AIAC e AIAC Emilia-Romagna

“LE INFEZIONI NEL PAZIENTE CON DEVICES: UN PROBLEMA IRRISOLTO DA CONOSCERE, APPROFONDIRE E RISOLVERE”

I fattori di rischio per le infezioni dei CIED

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REVIEW
Pacing and resynchronization therapy

Risk factors for cardiac implantable electronic device infection: a systematic review and meta-analysis

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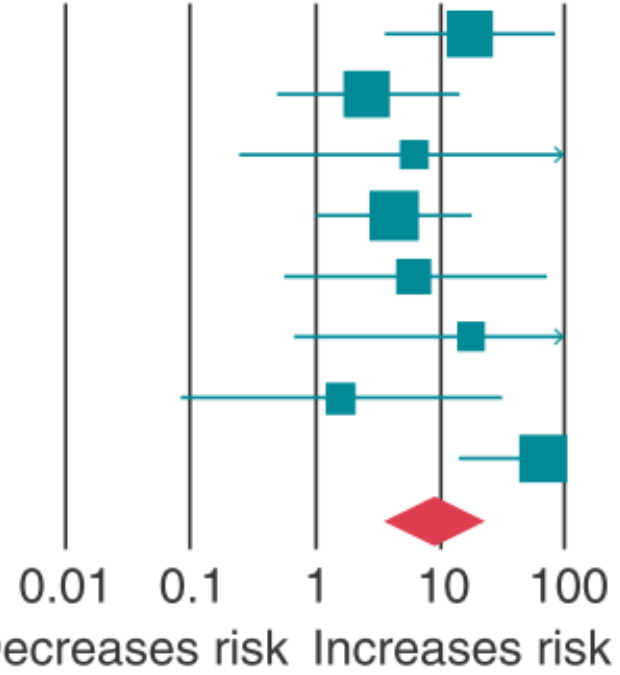
Electronic searches (up to January 2014) were performed in PubMed, Scopus, and Web of Science databases. 60 studies (21 prospective, 9 case–control, and 30 retrospective cohort studies) met the inclusion criteria.
*The average device infection rate was **1–1.3%**.*

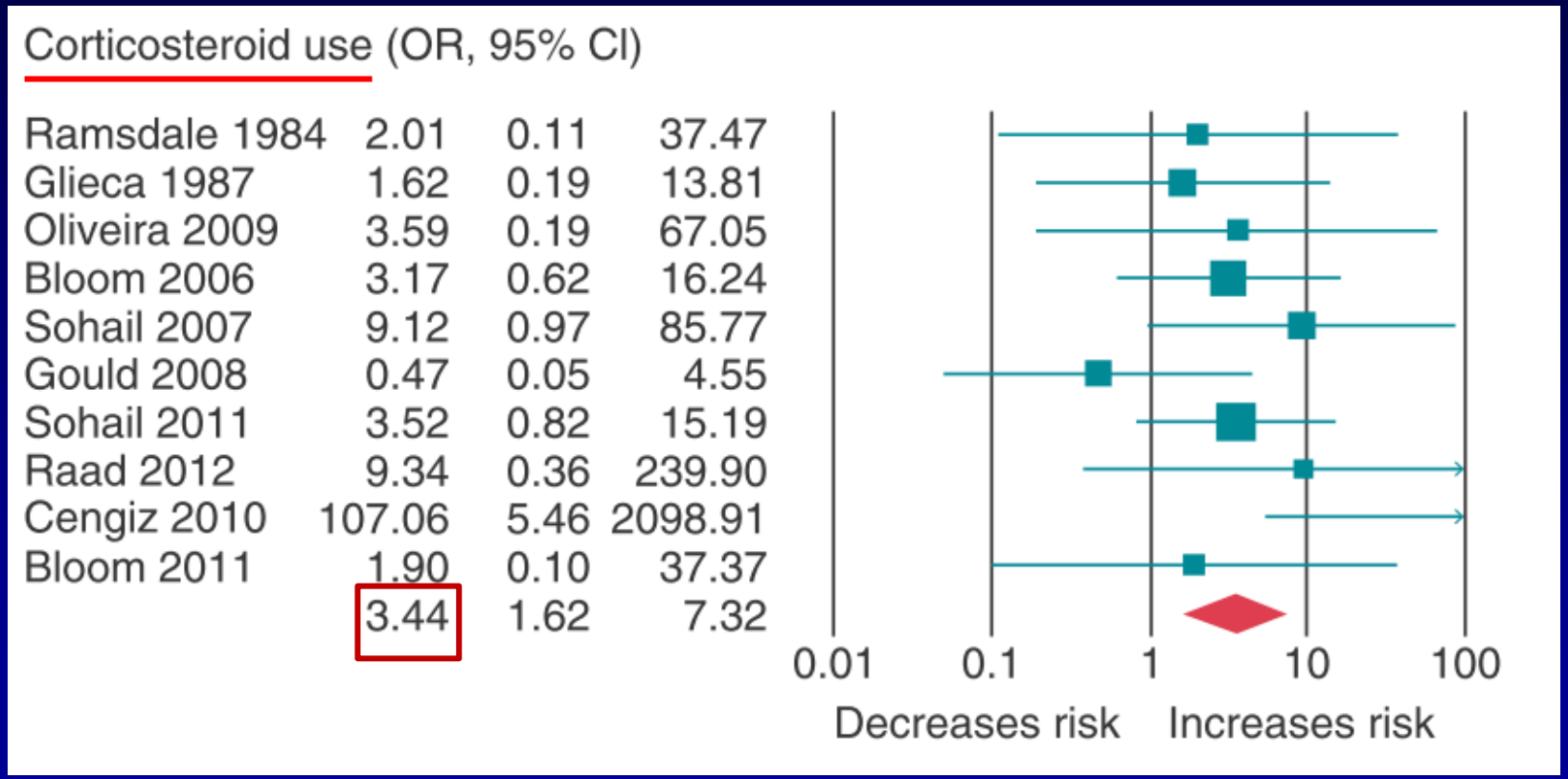
Significant host-related risk factors for infection

End-stage renal disease (OR, 95% CI)

Romeyer 2010	17.10	3.58	81.71
Bloom 2006	2.61	0.49	13.87
Sohail 2007	6.16	0.24	155.95
Sohail 2011	4.29	1.04	17.72
Dasgupta 2007	6.26	0.55	70.88
Ito 2009	17.29	0.66	453.44
Bloom 2011	1.62	0.08	31.74
Tompkins 2011	66.90	14.30	313.01
	8.73	3.42	22.31



Significant host-related risk factors for infection



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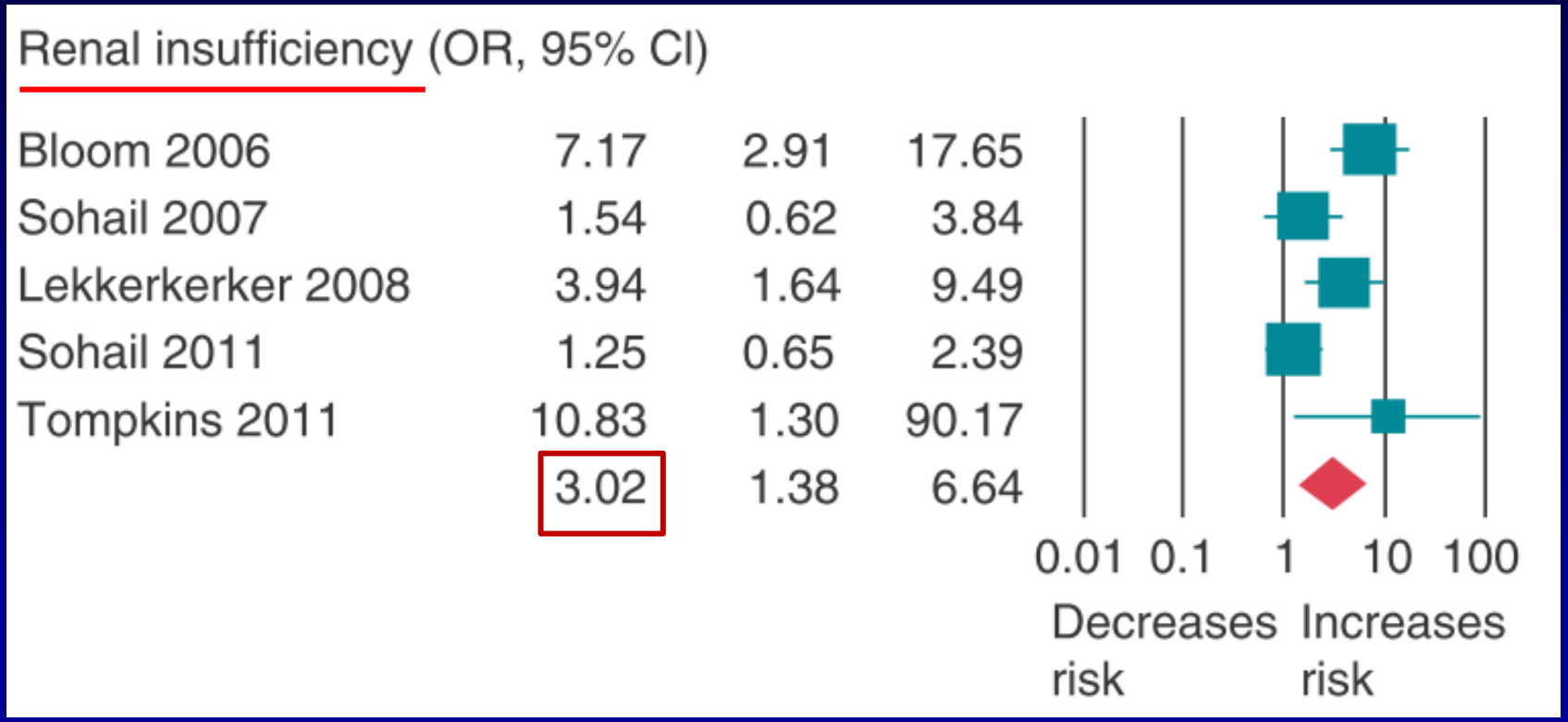

