Sharing of AMR control in local public hospital - hurdles and ways to overcome

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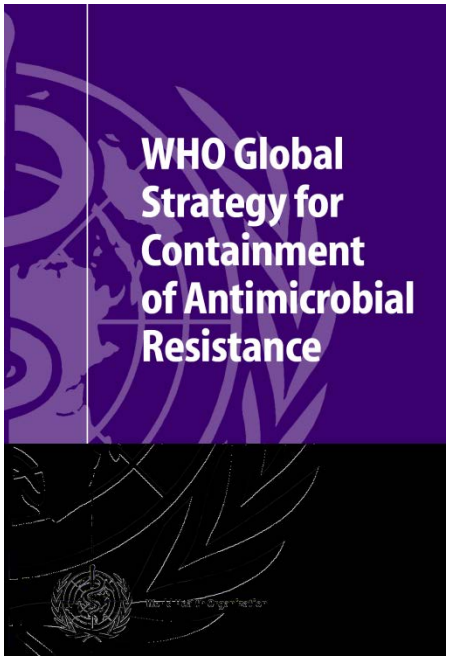
Worldwide Concern on Improving the containment of Antibiotic Resistance (2001)

“Antibiotics” - “Societal drugs”



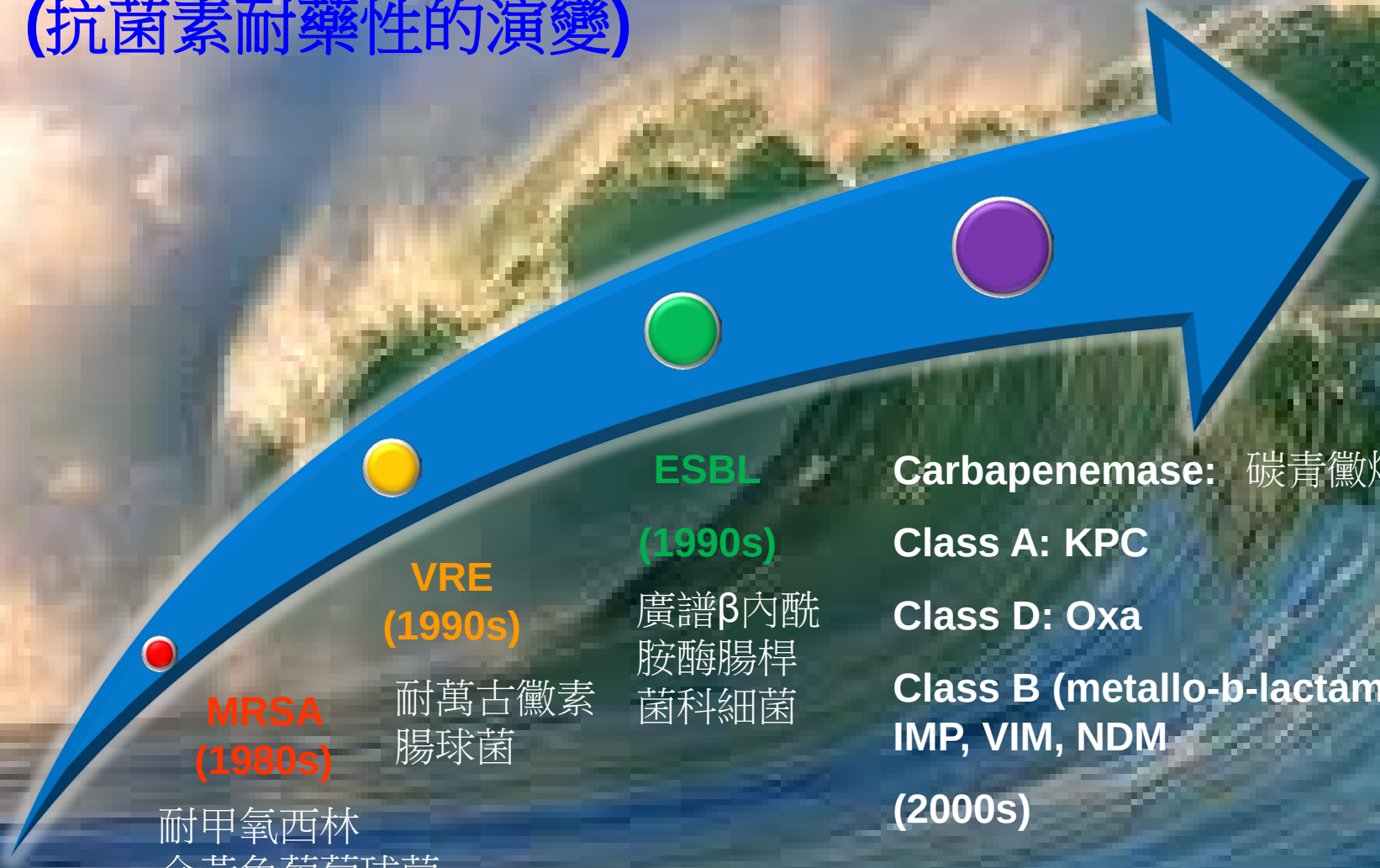
http://www.cdc.gov/

http://www.who.int/en/

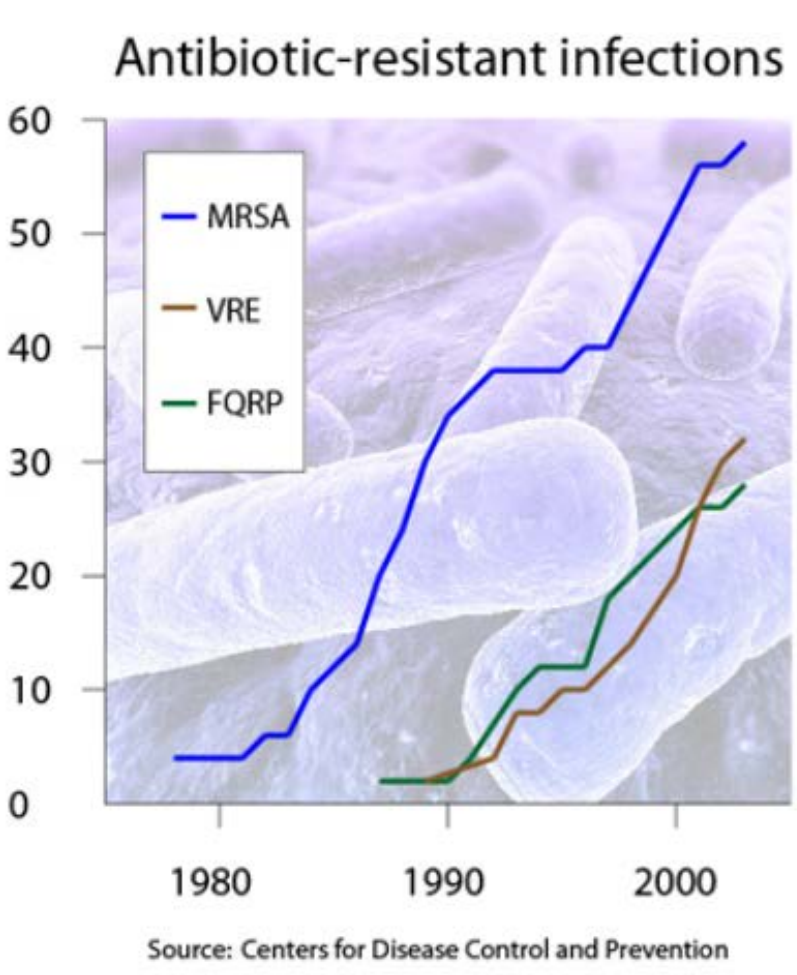
http://www.idsociety.org/

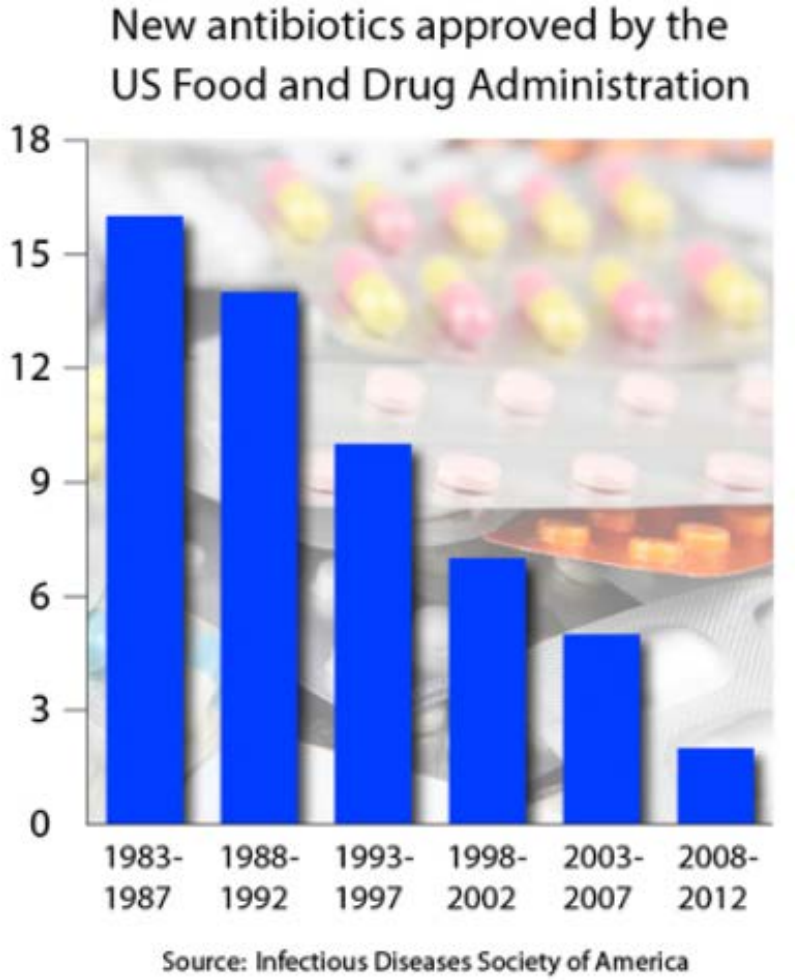
Evolution of antimicrobial resistance

(抗菌素耐藥性的演變)

