Il nostro nemico batterico numero 1: lo stafilococco aureo. Novità epidemiologiche, cliniche, diagnostiche e terapeutiche

Małgorzata MIKULSKA, MD, PhD
Associate Professor of Infectious Diseases
University of Genoa, Dipartimento di Scienze della Salute (DISSAL) and Ospedale Policlinico San Martino Genoa, Italy

Università degli Studi di Genova
Dipartimento di Scienze della Salute (DISSAL)
Genoa, Italy

Clinica Malattie Infettive
Ospedale Policlinico San Martino
Genoa, Italy

OSPEDALE POLICLINICO SAN MARTINO
Sistema Sanitario Regione Liguria
Istituto di Ricovero e Cura a Carattere Scientifico

Disclosures

- Lecture fees and board meeting fees from: Allovir, Astra-Zeneca, bioMerieux, Gilead, Janssen, Moderna, Mundipharma, Pfizer; Shionogi
- Drug/study advisory board: Mundipharma, Pfizer, Shionogi
- Grant to my institution: Gilead

S. aureus – enemy no. 1

- *Staphylococcus aureus* - the leading bacterial cause of death in 135 countries in 2019
- In high-income countries, SAB incidence: 9.3 - 65 cases per 100 000 person-years
- In a 21-year prospective study of 2348 patients
  - In 2015 **54%** with *S aureus* bacteremia had implanted **prosthetic material** (most commonly a central venous catheter or cardiac device)

Despite improvements in treatment and diagnosis,

- Mortality among patients with *S aureus* bacteremia after 2011
  - **18.1% (95%CI, 16.3-20) at 1 month**
  - **27.0% (95%CI, 21.5-33.3) at 3months**

Tong SYC, Fowler VG Jr, Skalla L, Holland TL. Management of Staphylococcus aureus Bacteremia: A Review. JAMA. 2025 Apr 7

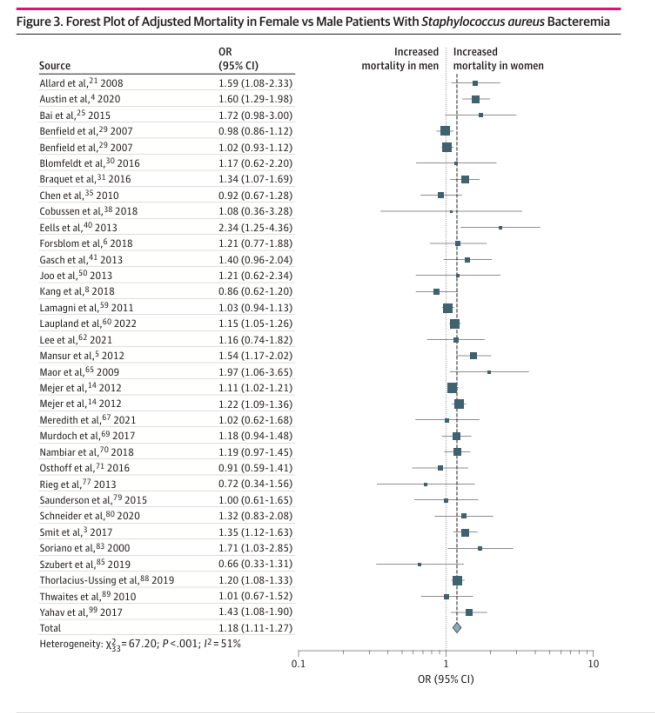
Unexpected risk factors for mortality

2023 cohort study

- 121 women with SAB received **shorter durations of antimicrobial treatment** and were less likely to undergo **transesophageal echocardiography** compared to men

2024 systematic review and meta-analysis

- 132 582 patients from 89 studies
- female sex was associated with increased mortality: females had 18% increased odds of death compared with male patients



Westgeest AC et la. Clin Microbiol Infect. 2023;29(9):1182-1187

Westgeest AC, et al. Female Sex and Mortality in Patients with Staphylococcus aureus Bacteremia: A Systematic Review and Meta-analysis. JAMA Netw Open. 2024 Feb 5;7(2):e240473

Negative outcomes, risk stratification

Low risk SAB

Persistent infection

- Despite appropriate antibiotic therapy, approximately 33% of patients with SAB have persistent bacteremia
- In a prospective multicenter cohort study, the 90-day mortality of patients with **2 to 4 days of *S aureus* bacteremia** following initiation of antibiotics was almost twice that of patients with only 1 day of bacteremia **(39% vs 22%)**
- A new metastatic focus of infection was more likely in those with delayed clearance
  - 6% in patients who cleared their bacteremia in a single day
  - 10% of patients with 2 to 4 days of bacteremia
  - 22% of those with 5 to 7 days of bacteremia

Complicated SAB

- Endocarditis excluded
- No implanted prostheses
- Follow-up blood cultures 2 to 4 days after the initial blood cultures do not grow *S aureus*
- Defervescence has occurred within 72 hours of initiating effective therapy
- No evidence of metastatic sites of infection

- Across different cohorts, approximately **30%** of patients with *S aureus* bacteremia are classified as uncomplicated

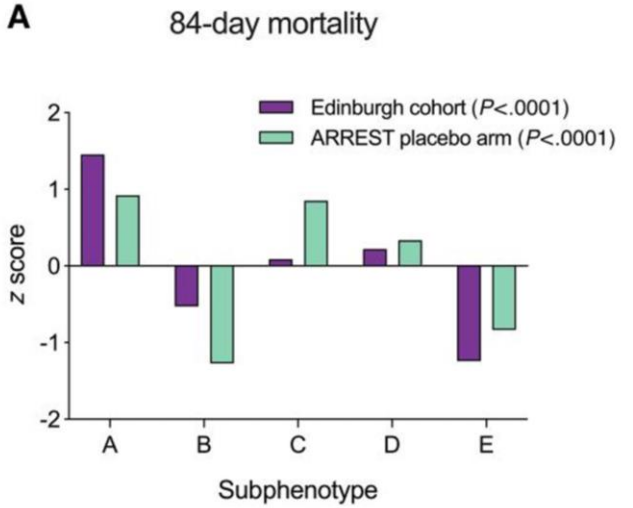
Kuehl R, et al. Defining persistent *Staphylococcus aureus* bacteraemia: secondary analysis of a prospective cohort study. *Lancet Infect Dis*. 2020;20(12):1409-1417

