

Periodical Report Antibacterial Susceptibility Patterns

Antibiotic – Susceptibility Profiles of Bacterial
Pathogens Causing Bloodstream Infections in
Shiraz Periodical report
March 2020 – March 2022 (1399-1400)



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Periodical Report

Antibacterial Susceptibility

Patterns

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In the name of God

**Antibiotic – Susceptibility Profiles
of Bacterial Pathogens Causing Bloodstream
Infections in Shiraz**

**Periodical report
March 2020 – March 2022 (1399-1400)**

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Introduction

Infectious diseases are among the causes of high morbidity and mortality in our country and worldwide. Antibiotics are the therapeutic materials to combat infectious diseases. In addition, correct and rapid diagnosis of etiology of infectious diseases can reduce the rate of mortality and the cost of treatment. Therefore, accurate and on time diagnosis of infectious diseases and administration of appropriate antibiotic could help in this regard. Furthermore, the proper empirical antibiotic therapy in some cases can save lives of the patients.

The objectives of this report are to publish the lists of microorganism's bacteria isolated from the blood (an automated blood culture system, Bactec ®, BD) from March 2020– March 2022 (1399-1400). To achieve these objectives Professor Alborzi Clinical Microbiology Research Center (PACMRC) in Nemazee Teaching Hospital was equipped, with Bactec system. Application of the Bactec system can improve the isolation of bacteria in blood culture, compared to conventional methods. Sensitivity of bacteria to different antibiotics was determined using standard disk diffusion method (Mast Co, UK), according to Clinical and Laboratory Standard Institute (CLSI). In addition, minimum inhibitory concentrations (MICs) of some antibiotics for some clinical isolates were determined, according to agar dilution or E-test methods. Determination of antibiotic sensitivity pattern in periodic intervals is mandatory in every center for choosing appropriate antibiotic therapy. The corresponding details are included in the booklet.

The results were shown in tables based on the most common isolated organisms. The three most and least effective antibiotics were included in the footnote of tables, in terms of sensitivity. It is clear that the results of antibiotic sensitivity reports from particular regions cannot be applicable worldwide. This report as the fifth report published by PACMRC could help clinicians in Iran and especially in Shiraz to have the background of antibiotic sensitivity patterns of important pathogens and guide them to choose effective antibiotics for treatment of bloodstream infections. However, the report is not perfect in some respects. Therefore, your valuable and practical suggestions can help us to improve next reports that we intend to publish at least every two years.



Section One

Frequency of pathogenic bacteria isolated from blood Culture in Shiraz

March 2020 – March 2022 (1399-1400)



Table 1: Frequency of pathogenic bacteria isolated from blood Culture based on hospitals in Shiraz, March 2020- March 2021 (1399)

Hospital	Number (%)
Nemazee	780 (83)
Shahid Dastgheib	70 (7)
Dena	17 (2)
Shiraz Central (MRI)	13 (1)
Al Zahra cardiac	6 (1)
Others	53 (6)
Total	939

Other hospitals include Shahid Beheshtee 4 (0.4), Amir 1 (0.1%), Ordibehesht 1 (0.1%), Kosar 1 (0.1%), Shefa 1 (0.1), Hafez 1 (0.1), Ali Asghar 1 (0.1), and non-identified 43 (4.6%).

Table 2: Frequency of pathogenic bacteria isolated from blood Culture based on hospitals in Shiraz, March 2021- March 2022 (1400)

Hospital	Number (%)
Nemazee	677 (96)
Shahid Dastgheib	15 (2)
Al Zahra cardiac	3 (0.4)
Dena	3 (0.4)
Hafez	3 (0.4)
Others	7 (0.8)
Total	708

Other hospitals include Shiraz Central (MRI) 1 (0.1%) and non-identified 6 (0.7%).

