

# Surgical Site Infection Prevention Guidelines: the US CDC 2014 Update

Prof. Joseph Solomkin, University of Cincinnati College of Medicine  
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Surgical Site Infection Prevention Guidelines:  
the US CDC 2014 Update

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www.regulations.gov/#docketDetail;D=CDC-2014-0003

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Draft Guideline for the Prevention of Surgical Site Infections

Docket Folder Summary View all documents and comments in this Docket

Docket ID: CDC-2014-0003 Agency: Centers for Disease Control and Prevention (CDC)  
Parent Agency: Department of Health and Human Services (HHS)

View More Docket Details

Primary Documents View All (1)

Draft Guideline—Centers for Disease Control and Prevention Draft Guideline for the Prevention of...

Notice Posted: 01/09/2014 ID: CDC-2014-0003-0001

## Guidelines in Modern Healthcare

- Clinical practice guidelines are systematically developed, generated by evidence, not expert opinion
- Over the past 10-15 years, the use of guidelines has significantly improved outcomes when applied to common and appropriately narrow health care issues
- In the US, government now are requiring guideline compliance

Vol. 20 No. 4 INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY 247

## GUIDELINE FOR PREVENTION OF SURGICAL SITE INFECTION, 1999

Alicia J. Mangram, MD; Teresa C. Horan, MPH, CIC; Michele L. Pearson, MD; Leah Christine Silver, BS; William R. Jarvis, MD;  
The Hospital Infection Control Practices Advisory Committee

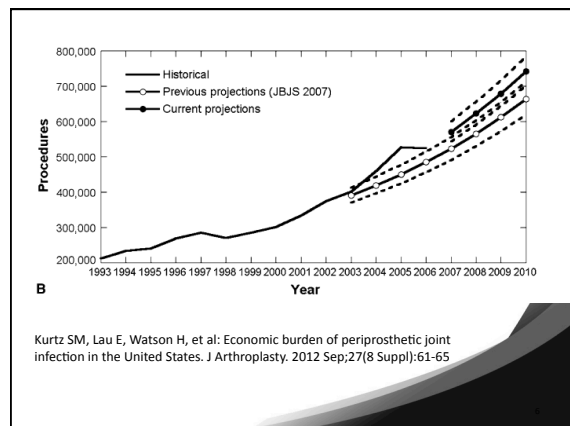
Hospital Infections Program  
National Center for Infectious Diseases  
Centers for Disease Control and Prevention  
Public Health Service  
US Department of Health and Human Services

Hospital Infection Control Practices Advisory Committee Membership List, January 1999

Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. Infect Control Hosp Epidemiol 1999;20:250-78.

## The Arthroplasty Module: What's the Big Deal?

- Approximately 1.2 million arthroplasties are performed annually in the United States
- By 2030, primary arthroplasties are projected to exceed 5.2 million procedures
- Anticipated increased infection burden from 1.4% to 6.5% and 6.8% in hip and knee arthroplasties, respectively



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### How Diabetes Causes Infection: Advanced Glycosylation Endproducts

- accumulation of AGEs in the extracellular matrix causing aberrant cross-linking
- the binding of circulating AGEs to the receptor of AGEs (RAGE) on different cell types and activation of key cell signalling pathways with subsequent modulation of gene expression and chronic inflammation
- intracellular AGE formation leading to quenching of nitric oxide and impaired function of growth factors

Initially, organic material forms a conditioning film on the surface.

- Individual cells populate the surface
- EPS produced and attachment becomes irreversible
- Biofilm architecture develops
- Architecture matures; competition replaced by cooperation
- Single cells (seeds) are released

apicchapter26.org/.../Biofilms%20APIC%20May%202011.ppt

### National Nosocomial Infection Surveillance System Risk Index

- One point given for each of the following:
  1. patient having an **American Society of Anesthesiologists (ASA)** preoperative assessment score of 3, 4, or 5
  2. an operation classified as either **contaminated or dirty-infected**
  3. an operation with **duration of >T hours**, where T is the 75<sup>th</sup> percentile for the operative procedure being done

### Surgical Site Infection Rates in the US: NNIS 1992-2004

Procedure	Risk 0	Risk 1	Risk 2	Risk 3
CABG	1.25	1.5	5.4	9.8
Small bowel	4.97	7.1	8.63	11.6
Abd hyster	1.36	2.3	5.17	---
Hip prosthesis	0.86	1.65	2.52	---
Laminectomy	0.88	1.35	2.46	---
Colorectal	3.98	5.66	8.54	11.25

Am J Infect Control 2004;32:470-85.