Clinical Infectious Diseases
MAJOR ARTICLE

Clinical Subphenotypes of *Staphylococcus aureus* Bacteremia

Maaike C. Swets,[1,2] Zsuzsa Bakk,[3] Annette C. Westgeest,[1] Karla Berry,[4,5] George Cooper,[4] Wynne Sim,[6] Rui Shian Lee,[6] Tze Yi Gan,[6] William Donlon,[6] Antonia Besu,[6] Emily Heppenstall,[4] Luke Tysall,[7] Simon Dewar,[5,7] Mark de Boer,[1,8] Vance G. Fowler Jr,[9,10] David H. Dockrell,[4] Guy E. Thwaites,[11,12] Miquel Pujol,[13,14,15] Natàlia Pallarès,[16,17] Cristian Tebé,[16] Jordi Carratalà,[13,14,15,18] Alexander Szubert,[19] Geert H. Groeneveld,[1,20] and Clark D. Russell[4,7,*]

- 3 cohorts of adults with monomicrobial SAB:
  - a UK retrospective observational study (Edinburgh cohort, n = 458),
  - the UK ARREST trial (n = 758),
  - the Spanish SAFO trial (n = 214).
- Mortality and microbiologic outcomes were then compared between subphenotypes.
- **Results: MSSA** 1366/1430, 95.5%; identified 5 distinct, reproducible subphenotypes:
- (A) **SAB associated with older age and comorbidity**,
- (B) **nosocomial intravenous catheter-associated SAB in younger people without comorbidity**,
- (C) community-acquired metastatic SAB,
- (D) SAB associated with chronic kidney disease,
- (E) **SAB associated with injection drug use**.
- In a secondary analysis of the ARREST trial, adjunctive rifampicin was associated with increased mortality in subphenotype B and improved microbiologic outcomes in subphenotype C.
- **Conclusions:** We have identified reproducible and clinically relevant subphenotypes within SAB and provide proof of principle of differential treatment effects.



Supplementary Table 1: Outcomes in Edinburgh and ARREST cohorts

	Sub-phenotype					P-value
	A	B	C	D	E	
Edinburgh cohort	n=147	n=132	n=103	n=39	n=37	
84-day mortality	64 (43·8)	20 (15·5)	25 (24·3)	10 (26·2)	2 (5·3)	<0·0001
Persistence or recurrence	7 (4·8)	1 (0·8)	8 (7·8)	0	1 (2·7)	0·04
ARREST placebo arm	n=60	n=52	n=138	n=69	n=69	
84-day mortality	13 (21·7)	0	29 (21·0)	11 (15·9)	3 (4·3)	<0·0001
Composite microbiologic failure	1 (1·9)	0	11 (8·6)	6 (8·8)	3 (4·3)	0·08

Results show the percentage of patients in each sub-phenotype with the specific outcome. Data shown as n (%). Outcomes were compared between sub-phenotypes within each cohort using Fisher's exact test.

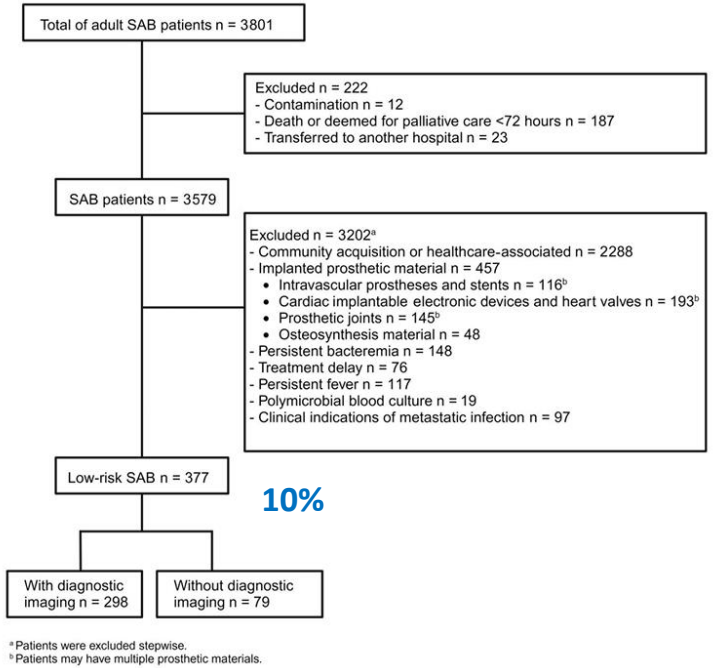
CID 2024 Nov 22;79(5):1153-1161.

Clinical Infectious Diseases
MAJOR ARTICLE

Low-Risk *Staphylococcus aureus* Bacteremia Patients Do Not Require Routine Diagnostic Imaging: A Multicenter, Retrospective, Cohort Study

Marianne M. C. Hendriks,[1,a] Kris S. A. Schweren,[1] Ayden Kleij,[2] Marvin A. H. Berrevoets,[2] Emma de Jong,[3] Peter van Wijngaarden,[3] Heidi S. M. Ammerlaan,[4] Anja Vos,[5] Sander van Assen,[5] Kitty Slieker,[6] Jet H. Gisolf,[7] Mihai G. Netea,[1,8] Jaap ten Oever,[1,a,9] and Ilse J. E. Kouijzer[1,a]

[1]Department of Internal Medicine and Radboud Center for Infectious Diseases, Radboud University Medical Center, Nijmegen, The Netherlands; [2]Department of Internal Medicine, Elisabeth-TweeSteden Hospital, Tilburg, The Netherlands; [3]Department of Internal Medicine, Amphia Hospital, Breda, The Netherlands; [4]Department of Internal Medicine, Catharina Hospital, Eindhoven, The Netherlands; [5]Department of Internal Medicine, Treant, Emmen, The Netherlands; [6]Department of Internal Medicine, Bernhoven Hospital, Uden, The Netherlands; [7]Department of Intenal Medicine, Rijnstate Hospital, Arnhem, The Netherlands; and [8]Department of Immunology and Metabolism, Life and Medical Sciences Institute, University of Bonn, Bonn, Germany



[a]Patients were excluded stepwise.
[b]Patients may have multiple prosthetic materials.

Figure 1. Flowchart of patient inclusion. Abbreviation: SAB, *Staphylococcus aureus* bacteremia.

