

X CURSO LEMC/ALERTA

PANORAMA DA RESISTÊNCIA BACTERIANA



PANORAMA GERAL DE RESISTÊNCIA NO BRASIL EM COCOS GRAM POSITIVOS

ALESSANDRO C. O. SILVEIRA

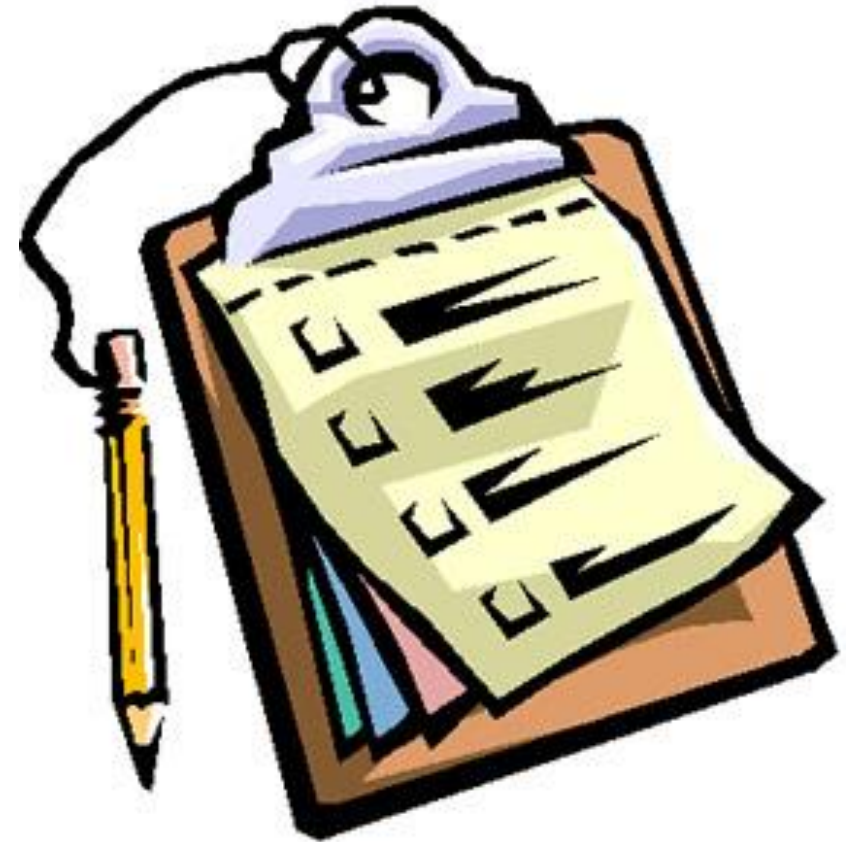


CONFLITO DE INTERESSE

NADA A DECLARAR

SUMÁRIO

- Introdução
- Etiologia
- *Staphylococcus aureus*
 - Oxacilina
 - Vancomicina
 - MLS_B
- Coagulase negativos
- Enterococos
- Estreptococos
 - *S. pneumoniae*
 - *S. agalactiae*
 - *S. pyogenes*
- Conclusões



CRITÉRIOS

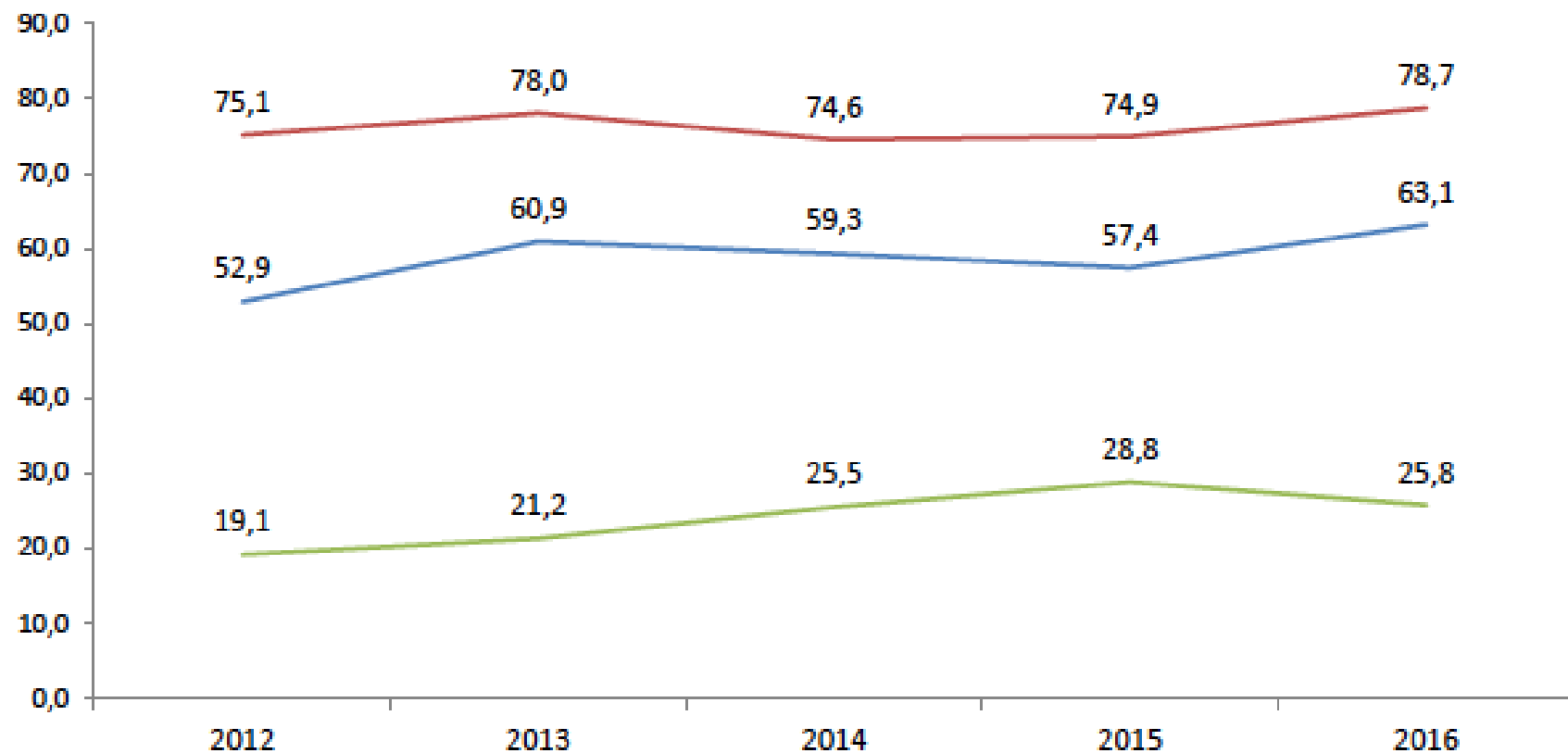
- **Etiologia: dados oficiais, nacionais e estaduais**
- **Artigos (21) publicados nos últimos 5 anos, em revistas indexadas**
- **Estudos brasileiros, de várias regiões**
- **Epidemiologia molecular e/ou perfis de resistência**
- **Levantamento de dados**
- **Sem análise crítica**

INTRODUÇÃO

- **Cocos Gram positivos são importantes agentes de infecções, principalmente de corrente sanguínea, pele e tecidos moles, trato respiratório, urinárias e do SNC**
- **Microrganismos conhecidos muito mais pelos seus fatores de virulência do que propriamente pela resistência**
- **Os principais mecanismos de resistência são devido à mudança de sítio de ligação aos antibióticos**
- **Causam infecções com altas taxas de morbidade e mortalidade, constituindo um grave problema de saúde pública**

Boletim Segurança do Paciente e Qualidade em Serviços de Saúde nº 16: Avaliação dos indicadores nacionais das Infecções Relacionadas à Assistência à Saúde (IRAS) e Resistência microbiana do ano de 2016