### “Complex Infections”

- Collectively, **deep incisional** and **organ space infections** are considered “**complex**” SSIs
- Complex SSIs represent about one-third to one-half of SSIs,
- Complex SSIs typically require re-hospitalization, drainage or debridement, and systemic antimicrobial therapy.
- These infections generate considerable morbidity, cost, and even mortality. In contrast, superficial incisional SSIs often do not require hospitalization and are inconsistently diagnosed by post-discharge surveillance

### Surgical Site Infection Rates: Deep Incision and Organ Space Infections NHSN 2011

Procedure	#Procedures	# Infections	Infection Rate (%)
CABG	87,934	926	1.05
Small bowel surgery	12,262	259	2.11
Colon surgery	68,702	1663	2.42
Abdominal hysterectomy	82,082	524	0.64
Hip prosthesis	180,996	1,422	0.79

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## Draft Guideline for the Prevention of Surgical Site Infection

**Sandra I. Berrios-Torres, MD, Craig A. Umscheid, MD, MSCE, Dale W. Bratzler, DO, MPH, Brian Leas, MA, MS, Erin C. Stone, MS, Rachel R. Kelz, MD, MSCE, FACS, Caroline Reinke, MD, MPH, Sherry Morgan, RN, MLS, PhD, Joseph S. Solomkin, MD, John E. Mazuski, MD, PhD, E. Patchen Dellinger, MD, Kamal Itani, MD, Elie F. Berbari, MD, John Segreti, MD, Javad Parvizi, MD, Joan Blanchard, MSS,BSN,RN, George Allen, PhD, J. W. Kluytmans, MD, Rodney Donlan, PhD, William P. Schechter, MD and the Healthcare Infection Control Practices Advisory Committee**

The screenshot shows the homepage of the GRADE working group. The URL is www.gradeworkinggroup.org/index.htm. The page includes a navigation menu with links for Home, Introduction, Tools, Publications, Member login, Links, and Contact. There are sections for 'Learn more' (FAQ, Organizations, GRADE guidelines, Guidelines, Downloads, Courses, About us) and 'What's new' (Webinars now available, New 2012/13 GRADE series continues to 2014 - part 13 now available). An 'Announcements' section lists 'More and more organizations chose GRADE'. A 'Welcome' message states: 'The Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group began in the year 2000 as an informal collaboration of people with an interest in advancing the methodology of patient practice systems in health care. The working group has developed a common, sensible and transparent approach to grading, quality of evidence and strength of recommendations. Many international organizations have provided input into the development of the approach and have started using it - we thank them!'.

## GRADE

**Category IA** A strong recommendation supported by high to moderate quality evidence suggesting net clinical benefits or harms  
**Category IB** A strong recommendation supported by low-quality evidence suggesting net clinical benefits or harms, or an accepted practice (e.g., aseptic technique) supported by low to very low-quality evidence  
**Category IC** A strong recommendation required by state or federal regulation  
**Category II** A weak recommendation supported by any quality evidence suggesting a tradeoff between clinical benefits and harms  
**No recommendation/ unresolved issue** An unresolved issue for which there is either low to very low-quality evidence with uncertain tradeoffs between benefits and harms or no published evidence on outcomes deemed critical to weighing the risks and benefits of a given intervention

## Preoperative Care

8A. Advise patients to shower or bathe (full body) with either soap (antimicrobial or non-antimicrobial) at least the night before the operative day (**Category IB**)

8B. Perform intraoperative skin preparation with an alcohol-based antiseptic agent, unless contraindicated. (**Category IA**)

8D. Use of plastic adhesive drapes with or without antimicrobial properties, is not necessary for the prevention of surgical site infection. (**Category II**)

## Antibiotic Prophylaxis

- Optimal timing for administration is begin the infusion within 60 minutes of the incision (**Category IB**)
- Adjust dose based upon actual body weight (**No recommendation**)
- Administer additional antibiotics every 1-2 half-lives of agent used (**No recommendation/unresolved issue**)
- In clean and clean-contaminated procedures, do not administer additional prophylactic antimicrobial agent doses after the surgical incision is closed in the operating room, even in the presence of a drain. (**Category IA**)

