

Antimicrobial Stewardship

Leadership Commitment and Support

Stephen Parodi, MD

Regional Medical Director of Hospital Operations

Kaiser Permanente Northern California



Setting Expectations

(Depending on Your Audience)

Clinicians

- Optimize selection, dose, and duration of tx
- Reduce adverse drug events
- Reduce morbidity and mortality
- Reduce secondary infection (eg. CDI)
- Prevent abx resistance

C-Suite

- Reduce drug costs
- Reduce LOS
- Optimize use of personnel time

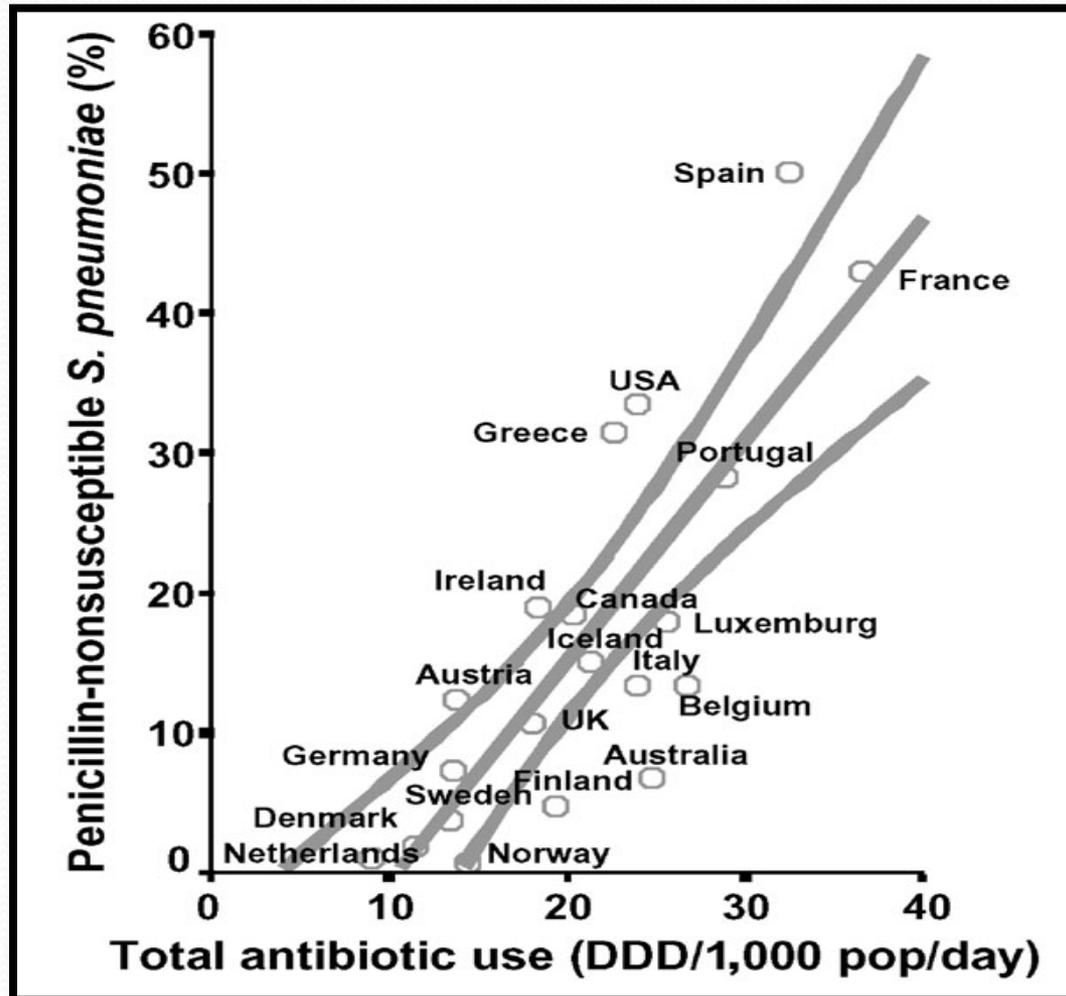
Making the Case

- Published data
- Institution specific data
- Anecdotal cases
- Guidelines/Standard of Care
- Patient Safety

The Why

- 30% of hospital pharmacy budgets due to ABX
- 50% of ABX use estimated to be inappropriate
- Resistant organisms develop 2^o inappropriate use
 - MDRO infections have ↑ morbidity and mortality
 - MDROs have ↑ costs (LOS, tx failures)
- Evidence shows ASP can improve:
 - Individual patient outcomes
 - Decrease resistance patterns
 - Decrease *Clostridium difficile* infection
 - Decreases costs of care

Utilization and Resistance



ESKAPE

Enterobacter

S aureus

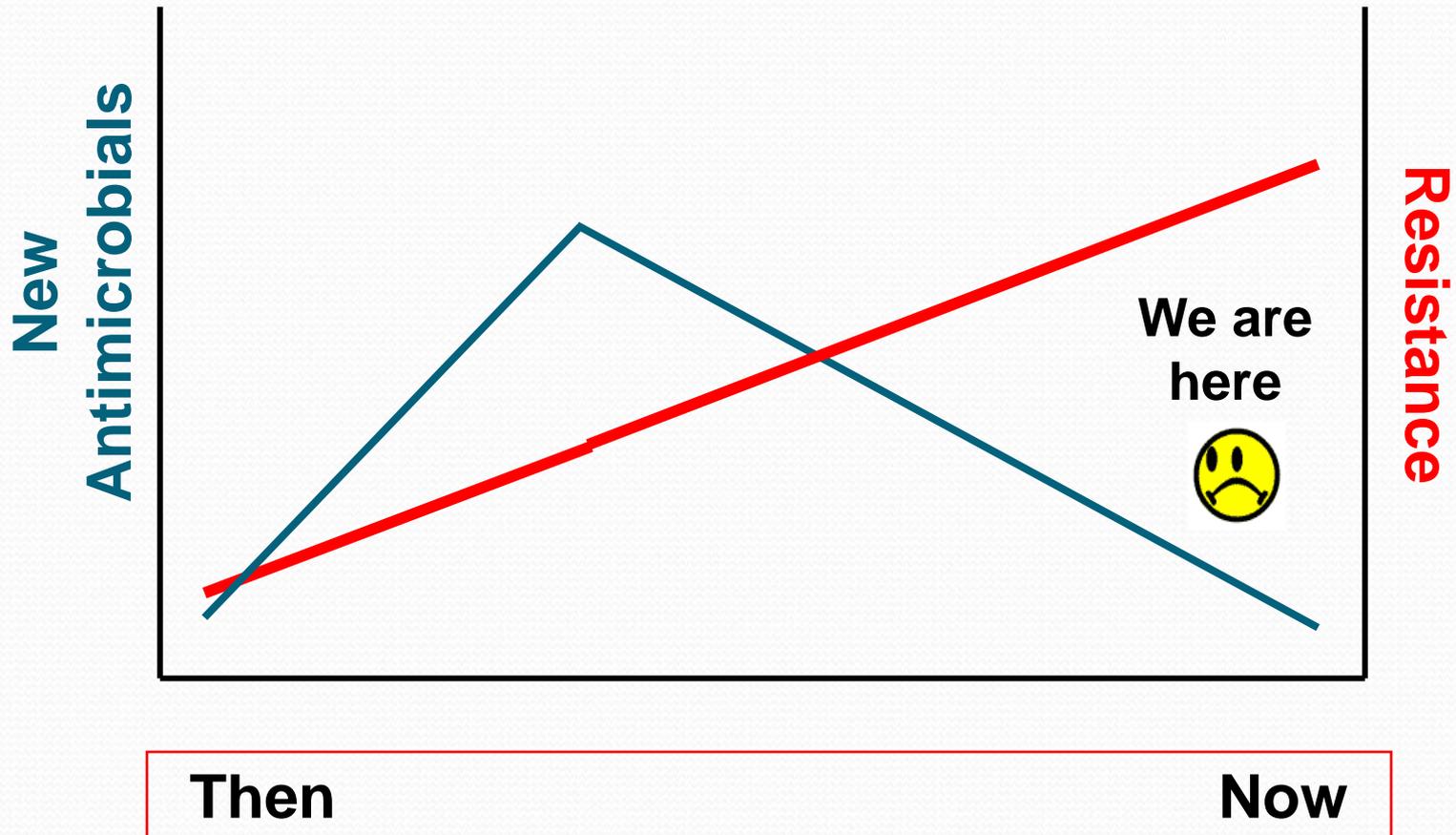
Klebsiella (CRE) (NDM-1)

