

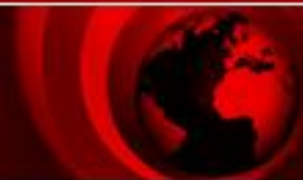
Healthcare Associated Infection:

The scale of the problem

(and some insights into possible solutions)

Graeme Jones

Director of Infection Prevention Unit
Southampton University Hospitals Trust

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Last Updated: Sunday, 23 September 2007, 03:31 GMT 04:31 UK

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Brown pledges hospital bug battle

NHS hospitals are to be ordered by Prime Minister Gordon Brown to conduct a "deep clean" to tackle the spread of infections such as "superbug" MRSA.

He wants the cleaning to be pre-emptive rather than a reaction to outbreaks.

But critics question how effective such moves are, saying it is staff, patients and visitors who carry MRSA.

Meanwhile, comments by the PM that he wants to make the NHS's future the key issue at the next election have added to speculation about an autumn poll.



Hospitals may have to shut a ward while cleaning is carried out

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Fears over deadly hospital bugs

The deadly Clostridium difficile hospital bug is on the rise, while MRSA superbug rates are falling too slowly to meet government targets.



C difficile rates are on the rise

The Health Protection Agency figures show the C difficile rate rose by 5.5% in England during the first three quarters of 2006 to 42,625.

The MRSA rate fell by 5% to 3,391, but if trends continue the target of halving cases by 2008 will be missed.

HPA officials said there was still much to be done to get a grip on the bugs.

Dr Georgia Duckworth, a hospital infection expert at the HPA, said: "While there are some encouraging signs in today's figures, there clearly remains much to be done.

“ It should be remembered that each of these statistics represents a person and family who suffer ”
Graham Tanner, of the National Concern for Healthcare Infections

"Cases of Clostridium difficile infection continue to rise - there may be some slowing down in the rate of increase, but it is too early to say for sure.

"With MRSA rates we are still seeing a plateau rather than any significant decrease, but the good news is that we can now say with confidence that reported rates are no longer rising."

Stiff target

In November 2004, then health secretary John Reid pledged MRSA rates would be halved by April 2008.

You are in: **Scotland**

News Front Page Sunday, 26 May, 2002, 08:47 GMT 09:47 UK

World **New 'superbug' found at hospital**

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The ESBL bacterium can break down antibiotics
A new "superbug" which can neutralise antibiotics and cause fatal blood poisoning has been found at a Lanarkshire hospital.

- “ AmpC . producers
- “ ESBL-producers
- “ Carbapenem resisters

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Sunday, 26 May, 2002, 08:47 GMT 09:47 UK

~~New~~ 'superbug' found at hospital



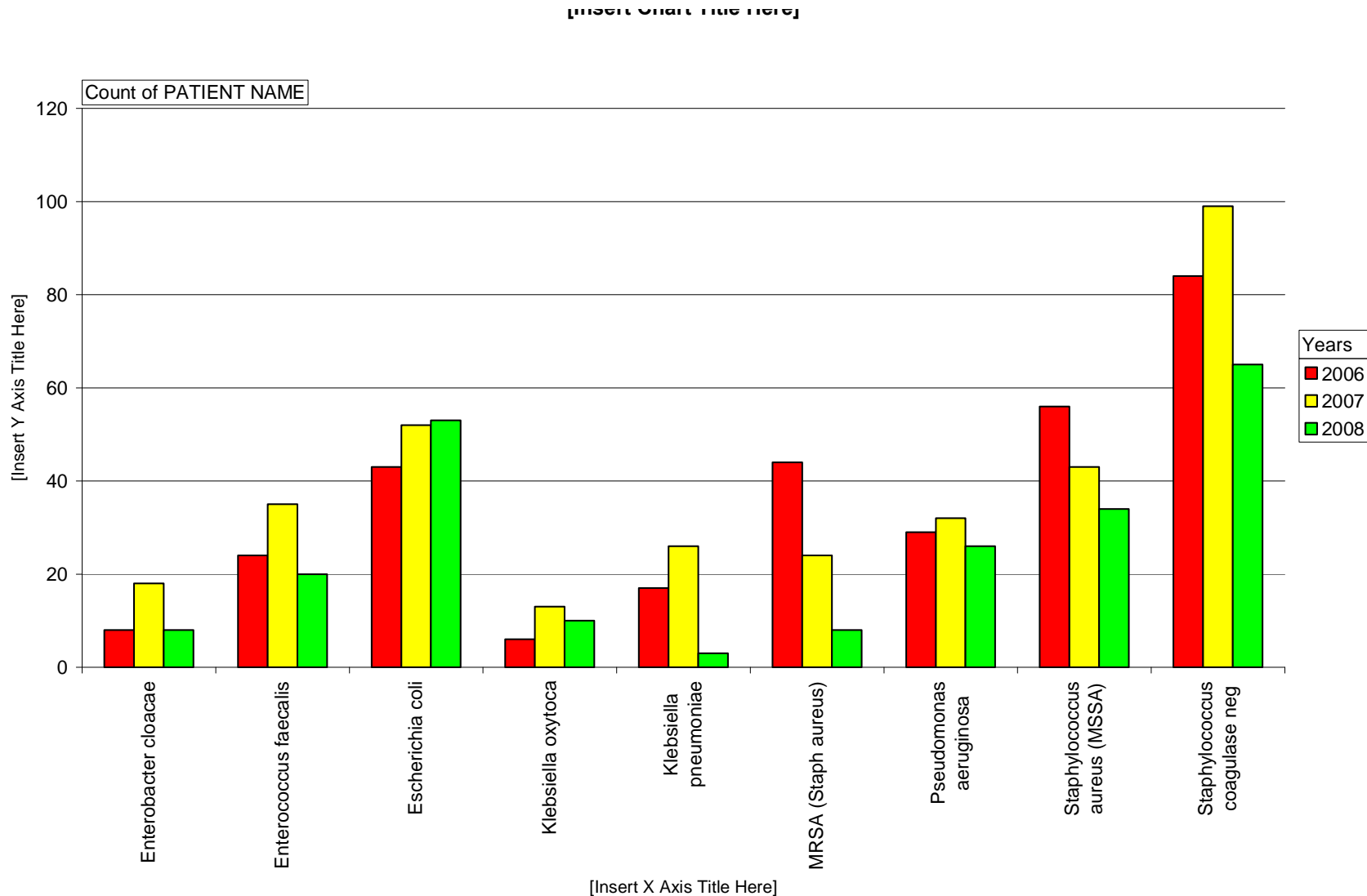
The ESBL bacterium can break down antibiotics
A new "superbug" which can neutralise antibiotics and cause fatal blood poisoning has been found at a Lanarkshire hospital.

“ MSSA

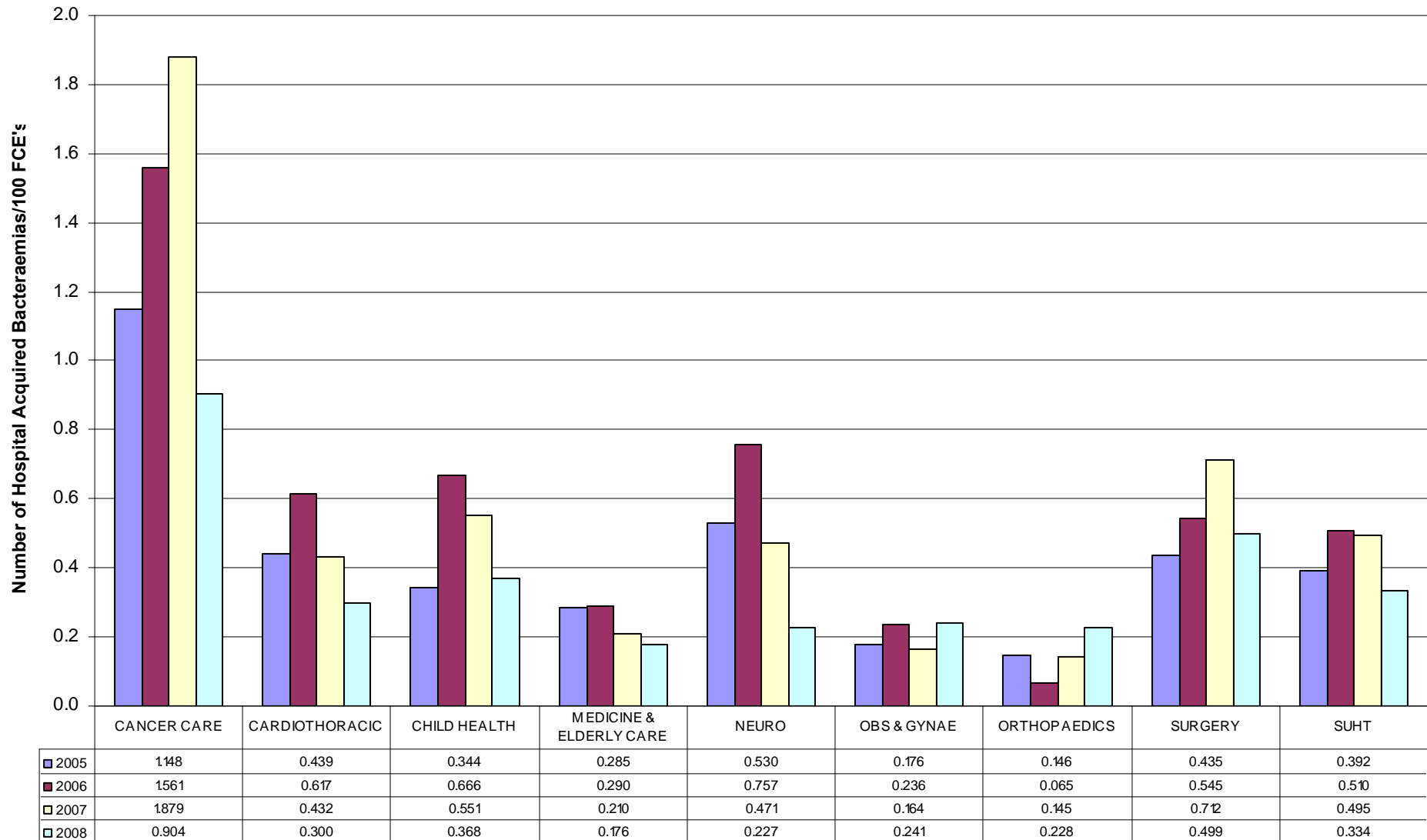
“ Group A streptococci

“ Influenza A

Commonest Causes of Hospital-Acquired Bacteraemia SUHT 2006-2008



Hospital-Acquired Blood Stream Infections per 100 FCE's 2005-2008



Hospital-acquired bacteraemia Medicine & Elderly Care 2008

“ Top 5 Organisms

- . E coli
- . Coag neg staphs
- . Enterococcus sp
- . Proteus sp
- . MRSA

| Source of Bacteraemia | n | Rate/1000 FCE |
|----------------------------|----|---------------|
| All | 46 | 1.13 |
| Skin/Soft tissue infection | 1 | 0.02 |
| Central venous cannula | 10 | 0.25 |
| Peripheral venous cannula | 3 | 0.07 |
| Urinary Tract | 19 | 0.47 |
| Resp Tract | 2 | 0.05 |
| Abdomen | 9 | 0.22 |
| Unknown | 2 | 0.05 |

