

# Implementatie van infectiepreventierichtlijnen met behulp van bundels

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# Disclosure slide

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## **(Potentiële) belangenverstrengeling**

Voor bijeenkomst mogelijke relevante relaties met bedrijven	NVT
Sponsoring of onderzoeksgeld	NVT
Honorarium of andere (financiële) vergoeding	NVT
Aandeelhouder	NVT
Andere relatie, namelijk.....	NVT

# Infectiepreventierichtlijnen

- Veel richtlijnen
- Aanbevelingen zijn wetenschappelijk moeilijk te onderbouwen
  - Afhankelijk van gedrag
  - Situationeel
  - Multifactoriële ontstaanswijze
  - Sommige aanbevelingen zijn nauwelijks uitvoerbaar en ontberen draagvlak
    - bijvoorbeeld 5 moments van WHO

# Guidelines

Hundreds of recommendations



# Guidelines and recommendations



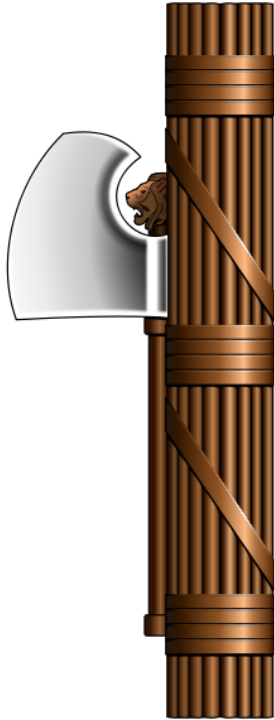
# Guidelines and recommendations (Especially when the guidelines do not make much sense and are easy to work around)



# Huidige situatie

- Naleving is gebrekkig
- SSI en lijngerelateerde infecties staan in de top drie van vermijdbare sterfte in Nederlandse ziekenhuizen

# Een mogelijke oplossing





**Fasces = bundle = strength**



# Bundles

- to help health care providers deliver the best possible care for patients undergoing particular treatments with inherent risks
- A bundle is a structured way of improving the processes of care and patient outcomes

# Bundles

- a small, straightforward set of evidence-based practices — generally three to five — that, when performed collectively and reliably, have been proven to improve patient outcomes
- Achievable in all patients

# A culture of safety

- Implementation of a zero-tolerance policy
- Impossible in an environment without a culture of safety
  - It is not about who is right, but about what is good for the patient
  - All employees involved in a procedure can stop the procedure if the bundle is not adhered to

# Checklist

Patients/procedures

	1	2	3	4	5	6	7	8	
Element 1	Y	Y	N	Y	Y	Y	Y	Y	87,5%
Element 2	Y	N	Y	N	Y	Y	Y	Y	75%
Element 3	N	Y	Y	Y	Y	Y	N	Y	75%
Element 4	Y	Y	Y	Y	Y	N	Y	Y	87,5%
Element 5	Y	Y	Y	Y	Y	Y	Y	N	87,5%
									12,5%

Elements of the bundle

# Conclusie

Als je het per bundelelement “best wel goed” doet  
(75-90% score) doe je het zelden “volledig” goed

Kwaliteit van zorg is dan verre van optimaal

Dit is wat je in praktijk ziet als je als mystery-guest meeloopt

# The Netherlands

- Study on causes of preventable deaths in the hospital
- SSI were leading the ranks
- National patient safety program
- Bundle for SSI
  - Hair removal
  - Antimicrobial prophylaxis
  - Normothermia
  - Disciplin in the OR ??

# Disciplin in the OR

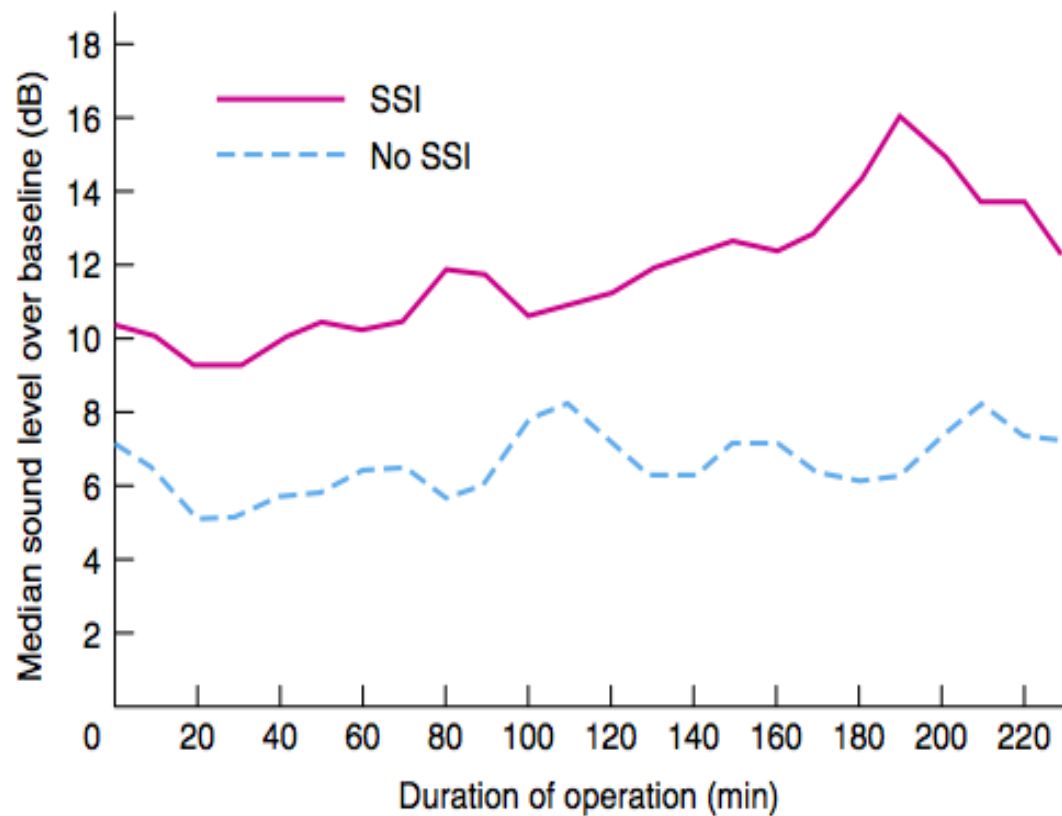
## Adverse effect of noise in the operating theatre on surgical-site infection