Table 3: Frequency of pathogenic bacteria isolated from blood Culture based on wards in Shiraz, March 2020 – March 2021 (1399)

Ward	Number (%)
Emergency	309 (33)
Adult medical	167 (17.8)
Intensive care unit	129 (13.7)
Pediatric medical	114 (12.1)
Surgery	35 (3.7)
Neonatal intensive care unit	29 (3.1)
Non-identified	156 (16.6)
Total	939

Table 4: Frequency of pathogenic bacteria isolated from blood Culture based on wards in Shiraz, March 2021 – March 2022 (1400)

Ward	Number (%)
Emergency	378 (53.4)
Adult medical	121 (17.1)
Intensive care unit	61 (8.6)
Pediatric medical	41 (5.8)
Neonatal Intensive care unit	29 (4.1)
Surgery	21 (3)
Non-identified	57 (8)
Total	708

Table 5: The most common pathogenic bacteria isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

Bacteria	Number (%)
<i>Escherichia coli</i>	124 (13.2)
<i>Staphylococcus</i> spp.	120 (12.8)
<i>Achromobacter</i> spp. ¹	115 (12.2)
<i>Enterobacter</i> spp.	112 (11.9)
<i>Klebsiella</i> spp. ²	108 (11.5)
<i>Stenotrophomonas maltophilia</i>	103 (11)
<i>Enterococcus</i> spp.	69 (7.3)
<i>Pseudomonas</i> spp. ³	60 (6.4)
<i>Acinetobacter</i> spp. ⁴	58 (6.2)
<i>Streptococcus</i> spp. ⁵	15 (1.6)
<i>Serratia</i> spp.	13 (1.4)
<i>Citrobacter</i> spp.	7 (0.7)
<i>Proteus</i> spp.	5 (0.5)
<i>Salmonella</i> spp.	4 (0.4)
<i>Brucella</i> spp.	3 (0.3)
Others	23 (2.6)
Total	939

¹ *Achromobacter* spp. include *Achromobacter xylosoxidans* 61 (6.5%), and *Achromobacter* sp. 54 (5.7%).

² *Klebsiella* spp. include *Klebsiella pneumoniae* 64 (6.8%), *Klebsiella* sp.44 (4.7%).

³ *Pseudomonas* spp. include *pseudomonas aeruginosa* 45(4.8%), *pseudomonas* sp. 12 (1.3%), *Pseudomonas stutzeri* 2 (0.2%), and *Pseudomonas fluorescens* 1 (0.1%).

⁴ *Acinetobacter* spp. include *Acinetobacter baumannii* 39 (4.2%), *Acinetobacter* sp. 15 (1.6%), *Acinetobacter lwoffii* 3 (0.3%), and *Acinetobacter hemolyticus* 1 (0.1%).

⁵ *Streptococcus* spp. include; *Streptococcus viridans* 10 (1.1%), *Streptococcus pneumoniae* 3 (0.3%), and *Streptococcus* sp. 2 (0.2%).

Table 6: The most common pathogenic bacteria isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

Bacteria	Number (%)
<i>Escherichia coli</i>	112 (15.8)
<i>Enterobacter spp.</i> ¹	106 (15)
<i>Staphylococcus spp.</i> ²	99 (14)
<i>Klebsiella spp.</i> ³	94 (13.3)
<i>Enterococcus spp</i>	64 (9)
<i>Pseudomonas spp.</i> ⁴	46 (6.5)
<i>Acinetobacter spp.</i> ⁵	44 (6.2)
<i>Achromobacter spp.</i> ⁶	43 (6.1)
<i>Stenotrophomonas maltophilia.</i>	34 (4.8)
<i>Streptococcus spp.</i> ⁷	12 (1.7)
<i>Ralstonia pickettii</i>	10 (1.4)
<i>Citrobacter spp.</i> ⁸	7 (1.1)
<i>Serratia spp.</i>	6 (0.8)
<i>Salmonella spp.</i>	6 (0.8)
Others	25 (3.5)
Totals	708

¹ *Enterobacter spp.* include *Enterobacter sp.* 99 (14%), and *Enterobacter cloacea* 7 (1%).

² *Staphylococcus spp.* include *Staphylococcus aureus* 95 (13.4%), and *Staphylococcus sp.* 4 (0.6%)

³ *Klebsiella spp.* include *Klebsiella pneumonia* 44 (6.2%), *Klebsiella sp.* 41 (5.8%) and *Klebsiella oxytoca* 9 (1.3%).

⁴ *Pseudomonas spp.* include *pseudomonas aeruginosa* 34(4.8%), *pseudomonas sp.* 9 (1.3%), *Pseudomonas stutzeri* 2 (0.3%), and *Pseudomonas medocina* 1 (0.1%).

