Practical Cost-Effectiveness of Infection Control Programs

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EXHIBIT 1
Health Spending in OECD Countries, 2001

	Total health spending per capita			GDP per capita		
Country	PPP$	As percent of U.S. spending	Average annual growth, 1991–2001 (%)	PPP$	Average annual growth, 1991–2001 (%)	Health spending as percent of GDP
United States	4,887	100	3.1	35,182	2.1	13.9
Switzerland	3,322	68	2.3	29,876	0.4	11.1
Norway	2,920	60	2.8	36,462	2.9	8.0
Germany[a]	2,808	57	2.4	26,199	2.2	10.7
Canada	2,792	57	2.1	28,811	2.1	9.7
Luxembourg[b]	2,719	56	3.0	48,687	3.2	5.6
Iceland	2,643	54	3.0	28,879	1.9	9.2
Netherlands	2,626	54	3.0	29,391	2.1	8.9
France	2,561	52	2.4	26,879	1.6	9.5
Australia	2,513	51	4.1	27,408	2.7	9.2
Denmark	2,503	51	2.2	29,216	2.0	8.6
Belgium	2,480	51	3.2	27,775	1.8	9.0
Sweden	2,270	46	2.6	26,052	1.9	8.7
Italy	2,212	45	1.5	26,345	1.4	8.4
Austria	2,191	45	2.5	28,324	1.7	7.7
Japan	2,131	44	3.9	26,652	0.9	8.0
United Kingdom	1,992	41	4.1	26,315	2.4	7.6
Ireland	1,935	40	6.5	30,002	6.7	6.5
Finland	1,841	38	−0.1	26,438	2.5	7.0
New Zealand	1,710	35	3.1	21,077	2.2	8.1
Portugal	1,613	33	5.3	17,560	2.1	9.2
Spain	1,600	33	3.2	21,294	2.3	7.5
Greece	1,511	31	4.4	16,137	1.7	9.4
Czech Republic	1,106	23	5.3	15,143	1.8	7.3
Hungary	911	19	2.1	13,431	2.6	6.8
Korea[b]	893	18	8.1	15,905	4.6	5.9
Slovak Republic[a]	682	14	NA	12,010	3.1	5.7
Poland	629	13	4.0	9,934	4.4	6.3
Mexico	536	11	2.8	8,903	1.3	6.0
Turkey[c]	301	6	6.3	5,734	0.8	4.8
OECD median	2,161	44	3.0	26,392	2.1	8.1

FOR MORE INFO...

Reinhardt UE et al. Health Affairs. 23, no.3 (2004): 10-25

Spending per country

Country	Health Spending, % of GDP	Private Spending as % of all spending	Per capita total spending on health	Per capita government spending on Health (PPP)	Doctors per 10,000 population
Australia	8.7	32	2441	2340	30
Liberia	11.8	67.5	49	16	0.14
Netherlands	11.9	13.6	5038	3991	
Thailand	3.9	25	330	247	2.98
United States	17.9	46.9	8362	4437	24.22

FOR MORE INFO...

http://www.theguardian.com/news/datablog/2012/jun/30/healthcare-spending-world-country

Objectives

- Infection Prevention Initiatives: How do you make a business case?
- Example: A business case for reducing CLABSI in your hospital

Attributable Costs

- Cost of HAI estimated to exceed $4.5 US billion annually
  - Estimate based on infections measured in mid 1970's (SENIC, Haley)
  - $6.25 billion in 2008 US dollars

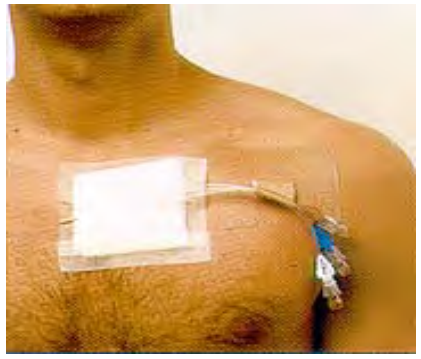
Nosocomial Bloodstream Infection

- CDC: 31K deaths/year from nosocomial BSI
- Most (>85%) are associated with CVCs

- If attributable mortality is 12-25%:
  - 25,000 deaths per year from CLABSI in US
- Costs: $3,700-$28,000 per line infection; $2.3 billion per year in US.

FOR MORE INFO...

Mermel L. Ann Intern Med 2000;132:391.
CDC. MMWR 51;RR-101
Klevens, et al. Pub Health Rep 2007;122:160-6



How should we use health economics?

- Literature
  - Cost-effectiveness analysis
  - Cost-benefit analysis
- Choose best things to do with your “fixed” budget
  - Increase staff
  - New surveillance software
- You cannot and should not aim only to save your hospital money!

What do we do?

- HAI are expensive and cause significant morbidity and mortality
- Data are limited as far as cost-effectiveness of interventions
- How do we motivate hospital administrators and individual staff to do best practice and limit HAI?

