Implementing Antibiotic Stewardship Programs in "ID Resource Challenged" Hospitals

CDI Prevention Collaborative

Audio Conference Call

January 12, 2011

www.macoalition.org

Massachusetts Coalition for the Prevention of Medical Errors

C. Difficile Prevention Collaborative
Agenda

Introductions & Upcoming events	Susanne Salem-Schatz, Sc.D. *Collaborative Director*
Implementing Antibiotic Stewardship Programs in "ID Resource Challenged" Hospitals	Kristi Kuper, PharmD, BCPS *Clinical Director, Infectious Diseases* *Cardinal Health Pharmacy Solutions*
Implementing an Antibiotic Stewardship Program: Community Hospital Experience	Karen Michaels, PharmD *Clinical Manager Suburban Hospital* *Bethesda, Maryland*

Massachusetts Coalition for the Prevention of Medical Errors

Watch your email

- Team reports and updated data worksheets
- Seeking executive sponsors
- Calls to provide input for March 29th Learning Session
  - Check with your team!

Massachusetts Coalition for the Prevention of Medical Errors

Save the Dates!

- Wednesday February 9, 1pm
  - **Team Coaching Call**

- Tuesday February 15, 1pm
  - **Antibiotic Stewardship Workgroup Call**

- Tuesday March 29
  - **CDI Prevention Learning Session 2**

    Westborough, MA

Massachusetts Coalition for the Prevention of Medical Errors

Implementing Antibiotic Stewardship Programs in “ID Resource Challenged” Hospitals

Kristi Kuper, PharmD, BCPS
Clinical Director, Infectious Diseases
Cardinal Health Pharmacy Solutions

January 12, 2010

Background

- Kristi Kuper, PharmD, BCPS
- Clinical Director, Infectious Diseases
  - Cardinal Health since 2002
- Primary responsibility is to develop programs to help acute care hospitals manage antibiotic use and address antimicrobial resistance
  - Spend approximately 50% of my time with ASP
- Support hospitals that do business with our Pharmacy Solutions group
  - 150 hospitals directly managed
  - Additional 400+ hospitals in various capacities

Cardinal Health Anti-Infective Training Programs

Introductory

Bugs and Drugs:
A Primer for the Health Care Professional
(Live)

Advanced

Introduction to Stewardship*

(Self Study)

Antibiotic Stewardship: A Case Based Approach*

(Live)

Special Interests (Self Study)

Modules:

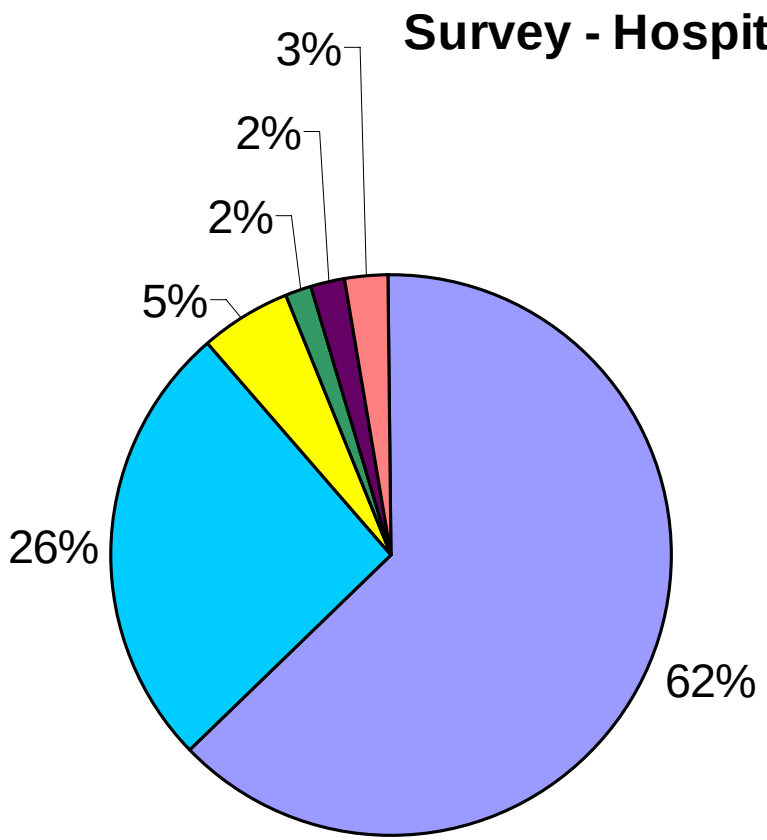
- **Aminoglycoside Dosing Competency**
- **Vancomycin Dosing Competency**
- **Basics of IV to PO (ASHP)**
- **Basics of Antibiotic Streamlining (ASHP)**

Web-Based Training:

- **Introduction to Microbiology (Est. 2011)**
- **Healthcare Associated Infections and National Patient Safety Goal 7**

Another way to think of implementing stewardship programs in a resource challenged hospital

Community Hospital Survey



Data on file: Cardinal Health

ID Physician Resources

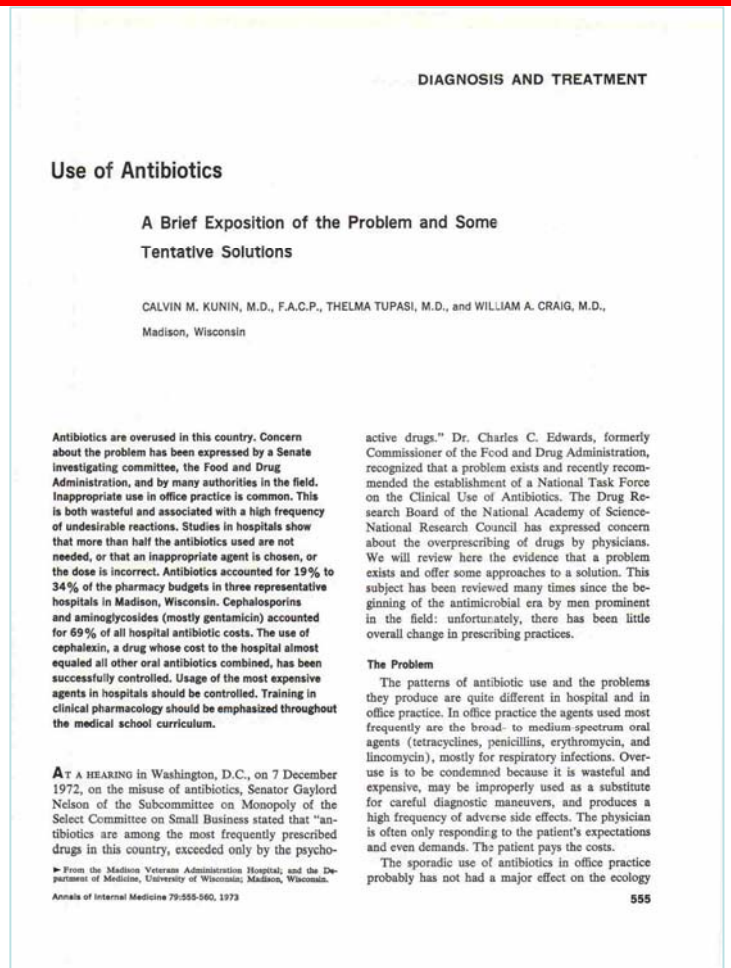
Which of the following provide an accurate description or the Infectious Disease physician resources available at your hospital?	
We do not have ID physicians at our hospital.	42%
Our ID physicians are in private practice and round on a consultative basis only.	47%
Some or all of our ID physicians are employed full time by the hospital.	11%

Data on file: Cardinal Health

Top 5 Barriers to Stewardship

- Lack personnel
- Need more training in antibiotics and ID
- ID physician support lacking
- Other programs take priority
- Lack sufficient IT resources

What is the Definition of Stewardship?



