Bloodstream infections in SOT recipients

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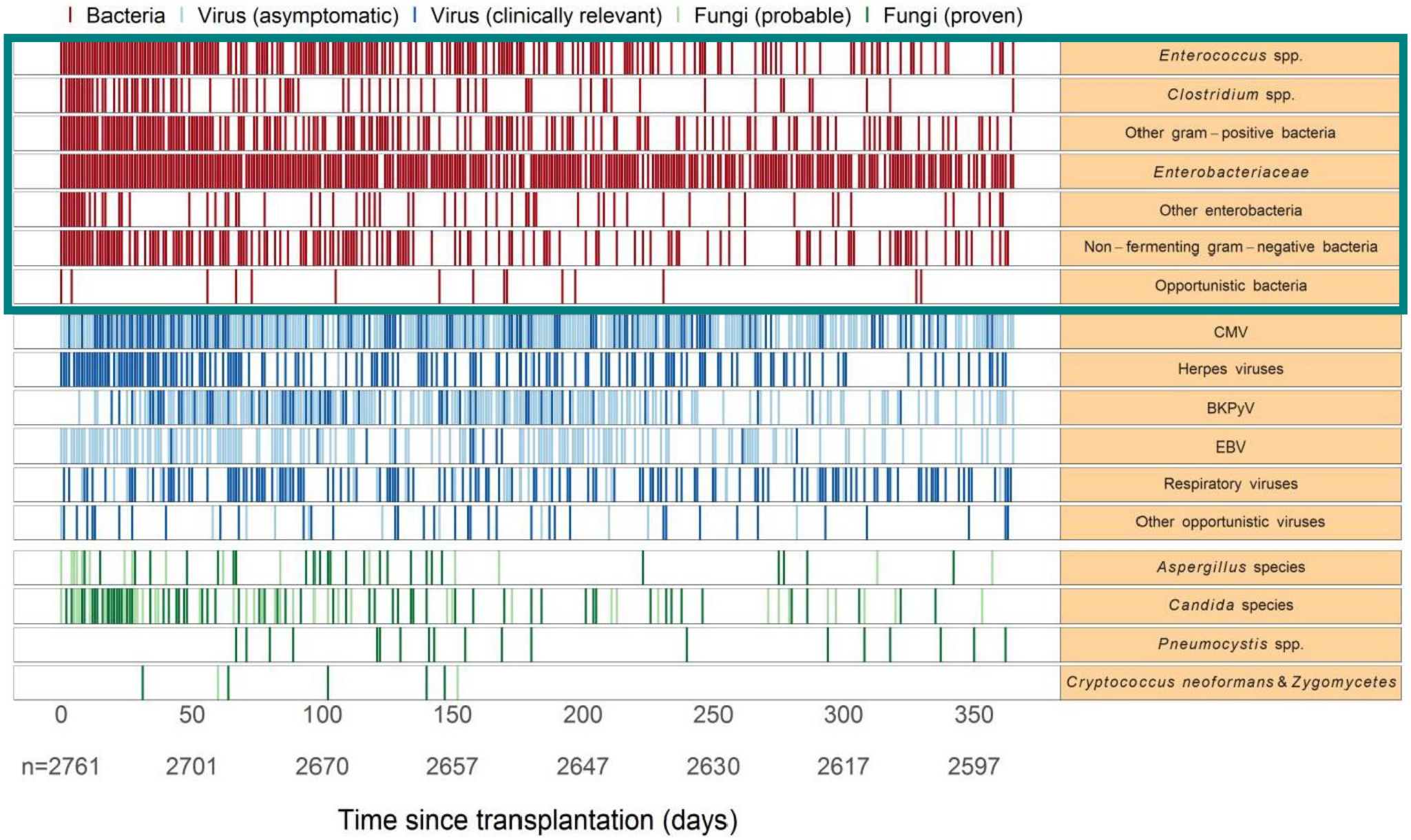
Outline

- Burden of disease
- Risk factors
- Particularities of the management in SOT recipients
- Prevention



SWISS TRANSPLANT COHORT STUDY

Van Delden C et al. Clin Infect Dis 2020

Open Forum Infectious Diseases

MAJOR ARTICLE

Bacteremia During the First Year After Solid Organ Transplantation: An Epidemiological Update

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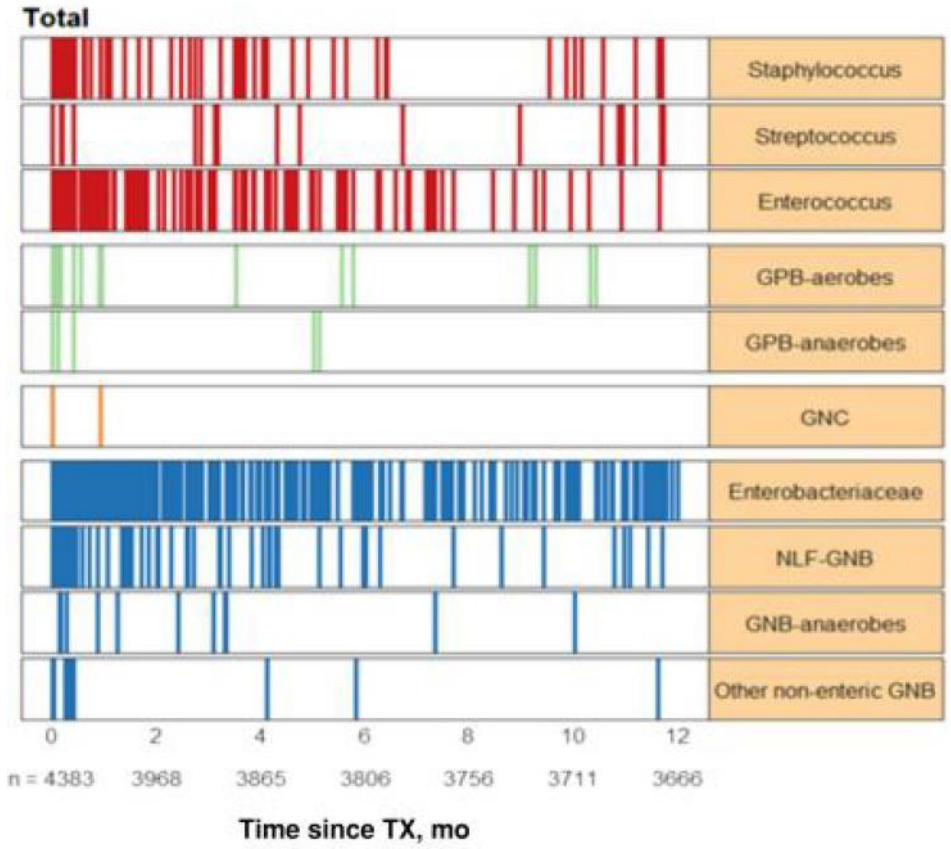
Gram-positive cocci

