

The Business of Antimicrobial Stewardship

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Disclosures

The MSH Antimicrobial Stewardship Program received a generous donation of \$1M (over 3 years) from Pfizer Canada, Inc. None of this money is used to support the clinical efforts of the ASP.

Pfizer produces **anidulafungin** (Eraxis), **azithromycin** (Zithromax), **clindamycin** (Dalacin), **doxycycline** (Vibramycin), **erythromycin** (ERYC), **fluconazole** (Diflucan), **linezolid** (Zyvoxam), **piperacillin-tazobactam** (Tazocin), **tigecycline** (Tygacil), and **voriconazole** (Vfend)

I have served as an expert witness on medicolegal cases involving appropriateness of antimicrobial therapy.

Total income over past two years is < \$50K

I receive salary support for my ASP activities at MSH and UHN.

This amounts to 0.6 FTE.

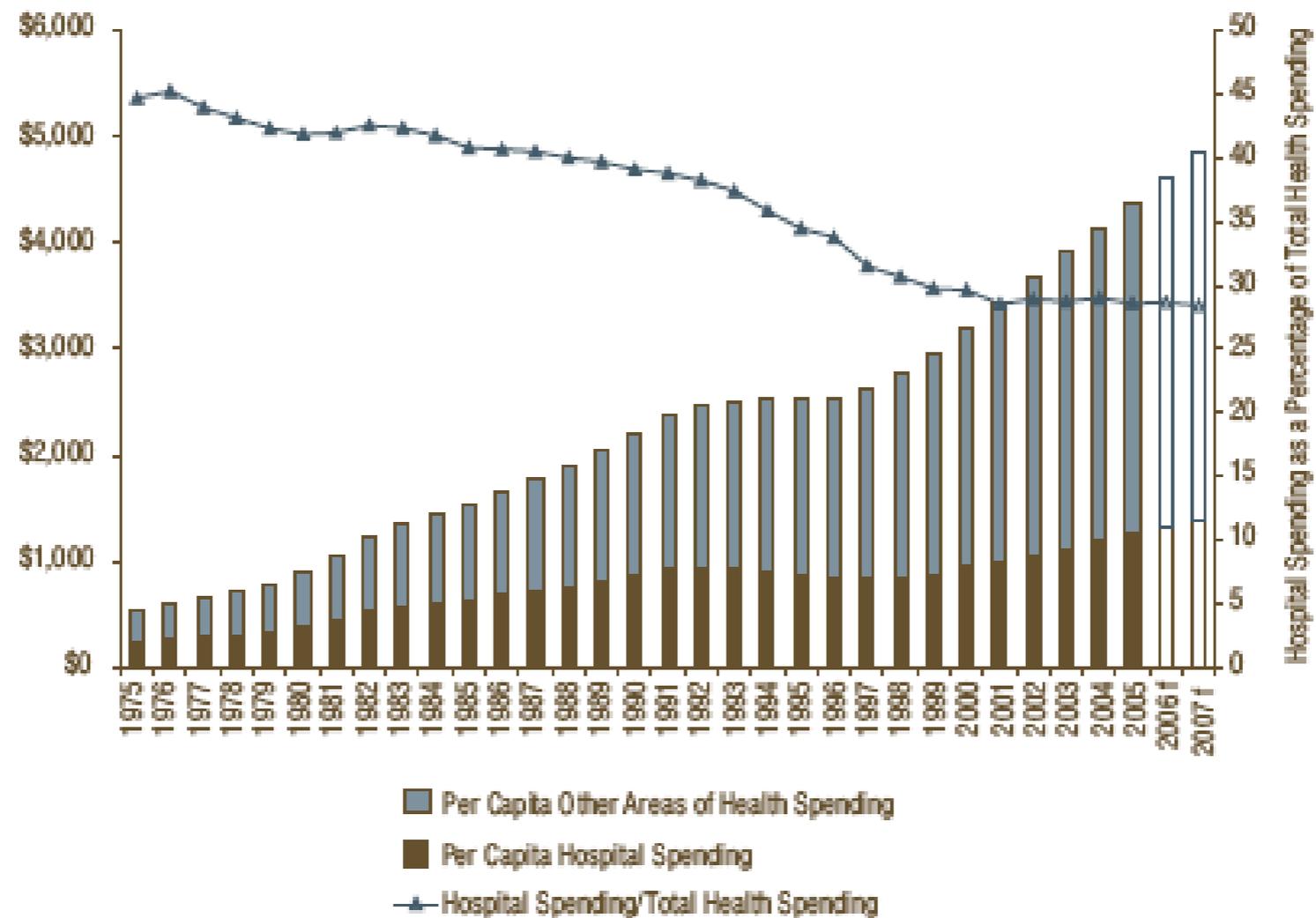
Objectives

- ✦ To appreciate the business aspects of medicine
- ✦ To understand how funding decisions are made
- ✦ To learn how to “get the money”

