

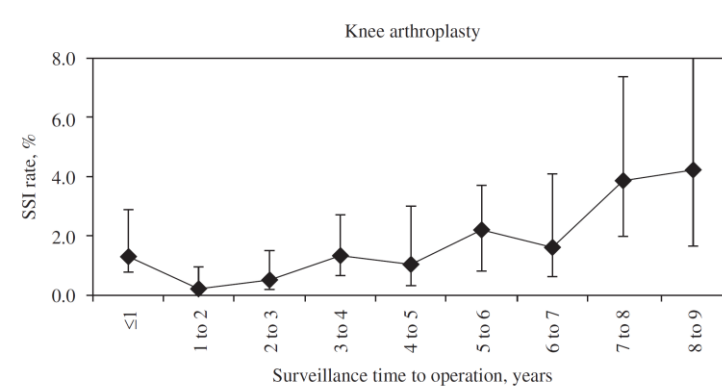
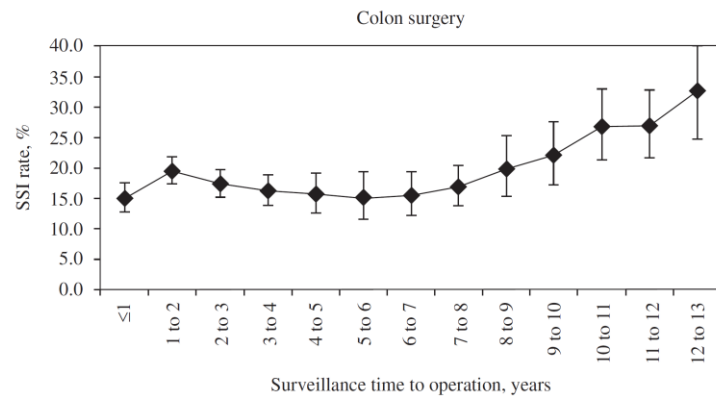
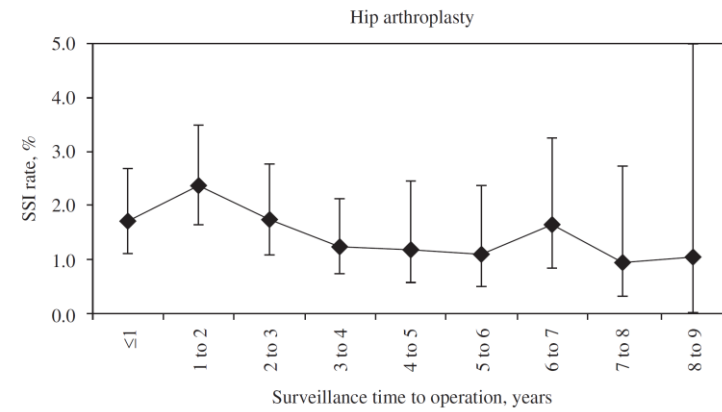
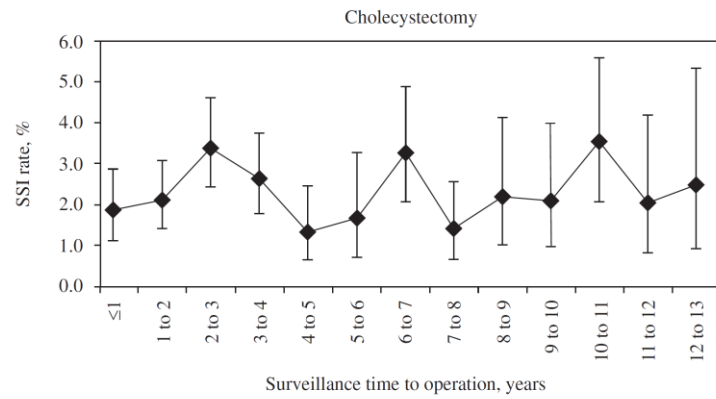
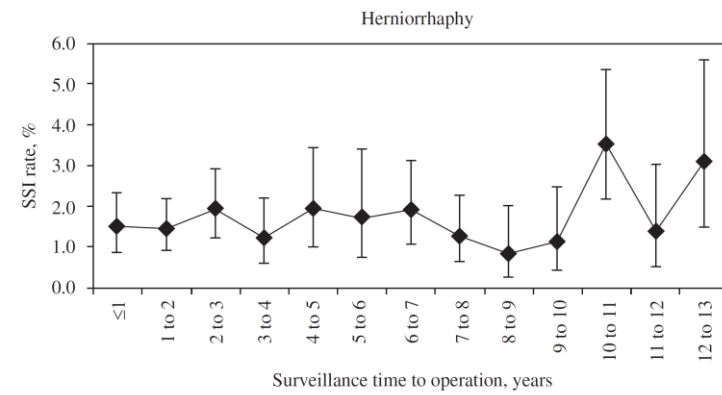
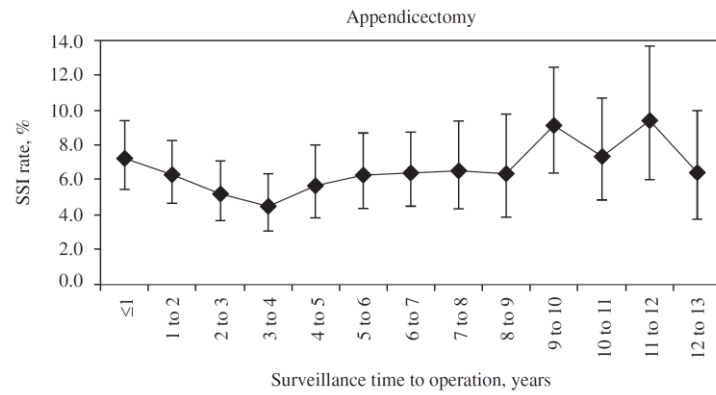
Rückmeldung zum Interventionsmodul zur SSI Prävention und Fokus auf die Antibiotikaprophylaxe

Dr. med. A. Schweiger
Leiter Forschung und Entwicklung

Hintergrund

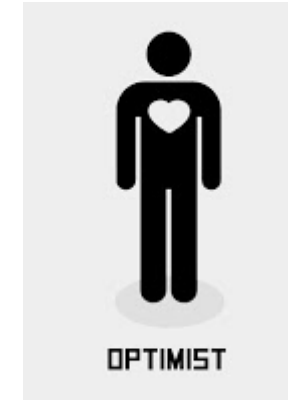
SSI- West und Südschweiz

- Multizenter-Kohortenstudie
- Insgesamt 13 Jahre Surveillance (1998-2010)
- Kumulativ 48'906 Eingriffe verfolgt
- SSI-Rate: Adaptiert nach NNIS-Index
- «Intervention»: Feedback alle 12 Monate



Mögliche Gründe für fehlende Abnahme SSI

1. Höheres Risikoprofil
 - Zusätzliche nicht in Datenerfassung integrierte Risikofaktoren
 - Beispiele: Adipositas, fortgeschrittene Tumorerkrankungen
2. Wechsel der Operateure
3. Bessere Performance der Surveillance-Teams



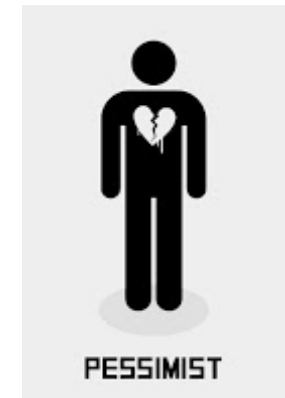
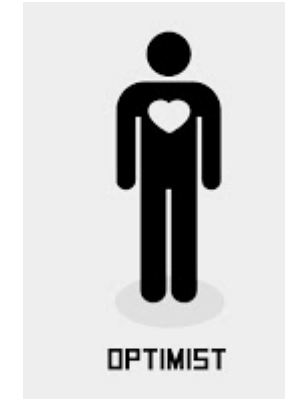
Staszewicz W et al. J Hosp Infect. 2014 Sep;88(1):40-7.

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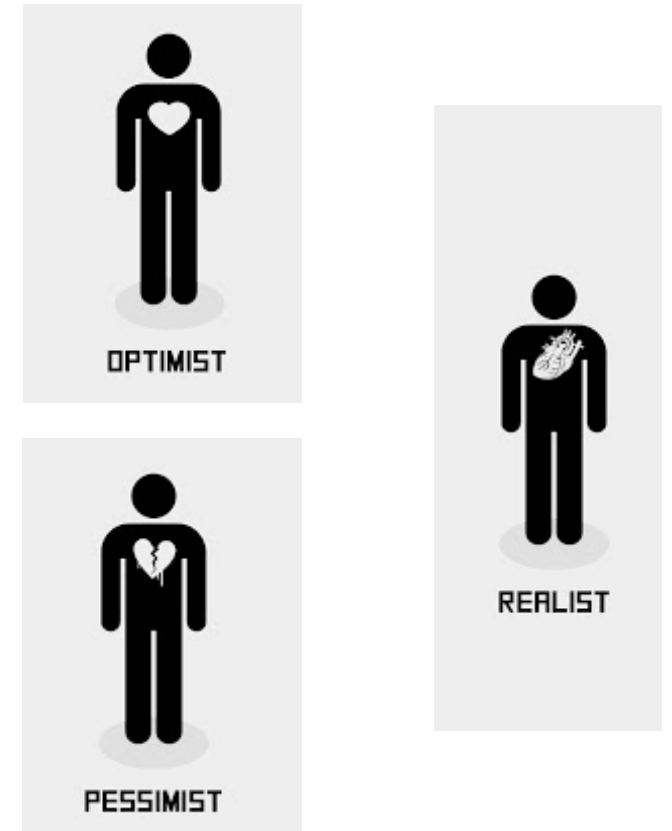
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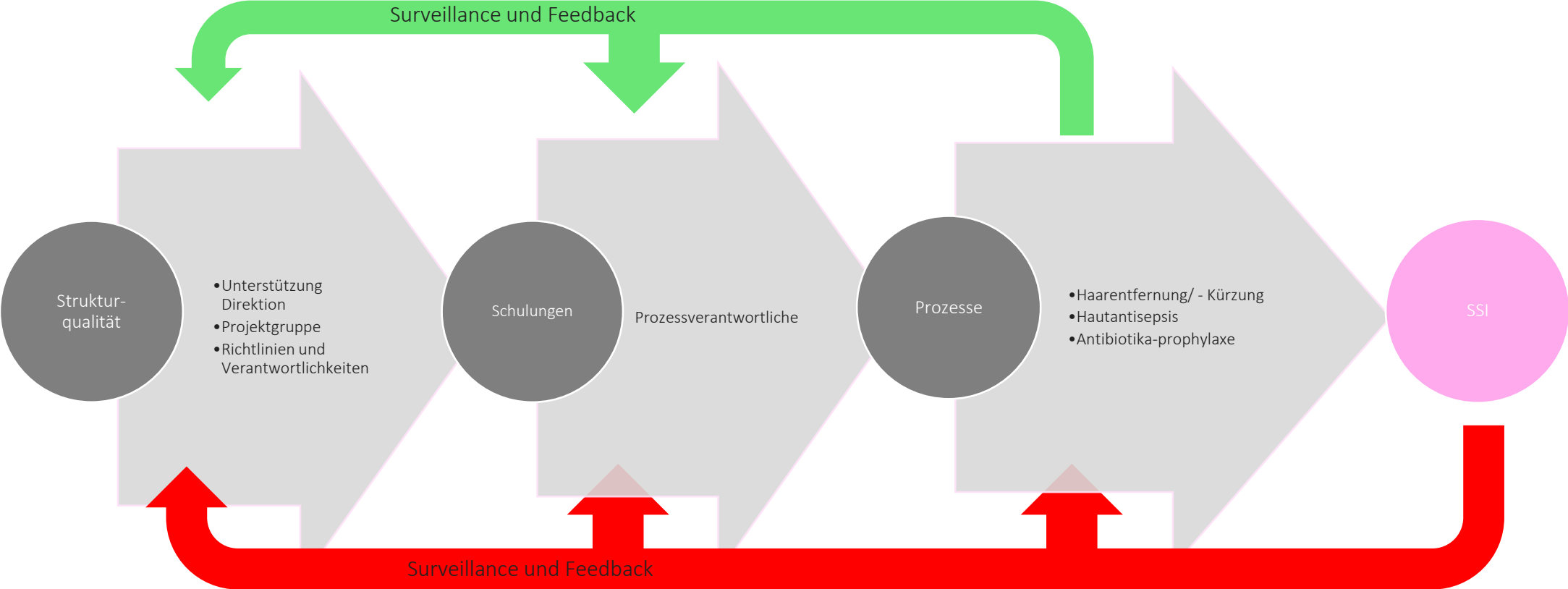
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Aufbau der Intervention



