

ESTRATEGIAS PARA DISMINUIR ISO EN ORTOPEDIA

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CDC/NHSN surveillance definition of health care–associated infection and criteria for specific types of infections in the acute care setting



Teresa C. Horan, MPH, Mary Andrus, RN, BA, CIC, and Margaret A. Dudeck, MPH
Atlanta, Georgia

- ▶ Superficial: <30 días
- ▶ Profunda y órgano espacio: <30 días o <1 año si hay implante

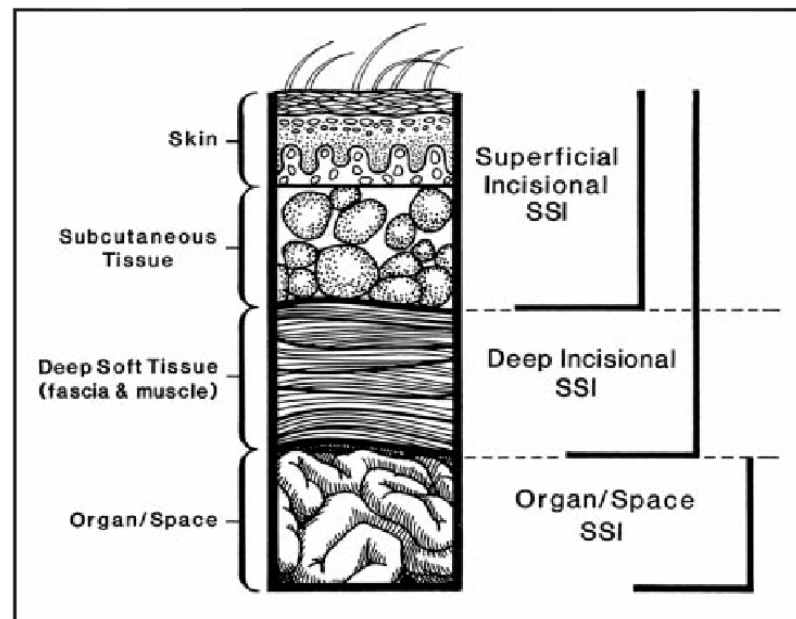


FIGURE. Cross-section of abdominal wall depicting CDC classifications of surgical site infection.²²



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

Guide to the Elimination of Orthopedic Surgical Site Infections

An APIC Guide

2010

Infect Control Hosp Epidemiol 1999;20:250-278

http://www.apic.org/Resource_/EliminationGuideForm/34e03612-d1e6-4214-a76b-e532c6fc3898/File/APIC-Ortho-Guide.pdf

Infección de sitio operatorio



- ▶ Segundo puesto en frecuencia en reportes de infección nosocomial en los Estados Unidos.
 - 20% de las infecciones nosocomiales
 - 38% de las infecciones en pacientes Qx.
- ▶ Se presentan hasta en el 30% de todas las QX
- ▶ Responsables > 8000 muertes al año en EUA
- ▶ Incrementan 2 a 5 veces costos hospitalarios

Infect Control Hosp Epidemiol 1999;20:250-78.
Infect Control Hosp Epidemiol 2010; 31:1219-29
Am J Infec Control 2012; 40:384-6

Infección de sitio operatorio



- ▶ % de infección:
 - Reemplazo de rodilla: 0.68–1,6%
 - Reemplazo de cadera: 0,67–2,4%
- ▶ ISO en ortopedia prolonga la estancia en 2 sem y los costos en 300%.
 - > Limitación física y < Calidad de vida
- ▶ Resistencia (SAMR)
 - Incremento de costos y Mortalidad

Tasas de ISO por procedimiento y categoría de riesgo

Procedure	Inpatient or Outpatient	Risk Index Category	Number of Procedures	Number of SSIs	Pooled Mean
Spinal fusion	Inpatient	0	20,059	140	0.70
Spinal fusion	Inpatient	1	16,640	306	1.84
Spinal fusion	Inpatient	2,3	4,511	187	4.15
Open reduction of fracture	Inpatient	0	3,600	40	1.11
Open reduction of fracture	Inpatient	1	5,629	100	1.78
Open reduction of fracture	Inpatient	2,3	1,249	42	3.36
Hip prosthesis	Inpatient	0	49,576	334	0.67
Hip prosthesis	Inpatient	1	65,046	938	1.44
Hip prosthesis	Inpatient	2,3	15,769	379	2.40
Knee prosthesis	Inpatient	0	70,675	409	0.58
Knee prosthesis	Inpatient	1	79,653	786	0.99
Knee prosthesis	Inpatient	2,3	20,855	333	1.60
Laminectomy	Inpatient	0	20,972	150	0.72
Laminectomy	Inpatient	1	15,054	166	1.10
Laminectomy	Inpatient	2,3	4,051	93	2.30
Knee prosthesis	Outpatient	0,1,2,3	16	0	0.00
Laminectomy	Outpatient	0,1,2,3	901	7	0.78

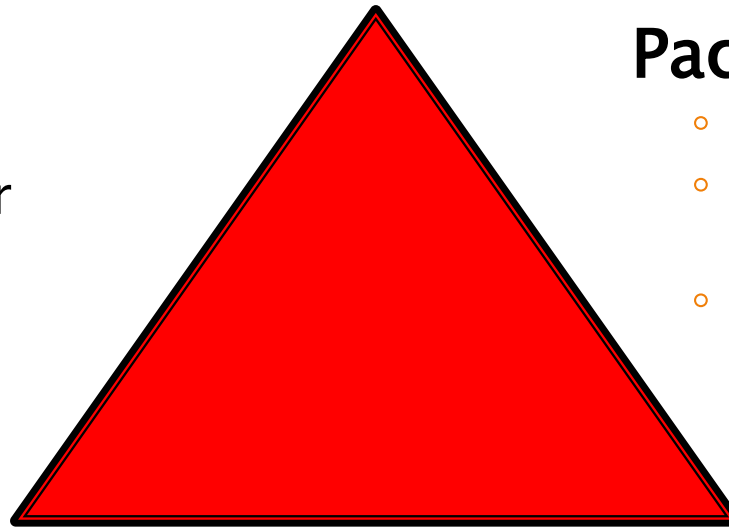
Factores de riesgo

	MODIFICABLES	NO MODIFICABLES
HUESPED	Obesidad Fumador HCTO < 36 Inadecuado control glicemia Portador nasal de <i>S aureus</i>	Diabetes Género: Masculino ASA: 3 o mas Pérdida de peso reciente Dependiente en el ABC Ca diseminado Ancianato
PROCEDIMIENTO	Pérdida sanguínea > 1 litro > tiempo QX Tiempo sub optimo de profilaxis AB > 2 residentes de Qx en el mismo procedimiento	Infección previa en el sitio QX Bajo volumen de procedimientos en el hospital O por el cirujano