39 %



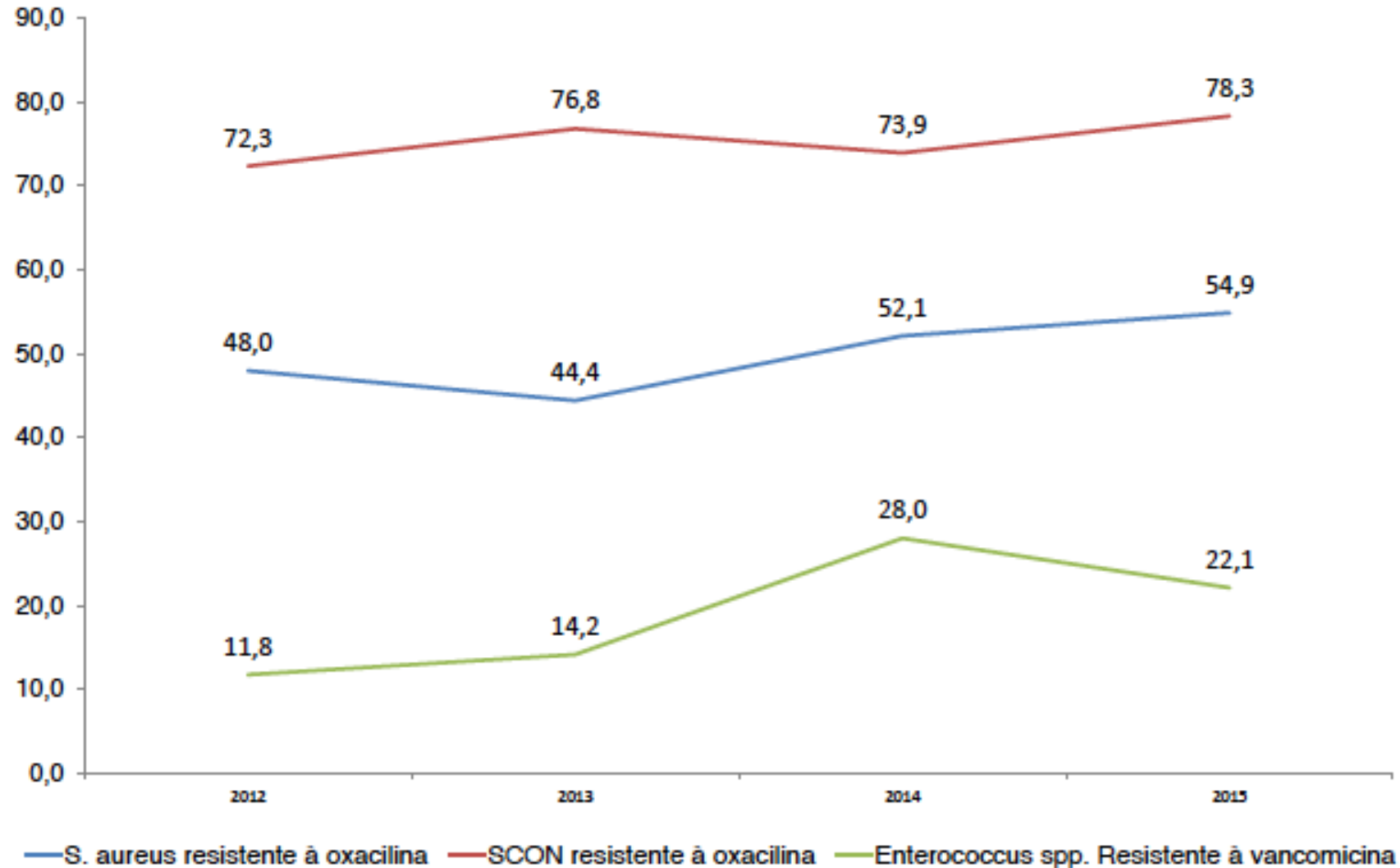
— S. aureus resistente à oxacilina

— SCON resistente à oxacilina

— Enterococcus spp. resistente à vancomicina

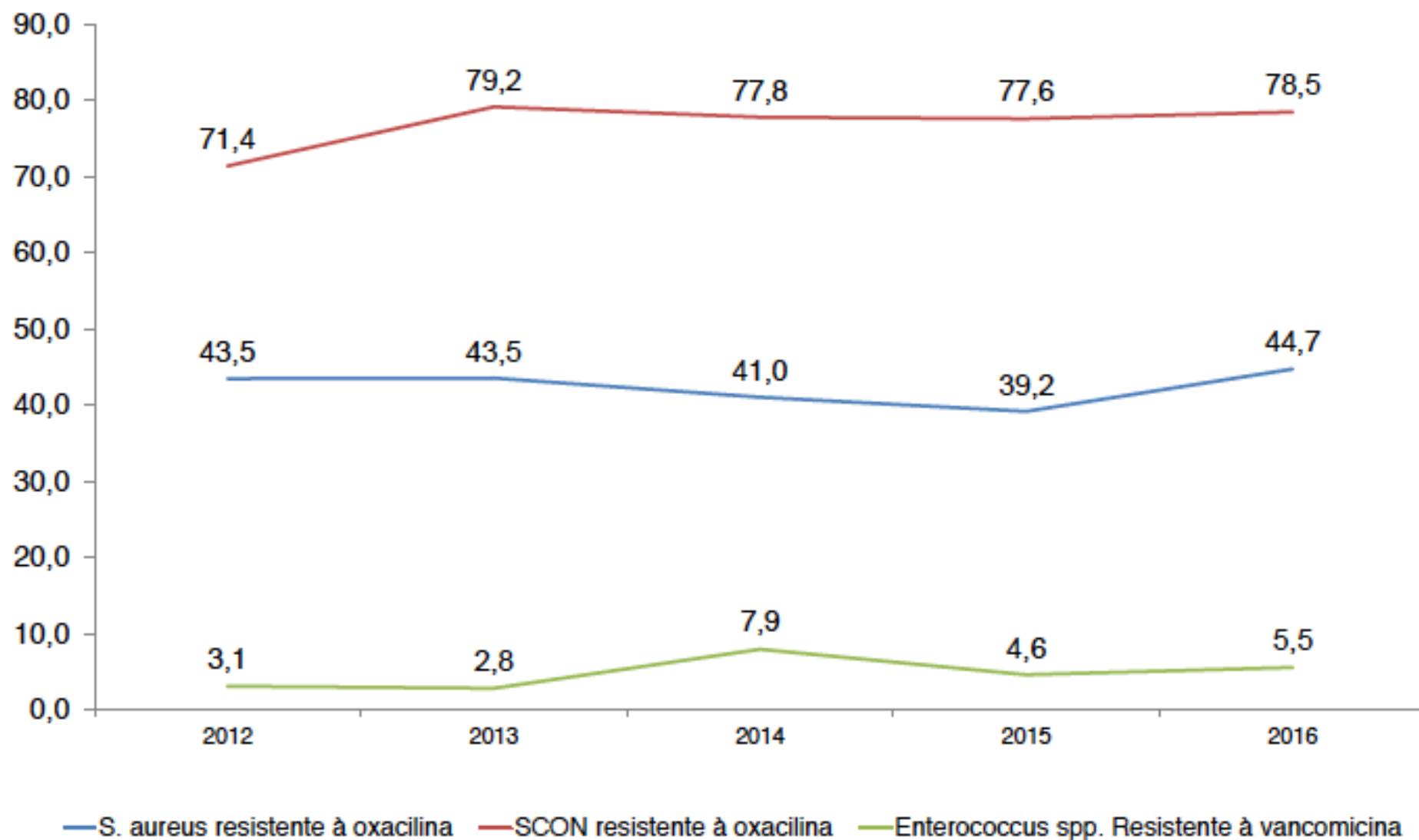
Análise dos dados da UTI pediatria

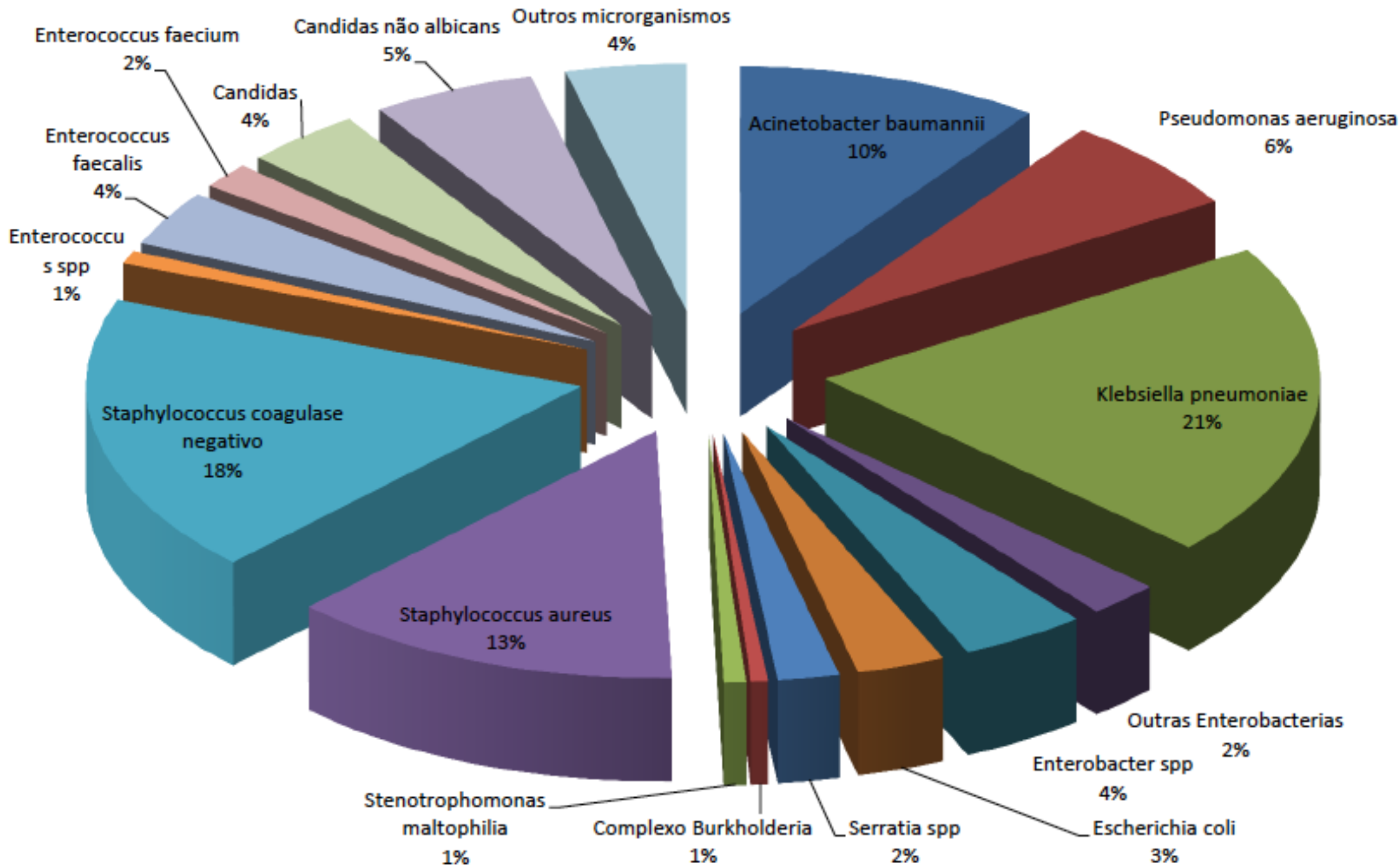
35,9 %



Análise dos dados da UTI neonatal

51,5 %

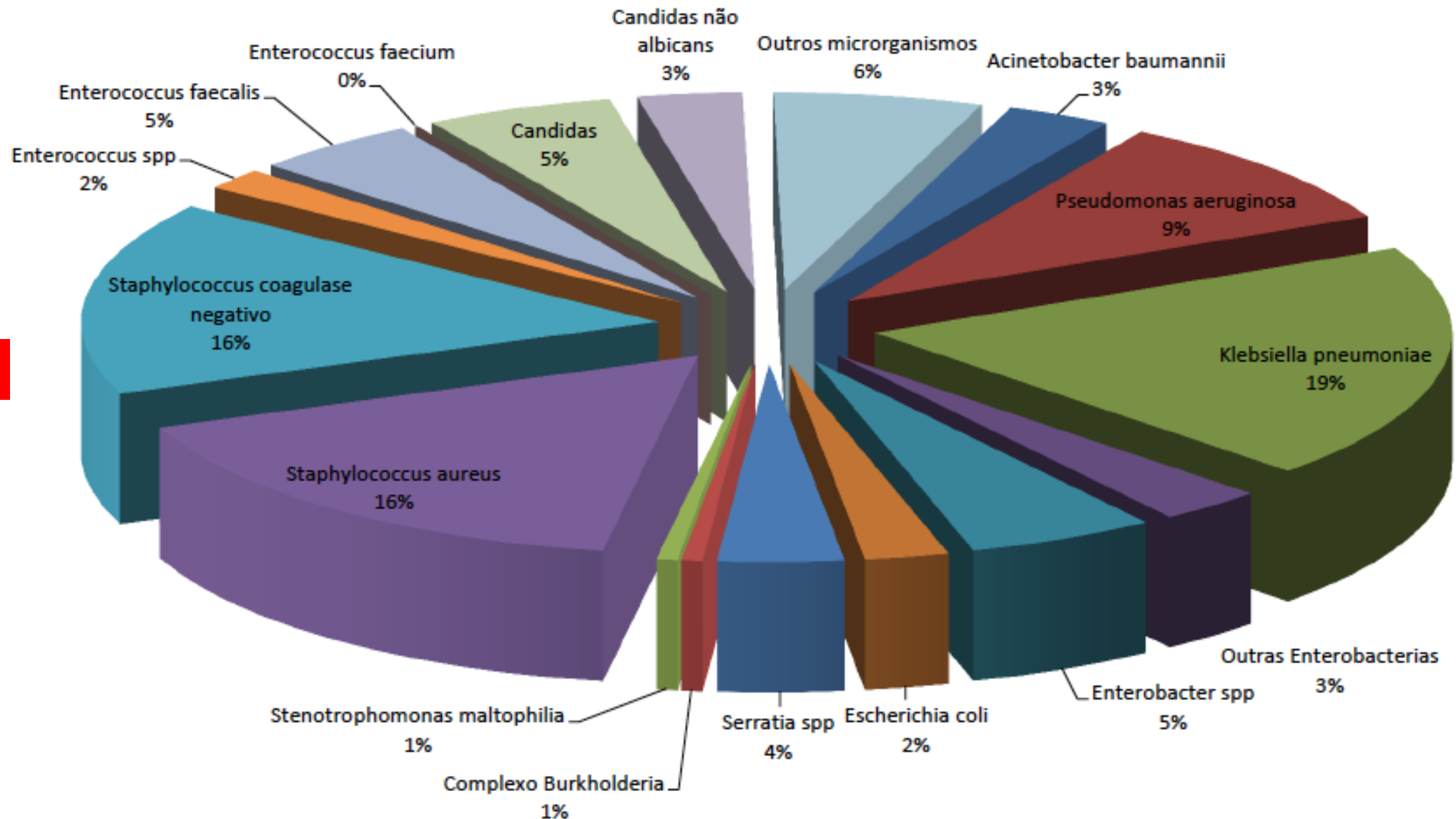




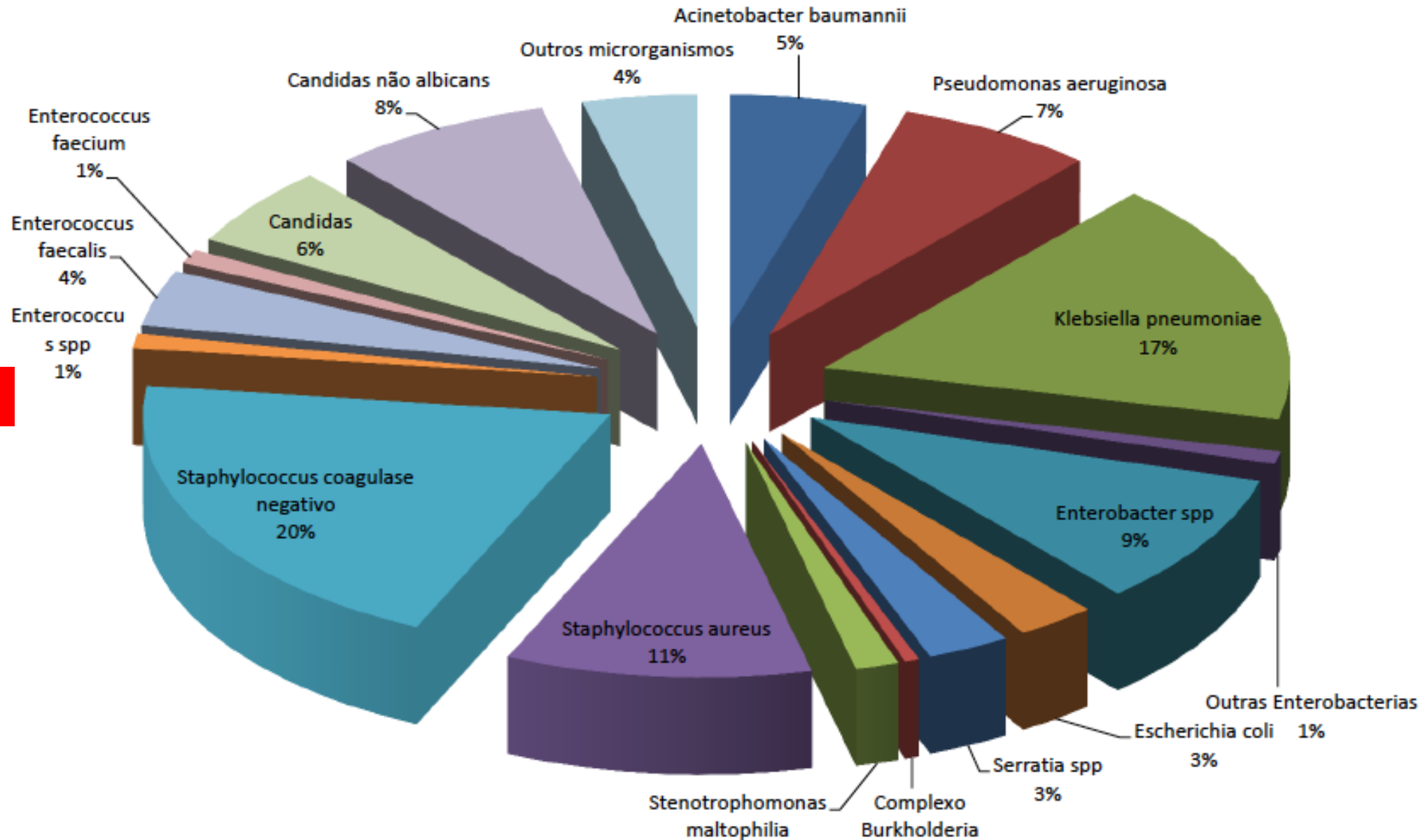
38 %

Microrganismos isolados em hemocultura UCO - 2018

39 %

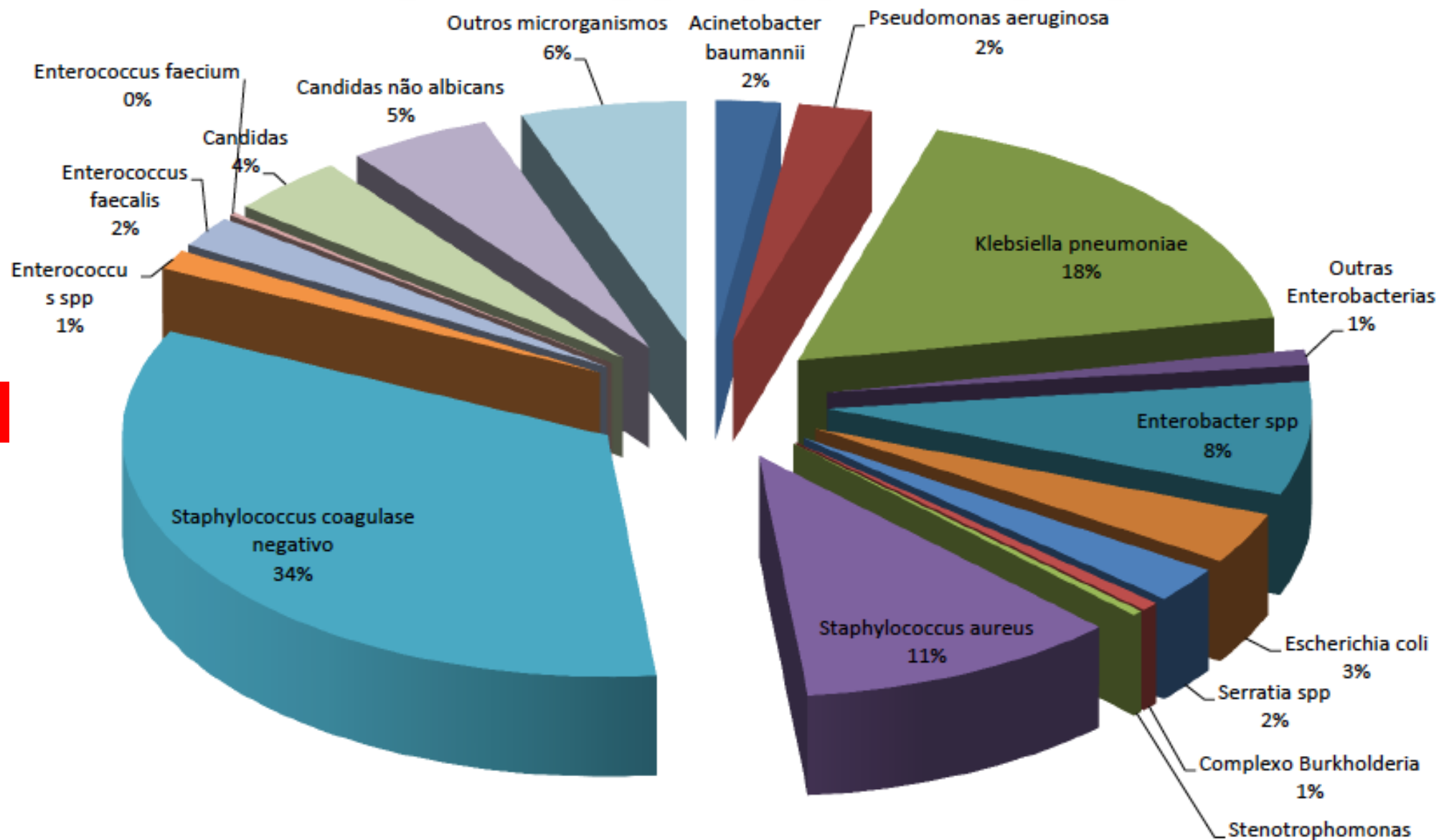


Microrganismos isolados em hemocultura UTI PED - 2018



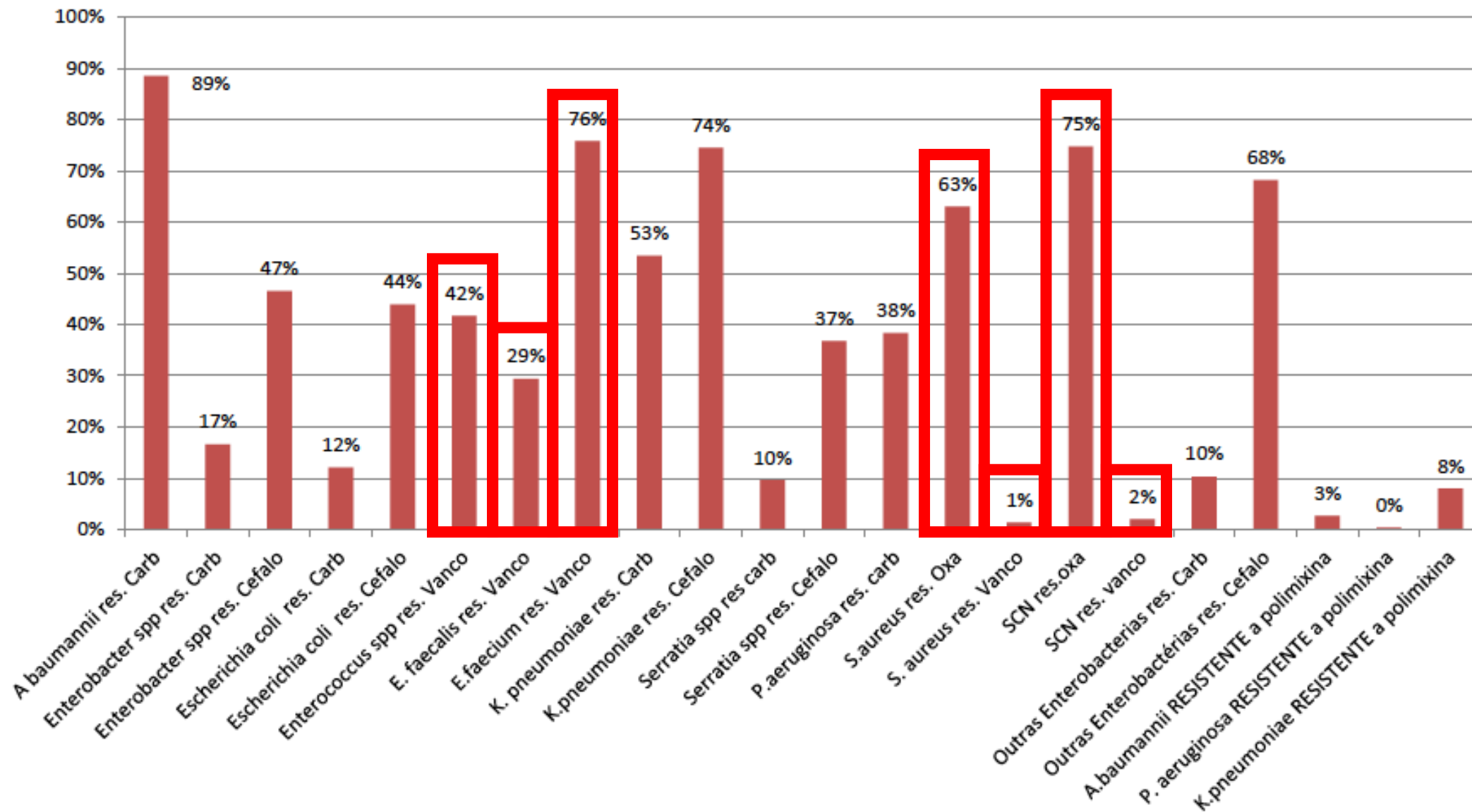
Microrganismos isolados em hemocultura

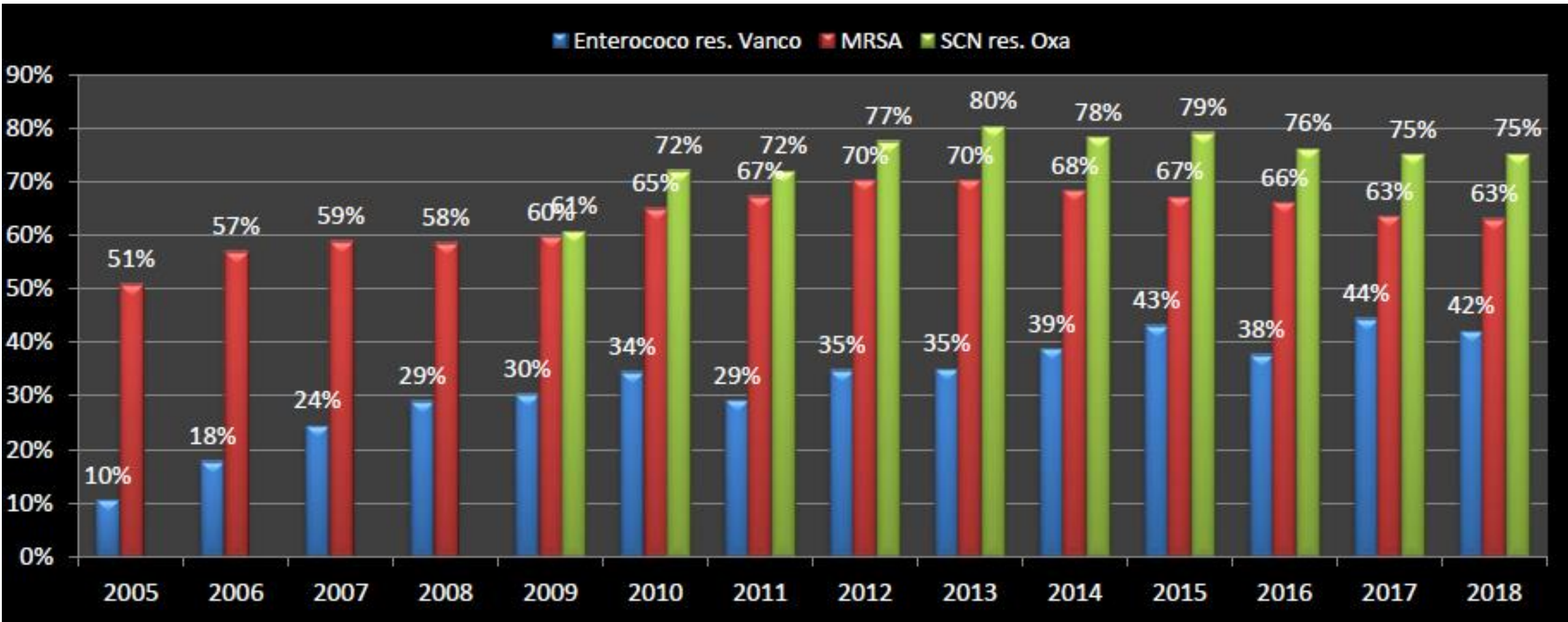
UTI Neonatal - 2018



48 %

Resistência Microbiana em IPCS - UTI Adulto - 2018







Boletim Informativo

**Avaliação dos Indicadores Estaduais das Infecções Relacionadas à
Assistência à Saúde, Resistência Microbiana e Consumo de
Antimicrobianos no Paraná, notificados no
Sistema Online de Notificação de Infecções Hospitalares (SONIH) de
janeiro a junho de 2018.**

Tabela 29 - Microorganismos causadores de IRAS reportados por subgrupos, no período de janeiro a junho de 2018:

Microorganismos reportados em IRAS por subgrupos	Números	%
Gram-Negativos Fermentadores	3.141	49%
Gram-Negativos Não-Fermentadores	1.420	22%
Gram-Positivos	1.655	26%
Fungos	141	2%
Total Geral	6.357	100%

Tabela 38- Distribuição do subgrupo de Gram-Positivos como causadores de IRAS, no período de janeiro a junho de 2018:

Gram-Positivos	Número	%
<i>Staphylococcus aureus</i>	948	57,27
<i>Staphylococcus coagulase negativo</i>	453	24,96
<i>Enterococcus faecalis</i>	162	11,4
<i>Enterococcus faecium</i>	92	6,37
Total Geral	1.655	100%

Microorganismo/Resistência	Ocorrência	%
<i>S. aureus R ou I Vancomicina</i>	24	2,53
<i>S. aureus R Oxacilina (MRSA)</i>	433	45,68
<i>S. aureus S Oxacilina (MSSA)</i>	491	51,79

Casos de R ou I à Vancomicina necessitam de confirmação junto ao hospital e laboratório de apoio.

Microorganismo/Resistência	Ocorrência	%
<i>Staphylococcus coagulase negativa R ou I Vancomicina</i>	15	3,31
<i>Staphylococcus coagulase negativa R Oxacilina</i>	268	59,16
<i>Staphylococcus coagulase negativa S Oxacilina</i>	170	37,53
Total	453	100%

Microorganismo/Resistência	Ocorrência	%
<i>E. faecalis R Vancomicina (VRE)</i>	7	4,32
<i>E. faecalis S Vancomicina</i>	155	95,68
Total	162	100%