Interventions-Elemente

1. Präoperative Haarentfernung



Interventions-Elemente

1. Präoperative Haarentfernung
2. Präoperative Hautdesinfektion



Interventions-Elemente

1. Präoperative Haarentfernung
2. Präoperative Hautdesinfektion
3. Perioperative Antibiotikaprophylaxe



Interventions-Elemente

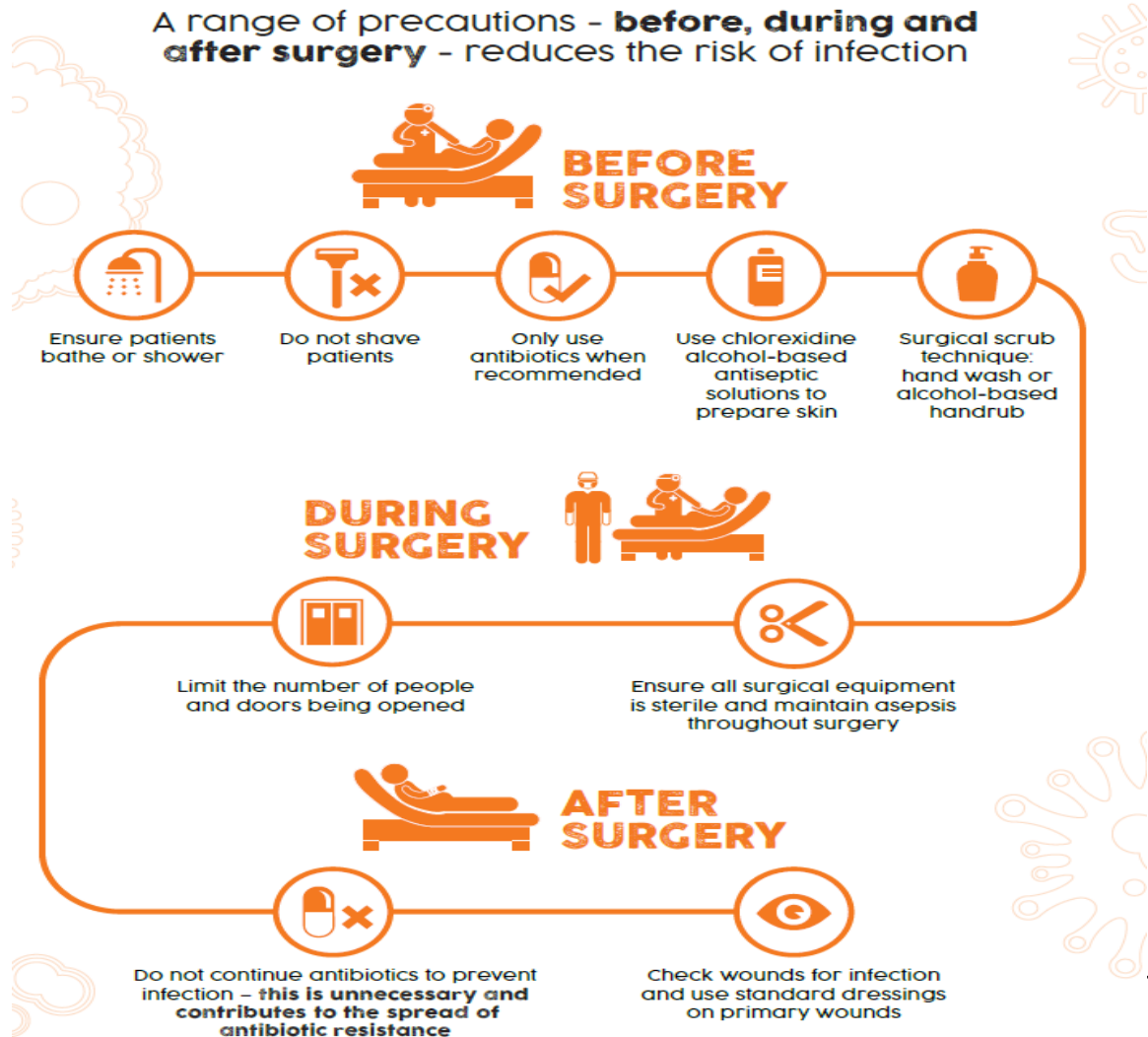
1. Präoperative Haarentfernung
2. Präoperative Hautdesinfektion
3. Perioperative Antibiotikaprophylaxe
4. Surveillance und Feedback



Top 9 WHO-Guidelines 11/2016

WHAT'S THE SOLUTION?

A range of precautions - **before, during and after surgery** - reduces the risk of infection

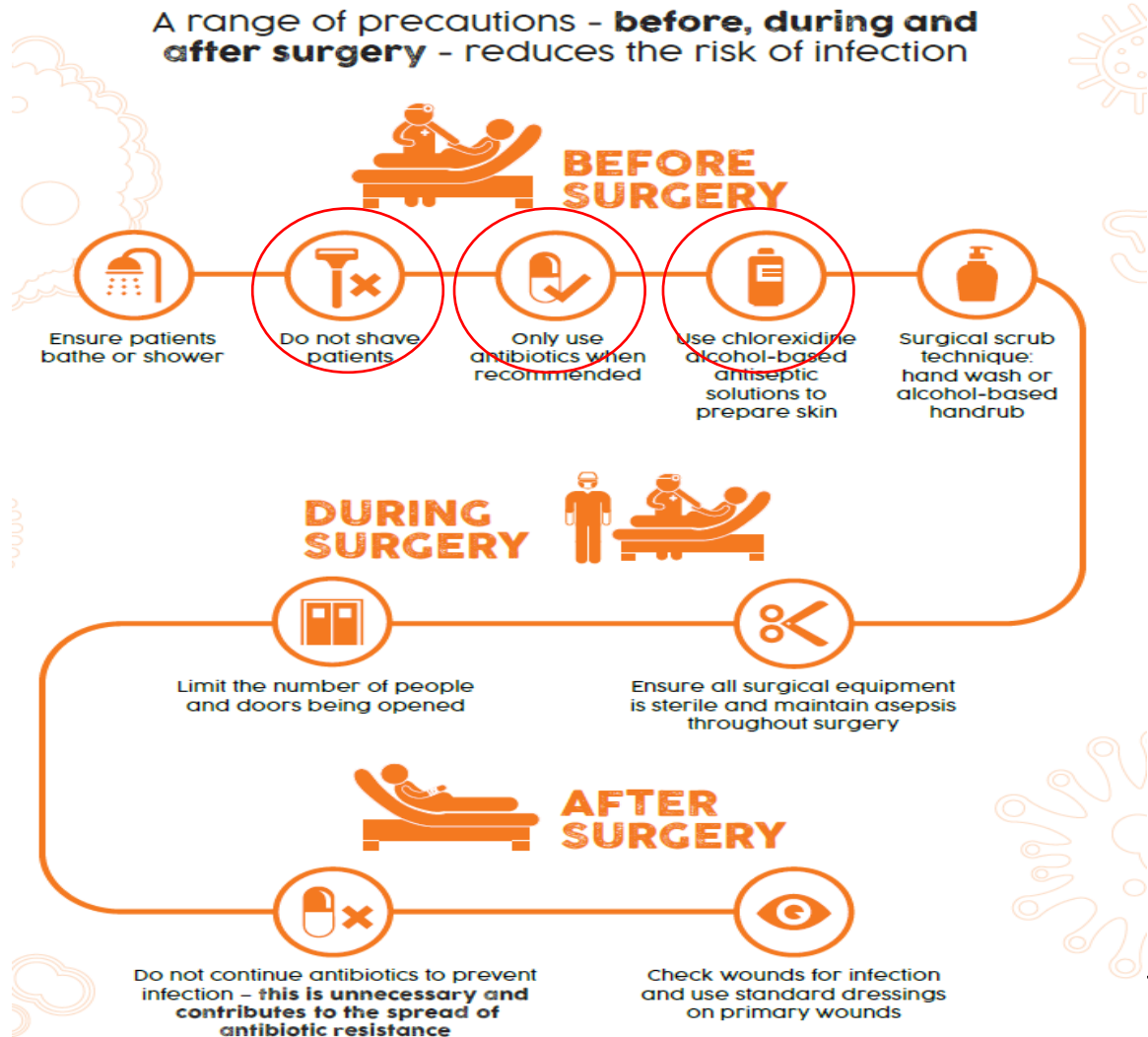


1. Kolonisation
2. Haarentfernung/ Haarkürzung
3. Antibiotikaprophylaxe (AMP)
4. Hautantiseptis
5. Chir. Händedesinfektion
6. Sterile Materialien/ Asepsis
7. Türöffnungen/ Personal im OP
8. AMP \leq 24h
9. Wundverbandprotokoll, Standardverbände

