Hospital Level Resistance Data
The Cape Town Perspective

Andrew Whitelaw

NATIONAL HEALTH
LABORATORY SERVICE

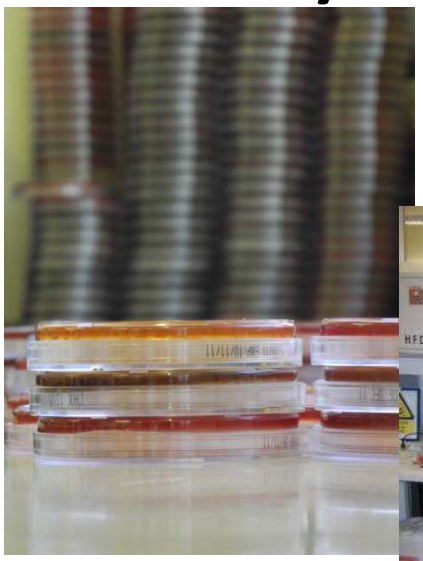
The Hospitals

- Groote Schuur
- Tertiary level
  - 893 beds
  - 28 ICU beds
  - Oncology, transplant

- Red Cross Children's
- Tertiary level
  - 240 beds
  - 22 ICU beds
  - Burns unit
  - Oncology, transplant

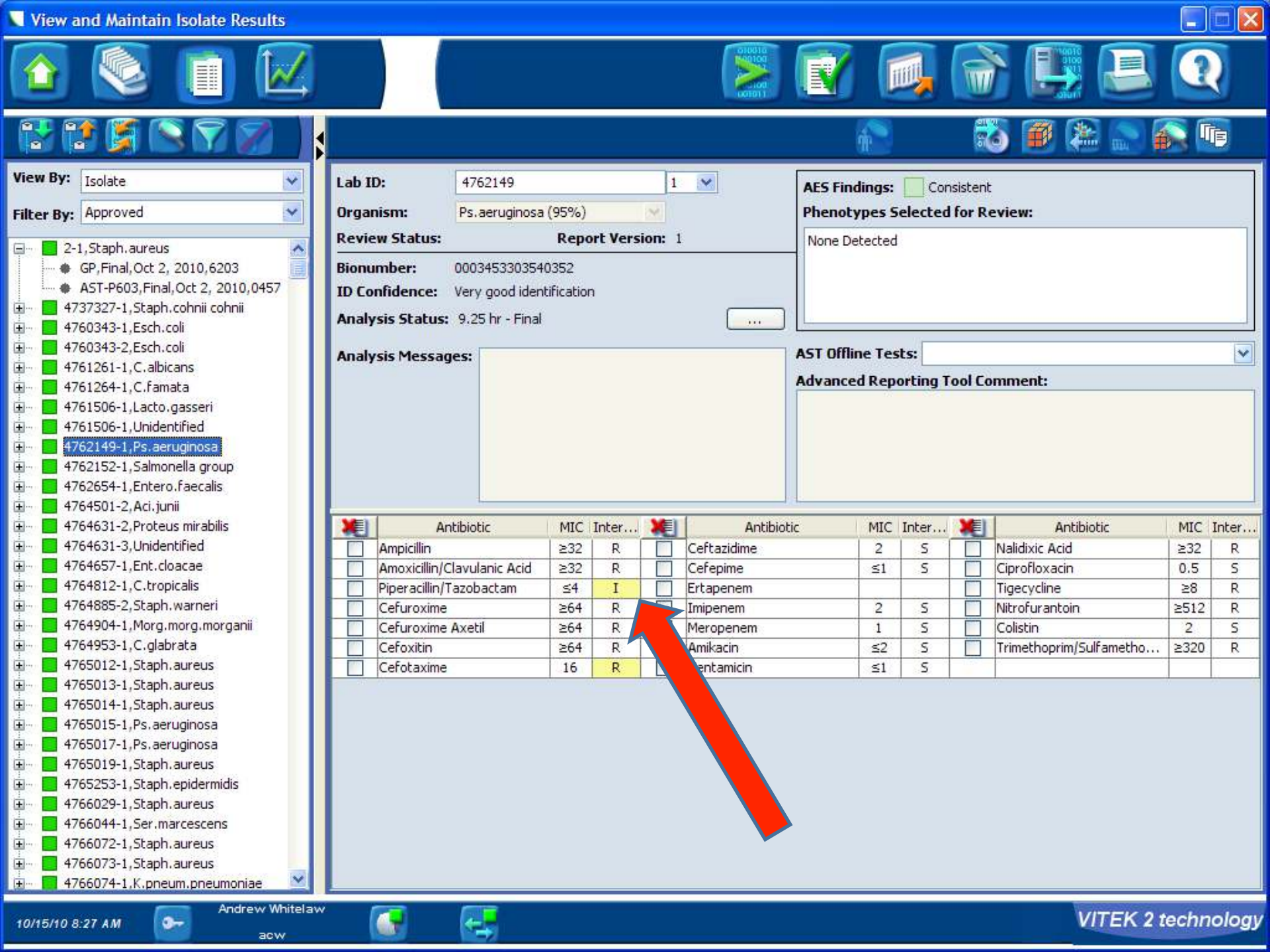
The laboratory

- National Health Laboratory Service
- SANAS accredited (ISO 15189) since 2002
- 3 microbiologists, 24-28 technologists / technicians
- 2000 BC / month
- 800 resp / month