Microorganismo/Resistência	Ocorrência	%
<i>E. faecium R Vancomicina (VRE)</i>	22	23,91
<i>E. faecium S Vancomicina</i>	70	76,09
Total	92	100%

ESTAFILOCOCOS

- **Principais mecanismos de resistência**
 - **Mudança de PBP (MRSA)**
 - **Espessamento de parede (hVISA/ VISA)**
 - **Aquisição de gene *vanA* (VRSA)**
 - **Metilação ribossomal (MLS_B)**



The Brazilian Journal of
INFECTIOUS DISEASES

www.elsevier.com/locate/bjid



Brief communication

Complete substitution of the Brazilian endemic clone by other methicillin-resistant *Staphylococcus aureus* lineages in two public hospitals in Rio de Janeiro, Brazil



Raiane Cardoso Chamon^{a,1}, Sthefanie da Silva Ribeiro^{a,1}, Thaina Miranda da Costa^a,
Simone Aranha Nouér^b, Katia Regina Netto dos Santos^{a,*}

Table 2 – General characteristics of 45 methicillin-resistant *Staphylococcus aureus* isolates from bloodstream infections.

Hospital/genotype (no of isolates)	Isolate number	Isolation date (mm/dd/yy)	Unit or floor	Acquisition mode	SCCmec type	PFGE subtype	Clonality	ST/CC	Antimicrobial resistance profile
<i>Hospital 1 (32)</i>									
A (22)	1223a	01/10/2008	11	HA	II	A1	USA100	5/5	cip cli ery mup tec
	1224a	01/12/2008	ICU	HA	II	A1	USA100	5/5	cip cli ery mup
	1255a	09/02/2008	ICU	HA	II	A1	USA100	5/5	cip cli ery mup
	1258a	09/16/2008	ICU	HA	II	A1	USA100	5/5	cip cli ery mup
	1265a	09/23/2008	9	HA	II	A1	USA100	5/5	cip cli ery mup
	1266a	09/24/2008	9	HA	II	A1	USA100	5/5	cip cli ery mup
	1276a	02/12/2008	9	HA	II	A1	USA100	5/5	cip cli ery mup
	1288a	03/12/2009	ICU	HA	II	A1	USA100	5/5	cip cli ery mup
	1289a	03/13/2009	11	HA	II	A1	USA100	5/5	cip cli ery mup
	1309a	03/14/2009	ND	HA	II	A1	USA100	5/5	cip cli ery mup clo rif
	1290a	03/19/2009	11	HA	II	A1	USA100	5/5	cip cli clo ery
	1291a	03/31/2009	9	HA	II	A1	USA100	5/5	cip cli ery mup
	1305a	06/04/2009	11	HA	II	A1	USA100	5/5	cip cli ery mup clo rif
	1308a	06/15/2009	10	HA	II	A1	USA100	5/5	cip cli ery mup clo rif
	<i>Hospital 2 (13)</i>								
A (1)	1087a	01/20/2008	11	HA	II	A1	USA100	5/5	cip cli ery mup
B (3)	1094a	01/16/2008	9	CA	IV	B1	USA400	1/1	cip cli ery
	1187a	06/12/2008	8	HA	IV	B1	USA400	1/1	cip cli clo ery
	1100a	01/27/2008	Em	CA	IV	B2	USA400	1/1	cip cli ery
C (5)	1214a	06/26/2009	7	HA	IV	C1	USA800	5/5	-
	1318a	08/16/2008	Em	HA	IV	C2	USA800	5/5	cip
	1324a	08/08/2008	Em	HA	IV	C3	USA800	5/5	cip
	1328a	12/23/2008	Em	HA	IV	C4	USA800	5/5	cip cli ery
	1326a	12/25/2008	9	HA	IV	C4	USA800	5/5	-