Hospital-acquired bacteraemia Cardiothoracic Care 2008

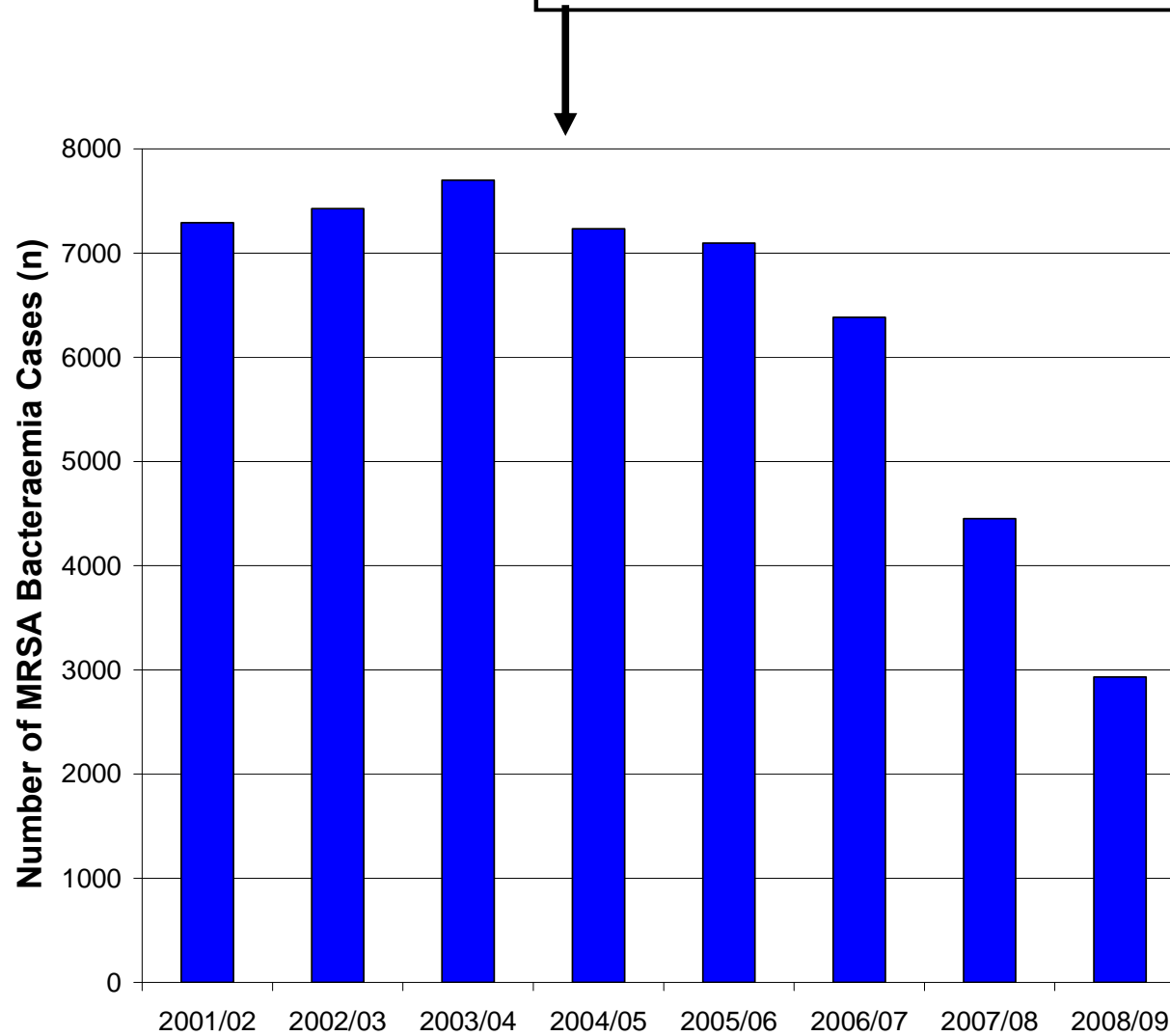
“ Top 5 Organisms

- . MSSA
- . MRSA
- . P. aeruginosa
- . Coag neg staphs
- . E coli

| Source of Bacteraemia | n | Rate/1000 FCE |
|---------------------------|----|---------------|
| All | 24 | 1.63 |
| Surgical site infection | 8 | 0.55 |
| Central venous cannula | 4 | 0.27 |
| Peripheral venous cannula | 3 | 0.20 |
| Urinary Tract | 5 | 0.34 |
| Resp Tract | 3 | 0.20 |
| Abdomen | 1 | 0.07 |

MRSA Bacteraemia in England 2001-2009

DH Performance limits introduced



Why has MRSA bacteraemia rate fallen?

“ Targets?

“ Interventions?

“ Other factors?

. MRSA bacteraemia rates fell 27% between 2001/02 and 2006/07

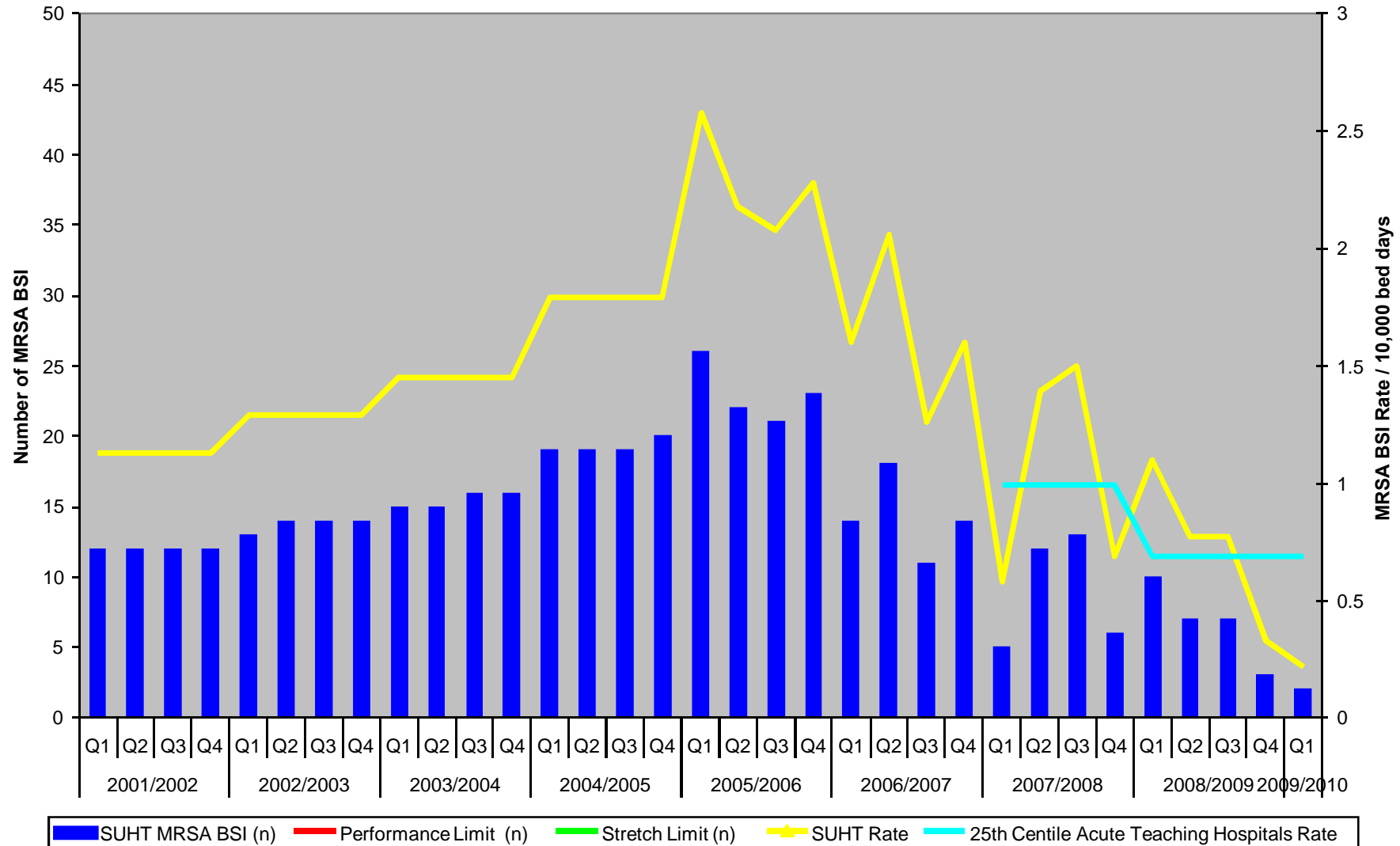
“ 11-19% attributable to fall in length of stay

“ 8-16% could be attributable to interventions

Why do some hospitals have a higher MRSA bacteraemia rate?

| | Lower Risk | Higher Risk |
|----------|---|---------------------------------------|
| Casemix | Higher proportion of: O&G Paediatrics Psychiatry | Higher proportion of: Surgery |
| Location | Anywhere but ã | London South East West Midlands |
| Hospital | Single Specialty Hospital CNST level 3 standard? | Acute Teaching Hospital |

SUHT MRSA Bacteraemia Performance 2001- 2009



MRSA Bacteraemia: Actions that made the change

- “ Focus on reinforcing safe practice
 - . Divisional accountability
 - . Hand hygiene awareness
 - . Invasive device care

- “ CEO review of RCAs

- “ Screening/bioburden reduction measures

MRSA bacteraemias: Learning from RCA

- “ Use knowledge to underpin activity
 - . Follow patient safety processes
 - . Understand why we are doing what we do
 - . Use antibiotic guidelines effectively
 - . Review results effectively

- “ Improve documentation of actions

- “ Provide more effective delegation of care

- “ Demonstrate engagement and leadership
 - . Line of sight from individual to organisational objectives

