.

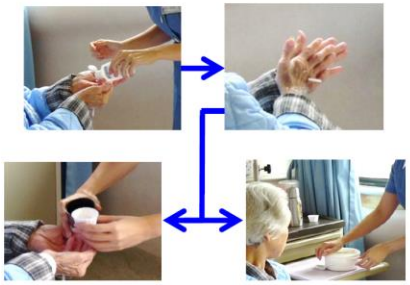
入院七件事，確保你安全
Seven Important Things To Protect Yourself While In Hospital

①請主動要求病房同事在接觸你前，
先用酒精搓手液潔手或皂液洗手。

Please take the initiative to ask ward staff
to perform hand hygiene before touching you.

預防病從口入 PREVENT ILLNESS FROM INTAKE

②,③ 用酒精搓手液潔手才服藥/進餐。
Hand hygiene before meals and drugs.



④用染有消毒劑的紙巾清潔水龍頭手柄，
然後才開水喉盛水漱口/刷牙。
Wipe water tap handle with disinfectant wetted tissue
before getting water for mouth rinsing/tooth brushing.

預防病從廁出 PREVENT ILLNESS FROM TOILET

⑤如廁前，請用染有消毒劑的紙巾清潔廁板。
Wipe the toilet seat
with disinfectant wetted tissue before use.

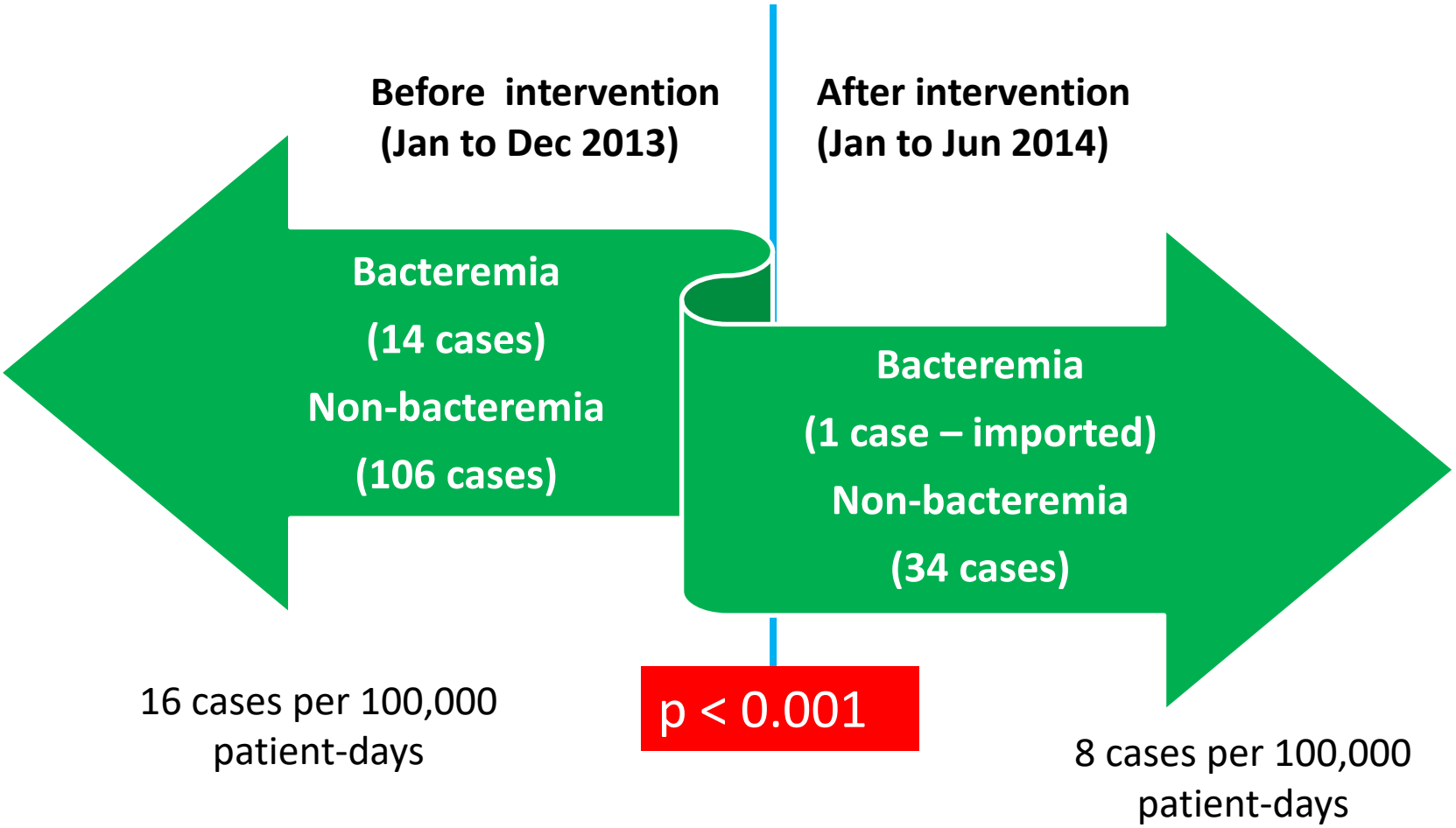
⑥大便後，先用皂液洗手再用酒精搓手液潔手。
小便後，則如常用皂液洗手。
After defaecation, wash hands with soap and water;
then disinfect hands with alcohol handrub. After
urination, as usual wash hands with soap and water.

⑦在床上用便盆大便後，請用濕紙巾抹手
再請病房同事給酒精搓手液潔手。
After defaecation using bedpan, please use
wet tissue to wipe hands; then ask ward staff
to provide alcohol handrub to disinfect hands.

瑪麗醫院控制感染2013年九月 QMH Infection Control Sep 2013

Cheng VC, et al. Emerging Microbes & Infections (2015) 4, e8.