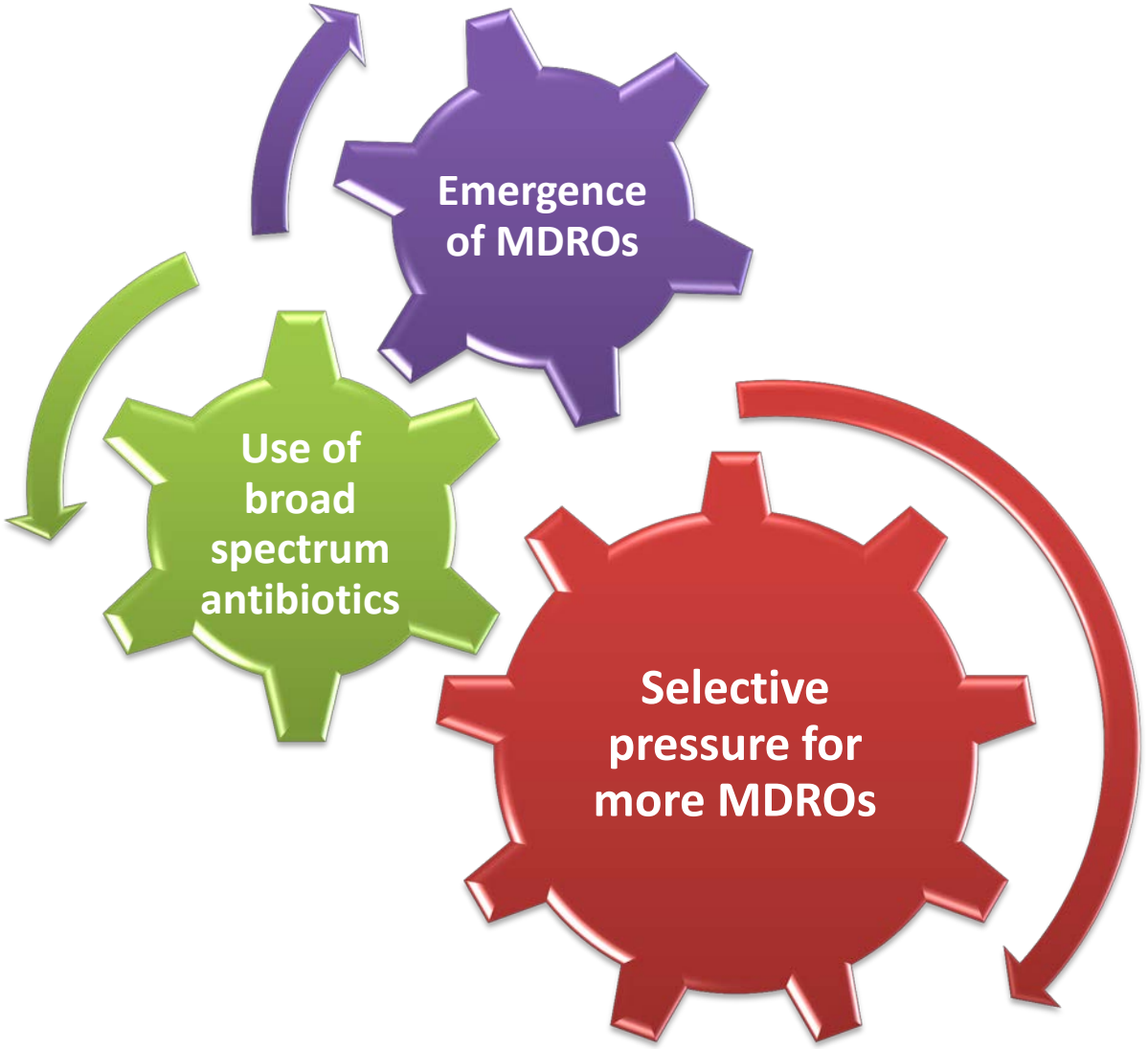


Inverse trajectory of declining antibiotic development

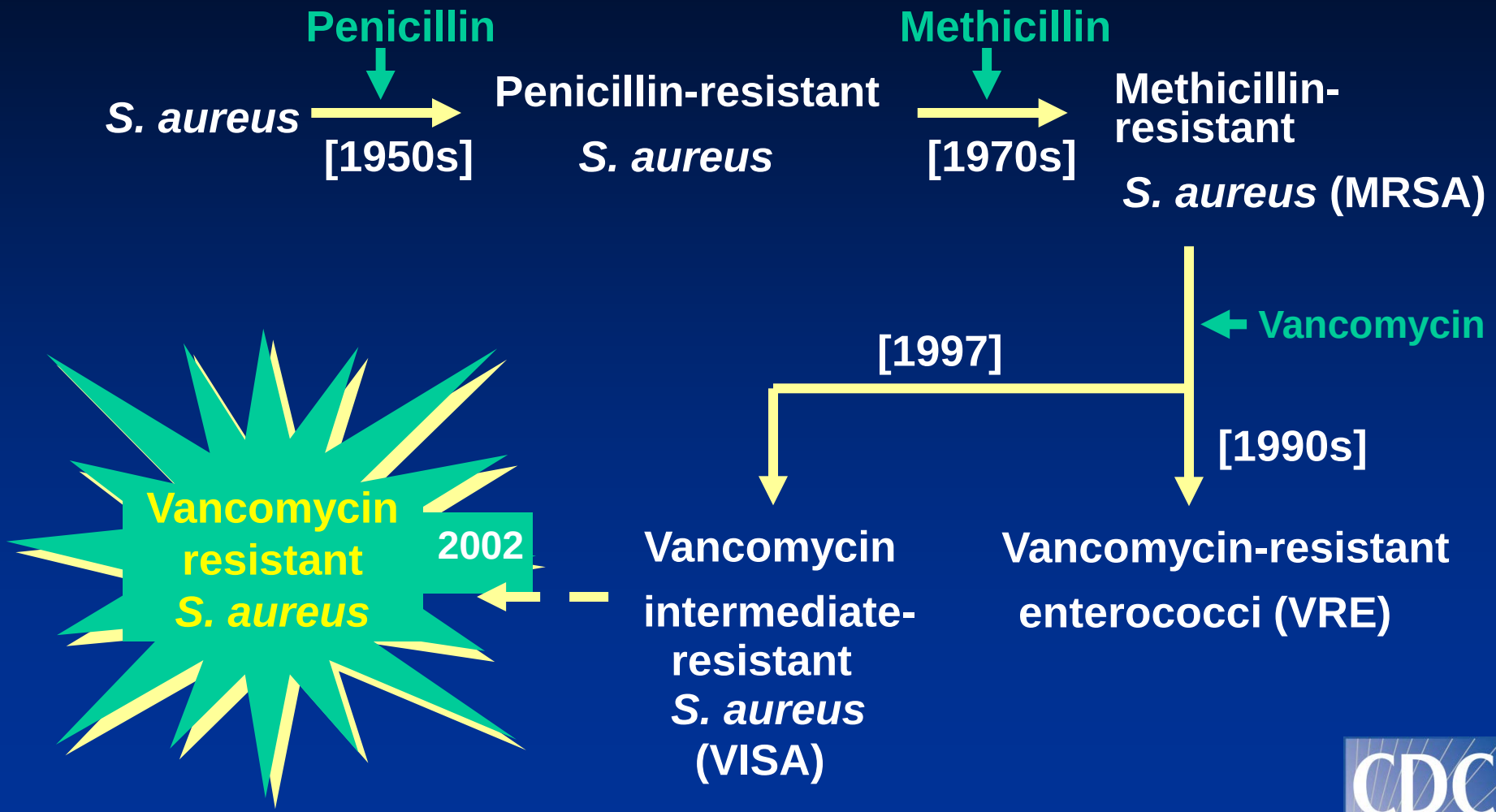




Antimicrobial stewardship & optimization program: patient safety vs public health concern



Evolution of Drug Resistance in *S. aureus*



CDC
Centers for Disease Control and Prevention

GUIDELINES FOR PRESCRIBING VANCOMYCIN & TEICOPLANIN IN ADULTS
Adapted from 1995 CDC recommendations

From the Working Group on Rational Prescribing of Drugs, QMH

(A) Indications for using vancomycin/ teicoplanin

1. Therapy of infections attributed to ß-lactam resistant Gram +ve organisms (mainly MRSA & MRSE), viz:
   a) ß-lactam resistant Gram +ve organism confirmed by culture
   b) suspected infective endocarditis (IE) affecting prosthetic device, awaiting microbiology

2. Empiric treatment of fever in
   a) neutropenic patient
   b) ICU patient

   with:
   i) evidence of central line inflammation, or
   ii) Gram +ve cocci revealed by blood culture or smear from appropriate specimens* (until confirmed to be ß-lactam sensitive); otherwise consider cloxacillin therapy **

3. Serious infections due to Gram +ve bacteria in patients with 'allergy' to ß-lactam antimicrobials.

4. Failure of antibiotic associated colitis to respond to metronidazole or if it is life-threatening.

5. Prophylaxis in patients vulnerable to IE and at high risk - during potentially bacteraemic procedures/episodes; i.e. those with
   a) recent exposure or hypersensitivity to penicillin or
   b) prosthetic heart valves, vascular shunts or other devices or past history of IE.

6. Prophylaxis against wound infection during major surgery for insertion of prosthetic device (e.g. artificial heart valve, hip).

7. As an additional antibiotic in the empiric treatment of presumed pneumococcal meningitis.

GUIDELINES FOR PRESCRIBING VANCOMYCIN & TEICOPLANIN IN ADULTS
Adapted from 1995 CDC recommendations

From the Working Group on Rational Prescribing of Drugs, QMH

B) Situations/conditions in which vancomycin is not advised

1. Initial empiric treatment of febrile neutropenia, except with central 'IV line' inflammation, or Gram +ve cocci incriminated (see A2).

2. Only one (of at least two blood cultures taken around the same time from 2 distinct sites) is +ve for Coagulase negative Staph (e.g. *S. epidermidis*), *Bacillus species* or diphtheroids.

3. Continued empiric treatment for 'sepsis'/fever, if cultures yield no ß-lactam-resistant Gram +ve microbe (after 48 h).

