

# Conferencia Dr. Juan Gálvez: **Lo mejor del año en infección cardiovascular**

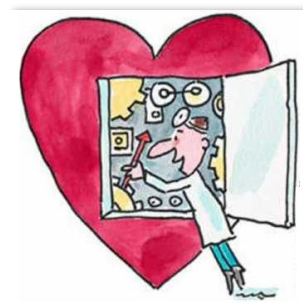
Noviembre 2022

**Guillermo Cuervo**

Servicio de Enfermedades Infecciosas

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**XI CONGRESO  
SEICAV 2022**

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# Metodología

- **Revisión NO sistemática**
- **Términos de búsqueda:** Endocarditis, Infective endocarditis, cardiac electronic devices infection, vascular graft infection.
- **Restricciones:**
  - Revistas más relevantes
  - Período: 15/09/2021 → 02/11/2022
- **Criterios de selección:**
  - Relevancia clínica
  - Ensayos clínicos
  - Estudios de cohortes multicéntricos



# Metodología

- Títulos revisados: 3038
  - Abstracts revisados: 84
    - Artículos seleccionados: 10

## Endocarditis infecciosa:

- Epidemiología (1)
- Diagnóstico (1)
- Microorganismos específicos (2)
- Poblaciones especiales
  - TAVI (1)
  - **DECs** (1)
  - Pacientes ADVP (1)
- Complicaciones (1)
- Prevención (1)
- Tratamiento quirúrgico (1)

THE LANCET  
Global Health



Journal of  
Clinical Microbiology®



European  
Heart Journal



European  
Heart Journal



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Circulation



# Epidemiology of infective endocarditis in Africa: a systematic review and meta-analysis

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Global Health

- **Systematic review and meta-analysis** of studies reporting primary data for the epidemiology of IE in Africa
- **Search terms:** “endocarditis”, “Africa”, and the name of all African countries
- **Inclusion period of participants:** 1990 to 2019 (articles published between 1996 and 2020)

2141 records

89 full-texts

42 articles

**42 cross-sectional studies (mostly retrospective)**

**Total population: 15097 patients**

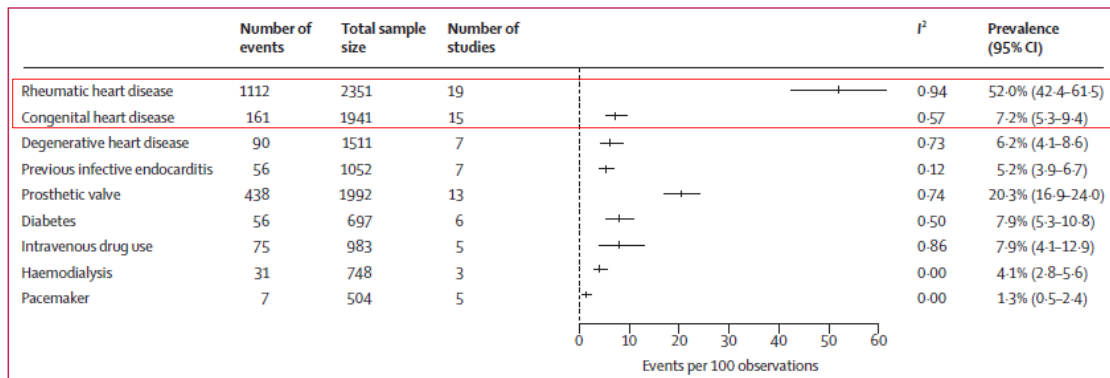


Noubiap J, et al. *Lancet Glob Health*. 2022

# Epidemiology of infective endocarditis in Africa: a systematic review and meta-analysis

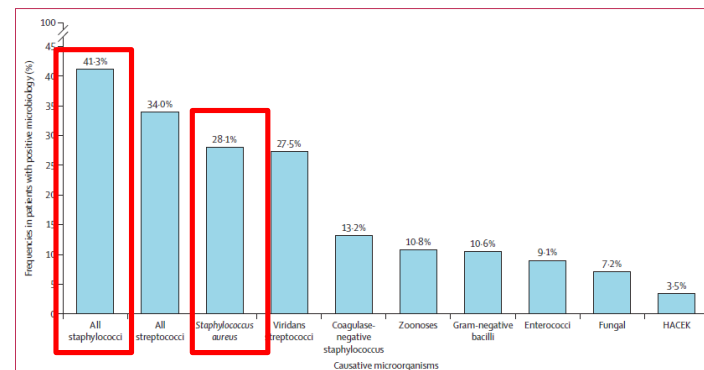
THE LANCET  
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## Risk factors



Pooled prevalence of risk factors for infective endocarditis

## Microbiology

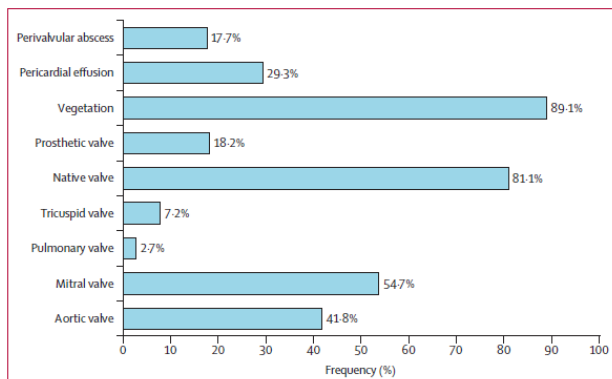


Pooled prevalence of microorganisms in positive blood cultures in infective endocarditis

# Epidemiology of infective endocarditis in Africa: a systematic review and meta-analysis

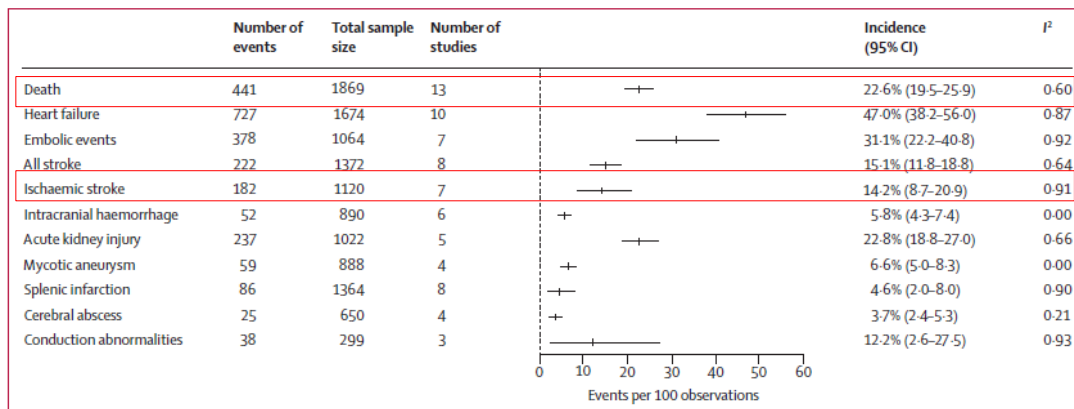
THE LANCET  
Global Health

## Echocardiogram



Pooled distribution of echocardiographic features of infective endocarditis

## Complications



Pooled incidence proportions of complications from infective endocarditis

**Pooled rate of surgical treatment → 49.1%**

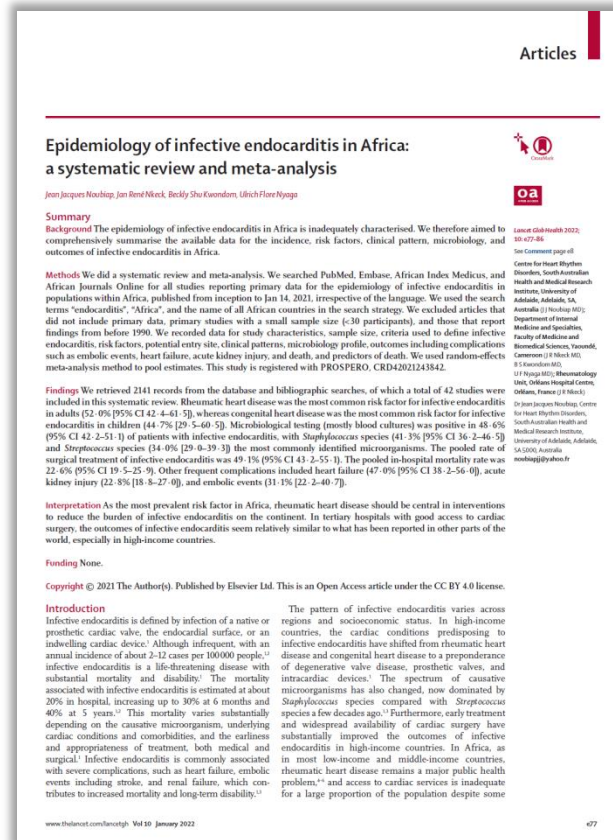
Noubiap J, et al. *Lancet Glob Health*. 2022

## ¿Por qué este artículo?

- Primer resumen exhaustivo de la epidemiología de la endocarditis en África

## Take-home messages:

- La cardiopatía reumática es el FR más frecuente de EI en adultos (y la C. congénita en niños)
- Los estafilococos son los microorganismos causantes más comunes
- La proporción de pacientes que reciben tratamiento quirúrgico por EI, la frecuencia de complicaciones y las tasas de mortalidad son similares a las reportadas en países de ingresos altos (sesgo de referencia)

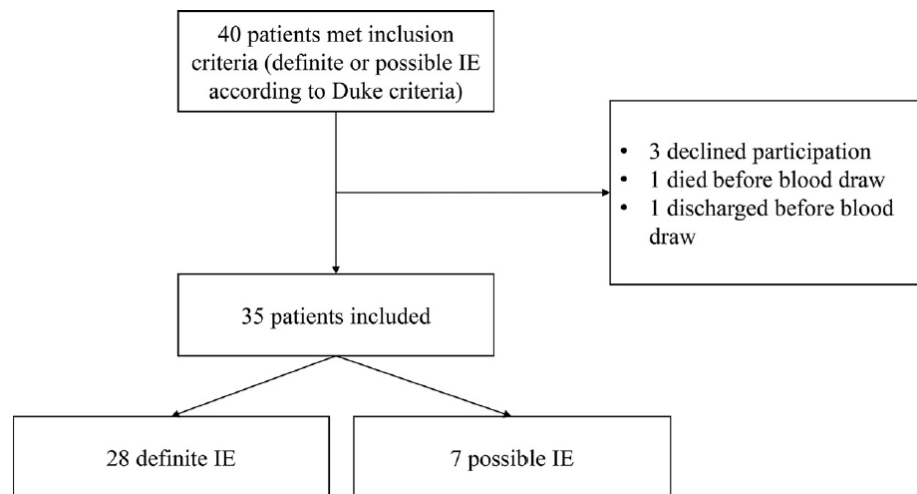


# Pathogen Detection in Infective Endocarditis Using Targeted Metagenomics on Whole Blood and Plasma: a Prospective Pilot Study



