



เรียนรู้การวิเคราะห์ข้อมูลและการใช้ประโยชน์จาก ข้อมูล 2P Safety เพื่อพัฒนาและออกแบบระบบงาน Surgical Site Infection: SSI

ศาสตราจารย์ ดร. นงเยาว์ เกษตร์ภิบาล, PhD, RN
คณะพยาบาลศาสตร์ มหาวิทยาลัยเชียงใหม่

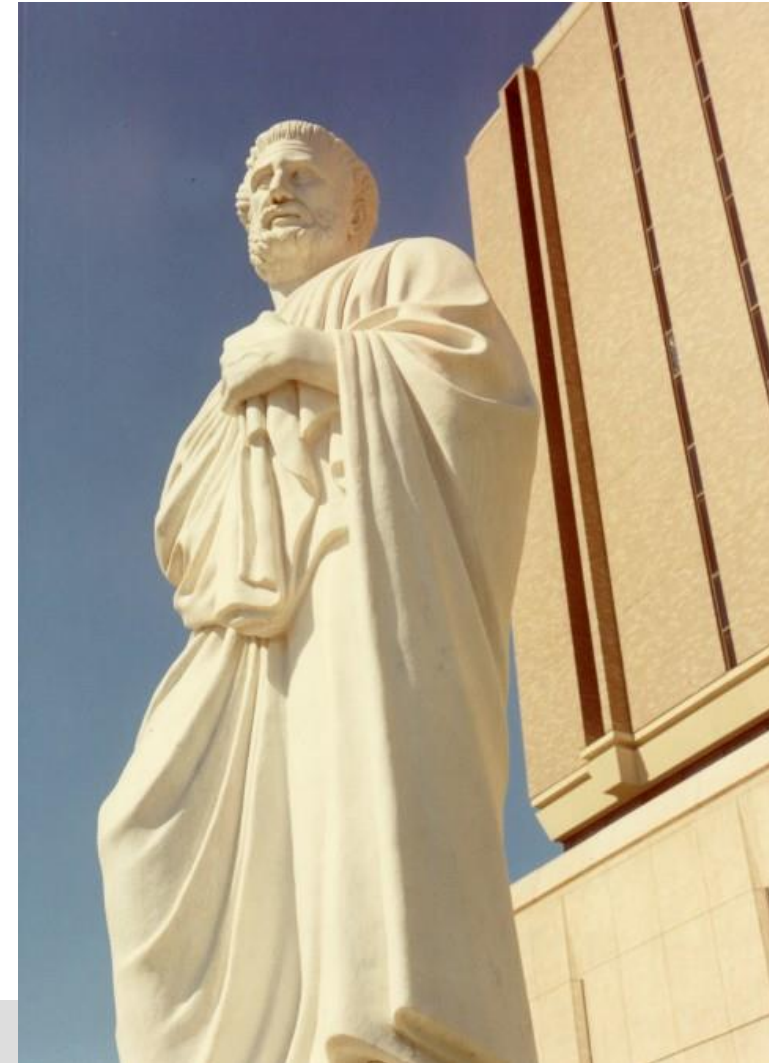
Case Covid-19: Cesarean Section



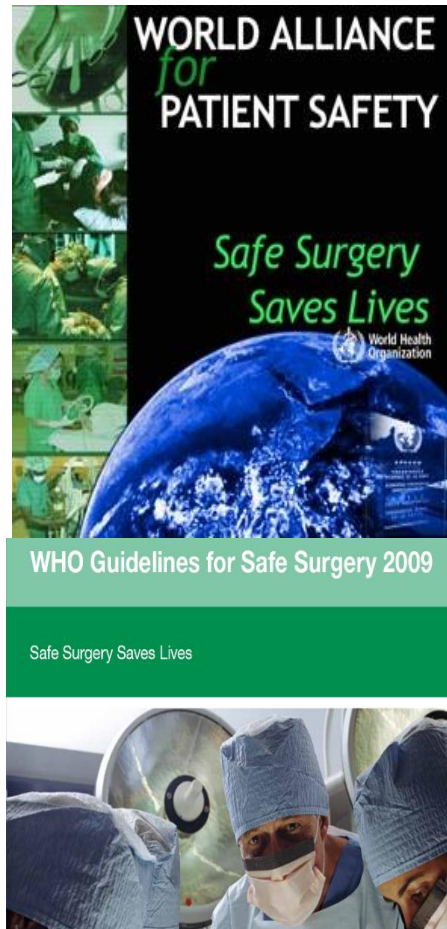
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Patient Safety

- **“First, do no harm”**
Hippocrates (460-377 B.C.)