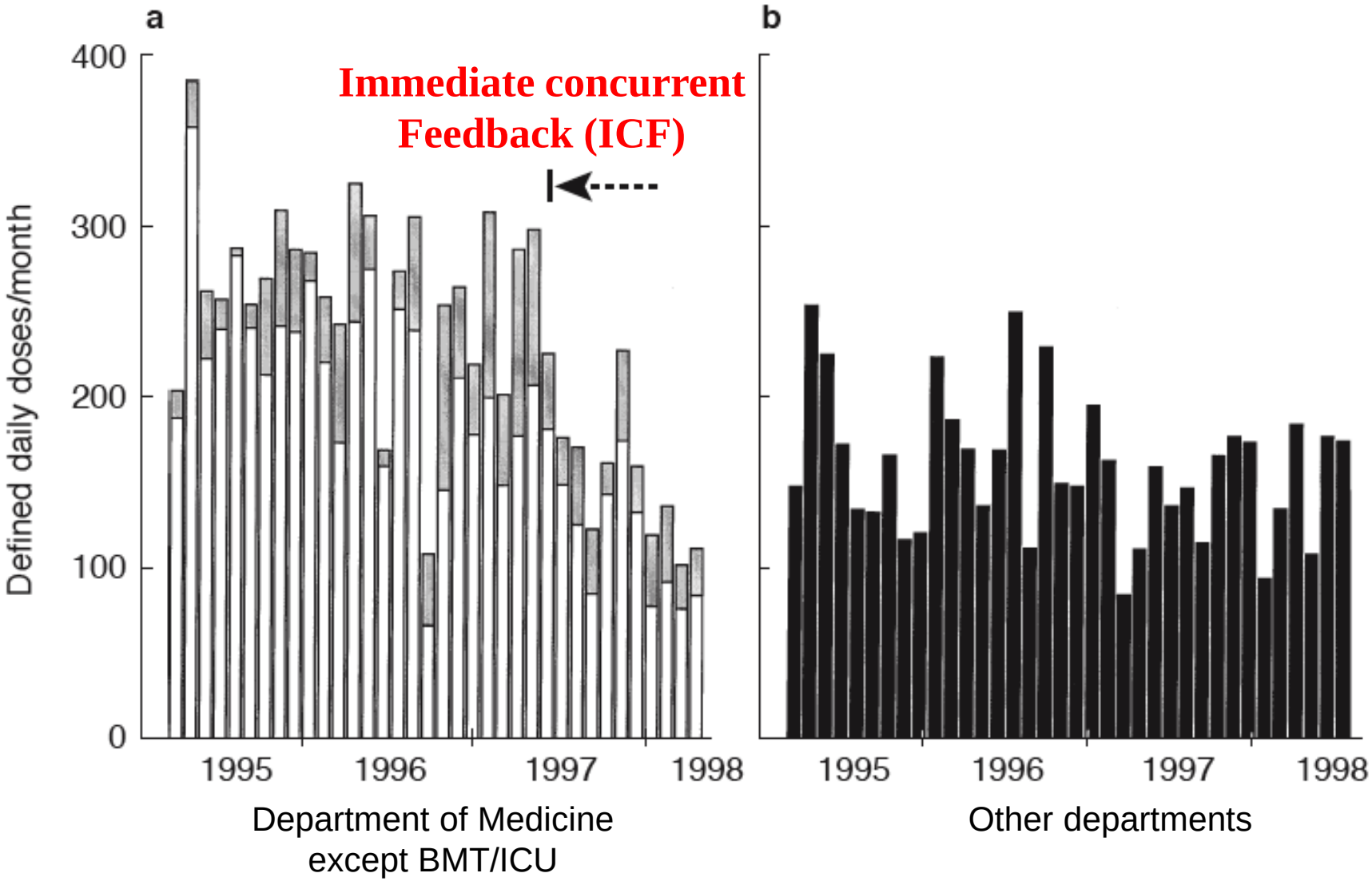
4. Treatment of ß-lactam-sensitive microbial infections in renal failure patients.

5. Routine prophylaxis against infection/colonisation: a) of central or peripheral lines (via IV route) and locally (e.g. heparin lock); b) during surgery; c) for gut decontamination; d) for CAPD, haemodialysis or changing Tenckhoffs; e) for low birth weight infants.

6. Eradication of MRSA from colonised surfaces and/or any other form of topical application/-irrigation.

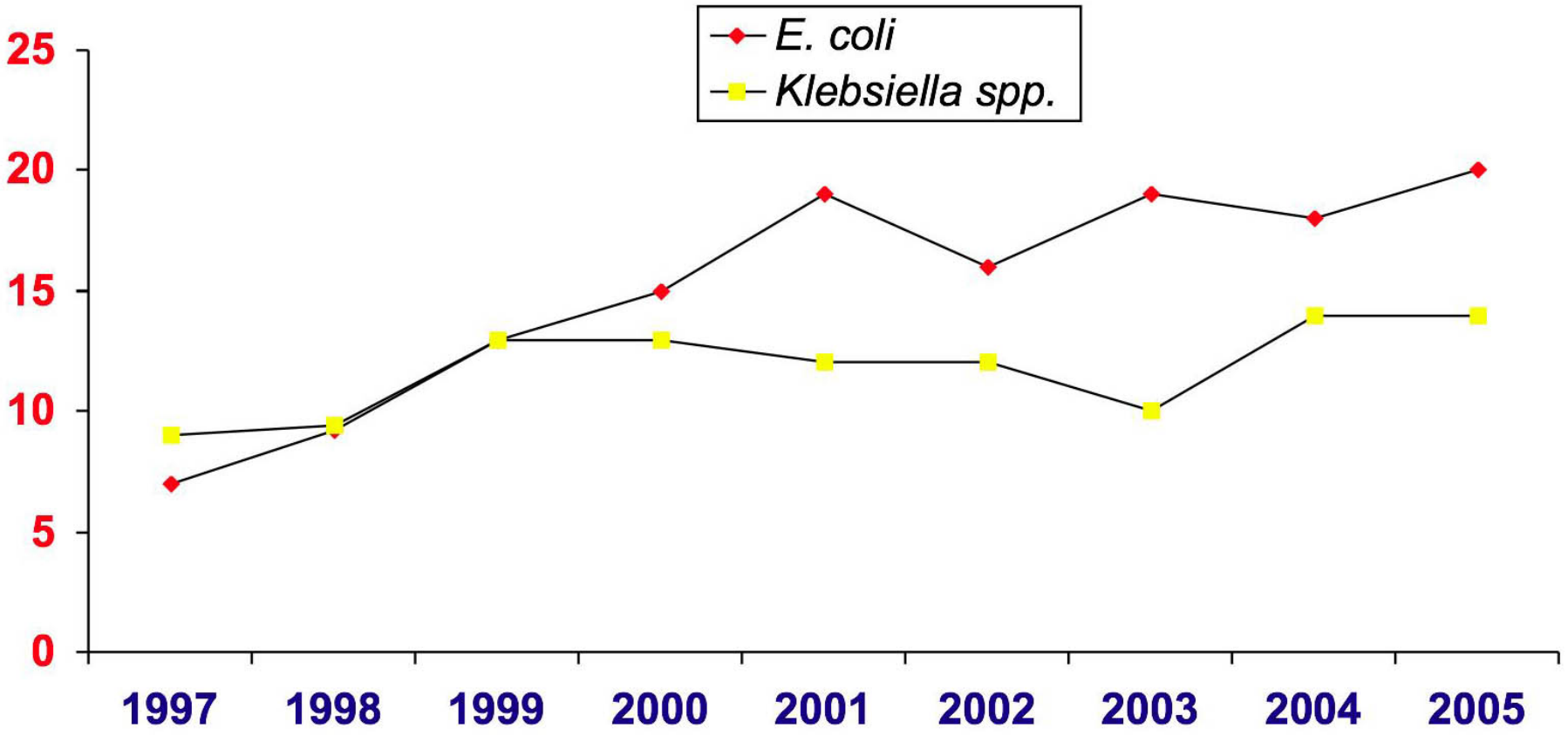
7. Primary treatment (orally) of antibiotic associated colitis; metronidazole preferred, except if life-threatening.

Glycopeptide (vancomycin, teicoplanin) usage in Queen Mary Hospital before and after antibiotic auditing



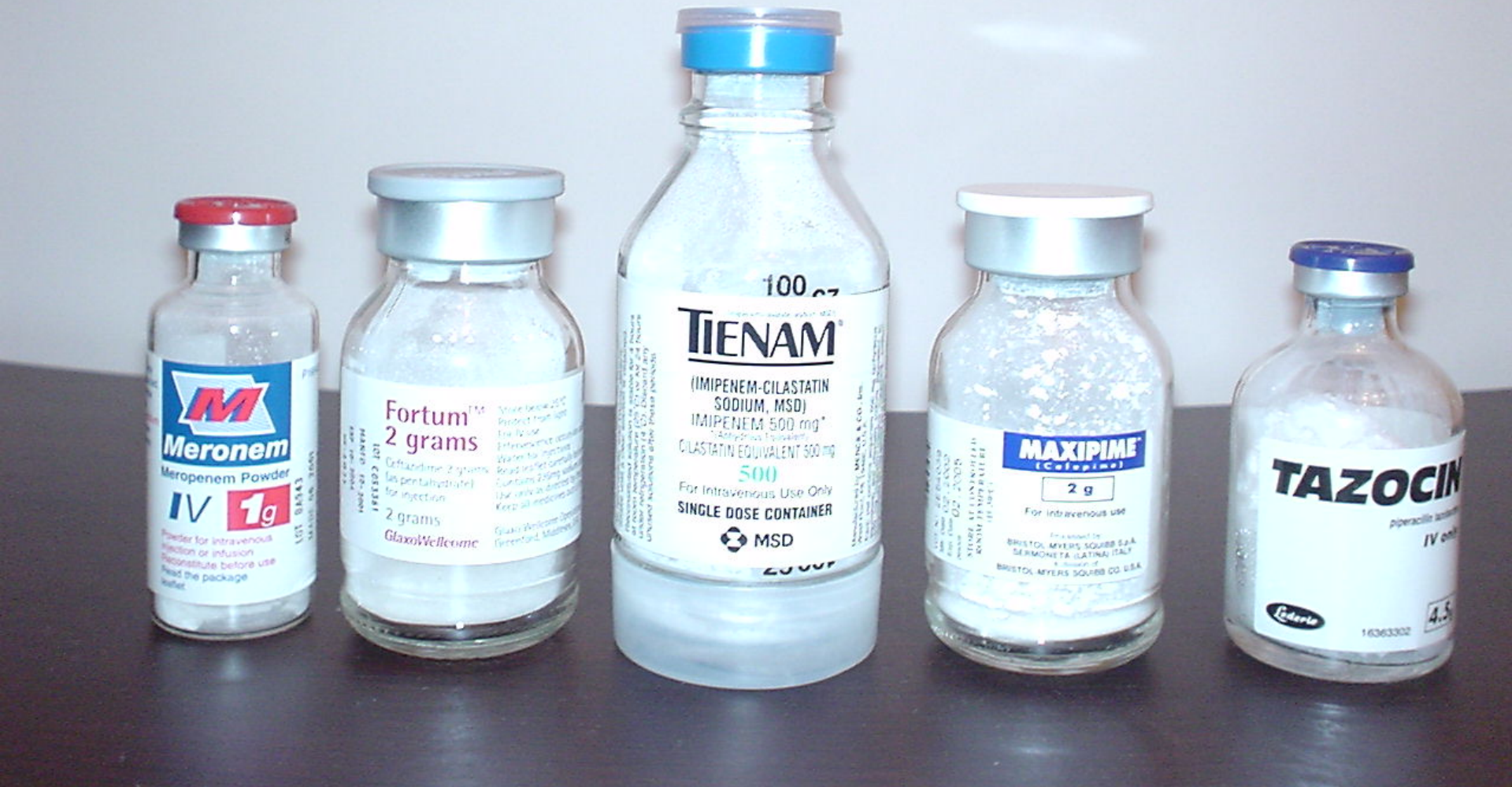
Br J Clin Pharmacol. 2001 Oct;52(4):427-32.