SHEA Guideline

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY OCTOBER 2007, VOL. 28, NO. 10

SHEA GUIDELINE

Raising Standards While Watching the Bottom Line: Making a Business Case for Infection Control

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Business Case Analysis

- Definition: Analysis of provider's expenditures for a program over a short period (often 1-3 years), including the effect of any offsetting savings*
- Profit vs. Loss
- Sound business case - return on investment (ROI)

FOR MORE INFO...

*Mark Smith, PhD and Paul Barnett, PhD, VA Health Economics Resource Center, Palo Alto CA

Time Horizon of Business Case

- Typically short horizon (*e.g.*, 1 year)
- Short-run costs and benefits only
- Importance: Reductions in health costs in the future do not offset initial costs
- Bias against adoption of interventions that are cost-effective in the long run
  - Interventions to reduce resistant bacterial transmission

What happens in hospitals now…

- Some leader decides they want to do introduce an
  - Antimicrobial coated catheter (or)
  - Chlorhexidine wipes
  - Etc etc…
- Present to value-analysis committees (supply chain)
- Rare that options are discussed
  - No opportunity for CE analysis of options

What should happen?

- Frame problem and develop hypothesis about potential solutions
  - Problem: CLABSI rates are high
  - Solution(s): antimicrobial-coated catheters, checklist implementation with education, scrub the hub campaigns, CHG-impregnated patch, or **all of these**
  - Read the literature, complete economic analysis

Cost of HAIs

- In order to make a business case you need:
  1. Estimates of HAI costs to your hospital
     - Problems with HAI estimates if used in your hospital-based business-case analysis
  2. Expected costs of intervention

Cost of Hospital Infections

	Attributable Costs 2005 US$			Excess Length of Stay (Days)		
Infection Type	Mean	Min	Max	Mean	Min	Max
Ventilator associated pneumonia	**22,875**	9,986	54,503	**9.6**	7.4	11.5
CABG-associated SSI	**17,944**	3,592	26,668	**25.7**	20	35
Central line associated bloodstream infection	**18,432**	3,592	34,410	**12**	4.5	19.6
Catheter associated urinary tract infection	**1,257**	804	1,710	**-**	-	-

FOR MORE INFO...

Perencevich EN, et al. Infect Control Hosp Epi, October 2007 (Studies from 1999-2005)

Use LOS in your business case

- Infection extends LOS though prolonged therapy
  - But also can delay discharge to LTCF, Rehab
- Hospital CFO's respond to:
  - Reduced costs
  - Increased revenues - improved throughput with more efficient use of fixed costs
  - Thus able to increased #admissions, #surgeries - decrease cost/case

Making your case

- Problem: CLABSI rates are high in your hospital
- Solution: Do something
- Question: What should I do and how should I pay for it?

Step 1: Frame the problem…

- ..and develop a hypothesis about potential solutions
  - Problem: CLABSI rates are high
  - Solution(s): antimicrobial-coated catheters, checklist implementation with education, scrub the hub campaigns, CHG-impregnated patch, or all of these
  - Read the literature, talk to colleagues

Some caution

- Don’t just say I want to do “X”
- Spend time talking with clinicians
  - Can you do “x”
  - What will it take to do “x”
    - Staffing
  - If we do “x” what will we not do
    - Opportunity costs – if we do one intervention can we no longer do another intervention?
    - Potential cost savings – coated catheters vs. uncoated catheters

Step 2: Meet with Key Administrators

- Build/Gauge/Confirm institutional support
- Identify key individuals who need to be included in making your business case
  - Clinicians, support staff, architects, waste management
- Begin discussions about cost with internal value analysis (supply chain) and cost-accounting

Step 3: Determine Annual Cost

- The easy part
- Annual costs
  - Catheters (coated vs uncoated; biopatch)
  - Staff time (FTEs for education)
  - Supplies (e.g. catheter insertion carts)
  - Implementation and education costs

Step 4: Determine infections avoided through intervention

- Internal (quasi-experimental) vs. literature data
- Estimate of how many infections prevented if intervention introduced
  - e.g. The CLABSI program will cut infections by 30% in one year, preventing X number of infections

Step 5: Determine costs associated with infection of interest

- CLABSI bacteremia
  - Literature estimates
  - Attributable LOS – 12 days per CLABSI
  - Attributable costs - $18,000 (hospital charges)
- Only include costs and other outcomes (LOS) that manifest after infection

FOR MORE INFO...