Journal of  
Clinical Microbiology®

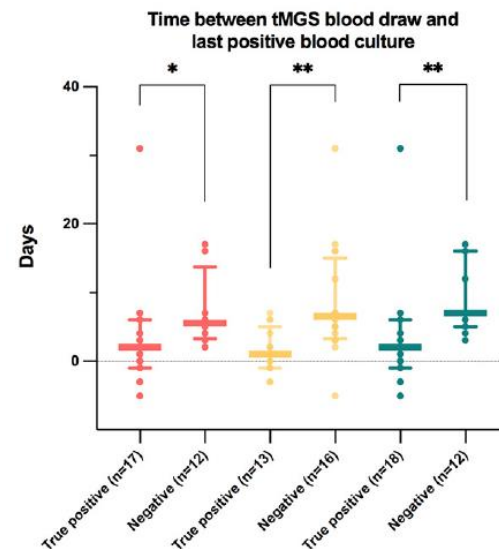
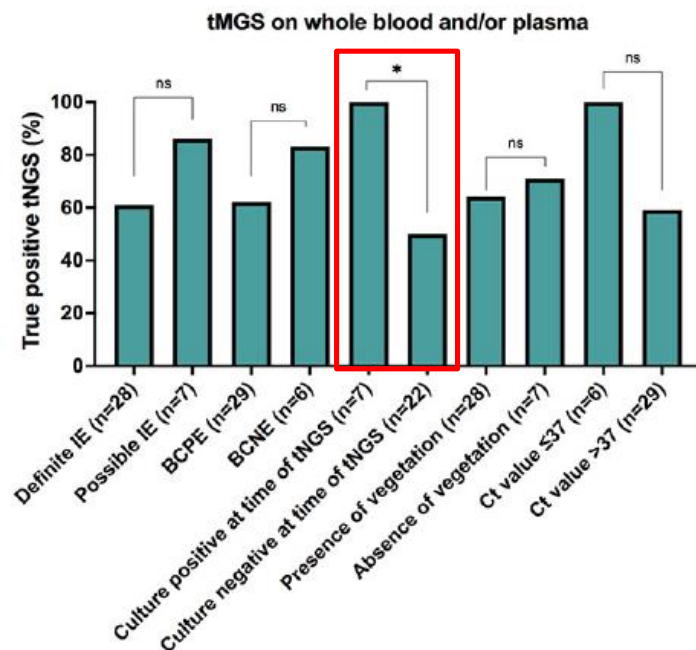
- Single center (Mayo Clinic)
- Prospective pilot study evaluating targeted metagenomic sequencing (tMGS)
- **Target:** V1-V3 region of the 16S ribosomal RNA gene
- Next-generation sequencing (Illumina MiSeq™ platform)





**TABLE 2** Results of targeted metagenomics sequencing (tMGS) of whole blood, plasma, and both combined<sup>a</sup>

Subjects	Positive tMGS test		
	Whole blood <i>n</i> = 34	Plasma <i>n</i> = 34	Combined <i>n</i> = 35
All infective endocarditis, <i>n</i> positive/ <i>n</i> total (%)	20/34 (59%)	16/34 (47%)	23/35 (66%)
Blood culture positive infective endocarditis, <i>n</i> positive/ <i>n</i> total BCPE (%)	17/28 (61%)	13/29 (45%)	18/29 (62%)
Blood culture positive on day tMGS collected, <i>n</i> positive/subgroup total (%)	7/7 (100%)	6/7 (86%)	7/7 (100%)
Blood culture negative on day tMGS collected, <i>n</i> positive/subgroup total (%)	10/21 (48%)	7/22 (32%)	11/22 (50%)
Blood culture negative infective endocarditis, <i>n</i> positive/ <i>n</i> total BCNE (%)	3/6 (50%)	3/5 (60%)	5/6 (83%)

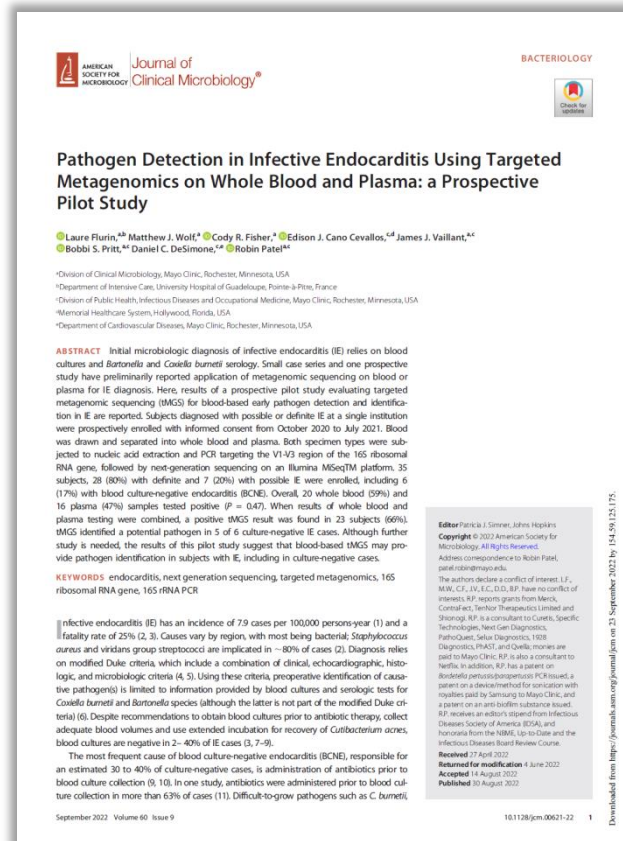


## ¿Por qué este artículo?

- Uno de los primeros estudios prospectivos de cohortes que ha evaluado la utilidad de la tMGS en pacientes con EI

## Take-home messages:

- tMGS podría mejorar el diagnóstico de EI:
  - Identificando patógenos en BCN-IE (positividad influenciada por el tiempo transcurrido desde el último cultivo positivo)
  - Proporcionando un diagnóstico más rápido que el hemocultivo para patógenos de crecimiento lento



Para leer más...



## Microbiological diagnosis in cardiac implantable electronic device infections detected by sonication and next-generation sequencing



Thomas Olsen, MD, PhD,<sup>\*†</sup> Ulrik Stenz Justesen, MD, DMSc,<sup>†‡</sup>  
Jens Cosedis Nielsen, MD, PhD, DMSc,<sup>§¶</sup> Ole Dan Jørgensen, MD, PhD,<sup>||\*\*</sup>  
Niels Christian Foldager Sandgaard, MD, PhD,<sup>\*</sup> Christen Ravn, MD, PhD,<sup>††</sup>  
Christian Gerdes, MD, PhD,<sup>§</sup> Anna Margrethe Thøgersen, MD, DMSc,<sup>‡‡</sup>  
Sabine Gill, MD, PhD,<sup>\*</sup> Kurt Fuursted, MD, DMSc,<sup>§§</sup> Jens Brock Johansen, MD, PhD<sup>\*†\*\*</sup>

Olsen T, et al. *Heart Rhythm*. 2022

Para leer más...



# Clinical Infectious Diseases



JOURNAL ARTICLE ACCEPTED MANUSCRIPT

## New perspectives for prosthetic valve endocarditis – impact of molecular imaging by FISHseq diagnostics

Maria M Hajduczenia, Frank R Klefisch, Alexander G M Hopf, Herko Grubitzsch, Miriam S Stegemann, Frieder Pfäfflin, Birgit Puhlmann, Michele Ocken, Lucie Kretzler, Dinah von Schöning ... [Show more](#)

Hajduczenia M, et al. *Clin Infect Dis.* 2022

# Sign of the Times: Updating Infective Endocarditis Diagnostic Criteria to Recognize *Enterococcus faecalis* as a Typical Endocarditis Bacterium

Clinical Infectious Diseases



## Box 1. The modified Duke criteria (adapted from Li et al [1])

### Major criteria

- Blood culture positive for IE
- Typical microorganisms consistent with IE from 2 separate blood cultures:
  - Viridans streptococci, *Streptococcus bovis*, HACEK group, *Staphylococcus aureus*; or community-acquired enterococci, in the absence of a primary focus; or



## Box 2. The proposed update to the “enterococcal adjusted Duke criteria” with modification shown in bold

### Major criteria

- Blood culture positive for IE
- Typical microorganisms consistent with IE from 2 separate blood cultures:
  - Viridans streptococci, *Streptococcus bovis*, HACEK group, *Staphylococcus aureus*, ***Enterococcus faecalis***; or

# Sign of the Times: Updating Infective Endocarditis Diagnostic Criteria to Recognize *Enterococcus faecalis* as a Typical Endocarditis Bacterium

Clinical Infectious Diseases



- Prospective multicenter cohort
- 344 patients with EF bacteremia
- All underwent Echo (74% TEE)

A

The Modified Duke criteria

		IE expert team decision		
		Endocarditis	No endocarditis	
The Modified Duke criteria	Definite IE	63	0	PPV 100%
	Not definite IE	27	254	NPV 90%
		Sensitivity 63/90 = 70%	Specificity 254/254 = 100%	

B

Enterococcal adjusted Duke criteria

		IE expert team decision		
		Endocarditis	No endocarditis	
Enterococcal adjusted Duke criteria	Definite IE	86	0	PPV 100%
	Not definite IE	4	254	NPV 98%
		Sensitivity 86/90 = 96%	Specificity 254/254 = 100%	

Dahl A, et al. *Clin Infect Dis*. 2022

## ¿Por qué este artículo?

- Paso importante para mejorar la concordancia entre la realidad clínica y los criterios diagnósticos de EI

## Take-home messages:

- Designar a ***Enterococcus faecalis* como un patógeno de endocarditis "típico"** (independientemente del lugar de adquisición o de la puerta de entrada), mejoró la sensibilidad para identificar correctamente la endocarditis definitiva

### Sign of the Times: Updating Infective Endocarditis Diagnostic Criteria to Recognize *Enterococcus faecalis* as a Typical Endocarditis Bacterium

Anders Dahl,<sup>1,2</sup> Vance G. Fowler,<sup>3</sup> Jose M. Mira,<sup>4,5</sup> and Niels E. Bruun<sup>6\*</sup>

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The modified Duke criteria requires that *Enterococcus faecalis* bacteremia must be both community-acquired and without known focus in order to be considered a microbiological "Major" diagnostic criterion in the diagnosis of infective endocarditis. We believe that the microbiological diagnostic criteria should be updated to regard *E. faecalis* as a "typical" endocarditis bacterium as is currently the case, for example, viridans group streptococci and *Staphylococcus aureus*. Using data from a prospective study of 344 patients with *E. faecalis* bacteremia evaluated with echocardiography, we demonstrate that designating *E. faecalis* as a "typical" endocarditis pathogen, regardless the place of acquisition or the portal of entry, improved the sensitivity to correctly identify definite endocarditis from 70% (modified Duke criteria) to 96% (enterococcal adjusted Duke criteria).

**Keywords.** modified duke criteria; enterococcal adjusted duke criteria; sensitivity; community acquired; microbiological.

Since published in 2000, the modified Duke criteria [1] has been the internationally accepted basis [2, 3] for diagnosing, investigating, and classifying infective endocarditis (IE). Since the update of these criteria 2 decades ago, the characteristics of IE populations have evolved, with increasing rates of healthcare contact and more patients with implanted endovascular devices [4–6]. These demographic shifts have been accompanied by an increase in IE caused by *Enterococcus faecalis* [6–10]. Our understanding of bacteremia has also evolved, with the recognition of community-acquired, healthcare-associated, and nosocomial routes of acquisition [11]. However, the modified Duke criteria has not evolved accordingly. These criteria define clinically definite IE based on the presence of either: (a) 2 major criteria; (b) 1 major criterion and 3 minor criteria; or (c) 5 minor criteria (Box 1). The microbiological major criterion requires 2 separate blood cultures (BCs) positive for a "typical" IE microorganism or persistent bacteremia with a microorganism consistent with IE. The "typical" IE microorganisms are defined as viridans group streptococci (VGS), *Streptococcus bovis*, HACEK (*Haemophilus*, *Aggregatibacter*, *Cardiobacterium*, *Eikenella*, *Kingella*) group, *Staphylococcus aureus*, or community-acquired enterococci in the absence of

a primary focus [1–3]. As a result, the current iteration of the modified Duke criteria only considers enterococcal bacteremia (including that caused by *E. faecalis*) to be a major microbiological criterion when it is either (a) persistent or (b) both community acquired and associated with an unknown primary focus. This interpretation contrasts with recent studies showing that only ~40% of patients with *E. faecalis* IE have community acquired infection and less than half of the patients have unknown primary focus [12, 13]. This discrepancy between the diagnostic criteria and the current clinical reality substantially limits the accuracy of the modified Duke criteria as well as the Society guidelines that rely upon it [14].