Top 9 WHO-Guidelines 11/2016

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Aktueller Stand

Total 9 Pilotspitäler, ca. 1'300 chirurgische Betten

7 → Implementation im OP

2 → Anpassung der Strukturqualität



Evaluation der Prozessparameter

Haarentfernung/ Haarkürzung

- Grundsatz: Keine Haarentfernung
- falls operationstechnisch nötig
- mit Clippern
- KEINE RASIERER
- Haarentfernung am Operationstag (<4h) in der OP-Vorbereitung
- Verantwortliche Person:
- Ist definiert
- ist **geschult** oder wird von einer geschulten Person überwacht



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	JA	NEIN	Nicht zutreffend
1. Kürzung der Haare im Operationsgebiet			
• Die Haare wurden nicht entfernt, oder wurden, bei operationstechnischer Notwendigkeit, durch Clipper gekürzt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Die Kürzung der Haare fand am Operationstag statt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Die Kürzung erfolgte von einer vorgängig definierten und geschulten Person, oder wurde durch sie beaufsichtigt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Prozess/Schritt	Compliance
Modus	87.3%
Zeitpunkt	91.4%
Qualifikation	96.6%
Total Haarentfernung	80.1%



Evaluation der Prozessparameter

Hautantiseptis

- 3-malige Applikation
- Beachten der **Einwirkzeiten**
- **Alkoholische** Lösung mit **remanentem** Desinfektionsmittel (Chlorhexidin, PVP-Jod oder Octenidin)
- Ausnahme: Schleimhäute/ Wunden
- Verantwortliche Person definiert und **geschult**



Evaluation der Prozessparameter

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- Ausnahme: Schleimhäute/ Wunden
- Verantwortliche Person definiert und **geschult**

	JA	NEIN	Nicht zutreffend
1. Hautantiseptis (Hautdesinfektion)			
• Es wurde Chlorhexidin, Octenidin oder PVP-Iod auf Alkohol-Basis (Ausnahme Schleimhäute) verwendet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Das Desinfektionsmittel wurde 3x durch eine definierte und geschulte Person aufgetragen (muss für Haupt-OP-Stelle und sekundäre OP-Stellen erfüllt sein)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Die Einwirkungszeit des Desinfektionsmittels wurde nach Herstellerangaben für jeden separaten Anstrich eingehalten (muss für Haupt-OP-Stelle und sekundäre OP-Stellen erfüllt sein)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Evaluation der Prozessparameter

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Prozess/Schritt	Compliance
Antiseptikum	82.8%
Anzahl/ Schulung	99.3%
Einwirkzeit	82.8%



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Nationales Zentrum für Infektionsprävention

1 2 3

Präoperative Hautdesinfektion – aller guten Dinge sind drei!

Evaluation der Prozessparameter

Hautantiseptis

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• Es wurde Chlorhexidin, Octenidin oder PVP-Iod auf Alkohol-Basis (Ausnahme Schleimhäute) verwendet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Prozess/Schritt	Compliance
Total Hautantiseptis	65.5%
Total ohne Einwirkzeit	81.6%
Total Haar/ Antiseptis	58.4%
Ohne Einwirkzeit	67.0%



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1 2 3

Präoperative Hautdesinfektion – aller guten Dinge sind drei!

Dauer Beobachtung

1 Beobachtung

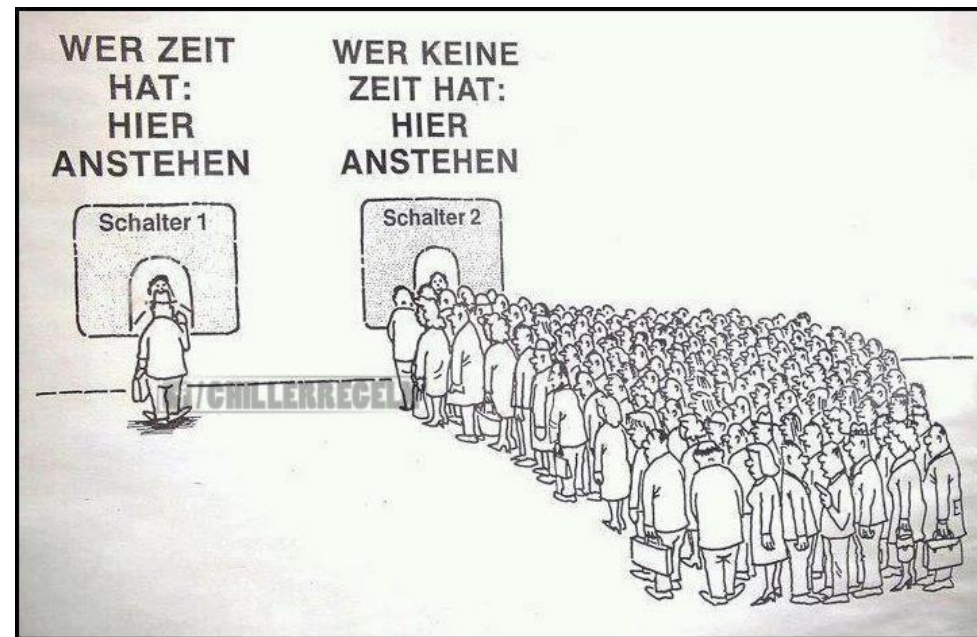
10 Beobachtungen Pro Quartal

Zeitliche Belastung Surveillance

Mittelwert 50 Minuten

8 h 20 Minuten

1 Arbeitstag



Antibiotikaprophylaxe in der Chirurgie

Alexander Schweiger

Andreas F. Widmer



Neue WHO Empfehlungen zu den intra- und postoperativen Massnahmen Nov 2016

Key research question	Recommendations for prevention of SSIs	Strength of recommendation (quality of evidence retrieved†)	Notes for implementation in low-income and middle-income countries	
(1) Perioperative oxygenation	How safe and effective is the perioperative use of high fraction of inspired oxygen in reducing the risk of SSI?	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	Strong recommendation (moderate)	Oxygen availability is low; oxygen and high-flow masks are an additional cost for the health-care facility or patient
(4) Decolonisation with mupirocin ointment with or without CHG body wash in nasal carriers of <i>Staphylococcus aureus</i> undergoing cardiothoracic and orthopaedic surgery	Is mupirocin nasal ointment in combination with or without a CHG body wash effective in reducing the number of <i>S aureus</i> infections in nasal carriers undergoing cardiothoracic and orthopaedic surgery?	Patients with known nasal carriage of <i>S aureus</i> should receive perioperative intranasal applications of mupirocin 2% ointment with or without a combination of CHG body wash	Strong recommendation (moderate)	Evidence of cost-effectiveness in high-income countries; nasal mupirocin ointment availability is low and is an additional cost for the health-care facility or patients; requires technical laboratory capacity and extra resources for the screening process
(7) MBP without the use of oral antibiotics	Is MBP without oral antibiotics effective for the prevention of SSI in colorectal surgery?	MBP alone (without the administration of oral antibiotics) should not be used in adult patients undergoing elective colorectal surgery	Strong recommendation (moderate)	It may require organisational resources for appropriate administration and possible additional costs; the oral antibiotics commonly used for MBP are inexpensive
(8) Hair removal	Does hair removal affect the incidence of SSI; and what method and timing of hair removal is associated with the reduction of SSI?§	In patients undergoing any surgical procedure, hair should either not be removed or, if absolutely necessary, it should be removed only with a clipper. Shaving is strongly discouraged at all times, whether preoperatively or in the operating room	Strong recommendation (moderate)	Clipper availability is low and their use is an additional cost for the health-care facility. If reused, appropriate cleaning and decontamination of clipper heads are crucial

Neue WHO Empfehlungen zu den intra- und postoperativen Massnahmen Nov 2016

Key research question	Recommendations for prevention of SSIs	Strength of recommendation (quality of evidence retrieved†)	Notes for implementation in low-income and middle-income countries	
(9) Optimal timing for administration of SAP	How does the timing of SAP administration affect the risk of SSI?	Administration of SAP should be before the surgical incision when indicated	Strong recommendation (low)	Cost, feasibility, and equity were not identified as significant issues; however, organisational resources and staff training are needed for implementation
(10) Precise timing for administration of SAP	What is the precise optimal timing?	SAP should be administered within 120 min before incision, while considering the half-life of the antibiotic	Strong recommendation (moderate)	Cost, feasibility, and equity were not identified as significant issues; however, organisational resources and staff training are needed for implementation
(16) Surgical antibiotic prophylaxis prolongation	Does continued postoperative surgical antibiotic prophylaxis reduce the risk of SSI compared with preoperative and (if necessary) intraoperative prophylaxis only?	Surgical antibiotic prophylaxis administration should not be prolonged after completion of the operation	Strong recommendation (moderate)	This recommendation leads to a cost reduction because of reduced antibiotic use; it also contributes to preventing antimicrobial resistance
(12) Surgical site preparation	In surgical patients, should alcohol-based antiseptic or aqueous solutions be used for skin preparation and, more specifically, should CHG or povidone-iodine solutions be used?	Alcohol-based antiseptic solutions based on CHG for surgical site skin preparation should be used in patients undergoing surgical procedures	Strong recommendation (low to moderate)	Availability of alcohol-based antiseptic solutions based on CHG is low and their use can be an additional cost for the health-care facility; local production should be encouraged
(11) Surgical hand preparation	What is the most effective type of product for surgical hand preparation to prevent SSI; and what is the most effective technique and the ideal duration of surgical hand preparation?	Surgical hand preparation should be performed either by scrubbing with a suitable antimicrobial soap and water or using a suitable alcohol-based hand rub before donning sterile gloves	Strong recommendation (moderate)	Surgery should not take place without surgical hand preparation; evidence of alcohol-based hand rub cost-effectiveness exists, including in low-income and middle-income countries; however, availability of and access to clean water can be poor in rural areas; alcohol-based hand rub availability may also be limited and its use may represent an additional cost to the health-care facility; local production should be encouraged