Perencevich EN, et al. Infect Control Hosp Epi, October 2007 (Studies from 1999-2005)

Focus on LOS

- Infections and medical errors extend hospital stays
- How many more patients can be admitted into beds now open since patients did not develop an infection
- Added revenue (not costs saved)

Excess length of stay to cost

- 40 infections with attributable LOS of 12 days
- Prevent 480 excess hospitals days
- $2000/day = added revenue ~$ 1 million

Step 6: Calculate Financial Impact

- Calculate the annual cost savings or added profits or losses
- Present a range of estimates
- Include additional benefits
  - Public reporting

Step 7: Include Health Benefits

- Business-cases from hospital perspectives typically do not include lives saved
  - Administrators respond to “6 deaths”
- Many IC interventions reduce more than one infection – include these

Step 8: Making your case

- First – meet again with key stake holders
  - Get their impressions
  - Solidify plan/presentation
  - Discuss implementation
  - Answer key questions before the board meeting
    - "Get everyone on board before the board meeting"
- Present your business case
  - Implementation

Step 9: Collect cost and outcome data prospectively

- Making your case is not a one time event
- Real-time data will help justify continued investment
- Implementation
  - Surgeons don't like new coated catheters
  - CHG patch can't be put in insertion kits

New First Step

- Spend time planning - annual budget and scope of work
  - What you already do
  - What you are already paid to do
  - What resources you already have
- Determination allows you to find areas of resource need
  - Allows you to say no

The Typical No

- The “A’s” of a typical no

- Accommodate - say yes when we want to say no
- Attack - we say no very poorly
- Avoidance - say nothing - stress

Positive No

- Three parts
- Uncover your “yes”
  - Protect our patients, prevent infection
  - Protect your infection control team
    - Time - work time and family time
- Empower and assert your “no”
  - Polite “no” - really say “yes” to yourself
- Propose another “yes”
  - Propose another plan or process

Example: Positive “no”

- Hospital vice president tells you that you have to attend a national meeting on CLABSI prevention and your have to get the hospital rates cut in half to be in line with other hospitals in your city. She provides you with no resources to go to the meeting or to reduce the infections

How do I say no?

- Say ‘yes’ to yourself first
  - You need resources to go to the meeting and to prevent infections
  - If you say yes now and work for free, when will you ever get resources to protect your patients?
  - You really need to hire more staff
  - You need to start leaving the hospital before 7pm because your family misses you

Empowered “no”

- No should not be based on what you are against; no anger, don’t react
  - The vice president doesn’t get it!!! arghhh
- Do not respond right away
  - Time to think
  - Develop a Plan B
- Remember what you are for, what motivates you - prevent infections

Your Response:

- I really feel that CLABSI are big problem. At the moment our IPs are extremely overworked and I'm concerned they may quit. I can't say yes to new initiatives without additional resources, as it will compromise what we are doing and my team. I propose we set up a hospital wide taskforce to come up with a plan to address the CLABSI problem.

CLABSI Example

- Medical Director for Infection Control
- October 2008
- 10 ICUs and 220 ICU beds
- Public reporting around the corner
- Johns Hopkins (AKA Peter Pronovost, 2 miles away) – we have no excuses

The Landscape

- Checklist in development
  - Not utilized
  - Most people against using it
- 2009 Joint Commission NPSG
- CHG-patch (biopatch): January 2007
- Silver-coated catheter: March 2007
- Mandatory internet training for CVC insertion

Key Performance Measures												
	Optimal Site Placement		**Maximal Barrier Precautions for Insertion**					**Daily Dressing Inspection**	**Access ports of CVC disinfected with alcohol before each use**	**Daily Assessment of Medical Necessity to Continue CVC**	**Use of a CVC cart**	**Use of a CVC Insertion Checklist**
ICU	**CVC placed in the subclavian vein whenever possible**	**Femoral site avoided except as a last option**	***Hand Wash***	***Full Body Drape***	***Sterile Gloves and Gown***	***Cap and Mask***	***CHG Skin Prep for Insertion***					
SICU	The Right IJ is frequently used. Unable to assess SC site usage		?	√	√	√	√	√	Less than 100%	Less than 100%	√	Less than 100%
MICU	√	√	√	√	√	√	√	√	√	Done on rounds?	√	Not fully operational
MTCC	√	√	√	√	√	√	√	√	Continue to reinforce	√	√	Tried - not in use
NTCC	√	√	√	√	√	√	√	√	Continue to reinforce	√	√	Tried - not in use
CSICU	√	√	√	√	√	√	√	√	Not all the time	Not all the time	**NO**	**NO**
CCU	√	√	√	√	√	√	√	√	√	√	√	√
NCICU	√	√	√	√	√	√	√	√	√	√	**NO**	**NO**
PICU			√	√	√	√	√	√	√	√	**NO**	**NO**
NICU			√	√	√	√	√	√	√	√	**NO**	**NO**

Other issues

- Silver-coated catheter
  - Expensive and didn't seem to be working
- A lot of effort went into this catheter being implemented
- Value Analysis: asked me to analyze benefit of catheter in early 2008

Results of internal analysis

- After controlling for time trends, trauma vs. non-trauma center, and correlation of data points within the same center, the **RR=1.06** (coated v. non-coated) 95% CI (0.83, 1.36) p=0.62;
- **No evidence for coated catheters reducing infections.**

February 2009 Coated CVCs

CLA-BSIs and CDC (2002)

- Impregnated or coated catheters
- HICPAC (CDC) strongly favors antibiotic catheters if CVC in place > 5 days*
- Combined with education, maximal sterile barrier precautions, 2% chlorhexidine skin antisepsis at insertion
- Particularly useful if rate >3.3/1000 catheter-days#

FOR MORE INFO...

