

# **MRSA Outcomes**

MOH Healthcare Quality Initiative Conference

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# Background

- MRSA as an “index” organism
- HA-MRSA (positive culture on sample taken >48 hours after admission)
- Goal: approach zero

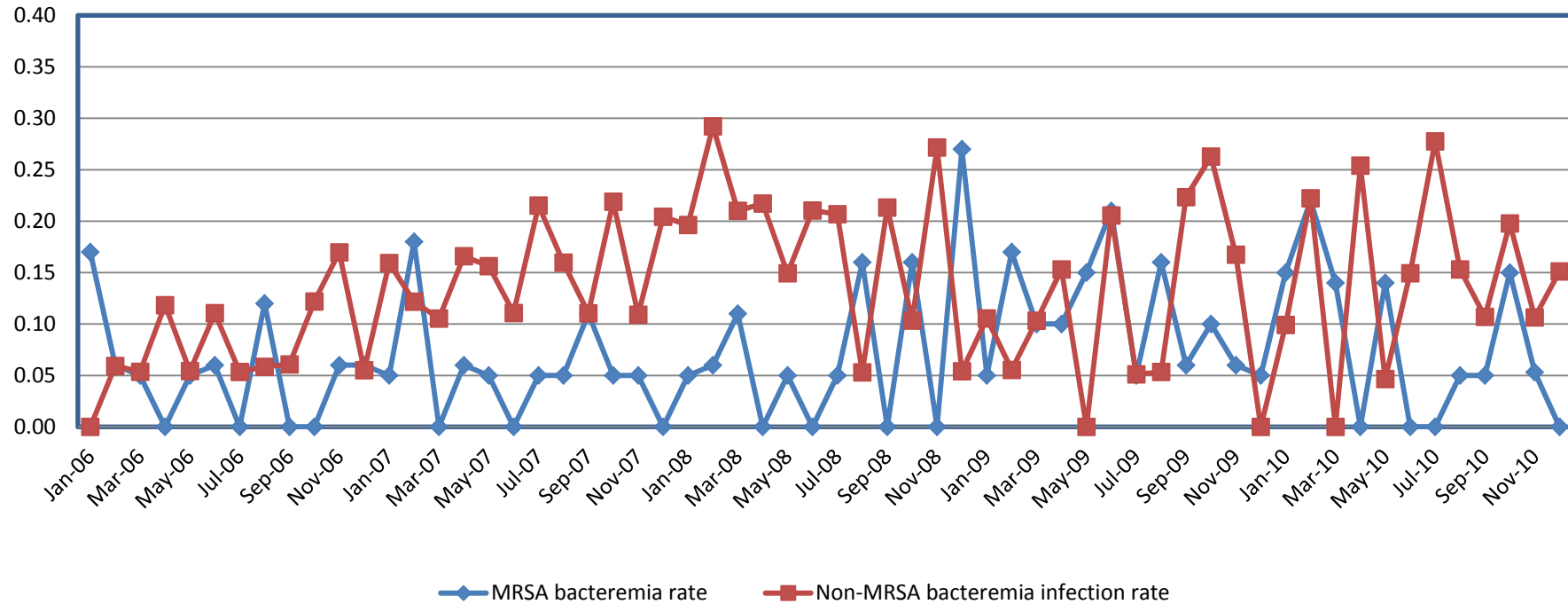
# Inter-hospital comparisons are not valid for several reasons:

- Size of hospital (mega, mid, small)
- Type of hospital (kids, adults, transplants, Onco, Rheum, cardiac surgery, etc.)
- Location of hospital (different patient demographics)
- Age of hospital (design)
- Load of hospital (pressures on staff)



# MRSA Control in Changi General Hospital

## CGH MRSA bacteremia and non-MRSA bacteremia infection rate 2006-2010



Date	Program implemented
Apr-09	Monitoring PICC line infection (ongoing)
Sep-10 to Jul-11	MRSA Active Surveillance Culture study in SICU (completed)
Oct-10	MRSAASC program in two 'c' class wards ( one medical, one surgical & orthopedic ; ongoing)

annual mean rates MRSA bacteremia  
(per 1000 patient days)

- 2006 – 0.052
- 2007 – 0.054
- 2008 – 0.076
- 2009 – 0.105
- 2010 – 0.079



# MRSA Control in National University Hospital

## MRSA Bundle Roll Out

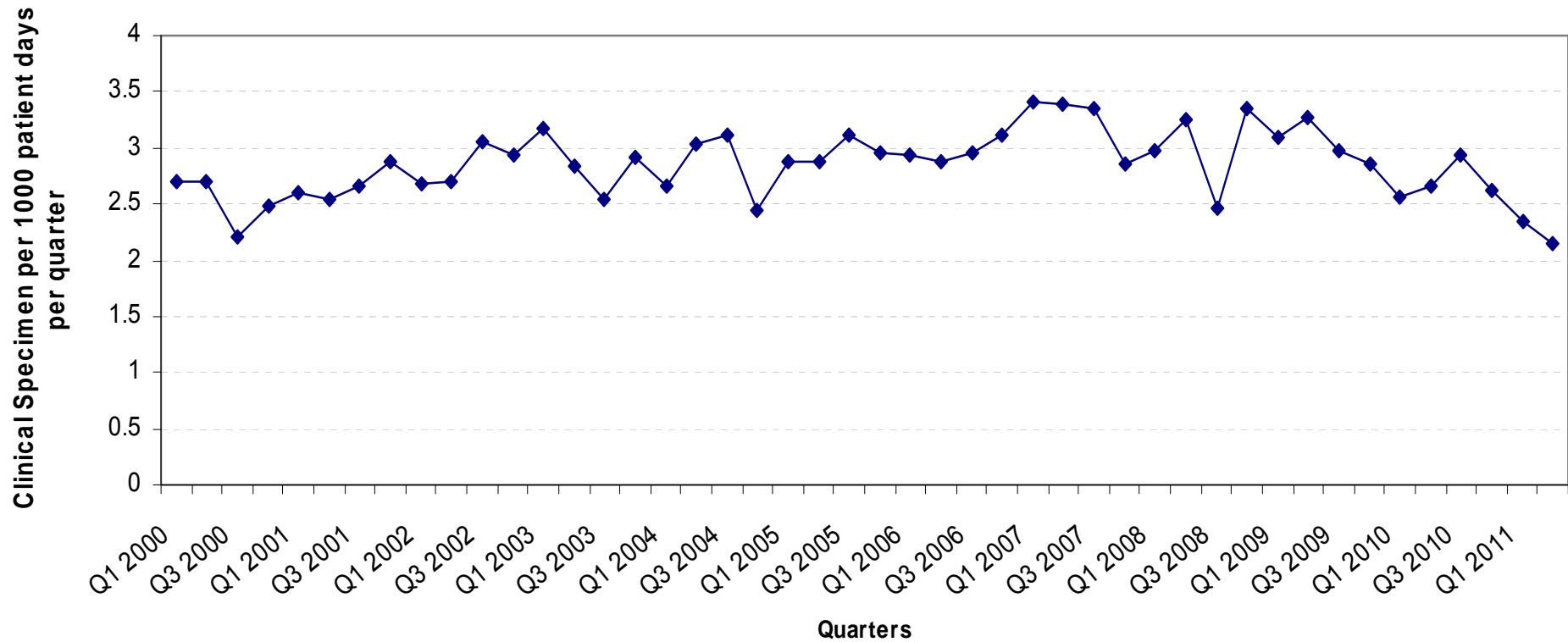
DATE	WARDS
2 Oct 2006	WD 51
12 Feb 2007	WD 20, WD 21, WD27 & WD26
01 Jan 2008	WD 41, WD 43, WD 44, WD 52 & WD 54
01 Mar 2009	WD 24, WD 25 & WD 55
01 Jul 2009	WD 46A
01 Oct 2009	WD 57, WD 58 & WD 86
16 Nov 2009	WD 23, WD 56 & WD 63
01 Jan 2010	WD 66, WD 76 & WD 78
01 Jun 2010	WD 53, WD 61, WD 62 & WD 64

Roll out completed.