Overview

- ✦ hospital costs (per capita) are rising, but not nearly as dramatically as the rest of healthcare
- ✦ physicians influence much of hospital costs, and thus motivating and/or controlling physicians is an increasingly appealing way to control costs
- ✦ healthcare is increasingly measured and remunerated by benchmarking quality measures

The proportion of health spending attributable to hospital spending has been falling



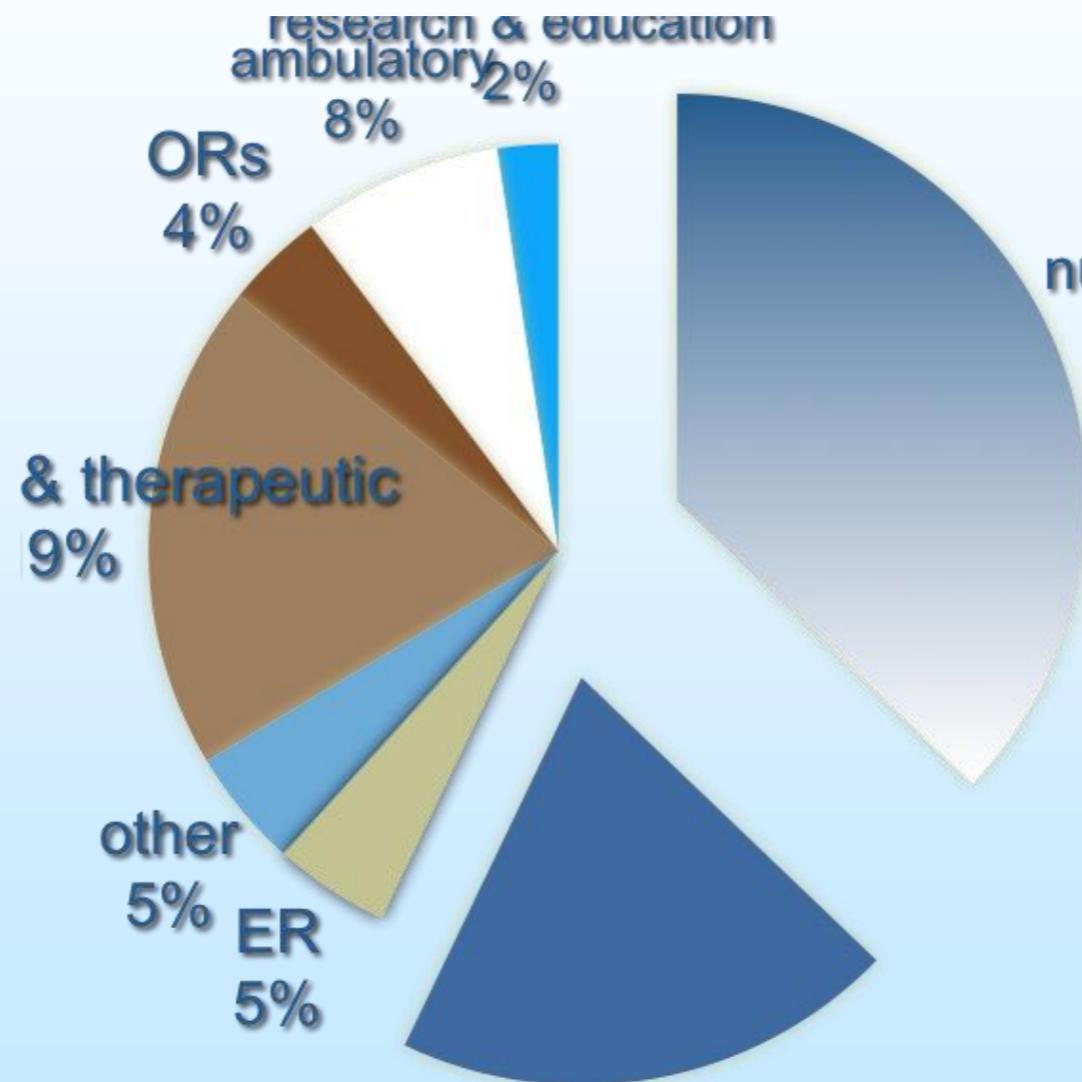
Source: CIHI

Hospital spending in Canada

- ✦ in 2006, \$23 billion was spent on hospitals
- ✦ 9.3% of hospital spending is on physicians
- ✦ although only 5% of a hospital's budget is spent on medical imaging, the costs have risen dramatically over the past 10 years
- ✦ acute inpatient care accounts for the bulk of hospital costs in Canada

Source: CIHI

Physicians are “responsible” for approximately 40% of non-physician hospital spending



Source: CIHI

Summary

- ✦ healthcare spending continues to rise at an incredibly high rate
- ✦ hospital spending is a small proportion of healthcare spending, and has risen at a proportionally slower rate than other healthcare spending
- ✦ physicians are responsible for a major share of hospital spending

Measuring acute in-hospital costs

- ✦ each hospitalized patient is assigned a major clinical category (MCC) and case mix group (CMG), determined by:
 - a diagnosis or condition responsible for the majority of the patient's stay (most responsible diagnosis)

OR

- an intervention that significantly affects the pattern of care and resources consumed by a patient

Source: CIHI

Measuring acute in-hospital costs

- ✦ using MCCs, CMGs, age, comorbidity and other factors that are associated with resource utilization, a CMG+ is calculated
- ✦ Resource Intensity Weights (RIWs) are assigned weightings for each CMG+ that indicates the amount of resources expected for each such patient
- ✦ Cost Per Weighted Case (CPWC) is a calculated number: the total costs incurred by an institution divided by the total weighted cases

Source: CIHI

Calculating the average inpatient CPWC

e.g. if a hospital has 5000 RIW weighted cases during a period and a net total inpatient cost of \$10 million, the average inpatient CPWC is \$2000.