D (1)	1314a	11/08/2008	7	HA	IV	D	ND	484/30	cip cli ery
E (1)	1092a	02/22/2008	9	HA	III	E	ND	889/5	cip clo ery gen sut tec
G (1)	1212a	06/02/2009	ICU	HA	II	G	ND	3050/45	cip cli ery
H (1)	1219a	06/06/2009	8	HA	II	H	ND	221/221	cip cli ery
	1302a	05/21/2009	ICU	HA	IV	B5	USA400	1/1	cip clo
	1306a	06/04/2009	10	HA	II	F	ND	105/5	cip cli clo ery



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Brief communication

Methicillin-resistant *Staphylococcus aureus* isolated from an intensive care unit in Minas Gerais, Brazil, over a six-year period



Thiago C. Nascimento^a, Cláudio G. Diniz^a, Vânia L. Silva^a,
Alessandra B. Ferreira-Machado^b, Marina O. Fajardo^a, Tamara Lopes R. de Oliveira^c,
Dennis de C. Ferreira^{d,e}, Fernanda S. Cavalcante^f, Kátia R. Netto dos Santos^{c,*}

21	04/02/07	04	54	Blood	Hodgkin lymphoma	II	USA100/5	A C E G L R
22	06/25/07	03	61	CT	Hemothorax	III	BEC/8	A H C E G L R S T
23	07/08/07	04	42	SS	Pancreatitis	III	BEC/8	A H C E G L R S T
24	09/10/07	06	35	TS	Aids	III	BEC/8	A H C E G L R S T
25	09/18/07	03	74	TS	Extrapontine myelinolysis	III	BEC/8	A H C E G L R S T
26	12/04/07	04	73	Blood	Bladder cancer	III	BEC/8	A H C E G L R S T
27	12/24/07	01	51	PL	Cirrhosis	III	BEC/8	A H C E G L R S T
28	12/31/07	01	73	Blood	Malnutrition	III	BEC/8	A C E G L R S T
29	01/14/08	02	23	CT	Diabetes mellitus	IV	USA800/5	C E G L T
30	01/30/08	03	65	TS	Chronic kidney disease	III	BEC/8	A H C E L R S T
31	02/03/08	02	84	TS	Respiratory failure	IV	USA400/1	A H C E G L
32	02/07/08	06	59	CT	Cirrhosis	III	BEC/8	A H C E G L R S T
33	03/16/08	03	81	CT	Acute kidney injury	NT	ND	A C E L S
34	08/16/08	06	61	Blood	Myocardial infarction	NT	ND	A C E G L R
35	10/13/08	01	65	SS	Appendicitis	I	USA500/5	A C E G L
36	07/18/09	03	42	TS	Renal transplantation	NT	ND	A H C E L R
37	08/03/09	05	19	TS	Pneumonia	II	USA100/5	A H C E L R
38	08/09/09	01	78	TS	Breast cancer	II	USA100/5	A H C E G L R
39	08/17/09	06	79	TS	COPD	II	USA100/5	A H C E G L R
40	12/14/09	01	83	TS	Cholangitis	III	BEC/8	A H C E G L R S T
41	02/06/10	02	44	TS	Acute kidney injury	II	USA100/5	A H C E G L R
42	02/21/10	04	98	TS	Aplastic anemia	III	BEC/8	A H C E G L R S
43	04/18/10	06	35	TS	Aids	III	BEC/8	A H C E G L R S T
44	08/25/10	06	59	Blood	Necrosis in amputation	II	USA100/5	A C E L
45	11/30/10	04	62	TS	Acute kidney injury	II	USA100/5	A C E L R

TABLE 1: Resistance profile of 67 *Staphylococcus aureus* strains.

