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# **Enhancement of Infection Control for MRSA in Renal Unit**

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# Common Multi-Drug Resistant Organisms (MDROs) in Renal Unit

- MRSA
- VISA, VRSA (Staph. aureus with intermediate and full resistance to Vancomycin)
- VRE (Vancomycin resistant Enterococcus)
- Certain Gram negative bacilli
  - including those producing extended spectrum  $\beta$  – lactamases (ESBL)
  - Multiple-drug Resistant Acinetobacter baumannii
  - Multiple-drug Resistant Pseudomonas aeruginosa

# Why are Renal patients susceptible to MRSA?

- Lots of vascular catheter, vascular access
- Lots of comorbidities
  - age and diabetes
- Antibiotic selection pressure
- High prevalence of MRSA colonization
- Dialyse in close proximity
- Interdepartmental transfer



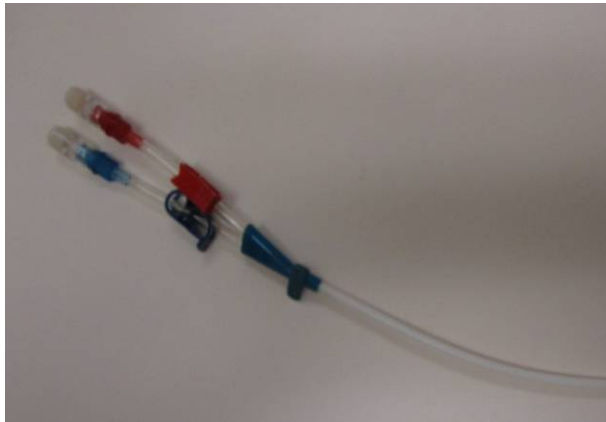


# Blood Stream Infection (BSI) among Haemodialysis (HD) Patients

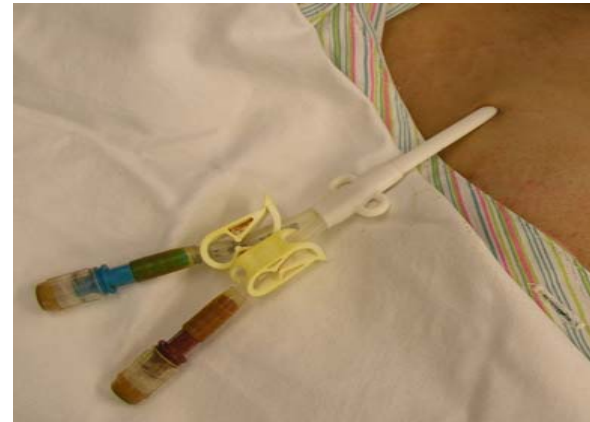
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- Staph. aureus was the most frequent blood culture isolated in renal patients and more than three quarters of the bacteraemia were attributed to haemodialysis catheter  
Peacock et al Infect Control Hosp. Epidemiology 1999
- UK Renal Vascular Access Survey (2005)
  - 1547 episodes of Staph. aureus bacteraemia reported
  - 462 episodes of MRSA (29.8%)
- US invasive MRSA infection among dialysis patients (2005)
  - 15% of MRSA bacteraemia occur in HD patients
  - 45/1000 HD patients, 100 X rate for the general population

# Haemodialysis Access



Non Cuffed CVC



Cuffed CVC



AVG



AVF



# Access Specific BSI Rates in Canadian Haemodialysis Center

Access	Mean Infection rate / 1000 dialysis procedure	Range Infection rate (P = 0.004)
Non-cuffed CVC	5.2	0 – 12
Cuffed CVC	3.1	0 – 4.7
AV Graft	0.6	0 – 5.3
AV Fistula	0.2	0 – 5.3

Taylor *et al* Infection Control Hospital Epi 2003



# Mortality and Morbidity in HD

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## Mortality

- 5 year prospective cohort study
- 54 MRSA vs 89 MSSA bacteraemia
- Relative risk of death at 12 weeks vs MSSA
  - OR 5.4 (range 1.5-18.7)

Reed et al. Infect Control Hosp Epidemiology, 2005 Feb 26(2): 175-83

## Morbidity

- Seeding events e.g. to heart valves and distant sites like lung, hip joint, vertebral disc, etc
  - Endocarditis
  - Abscess
  - Osteomyelitis