Patogénesis

Procedimiento

- MOS
- Trauma tisular
- Tiempo de profilaxis Ab



Paciente

- Inmunidad
- Estado nutricional
- Comorbilidades

Microorganismo

- [] $10^5 \dots 10^2$
- Virulencia
- Adherencia

Clasificación de las Heridas Quirúrgicas



Classification	Wound Parameters
Clean	• An uninfected operative wound in which no inflammation is encountered and there is no entry into the respiratory, alimentary, genital, or urinary tract • Clean wounds are closed primarily and, if necessary, drained with closed drainage
Clean-contaminated	• Operative wounds in which the respiratory, alimentary, genital, or urinary tracts are entered under controlled conditions and without unusual contamination • No evidence of infection is encountered or major break in technique occurs
Contaminated	• Open, fresh accidental wounds • Operations with major breaks in sterile technique or gross spillage from the gastrointestinal tract • Incisions in which acute, non-purulent inflammation is encountered
Dirty or infected	• Old traumatic wounds with retained devitalized tissue • Existing clinical infection or perforated viscera is encountered • This definition suggests that the organisms causing postoperative infection were present in the operative field prior to the procedure

Patogénesis

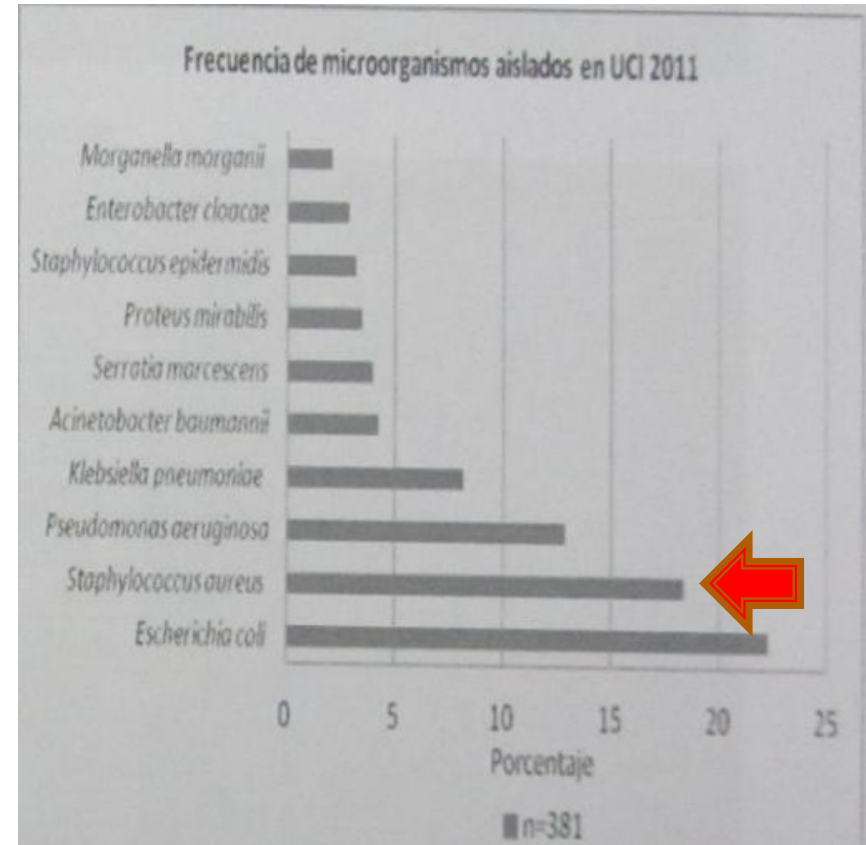
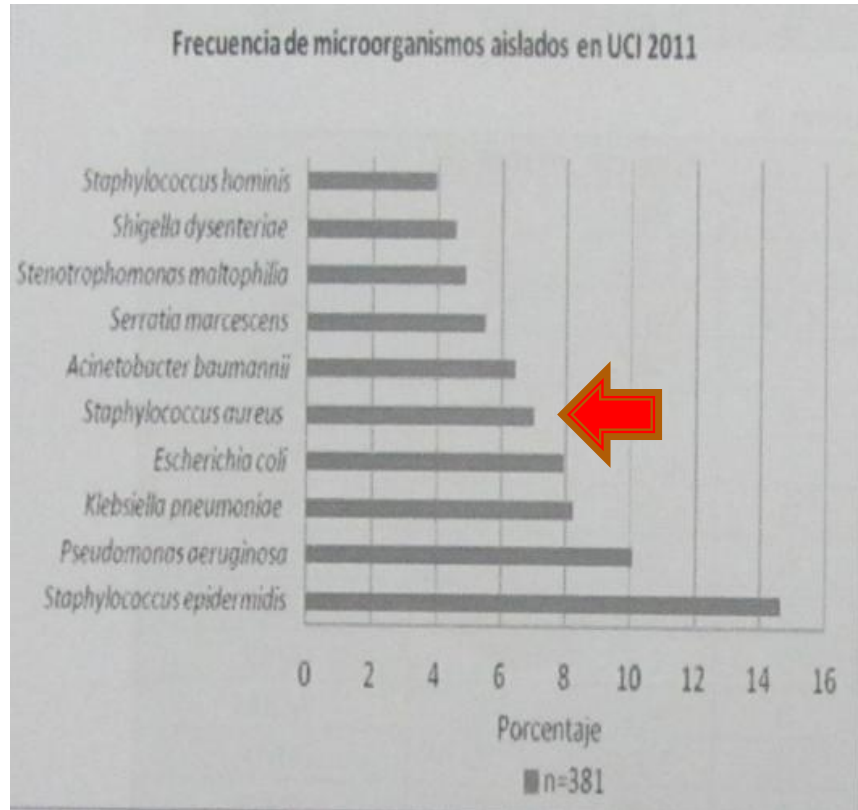
- ▶ Ortopedia: Cuerpos extraños
 - Introducción de microorganismos al implante
 - Siembra hematógena
 - 20–40% ISO en MOS
 - Fuertemente considerada si ocurre > 1 año
- ▶ Microbiología de la ISO afecta la severidad, inicio y aun el desenlace
- ▶ Biofilm