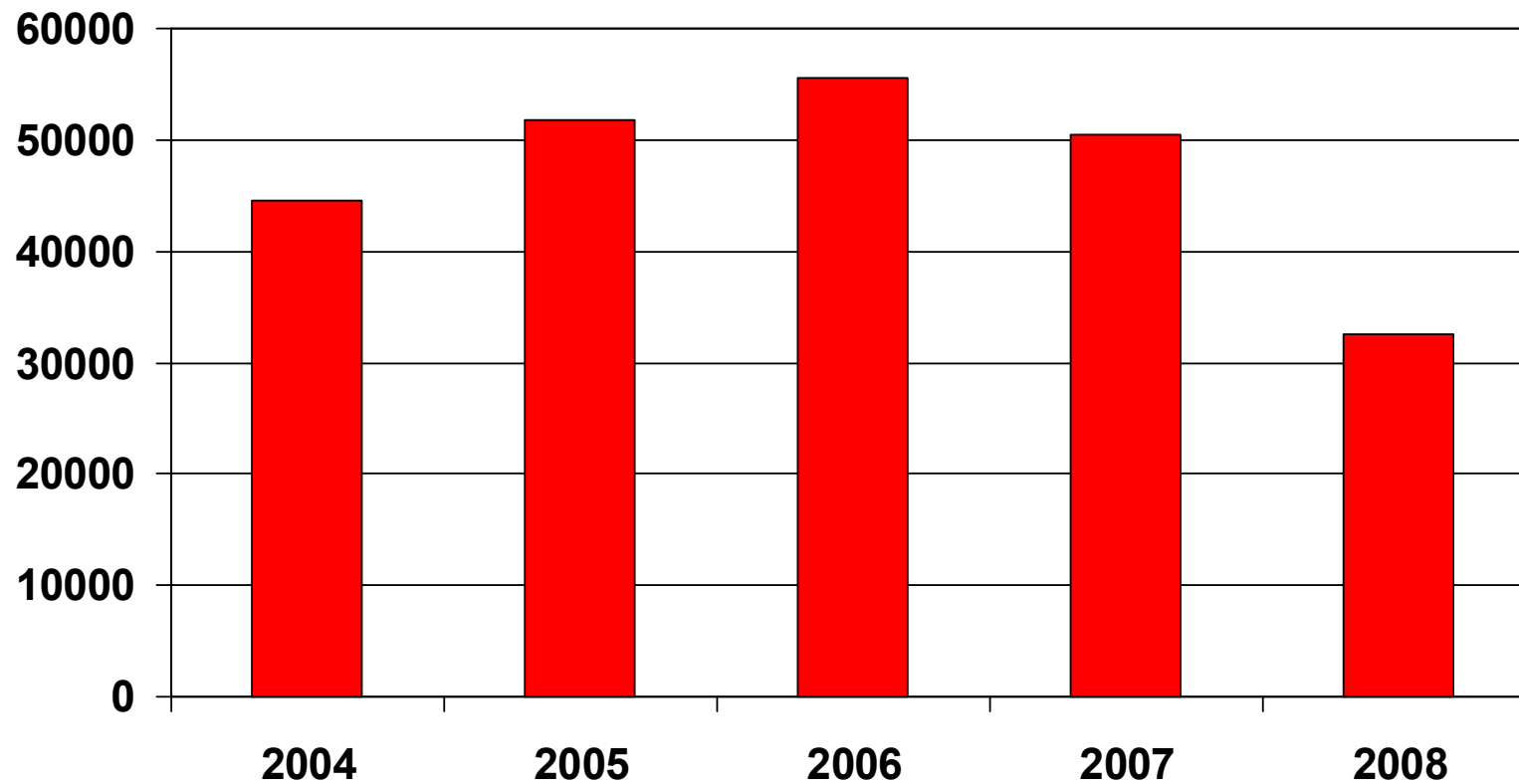


SUSTAINABILITY

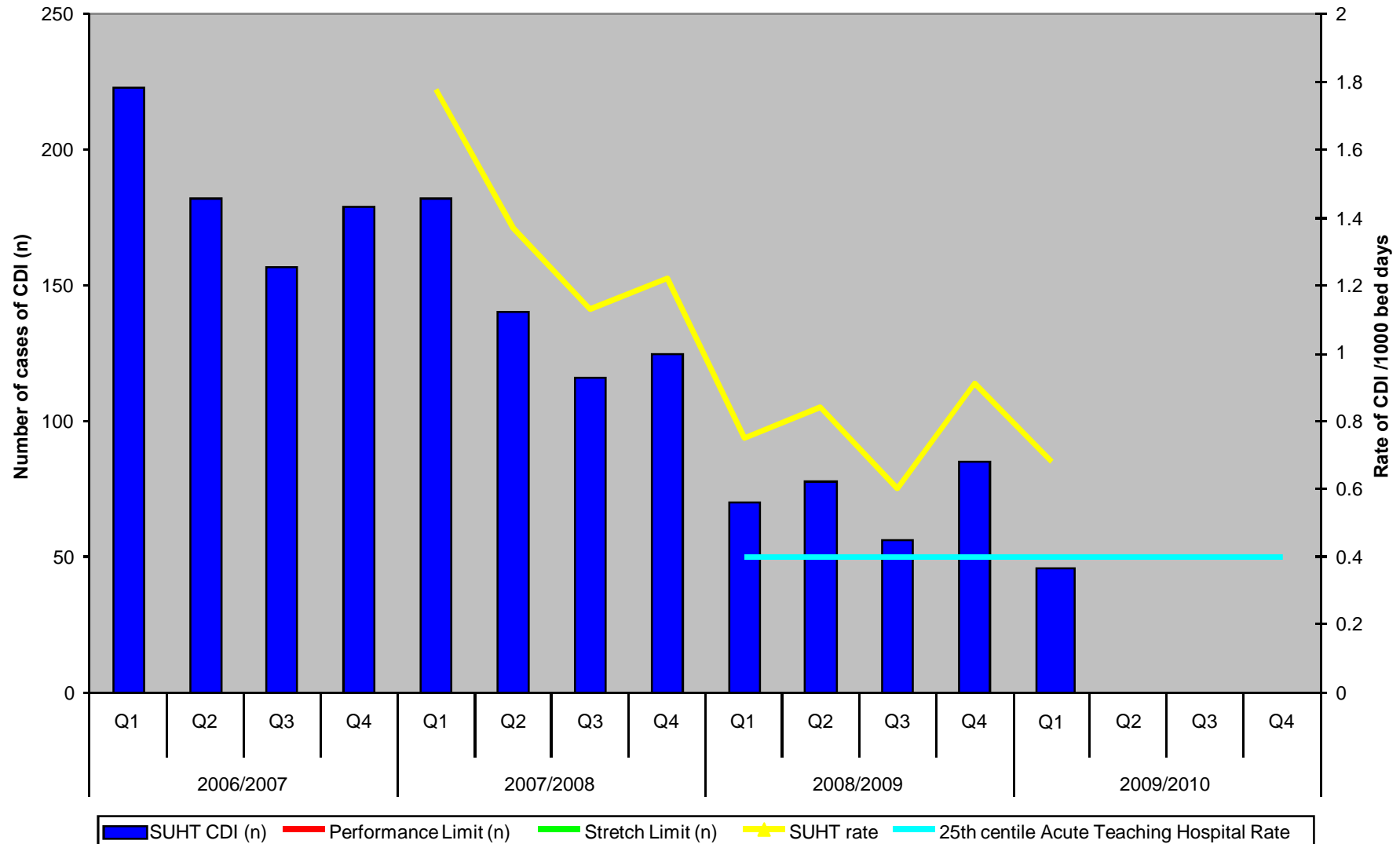
<http://shiptravel.auuuu.com>

Clostridium difficile Infections in England 2004-2008

DH Performance limits introduced



SUHT *C. difficile* Infection Performance 2006- 2009





Has no-one ever told you
about the *easy* road
to success!"

Key Objectives for *C.difficile* control

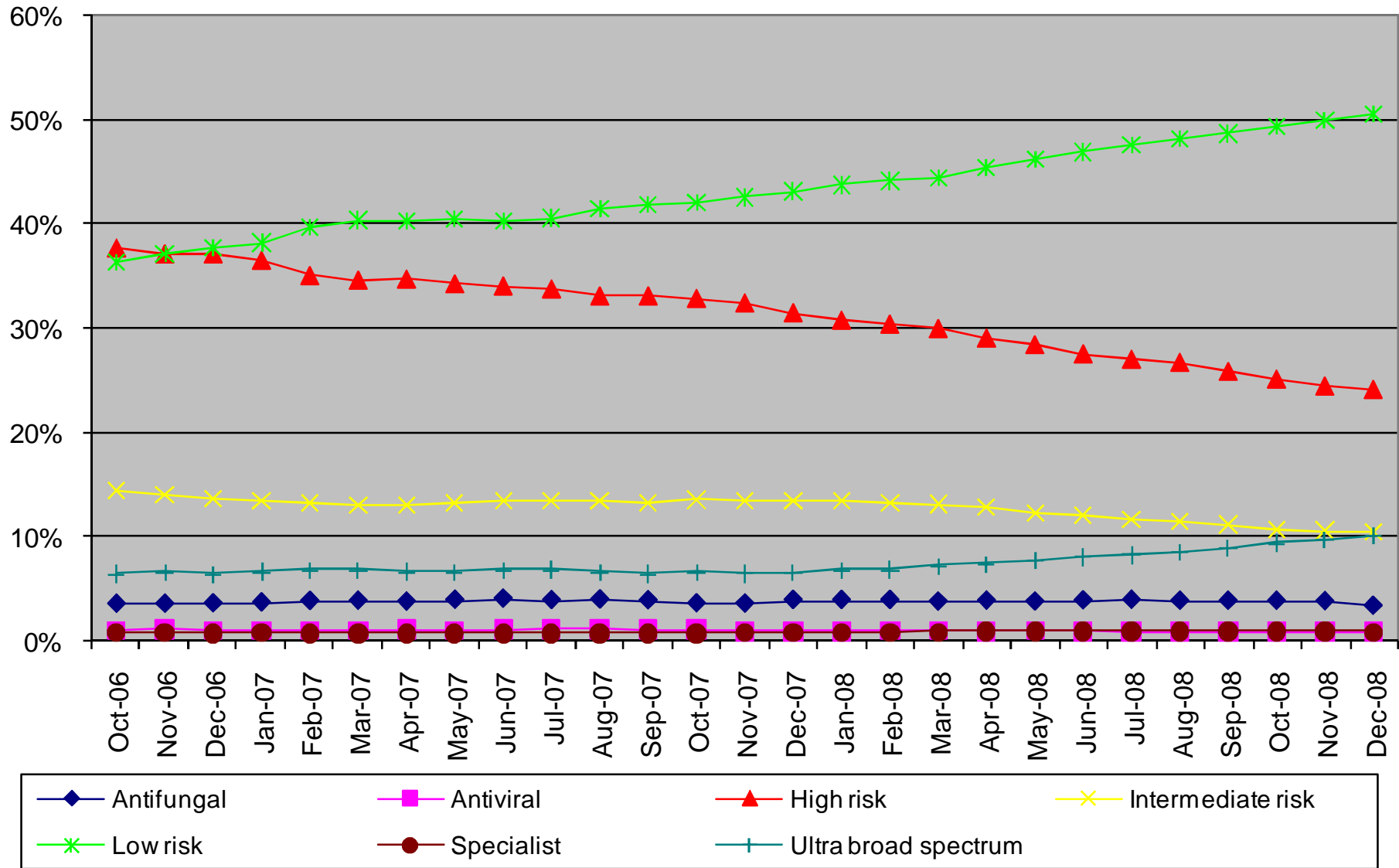
“ Control existing cases

- . Isolate potential cases and then confirm diagnosis
- . Clean the environment to remove faecal contamination
- . Treat cases to reduce further faecal contamination

