

Prevention of Nosocomial Transmission of VRE in Hong Kong West Cluster

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Vancomycin resistant enterococci in HA hospitals

	2009	2010	2011	2012	2013
All enterococci in clinical specimens (no.)	14096	13848	15002	15989	16253
VRE in clinical specimens (no. / %)	14 (0.10%)	55 (0.40%)	44 (0.29%)	50 (0.31%)	205 (1.26%)

VRE bacteremia (HA 2013): 0.0007 per 1000 acute patient days

Why we care to control VRE NOW: 40 – 80 folds lower than UK

UK: VRE Bacteremia rate ranged 0.03 to 0.06 per 1000 patient bed days (2013)

Source: London Health Sciences Centre: <u>http://www.lhsc.on.ca/About_Us/Accountability/Caring_for_our_Patients/Infection_Control/VRE/index.htm</u>

Empirical antibiotic treatment for infectious diseases in 201X in Hong Kong



Regimen for CRA and ESBL

Successful control of vancomycin-resistant *Enterococcus faecium* outbreak in a neurosurgical unit at non-endemic region ST 78 – related to mainland China

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Extensive contact tracing:

192 patients were screened 3 (1.6%) were VRE in QMH & TWH

A total of 440 (QMH) and 66 (TWH) environmental samples were collected

2 taken in TWH (bedside table and milk container): positive for VRE (in both direct inoculation and after broth enrichment culture)

Admission screening for silent carriers

Patient isolation in single room with contact precautions

Proactive Infection Control Measures for VRE

Exit & Entry Control "出入口管制" Enhanced environmental cleansing



Compliance check by ICNs

Window of opportunity for VRE screening in Queen Mary Hospital

Universal admission screening in high risk areas: AICU Hematology Liver transplant

"Added test" in lab: *Clostridium difficile*

Safety net screening: Day 14 of admission

Importance of good quality rectal swab for VRE screening

(Overall sensitivity < 60% if VRE density < 1 million cfu / gram of stool)

1st specimen: taken by ward staff



2nd specimen: repeated by ICN

Compliance check by laboratory staff

Effect of antibiotic therapy on the density of VRE in the stool of colonized patients





Nurse give tablet of 1 gm Augmentin to patient; both no hand hygiene!





Patient's fingers & environment full of VRE

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



Before drugs

(入口管制)

Before meals

Personal hygiene in toilet 如厠衛生要遵守 預防惡菌莫留手

BEFORE TOILET

Wipe the toilet seat lid with tissue sprayed with disinfectant

AFTER TOILET

Wash hands with soap and water, then rub hands with alcohol handrub

Exit control



283 toilet seat disinfectors: 46 ward's toilets





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



瑪麗醫院控制感染2013年九月 QMH Inf

QMH Infection Control Sep 2013





Enhanced environmental cleansing





92% of **curtain** showed contamination within 1 week:

MRSA (21%) VRE (42%)

Am J Infect Control. 2012 Dec;40(10):904-6.

High Touch Areas - BEDSIDE





Drinking bottles





Ward B1



Ward E3



Ward D6



Ward E6



Ward K21



Ward A3



Ward B3



Ward A4



Ward B4



Ward E1



Ward A5

Ward D2



Ward B5



Ward C4



Ward B7



Ward K7N

ward visit for infection control update Road show:

Summary of active surveillance culture for VRE in QMH (1 July 2011 to 13 November 2013)



Accepted & in press 2014

Extensive contact tracing and screening to control the spread of vancomycin-resistant *Enterococcus faecium* ST414 in Hong Kong

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Incidence of nosocomial acquisition of VRE in QMH

Characteristics of index patients with or without nosocomial transmission of VRE

	Index VRE patients resulted in nosocomial transmission (n=9)	Index VRE patients without nosocomial transmission (n=16)	p value
Age (mean days \pm SD)	76 ± 12.3	66 ± 15.7	0.126
Male sex (%)	5 (56%)	9 (56%)	0.973
Nasogastric tube (%)	1 (11.1%)	1 (6.3%)	0.667
Tracheostomy tube (%)	0	2 (12.5%)	0.269
Chronic wound or ulcer (%)	3 (33.3%)	2 (12.5%)	0.211
Urinary catheter (%)	5 (55.6%)	3 (18.8%)	0.058
Chronic cerebral conditions	4 (44.4%)	2 (12.5%)	0.073
Chronic cardiac conditions	5 (55.6%)	6 (37.5%)	0.383
Chronic pulmonary conditions	2 (22.2%)	1 (6.3%)	0.238
Chronic renal failure	0	3 (18.8%)	0.166
Liver cirrhosis	1 (11.1%)	3 (18.8%)	0.617
Diabetes mellitus	1 (11.1%)	3 (18.8%)	0.617
Malignancy	2 (22.2%)	3 (18.8%)	0.835

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Characteristics of index patients with or without nosocomial transmission of VRE

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Use of antibiotic 90 days before admission:			
Beta-lactam beta-lactamase inhibitors	8 (88.9%)	12 (75%)	0.405
Cephalosporin	3 (33.3%)	6 (37.5%)	0.835
Carbapenem	0	1 (6.3%)	0.444
Fluoroquinolones	3 (33.3%)	3 (33.3%)	0.915
Time to implementation of single room isolation with strict contact precautions (mean days ± SD)	13.1 ± 7.0	5.4 ± 3.6	0.001

Rapid identification of VRE upon admission (2014)



Chromogenic agar plate

6 7 8 9 10 11 12

MALDI Biotyper Realtime File View Tools He

81159_STL

81231_STL

B1



Matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS) ~ HK\$ 2 million



Prepared Aborted Measured Zeroline spectrum Measured, classified green Measured, classified yellow GO Measured, classified red Zeroline spectrum, not classified 🖃 主 🦉 Hide Identified Validation: set verified Detected Species Score Position 2.323 BTS Escherichia coli 80427 PUS 2.301 Vibrio parahaemolyticus 2.321 82519 PUS erobacter aerogenes 2 345 81212 PUS nas aeruginosa mophilus parainfluenzae 2.320 80360 SP 2 477 2.171 81605 VRF Δ8 Lactobacillus plantarum 2.448 82107 VRF nterococcus faecium 81125_VRE ccus faecalis 2.469 81229_STL A12 rovidencia alcalifaciens 2.146

Klehsiella pneumoniae

Clostridium hatheway

2 201

2.142

Not occupied

Identification of *E. faecium* within 30 mins

Shorten the total turn-around time of VRE detection by 1 day !



Days after hospitalization

Submitted for publication