$$\text{Cost per Weighted Case (CPWC)} = \frac{\text{Net Total Inpatient Cost}}{\text{Total Weighted Cases}} = \frac{\$10\,000\,000}{5000} = \$2000$$

✦ in **most** Canadian jurisdictions, hospital funding is based on the CPWC

Source: CIHI

Implications of the CPWC

- ✦ shortening length of stay (LOS) or reducing use of hospital resources benefits the hospital financially
- ✦ taking on more complex patients efficiently also benefits the hospital financially
- ✦ (unspoken but widely acknowledged) that “better” coding will also benefit the hospital financially
- ✦ because “bed costs” are relatively fixed, if LOS cannot be appreciably reduced, reducing diagnostic and therapeutic resources (including allied healthcare professionals) is one of the only ways to reduce hospital costs

Public Reporting

- ✦ the next logical step following establishment of benchmark measures for hospital performance, is to report on them. Publicly.
- ✦ there is little evidence demonstrating a value of public reporting to patient outcomes or healthcare
- ✦ public reporting unquestionably leads to altered priority-setting by healthcare leaders (guided by their payers):
 - if payers want wait times to be reduced, they will ask for them to be reported
 - public reporting may be unreliable

Public Reporting

- ✦ in 2009, all 211 Ontario hospitals were mandated to report hand hygiene compliance
- ✦ median compliance of hand hygiene before patient contact was 52%
- ✦ it rose to 67% in the second year of reporting
- ✦ roughly one quarter of Ontario hospitals reported hand hygiene compliance over 80%
- ✦ there is a paucity of evidence in the literature demonstrating such sustained success
- ✦ 6 hospitals have shown over 95% before-and-after patient contact hand hygiene adherence

JAMA 2010;**304**:1116-17

Pay for Performance

- ✦ the UK National Health System (NHS) was among the first payer to link payment of healthcare to performance, based on physician performance, starting in 2004
- ✦ in 2003, the Centers for Medicare and Medicaid Services (CMS) funded the CMS–Premier Hospital Quality Incentive Demonstration (HQID), linking benchmarked performance with financial reward to the top performers, and financial penalty to the bottom performers

Pay for Performance: Pneumonia

Table 3. Improvements in Quality over a 2-Year Period among Hospitals Engaged in Pay for Performance and Public Reporting.*