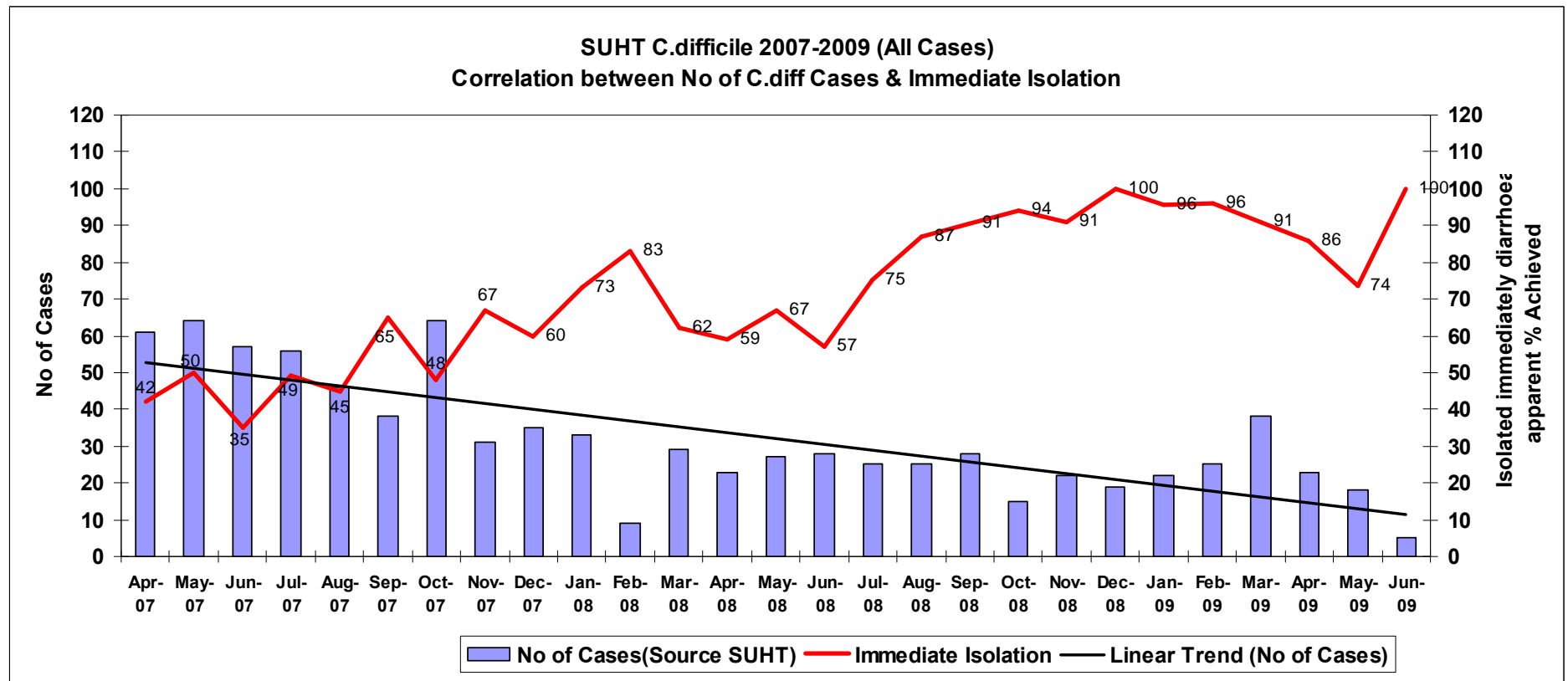
“ Control the environment to prevent new cases

- . Keep the wards clean to reduce environment risk
- . Reduce antibiotic use to reduce patient risk

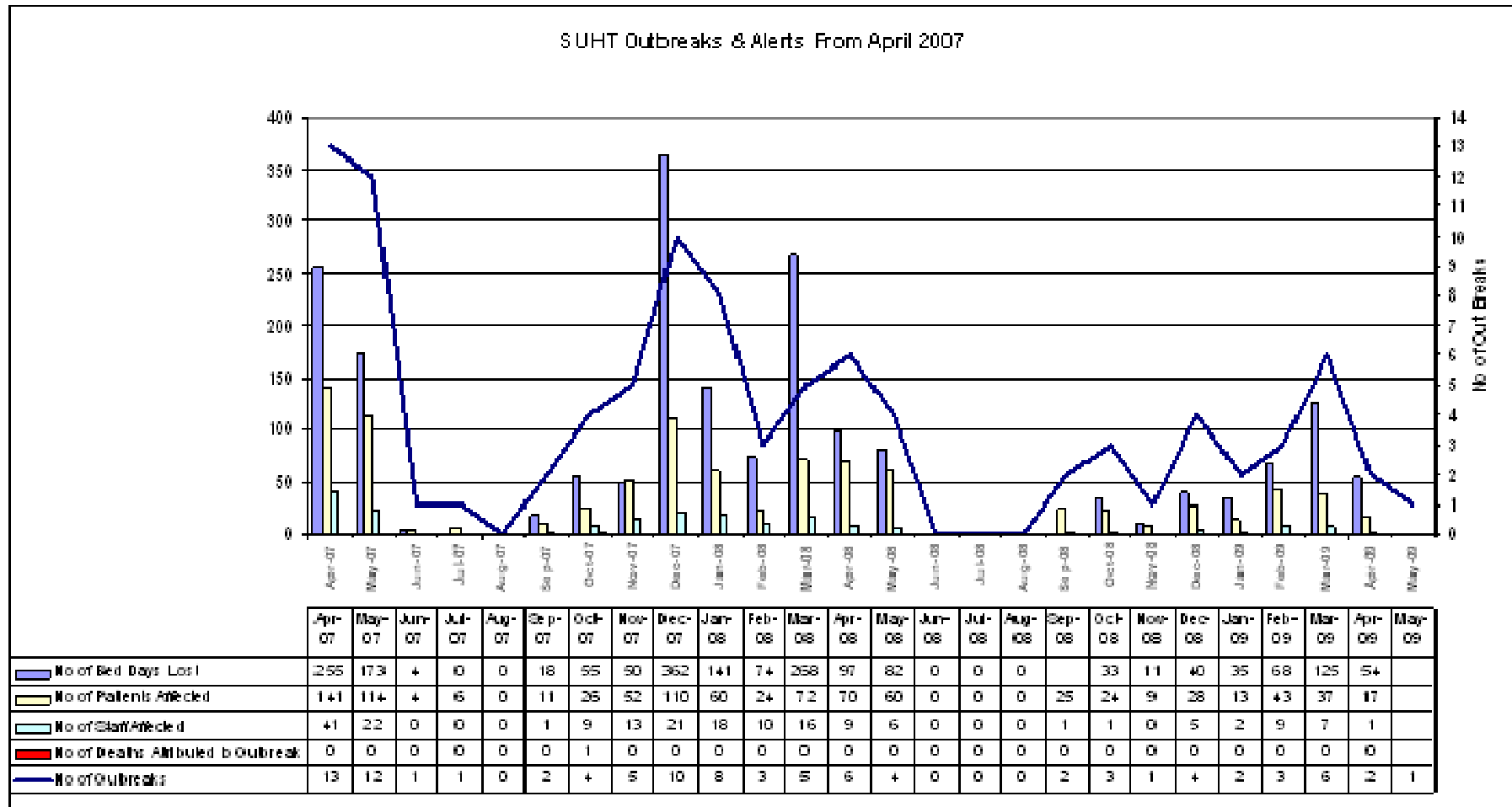
Trustwide Antimicrobial Use By Risk Classification (12 Month Rolling Average)