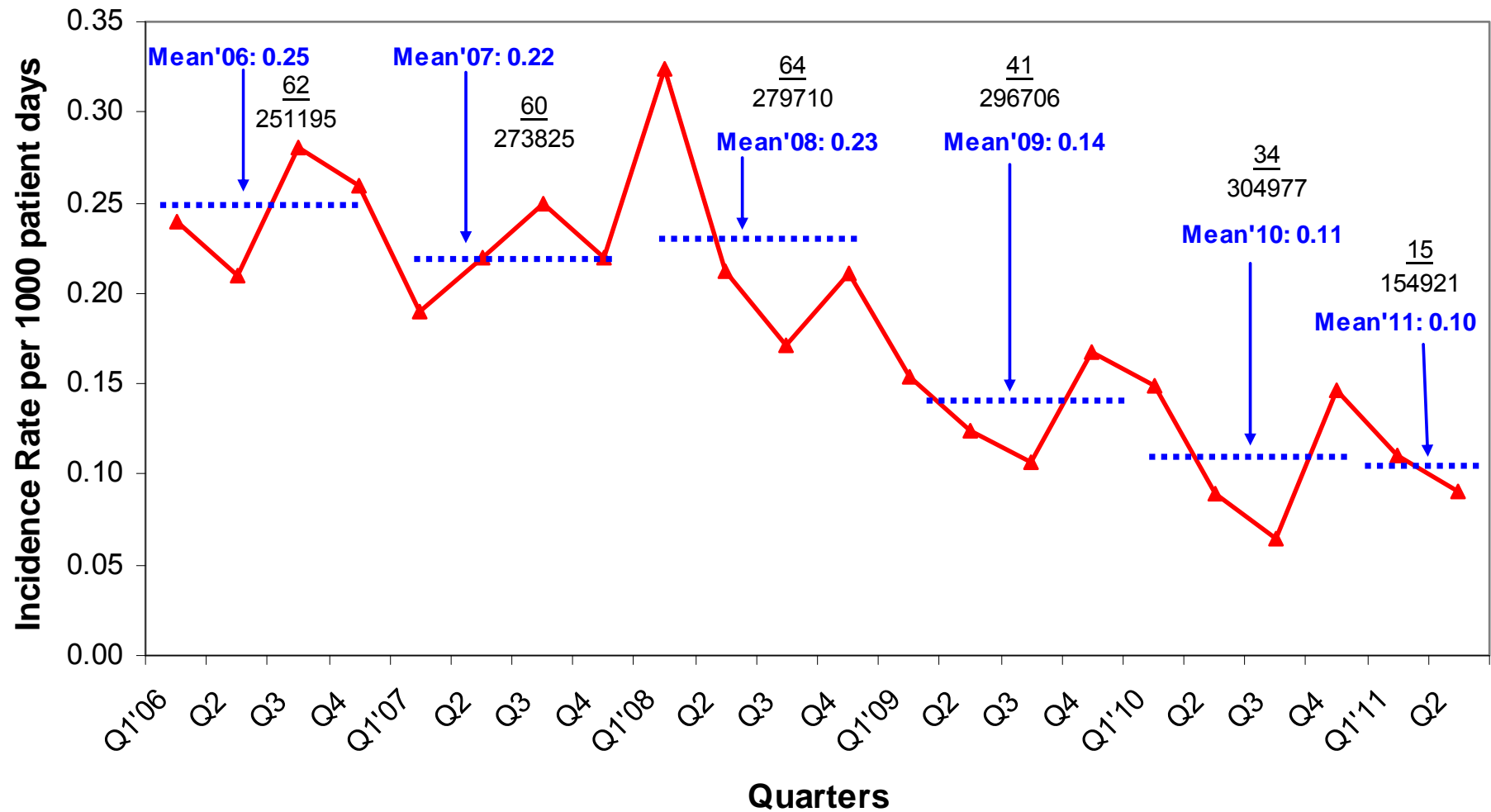
Note: WD 12, O&G & Paeds do not have active surveillance.

# Hospital Wide MRSA

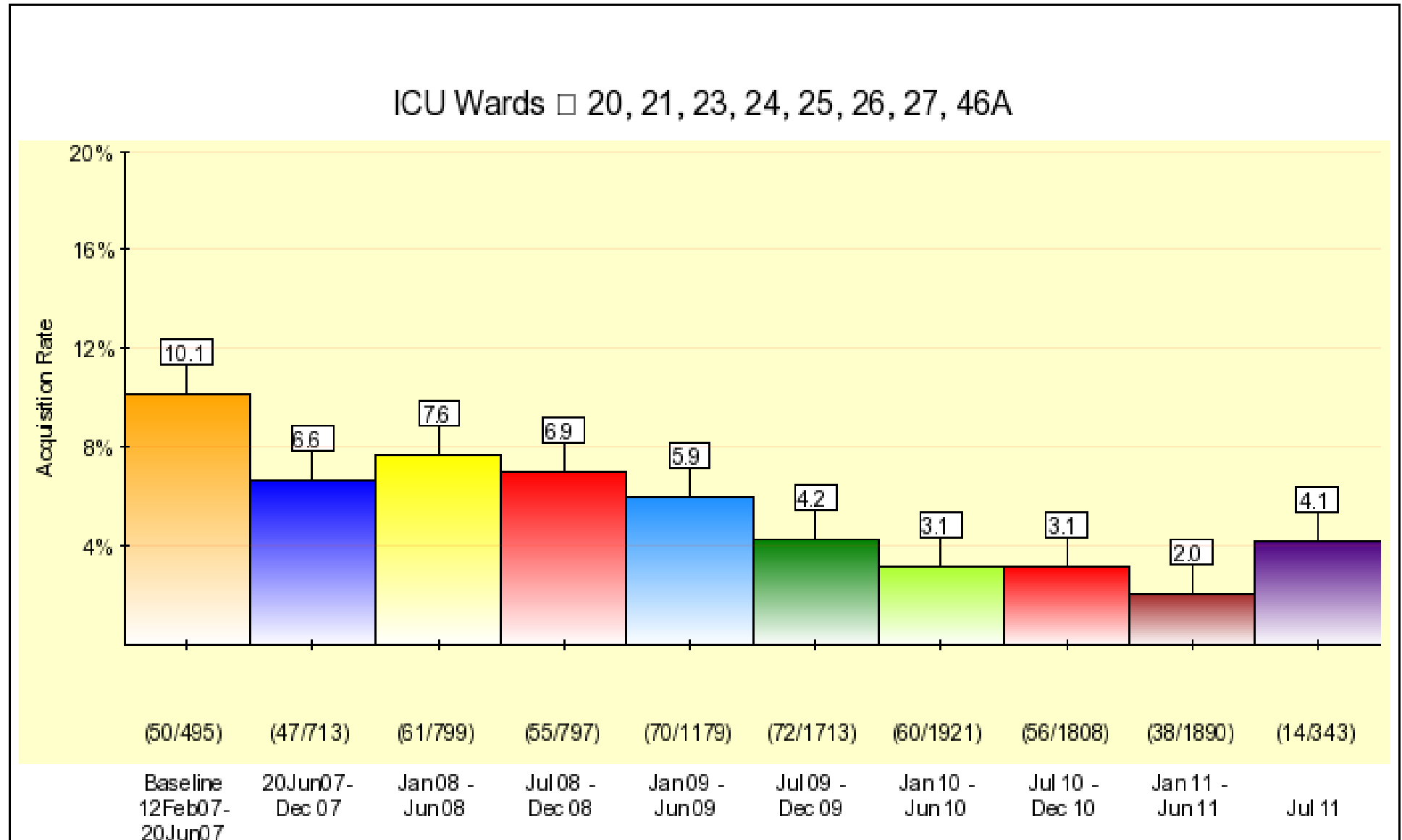
Hospital Wide MRSA Clinical Specimen  
Q1 2000 - Q2 2011



## MRSA Bacteraemia Hospital wide 2006 - Jun 2011

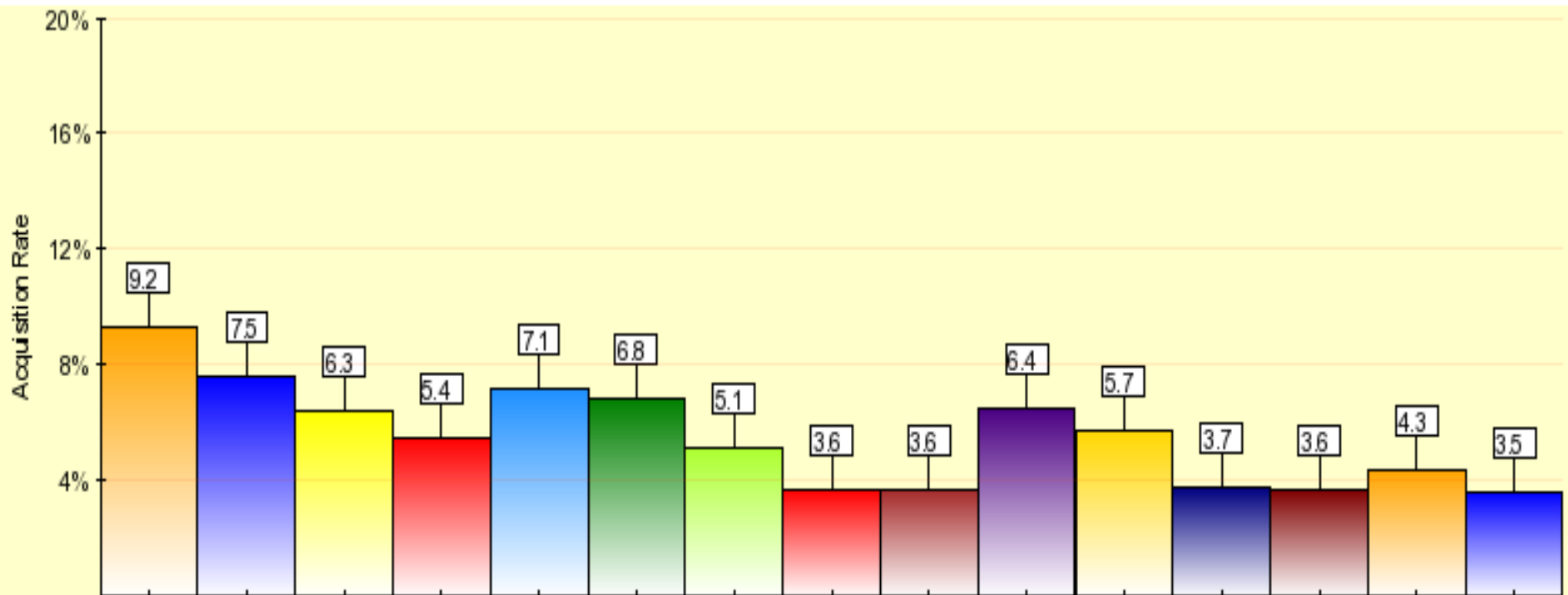


# MRSA in ICU



# MRSA in General Wards

General Wards □ 41, 43, 44, 52, 53, 54, 55, 56, 57, 58, 61, 62, 63, 64, 66, 76, 78, 86