**Because of the consequences**

**PREVENTION**

**better than to have to deal  
with**

**acute EPIDEMIC crisis**



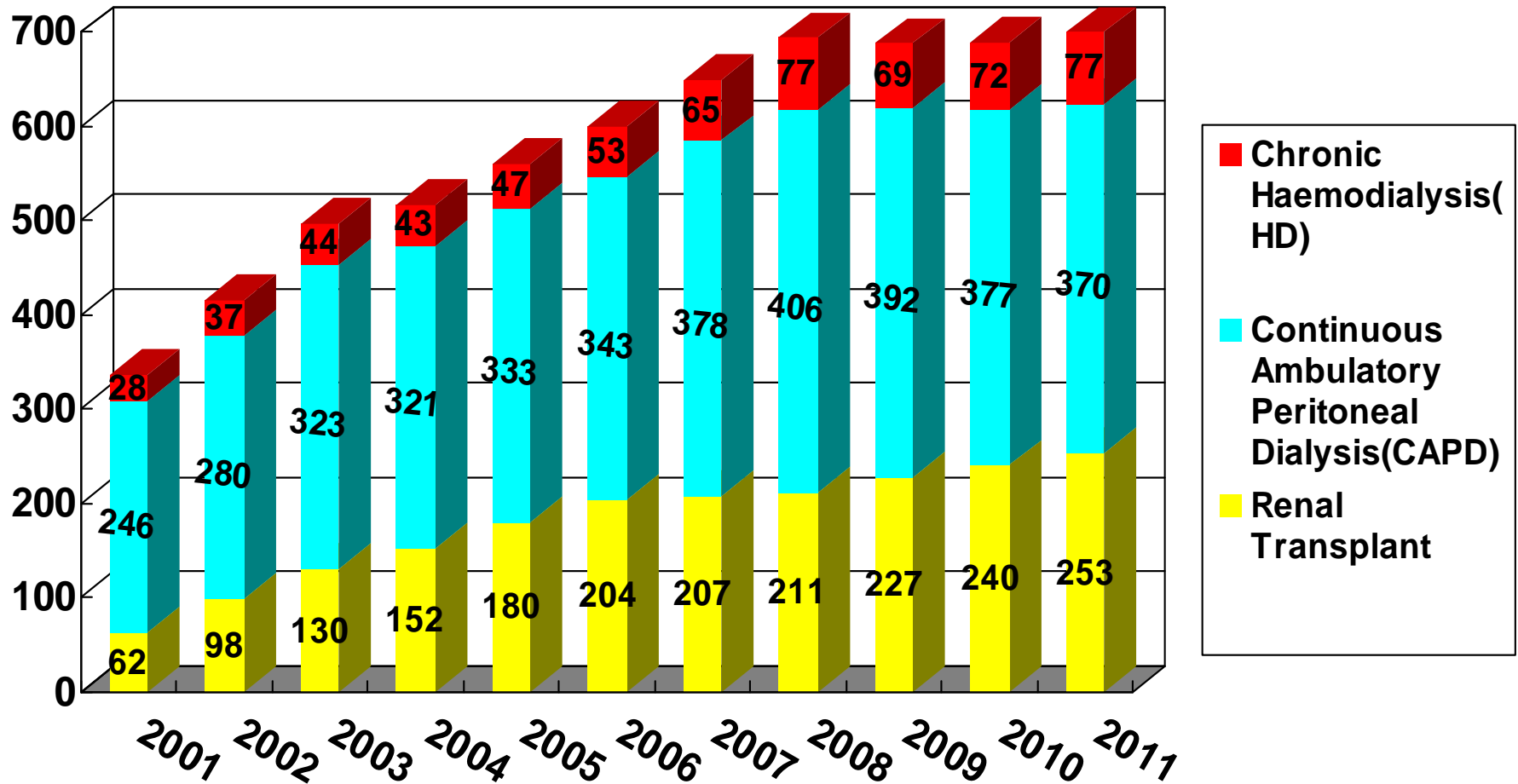
# Dialysis Services in PYNEH

- Dialysis Day Centre since 1994
- Integrate Renal ward and Dialysis Day Centre in 2000
- A major tertiary referral dialysis Centre in HKEC
- Type of Service
  - Haemodialysis (HD)
  - Peritoneal Dialysis
    - Intermittent Peritoneal Dialysis (IPD)
    - Continuous Ambulatory Peritoneal Dialysis (CAPD)
  - Renal Transplant