AST

- Vitek II (BioMerieux) with expert system
- Disc diffusion (backup)
- Etest (S. pneumo)
- CLSI criteria, updated annually
- EQA – NHLS and NEQAS
- IQC on all reagents, cards, media etc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4765019-1,Staph.aureus
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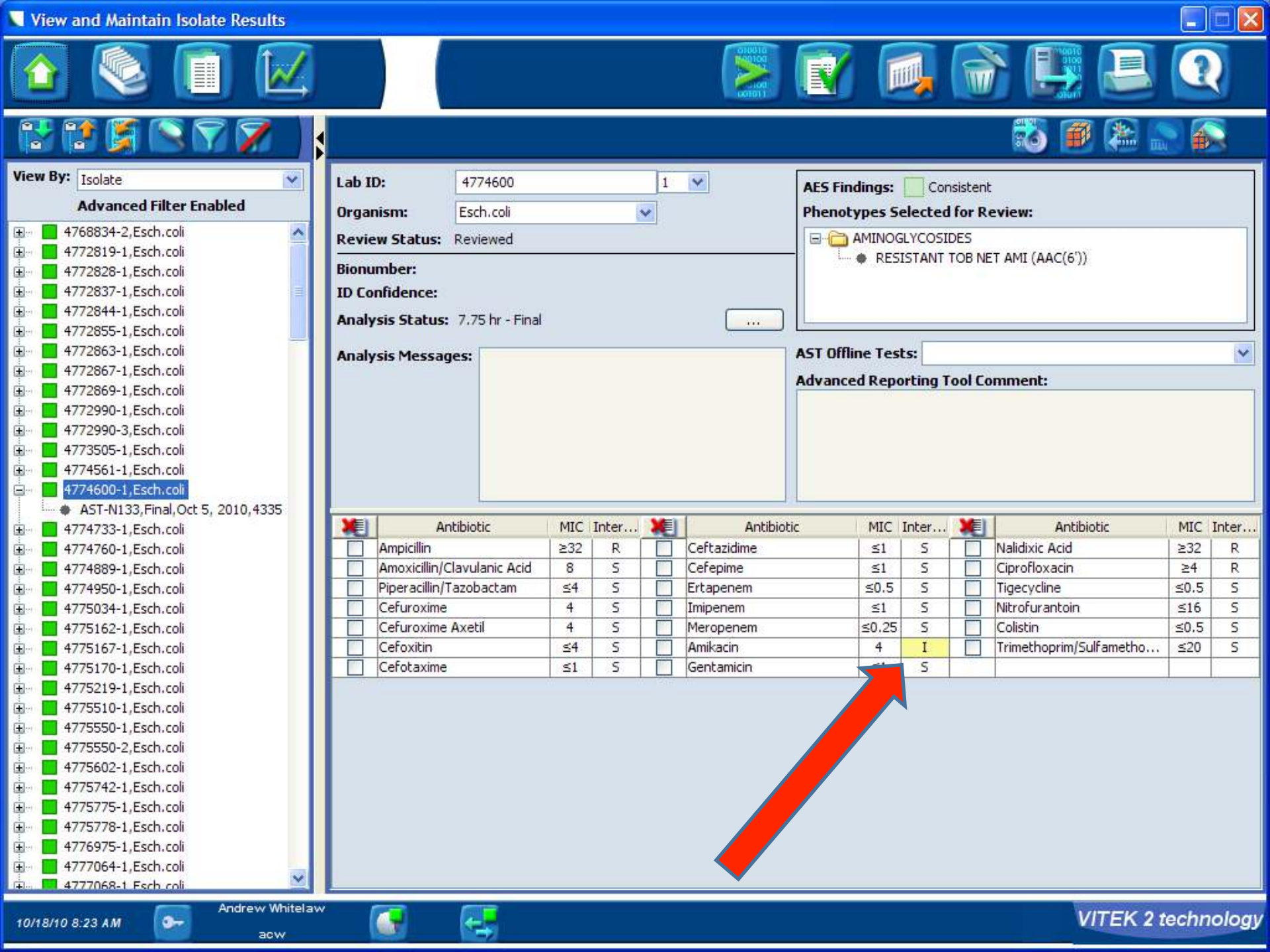
4766029-1,Staph.aureus
4766044-1,Ser.marcescens
4766072-1,Staph.aureus
4766073-1,Staph.aureus
4766074-1,K.pneum.pneumoniae
Lab ID: 4762149 1
Organism: Ps.aeruginosa (95%)
Review Status:
Report Version: 1
Bionumber: 0003453303540352
ID Confidence: Very good identification
Analysis Status: 9.25 hr - Final
...
Analysis Messages:
AES Findings: Consistent
Phenotypes Selected for Review:
None Detected
AST Offline Tests:
Advanced Reporting Tool Comment:
Antibiotic MIC Inter... Antibiotic MIC Inter... Antibiotic MIC Inter...
Ampicillin ≥32 R Ceftazidime 2 S Nalidixic Acid ≥32 R
Amoxicillin/Clavulanic Acid ≥32 R Cefepime ≤1 S Ciprofloxacin 0.5 S
Piperacillin/Tazobactam ≤4 I Ertapenem Tigecycline ≥8 R
Cefuroxime ≥64 R Imipenem 2 S Nitrofurantoin ≥512 R
Cefuroxime Axetil ≥64 R Meropenem 1 S Colistin 2 S
Cefoxitin ≥64 R Amikacin ≤2 S Trimethoprim/Sulfametho... ≥320 R
Cefotaxime 16 R ≤1 S
10/15/10 8:27 AM
Andrew Whitelaw
acw
VITEK 2 technology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4775602-1,Esch.coli
4775742-1,Esch.coli
4775775-1,Esch.coli
4775778-1,Esch.coli
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4777064-1,Esch.coli
Lab ID: 4774600 1
Organism: Esch.coli
Review Status: Reviewed
Bionumber:
ID Confidence:
Analysis Status: 7.75 hr - Final
...
Analysis Messages:
AES Findings: Consistent
Phenotypes Selected for Review:
AMINOGLYCOSIDES
RESISTANT TOB NET AMI (AAC(6'))
AST Offline Tests:
Advanced Reporting Tool Comment:
Antibiotic MIC Inter... Antibiotic MIC Inter... Antibiotic MIC Inter...
Ampicillin ≥32 R Ceftazidime ≤1 S Nalidixic Acid ≥32 R
Amoxicillin/Clavulanic Acid 8 S Cefepime ≤1 S Ciprofloxacin ≥4 R
Piperacillin/Tazobactam ≤4 S Ertapenem ≤0.5 S Tigecycline ≤0.5 S
Cefuroxime 4 S Imipenem ≤1 S Nitrofurantoin ≤16 S
Cefuroxime Axetil 4 S Meropenem ≤0.25 S Colistin ≤0.5 S
Cefoxitin ≤4 S Amikacin 4 I Trimethoprim/Sulfametho... ≤20 S
Cefotaxime ≤1 S Gentamicin S
10/18/10 8:23 AM
Andrew Whitelaw
acw
VITEK 2 technology