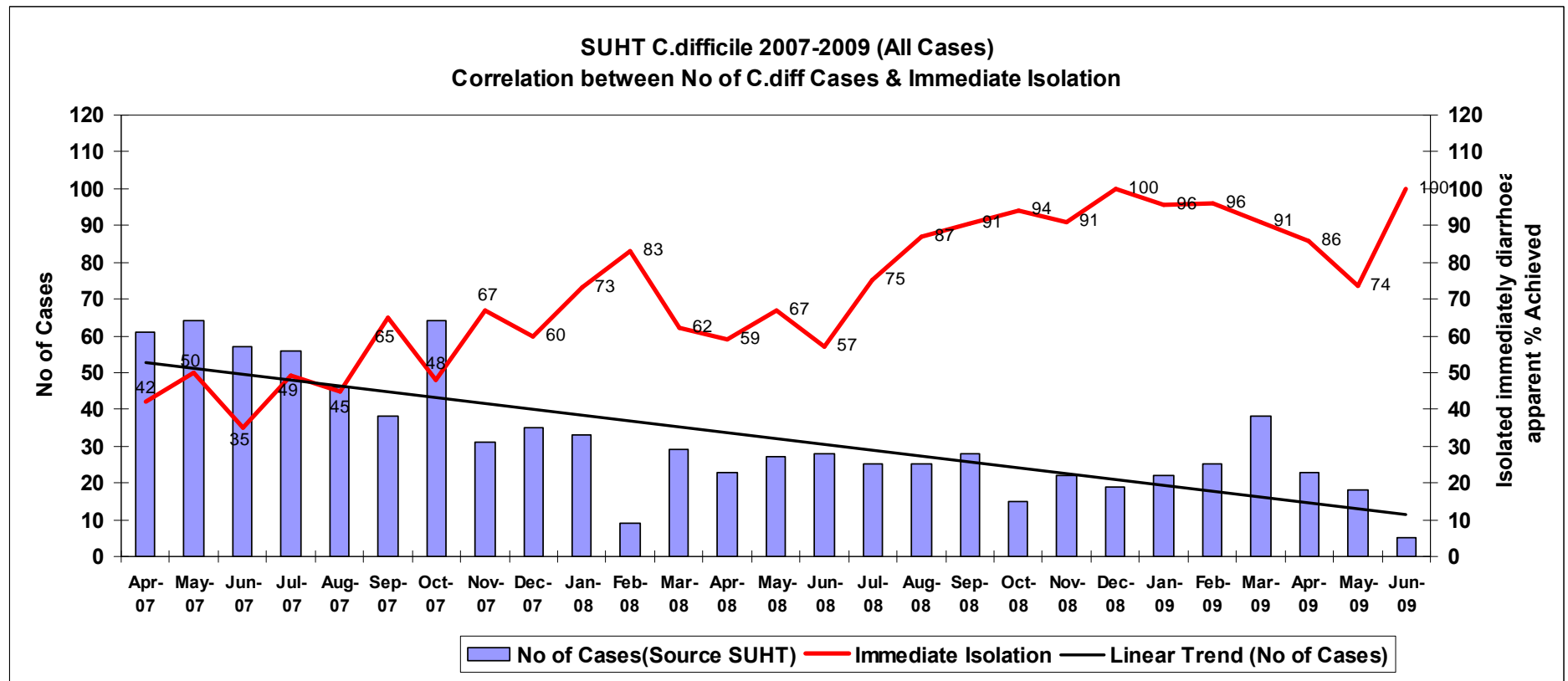
Association between early isolation of diarrhoea and cases of *C. difficile* infection



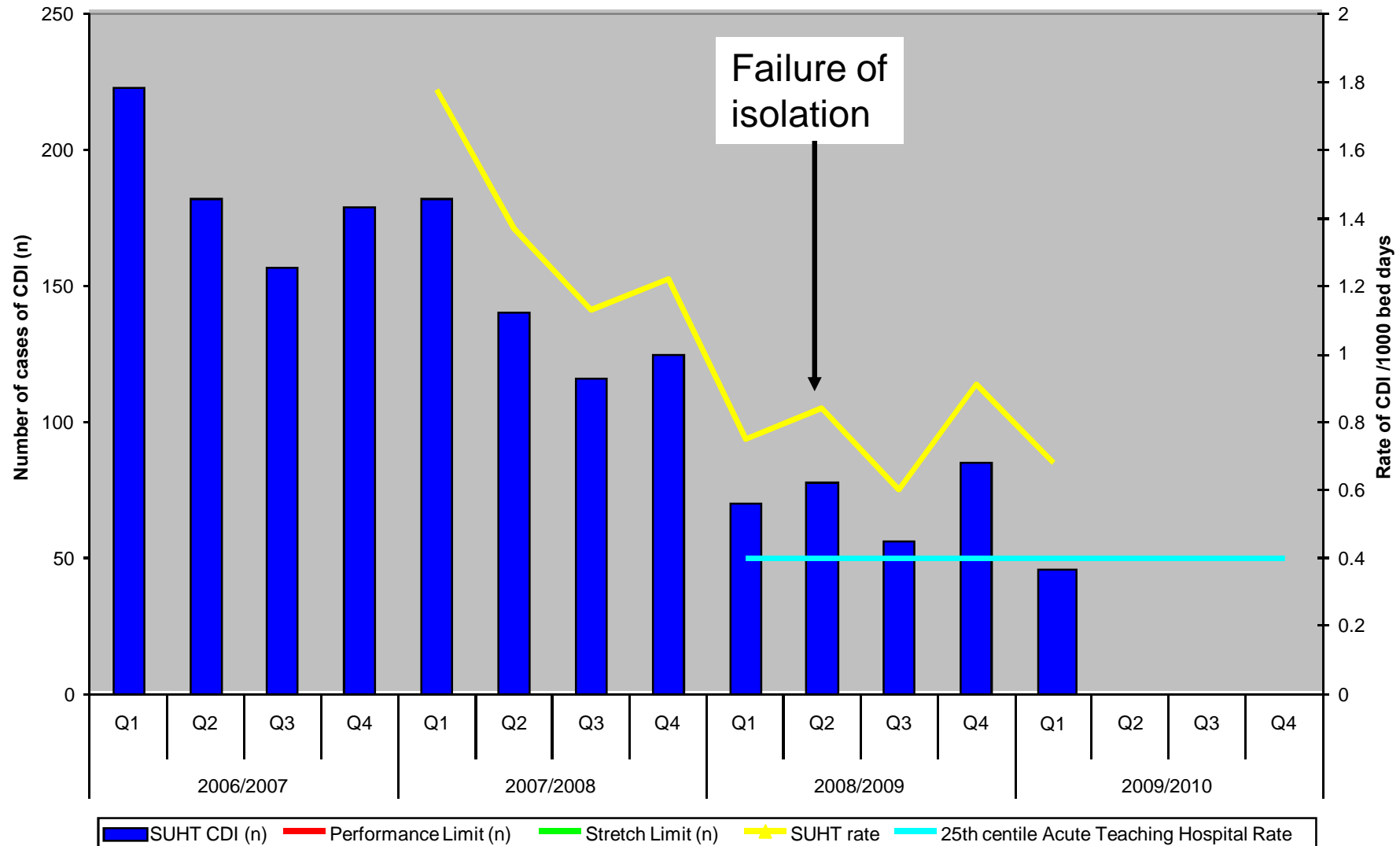
SUHT bed days lost to norovirus



Association between early isolation of diarrhoea and cases of *C. difficile* infection