- In 15 of these 298 patients who underwent diagnostic imaging (5%), imaging findings during patient admission had been interpreted as metastatic infections that should extend treatment. Using the final adjudicated diagnosis, 4 patients **(1.3%)** had clinically relevant metastatic infection.
- In a multi-level multivariable logistic regression analysis, **90-day relapse-free survival** was similar between patients without imaging and those who underwent **imaging**
  - **81.0% versus 83.6%;**
  - adjusted odds ratio, 0.749; 95%CI, .373–1.504

Conclusions

- Our study advocates risk stratification for the management of SAB patients
- Prerequisites are follow-up blood cultures, bedside infectious diseases consultation, and a critical review of disease evolution
- Using this approach, routine imaging could be omitted in low-risk patients

First line treatment of SAB

- MSSA
  - anti-staphylococcal penicillin
  - cefazolin
- MRSA
  - vancomycin
  - daptomycin
  - ceftobiprole (FDA approved for BSI 2024, 500mg x 4 for 8 days > 500mg x 3)
  - ceftaroline (approved for cSSTI or CAP with concomitant BSI; only EMA: high dose for cSSTI with *S. aureus* MIC 2mg/L or 4 mg/L 600 mg x 3)

- **None of 8 RCT demonstrated benefit of combination therapy**

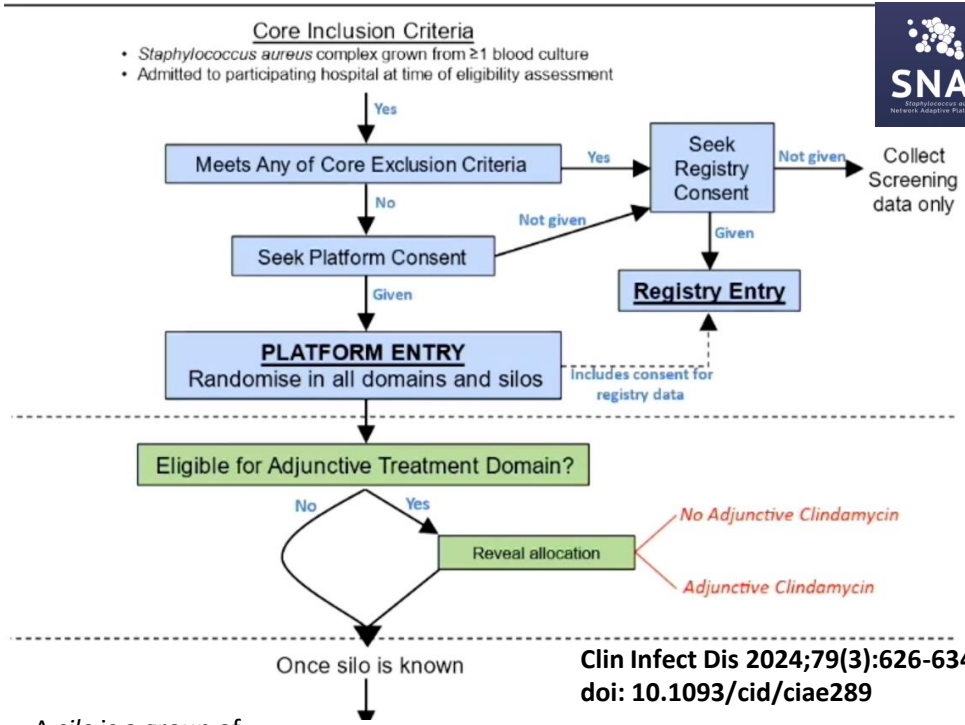
Tong SYC, Fowler VG Jr, Skalla L, Holland TL. Management of Staphylococcus aureus Bacteremia: A Review. JAMA. 2025 Apr 7

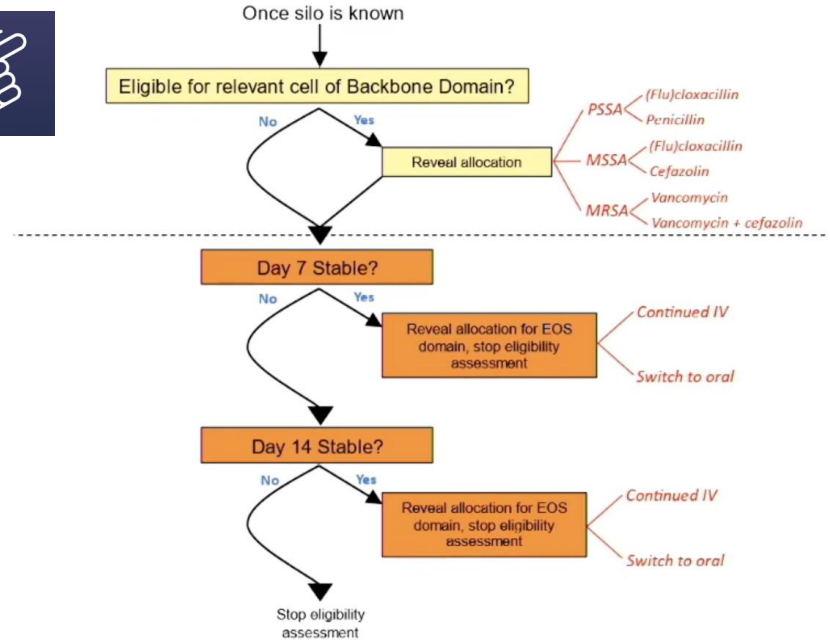
First line treatment – **MSSA data from adaptive platform study**

Primary endpoint: 90-day all-cause mortality

Secondary endpoints:
-All-cause mortality at 14, 28 and 42 days after entering the platform
-Microbiological failure: sterile site positivity for S. aureus between 14-90 days after platform entry
-C. difficile diarrhea
-Domain-specific endpoints: renal impairment, liver toxicity

Courtesy of Dr Mezzogori





Clin Infect Dis 2024;79(3):626-634
doi: 10.1093/cid/ciae289

A *silo* is a group of participants who are defined by the **antibiotic susceptibility** of their infecting isolate

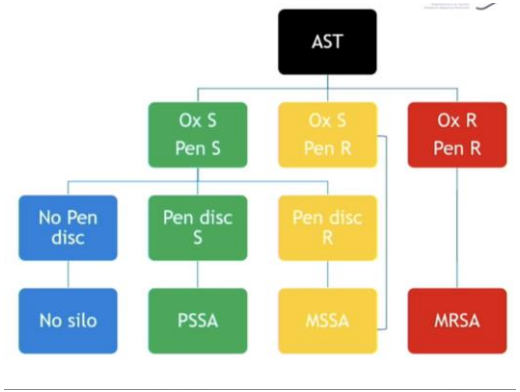
Exclusion Criteria:
-Positive blood cultures >72h from the first blood culture
-Polymicrobial bacteremia
-Known positive blood culture 72h to 180 days prior
-End-of-life care
-Considered unsuitable by caring physician

Silo	Backbone	Adjunctive	Early oral switch
PSSA	Non-inferiority; *then if met*: Superiority		
MSSA	Non-inferiority; *then if met*: Superiority	Superiority	Non-inferiority
MRSA	Superiority		