A. Kurmann<sup>1</sup>, M. Peter<sup>1</sup>, F. Tschan<sup>2</sup>, K. Mühlemann<sup>3</sup>, D. Candinas<sup>1</sup> and G. Beldi<sup>1</sup>

<sup>1</sup>Department of Visceral Surgery and Medicine and <sup>2</sup>Institute of Work and Organizational Psychology, University of Neuchâtel, Neuchâtel, Switzerland and <sup>3</sup>Institute of Infectious Diseases, Inselspital University Hospital Berne and University of Berne, Berne

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**Fig. 2** Intraoperative sound levels for patients with and without surgical-site infection (SSI)

**Median sound levels during surgery were significantly higher for patients who developed a SSI (43.5 versus 25.0 dB;  $P = 0.040$ )**

**There was an association between non-patient-related conversation and sound level ( $P = 0.024$ )**

**Analysis of the discipline score showed that such discussion was associated with a significantly higher noise level; this finding may represent a lack of concentration by the surgical team**



# The Netherlands












- **Bundle for SSI**
  - Hair removal
  - Antimicrobial prophylaxis
  - Normothermia
  - Disciplin in the OR
    - (door openings)



# Eerste bundel meting

	1	2	3	4	5	6	7	8	9	10	
<b>Hair removal</b>	Y	Y	Y	N	Y	Y	Y	N	Y	Y	80%
<b>Prophylaxis</b>	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	90%
<b>Normothermia</b>	N	N	Y	Y	N	Y	N	Y	Y	N	50%
<b>Door openings</b>	N	Y	N	N	N	N	Y	N	Y	N	30%

