Controlling Environmental Contamination of VRE in HA hospitals

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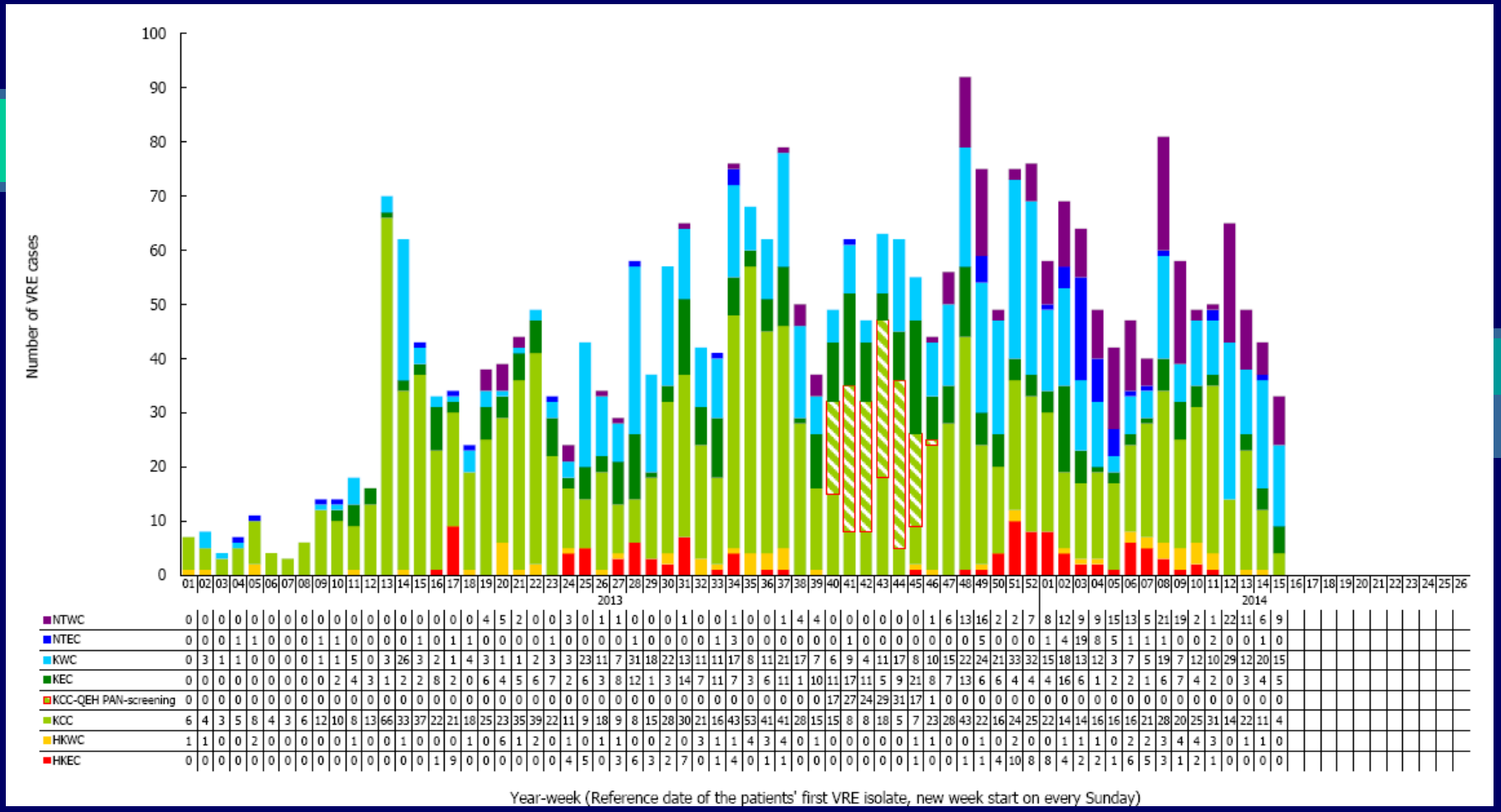
New VRE cases in HA hospitals



Control Bundle for MDROs

- Cases detection-“Find”
- Case Isolation-“Confine”
- Hand Hygiene
- Environmental Hygiene
- Prudent antibiotic use