Antibiotic		No. (%) of resistant strains		
		SCCmec II (n = 22)	SCCmec IV (n = 09)	MSSA (n = 36)
Erythromycin		22 (100)	08 (89)	07 (19)
Ciprofloxacin		22 (100)	04 (44)	03 (8)
Norfloxacin		22 (100)	04 (44)	03 (8)
Clindamycin		22 (100)	01 (11)	03 (8)
Rifampicin		17 (77)	0	0
Chloramphenicol		05 (23)	01 (11)	01 (3)
Gentamicin		0	01 (11)	01 (3)
Trimethoprim/Sulfamethoxazole		0	0	03 (8)
Tetracycline		0	0	10 (28)
Linezolid		0	0	0

ST	CC	Pulsotype/Clonality	No. of subtypes	SCCmec type	Virulence profile						No. of strains
					<i>cna</i>	<i>bbp</i>	<i>ebpS</i>	<i>fnbA</i>	<i>fnbB</i>	<i>lukS/F</i>	
5	5	A/USA100 (NY/J)	5	II	-	-	+	-	-	-	13
					-	-	+	+	-	-	8
					-	-	+	-	-	+	1
8	8	B/USA300	3	IV	-	-	-	+	+	+	3
					-	-	-	-	+	+	1
5	5	C*	2	IV	-	-	+	-	-	-	2
5	5	D*	1	IV	-	-	+	-	-	-	1
					-	-	+	+	-	-	1
45	45	E/USA600	1	IV	+	-	+	-	-	-	1

Table 1 – Epidemiological and antibiotic susceptibility characteristics of the 26 clones.


Clones	Isolates	Time	Source	City	Resistance	SCCmec
1	SI2, SI8	2-4/09	HOS	BLU	ER, CL, SU, CIP, NO, TE, CLO, AM, GE	II
2	SI10, SI29, L79	5/09-1/12	HOS	BLU, FLO	ER, CL, CIP, NO	II
3	L35, L77	9/10-12/11	HOS	FLO	ER, CL, CIP, NO	II
4	SI3, SI14	2/09-4/10	COM	BLU	ER, CL, CIP, NO	II
5	SI15, SI30	4/10-1/12	HOS	BLU	ER, CL, CIP, NO	II
6	SI1, SI5, SI9, L58, L86	1/09-3/12	HOS	BLU, FLO	ER, CL, CIP, NO	III
7	L40, L61, L62	10/10-4/11	HOS	FLO	ER, CL, CIP, NO	II
8	SI16, SI28, L72	5/10-11/11	HOS	BLU, FLO	CIP, NO	IVa
9	L22, L32, L46, L49, L81	7/10-1/12	HOS	FLO	ER, CL, CIP, NO	III
10	L39, L47, L48	8/10-11/10	HOS	FLO	ER, CL, CIP, NO	III
11	L55, L66, L88	6/11-5/12	HOS	FLO	ER, CL, CIP, NO	III
12	SI25, L27, L94	2/10-10/12	COM, HOS	BLU, FLO	ER, CL, CIP, NO	IVa
13	L5, L75	8/08-11/11	COM, HOS	FLO	-	IVa
14	L19, L25, L59	7/10-2/11	HOS	FLO	ER, CL, CIP, NO	IVa
15	L91, L93	7/12-10/12	HOS	FLO	ER, CL, CIP, NO	IVb
16	L20, L50	7/10-11/10	HOS	FLO	ER, CL, SU, CIP, NO, AM, GE	III
17	L24, L26, L28, L29	7/10-8/10	HOS	FLO	ER, CL, CIP, NO, AM, GE	I
18	L12, L21, L70	12/09-6/11	HOS	FLO	ER, CL, CIP, NO, CLO, AM, GE	III
19	L13, L14, L17	1/10-5/10	COM, HOS	FLO	ER, CL, SU, CIP, NO, TE, AM, GE	III
20	L3, L6	7/08-1/09	HOS	FLO	ER, CL, SU, CIP, NO, TE, CLO, AM, GE	III
21	L43, L51	10/10-11/10	HOS	FLO	ER, CL, SU, CIP, NO, AM, GE	III
22	SI19, L67	8/10-1/11	COM, HOS	BLU, FLO	ER, CL, CIP, NO	III
23	L2, L4	5/08-6/08	COM, HOS	FLO	-	IVa
24	L44, L63	10/10-7/11	HOS	FLO	ER, CL, CIP, NO, AM, GE	III
25	L54, L69, L92	5/11-8/12	HOS	FLO	ER, CL, SU, CIP, NO, TE, CLO, AM, GE	II
26	L36, L41, L42, L80	9/10-1/12	HOS	FLO	ER, CL, CIP, NO	II

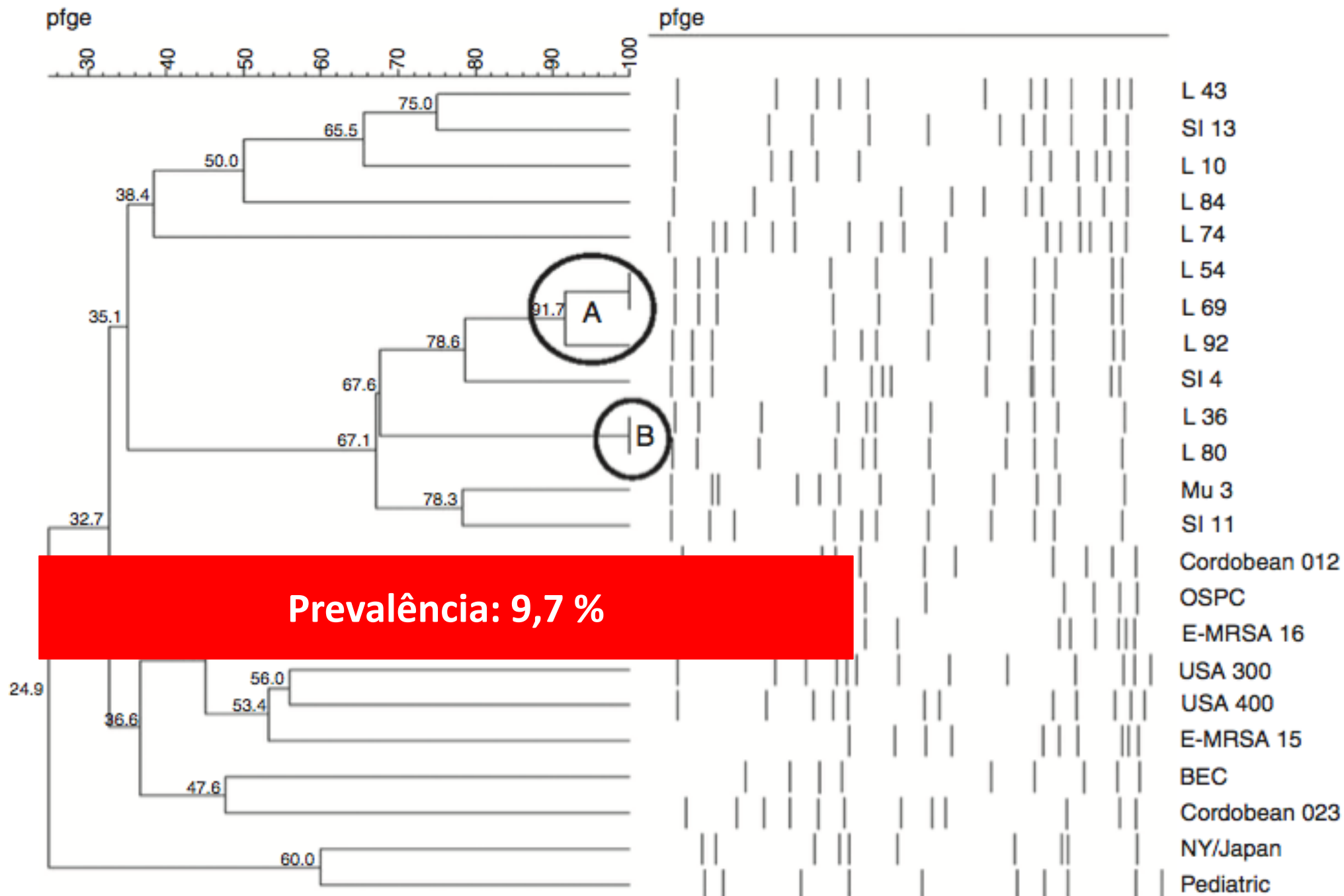
Clinical and Microbiological Characteristics of Heteroresistant and Vancomycin-Intermediate *Staphylococcus aureus* from Bloodstream Infections in a Brazilian Teaching Hospital

PLOS ONE | DOI:10.1371/journal.pone.0160506 August 30, 2016

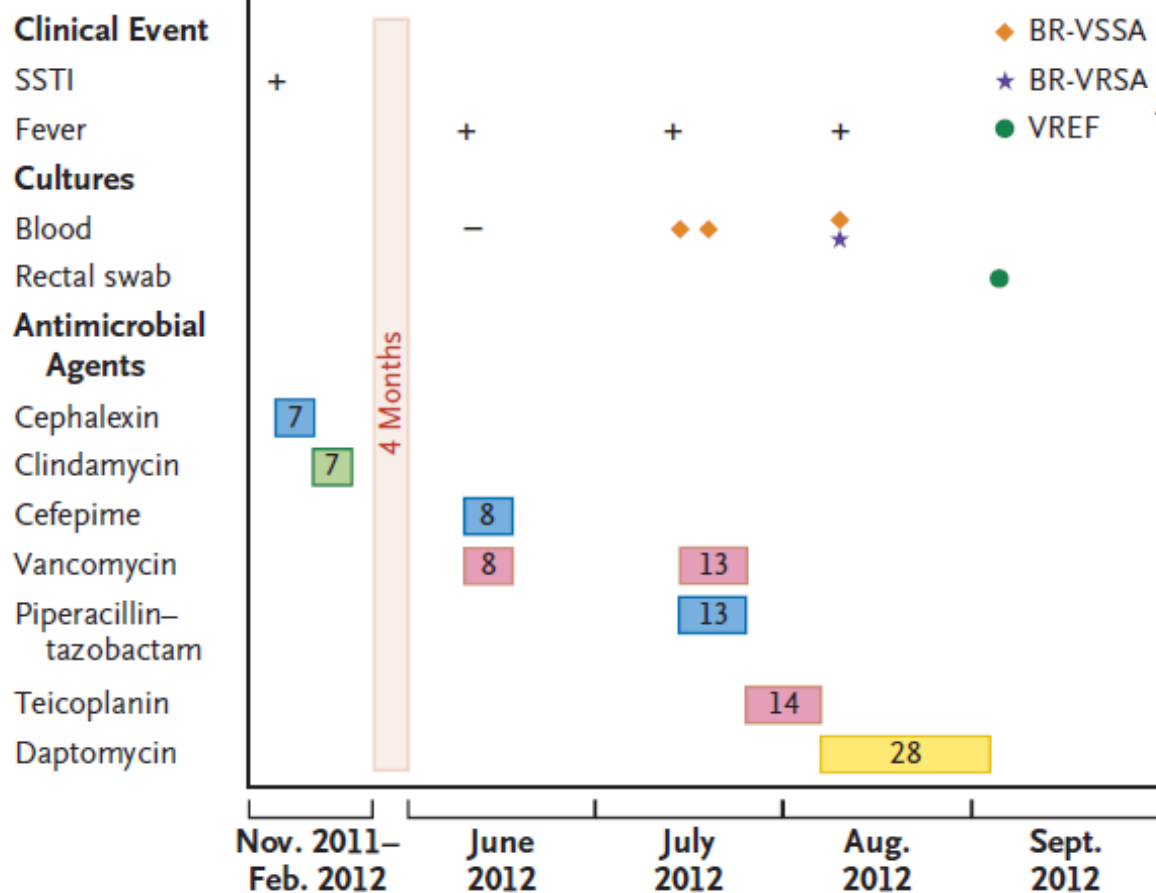
Thaina Miranda da Costa¹, Priscylla Guimarães Miguereles Morgado¹, Fernanda Sampaio Cavalcante¹, Andreia Paredes Damasco¹, Simone Aranha Nouér², Kátia Regina Netto dos Santos^{1*}

Table 4. Microbiological characteristics of six *Staphylococcus aureus* isolates presenting vancomycin MIC of 2 mg/L with at least one screening test positive to detect heterogeneous vancomycin intermediate resistance (hVISA).