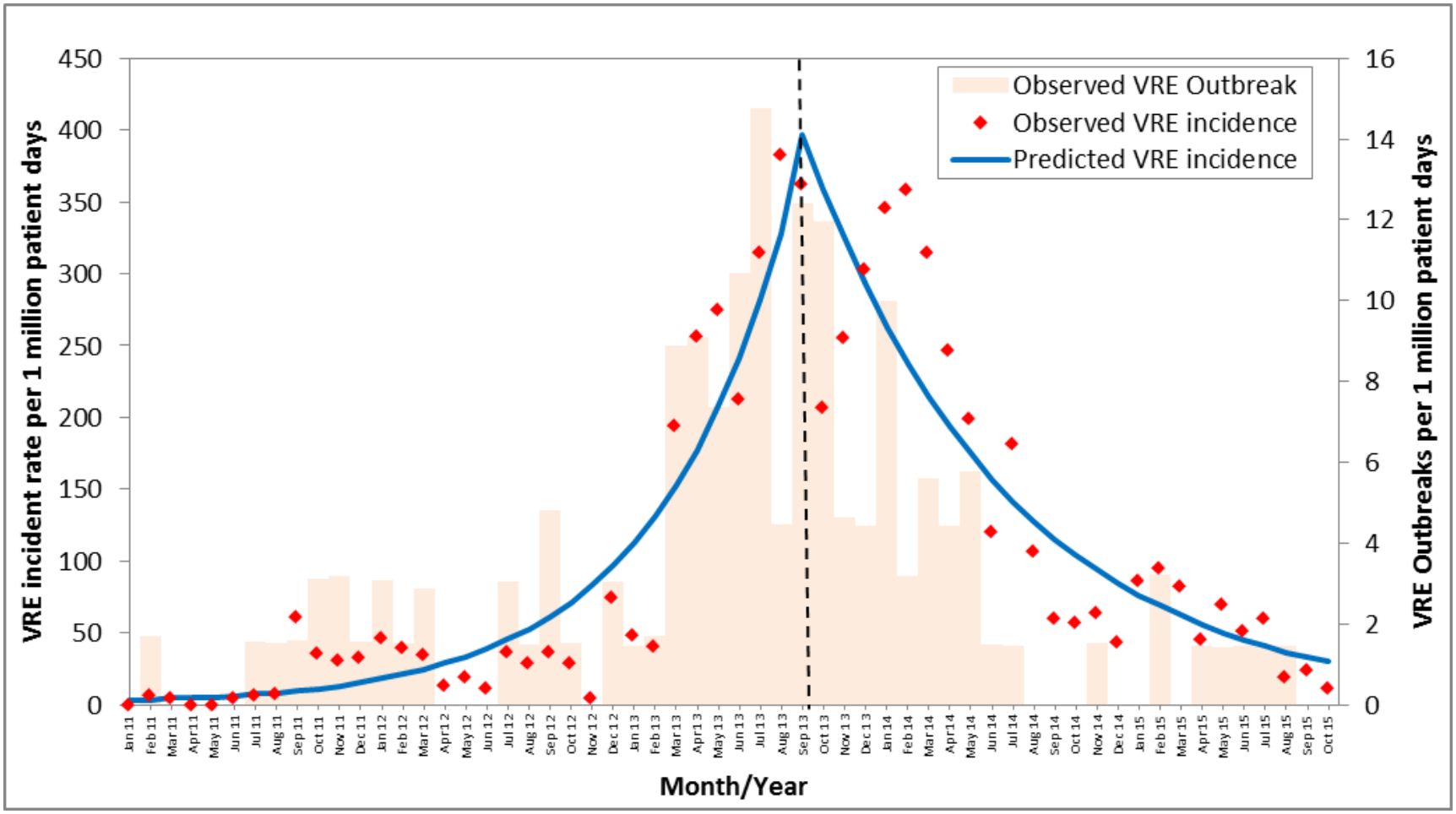
Control of hospital endemicity of multiple-drug-resistant *Acinetobacter baumannii* ST457 with directly observed hand hygiene



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.

The observed incidence and the predicted incidence of vancomycin resistant enterococci (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.

ICPIC2019

INTERNATIONAL CONFERENCE ON PREVENTION & INFECTION CONTROL

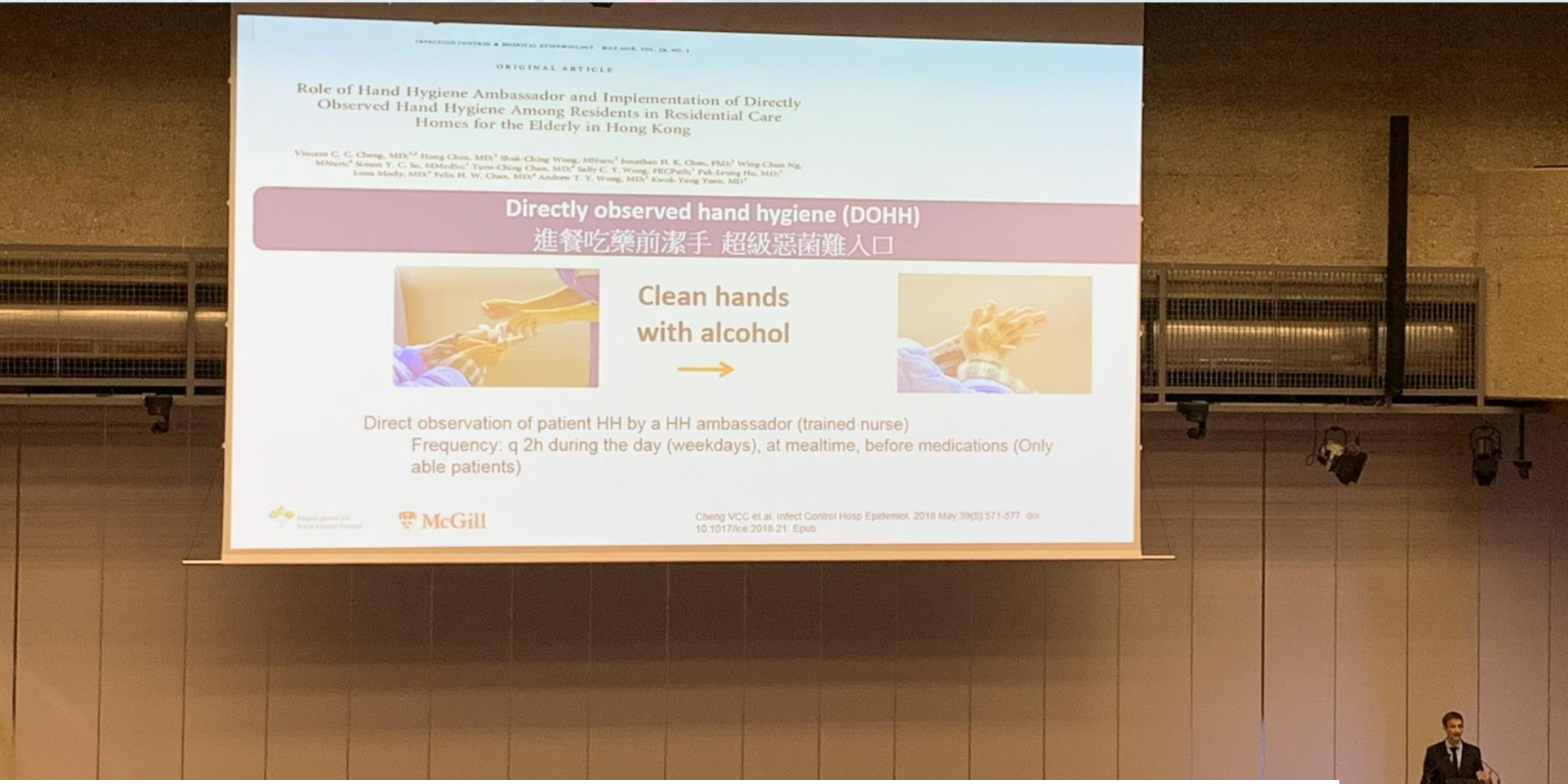
Geneva, Switzerland 10-13 September 2019

OPENING CEREMONY

18:00 - 19:00

Keynotes opening lectures

Chair: Stephan Harbarth (CH)



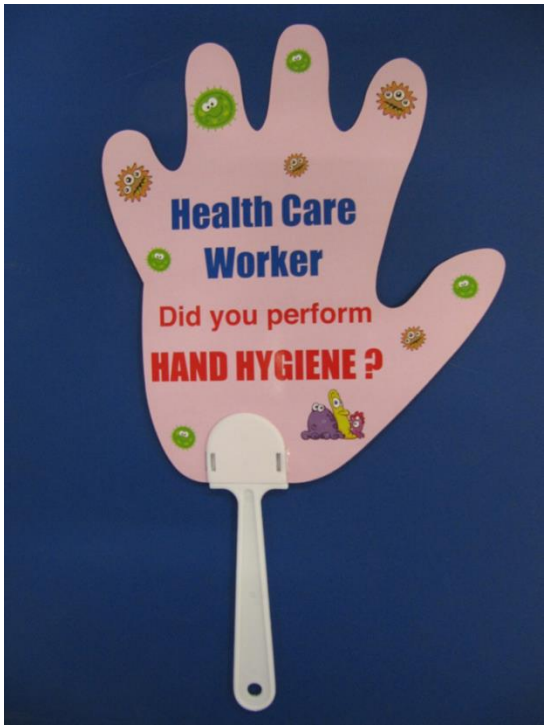
Patient participation in infection control

Yves Longtin (CA)