⁵ *Acinetobacter spp.* include *Acinetobacter baumannii* 35(4.9%), *Acinetobacter sp.* 8 (1.1%), and *Acinetobacter lwoffii* 1 (0.1%).

⁶ *Achromobacter spp.* include *Achromobacter xylosoxidans* 42 (5.9%), and *Achromobacter sp.* 1 (0.1%).

⁷ *Streptococcus spp.* include *Streptococcus sp.* 8 (1.1%), *Streptococcus viridans* 1 (0.1%), *Streptococcus pneumoniae* 1 (0.1%), and *Streptococcus agalactiae* 2 (0.3).

⁸ *Citrobacter spp.* Include *Citrobacter freundii* 6 (0.8%), *Citrobacter koserii* 1 (0.1%).

Section Two

Susceptibility Profiles of Enterobacteriaceae isolated in blood culture

**March 2020 – March 2022 (1399-1400)
(Alphabetical order)**

- *Enterobacter* spp.
- *Escherichia coli*.
- *Klebsiella* spp.



Table 7: Susceptibility Profiles of 112 *Enterobacter* spp. isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Amikacin	108	1.8	10.2	88
Levofloxacin	111	23.4	0.9	75.7
Imipenem	110	17.3	8.2	74.5
Piperacillin/Tazobactam	107	28	4.7	67.3
Chloramphenicol	108	27.8	8.3	63.9
Meropenem	110	30.9	5.5	63.6
Tigecycline	110	4.5	34.5	61
Trimethoprim/Sulfamethoxazole	105	38.1	6.7	55.2
Gentamicin	109	45	0	55
Aztreonam	103	45.6	0	54.4
Tobramycin	109	45.9	0	54.1
Cefepime	109	44	3.7	52.3
Ciprofloxacin	110	35.5	12.7	51.8
Ceftazidime	108	49.1	0	50.9
Cefotaxime	102	50	3.9	46.1
Ceftriaxone	104	50	5.8	44.2
Cefuroxime	66	54.6	22.7	22.7
Tetracycline	109	45	37.6	18.3
Ampicillin/Sulbactam	109	80.7	7.3	12
Cefixime	105	62.9	27.6	9.5
Amoxicillin/Clavulanic acid	108	93.5	0	6.5
Ampicillin	108	97.2	2.8	0
Cephalexin	106	100	0	0
ESBL**	94	51.1		48.9

The most effective antibiotics, in descending order: 1- Amikacin, 2- Levofloxacin, 3- Imipenem.

The least effective antibiotics: 1- Ampicillin /Cephalexin, 2- Amoxicillin/Clavulanic acid, and 3- Cefixime.

**Enterobacter* spp. include *Enterobacter* sp. (111), and *Enterobacter cloacea* (1).

**Extended-spectrum β -lactamases (ESBLs) are enzymes that mediate resistance to extended- spectrum (third generation) cephalosporins (e.g., ceftazidime, cefotaxime, and ceftriaxone) and monobactams (e.g., aztreonam) but do not affect cephamycins (e.g., cefoxitin and cefotetan) or carbapenems (e.g., meropenem or imipenem).

The presence of an ESBL-producing organism in a clinical infection can result in treatment failure if one of the above classes of drugs is used.

Table 8: Demographic and clinical characteristics of 112 *Enterobacter* spp. isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

Variables		Number	Percent
Female/Male		58/54	45/55
Hospitals	Nemazee	103	92
	Dena	1	1
	Non-identified	8	7
Wards	Emergency	27	24.1
	Adult Medical	20	17.8
	Pediatric medical	19	17
	Intensive care unit	13	11.6
	NICU	1	0.9
	Non-identified	32	28.6
	Non-identified	32	28.6
Age groups	Adult	53	47.3
	Children	30	26.8
	Neonates	3	2.7
	Non-identified	26	23.2
Infection types	Community-acquired or Health care associated [#]	56	50
	Hospital-acquired [*]	18	16.1
	Health care associated [§]	14	12.5
	Non-identified	24	21.4

* Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

Health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, patients who received patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility.