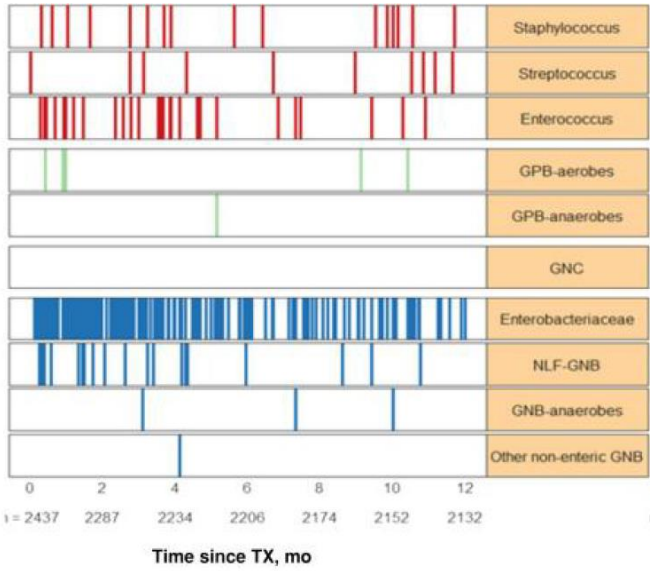
Gram-positive bacilli

Gram-negative cocci

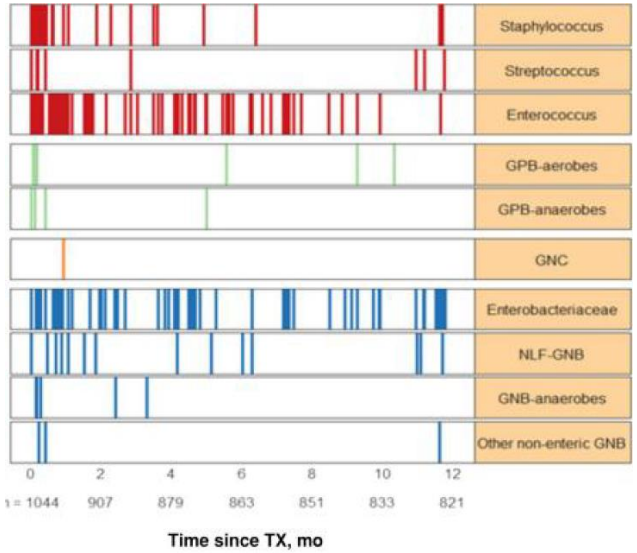
Gram-negative bacilli



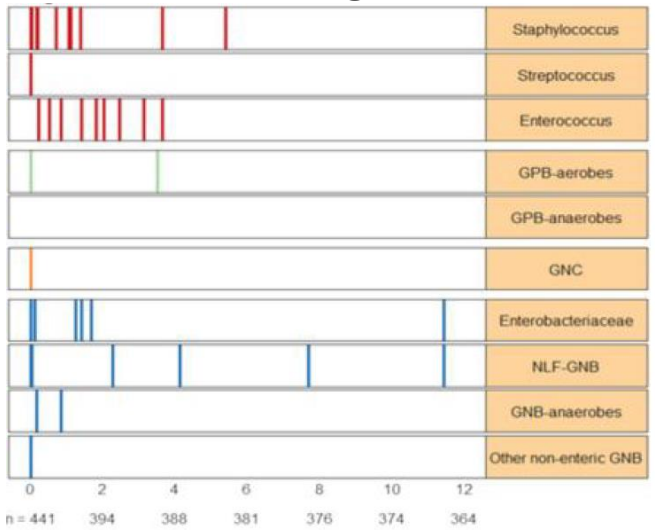
Kidney



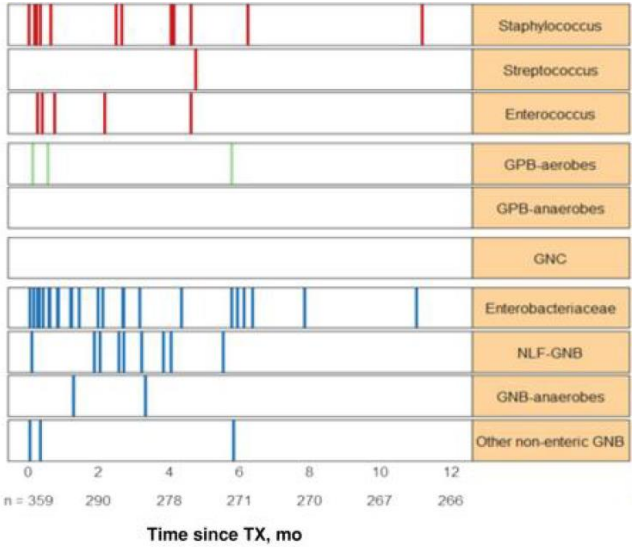
Liver



Lung