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

Patient empowerment in hand hygiene: a pilot program in TWH / GH (HKWC)

	Baseline (May-Jun 16)	Intervention (Jul-Aug 16)	Entire period
Patient (TWH)	130	128	258
Patient (GH)	72	39	111
Subtotal	*202*	*167*	*369*
Staff (TWH)	139	78	217
Staff (GH)	52	36	88
Subtotal	*191*	*114*	*305*



Promotion & Implementation of Patient Empowerment in Hand Hygiene

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

Regular meeting with patients' group representative with hospital management team, Queen Mary Hospital (10 February 2018)

(Participants agreed to use this photo for education & promotion)


所有公立醫院謝絕探病
No visiting in all public hospitals
謝絕探病
No Visiting

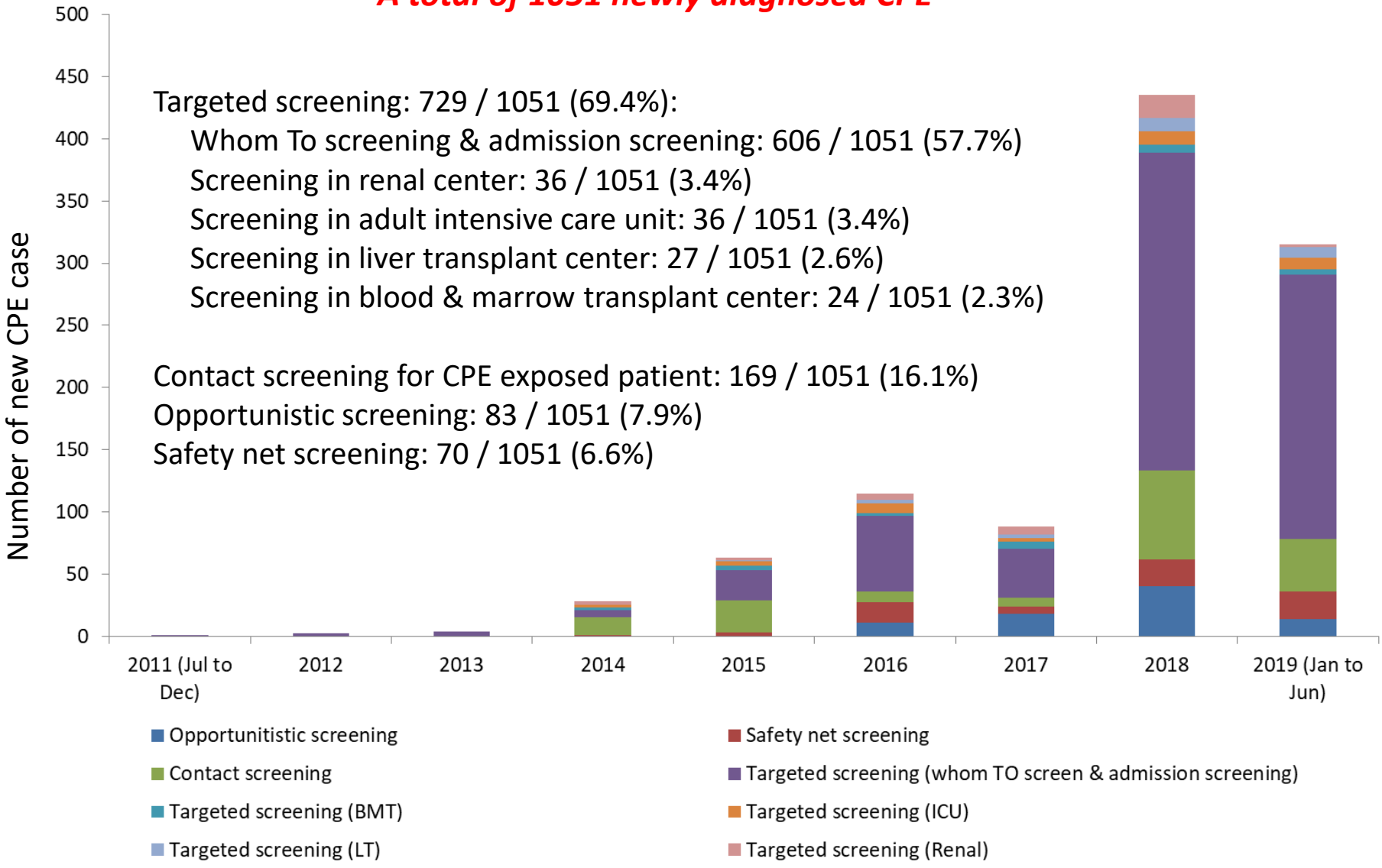
Number of patients with newly diagnosed MDROs in Hospital Authority

		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

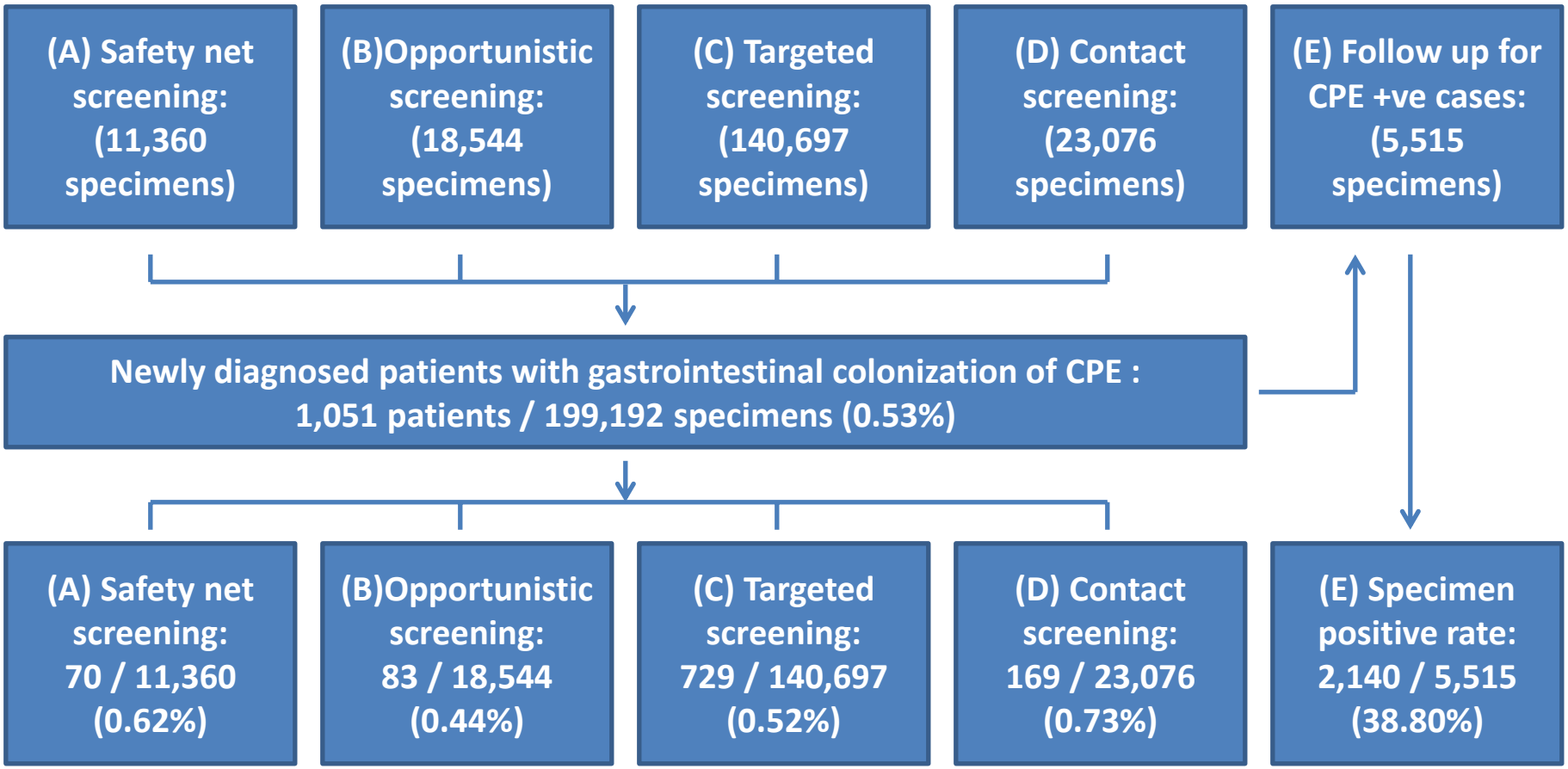
Multi-pronged screening strategy for early recognition of gastrointestinal colonization of CPE in Hong Kong West Hospital Network (1 July 2011 to 30 June 2019)