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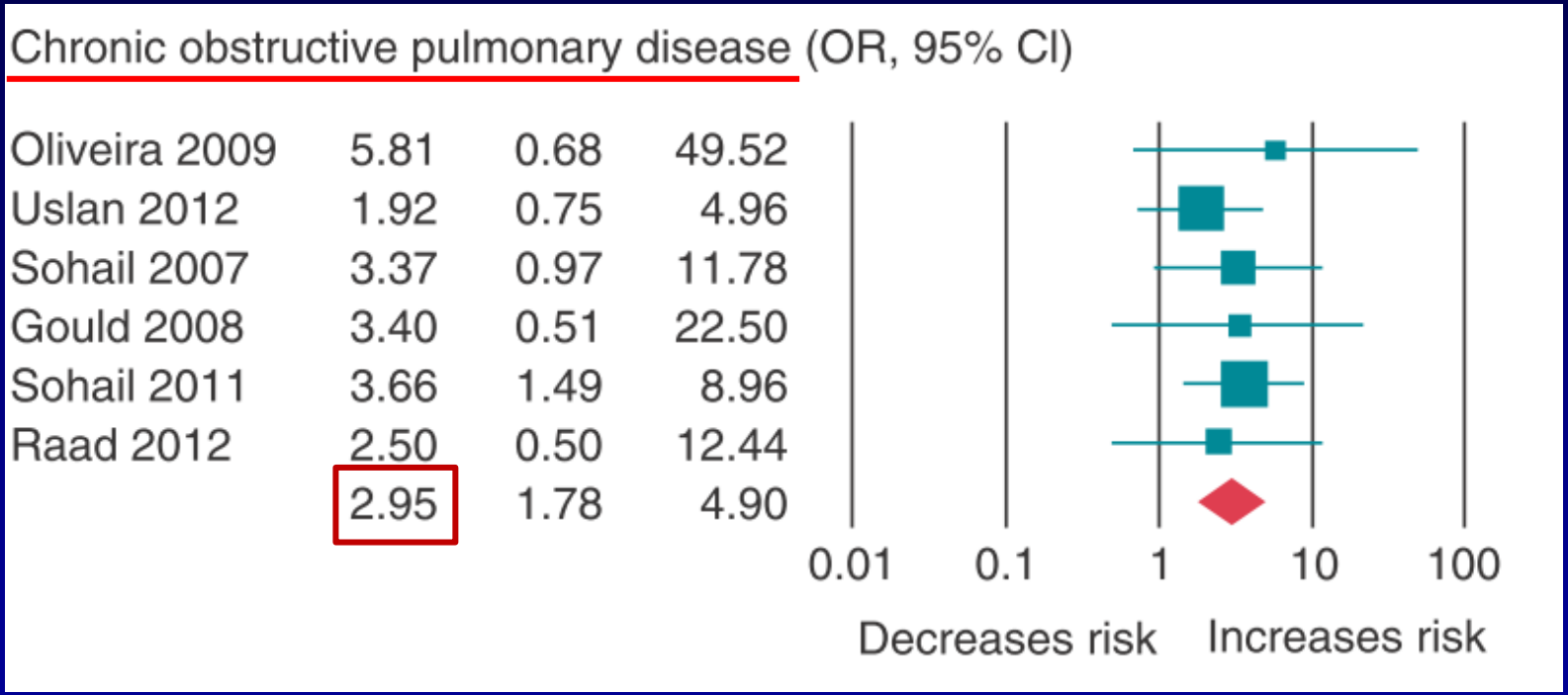

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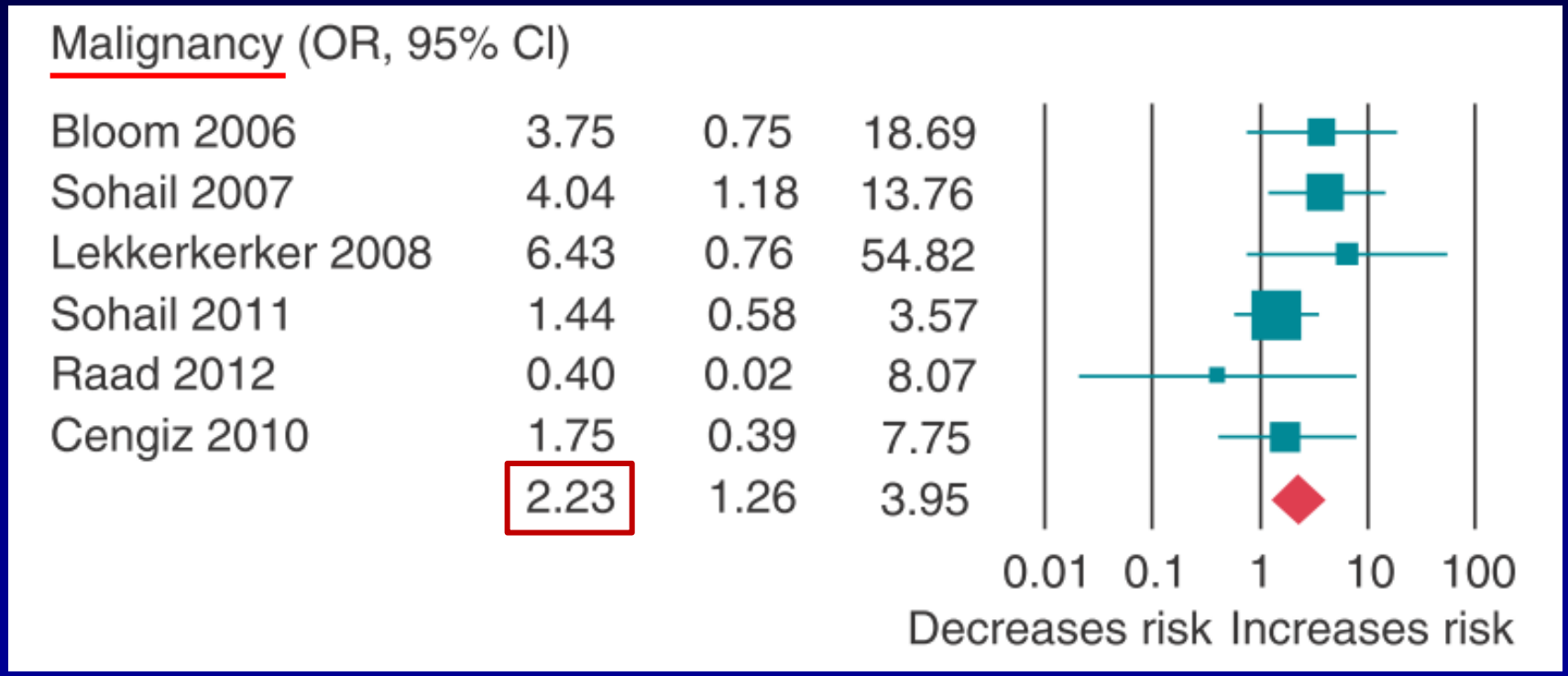