* O'Grady NP, Infect Control Hosp Epidemiol Dec 2002; 23(12):759-769

Dwyer A, Sem in Dialysis 2008 21(6):542-546

Choice of Catheters

- Silver-impregnated (Vantax CVC with Oligon – Edwards) – a couple trials
- Antiseptic catheters
  - 1st Gen CHX-Sulfa: external coated – 16 trials, only 2 show significant BSI reduction
  - 2nd Gen CHX-Sulfa: internal/external coated – 3 trials, no significant reduction
- Antibiotic-coated
  - Minocycline-rifampin (Cook) – 5 trials, all reduction with 2 having significant reduction

FOR MORE INFO...

- Raad et al, Lancet ID October 2007
- Casey et al. Lancet ID Dec 2008

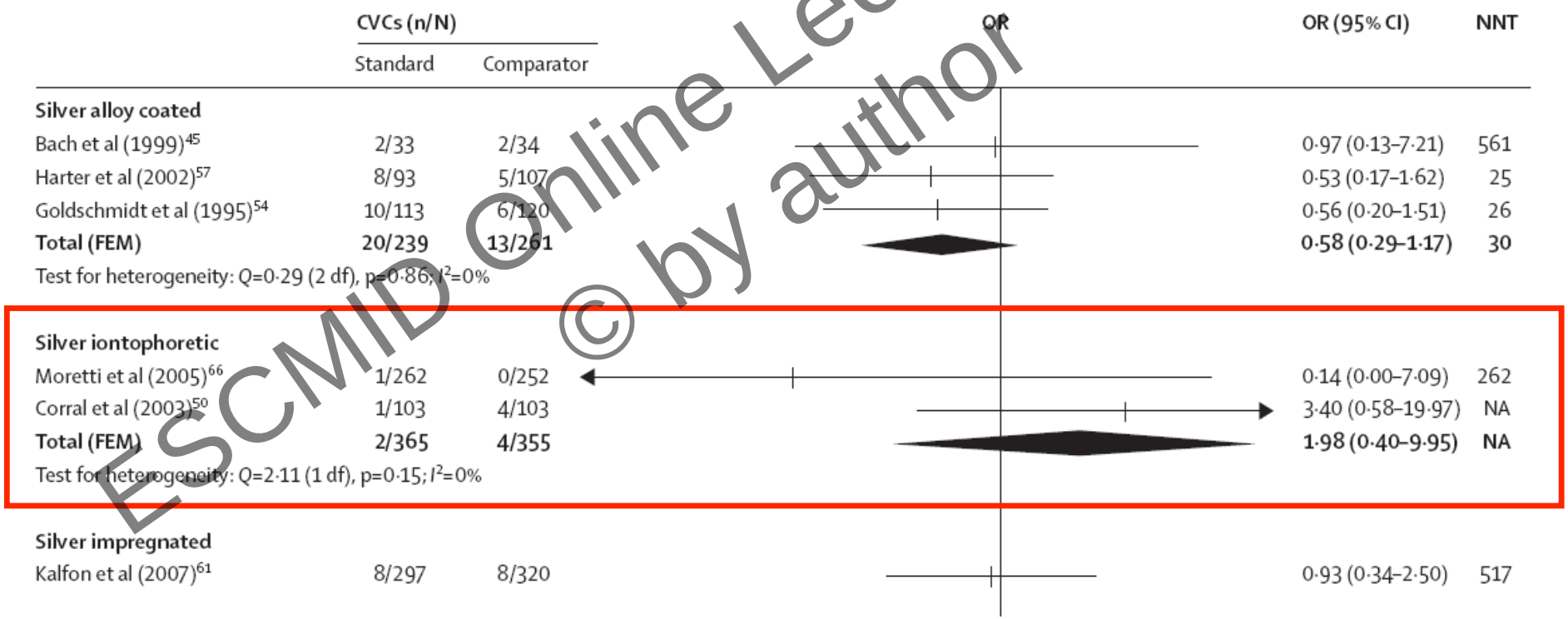
Meta-analysis

- 34 studies in each meta-analysis
- Looked at colonization and CR-BSI rates
- I will focus on BSIs
- Colonization rates misleading with many studies showing that BSIs occur even in setting of low colonization

FOR MORE INFO...