Acinetobacter

P aeruginosa

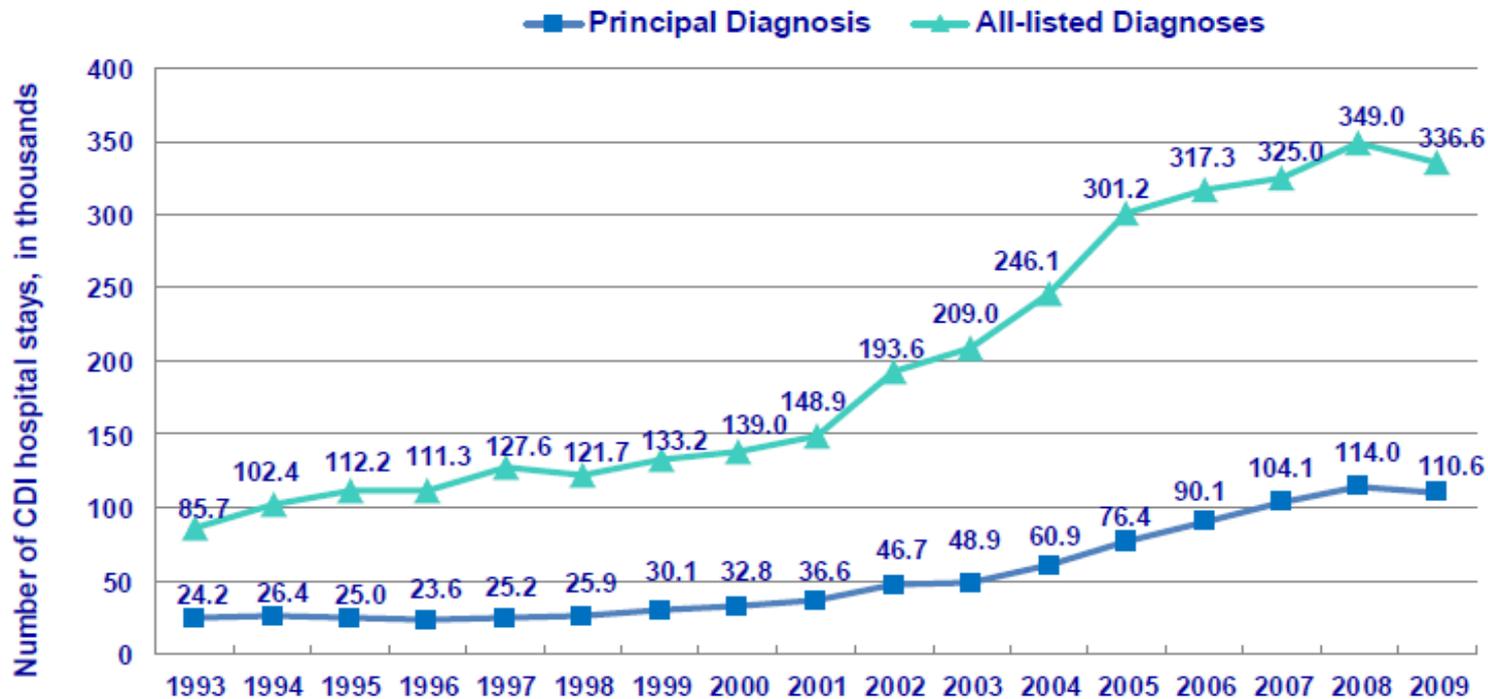
Enterococcus /ESBL

Antibiotic Armageddon



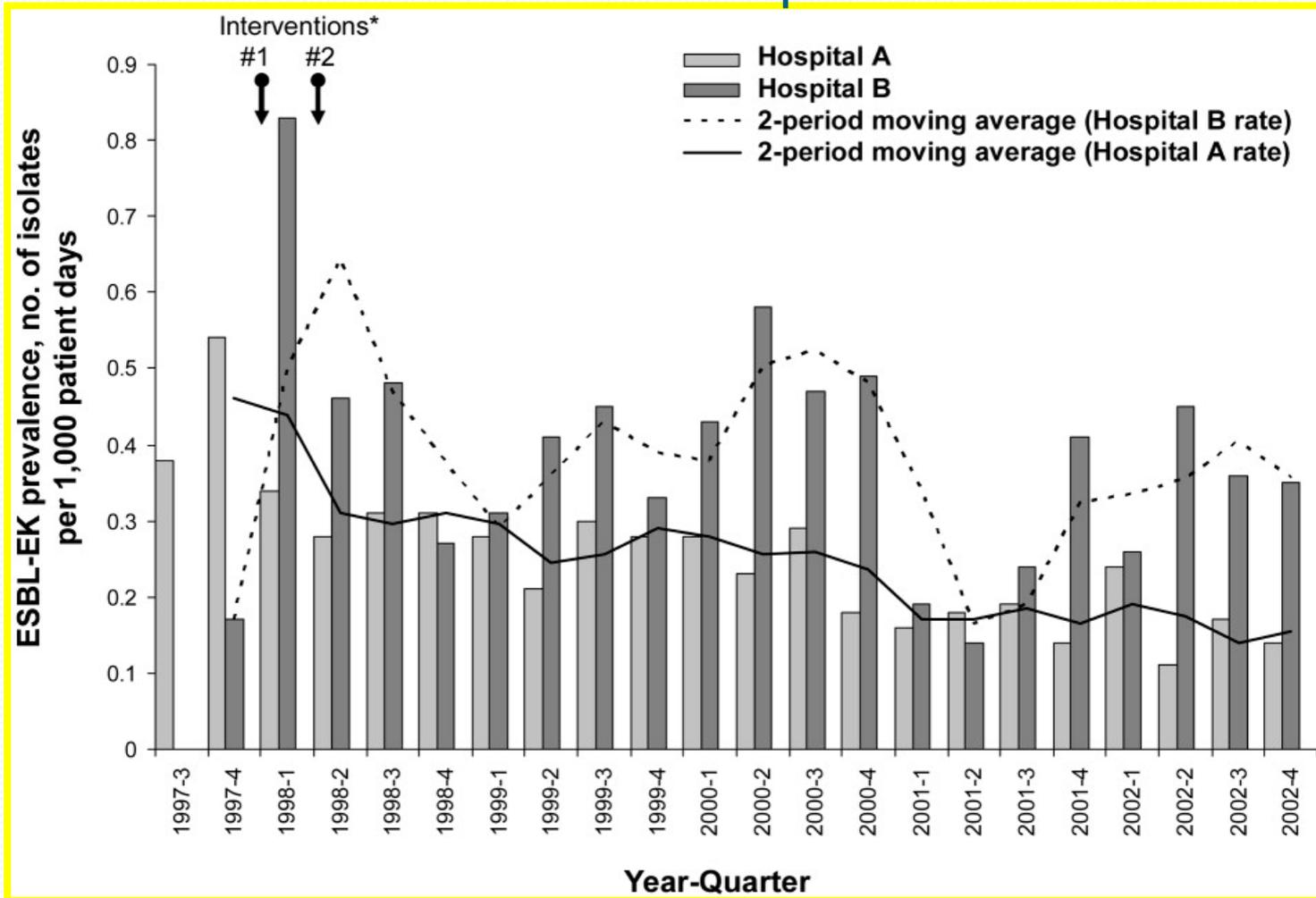


Trends in hospital stays associated with *Clostridium difficile* infection (CDI), 1993–2009