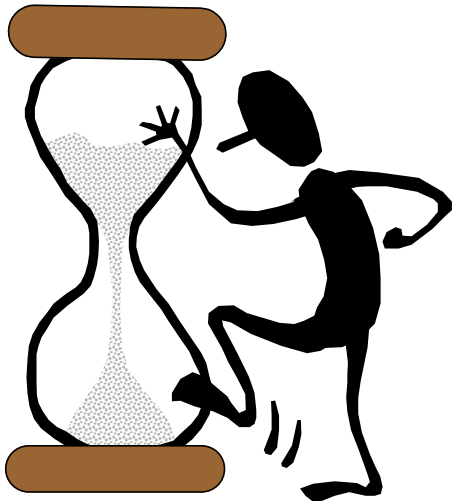
The Laboratory Information System

- DISAlab (SA product)
- All samples and results captured
- Scope for inter-laboratory variation
  - Confusion…
- All results stored centrally (data warehouse)
- Searchable – within reason
  - Locally
  - via CDW

- NO link to hospital information system
- NO admission / outcome data
- NO reliable clinical data

The new LIS

- Trak Care (LabTrak)
- Run off central server
- Attempt to standardise national reporting
  - Wait and see…



Available Data – Routine Lab

- Susceptibility summaries
  - By ward (dependent on data capture)
  - By specimen type (dependent on data capture)
  - By organism type
    - Genus, group (Enterobacteriaceae, non-fermenters etc)
  - By month, quarter, half, year
  - Duplicates excluded (same patient, specimen, organism, within 2 week window)
- Individual patient level data extracts more difficult (need more manual cleaning up)

Available data – Routine Pharmacy

- Usage / ward
- No/limited individual patient data (as yet)
  - Duration
  - Dose
  - Indication
  - Prescriber

Available data – Hospital system

- Admission / discharge
- Death
- Diagnosis
- No case notes

Available data - Other

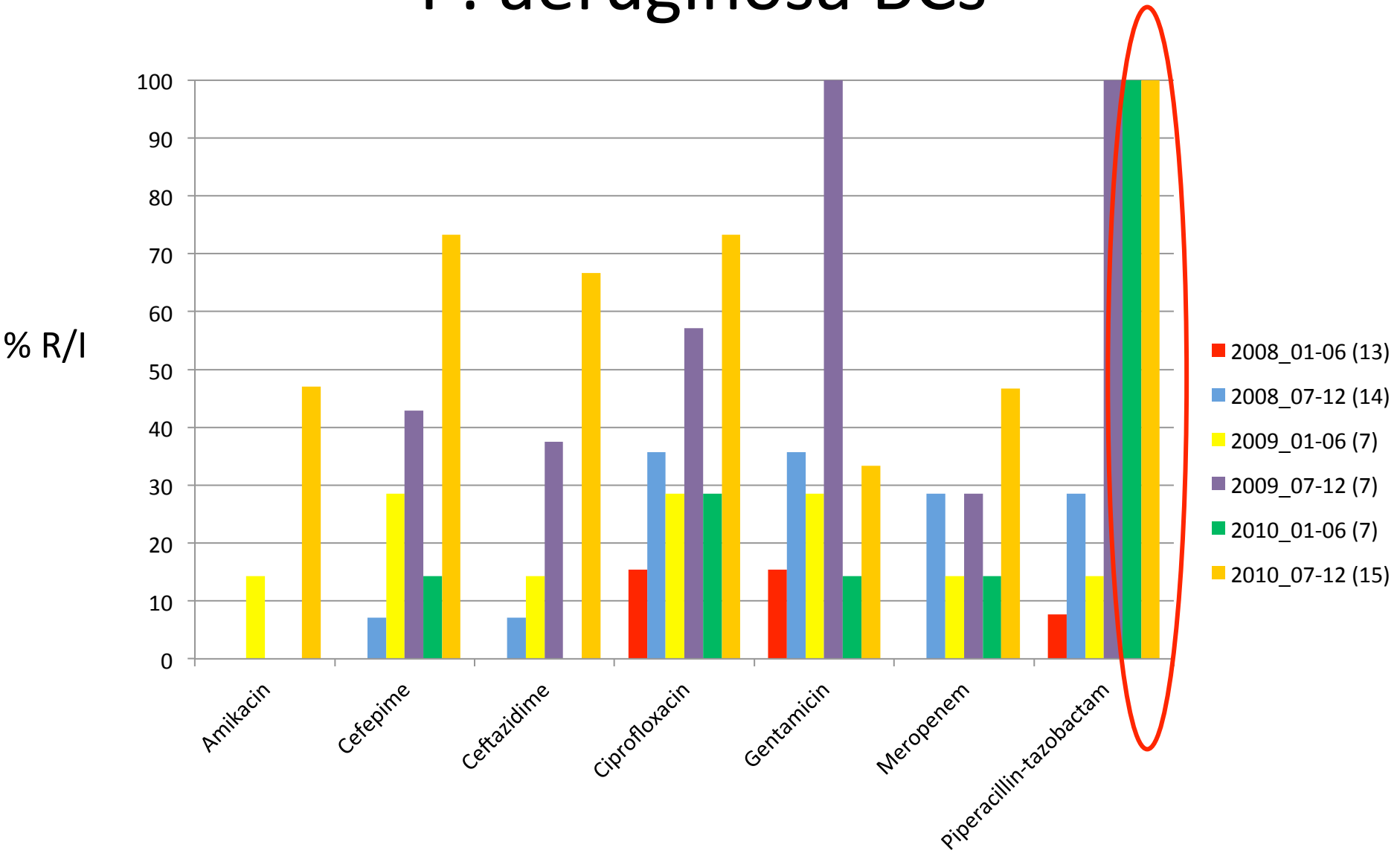
- Research studies
  - HAI surveys
  - Bacteraemia surveys
- Surveillance – respiratory, meningeal, enteric pathogens
  - S. pneumoniae, H. influenzae, N. meningitidis
  - Salmonella, Shigella
  - Cryptococcus

