Infection Control for the Orthopedic Surgeon

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Outline

- Paradigm shift in NI prevention
- SSI
  - External forces impacting IC: SCIP
    - Perioperative antibiotics, hair removal
  - Surgical Hand Preparation
- S.*aureus*/MRSA SSI
  - Mupirocin and other decolonization measures
  - Isolation wards for Orthopedic cases
- Prevention of BBF exposures in the OR
- Mandatory public reporting of NIs
- Conclusion

HAIs in the US Annually

Site	Infections N	Infections %	Deaths N	Deaths %
UTI	561,667	36%	13,088	32%
SSI	290,485	20%	8,205	22%
Bloodstream	248,678	11%	30,665	14%
Pneumonia	250,205	11%	35,967	15%
Other	386,090	22%	11,062	17%
TOTAL	1,737,125	100%	98,987	100%

Klevens RM et al. Pub Health Reports 2007;122:160-166.

Epidemiology of SSI in the US

- 30 million surgical procedures performed annually
- SSIs occur in 2-5% of clean, extra-abdominal procedures & up to 20% of patients undergoing intra-abdominal procedures
- CDC estimates that 300,000 SSIs occur annually
- Mean cost = $10,443 per infection
- Direct + indirect costs = $1-$10 billion
- 47-84% of SSIs occur after discharge

Klevens RM et al. Pub Health Reports 2007;122:160-166.
Anderson DJ et al. Infect Control Hosp Epidemiol 2007;28:767-773.

Orthopedics

- Between 1%-5% of all prosthetic joints become infected
  - Significant morbidity
    - Protracted hospitalization
    - Potentially renewed disability
  - Significant cost
    - $50,000-$60,000 per episode

•Sculpo TP. Orthopedics.1995;18:871-873

Risk Factors:orthopedics

- Prior surgery at site of prosthesis
- Rheumatoid arthritis
- Immunocompromised states
- Diabetes mellitus
- Poor nutritional status
- Obesity
- Psoriasis
- Advanced age

•Gristina et al. J Bone Joint Surg Am. 1983;65 126-34

•Brause BD. Curr Opin Rheumatolog.1989. 1:194-98

• Hansen Ad et al. J Bone Joint Surg Am. 1998

Sources of SSIs

- Endogenous: patient's skin or mucosal flora
  - Increased risk with devitalized tissue, fluid collection, edema, larger inocula
- Exogenous
  - Includes OR environment & instruments, OR air, personnel
- Hematogenous/lymphatic: seeding of surgical site from a distant focus of infection
  - May occur days to weeks following the procedure

- Most infections occur due to organisms implanted during the procedure

Surgical Site Infections

Pathogens: TKA/THA

Rank	Pathogen	Percent
1	*S. aureus*	22-39%
2	Coagulase-negative Staph	19-29%
3	Streptococci	5-11%
4	*Gram negative bacilli*	4-12%%

Lentino et al. *Clinical Infectious Diseases* 2003;36:1157-61.

Shifting Vantage Points on Nosocomial Infections

Many infections are inevitable, although some can be prevented

→

Each infection is potentially preventable unless proven otherwise

Gerberding JL. Ann Intern Med 2002;137:665-670.

Sadly, we as medical professionals and health systems frequently do not practice well known nosocomial infection risk reduction practices

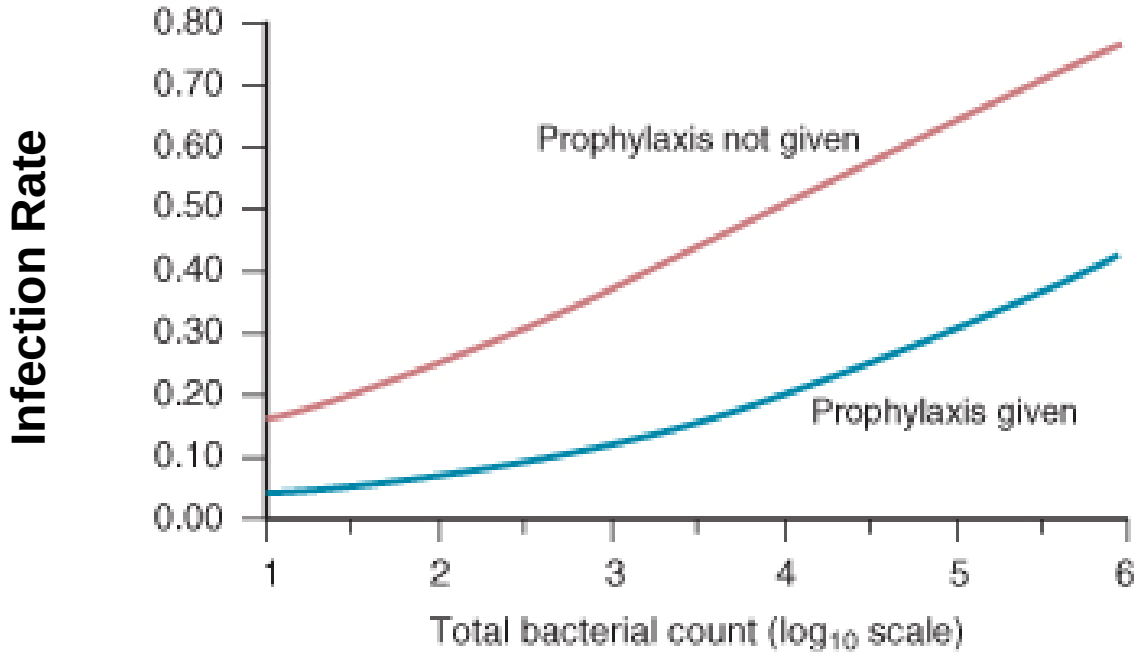
SCIP

Surgical Care Improvement Project

- A national partnership of organizations to improve the safety of surgical care by reducing post-operative complications
- Goal: reduce surgical complications 25% by 2010
- Initiated in 2003 by CMS & CDC
  - Steering committee of 10 national organizations
  - >20 additional organizations provide technical expertise
- Strategy: Surgeons, anesthesiologists, periop nurses, pharmacists, infection control professionals, & hospital executives work together to improve surgical care
- Target areas: Surgical site infections, perioperative adverse cardiac events, deep venous thrombosis, postoperative pneumonia

SCIP Measures

1	Perioperative antibiotic prophylaxis	Antibiotic given within 1 hour prior to incision
2		Appropriate antibiotic selected
3		Antibiotic discontinued within 24 hrs of surgery end time (48 hrs for cardiac surgery)
4	Glycemic control	Cardiac surgery patients with 6 AM glucose ≤ 200 mg/dL on postop day 1 & 2
5	Appropriate hair removal	No hair removal, or hair removal with clippers or depilatory
6	Normothermia	Colorectal surgery patients with T ≥96.8°F within the first hour after leaving the OR
7	Perioperative β-blockers	Patients on a β-blocker prior to admission who received a β-blocker 24 hrs prior to incision through discharge from PACU
8	DVT prophylaxis	Patients with recommended DVT prophylaxis ordered during the admission
9		Patients who received appropriate DVT prophylaxis within 24 hours prior to *Surgical Incision Time* to 24 hours after *Surgery End Time*