(Friedman ND, K et al, Ann Intern Med. 2002)

These patients are not calcified as hospital-acquired infection and data are not adequate to classify them as community-acquired or health-care associated infections. Therefore, we classified them under "community-acquired or health care associated infections

Table 9: Susceptibility Profile of 106 *Enterobacter* spp. isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Levofloxacin	106	17	1.9	81.1
Amikacin	106	12.3	7.5	80.2
Imipenem	105	16.2	9.5	74.3
Meropenem	106	24.5	6.6	68.9
Piperacillin/Tazobactam	105	21	11.4	67.6
Chloramphenicol	106	31.1	20.8	48.1
Tigecycline	103	7.8	44.7	47.5
Trimethoprim/Sulfamethoxazole	103	51.5	3.9	44.6
Ciprofloxacin	102	26.4	32.4	41.2
Gentamicin	105	61.9	0	38.1
Tobramycin	104	61.5	1.9	36.6
Cefepime	104	62.5	10.6	26.9
Aztreonam	105	50.5	22.8	26.7
Ceftriaxone	106	76.4	0	23.6
Cefotaxime	106	75.5	0.9	23.6
Ceftazidime	106	74.5	2.8	22.7
Cefixime	105	77.1	5.7	17.2
Cefuroxime	106	78.3	6.6	15.1
Tetracycline	103	73.8	17.5	8.7
Ampicillin/Sulbactam	106	84	9.4	6.6
Amoxicillin/Clavulanic acid	105	94.3	4.7	1
Ampicillin	106	99.1	0.9	0
Cephalexin	106	100	0	0
ESBL**	97	78.4		21.6

**Enterobacter* spp. included: *Enterobacter cloacae* (7), *Enterobacter* sp. (99)

The most effective antibiotics, in descending order: 1- Levofloxacin 2- Amikacin, and 3- Imipenem.

The least effective antibiotics: 1- Cephalexin/ Ampicillin, 2- Amoxicillin/Clavulanic acid, 3- Ampicillin/Sulbactam.

Table 10: Demographic and clinical characteristics of 106 *Enterobacter* spp. isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		50/56	47/53
Hospitals	Nemazee	104	98
	Non-identified	2	2
Wards	Emergency	42	39.6
	Adult Medical	23	21.7
	Pediatric medical	15	14.1
	Intensive care unit	10	9.4
	NICU	5	4.7
	Surgery	2	1.9
	Non-identified	9	8.6
Age groups	Adult	69	65.1
	Children	24	22.6
	Neonates	6	5.7
	Non-identified	7	6.6
Infection types	Community-acquired or Health care associated#	47	44.3
	Hospital-acquired*	35	33
	Health care associated [§]	12	11.3
	Non-identified	12	11.4

* Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

§ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 11: Susceptibility Profile of 124 *Escherichia coli* isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Amikacin	122	2.5	0.8	96.7
Imipenem	122	0.8	4.1	95.1
Piperacillin/Tazobactam	122	2.5	5.7	91.8
Tigecycline	120	0	8.3	91.7
Meropenem	121	6.6	7.4	86
Gentamicin	122	26.2	0	73.8
Tobramycin	122	30.3	3.3	66.4
Chloramphenicol	122	25.4	14.8	59.8
Aztreonam	120	37.5	10	52.5
Ceftazidime	121	40.5	9.1	50.4
Cefepime	119	42	14.3	43.7
Cefotaxime	119	53.8	5	41.2
Levofloxacin	122	56.5	2.5	41
Ampicillin/Sulbactam	119	37	22.7	40.3
Ceftriaxone	120	58.3	1.7	40
Ciprofloxacin	121	62	2.5	35.5
Trimethoprim/Sulfamethoxazole	120	67.5	0.8	31.7
Cefixime	120	64.2	6.6	29.2
Tetracycline	118	65.3	8.5	26.2
Cefuroxime	66	68.2	9.1	22.7
Amoxicillin/Clavulanic acid	117	63.2	14.5	22.3
Cephalexin	118	82.2	10.2	7.6
Ampicillin	122	86	6.6	7.4
ESBL**	109	59.6		40.4

The most effective antibiotics, in descending order: 1- Amikacin, 2- Imipenem, 3- Piperacillin/Tazobactam.

The least effective antibiotics: 1-Ampicillin, 2- Cephalexin, 3- Amoxicillin/Clavulanic acid.

**Extended-spectrum β -lactamases (ESBLs) are enzymes that mediate resistance to extended- spectrum (third generation) cephalosporins (e.g., ceftazidime, cefotaxime, and ceftriaxone) and monobactams (e.g., aztreonam) but do not affect cephamycins (e.g., cefoxitin and cefotetan) or carbapenems (e.g., meropenem or imipenem). The presence of an ESBL-producing organism in a clinical infection can result in treatment failure if one of the above classes of drugs is used.