Overall prevalence of ESBL for *K.pneumoniae* and *E. coli* among all isolates in Queen Mary Hospital



Data from Dept of Microbiology, QMH

Big-Gun antibiotic audit (2002)

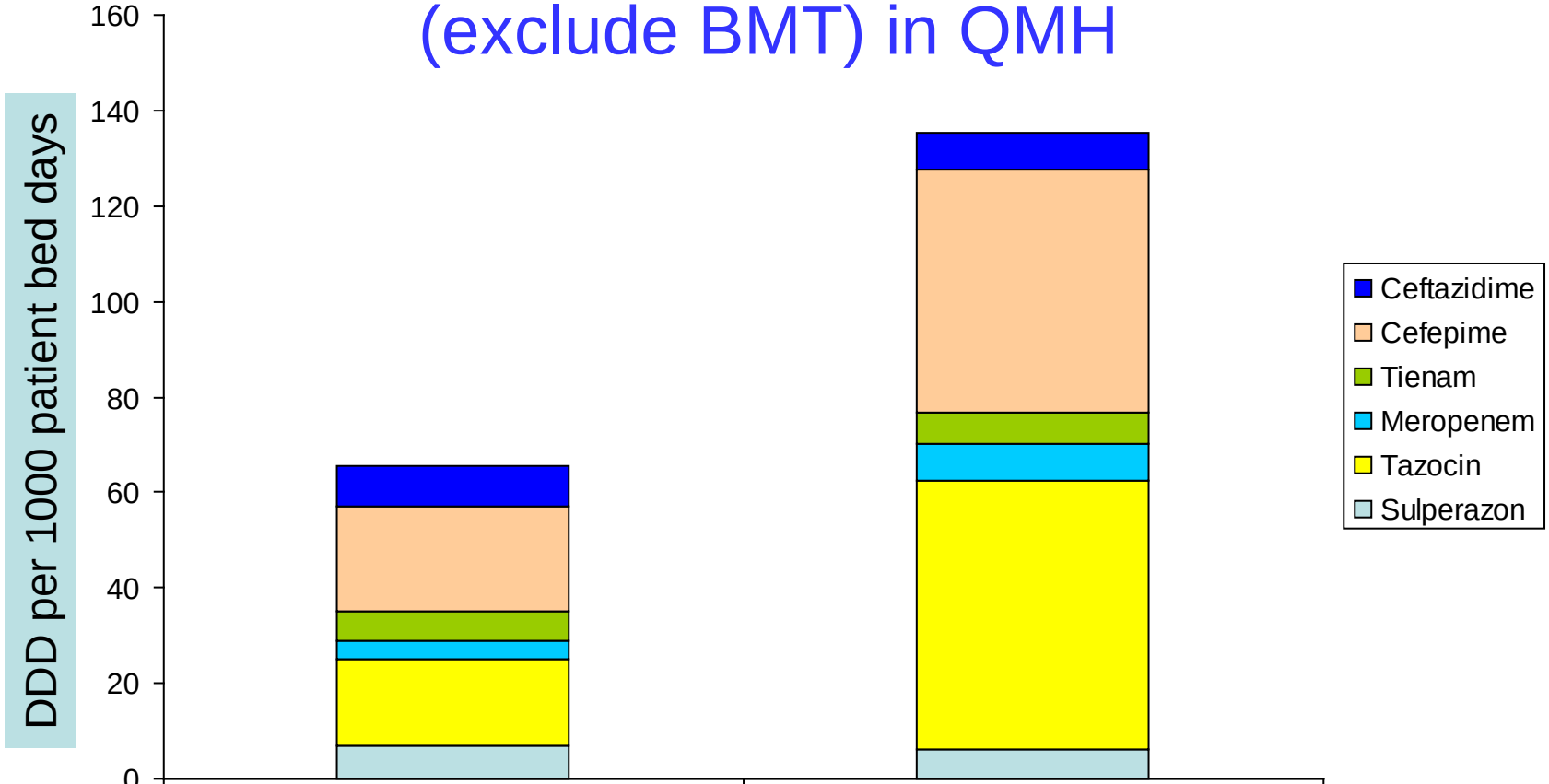


‘Big Gun’ Antibiotics in General Wards

‘Big Gun’ Antibiotic	Appropriate Reason for Preference	
	Invasive Infection Rx (Known /Suspected Pathogen)	Empirical Rx
Imipenem	Atypical Mycobacteria* e.g. *M. chelonae*	1. Neutropenic fever (Quant’ & Qual’) 2. Fever in Transplant recipient on immuno-supression + + 3. Severe sepsis 4. Deteriorating or fever persisting ≥72h
Meropenem	ESBL (or AmpC β-lactamase) producing organisms	
Cefepime		
Ceftazidime	1. *P.aeruginosa*† 2. Melioidosis	
Tazocin	*P.aeruginosa*†	

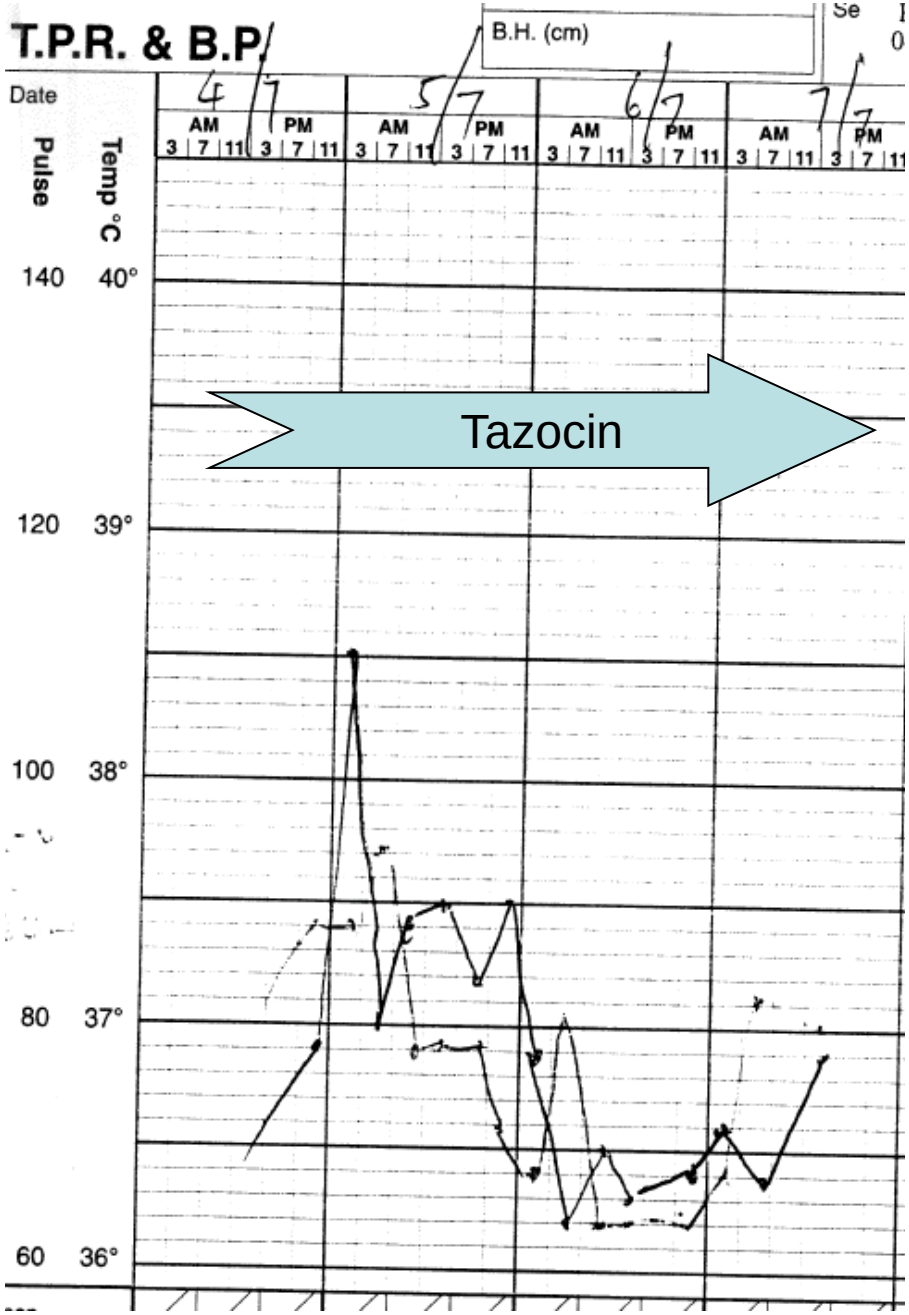
Preferably with:- ***other drugs*** ; an aminoglycoside*† ; *a macrolide or doxycyline* ‡

Use of broad-spectrum antibiotics in ALL Specialties (exclude BMT) in QMH



	2002	2003
Ceftazidime	8.7	7.6
Cefepime	22	51
Tienam	5.9	6.5
Meropenem	4.1	8
Tazocin	17.9	56.1
Sulperazon	7.1	6.2

Data from Clinical Pharmacy, QMH



F / 67
AML (diagnosed 4/08)
Chemo (4/08)
Fever
Admit: 4 Jul 08

	4 Jul 08	Range	Units
WBC	9.80	4.4 – 10.10	10^9/L
HGB	10.9	11.7 – 14.8	10^12/L
PLT	44	170 - 380	10^9/L
Neu	6.80	2.2 – 6.7	10^9/L
Lym	1.30	1.2 – 3.4	10^9/L
Mon	4.60	0.2 – 0.7	10^9/L
Eso	0.10	0.0 – 0.5	10^9/L
Baso	0	0.0 – 0.1	10^9/L

HOSPITAL AUTHORITY
Queen Mary Hospital
Infection Control Unit

From : Working Group on Rational Prescribing of Drugs, Queen Mary Hospital
Tel. : 2855-3553
Fax : 2855-3805

Date : 7th July 2009.

Dear Dr / Prof Ho.,

According to an ongoing audit of antibiotic therapy in the Department of Medicine, Queen Mary Hospital, your patient (name) [redacted]
in Ward/bed no F6 - 25 was prescribed Tazocin on 4/7/09 and the records suggest / indicate the following:

1. Treatment of colonization and no genuine evidence of infection. ☐
2. Treatment of a non-severe community-acquired infection. ☑
3. Treatment of a non-severe nosocomial infection. ☐
4. Treatment of an infection that is already responding to antibiotic with a narrow spectrum. ☐
5. Continued treatment against pathogen(s) known to be susceptible to antibiotic with a narrower spectrum. ☐
6. Continued treatment with a big gun antibiotic when the clinical course and subsequent finding indicate a viral infection or a non-infectious problem. ☐

Further comments: Patient is not neutropenic. Please follow our Hematology guideline & switch to Timentin.

As such, treatment for your patient did not appear to conform to any of the special indications for such prescribing (see attached guidelines).
PLEASE CONSIDER USING AN ALTERNATIVE AGENT OR DISCONTINUING IT.