The purpose of this article was to investigate the diagnostic performance of the modified Duke criteria compared to an updated version that considered *E. faecalis* as a "typical" IE bacterium (enterococcal adjusted Duke criteria), using a prospective cohort of *E. faecalis* bacteremia patients all investigated by echocardiography.

#### CLINICAL VIGNETTE

A 73-year-old male, known with diabetes, atrial fibrillation, and benign prostate hyperplasia, underwent transurethral resection of the prostate. Two weeks later the patient was treated with oral antibiotics for a culture positive urinary infection with *E. faecalis* (no fever and therefore no blood cultures performed). Furthermore, 2 weeks later the patient was admitted with fever, dyspnea, and symptoms of urinary infection. Urinary culture and blood cultures taken at admission were positive for *E. faecalis* (3 of 3 BCs taken at the same time point). XXXXX



# Outcomes of culture-negative vs. culture-positive infective endocarditis: the ESC-EORP EURO-ENDO registry



European  
Heart Journal



ESC-EORP EURO-ENDO Registry

156 centres from 40 countries (2016-2019)



3113

patients with IE

83.2% C PIE

16.8% CN IE



48.1%

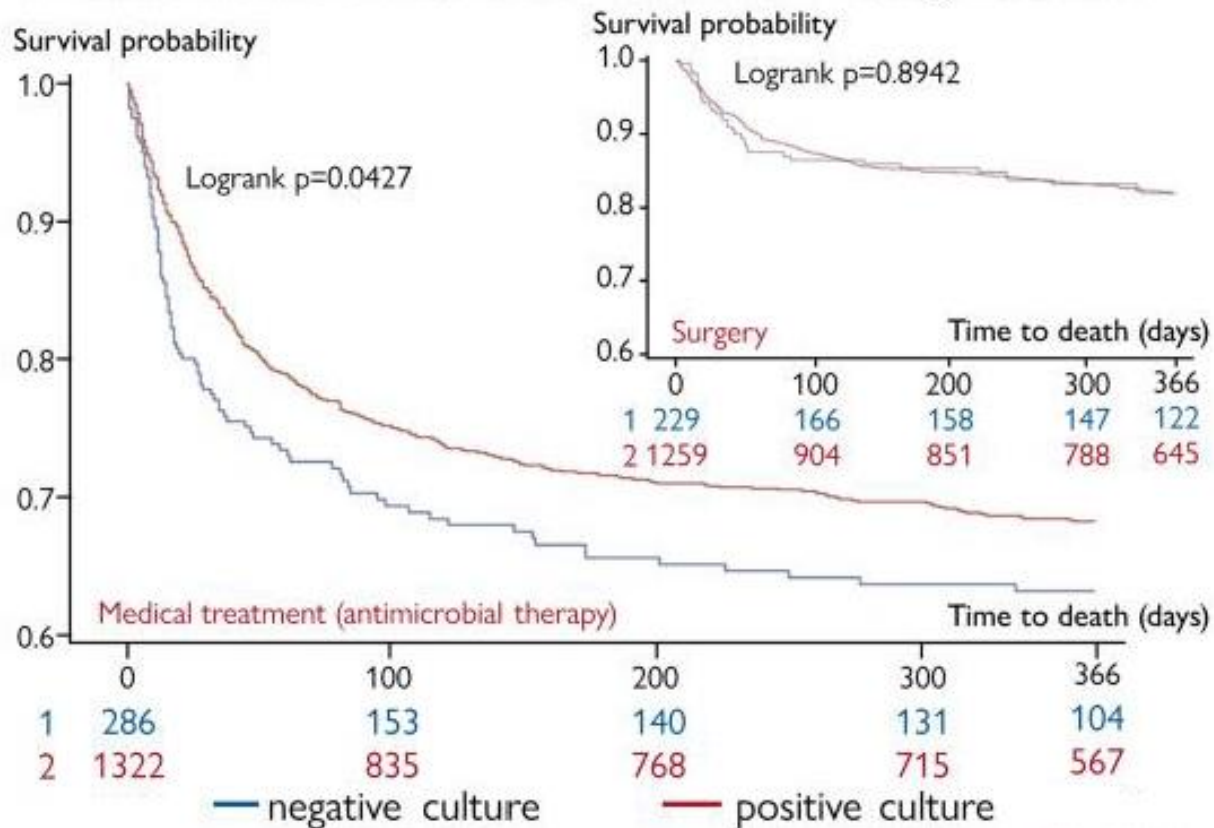
patients treated with surgery

Variable	CPIE N=2590	CNIE N=523	P-value
Male sex	70%	64%	.01
Age (years)	60	54	<.001
Ischemic heart disease	22.3%	17.5%	.02
Diabetes mellitus	23.5%	18.4%	.01
HTA	49.4%	42.6%	.005
Congenital disease	10.9%	15.7%	.002
Embolic events	21.7%	15.3%	.001
Spondylitis	5.3%	1.3%	<.001
Acute renal failure	17%	20.5%	.06
New abscess	6.7%	3.6%	.008
Heart Failure	13.7%	17.9%	.02
Valve or prosthetic dysfunction	16.3%	20.8%	.02
30-day mortality	10.2%	14.9%	.001
1-year mortality	22.5%	25.8%	.04

Kong W, et al. *Eur Heart J*. 2022



# Product-limit survival estimates - with number of subjects at risk



## ¿Por qué este artículo?

- El estudio más grande que compara CN-IE y CP-IE hasta la fecha

## Take-home messages:

- Aumento de la mortalidad a corto (30 días) y largo plazo (1 año) en pacientes con CN-IE
- Esta diferencia estuvo presente **en los pacientes que recibieron tratamiento médico exclusivo y NO en los que se sometieron a cirugía**, asociándose la cirugía con una menor mortalidad



European Heart Journal (2022) 43, 2770–2780  
https://doi.org/10.1093/eurheartj/ehac307

CLINICAL RESEARCH  
Valvular heart disease

## Outcomes of culture-negative vs. culture-positive infective endocarditis: the ESC-EORP EURO-ENDO registry

William K.F. Kong<sup>1,2†</sup>, Antonio Salsano<sup>3,4†</sup>, Daniele Roberto Giacobbe<sup>5,6†</sup>, Bogdan A. Popescu<sup>7</sup>, Cécile Laroche<sup>8</sup>, Xavier Duval<sup>9,10</sup>, Robert Schueler<sup>11</sup>, Antonella Moreo<sup>12</sup>, Paolo Colonna<sup>13</sup>, Cornelia Piper<sup>14</sup>, Francisco Calvo-Iglesias<sup>15</sup>, Luigi P. Badano<sup>16,17</sup>, Ilija Srdanovic<sup>18,19</sup>, David Boutoille<sup>20</sup>, Olivier Huttin<sup>21,22,23</sup>, Elisabeth Stöhr<sup>24</sup>, Ana Teresa Timóteo<sup>24,25,26</sup>, Jolanta-Justina Vaskelyte<sup>27</sup>, Anita Sadeghpour<sup>28,29</sup>, Pilar Tornos<sup>30</sup>, Leila Abid<sup>31</sup>, Kian Keong Poh<sup>1,2</sup>, Gilbert Habib<sup>32,34</sup>, and Patrizio Lancellotti<sup>28</sup> on behalf of the EURO-ENDO Investigators<sup>‡</sup>

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See the editorial comment for this article 'A double negative: culture-negative infective endocarditis', by E.L. Fosbol, <https://doi.org/10.1093/eurheartj/ehac230>.

### Abstract

**Aim** Fatality of infective endocarditis (IE) is high worldwide, and its diagnosis remains a challenge. The objective of the present study was to compare the clinical characteristics and outcomes of patients with culture-positive (CPE) vs. culture-negative IE (CNE).  
**Methods and results** This was an ancillary analysis of the ESC-EORP EURO-ENDO registry. Overall, 3113 patients who were diagnosed with IE during the study period were included in the present study. Of these, 2590 (83.2%) had CPE, whereas 523 (16.8%) had

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† These authors contributed equally to the study.

‡ The investigators name are listed in Supplementary material online, Appendix 1.

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# Surgical Treatment of Patients With Infective Endocarditis After Transcatheter Aortic Valve Implantation



**JACC**  
JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

	IE-AB (n = 473)	IE-CS (n = 111)	Unadjusted P Value <sup>a</sup>
Early IE (within 1 y)	330 (69.8)	72 (64.9)	0.316
Late IE (>1 y)	143 (30.2)	39 (35.1)	
Initial symptoms			
Fever	375 (79.3)	85 (76.6)	0.531
New-onset heart failure	104 (41.0)	40 (44.1)	0.547
Neurological	99 (20.9)	10 (9.0)	0.004
Echocardiographic findings			
Vegetation	287 (60.7)	84 (75.7)	0.003
Vegetation size, mm	10 (6-15)	11 (8-20)	0.016
TAVI platform involvement	268 (56.7)	82 (73.9)	0.001
Periannular complication	78 (16.5)	39 (35.1)	<0.001
Valves involved			
Isolated TAVI prosthesis	222 (46.9)	62 (55.9)	<0.001
Mitral (native/prosthetic valve)	80 (16.9)	6 (5.4)	
Cardiac device	8 (1.7)	15 (13.5)	
Right-sided IE	6 (1.3)	2 (1.8)	
Other <sup>d</sup>	157 (33.2)	26 (23.4)	
IE complication			
Any complication	327 (69.1)	92 (82.9)	0.004
Heart failure	180 (38.1)	63 (56.8)	<0.001
Other systemic embolization	38 (8.0)	21 (18.9)	<0.001
Persistent bacteremia	122 (25.8)	49 (44.1)	<0.001

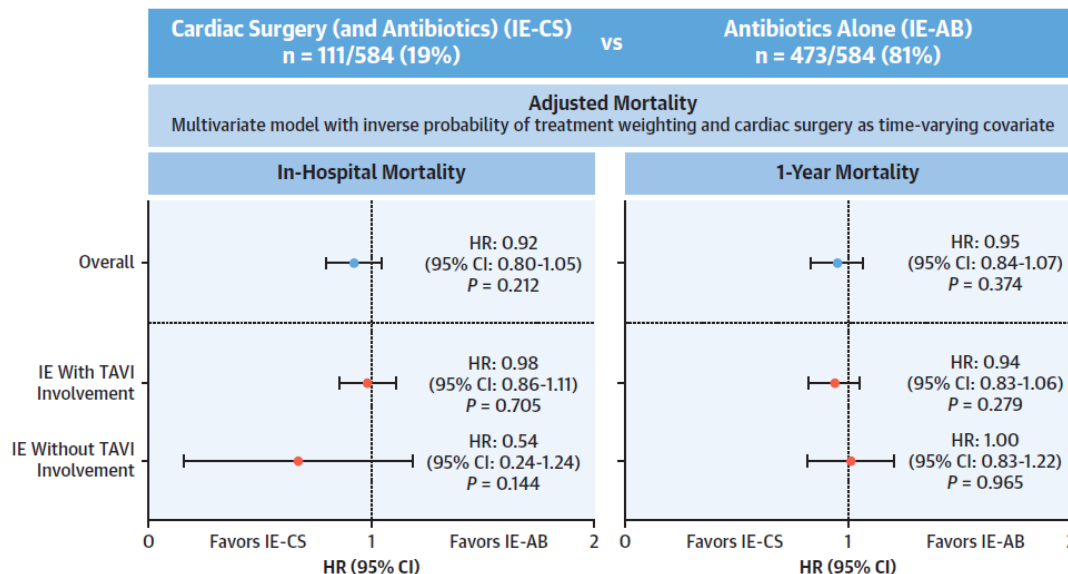
- 59 centers in 11 countries (2005-2020)
- 604 patients with definite IE after TAVI
  - 473 (81%) antibiotics alone (**IE-AB**)
  - 111 (19%) antibiotics and surgery (**IE-CS**)

Mangner N, et al. *J Am Coll Cardiol.* 2022

# Surgical Treatment of Patients With Infective Endocarditis After Transcatheter Aortic Valve Implantation



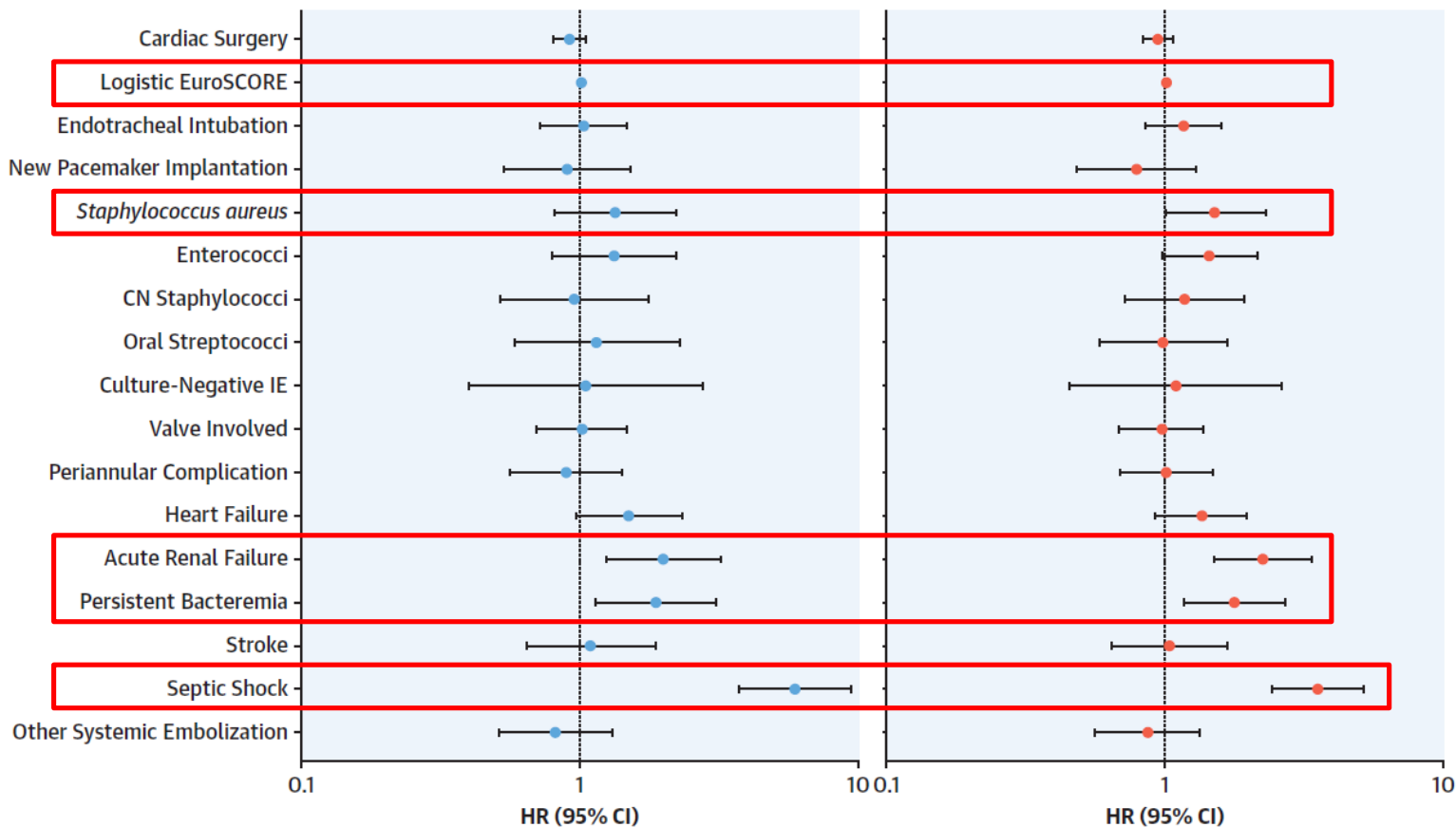
**JACC**  
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Mangner N, et al. *J Am Coll Cardiol.* 2022

## In-hospital mortality

## 1-year mortality

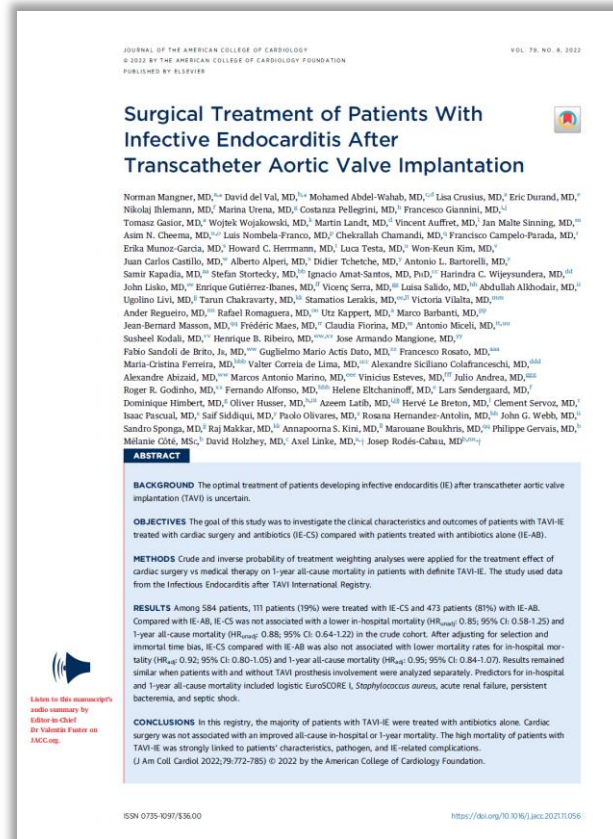


## ¿Por qué este artículo?

- Evaluación metodológicamente apropiada de las estrategias terapéuticas (médica vs. quirúrgica) en una gran cohorte de pacientes con endocarditis después de TAVI

## Take-home messages:

- 1/5 pacientes desarrollaron EI después de TAVI recibieron cirugía
- La mortalidad intrahospitalaria y por todas las causas a 1 año fue alta
- Las tasas de mortalidad para ambas estrategias no fueron significativamente diferentes (ni en la cohorte cruda y ni en la ajustada)
- Fueron **predictores de mortalidad** las comorbilidad/gravedad de los pacientes, los patógenos y las complicaciones relacionadas con la EI





Clinical Infectious Diseases

MAJOR ARTICLE



Infectious Diseases Society of America



hiv medicine association

OXFORD

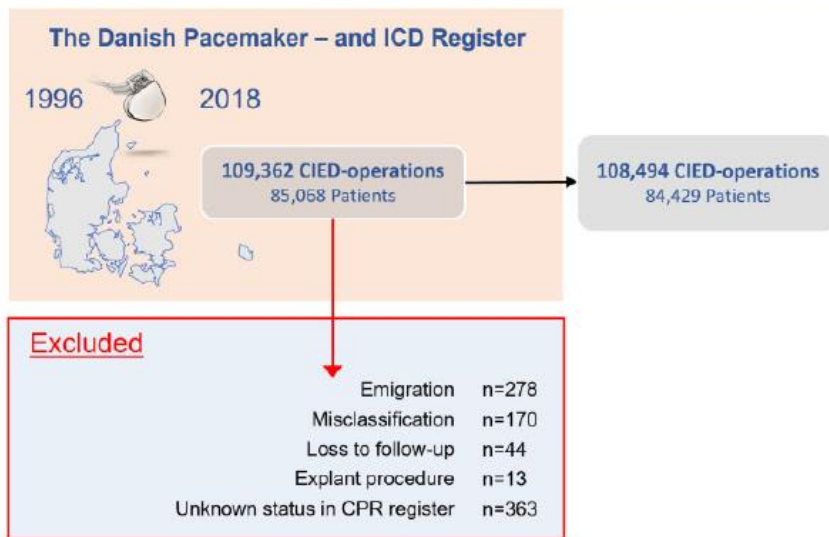
# Perivalvular Extension of Infective Endocarditis After Transcatheter Aortic Valve Replacement

Vassili Panagides,<sup>1,○</sup> David del Val,<sup>1</sup> Mohamed Abdel-Wahab,<sup>2,3,○</sup> Norman Mangner,<sup>2,4</sup> Eric Durand,<sup>5</sup> Nikolaj Ihlemann,<sup>6</sup> Marina Urena,<sup>7</sup> Costanza Pellegrini,<sup>8</sup> Francesco Giannini,<sup>8,10</sup> Tomasz Gasior,<sup>4</sup> Wojtek Wojakowski,<sup>11</sup> Martin Landt,<sup>3</sup> Vincent Auffret,<sup>12</sup> Jan Malte Sinning,<sup>13</sup> Asim N. Cheema,<sup>14,15</sup> Luis Nombela-Franco,<sup>16,○</sup> Chekrallah Chamandi,<sup>17</sup> Francisco Campelo-Parada,<sup>18,○</sup> Erika Munoz-Garcia,<sup>19</sup> Howard C. Herrmann,<sup>20</sup> Luca Testa,<sup>21,○</sup> Won-Keun Kim,<sup>22</sup> Juan Carlos Castillo,<sup>23</sup> Alberto Alperi,<sup>24,○</sup> Didier Tchetché,<sup>25</sup> Antonio L. Bartorelli,<sup>26</sup> Samir Kapadia,<sup>27,○</sup> Stefan Stortecky,<sup>28</sup> Ignacio Amat-Santos,<sup>29</sup> Harindra C. Wijeyesundera,<sup>30</sup> John Lisko,<sup>31</sup> Enrique Gutiérrez-Ibanes,<sup>32</sup> Vicenç Serra,<sup>33</sup> Luisa Salido,<sup>34,○</sup> Abdullah Alkhodair,<sup>35</sup> Ugo Livi,<sup>36</sup> Tarun Chakravarty,<sup>37</sup> Stamatis Lerakis,<sup>31,38</sup> Victoria Vilalta,<sup>39</sup> Ander Regueiro,<sup>40</sup> Rafael Romaguera,<sup>41,○</sup> Utz Kappert,<sup>4,○</sup> Marco Barbanti,<sup>42,○</sup> Jean-Bernard Masson,<sup>43</sup> Frédéric Maes,<sup>44</sup> Claudia Fiorina,<sup>45</sup> Antonio Miceli,<sup>46,47,○</sup> Susheel Kodali,<sup>48</sup> Henrique B. Ribeiro,<sup>49,50</sup> Jose Armando Mangione,<sup>51</sup> Fabio Sandoli de Brito Jr,<sup>49</sup> Guglielmo Mario Actis Dato,<sup>52</sup> Francesco Rosato,<sup>53</sup> Maria-Cristina Ferreira,<sup>54</sup> Valter Correia de Lima,<sup>55</sup> Alexandre Siciliano Colafranceschi,<sup>56</sup> Alexandre Abizaid,<sup>49</sup> Marcos Antonio Marino,<sup>57</sup> Vinicius Esteves,<sup>58</sup> Julio Andrea,<sup>59</sup> Roger R. Godinho,<sup>50</sup> Fernando Alfonso,<sup>60</sup> Helene Eltchaninoff,<sup>5</sup> Lars Søndergaard,<sup>6</sup> Dominique Himbert,<sup>7</sup> Oliver Husser,<sup>8,61</sup> Azeem Latib,<sup>8,62,○</sup> Hervé Le Breton,<sup>12</sup> Clement Servoz,<sup>18</sup> Isaac Pascual,<sup>24,○</sup> Saif Siddiqui,<sup>25</sup> Paolo Olivares,<sup>26</sup> Rosana Hernandez-Antolin,<sup>34</sup> John G. Webb,<sup>35</sup> Sandro Sponga,<sup>36</sup> Raj Makkar,<sup>37,○</sup> Annapoorna S. Kini,<sup>38</sup> Marouane Boukhris,<sup>43</sup> Philippe Gervais,<sup>1</sup> Axel Linke,<sup>2,4</sup> Lisa Crusius,<sup>2,4</sup> David Holzhey,<sup>2</sup> and Josep Rodés-Cabau<sup>1,40,○</sup>





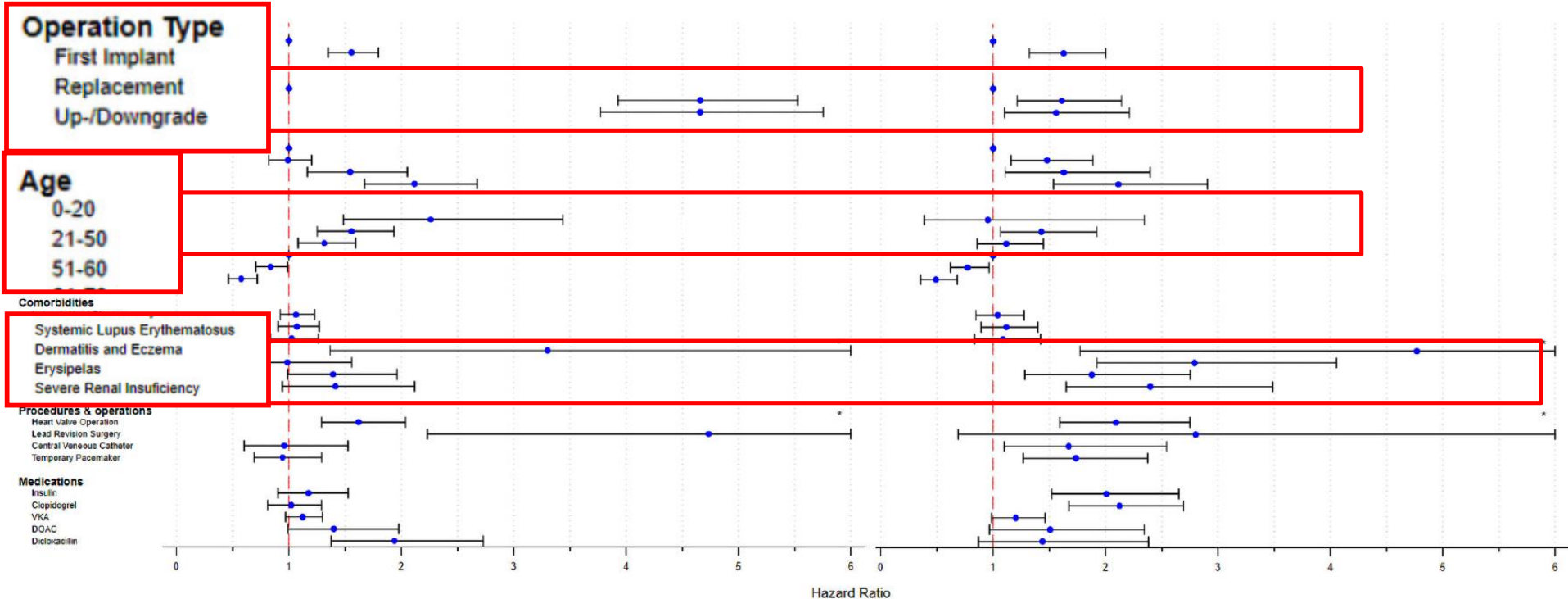
# Risk factors for cardiac implantable electronic device infections: a nationwide Danish study





## Pocket CIED infections

## Systemic CIED infections



## Patient-related risk factors for cardiac implantable electronic device infections

### Systemic CIED infections



Conditions that predispose to bacteraemia



CRT device



Young age



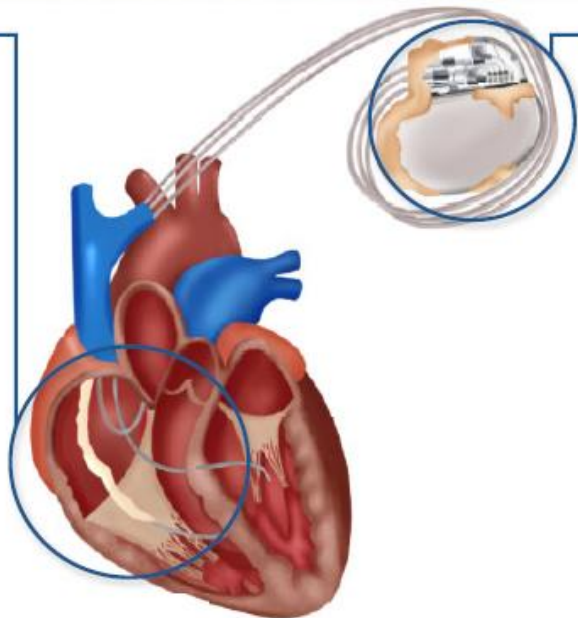
CIED-reoperations



Male sex



Prior valvular surgery



### Pocket CIED infections

CIED-reoperations



CRT device



Young age



Male sex



Prior valvular surgery

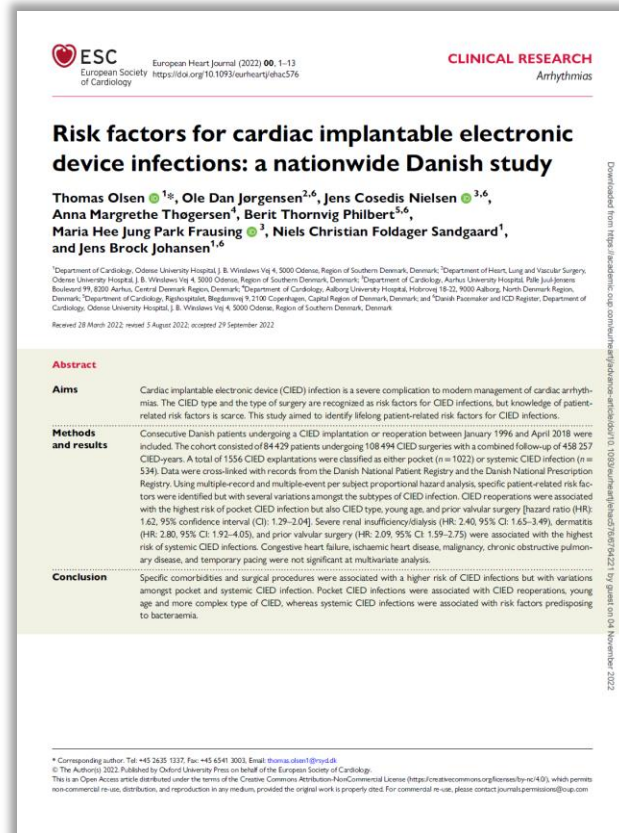


## ¿Por qué este artículo?

- Cohorte nacional de **84.429 pacientes** consecutivos de CIED con seguimiento de por vida
- Mayor análisis multivariado de factores de riesgo para infecciones por CIED

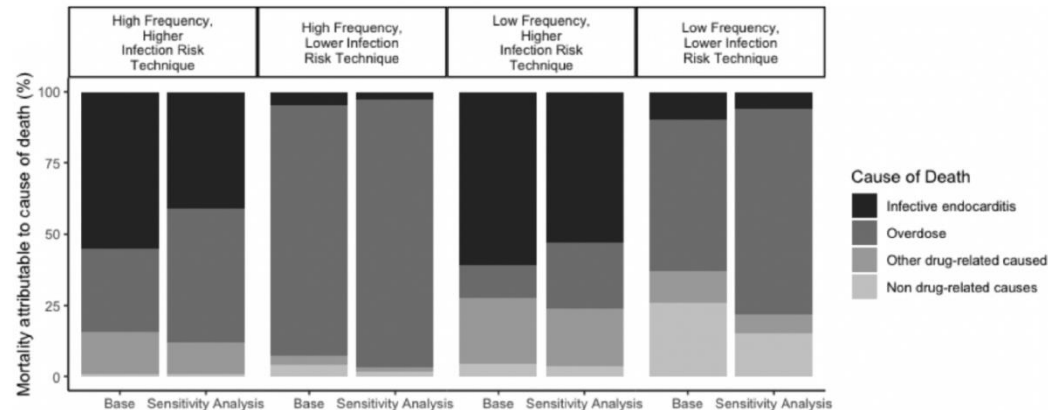
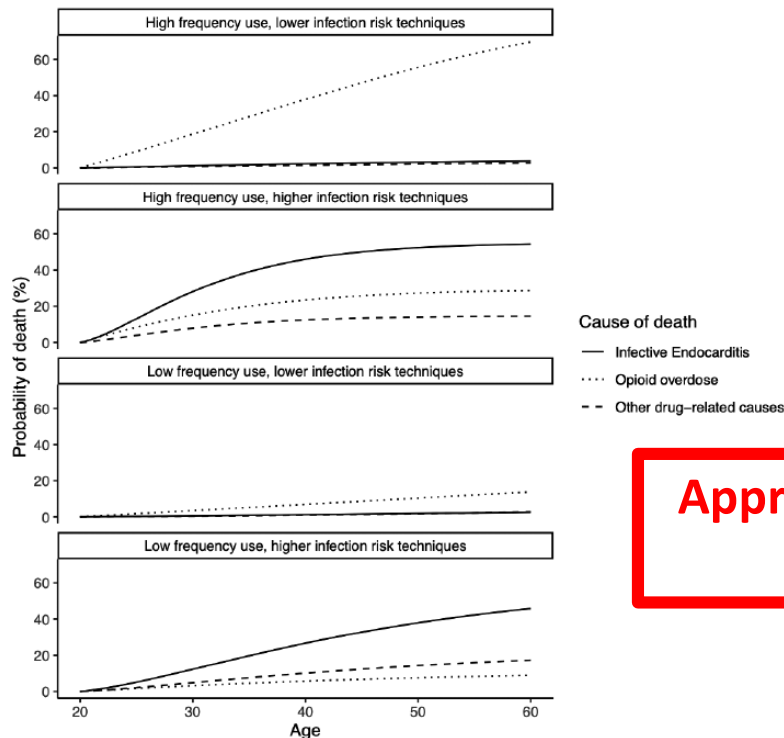
## Take-home messages:

- Las infecciones de bolsillo se asociaron principalmente con reoperaciones, menor edad y tipo más complejo de CIED
- Las infecciones sistémicas se correlacionaron con factores de riesgo que predisponen a la bacteriemia



# Long-term Infective Endocarditis Mortality Associated With Injection Opioid Use in the United States: A Modeling Study

Clinical Infectious Diseases



**Approximately 257,800 people are expected to die from IE by 2030.**

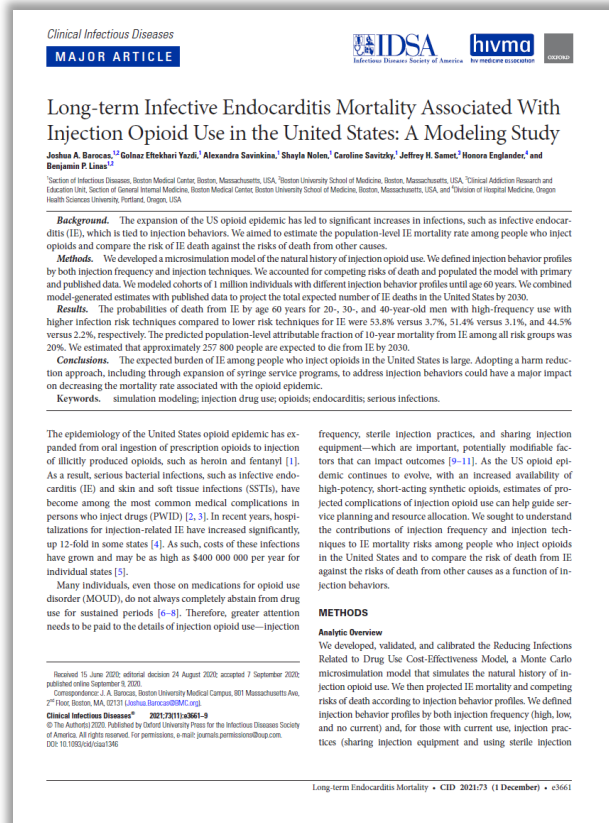
Barocas J, et al. *Clin Infect Dis*. 2021

## ¿Por qué este artículo?

- Estimación de la **tasa de mortalidad por EI a nivel poblacional entre las personas que se inyectan opioides** utilizando un nuevo modelo de microsimulación

## Take-home messages:

- Durante los próximos 10 años, se estima que la EI representará una quinta parte de todas las muertes en esta población
- El riesgo de muerte por EI fue más pronunciado entre aquellos con prácticas de mayor riesgo de infección
- La frecuencia de inyección tuvo poco efecto sobre el riesgo de muerte por EI



Para leer más...



## AHA SCIENTIFIC STATEMENT

# Management of Infective Endocarditis in People Who Inject Drugs: A Scientific Statement From the American Heart Association

Larry M. Baddour, MD, FAHA; Melissa B. Weimer, DO, MCR; Alysse G. Wurcel, MD, MS; Doff B. McElhinney, MD, Vice Chair; Laura R. Marks, MD, PhD; Laura C. Fanucchi, MD, MPH; Zerelda Esquer Garrigos, MD; Gosta B. Pettersson, MD; Daniel C. DeSimone, MD, Chair; on behalf of the American Heart Association Rheumatic Fever, Endocarditis and Kawasaki Disease Committee of the Council on Lifelong Congenital Heart Disease and Heart Health in the Young; Council on Cardiovascular Surgery and Anesthesia; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; and Council on Peripheral Vascular Disease

Baddour L, et al. *Circulation*. 2022



# Antibiotic Prophylaxis Against Infective Endocarditis Before Invasive Dental Procedures



**JACC**  
JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

**OBJECTIVES** : To investigate any association between invasive dental procedures (IDPs) and IE, and the effectiveness of antibiotic prophylaxis (AP)

**METHODS**: Case-crossover analysis and cohort study of the association between IDPs and IE, and AP efficacy in 7,951,972 U.S. subjects

**3774 IE-admissions**

**TABLE 1** Cardiac Conditions Used to Classify Individuals as Being at High or Moderate IE Risk

## High IE risk

- Previous history of IE
- Presence of prosthetic cardiac valve (including transcatheter valves)
- Prosthetic material used for valve repair (including annuloplasty and percutaneous valve procedures using prosthetic material)
- Unrepaired cyanotic congenital heart disease
- Congenital heart disease in which palliative shunts or conduits were used
- Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by transcatheter during the first 6 mo after the procedure only.

## Moderate IE risk

- Rheumatic heart disease
- Nonrheumatic valve disease (including mitral valve prolapse)
- Congenital valve anomalies (including aortic stenosis)
- Hypertrophic cardiomyopathy

**TABLE 2** Examples of IDP, Intermediate Dental Procedures, and Non-IDP

## IDP—procedures that should be covered by AP

- Dental extractions (including surgical removal of impacted teeth and residual tooth roots)
- Oral surgery procedures (including biopsies, periodontal surgery, implant surgery, and other oral surgery and maxillofacial procedures involving oral soft tissues or bone)
- Scaling procedures (including dental prophylaxis, periodontal scaling and root planning, periodontal maintenance and gingival irrigation, or delivery of antimicrobial agents into the diseased gingival crevice)
- Endodontic treatment (including pulpal debridement, endodontic treatment and retreatment, apexification/recalcification, apicectomy, and peri-radicular procedures)

## Intermediate dental procedures—procedures that may or may not require AP cover

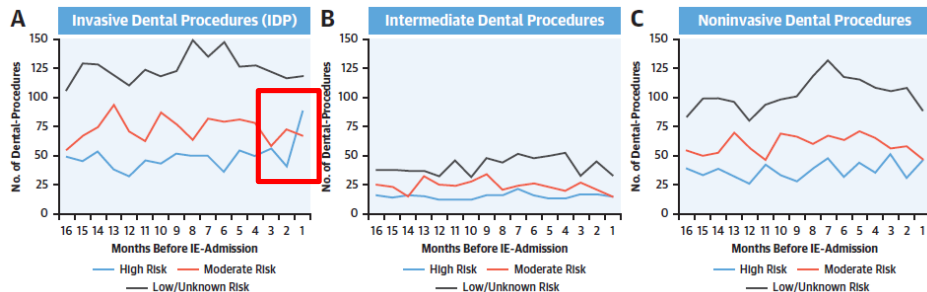
- Restorative dental procedures (fillings, inlays, crowns and bridges) and oral examination procedures that may on occasion involve gingival manipulation (when AP cover should be provided), but on other occasions do not involve gingival manipulation (when AP should not be provided).

## Non-IDP

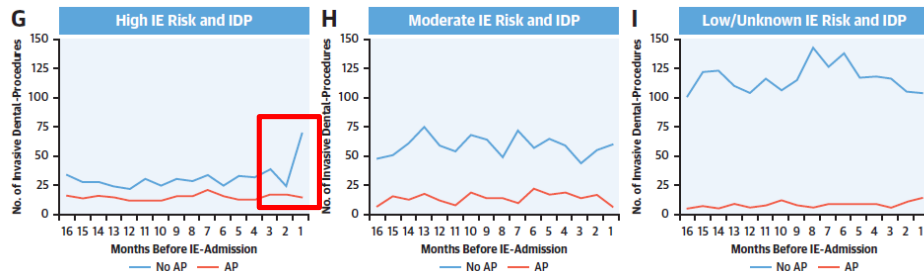
- Oral examinations not involving manipulation of the gingival or apical tissues
- Dental radiographs
- Placement of removable prosthodontic or orthodontic appliances
- Adjustment of orthodontic appliances and placement of orthodontic brackets

Thornhill M, et al. *J Am Coll Cardiol.* 2022

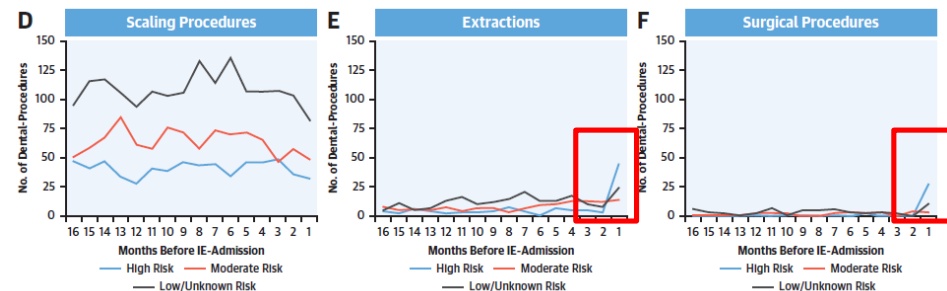
## Incidencia de procedimientos dentales antes del ingreso por IE (según grupo de riesgo de EI)



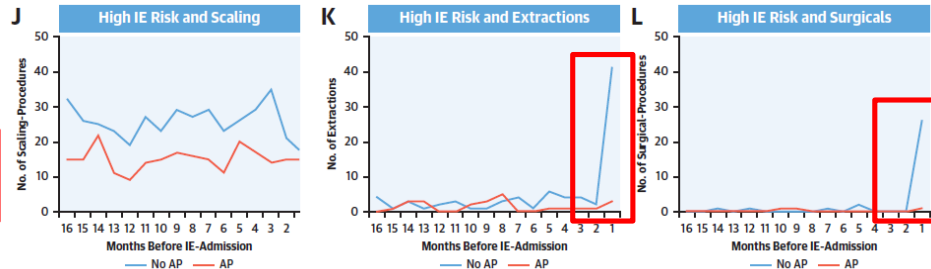
## Incidencia de procedimientos dentales antes del ingreso por IE (según uso de profilaxis)



## Incidencia de procedimientos dentales INVASIVOS antes del ingreso por IE (según grupo de riesgo de EI)

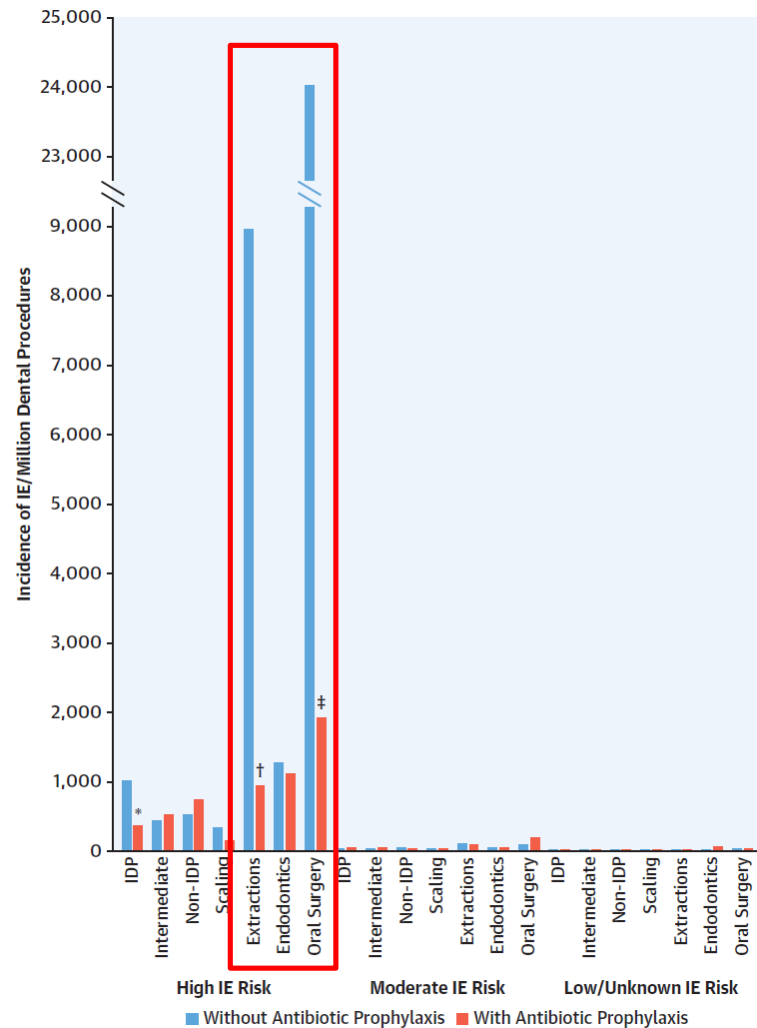


## Incidencia de procedimientos dentales INVASIVOS antes del ingreso por IE (según uso de profilaxis)





**Infective Endocarditis Incidence Within 1 Month of  
Dental Procedures Performed With or Without  
Antibiotic Prophylaxis**