Table 12: Demographic and clinical characteristics of 124 *Escherichia coli* isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

variables		Number	Percent
Female/Male		58/66	47/53
Hospitals	Nemazee	114	92
	Dena	2	1.6
	Shahid Dastgheib	2	1.6
	Al-zahra	1	0.8
	Non-identified	5	4
Wards	Emergency	51	41.2
	Adult Medical	28	22.7
	Intensive care unit	9	7.2
	Pediatric medical	5	4
	NICU	5	4
	Surgery	4	3.2
	Non-identified	22	17.7
Age groups	Adult	86	69.4
	Children	10	8.1
	Neonates	6	4.8
	Non-identified	22	17.7
Infection types	Community-acquired or Health care associated#	69	55.6
	Hospital-acquired*	18	14.5
	Health care associated\$	16	13
	Non-identified	21	16.9

* Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 13: Susceptibility Profile of 112 *Escherichia coli* isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Amikacin	111	6.3	2.7	91
Imipenem	111	4.5	4.5	91
Piperacillin/Tazobactam	109	10.1	3.7	86.2
Tigecycline	107	3.7	10.3	86
Meropenem	112	10.7	5.4	83.9
Gentamicin	112	18.8	2.7	78.5
Tobramycin	110	27.3	4.5	68.2
Chloramphenicol	112	18.7	17	64.3
Aztreonam	112	32.1	15.2	52.7
Cefepime	107	43.9	10.3	45.8
Ceftazidime	111	39.6	16.2	44.2
Ceftriaxone	111	54.1	1.8	44.1
Levofloxacin	110	50.9	6.4	42.7
Cefixime	109	54.1	5.5	40.4
Cefotaxime	112	54.5	5.3	40.2
Ciprofloxacin	112	56.2	4.5	39.3
Ampicillin/Sulbactam	112	45.5	17	37.5
Cefuroxime	112	59.8	2.7	37.5
Trimethoprim/Sulfamethoxazole	111	62.2	2.7	35.1
Tetracycline	112	60.7	8.9	30.4
Amoxicillin/Clavulanic acid	111	56.8	18	25.2
Cephalexin	112	64.3	13.4	22.3
Ampicillin	110	81.8	7.3	10.9
ESBL**	106	61.3		38.7

The most effective antibiotics, in descending order: 1- Amikacin/ Imipenem, 2- Piperacillin/Tazobactam, 3- Tigecycline.

The least effective antibiotics: 1-Ampicillin, 2- Cephalexin, 3- Amoxicillin/Clavulanic acid.

**Extended-spectrum β -lactamases (ESBLs) are enzymes that mediate resistance to extended- spectrum (third generation) cephalosporins (e.g., ceftazidime, cefotaxime, and ceftriaxone) and monobactams (e.g., aztreonam) but do not affect cephamycins (e.g., cefoxitin and cefotetan) or carbapenems (e.g., meropenem or imipenem).

The presence of an ESBL-producing organism in a clinical infection can result in treatment failure if one of the above classes of drugs is used.

Table 14: Demographic and clinical characteristics of 112 *Escherichia coli* isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		61/51	55/45
Hospitals	Nemazee	112	100
Wards	Emergency	74	66
	Adult Medical	25	22.3
	Intensive care unit	4	3.6
	Pediatric medical	2	1.8
	NICU	2	1.8
	Non-identified	5	4.5
Age groups	Adult	93	83
	Children	10	8.9
	Neonates	4	3.6
	Non-identified	5	4.5
Infection types	Community-acquired or Health care associated#	60	53.6
	Hospital-acquired*	39	34.8
	Health care associated\$	6	5.4
	Non-identified	7	6.2

* Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 15: Susceptibility Profile of 112 *Klebsiella* spp. Isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Amikacin	111	29.7	3.6	66.7
Imipenem	111	25.2	9.9	64.9
Tigecycline	107	7.5	30.8	61.7
Meropenem	109	34.9	7.3	57.8
Chloramphenicol	108	32.4	10.2	57.4
Levofloxacin	110	41.8	3.6	54.6
Piperacillin/Tazobactam	111	38.7	8.1	53.2
Gentamicin	110	47.3	0	52.7
Tobramycin	111	49.5	1	49.5
Trimethoprim/Sulfamethoxazole	109	50.5	5.5	44
Aztreonam	105	56.2	1.9	41.9
Cefotaxime	110	59.1	0	40.9
Ciprofloxacin	108	50	9.3	40.7
Ceftazidime	110	57.3	2.7	40
Ceftriaxone	111	59.5	1.8	38.7
Cefepime	110	58.2	4.5	37.3
Cefixime	110	62.7	5.5	31.8
Tetracycline	108	50.9	20.4	28.7
Ampicillin/Sulbactam	110	63.6	10	26.4
Cefuroxime	57	66.7	14	19.3
Cephalexin	110	72.7	10.9	16.4
Amoxicillin/Clavulanic acid	109	72.4	13.8	13.8
Ampicillin	110	99.1	0	0.9
ESBL**	92	58.7		41.3

* *Klebsiella* spp included: *Klebsiella pneumonia* (64), *Klebsiella* sp. (44) and *Klebsiella oxytoca* (4).

The most effective antibiotics, in descending order: 1-Amikacin, 2- Imipenem, 3- Tigecycline.

The least effective antibiotics: 1-Ampicillin, 2- Amoxicillin/Clavulanic acid, 3- Cephalexin.

**Extended-spectrum β -lactamases (ESBLs) are enzymes that mediate resistance to extended- spectrum (third generation) cephalosporins (e.g., ceftazidime, cefotaxime, and ceftriaxone) and monobactams (e.g., aztreonam) but do not affect cephamycins (e.g., cefoxitin and cefotetan) or carbapenems (e.g., meropenem or imipenem). The presence of an ESBL-producing organism in a clinical infection can result in treatment failure if one of the above classes of drugs is used.

Table 16: Demographic and clinical characteristics of 112 *Klebsiella spp.* Isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

variables		Number	Percent
Female/Male		46/66	41/59
Hospitals	Nemazee	90	80.3
	Shahid Dastgheib	4	3.6
	Shiraz Central (MRI)	4	3.6
	Dena	3	2.7
	Others	2	1.8
	Non-identified	9	8
Wards	Intensive care unit	28	25
	Emergency	27	24.2
	Adult medical	18	16.1
	Pediatric medical	11	9.8
	NICU	6	5.3
	Non-identified	22	19.6
Age groups	Adult	59	52.7
	Children	23	20.5
	Neonates	10	8.9
	Non-identified	20	17.9
Infection types	Community-acquired or Health care associated#	50	44.6
	Hospital-acquired*	35	31.3
	Health care associated\$	11	9.8
	Non-identified	16	14.3

* Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Others hospital include Hafez 1(0.9%), and Ali Asghar 1(0.9%)

Table 17: Susceptibility Profile of 94 *Klebsiella spp. isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)**

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Imipenem	91	28.6	9.9	61.5
Amikacin	93	34.4	4.3	61.3
Levofloxacin	92	39.1	2.2	58.7
Tigecycline	90	12.2	33.3	54.5
Meropenem	92	35.9	9.8	54.3
Piperacillin/Tazobactam	90	37.8	8.9	53.3
Chloramphenicol	91	34.1	13.2	52.7
Gentamicin	92	44.6	5.4	50
Ciprofloxacin	93	40.8	9.7	49.5
Tobramycin	93	51.6	2.2	46.2
Aztreonam	93	43	11.8	45.2
Trimethoprim/Sulfamethoxazole	89	48.3	7.9	43.8
Ceftriaxone	92	57.6	0	42.4
Ceftazidime	92	59.8	2.2	38
Cefotaxime	91	60.4	2.2	37.4
Cefepime	92	62	2.2	35.8
Cefixime	89	61.8	4.5	33.7
Cefuroxime	92	64.1	6.5	29.4
Ampicillin/Sulbactam	92	65.2	10.9	23.9
Cephalexin	93	67.7	9.7	22.6
Tetracycline	92	60.9	20.6	18.5
Amoxicillin/Clavulanic acid	93	68.8	14	17.2
Ampicillin	92	97.8	1.1	1.1
ESBL**	83	62.7		37.3

The most effective antibiotics, in descending order: 1- Imipenem, 2- Amikacin, 3- Levofloxacin.