So how do we use the data?

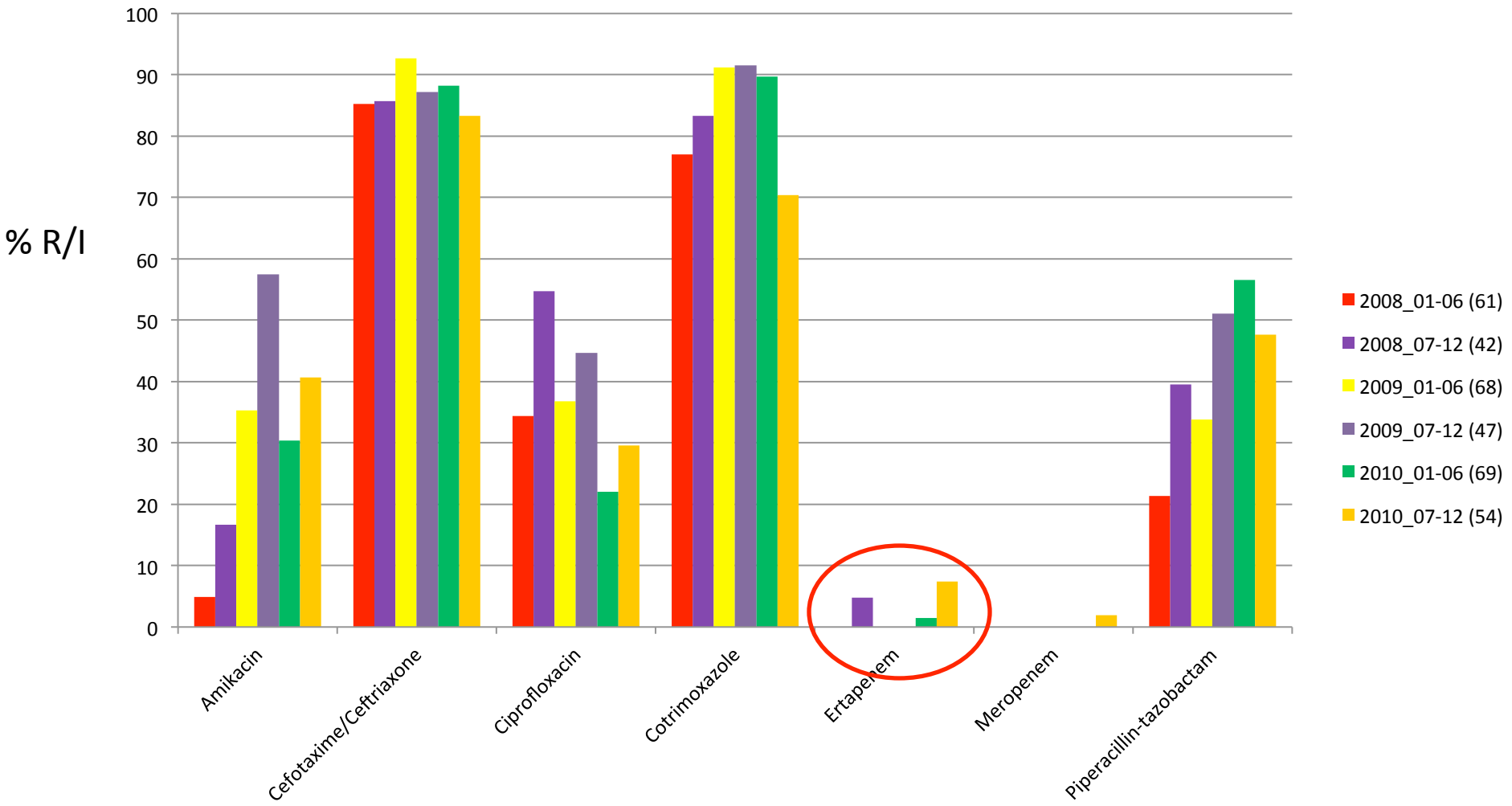
- Monitor current / emerging resistance
- Guide empiric choices
- Review interventions
- Monitor antibiotic usage