Variable	Hospitals with Pay for Performance plus Public Reporting			Hospitals with Public Reporting Only (Control Group)			Absolute Difference between Hospital Groups % (95% CI)	P Value†
	4th Quarter, 2003	3rd Quarter, 2005	Absolute Change	4th Quarter, 2003	3rd Quarter, 2005	Absolute Change		
	no. of patients (%)		%	no. of patients (%)		%		
Pneumonia								
Antibiotic timing	17,280 (68.2)	7,877 (79.9)	11.7	25,944 (68.9)	11,521 (76.3)	7.4	4.3 (1.8 to 6.6)	<0.001
Vaccination	9,357 (42.7)	5,515 (72.7)	30.0	13,599 (44.6)	8,009 (63.7)	19.1	10.9 (5.4 to 16.4)	<0.001
Oxygen assessment	18,523 (97.9)	9,757 (99.6)	1.7	28,077 (98.3)	14,562 (99.4)	1.1	0.6 (-0.1 to 1.2)	0.09
Appropriate care measures								
Acute myocardial infarction	13,187 (77.0)	11,193 (88.6)	11.6	21,665 (81.6)	17,912 (85.7)	4.1	7.5 (4.2 to 10.9)	<0.001
Heart failure	17,569 (76.1)	15,264 (88.3)	12.2	25,578 (77.8)	22,223 (84.0)	6.2	6.0 (3.1 to 9.0)	<0.001
Pneumonia	18,531 (48.5)	9,758 (70.6)	22.1	28,077 (50.0)	14,562 (65.0)	15.0	7.1 (3.6 to 10.6)	<0.001

NEJM 2007;356:486-96

Pay for Performance: Pneumonia

- ✦ retrospective study of 14 069 Medicare patients hospitalized for CAP: after adjustment (severity and demographic factors), administration of antibiotics within 8 hours was associated with a lower 30-day mortality rate (OR = 0.85, 95% CI 0.75-0.96) retrospective study of 13 771 Medicare patients hospitalized for CAP: among the 75% of patients without evidence of prehospital receipt of antibiotics, administration of antibiotics within 4 hours was associated with a lower 30-day mortality rate (OR = 0.85, 95% CI, 0.76-0.95)

JAMA 1997;**278**:2080-4 *Arch Intern Med.*
2004;**164**:637-44

Pay for Performance: Pneumonia

GUIDELINES FROM THE INFECTIOUS DISEASES SOCIETY OF AMERICA

Practice Guidelines for the Management of Community-Acquired Pneumonia in Adults

John G. Bartlett,¹ Scott F. Dowell,² Lionel A. Mandell,⁶ Thomas M. File, Jr.,³ Daniel M. Musher,⁴ and Michael J. Fine⁵

¹Johns Hopkins University School of Medicine, Baltimore, Maryland, ²Centers for Disease Control and Prevention, Atlanta, Georgia, ³Northeastern Ohio Universities College of Medicine, Cleveland, Ohio, ⁴Baylor College of Medicine and Veterans Affairs Medical Center, Houston, Texas, and ⁵University of Pittsburgh, Pennsylvania, USA; and ⁶McMaster University, Toronto, Canada

Update of Practice Guidelines for the Management of Community-Acquired Pneumonia in Immunocompetent Adults

Lionel A. Mandell,¹ John G. Bartlett,² Scott F. Dowell,³ Thomas M. File, Jr.,⁴ Daniel M. Musher,⁵ and Cynthia Whitney^{2*}

¹McMaster University, Hamilton, Ontario, Canada; ²Johns Hopkins University School of Medicine, Baltimore, Maryland; ³Centers for Disease Control and Prevention, Atlanta, Georgia; ⁴Summa Health System, Akron, Ohio; and ⁵VA Medical Center, Houston, Texas

“For patients requiring hospitalization for acute pneumonia, it is important to initiate therapy in a timely fashion; an analysis of 14,000 patients showed that a >8-h delay from the time of admission to initiation of antibiotic therapy was associated with an increase in mortality (B-II)”

Performance indicators

... initiation of antibiotic therapy within 8 h of hospitalization

Clin Infect Dis. 2000;**31**:347-82

Update on Performance Indicators

“Recommendation 1. Antibiotic therapy should be initiated within 4 h after registration for hospitalized patients with CAP (B-III)”

A more recent analysis ... included 113,000 patients with pneumonia who were hospitalized in 1998 and 1999 and who had not received antibiotics before admission. Initial therapy within 4 h after arrival at the hospital was associated with reduced mortality in the hospital (severity-adjusted OR, 0.85; 95% CI, 0.76–0.95).