Isolatenumber	Methicillin resistance/SCCmec type	Broth microdilution test MIC (mg/L) ^a			Screening plates (48h of incubation)				Etest macro ^b (µg/mL)		Etest GRD ^b (µg/mL)		PAP-AUC ratio ^c	Interpretation (Clonality)
		TEI	OXA	DAP	BHla3	BHla4	BHl4ca	BHla6	VAN	TEI	VAN	TEI		
1594	 SCCmecII	0.5	128	2	+	+	+	-	3	16	1	3	1.15	hVISA (USA100/ST5/CC5)
1636	SCCmecIV	0.25	8	1	+	-	-	-	4	4	1	1.5	0.50	False positive
1588	MSSA	0.25	0.5	1	-	-	-	-	4	12	1	3	ND	NA
1595	MSSA	0.5	0.5	2	-	-	-	-	3	16	0.5	3	ND	NA
1622	MSSA	0.25	0.25	1	+	-	-	-	2	2	0.75	1.5	ND	NA
1691	MSSA	0.25	≤0.2	1	+	-	-	-	6	4	0.75	3	ND	NA



VRSA



A PFGE and Dendrogram of *S. aureus* Strains

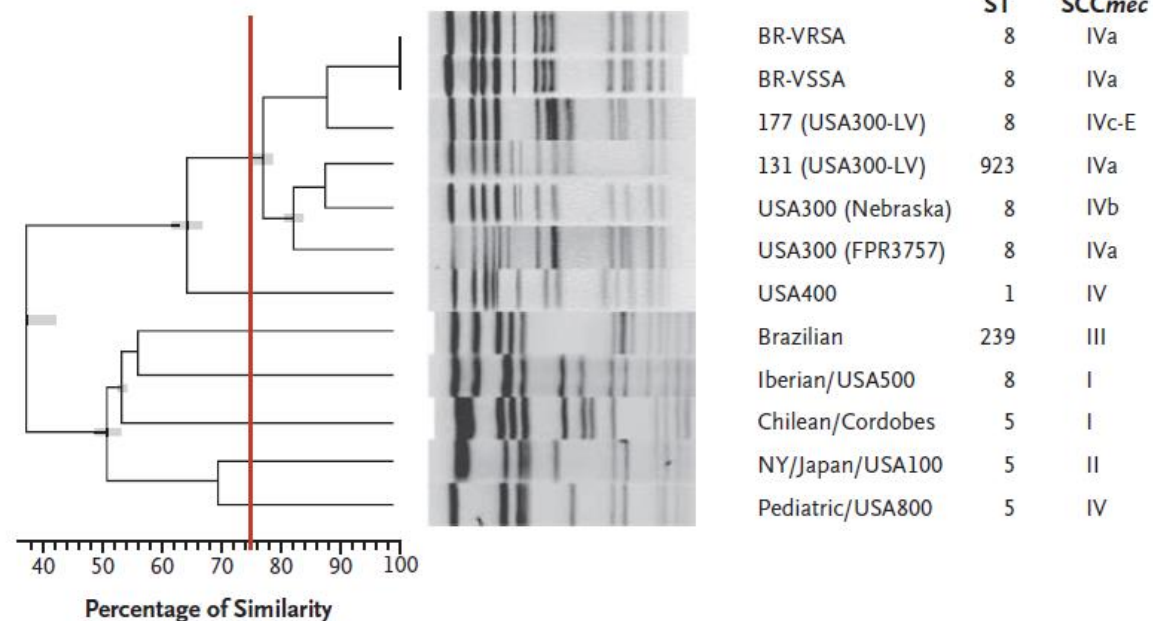


Figure 1. The Patient's Clinical Course before and after Isolation of the Vancomycin-Resistant *Staphylococcus aureus*.

MLS_B

Table 1 – Susceptibility profile to erythromycin and clindamycin of susceptible and methicillin-resistant *S. aureus* and CNS.

Phenotypes	MSSA n (%)	MRSA n (%)	MSCNS n (%)	MRCNS n (%)	Total n (%)
ERY-S, CLI-S (susceptible)	25 (67.6)	5 (22.7)	4 (28.6)	7 (23.3)	41 (39.8)
ERY-S, CLI-I	1 (2.7)	0 (0)	1 (7.1)	0 (0)	2 (1.9)
ERY-S, CLI-R	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
ERY-I, CLI-S	1 (2.7)	0 (0)	2 (14.3)	0 (0)	3 (2.9)
ERY-I, CLI-I	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
ERY-I, CLI-R	0 (0)	0 (0)	0 (0)	1 (3.3)	1 (1)
ERY-R, CLI-R (cMLS _B)	4 (10.8)	15 (68.2)	3 (21.4)	17 (56.7)	39 (37.9)
ERY-R, CLI-S/I, + D Test (iMLS _B)	4 (10.8)	1 (4.5)	0 (0)	0 (0)	5 (4.9)
ERY-R, CLI-S/I, – Test D (MS _B)	2 (5.4)	1 (4.5)	4 (28.6)	5 (16.7)	12 (11.6)
Total	37 (35.9)	22 (21.4)	14 (13.6)	30 (29.1)	103 (100)

Table 2 – Distribution of *ermA* and *ermC* genes among *Staphylococcus* spp. isolates with MLS_B resistance.

Genes	Isolates (%)
<i>ermA</i>	4 (9.1)
<i>ermC</i>	17 (38.6)
<i>ermA</i> + <i>ermC</i>	1 (2.3)
None	22 (50.0)
Total	44 (100.0)

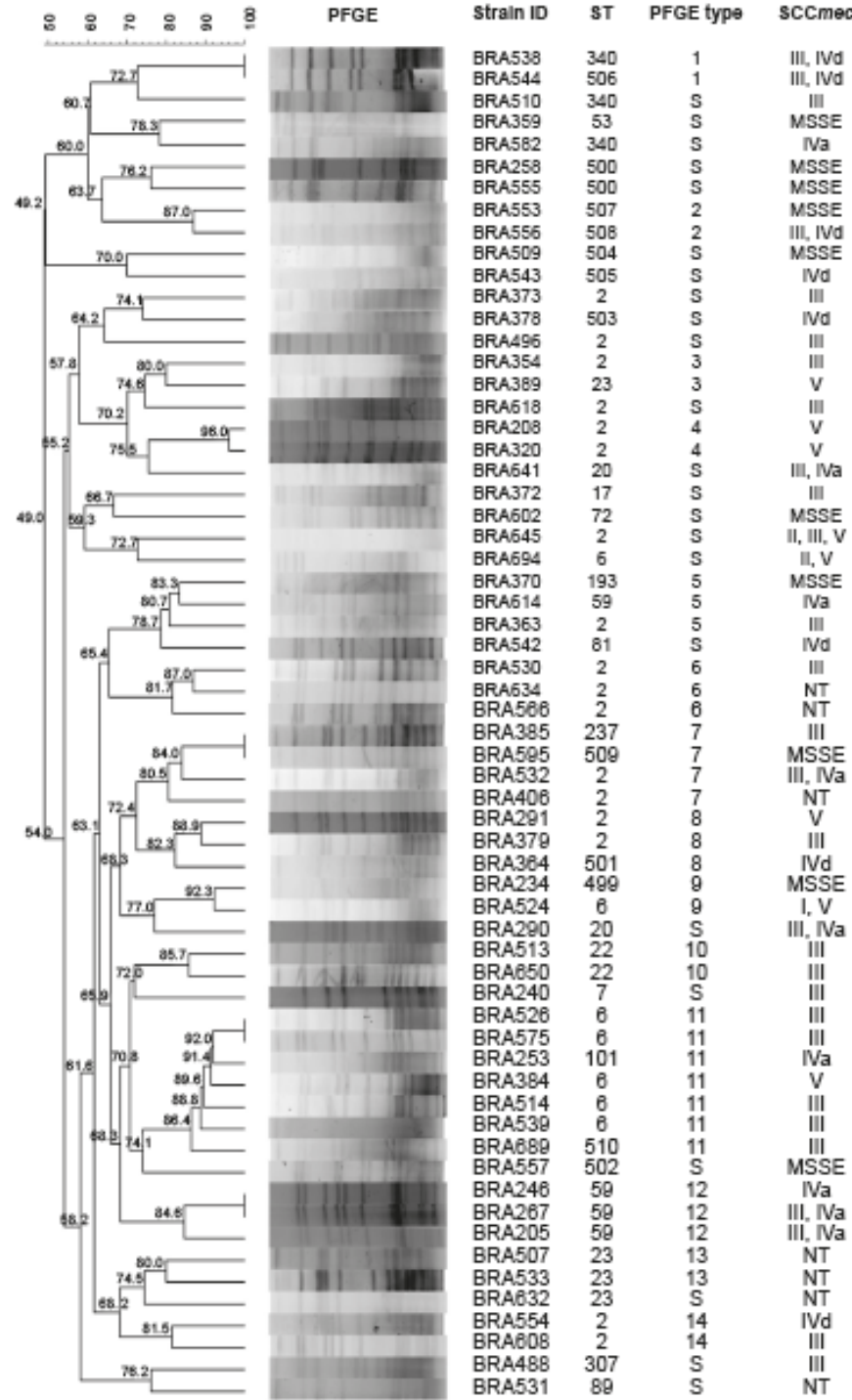
Phenotype	MRSA		MSSA		Total	
	n	%	n	%	n	%
ER-S, CL-S	4	2.9	77	55.0	81	57.9
ER-R, CL-R (constitutive MLS_B)	20	14.3	5	3.6	25	17.9
ER-R, CL-S (D-test +) (inducible MLS_B)	3	2.1	8	5.8	11	7.9
ER-R, CL-S (D-test -)	1	0.7	1	0.7	2	1.4
ER-S, CL-R	0	0.0	2	1.4	2	1.4
ER-S, CL-I	0	0.0	7	5.0	7	5.0
ER-I, CL-S	0	0.0	10	7.1	10	7.1
ER-I, CL-I	1	0.7	0	0.0	1	0.7
ER-I, CL-R	0	0.0	1	0.7	1	0.7
Total	29	20.7	111	79.3	140	100.0

COAGULASE NEGATIVOS

Rev Soc Bras Med Trop 49(3):292-299, May-June, 2016
doi: 10.1590/0037-8682-0015-2016

TABLE 1 - Distribution of SCC_{mec}^A types in MDR-CoNS isolated from a hospital in Southern Brazil from 2002 to 2004.