Grundregeln für eine Antibiotika-Prophylaxe

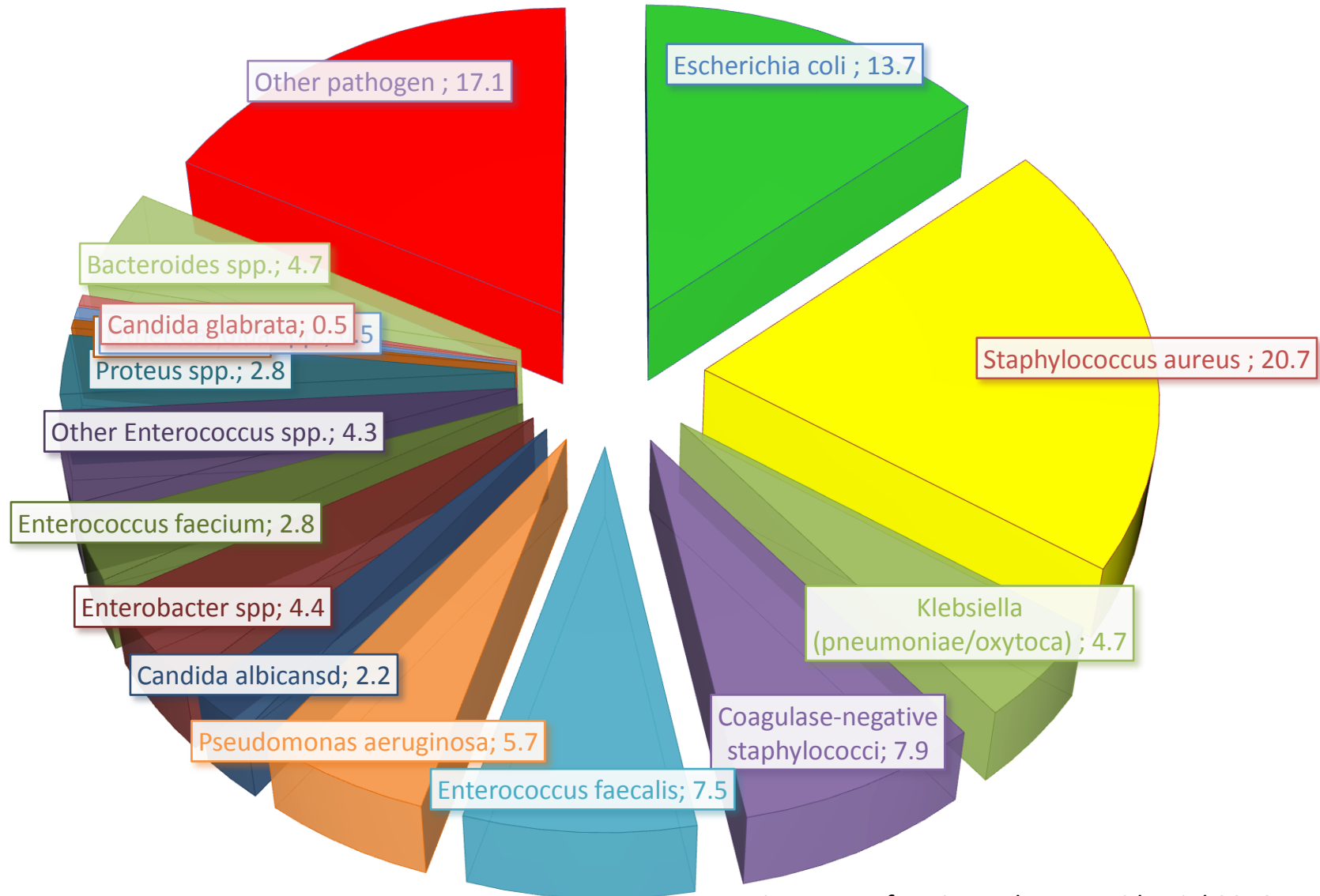
Empfehlungen Österreich

- Eine perioperative Prophylaxe ist nur bei Operationen mit **erhöhtem postoperativen Infektionsrisiko** indiziert (siehe Tabellen). Indikationen sind Wundinfektionsraten (Wundinfektions-Risiko) > 5 %, mögliche **schwerwiegende Folgen** lokal (z.B. Neurochirurgie) bzw. systemisch (z.B. immunsupprimierte Patienten).
- Die perioperative Antibiotika-Prophylaxe hat üblicherweise **mit Beginn der Narkose einzusetzen**, (auf jeden Fall aber **30 - 60 min.** bevor operative Handlungen gesetzt werden), um eine rechtzeitige Verteilung des Antibiotikums im Gewebe bzw. zum Ort einer potentiellen Infektion zu gewährleisten.
Die Antibiotikagabe erst **nach Wundverschluss** ist **wirkungslos**.
- Antibiotika-Prophylaxe **so kurz wie möglich ("single shot")**.
- Bei OP-Dauer > 2,5 bis 3 Stunden oder bei OP mit Blutverlust > 1 Liter sollte eine Wiederholungs-dosis verabreicht werden. Generell sollte eine weitere Dosis verabreicht werden, wenn die OP länger dauert als das **2,5-fache der Halbwertszeit** des verwendeten Antibiotikums (**Redosing**).

Antibiotikaprophylaxe in der Chirurgie: Basics

- Essentielle Daten zur Selektion des optimalen Antibiotikums zur chirurgischen Antibiotikaprophylaxe (Evidenz 1A)
 - Erwartetes Spektrum der Erreger, in Abhängigkeit der chirurgischen Disziplin (e.g. *S.aureus* in Orthopädie)
 - Zeitpunkt der Applikation des Antibiotikums vor Schnitt
 - Erwartete Dauer der Operation
- Klinisch wichtig (WHO Eminence-based medicine)
 - Body-mass-index (BMI) des Patienten
 - Einfachheit der Applikation
 - «Redosing»

Distribution of Pathogens Associated With Surgical Site Infections (SSIs) Frequently Reported to the National Healthcare Safety Network (NHSN), by Type of Surgery, 2011–2014



Distribution of Pathogens Associated With Surgical Site Infections (SSIs) Frequently Reported to the National Healthcare Safety Network (NHSN), by Type of Surgery, 2011–2014

Pathogen	Total no. (%) of pathogens	Abdominal ^a
<i>Staphylococcus aureus</i>	30,902 (20.7)	6,922 (9.1)
<i>Escherichia coli</i>	20,429 (13.7)	14,955 (19.6)
Coagulase-negative staphylococci	11,799 (7.9)	3,273 (4.3)
<i>Enterococcus faecalis</i>	11,156 (7.5)	7,197 (9.4)
<i>Pseudomonas aeruginosa</i>	8,458 (5.7)	4,469 (5.9)
<i>Klebsiella (pneumoniae/oxytoca)</i>	7,067 (4.7)	4,318 (5.7)
<i>Bacteroides</i> spp.	7,041 (4.7)	5,690 (7.5)
<i>Enterobacter</i> spp.	6,615 (4.4)	3,475 (4.6)
Other <i>Enterococcus</i> spp.	6,410 (4.3)	4,692 (6.1)
<i>Proteus</i> spp.	4,196 (2.8)	1,473 (1.9)
<i>Enterococcus faecium</i>	4,140 (2.8)	3,451 (4.5)
<i>Candida albicans</i>	3,351 (2.2)	2,736 (3.6)
Viridans streptococci	2,639 (1.8)	1,849 (2.4)
Group B streptococci	1,879 (1.3)	291 (0.4)
<i>Serratia</i> spp.	1,857 (1.2)	333 (0.4)
Other pathogen	21,070 (14.1)	11,183 (14.7)
Total	149,009 (100)	76,307 (100)

Weiner LM, Infect Control Hosp Epidemiol 2016;1–14

Distribution of Pathogens Associated With Surgical Site Infections (SSIs) Frequently Reported to the National Healthcare Safety Network (NHSN), by Type of Surgery, 2011–2014

Pathogen	Orthopedic ^h	Prostate ⁱ
<i>Staphylococcus aureus</i>	15,163 (44.2)	18 (29.5)
<i>Escherichia coli</i>	1,625 (4.7)	7 (11.5)
Coagulase-negative sta	4,461 (13.0)	4 (6.6)
<i>Enterococcus faecalis</i>	1,620 (4.7)	5 (8.2)
<i>Pseudomonas aeruginosa</i>	1,672 (4.9)	3 (4.9)
<i>Klebsiella (pneumoniae)</i>	943 (2.7)	4 (6.6)
<i>Bacteroides</i> spp.	128 (0.4)	5 (8.2)
<i>Enterobacter</i> spp.	1,401 (4.1)	1 (1.6)
Other <i>Enterococcus</i> spp.	592 (1.7)	3 (4.9)
<i>Proteus</i> spp.	1,108 (3.2)	...
<i>Enterococcus faecium</i>	271 (0.8)	2 (3.3)
<i>Candida albicans</i>	132 (0.4)	2 (3.3)
Viridans streptococci	254 (0.7)	...
Group B streptococci	765 (2.2)	...
<i>Serratia</i> spp.	527 (1.5)	1 (1.6)
Other pathogen	3,679 (10.7)	6 (9.8)
Total	34,341 (100)	61 (100)

Weiner LM, Infect Control Hosp Epidemiol 2016;1–14

Auswahl des Antibiotikums

Examples

- Orthopädie (Implantat)
 - 1. or 2.Gen Cephalosporin
- Häufige Erreger
 - *S.aureus*
 - Coag.neg.staphylococci
- Abdominalchirurgie
 - 2. Gen Cephalosporin plus Metronidazol
 - andere
- *E.coli*
 - Anaerobes (*B.fragilis*)
 - Enterococci

Clinical practice guidelines for antimicrobial prophylaxis in surgery

The antimicrobial agent should be administered at such a time to provide Serum and tissue concentrations

exceeding the minimum inhibitory Concentration (MIC)

(höher als minimale Hemmkonzentration MHK)