Clin Infect Dis. 2003;**37**:1405-33

Pay for Performance: Pneumonia

- ✦ in 1997, the Medicare Pneumonia Project endorsed antibiotics for CAP within 8 hours of presentation to hospital as a quality measure in 1998 in 2002, the window for “quality” antimicrobial therapy for CAP was narrowed to within 4 hours of presentation to the hospital the National Quality Forum, The Joint Commission and The Centers for Medicare & Medicaid Services (CMS) chose the 4-hour measure as 1 of their initial core measures of quality Since 2002, this measure has been publicly reported for all U.S. hospitals. In 2006, it became part of a measure set tied to additional payments under several pilot pay-for-performance programs

Ann Intern Med 2008;**149**:29-32

Pay for Performance: Pneumonia

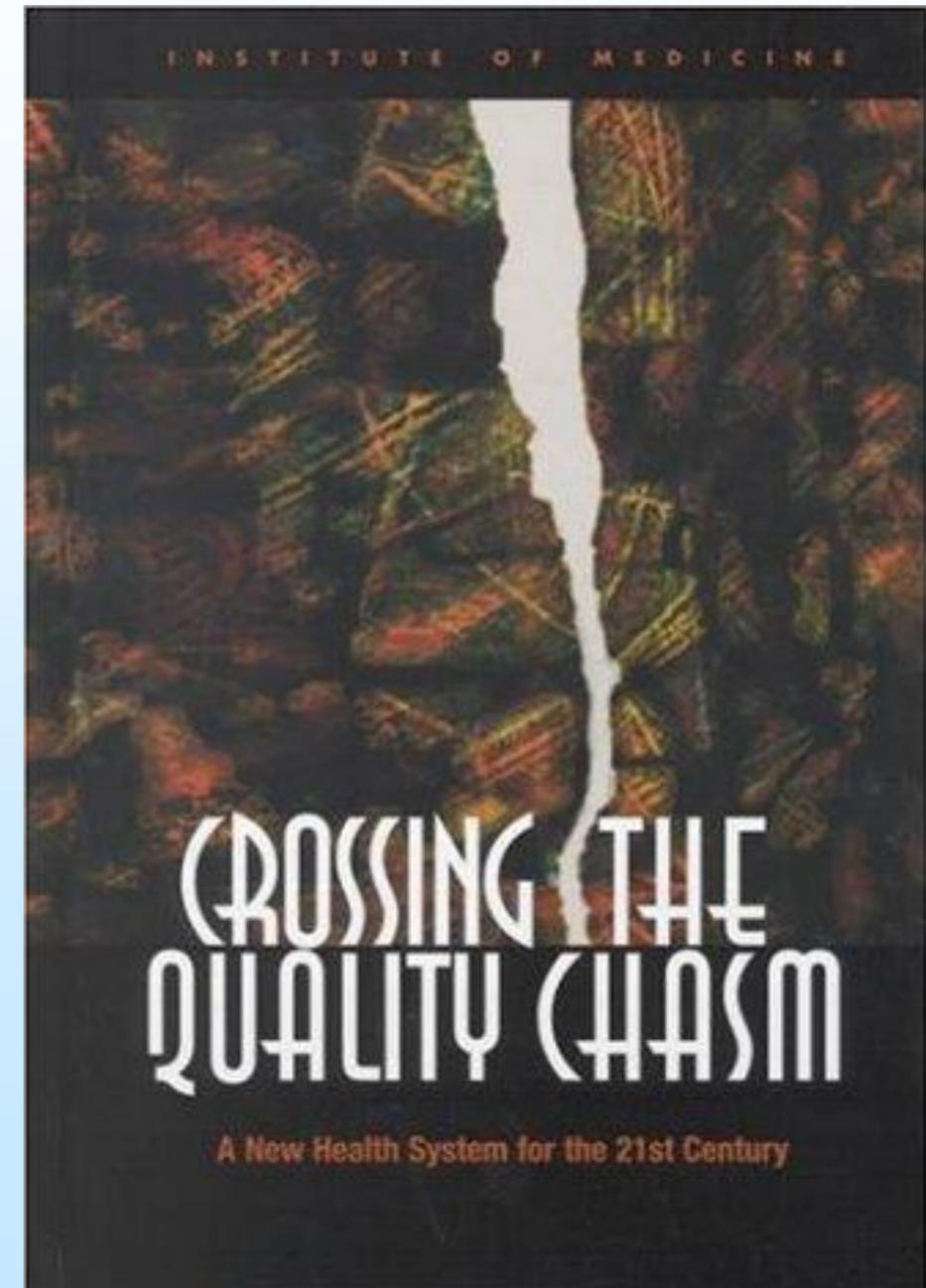
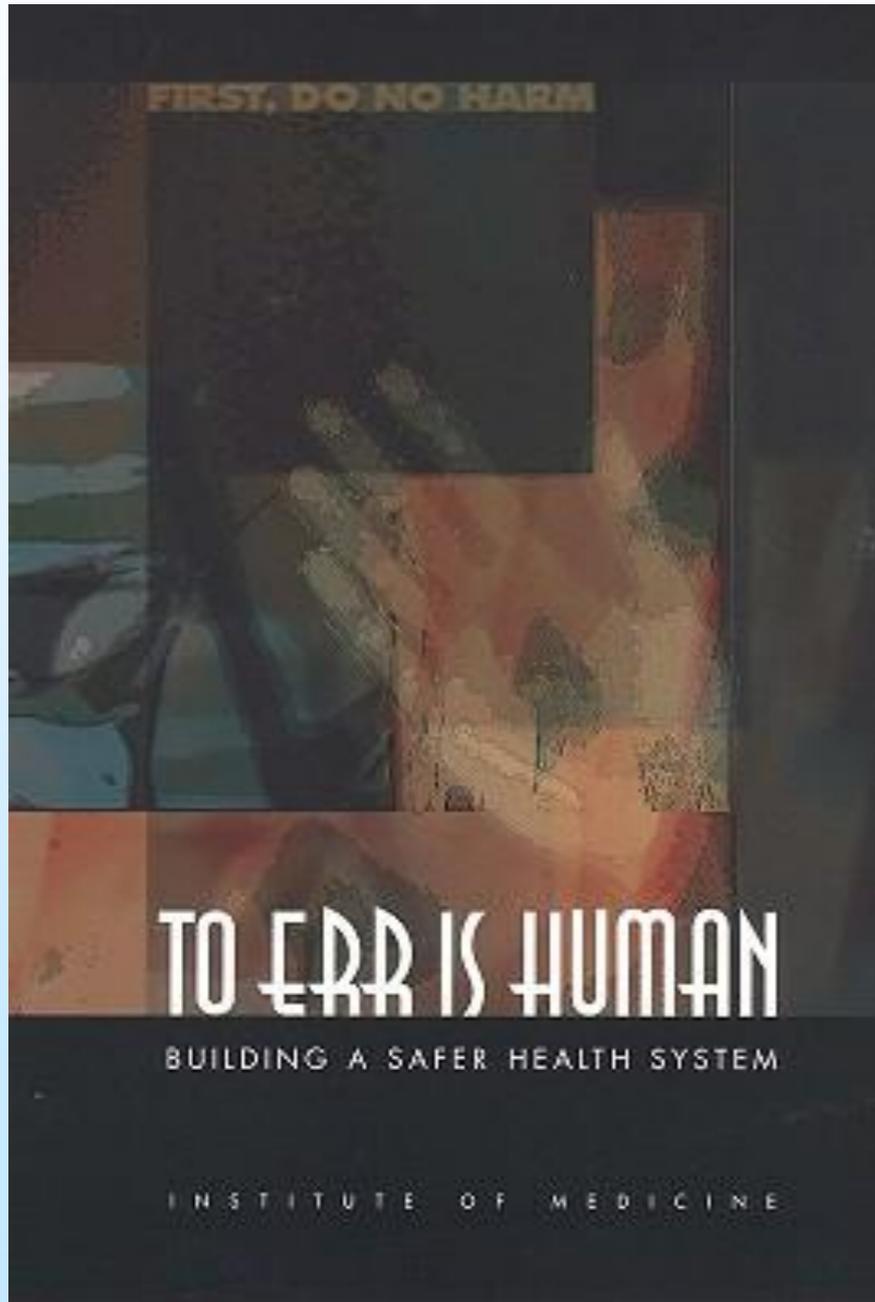
- ✦ following these changes, early antibiotic use increased from 54% to 66%, but percentage of patients with a discharge diagnosis of CAP was reduced from 76% to 59% overall antibiotic use went up 30% no change in severity of illness, LOS or mortality