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1993–2009

Impact of Antimicrobial Formulary Interventions on ESBL *E coli* and *Klebsiella* Species



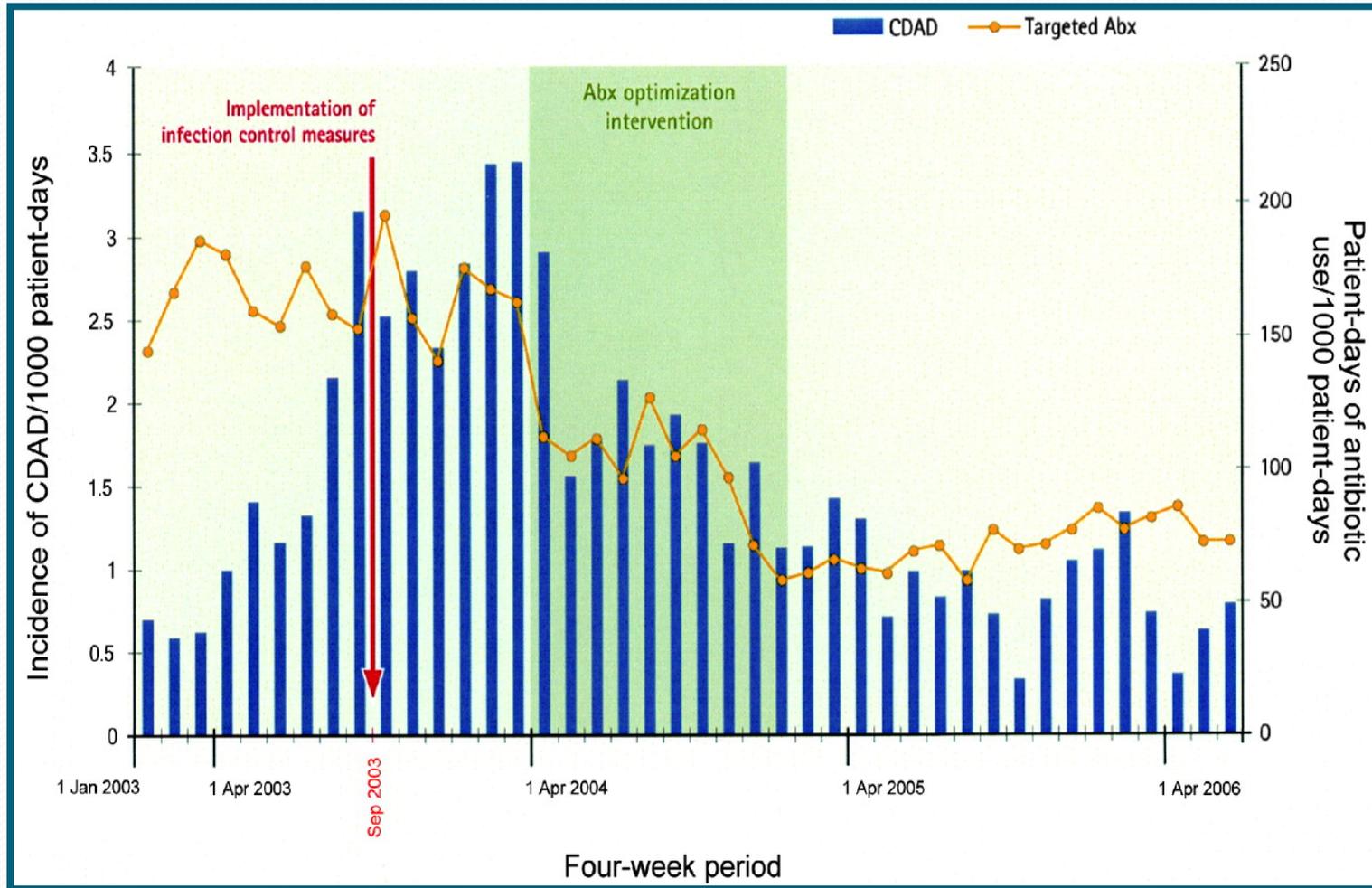
ESBL-EK=extended-spectrum β -lactamase-producing *Escherichia coli* and *Klebsiella* species.