Distribución de microorganismos causantes de ISO en Qx ortopédica



Pathogen	Orthopedic surgery (N = 963)	Pathogen	Orthopedic surgery (N = 963)
Coagulase-negative Staphylococcus	173 (15.3)	Escherichia coli	34 (3.0)
Staphylococcus aureus	548 (48.6)	Pseudomonas aeruginosa	38 (3.4)
Enterococcus Species		Klebsiella pneumoniae	14 (1.2)
E. faecalis	57 (5.1)	Enterobacter species	37 (3.3)
E. faecium	13 (1.2)	Acinetobacter baumannii	10 (0.9)
Not specified	34 (3.0)	Klebsiella oxytoca	5 (0.4)
Candida Species		Total number of pathogenic isolates by surgery type	1,128
Candida albicans	2 (0.2)		
Other or not specified	2 (0.2)		

Frecuencia de Aislamientos en el HRPL 2011



Perfil de Resistencia *S. aureus* HRPL 2011

S. aureus

SERVICIO UCI 2011					SERVICIO NO UCI 2011			
Antibióticos	n	%R	%I	%S	n	%R	%I	%S
OXA	23	60,9	0	39,1	70	52,9	0	47,1
GEN	23	17,4	0	82,6	70	5,7	1,4	92,9
RIF	23	4,3	8,7	87	70	2,9	1,4	95,7
CIP	23	13	0	87	68	2,9	4,4	92,6
SXT	23	17,4	0	82,6	70	2,9	0	97,1
CLI	23	39,1	4,3	56,5	70	30	0	70
LIN	23	0	0	100	70	1,4	0	98,6
VAN	23	0	0	100	70	0	0	100
TCY	23	26,1	4,3	69,6	70	27,1	2,9	70
ERY	23	43,5	13	43,5	70	34,3	14,3	51,4

Recomendaciones

Preparación preoperatoria

- Qx electiva: ingreso al hospital el día de la Qx.
- Para de fumar
- Instructivo por escrito

Preparación preQx de la piel?

FAQs

(frequently asked questions)

about

"Surgical Site Infections"

What is a Surgical Site Infection (SSI)?

A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place. Most patients who have surgery do not develop an infection. However, infections develop in about 1 to 3 out of every 100 patients who have surgery.

Some of the common symptoms of a surgical site infection are:

- Redness and pain around the area where you had surgery
- Drainage of cloudy fluid from your surgical wound
- Fever

Can SSIs be treated?

Yes. Most surgical site infections can be treated with antibiotics. The antibiotic given to you depends on the bacteria (germs) causing the infection. Sometimes patients with SSIs also need another surgery to treat the infection.

What are some of the things that hospitals are doing to prevent SSIs?

To prevent SSIs, doctors, nurses, and other healthcare providers:

- Clean their hands and arms up to their elbows with an antiseptic agent just before the surgery.
- Clean their hands with soap and water or an alcohol-based hand rub before and after caring for each patient.
- May remove some of your hair immediately before your surgery using electric clippers if the hair is in the same area where the procedure will occur. They should not shave you with a razor.
- Wear special hair covers, masks, gowns, and gloves during surgery to keep the surgery area clean.
- Give you antibiotics before your surgery starts. In most cases, you should get antibiotics within 60 minutes before the surgery starts and the antibiotics should be stopped within 24 hours after surgery.
- Clean the skin at the site of your surgery with a special soap that kills germs.

What can I do to help prevent SSIs?

Before your surgery:

- Tell your doctor about other medical problems you may have. Health problems such as allergies, diabetes, and obesity could affect your surgery and your treatment.

- Quit smoking. Patients who smoke get more infections. Talk to your doctor about how you can quit before your surgery.
- Do not shave near where you will have surgery. Shaving with a razor can irritate your skin and make it easier to develop an infection.

At the time of your surgery:

- Speak up if someone tries to shave you with a razor before surgery. Ask why you need to be shaved and talk with your surgeon if you have any concerns.
- Ask if you will get antibiotics before surgery.

After your surgery:

- Make sure that your healthcare providers clean their hands before examining you, either with soap and water or an alcohol-based hand rub.

If you do not see your providers clean their hands, please ask them to do so.

- Family and friends who visit you should not touch the surgical wound or dressings.
- Family and friends should clean their hands with soap and water or an alcohol-based hand rub before and after visiting you. If you do not see them clean their hands, ask them to clean their hands.

What do I need to do when I go home from the hospital?

- Before you go home, your doctor or nurse should explain everything you need to know about taking care of your wound. Make sure you understand how to care for your wound before you leave the hospital.
- Always clean your hands before and after caring for your wound.
- Before you go home, make sure you know who to contact if you have questions or problems after you get home.
- If you have any symptoms of an infection, such as redness and pain at the surgery site, drainage, or fever, call your doctor immediately.

If you have additional questions, please ask your doctor or nurse.