Prevention of Surgical Site Infection (SSI)



GLOBAL GUIDELINES FOR THE PREVENTION OF SURGICAL SITE INFECTION



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Strategies to Prevent Surgical Site Infections in Acute Care Hospitals: 2014 Update
Author(s): Deverick J. Anderson, MD, MPH; Kelly Podgorny, DNP, MS, RN; Sandra I. Berrios-Torres, MD; Dale W. Bratzler, DO, MPH; E. Patchen Dellinger, MD; Linda Greene, RN, MPS, CIC; Ann-Christine Nyquist, MD, MSPH; Lisa Saiman, MD, MPH; Deborah S. Yokoe, MD, MPH; Lisa L. Maragakis, MD, MPH; Keith S. Kaye, MD, MPH
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Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017

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

The Second Global Patient Safety Challenge “Safe Surgery, Saves Lives”



The Second Global Patient Safety Challenge

“Safe Surgery, Saves Lives”



Surgical Safety Checklist

Before induction of anaesthesia

(with at least nurse and anaesthetist)

Has the patient confirmed his/her identity, site, procedure, and consent?

Yes

Is the site marked?

Yes

Not applicable

Is the anaesthesia machine and medication check complete?

Yes

Is the pulse oximeter on the patient and functioning?

Yes

Does the patient have a:

Known allergy?

No

Yes

Difficult airway or aspiration risk?

No

Yes, and equipment/assistance available

Risk of >500ml blood loss (7ml/kg in children)?

No

Yes, and two IVs/central access and fluids planned

Before skin incision

(with nurse, anaesthetist and surgeon)

Confirm all team members have introduced themselves by name and role.

Confirm the patient's name, procedure, and where the incision will be made.

Has antibiotic prophylaxis been given within the last 60 minutes?

Yes

Not applicable

Anticipated Critical Events

To Surgeon:

What are the critical or non-routine steps?

How long will the case take?

What is the anticipated blood loss?

To Anaesthetist:

Are there any patient-specific concerns?

To Nursing Team:

Has sterility (including indicator results) been confirmed?

Are there equipment issues or any concerns?

Is essential imaging displayed?

Yes

Not applicable

Before patient leaves operating room

(with nurse, anaesthetist and surgeon)

Nurse Verbally Confirms:

The name of the procedure

Completion of instrument, sponge and needle counts

Specimen labelling (read specimen labels aloud, including patient name)

Whether there are any equipment problems to be addressed

To Surgeon, Anaesthetist and Nurse:

What are the key concerns for recovery and management of this patient?