Randomized 1:1

Courtesy of Dr Mezzogori

First line treatment - MSSA

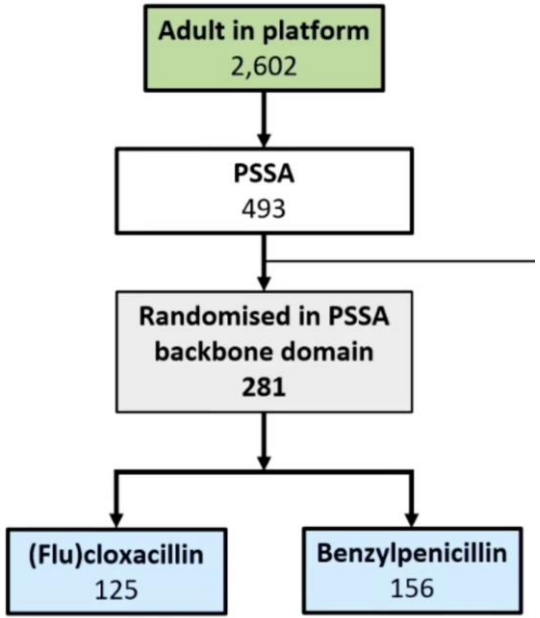


Flucloxacillin 2g q6h IV or cloxacillin 2g 14h IV (Canda, Israel, Singapore) > oral flucloxacillin

VS

Benzylpenicillin 1.8g (=3 million units) q4h IV or benzylpenicillin 2.4g (=4 million units) q6h IV > oral amoxicillin

Duration: 14 days or ≥ 28 days



Data and safety monitoring committee

Enrolment to SNAP commenced Feb 18 2022

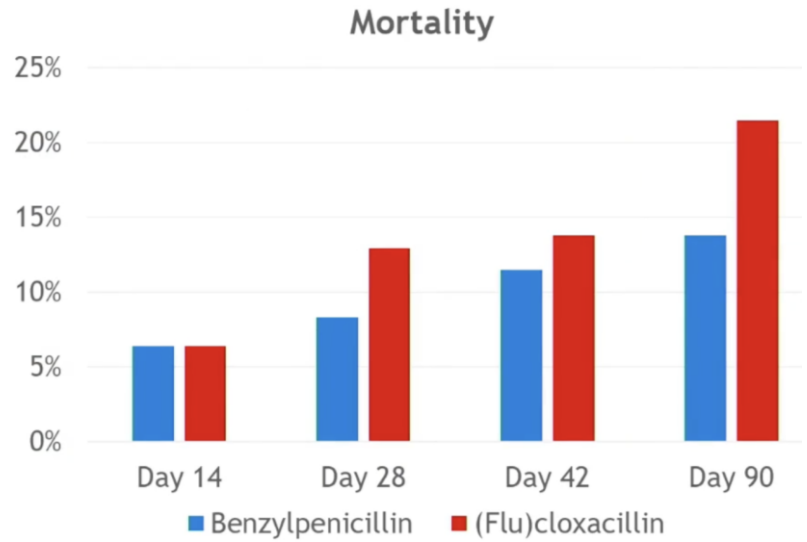
June 21 2024 at 4th Interim analyses:
Recommended **pause to recruitment** to PSSA and MSSA silos backbone domain because of safety concerns relating to AKI; requested additional follow-up and data

August 7 2024 at ad hoc meeting:
Recommended **closure** of backbone domains for MSSA and PSSA silos due to increased AKI with (flu)cloxacillin; and non-inferiority trigger for 90-day mortality in the MSSA silo

Courtesy of Dr Mezzogori

Benzylpenicillin for PSSA

Lower 90-day mortality with BP: (13.8%) vs (flu)cloxacillin (21.5%) to OR 0.67 (0.35, 1.28)
Lower renal impairment with BP:(10.9%) vs (flu)cloxacillin (21.6%) to OR 0.50 (0.26, 0.94)



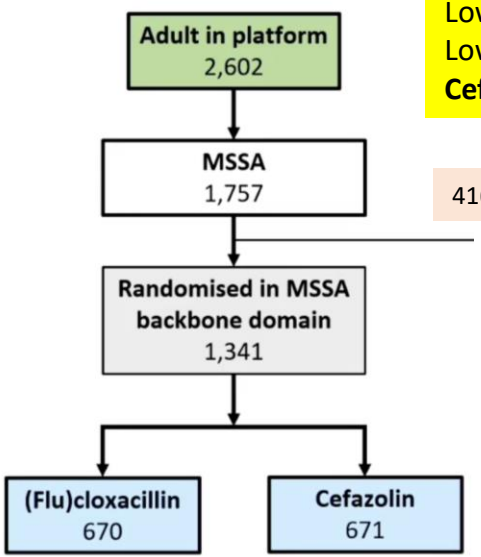
	(Flu)cloxacillin (n=125)	Benzylpenicillin (n=156)
Microbiological treatment failure from days 15 to 90		
Yes	3 (2.8)	6 (4.3)
Missing	19 (15.2)	15 (9.6)
***C. difficile* diarrhoea**		
Yes	1 (0.8)	0 (0.0)
Missing	2 (1.6)	0 (0.0)

Courtesy of Dr Mezzogori

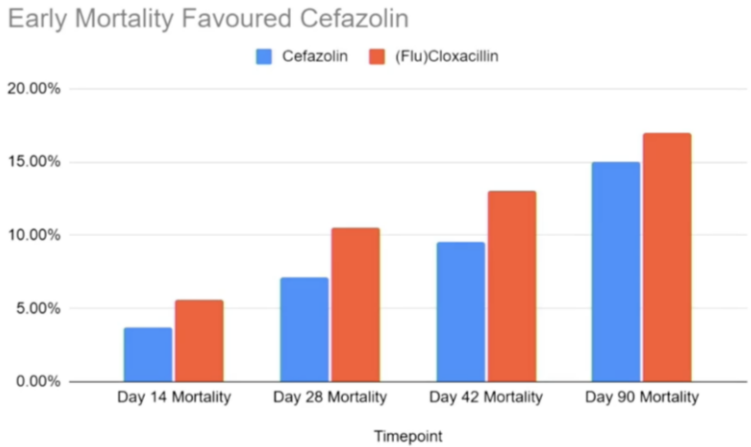
Cefazolin versus (flu)cloxacillin for PRSA MSSA

SNAP
Staphylococcus aureus Network Adaptive Platform

Lower 90-day mortality with cefazolin (15.0%) vs (flu)cloxacillin (17.0%) to OR **0.81 (0.59, 1.12)**
Lower renal impairment with cefazolin (13.7%) vs (flu)cloxacillin (19.1%) to OR 0.67 (0.50, 0.89)
Cefazolin not inferior to (flu)cloxacillin on mortality and superior with regard to AKI