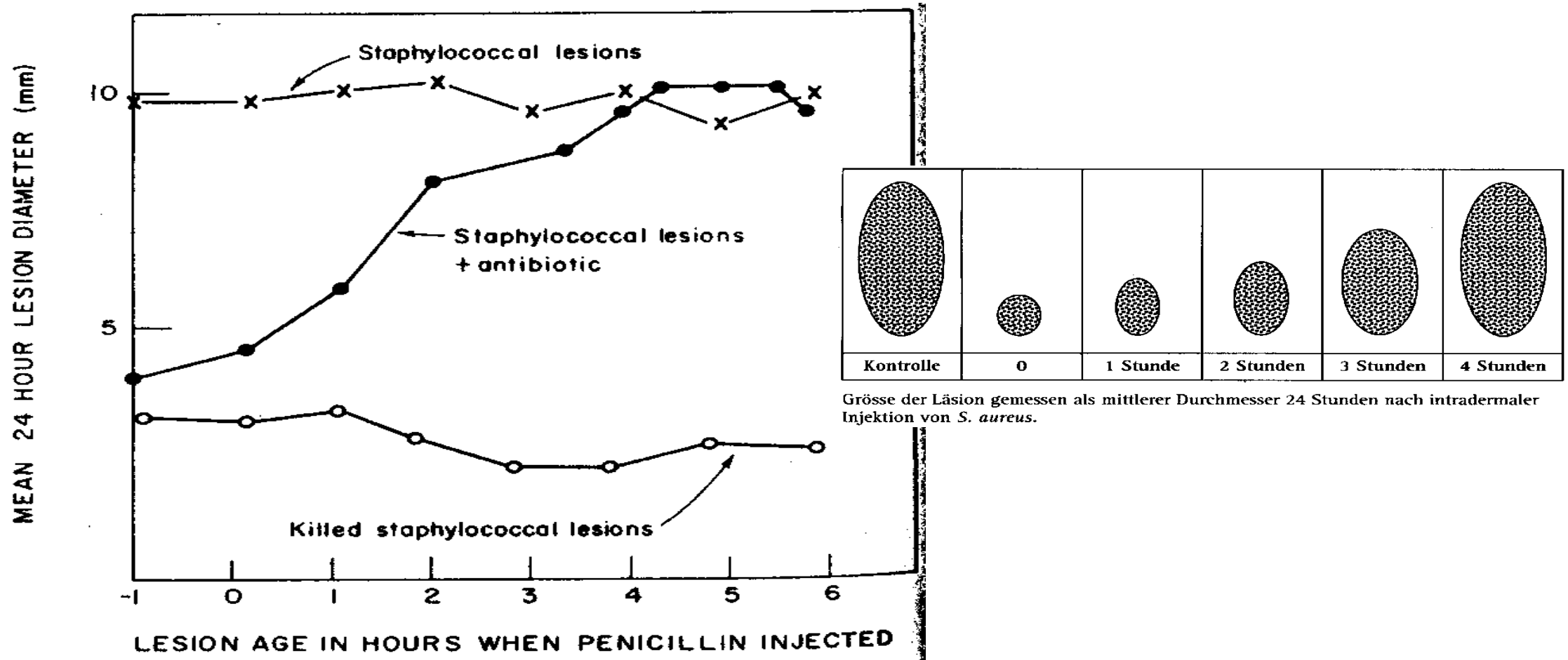
for the probable organisms associated with the procedure, at the time of incision, and for the duration of the procedure

Ziel der Prophylaxe/ Timing:

Antibiotikum am Zielort in genügender
Konzentration vor und während chirurgischer
«Kontamination»

The effective periode of preventive antibiotic action in experimental dermal lesions

J.F. Burke 1961. Surgery 50: 161-168



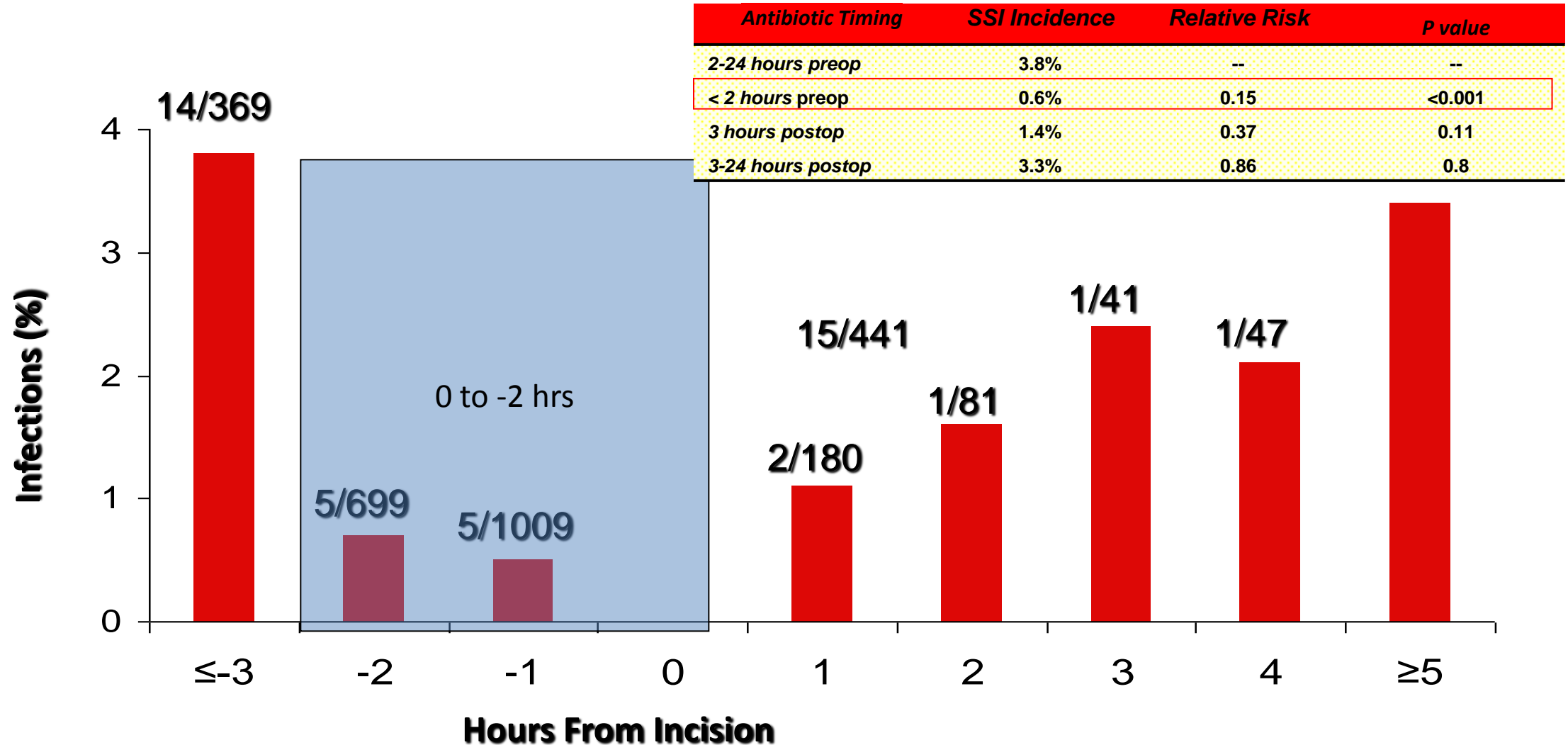
Antibiotic levels in Serum, Bone and Tissue ($\mu\text{g/ml}$)

Cephalosporine Single-shot 1g iv

	Serum			Bone			Tissue		
Time (min)	20	30	60	20	30	60	20	30	60
Cefamandol	74	50	34	11	14	8	16	18	16
Cefuroxime	63	47	35	11	14	7	18	19	19

Perioperative Antimicrobial Prophylaxis

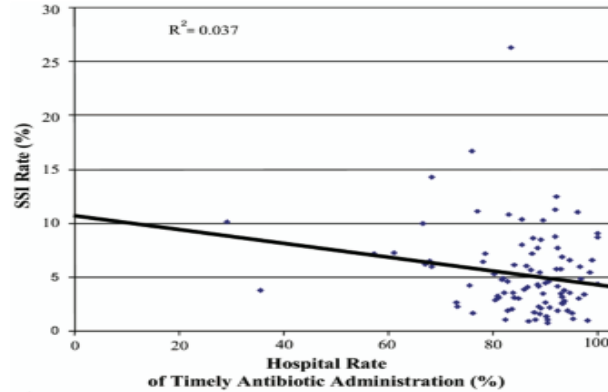
Timing of Administration



Antibiotics used in the Classen Study

- 84% of all the antibiotics used:
 - 56% cefazolin half-life: 2 hours
 - 12 % cefonicid half-life: 5 hours
 - 10% cefoxitin half-life: 0.7-1 hour
 - 6% cefamandole half-life: 0.5 hour
 - 16% other (vancomycin ?)
- “All the patients received prophylaxis for a minimum of 24 hours after surgery, and more than 80 percent received it for at least 48 hours”

No Association of Timely Administration of Prophylactic Antibiotics for Major Surgical Procedures and Surgical Site Infection



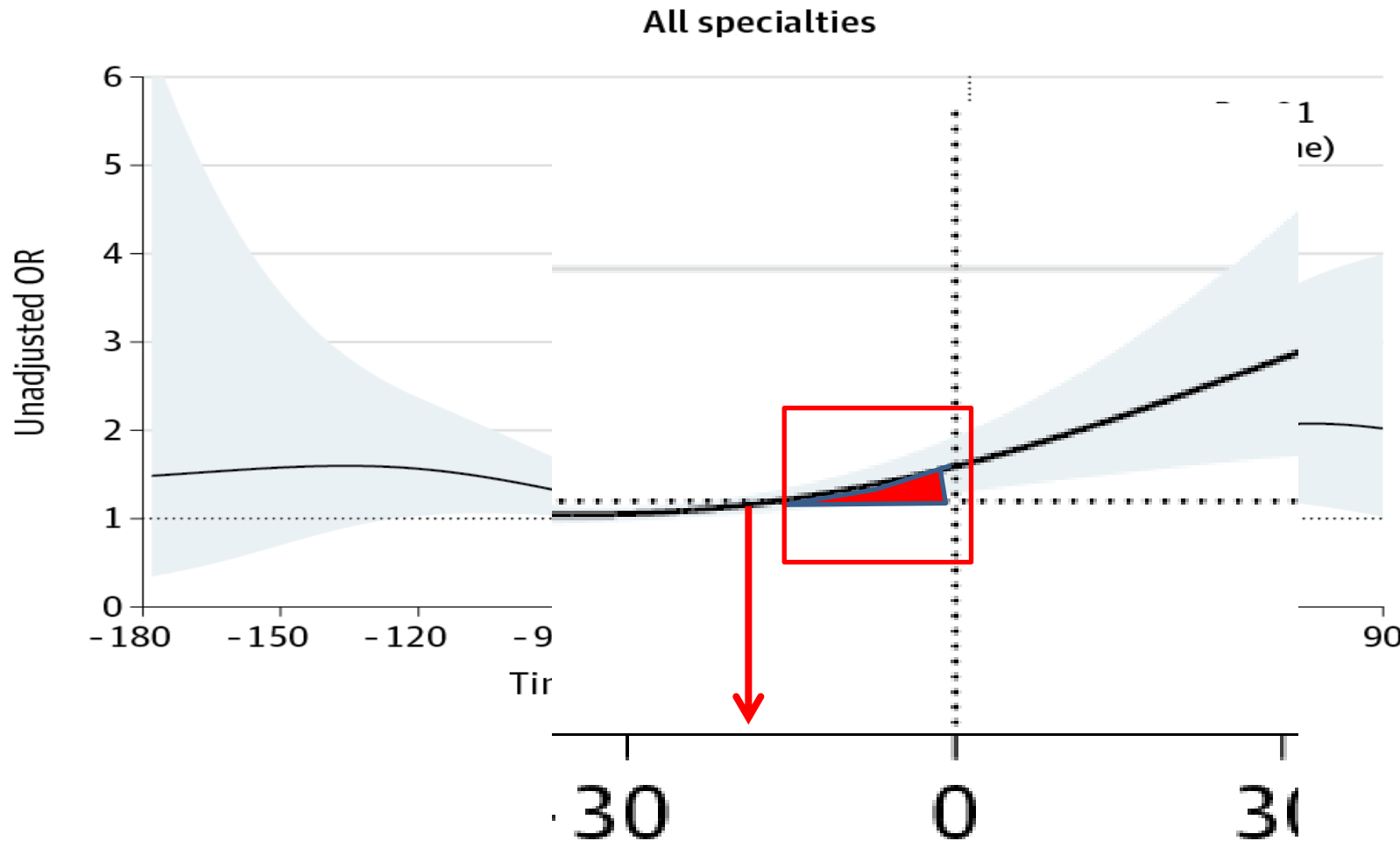
Analysis of surveillance data

A

Table 2. Relationship Between Timely Antibiotic Administration and Surgical Site Infection Stratified by Procedure Type