A total of 1051 newly diagnosed CPE



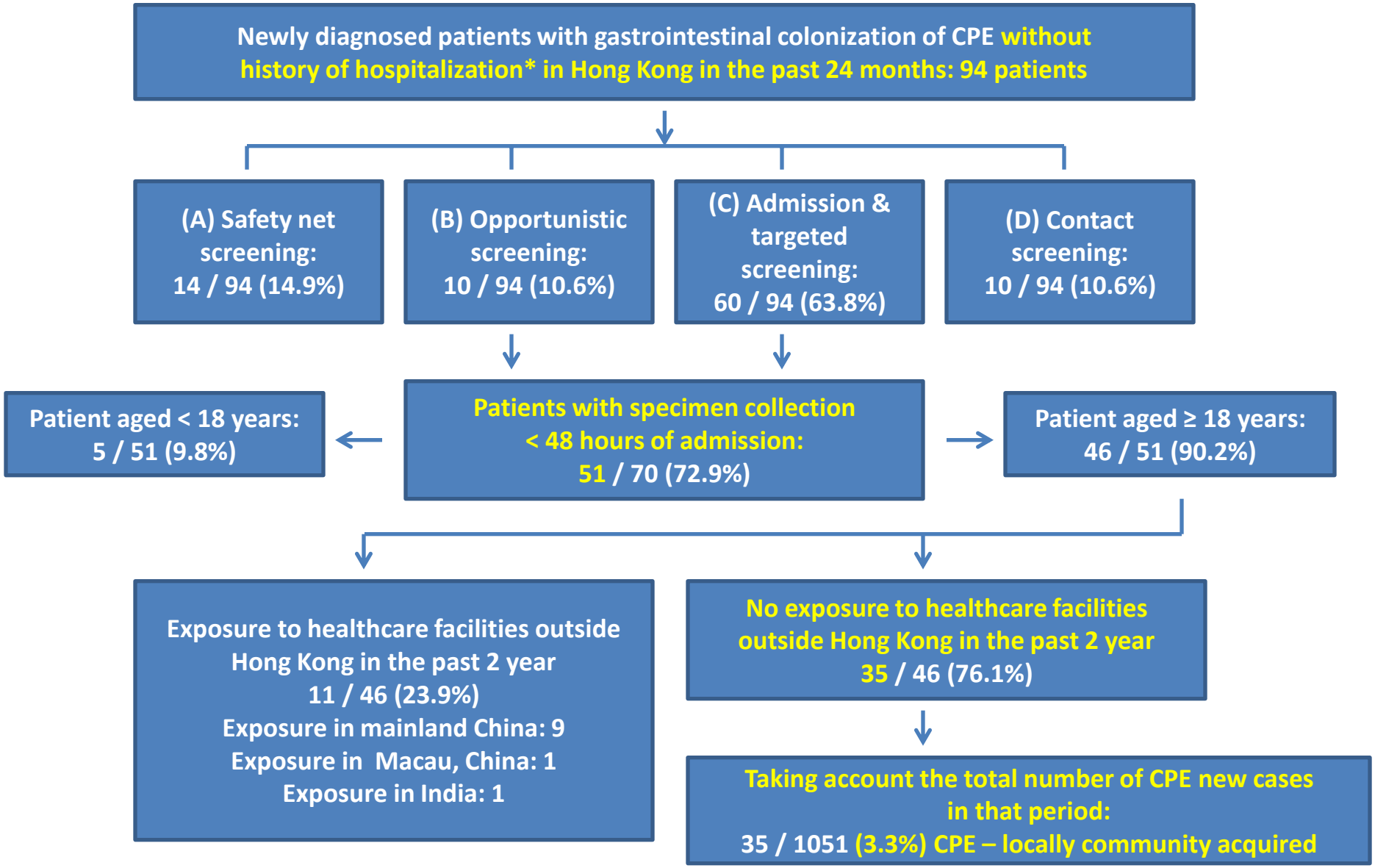
Wong Shuk-Ching, et al. Eur J Clin Microbiol Infect Dis. 2021 Sep;40(9):2017-2022.

Yield of screening of gastrointestinal colonization of carbapenemase-producing Enterobacteriaceae in Hong Kong West Hospital Network (1 July 2011 to 30 June 2019)



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

Community acquisition of carbapenemase-producing Enterobacteriaceae in Hong Kong (1 July 2011 to 30 June 2019)



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

Epidemiological exposure of patient with or without community acquisition of CPE

	Patient with gastrointestinal colonization of CPE (n=30) [a]	Patient without gastrointestinal colonization of CPE (n=33) [b]	p value
Female sex (%)	16 (53.3%)	18 (54.5%)	0.923
Age (mean ± SD)	51.9 ± 17.3	50.5 ± 23.7	0.793
Consumption of the following food items in the past 3 months (Y/N)			
Salad	18 (60.0%)	18 (54.5%)	0.962
Sashimi	20 (66.7%)	15 (45.5%)	0.091
Sushi	21 (70.0%)	16 (48.5%)	0.083
Chinese steamed chicken	24 (80.0%)	25 (75.8%)	0.686
Meat (raw)	6 (20.0%)	8 (24.2%)	0.686
Oyster (raw)	14 (46.7%)	10 (30.3%)	0.182
Soy source crab	5 (16.7%)	4 (12.1%)	0.607
Bloody clam	6 (20.0%)	3 (9.1%)	0.217
Shrimp (raw)	11 (36.7%)	10 (30.3%)	0.593
Tomato (raw)	16 (53.3%)	14 (42.4%)	0.387
Consumption of the following food items > 3 times per week (Y/N) [c]			
Salad	2 (6.7%)	0	0.223
Sashimi	4 (13.3%)	2 (6.1%)	0.412
Sushi	4 (13.3%)	2 (6.1%)	0.412
Chinese steamed chicken	4 (13.30%)	1 (3.03%)	0.183
Tomato (raw)	5	0	
Purchase of the following food items in wet market in the past 3 months (Y/N)			
Pork (raw)	21 (70.0%)	19 (57.6%)	0.306
Beef (raw)	20 (66.7%)	17 (51.5%)	0.222
Chicken (raw)	21 (70.0%)	17 (51.5%)	0.134
Vegetable	21 (70.0%)	21 (63.6%)	0.593
Seafood	20 (66.7%)	15 (45.5%)	0.091
Purchase of the following food items in wet market for > 3 times per week (Y/N)			
Pork (raw)	15 (50.0%)	6 (18.2%)	0.007
Beef (raw)	15 (50.0%)	7 (21.2%)	0.017
Chicken (raw)	12 (40.0%)	5 (15.2%)	0.026
Vegetable	15 (50.0%)	8 (24.2%)	0.034
Seafood	11 (36.7%)	9 (27.3%)	0.424
Cook by patient at home in the past 3 months (Y/N)	20 (66.7%)	19 (57.6%)	0.458
Cook by patient at home for >1 episode per week (Y/N)	14 (46.7%)	12 (36.4%)	0.407