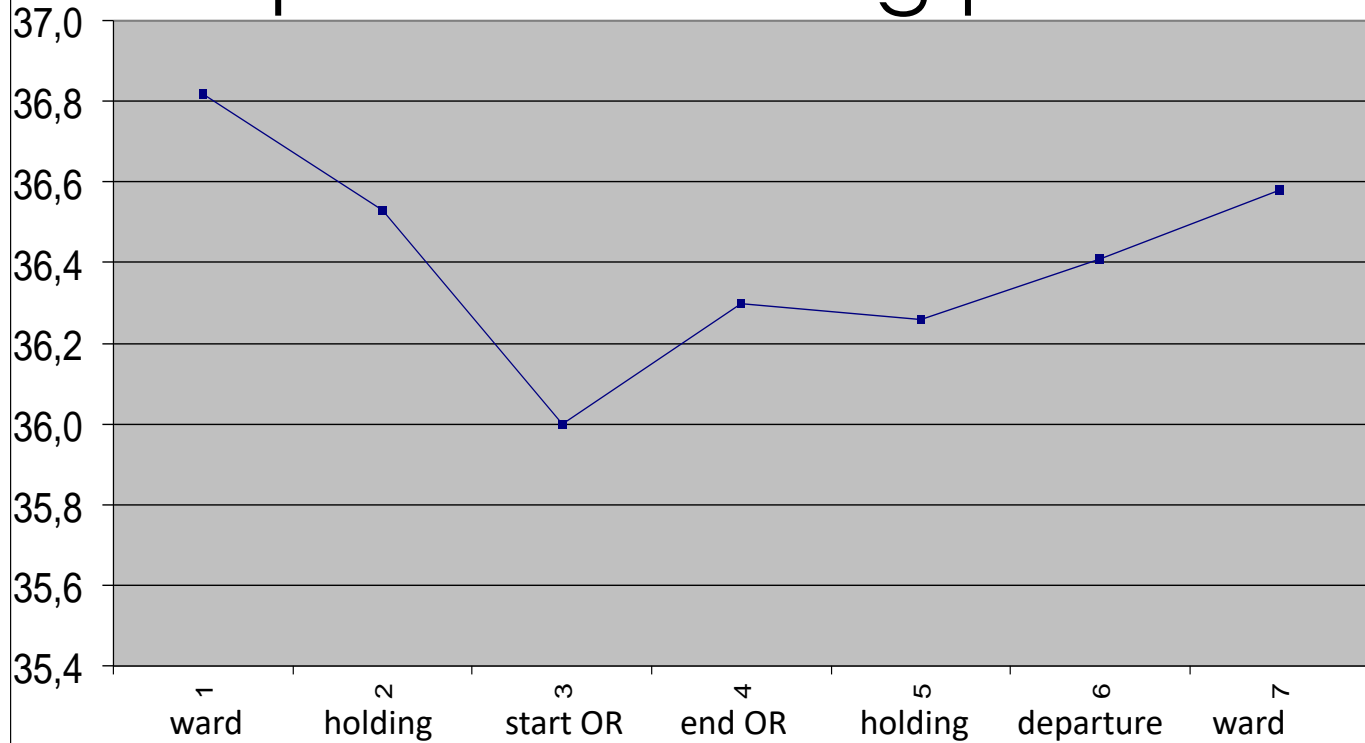
# Eerste bundel meting

	1	2	3	4	5	6	7	8	9	10		
Hair removal	Y	Y	Y	N	Y	Y	Y	N	Y	Y	80%	
Prophylaxis	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	90%	
Normothermia	N	N	Y	Y	N	Y	N	Y	Y	N	50%	
Door openings	N	Y	N	N	N	N	Y	N	Y	N	30%	
												10%

# ANALYSE AND IMPROVE

- **Hair removal**
  - Introduction of clippers
- **Normothermia**
  - Measurements of patients
- **Door openings**
  - Who, When, Why analysis

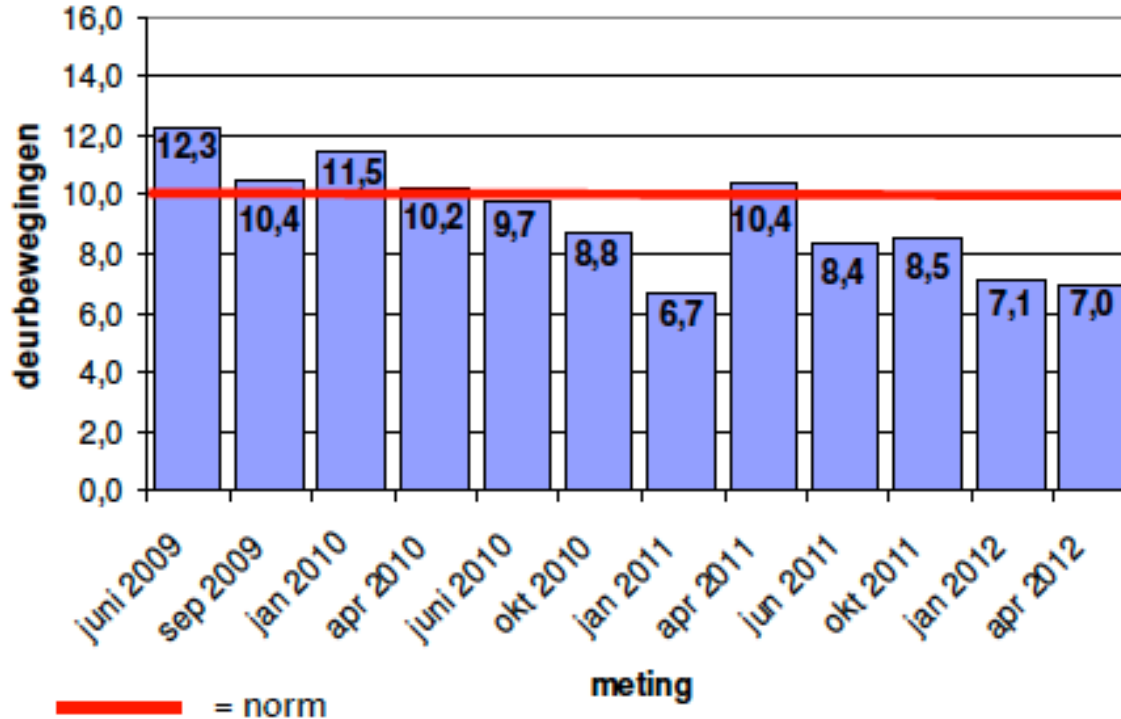
# Temperature during process





# Mean number of dooropenings per hour over time

Requires a change of behaviour



# Reasons for avoidable dooropenings

- Top three (in random order):
  1. Forgotten equipment
  2. Coffeekbreaks
  3. Social talk