DIAGNOSIS AND TREATMENT

Use of Antibiotics

A Brief Exposition of the Problem and Some Tentative Solutions

CALVIN M. KUNIN, M.D., F.A.C.P., THELMA TUPASI, M.D., and WILLIAM A. CRAIG, M.D.,
Madison, Wisconsin

Antibiotics are overused in this country. Concern about the problem has been expressed by a Senate investigating committee, the Food and Drug Administration, and by many authorities in the field. Inappropriate use in office practice is common. This is both wasteful and associated with a high frequency of undesirable reactions. Studies in hospitals show that more than half the antibiotics used are not needed, or that an inappropriate agent is chosen, or the dose is incorrect. Antibiotics accounted for 19% to 34% of the pharmacy budgets in three representative hospitals in Madison, Wisconsin. Cephalosporins and aminoglycosides (mostly gentamicin) accounted for 69% of all hospital antibiotic costs. The use of cephalexin, a drug whose cost to the hospital almost equaled all other oral antibiotics combined, has been successfully controlled. Usage of the most expensive agents in hospitals should be controlled. Training in clinical pharmacology should be emphasized throughout the medical school curriculum.

AT A HEARING in Washington, D.C., on 7 December 1972, on the misuse of antibiotics, Senator Gaylord Nelson of the Subcommittee on Monopoly of the Select Committee on Small Business stated that "antibiotics are among the most frequently prescribed drugs in this country, exceeded only by the psychoactive drugs." Dr. Charles C. Edwards, formerly Commissioner of the Food and Drug Administration, recognized that a problem exists and recently recommended the establishment of a National Task Force on the Clinical Use of Antibiotics. The Drug Research Board of the National Academy of Science-National Research Council has expressed concern about the overprescribing of drugs by physicians. We will review here the evidence that a problem exists and offer some approaches to a solution. This subject has been reviewed many times since the beginning of the antimicrobial era by men prominent in the field: unfortunately, there has been little overall change in prescribing practices.

► From the Madison Veterans Administration Hospital; and the Department of Medicine, University of Wisconsin; Madison, Wisconsin.

The Problem

The patterns of antibiotic use and the problems they produce are quite different in hospital and in office practice. In office practice the agents used most frequently are the broad- to medium-spectrum oral agents (tetracyclines, penicillins, erythromycin, and lincomycin), mostly for respiratory infections. Overuse is to be condemned because it is wasteful and expensive, may be improperly used as a substitute for careful diagnostic maneuvers, and produces a high frequency of adverse side effects. The physician is often only responding to the patient's expectations and even demands. The patient pays the costs.

The sporadic use of antibiotics in office practice probably has not had a major effect on the ecology

Stewardship is defined as the careful and responsible management of something entrusted to one's care.

Ann of Internal Med 1973;79:555-560.

Rationale for Implementing a Program

" The primary goal of antimicrobial stewardship is to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use, including toxicity, the selection of pathogenic organisms (such as *Clostridium difficile*), and the emergence of resistance."

GUIDELINES

Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship

Timothy H. Dellit,[1] Robert C. Owens,[2] John E. McGowan, Jr.,[3] Dale N. Gerding,[4] Robert A. Weinstein,[5] John P. Burke,[6] W. Charles Huskins,[7] David L. Paterson,[8] Neil O. Fishman,[9] Christopher F. Carpenter,[10] P. J. Brennan,[9] Marianne Billeter,[11] and Thomas M. Hooton[12]

[1]Harborview Medical Center and the University of Washington, Seattle; [2]Maine Medical Center, Portland; [3]Emory University, Atlanta, Georgia; [4]Hines Veterans Affairs Hospital and Loyola University Stritch School of Medicine, Hines, and [5]Stroger (Cook County) Hospital and Rush University Medical Center, Chicago, Illinois; [6]University of Utah, Salt Lake City; [7]Mayo Clinic College of Medicine, Rochester, Minnesota; [8]University of Pittsburgh Medical Center, Pittsburgh, and [9]University of Pennsylvania, Philadelphia, Pennsylvania; [10]William Beaumont Hospital, Royal Oak, Michigan; [11]Ochsner Health System, New Orleans, Louisiana; and [12]University of Miami, Miami, Florida

CID 2007:44(15 January) Dellit et al.

The Landscape of Stewardship

- Stewardship has become “vogue” more in the past few years
  - IDSA/SHEA guidelines
  - National Patient Safety Goal 7
    - 07.03.01 - Implement evidence-based practices to prevent health care-associated infections due to multidrug-resistant organisms in acute care organizations.
  - CMS “no pay” for select hospital acquired infections
  - CDC Guidelines for Prevention of MDROs
  - Fiscal challenges facing hospitals
  - State surveys
    - California