MDRO survival in the Environment

MDRO	Duration
Acinetobacter	3 days to 11 months
MRSA	7 days to 12 months
Pseudomonas aeruginosa	6 hours to 16 months
VRE	5 days to 46 months

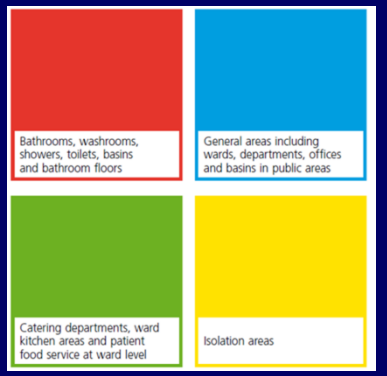
Kramer A, Schwebke I, Kampf G. How long do nosocomial pathogens persist on inanimate surfaces? A systematic review. BMC Infect Dis 2006;6:130.

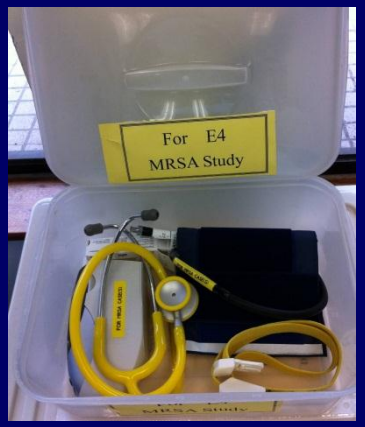
Cleansing of the Environment

HA guideline	CDC	WHO	AUS	NHS	Canada
when the environment is visibly soiled or contaminated;	✓	✓	✓	✓	✓
General housekeeping surfaces - according to housekeeping cleaning schedule			✓	✓	✓
HTA in General clinical area - cleaned with detergent and water at least once daily	more frequent schedule	✓	✓	✓	✓
HTA in Contact Precautions - cleaned and disinfected at least twice daily.	more frequent schedule	At least daily	(Base on Risk level, e.g. Outbreak)	(Base on Risk level, e.g. ICU, AED)	(Base on Risk level, e.g. VRE, C. diff)

Manual Cleaning :

- Standardize cleaning protocols in clinical areas
- Designated team for EH
- Training
- Onsite coaching and return demonstration
- regular monitoring of cleanliness
- Use of dedicated equipment
- Disposable wipe
- 2:1 disinfectants