CPE, carbapenemase-producing Enterobacteriaceae

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

Statistics

Antimicrobial Resistance Surveillance in Food – Raw meat

	12/2019 to 6/2020
Number of samples tested by selective isolation	851*
Samples positive for extended spectrum beta-lactamase (ESBL)-producing Enterobacteriaceae	679 (79.8%)
Samples positive for meropenem-resistant organisms	98 (11.5%)
Samples positive for vancomycin-resistant Enterococcus	0 (0%)
Total number of samples positive	682 (80.1%)

*Raw beef, chicken and pork

https://www.chp.gov.hk/en/static/104186.html

Statistics

Antimicrobial Resistance Surveillance in Food – Ready-to-eat food

	12/2019 to 6/2020
Number of samples tested by selective isolation	304*
Samples positive for extended spectrum beta-lactamase (ESBL)-producing Enterobacteriaceae	42 (13.8%)
Samples positive for meropenem-resistant organisms	5 (1.6%)
Samples positive for vancomycin-resistant Enterococcus	0 (0%)
Total number of samples positive	46 (15.1%)

*Ready-to-eat vegetable salad, salmon sashimi and tuna sashimi

https://www.chp.gov.hk/en/static/104187.html

高危人士

Susceptible populations

請留意生或未煮熟食物的風險

Pay attention to the risks associated with raw or undercooked food items

生牛奶芝士
Raw milk cheese

預先包裝沙律菜
Prepackaged salad vegetables

未熟的蛋
Undercooked egg

煙三文魚
Smoked salmon

刺身
Sashimi

https://www.cfs.gov.hk/english/multimedia/multimedia_pub/multimedia_pub_fsf_143_01.html

Contents lists available at ScienceDirect

EClinicalMedicine

journal homepage: https://www.journals.elsevier.com/eclinicalmedicine

EClinicalMedicine
Published by THE LANCET

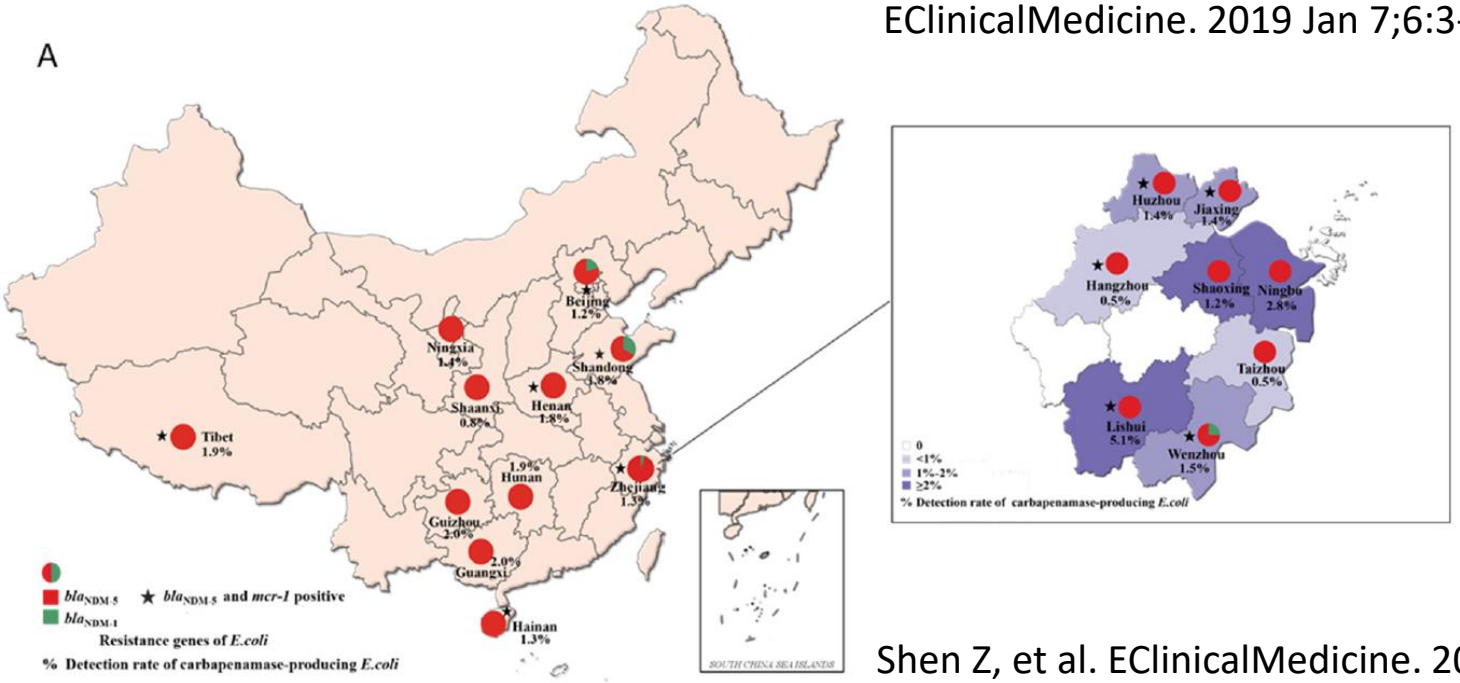
Commentary

Control of Carbapenemase-producing Enterobacteriaceae: Beyond the Hospital

Vincent C.C. Cheng [a,b], Shuk-Ching Wong [b], Sally C.Y. Wong [a], Pak-Leung Ho [c], Kwok-Yung Yuen [c,*]

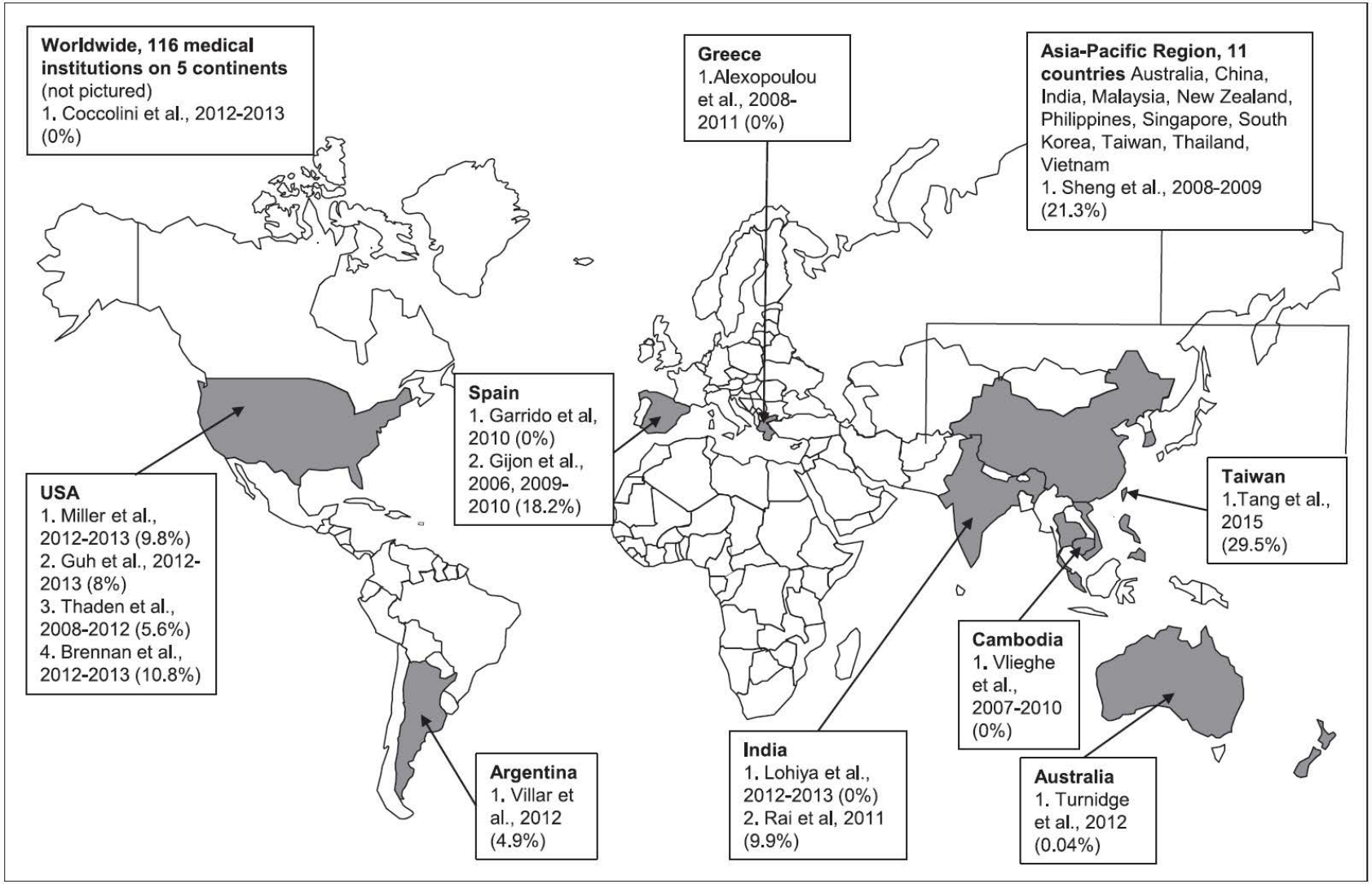
[a] Department of Microbiology, Queen Mary Hospital, Hong Kong Special Administrative Region, China
[b] Infection Control Team, Queen Mary Hospital, Hong Kong West Cluster, Hong Kong Special Administrative Region, China
[c] Department of Microbiology, The University of Hong Kong, Hong Kong Special Administrative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