แบบตรวจสอบรายการผ่าตัดปลอดภัย

1. ก่อนเริ่มให้การระงับความรู้สึก (sign in) ทำร่วมกัน อย่างน้อยต้องมี พยาบาลห้องผ่าตัดและวิสัญญี	ปฏิบัติ	ไม่ปฏิบัติ	หมายเหตุ
1.1 การยืนยันความถูกต้องของชื่อ-นามสกุลผู้ป่วย ตำแหน่งผ่าตัด ชนิดของการผ่าตัด และใบยินยอมผ่าตัด			
1.2 การทำเครื่องหมายบริเวณที่จะทำผ่าตัด			
1.3 การตรวจสอบความครบถ้วนของอุปกรณ์และยาที่ใช้ในการระงับความรู้สึก			
1.4 การตรวจสอบว่ามี pulse oximeter ติดให้ผู้ป่วยและใช้งานได้			
1.5 การตรวจสอบประวัติการแพ้ยา			
1.6 การตรวจสอบประวัติการใส่ท่อช่วยหายใจลำบากหรือเสี่ยงที่จะเกิดอาการ สำคัญขณะใส่ท่อช่วยหายใจ			
1.7 การตรวจสอบการมีโอกาสเสียเลือดมากกว่า 500 มล. หรือ 7 มล./กก. ใน ผู้ป่วยเด็ก กรณีที่มีความเสี่ยงมีการเตรียมพร้อมหลอดเลือดดำ 2 ตำแหน่งหรือ หลอดเลือดดำส่วนกลางและสารน้ำที่จะให้ทดแทน			
2. ก่อนที่จะลงมีด (time out) ทำร่วมกันทั้งพยาบาลห้องผ่าตัด วิสัญญี และศัลยแพทย์	ปฏิบัติ	ไม่ปฏิบัติ	หมายเหตุ
2.1 สมาชิกทีมผ่าตัดทุกคนมีการแนะนำชื่อและบทบาทของตนเอง			
2.2 ศัลยแพทย์ วิสัญญี และพยาบาล กล่าวยืนยันชื่อ-นามสกุลผู้ป่วย ชนิดของการ ผ่าตัด และตำแหน่งที่จะผ่าตัด			
2.3 การให้ยาปฏิชีวนะเพื่อป้องกันการติดเชื้อภายใน 60 นาที ก่อนลงมีด			
2.4 ศัลยแพทย์ทบทวนขั้นตอนการผ่าตัดที่สำคัญหรือขั้นตอนที่อาจเกิดโดยไม่ คาดคิด คาดคะเนระยะเวลาผ่าตัด และการสูญเสียเลือด			
2.5 วิสัญญีทบทวนปัญหาที่ต้องระมัดระวังในผู้ป่วยเฉพาะราย			
2.6 พยาบาลทบทวนประสิทธิภาพการทำให้ปราศจากเชื้อของเครื่องมือ (ตัวบ่งชี้ทางเคมี) ความพร้อมของเครื่องมือผ่าตัดและอื่นๆ			
2.7 การติดภาพรังสีที่ต้องใช้ระหว่างผ่าตัด			
3. ก่อนผู้ป่วยออกจากห้องผ่าตัด (sign out) ทำร่วมกันทั้งพยาบาลห้องผ่าตัด วิสัญญี และ ศัลยแพทย์ (ข้อ 3.1-3.4 พยาบาลห้องผ่าตัดกล่าวยืนยันให้ทีมผ่าตัดได้ยิน)	ปฏิบัติ	ไม่ปฏิบัติ	หมายเหตุ
3.1 ชนิดของ การผ่าตัดที่บันทึกในแบบบันทึกการผ่าตัดถูกต้อง			
3.2 การตรวจนับเครื่องมือผ่าตัด ผ้าซับเลือด เข็มเย็บ ครบถ้วน			
3.3 การเขียนป้ายส่งตรวจถูกต้อง (อ่านการเขียนป้ายส่งตรวจรวมถึงชื่อผู้ป่วย โดย เปล่งเสียงดัง)			
3.4 ปัญหาเกี่ยวกับเครื่องมือผ่าตัด ถ้ามีให้ระบุปัญหาที่พบ			
3.5 ศัลยแพทย์ วิสัญญี และพยาบาล ทบทวนเหตุการณ์สำคัญที่เกิดขึ้นระหว่าง การผ่าตัด ซึ่งต้องแจ้งให้ทีมห้องพักรักษาตัวผู้ป่วยต่อเนื่อง			



WHO global guidelines for the prevention of surgical site infection



The 2016 World Health Organization (WHO) Global guidelines for the prevention of surgical site infection (SSI) are evidence-based and unique in that they are the first global guidelines of this sort, are based on systematic reviews and present additional information in support of actions to improve practice. They were developed by international experts adhering to WHO's Guideline Development Process and overall aim to achieve standardisation.

Summary

The objectives of the new Guidelines are:

1. To provide comprehensive evidence- and expert consensus-based recommendations to be applied during the pre-, intra- and postoperative periods for prevention of SSI and to help combat antimicrobial resistance (AMR).
2. To support health (and related) settings and practitioners to develop or strengthen infection prevention and control (IPC) programmes, with a focus on surgical safety, as well as AMR action plans.
3. To highlight that working as teams, both practices and patient outcomes can be improved, taking account of resource availability.