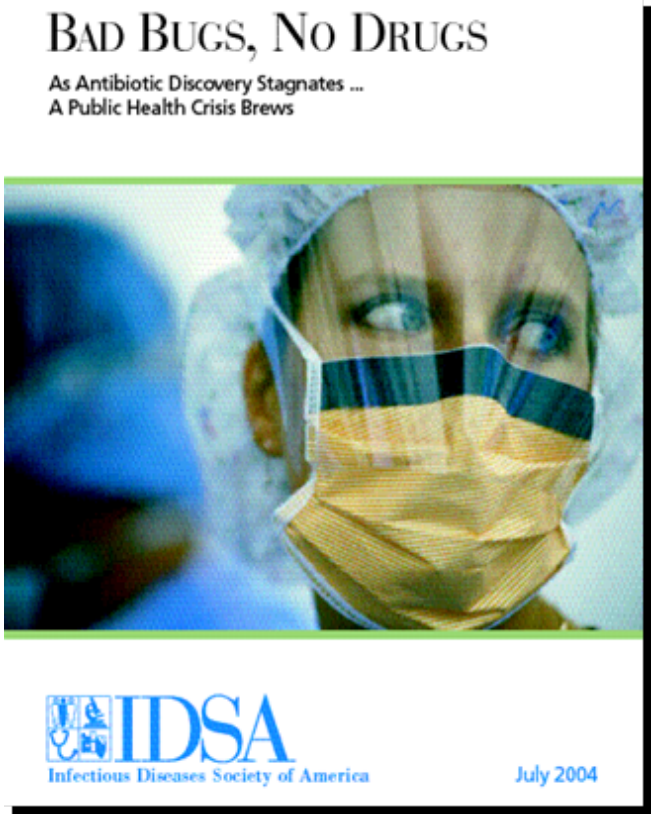
Antimicrobial Resistance

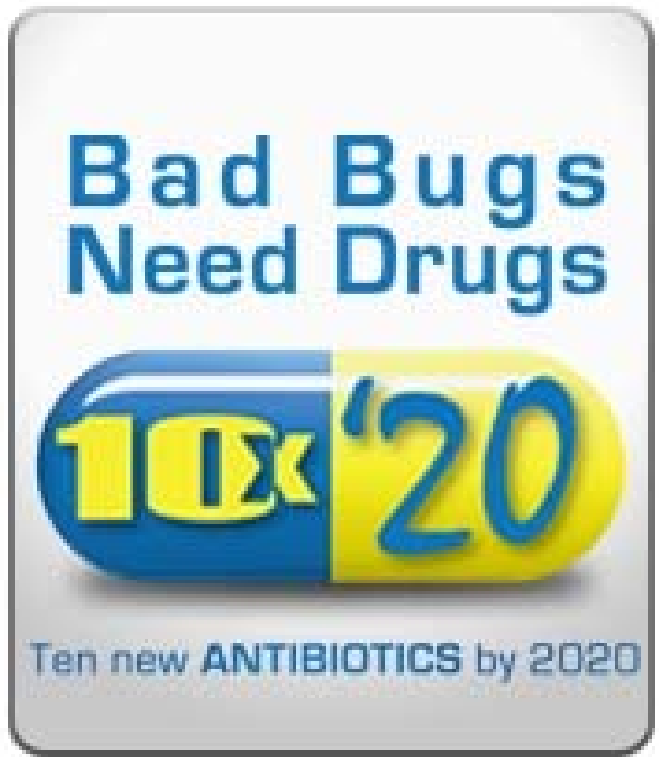
Gram positive
Methicillin resistant *Staphylococcus aureus* (MRSA)
Vancomycin resistant Enterococcus (VRE)

Anaerobes
Bacteroides fragilis

Gram negative
Acinetobacter baumanii (AB)
Extended spectrum beta lactamases (ESBLs)
Klebsiella pneumoniae producing carbapenemases (KPCs)
Multi-drug resistant *Pseudomonas aeruginosa* (MDR- PSA)
Metallo-beta lactamases (MBLs) – circa 2010

Why Stewardship, Why Now?

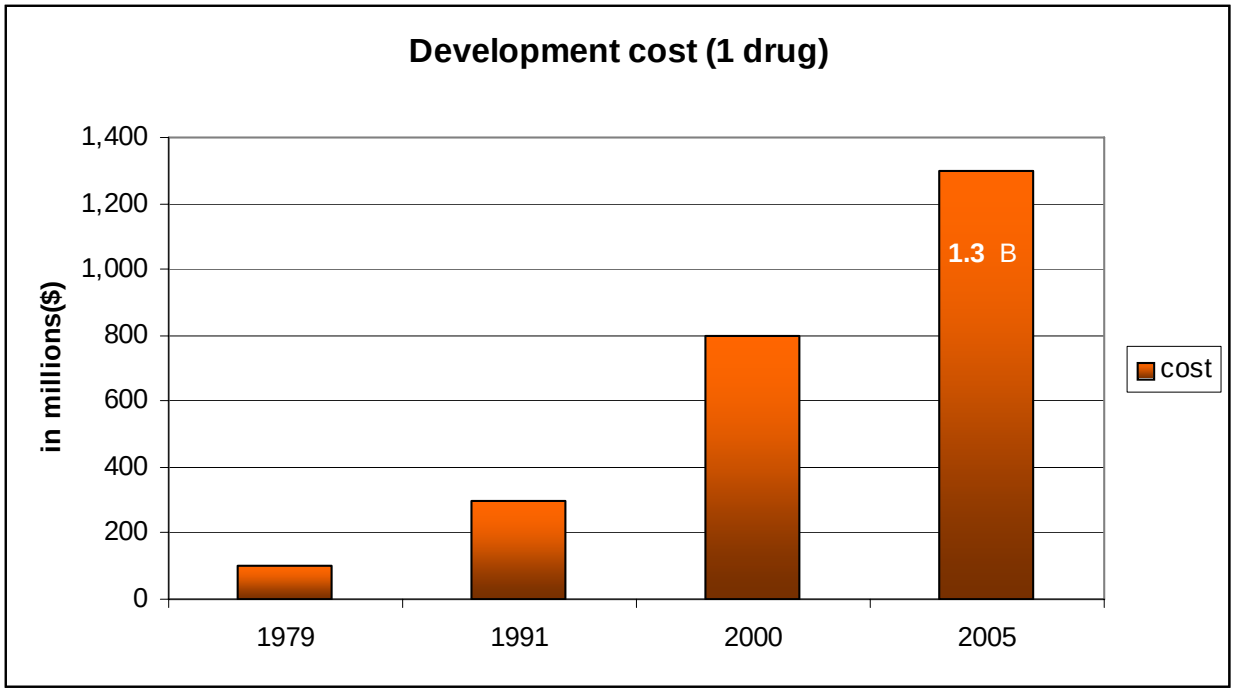




1. Infectious Diseases Society of America. *Bad Bugs, No Drugs: As Antibiotic Discovery Stagnates, A Public Health Crisis Brews*. July, 2004. http://www.idsociety.org/WorkArea/showcontent.aspx?id=5554. Accessed January 15, 2009.

Market Influences - Economics

- Antibiotics have a finite use period unlike chronic medications
- Return on investment not as high with antibiotics



http://www.idsociety.org/10x20. Accessed 6/2010.

Regulatory History

Drug name	Company	Description	Status
Iclaprim	Arpida	IV DHF inhibitor for CSSI	Denied 11/08 – sold to Acino Pharma
Oritavancin	Targanta	IV glycopeptide for CSSI	Denied 11/08 – sold to Medicines company
Faropenem	Replidyne	PO penem for RTIs	Denied 10/06
Cethromycin	Advanced Life Sciences	PO treatment for CAP (ketolide)	Denied June 09
Dalbavancin	Pfizer	Once weekly anti-MRSA IV	Pfizer withdrew application

Ten Steps to Implementing a Stewardship Program in a Resource Challenged Environment

Step 1 – Assess Program Motivations

- Analyze motivations for establishing a program
- What problems exist today that document the need for a stewardship program?
- Quantify the answer using objective data
- Remember – before you know where you are going, you need to know where you have been

The Wrong Answers

- To save money or because my CFO thought it would be a good idea.
- Because we (Administration) can't control the physicians prescribing but we think Pharmacy can.
- I enter a lot of orders for antibiotics.
- There just seems to be a lot of antibiotic overuse.
- Antibiotic resistance is bad.
- ***Remember****: If you are willing to accept anecdotal information up front to support your stewardship program, you have to be willing to accept anecdotal info from physicians about why they won't change.*

The Right Answers

- To improve the quality of care in our institution.
- To create a multi-disciplinary program that will encourage appropriate antimicrobial use in our institution.
- Antibiotic utilization has increased by 17% in the last year.
    - Our goal is to reduce this number to 5% growth for FY11
- Based on a review of 100 general medical and surgical patients who received ≥ 3 antibiotics, only 30% of patients had therapy de-escalated after culture and susceptibility reports were returned.
    - Our goal is to improve this number to 60% by year end

Steps 2 and 3

- Step 2 – Identify which of the defined problems or issues you plan to address with your stewardship program?
  - Rome wasn't built in a day

- Step 3 - Define how will you measure your progress and measure your success.
  - Defined daily dose per 1000 patient days (DDD/ per 1000 pt days)
  - Days of therapy (DOT)
  - Cost per patient day or cost per adjusted patient day ($/PD or $ per APD)

Measuring Antimicrobial Use

Measurement	Advantages	Disadvantages
DDD/1000 patient days [(grams/DDD)/pt days]*1000	Allows for comparison among multiple facilities; does not require order level data	Discrepancies between DOT and DDD, not useful with pediatric data, can underestimate drugs that are renally dose adjusted, approved DDDs may change which can create confusion
Days of Therapy	Better measurement for pediatric data,not influenced by changes in recommended DDD or discrepancies between the DDD and the preferred daily dose	Will overestimate use for drugs that are given in multiple doses per day; more difficult to measure without computerized pharmacy records
Cost based methodologies	Easiest to obtain	Loses accuracy as price changes increase or decrease significantly

Clinical Infectious Diseases 2007; 44:664–70

Step 4 – Define Implementation

- How will the day to day activities of the ASP be set up?
- Who will perform the streamlining functions?
- Which personnel are assigned to the program (based on hours per week)?
- Most hospitals are more successful in implementing the stewardship program in stages vs. all at once.
  - “Culture of the month”
  - Use "culture of the month" principles
  - First month only do bug-drug matching on urine cultures, then blood cultures, etc

Step 5 – Identify Physician Champion

- If interventions need to occur to change prescribing practices, identify a physician champion or physician groups that will agree to have “peer to peer” discussions with outlying physicians.