416 excluded



	(Flu)cloxacillin (n=670)	Cefazolin (n=671)
Microbiological treatment failure (D15-90)	12/556 (2.1)	18/587 (3.1)
C. difficile diarrhoea	10/664 (1.5)	14/664 (2.1)

Change in therapy due to adverse event		
Yes	61 (9.1)	11 (1.6)
Missing	0 (0.0)	0 (0.0)
Change in therapy due to inadequate response		
Yes	16 (2.4)	14 (2.1)
Missing	0 (0.0)	0 (0.0)

Courtesy of Dr Mezzogori

Clinical Infectious Diseases
MAJOR ARTICLE

Exebacase in Addition to Standard-of-Care Antibiotics for *Staphylococcus aureus* Bloodstream Infections and Right-Sided Infective Endocarditis: A Phase 3, Superiority-Design, Placebo-Controlled, Randomized Clinical Trial (DISRUPT)

Vance G. Fowler Jr,[1,2] Anita F. Das,[2] Joy Lipka-Diamond,[2] Jane E. Ambler,[2] Raymond Schuch,[2] Roger Pomerantz,[2] Cara Cassino,[2] Luis Jáuregui-Peredo,[2] Gregory J. Moran,[3] Mark E. Rupp,[3] Anne M. Lachiewicz,[3] Joseph L. Kuti,[3] Robert A. Wise,[3] Keith S. Kaye,[3] Marcus J. Zervos,[3] and W. Garrett Nichols[3]

[1]Department of Medicine, Duke University Medical Center, Durham, North Carolina, USA, [2]AD Stat Consulting, Guerneville, California, USA, [3]ContraFect Corporation, Yonkers, New York, USA, [4]Stony Point Life Sciences Consulting, Benson, Vermont, USA, [5]Department of Medicine, Mercy Health-St. Vincent Medical Center, Toledo, Ohio, USA, [6]Department of Medicine, Olive View-UCLA Medical Center, Sylmar, California, USA, [7]Department of Medicine, University of Nebraska Medical Center, Omaha, Nebraska, USA, [8]Department of Medicine, University of North Carolina Health Care System, Chapel Hill, North Carolina, USA, [9]Department of Medicine, Hartford Hospital, Hartford, Connecticut, USA, [10]Department of Medicine, Johns Hopkins Bayview Medical Center, Baltimore, Maryland, USA, [11]Department of Medicine, Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey, USA, and [12]Department of Medicine, Henry Ford Health System, Detroit, Michigan, USA

- **Exebacase** - first-in-class **antistaphylococcal lysin** that is rapidly bactericidal and synergizes with antibiotics
- The addition of exebacase to either vancomycin or daptomycin increased survival significantly in animal models of disease when compared to treatment with SOC antibiotics or exebacase alone.

Methods

- RCT: a single dose of intravenous exebacase or placebo in addition to standard-of-care antibiotics
- **The primary efficacy outcome: clinical response at day 14 in the MRSA population**

Results

- 259 patients randomized before the study was stopped for **futility** based on the recommendation of the unblinded Data Safety Monitoring Board
- 77% had complicated SAB, 15% endocarditis
- Clinical response rates at day 14 in the MRSA population (n = 97): 50.0% exebacase + antibiotics (32/64) vs. 60.6% antibiotics (20/33), p= .392
- All cause mortality day 30 approx. 10%, but MRSA 23% in exebacase vs. 12% antibiotics only, MSSA: 5%vs 7.7%
- Safety: no difference

Efficacy and safety of an early oral switch in low-risk *Staphylococcus aureus* bloodstream infection (SABATO): an international, open-label, parallel-group, randomised, controlled, non-inferiority trial

- 5063 patients with SAB assessed for eligibility
- Exclusion criteria: complicated bacteremia
  - deep-seated focus of infection,
  - septic shock,
  - prolonged bacteremia [positive blood culture result obtained >72 hours after start of appropriate antibiotic therapy],
  - fever in the prior 2 days,
  - intravascular catheter that was not removed,
  - a history of *S aureus* bloodstream infection within the preceding 3 months,
  - injection drug use
  - severe immunodeficiency or severe immunosuppression
  - presence of a prosthetic heart valve or deep-seated vascular graft
- Randomized **213 patients (4%)** with **low-risk** *S aureus* bacteremia (16 MRSA, **197 MSSA**) to receive oral antibiotics after 5 to 7 days of IV therapy vs continuing IV, for a total of 14 days
- **Primary endpoint, i.e. failure: relapse, deep seated infection, death:**
  oral switch group 14 (13%) vs. 13 (12%) IV, treatment difference 0.7% (95% CI –7.8 to 9.1; p=0.013).
- Serious adverse event: oral group 36/107 (34%) vs. 27/103 (26%) IV group, p=0.29

Kaasch et al. Lancet Infect Dis 2024 May;24(5):523-534

Clinical Infectious Diseases
MAJOR ARTICLE

Oral Versus Intravenous Antibiotic Therapy for *Staphylococcus aureus* Bacteremia or Endocarditis: A Systematic Review and Meta-Analysis of Randomized, Controlled Trials

Ahmad Mourad,[1,2,0] Nnamdi Nwafo,[3] Lesley Skalla,[4] Thomas L. Holland,[1,2] and Timothy C. Jenkins[5,6]

ble 2. Number of Participants Who Received Oral Versus Intravenous Therapy for *Staphylococcus aureus* Bacteremia or Endocarditis in Each Study

		Participants With SAB/IE in Oral Therapy Arm			Participants With SAB/IE in Intravenous Therapy Arm		
Author	Total Participants Randomized	Total	MSSA	MRSA	Total	MSSA	MRSA
Heldman et al	93[a]	44	42	2	43	40	3
Schrenzel et al	130	30[b]	Unknown	Unknown	16[b]	Unknown	Unknown
Iversen et al	400	47	47	0	40	40	0
Kaasch at al	213	108	102	6	105	95	10

Abbreviations: MRSA, methicillin-resistant *Staphylococcus aureus*; MSSA, methicillin-sensitive *Staphylococcus aureus*; SAB/IE, *Staphylococcus aureus* bacteremia or infective endocarditis.
[a]Eighty-seven of 93 participants had SAB/IE, and 6 participants had coagulase-negative *Staphylococcus*; however, outcomes are not defined separately.
[b]Participants with catheter-related SAB or primary bacteremia; includes only clinically evaluable population that completed follow-up; intention-to-treat population not available.

