MOET ANTIBIOTISCHE PROFYLAXE WORDEN AANGEPAST BIJ HOOG RISICO GROEPEN?

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Internist-infectioloog
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umcg

NINJA.
Northern Infection Network Joint Arthroplasty

HOOG RISICO GROEPEN VOOR PJI

Algemeen:

Risico PJI 1-2%

1.5 – 10 hoger risico

op PJI

Second INTERNATIONAL CONSENSUS MEETING (ICM) on MUSCULOSKELETAL INFECTION

TABLE 1. Summary of risk factors associated with development of SSI/PJI

Modifiable Host Factors	Factors with Limited Evidence of Associations with SSI/PJI
• BMI – Strong • Smoking – Strong • High alcohol intake (alcohol abuse) – Strong • Low income - Strong • Malnutrition (low serum albumin) – Strong • History of DM – Strong • History of CVD – Moderate • History of CHF – Strong • History of cardiac arrhythmia – Strong • History of PVD – Strong • Chronic pulmonary disease – Strong • Chronic obstructive pulmonary disease – Strong • History of renal disease – Strong • History of liver disease/cirrhosis – Strong • History of RA – Strong • History of cancer/malignancy – Strong • History of osteonecrosis – Strong • History of depression – Strong • History of psychosis – Strong • History of HIV/AIDS – Strong • Neurologic disease (hemiplegia, paraplegia) – Moderate • History of corticosteroid administration – Strong • History of intra-articular corticosteroid injection – Moderate • Previous joint surgery – Strong • Revision arthroplasty – Strong • Previous joint infection – Moderate • Frailty – Moderate • Preoperative anemia – Strong • ASA grade > 2 – Strong • Charlson comorbidity index (high) – Strong • Preoperative hyperglycemia and high HbA1c – Moderate • Allogenic blood transfusion – Strong • Prophylaxis with warfarin or low molecular weight heparin – Moderate	• Age (as a continuous exposure) – Limited • Hispanic ethnicity – Limited • Native American and Eskimo ethnicity – Limited • Asian race – Limited • History of drug abuse – Limited • Rural location vs. non-rural location – Limited • Underweight – Limited • History of hypertension – Limited • History of osteoarthritis – Limited • History of post-traumatic arthritis – Limited • Low- or high-risk dental procedures – Limited • History of UTI – Limited • History of dementia – Limited • Hypercholesterolemia – Limited • Peptic ulcer disease – Limited • Valvular disease – Limited • Metastatic tumor – Limited • History of coagulopathy – Limited • History of venous thromboembolism – Limited • Pulmonary circulatory disorders – Limited • Hypothyroidism – Limited • Hepatitis (B or C) – Limited • Electrolyte imbalance – Limited • Autogenous blood transfusion – Limited
Non-modifiable Host Factors	
• Age (≥75 years) – Moderate • Male sex – Strong • Black race – Strong • TKA vs. THA – Strong	

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WAAR TE BEGINNEN?
EN HOE?

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Extended Oral Antibiotic Prophylaxis in High-Risk Patients Substantially Reduces Primary Total Hip and Knee Arthroplasty 90-Day Infection Rate

Avinash Inabathula, MD, Julian E. Dilley, BS, Mary Ziemba-Davis, BA, Lucian C. Warth, MD, Khalid A. Azzam, MD, Philip H. Ireland, MD, and R. Michael Meneghini, MD

Investigation performed at the Department of Orthopaedic Surgery, Indiana University School of Medicine, Indianapolis, Indiana

J Bone Joint Surg Am. 2018;100:2103-9

VERLENGDE ORALE ANTIBIOTICA PROFYLAXE IN HOOG RISICOGROEPEN?

2181 primaire TJA

Retrospectieve studie (2011-2016)

2015: 7 dagen orale AB profylaxe geimplementeerd

Outcome: PJI < 90 days

<u>High risk groups, ≥ 1:</u>

- BMI ≥ 35 kg/m^2
- Diabetes mellitus
- Active smoker
- Chronic kidney disease
- Autoimmune disease
- Nasal colonization with MRSA or MSSA

Inabathula et al. *J Bone Joint Surg Am* 2018

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	Low risk	High risk
TKA	0.3% (1/369)	2.1% (10/468)
THA	1.5% (5/336)	4.3% (12/282)
Total	**0.9% (6/705)**	**2.9% (22/750)**

Inabathula et al. *J Bone Joint Surg Am* 2018

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2015

	Low risk	High risk	High risk, extended AB	*P*-value
TKA	0.3% (1/369)	2.1% (10/468)	0.4% (2/450)	0.009
THA	1.5% (5/336)	4.3% (12/282)	1.1% (3/276)	0.020
Total	**0.9% (6/705)**	**2.9% (22/750)**	**0.7% (5/726)**	0.006

Inabathula et al. *J Bone Joint Surg Am* 2018

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Study limitations:

- **67.7% geclassificeerd als hoog risico (NNT 47)**
- **Bias: incidentie PJI laag risico groep vanaf 2015?**
- **Is infectie voorkomen of uitgesteld?**

- Nasal colonization with MRSA or MSSA

Total	**0.9% (6/705)**	**2.9% (22/750)**	**0.7% (5/726)**	0.006

Inabathula et al. *J Bone Joint Surg Am* 2018

Perioperative Antibiotic Prophylaxis in Total Joint Arthroplasty

A Single Dose Is as Effective as Multiple Doses

Timothy L. Tan, MD, Noam Shohat, MD, Alexander J. Rondon, MD, MBA, Carol Foltz, PhD, Karan Goswami, MD, Sean P. Ryan, MD, Thorsten M. Seyler, MD, PhD, and Javad Parvizi, MD, FRCS