- Ideally it is nice if this includes an ID physician but this individual may not always be available or willing to engage in this responsibility. Other advocates may include hospitalists, ER physicians, or Intensivists.

Physician Compensation

- Paying physicians for their services
  - $250/hour (Clin. Infect. Dis. 2008; 47:1051–63)
  - Our own internal survey has shown rates to be much lower and depends on area of the country
  - Some hospitals pay per hour, some give an annual stipend (e.g. $10,000/yr) or % of costs saved

Step 6 – Identify Additional Resources

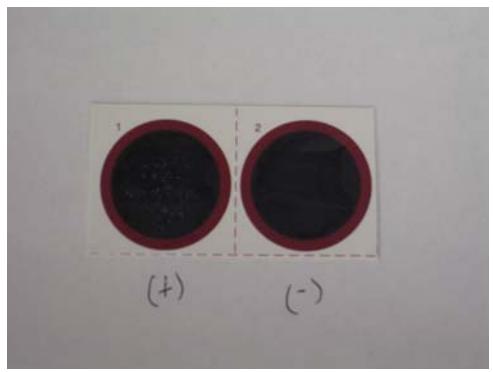
- Assess resources that are available (personnel and tools)
  - Personnel
    - The most successful programs are inter-disciplinary
    - Don’t forget to include nursing and case management
    - Pharmacy technicians can be helpful
  - Tools perspective
    - Make friends with your hospital IT department
    - Intervention tracking
    - Other systems within the hospital
      - For example, look at Infection Control tools available
  - Maximize technology

Step 6 – Identify Additional Resources

- Pharmacists education
  - Home grown
  - Commercial products
    - MAD ID
    - Society of Infectious Diseases Pharmacists
    - State pharmacy societies (e.g. New York, Maine)
- Medical education
- Basic bugs and drugs
  - Nursing
  - Microbiology (obviously more drugs than bugs)

Step 7 – Influence of External Factors

- Poor or no specimen obtainment processes
- Poor testing practices in microbiology
- Inappropriate infection control programs
- Look outside the walls of the pharmacy and assess these other areas



Step 8 – Establish Frequency of Monitoring

- Set up a scorecard with key metrics
- Establish the frequency of tracking and reporting this data
- Identify who is collecting antibiotic or infectious disease related information within the facility.
  - Infection preventionists are often meticulous at collecting data related to hospital acquired infections, *C. difficile* rates, etc.
  - Microbiology may also be monitoring issues such as blood culture contamination rates, which if increased, could affect the utilization of certain antibiotics.

Step 9 – Establish Reporting

- If resources are available, consider developing an antimicrobial stewardship committee to review activities associated with antibiotic use or stewardship.

- If not, the P&T committee or infection control committee can be a second option.

Step 10 – Market the Program

- Advertise the program before it starts and clearly communicate that this is not just a cost issue.

- Continue to advertise or communicate the results in newsletters or unique communiqués.

- Recognize the successes and acknowledge those individuals who contributed to the success of the program.

Stewardship Resources

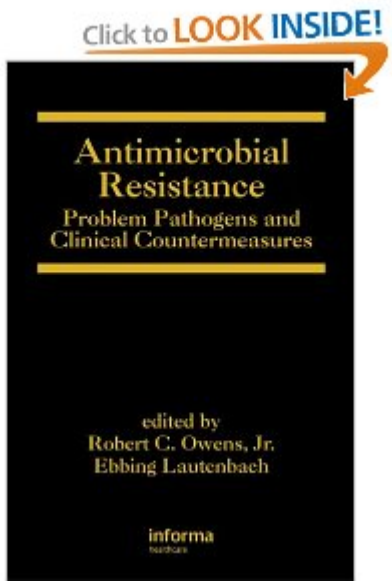
On the Web

- ASHP Stewardship Initiative
  - http://onlinece.ashpadvantage.com/stewardship/
- Johns Hopkins Antibiotic Guide
  - http://www.hopkins-abxguide.org/
- Nebraska Medical Center ASP Homepage
  - http://www.nebraskamed.com/careers/education/asp/
- University of Kentucky – Chandler Medical Center
  - http://www.hosp.uky.edu/pharmacy/amt/default.html
- KU Medical Center Antibiotic Homepage
  - http://www2.kumc.edu/pharmacy/AbxUseGuide/Table%20of%20Contents.htm

On the Web

- CDC Get Smart - Antimicrobial Stewardship
  - http://cdc.gov/getsmart/healthcare/improve-efforts/index.html
- SHEA website
  - http://www.shea-online.org/news/stewardship.cfm
- Conferences
  - MAD-ID
    - http://www.mad-id.com/
  - Pediatric Stewardship (Childrens Mercy Hospital - KC)
    - http://www.regonline.com/builder/site/Default.aspx?eventid=837442
  - State Society Meetings
    - https://m360.nyschp.org/event.aspx?eventID=17858

In Print



- Antimicrobial stewardship: concepts and strategies in the 21st century (*Diagnostic Microbiology and Infectious Disease* 61 (2008) 110–128)
- Antimicrobial Stewardship Programs: Interventions and Associated Outcomes (*Expert Rev Anti Infect Ther.* 2008;6(2):209-222)
- Antimicrobial Susceptibility Testing:A Primer for Clinicians (*Pharmacotherapy* 2009;29(11):1326–1343)

Sources of Comparison Data
Pharma Sponsored

Name (Sponsor)	Data Source	Website	Comments
T.E.S.T – Tigecycline Evaluation and Surveillance Trial (Pfizer, Formerly Wyeth)	Isolates are collected from 130 global centers. Micro testing performed on site and then info entered into a proprietary database	http://testsurveillance.com/index.php?view=welcome&template=main	Susceptibility data limited to drugs that have similar spectrum of activity to tigecycline. Access is free but must register.
Susceptibility of Gram Positive Pathogens (Cubist)	JMI Labs Central Data Repository	http://www.gp-pathogens.com/data/default.cfm	Data is independently maintained by JMI Labs, one of the leaders in antibiotic susceptibility testing. Site only has gram positive info.
MYSTIC –Meropenem Yearly Susceptibility Test Information Collection (Astra Zeneca)	JMI Labs Central Data Repository	Not available	Data can only be found in published articles. Not searchable.
TRUST - Tracking Resistance in the US Today	Focus Technologies Central Data Repository	http://www.levaquin360.com/levaquin360/microbiology_support--tracking_antibiotic_resistance.html	Website only contains info on S. pneumoniae resistance patterns but TRUST surveillance tracks gram negative also. May be able to access more info through Ortho MSLs.