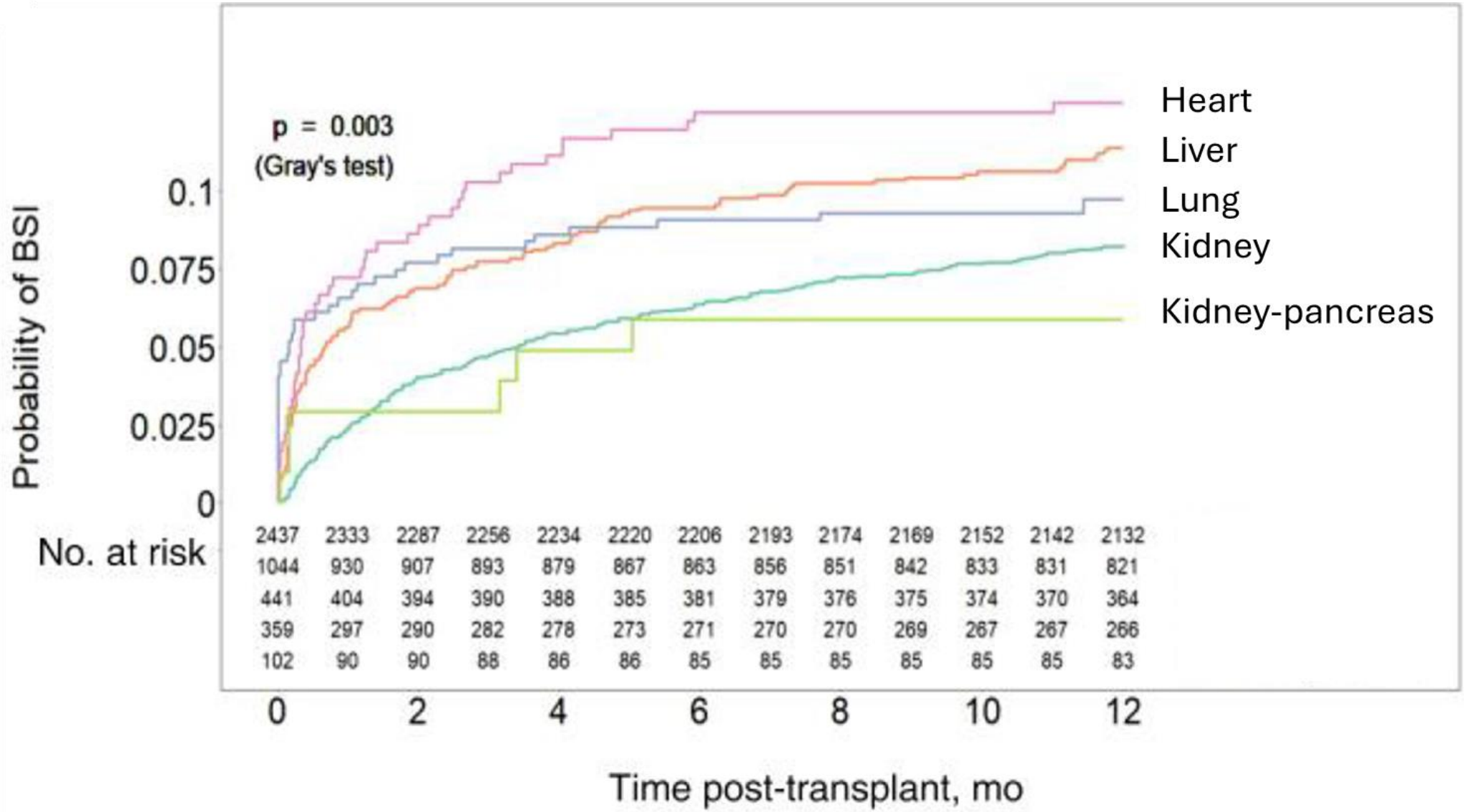
Heart



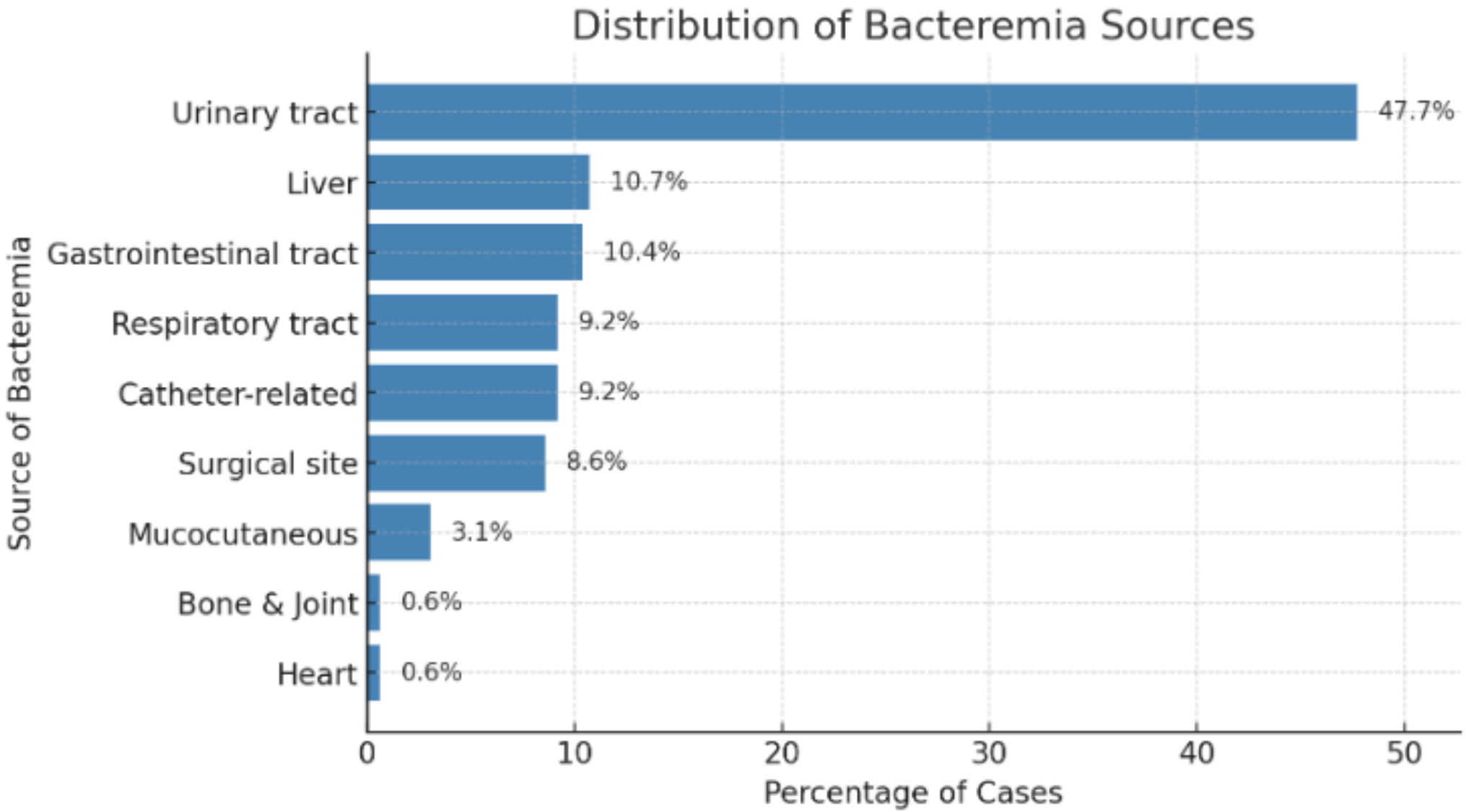
SWISS TRANSPLANT COHORT STUDY

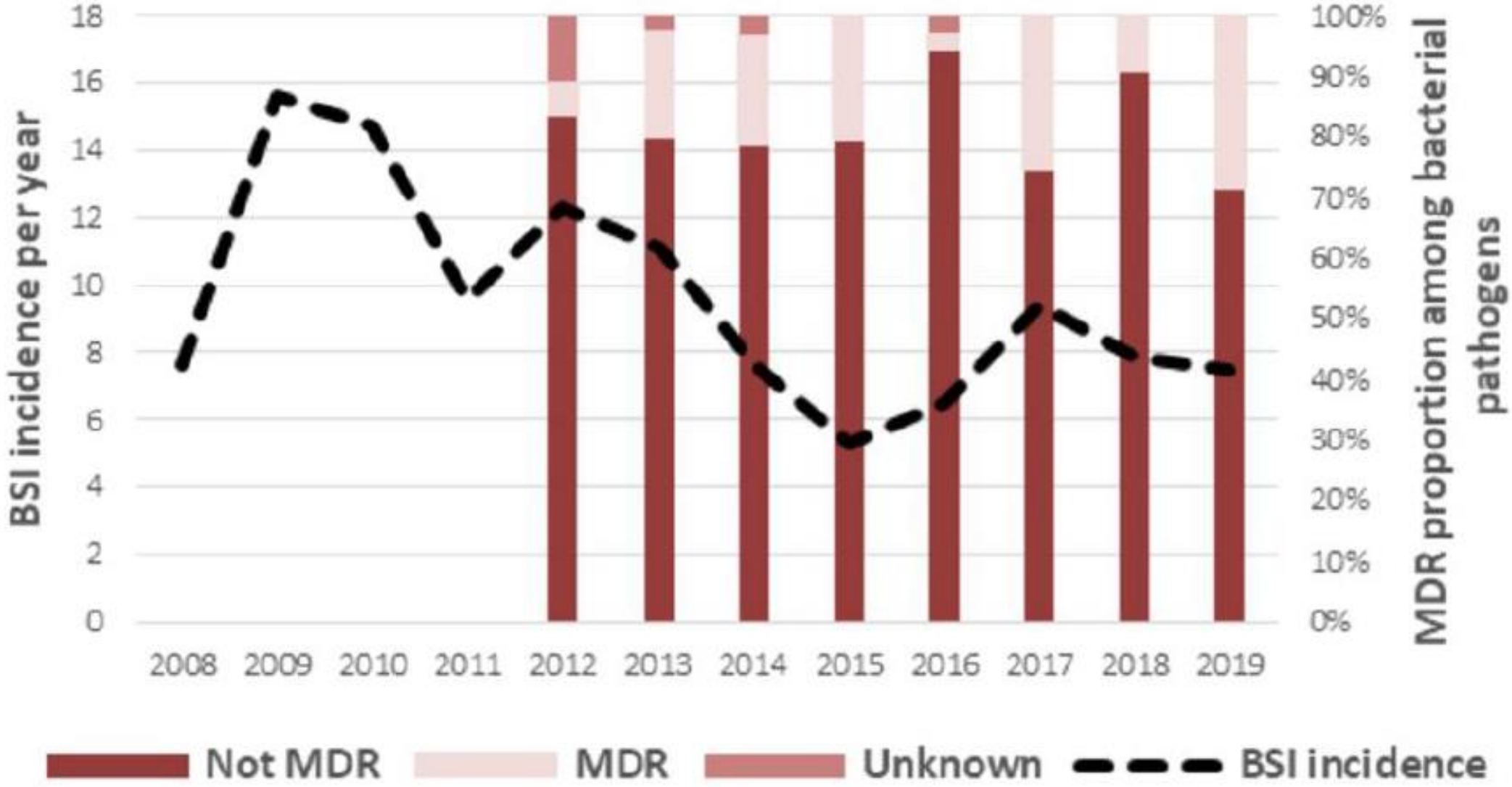
STCS

Neofytos D et al. Open F Infect Dis 2023



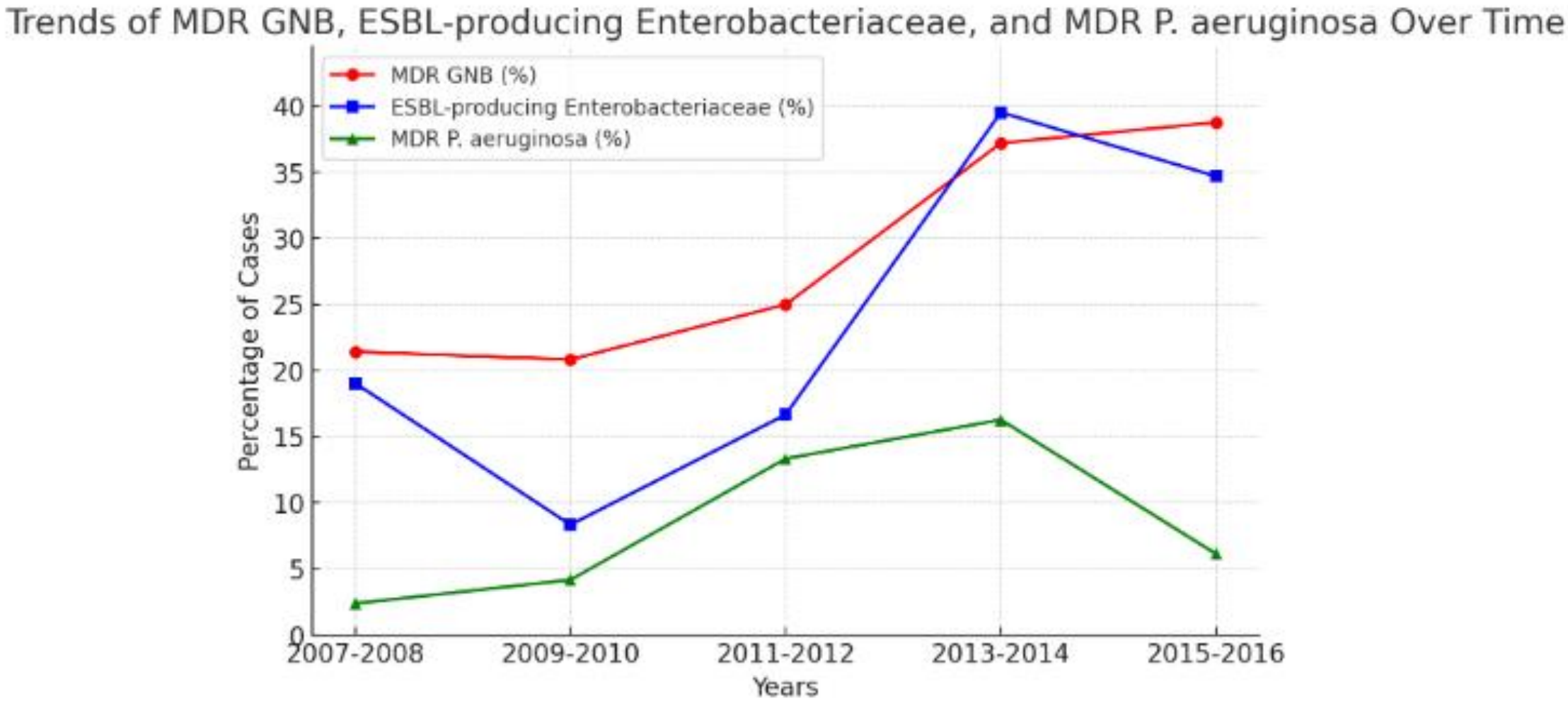
Neofytos D et al. Open F Infect Dis 2023


Distribution of Bacteremia Sources
Source of Bacteremia
Urinary tract
Liver
Gastrointestinal tract
Respiratory tract
Catheter-related
Surgical site
Mucocutaneous
Bone & Joint
Heart
47.7%
10.7%
10.4%
9.2%
9.2%
8.6%
3.1%
0.6%
0.6%
0
10
20
30
40
50
Percentage of Cases