(163/1780)(98/1310) (95/1512) (67/1233)(101/1417)(104/1527)(91/1783) (96/2650)(116/3228)(256/3982)(233/4100)(153/4179)(159/4469)(64/1485) (52/1475)

Baseline Jun08 - Sep08 - Dec08 - Mar09 - Jun09 - Sep09 - Dec09 - Mar10 - Jun10 - Sep10 - Dec10 - Mar11 -  
 Jan08- Aug08 Nov08 Feb09 May09 Aug09 Nov09 Feb10 May10 Aug10 Nov10 Feb11 May11 Jun11 Jul11  
 May08



Singapore  
General Hospital  
SingHealth



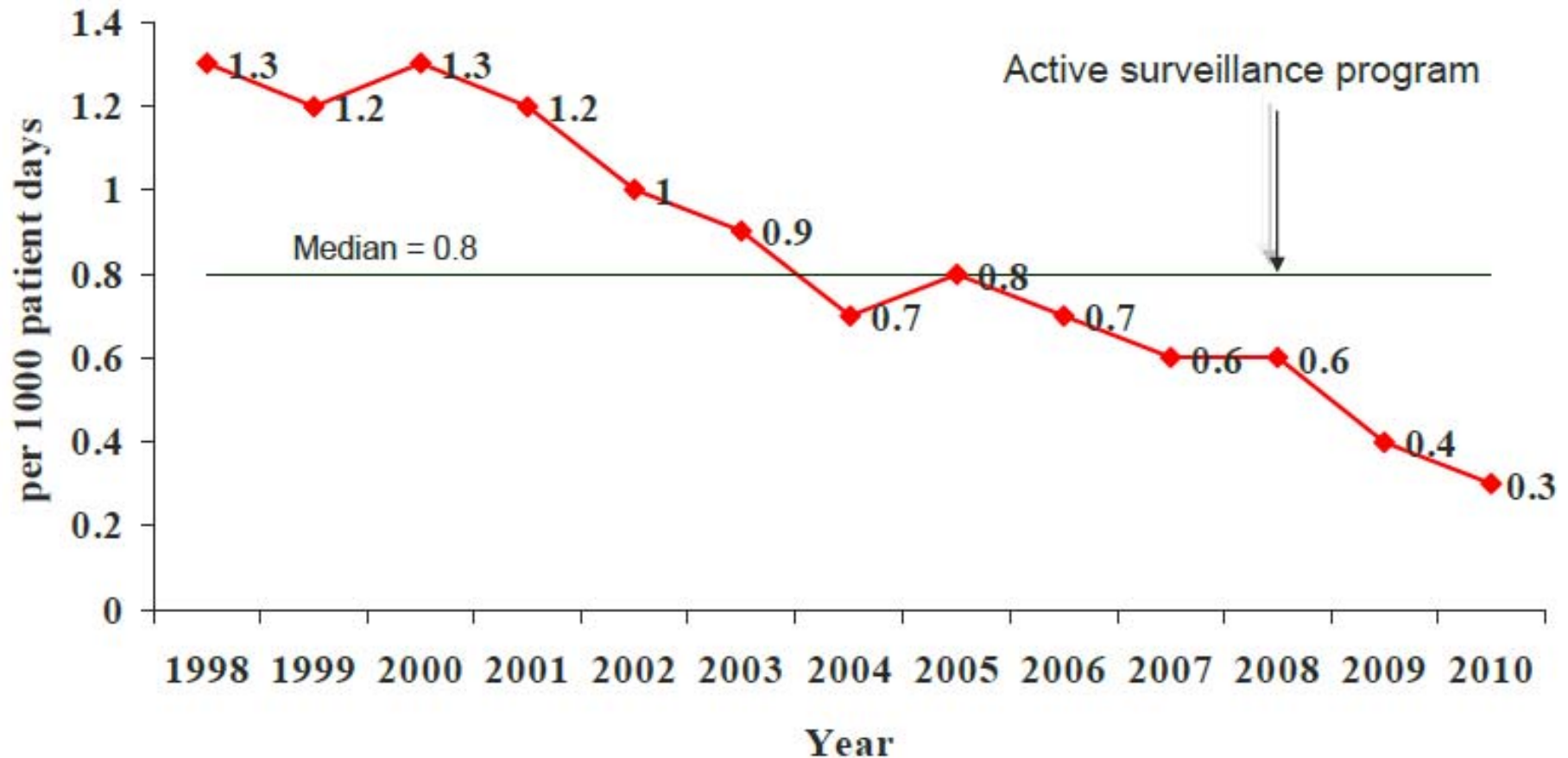
# MRSA Control in Singapore General Hospital

# Screening inpatients and elective surgical patients at outpatient clinics

## High risk patient group screening

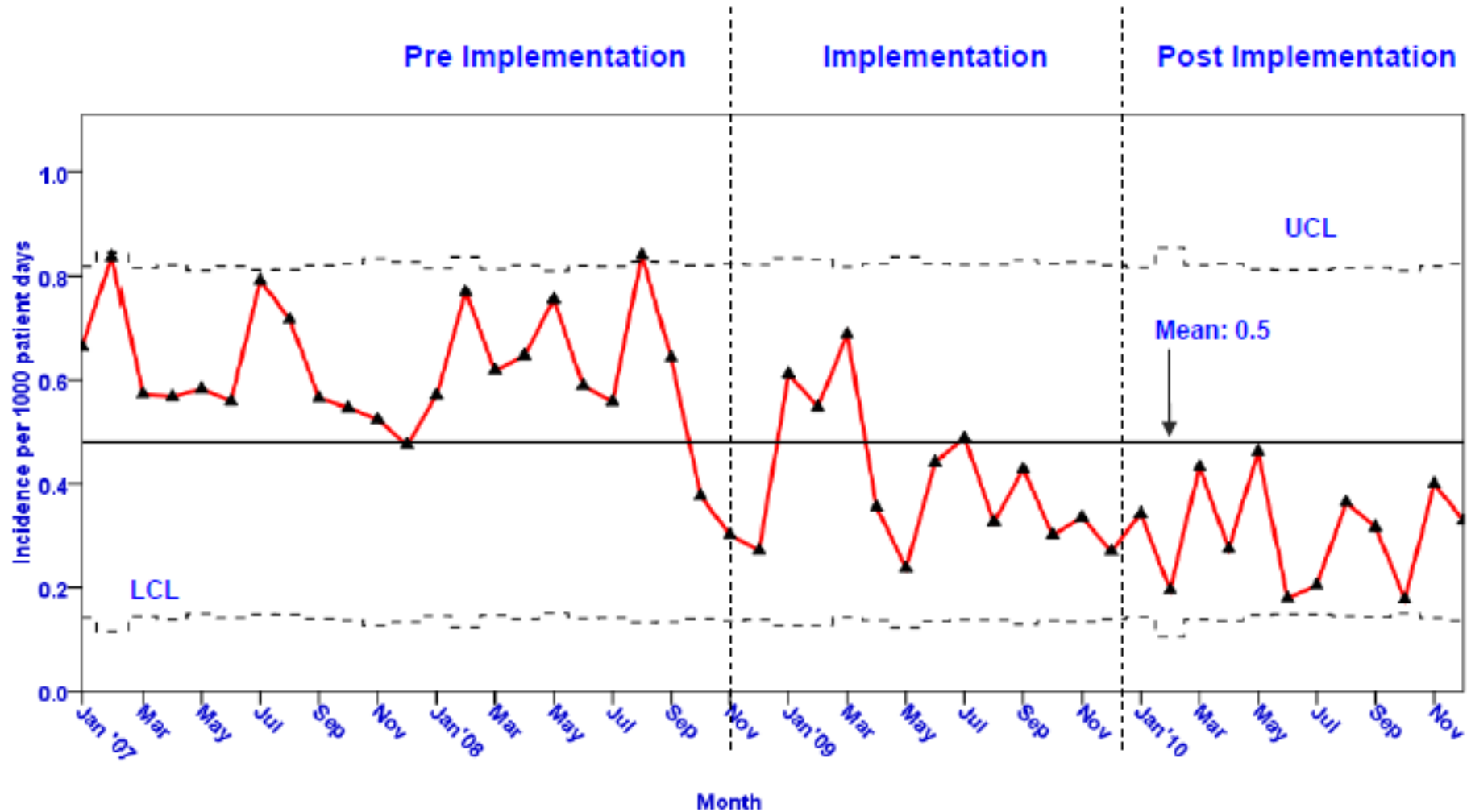
Risk factors	Yes	No
Previous history of MRSA		
History of hospitalization (local or overseas) in past 1 year		
History of stay at long-term care facilities in past 1 year		
End stage renal failure patient requiring dialysis		
If there is a 'YES' to any of the above risk factors, doctor is to order MRSA Screening (Nasal Swab)		