- Present / publish

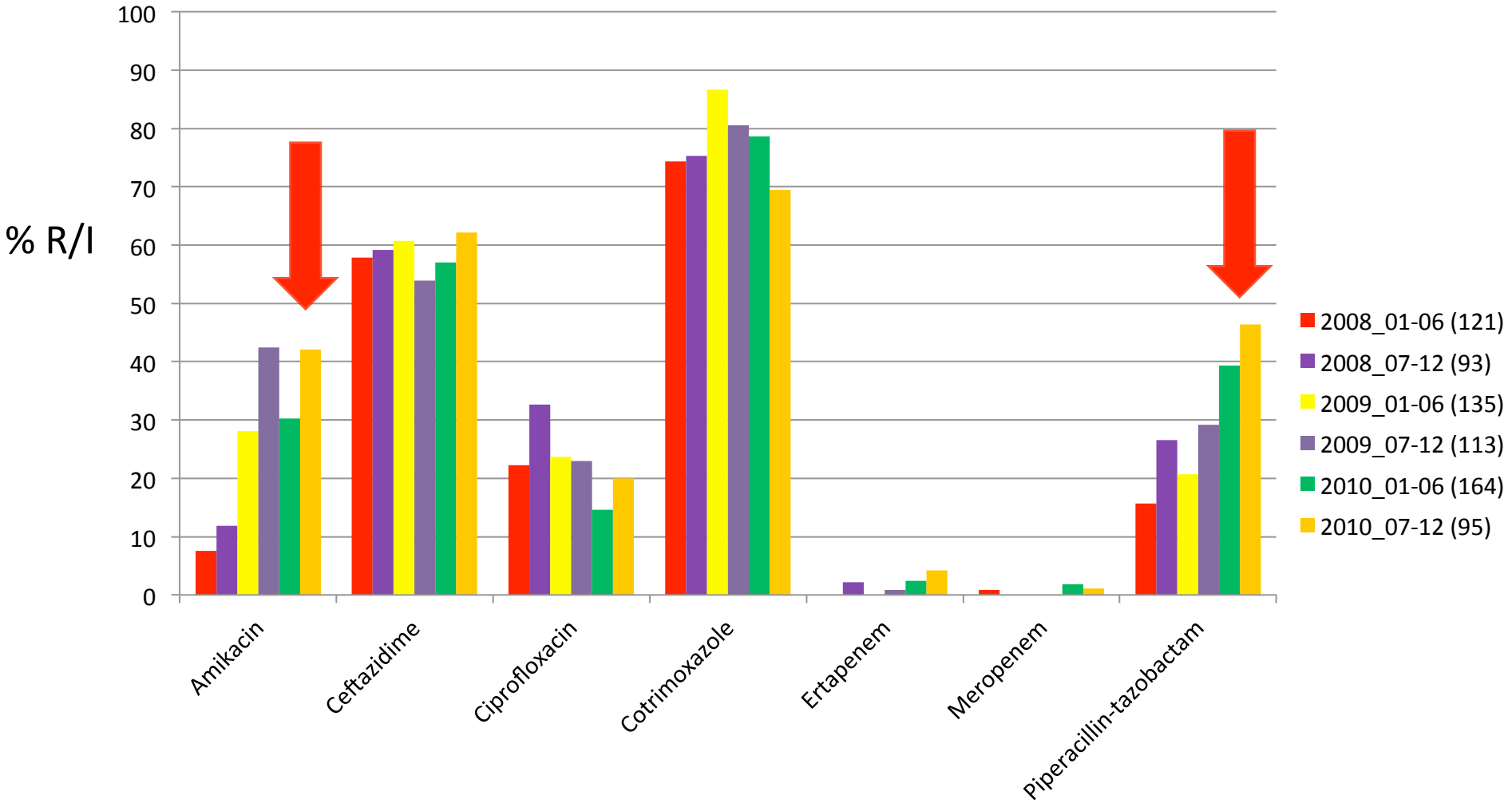
Monitor Resistance
P. aeruginosa BCs



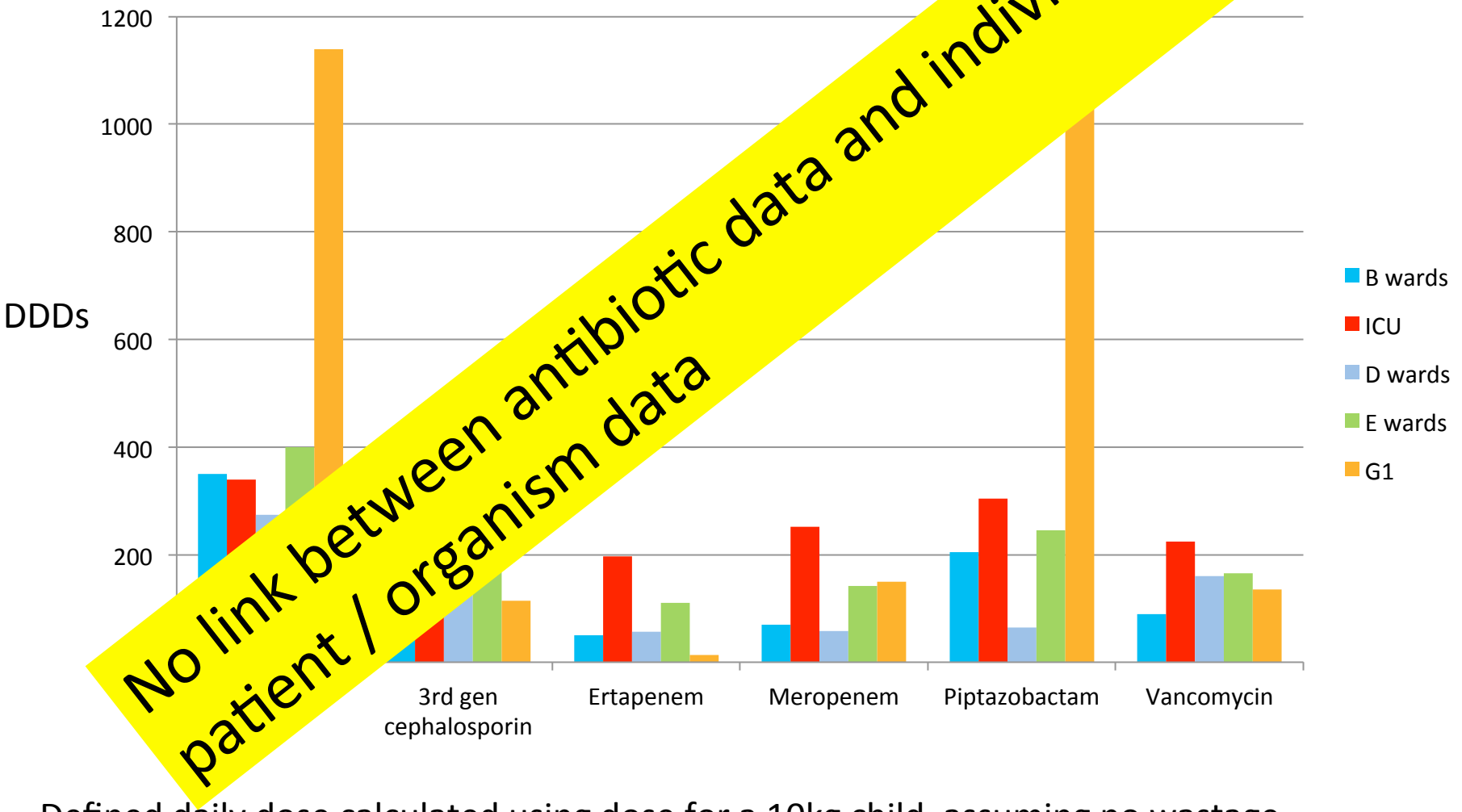
Monitor Resistance
K. pneumoniae from BCs