Procedure	Timely	n	Surgical site Infection		Odds ratio	95% CI	p Value
			Yes	No			
Orthopaedic	Yes	5,310	85	5,225	0.93	0.49–1.78	0.83
	No	671	10	661			
Colon	Yes	1,591	194	1,397	0.88	0.62–1.26	0.50
	No	375	41	334			
Vascular	Yes	1,044	80	964	1.38	0.84–2.28	0.21
	No	204	21	183			

No Association Between Timing of Prophylactic Antibiotics and SSI if given prior Incision



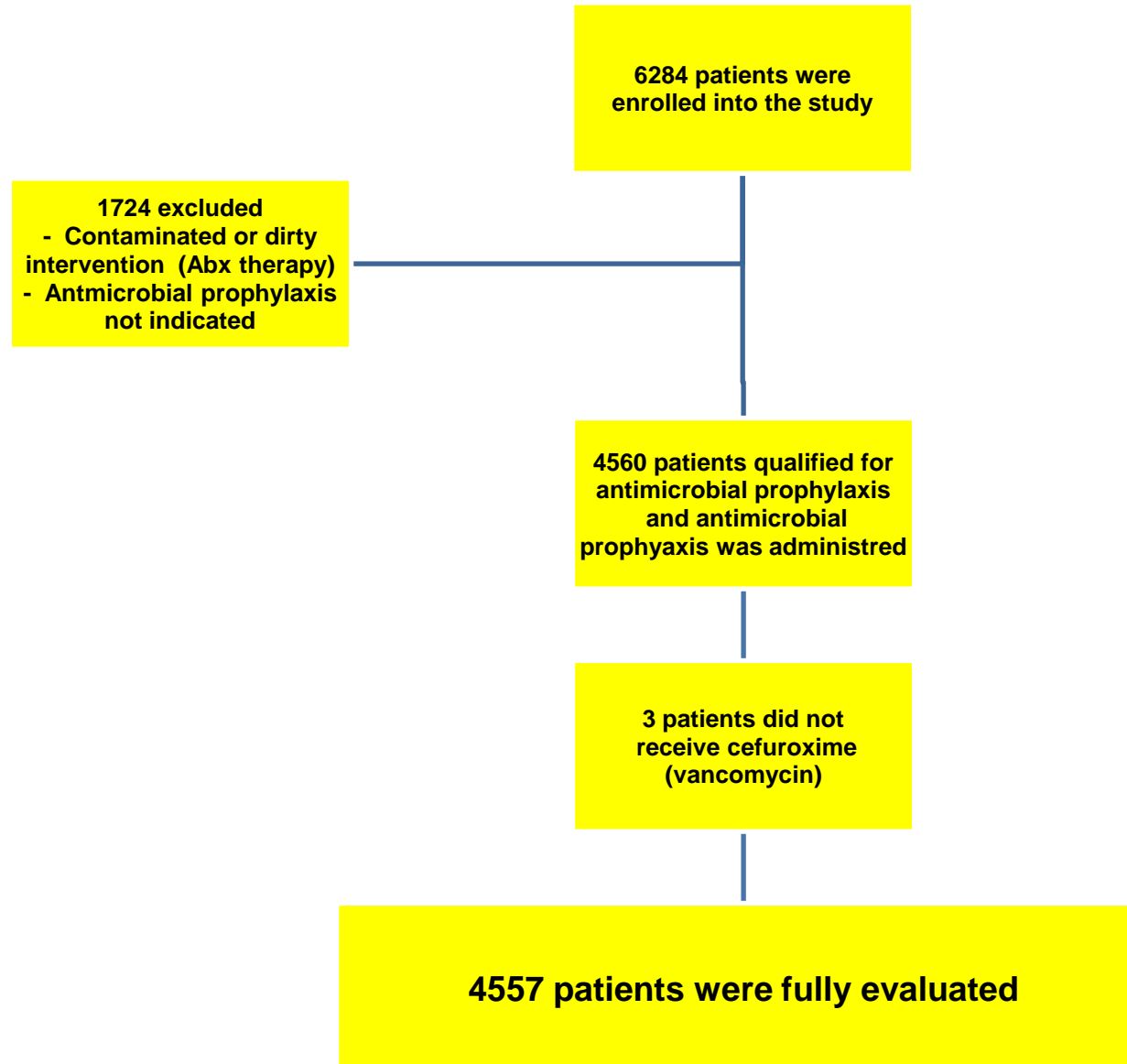
VA Hospital database
 32' 459 operations with prophylaxis
 median 28 minutes prior incisions (interquartile
 range, 17-39 minutes)
 SSI rate: 1497 (4.6%)

OR= 1.34(CI₉₅1.08-1.66)
 significantly increase of SSI
 if given >60 prior incision

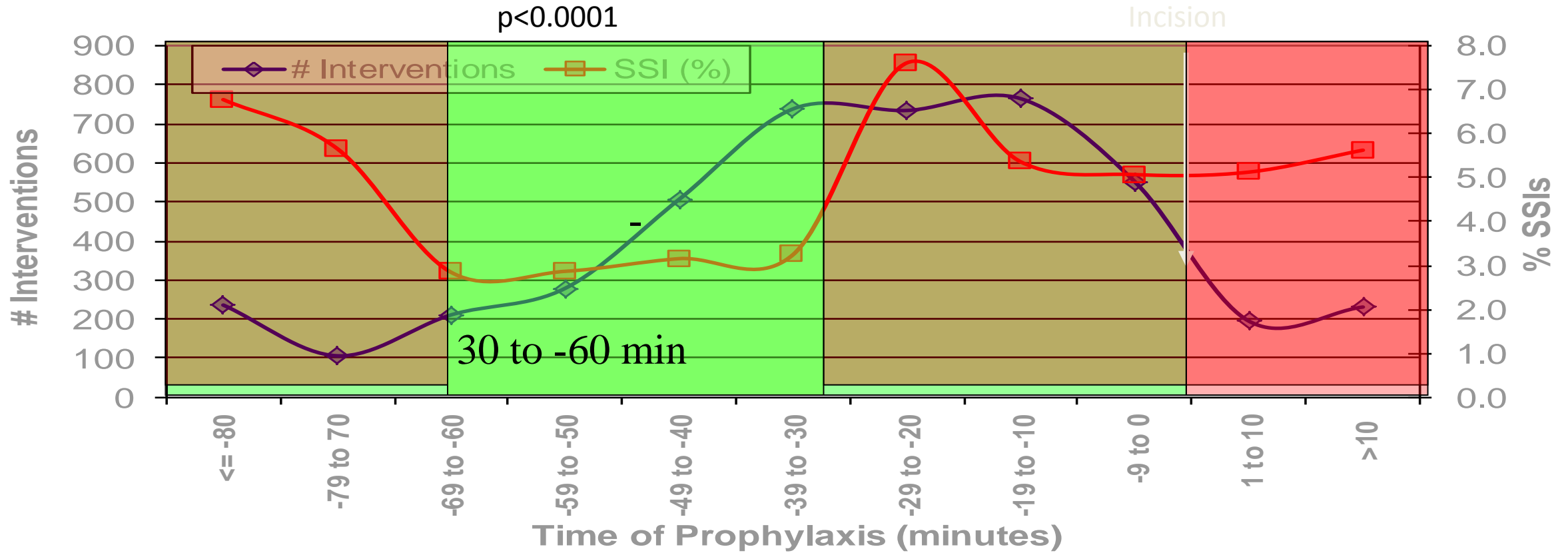
OR = 1.26(CI₉₅, 0.92-1.72).
 No increase, if given after incision

redosing and microbiologic characteristics of SSI
 were not studied,

Prospective Trial on Timing of Antimicrobial Prophylaxis



Incidence of SSIs and Time of Antimicrobial Prophylaxis prior to Incision with Cefuroxime 1.5g iv



Timing of surgical antimicrobial prophylaxis: a phase 3 randomised controlled trial

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Summary

Background Based on observational studies, administration of surgical antimicrobial prophylaxis (SAP) for the prevention of surgical site infection (SSI) is recommended within 60 min before incision. However, the precise optimum timing is unknown. This trial compared early versus late administration of SAP before surgery.

Methods In this phase 3 randomised controlled superiority trial, we included general surgery adult inpatients (age ≥ 18 years) at two Swiss hospitals in Basel and Aarau. Patients were randomised centrally and stratified by hospital according to a pre-existing computer-generated list in a 1:1 ratio to receive SAP early in the anaesthesia room or late in the operating room. Patients and the outcome assessment team were blinded to group assignment. SAP consisted of single-shot, intravenous infusion of 1.5 g of cefuroxime, a commonly used cephalosporin with a short half-life, over 2–5 min (combined with 500 mg metronidazole in colorectal surgery). The primary endpoint was the occurrence of SSI within 30 days of surgery. The main analyses were by intention to treat. The trial is registered with ClinicalTrials.gov, number NCT01790529.