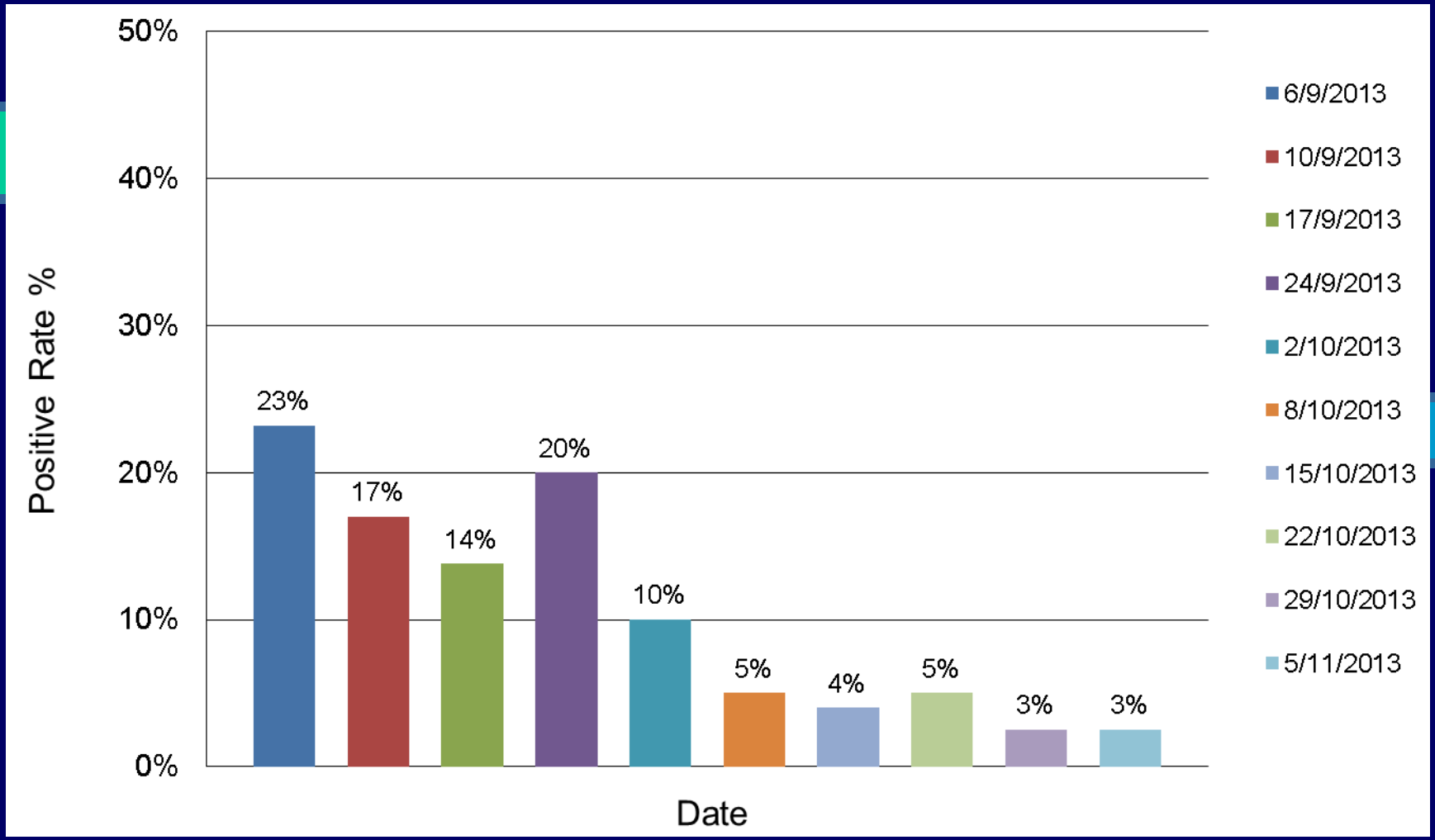
Monitoring on Effectiveness of Cleaning

- Visual assessment (UV aided)
- Total aerobic Colony count (ACC)
- Indicator organisms (e.g. MRSA)
- Bioburden e.g. ATP

Top Ten VRE Positive Sites (HTA)

1. Curtain
2. Bedside rails, table & locker
3. High chair
4. Commode
5. Napkin trolley
6. Blood taking trolley
7. Nurse station (keyboard, mouse, fax and telephone)
8. BP machine/ ventilator
9. Injection trolley
10. Water bottle in the corridor