EClinicalMedicine. 2019 Jan 7;6:3-4.



Shen Z, et al. EClinicalMedicine. 2018 Dec 4;6:11-20.

Geographical distribution of studies included in the review (percentage of community-associated or community-onset carbapenem-resistant Enterobacteriaceae)



Kelly AM, et al. Int J Antimicrob Agents. 2017 Aug;50(2):127-134.

Dissemination of NDM-1 positive bacteria in the New Delhi environment

(From Sept 26 to Oct 10, 2010)

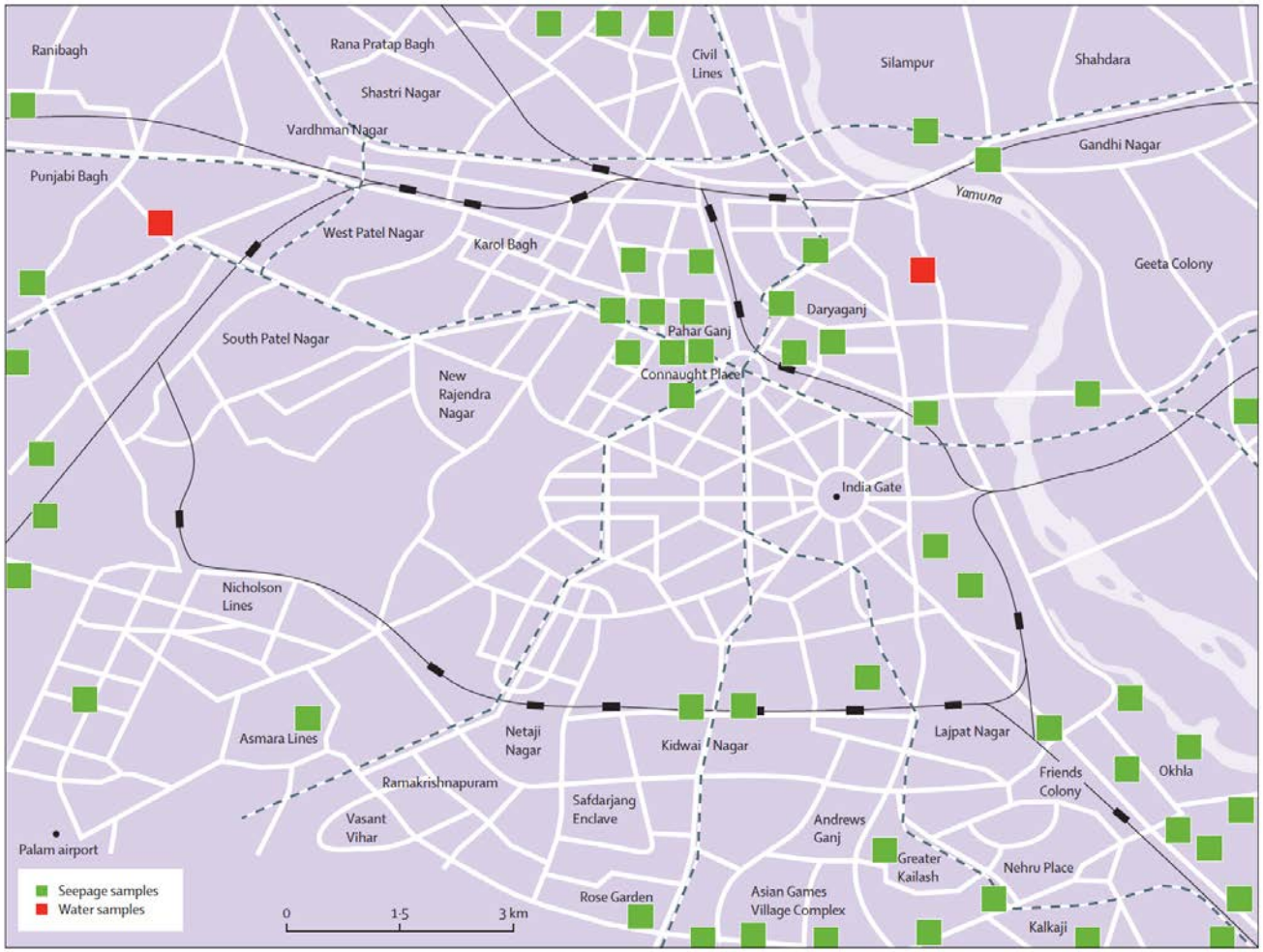


Figure 1: Map of NDM-1-positive samples from New Delhi centre and surrounding areas

Bacteria with *bla*NDM-1 were grown from 12 (7%) of 171 seepage samples and two (4%) of 50 water samples, and included 11 species in which NDM-1 has not previously been reported, including *Shigella boydii* and *Vibrio cholerae*

Swabs absorbing about 100 µL of seepage water (ie, water pools in streets or rivulets) and 15 mL samples of public tap water were collected from sites within a 12 km radius of central New Delhi

Walsh TR, et al. Lancet Infect Dis. 2011 May;11(5):355-62.