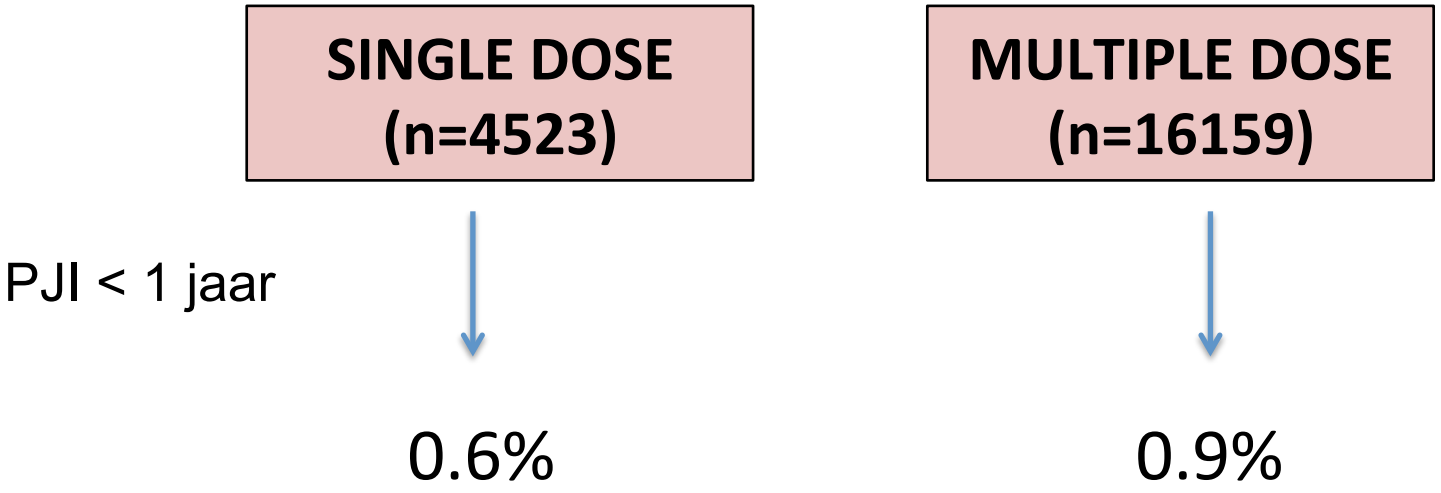
Investigation performed at The Rothman Institute at Thomas Jefferson University, Philadelphia, Pennsylvania

J Bone Joint Surg Am. 2019;101:429-37

1 GIFT VERSUS MULTIPELE GIFTEN

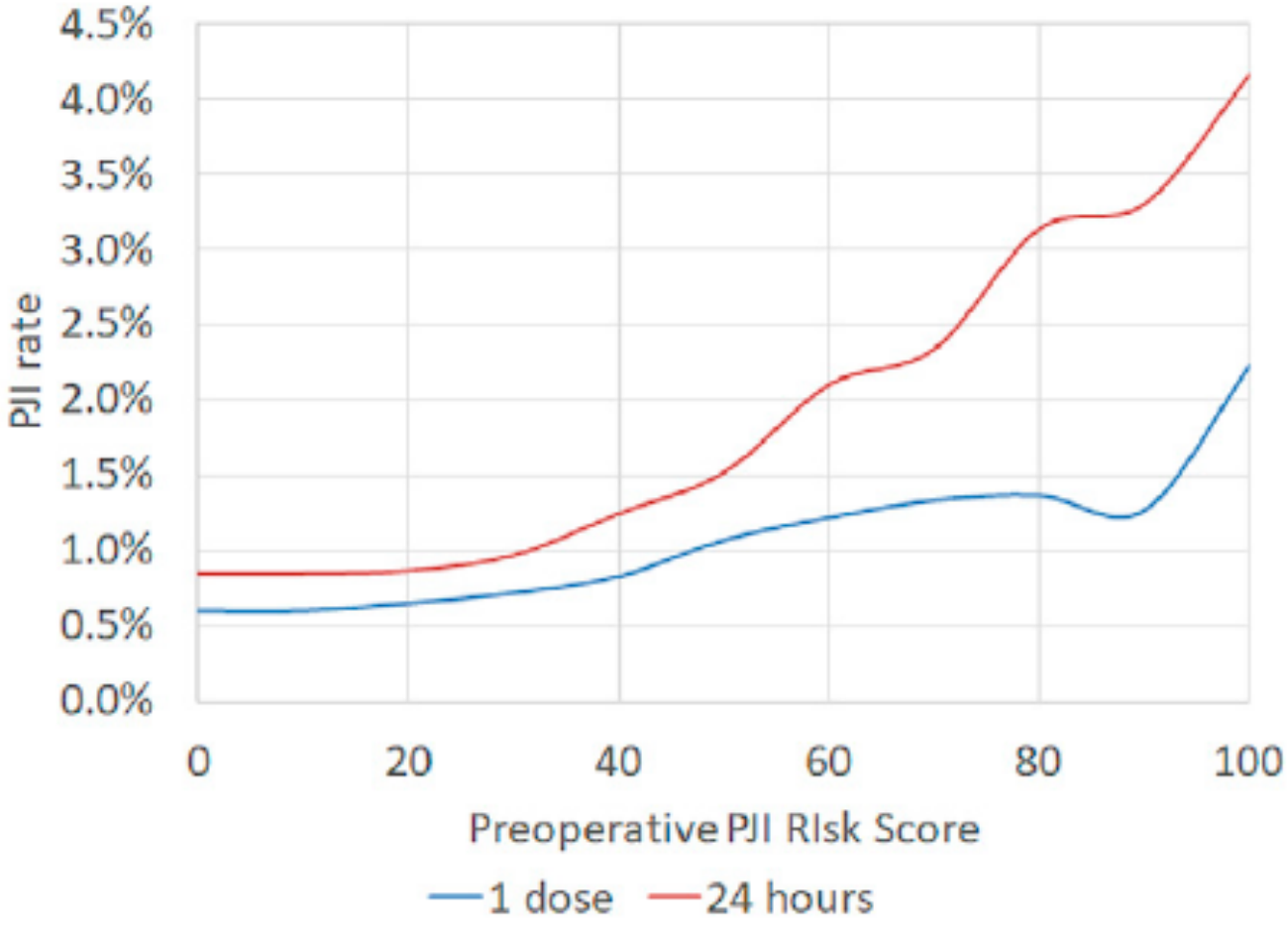
20682 primaire TJA

2006-2017



P = 0.66

HOOG RISICO PATIËNTEN



UITZONDERING TUMOR CHIRURGIE?