Why these guidelines?

1. To increase awareness of the global burden of SSI in all settings, and including in maternal and child health.
2. To increase knowledge of the need for appropriate antibiotic prophylaxis for surgical patients.
3. To increase knowledge of the high burden of preventable SSI and to mobilize surgeons, nurses, technical support staff, anaesthetists and any professionals directly providing surgical care.
4. Because every infection prevented is an antibiotic treatment avoided.

Strong guideline recommendations

- Patients with known nasal carriage of *S. aureus* should receive **intranasal applications of mupirocin 2% ointment with or without a combination of chlorhexadine gluconate body wash.**
- **Mechanical bowel preparation alone (without the administration of oral antibiotics) should NOT be used** in adult patients undergoing elective colorectal surgery.
- In patients undergoing any surgical procedure, **hair should either NOT be removed or, if absolutely necessary, should only be removed with a clipper.** Shaving is strongly discouraged at all times, whether preoperatively or in the operating room.
- **Surgical antibiotic prophylaxis (SAP) should be administered before surgical incision, when indicated.**
- **SAP should be administered within 120 min before incision, while considering the half-life of the antibiotic.**
- **Surgical hand preparation should be performed** either by scrubbing with a suitable antimicrobial soap and water or using a suitable alcohol-based handrub before donning sterile gloves.
- **Alcohol-based antiseptic solutions based on CHG for surgical site skin preparation should be used** in patients undergoing surgical procedures.
- Adult patients undergoing general anaesthesia with endotracheal intubation for surgical procedures should receive **80% fraction of inspired oxygen intraoperatively** and, if feasible, in the immediate postoperative period for 2–6 h.
- **Surgical antibiotic prophylaxis administration should not be prolonged** after completion of the operation.

Conditional guideline recommendations

Immunosuppressive medication

Immunosuppressive medication should **not** be discontinued prior to surgery for the purpose of preventing SSI.

Nutritional formulas

Consider the administration of oral or enteral multiple nutrient-enhanced nutritional formulas for the purpose of preventing SSI in underweight patients who undergo major surgical operations.

Bathing before surgery

It is good clinical practice for patients to bathe or shower before surgery. Either a plain soap or an antiseptic soap could be used for this purpose.

Intranasal mupirocin

Consider treating patients with known nasal carriage of *S. aureus* undergoing other types of surgery with perioperative intranasal applications of mupirocin 2% ointment with or without a combination of CHG body wash.

Antibiotics & MBP

Preoperative oral antibiotics combined with MBP should be used to reduce the risk of SSI in adult patients undergoing elective colorectal surgery.

Antimicrobial sealants

Antimicrobial sealants should **not** be used after surgical site skin preparation for the purpose of reducing SSI.

Warming devices

Warming devices should be used in the operating room and during the surgical procedure for patient body warming with the purpose of reducing SSI.

Blood glucose control

Protocols for intensive perioperative blood glucose control should be used for both diabetic and non-diabetic adult patients undergoing surgical procedures.

Fluid therapy

Goal-directed fluid therapy should be used intraoperatively for the purpose of reducing SSI.

Drapes and gowns

Either sterile disposable non-woven or sterile reusable woven drapes and surgical gowns can be used during surgical operations for the purpose of preventing SSI.

Conditional guideline recommendations

Adhesive drapes

Plastic adhesive incise drapes with or without antimicrobial properties should **not** be used for the purpose of preventing SSI.

Wound protectors

Consider the use of wound protector devices in clean-contaminated, contaminated and dirty abdominal surgical procedures for the purpose of reducing the rate of SSI.

Saline wound irrigation

There is insufficient evidence to recommend for or against saline irrigation of incisional wounds for the purpose of preventing SSI.

Povidone iodine irrigation

Consider the use of irrigation of the incisional wound with an aqueous povidone iodine solution before closure for the purpose of preventing SSI, particularly in clean and clean-contaminated wounds.