Sources of Comparison Data Non-Pharma

Name (Sponsor)	Website	Comments
Antibiotic 10 step (Cardinal Health)	Not available	Collect antibiogram data for over 40 hospitals. Contact Clinical Affairs (KK) for more special reports.
ABC - Active Bacterial Core Surveillance – CDC	http://www.cdc.gov/abcs/reports-findings/surv-reports.html	Contains annual susceptibility reports for Group A and B Strep, MRSA, N. meningitidis, and S. pneumoniae, and H. influenzae
CDC Antimicrobial Resistance homepage (CDC)	http://www.cdc.gov/ncidod/dhqp/ar.html	Data is static and epidemiologic summaries can run several years behind
JMI Laboratories	http://jmilabs.com/default.cfm	One of the leaders in antimicrobial testing. Posters and abstracts that they have presented are on this website under the Scientific presentations website but are difficult to search for a particular resistance pattern.
National Healthcare Safety Network	http://www.cdc.gov/nhsn/PDFs/AR_report2008.pdf	Data is static and epidemiologic summaries can run several years behind

Closing Thoughts

- “Don’t let the better get in the way of the good.” (Voltaire)

- “Don’t let perfection stand in the way of progress.”

Q&A

Kristi Kuper, PharmD,BCPS

Ph: 281-749-4056

Email: kristine.kuper@cardinalhealth.com

Thank you!

Implementing an Antibiotic Stewardship Program: Community Hospital Experience

Karen Michaels, PharmD
Clinical Manager
Suburban Hospital
Bethesda, Maryland
KMichaels@SuburbanHospital.org

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Suburban Hospital Background

- 236 bed not for profit, acute care hospital
- Became affiliated with Johns Hopkins Medicine in June 2009
- Designated regional trauma center
- Primary service lines include
  - NIH affiliated CT surgery program
  - Orthopedics, Critic Care, Oncology
  - Acute med/surg
  - No peds or OB

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Pharmacy Resources

- 24 pharmacy FTEs (14 pharmacists)
- Decentralized clinical pharmacy staff model
- Two full time clinical pharmacists
  - Karen Michaels, PharmD – Clinical Manager
  - Mehran Mahdavi, PharmD,BCOP- Clinical pharmacist
- During this program, also had half time clinical pharmacist working in the ICU
- ASHP Accredited Pharmacy Residency Site
- Preceptor site for Doctor of Pharmacy students

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Infectious Diseases Resources

- Nine private practice ID physicians
- Many see patients at other facilities
- Antibiotic Subcommittee
  - Pharmacist and Physician co –chairs
  - Multi-disciplinary attendance
- Recommendations are forwarded to the P&T Committee for final approval

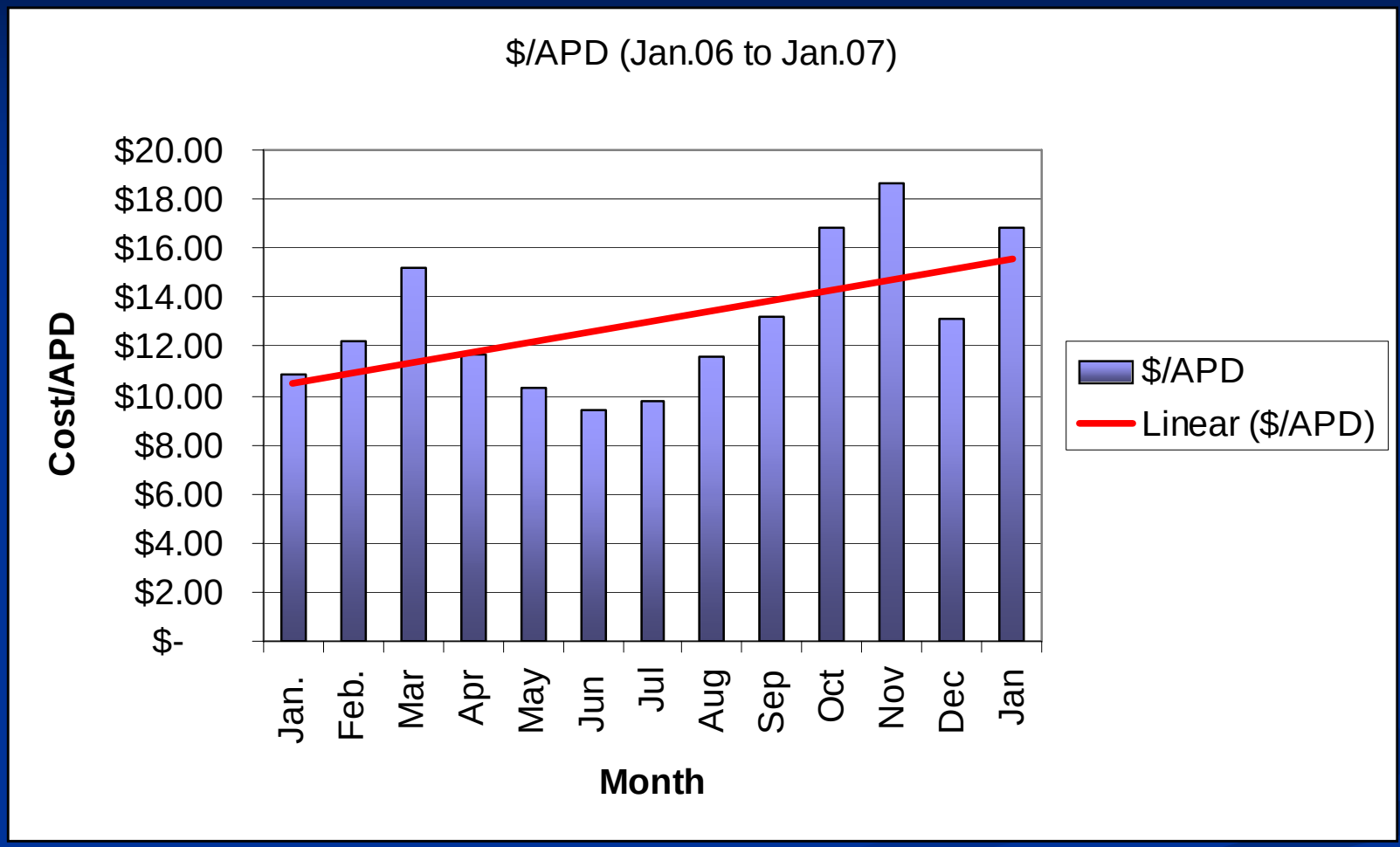
SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

IT Resources

- Meditech Computer System (version 5.61)
  - Interventions documented through here
- Cardinal Health resources
  - Internet based Pharmacy cost monitoring reports (down to the NDC level)
  - Cost and utilization benchmark data
  - Several Excel based tools
- No access to commercial antimicrobial decision support tools