Systematic review 4836 patiënten

Deep infection rate 13% (<24h) → 8% (>24h)

PARITY

PROPHYLACTIC ANTIBIOTIC REGIMENS IN TUMOR SURGERY

Racano et al. *Clin Orthop Relat Res* 2013

BREDERE OF ANDERE PROFYLAXE NODIG?

8575 primary joint arthroplasties

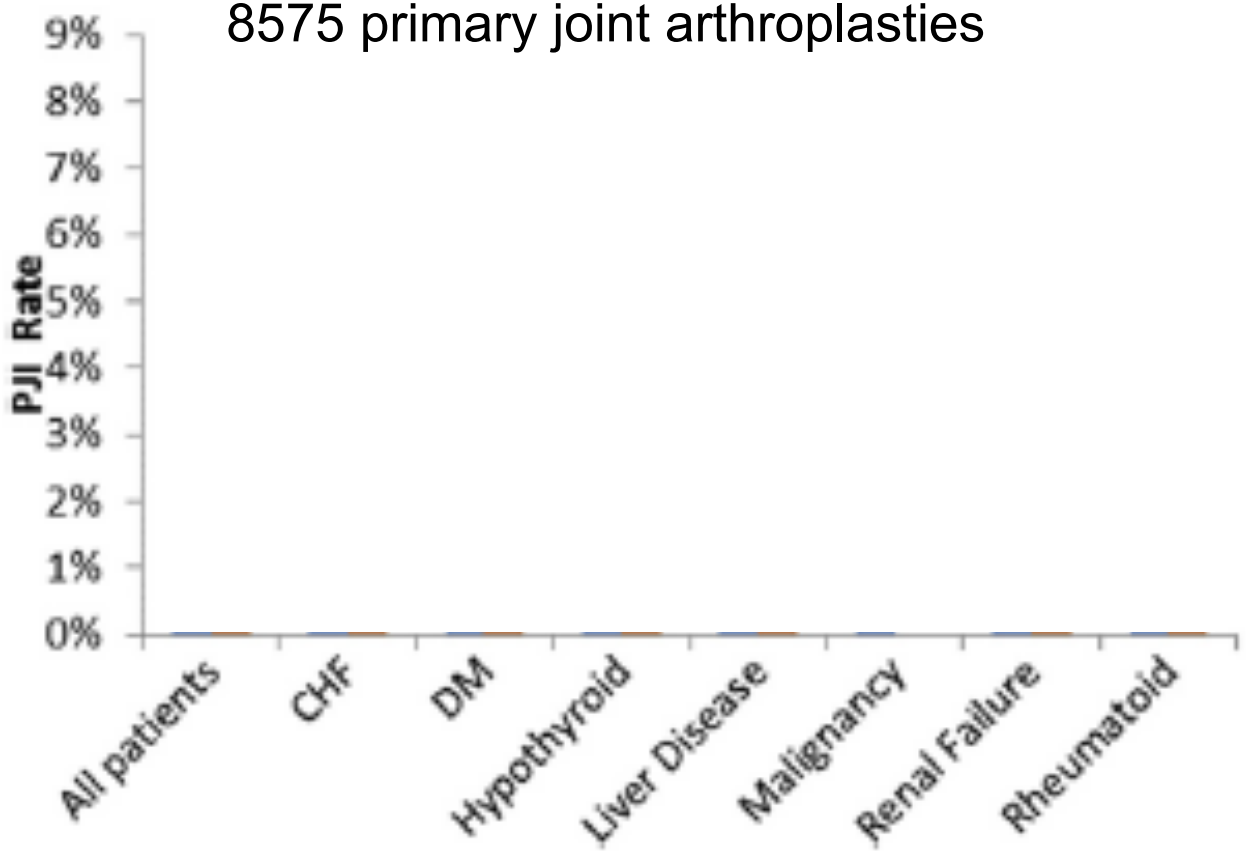
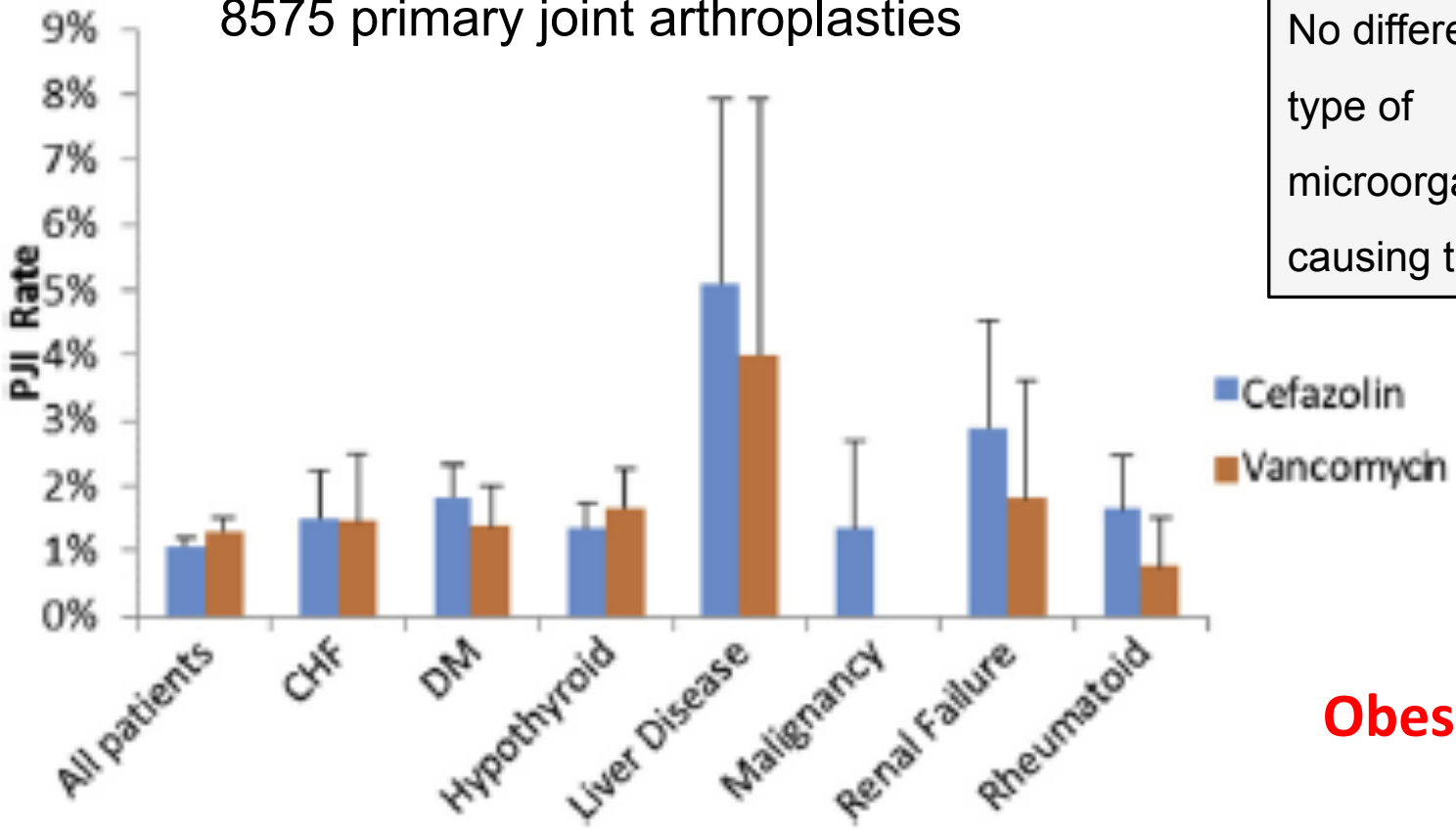