Reprinted with permission from Lipworth AD, et al. *Infect Control Hosp Epidemiol.* 2006;27(3):279-286.

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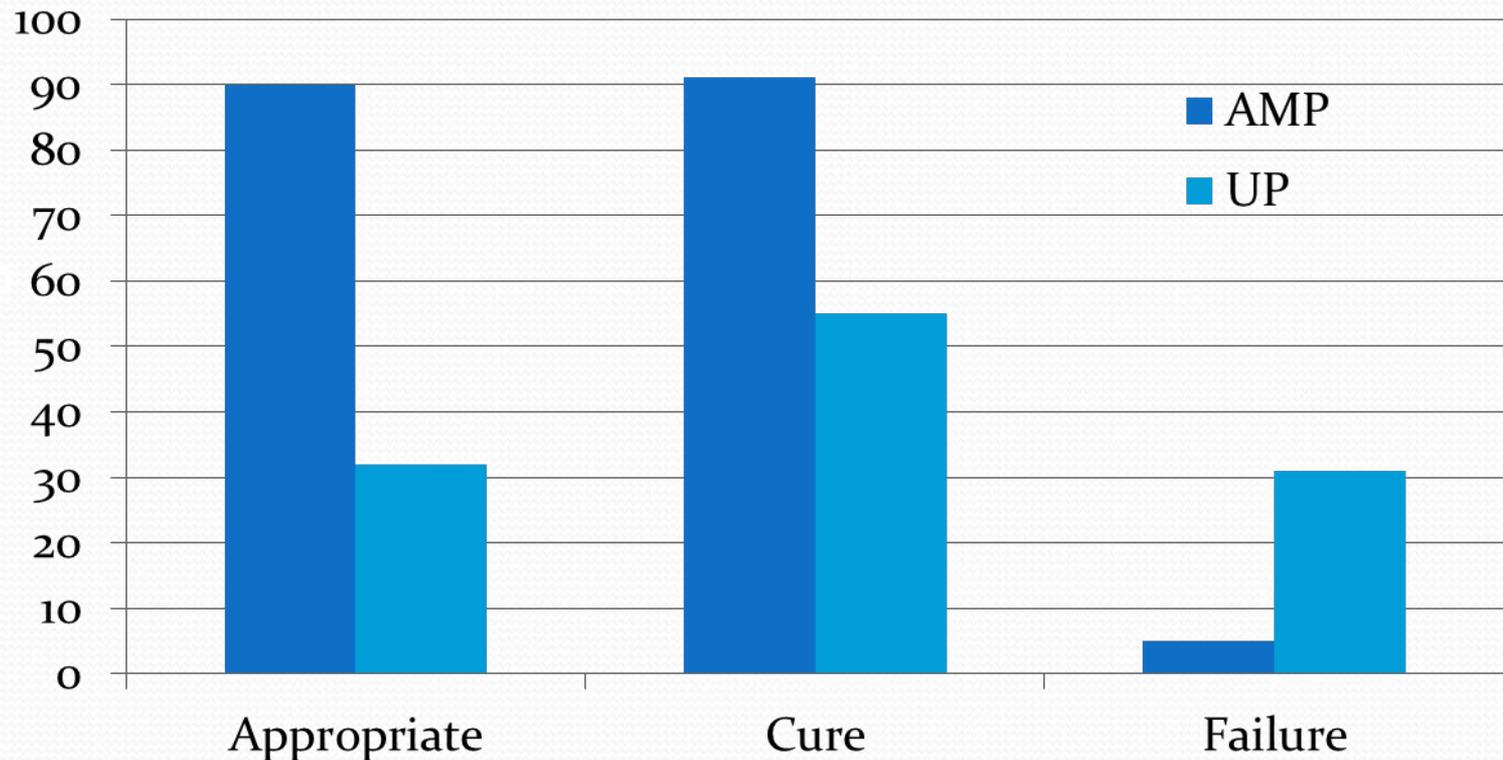
ASP Can Make a Difference with HA-CDI

Tertiary Care Hospital; Québec, Canada (2003-2006)



CDAD=C difficile-associated diarrhea; Abx=antibiotics.

ASP Can Improve Individual Patient Clinical Outcomes



AMP=antibiotic management program; UP=usual practice; RR=relative risk; CI=confidence interval.

Economic Outcomes

Randomized Controlled Trial

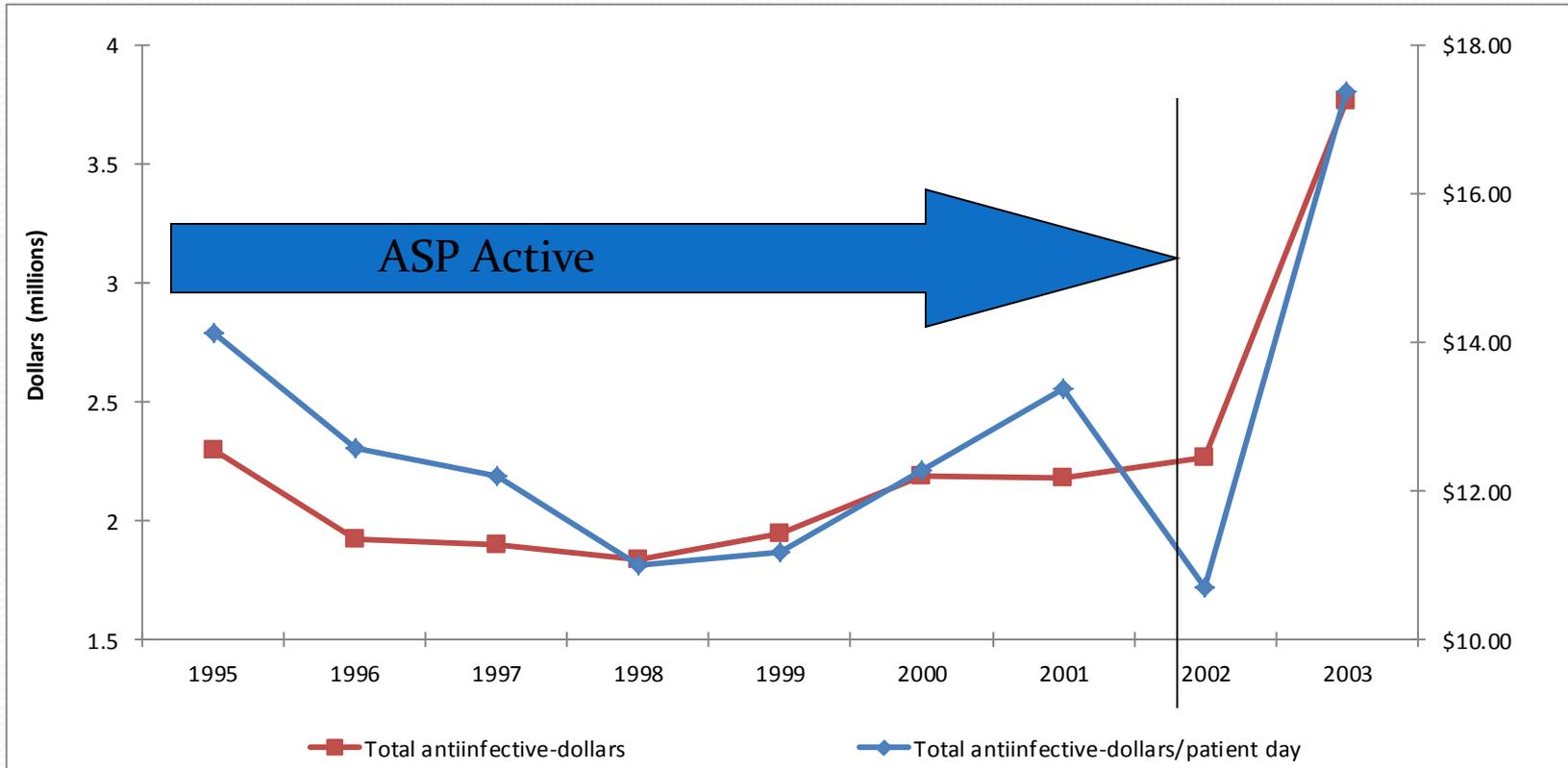
Cost	AMP (median)	UP (median)	Difference (95% CI)*
Antibiotics	\$53	\$95	\$42 (\$-3, \$103)
Infection- associated costs	\$172	\$246	\$74 (\$-40, \$197)
Total costs	\$10,021	\$10,615	\$594 (\$-4510, \$5331)