# Outcome: Reduction of HA- MRSA Infections



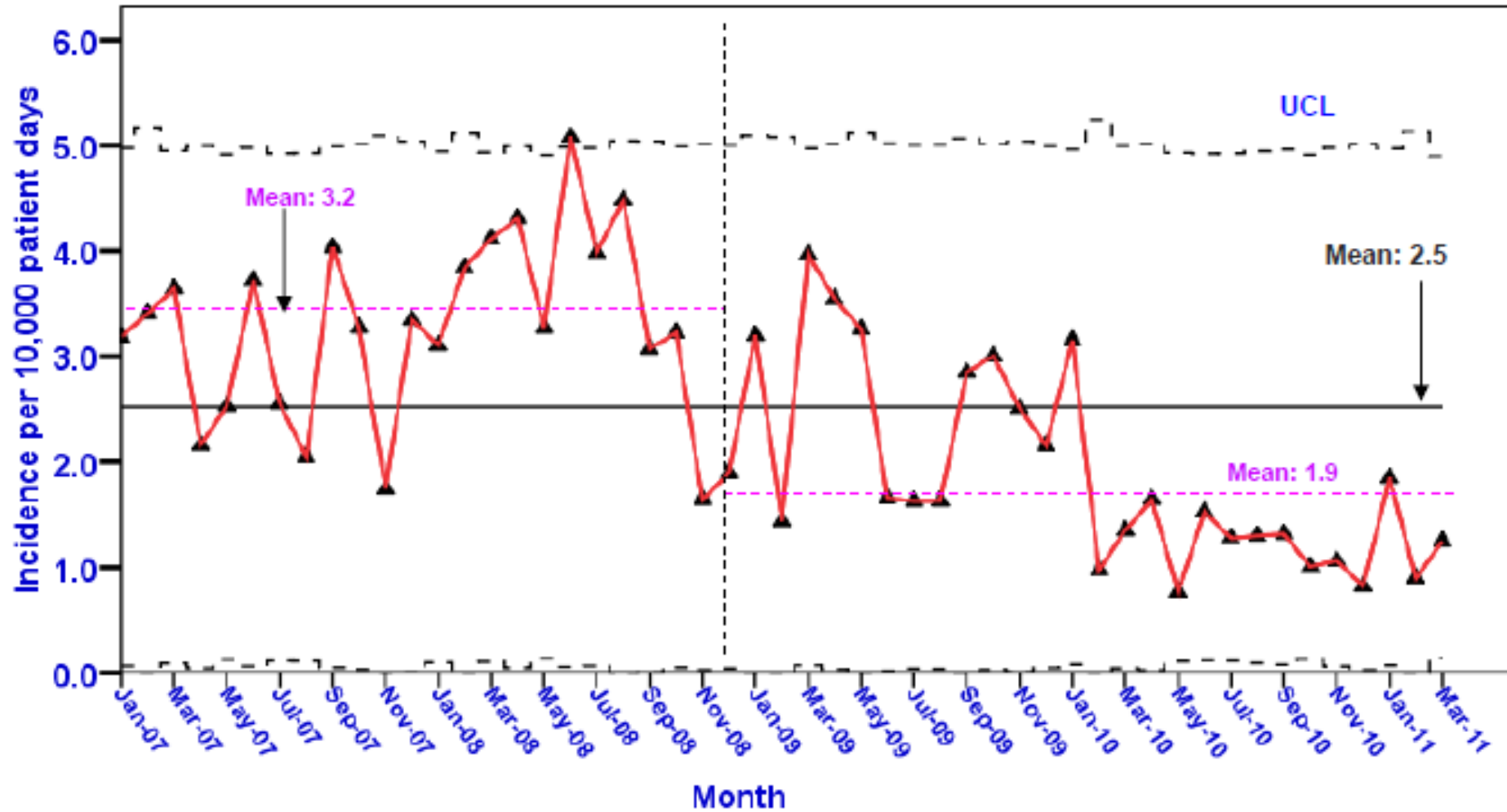


# HA-MRSA (2007 – 2010)





# HA-MRSA Bacteremia





# MRSA Control in Tan Tock Seng Hospital

# MRSA Action Plan @ TTSH

Active Surveillance Cultures (ASC) started in Medical Intensive Care Unit (MICU) in September 2006

Creation of one MRSA cohort ward in late 2007

# MRSA Cohort Ward

A dedicated MRSA Cohort Ward in August 2007



Problems encountered:  
Multi-disciplinary  
Resistance from doctors and patients  
Capacity well exceeded

# MRSA Action Plan @ TTSH

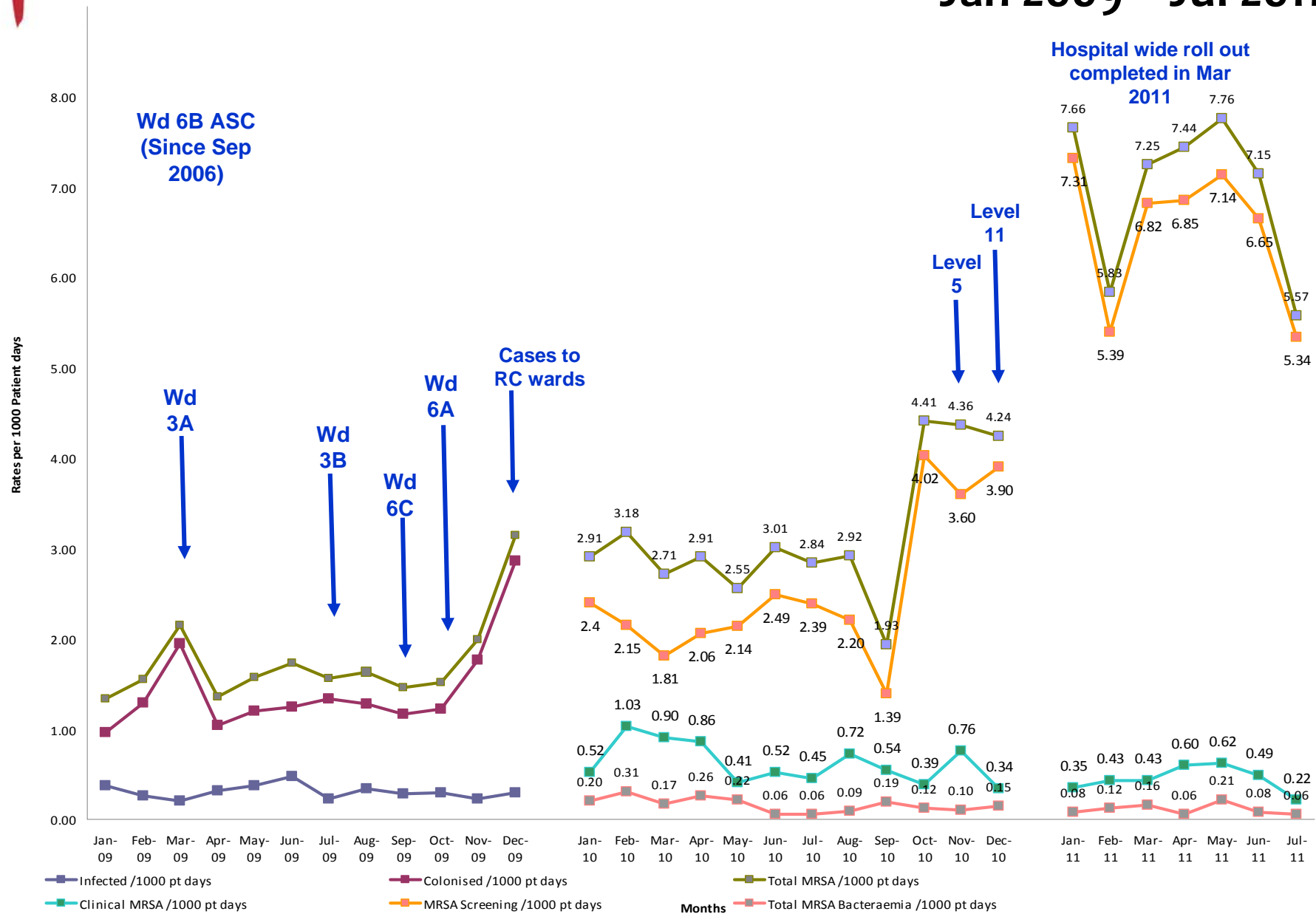
- **Rollout** of ASC to other ICU's and HD in 2009
- Added on cases being transferred to TTSH@ RenCi wards (sub-acute care) from November 2009

Started ASC for **elective surgical cases** in May 2010, (using rapid **PCR** test) in conjunction with identification of a **“clean” ward** in Ren Ci