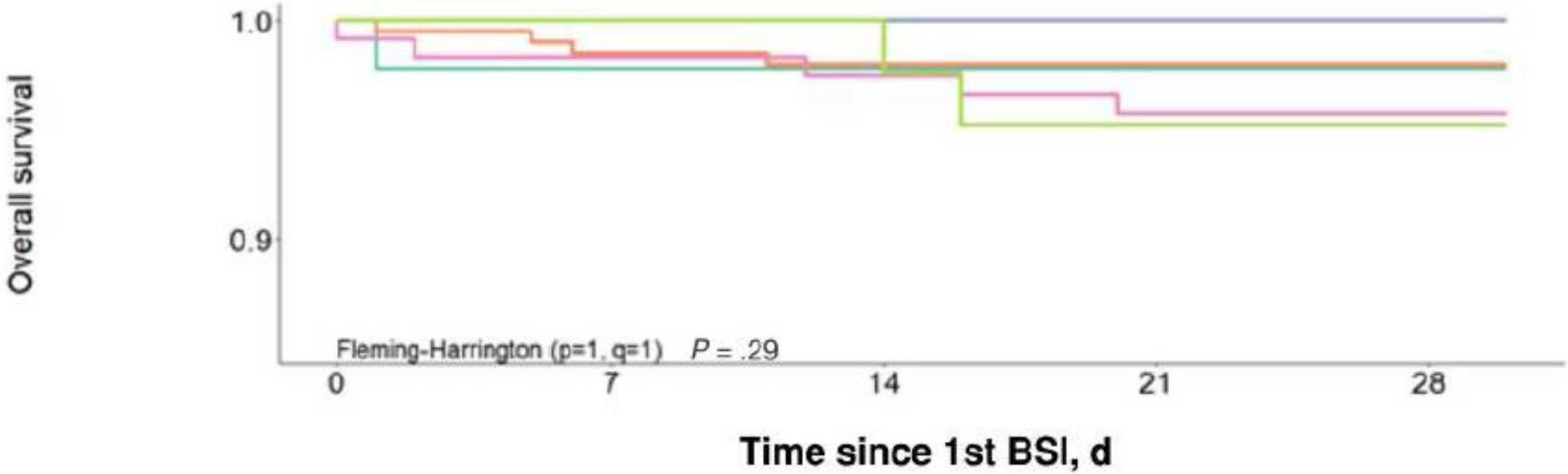


Neofytos D et al. Open F Infect Dis 2023

Adelman et al. JAC 2024



Oriol I et al. Transplant Int 2017



Patients at risk

Heart	46	44	43	43	43
Kidney	201	196	195	195	195
Kidney - Pancreas	6	5	5	5	5
Liver	119	114	112	108	108
Lung	43	42	42	39	39