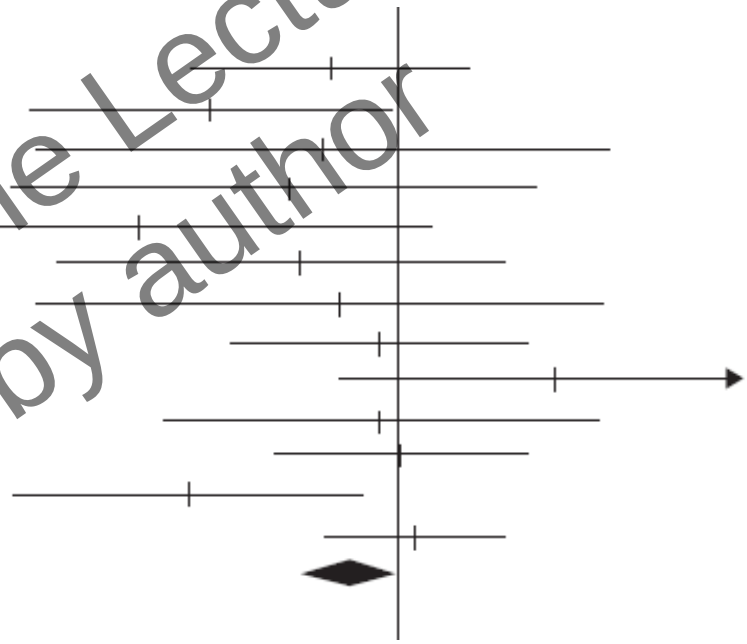
- Ramritu et al. Am J Infect Control March 2008
- Casey et al. Lancet ID December 2008

Silver Catheters - CRBSIs



	CVCs (n/N)		OR	OR (95% CI)	NNT
	Standard	Comparator			
Silver alloy coated					
Bach et al (1999)[45]	2/33	2/34		0·97 (0·13–7·21)	561
Harter et al (2002)[57]	8/93	5/107		0·53 (0·17–1·62)	25
Goldschmidt et al (1995)[54]	10/113	6/120		0·56 (0·20–1·51)	26
Total (FEM)	**20/239**	**13/261**		**0·58 (0·29–1·17)**	**30**
Test for heterogeneity: Q=0·29 (2 df), p=0·86; I^2=0%					
Silver iontophoretic					
Moretti et al (2005)[66]	1/262	0/252		0·14 (0·00–7·09)	262
Corral et al (2003)[50]	1/103	4/103		3·40 (0·58–19·97)	NA
Total (FEM)	**2/365**	**4/355**		**1·98 (0·40–9·95)**	**NA**
Test for heterogeneity: Q=2·11 (1 df), p=0·15; I^2=0%					
Silver impregnated					
Kalfon et al (2007)[61]	8/297	8/320		0·93 (0·34–2·50)	517

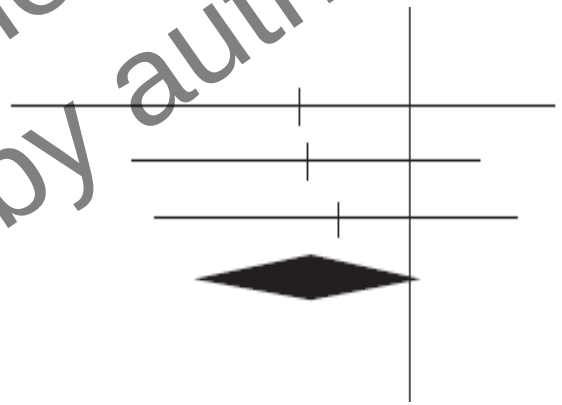
1st Gen Chlorhexidine-sulfadiazine



First-generation CSS				
Tennenberg et al (1997)[75]	9/145	5/137	0·58 (0·20–1·70)	39
Maki et al (1997)[64]	9/195	2/208	0·25 (0·08–0·84)	27
Marik et al (1999)[65]	2/39	1/36	0·56 (0·06–5·43)	43
Hannan et al (1999)[56]	3/177	1/174	0·37 (0·05–2·66)	89
Bach et al (1996)[44]	3/117	0/116	0·13 (0·01–1·30)	39
Collin et al (1999)[49]	4/139	1/98	0·41 (0·07–2·46)	54
Sheng et al (2000)[73]	2/122	1/113	0·55 (0·06–5·36)	133
Heard et al (1998)[58]	6/157	5/151	0·86 (0·26–2·87)	196
Osma et al (2006)[67]	1/69	4/64	3·73 (0·63–22·16)	NA
Pemberton et al (1996)[69]	3/40	2/32	0·83 (0·13–5·06)	80
Ciresi et al (1996)[47]	8/127	8/124	1·03 (0·37–2·82)	NA
Jaeger et al (2005)[60]	8/55	1/51	0·20 (0·05–0·78)	8
Logghe et al (1997)[63]	15/342	17/338	1·15 (0·57–2·35)	NA
Total (FEM)	**73/1724**	**48/1642**	**0·68 (0·47–0·98)**	**72**