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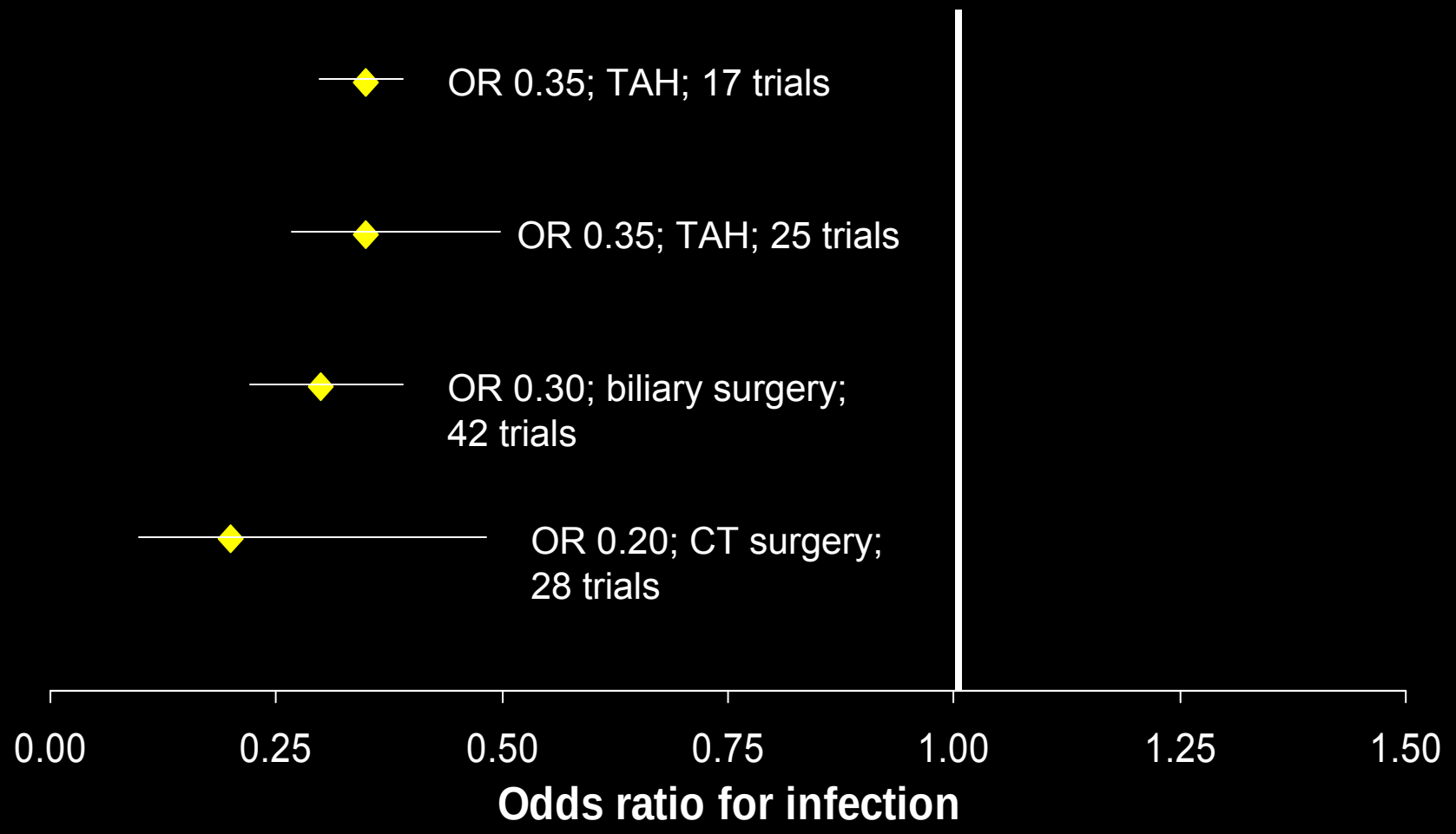
Downloaded from: Principles and Practice of Infectious Diseases

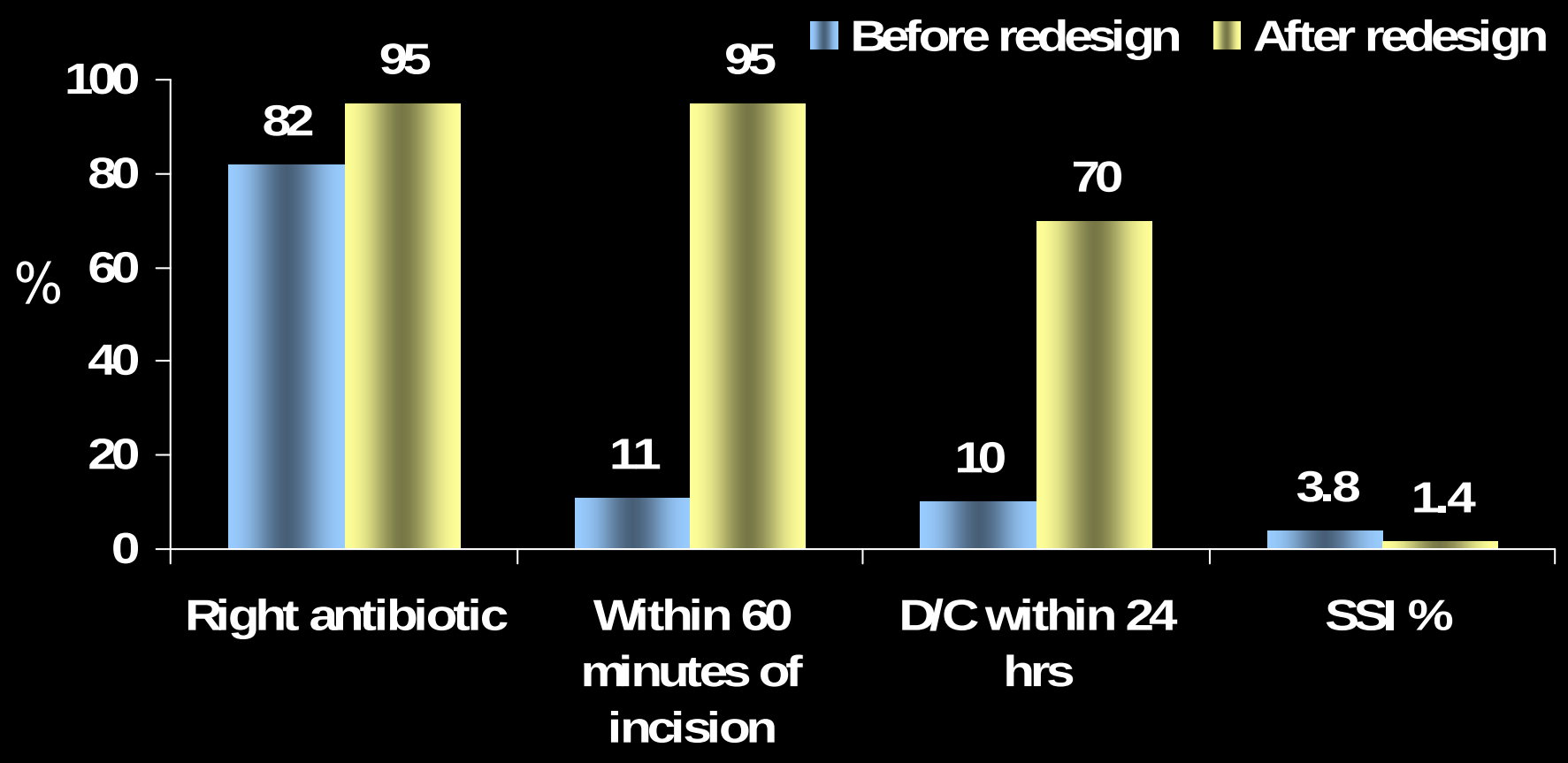
Meta-analyses:

Antibiotic Prophylaxis vs Placebo



Auerbach AD. *Making Health Care Safer.* AHRQ, 2001:224-5.

Effect of Appropriate Perioperative Antibiotic Prophylaxis at a 650-bed Tertiary Care Hospital



Kanter G et al. Anesth Analg 2006;103:11517-1521.

Process Indicators:
Timing of First Antibiotic Dose

Infusion should begin within 60 minutes of the incision

- Little controversy regarding this indicator

Bratzler DW et al. Clin Infect Dis 2004;38:1706-15.

Process Indicators:

Duration of Antimicrobial Prophylaxis

Prophylactic antimicrobials should be discontinued within 24 hrs after the end of surgery

- Areas of controversy:
  - ASHP recommends continuing prophylaxis for CT surgery procedures for up to 72 hrs after the operation; Society of Thoracic Surgeons recommends 48 hrs

Bratzler DW et al. Clin Infect Dis 2004;38:1706-15.

The Timing of Surgical Antimicrobial Prophylaxis

- Objective: to determine the optimal timing of surgical antimicrobial prophylaxis
- Prospective observational cohort at Basel University Hospital
  - Consecutive series of 3836 surgical procedures
  - Multiple logistic regression analyses for the odds of SSI when the antimicrobial was administered in less than 30 minutes prior to incision vs 59 to 30 minutes prior to incision