Annual savings (600 interventions/month)

Antibiotics	\$302,400
Infection-associated costs	\$533,000
Total costs	> \$4,250,000



Total Antibiotic Expenditures: 1995-2003



Antimicrobial Stewardship: The Cost of Discontinuing a Program

- Large tertiary care academic medical center: ASP Active 2002-2009
- FY01-08: ABX Utilization cost savings > \$14 million
- FY09: Discontinued ASP = CONSEQUENCES
 - >\$1 million ABX costs FY09 compared with FY08
 - 33-147% increased cost of broad spectrum agents
 - Overall DDD increased 4.8% AND broad spectrum DDD increased 26.8%

Conclusions:

- ASP is a long term proposition
- The lack of ASP has significant costs

Local Case: Do An MUE

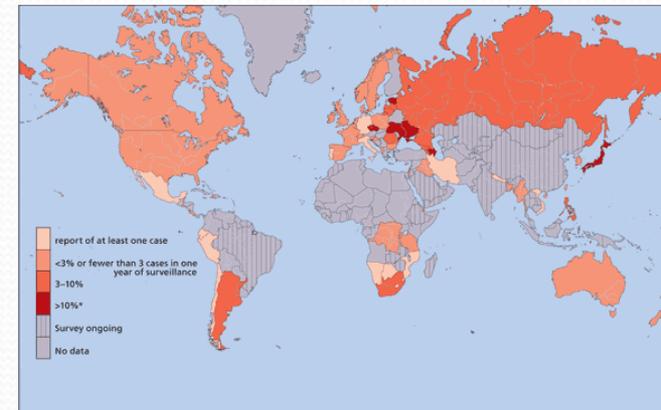
- Pharmacy approached ID specialists regarding the use of carbapenems in 2005
 - MUE of Carbapenems found **no clear indication for use 20% of the time**
- **↑ local carbapenem resistance 11%** of blood/miscellaneous Pseudomonas isolates in 2004
- **↑ *C. difficile* rates 10.9 → 22.6** cases/10,000 patient days from 2004 to 2006
 - Cost associated with CDI presented to leadership



Power of the Anecdote

Raising the Specter of a Post Antibiotic Era

ORGANISM: 01	MTBCmplx	MIC	BLOOD
Amikacin			R
Capreomycin			R
Ciprofloxacin			R
Clarithromycin			S
Cycloserine			S
Clofazimin			R
Rifabutine			R
Ethambutol 7.5			R
ETHIONAMIDE 10MCG=SUSCEPTIBLE			.
Gatifloxacin			I
Isoniazid			.
Kanamycin			R
Levofloxacin			R
Linezolid			S
Moxifloxacin			I
Ofloxacin			R
Pyrazinamide			R
Rifampin			R
Streptomycin 6			R
PAS 8MCG=RESISTANT			.
Rifampin			R
Augmentin			R



Guidelines: Domestic and International

- IDSA/SHEA Guidelines¹ suggest:
 - Physician and pharmacist compensated for time
- Guidelines for Antimicrobial Stewardship in Hospitals in Ireland²
 - Smaller hospitals should have at least one pharmacist with part-time responsibilities
 - Regional committees should be set up to serve smaller hospitals or develop regional guidelines
- European Union Project Antibiotic Stewardship International³
 - An antibiotic officer is needed
 - For smaller hospitals, individual could be either physician, pharmacist, or trained microbiologist

Dellit TH, et al. *Clin Infect Dis*. 2007;44(2):159-177

Health Protection Surveillance Centre. <http://www.hpsc.ie>. Accessed September 29, 2010;

Allerberger F, et al. *Chemotherapy*. 2008;54(4):260-267.

Regulation



- CA SB 739

(4) Require that general acute care hospitals develop a process for evaluating the judicious use of antibiotics, the results of which shall be monitored jointly by appropriate representatives and committees involved in quality improvement activities.

- CA SB 1311

(a) Adopt and implement an antimicrobial stewardship policy in accordance with guidelines established by the federal government and professional organizations. This policy shall include a process to evaluate the judicious use of antibiotics in accordance with paragraph (3) of subdivision (a) of Section 1288.8.

(b) Develop a physician supervised multidisciplinary antimicrobial stewardship committee, subcommittee, or workgroup.

(c) Appoint to the physician supervised multidisciplinary antimicrobial stewardship committee, subcommittee, or workgroup, at least one physician or pharmacist who is knowledgeable about the subject of antimicrobial stewardship through prior training or attendance at continuing education programs, including programs offered by the federal Centers for Disease Control and Prevention, the Society for Healthcare Epidemiology of America, or similar recognized professional organizations.

(d) Report antimicrobial stewardship program activities to each appropriate hospital committee undertaking clinical quality improvement activities.