# The Results

# Colorectal surgery

OPEN  ACCESS Freely available online

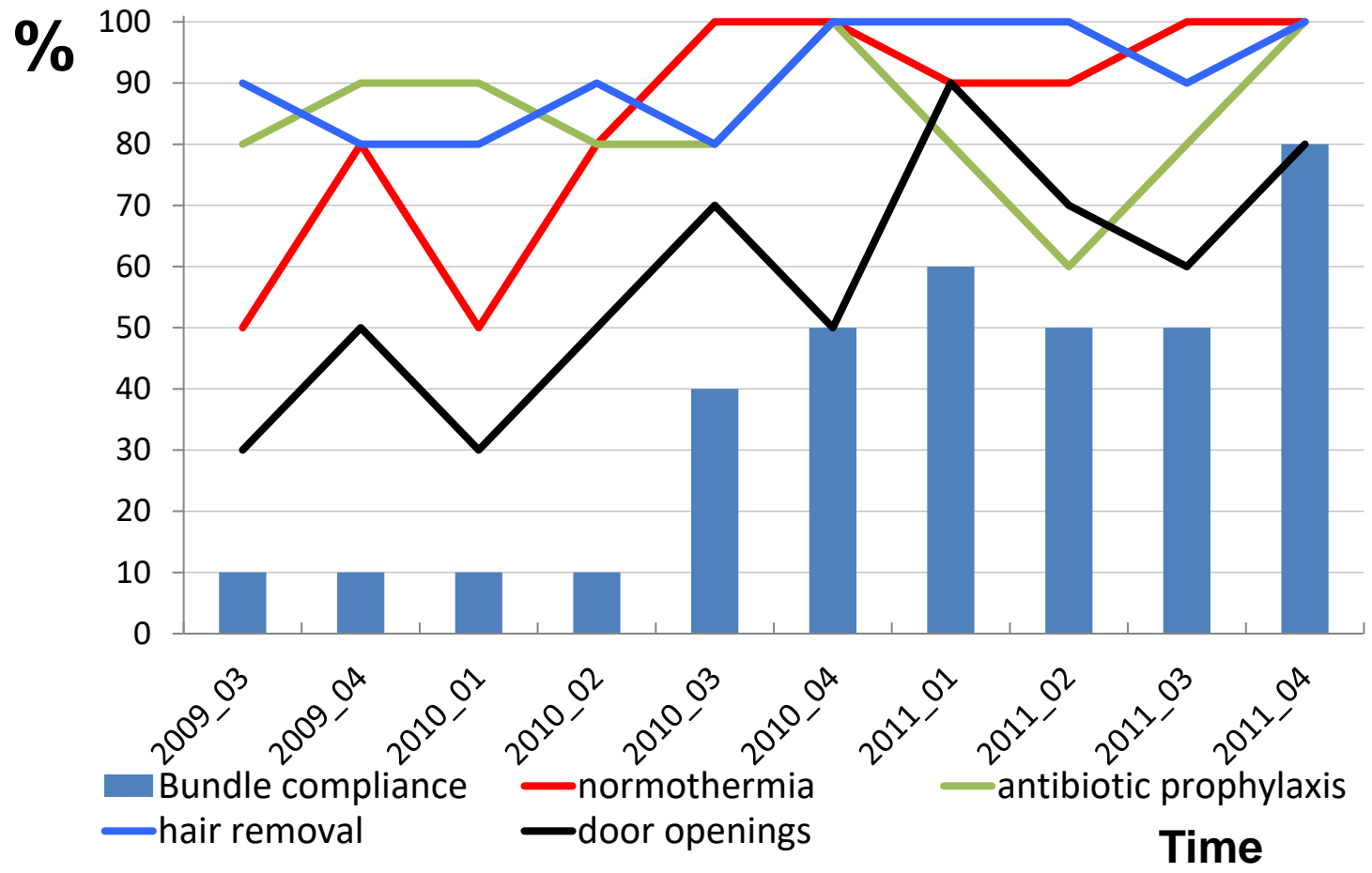
 PLOS ONE

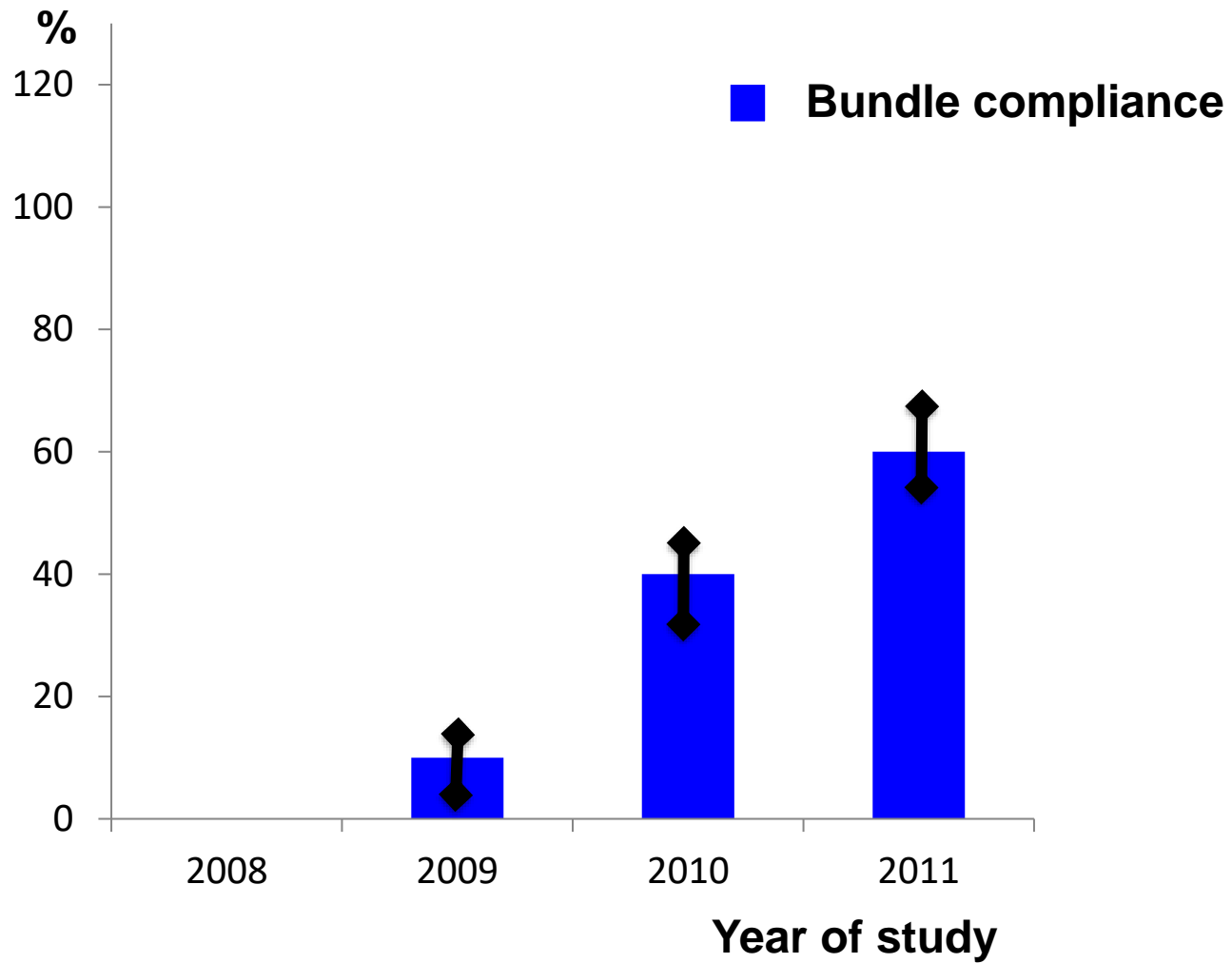
## Reduction of Surgical Site Infections after Implementation of a Bundle of Care