Yours sincerely

Dr. SF TANG

M/77

Past health :

- IHD
- PTB
- Bronchiectasis
- BPH

fever for 2 days

chills and rigor

dysuria, hematuria

nausea and vomiting

T 38 C, BP 130/80, P 79/min

Chest clear

Abd mild loin tenderness on L side

WCC 15.4

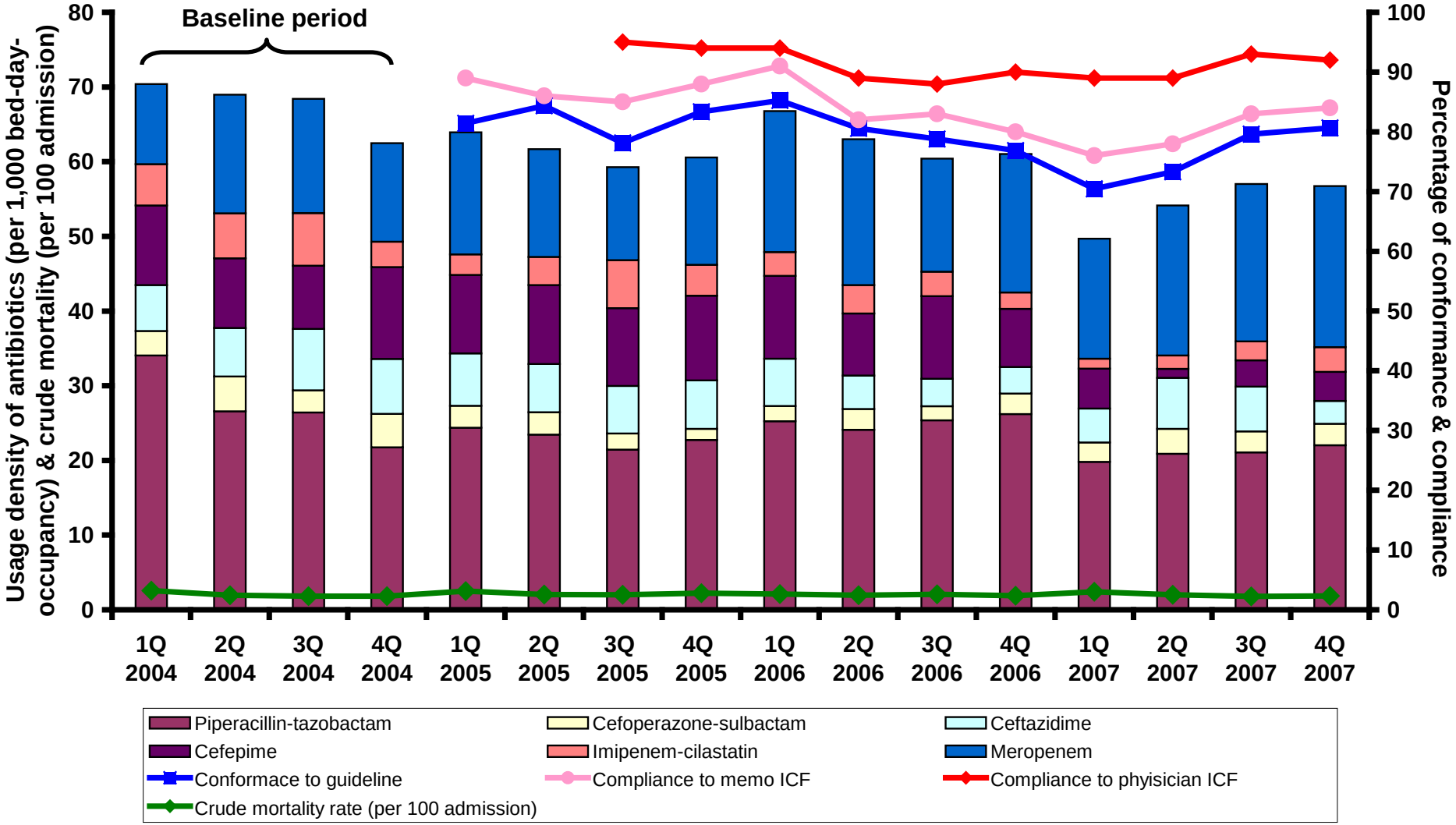
Cr 123

Septic workup done

Antibiotic stewardship program

Physician Immediate Concurrent Feedback

Overview of the ASP in a 3-year study period (2005 – 2007)



Eur J Clin Microbiol Infect Dis. 2009 Dec;28(12):1447-56.

抗生素導向計劃全港推行

醫院管理局資料顯示，對付「超級惡毒」的8種廣譜（可用於治療多種細菌）抗生素使用量，在過去5年間增加了逾五成，當中使用最多、治理下呼吸道或皮膚組織感染和細菌性敗血症等的哌拉西林（Piperacillin），細菌抗藥性的問題已威脅到救治病人的成效，爲防此等「最後救藥」逐一失效，全港14間急症公立醫院和兩間復康醫院，已推行「抗生素導向計劃」作挽救。

瑪麗經驗 抗生素用量跌兩成

衛生防護中心細菌抗藥性衛生防護項目主席何栢良教授警告，「預計未來5年再無新的廣譜抗生素面世」，力阻濫用作爲最後防線的廣譜抗生素急不容緩，醫生依指引處方對症下藥是其中一個控制重點。

他指出，以瑪麗醫院04至05年實施抗生素導向計劃的經驗（**見流程圖**），令去年廣譜抗生素使用量較兩年前下跌兩成。何說，推行計劃後，病人感染抗藥性惡菌的情況亦見減少，高達96%的醫生處方抗生素時會依照指引而行，較04年前遵從率50%大大提升。

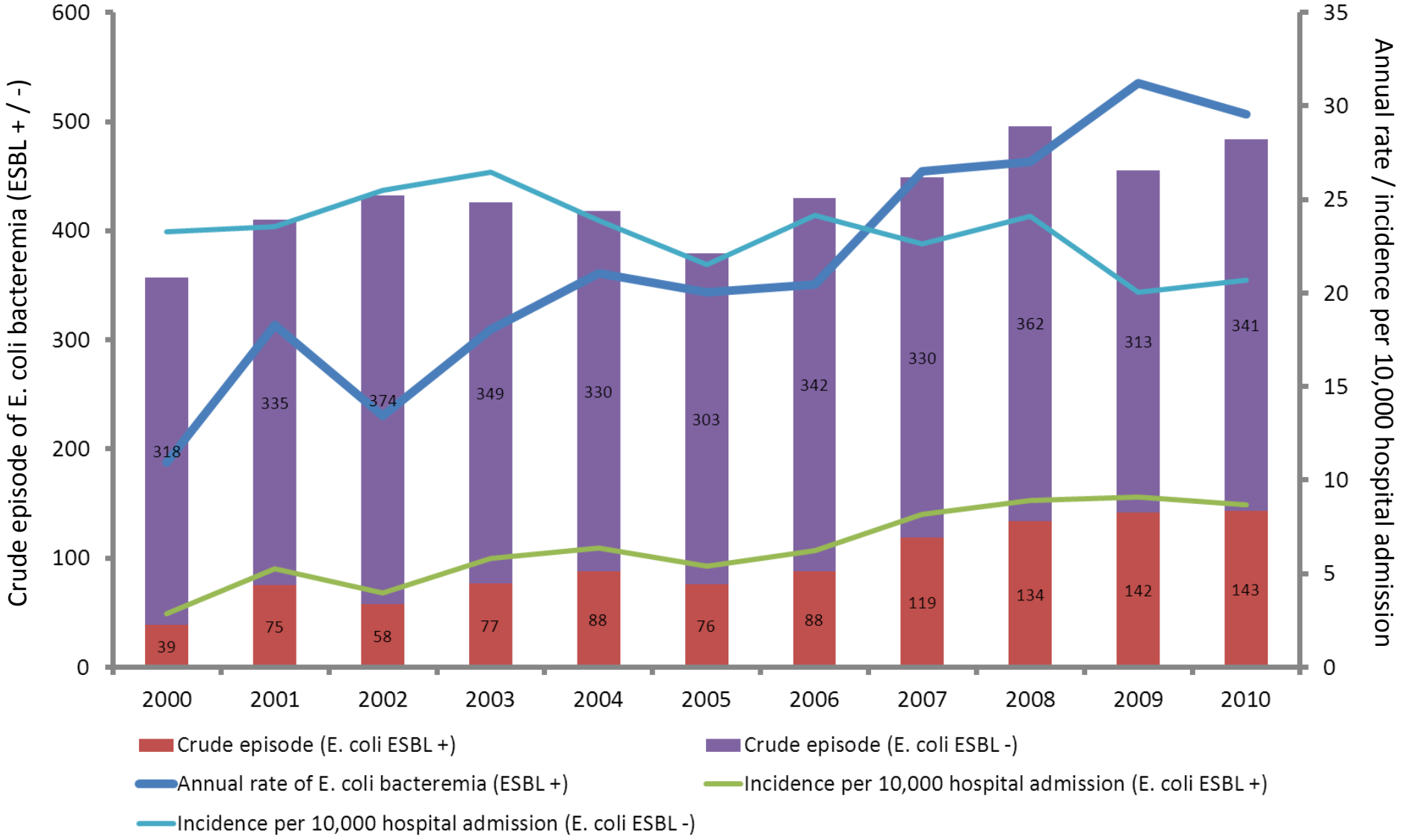
Ming Pao 18 Feb 2006

The Antibiotic Stewardship Program
Hospital Authority

The Implementation Committee on
Antibiotic Stewardship Program
HAHO

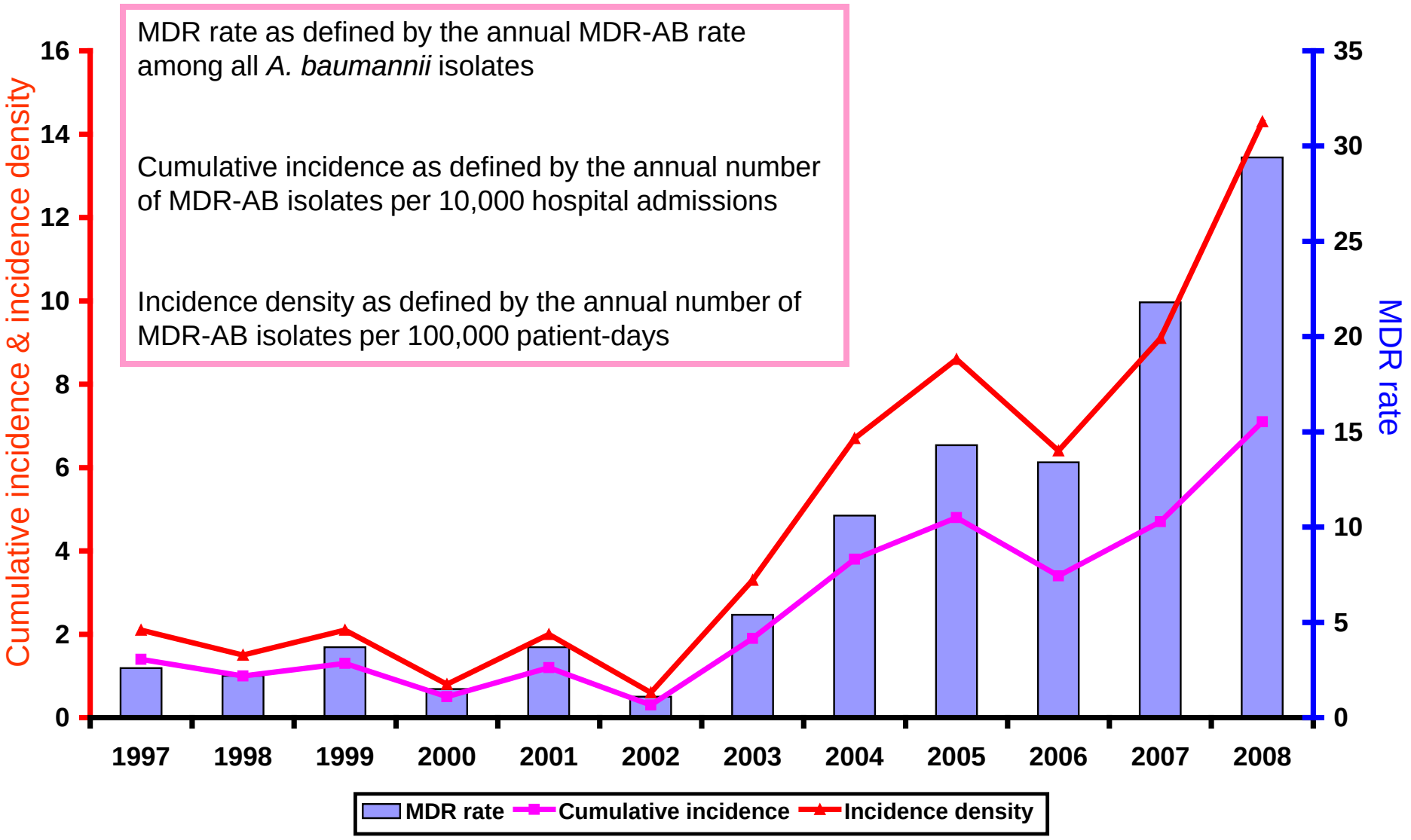
2006

ESBL-positive *E. coli* bacteraemia in Hong Kong, 2000-2010



J Antimicrob Chemother. 2012 Mar;67(3):778-80.