Co-sponsored by:



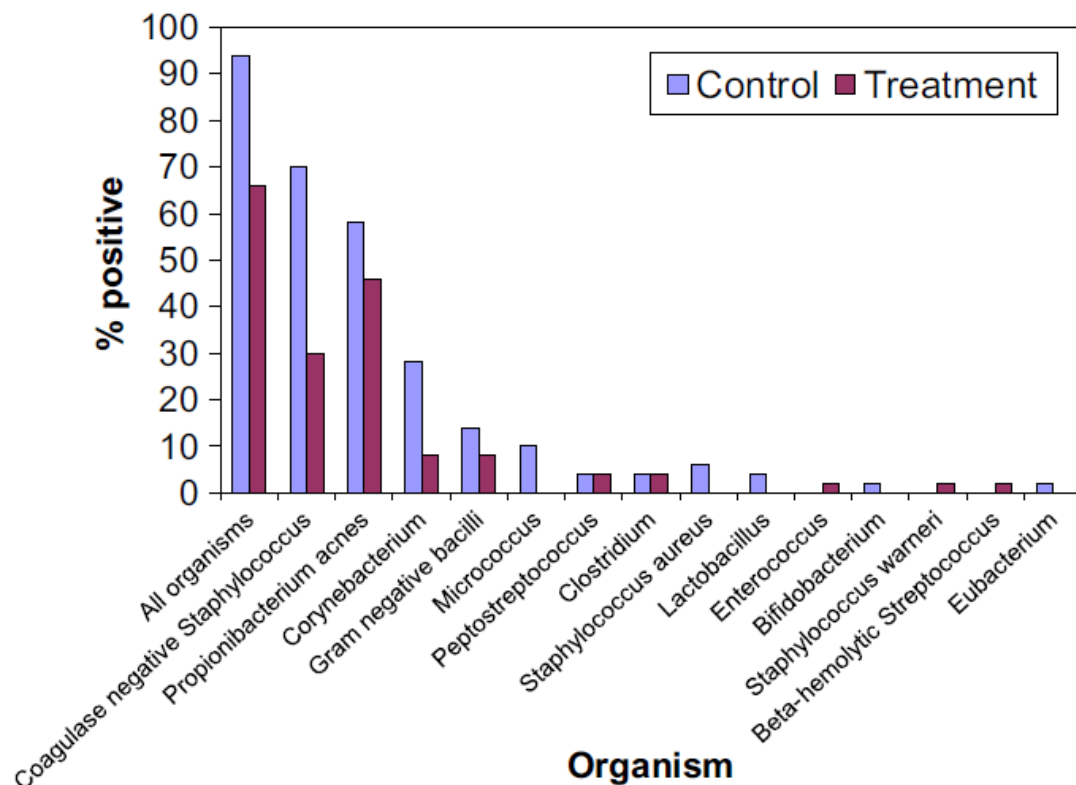





Efficacy of preoperative home use of 2% chlorhexidine gluconate cloth before shoulder surgery



Michael R. Murray, MD*, Matthew D. Saltzman, MD, Stephen M. Gryzlo, MD, Michael A. Terry, MD, Chase C. Woodward, BS, Gordon W. Nuber, MD



- ▶ 100 ptes
- ▶ 2 meses se seguimiento
- ▶ No infecciones

Figure 1 Rate of positive qualitative cultures for overall shoulder area (posterior and axilla).

Preparación preQx de la piel

Preoperative bathing or showering with skin antiseptics to prevent surgical site infection (Review)

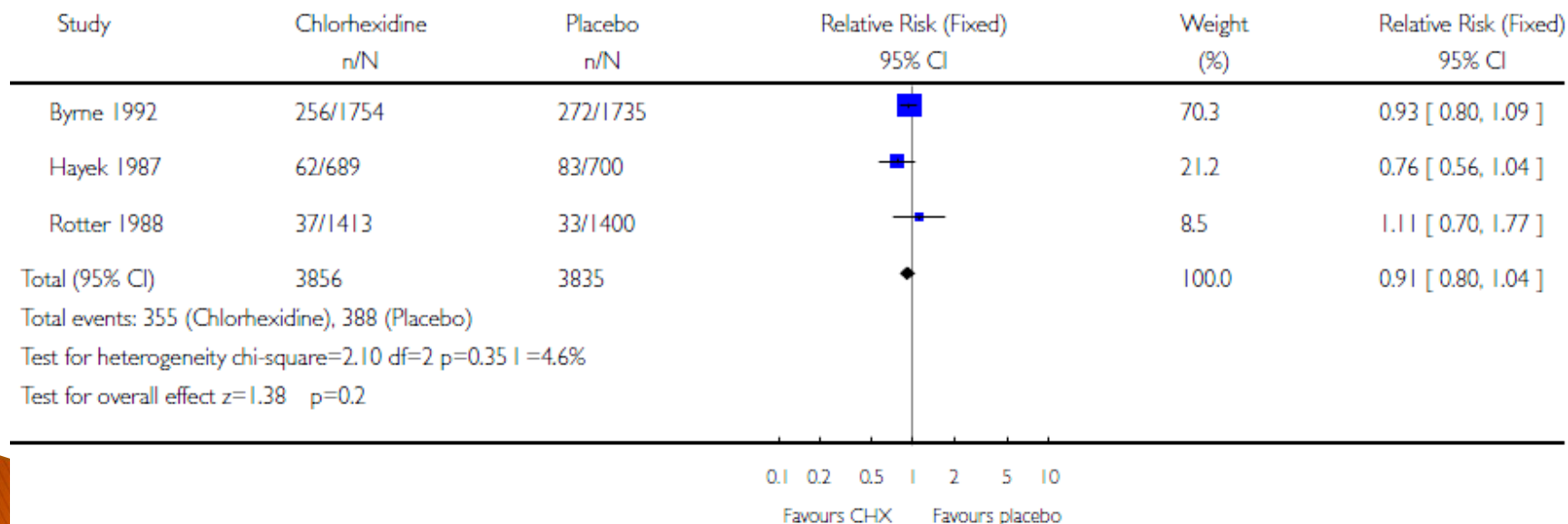
Webster J, Osborne S

Analysis 01.01. Comparison 01 Chlorhexidine 4% versus placebo, Outcome 01 Surgical site infection

Review: Preoperative bathing or showering with skin antiseptics to prevent surgical site infection