Guide empiric therapy
Enteric GNB from BCs



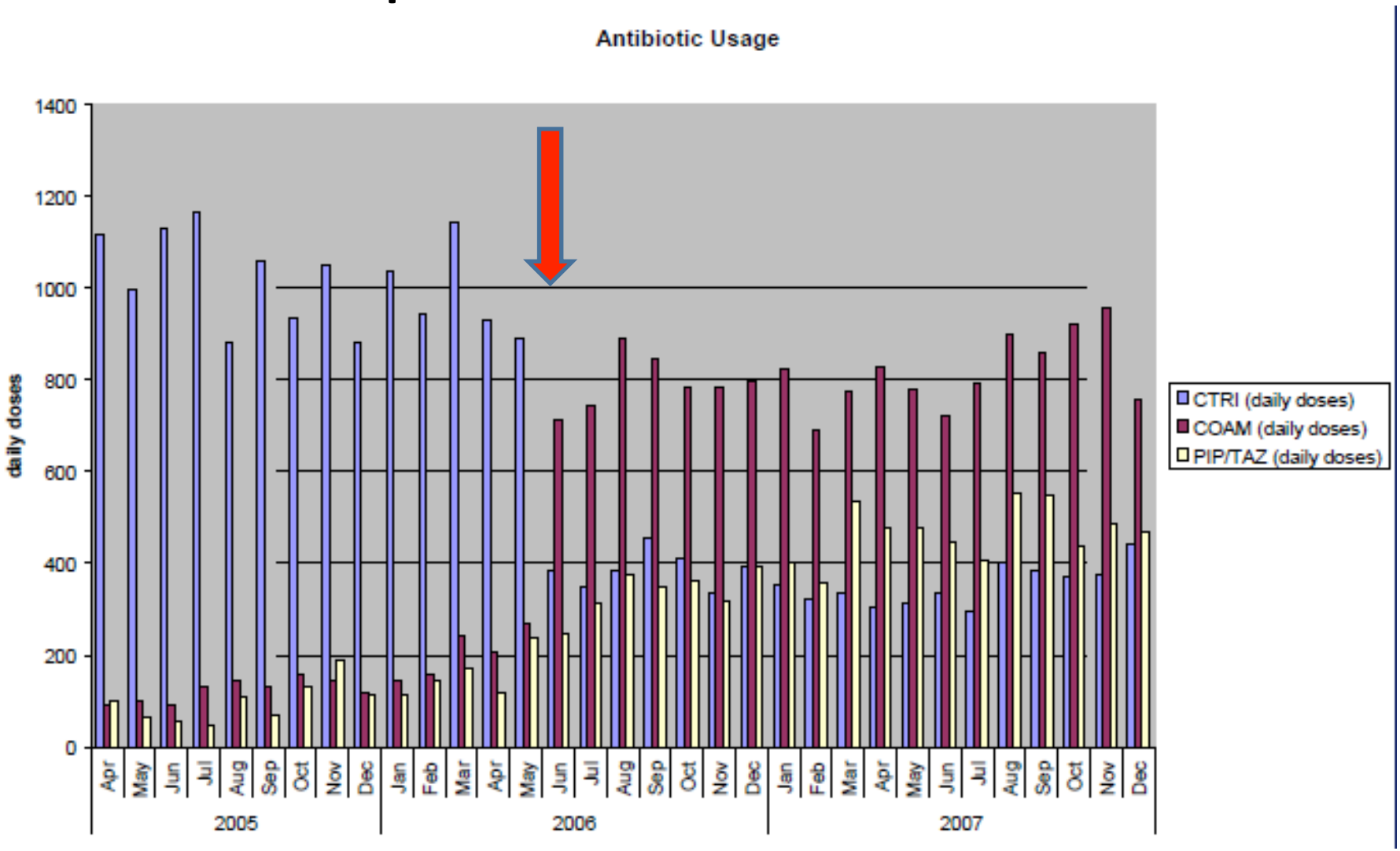
Monitor antibiotic use
Defined daily dose