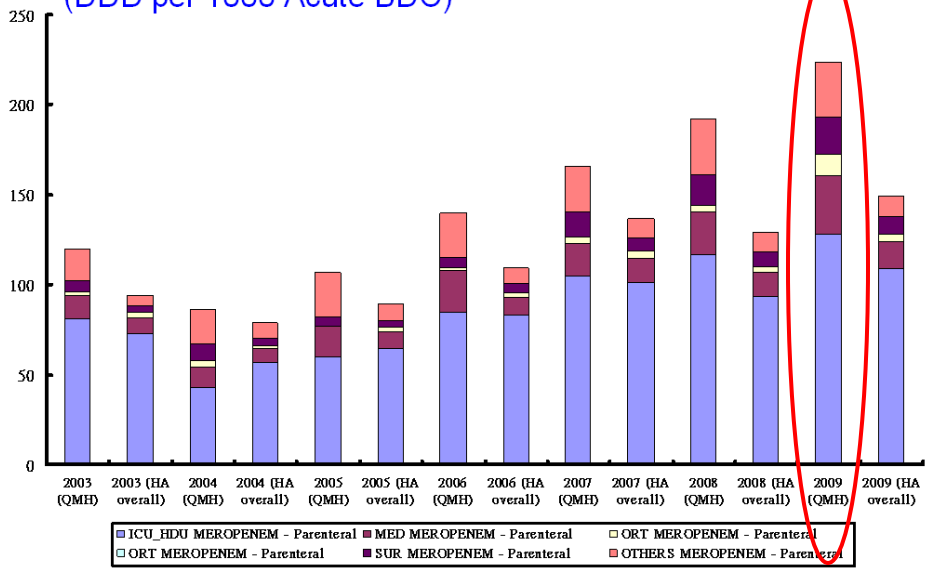
Changes in the rate, cumulative incidence and incidence density of MDR-AB according to definition: resistance to carbapenems class (imipenem, meropenem)



Int J Antimicrob Agents. 2010 Nov;36(5):469-71.

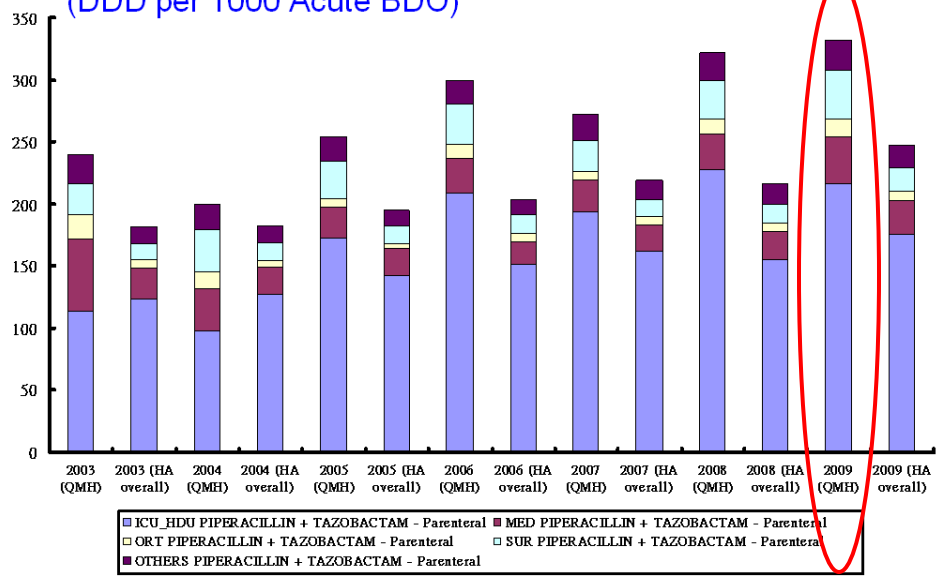
Antibiotic stewardship program in Queen Mary Hospital

Meropenem consumption in QMH & HA
(DDD per 1000 Acute BDO)



Data from CDARS, HAHO

Piperacillin / tazobactam consumption in QMH & HA
(DDD per 1000 Acute BDO)



Data from CDARS, HAHO

Observation:

↑ consumption of meropenem & piperacillin / tazobactam in QMH > HA hospitals

Recommendation:

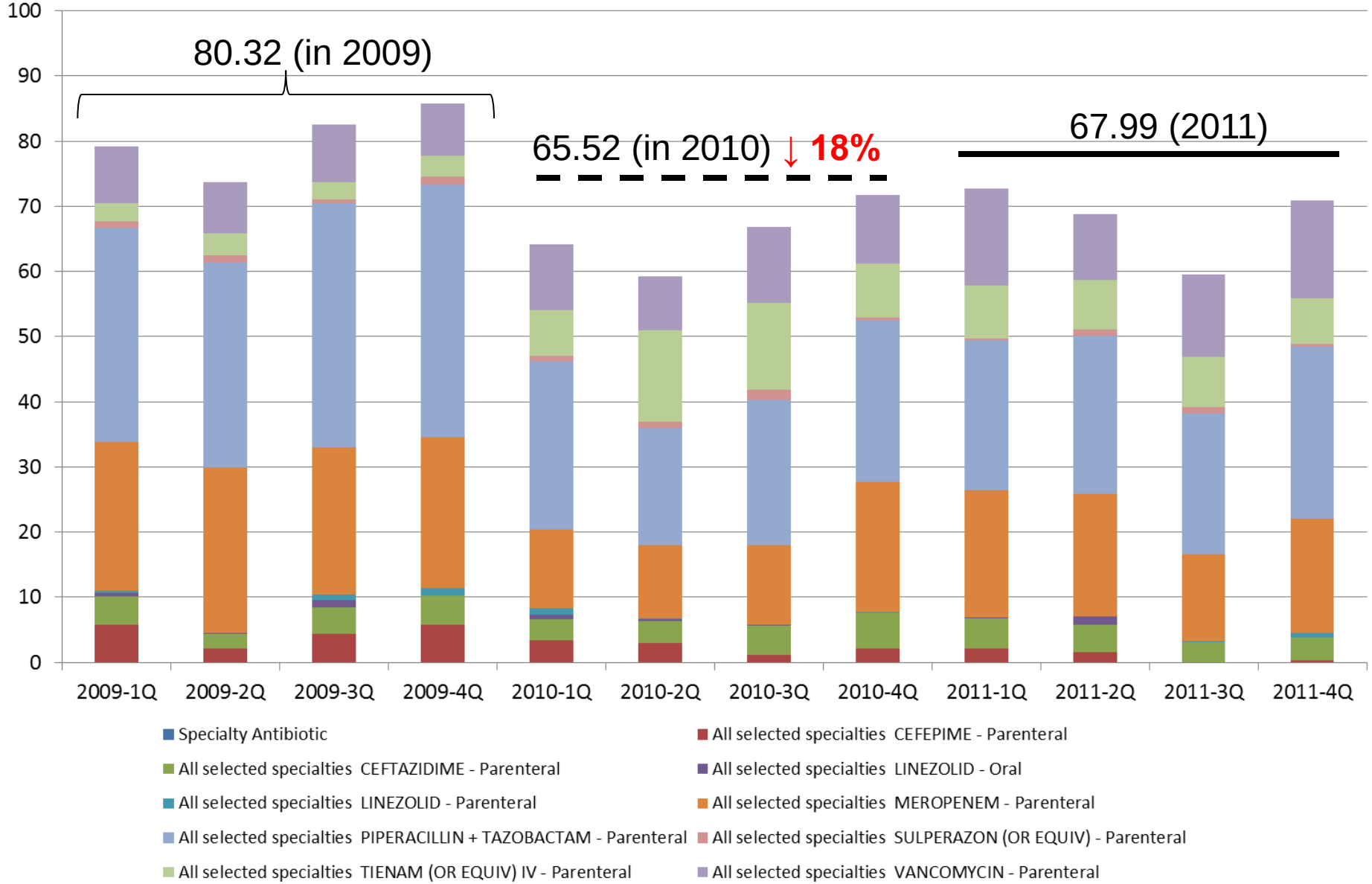
Empirical regimen of **"A T & I" or "A T & T"**

Stable patients: **A**moxicillin / clavulanate (**A**ugmentin®) as first line therapy

Not responding to first line therapy: **T**icarcillin / clavulanate (**T**imentin®)