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>

**Mean Additional  
Length of Stay After Surgery  
In Patients With SSI:  
18 days**

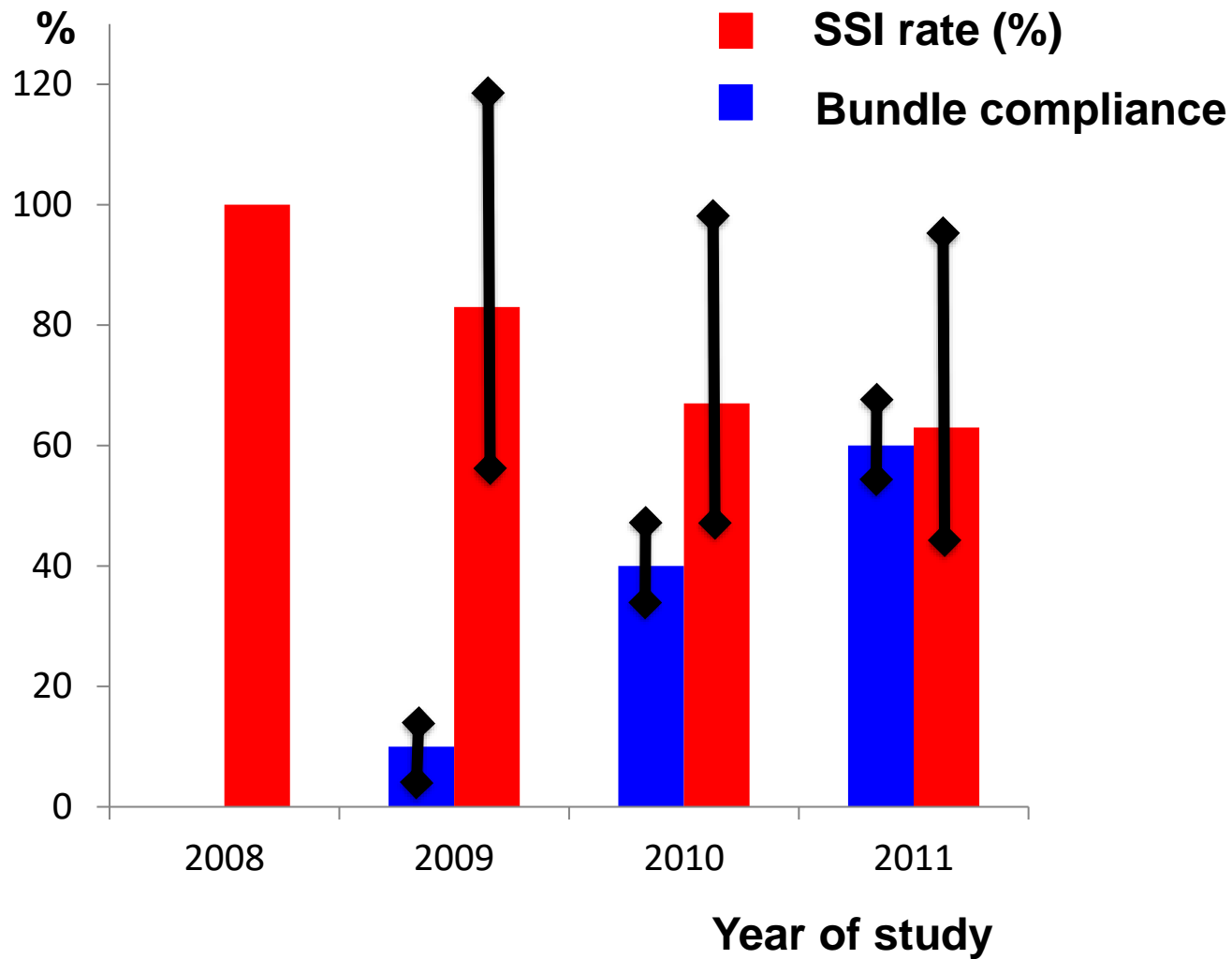
# Implementation of the bundle







Variable	AOR	95% CI	p-value
Laparoscopic versus open procedure	0.56	0.39-0.80	0.001
ASA class (3,4 and 5 versus 1 and 2)	1.55	1.15-2.08	0.004
Wound score (3 and 4 versus 1 and 2)	1.92	1.33-2.77	<0,001
Number of procedures per surgeon ( $\leq 100$ versus $> 100$ )	1.52	1.14-2.04	0.005
Non-elective versus elective procedures	1.22	0.69-2.17	0.489
Duration of surgery (minuts)	1.006	1.003-1.008	<0,001