Weber et al. ***Annals of Surgery***.247;6,2008, 918-926

The Timing of Surgical Antimicrobial Prophylaxis

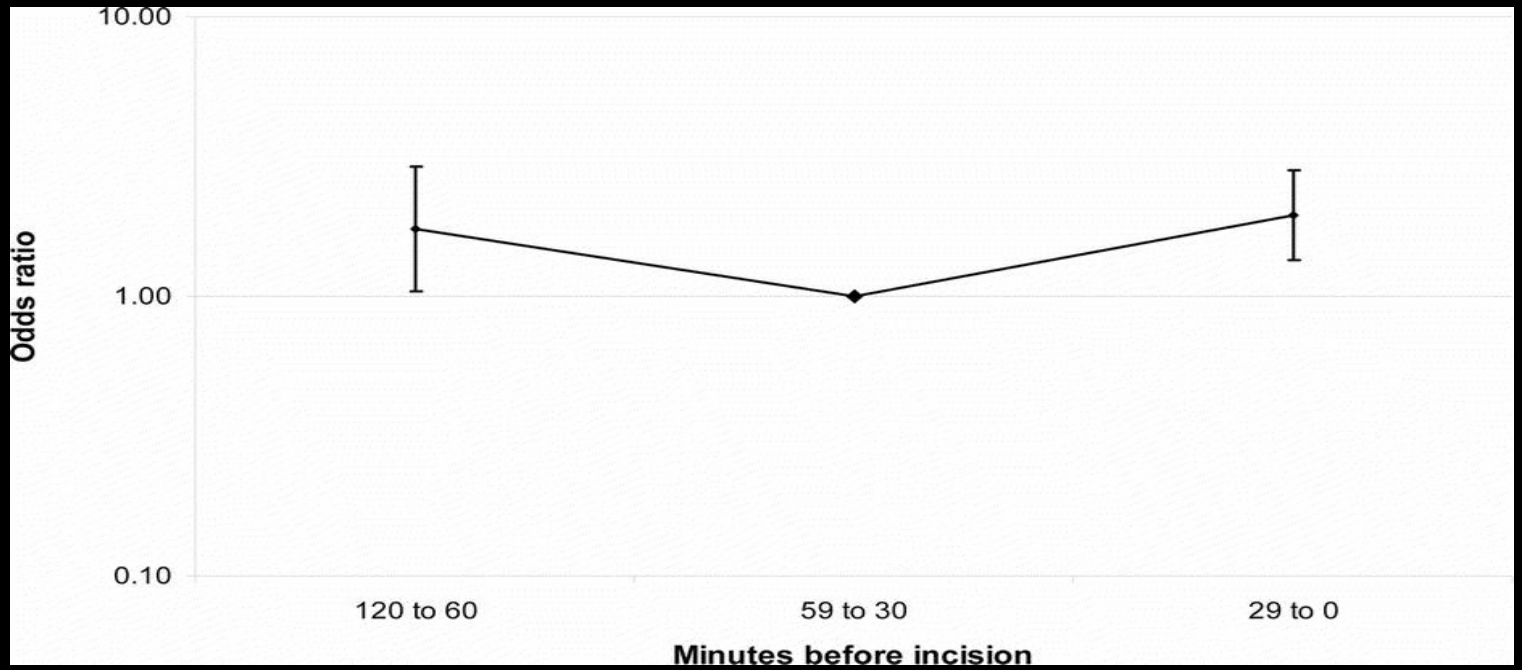


FIGURE 1. Risk-adjusted odds ratios and 95% confidence intervals for surgical site infection versus timing of antimicrobial prophylaxis divided into 3 time intervals. Association of timing of antibiotic prophylaxis and the odds of SSI obtained with multivariable logistic regression analysis, which included wound classification, ASA score in groups I to IV, division of surgical specialty (visceral, vascular, trauma), lowest intraoperative body temperature, body mass index, preoperative antibiotic therapy, smoking status, diabetes, immunosuppression, T time surpassed, sex, and age by 10-year intervals.

Weber et al. ***Annals of Surgery***.247;6,2008, 918-926

Much Cleaner Cuts

PROBLEM: Infection related to surgery ● **PROPOSAL:** Better use of antibiotics, don't shave with razor prior to surgery, tighten control of blood sugar ● **POSSIBLE LIVES SAVED:** 8,000

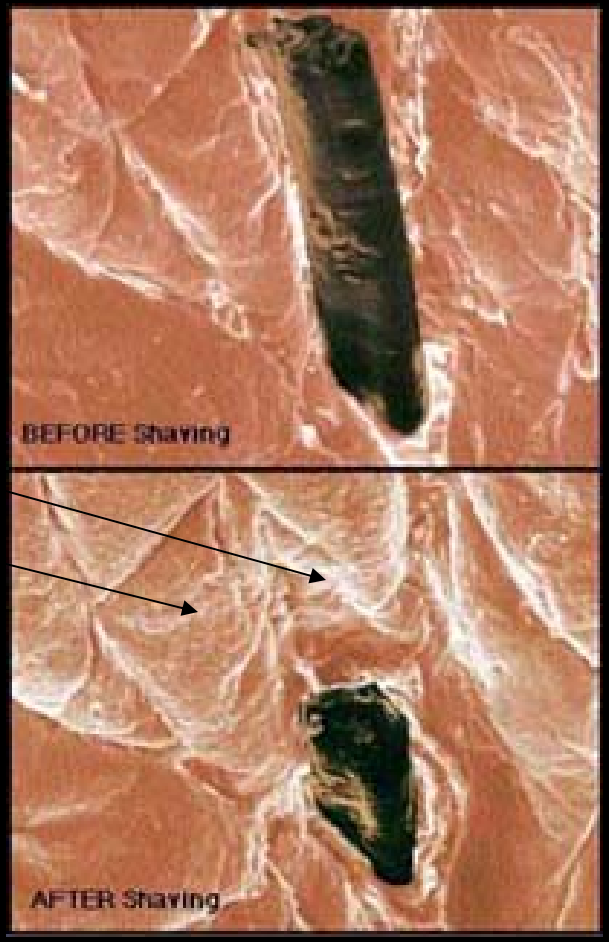
A hospital is a risky place for people who have had surgery. No matter how much antibacterial solution is painted on before the first cut, opening the body invites lurking microbes. Infections at the surgery site complicate an estimated 780,000 operations a year, or more than 1 in every 40 procedures. For abdominal surgery, the likelihood is as high as 1 in 5. And the complications are tough to treat. Infected patients are two to three times more likely to die and are hospitalized an average of seven days longer than uninfected patients who had the same operation.

Even before the 100K campaign got underway, IHI had been working with a group of 56 hospitals on strategies to lower the rate of surgical-site infections. Results of the yearlong effort, published last month in the *American Journal of Surgery*, showed a re-

U.S. News and World Report, July 18, 2005.

Pathophysiology of Shaving & SSI

- Hair removal with a razor can disrupt skin integrity
- Microscopic exudative rashes and skin abrasions can occur during hair removal.
- These rashes and skin abrasions can provide a portal of entry for microorganisms



Cochrane Database of Systematic Reviews: Preoperative Hair Removal and SSIs

Trial	Result
3 trials compared hair removal with razor or depilatory cream vs no hair removal	No significant difference in SSI
3 trials compared hair removal with clippers vs shaving	Increased risk of SSI with Shaving (RR=2.02)
7 trials compared hair removal with shaving vs depilatory cream	Increased risk of SSI with Shaving (RR=1.54)
One trial each compared shaving the night before vs day of surgery, and clipping the day before vs day of surgery	No significant difference in SSI

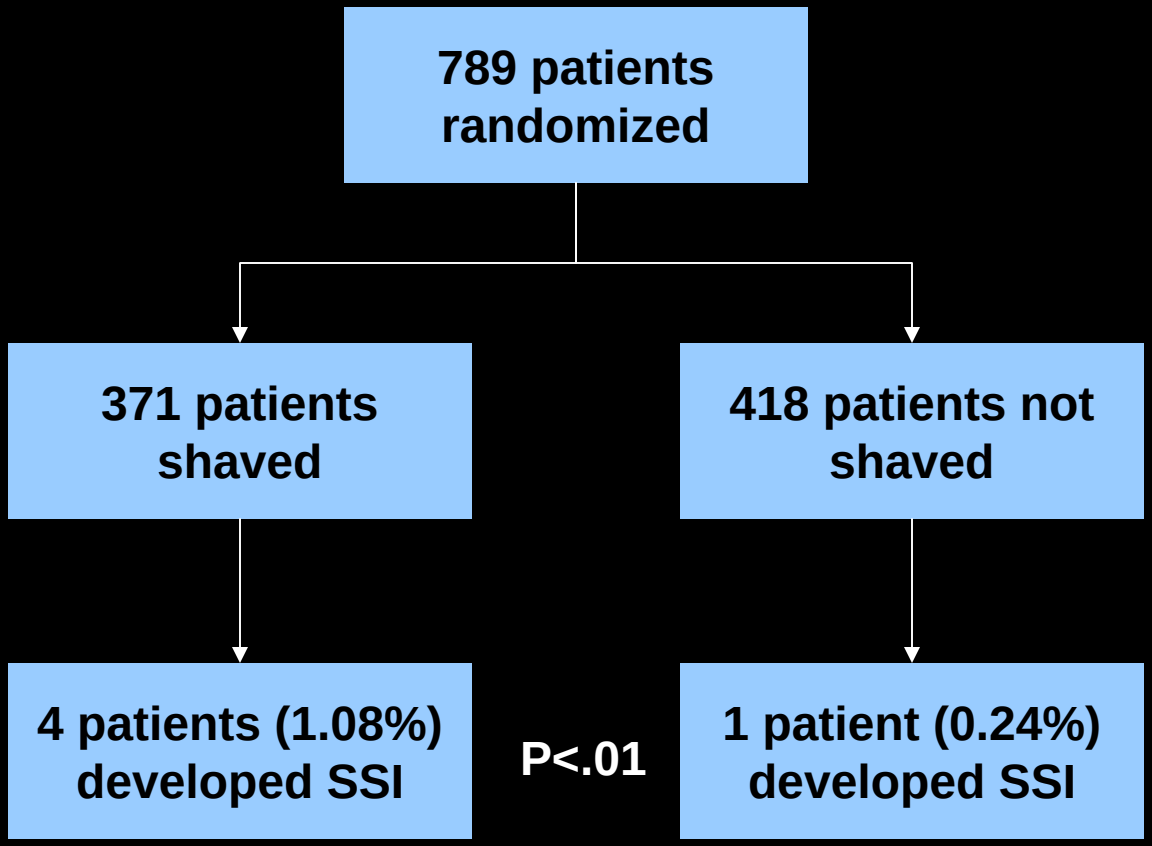
Tanner et al. *Cochrane Database of Systematic Reviews* 2006, issue 3, Art No. CD004122

Cochrane Database of Systematic Reviews: Preoperative Hair Removal and SSIs

- No difference in SSI in those that have had hair removed prior to surgery vs those who have not.
- If hair removal is necessary then clipping and depilatory creams result in fewer SSIs than shaving with a razor
- There is no difference in SSI if hair is removed one day prior or on the day of surgery

Tanner et al. *Cochrane Database of Systematic Reviews* 2006, issue 3, Art No. CD004122

Effect of Shaving in Spinal Surgery



Cedlik SE, Kara A. Spine 2007;32:1575-1577.