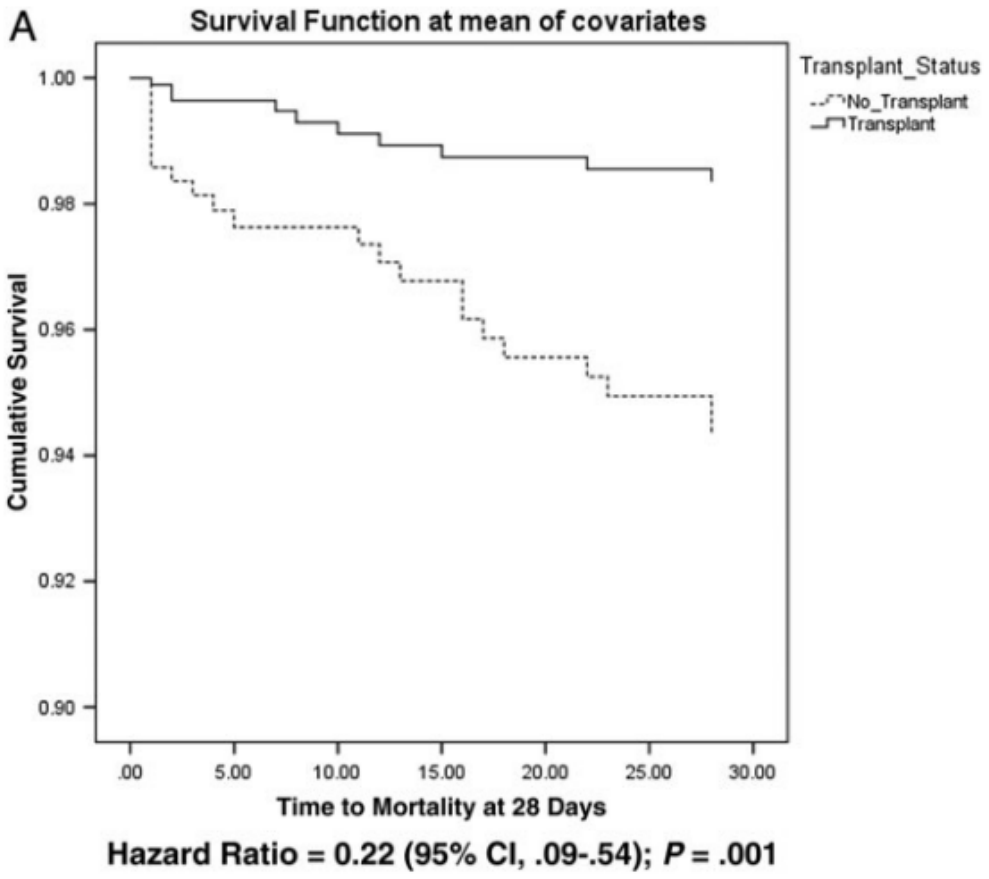
Cumulative number of deaths

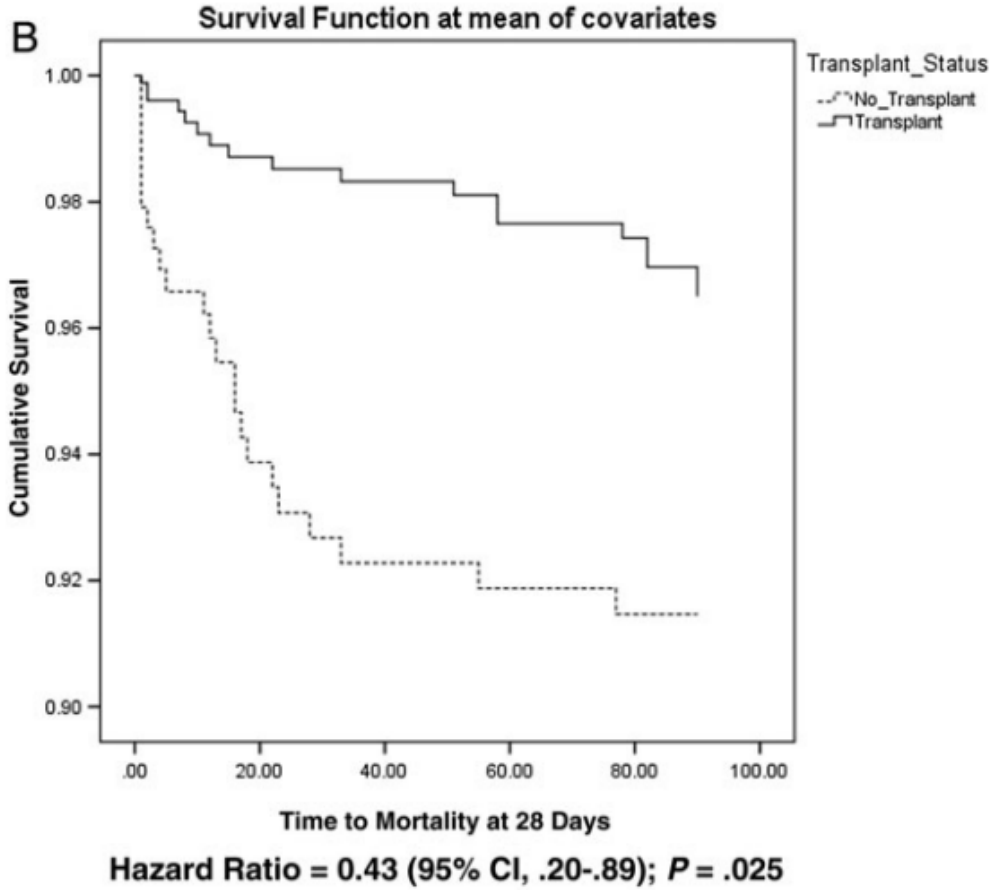
Heart	0	1	1	1	1
Kidney	0	3	4	4	4
Kidney - Pancreas	0	0	0	0	0
Liver	1	2	3	5	5
Lung	0	0	1	2	2

3% mortality

Neofytos D et al. Open F Infect Dis 2023

Is Bacteremic Sepsis Associated With Higher Mortality in Transplant Recipients Than in Nontransplant Patients?





Kalil AC et al. Clin Infect Dis 2015

Epidemiological messages

- Bacteremia is relatively common after organ transplantation, but incidence is decreasing over time
- Gram-negative predomine over Gram positive (except in liver transplant recipients)
- UTI as more common source of bacteremia
- MDR similar than in the general population
- Low mortality rates (3% at 30 days): immunomodulatory effect of immunosuppression vs. improved management

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Risk Factors for Bloodstream Infections

	HR	95% CI	P-value
Recipient age, 10 y	1.16	1.05–1.29	0.003
Diabetes mellitus, yes vs no	1.42	1.12–1.8	0.004
Transplant year, 2014–2019 vs 2009–2013	0.66	0.54–0.82	<0.001
CMV serology status, D-/R- vs R+	0.62	0.46–0.86	0.003
Surgical complications, yes vs no	3.09	2.21–4.33	<0.001
Rejection, yes vs no	2.37	1.76–3.19	<0.001
Invasive fungal infection, yes vs no	3.14	1.57–6.27	0.001
Administration of TMP/SMX as prophylaxis, yes vs no	0.5	0.38–0.65	<0.001

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Is any particularity on the management of bloodstream infection in SOT recipients?

no.