SUHT *C. difficile* Infection Performance 2006- 2009

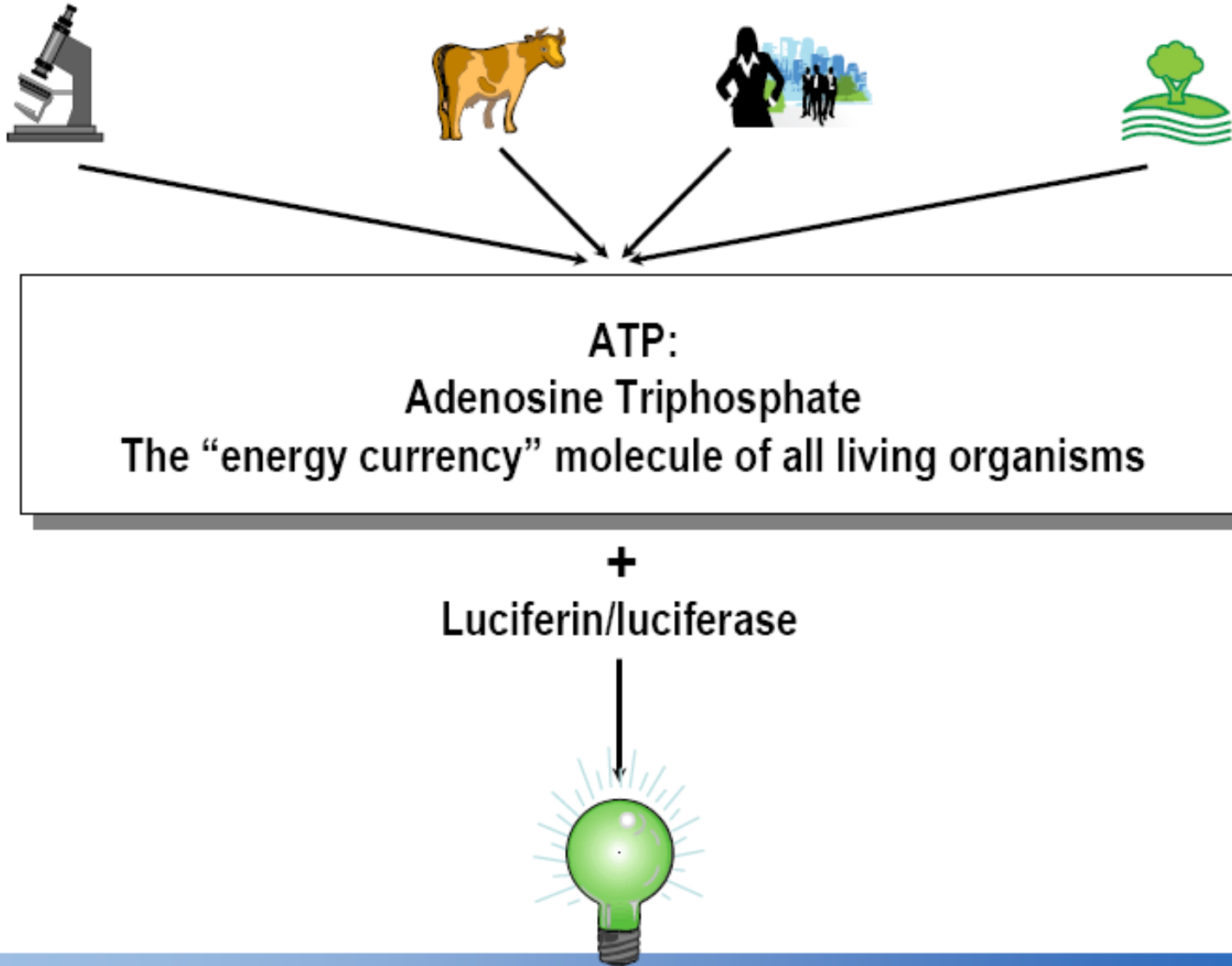


The inanimate environment is a reservoir of pathogens

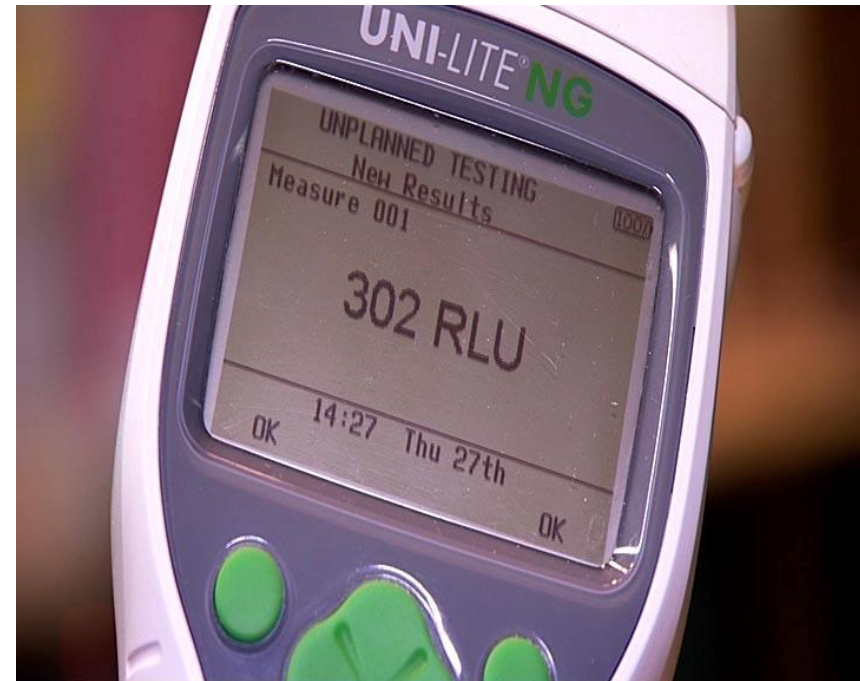
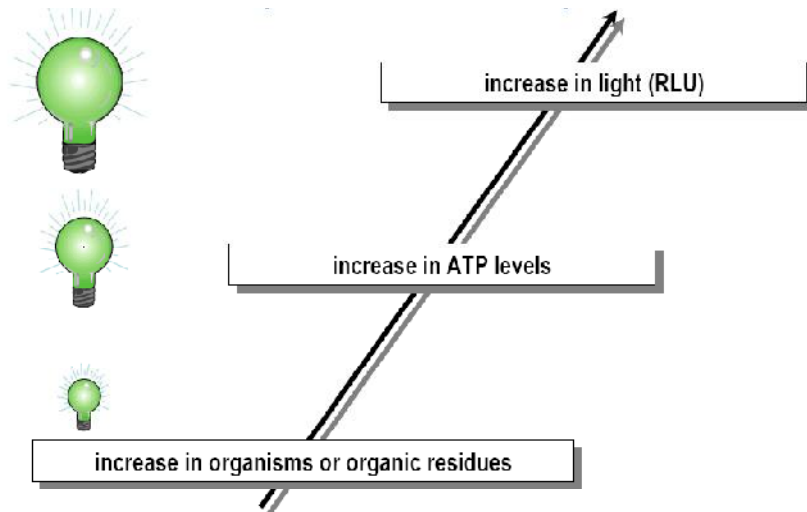


~ Contaminated surfaces increase cross-transmission ~

The Principle Behind ATP Bioluminescence

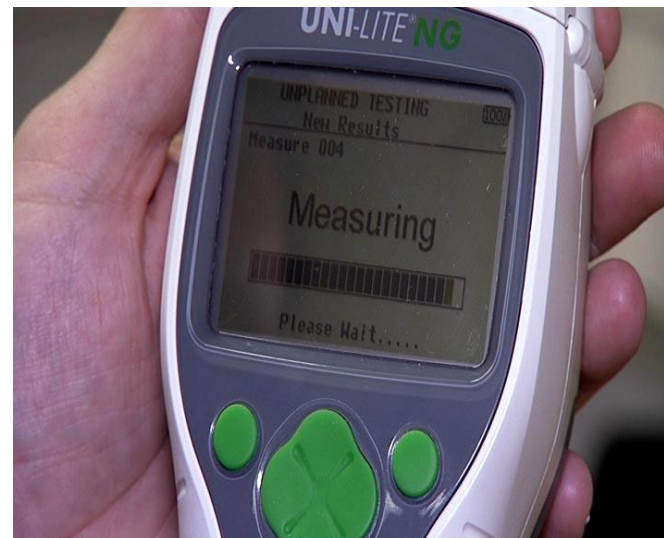


ATP-Bioluminescence Measurement

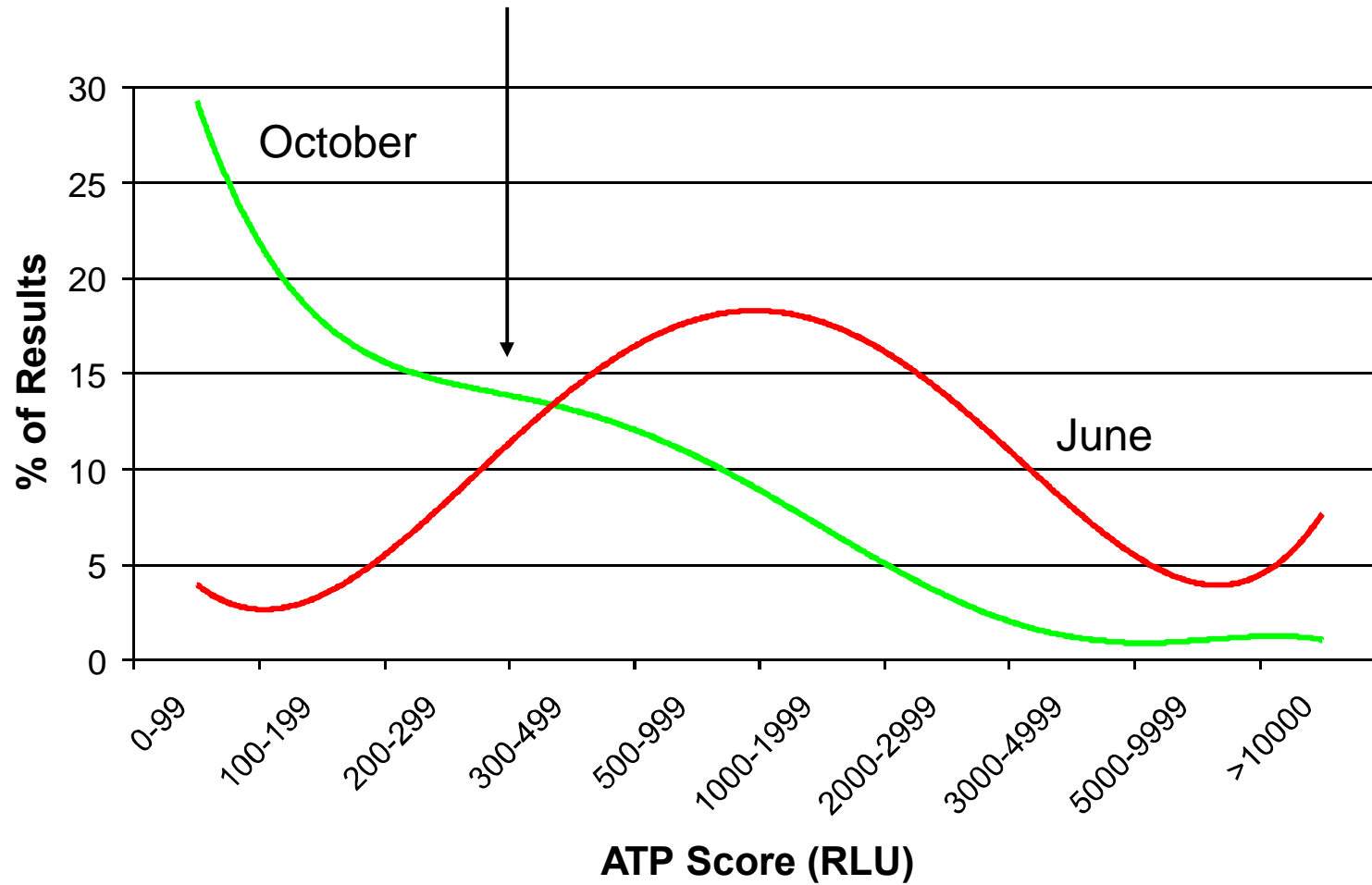


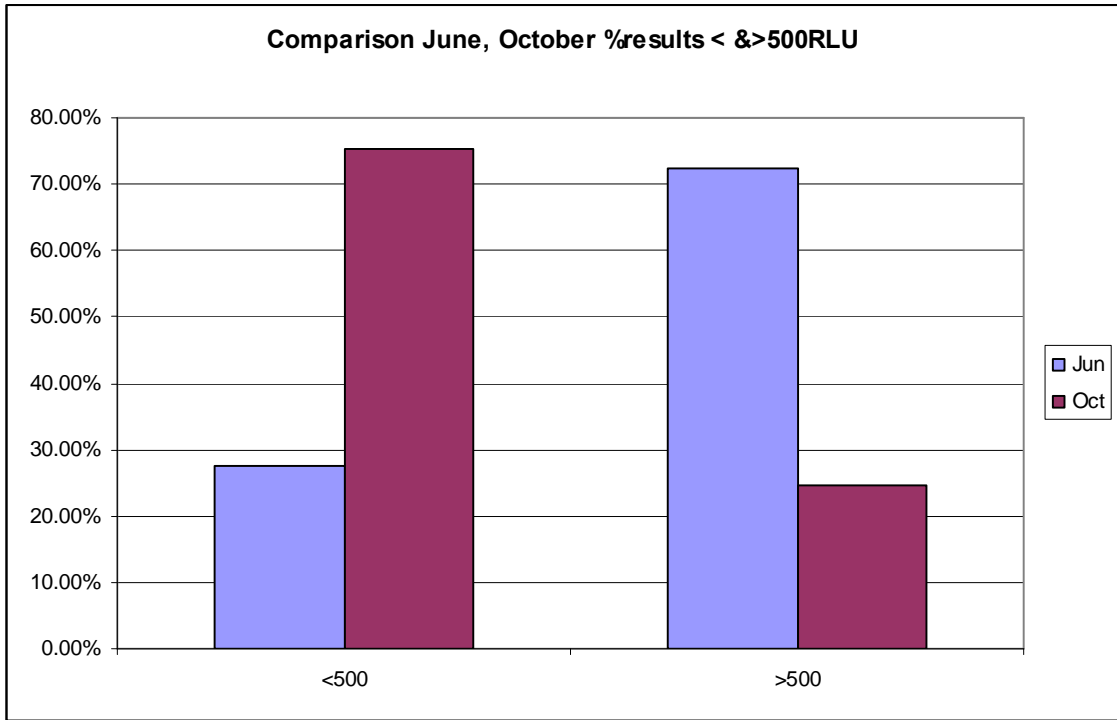
ATP bioluminescence monitoring

| Order No | Test Point |
|----------|---------------------------|
| 1 | Ext door plate main door |
| 2 | Int door plate main door |
| 3 | Centre of overbed table |
| 4 | FloorUnder patients bed |
| 5 | Top Bedside cabinet |
| 6 | Top cot or side bed rail |
| 7 | OnOffSwitch infusion pump |
| 8 | TopSurface arrest trolley |
| 9 | Nurse station by Keyboard |
| 10 | Drug trolley cover handle |
| 11 | Button on Microwave |
| 12 | Handle kitchen Fridge |
| 13 | Floor Front of BthRm Sink |
| 14 | Flush handle patient WC |
| 15 | TapHandle wash hand basin |
| 16 | Top of Patients WC seat |
| 17 | Commode seat bottom front |
| 18 | Int Door handle side ward |
| 19 | Ext Door handle side ward |