Surgical Hand Antisepsis

Study	Findings
•Meers et al. J Hygiene 1978 •Kikuchi et al. Acta Derm Venereol 1999	Surgical hand preparation requiring scrubbing with a brush damages the skin and leads to increased shedding of bacteria and squamous epithelial cells
•Dineen,P. Surg Gynecol Obstet 1973 •Bornside GH. Surgery 1968	Scrubbing with a disposable sponge or combination sponge-brush has reduced bacterial counts on the hands as effectively as scrubbing with a brush.
•Mulberry et al. Am J Infect Control 2001 •Loeb et al. Am J Infect Control 1997	Neither brush nor sponge is necessary to reduce bacterial counts on the hands of surgical staff to acceptable levels

CDC. MMWR, Guideline For Hand Hygiene in Healthcare Setting, October 25, 2002

Comparison of Different Regimens for Surgical Hand Preparation

- Prospective clinical trial comparing a traditional surgical scrub with chlorhexidine vs. a short application without scrub of a waterless, alcohol-based hand preparation (waterless hand rub)
- Waterless hand rub:
  - Caused less skin damage (P=0.002)
  - Produced lower microbial counts postscrub at days 5 (P=0.002) & 19 (P=0.02)
  - Required less time (1.3 minutes vs. 2.4 minutes; P<0.0001)
  - Was preferred by surgical staff (P=0.001)
  - Was cheaper

Larson EL et al. AORN Journal 2001;73:412-420.

Alcohol-based Hand Rub vs Traditional Scrub
Prevention of Surgical Site Infection

- Prospective, randomized equivalence trial comparing comparing the effectiveness of waterless, alcohol-based hand rub vs traditional scrub (betadine or chlorhexidine) to prevent SSI
- 4,387 consecutive patients who underwent clean and clean contaminated surgery
- Findings:
  - Alcohol hand rub was as effective as traditional scrub in preventing SSIs in a 30 day follow-up
  - Alcohol hand rub was better tolerated by surgical teams
  - Alcohol hand rub can be safely used as an alternative to traditional surgical hand-scrubbing

Parienti J et al. JAMA 2002; 288:722-727.

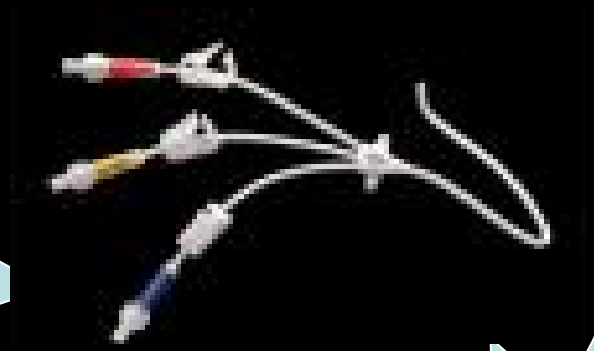
Nosocomial Bloodstream Infections

The risk factors interact in a dynamic fashion

The CVC is the greatest risk factor for Nosocomial BSI

Host

The CVC: Subclavian, Femoral and IJ sites



The intensity of the Catheter Manipulation

As the host cannot be altered, preventive measures are focused on risk factor modification of catheter use, duration, placement and manipulation

Nosocomial Bloodstream Infections

- 12-25% attributable mortality
- Risk for bloodstream infection:

Device	BSI per 1,000 catheter/days
Central venous SQ port	0.1
Peripheral IV	0.5
PICC (outpatient setting)	1.0
Noncuffed, rifampin/minocycline CVC	1.2
Noncuffed, chlorhexidine/silver sulfadiazine CVC	1.6
Cuffed, tunneled CVC	1.6
PICC (inpatient setting)	2.1
Noncuffed, nonmedicated CVC	2.7
Pulmonary artery catheter	3.7
Temporary dialysis catheter	4.8

Maki DG et al. Mayo Clin Proc 2006;81:1159-1171.

Risk Factors for Nosocomial BSIs

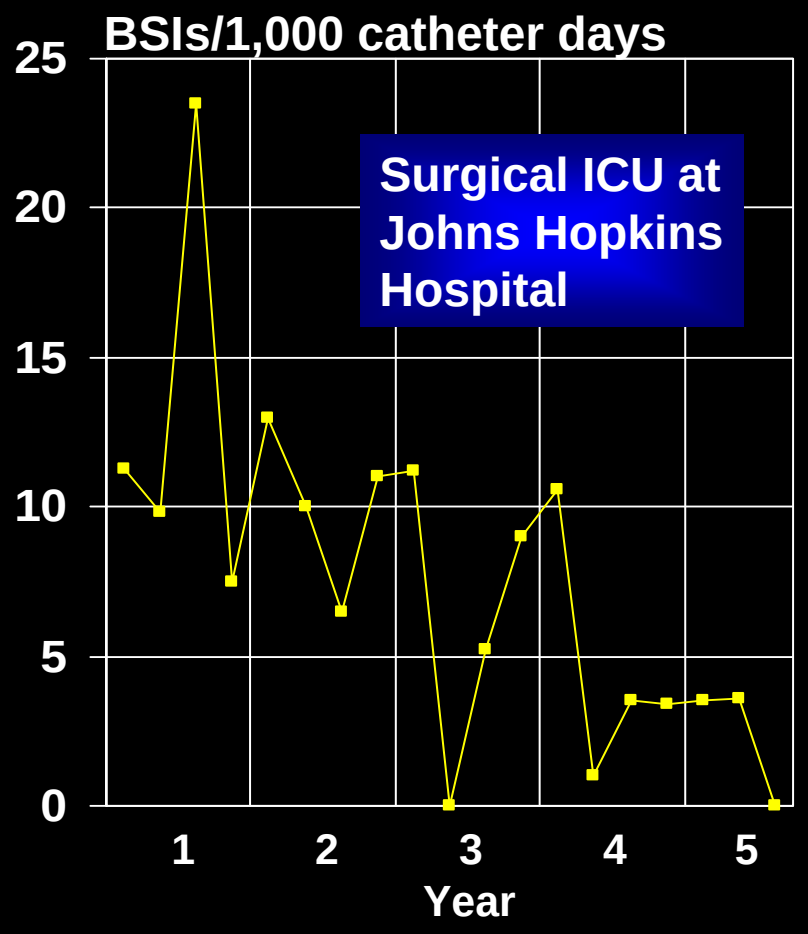
- Heavy skin colonization at the insertion site
- Internal jugular or femoral vein sites
- Duration of placement
- Contamination of the catheter hub

Prevention of Nosocomial BSIs
Hopkins Model (Central Line Bundle)