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

What Started it All



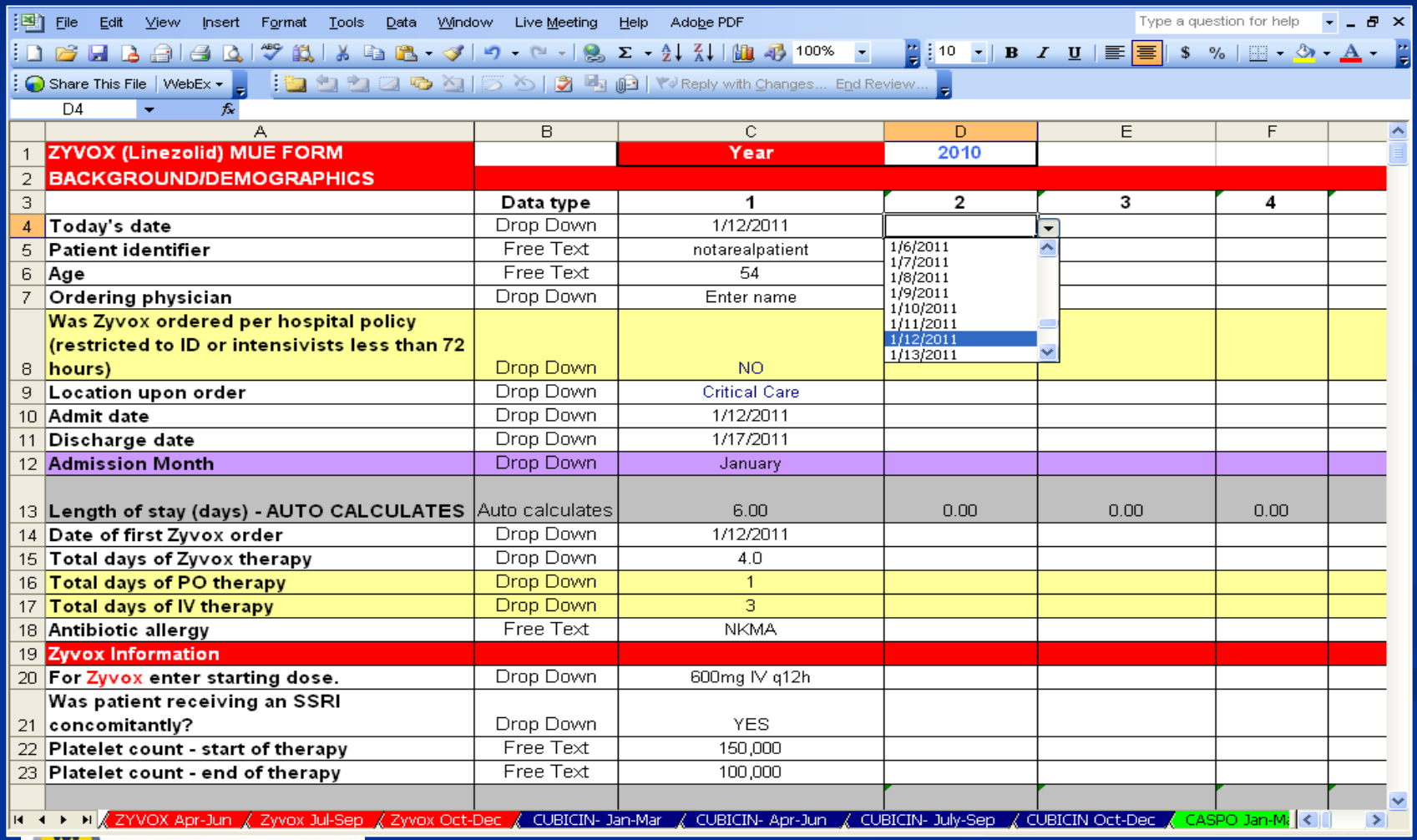
SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

What Did We Do?

- Began formalized prospective daily review program for antibiotics in early 2007
  - Included evaluating antibiotics for appropriate renal dosing and opportunity to convert to oral therapy (i.e. IV to PO)
- Implemented expanded prospective medication use evaluation (MUE) program for caspofungin, linezolid, and daptomycin
  - These drugs are restricted to ID or Intensivists(≤ 72 hours)
  - Selected these drugs because of cost and quality issues

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Prospective MUE Program



	A	B	C	D	E	F
1	ZYVOX (Linezolid) MUE FORM		Year	2010		
2	BACKGROUND/DEMOGRAPHICS					
3		Data type	1	2	3	4
4	Today's date	Drop Down	1/12/2011			
5	Patient identifier	Free Text	notarealpatient			
6	Age	Free Text	54			
7	Ordering physician	Drop Down	Enter name			
8	Was Zyvox ordered per hospital policy (restricted to ID or intensivists less than 72 hours)	Drop Down	NO			
9	Location upon order	Drop Down	Critical Care			
10	Admit date	Drop Down	1/12/2011			
11	Discharge date	Drop Down	1/17/2011			
12	Admission Month	Drop Down	January			
13	Length of stay (days) - AUTO CALCULATES	Auto calculates	6.00	0.00	0.00	0.00
14	Date of first Zyvox order	Drop Down	1/12/2011			
15	Total days of Zyvox therapy	Drop Down	4.0			
16	Total days of PO therapy	Drop Down	1			
17	Total days of IV therapy	Drop Down	3			
18	Antibiotic allergy	Free Text	NKMA			
19	Zyvox Information					
20	For Zyvox enter starting dose.	Drop Down	600mg IV q12h			
21	Was patient receiving an SSRI concomitantly?	Drop Down	YES			
22	Platelet count - start of therapy	Free Text	150,000			
23	Platelet count - end of therapy	Free Text	100,000			

1/6/2011
1/7/2011
1/8/2011
1/9/2011
1/10/2011
1/11/2011
1/12/2011
1/13/2011

ZYVOX Apr-Jun | Zyvox Jul-Sep | Zyvox Oct-Dec | CUBICIN- Jan-Mar | CUBICIN- Apr-Jun | CUBICIN- July-Sep | CUBICIN Oct-Dec | CASPO Jan-M

MUE Scorecard

MUE Scorecard

NOTE: This spreadsheet autocalculates - do not make any adjustments.

Parameter		1st Quarter Total January to March	2nd Quarter Total April - June	3rd Quarter Total July - September
Year	2008	2009	2009	2009
Zyvox				
Total patients (n)	115	16	5	0
Total days of therapy (n)	495	54	15.5	0
Vanco prior to therapy	52%	31.25%	60.00%	#DIV/0!
% ordered per policy	72%	81%	80.00%	#DIV/0!
On SSRI at start of therapy	12%	0%	20.00%	#DIV/0!
Pts with platelet drop > 25%	15%	25%	20%	#DIV/0!
Therapy discontinued for low platelets	13%	12.50%	0.00%	#DIV/0!
Empiric use (measured at tx start)	52%	50.00%	40.00%	#DIV/0!
Percent used for UTI tx	14%	6.25%	0.00%	#DIV/0!
Pharmacist intervention (n)	34	2	2	0
Physician acceptance	66%	50.00%	100.00%	#DIV/0!
Patients converted to PO	46%	25.00%	20.00%	#DIV/0!
Percent of doses given PO (e.g. PO:IV rate)	39%	21.30%	32.26%	#DIV/0!
Cubicin				
Total patients (n)	43	16	4	0
Total days of therapy	240.5	67.5	37	0
Vanco prior to therapy	70%	50.00%	75.00%	#DIV/0!
% ordered per policy	100%	100.00%	100.00%	#DIV/0!
Dose/Frequency appropriate	86%	100.00%	100.00%	#DIV/0!
CPK drawn during therapy	61%	31.25%	100.00%	#DIV/0!
Empiric use (measured at tx start)	40%	37.50%	0.00%	#DIV/0!
Pharmacist intervention	11	1	0	0
Physician acceptance	64%	100.00%	#DIV/0!	#DIV/0!
Cancidas				
Total patients (n)	15	5	3	0
Total days of therapy	82+	75	9	0
% ordered per policy	87%	100.00%	100.00%	#DIV/0!
Fluconzole prior to caspo.	67%	60.00%	66.67%	#DIV/0!
Dose appropriate for hepatic function	100%	100.00%	100.00%	#DIV/0!