The least effective antibiotics: 1-Ampicillin, 2- Amoxicillin/Clavulanic acid, 3- Tetracycline.

**Klebsiella spp* included: *Klebsiella pneumonia* (44), *Klebsiella sp.* (41), and *Klebsiella oxytoca* (9).

**Extended-spectrum β -lactamases (ESBLs) are enzymes that mediate resistance to extended- spectrum (third generation) cephalosporins (e.g., ceftazidime, cefotaxime, and ceftriaxone) and monobactams (e.g., aztreonam) but do not affect cephamycins (e.g., cefoxitin and cefotetan) or carbapenems (e.g., meropenem or imipenem). The presence of an ESBL-producing organism in a clinical infection can result in treatment failure if one of the above classes of drugs is used.

Table 18: Demographic and clinical characteristics of 94 *Klebsiella* spp. isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		40/54	43/57
Hospitals	Nemazee	92	98
	Dena	1	1
	Hafez	1	1
Wards	Emergency	42	44.7
	NICU	16	17
	Intensive care unit	13	13.8
	Adult Medical	10	10.6
	Pediatric medical	4	4.2
	Surgery	3	3.2
	Non-identified	6	6.5
Age groups	Adult	62	66
	Neonates	15	15.9
	Children	11	11.7
	Non-identified	6	6.4
Infection types	Hospital-acquired*	50	53.2
	Community-acquired or Health care associated#	31	33
	Health care associated\$	5	5.3
	Non-identified	8	8.5

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Section Three

Susceptibility Profiles of Non-Fermenting Gram-negative bacteria isolated for blood culture

March 2020 – March 2022 (1399-1400)

(Alphabetical order)

- *Achromobacter spp.*
- *Acinetobacter spp.*
- *Pseudomonas spp.*
- *Stenotrophomonas maltophilia*



Table 19: Susceptibility Profiles of 54 *Achromobacter* spp. isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Imipenem	53	0	0	100
Piperacillin/Tazobactam	53	1.9	0	98.1
Trimethoprim/Sulfamethoxazole	52	3.8	0	96.2
Levofloxacin	54	5.6	3.7	90.7
Tigecycline	54	0	13	87
Meropenem	53	11.3	7.5	81.2
Ceftazidime	53	43.4	41.5	15.1
Cefuroxime	27	88.9	0	11.1
Chloramphenicol	51	47.1	43.1	9.8
Cefepime	51	90.2	5.9	3.9
Tetracycline	52	96.2	0	3.8
Ampicillin/Sulbactam	51	98	0	2
Amoxicillin/Clavulanic acid	50	96	2	2
Gentamicin	50	98	0	2
Tobramycin	50	98	0	2
Ciprofloxacin	53	18.9	79.2	1.9
Amikacin	52	98.1	0	1.9
Ceftriaxone	53	100	0	0
Cefixime	53	100	0	0
Ampicillin	52	96.2	3.8	0
Cephalexin	51	100	0	0
Aztreonam	50	98	2	0
Cefotaxime	48	97.9	2.1	0

The most effective antibiotics, in descending order: 1- Imipenem, 2- Piperacillin/Tazobactam, 3- Trimethoprim/Sulfamethoxazole.

The least effective antibiotics: 1- Ceftriaxone/ Cefixime/Ampicillin/Cephalexin/Aztreonam/Cefotaxime, 2- Amikacin/ Ciprofloxacin, 3- Ampicillin/Sulbactam/Amoxicillin/Clavulanic acid/Gentamicin/Tobramycin.

Table 20: Demographic and clinical characteristics of 54 *Achromobacter* spp. isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

variables		Number	Percent
Female/Male		20/34	37/63
Hospitals	Nemazee	54	100
Wards	Emergency	13	24.1
	Pediatric medical	11	20.4
	Adult Medical	11	20.4
	Intensive care unit	10	18.5
	Surgery	3	5.5
	Non-identified	6	11.1
Age groups	Adult	22	40.7
	Children	21	39
	Neonates	3	5.5
	Non-identified	8	14.8
Infection types	Community-acquired or Health care associated#	34	63
	Health care associated\$	7	13
	Hospital-acquired*	5	9.2
	Non-identified	8	14.8