Weekly environmental sampling for VRE



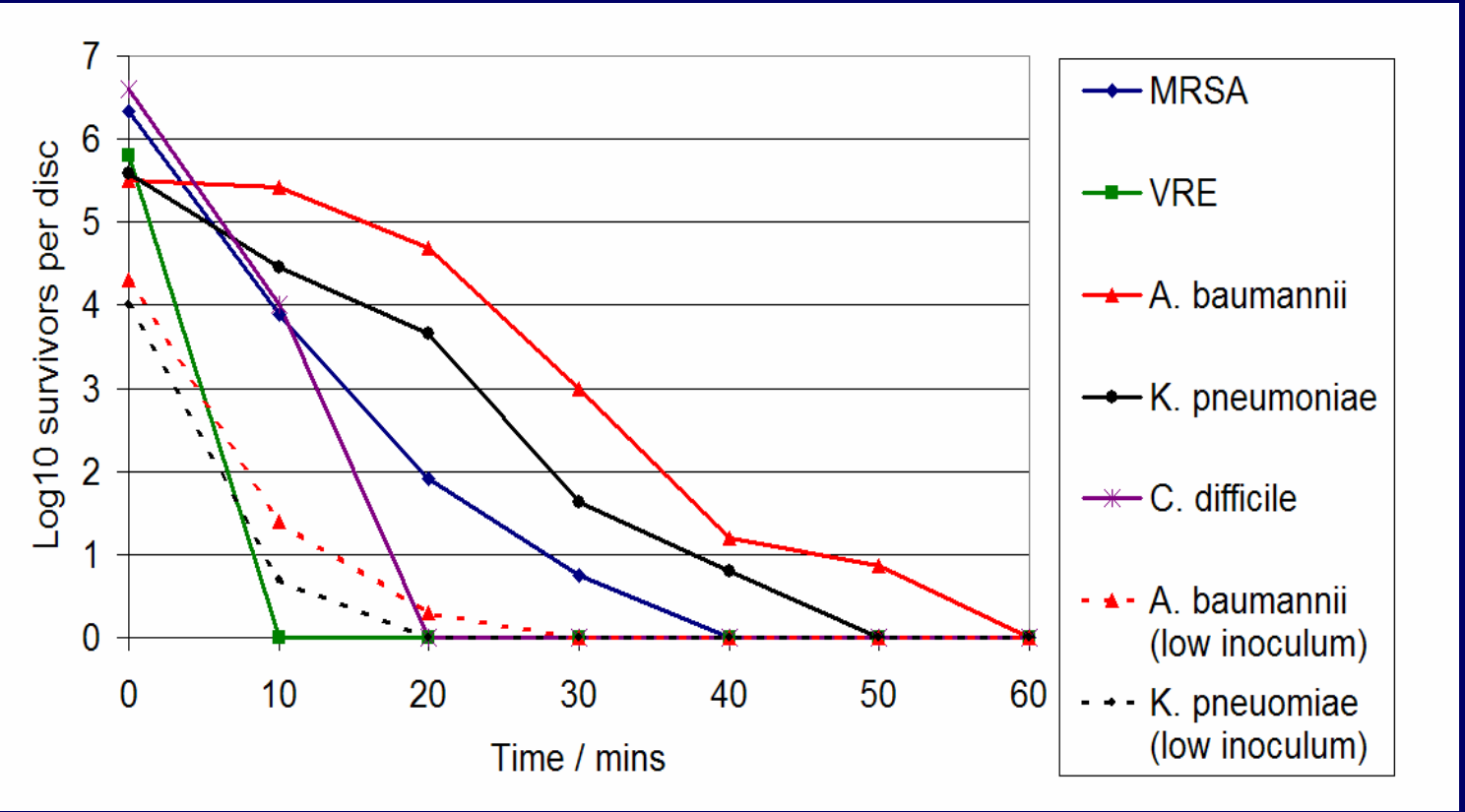
New technology for environmental decontamination

- "Non-touch Disinfection"
  - Hydrogen peroxide
  - Ultraviolet-C
- "Self-disinfecting surface/coating"
  - Silver, copper
  - Triclosan, QACs
  - Chlorine dioxide

New technology for environmental decontamination

- Efficacy,
- Safety,
- Costs,
- Practicability

Efficacy of H_2O_2 against common bacteria



Otter and French. *J Clin Microbiol* 2009;47:205-207.

Efficacy Considerations

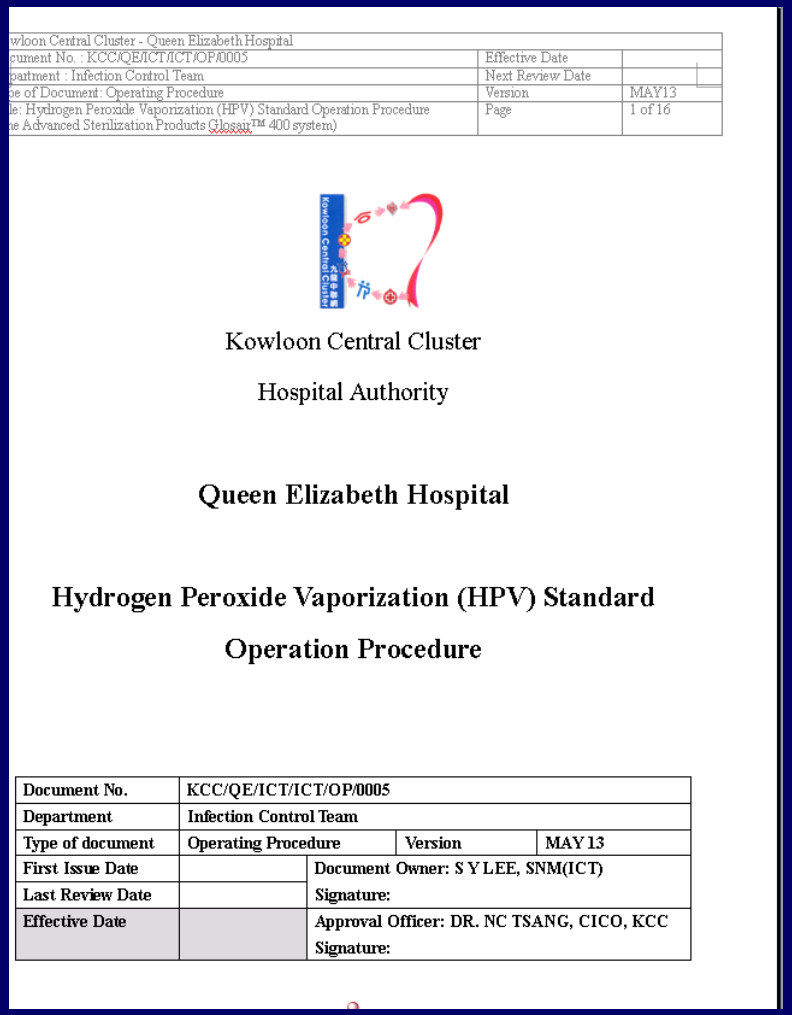
- Reduction of Bioburden
  - 45% reduction in environmental VRE contamination
- Re-contamination
- Reduction of cross transmission
  - 80% reduction in acquisition of VRE