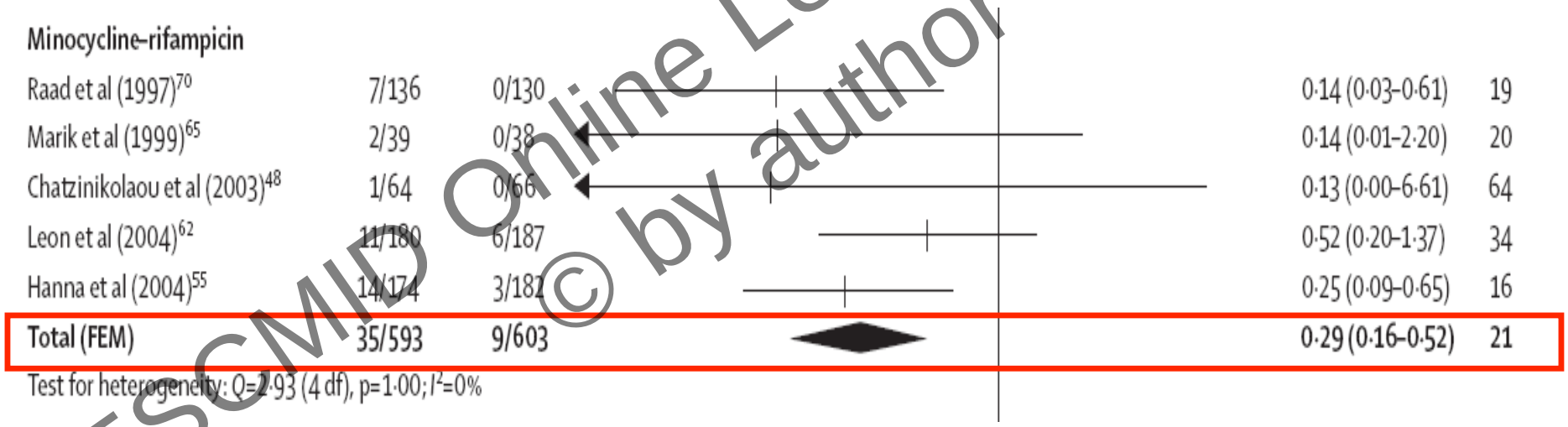
Test for heterogeneity: Q=14·95 (12 df), p=1·00; I^2=26·4%

2nd Gen Chlorhexidine-sulfadiazine



Second-generation CSS				
Rupp et al (2005)[72]	3/393	1/384	0·38 (0·05–2·87)	199
Ostendorf et al (2005)[68]	7/94	3/90	0·45 (0·13–1·61)	24
Brun-Buisson et al (2004)[46]	5/175	3/188	0·56 (0·14–2·26)	79
Total (FEM)	**15/662**	**7/662**	**0·47 (0·20–1·10)**	**154**
Test for heterogeneity: Q=0·11 (2 df), p=0·95; I^2=0%				

Minocycline-rifampin



Minocycline–rifampicin				
Raad et al (1997)[70]	7/136	0/130	0·14 (0·03–0·61)	19
Marik et al (1999)[65]	2/39	0/38	0·14 (0·01–2·20)	20
Chatzinikolaou et al (2003)[48]	1/64	0/66	0·13 (0·00–6·61)	64
Leon et al (2004)[62]	11/180	6/187	0·52 (0·20–1·37)	34
Hanna et al (2004)[55]	14/174	3/182	0·25 (0·09–0·65)	16
Total (FEM)	**35/593**	**9/603**	**0·29 (0·16–0·52)**	**21**