# Renal Replacement Therapy in PYNEH

*as at March 2011*



Each HD patient receive 2.3 HD sessions / week

# MRSA Bacteraemia in Renal Unit 2009

No. of HAI MRSA bacteraemia in PYNEH	25
HD patient with MRSA bacteraemia	10
Non-cuffed catheter: Cuffed catheter	9:1
Average LOS of non-cuffed catheter	27 days

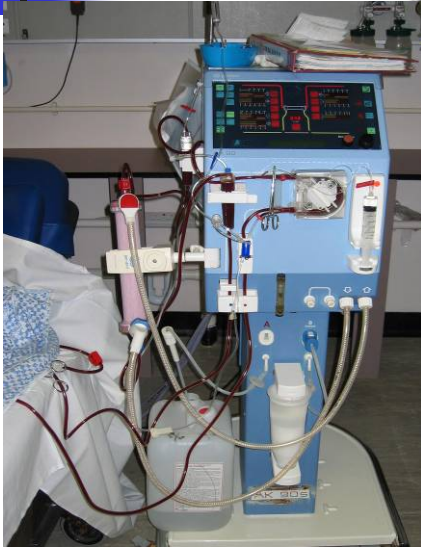
→ 40% HAI MRSA bacteraemia occur in HD patients

→ Infection Rate: 0.12 episodes per 100 HD sessions

0.06 Gram-positive isolate episodes per 100 HD sessions in Ottawa General Hospital

Human et al, AJIC, 1993 Vol 24 No5: 359-363

# Direct Observation of Clinical Practices



Hand hygiene facilities



Preparation for next session



Trolley setting



Case Mixed



Cleansing devices



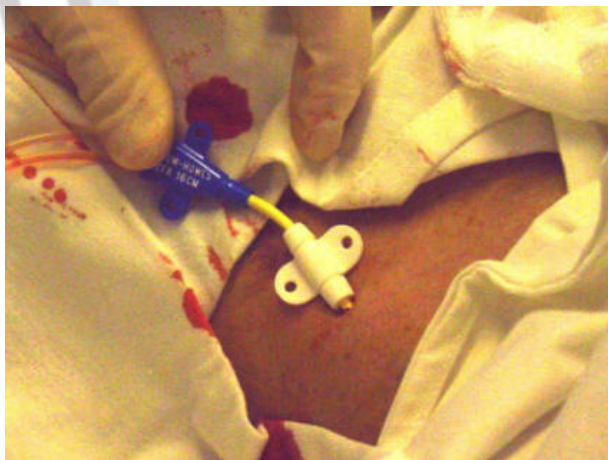
# Direct Observation of Clinical Practices