Findings Between Feb 21, 2013, and Aug 3, 2015, 5580 patients were randomly assigned to receive SAP early (2798 patients) or late (2782 patients). 5175 patients (2589 in the early group and 2586 in the late group) were analysed. Median administration time was 42 min before incision in the early group (IQR 30–55) and 16 min before incision in the late group (IQR 10–25). Inpatient follow-up rate was 100% (5175 of 5175 patients); outpatient 30-day follow-up rate was 88.8% (4596 of 5175), with an overall SSI rate of 5.1% (234 of 4596). Early administration of SAP did not significantly reduce the risk of SSI compared with late administration (odds ratio 0.93, 95% CI 0.72–1.21, $p=0.601$).

Interpretation Our findings do not support any narrowing of the 60-min window for the administration of a cephalosporin with a short half-life, thereby obviating the need for increasingly challenging SAP timing recommendations.

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Introduction

Surgical site infections (SSIs) are the most common hospital-acquired infections in surgical patients, and have a substantial economic effect.¹ Administration of surgical antimicrobial prophylaxis (SAP) is a highly effective method that reduces the risk of SSI after various surgical procedures.^{2–4} Single-shot first-generation or second-generation cephalosporins are widely used as the drug of choice for routine SAP, supplemented with metronidazole to provide anaerobic activity in colorectal surgery.⁵

The association between timing of SAP and risk of SSI has been described in early experimental animal studies.⁶ The landmark study by Classen and colleagues⁷ in 1992 showed that the lowest risk of SSI in human beings was when SAP was initiated within 2 h of skin incision. The 2016 WHO guidelines for the prevention of SSI still call for a timing of less than 120 min before incision, but recommend that administration should

be closer to the incision time (<60 min before) for antibiotics with a short half-life, such as commonly used cephalosporins and penicillins.⁸ This 60-min window before surgery reflects the most widely implemented recommendation on SAP timing.^{5,9,10} The 2013 National Institute for Health and Care Excellence guidelines simply recommend a single dose of antibiotic intravenously on starting anaesthesia.¹¹

Several groups have attempted to further reduce the 60-min window, resulting in two opposing clinical trends in SAP timing recommendations. Most of these observational studies favour the administration of SAP shortly before incision.^{12–14} Therefore, some guidelines suggest that SAP should be administered within the final 30 min before incision, except for vancomycin and fluoroquinolones.^{15,16} Other observational studies, including the largest prospective cohort study on cefuroxime (a second-generation cephalosporin) to date,^{17,18} suggested that administration of SAP close to



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Weber W. (Widmer A) ...MartiW
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	SAP in anaesthesia room, early administration (n=2296)*	SAP in operating room, late administration (n=2300)*	Odds ratio (95% CI)	p value†
Primary outcome				
Surgical site infection	113 (5%)	121 (5%)	0.93 (0.72–1.21)	0.601
Superficial incisional infection	48 (2%)	55 (2%)	0.87 (0.59–1.29)	0.491
Deep incisional infection	23 (1%)	20 (1%)	1.15 (0.63–2.11)	0.642
Organ space infection	42 (2%)	46 (2%)	0.91 (0.60–1.39)	0.673
Secondary outcomes				
All-cause 30-day mortality	29 (1%)	24 (1%)	1.21 (0.70–2.09)	0.485
Median length of hospital stay, days	5.1 (3–9)	5.0 (3–10)	NA	0.375

Data are n (%) or median (IQR). For the secondary outcome all-cause 30 day mortality, the complete case set numbers were 2301 in the early and 2306 in the late group. For the secondary outcome median length of hospital stay, the complete case set numbers are equal to the total study population (ie, 2589 for the early group and 2586 for the late group). SAP=surgical antimicrobial prophylaxis. NA=not applicable. *These numbers represent the complete case set (ie, the numbers of cases with complete 30-day follow-up). †p values for binary outcomes are Wald p values from logistic regression and for length of stay from a Wilcoxon (Mann–Whitney) rank-sum test.

Table 2: Effect of early vs late administration of surgical antimicrobial prophylaxis on primary and secondary outcomes in the intention-to-treat analysis



SURGICAL SAFETY CHECKLIST (DRAFT)

SAFE SURGERY SAVES LIVES
GLOBAL PATIENT SAFETY CHALLENGE
WORLD HEALTH ORGANIZATION

TIME OUT - PRIOR TO SKIN INCISION, THE FOLLOWING ITEMS MUST BE COMPLETED:

- SURGEON, NURSE, AND ANAESTHESIA PROFESSIONAL VERBALLY CONFIRM PATIENT, SITE, PROCEDURE, POSITION
- ANTIBIOTIC PROPHYLAXIS GIVEN IN LAST 60 MIN NOT APPLICABLE
- ESSENTIAL IMAGING DISPLAYED NOT APPLICABLE

ANTICIPATED CRITICAL EVENTS

- SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS?
- ANAESTHESIA TEAM REVIEWS: WHAT ARE CRITICAL RESUSCITATION PLANS, PATIENT-SPECIFIC CONCERNS, IF ANY?
- NURSING TEAM REVIEWS: WHAT ARE THE STERILITY INDICATOR RESULTS, EQUIPMENT ISSUES, OTHER PATIENT CONCERNS?
- OTHER CHECKS: _____

- ANAESTHESIA TEAM REVIEWS: WHAT ARE CRITICAL RESUSCITATION PLANS, PATIENT-SPECIFIC CONCERNS, IF ANY?
- NURSING TEAM REVIEWS: WHAT ARE THE STERILITY INDICATOR RESULTS, EQUIPMENT ISSUES, OTHER PATIENT CONCERNS?
- OTHER CHECKS: _____

Guideline
WHO Jan 2009

- #### ***SIGN OUT - PRIOR TO REMOVAL OF SURGICAL DRAPES, THE FOLLOWING ITEMS MUST BE COMPLETED:***
- SURGEON REVIEWS WITH ENTIRE TEAM:
 - WHAT PROCEDURE WAS DONE
 - IMPORTANT INTRA-OPERATIVE EVENTS
 - MANAGEMENT PLAN
 - ANAESTHESIA PROFESSIONAL REVIEWS WITH ENTIRE TEAM:
 - IMPORTANT INTRA-OPERATIVE EVENTS
 - RECOVERY PLAN
 - NURSE REVIEWS WITH ENTIRE TEAM:
 - INSTRUMENT AND SPONGE COUNTS
 - SPECIMEN LABELLING (INCLUDING PATIENT NAME)
 - IMPORTANT INTRA-OPERATIVE EVENTS/RECOVERY PLAN

ANTIMICROBIAL PROPHYLAXIS (AMP) – PARENTERAL

What are the most effective strategies for administering parenteral AMP to reduce the risk of SSI?

Recommendations by CDC Atlanta 2014

1A. **No recommendation** can be made regarding the optimal timing of preoperative parenteral prophylactic antimicrobial agent administration for the prevention surgical site infection. **(No recommendation/unresolved issue)**

- *Clinical practice guidelines recommend administering by the intravenous route a **single dose** of prophylactic antimicrobial agent.*
- *For most prophylactic agents, administration should be **within 60 minutes** prior to incision.*
- *Administer vancomycin and fluoroquinolones within **60-120 minutes** prior to incision.* [12,22-27](#)

1E. 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) [34-72](#)

WHO Surgical Site infection Prevention Guidelines

Systematic review on optimal timing for preoperative surgical antibiotic prophylaxis

1. Overall, low quality evidence shows that **the administration of SAP after incision causes significant harm** due to an increase of the SSI risk when compared to administration prior to incision.
2. Overall, moderate quality evidence shows that SAP administration **before 120 minutes prior to incision** causes significant harm due to increase of the SSI risk compared to administration within 120 minutes.
3. **It is not possible to establish more precisely the optimal timing within the 120-minute interval.**

No significant difference was found between the different time intervals within this period i.e. within 120 to 60 minutes prior to incision vs. within 60 to 0 minutes prior to incision or within 60 to 30 minutes prior to incision vs. within 30 to 0 minutes prior to incision.

 1. a. Overall, a very low quality of evidence shows that administration within 60 minutes prior to incision has neither benefit nor harm related to the reduction of the SSI rate when compared to administration within 60 to 120 minutes prior to incision.
 2. b. Overall, a very low quality of evidence shows that administration within 30 minutes prior incision has neither benefit nor harm related to the reduction of the SSI rate when compared to administration within 60 to 30 minutes prior to incision.

WHO Surgical Site infection Prevention Guidelines

systematic review on optimal timing for preoperative surgical antibiotic prophylaxis

Limitations

- Several limitations can be observed among the available studies:
- All reported studies are **observational**. No randomized prospective studies have been done on this topic.
- Several aspects of the antibiotic regimen **differed** between studies or were unclear:
 - all studies used multiple agents with **varying half-lives**;
 - all studies reported time of administration, but information on **infusion time** was **lacking** in many;
 - the **duration** of the procedure and **re-dosing** protocol **varied**; when a re-dosing protocol was applied, it was based on the duration of the procedure rather than on time after the first dose, thus leading to a high risk of inadequate re-dosing; and
 - **postoperative antibiotic duration was not the same**.
- All these aspects influence the effect of timing and also SSI rates. Future research should focus on an **optimal interval within 120 minutes**, preferably through randomized prospective trials. The above-mentioned methodological aspects should be well described and standardized in future studies.