Fig. 2. Rate of PJI by patient's comorbidity and perioperative antibiotic. DM, diabetes mellitus; CHF, congestive heart failure.

Tan et al. *J Arthroplasty* 2017

VERWEKKERS IN RELATIE TOT COMORBIDITEIT

8575 primary joint arthroplasties



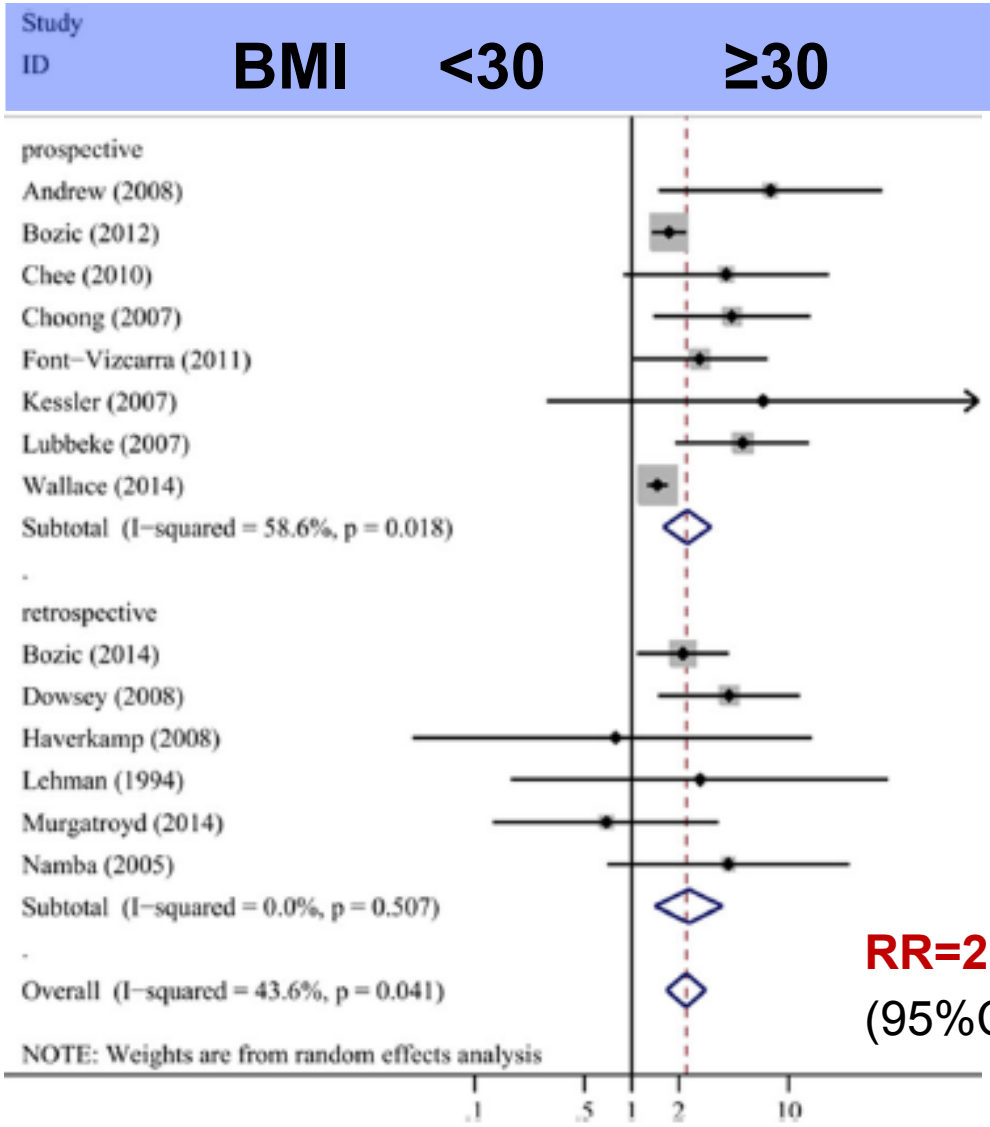
Comorbidities:
No differences in type of microorganism(s) causing the PJI

Obesitas?