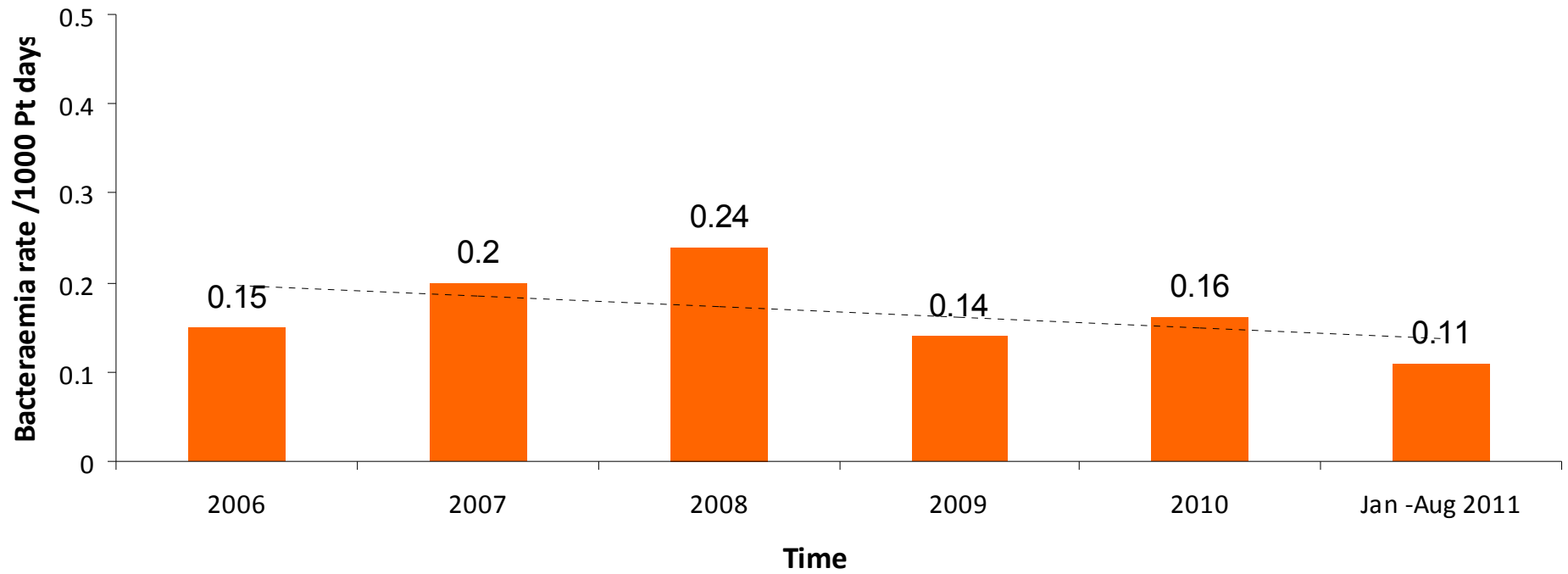
Started ASC for all admissions, transfers and discharges from October 2010

Started with one level ( 4 wards) in October 2010, progressive roll-out by levels every 1-2 months until completion of entire hospital in March 2011

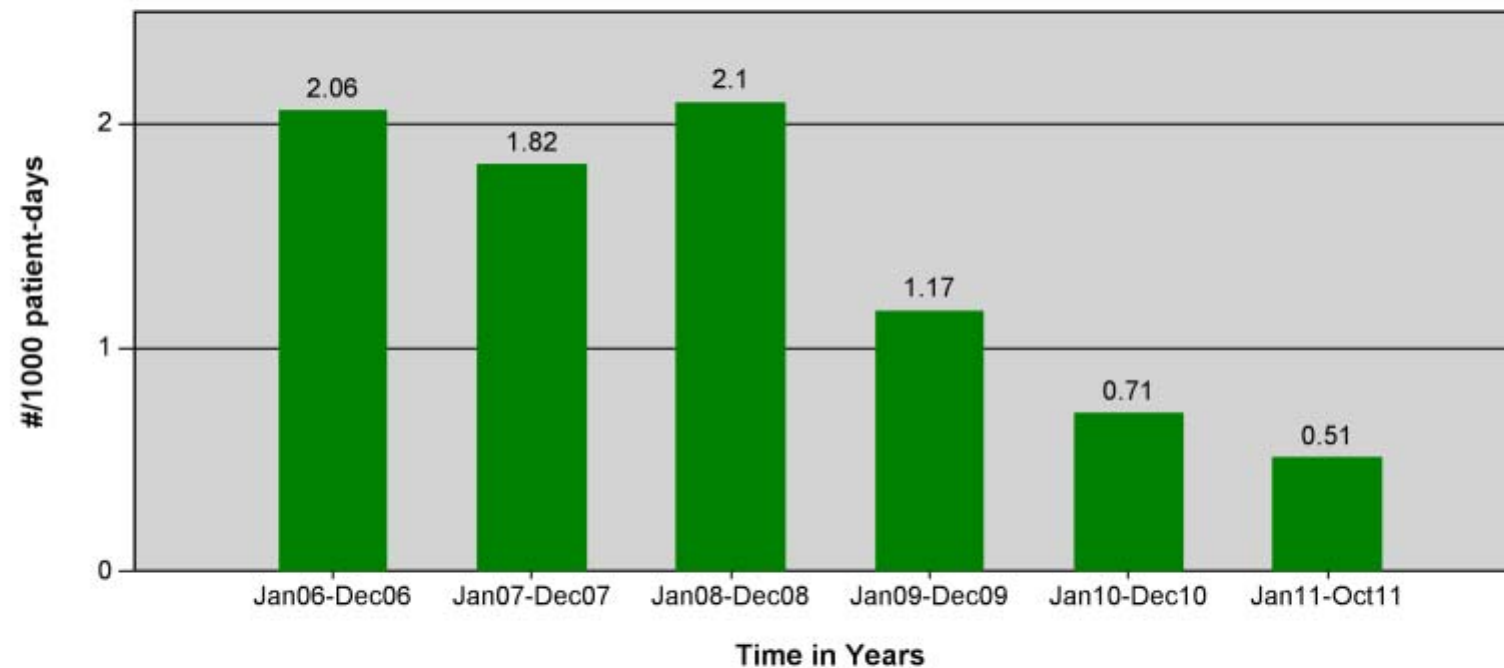
# MRSA Acquisition Jan 2009 – Jul 2011



### MRSA Bacteraemia Rate 2006- Aug 2011



### Incidence of Methicillin-resistant *S. aureus* in Different Locations Over Time (Jan 2006 - Oct 2011)



■ TTSH

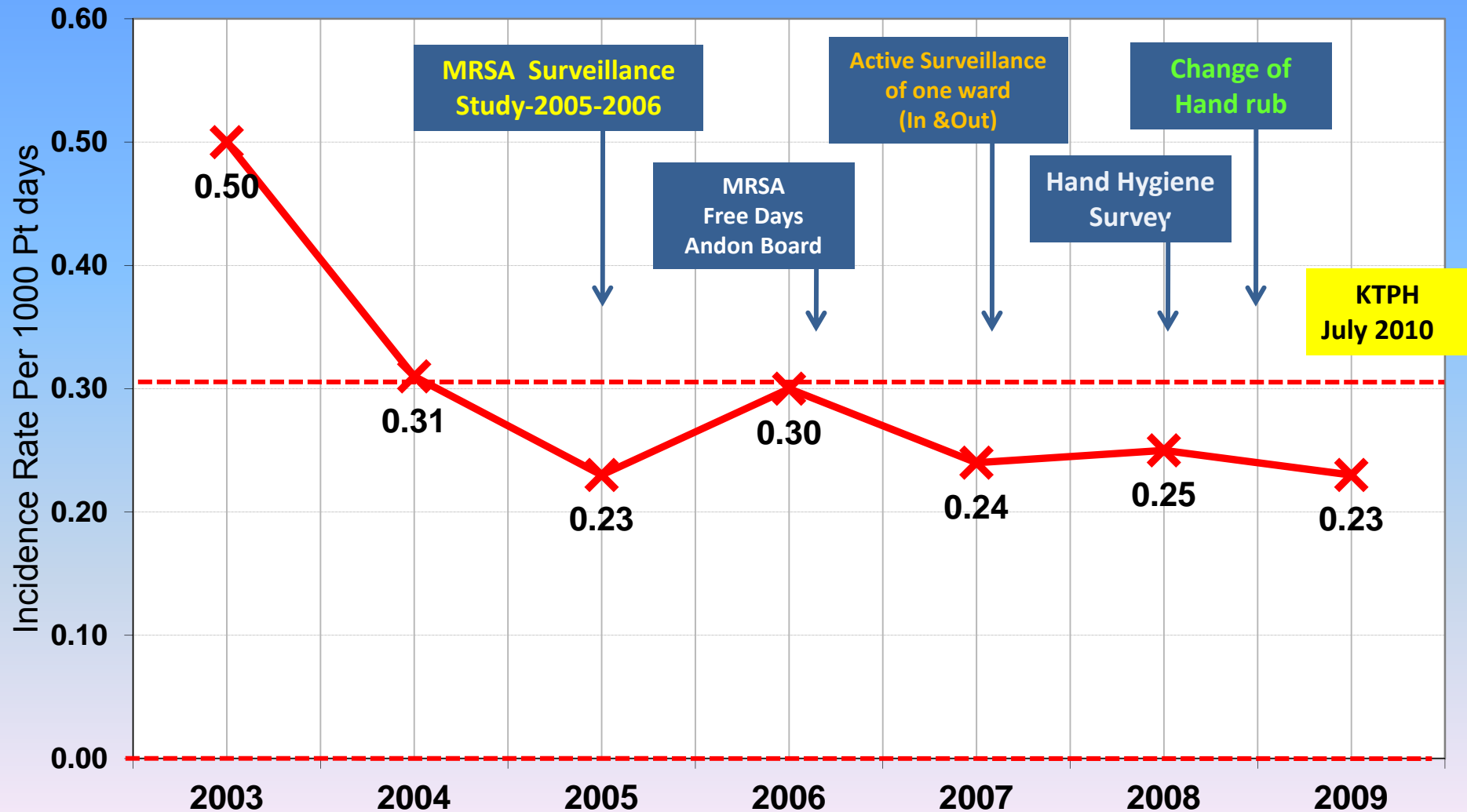
Specimen Type -  
All



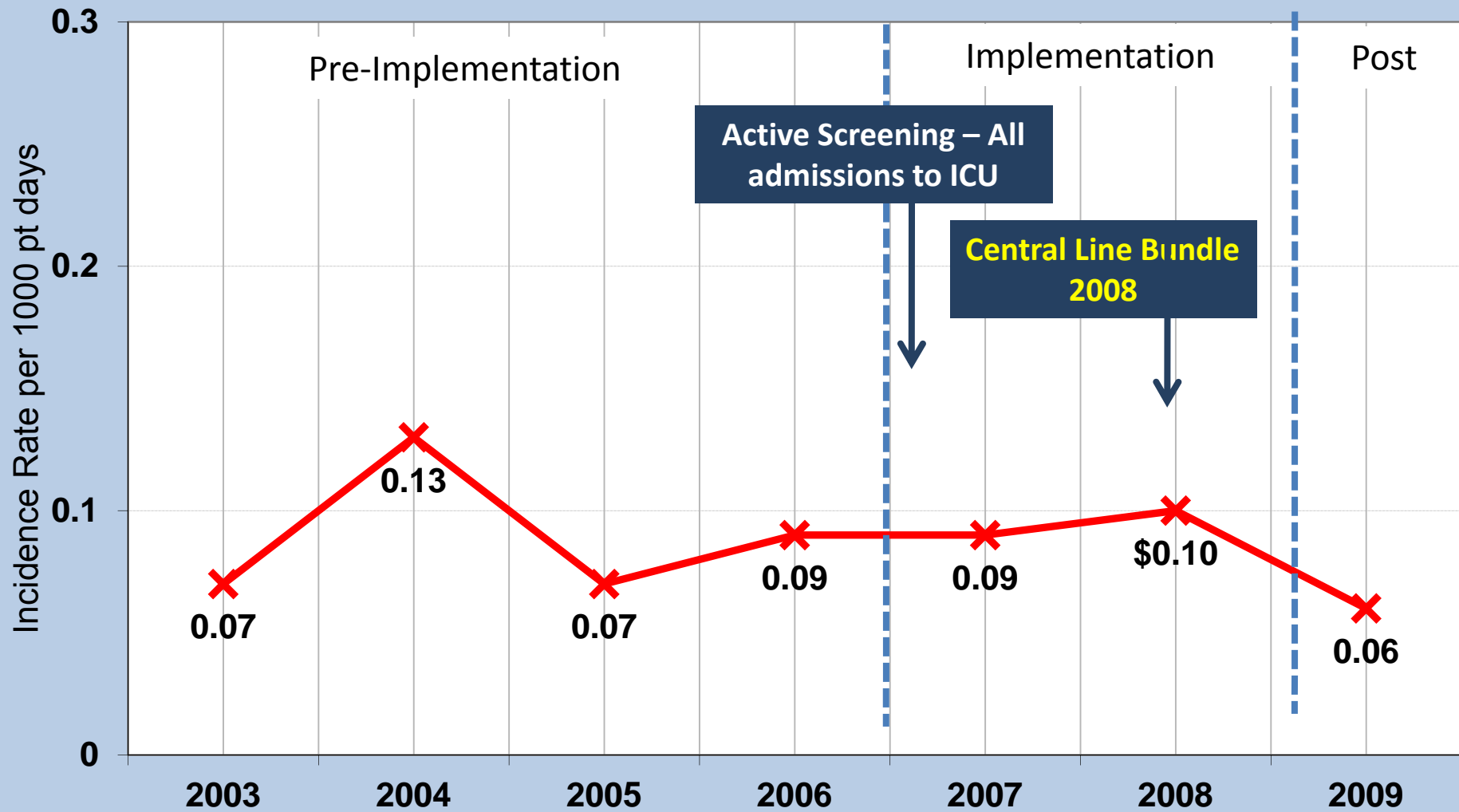
# **MRSA Control in Alexandra Hospital 2005 to 2009**

SN	Initiatives / Projects	Year	Activities	Outcome
1	MRSA FREE Days	2005	Create Staff awareness	On Going Update daily in AH Intranet & Ward Anton Board
2	MRSA Study Isolation of positive cases in Single Room	Aug-05	HQIF Project - Completed in Aug 06 - Active screening of High Risk Patients - Contact Precaution - Isolate positive case in single room - Dedicated equipment	Lack of single room due to 'VRE' contacts from other institutions. Rates increased with patients being 'cohorted' in cubicle
3	Active Surveillance Nasal Screening for High Risk Cases	2005	Nasal screening for High Risk Patients	Lack of single rooms ?% of compliance to screening
4	Screening Nasal / Armpit & Groin all new admissions	2007	Started in both ICU	In progress
5	Environment Screening of Ward & Staff	May - Aug 2007	Screening of selected high risk areas Screening of Stethoscopes - October 07	Report of findings Positive staff - decolonised x 5 days treatment
6	Annual Hand Hygiene Campaign (NHG)	2006	Annual pre & post Hand Hygiene (2x a year) audit using common audit tool. NHG Posters to facilitate compliance	2007 - poor compliance rate - Hand rub at point of care in 2007 - Change to IHI audit tool ( modified) - Conduct Monthly audit - Report findings. Direct communication to Ward with poor compliances - Updated in AH Intranet (MRSA Free Days)
7	Infection Control Month in October	2005 2006 2007	Quizes on infection control prevention for nurses Hand Hygiene to visitors at the lobby Mascot and Link Nurses - hand hygiene awareness for staff, patient, and visitors in the ward Talk on MRSA at Nurses Journal Club Infection Control Fair - Invited speak	Awareness to all HealthCare Workers
8	Hand Hygiene Survey	02 Feb 2008	Survey on Barriers To Hand Hygiene n=254	High % Skin Irritation from J&J hand rub - Evaluated new product of Alcohol gel from October to March at different area - Submitted evaluation for approval of Alcohol Gel - Awaiting to get supply
9	Central Line Bunde	29 June 2008	Started in MICU then to SICU	In progress
10	MRSA Costing (NHG)	2008	Started meeting in Oct 07 - Recruitment of patients in Feb 2008	In progress
11	MRSA Colaboration (NHG)	2008	Started in July 07	In progress