**Heparin injection**



**Procedure Room**



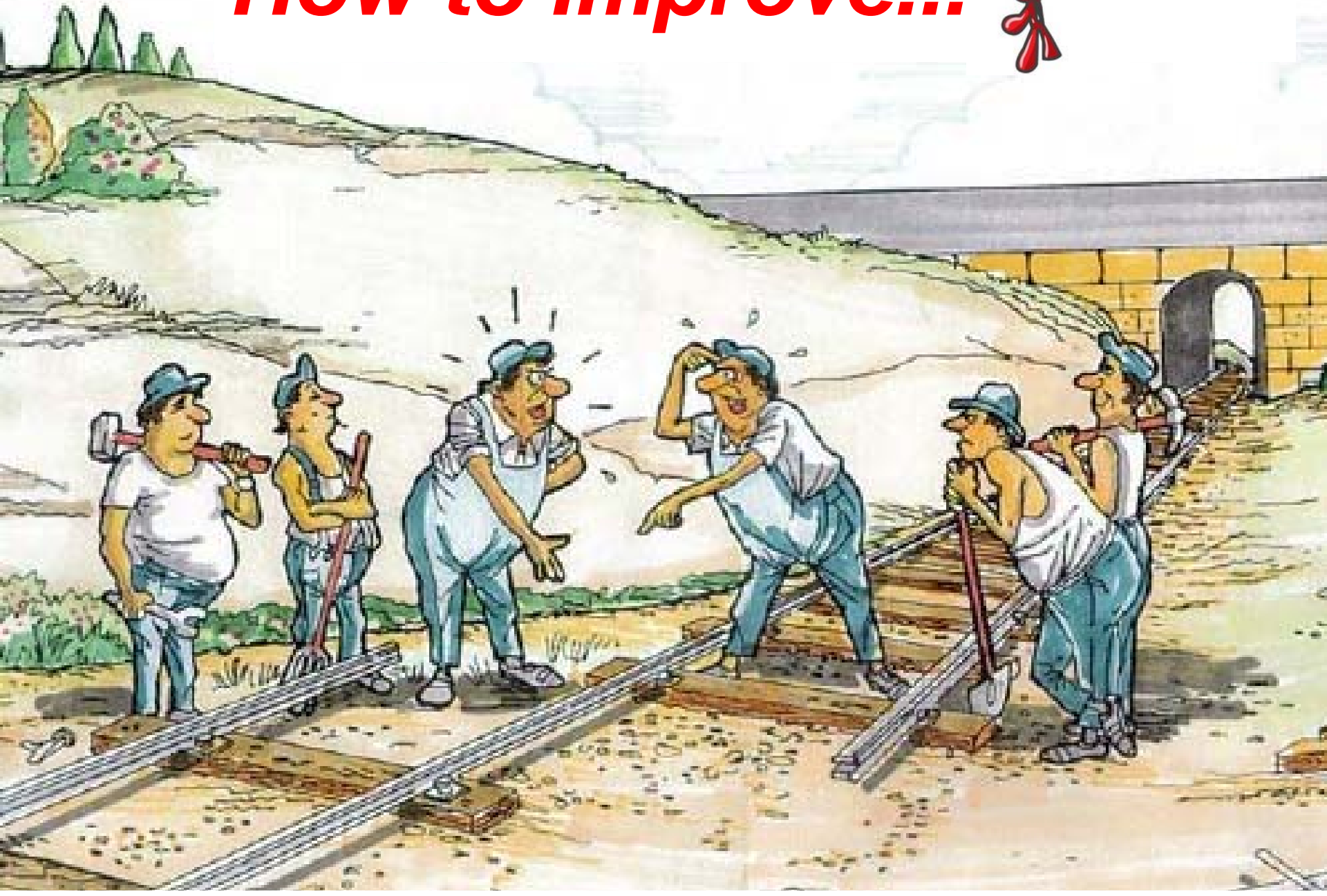
**Line Insertion**



**Blood Culture**



# *How to Improve...*





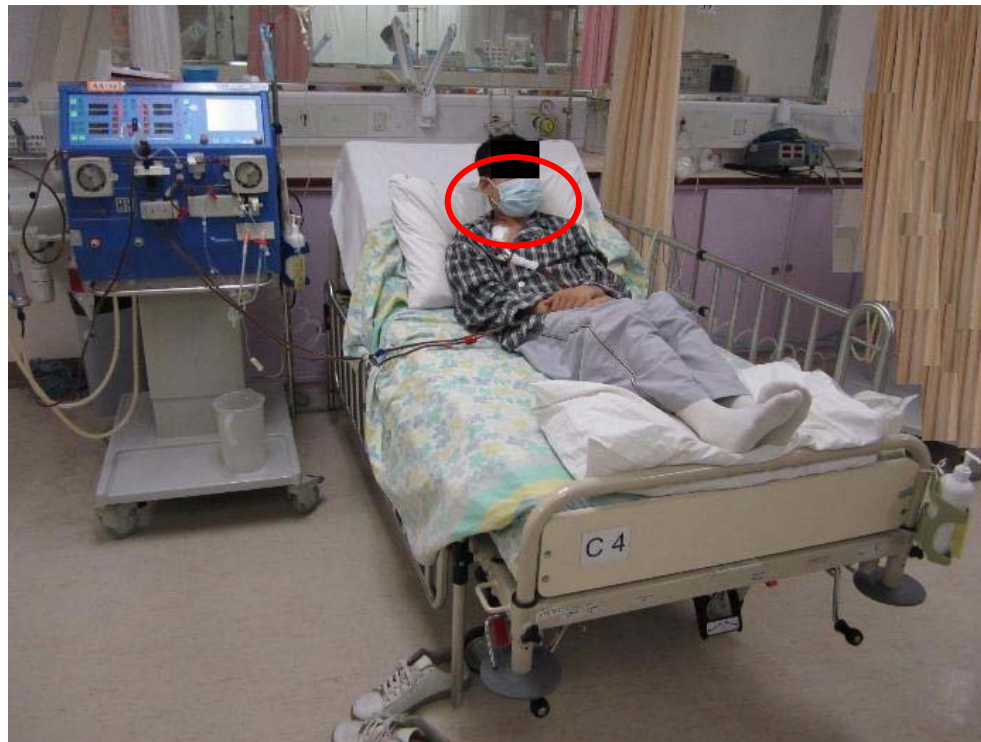
# Improve Hand Hygiene

- AHR available at each HD machine
- Immediate feedback of hand hygiene performance
- Reinforce WHO 5 moments of Hand Hygiene
- Hand Hygiene Compliance
  - 4Q 09: 61.8%
  - 1Q 10: 85.4%
  - 1Q 11: 81.3%