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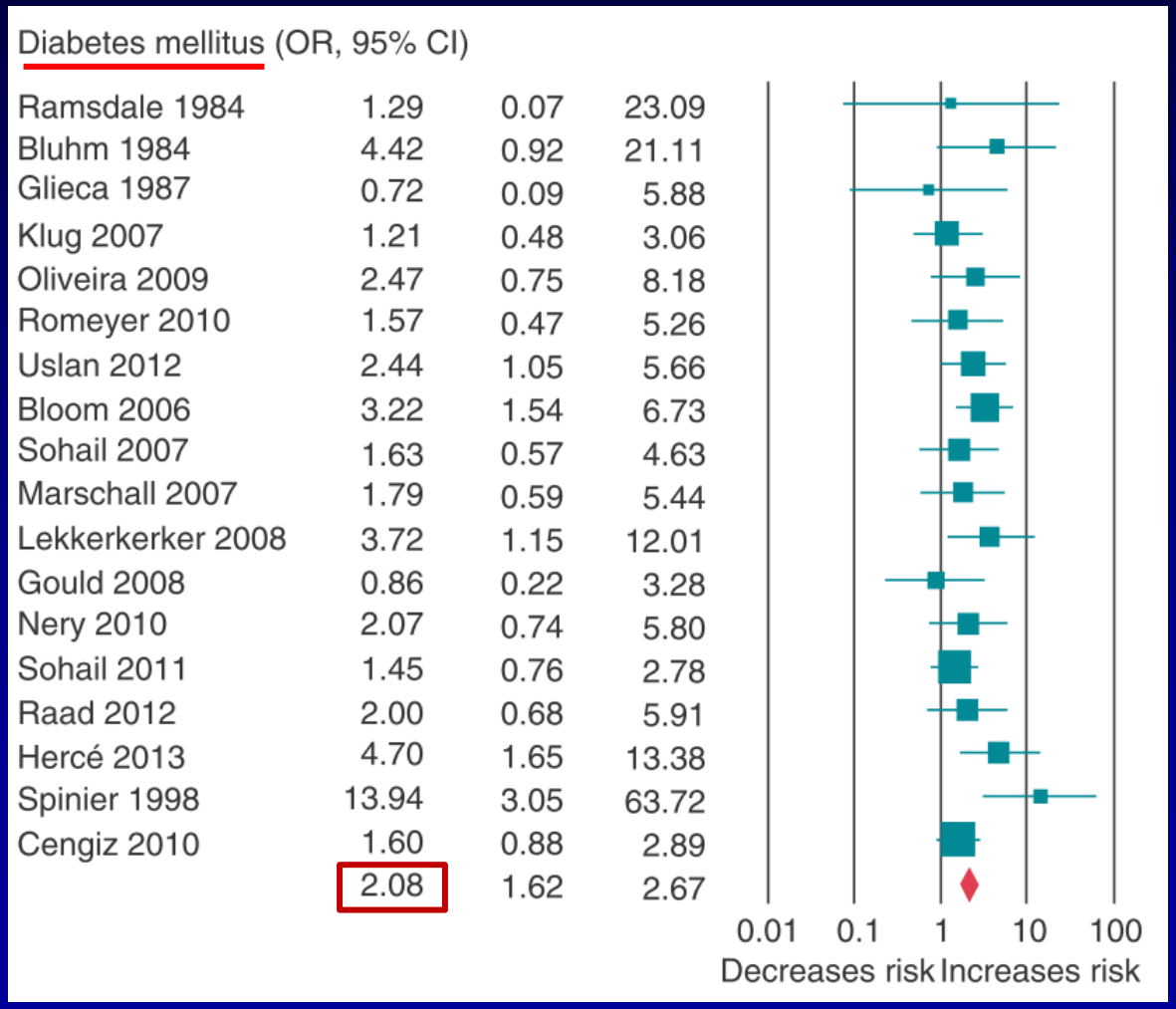

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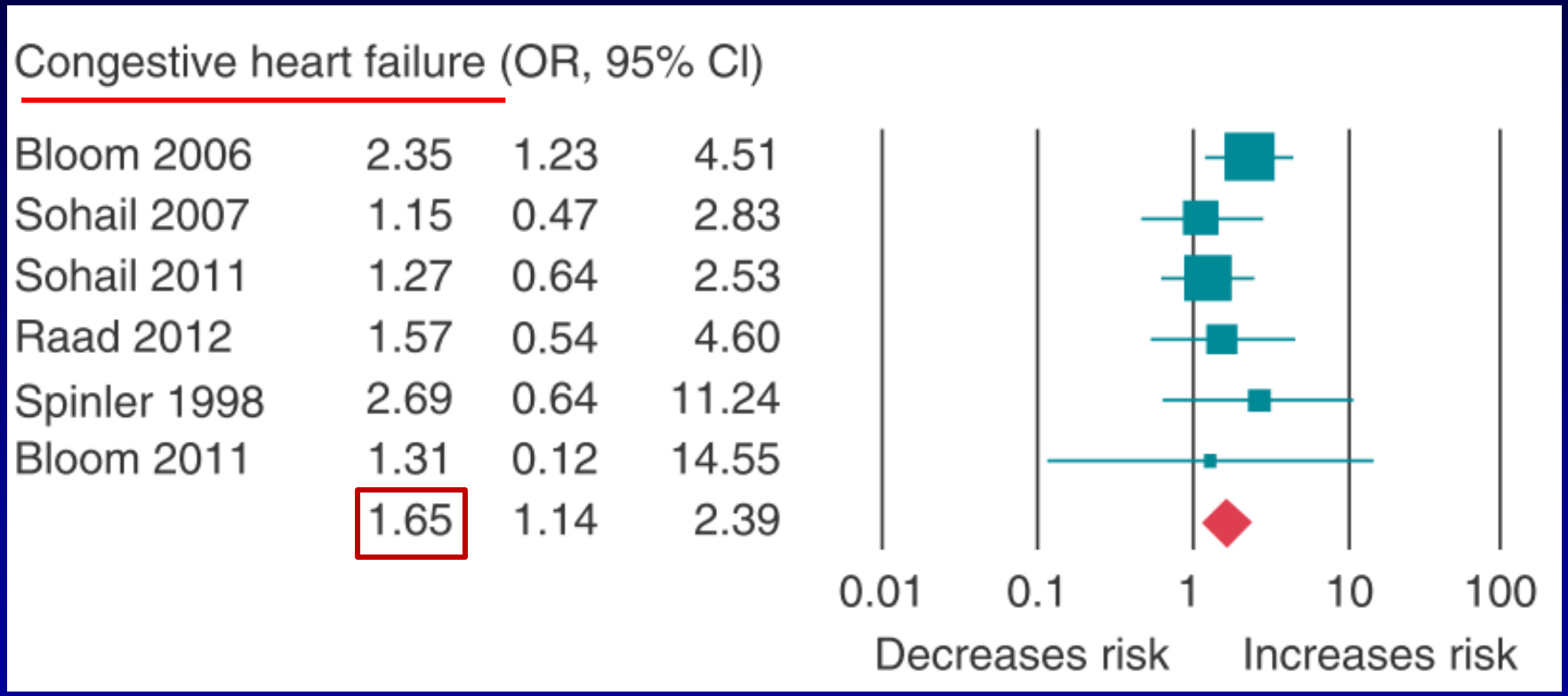

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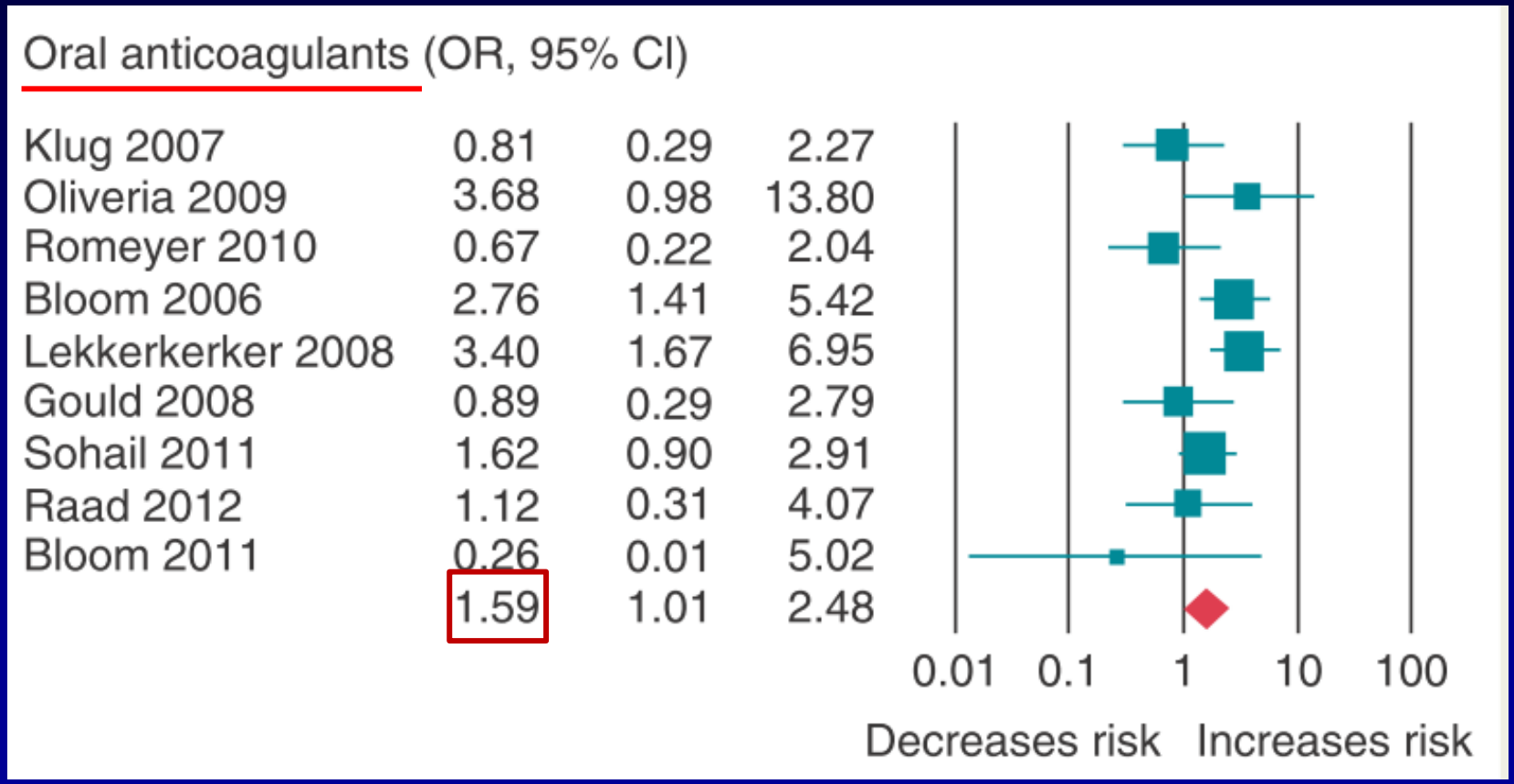
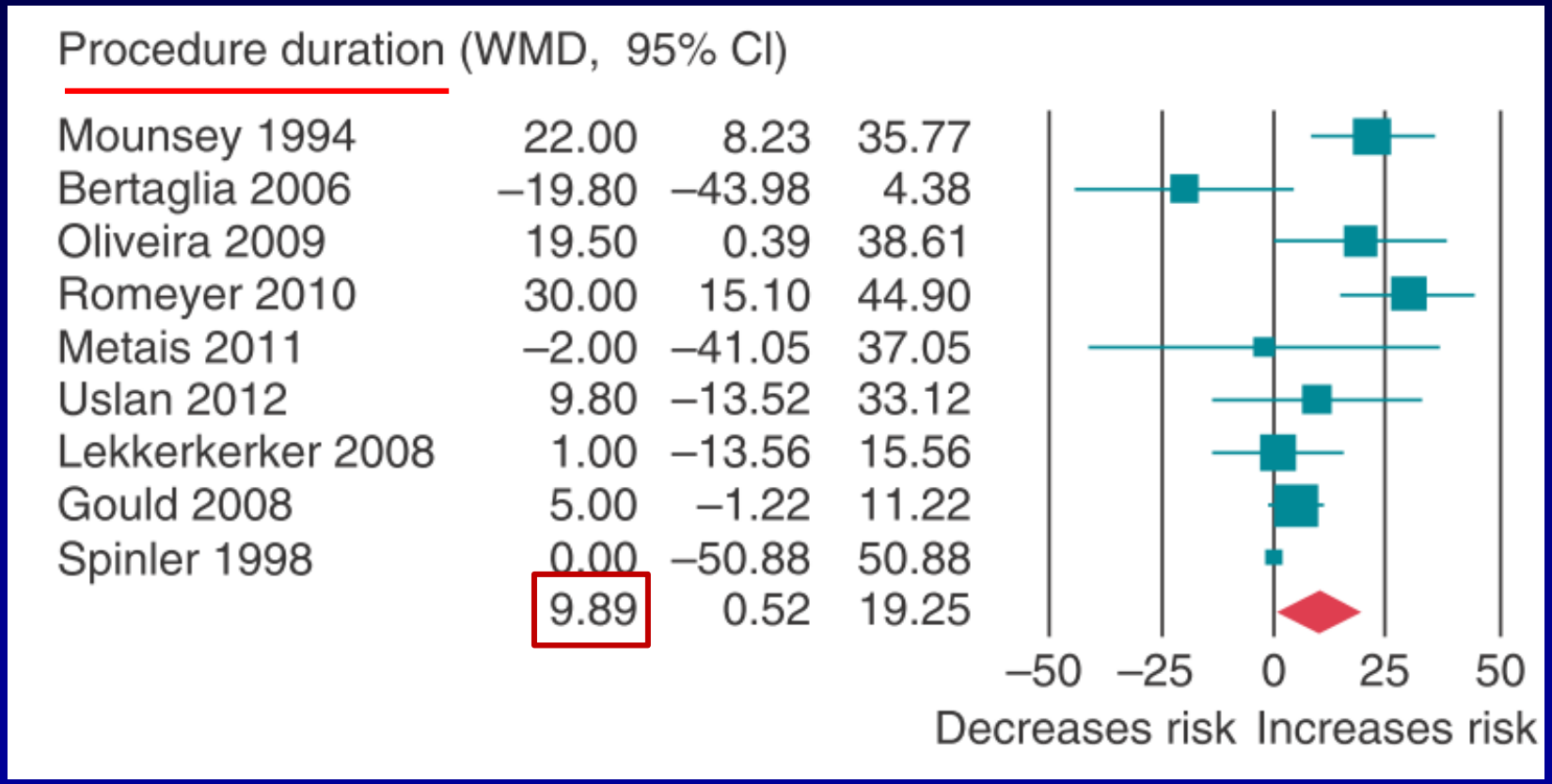