age (years)	1.009	0.997-1.021	0.128
Body mass index (kg/m <sup>2</sup> )	1.011	0.979-1.043	0.510
year (2009 versus 2008)	0.83	0.57-1.22	0.345
year (2010 versus 2008)	0.67	0.46-0.98	0.039
year (2011 versus 2008)	0.64	0.44-0.95	0.025

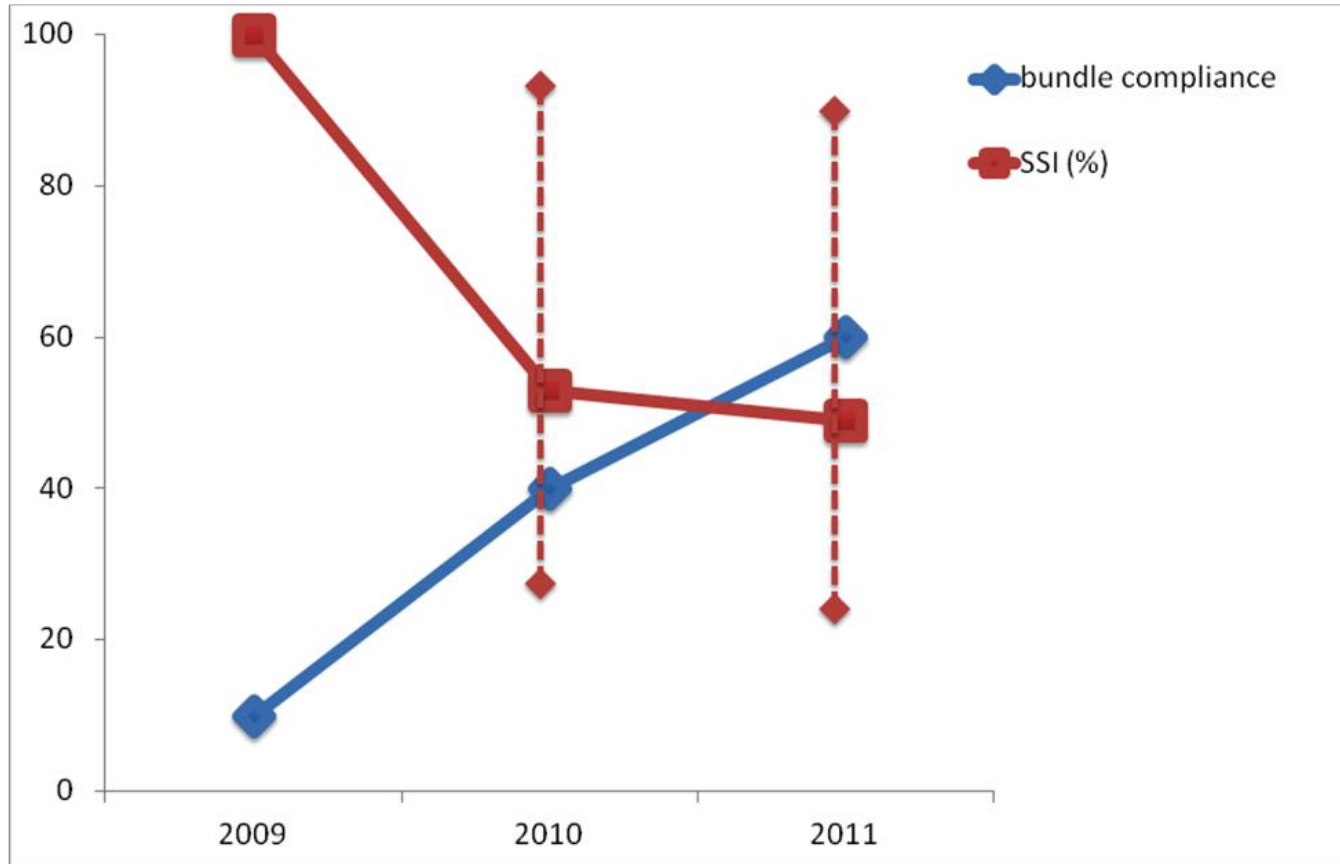


# Implementation of a Bundle of Care to Reduce Surgical Site Infections in Patients Undergoing Vascular Surgery

**Jasper van der Slegt<sup>1\*</sup>, Lijckle van der Laan<sup>1</sup>, Eelco J. Veen<sup>1</sup>, Yvonne Hendriks<sup>2</sup>, Jannie Romme<sup>2</sup>, Jan Kluytmans<sup>2,3</sup>**