Species	Number	SCC _{mec} type													Non-typable	
		I	II	III	IVa	IVb	IVc	IVd	V	I+III	I+V	II+V	III+IVa	III+IVd		II+III+V
<i>Staphylococcus epidermidis</i>	52	-	-	20	4	-	-	6	4	-	1	1	5	3	1	7
<i>Staphylococcus haemolyticus</i>	41	-	5	16	-	-	-	-	6	-	-	9	-	-	1	4
<i>Staphylococcus hominis</i>	19	-	-	14	-	-	-	-	-	-	-	1	-	-	-	4
<i>Staphylococcus warneri</i>	6	-	-	1	-	-	-	-	-	-	-	1	-	-	-	4
<i>Staphylococcus saprophyticus</i>	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
<i>Staphylococcus xylosum</i>	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
<i>Staphylococcus colmā</i>	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Total	126	-	5	52	4	-	-	6	10	-	1	12	5	3	2	26
Percentage (%)	100.0	-	4.0	41.2	3.2	-	-	4.8	7.9	-	0.8	9.5	4.0	2.4	1.6	20.6

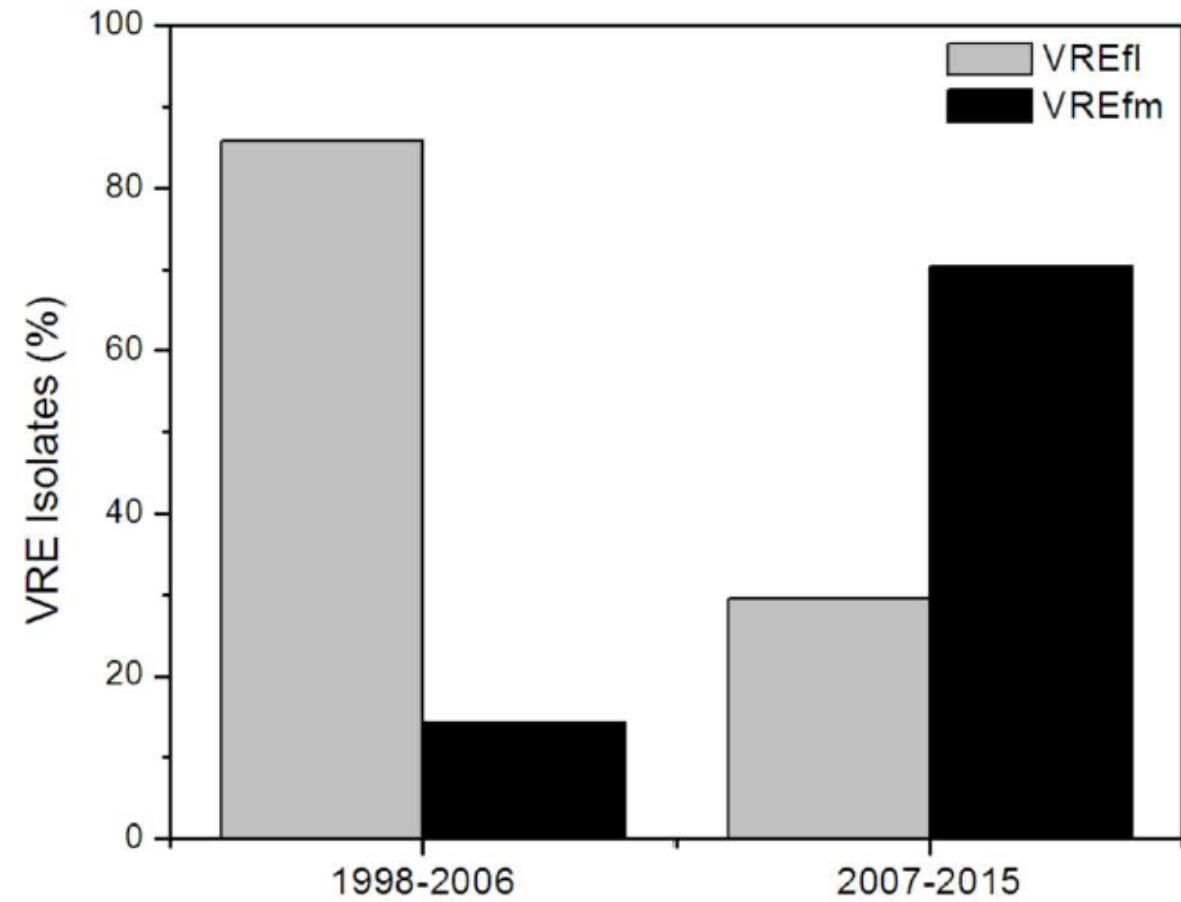
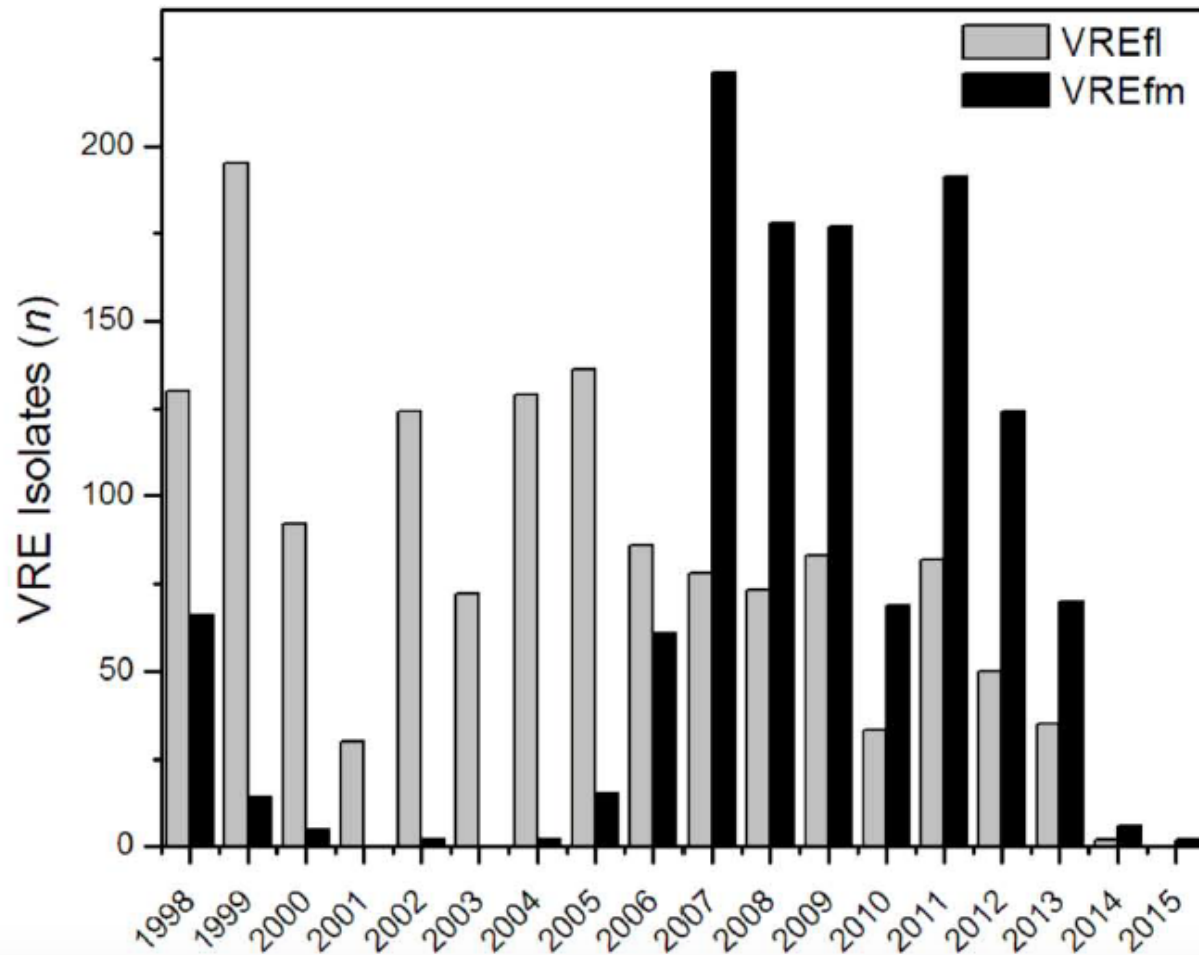


Occurrence of the *vanA* gene in *Staphylococcus epidermidis* from nasopharyngeal secretion of Health-Care Workers, Recife, Brazil

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Bacterial species	Susceptibility profile	Cefoxitin disc-diffusion	BHI-V6	E-test ($\mu\text{g}/\text{mL}$)	Broth microdilution ($\mu\text{g}/\text{mL}$)	Gene <i>vanA</i>	Gene <i>mecA</i>
CoNS	PEN, CLI, SUF, CHL, CFO, ERY	R	+	128	128	-	+
CoNS	SUF, CHL, CFO, CIP	R	+	2	2	-	+
CoNS	PEN, CLI, SUF, CFO, LZD, RIF, ERY, CIP	R	+	4	2	-	+
CoNS	CLI, CHL, GM, CFO, ERY, CIP	R	+	2	2	-	+
CoNS	CLI, GM, CFO, ERY, CIP	R	+	4	2	-	+
CoNS	PEN, CLI, CFO, ERY, CIP	R	+	4	2	-	+
CoNS	PEN, CLI, CFO, ERY, CIP	R	+	2	2	-	+
CoNS	PEN, SUF, CFO, ERY	R	+	> 256	32	+	+
CoNS	PEN, CLI, SUF, GM, CFO, RIF, ERY, CIP	R	+	2	2	-	+
CoNS	CFO, LZD, CIP	R	+	2	2	-	-
CoNS	PEN, CLI, CHL, CFO, ERY, CIP	R	+	2	2	-	+
CoNS	PEN, CLI, GM, CFO, ERY, CIP	R	+	4	2	-	+

ENTEROCOCOS



Emergence of *vanA* vancomycin hospital in Porto Alegre, South

n°	Site	Antimicrobials ^a							
		AMP	CIP	HLG	LEV	LIN	HLS	Q/D	TET
1	Urine	R	I	S	R	S	S	I	S
2	Blood	R	R	S	R	S	S	I	S
3	Blood	R	R	S	R	S	S	S	S
4	Urine	R	I	S	R	S	S	I	S
5	Blood	R	R	S	R	S	S	S	S
6	Urine	R	I	S	R	S	S	S	S
7	Urine	R	R	S	R	R	R	R	R
8	Blood	R	R	S	R	S	S	S	S
9	Urine	R	R	S	R	I	S	S	S
10	Blood	R	I	S	R	S	S	S	S
11	Urine	R	I	S	R	S	S	S	S
12	Urine	R	I	S	R	S	S	S	R
13	Urine	R	I	S	R	S	S	S	S
14	Urine	R	I	S	R	S	S	S	S
15	Urine	R	R	S	R	S	-	R	R
16	Urine	R	R	S	R	S	S	S	S
17	Urine	R	I	S	S	S	S	I	S
18	Blood	R	R	S	R	S	S	I	S
19	Urine	R	I	S	R	S	S	S	S
20	Urine	R	R	S	R	S	S	I	S
21	Blood	R	R	S	R	S	S	S	S
22	Blood	R	R	S	R	S	S	S	S
23	Blood	R	I	S	R	S	S	I	S
24	Ascitic fluid	R	R	R	R	S	R	S	S
25	Blood	R	R	S	R	S	S	S	S
26	Urine	R	R	S	R	S	S	S	S
27	Urine	R	R	S	R	S	S	S	S
28	Blood	R	R	S	R	S	S	S	S
29	Urine	R	R	S	R	S	S	S	S