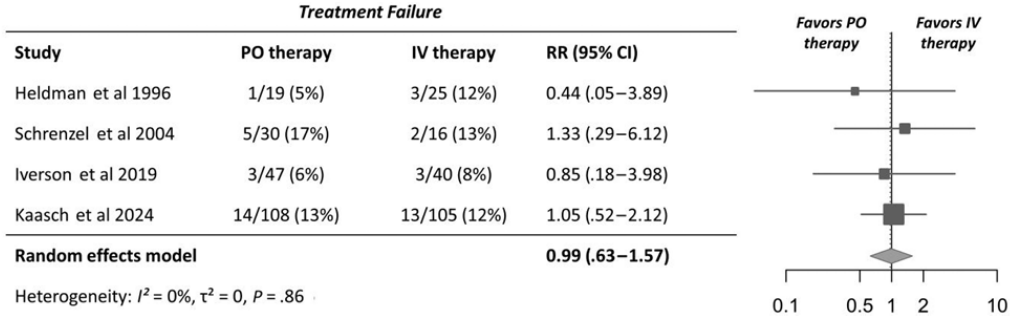


Figure 2. Forest plot of treatment failure in study participants who received oral versus intravenous therapy for *Staphylococcus aureus* bacteremia or endocarditis. Abbreviations: CI, confidence interval; IV, intravenous; PO, oral; RR, risk ratio.

CID 2025

Clinical Infectious Diseases
MAJOR ARTICLE

Early Oral Antibiotic Switch in *Staphylococcus aureus* Bacteraemia: The *Staphylococcus aureus* Network Adaptive Platform (SNAP) Trial Early Oral Switch Protocol

Dana de Kretser,[1,a] Jocelyn Mora,[2,a] Max Bloomfield,[3,a] Anita Campbell,[4,a] Matthew P. Cheng,[5,a,b] Stephen Guy,[6,7,a] Marjolein Hensgens,[8,9,a,b] Shirin Kalimuddin,[10,11,a] Todd C. Lee,[12,a,b] Amy Legg,[13,14,a] Robert K. Mahar,[15,16,a] Michael Marks,[17,18,19,a] Julie Marsh,[20,a,b] Anna McGlothlin,[21,a,b] Susan C. Morpeth,[22,a,b] Archana Sud,[23,a] Jaap Ten Oever,[24,a] Dafna Yahav,[25,a,b] Marc Bonten,[8,b] Asha C. Bowen,[20,b] Nick Daneman,[26,b] Sebastiaan J. van Hal,[27,28,b] George S. Heriot,[2,b] Roger J. Lewis,[21,b] David C. Lye,[29,30,31,32,b] Zoe McQuilten,[7,33,b] David L. Paterson,[34,b] J. Owen Robinson,[35,36,37,38,b] Jason A. Roberts,[14,34,39,40,41,b] Matthew Scarborough,[42,b] Steve A. Webb,[42,b] Lynda Whiteway,[b] Steven Y. C. Tong,[2,43,a,b] Joshua S. Davis,[44,a,b] Genevieve Walls,[22,a,b,c] Anna L. Goodman,[1,42,45,a,b,c]; the SNAP Early Oral Switch Domain-Specific Working Group[a] and SNAP Global Trial Steering Committee[b] for the SNAP Trial Group

Table 5. Hierarchy of Recommended Oral Antibiotics for EOS by Silo (ie Susceptibility of *S. aureus*)

	Recommended Oral Antibiotic According to Allocated Backbone Domain					
Silo	Adult		Pregnancy		Pediatric	
PSSA	Benzylpenicillin 1. Amoxicillin 2. (Flu/di)cloxacillin 3. Cefalexin/cefadroxil 4. Linezolid	(Flu)cloxacillin 1. (Flu/di)cloxacillin 2. Amoxicillin 3. Cefalexin/cefadroxil 4. Linezolid	Benzylpenicillin 1. Amoxicillin 2. (Flu/di) cloxacillin 3. Cefalexin/ cefadroxil	(Flu)cloxacillin 1. (Flu/di)cloxacillin 2. Amoxicillin 3. Cefalexin/ cefadroxil	Benzylpenicillin 1. Amoxicillin 2. Cefalexin/cefadroxil 3. (Flu/di)cloxacillin 4. Linezolid	(Flu)cloxacillin 1. Cefalexin/cefadroxil 2. (Flu/di)cloxacillin 3. Amoxicillin 4. Linezolid
MSSA	(Flu)cloxacillin 1. (Flu/di)cloxacillin 2. Cefalexin/cefadroxil 3. Linezolid	Cefazolin 1. Cefalexin/cefadroxil 2. (Flu/di)cloxacillin 3. Linezolid	(Flu)cloxacillin 1. (Flu/di) cloxacillin 2. Cefalexin/ cefadroxil	Cefazolin 1. Cefalexin/ cefadroxil 2. (Flu/di)cloxacillin	(Flu)cloxacillin 1. Cefalexin/cefadroxil 2. (Flu/di)cloxacillin 3. Linezolid	Cefazolin 1. Cefalexin/cefadroxil 2. (Flu/di)cloxacillin 3. Linezolid
MRSA	Vancomycin/ daptomycin 1. Linezolid 2. Fluoroquinolone + rifampicin 3. TMP-SMX 4. Fusidic acid + rifampicin	Vancomycin/ daptomycin + cefazolin 1. Linezolid 2. Fluoroquinolone + rifampicin 3. TMP-SMX 4. Fusidic acid + rifampicin	Vancomycin/ daptomycin 1. Clindamycin 2. TMP-SMX[a]	Vancomycin/ daptomycin + cefazolin 1. Clindamycin 2. TMP-SMX[a]	Vancomycin/ daptomycin 1. TMP-SMX 2. Linezolid 3. Fluoroquinolone + rifampicin 4. Fusidic acid + rifampicin	Vancomycin/ daptomycin + cefazolin 1. TMP-SMX 2. Linezolid 3. Fluoroquinolone + rifampicin 4. Fusidic acid + rifampicin

Site PIs and treating clinicians are encouraged, but not mandated, to select the highest antibiotic on this list which is appropriate for a given patient.

Abbreviations: EOS, early oral switch; MRSA, methicillin-resistant *Staphylococcus aureus*; MSSA, methicillin- susceptible *Staphylococcus aureus*; PSSA, penicillin-susceptible *Staphylococcus aureus*; TMP-SMX, trimethoprim-sulfamethoxazole.