The Physician Champion

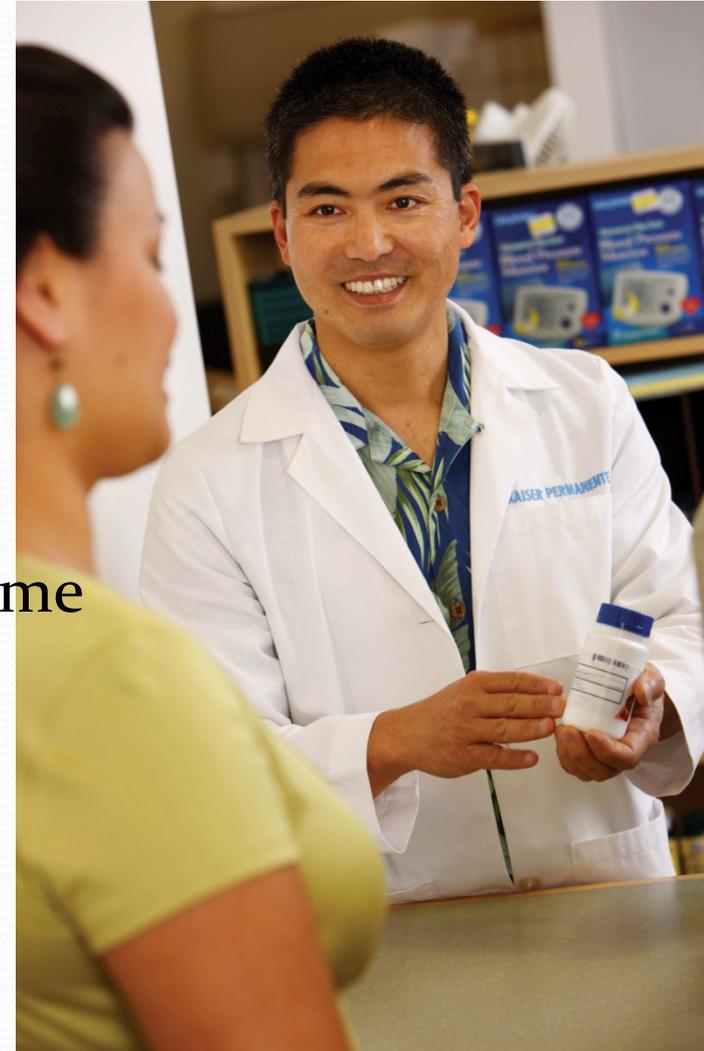
- Basic knowledge of antibiotics*
- Must show interest in taking a leadership role in the local community
- Respected by his or her peers
- Good interpersonal skills
- Good team player
- Basic understanding of human factors and culture transformation

**Does not have to be an ID Specialist*



The Pharmacist

- Good knowledge general base
 - Willing to learn
- Good interpersonal skills
- Confident/willing to approach physicians
- Dedicated time to the program
 - IT Resources can optimize pharmacy time
- NOT Required—ideal
 - ID Specific Residency Training
 - General Residency Training



(ID) Physician

- Content experts
- Help with training
- Able to talk to MDs about 'tougher' cases

- *Communication*
- *Rounding*
- *Intervention*

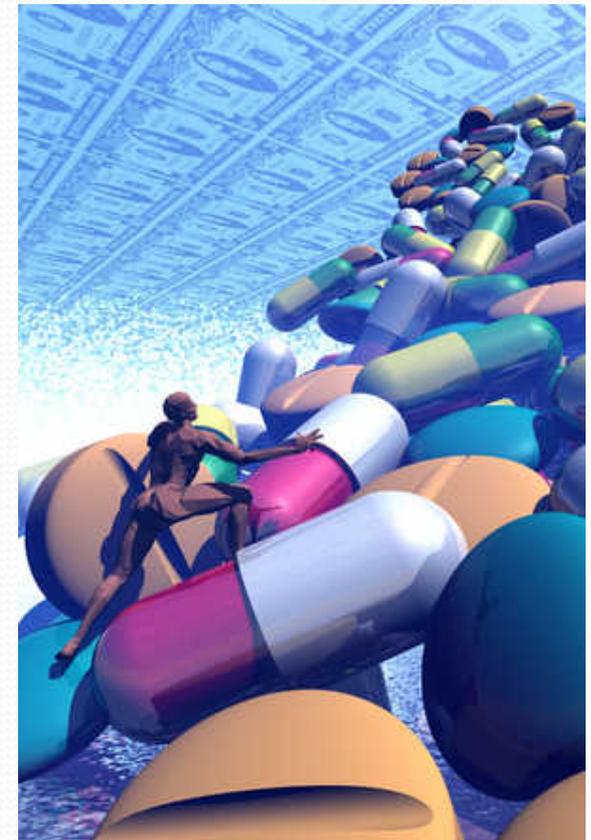
(ID) Pharmacist

- Identifies issues
- Recommends intervention
- Advise on dosing/interactions
- Keeps the ID MD informed

**IT System
Microbiology**

Resourcing

- Pharmacy and Physician Time (ASP)
- Hospital size
- Low or High Tech
- Can you do rounding?
 - How much is possible
 - How much is needed
 - Is remote rounding an option?