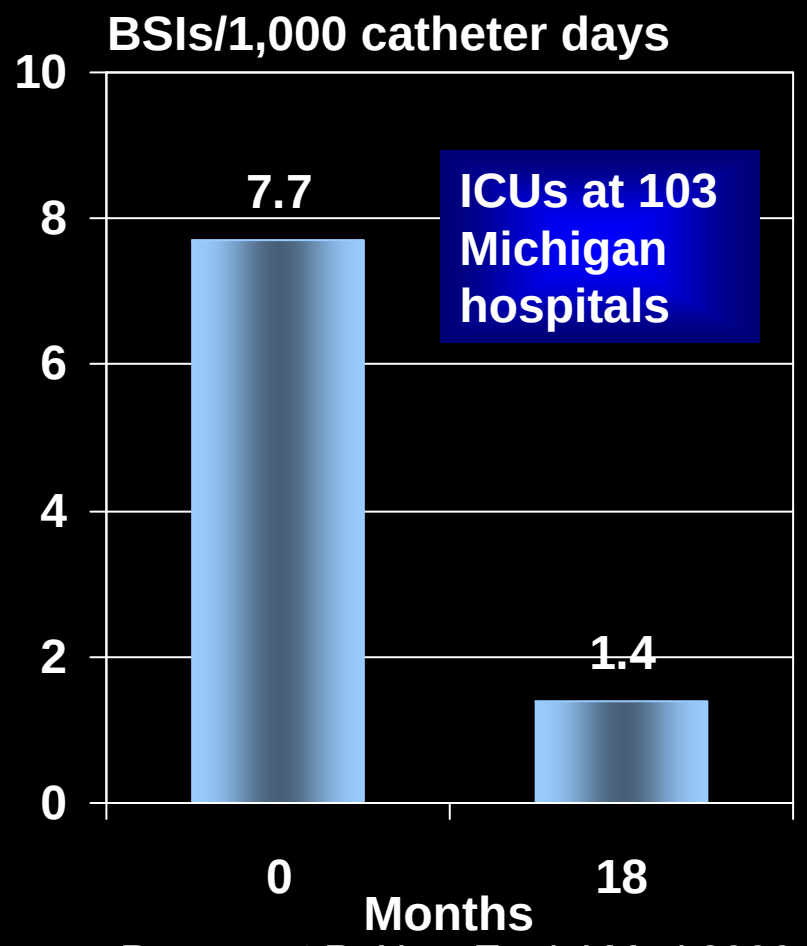
- Creation of a central line insertion cart
- Use of a insertion checklist to ensure:
  - Hand hygiene prior to the procedure
  - Sterile gloves, gown, mask, cap, full-size drape
  - Chlorhexidine skin prep of the insertion site
  - Use of subclavian vein as the preferred site
- Bedside nurse empowered to stop the procedure if a step is missed
- Ask every day during rounds whether catheters can be removed

Berenholtz S et al. Crit Care Med 2004;32:2014-20.

Practice Standardization Leads to Major Reduction in ICU CR-BSIs



Berenholtz SM et al. Crit Care Med 2004;32:2014-20.



Pronovost P. New Engl J Med 2006; 355:2725-32.

Catheter-related bloodstream infections are expensive and result in significant morbidity and mortality.

Simple, inexpensive, and evidence based interventions to reduce these infections are effective.

Broad use of these interventions could significantly reduce cost, morbidity and mortality.

Staphylococcus aureus nasal carriage and surgical site infections

S.aureus carriage in healthy populations

- Cross sectional surveys
  - Nasal carriage 20%-55%
- Longitudinal studies
  - 10%-35% of healthy adults are persistent nasal carriers
  - 20%-75% of healthy adults are intermittent carriers

Vandenberg et al. J Lab Clin Med 1999;133:525-34

Correlation of *S.aureus* nasal carriage and *S.aureus* SSI

Nasal *S.aureus* carriage CFUs (n)	Patients (N)	Infections rate (%)
0	345	8
10^1 to 10^3	14	7
10^3 to 10^5	28	11
10^5 to 10^6	26	19
> 10^6	38	29

White A. *Antimicrob Agents Chemother* 1963;3:667-70

What about MRSA SSI?

SSI pathogens isolated from 10,672 surgeries in rural and urban community hospitals	
Organism	**Number of Isolates (%)**
S.aureus	**19 (21.3)**
MRSA	**4 (4.5)**
Streptococcal species	**10 (11.2)**
CNS	**9 (10.1)**
Enterococcus species	**7 (7.9)**
P. aeruginosa	**6 (6.7)**
Enterobacteriacea	**11 (12.4)**
Other	**3 (3.4)**
No organism isolated	**20 (22.5)**
Total	**89 (100)**

Cantlon et al. *Amer Journal Infect Control* 2006;34:8, 526-529

Intranasal Mupirocin to prevent S.*aureus* SSI

Variable	Mupirocin Group	Placebo group
	S.*aureus* carriers N=444	S.*aureus* carriers N=447
Nosocomial infection	57/444 (12.8)	72/447 (16.1)
Nosocomial S.*aureus* infection	17/430 (4.0)	34/439 (11.6)
SSI	44/444 (9.9)	52/447 (11.6)
S.*aureus* SSI	16/32 (3.7)	26/439 (5.9)

Randomized, placebo controlled trial of placebo vs intranasal mupirocin ointment in 4030 patients undergoing general, gynecologic, neurologic or cardiothoracic surgeries

Perl et al. *New Engl J Med*, Vol 346, No.25, 1871-77

Mupirocin in Orthopedic Surgery

	Mupirocin Intervention Group N=1044	Historical Controls N=1260	P-Value
Overall SSI	14/1044	34/1260	0.02
S.*aureus* SSI	7/1044	14/1260	0.30

- Unblinded intervention trial with historical controls

Gernaat-van de Sluis et al. *Acta Orthop Scand*, 1998 Aug;69(4), 412-4

Mupirocin in Orthopedic Surgery

	Mupirocin Group 315	Placebo Group 299	P Value
Eradication of nasal carriage	83.5%	27.8%	N/A
Rate of endogenous S.*aureus* infection	0.3% (N=1)	1.7% (N=5)	0.19

- Randomized, placebo control trial with application of placebo vs. muprocin the night prior to surgery in 614 orthopaedic patients

Kalmeijer et al et al. *Clinical Infec Diseases*. 2002;35:353-8

Rapid Detection of MRSA

- The BD GeneOhm™ MRSA Assay
  - Qualitative *in vitro* diagnostic test for the direct detection of methicillin-resistant *Staphylococcus aureus* (MRSA) from a nasal specimen.
- Results available in less than 2 hours, directly from a nasal swab specimen
- No culture step required

Highly Effective Regimen for Decolonization of Methicillin-Resistant *Staphylococcus aureus* Carriers

- Prospective cohort study with a mean follow-up period of 36 months
- 62 patients
  - Decolonization treatment was performed
  - At least 6 body sites were screened for MRSA (including by use of rectal swabs) before the start of treatment.

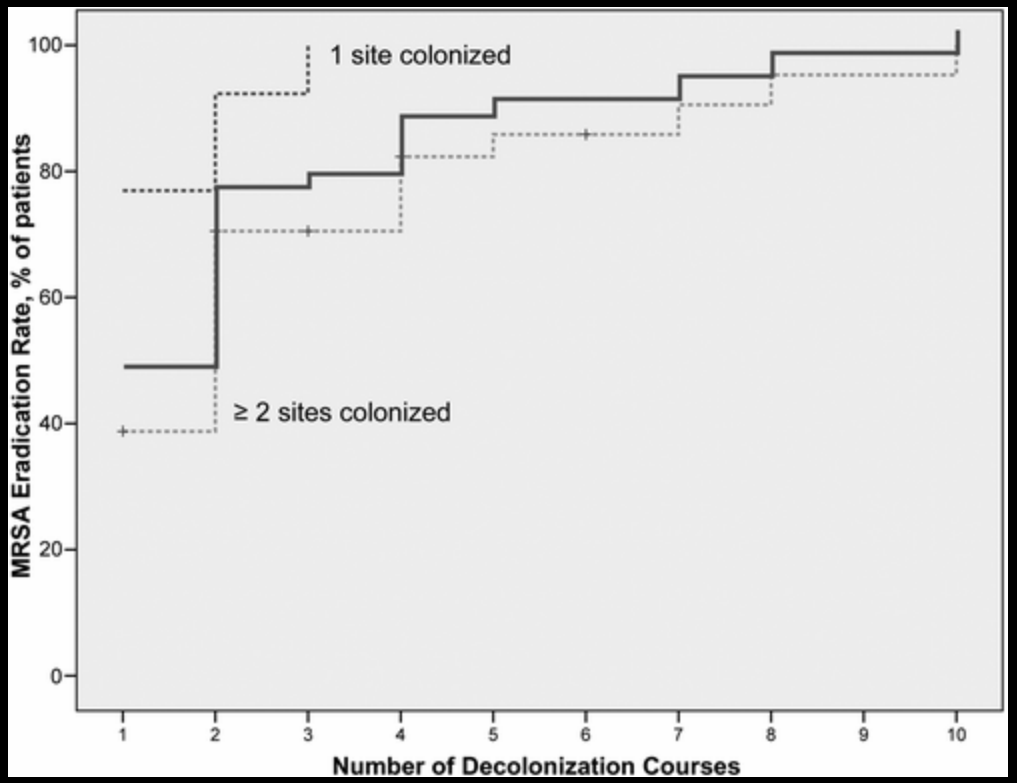
Buehlmann et al *Infect Control Hosp Epidemiol* 2008;29:510–516

Highly Effective Regimen for Decolonization of Methicillin-Resistant *Staphylococcus aureus* Carriers

- Standardized decolonization treatment
  - Mupirocin nasal ointment
  - Chlorhexidine mouth rinse
  - Full-body wash with chlorhexidine soap for 5 days.
  - Intestinal and urinary-tract colonization treated with oral vancomycin and cotrimoxazole, respectively
  - Vaginal colonization treated with povidone-iodine or, alternatively, with chlorhexidine ovula or octenidine solution
  - Successful decolonization was considered to have been achieved if results were negative for 3 consecutive sets of cultures of more than 6 screening sites.