Fig. 2. Rate of PJI by patient's comorbidity and perioperative antibiotic. DM, diabetes mellitus; CHF, congestive heart failure.

Tan et al. *J Arthroplasty* 2017

OBESITAS ALS RISICO FACTOR VOOR PJI



RR=2.31
(95%CI=1.4-3.8)

RR=9.86
(95% CI=2.8-35.2)

Ma et al. *Int Orthop* 2016

VERWEKKERS PJI OBESE VS NIET OBESE PATIËNTEN

EARLY PJI	HIP	BMI <30 (n=79)	BMI 30-35 (n=43)	BMI ≥35 (n=38)	P value
Polymicrobial infection		34.2%	67.4%	68.4%	.001
Gram-positives		96.2%	95.3%	97.4%	.892
	Staphylococcus aureus	41.8%	41.9%	36.8%	.863
	Staphylococcus epidermidis	31.6%	41.9%	44.7%	.308
	Corynebacterium species	8.9%	34.9%	13.2%	.008
	Enterococcus species	12.7%	29.4%	36.8%	.007
	Streptococcus species	25.3%	27.9%	10.5%	.122
Gram-negatives		12.7%	16.3%	34.2%	.005
	Escherichia coli	2.5%	2.3%	5.3%	.685
	Enterobacter cloacae	2.5%	2.3%	5.3%	.685
	Proteus species	2.5%	0.0%	18.4%	<.001
	Pseudomonas species	3.8%	4.7%	2.6%	.892
	Morganella morganii	0.0%	0.0%	7.9%	.002
Anaerobes		3.8%	2.3%	7.9%	.445

Löwik et al. PLoS One 2019

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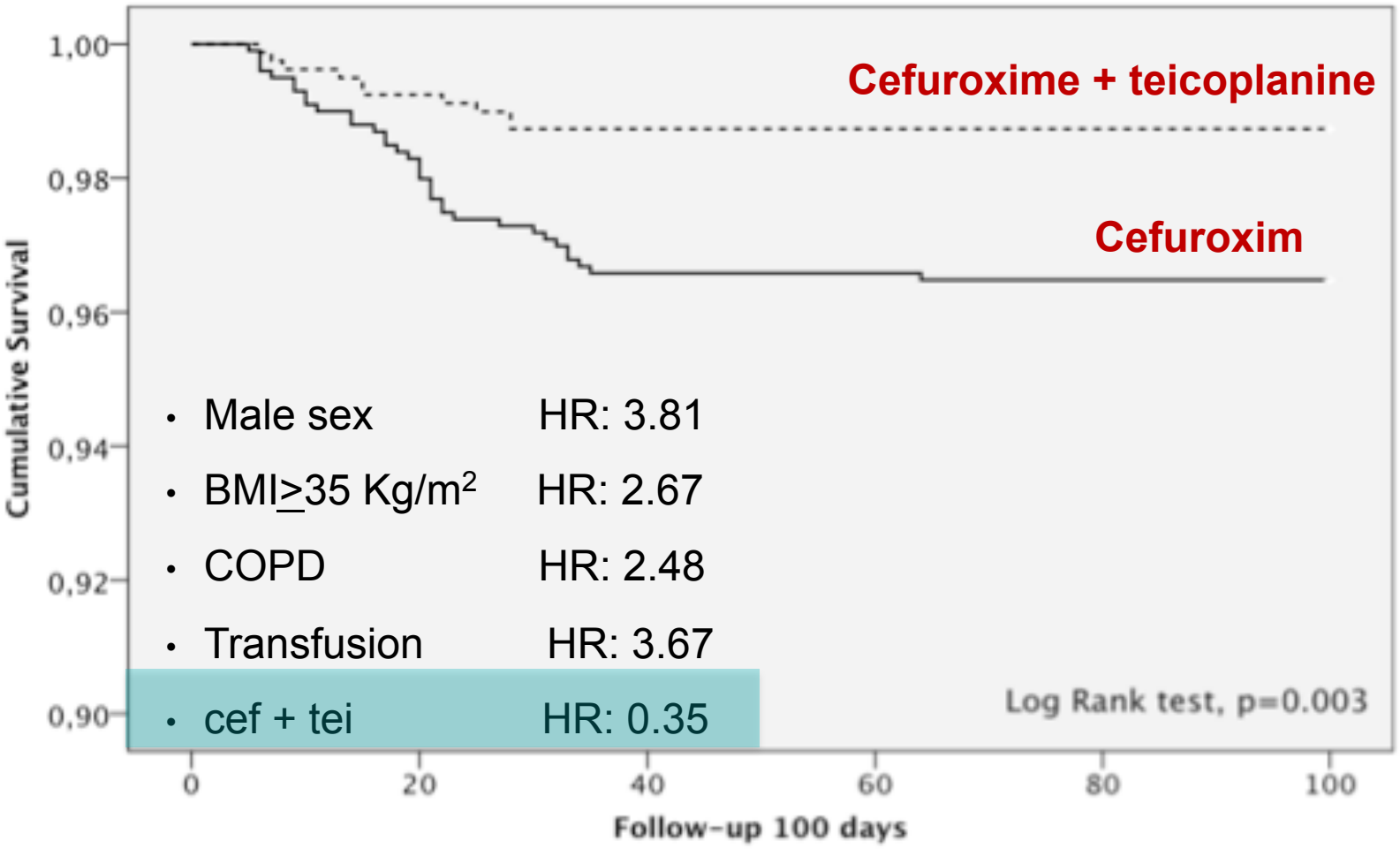
No differences observed in knees

Löwik et al. PLoS One 2019

DUO PROFYLAXE?



