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# Epidemiology and Outcomes of Bacteremia in Neutropenic Patients: A Changing Scenario over Time

fabian1961@gmail.com
4102 Galvan Street
1431 Buenos Aires
Argentina

Herrera F[1], Torres D[1], Laborde A[2], Tula L[3], Mañez N[4], Suchowiercha N[5], Berruezo L[6], Pereyra M[7], Benso J[8], Nenna A[9], González Ibañez M[2], Lambert S[3], Barcán L[4], Roccia Rossi I[5], Fernández A[6], Gago R[7], Fernández V[8], Soto V[9], Grippo N[1], Pennini M[2], Blanco M[3], Visús M[4,8], Reynaldi M[5], Carbone R[6], Azula N[7], Chaves M[9], Pasterán F[10], Corso A[10], Rapoport M[10], Carena A[1].

1. CEMIC, 2. FUNDALEU, 3. Hospital El Cruce, 4. Hospital Italiano de Buenos Aires, 5. HIGA Gral San Martín, 6. HIGA Rodolfo Rossi, 7. Hospital Universitario Austral, 8. Hospital Italiano de San Justo, 9. Hospital de Oncología Marie Curie, 10. Servicio de antimicrobianos, INEI-ANLIS Dr. Carlos Malbrán. **Argentinean Bacteremia in Cancer and Hematopoietic Stem Cell Transplant Study Group (ROCAS).**

## Background

The epidemiology of bacteremia in neutropenic patients (NP) may differ according to the geographic region or country and can change over time. The growing rate of Multidrug-resistant gram-negative bacilli (MDR-GNB) is usually associated with high mortality rate.

## Methods

Prospective and multicenter study. All the first episodes of bacteremia in adult NP with hematologic malignancies were included in 9 centers in Argentina, from June 2014 to December 2023.
They were divided in 3 periods:

- P1: June 2014 - July 2017
- P2: August 2017 - June 2020
- P3: July 2020 - December 2023

Epidemiological, clinical, and treatment characteristics, as well as 30-day infection-related mortality of bacteremia episodes, were compared among the periods.

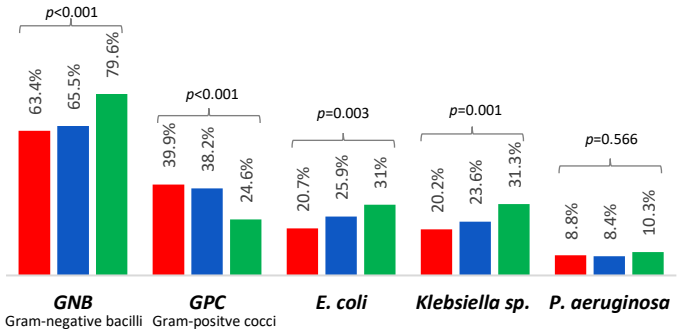
## Results

1330 episodes | P1: 411 | P2: 513 | P3: 406

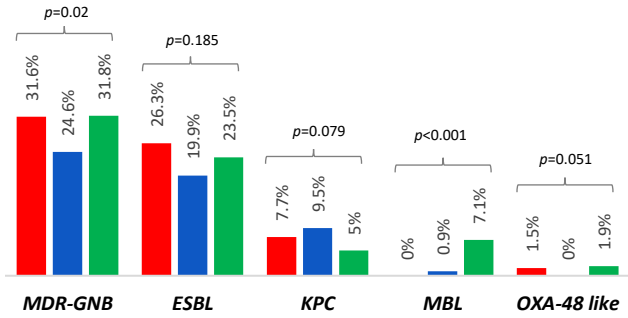
### Clinical Characteristics

| | P1 | P2 | P3 | *P* |
|---|---|---|---|---|
| **Age** - Median (IQR) | 49 (33-61) | 51 (36-62) | 50 (33-61) | 0.62 |
| **Male gender** | 60.3% | 60% | 55.4% | 0.26 |
| **Hematological malignancies** | 52.8% | 57.8% | 55.4% | 0.31 |
| Acute leukemia | 26.2% | 23.5% | 21.4% | 0.26 |
| Lymphoma | | | | |
| **Diseases status** | | | | |
| Recent diagnosis | 30.9% | 30.9% | 30.05% | 0.94 |
| Complete remission | 25.5% | 28.4% | 28.8% | 0.50 |
| **HSCT** | 30.9% | 32.6% | 37.4% | 0.11 |
| **Immunosuppression** | | | | |
| Recent chemotherapy | 68.6% | 78.3% | 74.1% | 0.004 |
| Corticosteroids | 26.5% | 27.1% | 30.3% | 0.42 |
| Biological agents | 6.6% | 22.2% | 22.4% | <0.01 |
| **High-risk neutropenia** | 88.3% | 90.4% | 90.3% | 0.50 |
| **Clinical source** | 70.5% | 73.2% | 66.2% | 0.06 |
| Catheter | 26.5% | 29.8% | 27% | 0.48 |
| Abdominal infection | 20.1% | 18.9% | 19.9% | 0.87 |
| Respiratory infection | 6.8% | 6.8% | 6.6% | 0.99 |
| **Charlson Score** | 2 (2-4) | 2 (2-4) | 2 (2-3) | 0.02 |

### Etiology




### Resistance Mechanisms

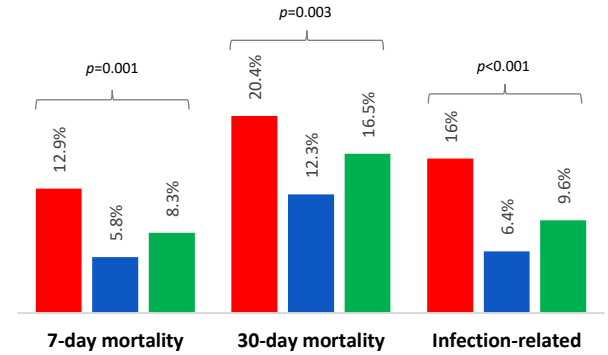



### Severity and Treatment

| | P1 | P2 | P3 | *P* |
|---|---|---|---|---|
| **Severity** | | | | |
| ICU admission | 20.4% | 15.9% | 17.9% | 0.21 |
| Septic shock | 21.9% | 14.8% | 21.3% | 0.008 |
| APACHE II Score | 14 (10-17) | 15 (12-19) | 15 (13-19) | <0.001 |
| Pitt Score | 0 (0-2) | 0 (0-2) | 1 (0-2) | 0.01 |
| **Appropriate ET** | 78.1% | 86.2% | 85.5% | 0.002 |
| **Monotherapy (DT)** | 77.8% | 81.6% | 87.4% | 0.002 |
| **Treatment duration (days)** | 13 (9-15) | 11 (4-14) | 9 (7-12) | <0.001 |

ET: empirical treatment, DT: definitive treatment

### Mortality




**Conclusion:** GNB and MDR-GNB were the leading cause of bacteremia, significantly increasing in the last three years. A change in carbapenemase type has been observed, with a significant rise in MBL, which presents limited therapeutic options. Notwithstanding that, an improvement in the appropriate antibiotic therapy provided and lower infection-related mortality have been observed in the last few years. In order to adapt treatment and improve the outcome in neutropenic patients, changes in bacteremia local epidemiology must be known.