# Improve Patient Accommodation

- Cohort MRSA patients in one room / cubicle
- Implement mask wearing and AHR to patients





# Improve Line Insertion

- Hibiscrub bath / shower before line insertion
- Compliance check on catheter insertion
- Use 2% Chlorhexidine in 70% alcohol for skin disinfection
- Maximal barrier precaution
- Antiseptic hand hygiene
- Perform cuffed catheter insertion in OT



# Improve Line Management

- Use a cuffed catheter for dialysis if the period of temporary access is anticipated to be longer than 3 weeks

# Improve Blood Culture Collection

- Discard first 5ml of heparinized blood to minimize risk of contamination



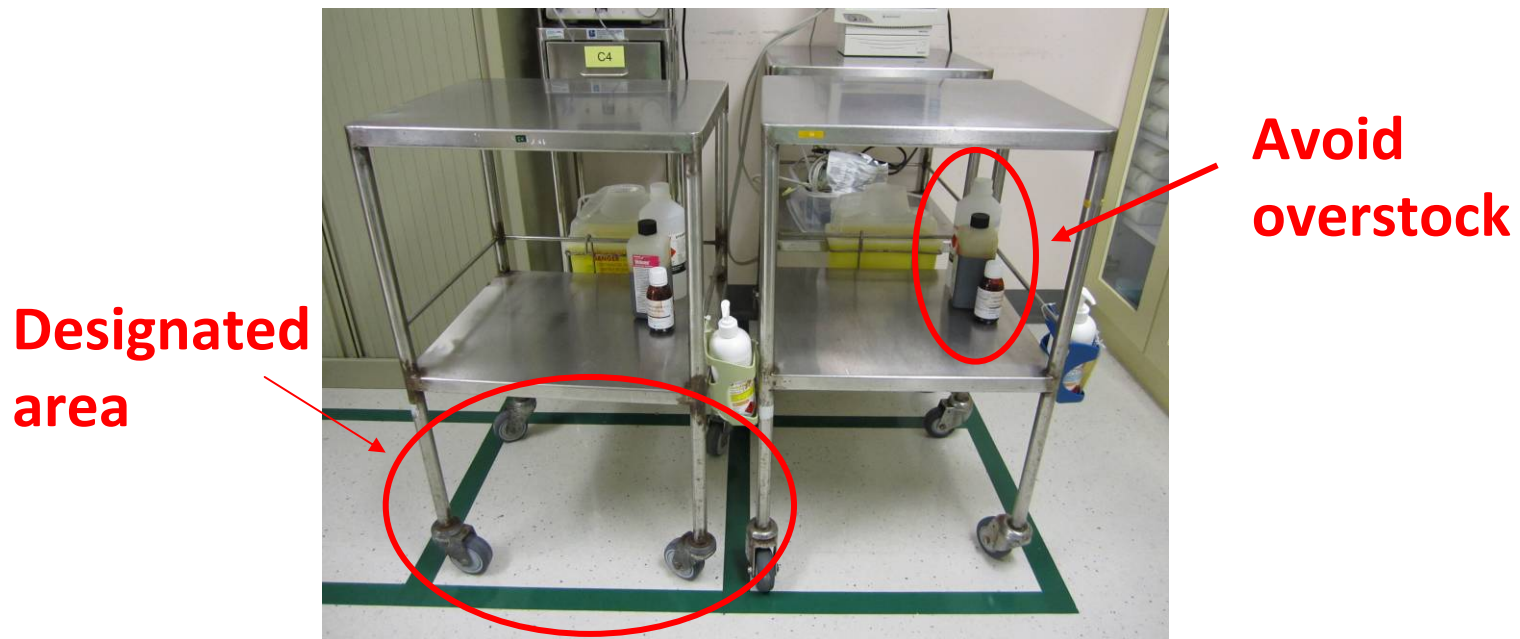
# Improve IV Medication

- Use single dose heparin
- Prepare medication in designated area away from patient cubicle
- Avoid IV medications place on the top of HD machines