What Did We Do?

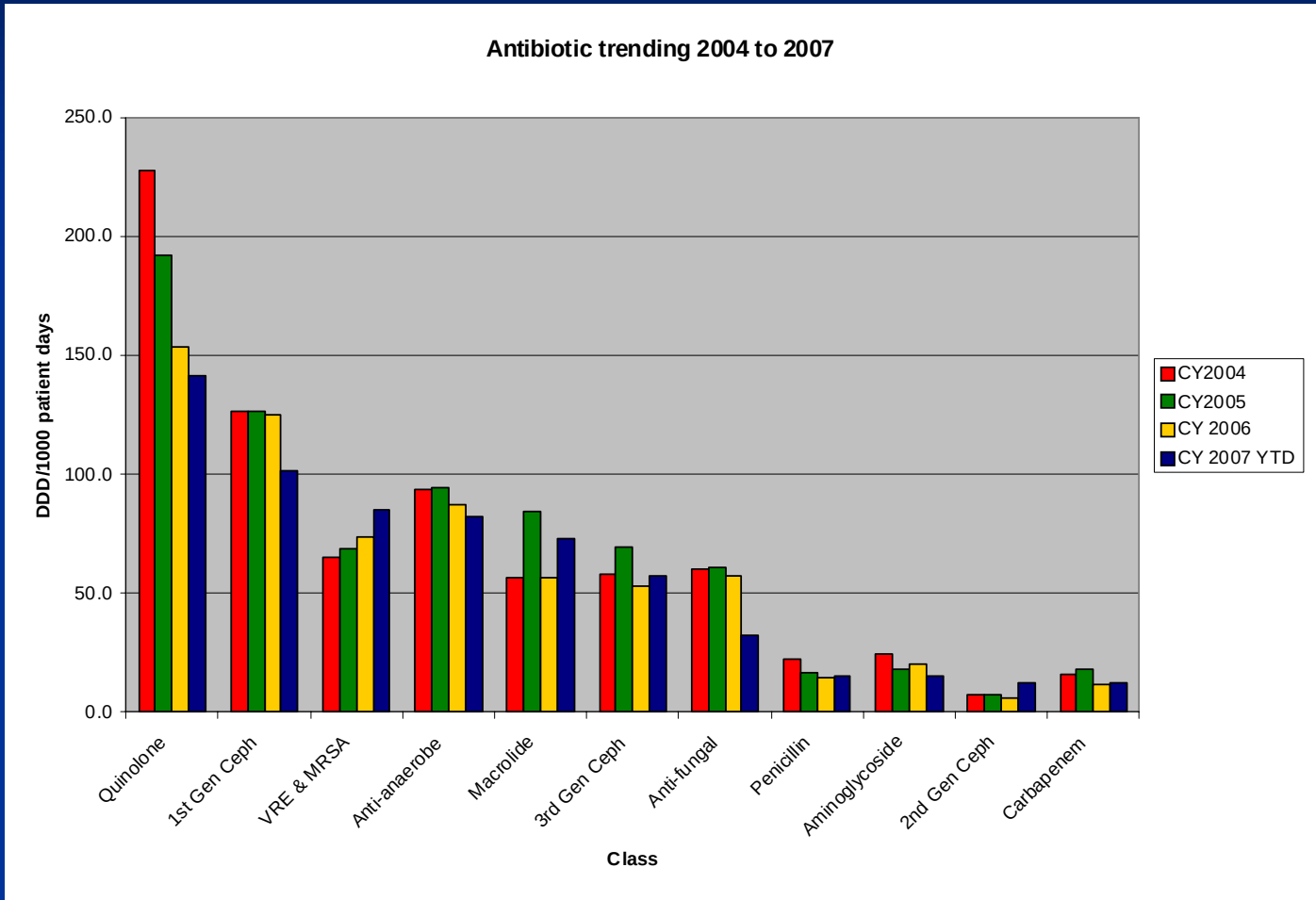
- Used a tool that allowed us to track use monthly (DDD/1000 patient days)
  - Technician ran a report for antibiotics from Meditech every month
  - Manually keyed into an Excel spreadsheet called the “Antibiotic 10 Step” from Cardinal Health
  - The spreadsheet has pre-built functions that will convert utilization over to DDD/1000 patient days

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Ten Steps to Monitoring Antimicrobial Use in the Hospital

Steps	Description
Step 1	Start with antibiogram; look for key Bug - Drug resistance patterns
Step 2	Understand and investigate external influences that have an impact on antimicrobial resistance.
Step 3	Target all organisms that may have potential resistance problems
Step 4	Compare antibiotic utilization to trend for cause/effect
Step 5	Review intravenous and oral conversion rates
Step 6	Conduct Multiyear trending (antibiogram)
Step 7	Prepare analysis and discuss with prescribers
Step 8	Based on resistance patterns and involved infections, work with physicians/Infection Control to develop or improve prevention and treatment guidelines.
Step 9	Audit for compliance
Step 10	Track results and report back to physicians

Antibiotic 10 Step Sample Reports



SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

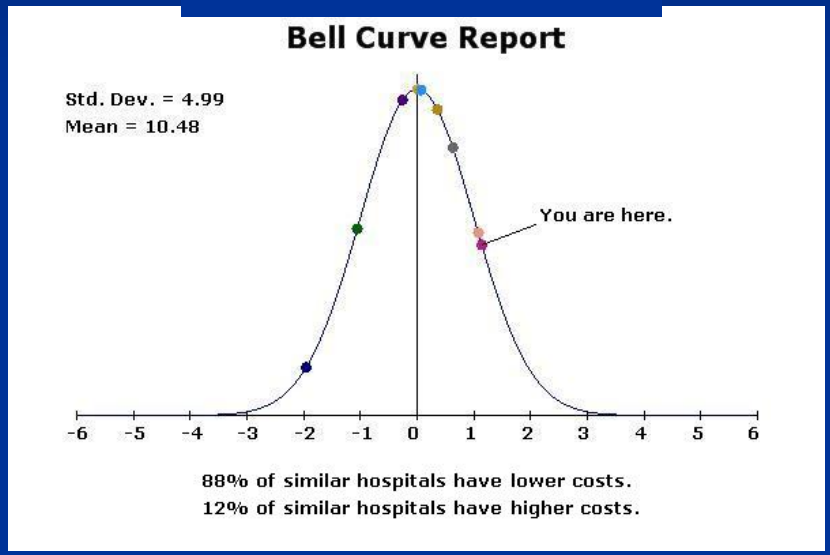
What Did We Do?