Comparison: 01 Chlorhexidine 4% versus placebo

Outcome: 01 Surgical site infection



Preparación preQx de la piel

Impact of non-rinse skin cleansing with chlorhexidine gluconate on prevention of healthcare-associated infections and colonization with multi-resistant organisms: a systematic review

4 Estudios:
Ptes de Ortopedia

S. Karki, A.C. Cheng*

Infectious Disease Epidemiology Unit, Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia

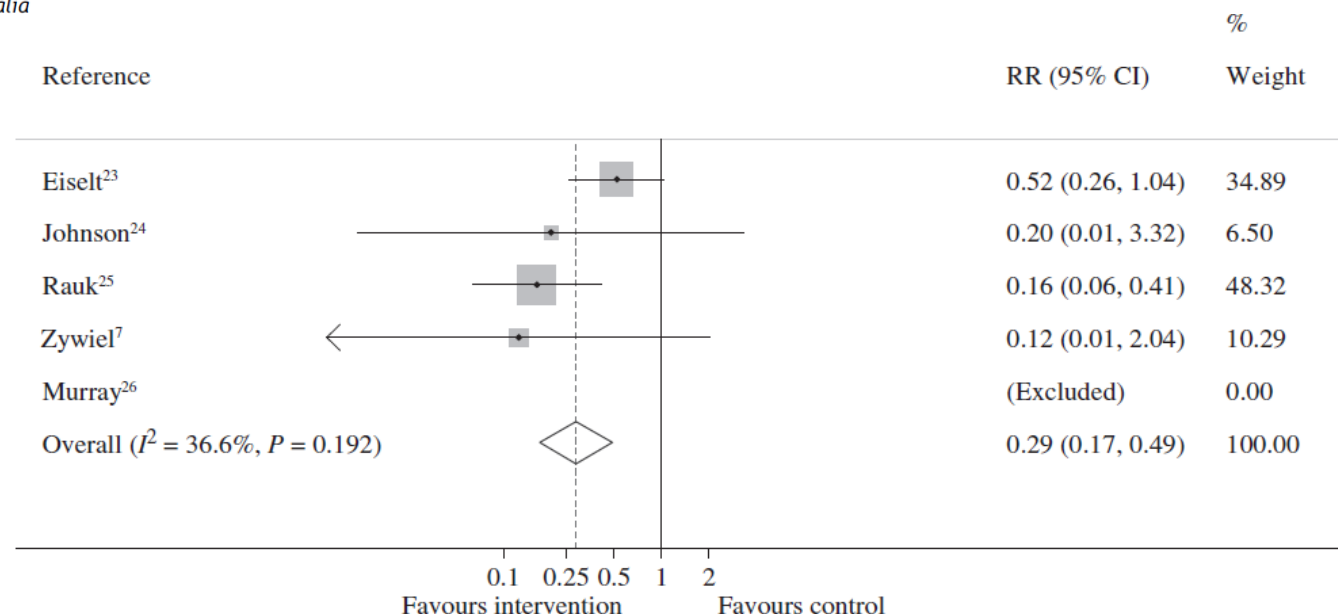
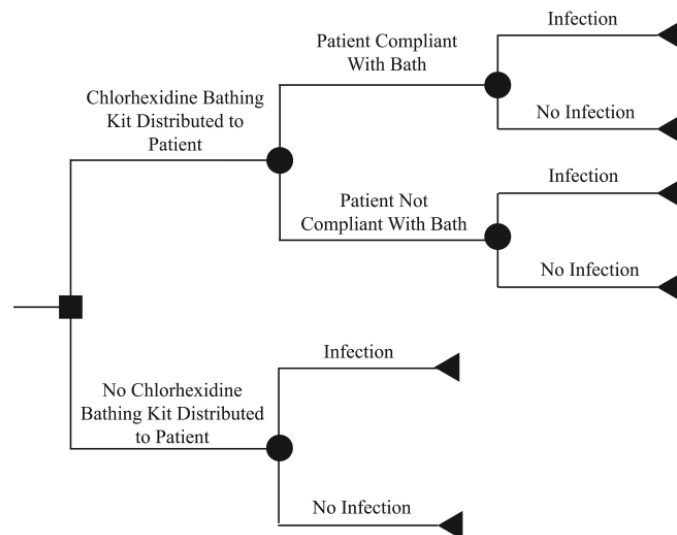


Figure 3. Effect of chlorhexidine gluconate washcloths in reducing surgical site infections. RR, relative risk, CI, confidence interval.

Economic Value of Dispensing Home-Based Preoperative Chlorhexidine Bathing Cloths to Prevent Surgical Site Infection



Rachel R. Bailey, PhD, MPH;^{1,2,3} Dianna R. Stuckey;^{1,2,3} Bryan A. Norman, PhD;⁴ Andrew P. Duggan;⁴
Kristina M. Bacon, MPH;^{1,2,3} Diana L. Connor, MPH;^{1,2,3} Ingi Lee, MD, MSCE;^{5,6}
Robert R. Muder, MD;⁷ Bruce Y. Lee, MD, MBA^{1,2,3}



- ▶ Incluso con un cumplimiento de 50%, la estrategia reduce costos y produce desenlaces adecuados

FIGURE 1. Model structure for deciding whether to distribute chlorhexidine bathing cloth kits to study patients.