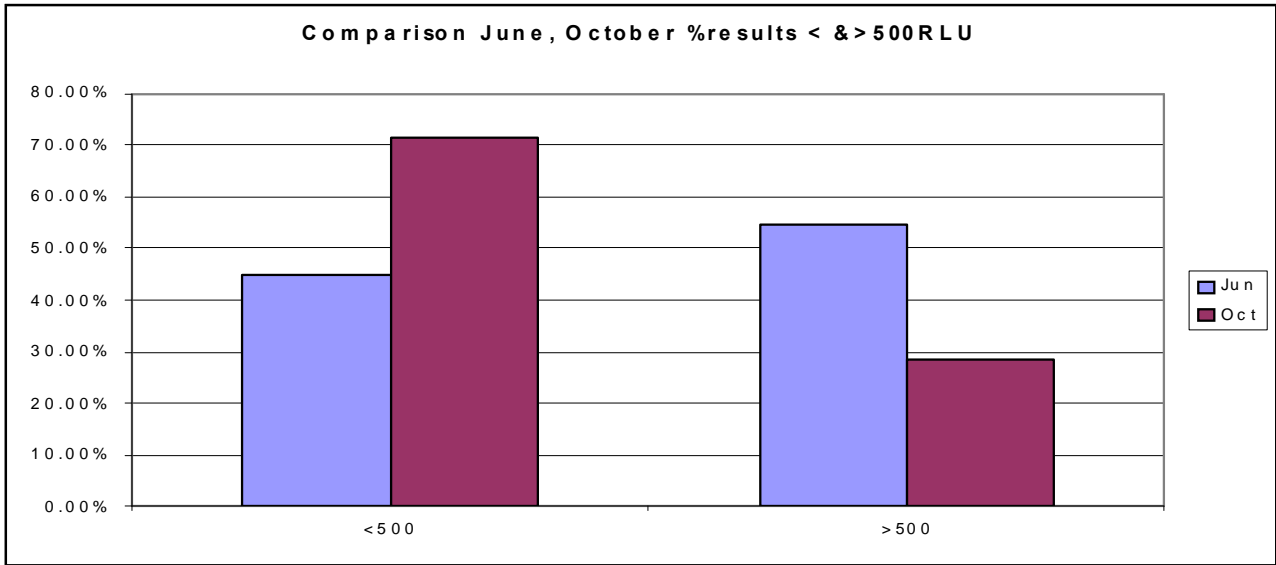
Distribution Curve of ATP Results





SUHT

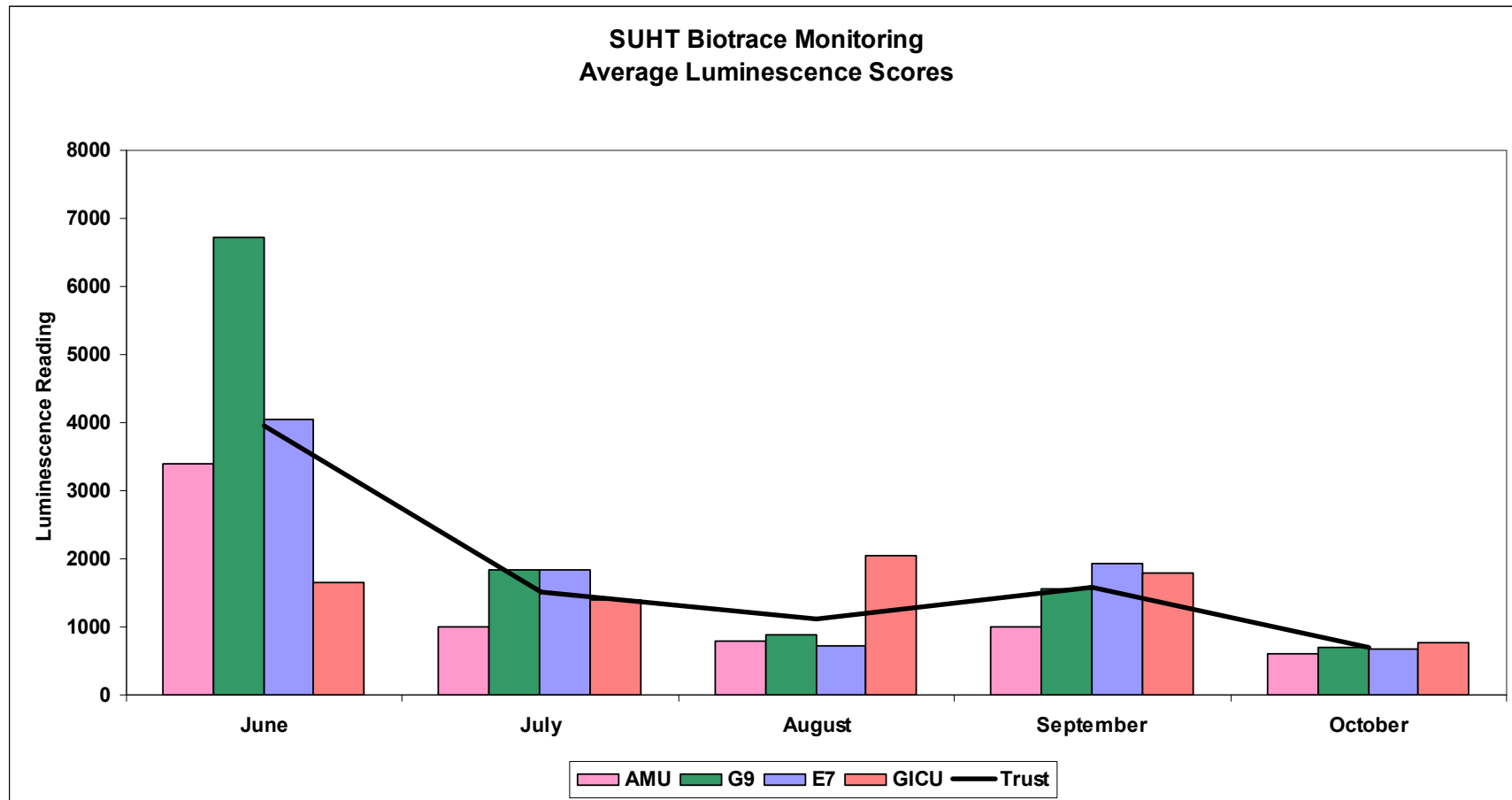
June . dirtier than average
 October . as clean



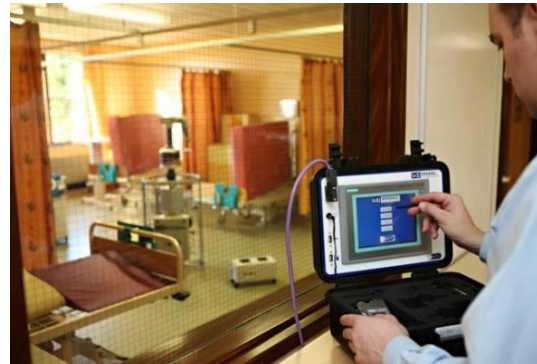
All hospitals

How clean is your ward?

Impact of feedback on cleanliness in SUHT



Bioquell Kit



Hydrogen Peroxide Vaporization System (Bioquell)

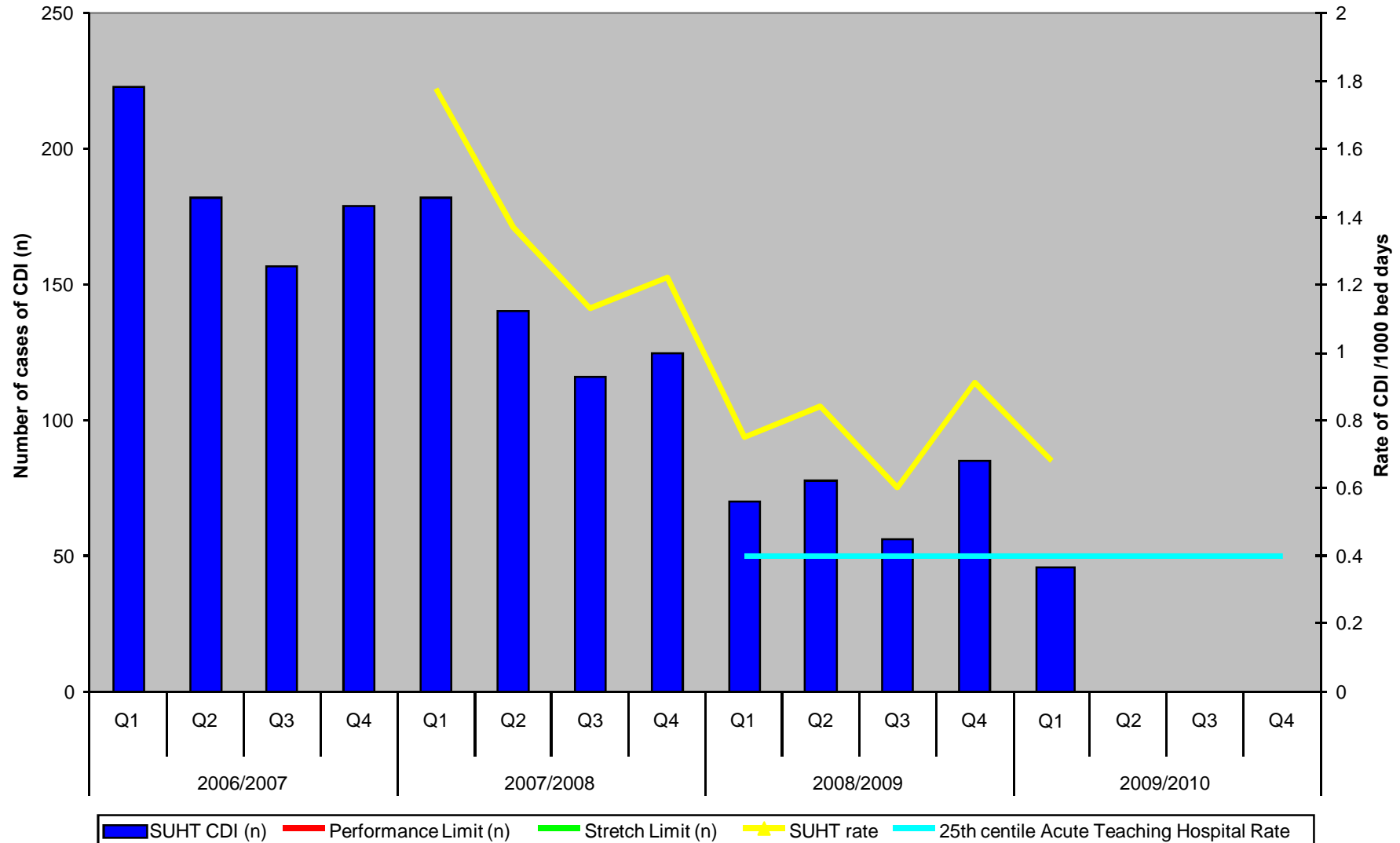
- ⊕ 30% H₂O₂ is heated
- ⊕ Released via high velocity by a 360° rotating nozzle
 - ⊕ Gas Phase - Vapour into the environment
(20 minutes)
- ⊕ Dwell Phase - Droplets formation rapid evaporation
(20 minutes)
- ⊕ Aeration (1:20 . 3:30) removal of residual H₂O₂