Antibiotic irrigation

Antibiotic incisional wound irrigation before closure should **not** be used for the purpose of preventing SSI.

Neg pressure wound therapy

Prophylactic negative pressure wound therapy may be used on primarily closed surgical incisions in high-risk wounds and, taking resources into account, for the purpose of preventing SSI.

Coated sutures

Triclosan-coated sutures may be used for the purpose of reducing the risk of SSI, independent of the type of surgery.

Laminar flow ventilation

Laminar airflow ventilation systems should **not** be used to reduce the risk of SSI for patients undergoing total arthroplasty surgery.

Peri-op antibiotics

Perioperative surgical antibiotic prophylaxis should **not** be continued due to the presence of a wound drain for the purpose of preventing SSI.

Wound drains

The wound drain should be removed when clinically indicated. No evidence was found to allow making a recommendation on the optimal timing of wound drain removal for the purpose of preventing SSI.

Advanced dressings

Advanced dressing of any type should **not** be used over a standard dressing on primarily closed surgical wounds for the purpose of preventing SSI.

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Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017

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TABLE 1. SUMMARY OF UPDATED, KEY RECOMMENDATIONS FROM THE CENTERS FOR DISEASE CONTROL AND PREVENTION GUIDELINE FOR THE PREVENTION OF SURGICAL SITE INFECTION, 2017

Recommendation	Strength of Evidence
PARENTERAL ANTIMICROBIAL PROPHYLAXIS	
Administer antimicrobials only when indicated based on published guidelines. Time administration such that bactericidal concentration is established in serum and tissues at initial incision.	Category IB
For caesarean sections, administer the appropriate agent prior to skin incision (versus at cord clamping).	Category IA
NONPARENTERAL ANTIMICROBIAL PROPHYLAXIS	
Consider use of triclosan-coated sutures.	Category II
GLYCEMIC CONTROL	
Implement perioperative glycemic control using blood glucose target levels ≤ 200 mg/dL in both diabetic and non-diabetic patients.	Category IA
NORMOTHERMIA	
Maintain perioperative normothermia.	Category IA
OXYGENATION	
Administer increased fraction of inspired oxygen intraoperatively and in the immediate post-operative period following extubation for all patients with normal pulmonary function undergoing general anesthesia with endotracheal intubation.	Category IA
ANTISEPTIC PROPHYLAXIS	
Instruct patients to perform full body shower or bath the night before surgery (with either soap or an antiseptic agent).	Category IB
Intraoperative skin preparation should be performed with an antiseptic agent containing alcohol unless contraindicated.	Category 1A
Consider intraoperative irrigation of deep or subcutaneous tissues with aqueous iodophor solution.	Category II

TABLE 2. STRATEGIES DETERMINED TO BE UNNECESSARY IN THE PREVENTION OF SURGICAL SITE INFECTIONS

Strategy	Strength of Evidence
Antimicrobial prophylaxis after surgical closure (clean and clean-contaminated procedures)	Category IA
Topical antimicrobial agents applied to the surgical incision	Category IB
Autologous, platelet-rich plasma	Category II
Antimicrobial sealant following intraoperative skin preparation	Category II
Plastic adhesive drapes for antisepsis	Category II
Withholding transfusion of necessary blood products (question posed for patients undergoing prosthetic joint arthroplasty)	Category IB

Effectiveness of Probiotic, Prebiotic, and Synbiotic Therapies in Reducing Postoperative Complications: A Systematic Review and Network Meta-analysis

Nongyao Kasatpibal,¹ JoAnne D. Whitney,² Surasak Saokaew,^{3,4} Kirati Kengkla,³ Margaret M. Heitkemper,² and Anucha Apisarntharak⁵

¹Division of Nursing Science, Faculty of Nursing, Chiang Mai University, Thailand; ²Department of Biobehavioral Nursing and Health Informatics, School of Nursing, University of Washington, Seattle; ³Center of Health Outcomes Research and Therapeutic Safety (Cohorts), School of Pharmaceutical Sciences, University of Phayao, Thailand; ⁴School of Pharmacy, Monash University Malaysia, Selangor Darul Ehsan; and ⁵Division of Infectious Diseases, Thammasart University Hospital, Pratumthani, Thailand

Background. Microbiome-directed therapies are increasingly used preoperatively and postoperatively to improve postoperative outcomes. Recently, the effectiveness of probiotics, prebiotics, and synbiotics in reducing postoperative complications (POCs) has been questioned. This systematic review aimed to examine and rank the effectiveness of these therapies on POCs in adult surgical patients.