Significant procedure-related risk factors for infection



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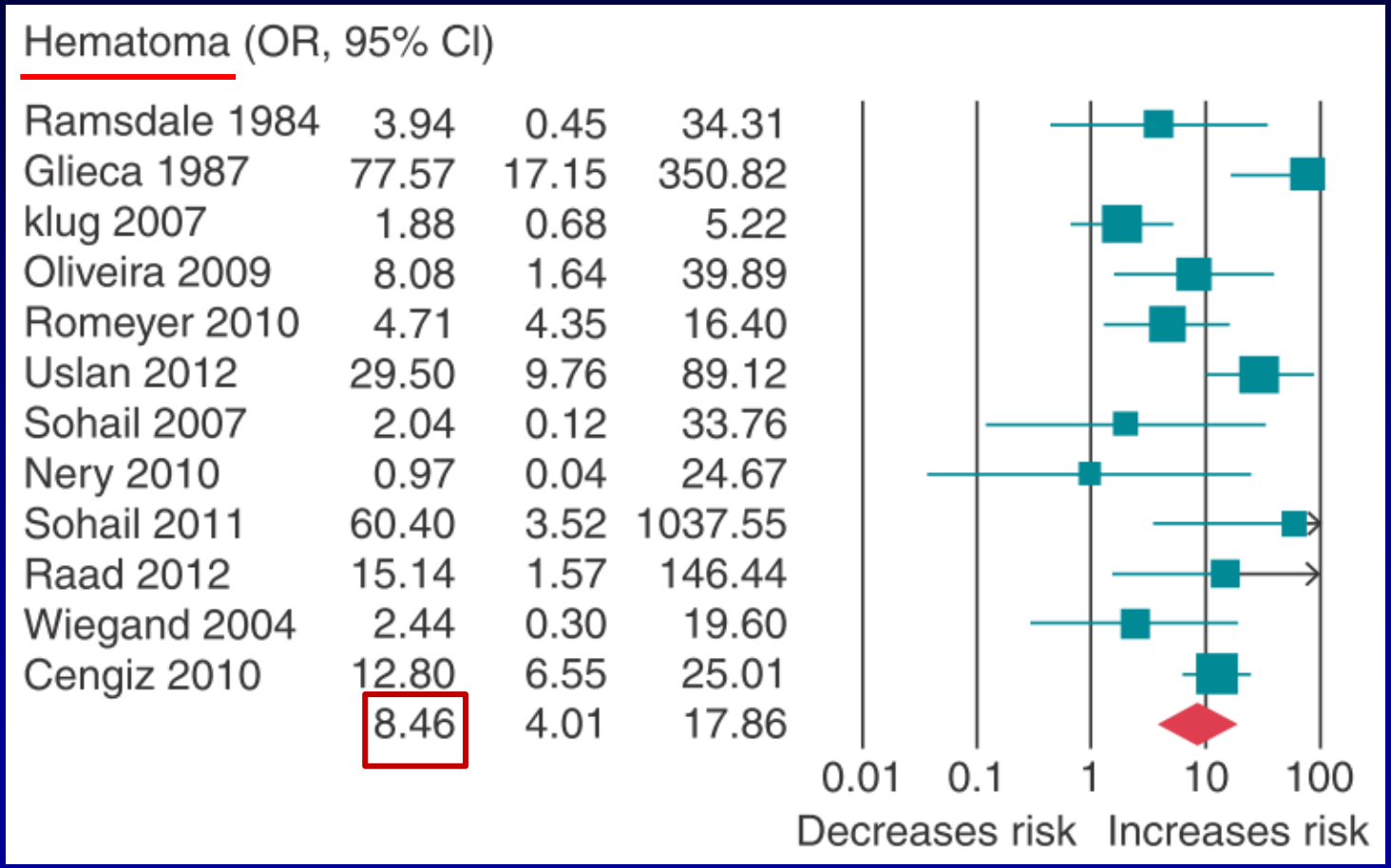

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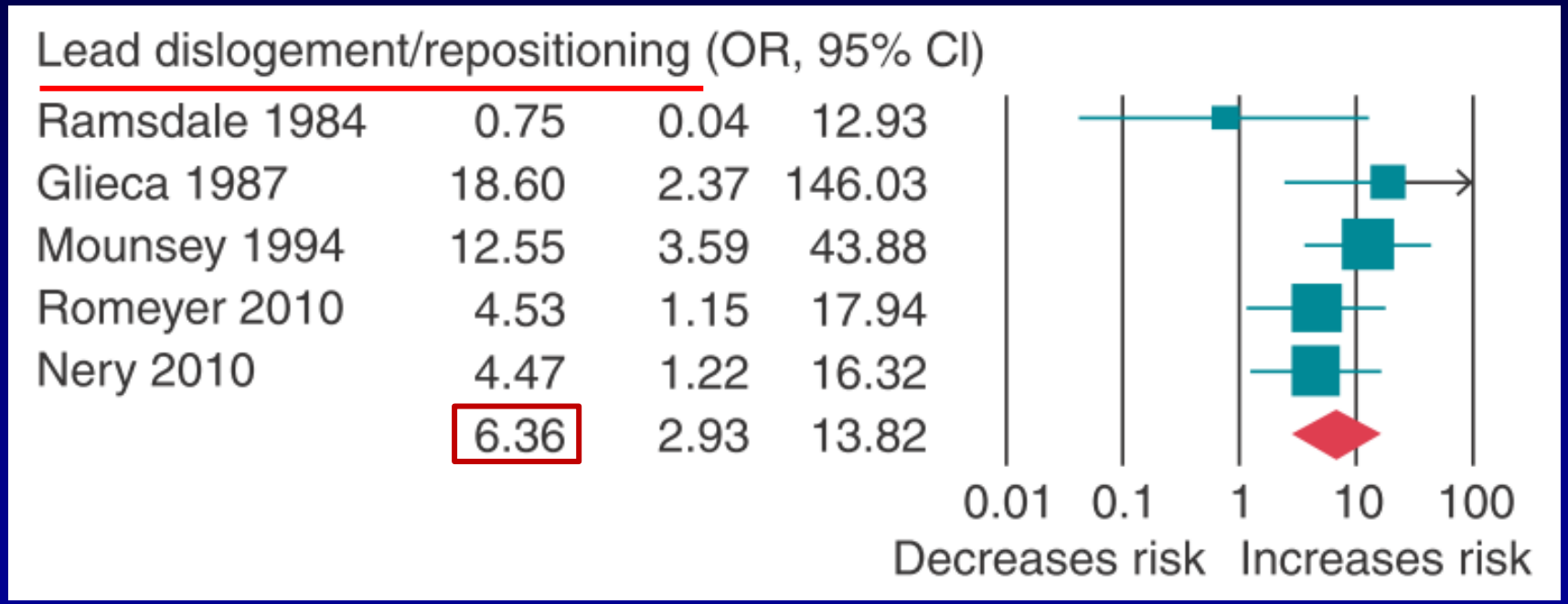

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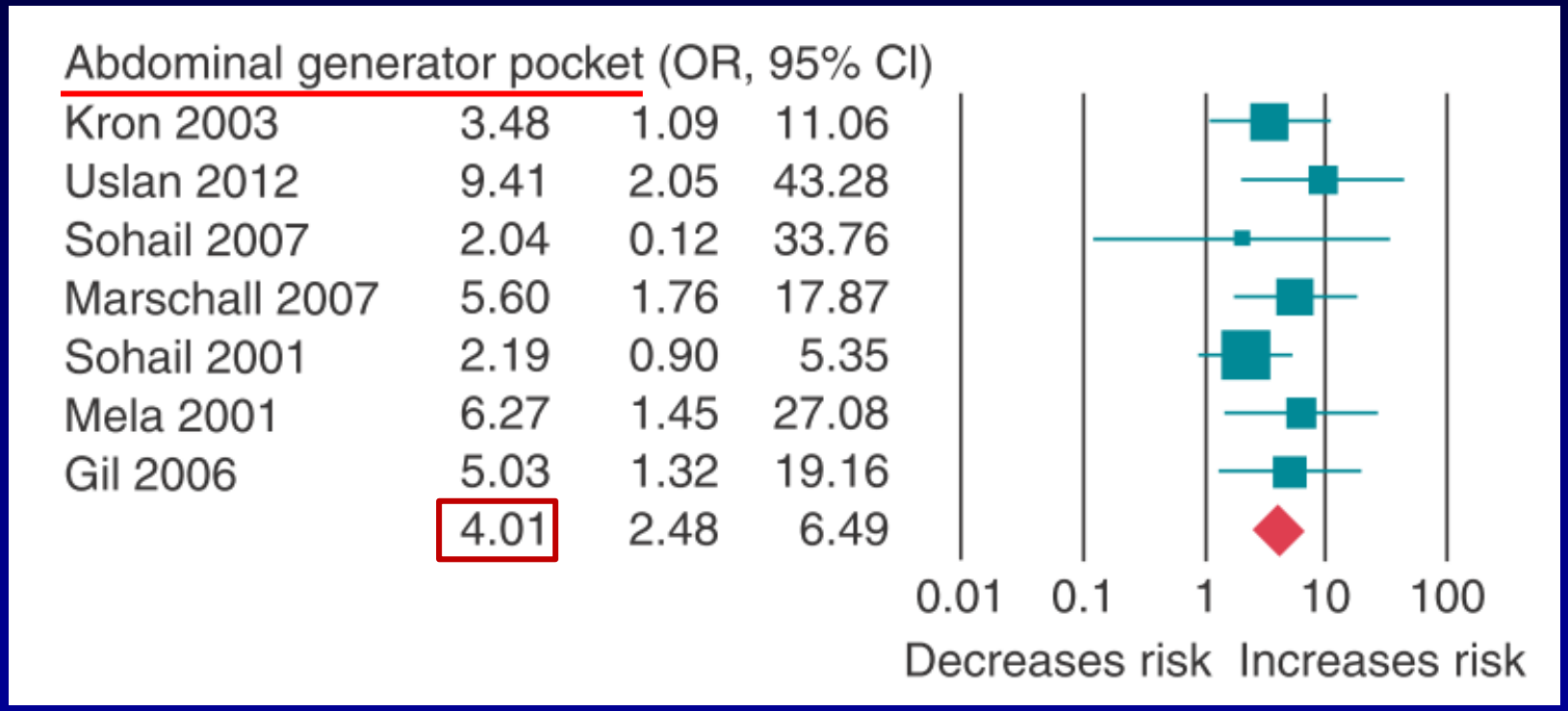