**1** Department of Surgery, Amphia Hospital, Breda, The Netherlands, **2** Laboratory for Microbiology and Infection Control, Amphia Hospital, Breda, The Netherlands, **3** Department of Medical Microbiology and Infection Control, VU University Medical Center, Amsterdam, The Netherlands

# Vascular surgery



# Costs and benefits

- Bundle program (measurements and feedback) costs 1,5 fte (90.000 euro)
- Minor investments in equipment (clippers, warming blankets etc)

# Benefits

- Colorectal surgery 36% reduction of SSI rate
  - SSI rate before program started: 20%
  - Annual number of procedures 500
  - 100 SSI > 64 SSI
  - $36 * 18 \text{ days} = 648 \text{ days}$  (20% on ICU)
  - Average cost of one day: 500 euro
  - Savings: € 324.000
  - and 4 deaths prevented per year

# Benefits

- Vascular surgery 50% reduction of SSI rate
  - SSI rate before program started: 15%
  - Annual number of procedures 300
  - 45 SSI > 23 SSI
  - 22 \* 18 days = 396 days
  - Average cost of one day: 500 euro
  - Savings: € 198.000
  - and 1 death prevented per year

# Balance

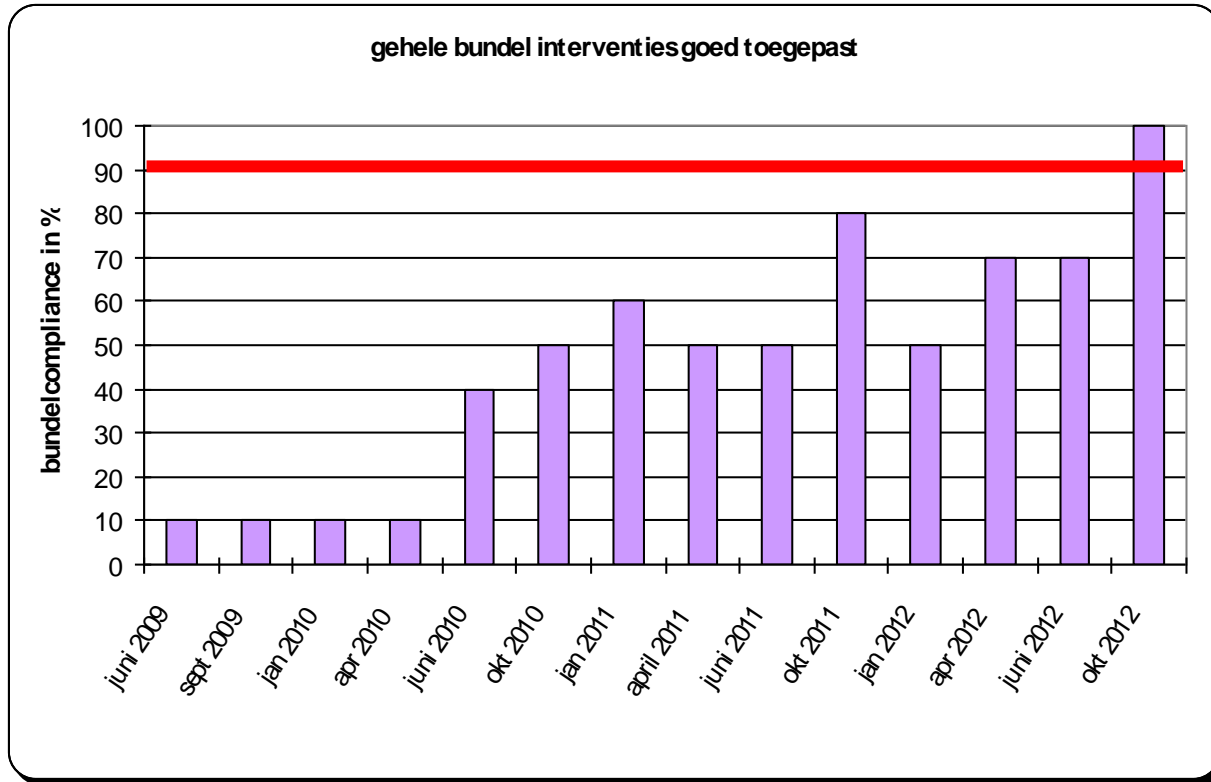
- Costs < €100.000 per year
- Benefits combined bundle program in colorectal and vascular surgery
  - > €500.000 per year
  - 5 deaths prevented



# Conclusions

- Introduction of a bundle of care is associated with a strong and significant reduction of the SSI-rate
- Inexpensive measures
- Door-openings were the most difficult item
- The bundle introduced a culture change in the OR