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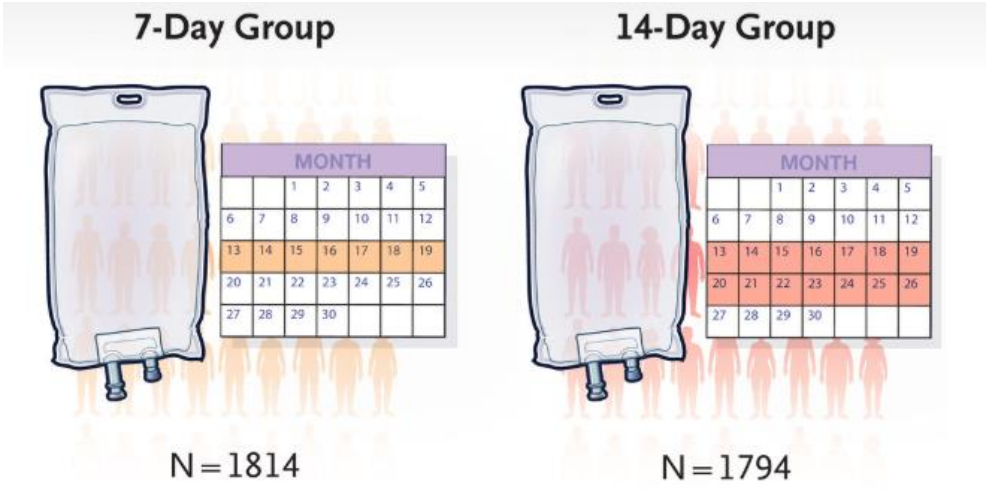
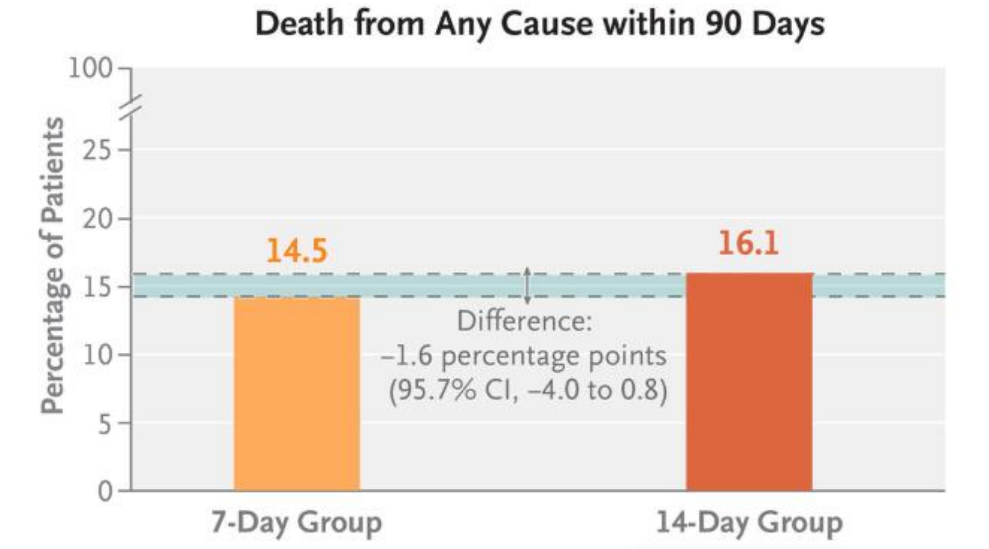
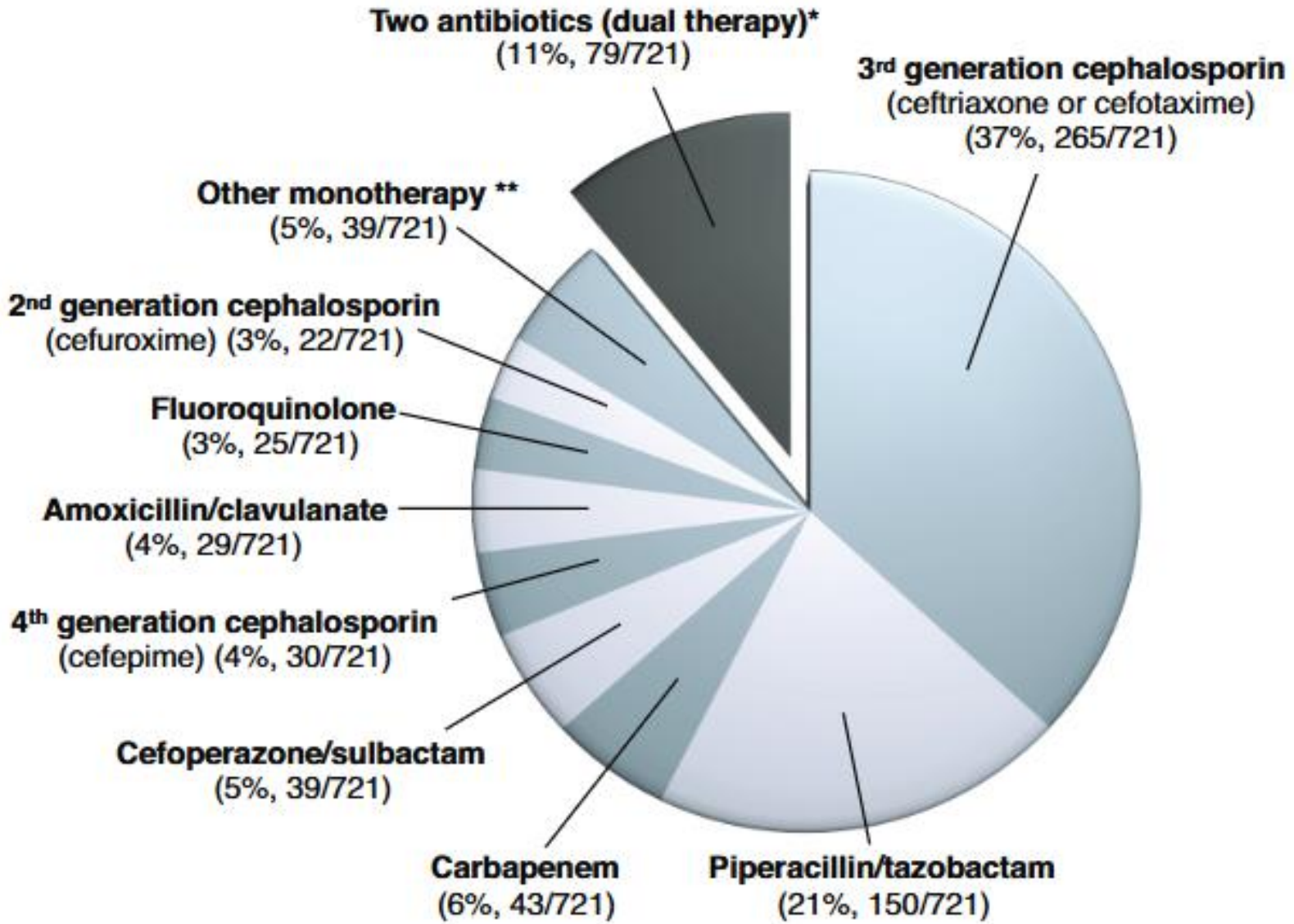
- Drug-drug interaction:
  - Rifampin in prosthetic-valve endocarditis
- Drug toxicity:
  - Nephrotoxicity: vancomycin, aminoglycosides
  - Hematological toxicity: cotrimoxazole
- Empirical antibiotic therapy
  - Broad spectrum if sepsis or risk factors for MDR (post surgery, lung transplantation)
  - But otherwise similar than in the general population
- Duration of antibiotic therapy





Characteristic	Overall (N=3608)	7-Day Group (N=1814)	14-Day Group (N=1794)
Glucocorticoid use or immunosuppression‡	440 (12.2)	230 (12.7)	210 (11.7)

The BALANCE Investigators. N Engl J Med 2025



Coussement J et al. Transpl Infect Dis 2024

Would any of the following scenarios make you select a regimen that has a broader spectrum than the standard regimen you selected in the previous question (see Figure 1)? (n = 698)

Septic shock or sepsis	85% (*n* = 592)
Imaging done at admission showed urinary tract obstruction	29% (*n* = 199)
Imaging done at admission showed an abscess of the kidney graft	57% (*n* = 395)
Recent transplant (last 3–6 months)	30% (*n* = 207)
Healthcare-associated infection*	57% (*n* = 394)
Recent antibiotic treatment (last 3–6 months)	57% (*n* = 397)
Current use of trimethoprim/sulfamethoxazole prophylaxis	14% (*n* = 97)
Current use of another antibiotic to prevent urinary tract infections**	36% (*n* = 252)
Recent urine culture with growth of ESBL-producing organism (last 3–6 months)	85% (*n* = 596)
Recent urine culture with growth of carbapenemase-producing organism (last 3–6 months)	90% (*n* = 628)

n: number of answers received.

*Defined as urinary catheter, hospital stay, and/or hemodialysis in last 3–6 months.

**e.g., nitrofurantoin, fosfomycin, or cephalexin. ESBL: extended-spectrum ß-lactamase.

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A detailed description of the activities carried out using the ASP.

Criteria used to select treatment courses needing revision[a]

- Any antimicrobial agent administered by the IV route for >5 days
- Any antimicrobial agent administered by the oral route for >10 days
- Fluoroquinolone antibiotics administered by the IV route, regardless of the length of treatment
- Any carbapenem-, piperacillin/tazobactam-, cefepime-, aminoglycoside-, or glycopeptide-containing regimen, regardless of the length of treatment
- Any combination regimen with > 2 antimicrobial agents concurrently prescribed

Recommendations issued[b]

- Switch from IV to oral route whenever possible (eg, agents with high oral bioavailability, such as levofloxacin, clindamycin, or metronidazole)
- De-escalate from a broad-spectrum to a narrower-spectrum agent guided by microbiological results and antimicrobial susceptibility testing
- Discontinue antimicrobial therapy in the absence of clinical and/or microbiological evidence of infection
- Avoid prolonged courses of therapy, whenever possible, by favoring compliance with clinical practice guidelines
- Use of a once-daily dosing regimen for aminoglycosides
- Avoid the use of antipseudomonal antibiotics when the involvement of *Pseudomonas aeruginosa* is deemed unlikely (eg, community-acquired infection with no previous antibiotic pressure)
- Restrict the use of glycopeptides to infections produced by bacteria resistant to other antibiotics or in the case of documented β-lactams allergy
- Restrict the use of piperacillin/tazobactam, cefepime, and carbapenems for hospital-acquired infections
- Discontinue inappropriate antimicrobial prophylaxis regimens