Passaretti et al. Clin Infect Dis 2013 (1 January) HPV decontamination

Safety of H_2O_2 System

- A commonly used as disinfectants for years.
- Non-mutagenic, Non-carcinogen
- Bio-degradable (decompose into Oxygen and water) and leave no toxic residues.
- Design to minimize exposure to operators, e.g. sealed cartridge with no workers present.
- Automatic operation and monitor to detect H_2O_2 concentration

New technology for the control of MDROs



wloon Central Cluster - Queen Elizabeth Hospital		
cument No. : KCC/QE/ICT/ICT/OP/0005	Effective Date	
partment : Infection Control Team	Next Review Date	
pe of Document: Operating Procedure	Version	MAY13
le: Hydrogen Peroxide Vaporization (HPV) Standard Operation Procedure e Advanced Sterilization Products (Glosair™ 400 system)	Page	1 of 16

Kowloon Central Cluster

Hospital Authority

Queen Elizabeth Hospital

Hydrogen Peroxide Vaporization (HPV) Standard Operation Procedure

Document No.	**KCC/QE/ICT/ICT/OP/0005**		
Department	**Infection Control Team**		
Type of document	**Operating Procedure**	**Version**	**MAY 13**
First Issue Date		**Document Owner: S Y LEE, SNM(ICT)**	
Last Review Date		**Signature:**	
Effective Date		**Approval Officer: DR. NC TSANG, CICO, KCC** **Signature:**	

Automated UV device

- samples of MRSA, vancomycin-resistant *enterococcus*, *Acinetobacter baumannii*, and *Clostridium difficile* were placed behind objects and within line-of-sight of the ultraviolet device.
- reduced vegetative bacteria counts by more than 99.9% within 15 minutes,

Self-disinfecting surface/coating

Sustained release Chlorine dioxide polymer encapsulated formula

- Polymer encapsulation with nano-particles
- Achieve continuous and heat/moisture triggered release - sufficient to continuously inhibit bacterial growth
- The specific polymer is an FDA approved product for contact with the eyes.
- The ingredients are all USEPA and USFDA approved

Safety of ClO_2

- Acute exposure of the skin causes irritations and burns.
- Eye exposure causes irritations, watering eyes and a blurry sight.
- Chlorine dioxide gas can be absorbed by the skin, where it damages tissue and blood cells.
- Inhalation causes coughing, a sore throat, severe headaches,
- Permissible exposure limit (PEL) over 8 hours and 40-hour workweek : 0.1 ppm time-weighted average
- Short-term exposure limit (STEL) <15 minutes
  - 0.3 ppm

Self-disinfecting surface/coating

Advantages

- Continuous disinfection
- Non worker-dependent

Limitations

- Cost
- ? Selection of resistance
- ? Efficacy
- ? Durability

AJIC 2013;41:S31-35

[TENTATIVE]

Conclusions

- Recognize the importance as 2nd sources
- Training and supervision on cleaning
- Monitoring markers
- Cost-effective use of new technologies
- Research and field studies

Thank You