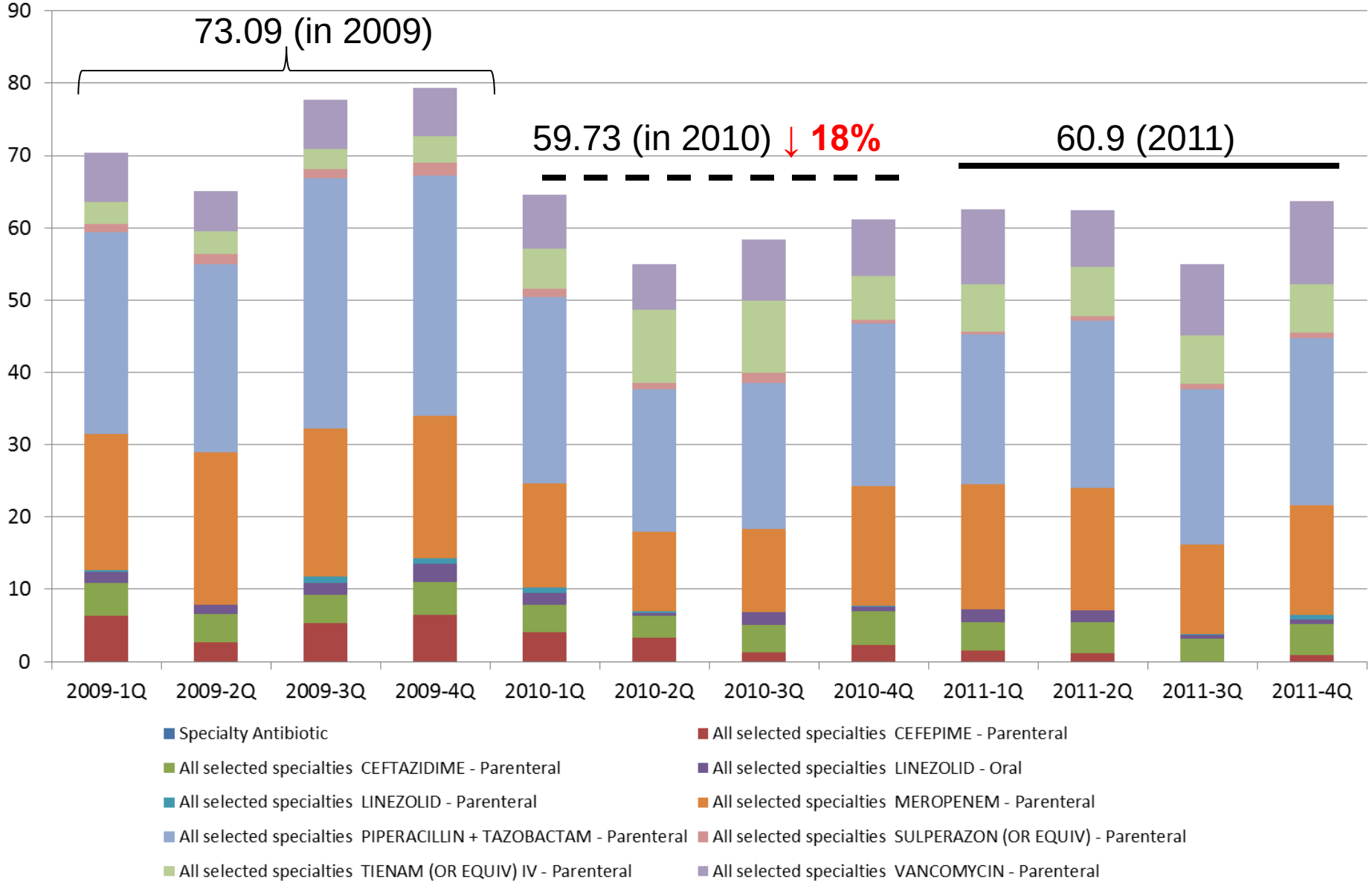
Critically ill patients: **I**mipenem / cilastatin (**T**ienam®)

Big Gun antibiotics consumption (6 Big Gun & Van / Lin) in QMH (MED / SUR / ORT / ONC / ICU & HDU) (DDD per acute 1000 BDO)



Data from CDARS, HAHO

Big Gun antibiotics consumption (6 Big Gun & Van / Lin) in HKWC (MED / SUR / ORT / ONC / ICU & HDU) (DDD per 1000 BDO)



Data from CDARS, HAHO

Antibiotic Stewardship Program (AT&T in 2010-2011)

Daily cost: $ 222.6

Daily cost: $ 163.5

Drugs with similar pharmacodynamic / kinetic profile / susceptibility profile

Daily cost: $ 318

Daily cost: $ 222

Antibiotic Stewardship Program vs Cost-Effective Usage

Daily cost: $ 66.6

???????

Daily cost: $ 163.5

Drugs with similar pharmacodynamic / kinetic profile / susceptibility profile

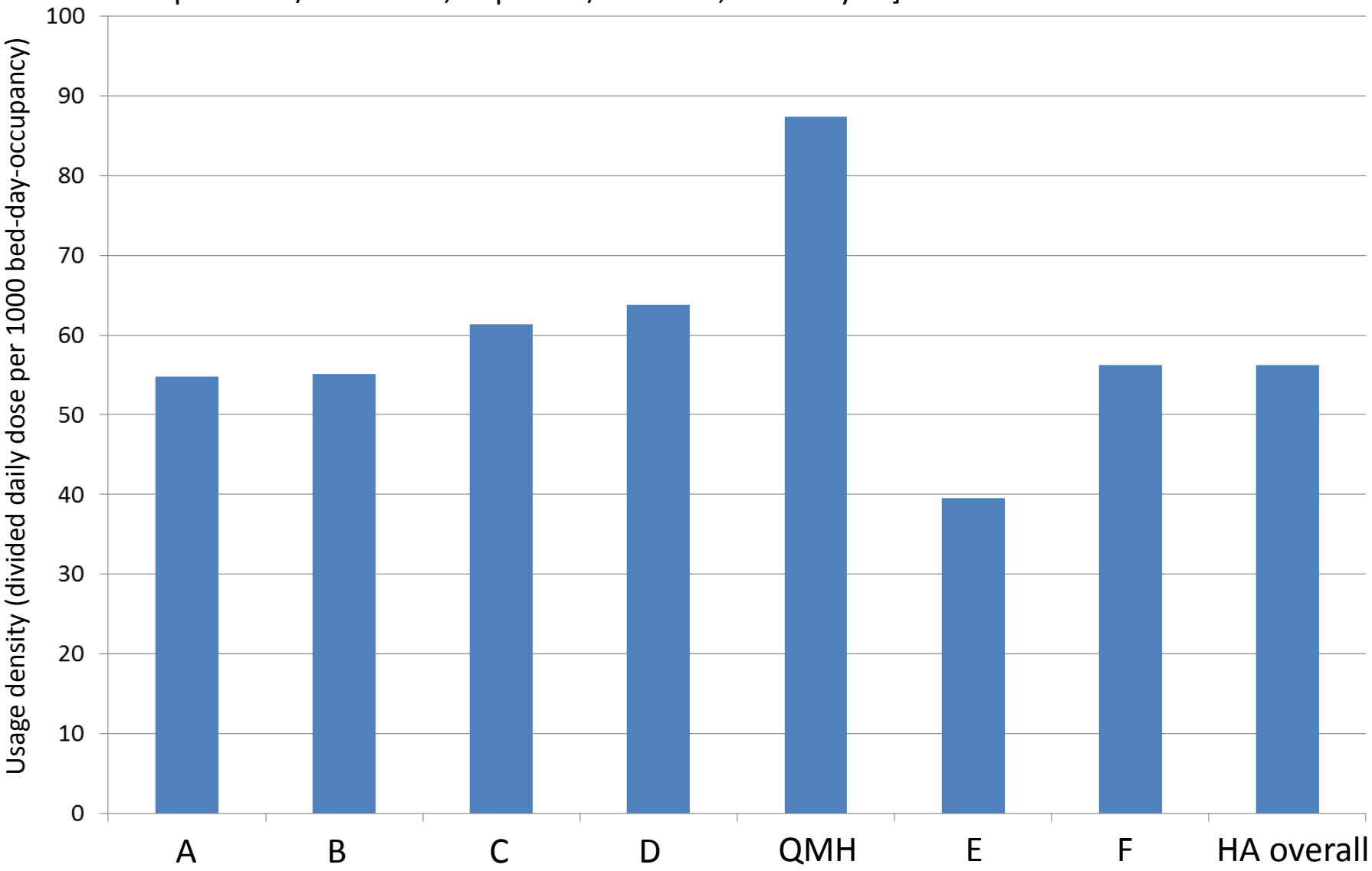
Daily cost: $ 90

???????

Daily cost: $ 189

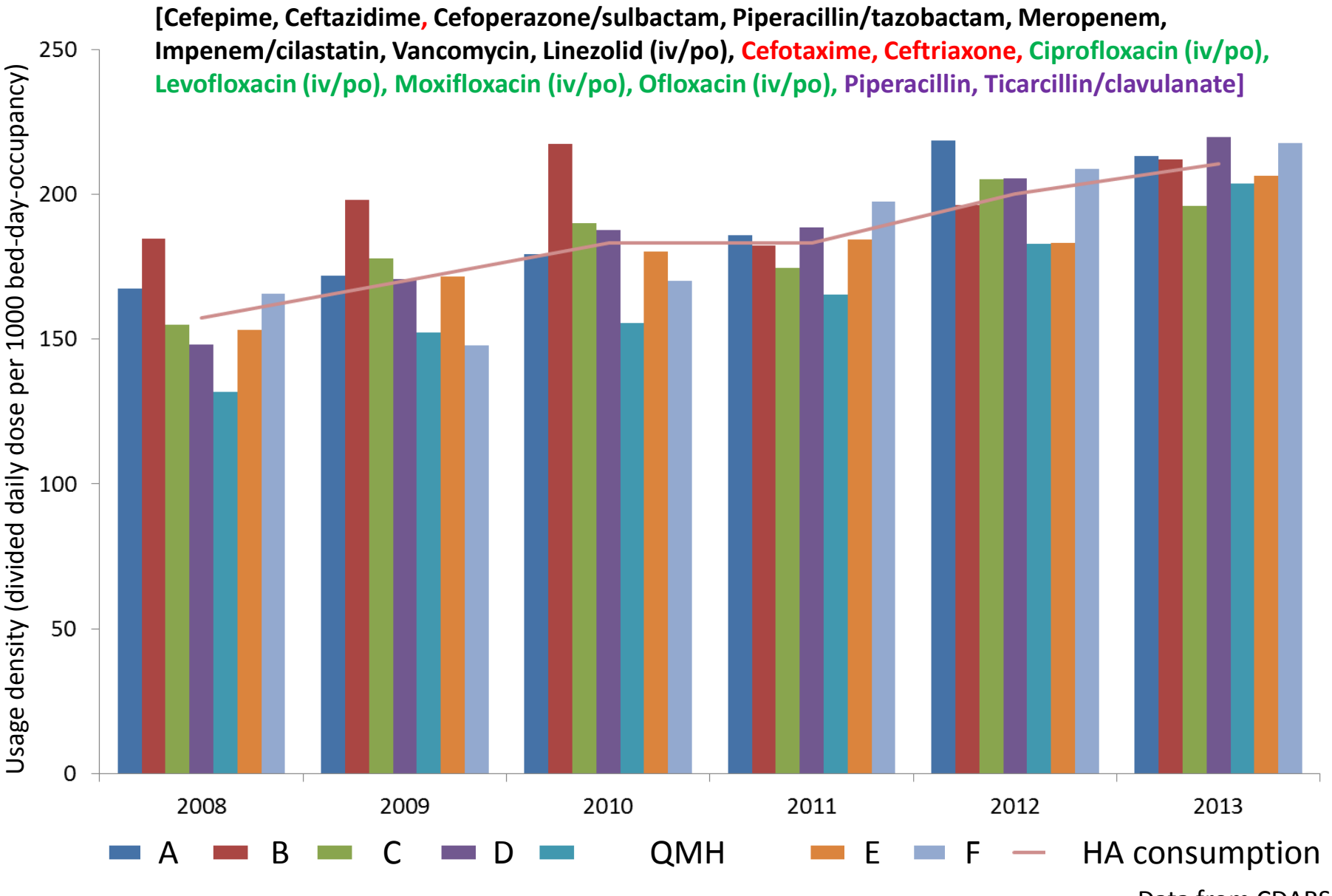
Consumption of **Big Gun Antibiotics** in All Specialties at 7 Hospitals of HA (2012)