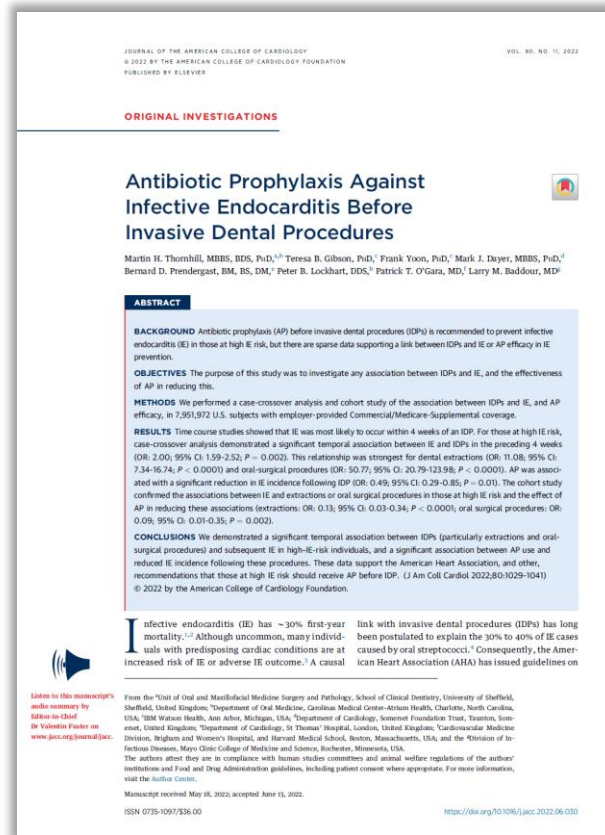
Thornhill M, et al. *J Am Coll Cardiol.* 2022

## ¿Por qué este artículo?

- Primera evidencia clínica que respalda las recomendaciones de la AHA y ESC sobre profilaxis antibiótica

## Take-home messages:

- En una población de casi 8 millones de personas, se demostraron asociaciones significativas:
  - Entre procedimientos dentales invasivos (particularmente extracciones y procedimientos quirúrgicos) y El **en pacientes con alto riesgo de EI**
  - Entre uso de profilaxis antibiótica y una menor incidencia de EI



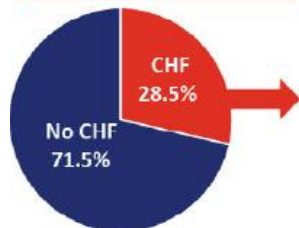
# Characteristics, management, and outcomes of patients with left-sided infective endocarditis complicated by heart failure: a substudy of the ESC-EORP EURO-ENDO (European infective endocarditis) registry

European Journal of  
**Heart  
Failure**



## Baseline differences

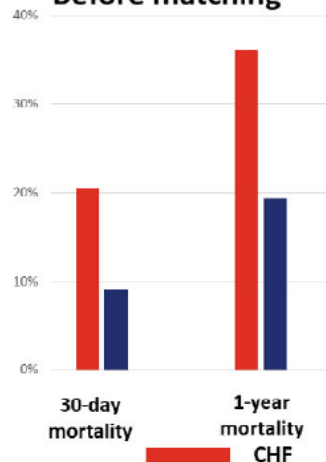
2449 patients with  
left-sided IE



- Older
- More comorbidities
- More severe valvular damage:
  - ↑ *Vegetation size*
  - ↑ *Severe regurgitations*
  - ↑ *Mitro-aortic involvement*
- More uncontrolled infection

## Survival differences

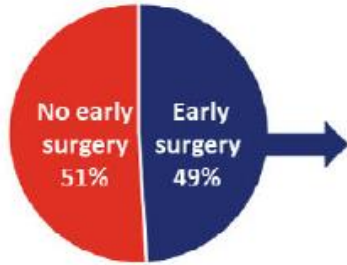
### Before matching



Bohbot Y, et al. *Eur J Heart Fail.* 2022

## Early surgery in CHF patients (within 30 days)

698 patients with  
left-sided IE and CHF



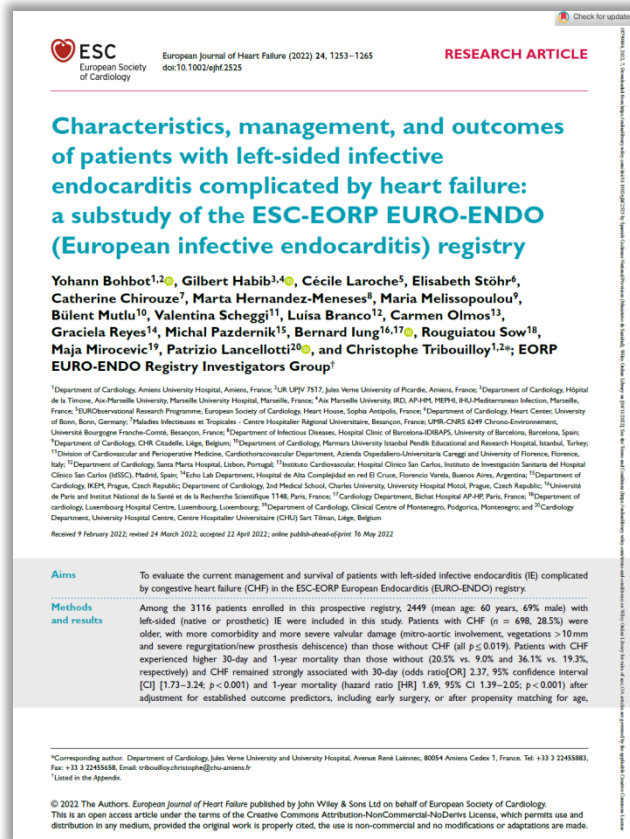
- Younger
- Less comorbidities
- More severe valvular damage:
  - ↑ *Vegetation size*
  - ↑ *Severe regurgitations*
  - ↑ *Perivalvular complications*
- Less uncontrolled infection

## ¿Por qué este artículo?

- Primer estudio sobre una gran cohorte europea que evaluó las características clínicas, tratamiento y outcomes de pacientes con EI izquierda complicada con ICC

## Take-home messages:

- La insuficiencia cardiaca congestiva es frecuente en la EI izquierda
- Los pacientes con ICC en el momento del diagnóstico de EI muestran una mayor mortalidad a los 30 días y al año
- La cirugía precoz en pacientes con ICC se asoció independientemente con una menor mortalidad a los 30 días y al año (aunque se realizó solo en un 50 % de los casos, principalmente debido a un riesgo quirúrgico prohibitivo)

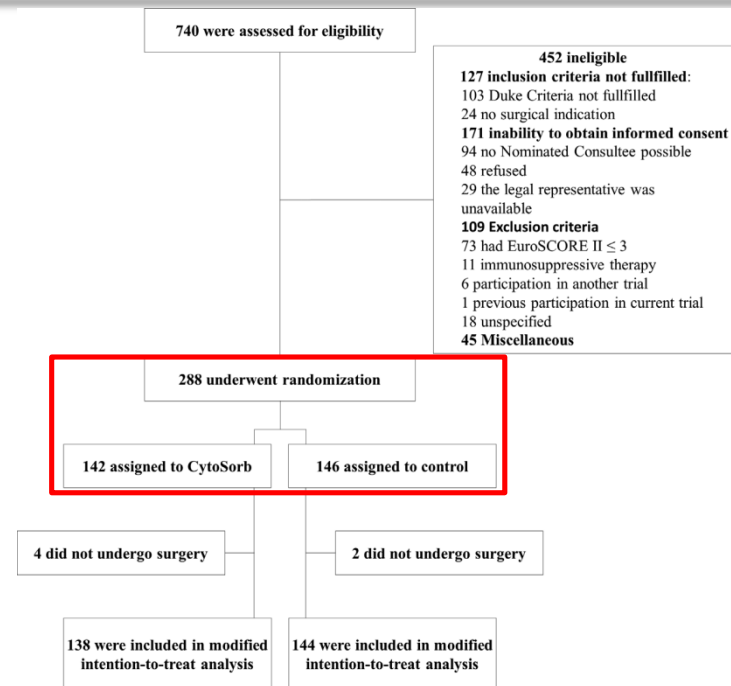


# Cytokine Hemoadsorption During Cardiac Surgery Versus Standard Surgical Care for Infective Endocarditis (REMOVE): Results From a Multicenter Randomized Controlled Trial

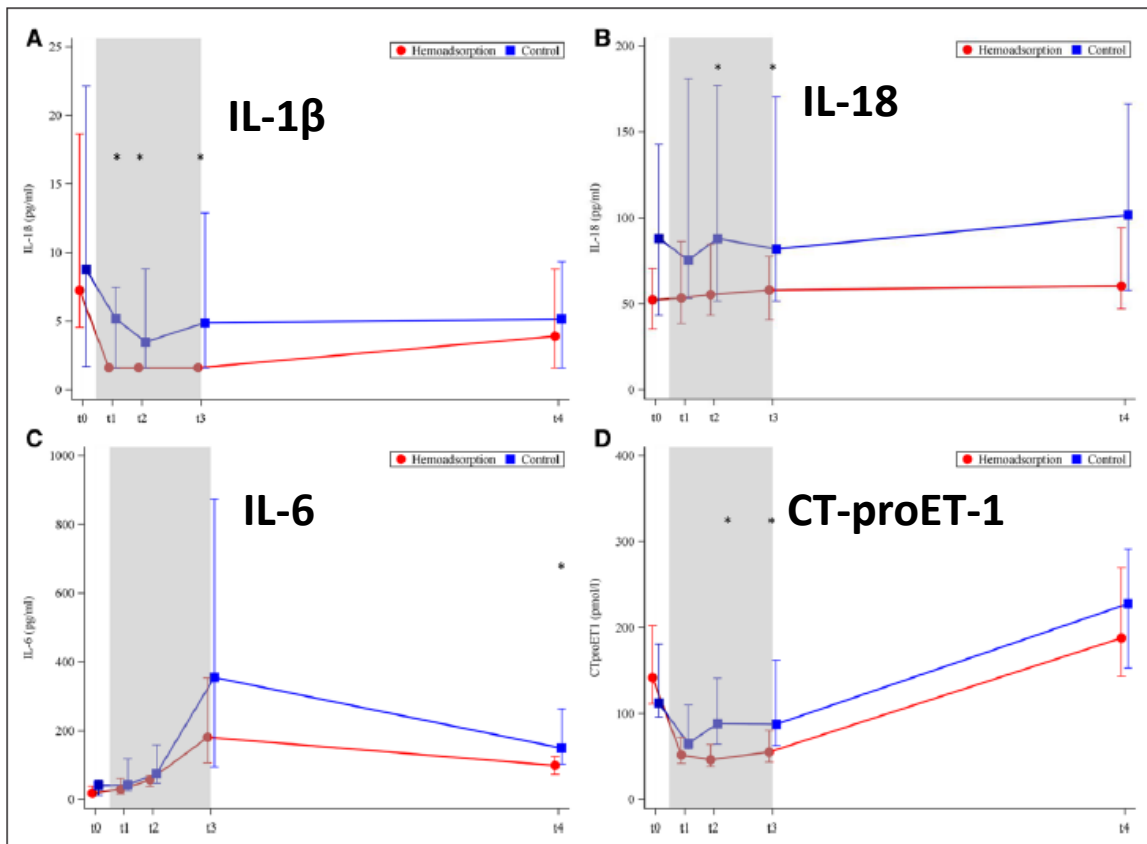
**Circulation**

- **REMOVE trial** (Revealing Mechanisms and Investigating Efficacy of Hemoadsorption for Prevention of Vasodilatory Shock in Cardiac Surgery Patients With Infective Endocarditis)
- Multicenter (14 cardiac surgery centers in Germany) randomized, non-blinded, controlled trial with 2 groups designed for assessing superiority
- Patients undergoing cardiac surgery for IE were randomly assigned to receive hemoadsorption during cardiopulmonary bypass using CytoSorb or to the control group.
- **Primary outcome:** change in sequential organ failure assessment score [ $\Delta$ SOFA]