Chest 2007;131:1865-9

Summary

- ✦ healthcare is becoming increasingly measured
- ✦ patients and conditions
- ✦ utilization of resources
- ✦ processes
- ✦ outcomes
- ✦ most of these measures are unreliable and/or not based on evidence
- ✦ planning a program (e.g. ASP) requires an understanding of measures, and needs to consider them

The Safety and Quality Agenda



The Safety and Quality Agenda: Canada

Research

Recherche

The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada

G. Ross Baker, Peter G. Norton, Virginia Flintoft, Régis Blais, Adalsteinn Brown, Jafna Cox, Ed Etchells, William A. Ghali, Philip Hébert, Sumit R. Majumdar, Maeve O'Beirne, Luz Palacios-Derflingher, Robert J. Reid, Sam Sheps, Robyn Tamblyn

See related article page 1688

Abstract

Background: Research into adverse events (AEs) has highlighted the need to improve patient safety. AEs are unintended injuries or complications resulting in death, disability or prolonged hospital stay that arise from health care management. We estimated the incidence of AEs among patients in Canadian acute care hospitals.

Methods: We randomly selected 1 teaching, 1 large community and 2 small community hospitals in each of 5 provinces (British Columbia, Alberta, Ontario, Quebec and Nova Scotia) and reviewed a random sample of charts for nonpsychiatric, nonobstetric adult patients in each hospital for the fiscal year 2000. Trained reviewers screened all eligible charts, and physicians reviewed the positively screened charts to identify AEs and determine their preventability.

Results: At least 1 screening criterion was identified in 1527 (40.8%) of 3745 charts. The physician reviewers identified AEs in 255 of the charts. After adjustment for the sampling strategy, the AE rate was 7.5 per 100 hospital admissions (95% confidence interval [CI] 5.7–9.3). Among the patients with AEs, events judged to be preventable occurred in 36.9% (95% CI 32.0%–41.8%) and death in 20.8% (95% CI 7.8%–33.8%). Physician reviewers estimated that 1521 additional hospital days were associated with AEs. Although men and women experienced equal rates of AEs, patients who had AEs were significantly older than those who did not (mean age [and standard deviation] 64.9 [16.7] v. 62.0 [18.4] years; $p = 0.016$).

Interpretation: The overall incidence rate of AEs of 7.5% in our study suggests that, of the almost 2.5 million annual hospital admissions in Canada similar to the type studied, about 185 000 are associated with an AE and close to 70 000 of these are potentially preventable.

DOI:10.1001/cmaj.2004.170111.1678-86

Patient safety is receiving growing attention in Canada. Numerous legal cases and media stories have highlighted the consequences of unintended adverse events (AEs). In 2002 the Canadian government budgeted \$50 million over 5 years for the creation of the

Canadian Patient Safety Institute, and many health care organizations have initiated efforts to improve patient safety.

One important indicator of patient safety is the rate of AEs among hospital patients. AEs are unintended injuries or complications that are caused by health care management, rather than by the patient's underlying disease, and that lead to death, disability at the time of discharge or prolonged hospital stays.^{1,2} Some AEs are the unavoidable consequences of health care, such as an unavoidable allergic reaction to an antibiotic. However, 37%–51% of AEs have been judged in retrospect to have been potentially preventable.^{3,4}

In various countries, hospital chart reviews have revealed that 2.9%–16.6% of patients in acute care hospitals experienced 1 or more AEs.^{5,6} The results of these studies have offered important data on a critical aspect of hospital performance and provided impetus for the development of patient safety initiatives.

There are few Canadian data on AEs in hospital patients.^{8,9} We report on the first Canadian study to provide a national estimate of the incidence of AEs across a range of hospitals using methods comparable to those used in recent studies from other countries. Our study was designed to describe the frequency and type of AEs in patients admitted to Canadian acute care hospitals and to compare the rate of these AEs across types of hospitals and between medical and surgical care. Additional detailed analyses on the specific nature of the AEs as well as comparisons to other methods for detecting AEs will be reported elsewhere.

Methods

The methods used in this study are based on a protocol developed by the Harvard Medical Practice Study, which examined the incidence of AEs in New York state hospitals in 1984.¹⁰ This protocol, with modifications, was used in subsequent studies in Australia, the United Kingdom, New Zealand, the United States (in Colorado and Utah) and Denmark.^{11,12}

CANADA'S WEEKLY NEWSMAGAZINE | www.macleans.ca

APRIL 14 2003

MACLEAN'S

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The battle over post-war Iraq

THE QUEBEC ELECTION
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DANIEL LANOIS
Canada's producer to the stars

SARS: IS THIS YOUR BEST DEFENCE?