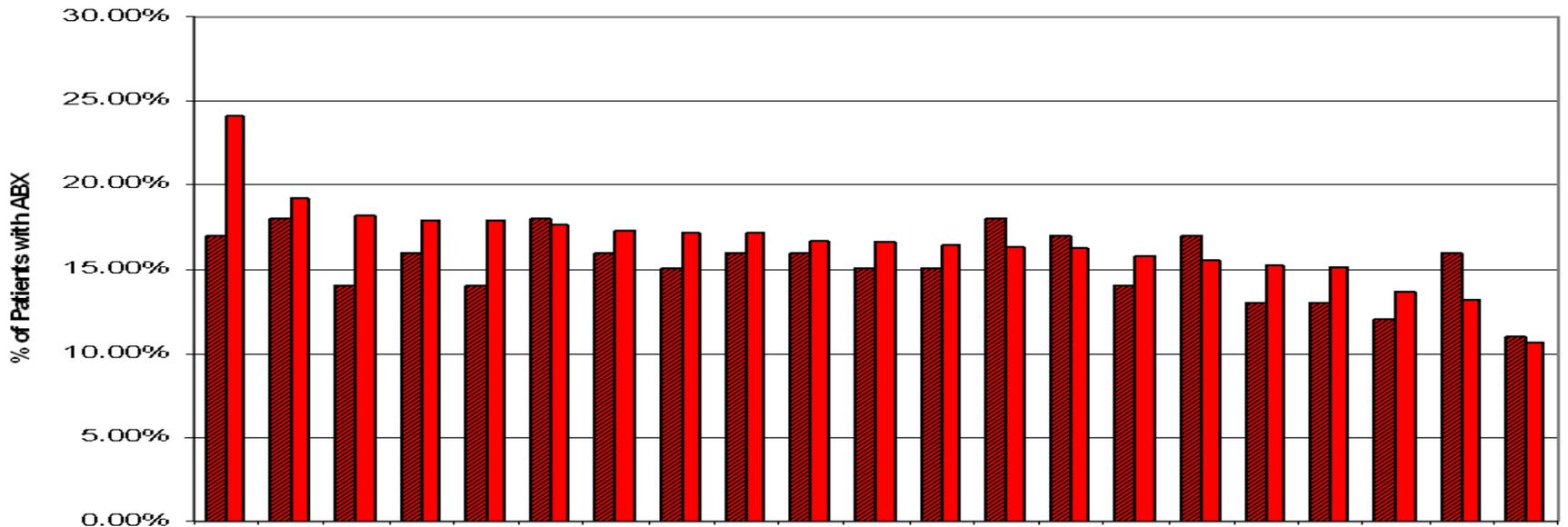
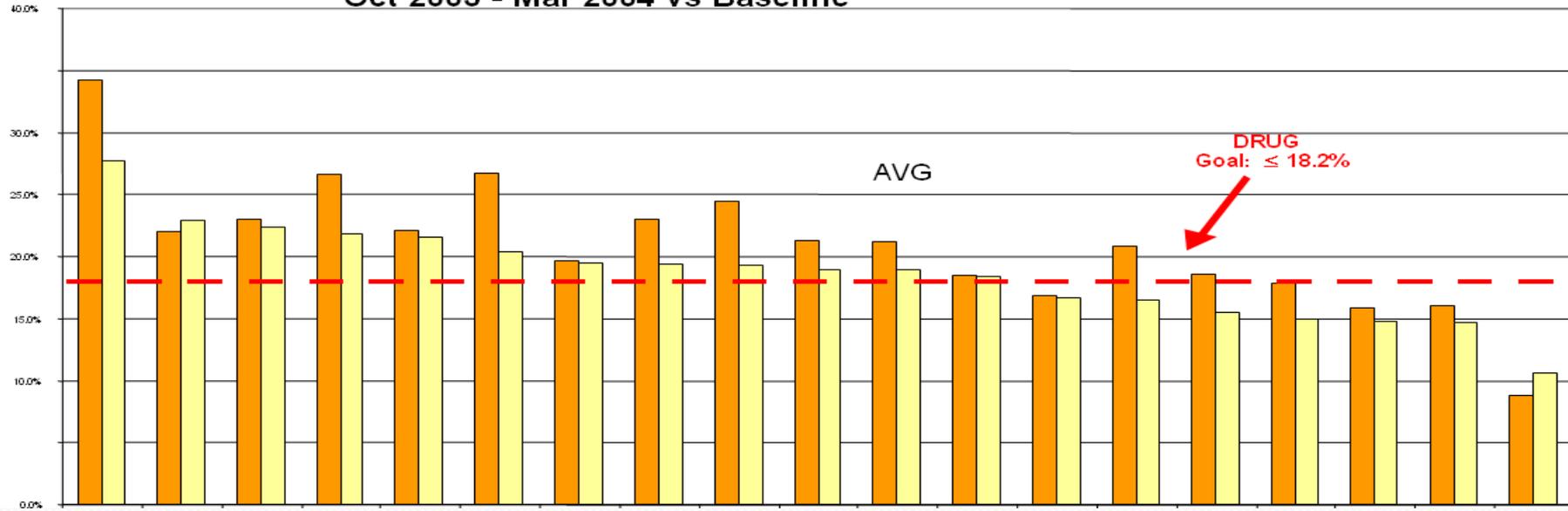
Commitment

Tasks	4/09	5/09	6/09	7/09	8/09	9/09	10/09	11/09	12/09	Completed
Compose Project Team	■									4/30/2009
Develop Program Elements		■	■							6/30/2009
Develop Stewardship Models		■	■							6/30/2009
Develop Training Tools/Materials				■						7/31/2009
Develop Competencies				■						7/31/2009
Presentation to IPD/IPS					■					8/31/2009
Program Approved By ID Chiefs					■					8/31/2009
ID Chiefs Update Guidelines					■					8/31/2009
Begin Training						■				9/7/2009
Develop General Antibiotic Management Protocol						■				9/30/2009
Program Approved By local ID Chief						■	■			10/30/2009
Complete Training						■	■			10/31/2009
Protocols Approved By P & T if needed							■	■		11/30/2009
Program Presentation or Approval P&T							■	■		11/30/2009
Pass Competencies							■	■		11/30/2009
Implementation									■	12/15/2009