Methods. We searched for articles from PubMed, Embase, Cochrane, Web of Science, Scopus, and CINAHL plus. From 2002 to 2015, 31 articles meeting the inclusion criteria were identified in the literature. Risk of bias and heterogeneity were assessed. Network meta-analyses (NMA) were performed using random-effects modeling to obtain estimates for study outcomes. Risk ratios (RRs) and 95% confidence intervals (CIs) were estimated. We then ranked the comparative effects of all regimens with the surface under the cumulative ranking (SUCRA) probabilities.

Results. A total of 2,952 patients were included. We found that synbiotic therapy was the best regimen in reducing surgical site infection (SSI) (RR = 0.28; 95% CI, 0.12–0.64) in adult surgical patients. Synbiotic therapy was also the best intervention to reduce pneumonia (RR = 0.28; 95% CI, 0.09–0.90), sepsis (RR = 0.09; 95% CI, 0.01–0.94), hospital stay (mean = 9.66 days, 95% CI, 7.60–11.72), and duration of antibiotic administration (mean = 5.61 days, 95% CI, 3.19–8.02). No regimen significantly reduced mortality.

Conclusions. This network meta-analysis suggests that synbiotic therapy is the first rank to reduce SSI, pneumonia, sepsis, hospital stay, and antibiotic use. Surgeons should consider the use of synbiotics as an adjunctive therapy to prevent POCs among adult surgical patients. Increasing use of synbiotics may help to reduce the use of antibiotics and multidrug resistance.

Keywords. probiotics; prebiotics; synbiotics; surgical site infection; postoperative complication.

Results: Primary Outcome

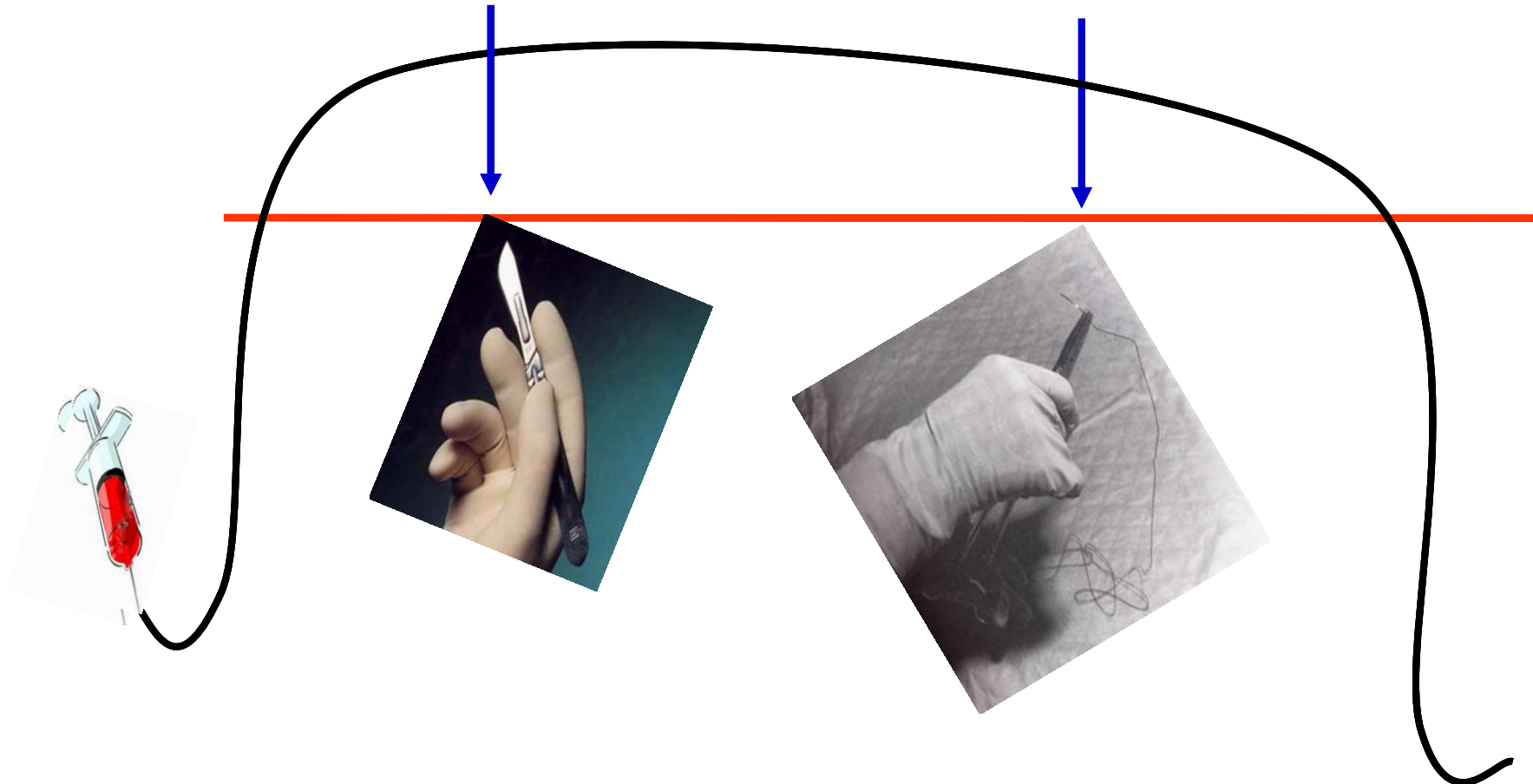
- **Synbiotic therapy** was the **best choice** in **reducing SSI** in adult surgical patients.
(RR, 0.28; 95% CI, 0.12-0.64)