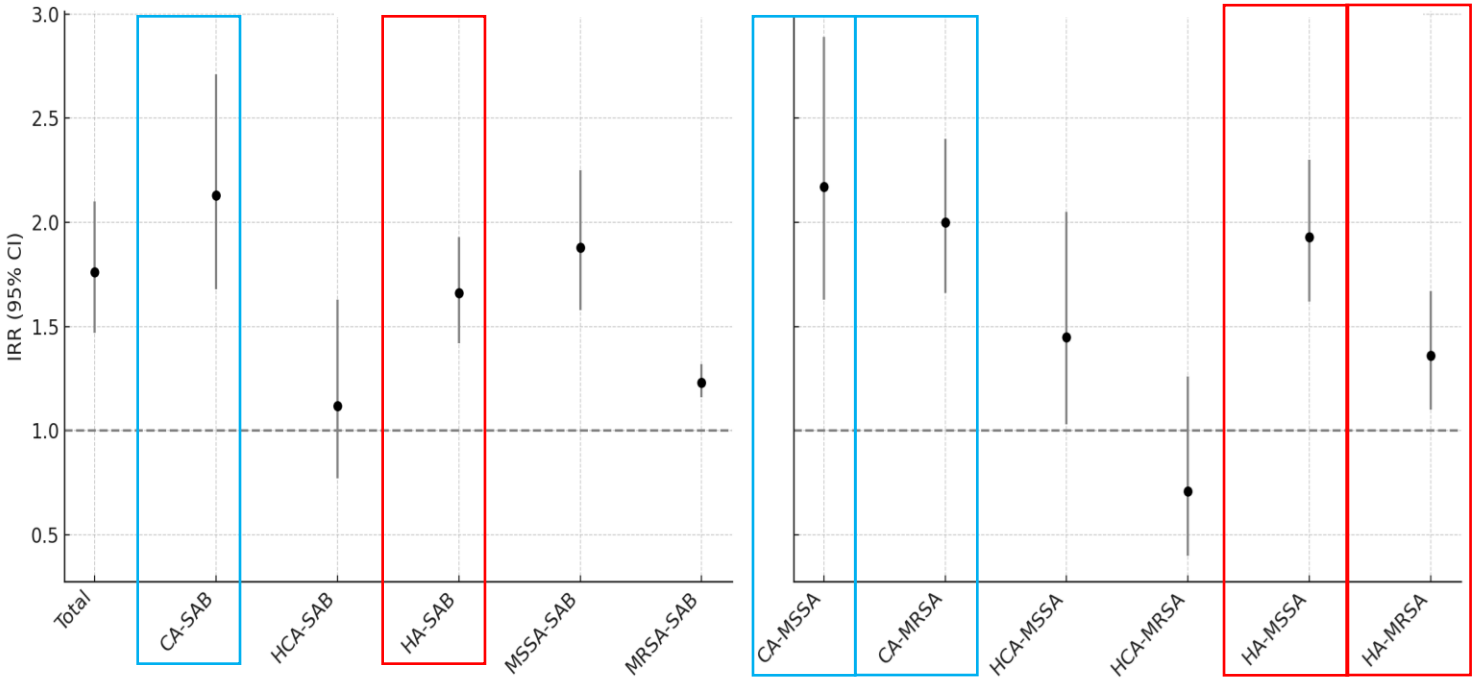
[a]TMP-SMX only suitable during the second trimester. Avoid in first and third trimester.