- Male sex HR: 3.81
- BMI≥35 Kg/m^2 HR: 2.67
- COPD HR: 2.48
- Transfusion HR: 3.67
- cef + tei HR: 0.35

Tornero E et al. *Antimicrob Agents Chemother* 2015

DUO PROFYLAXE?

Patient subgroup (no. of patients) and PJI subgroup	C group ($n = 995$)	CT group ($n = 791$)	P value[a]
BMI of <30 kg/m^2 ($n = 960$)[b]			
PJI	13 (2.6)	8 (1.8)	0.383
PJI due to GP[c]	9 (1.8)	6 (1.3)	0.558
BMI of ≥30 kg/m^2 ($n = 822$)[b]			
PJI	22 (4.5)	2 (0.6)	0.001
PJI due to GP	20 (4.1)	1 (0.3)	0.001

*** afname was met name in MSSA, doserings probleem?**

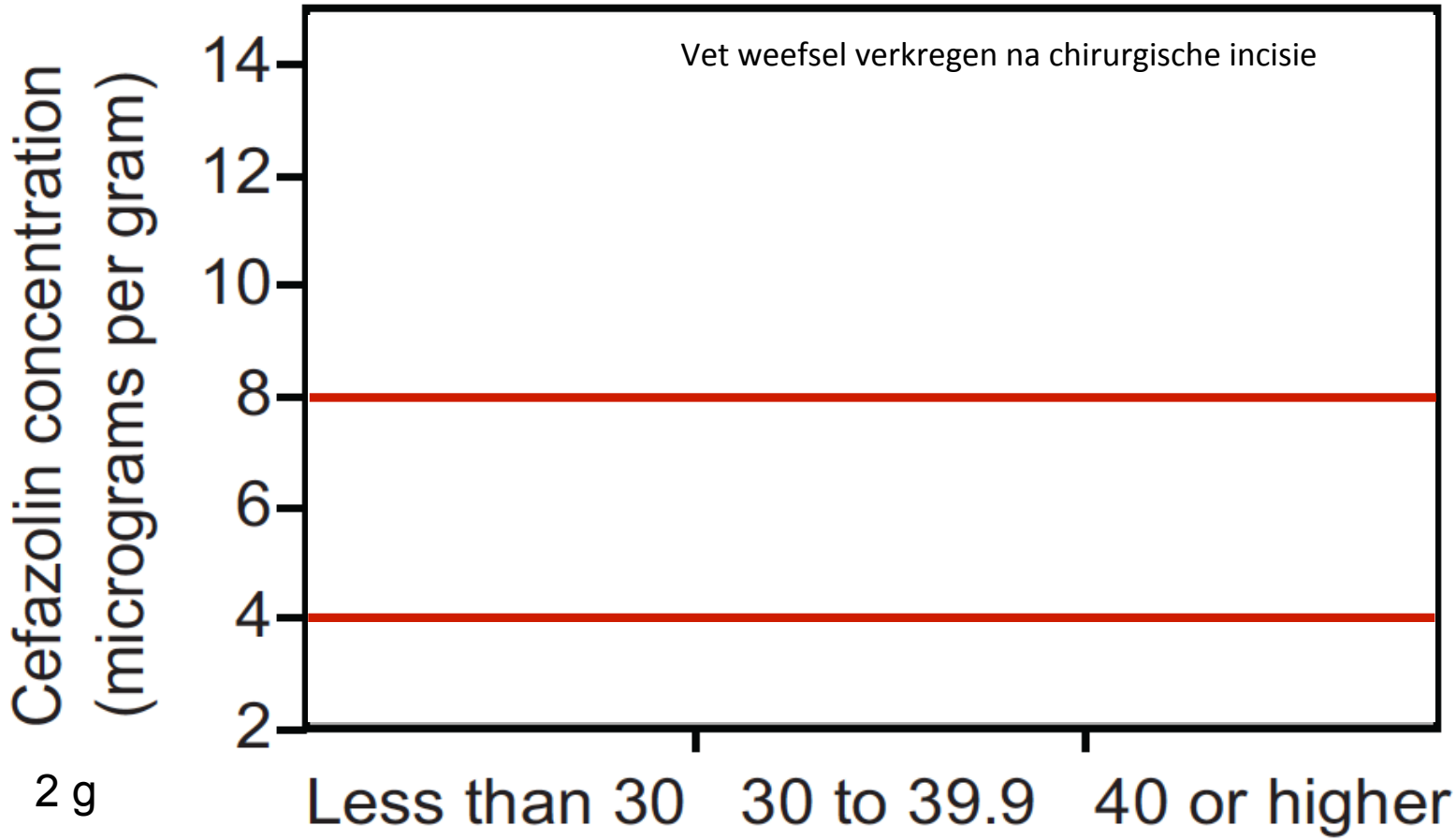
Tornero E et al. *Antimicrob Agents Chemother* 2015

BLOED PERFUSIE IN VET WEEFSEL

Clinical feature	Control subjects (n° 10)	Obese patients before RYGB (n° 16)	Obese patients after RYGB (n° 16)
Age (years)	46 ± 9	45 ± 11	46 ± 11
Sex M/F	1/9	2/14	2/14
Body-mass index	21 ± 2	46 ± 6	33 ± 6
Adipose blood perfussion (PU)	79 (34)	4.8 (2.7) ⬇	10 (6) ⬇