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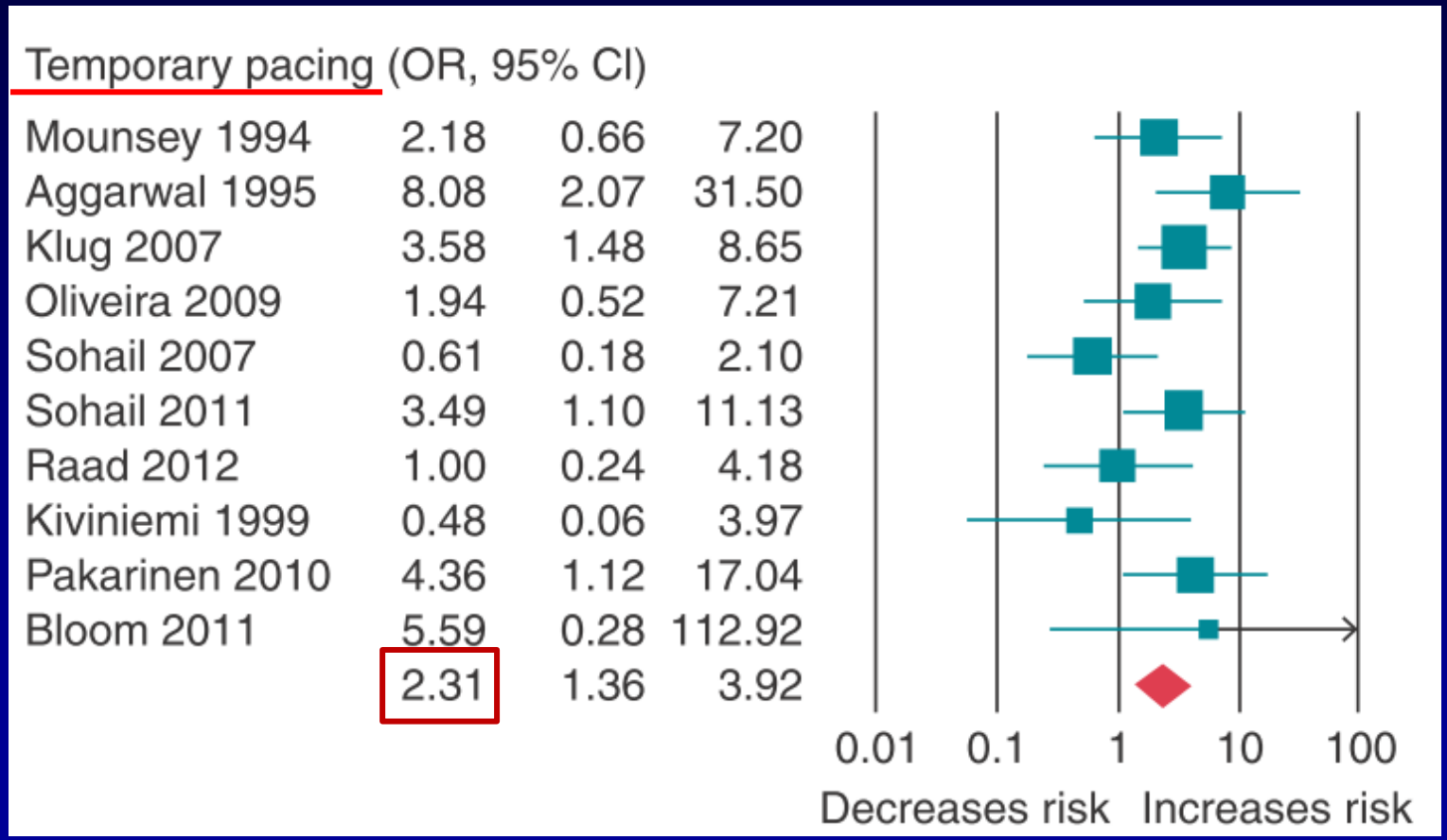

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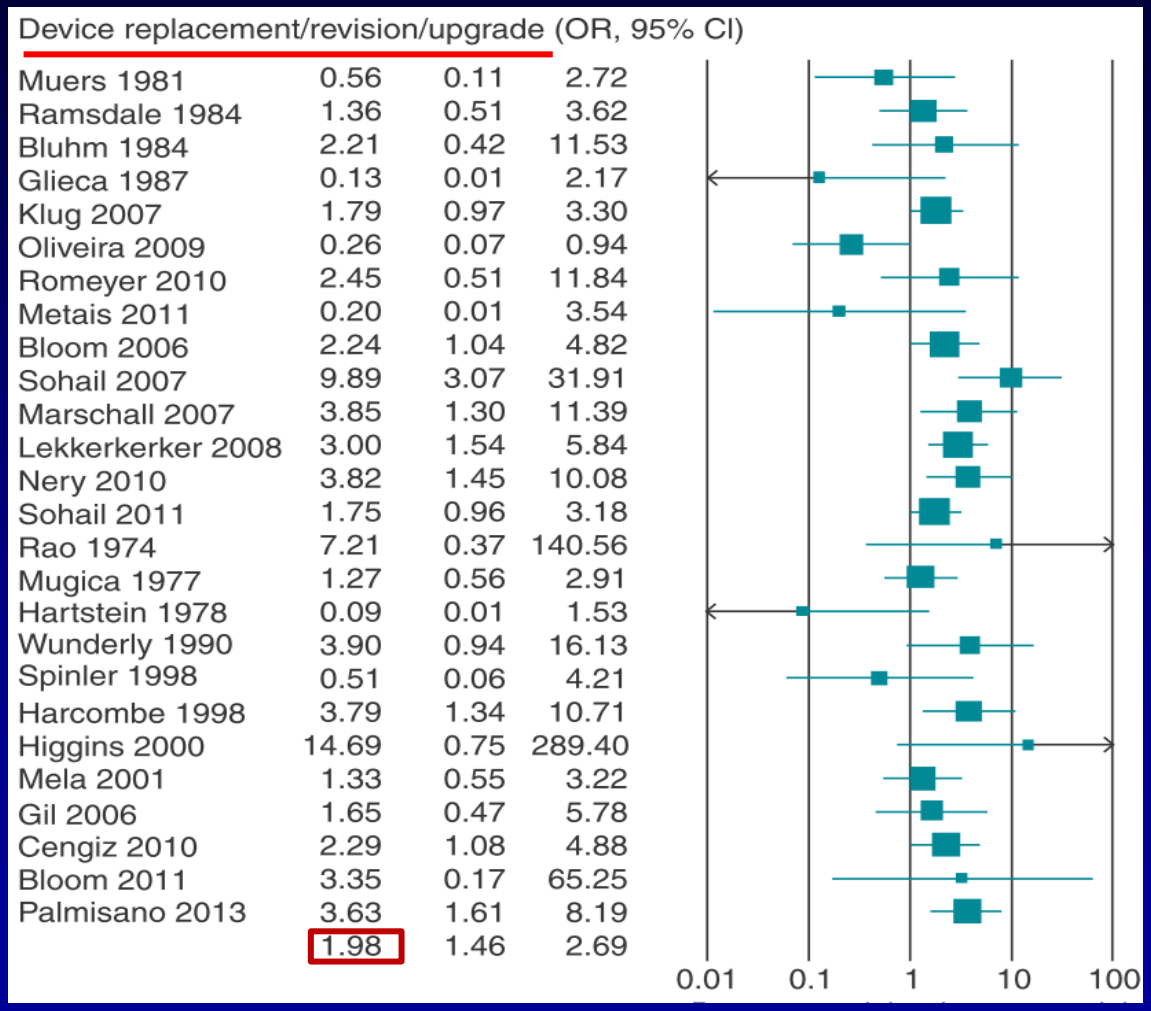