Antibiotic prophylaxis



Why before operation?

Maximize tissue concentration



Surgical antibiotic prophylaxis: Strong recommendation

Surgical antibiotic prophylaxis should be administered within 120 minutes before incision, while considering the half-life of the antibiotic.

Redosing: exceeds two half-lives of the drug.

Surgical antibiotic prophylaxis administration should not be prolonged after completion of the operation.

Failure to Redose Antibiotic Prophylaxis in Long Surgery Increases Risk of Surgical Site Infection

Nongyao Kasatpibal,^{1,2} Joanne D. Whitney,² E. Patchen Dellinger,³
Bala G. Nair,⁴ and Kenneth C. Pike⁵

Abstract

Background: Antibiotic prophylaxis is a key component of the prevention of surgical site infection (SSI). Failure to manage antibiotic prophylaxis effectively may increase the risk of SSI. This study aimed to examine the effects of antibiotic prophylaxis on SSI risk.

Methods: A retrospective cohort study was conducted among patients having general surgery between May 2012 and June 2015 at the University of Washington Medical Center. Peri-operative data extracted from hospital databases included patient and operation characteristics, intra-operative medication and fluid administration, and survival outcome. The effects of antibiotic prophylaxis and potential factors on SSI risk were estimated using multiple logistic regression and were expressed as risk ratios (RRs).

Results: A total of 4,078 patients were eligible for analysis. Of these, 180 had an SSI. Mortality rates within and after 30 days were 0.8% and 0.3%, respectively. Improper antibiotic redosing increased the risk of SSI (RR 4.61; 95% confidence interval [CI] 1.33–15.91). Other risk factors were in-patient status (RR 4.05; 95% CI 1.69–9.66), smoking (RR 1.63; 95% CI 1.03–2.55), emergency surgery (RR 1.97; 95% CI 1.26–3.08), colectomy (RR 3.31; 95% CI 1.19–9.23), pancreatectomy (RR 4.52; 95% CI 1.53–13.39), proctectomy (RR 5.02; 95% CI 1.72–14.67), small bowel surgery (RR 6.16; 95% CI 2.13–17.79), intra-operative blood transfusion >500 mL (RR 2.76; 95% CI 1.45–5.26), and multiple procedures (RR 1.40; 95% CI 1.01–1.95).