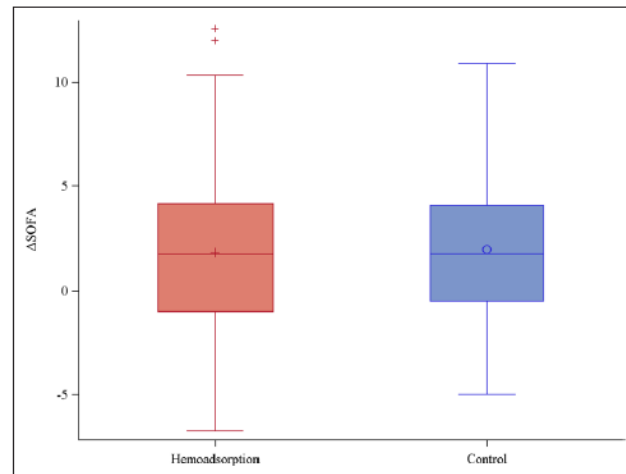
Diab M, et al. *Circulation*. 2022



## Intraoperative and postoperative plasma levels of cytokines



## Primary Outcome: $\Delta$ SOFA



Diab M, et al. *Circulation*. 2022

# Cytokine Hemoadsorption During Cardiac Surgery Versus Standard Surgical Care for Infective Endocarditis (REMOVE): Results From a Multicenter Randomized Controlled Trial

Circulation

**Table 2. Secondary Outcomes**

Outcomes	Hemoadsorption group (n=138)	Control group (n=144)	P value	Difference (95% CI)*
30-day mortality	29 (21.0)	32 (22.4)	0.782	0.94 (0.60–1.47)
Postoperative stroke	5 (3.6)	3 (2.1)	0.442	1.73 (0.42–7.09)
Hospital stay, d	20 (13–30)	19 (12–29)	0.392	1 (0–2)
ICU stay, d	7 (3–12)	6 (3–10)	0.241	1 (0–2)
Duration of postoperative hemodialysis, d	0 (0–1)	0 (0–2)	0.791	0 (0–0)
Duration of postoperative ventilation, d	1 (0–7)	1 (0–3)	0.165	0.5 (0–1)
Duration of postoperative vasopressors therapy, d	3 (1–8)	3 (1–7)	0.896	0 (–1–1)
Δ SOFA: CVS subscore	1.57±1.52	1.67±1.49	0.841	–0.04 (–0.39 to 0.32)
Δ SOFA: CNS subscore	0.16±0.54	0.19±0.40	0.560	–0.04 (–0.16 to 0.09)
Δ SOFA: coagulation subscore	0.52±0.88	0.50±0.83	0.487	–0.08 (–0.31 to 0.15)
Δ SOFA: hepatic subscore	0.42±0.84	0.46±0.82	0.840	–0.02 (–0.27 to 0.22)
Δ SOFA: renal subscore	–1.86±1.94	–1.93±1.73	0.392	–0.16 (–0.54 to 0.22)
Δ SOFA: respiratory subscore	0.94±1.29	0.85±1.22	0.662	–0.05 (–0.27 to 0.17)



## ¿Por qué este artículo?

- Ensayo clínico que aleatorizó a casi 290 pacientes con EI e indicación quirúrgica

## Take-home messages:

- La hemoadsorción redujo las citocinas plasmáticas al final del bypass cardiopulmonar
- No hubo diferencia en ninguna de las medidas de resultado clínicamente relevantes

### Circulation

#### ORIGINAL RESEARCH ARTICLE

## Cytokine Hemoadsorption During Cardiac Surgery Versus Standard Surgical Care for Infective Endocarditis (REMOVE): Results From a Multicenter Randomized Controlled Trial

Mahmoud Diab<sup>1</sup>, PhD; Thomas Lehmann, PhD; Wolfgang Bothe, PhD; Payam Akhyari, PhD; Stephanie Platzer, PhD; Daniel Wendt, PhD; Antje-Christin Deppe, PhD; Justus Strauch, PhD; Stefan Hagel<sup>2</sup>, PhD; Albrecht Günther<sup>3</sup>, MD; Gloria Faerber, PhD; Christoph Sponholz<sup>4</sup>, PhD; Marcus Franz, PhD; André Scherag, PhD; Ila Velichkov<sup>5</sup>, MD; Miriam Silaschi, MD; Jens Fassl, PhD; Britt Hofmann, PhD; Sven Lehmann, PhD; Rene Schramm, PhD; Georg Fritz, MD; Gabor Szabo, PhD; Thorsten Wahlers<sup>6</sup>, PhD; Klaus Matschke, PhD; Anur Lichtenberg<sup>7</sup>, PhD; Mathias W. Pleh<sup>8</sup>, PhD; Jan F. Gummert, PhD; Friedhelm Beyersdorf<sup>9</sup>, PhD; Christian Hagl, PhD; Michael A. Borge<sup>10</sup>, PhD; Michael Bauer<sup>11</sup>, PhD; Frank M. Brunkhorst, PhD; Torsten Doenst<sup>12</sup>, PhD; on behalf of the REMOVE Trial Investigators\*

**BACKGROUND:** Cardiac surgery often represents the only treatment option in patients with infective endocarditis (IE). However, IE surgery may lead to a sudden release of inflammatory mediators, which is associated with postoperative organ dysfunction. We investigated the effect of hemoadsorption during IE surgery on postoperative organ dysfunction.

**METHODS:** This multicenter, randomized, nonblinded, controlled trial assigned patients undergoing cardiac surgery for IE to hemoadsorption (integration of CytoSorb to cardiopulmonary bypass) or control. The primary outcome (change in sequential organ failure assessment score [SOFA]) was defined as the difference between the mean total postoperative SOFA score, calculated maximally to the 9th postoperative day, and the basal SOFA score. The analysis was by modified intention to treat. A predefined intergroup comparison was performed using a linear mixed model for ASOFA including surgeon and baseline SOFA score as fixed effect covariates and with the surgical center as random effect. The SOFA score assesses dysfunction in 6 organ systems, each scored from 0 to 4. Higher scores indicate worsening dysfunction. Secondary outcomes were 30-day mortality, duration of mechanical ventilation, and vasopressor and renal replacement therapy. Cytokines were measured in the first 50 patients.

**RESULTS:** Between January 17, 2018, and January 31, 2020, a total of 288 patients were randomly assigned to hemoadsorption (n=142) or control (n=146). Four patients in the hemoadsorption and 2 in the control group were excluded because they did not undergo surgery. The primary outcome, ASOFA, did not differ between the hemoadsorption and the control group (1.79±3.75 and 1.93±3.53, respectively; 95% CI, −1.20 to 0.83; P=0.6706). Mortality at 30 days (21% hemoadsorption versus 22% control; P=0.782), duration of mechanical ventilation, and vasopressor and renal replacement therapy did not differ between groups. Levels of interleukin-1β and interleukin-18 at the end of integration of hemoadsorption to cardiopulmonary bypass were significantly lower in the hemoadsorption than in the control group.

**CONCLUSIONS:** This randomized trial failed to demonstrate a reduction in postoperative organ dysfunction through intraoperative hemoadsorption in patients undergoing cardiac surgery for IE. Although hemoadsorption reduced plasma cytokines at the end of cardiopulmonary bypass, there was no difference in any of the clinically relevant outcome measures.

**REGISTRATION:** URL: <https://www.clinicaltrials.gov>; Unique identifier: NCT03266302.

**Key Words:** cardiopulmonary bypass • cytokines • endocarditis • thoracic surgery

Correspondence to: Torsten Doenst, MD, PhD, Department of Cardiothoracic Surgery, Friedrich-Schiller-University of Jena, Am Klinikum 1, 07747 Jena, Germany. Email: doenst@med.uni-jena.de

\*A list of the REMOVE Trial Investigators is provided in the Supplemental Material. Supplemental Material is available at <http://www.ahajournals.org/doi/suppl/10.1161/CIRCULATIONAHA.121.056940>.

For Sources of Funding and Disclosures, see page 967.

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Circulation is available at [www.ahajournals.org/journal/circ](http://www.ahajournals.org/journal/circ).

Circulation. 2022;145:959–968. DOI: 10.1161/CIRCULATIONAHA.121.056940

March 29, 2022 959

Diab M, et al. *Circulation*. 2022

Para leer más...



ORIGINAL ARTICLE



## Impact of therapeutic drug monitoring of antibiotics in the management of infective endocarditis

G. Macheda<sup>1</sup> · N. El Helali<sup>2</sup> · G. Péan de Ponfily<sup>3,4,5</sup> · M. Kloeckner<sup>6</sup> · P. Garçon<sup>6</sup> · M. Maillet<sup>1</sup> · V. Tolsma<sup>1</sup> · C. Mory<sup>2</sup> · A. Le Monnier<sup>3,4,5</sup> · B. Pilmis<sup>3,7</sup>

Macheda G, et al. *Eur J Clin Microbiol Infect Dis*. 2022

## Outpatient Parenteral Antibiotic Treatment vs Hospitalization for Infective Endocarditis: Validation of the OPAT-GAMES Criteria

Juan M. Pericàs,<sup>1,2,a</sup> Jaume Llopis,<sup>1,3,a</sup> Patricia Muñoz,<sup>4,e</sup> Victor González-Ramallo,<sup>4</sup> M. Eugenia García-Leoni,<sup>4</sup> Aristides de Alarcón,<sup>5</sup> Rafael Luque,<sup>5</sup> M. Carmen Farinas,<sup>6</sup> Miguel A. Goenaga,<sup>7</sup> Marta Hernández-Meneses,<sup>1</sup> David Nicolás,<sup>1</sup> Antonio Ramos-Martínez,<sup>8</sup> M. Angeles Rodríguez-Esteban,<sup>3</sup> Aroa Villoslada-Gelabert,<sup>10</sup> and José M. Miró,<sup>1,11</sup> on behalf of the GAMES Investigators<sup>5</sup>

Pericàs JM, et al. *Open For Infect Dis*. 2022

## ORIGINAL RESEARCH

## Machine Learning–Based Risk Model for Predicting Early Mortality After Surgery for Infective Endocarditis

Li Luo , MD\*; Sui-qing Huang, MD\*; Chuang Liu, MCS; Quan Liu , MD; Shuohui Dong, MD; Yuan Yue, MD; Kai-zheng Liu, MD; Lin Huang, MD; Shun-jun Wang, MD; Hua-yang Li, MD; Shaoyi Zheng, PhD, MD; Zhong-kai Wu , PhD, MD

Luo L, et al. *J Am Heart Assoc*. 2022



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**¡Muchas gracias!**

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