[Cefepime, Ceftazidime, Linezolid (oral & intravenous), Meropenem, Piperacillin/tazobactam, Cefoperazone/sulbactam, Impenem/cilastatin, Vancomycin]



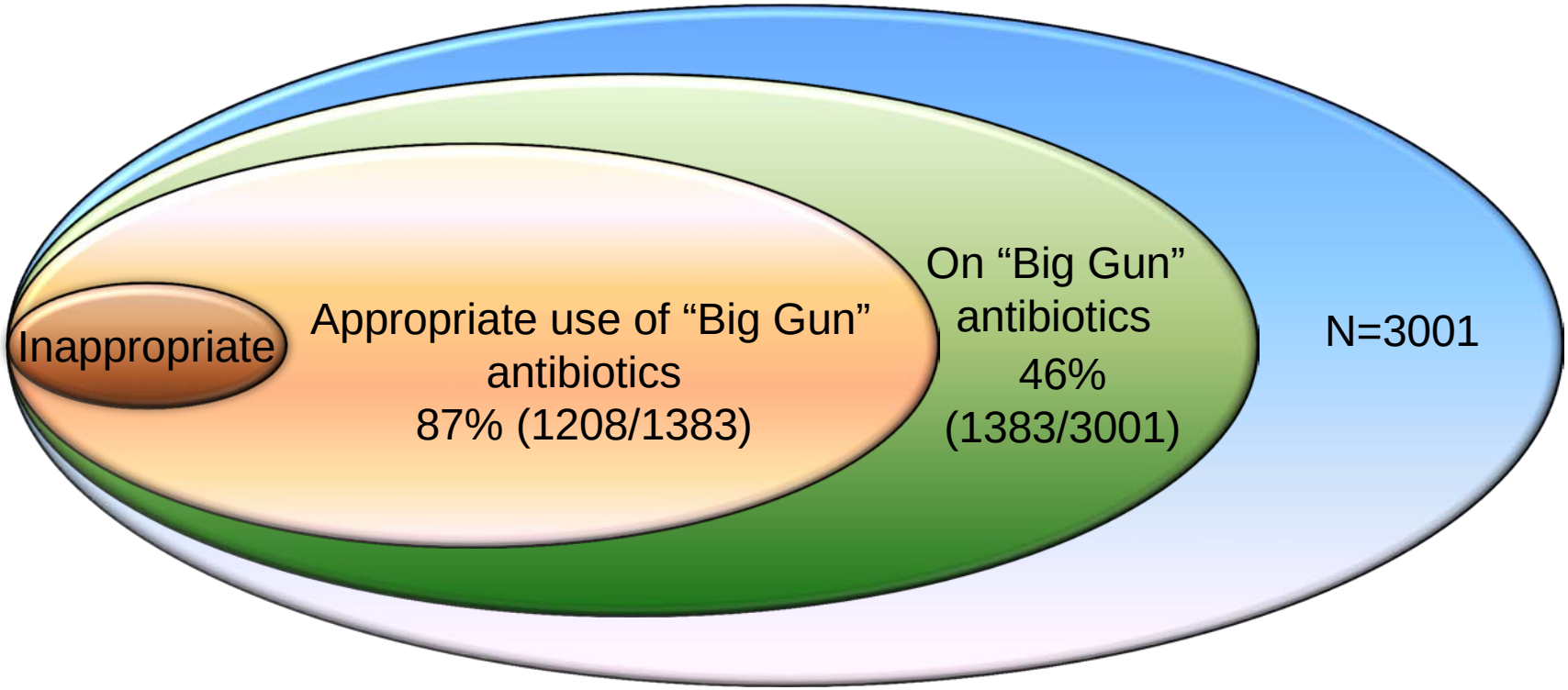
Data from CDARS

Consumption of **ALL Broad Spectrum Antibiotics** with potential for selecting MDROs in All Key Specialties (ICU & HDU / MED / ONC / ORT / SUR) at 7 Hospitals of HA (2008 - 2013)



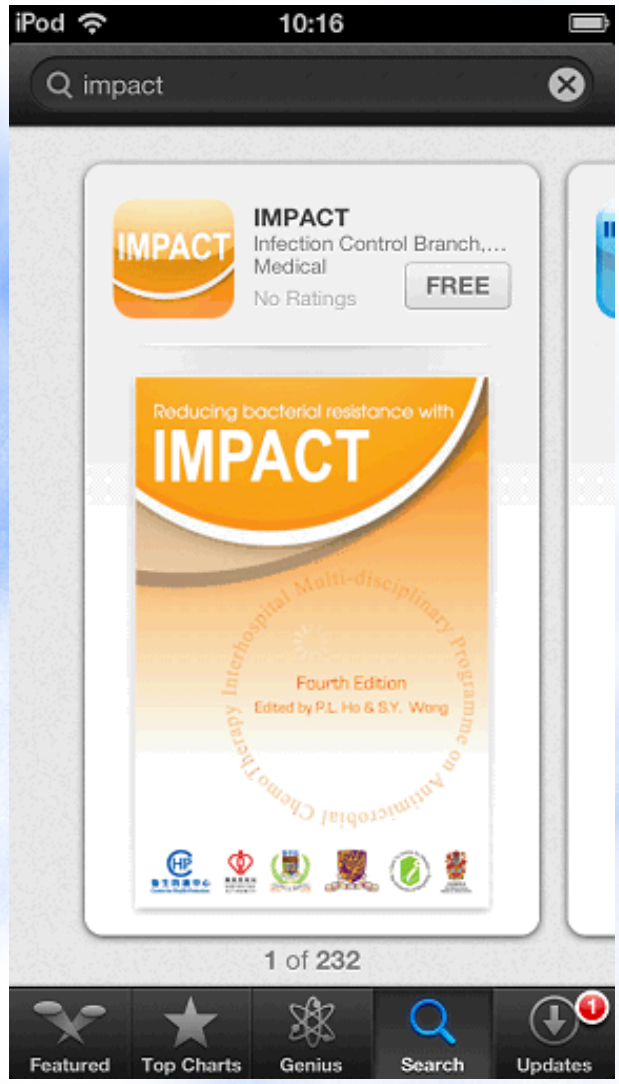
Data from CDARS

Microbiology & Infectious Disease Consultation between 1 Jan and 31 Jul 2014 (Queen Mary Hospital)



Integration of ASP into daily clinical consultation

IMPACT Guidelines (Third Edition)



Local Key References for

- Antibiotic resistance
- Antibiotic stewardship program
- Selected antimicrobial use
- Empirical Rx of common infections
- Known-pathogen therapy
- Surgical prophylaxis
- Cost & dosage of antimicrobials

Click here to view full guidelines

http://ha.home/ho/ps/impact.pdf

IV to oral switch

Fluoroquinolones

Ciprofloxacin

Bioavailability ~70-80%

IV to PO regimen
200mg IV q12h → 250mg PO q12h
400mg IV q12h → 500mg PO q12h
400mg IV q8h → 750mg PO q12h

Levofloxacin

Bioavailability ~99%

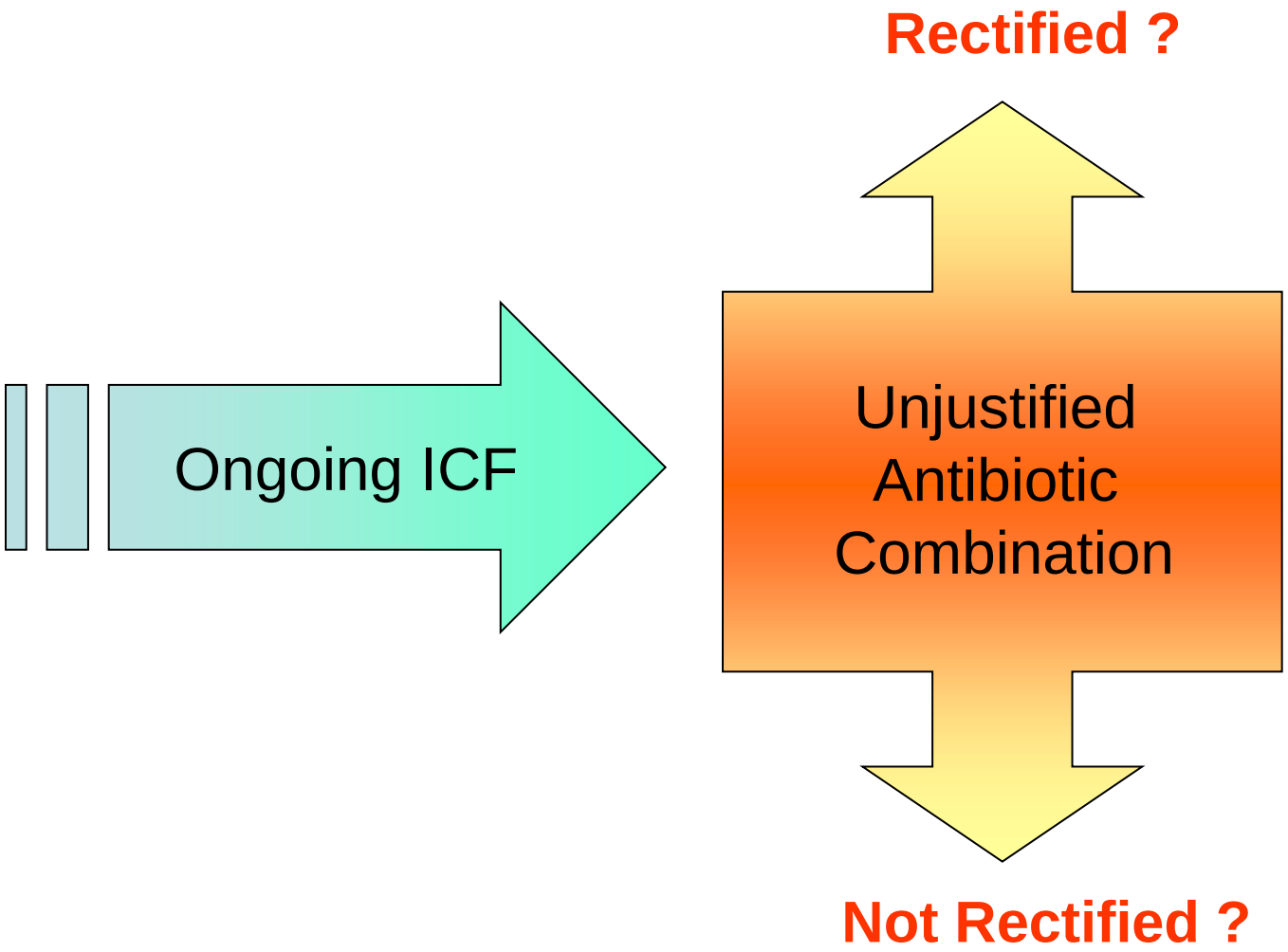
IV to PO regimen
The Oral and IV route of administration is interchangeable

Moxifloxacin

Bioavailability ~90%

IV to PO regimen
400mg IV q24h → 400mg PO q24h

After IV to oral switch…



Trust and collaboration