## Hospital Wide Healthcare Associated MRSA Infection



## MRSA Bacteremia



# MRSA Control

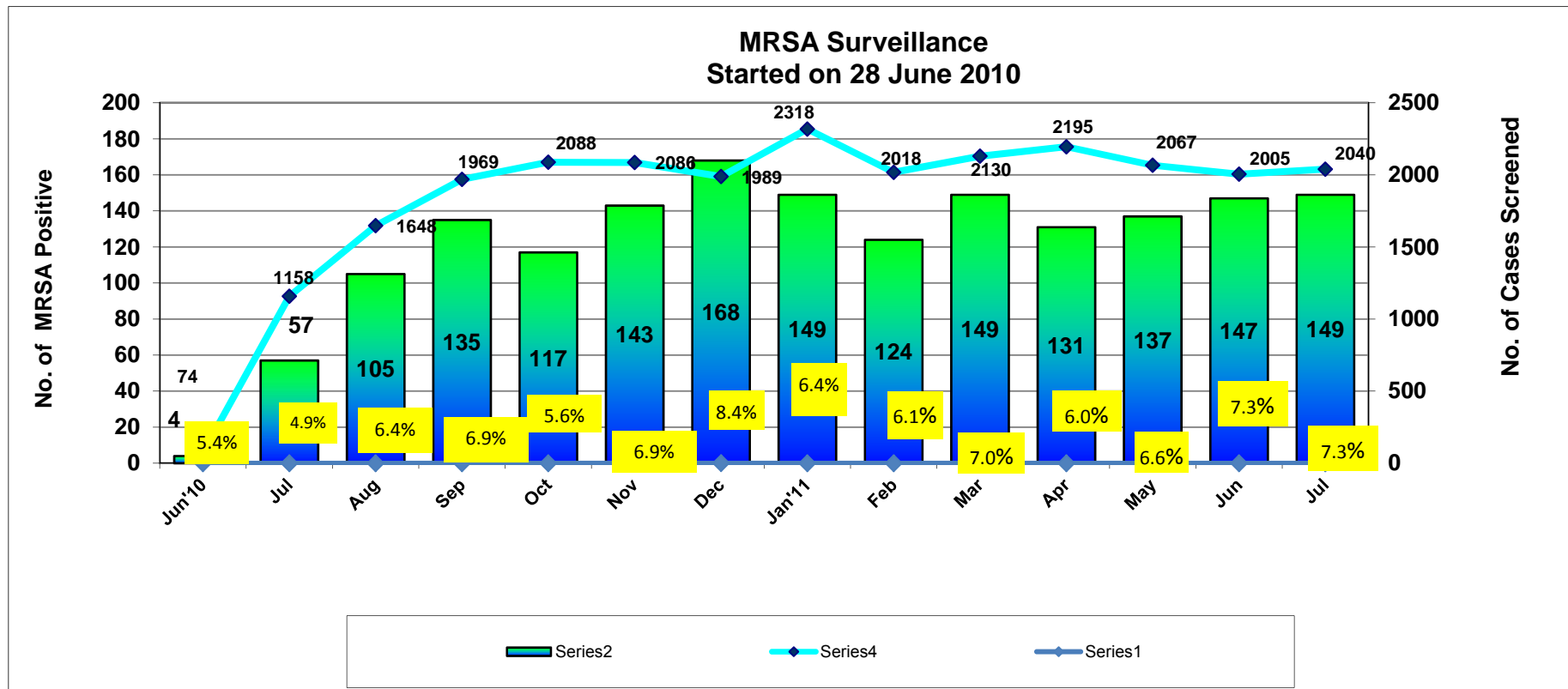


SN	Initiatives / Projects	Year	Activities	Outcome
1	Prevalence Study of MRSA in AH	27/4 to 4/5/2010 AH	MRSA surveillance swabs were taken. Patients were stratified into high risk, moderate risk and low risk groups. Prevalence of MRSA is tabulated according to different risk groups.	Started Universal screening on 28 June 2010 at KTPH.
2	Universal Screening	28 June 2010 KTPH	1. Daily monitoring of compliances 2. Check MRSA cases via TD Web 3. Review positive MRSA cases - ensure contact precaution & cohorted.	On going
3	Inpatient Antiseptic Bath to reduce the overall skin-surface load of nosocomial organisms	July-10	1. Individual disposable basins & disposable washcloth, chlorhexidine 2. Finance created charge code for billing	On going
4	Pre-surgery MRSA nasal screening	September 2010	1. Start screening at Pre-op assessment Clinic for orthopaedic implants.	In Progress Review in 6mths
5.	Risk Stratification Study	Sept to Oct 2010 Data analysis in 2011	1. Survey Questionnaire for Admissions done at A&E 2. Total (completed) = 1056	Data entry in Jan 2011 Analyze data
6.	MRSA PCR Project with Roche (LightCycler)	Nov - Dec 2010	1. 500+ samples done in 2010 2. Screening of Positive MRSA	Completed January 2011
7.	Risk Acquisition Rotational Exit Swabs	Dec 2010 to Mar 2011	1. 3 wards each month 2. Collection of Data / Questionnaire Survey form 3. Evaluate Transmission Rates Monthly	Evaluation
8.	Risk Acquisition Survey	Dec 2010 to Mar 2011	1. Survey done together with Exit swabs. 2. Collection of data 3. Data Entry 4. Analyze of data	Completed Analyzing
9.	MRSAAlert via SCM	November 2010	1.Create Precaution : MRSA positive on screen 2. Auto de-tagged when MRSA negative	In Progress

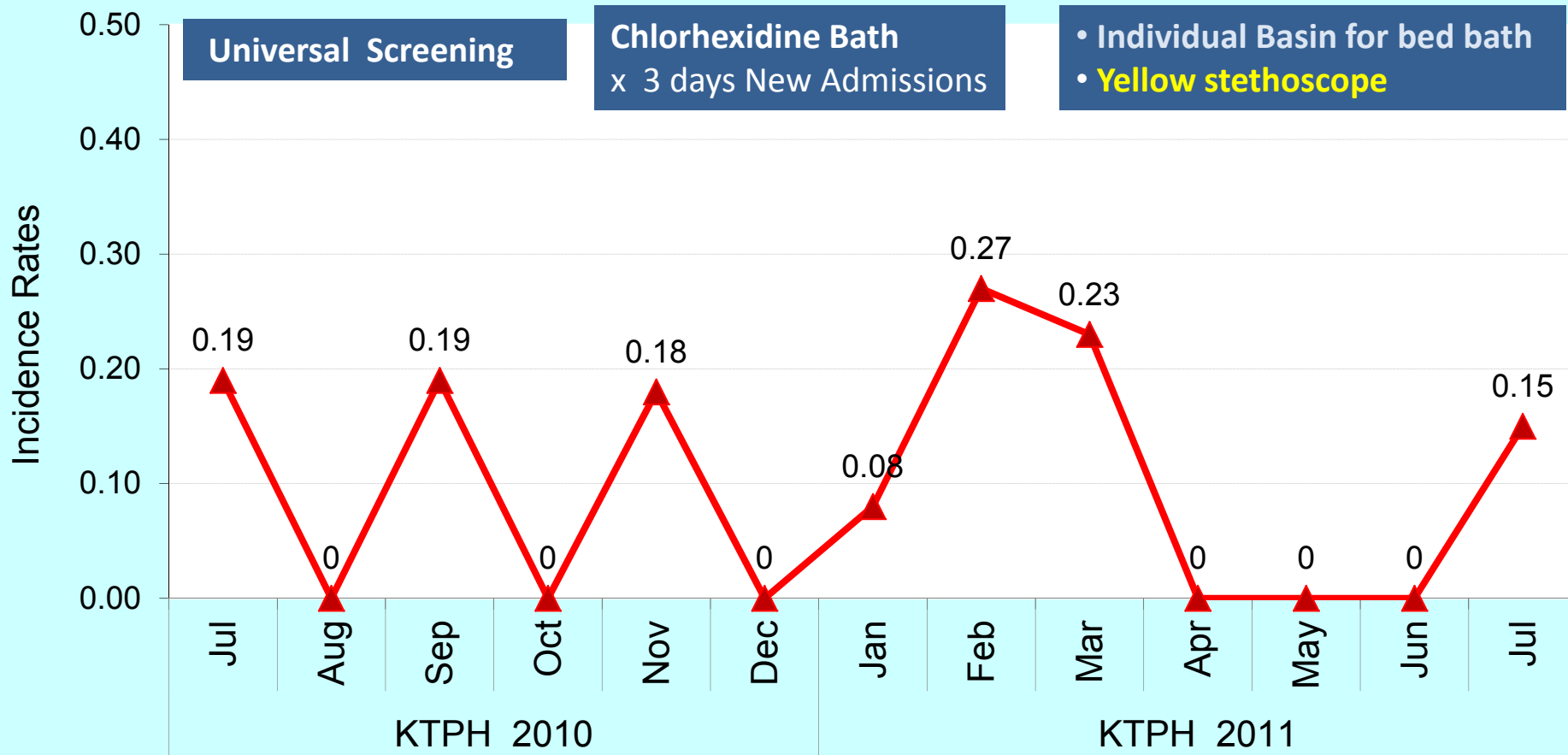
# Universal Screening

started on 28th Jun 2010(Inpatient wards)

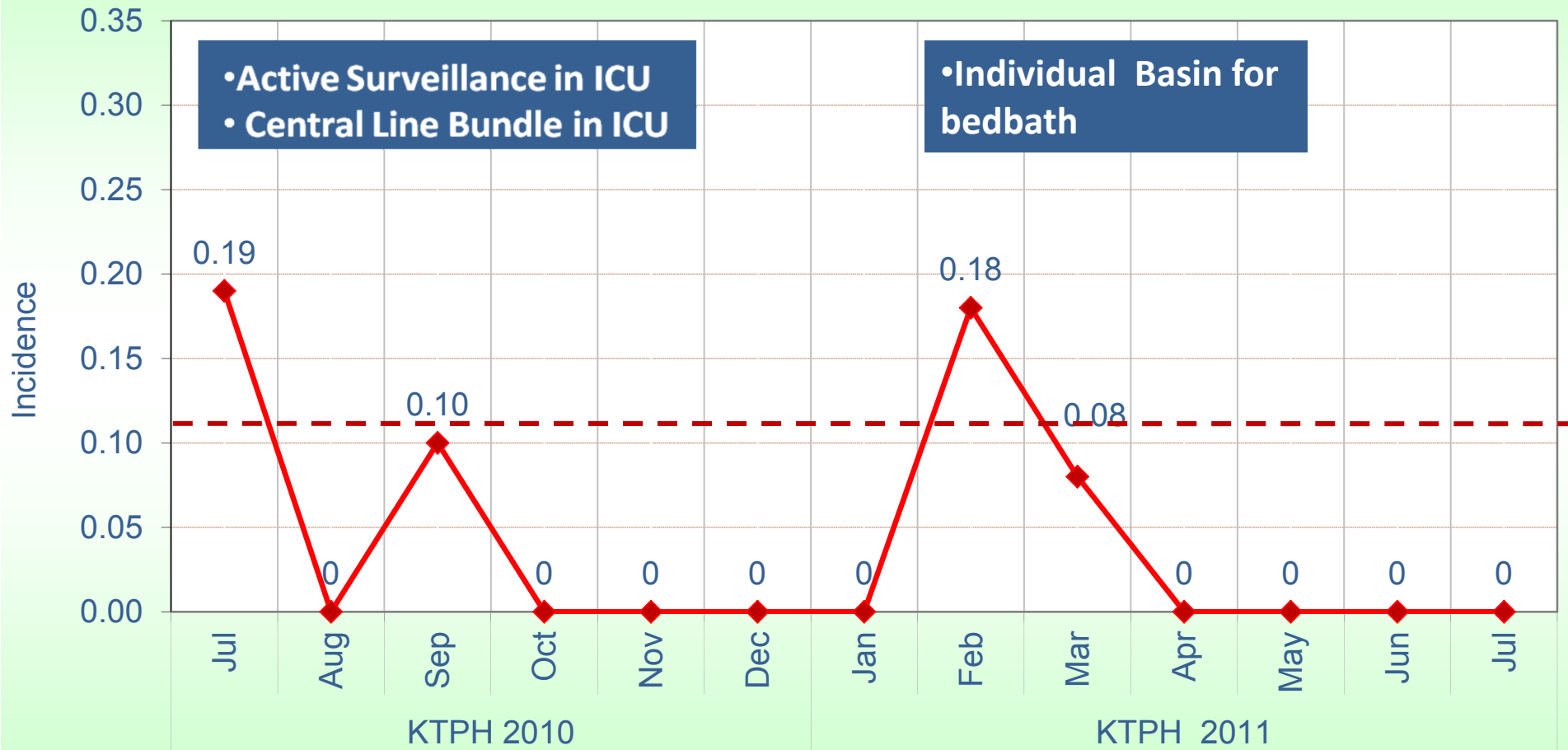
	Jun'10	Jul	Aug	Sep	Oct	Nov	Dec	Jan'11	Feb	Mar	Apr	May	Jun	Jul
<b>MRSA Positive</b>	4	57	105	135	117	143	168	149	124	149	131	137	147	149
<b>No of Cases Screened</b>	74	1158	1648	1969	2088	2086	1989	2318	2018	2130	2195	2067	2005	2040
<b>% of MRSA POS</b>	5.4%	4.9%	6.4%	6.9%	5.6%	6.9%	8.4%	6.4%	6.1%	7.0%	6.0%	6.6%	7.3%	7.3%