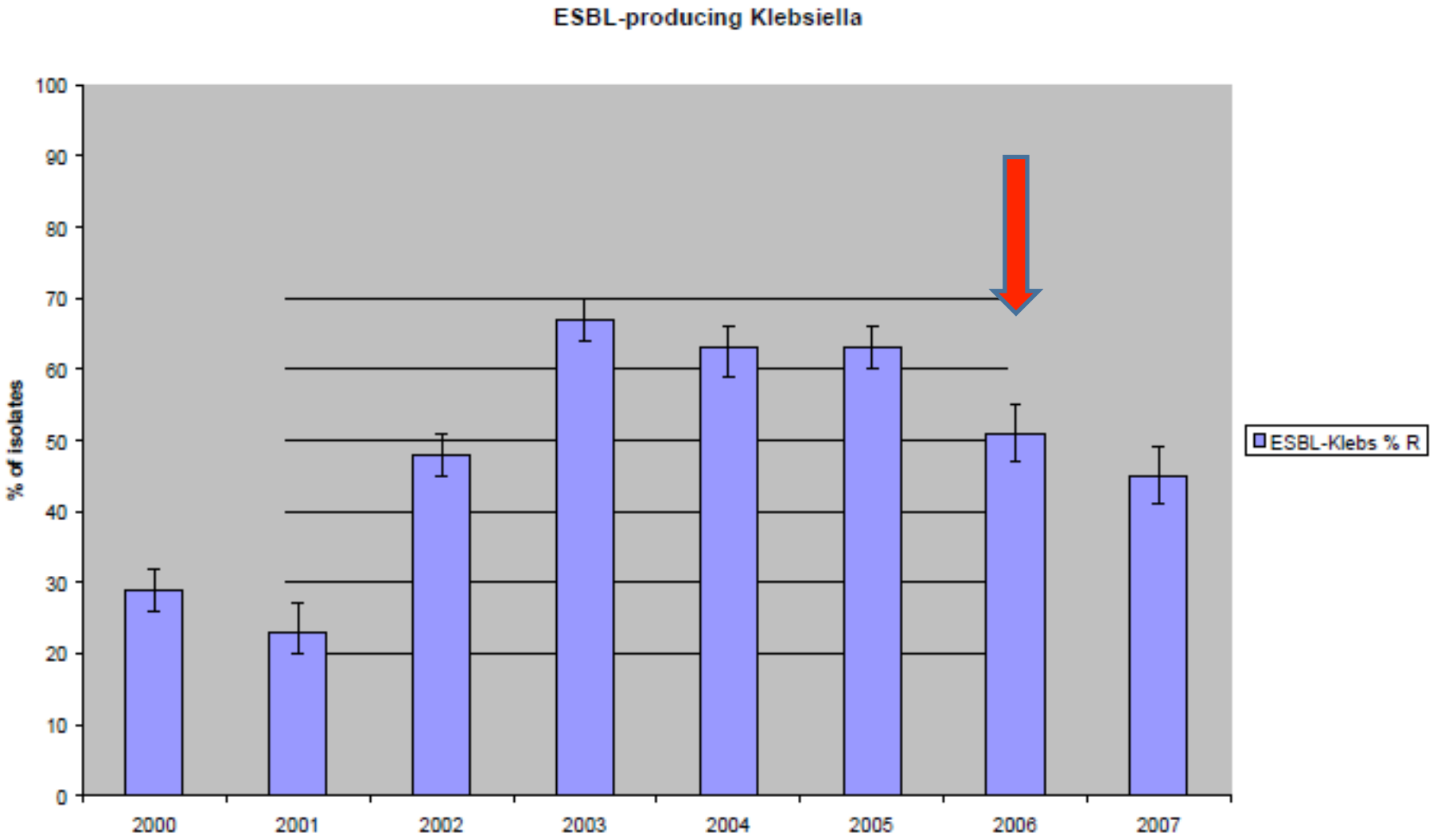
No link between antibiotic data and individual patient / organism data

Defined daily dose calculated using dose for a 10kg child, assuming no wastage

Intervention
Ceph R and use at GSH



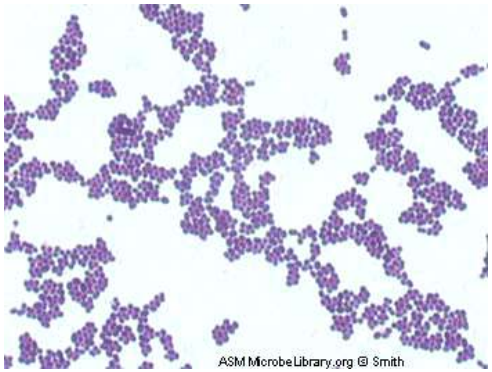
Oliver S, Poster 1291, ECCMID 2008

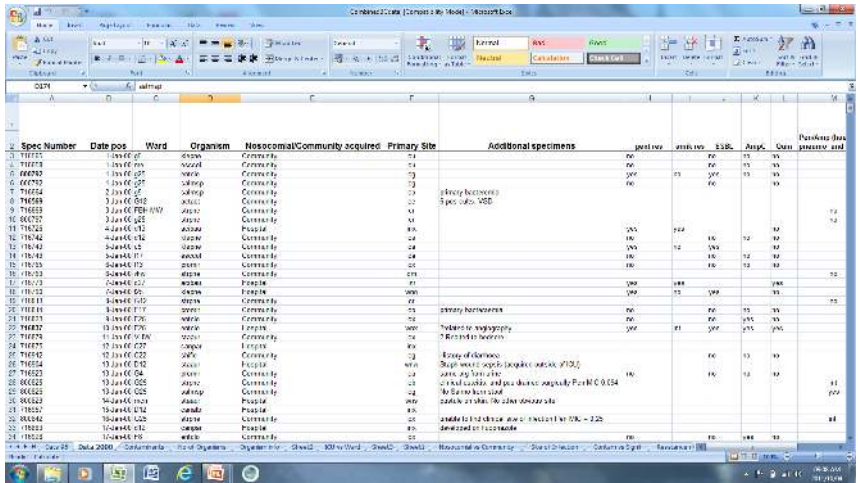


Oliver S, Poster 1291, ECCMID 2008

Surveillance
Classification of Bacteraemia

- Pos BCs notified telephonically
- Manually entered onto excel
  - Demographics
  - Organism
  - Site of infection
  - Key antibiotics