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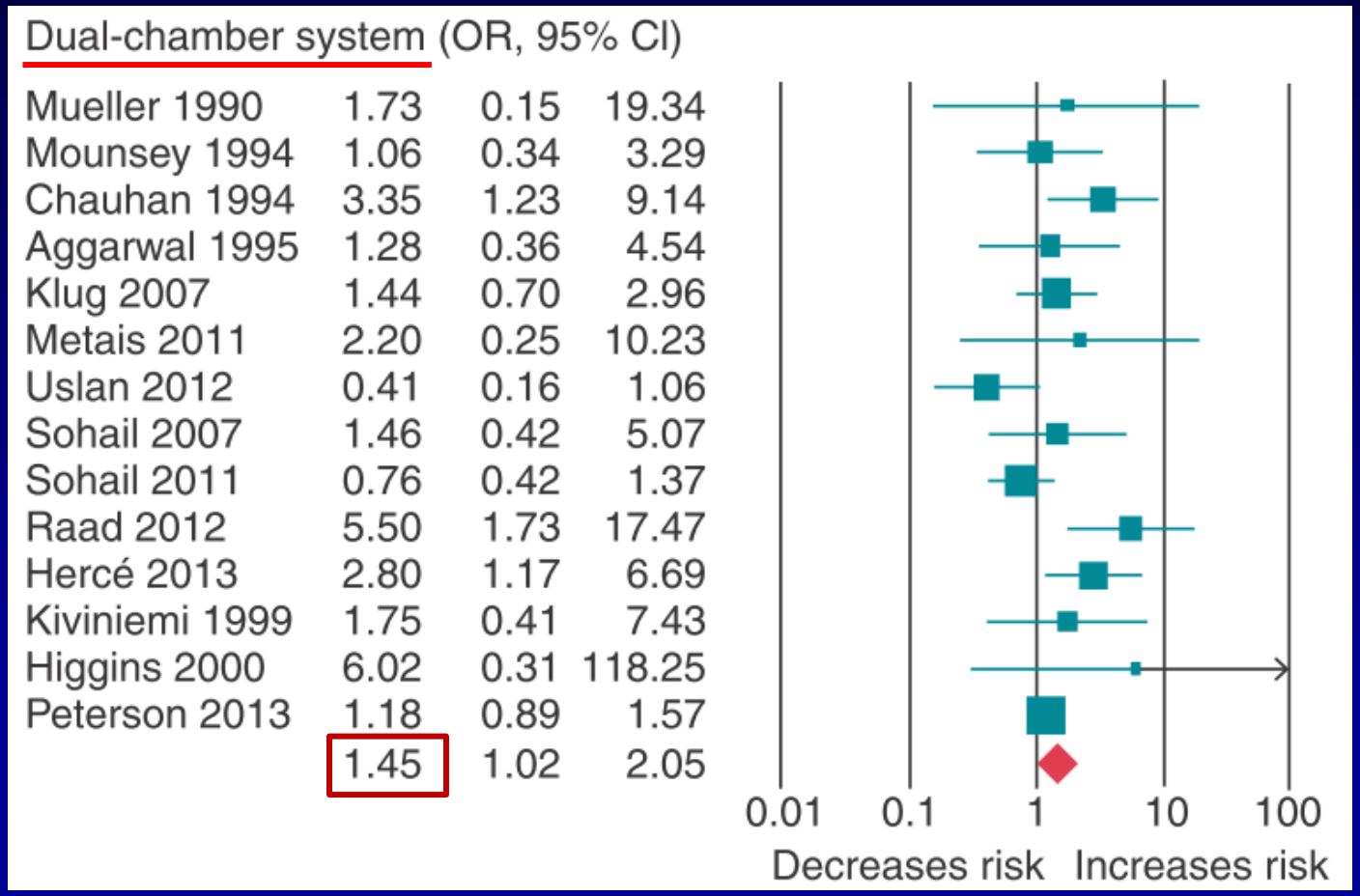

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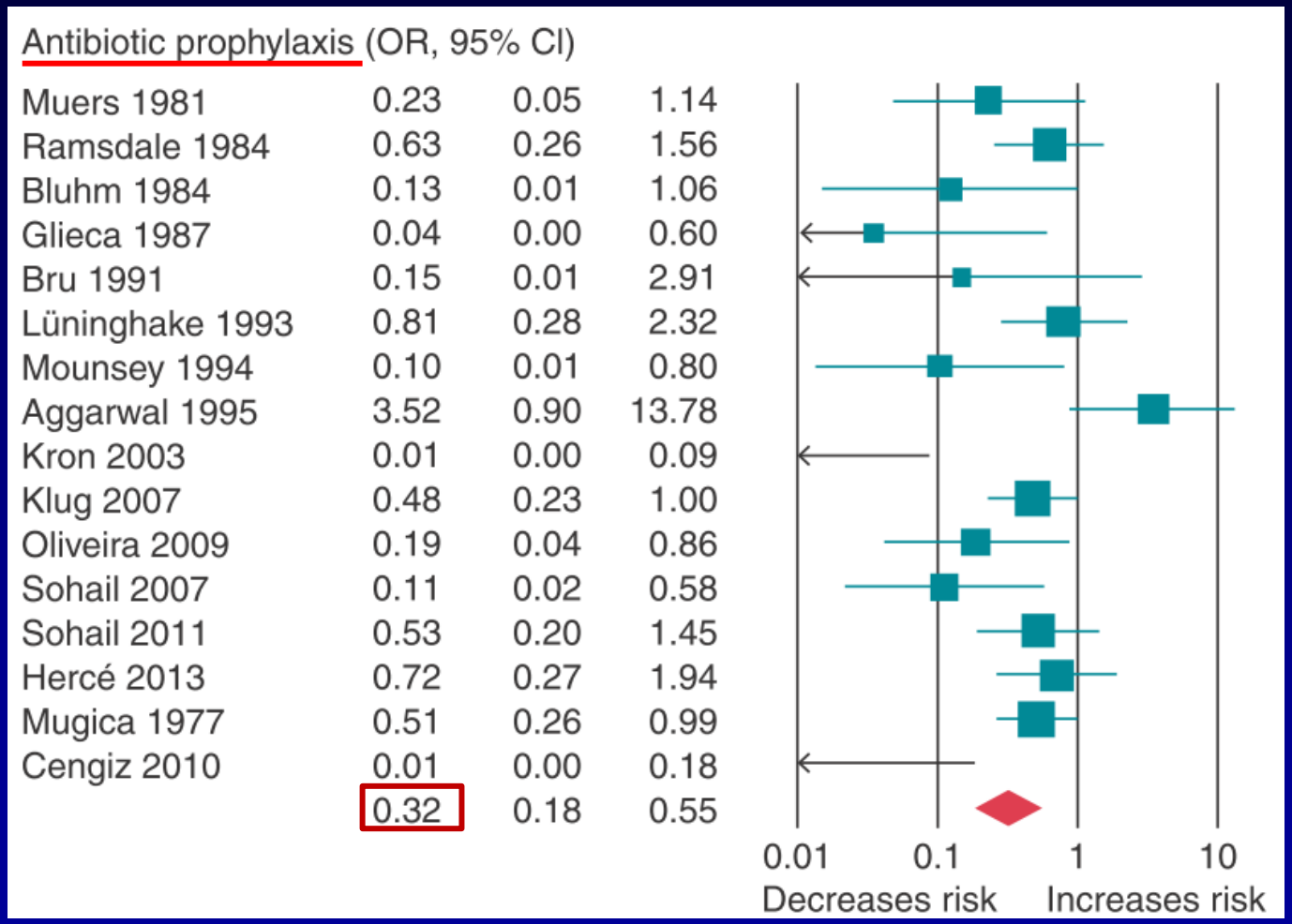

Rates of and Factors Associated With Infection in 200 909 Medicare Implantable Cardioverter-Defibrillator Implants

Results From the National Cardiovascular Data Registry

Jordan M. Prutkin, MD, MHS; Matthew R. Reynolds, MD, MSc; Haikun Bao, PhD; Jeptha P. Curtis, MD; Sana M. Al-Khatib, MD, MHS; Saurabh Aggarwal, MD; Daniel Z. Uslan, MD

Background—The rate of implantable cardioverter-defibrillator (ICD) infections has been increasing faster than that of implantation. We sought to determine the rate and predictors of ICD infection in a large cohort of Medicare patients.