Buehlmann et al *Infect Control Hosp Epidemiol* 2008;29:510–516

Highly Effective Regimen for Decolonization of Methicillin-Resistant *Staphylococcus aureus* Carriers



Decolonization was successful in 54 (87%) of the patients in the intent-to-treat analysis

Figure 2. Number of decolonization courses needed for successful methicillin-resistant *Staphylococcus aureus* (MRSA) eradication, overall *(bold line)* and stratified according to number of sites initially colonized by MRSA (*P* = .004)

Buehlmann et al *Infect Control Hosp Epidemiol* 2008;29:510–516

Isolation Ward for Orthopedic Surgical cases with MRSA

	Average Number of MRSA cases per month
Case Ward	1.17
Control ward 1	3.57
Control ward 2	3.18

- All patients screened for MRSA positivity over a 6 year period
- Case ward: segregation policy for patients MRSA positive, hand washing and barrier nursing (gowns)
- Control wards: no segregation policy; hand washing and barrier nursing

Johnston P et al. *Ann R Coll Surg Eng* 2005; 87:123-25

Prevention of BBF Exposures in the OR

Double Gloving

- American College of Surgeons
  - ***The ACS recommends the universal adoption of the double glove (or underglove) technique in order to reduce body fluid exposure caused by glove tears and sharps injuries in surgeons and scrub personnel.***
    - ***In certain delicate operations, and in situations where it may compromise the safe conduct of the operation or safety of the patient, the surgeon may decide to forgo this safety measure***

http://www.facs.org/fellows_info/statements/st-58.html

Double Gloving

- Glove barrier perforation rates
  - As high as 61 percent for thoracic surgeons and 40 percent for scrub personnel.
  - Double gloving reduces the risk of exposure to patient blood by as much as 87
- Double gloving has disadvantages such as decreased tactile sensation
  - Example: neurosurgery where delicate manipulation of instruments and tissues is required
- Despite a large body of data documenting the benefits of double gloving, this technique has not received wide acceptance by surgeons.

http://www.facs.org/fellows_info/statements/st-58.html

Incidence of Glove Perforations in GI Surgery and the Protective Effect of Double Gloves: A Prospective, Randomized Control Study

- 566 pairs of gloves tested
  - 306 pairs of single gloves
  - 260 pairs of double gloves

Indicator	Single glove	Double glove	P value
Number of glove perforations	53/306 (17%)	6/260 (2%)	<0.005
Rate of surgeon blood contamination of hands	15/115 (13%)	2/98 (2%)	<0.005

Naver PS et al. European J Surg 2000;166: 293-295

Glove Perforation in Orthopedic and Trauma Surgery

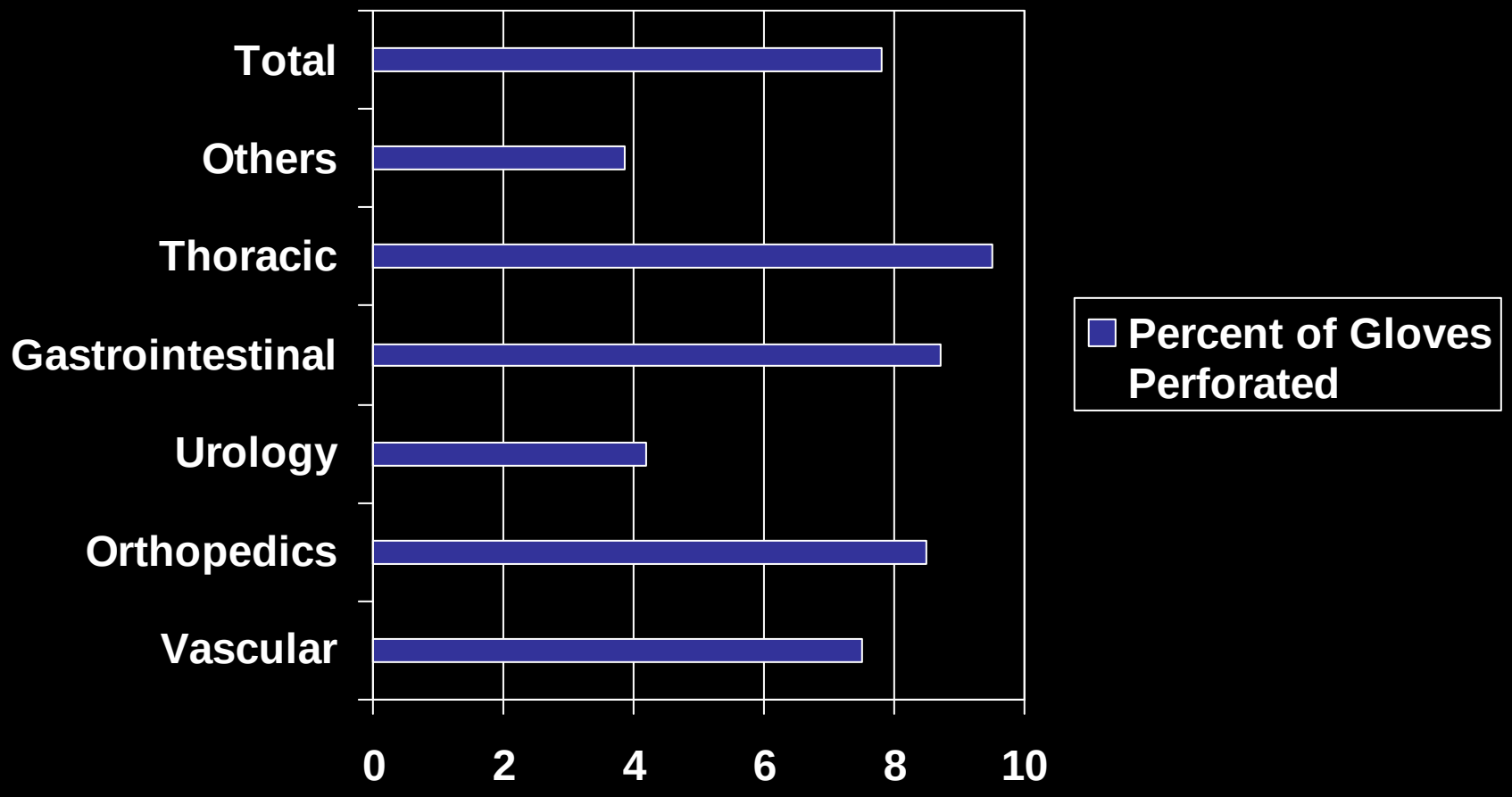
1769 Gloves from 349 Operations		
	Perforations/Gloves	Perforations Detected During Surgery
Single Gloves	13/186 (7%)*	3/13 (23%) †
Indicator Gloves	41/426 (9.6%)*	37/41 (90.2%) †
Combination Gloves	25/242 (10.3%)*	9/25 (36%) †

•Orthopedic surgeons randomized to either single gloves of their preference, double indicator gloves, or a combination of two regular surgical gloves

*** P>0.05 , †P <0.001**

Laine, T and Aarnio P. *J Bone Joint Surgery*, 2004;86-B:898-900

How Often Does Glove Perforation Occur in Surgery?



Laine, T and Aarnio P. *The American Journal of Surgery, 2001, 181 564-66*

Double gloving to reduce surgical cross-infection

- Review of randomized, controlled trials involving: single gloving, double gloving, triple gloving, glove liners, knitted outer gloves, steel weave outer gloves and perforation indicator systems

J Tanner, H Parkinson*Cochrane Database of Systematic Reviews* 2008 Issue 2

Double gloving to reduce surgical cross-infection

14 trials of double gloving	**•More perforations to the single glove than the innermost of the double gloves (OR 4.10, 95% CI 3.30 to 5.09)**
8 trials of indicator gloves	**•Fewer perforations detected with single gloves compared with indicator gloves (OR 0.10, 95% CI 0.06 to 0.16)** **•Fewer perforations detected with standard double glove compared with indicator gloves (OR 0.08, 95% CI 0.04 to 0.17)**
2 trials of glove liners (a glove knitted with cloth or polymers worn between two pairs of latex gloves)	**•More perforations to the innermost glove of a standard double glove vs glove liner gloves (OR 26.36, 95% CI 7.91 to 87.82)**

J Tanner, H Parkinson*Cochrane Database of Systematic Reviews* 2008 Issue 2

Double gloving to reduce surgical cross-infection

- There is no direct evidence that additional glove protection worn by the surgical team reduces surgical site infections in patients, however the review has insufficient power for this outcome.
- The addition of a second pair of surgical gloves significantly reduces perforations to innermost gloves.
- Triple gloving, knitted outer gloves and glove liners also significantly reduce perforations to the innermost glove.
- Perforation indicator systems results in significantly more innermost glove perforations being detected during surgery