Org and resistance by site (2000)

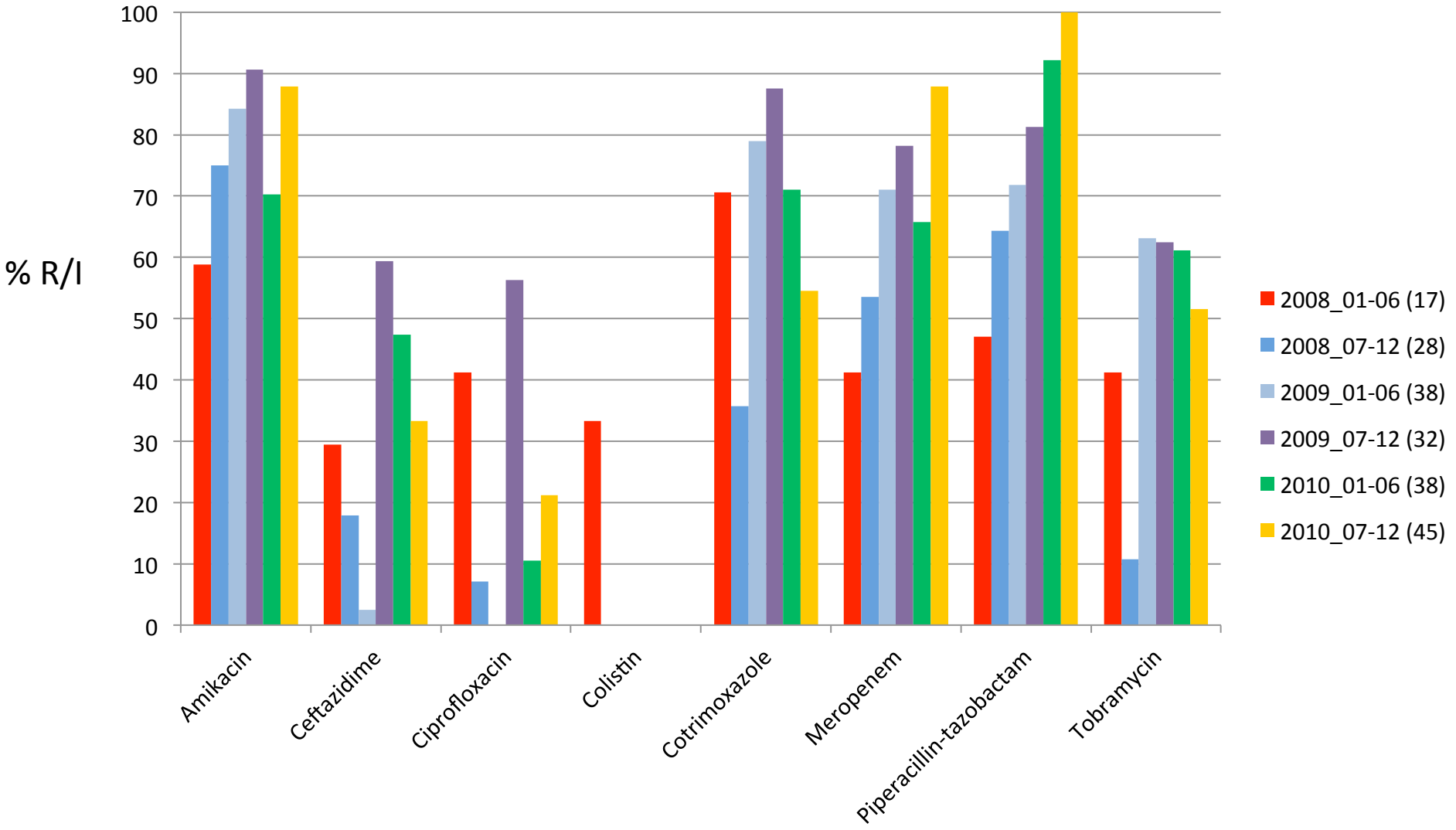
	Ward isolates		ICU isolates		Community isolates		Total	
ESBL pos	19	20%	32	24%	15	7%	66	15%
AmpC pos	19	20%	31	24%	19	8%	69	15%
Quin Res	14	15%	31	24%	9	4%	54	12%
Amik Res	14	15%	43	33%	4	2%	61	13%
Gent Res	32	34%	0	0%	26	11%	131	13%
Piptazo res	10	11%	18	14%	3	1%	31	7%
Mero Res	6	6%	24	18%	2	1%	32	7%
MRSA	19	44%	7	47%	9	15%	35	30%
Meth R Coag neg Staph	6	50%	6	75%	4	50%	16	57%
E.coli	17		5		108		130	
K. pneumonia	13		29		38		80	
Enterobacter spp	12		20		17		49	
Klebsiella spp	0		4		4		8	
Proteus spp	5		0		14		19	
Serratia spp	8		10		4		22	
Citrobacter spp	1		2		5		8	
A. baumanii	15		24		3		42	
S. maltophilia	4		16		1		21	
P. aeruginosa	9		14		5		28	
Salmonella spp	0		2		29		31	
Pantoea spp	2		2		0		4	
Other Acineto	6		2		0		8	
Other Pseudomonas	1		1		2		4	
Total GNB	93		131		230		454	
S. aureus	43		15		59		117	
Coag neg Staph	12		8		8		28	

Future plans

- Link HIS to LIS
- Active surveillance for Klebsiella, S. aureus bacteraemia
- Capture community vs health care associated on LIS (bacteraemia)
- Better use pharmacy data / pharmacists


THE END
THANK YOU

Monitor Resistance
A. baumannii from BCs



Enteric GNB from BCs

In-patient wards, oncology (2010, n=124)