PERIODO 1
AGOSTO 2018 – LUGLIO 2019

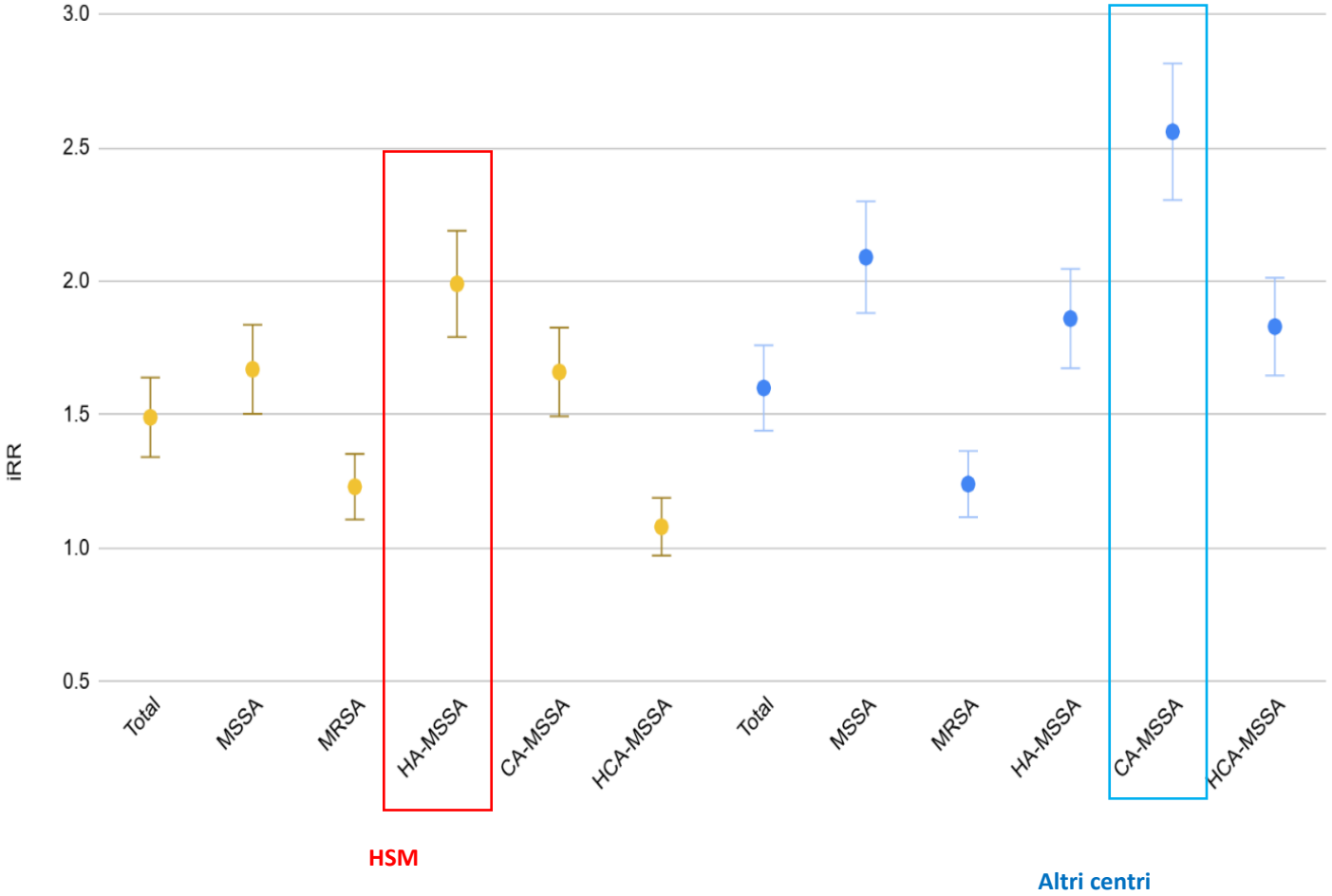
PERIODO 2
AGOSTO 2020 – LUGLIO 2021

Hospital	Period	N. admissions	N. blood cultures	SAB episodes	
ASL 4	Period 1	17132,00	11840,00	24,00	
ASL 4	Period 2	16313,00	9029,00	49,00	
ALBENGA	Period 1	20833,00	8012,00	47,00	
ALBENGA	Period 2	15479,00	12632,00	48,00	
SAVONA	Period 1	15022,00	3785,00	20,00	
SAVONA	Period 2	12509,00	14344,00	47,00	
SANREMO	Period 1	20946,00	10760,00	78,00	
SANREMO	Period 2	14259,00	17046,00	93,00	
HSM	**Period 1**	**39941,00**	**272766,00**	**219,00**	
HSM	**Period 2**	**34632,00**	**389399,00**	**283,00**	
GALLIERA	Period 1	23675,00	10835,00	61,00	
GALLIERA	Period 2	22285,00	13526,00	86,00	
TOTAL	Period 1	137549,00	317998,00	449,00	
	Period 2	115477,00	455976,00	606,00	= 1055 SAB

Incidence rate ratio (08/2018-07/2019 vs. 08/2020-07/2021) adjusted for the number of BC and hospital effect

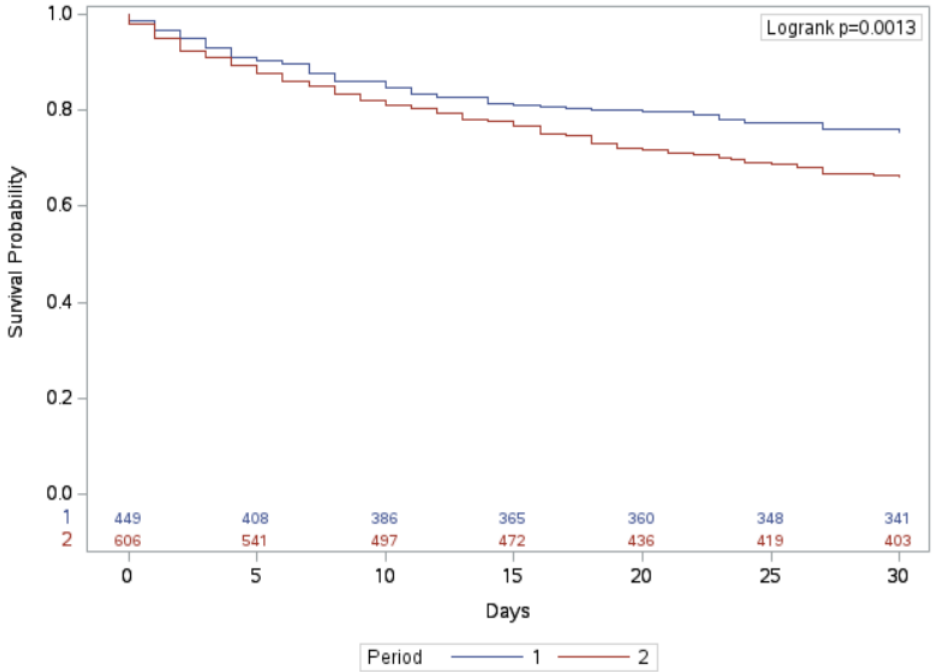


TOTALE


3.0
2.5
2.0
1.5
1.0
0.5
iRR
Total
MSSA
MRSA
HA-MSSA
CA-MSSA
HCA-MSSA
Total
MSSA
MRSA
HA-MSSA
CA-MSSA
HCA-MSSA
HSM
Altri centri

Variable	Total N=1055	Period 1 n=449	Period 2 n=606	p-value
Male sex, n (%)	648 (61.4)	279 (62.1)	369 (60.9)	0.6808
Age, years, median (IQR)	**75 (63-83)**	**75 (61-82)**	**75 (63-84)**	**0.0868**
SAB origin, n (%)				0.0015
CAI	271 (25.7)	98 (21.8)	173 (28.6)	
HCA	229 (21.7)	119 (26.5)	110 (18.6)	
HAI	**555 (52.6)**	**232 (51.7)**	**323 (53.3)**	
MRSA, n (%)	372 (35.3)	184 (41.0)	188 (31.0)	0.0008
Covid BSI, n (%)	85 (8.1)	0 (0.0)	85 (14.0)	
ID consultation, n (%)	**686 (65.0)**	**241 (53.7)**	**443 (73.4)**	**<0.0001**
Charlson Comorbidity, score, median (IQR)	**6 (4-8)**	**6 (4-8)**	**6 (4-8)**	**0.6024**
Active treatment, n (%)				0.7210
Yes	813 (77.1)	342 (76.2)	471 (77.7)	
No	63 (6.0)	26 (5.8)	37 (6.1)	
Time to active treatment, days, median (IQR)	1 (0-2)	1 (0-3)	1 (0-2)	0.4504

Overall mortality
30% at 30-days from the first positive BC



30-day mortality, predictors

	Univariable		Multivariable backward**	
Variable	HR (95% CI)	p-value	aHR (95% CI)	p-value
Period (2 vs. 1)	1.46 (1.16-1.84)	0.0014	1.72 (1.35-2.20)	<0.0001
Male sex	0.78 (0.62-0.97)	0.0246	-	
Age, years	1.04 (1.04-1.05)	<0.0001	1.03 (1.02-1.04)	<0.0001
SAB origin (vs. CAI)				
HAI	1.23 (0.94-1.62)	0.1323		
HCA	1.03 (0.74-1.44)	0.8619		
MRSA (vs. MSSA)	1.66 (1.33-2.07)	<0.0001	1.49 (1.19-1.87)	0.0006
Covid BSI (Yes vs. No)	1.17 (0.80-1.71)	0.4292		
ID consultation (Yes vs. No)	0.59 (0.47-0.74)	<0.0001	0.65 (0.51-0.83)	0.0004
Charlson Comorbidity, score	1.14 (1.11-1.17)	<0.0001	1.07 (1.03-1.12)	0.0003
Source unknown (Yes vs. No)*	1.67 (1.26-2.22)	0.0004	1.65 (1.20-2.28)	0.0022

** adjusted for effect of center

Thank you for your attention