# bundelcompliance



 = TARGET

# Further steps

- OR management:
  - takes the lead of the program
  - automatic measurement with display in OR
- Infection control
  - monitoring of SSI rates and feedback
- Door-openings
  - raise the bar (8 per hour)
- Yellow and Red cards

**Warning**

**Don't try this at home**

# Warning

**Don't try this at home  
(without proper precautions)**

ONLINE FIRST

# Evaluating an Evidence-Based Bundle for Preventing Surgical Site Infection

*A Randomized Trial*

ARCH SURG/VOL  
146 (NO. 3), MAR  
2011

Thomas Anthony, MD, MSc; Bryce W. Murray, MD; John T. Sum-Ping, MD; Fima Lenkovsky, MD;  
Vadim D. Vornik, MD; Betty J. Parker, RN; Jackie E. McFarlin, RN, CIC; Kathleen Hartless, RN, CIC; Sergio Huerta, MD

**Table 1. Evidence-Based Interventions That Reduce Surgical Site Infections**

Intervention	Trial Type; Subjects	Study Arms	Outcome
Omission of mechanical bowel preparation Guenaga et al, 2009 <sup>14</sup>			
Guenaga et al, 2006 <sup>8</sup>			
Perioperative supplemental oxygen Qadan et al, 2009 <sup>11</sup>			
Preoperative and intraoperative warming Kurz et al, 1996 <sup>9</sup>			
Melling et al, 2001 <sup>10</sup>			
Reduction of intraoperative intravenous fluids Brandstrup et al, 2003 <sup>12</sup>			
Use of wound barriers Sookhai et al, 1999 <sup>13</sup>			

Omission of Mechanical Bowel Prep

Supplemental Oxygen

Pre- and Intra-operative warming

Reduction of Intraoperative IV-fluids

Use of Wound Barriers

# Results

- Extended arm SSI = 45% vs.
- Standard arm = 24% ( $P = 0.003$ ).
- Multivariable analysis:
  - Extended arm associated w/  $\uparrow$  SSI risk
  - OR: 2.49 (95% CI, 1.36-4.56;  $P = 0.003$ ).

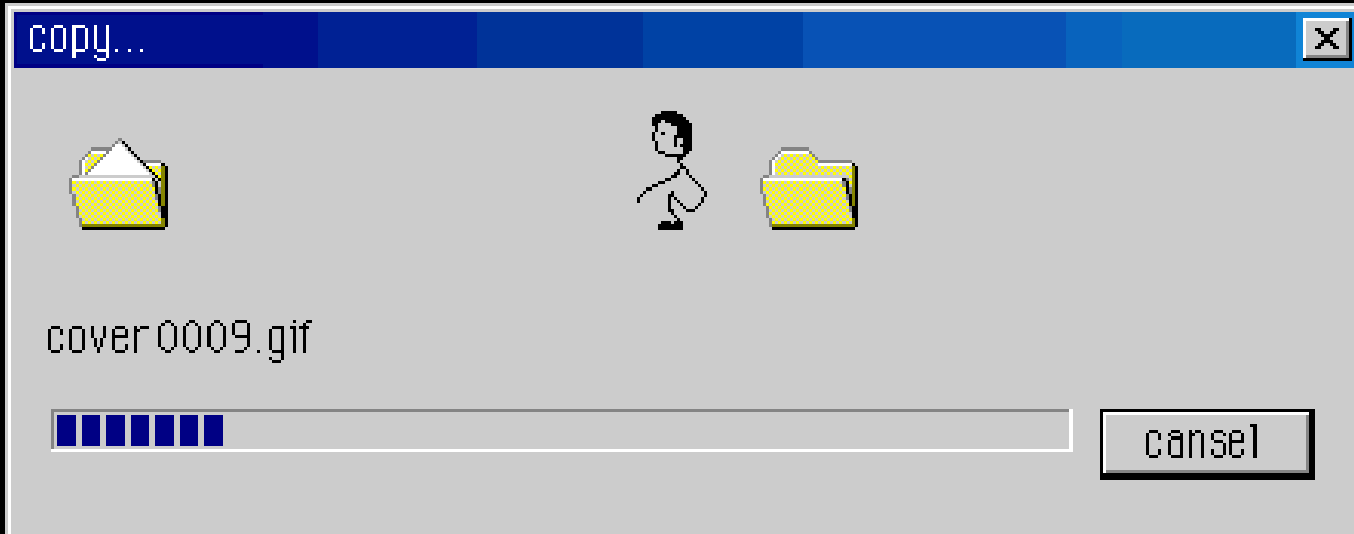


# Was this a true bundle?

- A complex procedure was changed on 5 aspects and studied using randomisation on the level of individual patients
- This is not the proper way to implement a bundle
- Changing complex procedures in patientcare carries serious risks and should be done with great care (which takes time)
- Bundle did not include a culture change

conclusions

# How complex procedures are managed in most hospitals



# The only thing that you can trust on is outcome

Bundles can be useful tools to improve the outcome

Realise that it takes time and tenacity to achieve a culture change

Full support by management and staff is essential

Standard outcome measurements in high-risk surgery should be the standard of care