Swissnoso Empfehlung Antibiotikaprophylaxe

Eingriffsart	Empfohlene Substanzen	Alternative Substanzen bei Patienten mit Soforttyp/Typ 1 Beta-Laktam Allergie
<p>Kopf und Hals</p> <p>Saubere Eingriffe</p> <p>Saubere Eingriffe mit Prothesenimplantation (ausser Tympanostomieröhrchen)</p> <p>Sauber-kontaminierte Eingriffe ausser Tonsillektomie und funktionelle endoskopische Eingriffe an den Sinus</p>	<p>Keine Prophylaxe</p> <p>Cefazolin, Cefuroxim</p> <p>Cefazolin PLUS Metronidazol, Cefuroxim PLUS Metronidazol, Amoxicillin/Clavulansäure</p>	<p>Keine Prophylaxe</p> <p>Clindamycin</p> <p>Clindamycin</p>

mit

Tabelle 3. Empfohlene Dosierungen und Intervalle für die Dosiswiederholung (adaptiert aus (4, 5, 35))

Antimikrobielle Substanz	Empfohlene Dosis	Applikation	Halbwertszeit bei Erwachsenen mit normaler Nierenfunktion, h	Empfohlenes Intervall für die Dosiswiederholung (seit Beginn der präoperativen Dosis), h		
				CrCl >50 ml/min	CrCl 20-50 ml/min	CrCl <20 ml/min
Amoxicillin/Clavulansäure	2.2 g (Amoxicillin 2g/Clavulansäure 0.2g)	Infusion über 30 min	1.0–1.5	2 (2.2 g)	4 (1.2 g)	4 (1.2 g)
Cefazolin	2 g ^b	3-5 min iv KI	1.2–2.2	3-4	8	16
Cefuroxim	1.5 g ^b	3-5 min iv KI	1–2	3-4	6	12
Ciprofloxacin	400 mg	Infusion über 30-60 min	3–7	8	12	Keine Wiederholung
Clindamycin	600 mg ^b	Infusion über 30 min	2–4	6	6	6
Gentamicin ^a	5 mg/kg, max. 540 mg	Infusion über 30 min	2–3	Keine Wiederholung	Keine Wiederholung	Keine Wiederholung
Metronidazol	500 mg	Infusion über 20 min	6–8	8	8	8
Vancomycin	15 mg/kg, max. 2500 mg	≤1 g/60-90 min	4–8	8	16	Keine Wiederholung

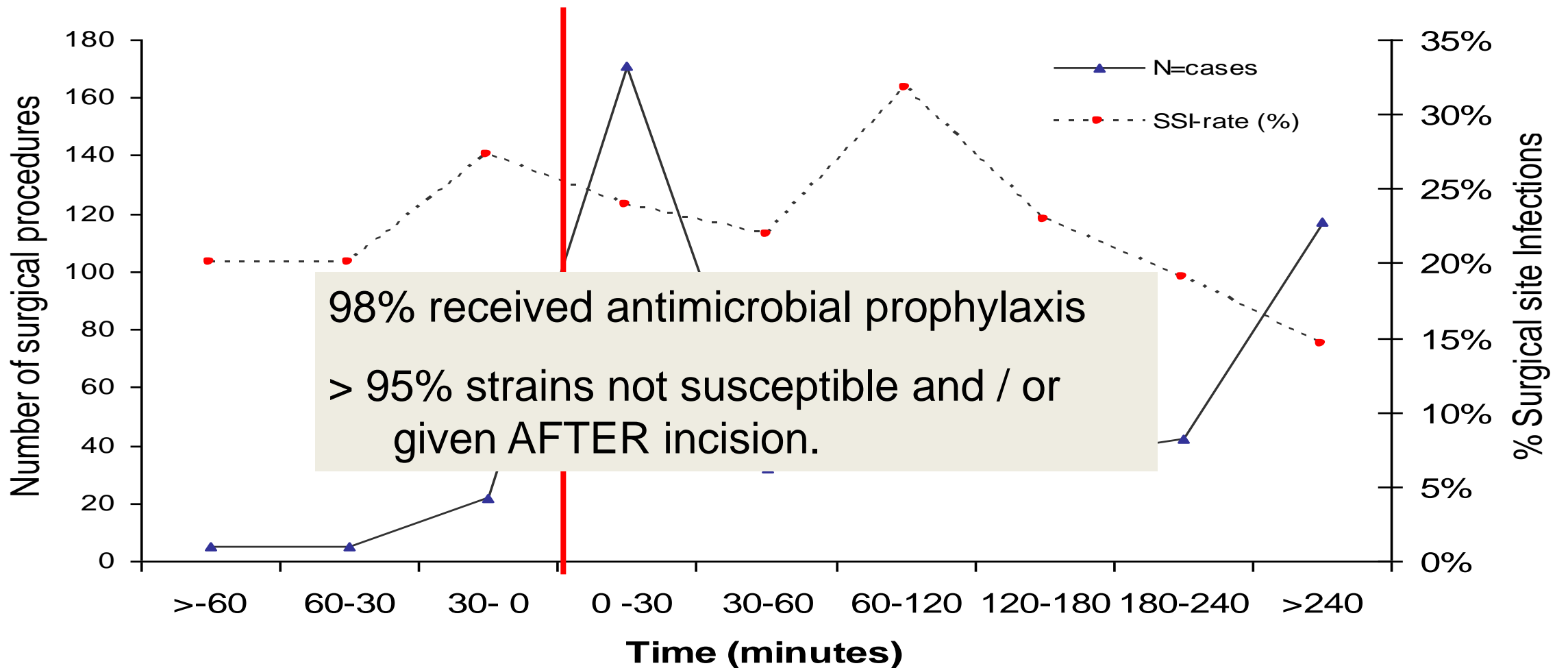
Realität In klinischer Praxis

St. Francis Designated District Hospital Ifakara, Tanzania, East Africa

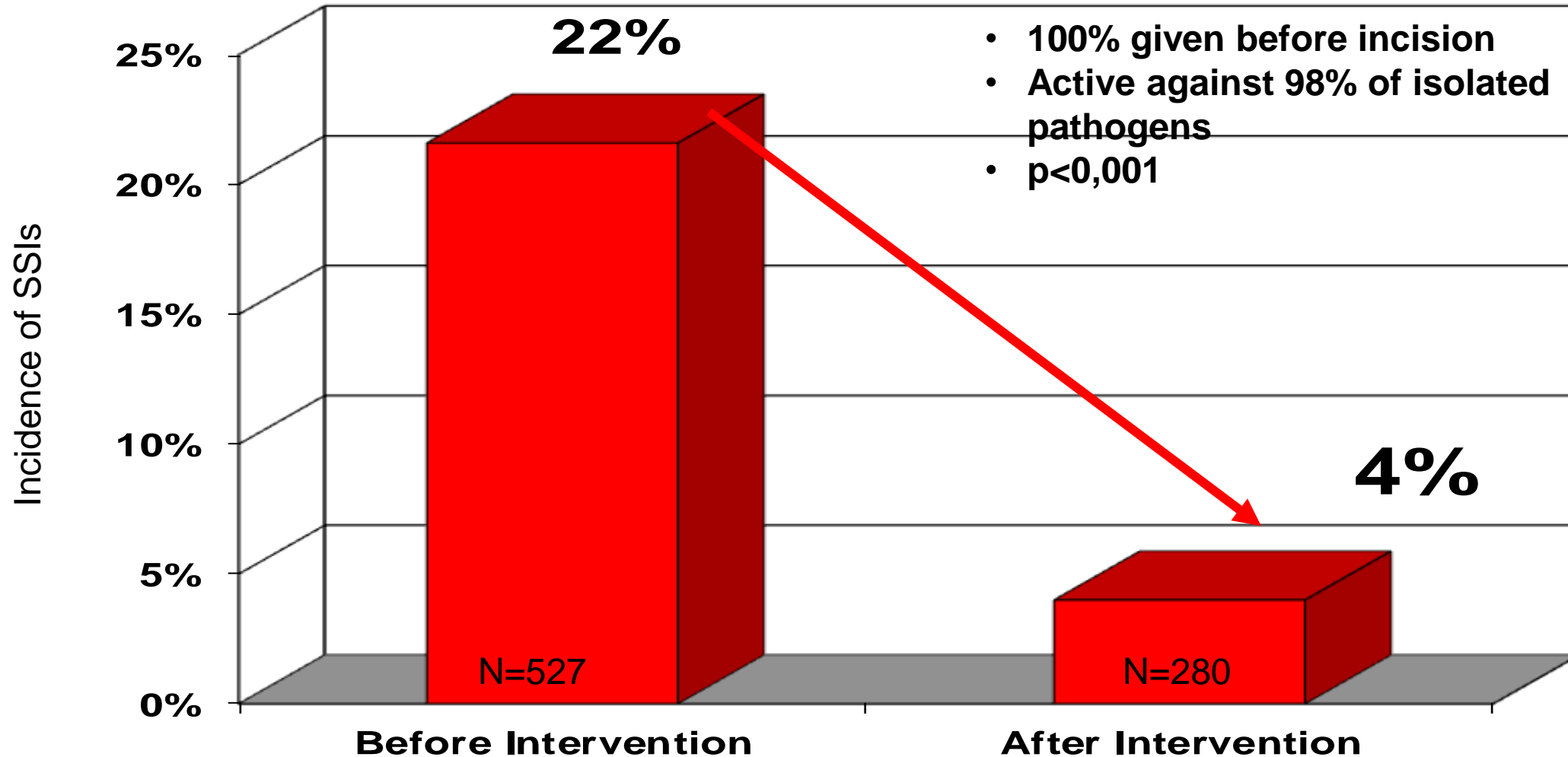
- Population 400'000
- 371 beds
- 155 surgical interventions/month
- 4 Surgeons
- Frequent ORs:
 - Ceaseran section
 - Hernia /hydrocele



Failure of appropriate timing of Surgical Antimicrobial Prophylaxis to Prevent SSIs



Intervention: Optimized Antimicrobial Prophylaxis



Nationale Surveillance postoperativer Infektionen

www.swissnoso.ch

July 16

145 Krankenhäuser

>300'000 Patienten eingeschlossen



Swiss National Surveillance System

Timing of antimicrobial prophylaxis (AMP)

Type of Surgery	AMP within 60 min prior to incision (%)	
	06/2009 – 05/2010	06/2010 – 09/2011
Appendectomy	56	68
Cholecystectomy (Class II)	56	62
Herniotomy (Class I)	80	86
Colon surgery (Class II)	64	66
Cardiac surgery (Class I)	---	80
Hip arthroplasty (Class I)	---	87
Knee arthroplasty (Class I)	---	86

Antibiotikaprophylaxe vor und nach Beginn Swissnoso SSI-Intervention

	Pre		Post		Relative risk
	Anzahl	Compliance	Anzahl	Compliance	
Timing	5665	81.7	865	82.3	0.99 (0.95-1.03)
Redosing insgesamt	1812	85.2	837	91.2	0.93 (0.91-0.96)
Appliziert falls indiziert	361	51.5	95	38.9	1.32 (1.01-1.73)
Gewichtsadaptation	1629	83.2	720	87.5	0.95 (0.92-0.99)

Zusammenfassung

- Die Antibiotikaprophylaxe vor Operation am Abdomen, Herz, Knochen ist die **wichtigste infektpräventive** Massnahme
 - Best Clinical Practice mittels PK/PD und evidence-basierte Outcome-Daten
 - Cephalosporine:
0 min (clinical data) vs 15 min (PK/PD) data – 60 min to 120m (WHO)
 - Cipro/Vanco 2-4hrs
 - Prophylaxe: <24h, Therapie: >24h
 - WHO Richtlinie:
 - 0-120 min evidence basiert
 - besser 0-60min (alte WHO guideline)
 - optimal 0-30min (Swissnoso grösste observational study und Basel RCT)
- restart discussion on timing when compliance >90% of 0-60min

Danke für Ihre kostbare Zeit