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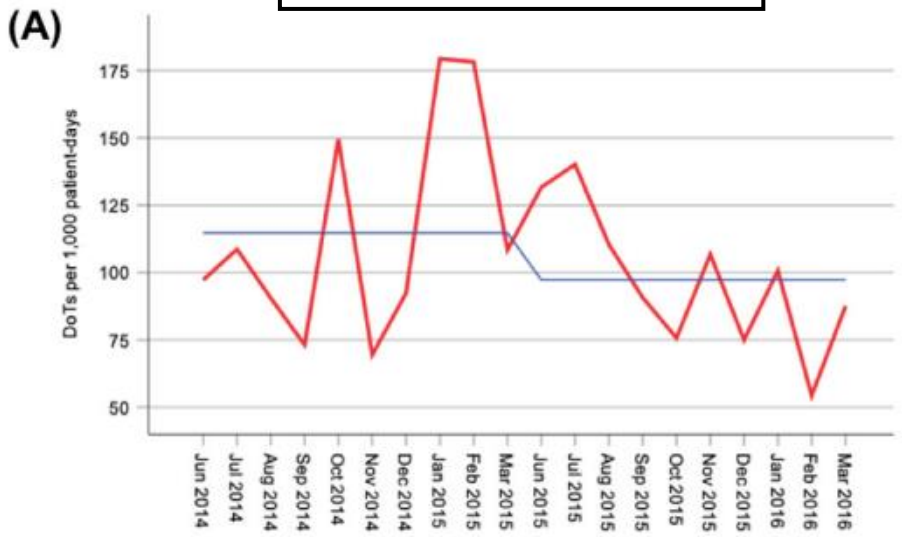
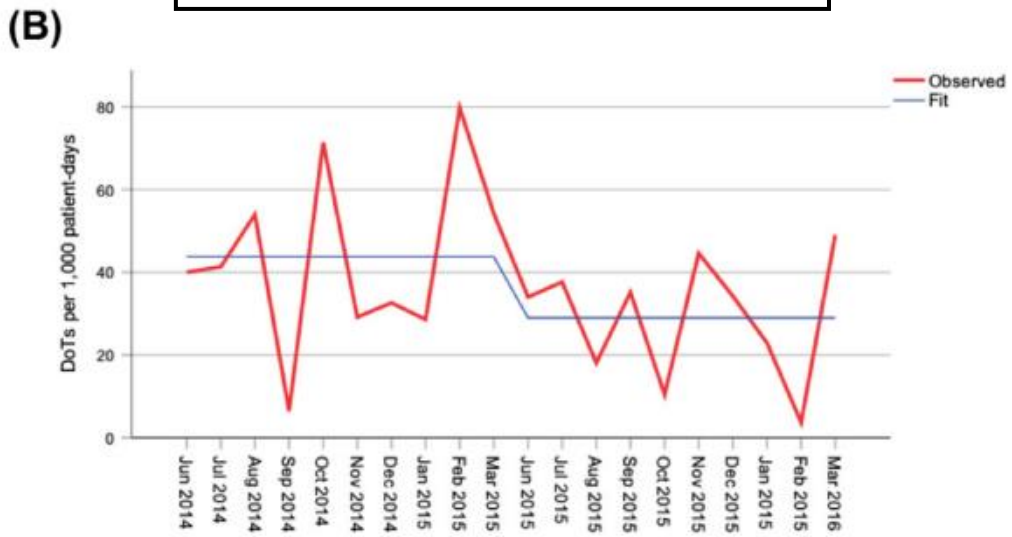
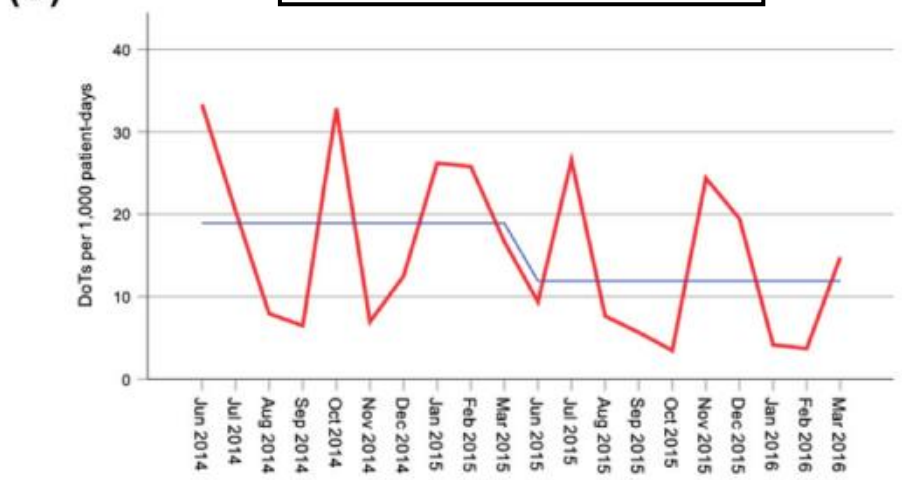
All antibiotics



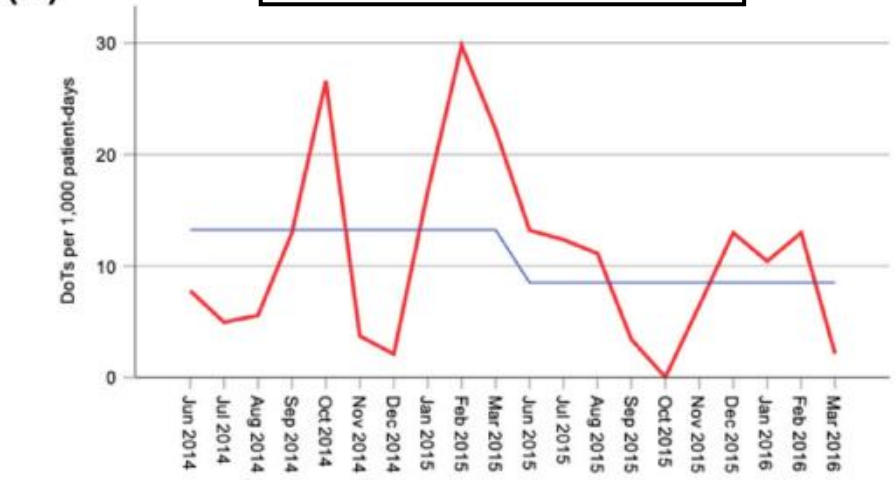
Broad-spectrum antibiotics



Meropenem



Vancomycin



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Conclusions

- Bloodstream infection in SOT recipients is relatively common but associated with low mortality – in countries with low MDR rates
- Most common source is UTI – potential strategies for antibiotic stewardship
- Risk factors include surgical complications post transplant, age, and CMV infection
- Use of SMX-TMP is protective