es 2014; 8(2):160-167. doi:10.3855/jidc.4126

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Serotype	Number	Specimen	Age	MLST	MLVA	Minimal inhibitory concentrations (MIC) ($\mu\text{g ml}^{-1}$)					
						PEN	CRO	MERO	ERY	TET	SXT
19A	062-13	Blood	61	ST320	MT19A.2†	2*	2*	0.25	>256*	4*	4*
	063-13	Blood	75	ST320	MT19A.3†	2*	2*	0.5*	>256*	16*	16*
	014-14	Blood	72	ST9678	MT19A.4	0.06	0.06	≤ 0.03	0.03	0.25	0.25
	016-14	Blood	50	ST320	MT19A.5†	1*	1*	0.25	4*	0.12	4*
	017-14	Blood	78	ST320	MT19A.6†	1*	1*	0.5*	>256*	4*	4*
	030-14	Blood	60	ST320	MT19A.1†	2*	2*	0.06	2*	0.12	2
	037-14	Blood	57	ST320	MT19A.7†	4*	2*	0.25	1*	0.12	1
	041-14	Blood	63	ST320	MT19A.8†	2*	2*	0.5*	>256*	4*	2
	049-14	Blood	61	ST733	MT19A.9	≤ 0.03	0.06	≤ 0.03	0.03	0.12	2
	056-14	Blood	57	ST320	MT19A.1†	1*	1*	0.5*	2*	0.12	2
	057-14	CSF	57	ST320	MT19A.1†	1*	1*	0.5*	2*	0.12	2
	060-14	Blood	69	ST2260	MT19A.10	0.06	0.06	≤ 0.03	0.06	0.12	2
	030-15	CSF	77	ST320	MT19A.11	≤ 0.03	≤ 0.03	≤ 0.03	0.06	0.25	0.12
	22F	031-13	CSF	66	—	MT22F.2§	0.012	0.023	0.002	0.016	2
045-13		Blood	83	ST6403	MT22F.3‡	0.016	0.032	0.006	0.016	0.094	0.125
051-13		Blood	57	ST6403	MT22F.4‡	0.023	0.032	0.064	0.023	0.19	0.094
040-14		Blood	58	—	MT22F.5§	0.023	0.047	0.006	0.016	0.094	0.094
050-14		Blood	65	ST6403	MT22F.1	0.016	0.047	0.012	0.047	0.094	0.094
051-14		Pleural	65	ST6403	MT22F.1	0.016	0.047	0.012	0.032	0.094	0.094
064-14		Blood	87	—	MT22F.6§	0.016	0.064	0.008	0.032	0.19	0.125
021-15		Blood	60	ST6403	MT22F.7‡	0.032	0.023	0.032	0.032	0.19	0.094
032-15		Blood	76	ST6403	MT22F.8	0.023	0.016	0.006	0.064	0.12	0.064
047-15		Blood	62	—	MT22F.9§	0.023	0.016	0.003	0.032	0.19	0.064

Emergence of serotype 19A *Streptococcus pneumoniae* after PCV10 associated with a ST320 in adult population, in Porto Alegre, Brazil

Epidemiology and Infection

Received: 24 July 2017

Revised: 10 October 2018

Accepted: 26 December 2018

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Table 4. Antimicrobial susceptibility profile of 36 *S. pneumoniae* from serotype 19A pre- (five isolates) and post-vaccine period (31 isolates*)

	Pre-vaccine			Post-vaccine		
	S (%)	I (%)	R (%)	S (%)	I (%)	R (%)
Penicilin (non-meningitis) ^a	5 (100)	0 (0)	0 (0)	23 (76.7)	7 (23.3)	0 (0)
Penicilin (meningitis) ^a	1 (20)	–	4 (80)	7 (23.3)	–	23 (76.7)
Ceftriaxone(non-meningitis) ^a	5 (100)	0 (0)	0 (0)	15 (50)	15 (50)	0 (0)
Ceftriaxone (meningitis) ^a	5 (100)	0 (0)	0 (0)	9 (30)	9 (30)	12 (40)
Meropenem ^a	5 (100)	0 (0)	0 (0)	16 (53.3)	9 (30)	5 (16.7)
Tetracycline	5 (100)	0 (0)	0 (0)	16 (51.6)	6 (19.4)	9 (29)
Erythromycin	5 (100)	0 (0)	0 (0)	8 (25.8)	1 (3.2)	22 (71)
Trimethoprim-Sulfamethoxazole	3 (60)	1 (20)	1 (20)	6 (19.3)	17 (54.9)	8 (25.8)

Streptococcus agalactiae

ANTIMICROBIAL SUSCEPTIBILITY OF *Streptococcus agalactiae* ISOLATED FROM PREGNANT WOMEN

Rev. Inst. Med. Trop. Sao Paulo

2016;58:83

<http://dx.doi.org/10.1590/S1678-9946201658083>

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Table 1

Antimicrobial susceptibility profile of *Streptococcus agalactiae* isolated from pregnant women in Northern Paraná, Brazil

Drugs	Susceptibility (%)	Intermediate (%)	Resistant (%)
Penicillin	100 (136/136)	-	-
Vancomycin	100 (136/136)	-	-
Levofloxacin	99.3 (135/136)	0.7 (1/136)	-
Tetracycline	14 (19/136)	3.7 (5/136)	82.3 (112/136)
Chloramphenicol	95.6 (130/136)	4.4 (6/136)	-
Cefotaxime	100 (136/136)	-	-
Clindamycin	91.9 (125/136)	2.2 (3/136)*	5.9 (8/136)**
Erythromycin	91.9 (125/136)	-	8.1 (11/136)



Caption

States with published results in the last ten years

Period	Location	Antibiotic resistance rates (%)			Reference
		Clindamycin	Erythromycin	Tetracycline	
1980–2006	Rio de Janeiro São Paulo Santa Catarina	1.9	4	8.2	59
2008	Rio de Janeiro	16.7	13.2	81.7	74
2008–2009	Rio de Janeiro	5	14	83	75
2010	Paraná	2.2	8.1	82.3	39
2008–2015	Rio de Janeiro	2	14	86	33



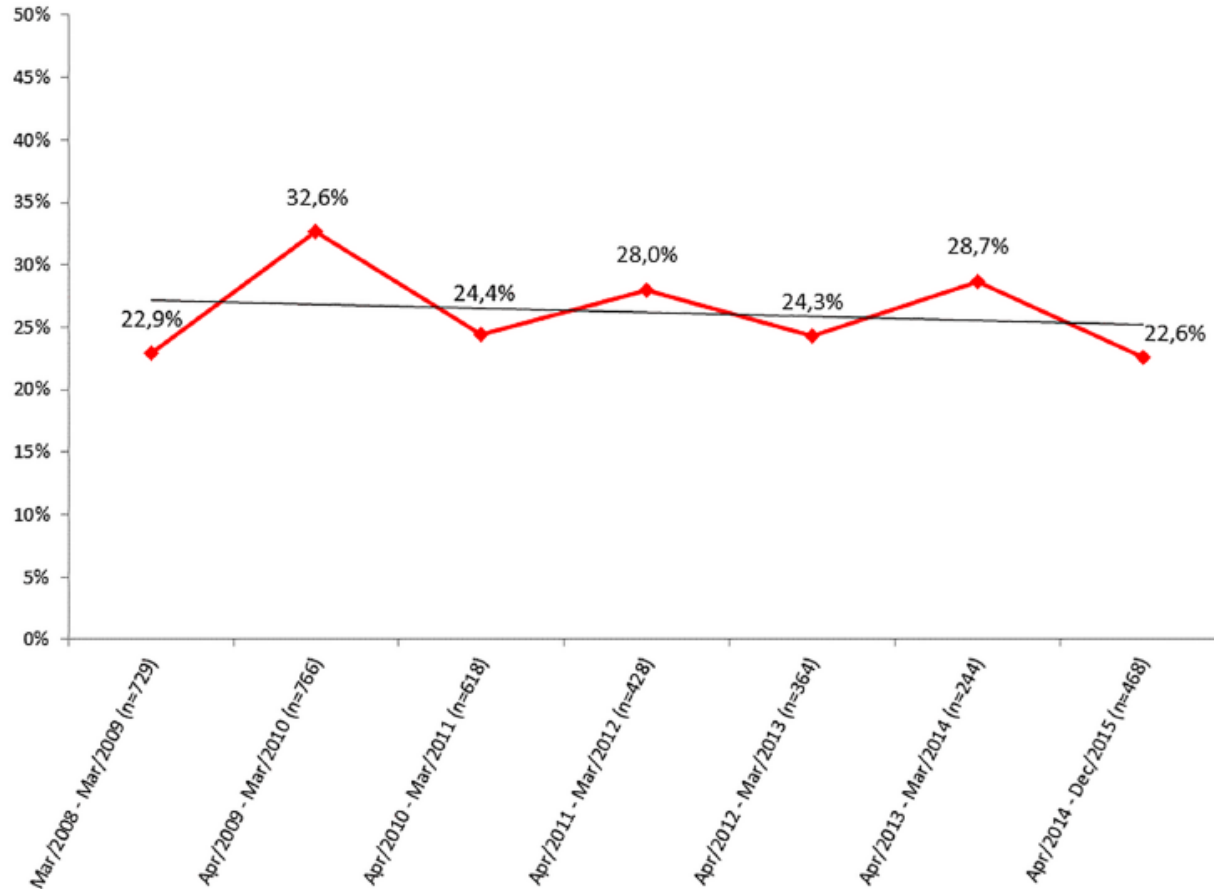
2010
2017
2018

Fig. 1 Geographic distribution of GBS prevalence in pregnant women

Streptococcus agalactiae carriage among pregnant women living in Rio de Janeiro, Brazil, over a period of eight years

PLOS ONE | <https://doi.org/10.1371/journal.pone.0196925> May 11, 2018

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Antimicrobial susceptibility profiles					Number (%) of isolates
Chl	Cli	Ery	Lev	Tet	
S	S	S	S	R	495 (71.8%)
S	S	R	S	R	48 (7%)
S	S	S	S	S	97 (14.1%)
S	R	R	S	R	14 (2.1%)
R	S	R	R	R	35 (5%)

Streptococcus pyogenes

Phenotypic and genotypic characteristics of macrolide resistant isolates

Isolate number	Year of recovery	<i>emm</i> type	MIC (µg/mL)	Phenotype	Macrolide resistance genes		
					<i>ermA</i>	<i>ermB</i>	<i>mefA/E</i>
186	2008	68.1	> 256	cMLS _B	-	+	-
274	2008	58	> 256	iMLS _B	+	-	-
302	2008	58	> 256	iMLS _B	+	-	-
402	2009	1	> 256	cMLS _B	-	+	-
418	2009	58.14	8	iMLS _B	+	-	-
425 ^a	2009	3.3	16	cMLS _B	-	+	-
536	2010	22	> 256	cMLS _B	-	+	-
637A	2011	1	> 256	cMLS _B	+	+	-
638	2011	76.7	> 256	cMLS _B	+	+	-
710	2011	28	> 256	cMLS _B	-	+	-
749	2011	73	> 256	cMLS _B	+	+	-
750	2011	6	> 256	cMLS _B	+	+	-
780	2012	11	> 256	cMLS _B	+	+	-
798	2012	11	> 256	iMLS _B	+	+	-

CONCLUSÕES

- **Poucos estudos avaliando a resistência em cocos Gram positivos**
- **Os dados fenotípicos e genotípicos são heterogêneos**
- **As informações de epidemiologia molecular ainda são escassas em nosso País**
- **De uma maneira em geral, as taxas de resistência tem aumentado discretamente nos últimos anos**
- **Necessitamos que seja criada uma rede de vigilância epidemiológica para estes microrganismos**



Obrigado!

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