### Healthcare Associated MRSA Infection (per 1000 Patient Days) July 2010- July 2011



## Healthcare Associated MRSA Bacteremia (per 1000 Patient Days) July 2010 to July 2011





KK Women's and  
Children's Hospital  
SingHealth

# **MRSA Control in Kandang Kerbau Women's and Children's Hospital**

# Attitude towards MRSA in KKH, and any strategies adopted:

- 1985-1990: No data
- 1990-2010:
  - 1) Screen (nasal/axillae) **all** transferred patients for MRSA or if hospitalized in previous 30 days.
    - From other acute care or chronic care hospitals/NH
    - also screen stool/ rectal swab for VRE & ESBL
    - Isolate patient while waiting for results
  - 2) Active MRSA surveillance in NICU (Neonatal ICU).
    - Nasal swab or ETT aspirate for MRSA every Mon and Thu.
    - Stopped active MRSA surveillance in NICU Mar 2010- Feb 2011.
  - 3) Screen other patients based on clinical indication.

# Control Measures in NICU

- Cohort all MRSA babies in a separate area (away from NICU)
- Cohort nurses providing care for these babies
- Doctors – separate team allocated to MRSA area
- Alcohol handrubs at every baby's cotside.
- Gloves & apron to be donned when handling babies
- Discharge babies from MRSA area – no transfer out
- Screen all MOs for MRSA prior joining the department
- Liaison nurse conducts audit on hand hygiene & environmental disinfection

## Treatment & clearance tests

- Bactroban nasal ointment tds x 5 days
- 4% Chlorhexidine bath x 5 days  
(neonates 0.4%)
- Clearance tests – 3 negative swabs

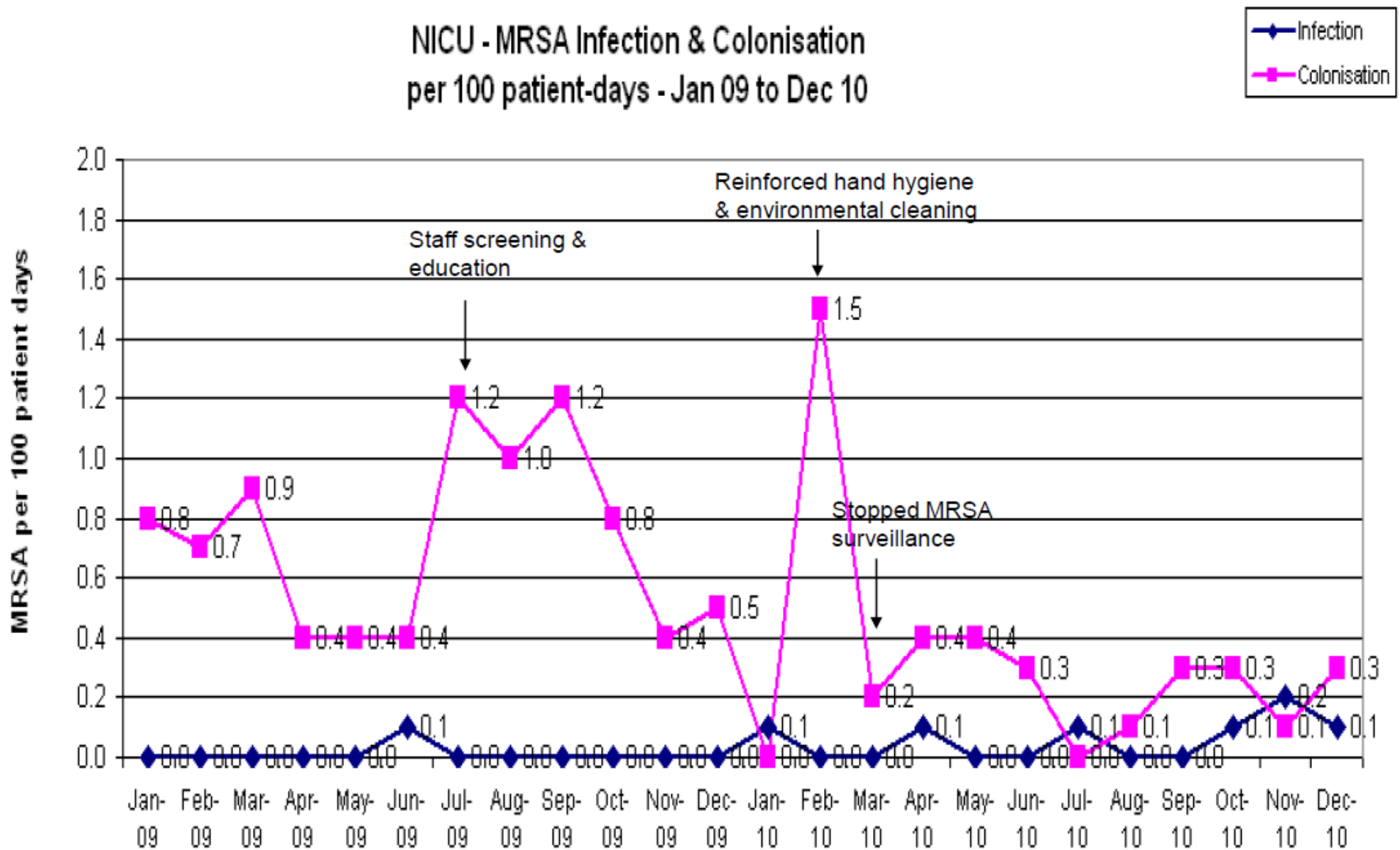


# Control Measures

- ◆ Baby cots – disinfect with Mediwipes antiseptic after washing with soap and water upon discharge of the newborns
- ◆ Breast pump - protocols for disinfection – steam sterilize the funnel and antiseptic wipe to decontaminate exterior of the breast pump in between patient use
- ◆ Disinfect the telephones & computer keyboards – twice a day
- ◆ Ongoing education & audits



## NICU - MRSA Infection & Colonisation per 100 patient-days - Jan 09 to Dec 10



Members of the SingHealth Group

Changi General Hospital • KK Women's and Children's Hospital • Singapore General Hospital

National Cancer Centre • National Dental Centre • National Heart Centre • National Neuroscience Institute • Singapore National Eye Centre

SingHealth Polyclinics

# Attitude towards MRSA in KKH, and any strategies adopted:

- 2011:
  - On 1 Mar 2011, KKH started a pilot programme for MRSA active surveillance testing.
  - Started on 1st March 2011 onwards – NICU (neonatal ICU), CICU (children’s ICU) , WICU (women’s ICU) , wd 43 (gynaecology-oncology ward), wd 76 & wd 75 (paediatric oncology wards).
  - Added on 1st May 2011 onwards - SCN (special care nursery), wd 65 (paediatric high dependency ward) & wd 44( gynaecology ward, with gynaecology-oncology overflow cases)
    - Note: SCN stopped MRSA AST on 12 May 2011 due to logistics issues.
    - **AST covered about 14% of all KKH admissions (ie 14% of patients are admitted to the high risk wards in KKH, where they are screened for MRSA).**
  - All new admissions to above wards:
    - Entry swab & exit swabs (if patient stays is more than 72 hrs)
    - Screen nasal, axilla & groin swab for MRSA
    - The cost of screening is charged to the patients

# Summary

- Definite progressive decline in MRSA infected cases is being seen when robust interventions are put in place. Bacteremia rates now around 0.1 +/- cases per 1000 patient days
- MRSA control has forced an improvement in Hand-hygiene compliance. This improvement will no doubt help to reduce spread of other MDRO. It has also helped change the mind-set in healthcare to prepare us for the battle against other MDRO
- Cost effective

**Thank You**