Rossie et al. *Clin Hemorheol Microcirc* 2012

LAGERE CEFAZOLINE CONCENTRATIES IN VETWEEFSEL



Pevzner L et al. *Obstet Gynecol* 2011

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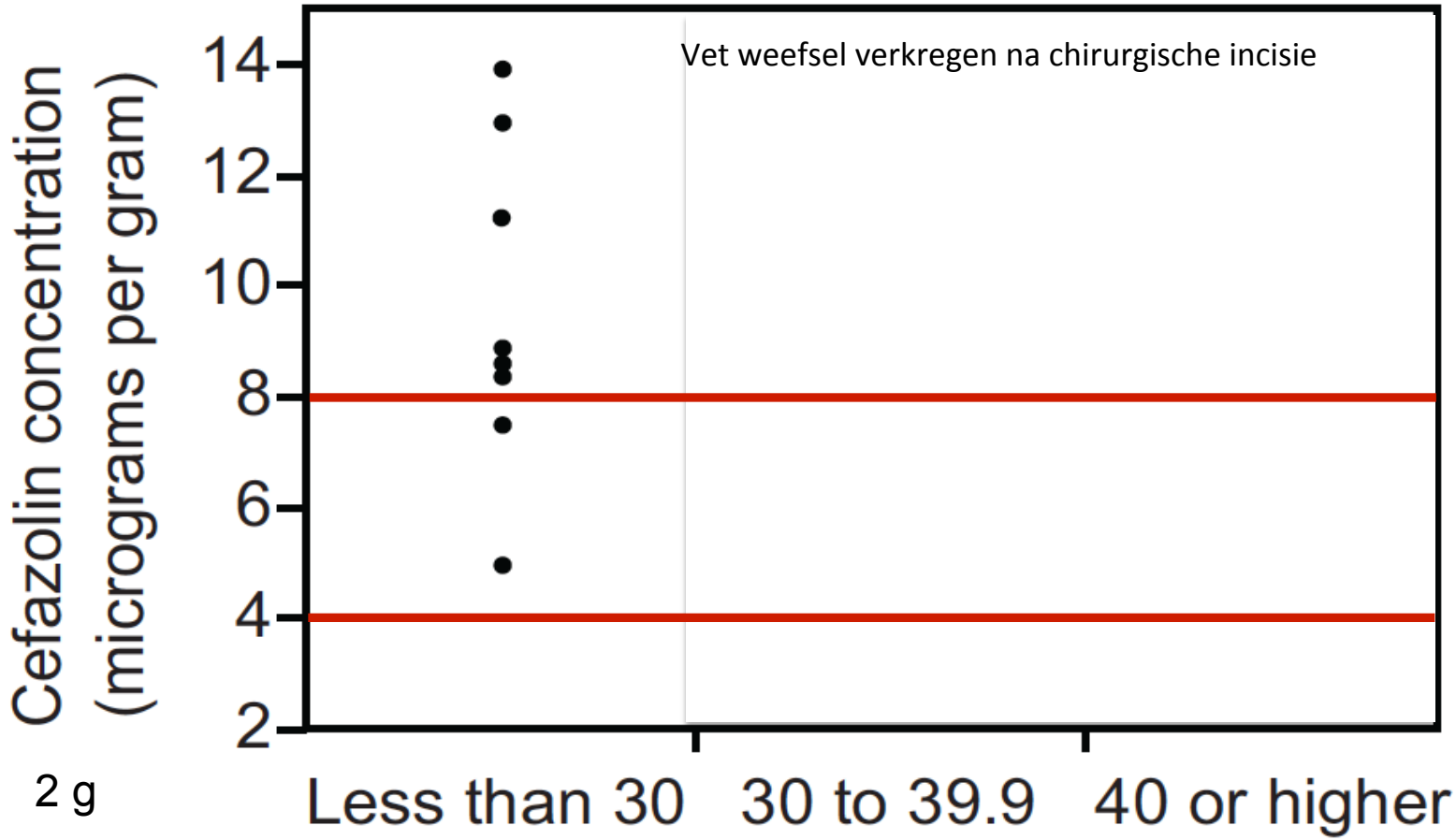

Pevzner L et al. *Obstet Gynecol* 2011

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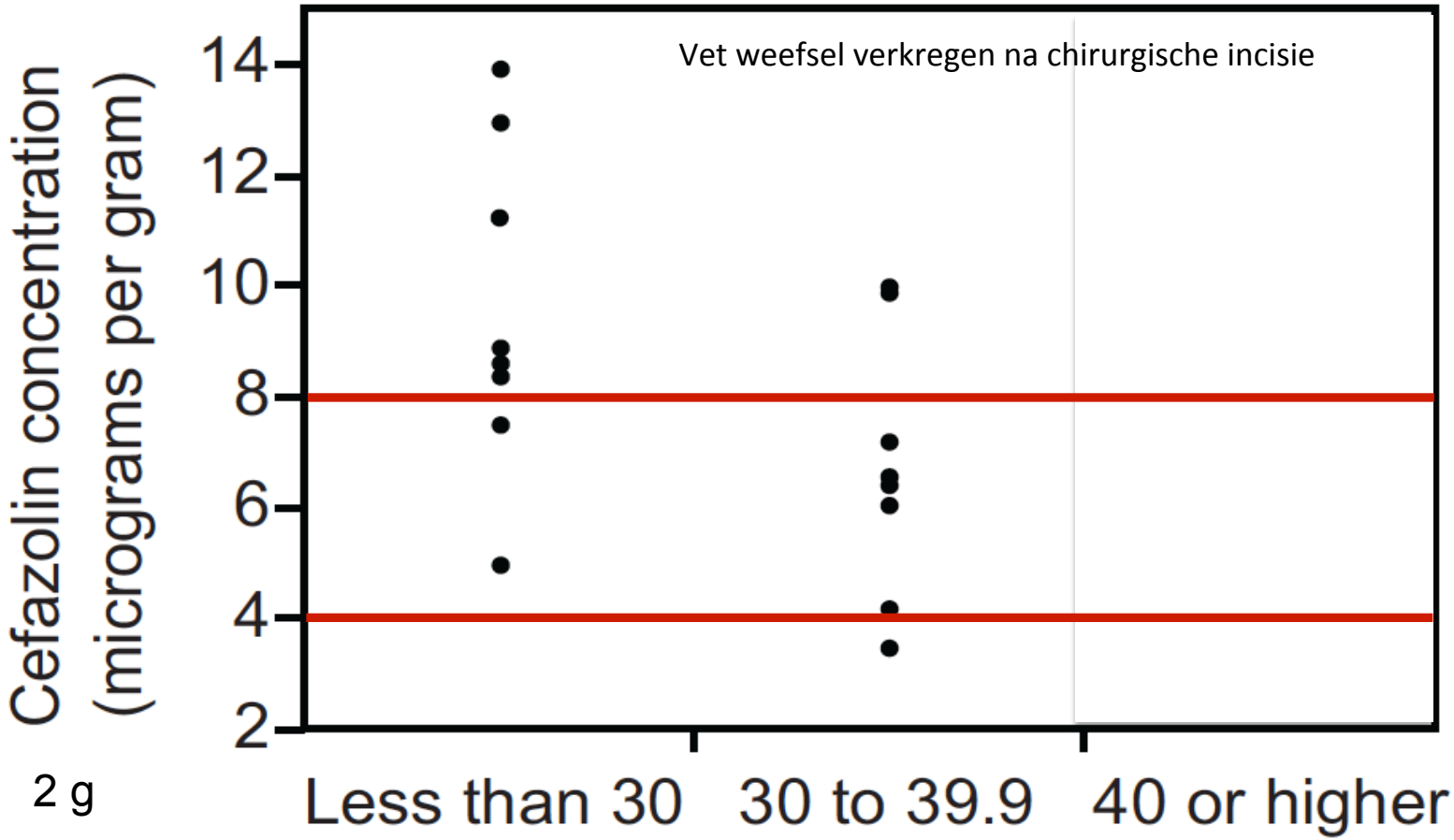