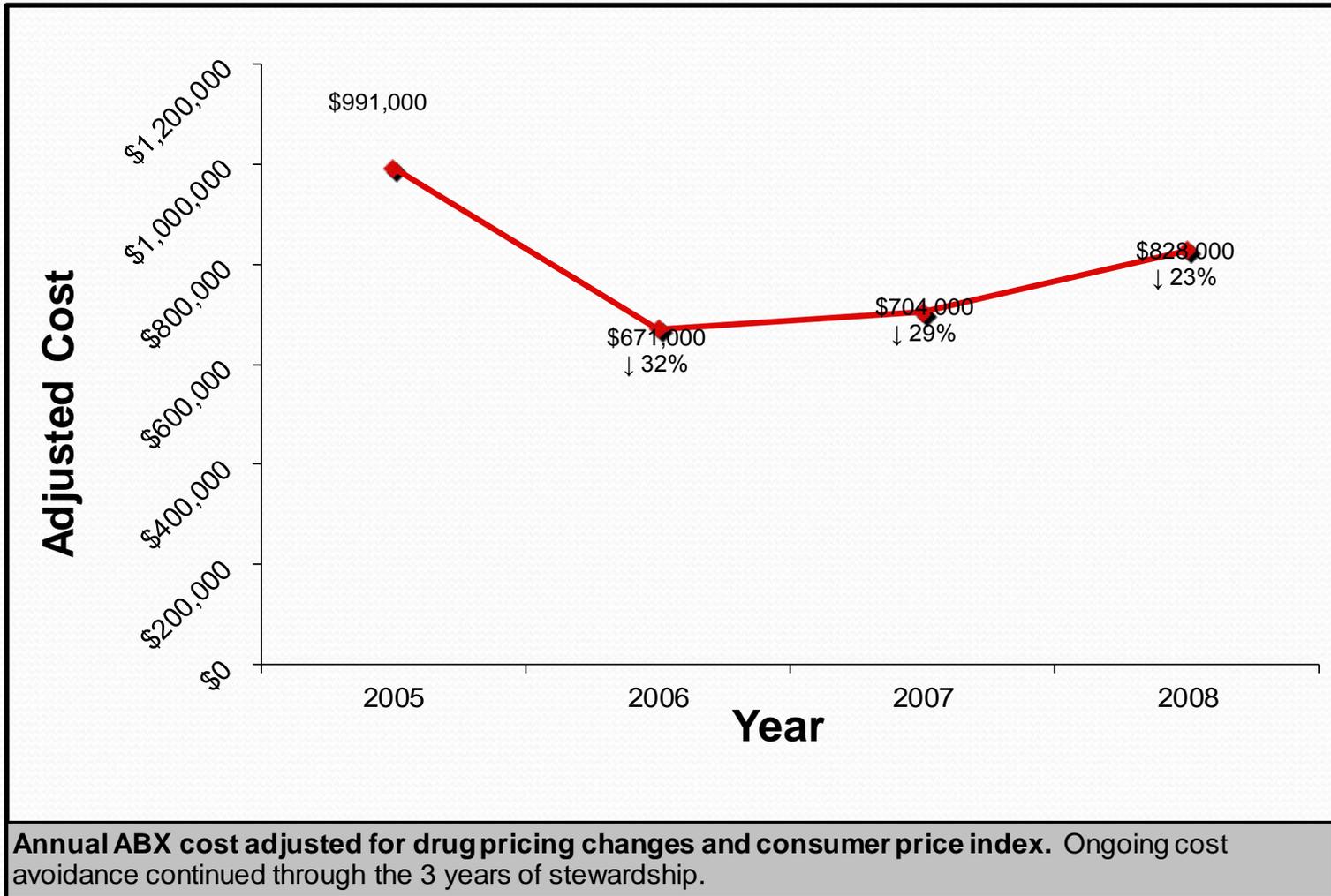
Examples Process/Outcome Measures

- Antimicrobial use (Inventory Data v. Administration)
 - Defined daily dose
 - Days of therapy
- Physician's acceptance of ASP recommendations
- Types of Interventions
- Antimicrobial costs
- Timely antibiotic administration and duration
- Cultures obtained before antibiotic(s) administered
- Adverse drug events
- Selected antimicrobial resistance patterns
- *C. difficile* rates/Reduction in LOS

DRUG ABX Initiative
Medical Centers Percent Received ABX for Selected
"itis" Dx's (exluding otitis media)
Oct 2003 - Mar 2004 vs Baseline*



Example Reduction in Drug Cost





Hospital-Associated Clostridium Difficile Infection

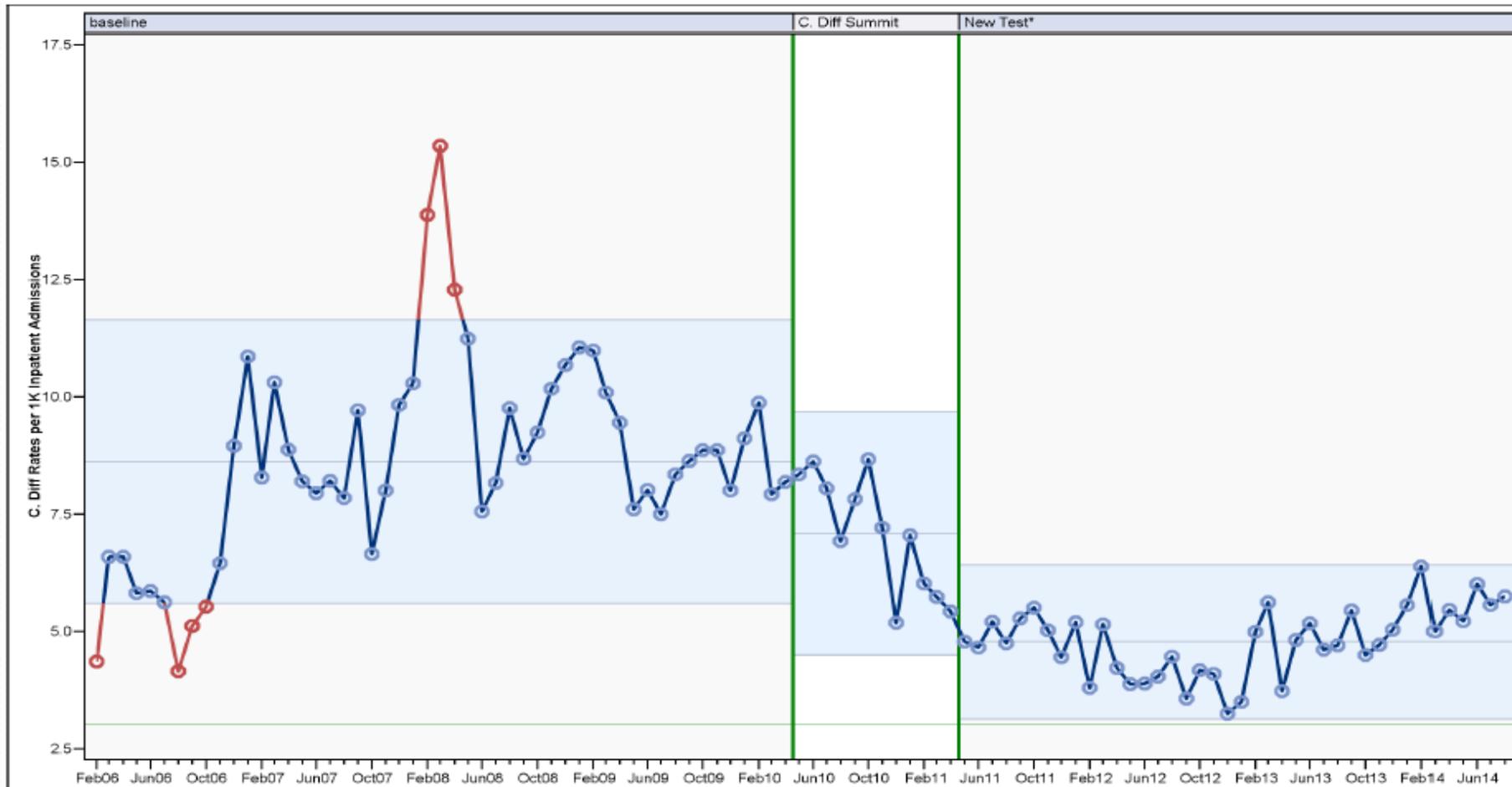
HA-CDI Cases Prevented*:

4600

Patient Days Saved*:

46000

KP Northern California



Summary

- Leadership Engagement
 - Buy in
 - Personnel
 - Ideally IT, Microbiology
 - Engagement with frontline clinicians
- Commitment to Measurement of Processes & Outcomes
- Follow up on bright and troublesome issues