Methods and Results—Cases submitted to the ICD Registry from 2006 to 2009 were matched to Medicare fee-for-service claims data using indirect patient identifiers. ICD infections occurring within 6 months of hospital discharge after implantation were identified by ICD-9 codes. Logistic regression was used to examine factors associated with risk of ICD infection. Of 200 909 implants, 3390 patients (1.7%) developed an ICD infection. The infection rate was 1.4%, 1.5%, and 2.0% for single, dual, and biventricular ICDs, respectively ($P<0.001$). Generator replacement had a higher rate compared with initial implant (1.9% versus 1.6%, $P<0.001$). The factors associated with infection were adverse event during implant requiring reintervention (odds ratio [OR], 2.692; 95% confidence interval [CI], 2.304–3.145), previous valvular surgery (OR, 1.525; 95% CI, 1.375–1.692), reimplantation for device upgrade, malfunction, or manufacturer advisory (OR, 1.354; 95% CI, 1.196–1.533), renal failure on dialysis (OR, 1.342; 95% CI, 1.123–1.604), chronic lung disease (OR, 1.215; 95% CI, 1.125–1.312), cerebrovascular disease (OR, 1.172; 95% CI, 1.076–1.276), and warfarin (OR, 1.155; 95% CI, 1.060–1.257).

Conclusions—Patients who developed an ICD infection were more likely to have had peri-ICD implant complications requiring early reintervention, previous valve surgery, device replacement for reasons other than battery depletion, and increased comorbidity burden. Efforts should be made to carefully consider when to reenter the pocket at any time other than battery replacement. **(*Circulation*. 2014;130:1037-1043.)**

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CLINICAL RESEARCH
Arrhythmia/electrophysiology

Complications after cardiac implantable electronic device implantations: an analysis of a complete, nationwide cohort in Denmark

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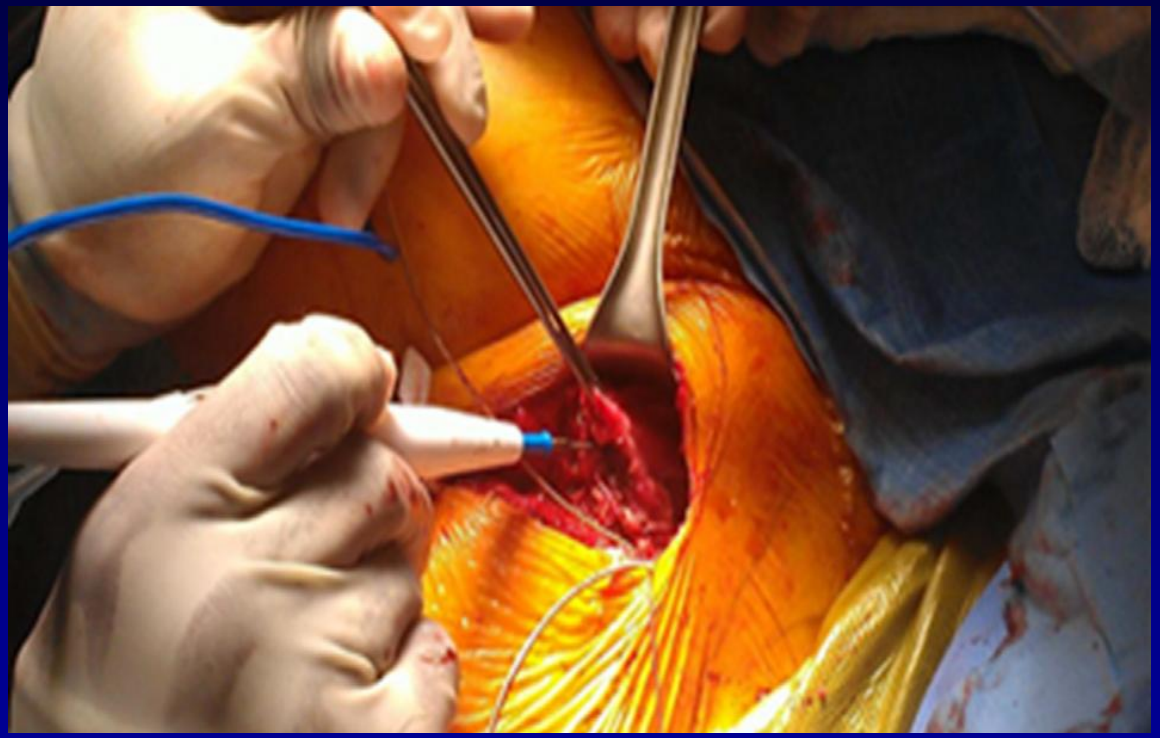
See page 1167 for the editorial comment on this article (doi:10.1093/eurheartj/eht568)

Aims Complications after cardiac implantable electronic device (CIED) treatment, including permanent pacemakers (PMs), cardiac resynchronization therapy devices with defibrillators (CRT-Ds) or without (CRT-Ps), and implantable cardioverter defibrillators (ICDs), are associated with increased patient morbidity, healthcare costs, and possibly increased mortality.

Methods and results Population-based cohort study in all Danish patients who underwent a CIED procedure from May 2010 to April 2011. Data on complications were gathered on review of all patient charts while baseline data were obtained from the Danish Pacemaker and ICD Register. Adjusted risk ratios (aRRs) with 95% confidence intervals were estimated using binary regression. The study population consisted of 5918 consecutive patients. A total of 562 patients (9.5%) experienced at least one complication. The risk of any complication was higher if the patient was a female (aRR 1.3; 1.1–1.6), underweight (aRR 1.5; 1.1–2.3), implanted in a centre with an annual volume <750 procedures (0–249 procedures: aRR 1.6; 1.1–2.2, 250–499: aRR 2.0; 1.6–2.7, 500–749: aRR 1.5; 1.2–1.8), received a dual-chamber ICD (aRR 2.0; 1.4–2.7) or CRT-D (aRR 2.6; 1.9–3.4), underwent system upgrade or lead revision (aRR 1.3; 1.0–1.7), had an operator with an annual volume <50 procedures (aRR 1.9; 1.4–2.6), or underwent an emergency, out-of-hours procedure (aRR 1.5; 1.0–2.3).

Conclusion CIED complications are more frequent than generally acknowledged. Both patient- and procedure-related predictors may identify patients with a particularly high risk of complications. This information should be taken into account both in individual patient treatment and in the planning of future organization of CIED treatment.

IMpact of pocKet rEvision on the rate of InfecTion and other CompLications in patients rEquiring pocket mAnipulation for generator replacement and/or lead replacement or revisioN (MAKE IT CLEAN): A prospective randomized study



Swab and tissue cultures of the fibrous capsule have been shown to grow gram-positive bacteria, most often Staphylococcus species, in 30% to 50% of patients without evidence of any clinical infection.

It has been proposed that removal of the fibrous capsule forming the pocket during device replacement procedures could reduce infection rates.

Lakkireddy D, Heart Rhythm 2015

IMpact of pocKet rEvision on the rate of InfecTion and other CompLications in patients rEquiring pocket mAnipulation for generator replacement and/or lead replacement or revisioN (MAKE IT CLEAN): A prospective randomized study

Table 5 Differences in primary and secondary outcomes between the 2 groups

Outcome during 1-year follow-up	Group A with pocket revision	Group B without pocket revision	95% Confidence interval for difference between groups	*P* value
Primary outcome				
Deep infection	0 (0)	0 (0) [NA]	NA	1
Secondary outcome				
Superficial infection	1.5% (2) [0 , 3.5]	4.7% (6) [1,8]	[-0.014, 0.08]	.16
Serosanguineous drainage	0.7% (1) [0 , 2]	7% (9) [2.5 , 11]	[0.015, 0.12]	.009
Hematoma	6.1% (8) [2,10]	0.8% (1) [0 , 2]	[0.006, 0.108]	.036
Mortality	2.2 % (3) [0 , 5]	0.8% (1) [0 , 2]	[–0.02, 0.05]	.6

Lakkireddy D, Heart Rhythm 2015

Conclusions

- Increase in CIED infection rates is reported over the past decade. It is most likely that an increase in the indications for CIED implantation in patients with serious comorbidities mostly accounts for this rise.
- The meta-analysis confirmed the effectiveness of antibiotics to prevent infection in PPM, ICD, or CRT device recipients.
- Particular attention should be paid on adequate haemostasis, especially in patients at high risk undergoing to device replacement, revision or upgrade.

Significant procedure-related risk factors for infection