As the killer virus spreads, more Canadians die and experts remain baffled. What we know—and what we don't BY DANYLO HAWALESHKA.



What drives the hospital agendas in 2011?

“Patient safety. Of course economics. But patient safety.”

“Patient safety. Quality.”

“Demonstrate that you can make patients safer, and hospital leaders will invest [in your strategy].”

Hospital funding and Decisions

- ✦ hospital receive funding, primarily, from the care they provide (cf. CPWC, cost per weighted case)
- ✦ hospitals, however, receive other moneys:
 - ✦ private donors
 - ✦ corporate sponsors
 - ✦ governments
 - ✦ demonstrating that your hospital meets an unmet (or politically appealing) need, increases the likelihood of additional money
- ✦ improve patient safety and save money ... for your hospital's priority programs = success

Hospital priorities and antimicrobial stewardship: examples

- ✦ surgical programs
 - improve antimicrobial prophylaxis
 - reduce post-op antibiotic-associated side effects
 - standardize approach to surgical site infections
- cardiac programs
- optimize prophylaxis of infective endocarditis
- develop a program to enhance the safety of patients with infective endocarditis being discharged on iv antibiotics
- physical rehabilitation
- reduce *C. difficile*, and costs for treatment of UTI

Drawing up a Business Case

- ✦ no hospital administrator worth their salt will approve spending money without understanding the dollars and cents of it
- ✦ your job:
 - to get the money ...
- ... by demonstrating that spending money will save money (while enhancing patient safety)

Drawing up a Business Case

- ✦ explain, in simplest terms, what antimicrobial stewardship is
- ✦ explain, in simplest terms, why antimicrobial stewardship will enhance patient safety and improve healthcare quality
 - C. difficile
 - adverse drug effects
 - AROs
- ✦ explain, in dollars and cents, why antimicrobial stewardship will save money

Drawing up a Business Case

Business Case for Antimicrobial Stewardship Program Return on Investment Analysis

		Discount Rate 5%			
	Pre-implementation	Intervention Year			Total (All Years)
		1	2	3	
Investment in Antimicrobial Stewardship Program					
Initial Investment Costs	\$ 8 000				
Operating Costs		\$ 303 675	\$ 318 859	\$ 334 802	
Total Annual Investment Costs	\$ 8 000	\$ 303 675	\$ 318 859	\$ 334 802	
x Present Value Factors	1.00	0.95	0.91	0.86	
Total Discounted Annual Investment Costs	\$ 8 000	289 214	289 214	14 289 2	5 643 87
Incremental Savings (Increases) from Antimicrobial Stewardship Program					
Estimated Incremental Utilization Increases		\$ 0	\$ 0	\$ 0	
Estimated Incremental Utilization Savings		\$ 250 800	\$ 423 324	\$ 554 210	
Total Annual Incremental Savings (Increases)		\$ 250 800	\$ 423 324	\$ 554 210	
x Present Value Factors		1	1	1	
Total Discounted Annual Incremental Savings (Increases)		238 857	383 967	47 478 7	101 572 1
Incremental Return on Investment Summary					

Mistakes in Making a Case for Funding

- ✦ not having the right people supporting your proposal
- consider bringing in a local, regional, national or even international expert to give Medical Grand Rounds
- get prominent hospital leaders on board
- ✦ asking for too little
- ask, as a minimum, 20% more than what you will think you need
- ✦ accepting too little
- don't start your ASP with insufficient funds: you will be in a no-win situation
- ✦ raising unrealistic (or risky) expectations:
- promise conservatively ... and then over-perform

Getting more money ... or time

- ✦ your hospital administration (esp. if tied in with *C. difficile*)
- ✦ your hospital foundation
- ✦ governmental agencies (interested in cost-saving innovations)
- ✦ industry (pharmaceutical, IT, etc.)
- ✦ engineering or computer students
- ✦ hospital programs (e.g. surgical programs)

Summary

- ✦ know your hospital's administration
- ✦ know what are your hospital's priority programs
- ✦ appeal to the Quality & Safety agenda
- ✦ make your request a “no brainer”:
safer, better healthcare, that will save money