Conclusions: These data demonstrate that failure to redose prophylactic antibiotic during long operations increases the risk of SSI. Strengthening a collaborative surgical quality improvement program may help to eradicate this risk.

Keywords: antibiotic prophylaxis; surgical site infection

Oxygen and wound healing /infection

- Bactericidal activity of neutrophil is mediated by oxidative killing.
- A critical defense against surgical pathogens.
- The formation of collagen requires hydroxylation of proline and lysine residues.

Perioperative oxygenation: Strong recommendation

Adult patients undergoing general anaesthesia with endotracheal intubation for surgical procedures should receive an 80% fraction of inspired oxygen (FiO₂) intraoperatively and, if feasible, in the immediate postoperative period for 2-6 hours to reduce the risk of SSI.

Hypothermia

VARIABLE	NORMOTHERMIA (N = 104)	HYPOTHERMIA (N = 96)	P VALUE
All patients			
Infection — no. of patients (%) *	6 (6)	18 (19)	0.009
ASEPSIS score	7 ± 10	13 ± 16	0.002
Collagen deposition — $\mu\text{g}/\text{cm}$	328 ± 135	254 ± 114	0.04

* ASEPSIS: Additional treatment, Serous discharge, Erythema, Purulent exudate, Separation of deep tissues, Isolation of bacteria, and duration as inpatient Stay. Higher scores indicate poorer wound healing and a greater likelihood of infection.

Kurz A, et al. Perioperative normothermia to reduce the incidence of surgical wound infection and shorten hospitalization. *N Engl J Med* 1996;334:1209-15.

Consequence of hypothermia

- **Impair platelet by decrease thromboxane A2**
- **Inhibition of clotting factor enzyme function**
- **Prolong both prothrombin (PT) and partial thromboplastin (PTT) times**
- **Vasoconstriction**
 - Decrease blood supply**
 - Decrease oxygen tension**
 - Decrease oxidative killing by neutrophil**

Normothermia

- Measures to maintain core normothermia should be taken throughout the perioperative period.



Association between blood glucose levels and surgical site infection: A case-control study

Glucose (mg/dL)	Cases (%)	Controls (%)	OR	95% CI
<200	35 (49)	651 (72)	1.00	(reference)
200-249	21 (29)	154 (17)	2.54	1.36-4.62
250-299	11 (15)	69 (8)	2.97	1.30-6.30
>300	5 (7)	28 (3)	3.32	0.94-9.44

Latham R, Lancaster AD, Covington JF, Pirolo JS, Thomas CS Jr. The association of diabetes and glucose control with surgical-site infections among cardiothoracic surgery patients. *Infect Control Hosp Epidemiol* 2001;22:607-612.

Hyperglycemia and wound infection

- Impair chemotaxis, phagocytosis and bacteriocidal activity
- Facilitate gram positive bacterial growth
- Decrease CD4 cell counts
- Increase atherosclerosis
 - Decrease blood supply to wound

Blood glucose control

- **Conditional recommendation:** use of protocols for intensive perioperative blood glucose control for both diabetic and non-diabetic adult patients undergoing surgical procedures to reduce the risk of SSI.
- **WHO 2009; CDC 2017:** Adequately control serum blood glucose levels in all diabetic patients (≤ 200 mg/dL)

Summary

- Safe surgery, saves lives is in your hand.
- Success is wholly dependent on partnership.
- The path forward requires a system, resources, and courage.





ถ้าคิดว่าดี
ทำต่อไป

อย่าเพิ่งท้อ
พอมองอยู่



Thammasak Orachonwong



ยอห์นถือประโยชน์ส่วนตัว ในทั้งสอง

ประโยชน์ของเพื่อนมนุษย์ เป็นกิจที่หนึ่ง

ความรัก และเคียดแค้น จะตกแก่ตนเอง

รักท่านทรงพระนามว่าไฟ ไ้โน้บัสโกสกี

ด.ม.