Pevzner L et al. *Obstet Gynecol* 2011

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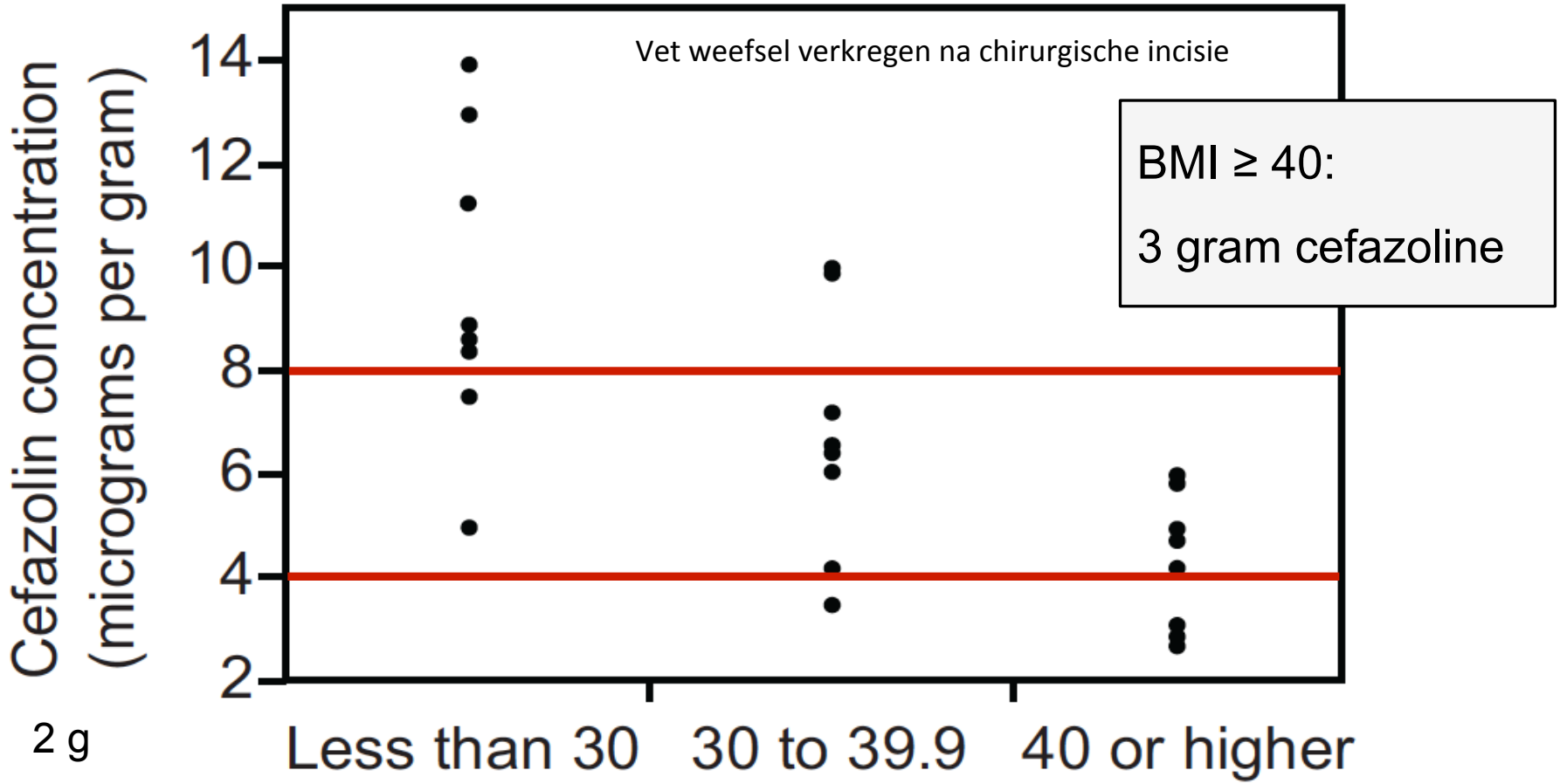

Pevzner L et al. *Obstet Gynecol* 2011

CONCLUSIES

- Behoudens in tumor chirurgie, vooralsnog geen overtuigende aanwijzingen dat verlenging van de antibiotica profylaxe het risico op PJI verlaagt.
- Onvoldoende data dat antibiotica profylaxe aangepast of verbreed moet worden in hoog risico groepen.
- De dosering van antibiotica profylaxe moet worden geoptimaliseerd in obese patiënten.
- Andere preventie maatregelen belangrijker dan antibiotica profylaxe?