Available online at www.sciencedirect.com

Journal of Hospital Infection

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

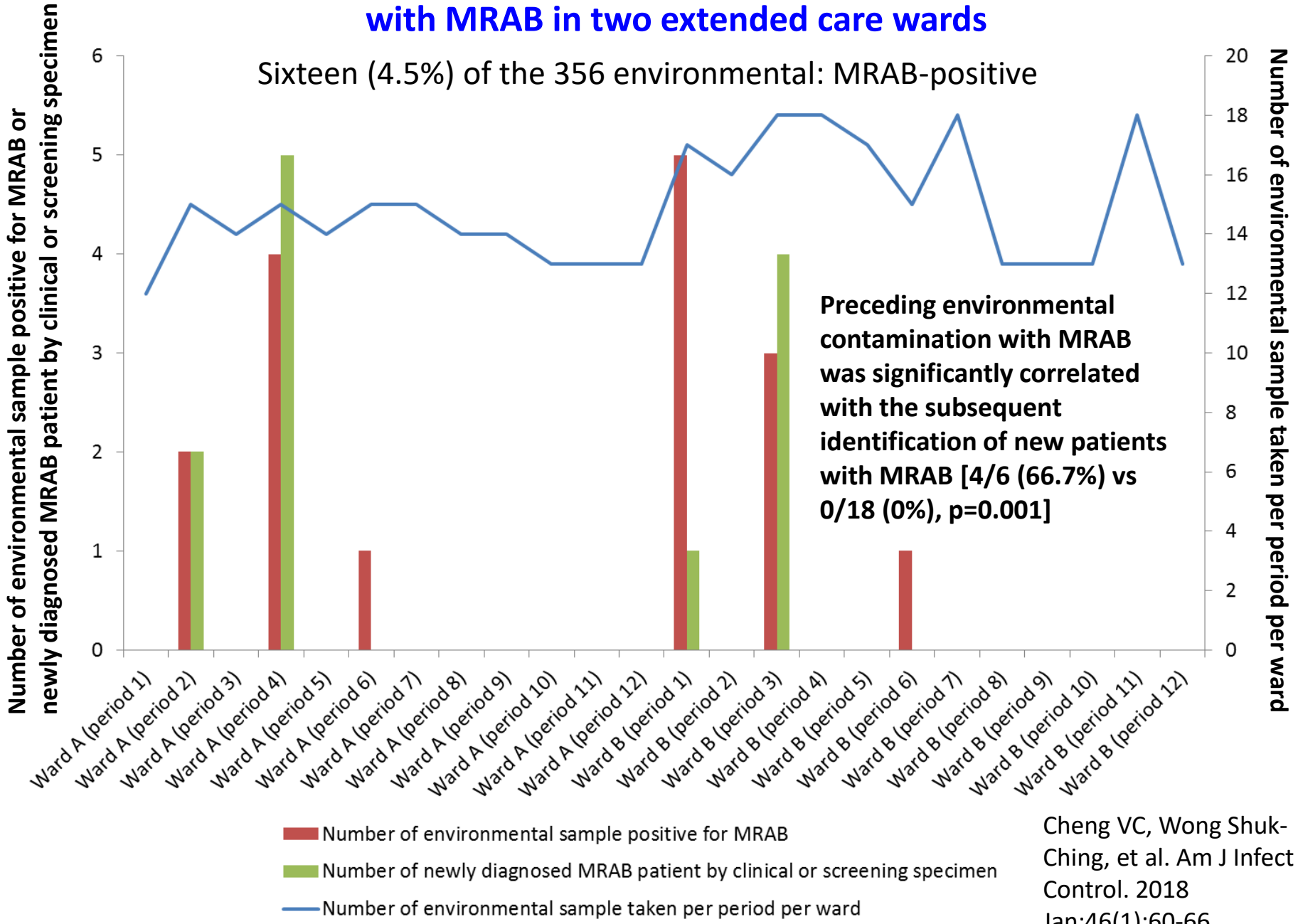
Air dispersal of multidrug-resistant *Acinetobacter baumannii*: implications for nosocomial transmission during the COVID-19 pandemic

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*

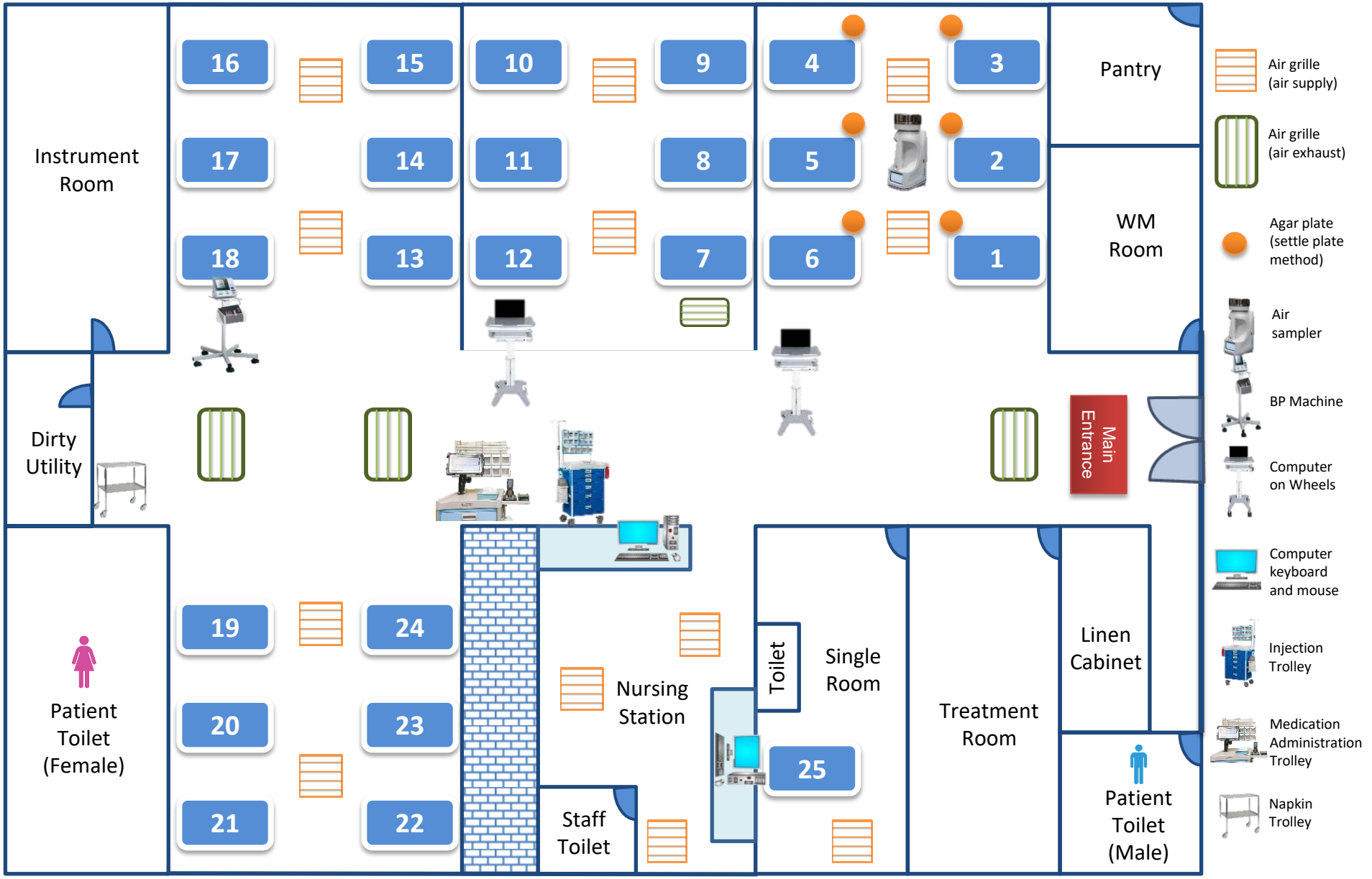
Wong Shuk-Ching, et al. J Hosp Infect. 2021 Oct;116:78-86.

Correlation between environmental culture and newly diagnosed patient with MRAB in two extended care wards



Cheng VC, Wong Shuk-Ching, et al. Am J Infect Control. 2018 Jan;46(1):60-66.

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.