## What to Put In or On the Wound


- 9A. Consider intraoperative irrigation of deep or subcutaneous tissues with aqueous iodophor solution for the prevention of surgical site infection. Intra-peritoneal lavage with aqueous iodophor solution in contaminated or dirty abdominal procedures is not necessary. (**Category II**)
- 9B. Use of antimicrobial coated sutures is not necessary for the prevention of surgical site infection. (**Category II**)
- 9C. Do not apply antimicrobial agents (i.e., ointments, solutions, powders) to the surgical incision for the prevention of surgical site infection (**Category IB**)

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### Other Recommendations

- use blood glucose target levels <200mg/dL in diabetic and non-diabetic patients. **(Category IA)**
- Maintain perioperative normothermia **(Category IA)**
- For patients with normal pulmonary function undergoing general anesthesia with endotracheal intubation, administer increased fraction of inspired oxygen (FiO2) both intraoperatively and post-extubation in the immediate postoperative period. To optimize tissue oxygen delivery, maintain perioperative normothermia and adequate volume replacement. **(Category IA)**



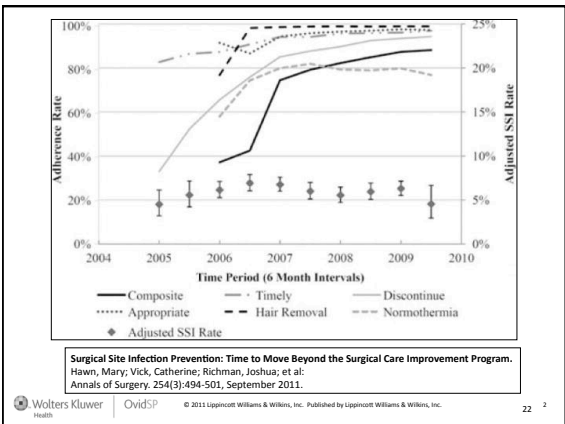
### Surgical Care Improvement Project

The Institute for Healthcare Improvement (IHI) has launched the **Surgical Care Improvement Project (SCIP)**. The goal of this initiative is to prevent surgical site infections by implementing the four components of care:

1. **Appropriate use of prophylactic antibiotics**
2. Appropriate hair removal
3. Controlled 0600 postoperative serum glucose in
4. Cardiac surgery patients
8. Immediate postoperative normothermia
9. for colorectal patients

### How SCIP Works

- For each patient undergoing operation, hospitals report to the government (CMS/ CDC) if SCIP measures were met
- If hospitals have <90% compliance, payment from CMS is reduced by 1-3%
- Compliance rates are reported to the public through the internet



### SSI Prevention Guidelines – WHO Perspectives

- Need for updated, evidence-based guidelines
- Valid for any country, but including specific issues depending on regional differences and/or peculiar to low-/middle-income countries
- Strong component on **implementation strategies and surveillance**
- Associated **implementation tools**

### Risk Models are Needed to Monitor Performance

- Different patients, different diseases, and different operations create different risks of infection
- risk adjustment that accounts for these differences is critical to allow for meaningful comparisons between surgeons or between hospitals

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### Conclusions

- Absence of data makes planning hierarchy of recommendations difficult
- Not obvious there is easy extrapolation of high income data (clean elective background) to low/middle income settings
- Implementation strategies will likely require surgical champions

### 2014 WHO Teleclass Schedule

Clean Care is Safer Care

<p>January 29 <b>Innovation and implementation strategic approaches to reduce catheter-related bacteraemia: The results of a European multicentre study (PROHIBIT)</b> <i>Dr. Walter Zingg, Switzerland</i></p> <p>March 7 <b>How to prevent the spread of multiresistant bacteria</b> <i>Dr. Stephan Harbarth, Switzerland</i></p> <p>April 9 <b>Highlights on SSI prevention: The new CDC guidelines and more</b> <i>Dr. Joseph Solomkin, USA</i></p>	<p>May 5 <b>Special lecture for International Hand Hygiene Day</b> <i>Prof. Didier Pittet, Switzerland</i></p> <p>September 3 <b>New WHO global campaign to eliminate unsafe therapeutic injections</b> <i>Dr. Benedetta Allegranzi, Switzerland</i></p> <p>October 8 <b>Public reporting and disclosure of HAI rates: Positive impact or confusion?</b> <i>Dr. Maryanne McGuckin, USA</i></p> <p>November 5 <b>Global application of behaviour change models and infection control strategies</b> <i>Dr. Michael Borg, Malta</i></p>
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