J Tanner, H Parkinson*Cochrane Database of Systematic Reviews* 2008 Issue 2

The Neutral Zone

- *The ACS recommends the use of HFT as an adjunctive safety measure to reduce sharps injuries during surgery except in situations where it may compromise the safe conduct of the operation, in which case a partial HFT can be used*

http://www.facs.org/fellows_info/statements/st-58.html

The Neutral Zone

- HFT and Sharps Neutral Zone
  - No direct handing of instruments from scrub person to surgeon and back
- Partial HFT
  - Sharps are directly handed by the scrub person to the surgeon, but then returned to the scrub person via a neutral zone

http://www.facs.org/fellows_info/statements/st-58.html

Effectiveness of the Hands Free Technique in Reducing Operating Theatre Injuries

Hands free Technique	Event rate	Rate ratio
Used	2.1% (33/1545)	0.41 (0.49-1.98)
Not used	5.1% (110/2153)	1.0 reference

- Prospective evaluation of the hands-free technique in reducing the incidence of percutaneous injuries, contaminations, and glove tears.
- 3765 operations observed over 6 months in main and surgical day care operating theatres.
- Circulating nurses recorded the proportion of use of the hands-free technique during each operation

Occup Environ Med 2002; 59: 703-707

Blunt Tip Suture Needles

- ***Suture needle injuries pose the greatest risk of sharps injury to the surgeon and scrub personnel***
- ***The ACS recommends the universal adoption of blunt tip suture needles for the closure of fascia and muscle in order to reduce needle-stick injuries in surgeons and OR personnel***

http://www.facs.org/fellows_info/statements/st-58.html

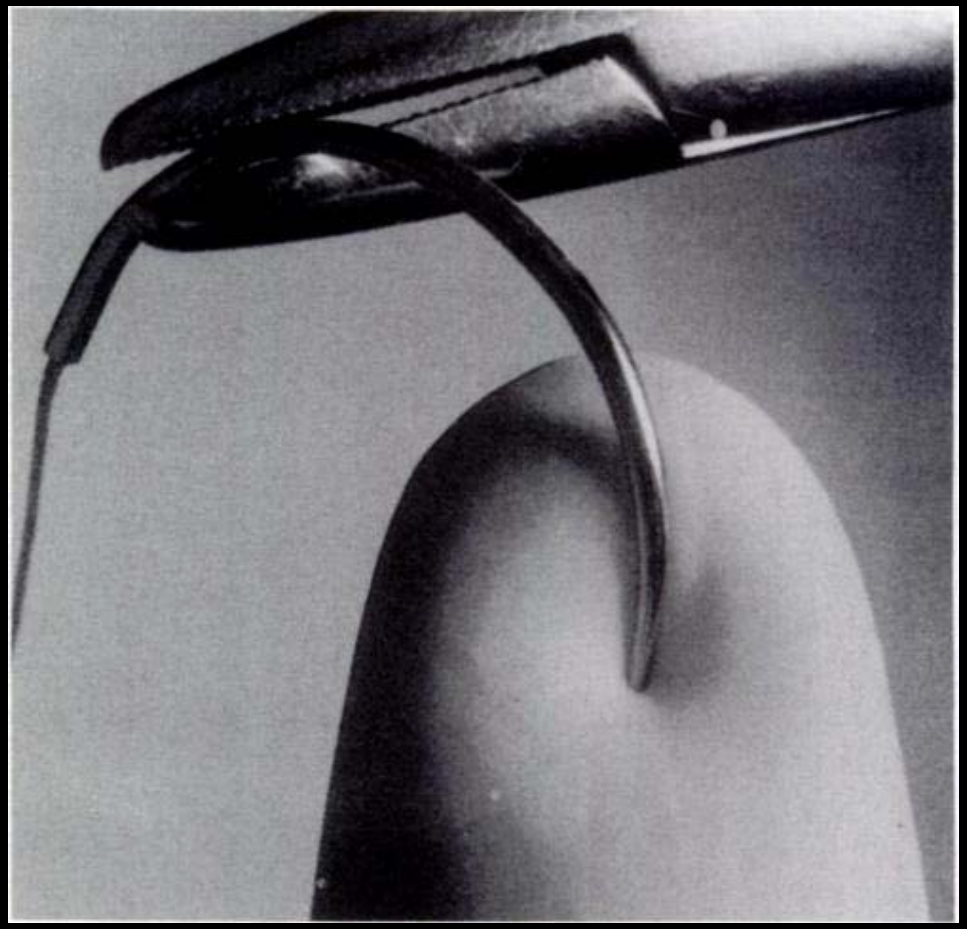
Blunt Tip Suture Needles

- ***The ACS recommends the universal adoption of blunt tip suture needles for the closure of fascia and muscle in order to reduce needle-stick injuries in surgeons and OR personnel***
  - ***A new generation of blunt suture needles is now on the market with a slightly more tapered tip profile that may provide for easier suturing***

http://www.facs.org/fellows_info/statements/st-58.html

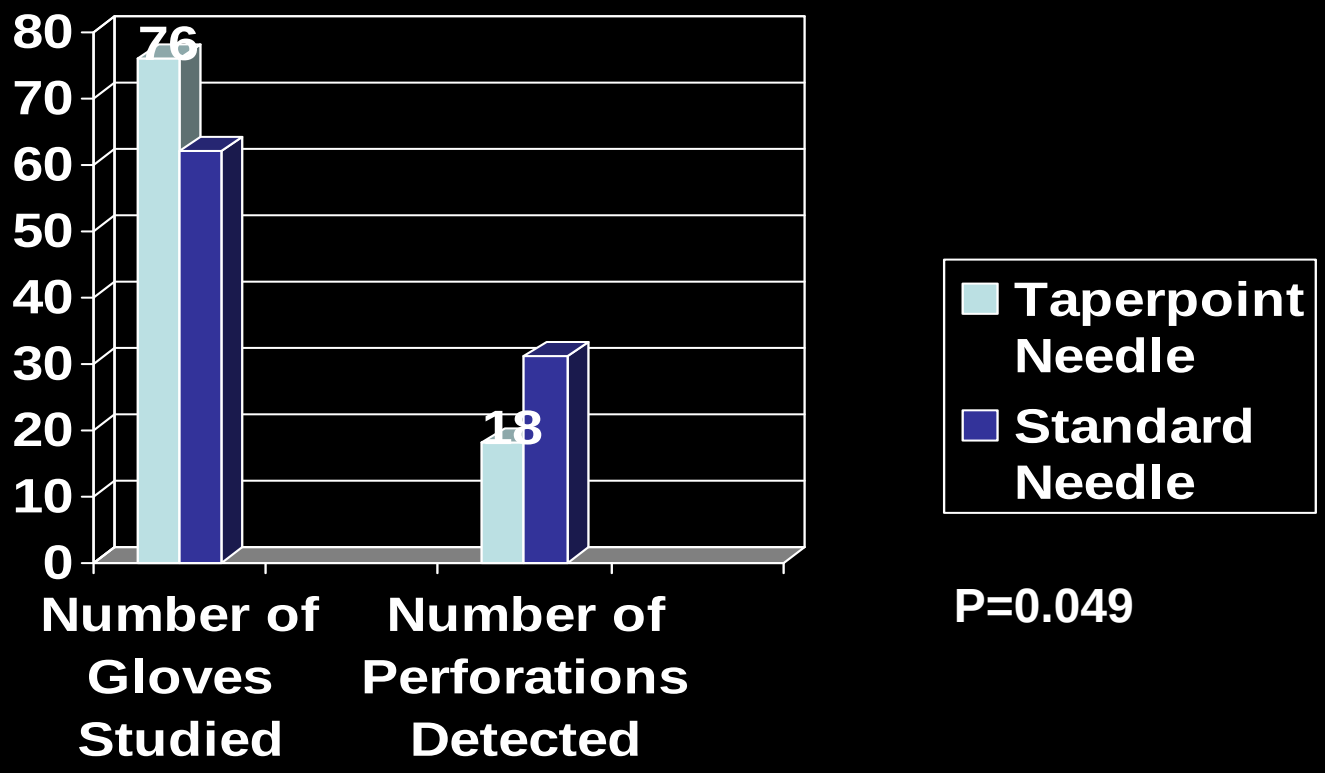
Glove Perforation During Hip Arthroplasty

- Prospective randomized trial comparing the incidence of surgical glove perforation by standard surgical needle vs. taperpoint needle



J *Bone Joint Surg [Br]* 1993 ; 75-B :918-20.