Baño diario en UCI con Corhexidina y Bacteriemia

The Efficacy of Daily Bathing with Chlorhexidine for Reducing Healthcare-Associated Bloodstream Infections: A Meta-analysis

John C. O'E

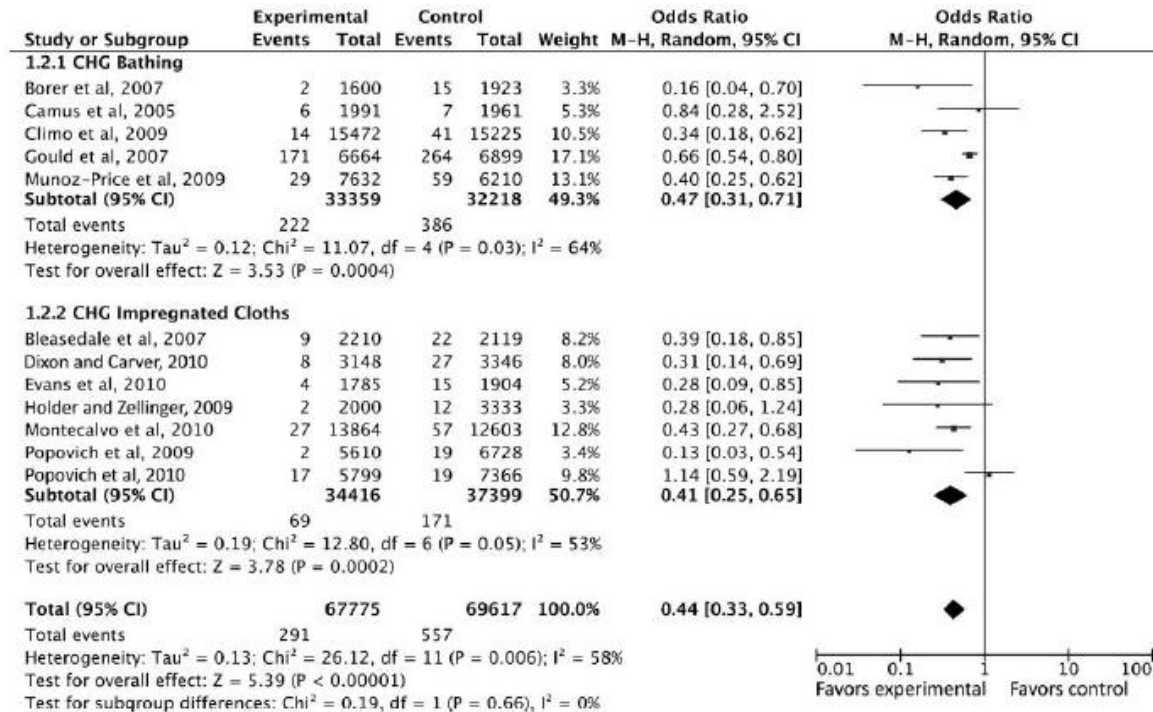


FIGURE 3. Risk of healthcare-associated bloodstream infection (BSI) with chlorhexidine (CHG) bathing and comparator, using patient-days in the analysis. “Events” refers to the study end point of central line-associated BSI or BSI, as defined in Table 1. Studies using a CHG-impregnated cloth are listed in the lower subgroup (1.2.2); all other studies are listed on top (1.2.1). CI, confidence interval; M-H, Mantel-Haenszel.

Baño diario en UCI con Corhexidina y Bacteriemia

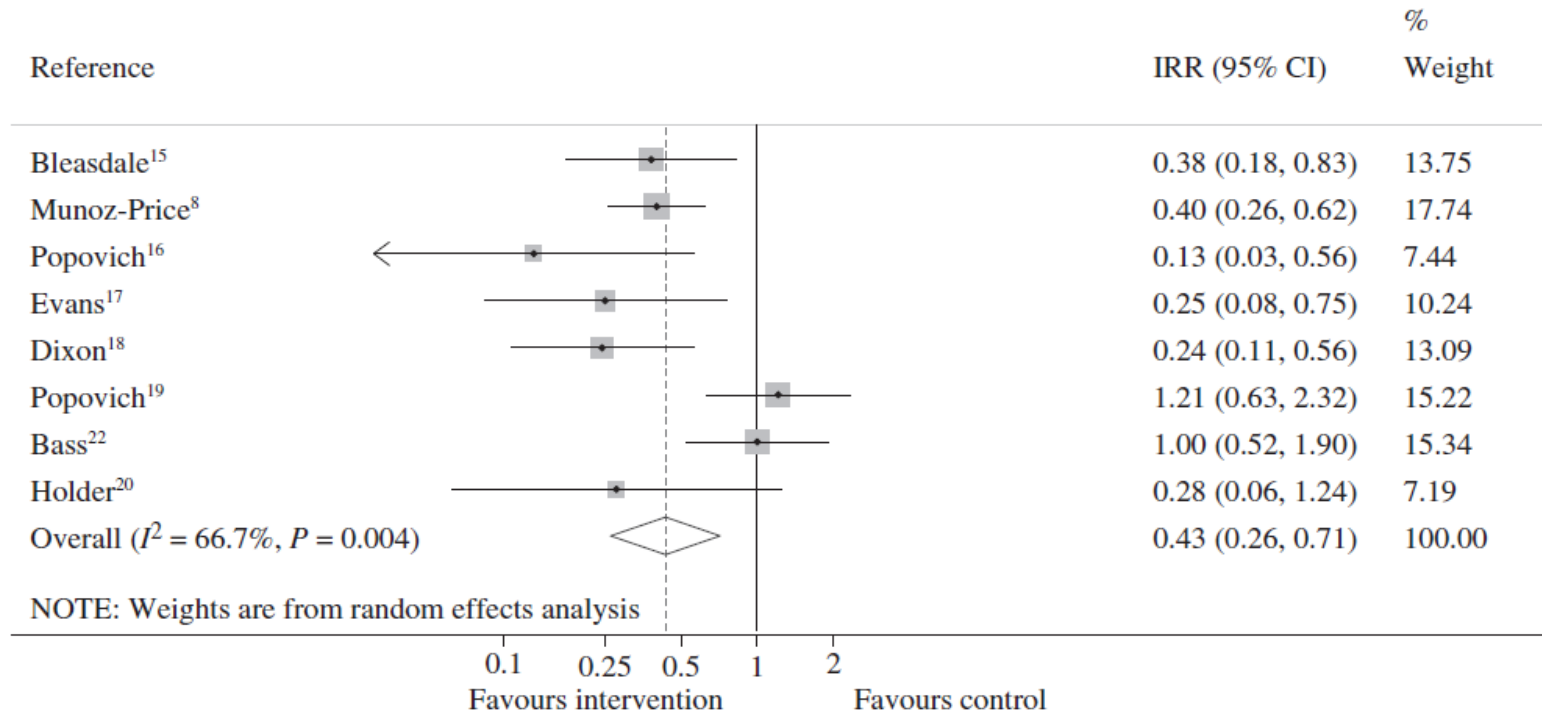


Figure 2. Effect of chlorhexidine gluconate washcloths in reducing central-line-associated bloodstream infection. IRR, Incidence rate ratio; CI, confidence interval.

Descolonización de portadores asintomáticos de *S. aureus*?



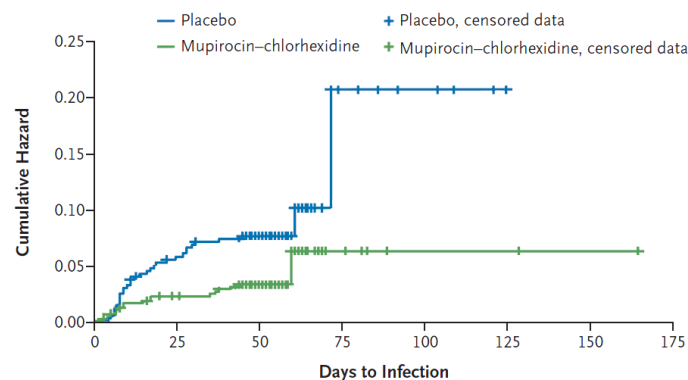
Preventing Surgical-Site Infections in Nasal Carriers of *Staphylococcus aureus*

Lonneke G.M. Bode, M.D., Jan A.J.W. Kluytmans, M.D., Ph.D., Heiman F.L. Wertheim, M.D., Ph.D., Diana Bogaers, I.C.P., Christina M.J.E. Vandenbroucke-Grauls, M.D., Ph.D., Robert Roosendaal, Ph.D., Annet Troelstra, M.D., Ph.D., Adrienne T.A. Box, B.A.Sc., Andreas Voss, M.D., Ph.D., Ingeborg van der Tweel, Ph.D., Alex van Belkum, Ph.D., Henri A. Verbrugh, M.D., Ph.D., and Margreet C. Vos, M.D., Ph.D.

- ▶ Multicentrico, aleatorizado, controlado con placebo.
- ▶ Identificación de portador con PCR

Table 2. Relative Risk of Hospital-Acquired *Staphylococcus aureus* Infection and Characteristics of Infections (Intention-to-Treat Analysis).

Variable	Mupirocin–Chlorhexidine (N = 504) no. (%)	Placebo (N = 413) no. (%)	Relative Risk (95% CI)*
<i>S. aureus</i> infection	17 (3.4)	32 (7.7)	0.42 (0.23–0.75)
Source of infection†			
Endogenous	12 (2.4)	25 (6.1)	0.39 (0.20–0.77)
Exogenous	4 (0.8)	6 (1.5)	0.55 (0.16–1.92)
Unknown	1 (0.2)	1 (0.2)	
Localization of infection			
Deep surgical site‡	4 (0.9)	16 (4.4)	0.21 (0.07–0.62)
Superficial surgical site‡	7 (1.6)	13 (3.5)	0.45 (0.18–1.11)
Lower respiratory tract	2 (0.4)	2 (0.5)	0.82 (0.12–5.78)
Urinary tract	1 (0.2)	0	
Bacteremia	1 (0.2)	1 (0.2)	
Soft tissue	2 (0.4)	0	



No. at Risk

Mupirocin–chlorhexidine	504	484	240	6	2	1
Placebo	413	386	204	7	4	0

Figure 3. Kaplan–Meier Curves Showing Cumulative Hazard of Hospital-Acquired *Staphylococcus aureus* Infection in the Study Groups.

Data were censored at the end of the follow-up period or at the time of death.

Decolonización nasal de *S. aureus*



A Preoperative Decolonization Protocol for *Staphylococcus aureus* Prevents Orthopaedic Infections

Nalini Rao MD, FACP, FSHEA, Barbara Cannella RN,
Lawrence S. Crossett MD, A. J. Yates Jr MD,
Richard McGough III MD

- ▶ Cultivo nalsal
- ▶ Mupirocina nasal
2/día y baño diario
con Clorhexidina
por 5 días

Table 2. *Staphylococcus aureus* (*S. aureus*) surgical site infections (SSIs) in patients with nasal cultures confirmed (intervention group) or assumed (concurrent control group) to be positive for *S. aureus*

Patient group	Number of SSIs/Number of patients	Infection rate %
Intervention	0/164	0
Concurrent control	12/345	3.5*

* $p = 0.016$ (equal variances assumed; 99% confidence interval).

Intraoperatorio

- ▶ Apropriada remoción el pelo
 - Clippers
 - Neuroqx, Qx cardiovascular y implante de material protésico
- ▶ **Lavado de manos (No Cepillos)**
- ▶ Control glicemico
- ▶ Normotermia ($>36^{\circ}\text{C}$ 30 minutos antes o 15 minutos después de terminar la anestesia)
- ▶ No de personas en la sala y su trafico

Antibióticos profilácticos



- ▶ Adecuada elección
- ▶ Aplicación 1 h antes de la incisión
- ▶ Ante el uso de torniquete, administrar profilaxis antes de que sea inflado.
- ▶ Repetir si el tiempo quirúrgico $> 2 \text{ V } \frac{1}{2}$ (Cefazolina 4 h), o pérdida sanguínea excede 1.5 L
- ▶ Descontinuar 24 h
- ▶ La presencia de catéteres y/o drenajes no justifica la prolongación de la profilaxis quirúrgica.
- ▶ En las cirugías sucias, donde hay una infección establecida, la profilaxis quirúrgica se transforma en tratamiento, cuya duración de tratamiento se ajustara de acuerdo a la situación clínica.

Procedimiento	Esquema	Duración	Alternativas
Colocación de prótesis articulares y material de osteosíntesis	Cefazolina 1 g IV c/8 horas	24 horas	Alergico a B-lactámicos: Vancomicina 1g IV c/12 horas por 24 h
Fractura expuesta I y II	Cefazolina 1 g IV c/8 horas	24 horas despues del cierre de la herida	Alergico a B-lactámicos Clindamicina 600 mg IV c/8
Fractura expuesta III, A-B-C	Cefazolina 1 g IV c/8 horas más gentamicina 5 mg/kg IV C/24 h	24 horas despues del cierre de la herida	Alergico b-lactámicos: clindamicina 600 mg IV c/8 h mas gentamicina 5 mg/kg IV C/ 24 h.
	En pacientes con gran contaminación con material inorgánico adicionar penicilina cristalina 4 millones de U C/ 4 h o ampicilina 2 gramos IV C/4 h por 24 horas despues del cierre de la herida		
Amputación por traumatismo	Clindamicina 600 mg IV c/8 horas mas gentamicina 5 mg/kg IV dosis unica	24 horas	Ampicilina sulbactam 3 g IV c/6 horas por 24 horas
Otros	Cefazolina 1g IV	Dosis única	Alérgico a B-lactámicos: clindamicina 600 mg IV

Antisepsis de la piel

Systematic review and meta-analysis of preoperative antisepsis with chlorhexidine *versus* povidone-iodine in clean-contaminated surgery

A. Noorani¹, N. Rabey³, S. R. Walsh¹ and R. J. Davies²

Preoperative antisepsis with chlorhexidine *versus* povidone-iodine in clean-contaminated surgery

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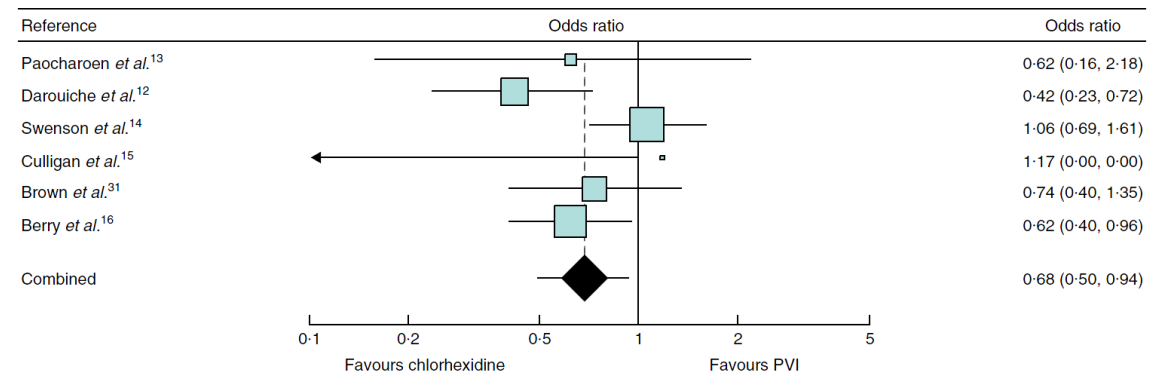


Fig. 2 Forest plot comparing the incidence of surgical-site infection following skin preparation with chlorhexidine *versus* povidone-iodine (PVI). The meta-analysis was done using a random-effects model. Odds ratios are shown with 95 per cent confidence intervals. The vertical dashed line represents the summary estimate

- ▶ ISO: 145 (5.7 %) 2529 ptes Clorhexidina vs 198 (7.9%) 2502 ptes Iodopovidona (OR: 0.68 IC 95% 0.5–0.94; $P = 0.019$)

Antisepsis de la piel

Systematic Review and Cost Analysis Comparing Use of Chlorhexidine with Use of Iodine for Preoperative Skin Antisepsis to Prevent Surgical Site Infection

Ingi Lee, MD, MSCE; Rajender K. Agarwal, MD, MPH; Bruce Y. Lee, MD, MBA;
Neil O. Fishman, MD; Craig A. Umscheid, MD, MSCE

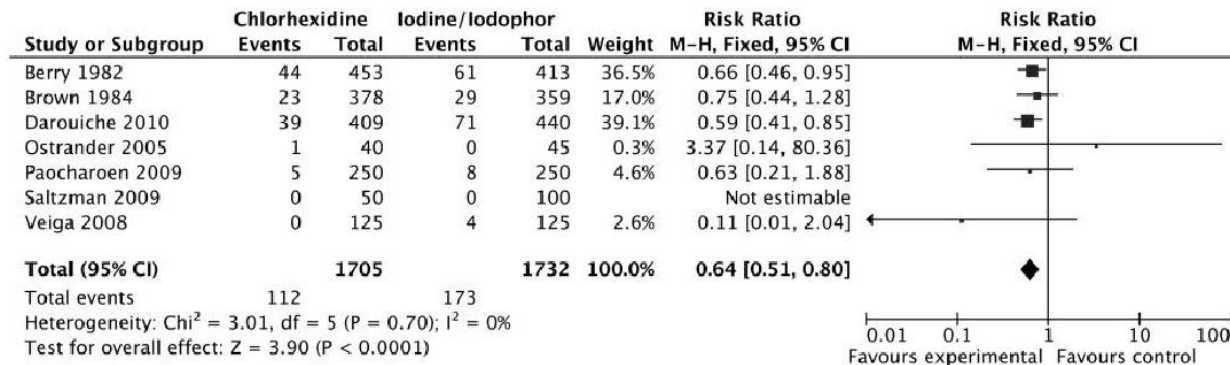


FIGURE 3. Meta-analysis of 7 studies that evaluated use of chlorhexidine, compared with use of iodine, for preoperative skin antisepsis with surgical site infection as the outcome.

- ▶ El uso de clorhexidina
 - Se asocia a 36% de reducción el numero de ISO
 - resulta en ahorros netos de US\$ 16 a US\$ 26 por caso quirúrgico y de US\$ 349.904 a US\$ 568.594 por año para el hospital

Blue = World Health Organization (WHO) Green = The Joint Commission - Universal Protocol (JC) 2010 National Patient Safety Goals Orange = JC and WHO

The Joint Commission also does not stipulate where these activities occur. See the Universal Protocol for details on the Joint Commission requirements.

Conclusiones

- ▶ La incidencia de ISO en ortopedia varia con el tipo de QX y puede ser influenciada por FR modificables y no modificables, Entender estos FR puede ayudar al desarrollo de estrategias para prevenirlas.