# Improve Setting of Dressing Trolley

- Unused dressing trolley should be placed in a designated area in treatment room
- Avoid overstock of skin disinfectants in the dressing trolley



# Improve Patient Environment

- Strictly follow colour coding system in performing environmental cleansing
- Designated toilet and bathroom for MRSA patients





# Outcome

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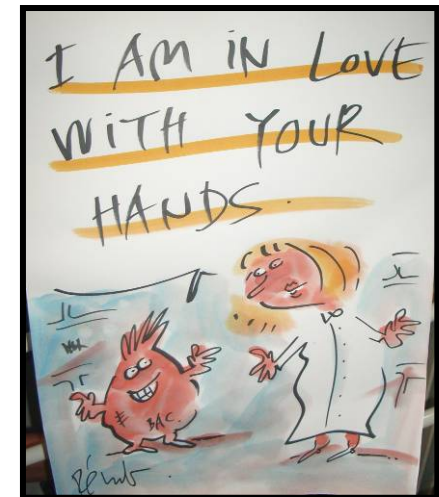
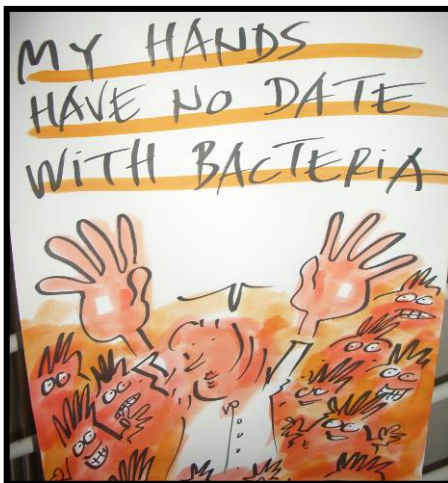
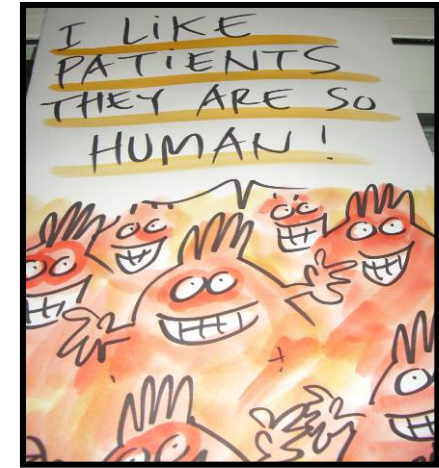
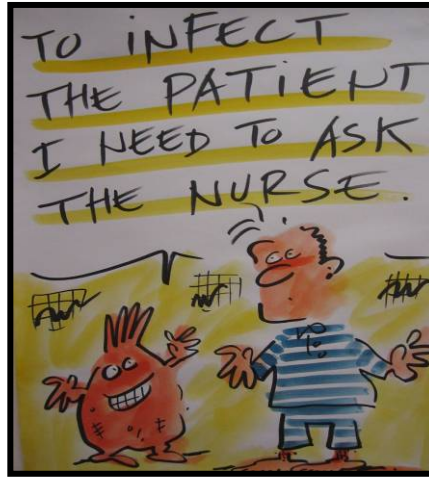
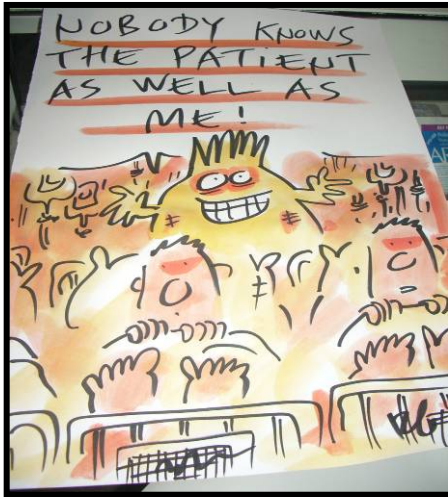
## **MRSA bacteraemia in Renal patients 2010**

- 8 HD patients with MRSA bacteraemia during the first 7 months
- Nil case from August 2010 to Jan 2011
- Infection Rate: 0.09 episodes per 100 HD sessions



# International Conference on Prevention and Infection Control

29 June to 2 July 2011



Thank you & wish  
You Good Health