Test for heterogeneity: $Q=2·93$ (4 df), $p=1·00$; $I^2=0\%$

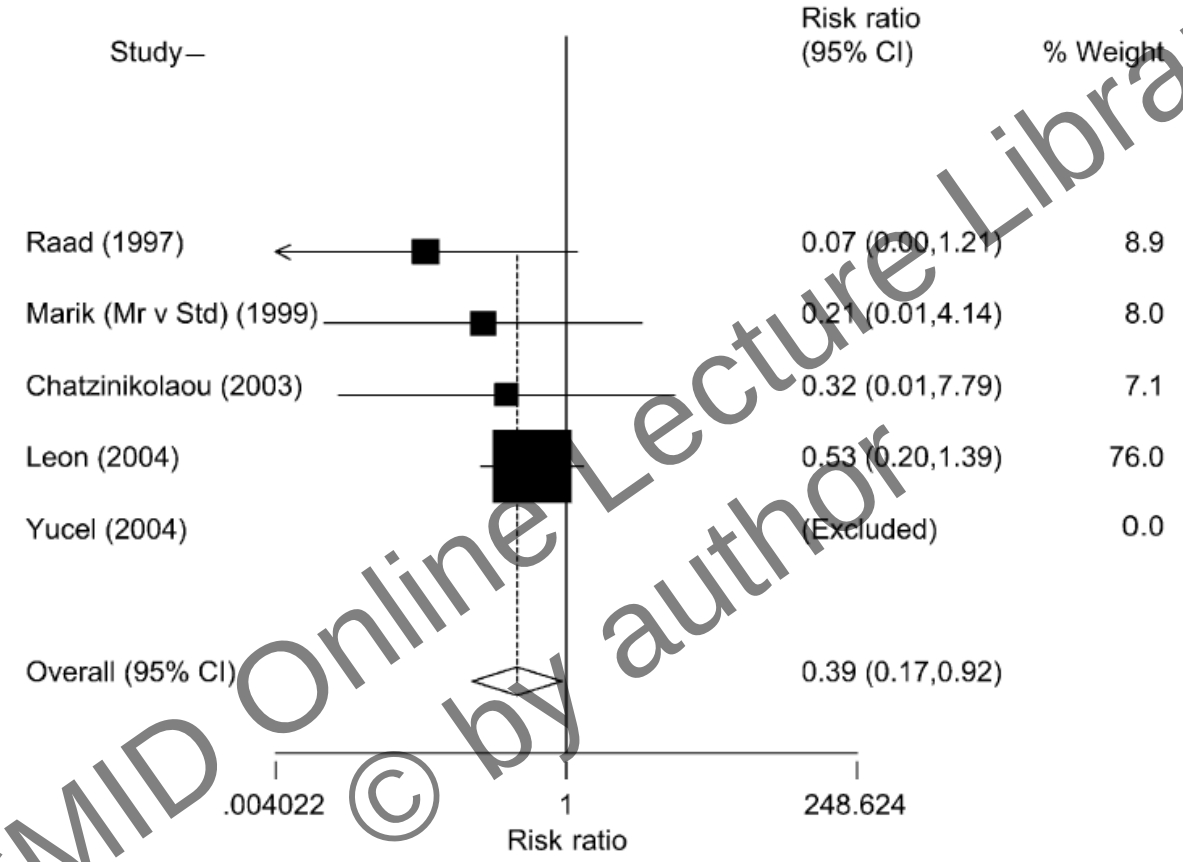


Fig 3. Forest plot of RR of CRBSI in trials comparing minocycline/rifampicin-coated central venous catheters with noncoated catheters. Note: Studies ordered by year of publication. For each study, the size of the square is proportional to the number of catheters. The diamond indicates the summary relative risk and 95% confidence interval.

Economics

- Summary of economic analysis
- Mino-rifampin vs CHG-SSD catheter
  - Cost-saving: $83
- Mino-rifampin vs non-coated catheter
  - Cost saving: $314

FOR MORE INFO...

* Halton K, Emerg Infect Dis June 2007; 13(6):815-822

Concerns for Resistance

- Clinicians concerned for resistance to minocycline or rifampin
- DATA?
  - Resistance only when used alone (rifampin)
  - Highly unlikely if used together
- Four (of 5) prospective studies evaluated skin colonization before/after insertion and failed to detect resistance

FOR MORE INFO...

- Raad et al, Lancet ID October 2007

CHG-impregnated sponges: RCT

- Dec 2006-June 2008
- RCT in 7 ICUs: CHG with 3 or 7-day dressing changes
- Use of CHG-sponge reduced major CRI (sepsis +CLABSI) by 60% and CLABSI by 75%
  - 1.4/1000 catheter days to 0.6/1000 catheter days
  - 1.3/1000 catheter days to 0.4/1000 catheter days
- NNT = 117 to prevent a major CRI

FOR MORE INFO...

- Timsit JF et al. JAMA 2009; 301(12):1231-41
- Perencevich and Pittet. JAMA 2009; 301(12):1285-7

The Checklist

CA-BSI: Prevention "Bundles"

- Keystone Project, over 100 Michigan ICUs
  - ↓ mean CA-BSI rate from 7.7 to 1.4 per 1000 catheter-days (66% reduction)
  - Reduced median to "zero"
  - Reduction persisted out to 18 months
    - Quasi-experimental design, Hawthorne effect, incomplete data collection, little process information
    - *But still*…….

Pronovost P, et al. NEJM 2006;355:2725-32.

Table 3. Rates of Catheter-Related Bloodstream Infection from Baseline (before Implementation of the Study Intervention) to 18 Months of Follow-up.*

Study Period	No. of ICUs	No. of Bloodstream Infections per 1000 Catheter-Days				
		Overall	Teaching Hospital	Nonteaching Hospital	<200 Beds	≥200 Beds
		median (interquartile range)				
Baseline	55	2.7 (0.6–4.8)	2.7 (1.3–4.7)	2.6 (0–4.9)	2.1 (0–3.0)	2.7 (1.3–4.8)
During implementation	96	1.6 (0–4.4)†	1.7 (0–4.5)	0 (0–3.5)	0 (0–5.8)	1.7 (0–4.3)†
After implementation						
0–3 mo	96	0 (0–3.0)‡	1.3 (0–3.1)†	0 (0–1.6)†	0 (0–2.7)	1.1 (0–3.1)‡
4–6 mo	96	0 (0–2.7)‡	1.1 (0–3.6)†	0 (0–0)‡	0 (0–0)†	0 (0–3.2)‡
7–9 mo	95	0 (0–2.1)‡	0.8 (0–2.4)‡	0 (0–0)‡	0 (0–0)†	0 (0–2.2)‡
10–12 mo	90	0 (0–1.9)‡	0 (0–2.3)‡	0 (0–1.5)‡	0 (0–0)†	0.2 (0–2.3)‡
13–15 mo	85	0 (0–1.6)‡	0 (0–2.2)‡	0 (0–0)‡	0 (0–0)†	0 (0–2.0)‡
16–18 mo	70	0 (0–2.4)‡	0 (0–2.7)‡	0 (0–1.2)†	0 (0–0)†	0 (0–2.6)‡