Glove Perforation During Hip Arthroplasty

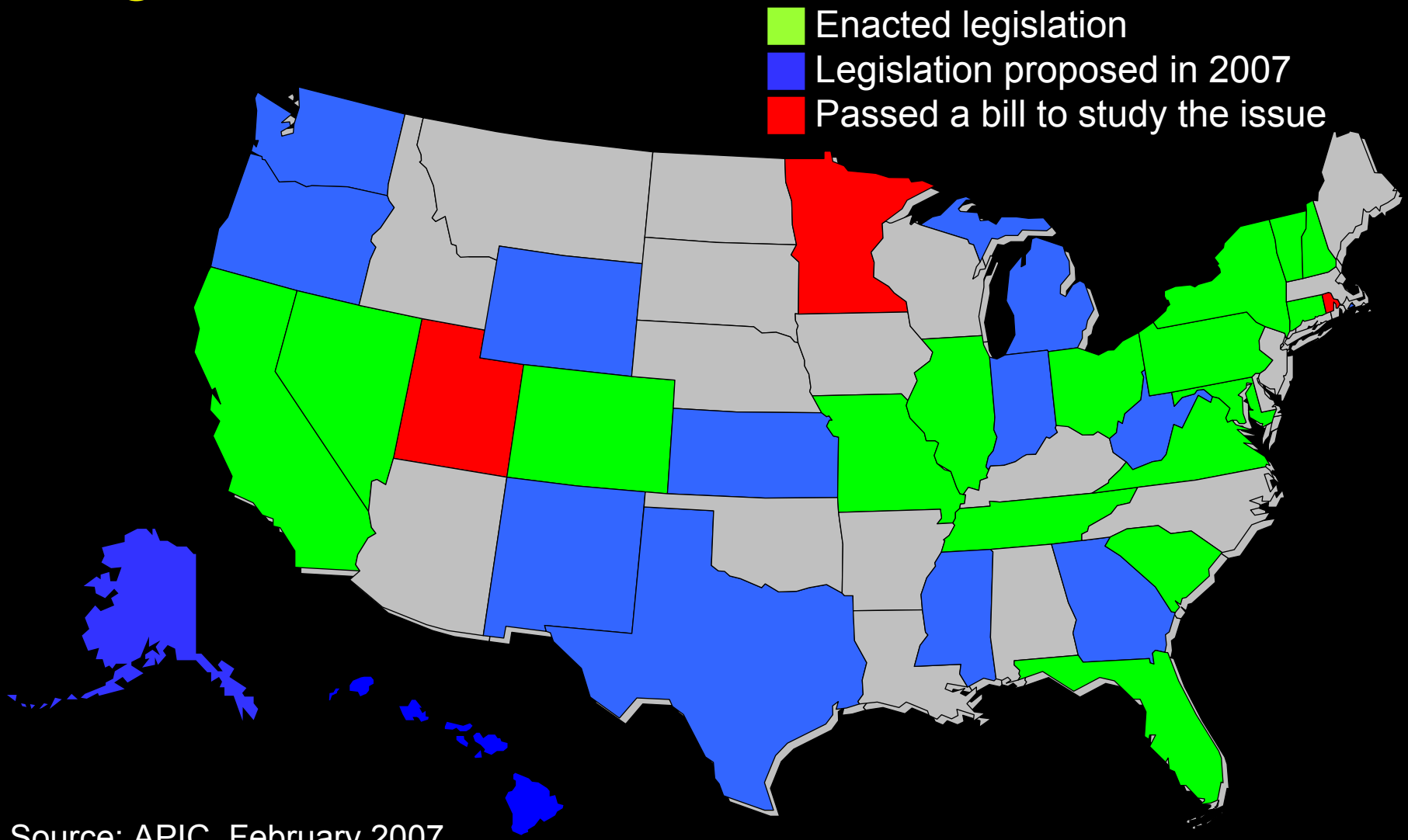


P=0.049

J Bone Joint Surg [Br] 1993 ; 75-B :918-20.

Mandatory Public Reporting of Nosocomial Infections

Status of Mandatory Reporting Legislation for Nosocomial Infections



Source: APIC, February 2007

Goals of the Ideal Mandatory Reporting & Disclosure Program

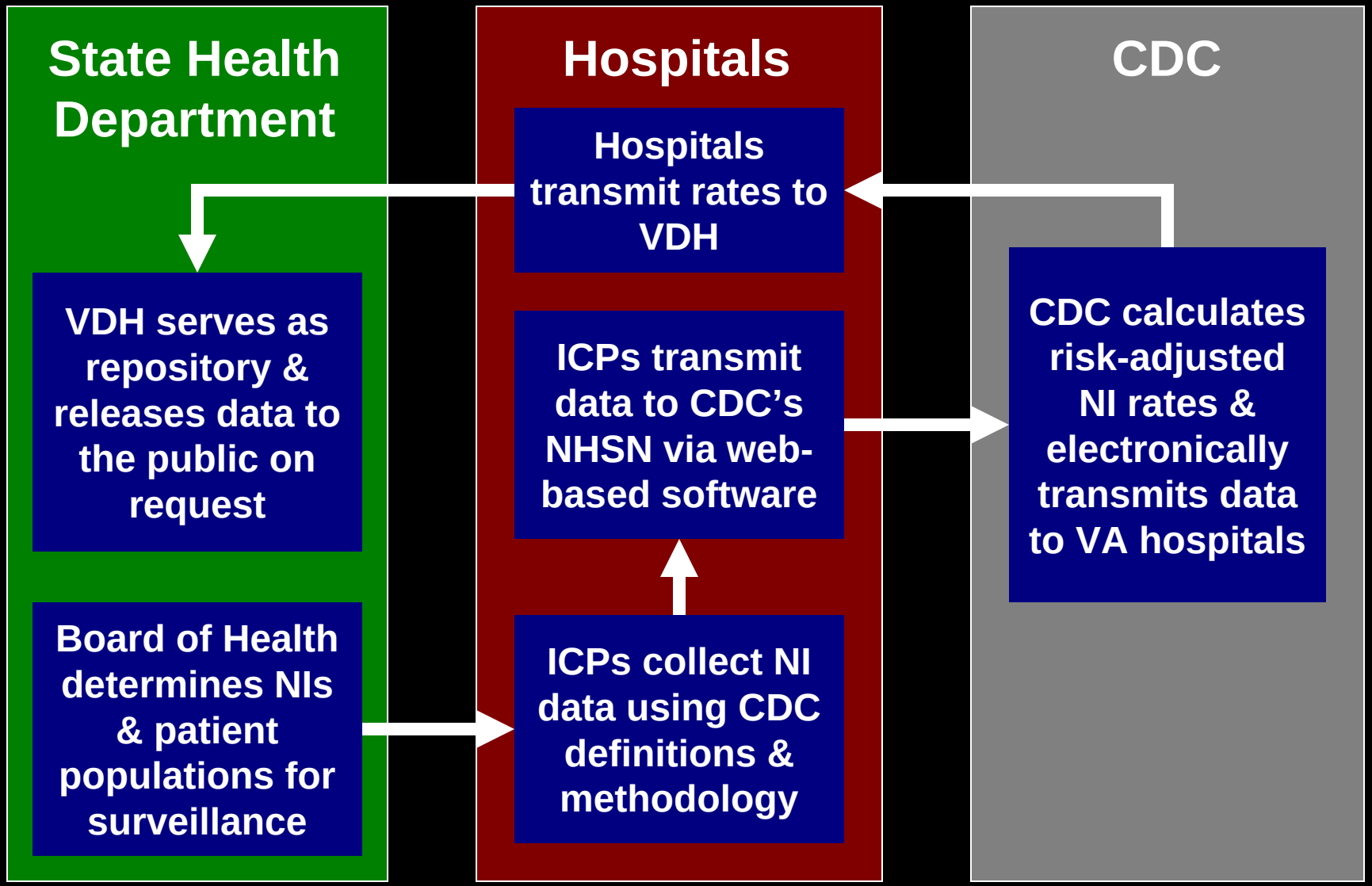
- Maximize accuracy of data collection
- Standardize methodology for data collection & analysis
- Minimize costs to hospitals & government agencies
- Produce data that are valid, fair to hospitals, & useful to consumers

Edmond MB. In: *Hospital Infections*, 5th ed., 2007.

Examples of Public Reporting-USA

State	Data Source	Metrics Reported	Reporting and Release
Illinois	Administrative claims & clinical data	Class I SSI, VAP, CL-BSI	Mandatory quarterly reports to the Dept of Health which then submits to the General Assembly a summary report to be published on its website
Virginia	Clinical data using CDC definitions for nosocomial infections	To be set by the State Board of Health	Hospitals required to report selected indicators to the CDC & forward adjusted infection rates to the State Health Department; data may be released to the public on request
Missouri	Data source not specified	Class I SSI, VAP, CL-BSI	Data collection, analysis and reporting rules to be recommended by an advisory committee. Dept of Health to publish a quarterly report on its website
Nevada	Data source not specified	SSI, VAP, CL-BSI,UTI	Hospitals report to the Health Division of the Department of Human Resources. No provision for public disclosure.

Virginia Plan for NI Reporting



Conclusion

- System level changes involving the measurement and feedback of adherence to IC measures are needed to implement risk reduction strategies consistently
- S.aureus/MRSA SSI can likely be reduced by proper use of intranasal mupirocin, chlorhexidine showers and the correct preoperative antibiotic
- MRSA isolation wards for orthopedics may result in greater adherence to IC guidelines and may thus decrease cross transmission
- Measures such as double gloving, blunt suture needles and HFT will likely reduce exposure to BBF
- Mandatory reporting of NIs, including SSIs is now a reality