RRP 1 Rated

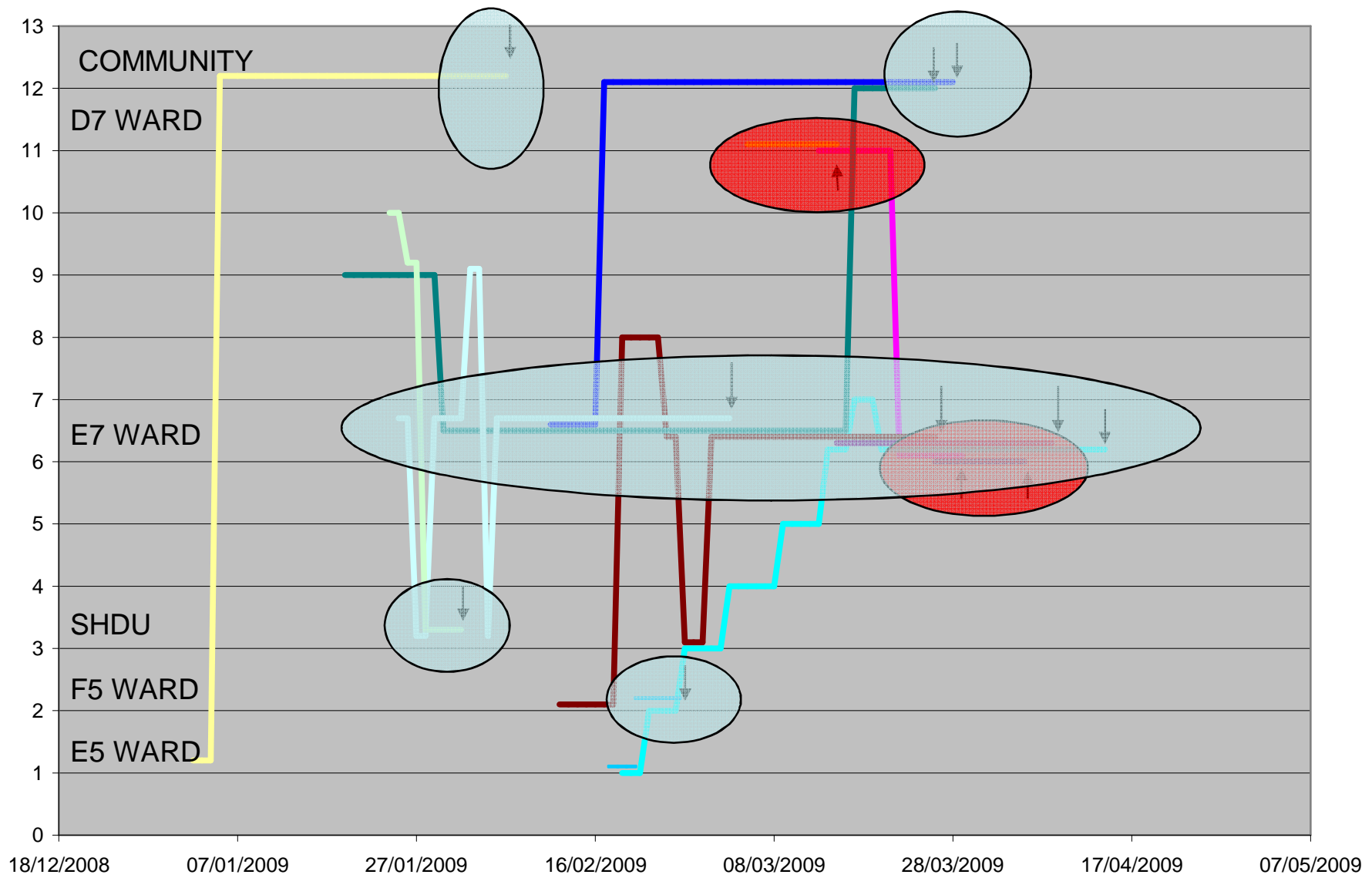
Benefits

- ⊕ Rapid decontamination
- ⊕ Alternative to Chloride and Formaldehyde
- ⊕ No Residue
- ⊕ Replaces “*Deep Cleaning*”
- ⊕ More Effective than Deep Cleaning

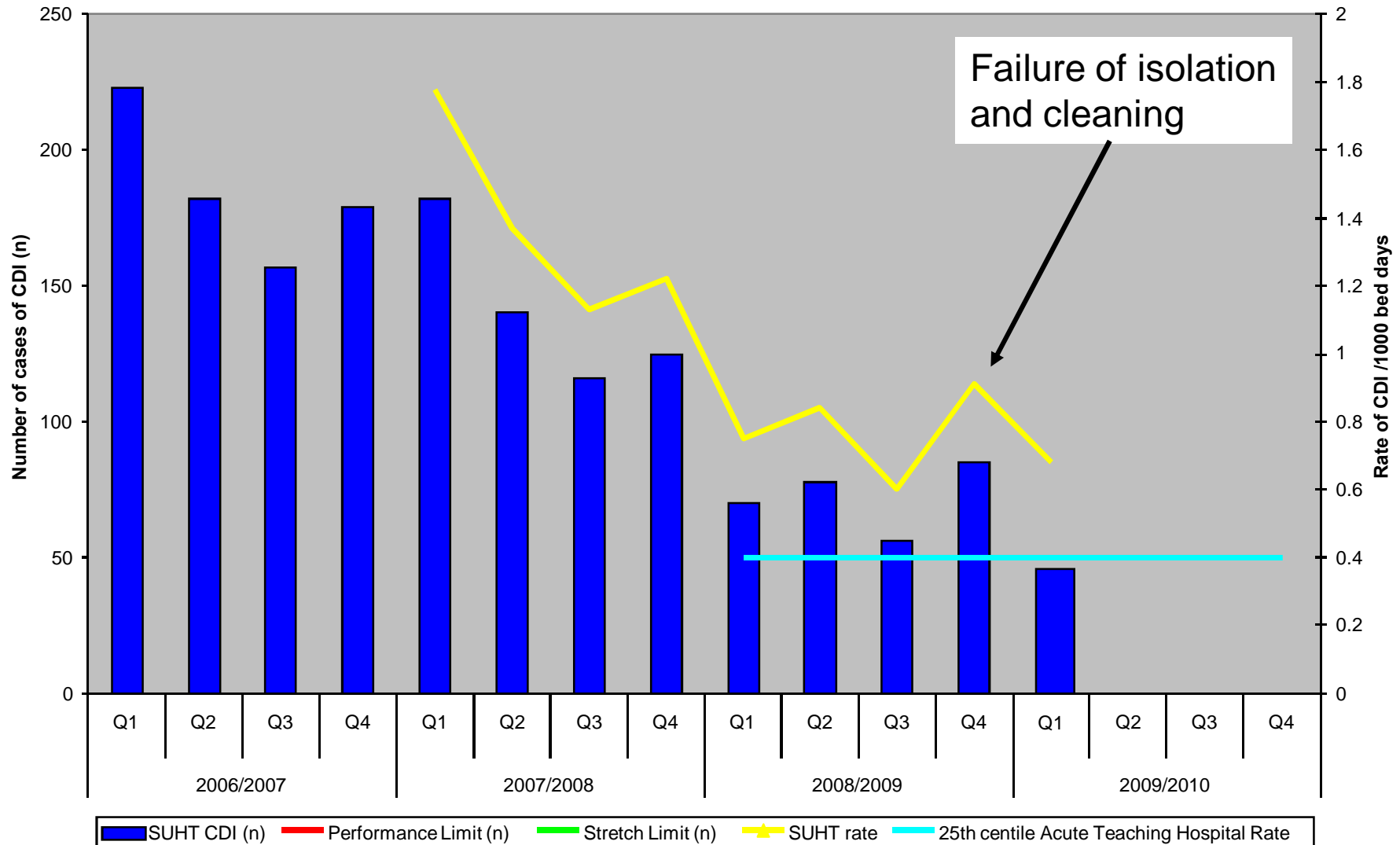
SUHT *C. difficile* Infection Performance 2006- 2009



E7 WARD C difficile O27 VNTR Cluster 1 and Cluster 2



SUHT *C. difficile* Infection Performance 2006- 2009



C. difficile Infection: Actions to make the change

- “ Early isolation of potentially infective diarrhoea
 - . Effective monitoring of performance
 - . Escalation of failures

- “ Ward cleaning
 - . Effective monitoring of performance
 - . Escalation of failures

- “ Prudent use of antibiotics
 - . Documentation of reasons for non-policy use
 - . Feedback on performance

- “ Monitoring of Overall Performance
 - . Saving Lives audits
 - . Early investigation of periods of increased incidence

õ Because there is no Plan B

- “ Maintaining effort to sustain achievement
- “ Continued attention to basic details
- “ Understanding process
 - . How we do what we do
 - . Why we do what we do
- “ Knowing outcomes