* Because the ICUs implemented the study intervention at different times, the total number of ICUs contributing data for each period varies. Of the 103 participating ICUs, 48 did not contribute baseline data. P values were calculated by the two-sample Wilcoxon rank-sum test.
† P≤0.05 for the comparison with the baseline (preimplementation) period.
‡ P≤0.002 for the comparison with the baseline (preimplementation) period.

Table 4. Incidence-Rate Ratios for Catheter-Related Bloodstream Infections.*

Variable	Incidence-Rate Ratio (95% CI)	P Value
Study period		
Baseline	1.00	
During implementation	0.76 (0.57–1.01)	0.063
After implementation		
0–3 mo	0.62 (0.47–0.81)	0.001
4–6 mo	0.56 (0.38–0.84)	0.005
7–9 mo	0.47 (0.34–0.65)	<0.001
10–12 mo	0.42 (0.28–0.63)	<0.001
13–15 mo	0.37 (0.20–0.68)	0.001
16–18 mo	0.34 (0.23–0.50)	<0.001
Teaching hospital	1.34 (0.73–2.46)	0.35
Bed size (per 100 beds)	1.03 (0.97–1.09)	0.33

* Incidence-rate ratios were calculated with the use of a generalized linear latent and mixed model (Rabe-Hesketh and Skrondal[18]), with robust variance estimation and random effects to account for clustering of catheter-related bloodstream infections within hospitals and clustering of hospitals within geographic regions. Rates of catheter-related bloodstream infection during and after implementation of the study intervention were compared with baseline (preimplementation) values, adjusted for the hospital's teaching status and number of beds.

Pronovost P, et al. NEJM 2006;355: 2725-32.

Importance of Bundle Compliance

- 2007 Survey of NHSN Hospitals
- 250 hospitals provided:
  - CLABSI/1000 central-line days
  - Existence of CLABSI bundle policies
  - Compliance with components of the bundle
- Mean 2.1/1000 CL-days

FOR MORE INFO...

Furuya EY et al. PLoS One 2010 (in press)

Importance of Bundle Compliance

- 49% had a bundle policy
- 38% of those reported very high compliance with the CLABSI bundle
- Only when ICU had a policy, monitored compliance and had >95% compliance did it reduce CLABSI rates
- If ICU achieved high compliance, CLABSI rates would be expected to fall 38%

FOR MORE INFO...

Furuya EY et al. PLoS One 2010 (in press)

BUT…

- ICU Director against checklists
  - Blocked approval
  - Delayed everything
  - Organizational constipater

What did I do?

- I talked to the Chief Medical Officer and made the ICU Director head of CLABSI reduction taskforce
- My thought, if he can reduce CLABSI without checklist, I want to see it…

Developed White Paper

- Authors: Myself, CMO, CNO, Chair of Anesthesiology, others
- ICU teams – MD and RN in each of 10 ICUs
- Listed each component that all ICUs must follow and how they will be tracked

White Paper Items

- **1) Central Venous Catheter Insertion Checklist (UMMC Bundle)**
  - Appropriate hand hygiene
  - Age appropriate use of chlorhexidine for skin antisepsis
  - Use of maximal sterile barrier precautions (mask, sterile gown, sterile gloves and large full-body sterile drapes) during insertion
  - Avoidance of the femoral vein as an access site
- Prompt removal of unnecessary catheters

Additional Items

- **2) Avoid Drawing Blood Cultures through the CVC-ports**
- **3) Educational Compliance (Online Tutorial) for all Catheter Inserters**
- **4) Line Maintenance**
  - Scrub the hub
  - CHG patch if >2 months old
- **5) Antimicrobial (Minocycline-Rifampin) Catheter Use**

Did all this work?

Preventing 120 CLABSI

- 120 CLABSI
- Economic cost at $18,400/catheter
- Economic savings =$2.2 million
- LOS savings = 1440 bed days
- @$2,000/day = $2.8 million
- Our initial estimate was $1 million
- We beat this by 2-3 times!

Conclusions

- Infection control does not need to be cost-saving
- Using the SHEA Guideline can assist you in making choices and improvements at your hospital
- If you don't have the resources to do additional work, say "No" so that you can say a better "Yes" for your patients

Conclusions

- Evidence-based methods exist for CLABSI and can be used to make a solid business case at your institution
- These methods can be followed to assist with making a business case for other interventions and preventing other infections.