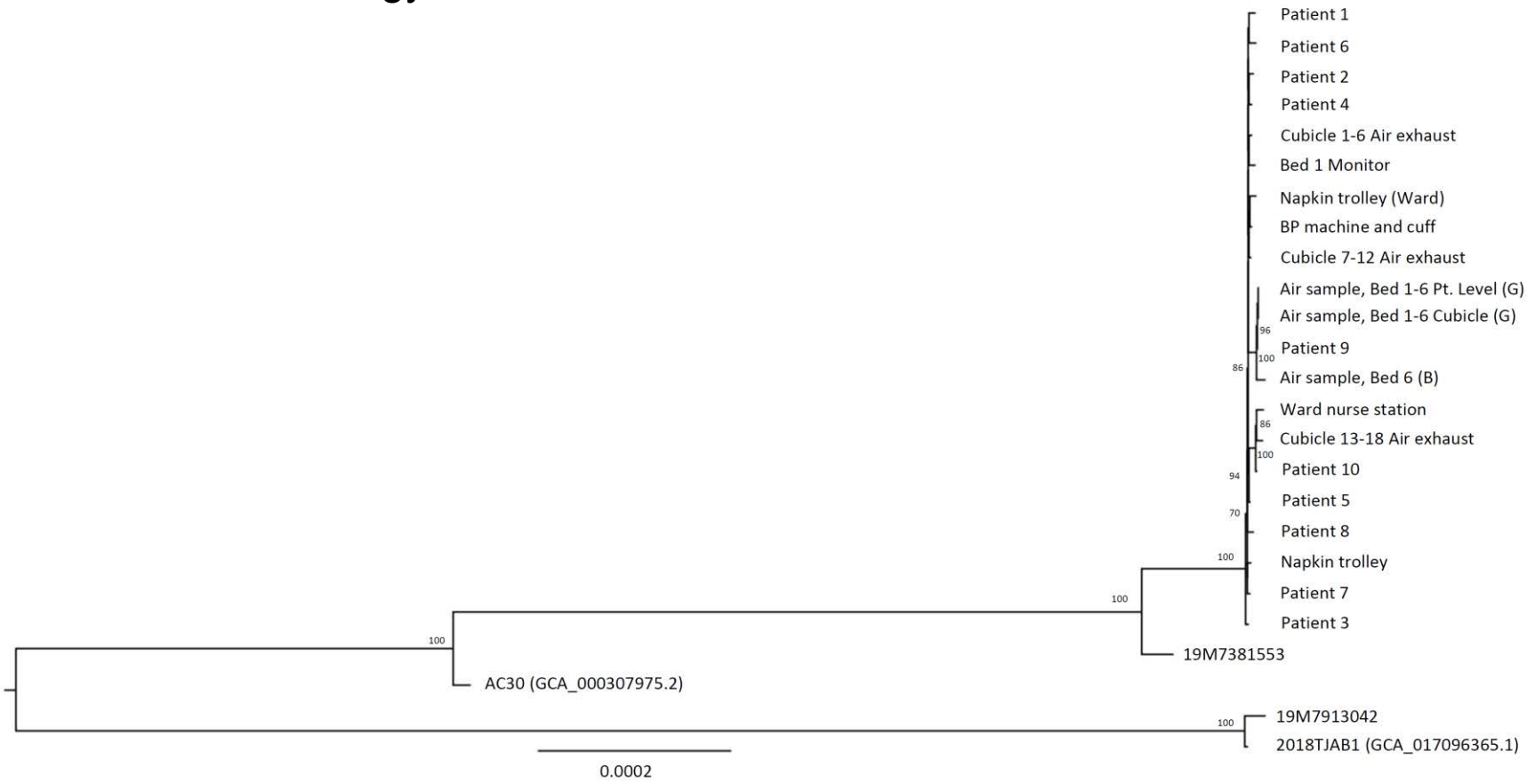
Wong Shuk-Ching, et al. J Hosp Infect. 2021 Oct;116:78-86.

Literature review on air sampling for *Acinetobacter baumannii* in the clinical setting

No.	Country [setting]	Study period [year of publication]	Resistant pattern	Air sampling method (by machine, M, or settle plate, SP)	No. of patient [a]	No. (%) of air sample +ve for A. baumannii [remark, if any]	Typing [b] [relatedness of clinical & air samples]	Ref
1	Argentina [ICU]	Jul-Sep, 2003 [2008]	CSAB, CRAB	M: AF 11, T 20 min M: AF 250, T 4 min SP: NS	NM	4 (7.4%) / 54	PFGE [NM]	23
2	US [ICU]	Mar-Apr, 2012 [2013]	CSAB, CRAB	SP: T 24–48 hours; at head of bed ~ 2.25 m from the floor	53	12 (22.6%) / 53	PFGE [clonally related]	24
3	China [ward]	Jan-Jun, 2011 [2014]	CRAB	M: AF 28.3, T 10 min; at ward center & corridor ~ 1.5 m from the floor	NM	16 [majority of air samples were negative]	REP-PCR [NM]	25
4	US [ICU]	Mar-Jul, 2013 [2015]	CRAB	SP: T 24 hours; ~ 90 cm from headboard & within 90 cm of roof tile	30	NS [positive air sample ~ 21% of study days]	REP-PCR [4 of 6 air/clinical isolate pairs closely related]	26
5	US [ICU]	May-Dec, 2013 [2015]	MRAB [c]	M: AF 28.3, T 1 hour; 3 feet from head of bed	12	1 (8.3%) / 12	ND	27
6	US [ICU]	Oct, 2013-Feb, 2014 [2016]	CRAB	SP: T 24 hours; ~ 2 feet from headboards & 2 feet from roof tiles	25	36 (19.6%) / 184	ND	28
7	Thailand [ward]	Jan 2015 [2016]	CRAB	SP: T 6 hours; vicinity at bedside & 1 m from the floor	434 [d]	0 / 3,472 [e]	NA	29
8	Turkey [ICU]	NM [2016]	CSAB, CRAB	M: AF NM, T NM; from 4 defined areas in ICU & ~ 1 m, 2 m, and 3 m from bed	NM	26 (13.9%) / 186 [f]	REP-PCR [18 air strains clonally related to the clinical strains of 9 patients]	30
9	Ethiopia [ICU, OT, DR]	Dec, 2015-Apr, 2016 [2017]	CSAB, CRAB	M: AF 28.3, T 5 min SP: NS	NM	43 (19.9%) / 216	ND	31
10	Iran [ICU, OT ward] [g]	Apr, 2014-Apr, 2015 [2017]	CRAB	M: AF 10; T 4 hours; ~ 1.5 m from the floor	NM	7 (10.9%) / 64	ND	32
11	China [ICU, ward]	May-Nov, 2014 [2018] [h]	CRAB	M: AF 28.3, T 20 min; at ward center & corridor ~ 1.5 m from the floor	NM	4 (6.3%) / 64	PFGE & MLST [1 air & 1 clinical strain with same PFGE & MLST pattern]	33
12	Israel [ICU, ward]	Sep-Dec, 2016 [2019]	CRAB	M: AF 60, T 30 min; i ~ 1.5m from patient's head at a height of 1 m	10	22 (15.7%) / 140	ND	34

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

Whole genome phylogenetic analysis of 25 multidrug resistant *Acinetobacter baumannii* (MRAB) genomes showing the relationship between the patients in a medical neurology ward and the ward environment



The tree was constructed by maximum likelihood method with IQ-Tree. The 2018TJAB1 MRAB strain (GenBank assembly accession number GCA_017096365.1) was used as the root of the tree. The substitution model TPM3u+I was used.

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

Control of MDROs in Hong Kong

MRSA:
Conjoint effort between old age homes & hospitals

CPE:
Source control & education in the community
Prevent amplification & transmission in the hospitals

MRAB:
Infection control measures in hospitals
Alert the risk of air dispersal


Thank You!