- Monitored costs monthly and quarterly using a proprietary program
- Updated the way that we tracked clinical interventions
- Presented this information on a regular basis to both the Antibiotic Subcommittee and P&T Committee
  - This really helped to increase awareness of cost issues as well as served as a measurable outcome

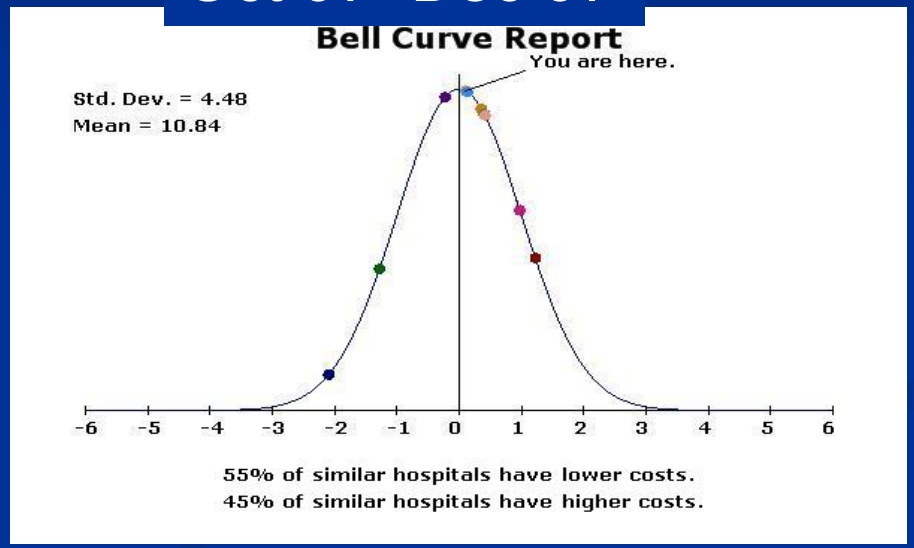
SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Other Tools: Cost Benchmarking (Example)

Oct 06- Dec 06



Oct 07- Dec 07



Cost avoidance $62,000 in 2nd quarter compared to previous year 2nd quarter

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Intervention Tracking
Before

- Four methodologies
  - Paper system (Transposed to…)
  - Excel spreadsheets
  - Meditech data
  - MUE tracking
- Information transposed to P&T tracking spreadsheet
- Did not see any $$ quantification

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Intervention Tracking

After

SUBURBAN HOSPITAL - QUARTERLY P&T REPORT

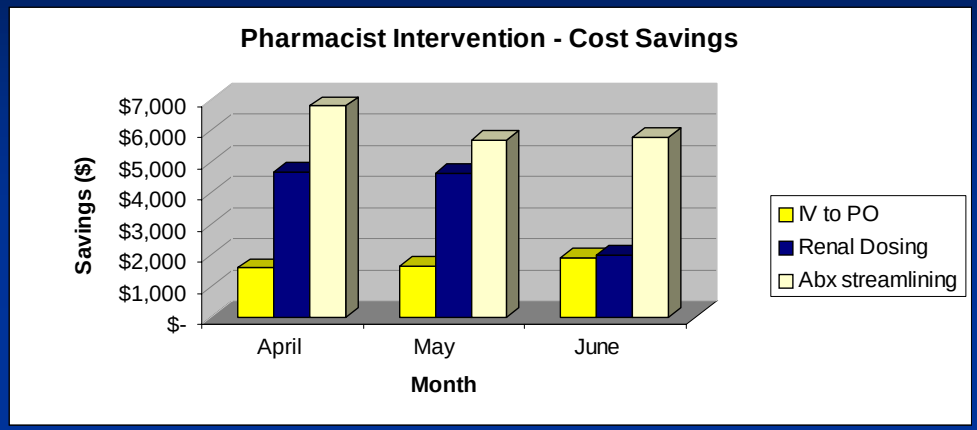
Total admissions	3641	<-----*enter number he*
Time period	April-June	<-----*enter time frame*
Year	2009	
Total interventions - quarter	6947	
Total chart reviews - quarter	5809	

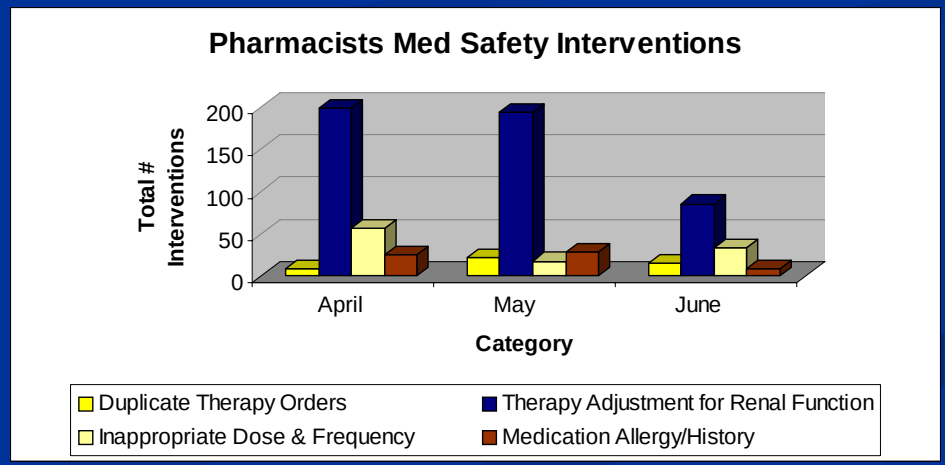
Category	Number	Savings
Duplicate Orders	47	NA
Inappropriate Dose & Frequency	108	NA
Medication/Allergy History	64	NA
Non Form Changed to Form	659	NA
Renal Adjustments	481	$ 11,325.00
IV to PO	278	$ 5,172.47
Antibiotic Streamlining	183	$ 18,300.00
TOTALS	1820	$ 34,797.47

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Intervention Tracking

After





SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Other Activities

- Physician directed
  - Antibiotic Consensus Conference
  - Annual CME to medical staff by ID physician
  - Shared information on a regular basis with CMO and upon request for credentialing purposes
- Pharmacy directed
  - Educated pharmacy staff about antibiotic stewardship
  - Included basic antibiotic clinical activities in daily decentralized pharmacists job function
  - Structured resident projects around ID/stewardship topics

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Other Activities

- Microbiology
  - Met with microbiology to ensure that their testing cards aligned with our closed formulary
  - Tracked antibiotic resistance and presented this information back to key providers
    - P&T
    - Antibiotic Subcommittee
    - Nursing Home Collaborative Committee

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Selected Outcomes

- Overall antibiotic utilization decreased by 5.4% over 2 year period (2007 to 2009)
  - Previous studies from 22 hospitals showed 12% increase in utilization from 2008 to 2009*
- Cost savings over 2 year period
  - $290,000

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

* ACCP poster 150, 2010 annual meeting, Austin, TX

Target Drugs: Quality Indicators

- Linezolid
  - Inappropriate use for UTI/colonization decreased from 14% to 3%
  - Changed therapy on several patients who developed thrombocytopenia
- Daptomycin
  - Improved appropriateness of weight based and renal dosing
  - MUE info provided support to get automatic CPK ordering protocol for pharmacists
- Caspofungin
  - Improvements in hepatic dosing
  - Identified patients who could be converted to fluconazole

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Lessons Learned

- Multi-disciplinary team is essential
- CMO support was invaluable and a real key to our success
- Primary ID physician that interacted the most with the program was well respected in the institution
- Get “offenders” involved in the solution
- Make sure that pharmacists have the tools to do their jobs (e.g. education/training)

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Lessons Learned

- Include quality in the discussion
  - Its not all about cost

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Acknowledgements

- William “Buck” Davis, MD (ID physician)
- Eugene Passamani, MD (CMO)
- Marianne Durante (Microbiology)
- Rita Smith, RN (Infection Prevention)
- Suburban Hospital Pharmacy Staff

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

Thank You!

SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE