

# Cirurgia segura: onde estamos em relação ao controle de infecções?

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CCIH do Hospital Sírio Libanês

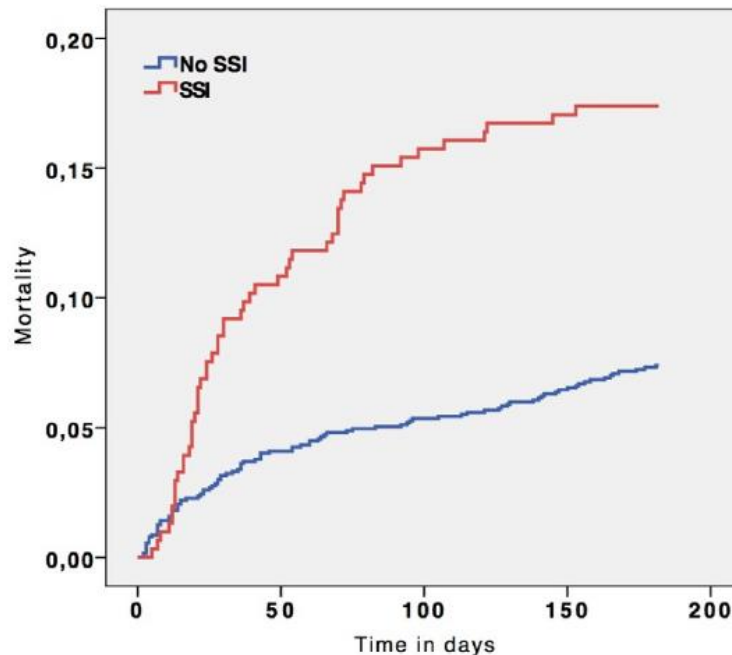


- Até 60 % das ISC são preveníveis

## Estimating the Proportion of Healthcare-Associated Infections That Are Reasonably Preventable and the Related Mortality and Costs

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY FEBRUARY 2011, VOL. 32, NO. 2

- Até 77% dos óbitos em pacientes com ISC são atribuíveis a ISC



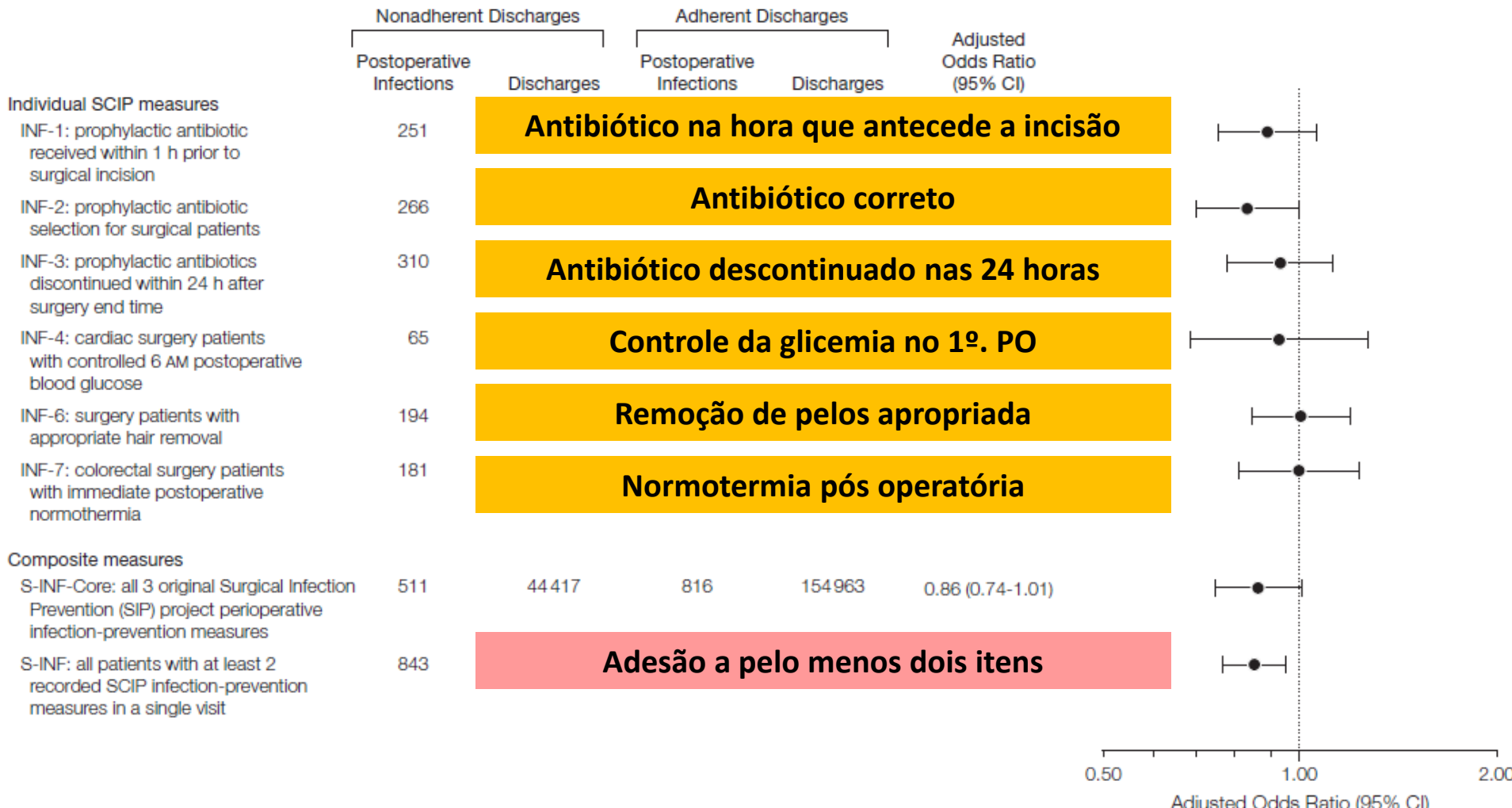
PLOS ONE September 2012 | Volume 7 | Issue 9 | e44599

Figure 3. Kaplan meier curve of 6 months mortality in patients with and without a surgical site infection (SSI).

# Adherence to Surgical Care Improvement Project Measures and the Association With Postoperative Infections

JAMA. 2010;303(24):2479-2485

405720 pacientes



# Reduction of Surgical Site Infections after Implementation of a Bundle of Care

Rogier M. P. H. Crolla<sup>1</sup>, Lijckle van der Laan<sup>1</sup>, Eelco J. Veen<sup>1</sup>, Yvonne Hendriks<sup>2</sup>, Caroline van Schendel<sup>3</sup>, Jan Kluytmans<sup>2,4\*</sup>

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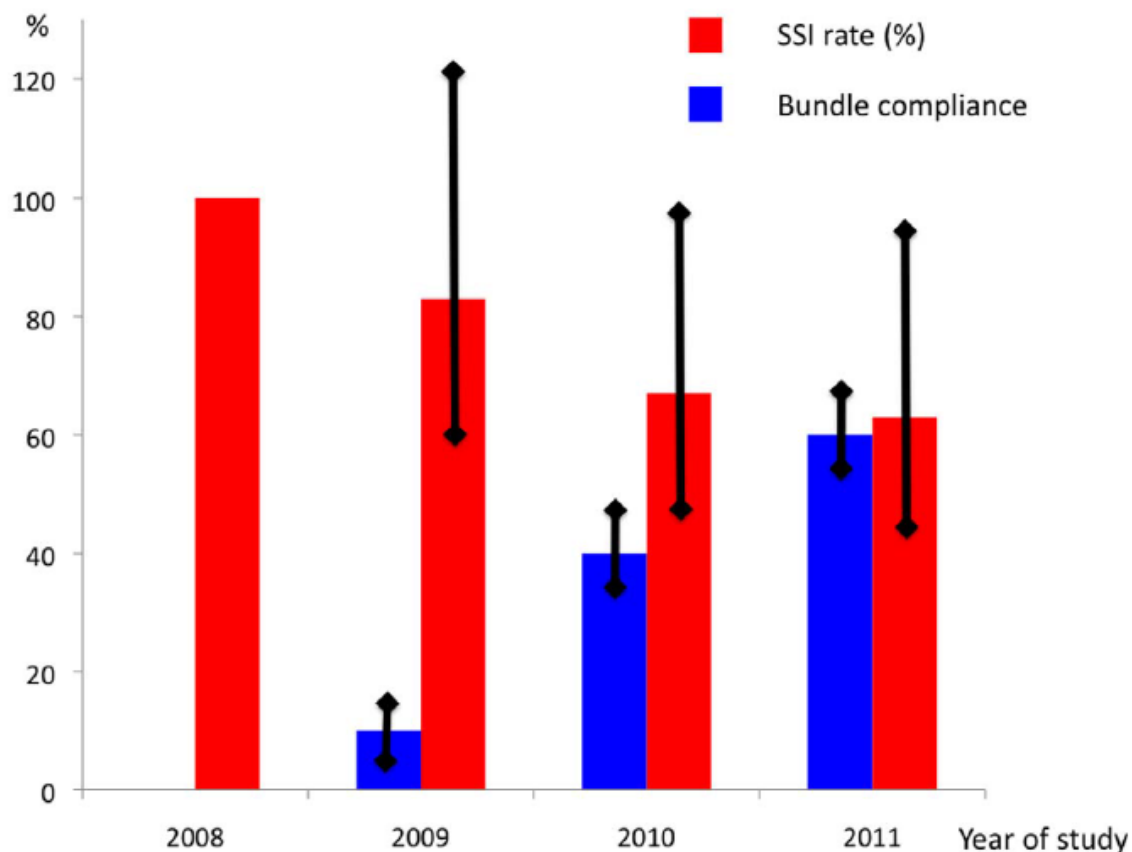


Figure 2. Annual changes in the surgical site infection (SSI) rate and bundle compliance and the 95% confidence interval.

Adesão ao bundle foi fator independentemente relacionado a diminuição na ISC.

# Banho pré-operatório

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

Webster J, Osborne S



- CHG vs. sabão comum: Sem redução na ISC  
(RR 1.02, 95% CI 0.57-1.84)
- CHG vs. sem banho: Redução na ISC  
(RR 0.35, 95% CI 0.17-0.79)

MAS sem maior incidência de alergia (RR 0.89 0.36-2.19)

## Q8A. How safe and effective is preoperative antiseptic bathing or showering?

*Draft Recommendations* **Banho com sabão e antisséptico pelo menos na noite anterior**

8A. Require patients to shower or bathe (full body) with either soap (antimicrobial or non-antimicrobial) or an antiseptic agent on at least the night before the operative day (**Category IB**) (Webster 2008)

8A.1. No recommendation can be made regarding the optimal timing of the preoperative shower or bath or the total number of soap or antiseptic agent applications for the prevention of surgical site infection. (**No recommendation/ unresolved issue**) (Webster 2008, Veiga 2008)

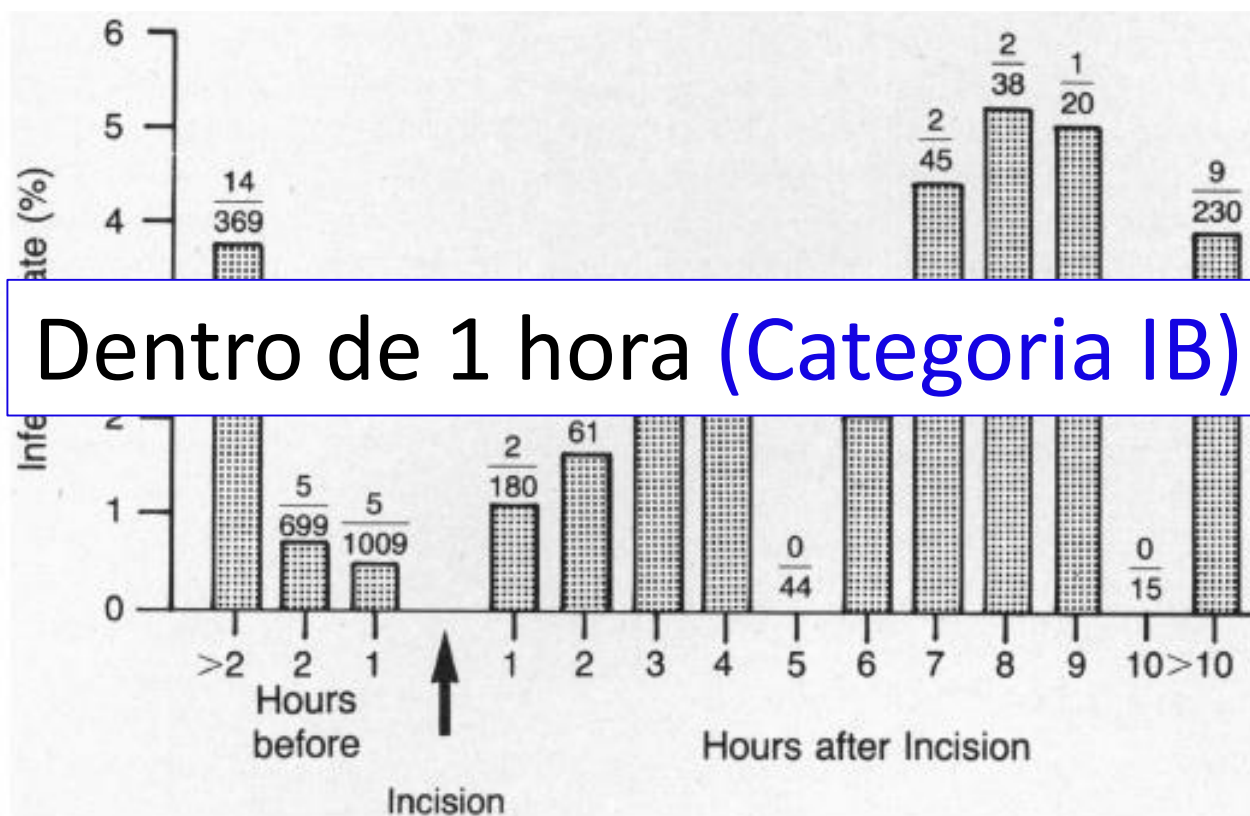
**Momento ideal?**  
**Quantidade de produto?**

Disclaimer: The findings and conclusions are draft and have not been formally disseminated by the Centers for Disease Control and Prevention and should not be construed to represent any agency determination or policy.

# Antibiotico profilaxia

## THE TIMING OF PROPHYLACTIC ADMINISTRATION OF ANTIBIOTICS AND THE RISK OF SURGICAL-WOUND INFECTION

DAVID C. CLASSEN, M.D., R. SCOTT EVANS, PH.D., STANLEY L. PESTOTNIK, R.Ph., SUSAN D. HORN, PH.D., RONALD L. MENLOVE, PH.D., AND JOHN P. BURKE, M.D.



Dentro de 1 hora (Categoria IB)

Figure 1. Rates of Surgical-Wound Infection Corresponding to the Temporal Relation between Antibiotic Administration and the Start of Surgery.

THE NEW ENGLAND JOURNAL OF MEDICINE

Jan. 30, 1992

## **Studies on the duration of antibiotic administration for surgical prophylaxis.**

Scher KS.

- 801 cirurgias eletivas

Cefazolina 1 g pré-op



Cefazolina 1 g pré-op  
+  
Redose após 3 horas



Cefotetan 1 g pré-op

### Redosagem (Categoria IB)



- Para procedimentos com duração < 3 horas: ISC sem diferença estatística
- Para procedimentos com duração > 3 horas:  $p < 0,01$

Surgery. 1989 Oct;106(4):750-6; discussion 756-7.

## **Antibiotic prophylaxis for surgery in morbidly obese patients.**

Forse RA<sup>1</sup>, Karam B, MacLean LD, Christou NV.

- ISC em gastroplastia

Obesos: 16,5%

Peso normal: 2,5%

- Com 1 

**Dose para obeso(Categoria IB)**

 sos ( $p < 0,001$ )



Dose para Cefazolina 2 g em obesos



ISC para 5,6% ( $p = 0,03$ )

# Clinical practice guidelines for antimicrobial prophylaxis in surgery

DALE W. BRATZLER, E. PATCHEN DELLINGER, KEITH M. OLSEN, TRISH M. PERL, PAUL G. AUWAERTER, MAUREEN K. BOLON, DOUGLAS N. FISH, LENA M. NAPOLITANO, ROBERT G. SAWYER, DOUGLAS SLAIN, JAMES P. STEINBERG, AND ROBERT A. WEINSTEIN

Am J Health-Syst Pharm. 2013; 70:195-283

Table 1.  
Recommended Doses and Redosing Intervals for Commonly Used Antimicrobials for Surgical Prophylaxis

Antimicrobial	Recommended Dose		Half-life in Adults With Normal Renal Function, hr <sup>19</sup>	Recommended Redosing Interval (From Initiation of Preoperative Dose), hr <sup>c</sup>
	Adults <sup>a</sup>	Pediatrics <sup>b</sup>		
Ampicillin-sulbactam	3 g (ampicillin 2 g/sulbactam 1 g)	50 mg/kg of the ampicillin component	0.8–1.3	2
Ampicillin	2 g	50 mg/kg	1–1.9	2
Aztreonam	2 g	30 mg/kg	1.3–2.4	4
Cefazolin	2 g, 3 g for pts weighing ≥120 kg	30 mg/kg	1.2–2.2	4
Cefuroxime	1.5 g	50 mg/kg	1–2	4
Cefotaxime	1 g <sup>d</sup>	50 mg/kg	0.9–1.7	3
Cefoxitin	2 g	40 mg/kg	0.7–1.1	2
Cefotetan	2 g	40 mg/kg	2.8–4.6	6
Ceftriaxone	2 g <sup>e</sup>	50–75 mg/kg	5.4–10.9	NA
Ciprofloxacin <sup>f</sup>	400 mg	10 mg/kg	3–7	NA
Clindamycin	900 mg	10 mg/kg	2–4	6
Ertapenem	1 g	15 mg/kg	3–5	NA
Fluconazole	400 mg	6 mg/kg	30	NA
Gentamicin <sup>g</sup>	5 mg/kg based on dosing weight (single dose)	2.5 mg/kg based on dosing weight	2–3	NA
Levofloxacin <sup>f</sup>	500 mg	10 mg/kg	6–8	NA
Metronidazole	500 mg	15 mg/kg	6–8	NA
Neonates weighing <1200 g should receive a single 7.5-mg/kg dose				

# Effectiveness of a bundled intervention of decolonization and prophylaxis to decrease Gram positive surgical site infections after cardiac or orthopedic surgery: systematic review and meta-analysis

BMJ 2013;346:f2743

15 estudos

Studies by intervention	All studies	Cardiac studies	Total joint arthroplasty or orthopedic studies
Glycopeptide prophylaxis studies:			
Gram positive SSIs	0.70 (0.47 to 1.04)†	0.76 (0.49 to 1.18)†	0.69 (0.37 to 1.30)
<i>S aureus</i> SSIs	0.53 (0.24 to 1.16)†	0.52 (0.17 to 1.56)†	0.92 (0.59 to 1.44)
MRSA SSIs	0.40 (0.20 to 0.80)	0.39 (0.15 to 1.03)	0.46 (0.13 to 1.63)†
MSSA SSIs	1.47 (0.91 to 2.38)	1.32 (0.82 to 2.12)	1.18 (0.65 to 2.13)

Quando analisados 6 estudos com combinação do glicopeptideo com beta-lactâmico ou clindamicina:

Infecção de sítio cirúrgico por gram positivo: 0,22 (0,09-0,55)

Pacientes colonizados por gram  
negativos multirresistentes



## **Clinical practice guidelines for antimicrobial prophylaxis in surgery**

DALE W. BRATZLER, E. PATCHEN DELLINGER, KEITH M. OLSEN, TRISH M. PERL, PAUL G. AUWAERTER,  
MAUREEN K. BOLON, DOUGLAS N. FISH, LENA M. NAPOLITANO, ROBERT G. SAWYER, DOUGLAS SLAIN,  
JAMES P. STEINBERG, AND ROBERT A. WEINSTEIN

*Am J Health-Syst Pharm.* 2013; 70:195-283

ment. Thus, patients must be treated  
on a case-by-case basis, taking into  
account multiple considerations.

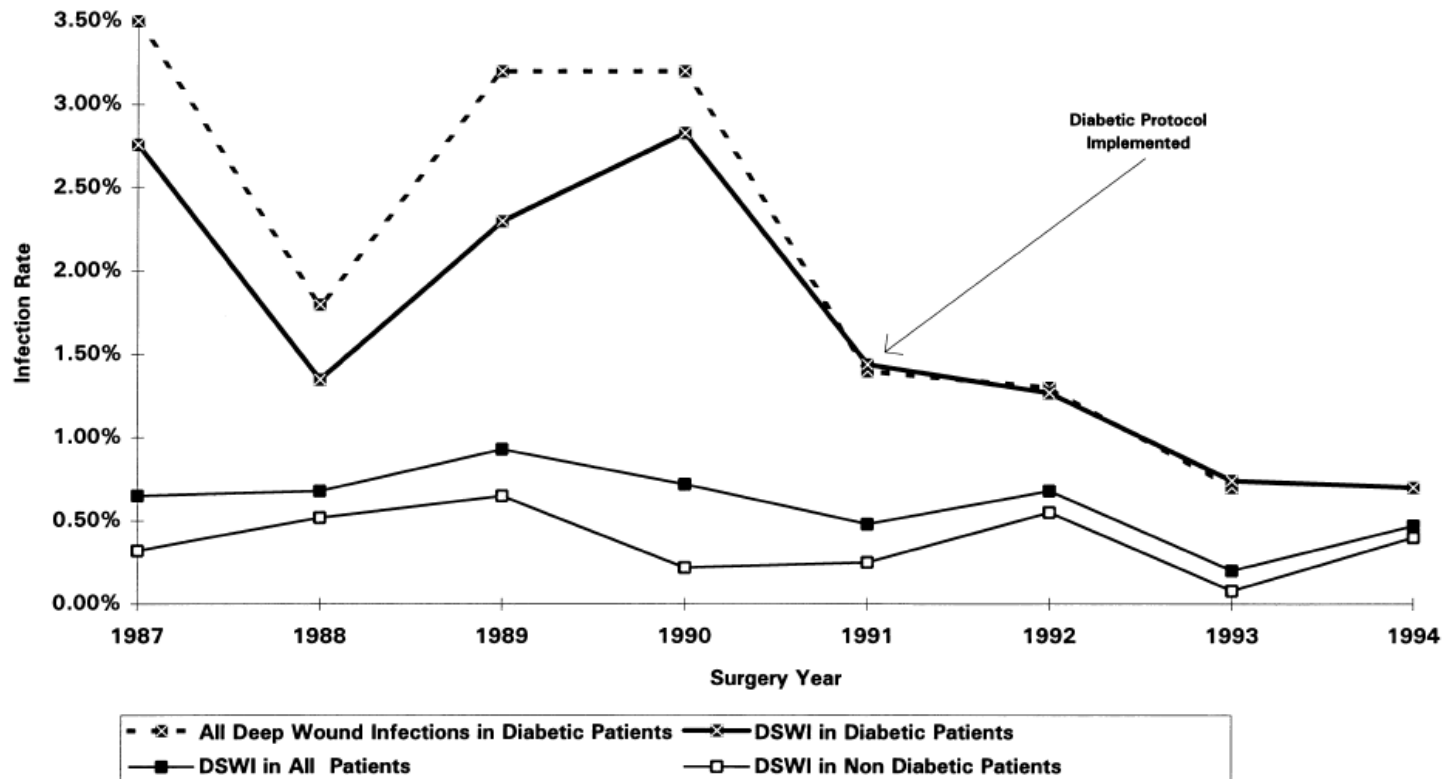
# Nível glicêmico <200

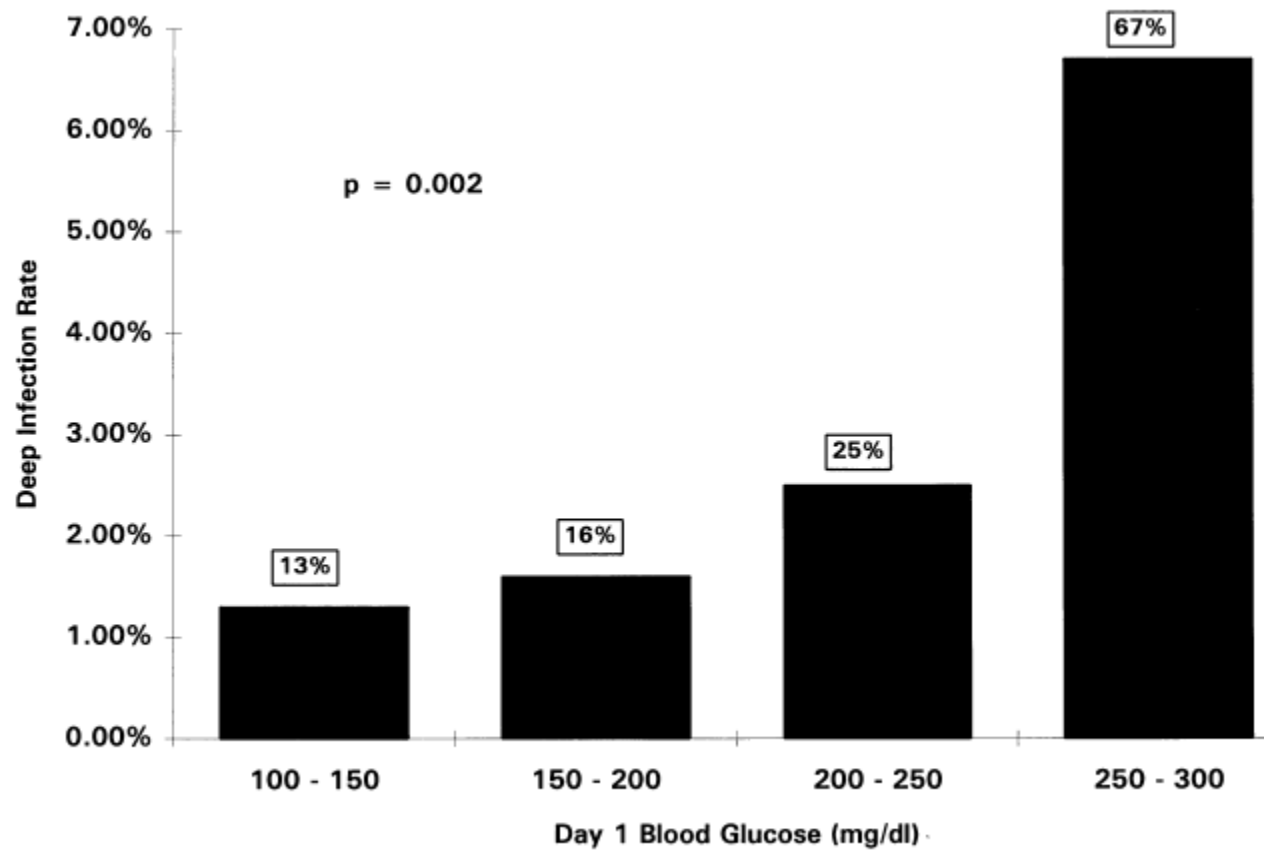
## Glucose Control Lowers the Risk of Wound Infection in Diabetics After Open Heart Operations

Kathryn J. Zerr, MBA, Anthony P. Furnary, MD, Gary L. Grunkemeier, PhD, Stephen Bookin, MD, Vivek Kanhere, MD, and Albert Starr, MD

8910 pacientes submetidos a cirurgia cardíaca  
Protocolo para glicemia < 200

*(Ann Thorac Surg 1997;63:356–61)*





# THE ASSOCIATION OF DIABETES AND GLUCOSE CONTROL WITH SURGICAL-SITE INFECTIONS AMONG CARDIOTHORACIC SURGERY PATIENTS

Robert Latham, MD; Ava D. Lancaster, RN; Janet F. Covington, RN; John S. Pirolo, MD; Clarence S. Thomas, Jr, MD

*Infect Control Hosp Epidemiol* 2001;22:607-612

- A hiperglicemia no pós operatório foi fator de risco independente para ISC
  - diabéticos: OR 1.86 (1.04-3.34)
  - não diabéticos: OR 2.14 (1.05-4.40)

TABLE 3  
GLUCOSE LEVELS AMONG 72 CASES WITH SURGICAL-SITE INFECTIONS AND 902 CONTROLS WITHOUT SURGICAL-SITE INFECTIONS

Glucose (mg/dL)	Cases ( )	Controls ( )	OR
<200 (referrent)	35 (49)	651 (72)	1.00
200-249	21 (29)	154 (17)	2.54
250-299	11 (15)	69 (8)	2.97
≥300	5 (7)	28 (3)	3.32

Abbreviation: OR, odds ratio.

Chi-square for linear trend=16.375,  $P<.0001$ .

SHEA: Maintain postoperative blood glucose of 180 mg/dL or lower.

*Draft Recommendations*

3A. Implement perioperative glycemic control and use blood glucose target levels <200mg/dL in diabetic and non-diabetic patients. **(Category IA)** (Ghandi 2007, Chan 2009)

# Normothermia

## PERIOPERATIVE NORMOTHERMIA TO REDUCE THE INCIDENCE OF SURGICAL-WOUND INFECTION AND SHORTEN HOSPITALIZATION

ANDREA KURZ, M.D., DANIEL I. SESSLER, M.D., AND RAINER LENHARDT, M.D.,  
FOR THE STUDY OF WOUND INFECTION AND TEMPERATURE GROUP\*

N Engl J Med 1996;334:1209-15

- 200 pacientes randomizados para **normothermia** (T perioperatória= 36,5°C) ou **hipotermia** (T perioperatória podia chegar até 34,5°C)

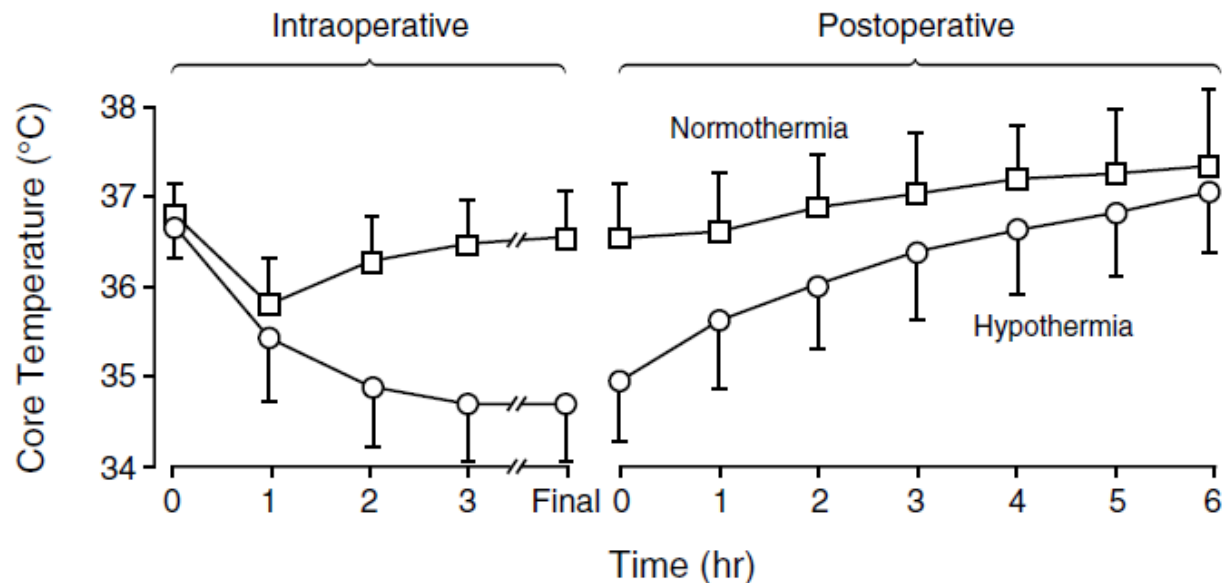


Table 2. Postoperative Findings in the Two Study Groups.\*

VARIABLE	NORMOTHERMIA (N = 104)	HYPOTHERMIA (N = 96)	P VALUE
<b>All patients</b>			
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
Days to first solid food	5.6±2.5	6.5±2.0	0.006
Days to suture removal	9.8±2.9	10.9±1.9	0.002
Days of hospitalization	12.1±4.4	14.7±6.5	0.001
<b>Uninfected patients</b>			
No. of patients	98	78	
Days to first solid food	5.2±1.6	6.1±1.6	<0.001
Days to suture removal	9.6±2.6	10.6±1.6	0.003
Days of hospitalization	11.8±4.1	13.5±4.5	0.01

\*Plus-minus values are means  $\pm$ SD.

### *Draft Recommendation*

4. Maintain perioperative normothermia (**Category 1A**) (Melling 2001, Kurtz 1996)

### *Draft Recommendation*

5. No recommendation can be made regarding the safety and effectiveness of strategies to achieve and maintain normothermia, the lower limit of normothermia, or the optimal timing and duration of normothermia for the prevention of surgical site infection. (**No recommendation/unresolved issue**)

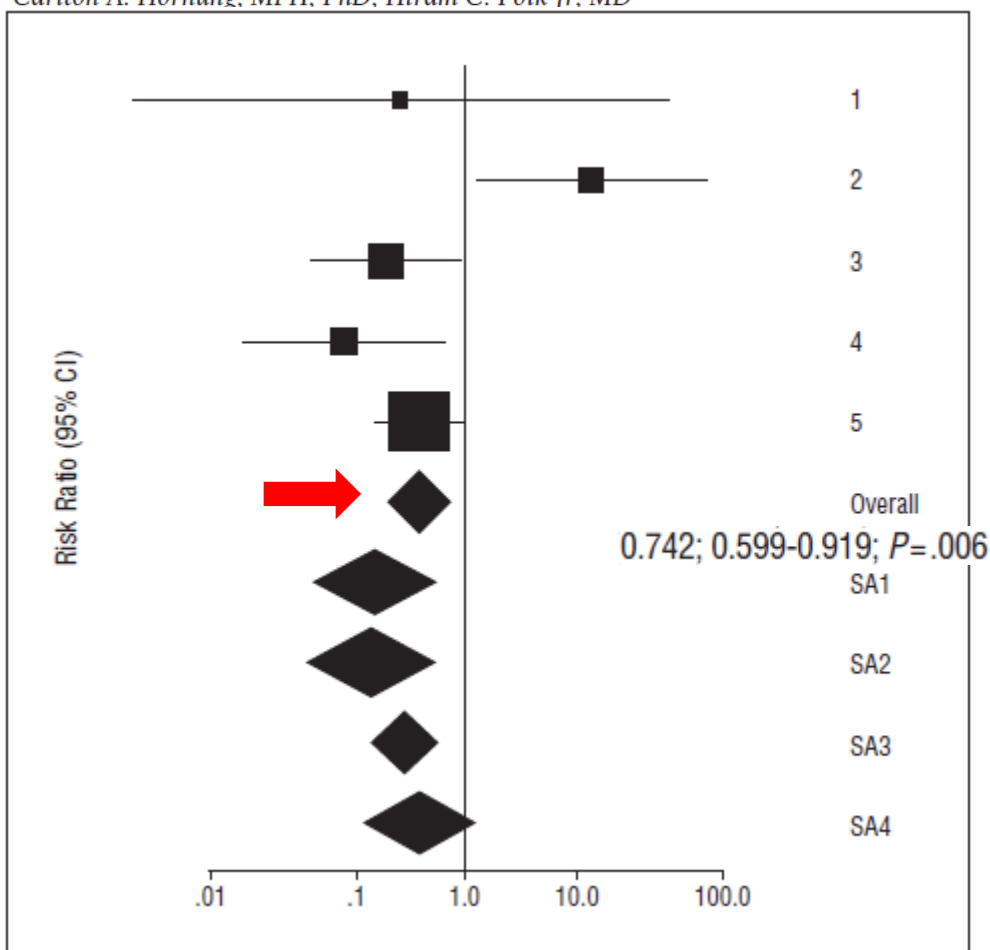
# Suplementação de oxigênio

## Perioperative Supplemental Oxygen Therapy and Surgical Site Infection

*Arch Surg.* 2009;144(4):359-366

*A Meta-analysis of Randomized Controlled Trials*

Motaz Qadan, MBChB, MRCS(Edin); Ozan Akça, MD; Suhal S. Mahid, MRCS, PhD;  
Carlton A. Hornung, MPH, PhD; Hiram C. Polk Jr, MD



- 5 estudos
- FiO2 de 30-35% X FiO2 80%

Redução de 25% na ISC

Otimizar a oxigenação tecidual com normotermia e reposição volêmica

*Draft Recommendation*

6. For patients with normal pulmonary function undergoing general anesthesia with endotracheal intubation, administer increased fraction of inspired oxygen ( $\text{FiO}_2$ ) both intraoperatively and post-extubation in the immediate postoperative period. To optimize tissue oxygen delivery, maintain perioperative normothermia and adequate volume replacement. **(Category IA)**

(Belda 2005, Bickle 2011, Grief 2000, Meyhoff 2009, Staehr 2011, Pryor 2004)

# Descolonização

## 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 Boerendoel, Ph.D.,  
Annet Troelstra, M.D., Ph.D., Adrienne T.A. Box, B.A.Sc., Andreas Voss, M.D.,  
Alex van Belkum, Ph.D., Henri A. Verbrugh, M.D., Ph.D., and M.

N Engl J Med 2010;362:9-17.

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

Variable	Mupirocin– Chlorhexidine (N = 504)	Placebo (N = 413)	Relative Risk (95% CI)*
	no. (%)		
<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 (0.16–1.82)
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	

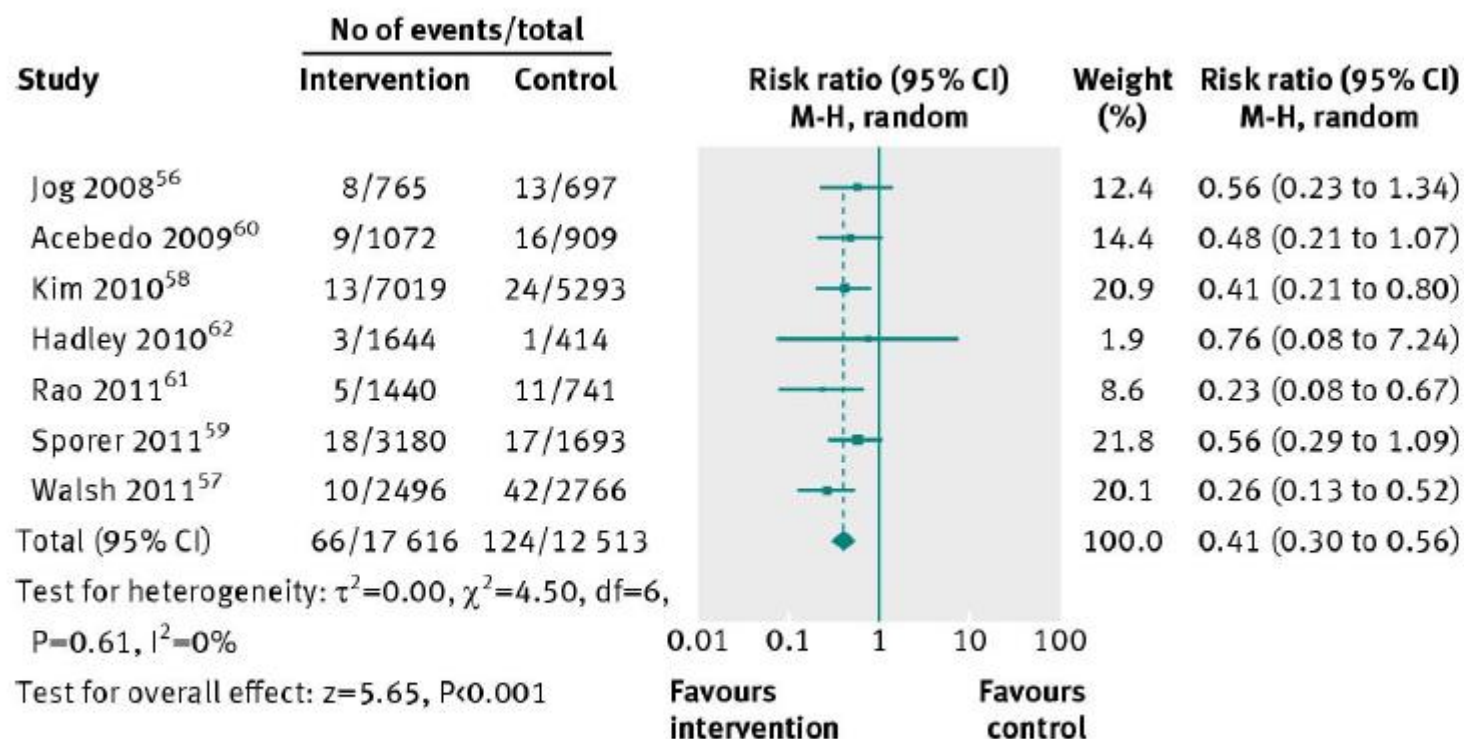
Redução de  
80%

- PCR para identificação dos colonizados por *S. aureus*
- Randomização para:  
Mupirocina nasal 2X/dia +  
banho com clorexidina por 5  
dias  
X  
Placebo

Effectiveness of a bundled intervention of decolonization and prophylaxis to decrease Gram positive surgical site infections after cardiac or orthopedic surgery: systematic review and meta-analysis

BMJ 2013;346:f2743

Estudo	RR (IC)
Descolonização de portadores de <i>S.aureus</i>	0,40 (0,29-0,55)
Descolonização universal	0,36 (0,22-0,57)



**Fig 3** Forest plot of bundle intervention to prevent surgical site infections caused by Gram positive were observational

BMJ 2013;346:f2743

Studies by intervention	All studies	Cardiac studies	Total joint arthroplasty or orthopedic studies
Gram positive SSIs	0.41 (0.30 to 0.56)	NA†	0.44 (0.31 to 0.65)
<i>S aureus</i> SSIs	0.29 (0.19 to 0.42)	NA†	0.33 (0.21 to 0.52)
MRSA SSIs	0.22 (0.12 to 0.38)	NA†	0.27 (0.14 to 0.53)
MSSA SSIs	0.45 (0.26 to 0.78)	NA†	0.42 (0.23 to 0.77)

## Preventing Surgical Site Infections: A Randomized, Open-Label Trial of Nasal Mupirocin Ointment and Nasal Povidone-Iodine Solution

Michael Phillips, MD;<sup>1,2</sup> Andrew Rosenberg, MD;<sup>1,2</sup> Bo Shopsis, MD, PhD;<sup>1,2</sup> Germaine Cuff, RN, PhD;<sup>2</sup>  
Faith Skeete, RN;<sup>1</sup> Alycia Foti, BA;<sup>1</sup> Kandy Kraemer, RN;<sup>1</sup> Kenneth Inglima, MS;<sup>1</sup>  
Robert Press, MD, PhD;<sup>1,2</sup> Joseph Bosco, MD<sup>1,2</sup>

Mupirocina nos 5 dias que  
antecedem a cirurgia, 2X/dia

+

Banho com lenços de  
clorexidina 2% na noite anterior  
e manhã da cirurgia

PVPI solução 5% 2 horas antes  
da cirurgia (4 aplicações)

+

Banho com lenços de  
clorexidina 2% na noite anterior  
e manhã da cirurgia

Cultura pré operatória para *S.aureus* para pesquisa de carreador  
nasal (7-31 dias)

Cultura nasal pós operatória para *S.aureus* para os previamente  
colonizados

TABLE 1. Demographic and Clinical Characteristics of Subjects in the Modified Intention-to-Treat Analysis

Characteristic	Mupirocin group (n = 855)	Povidone-iodine group (n = 842)
Age, years		
Median	62.4	61.8
Range	19.2–93.2	19.1–92.4
Female sex	523 (61)	499 (59)
Race		
White	677 (79)	670 (80)
Black	138 (16)	145 (17)
Asian	23 (2.7)	21 (2.5)
Other <sup>a</sup>	22 (2.6)	7 (0.8)
Ethnic group		
Hispanic	97 (11)	88 (10)
Non-Hispanic	746 (87)	749 (89)
BMI		
Median	29.5	29.5
Range	14.9–58.9	12.0–57.3
Current smoking	104 (12)	114 (13)
Medical comorbidity		
Diabetes mellitus	110 (13)	104 (12)
Rheumatoid arthritis	36 (4.2)	36 (4.3)
<b>Preoperative <i>Staphylococcus aureus</i> colonization</b>		
MSSA		135 (16)
MRSA		24 (2.9)
130 (15)		21 (2.5)
<b>Postoperative course</b>		
ASA score		
1	35 (4.5)	39 (5.0)
2	486 (62)	524 (68)
3	254 (32)	206 (27) <sup>b</sup>
4	9 (1.1)	4 (0.5)
Receipt of blood products	179 (21)	158 (19)
Postoperative day 1 glucose level ≥180 mg/dL	40 (4.7)	46 (5.5)
Procedure		
Spine fusion	148 (17)	145 (17)
Spine fusion, revision	12 (1.4)	10 (1.2)
Arthroplasty surgery		
Knee	299 (35)	297 (35)
Knee, revision	24 (2.8)	24 (2.8)
Hip	298 (35)	293 (35)
Hip, revision	35 (4.1)	29 (3.4)
Shoulder	33 (3.9)	42 (5.0)
Shoulder, revision	7 (0.8)	1 (0.1)
Bilateral arthroplasty	49 (6.2)	73 (9.3) <sup>b</sup>
Median operative time, minutes		
Spine fusion	202	205
Spine fusion, revision	256	299
Arthroplasty surgery, unilateral		
Knee	93	87
Knee, revision	137	128
Hip	94	93
Hip, revision	138	123
Shoulder	106	109
Shoulder, revision	122	119

NOTE. Data are no. (%) of patients, unless otherwise indicated. ASA, American Society of Anesthesiologists; BMI, body mass index, calculated as the weight in kilograms divided by the square of height in meters; MRSA, methicillin-resistant *S. aureus*; MSSA, methicillin-susceptible *S. aureus*.

<sup>a</sup> Other includes Native Hawaiian/Pacific Islander, American Indian/Alaska native, and no race declared.

<sup>b</sup>  $P < .05$  by  $\chi^2$  test.

TABLE 2. Number of Subjects with Deep Surgical Site Infection (SSI) and SSI Rates

Analysis	No. of subjects	Overall			<i>Staphylococcus aureus</i> infection		
		No. of cases	Rate, cases per 100 subjects	<i>P</i> <sup>a</sup>	No. of cases	Rate, cases per 100 subjects	<i>P</i> <sup>a</sup>
Intent to treat							
Mupirocin	855	14	1.6	.1	5	0.6	.2
Povidone-iodine	842	6	0.7		1	0.1	
Per protocol							
Mupirocin	763	13	1.7	.06	5	0.7	.03
Povidone-iodine	776	5	0.6		0	0	

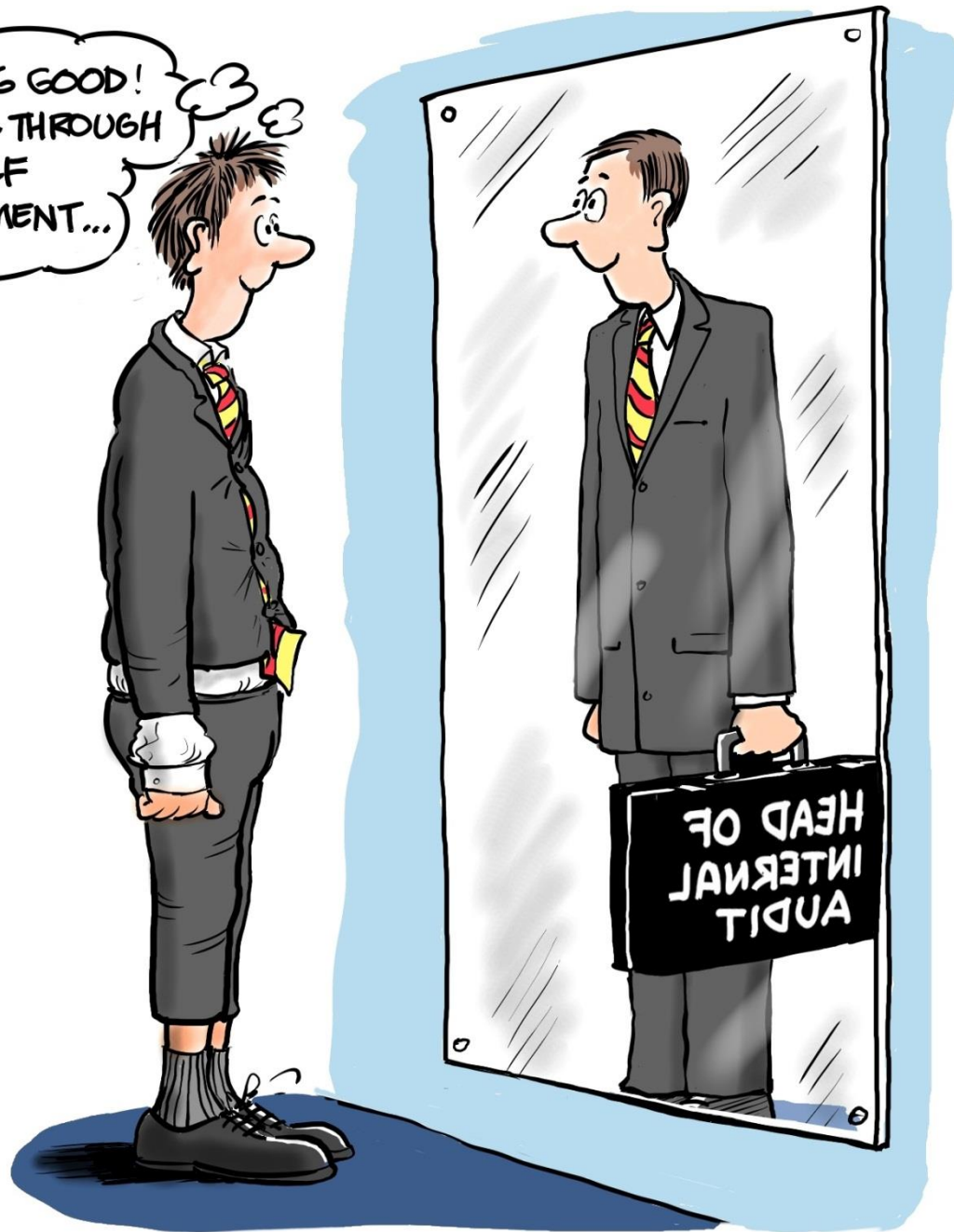
<sup>a</sup> By  $\chi^2$  test.



Opção para os nossos hospitais que não tem um ambulatório pré cirúrgico estruturado para orientar os pacientes e pesquisar colonização por *S. aureus*?

A solução de PVPI custa 3-6 vezes menos

LOOKING GOOD!  
I'LL SAIL THROUGH  
THE SELF  
ASSESSMENT...



# Lançamento

20 nov 10:30 h  
Stand APARCHI

A mais nova versão do Guia de utilização de  
anti-infecciosos e recomendações para a prevenção  
de infecções relacionadas a assistência à saúde



EM BREVE

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