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 21: Susceptibility Profiles of 43 *Achromobacter* spp. Isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Imipenem	43	0	0	100
Meropenem	43	0	0	100
Piperacillin/Tazobactam	43	0	0	100
Trimethoprim/Sulfamethoxazole	42	2.4	0	97.6
Tigecycline	43	0	9.3	90.7
Levofloxacin	42	4.8	42.8	52.4
Ciprofloxacin	43	44.2	27.9	27.9
Ceftazidime	42	38.1	42.9	19
Chloramphenicol	43	65.1	20.9	14
Tetracycline	42	95.2	2.4	2.4
Amikacin	43	90.7	7	2.3
Tobramycin	43	97.7	0	2.3
Ampicillin	43	100	0	0
Ampicillin/Sulbactam	43	97.7	2.3	0
Aztreonam	43	100	0	0
Ceftriaxone	43	100	0	0
Gentamicin	43	97.7	2.3	0
Cefixime	43	100	0	0
Cephalexin	43	100	0	0
Amoxicillin/Clavulanic acid	42	100	0	0
Cefotaxime	42	100	0	0
Cefuroxime	41	100	0	0
Cefepime	41	100	0	0

The most effective antibiotics, in descending order: 1- Imipenem/ Meropenem/ Piperacillin/Tazobactam, 2- Trimethoprim/Sulfamethoxazole, 3- Tigecycline.

The least effective antibiotics: 1-Ampicillin/Ampicillin/Sulbactam/Aztreonam/Ceftriaxone/Gentamicin/Cefixime/Cephalexin/Amoxicillin/Clavulanic acid/Cefotaxime/Cefuroxime/Cefepime, 2-Amikacin/Tobramycin, 3- Tetracycline.

Table 22: Demographic and clinical characteristics of 43 *Achromobacter* spp.

Isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		22/21	52/48
Hospitals	Nemazee	42	98
	Shahid Dastgheib	1	2
Wards	Emergency	27	62.8
	Adult medical	6	14
	Intensive care unit	3	7
	Surgery	3	7
	Non identified	4	9.2
Age groups	Adult	35	81.4
	Children	2	4.6
	Non-identified	6	14
Infection types	Community-acquired or Health care associated#	26	60.4
	Hospital-acquired*	9	21
	Health care associated\$	3	7
	Non-identified	5	11.6

* Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 23: Susceptibility Profiles of 58 *Acinetobacter* spp. isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Gentamicin	54	68.5	0	31.5
Trimethoprim/Sulfamethoxazole	56	66	3.6	30.4
Tigecycline	58	37.9	32.8	29.3
Tobramycin	54	75.9	0	24.1
Amikacin	55	74.5	1.8	23.7
Levofloxacin	56	75	1.8	23.2
Ampicillin/Sulbactam	56	76.8	1.8	21.4
Imipenem	55	78.2	1.8	20
Ciprofloxacin	55	80	1.8	18.2
Piperacillin/Tazobactam	55	80	1.8	18.2
Meropenem	55	83.6	1.8	14.6
Chloramphenicol	53	88.7	1.9	9.4
Cefepime	53	84.9	5.7	9.4
Tetracycline	52	76.9	15.4	7.7
Ceftazidime	55	89.1	3.6	7.3
Ampicillin	54	94.4	0	5.6
Amoxicillin/Clavulanic acid	56	92.9	1.8	5.3
Cefotaxime	56	92.9	1.8	5.3
Aztreonam	55	89.1	7.3	3.6
Cefuroxime	45	95.6	2.2	2.2
Cephalexin	56	98.2	0	1.8
Ceftriaxone	56	94.6	5.4	0
Cefixime	52	98.1	1.9	0

**Acinetobacter* spp. include *Acinetobacter baumannii* (39), *Acinetobacter* sp. (15), *Acinetobacter lwoffii* (3), and *Acinetobacter haemolyticum* (1)

The most effective antibiotics, in descending order: 1 - Gentamicin, 2- Trimethoprim/Sulfamethoxazole, 3- Tigecycline.

The least effective antibiotics: 1- Cefixime/ Ceftriaxone, 2- Cephalexin, 3- Cefuroxime.

Table 24: Demographic and clinical characteristics of 58 *Acinetobacter* spp. isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

variables		Number	Percent
Female/Male		15/43	26/74
Hospitals	Nemazee	51	88
	Dena	4	7
	Shahid Beheshti	2	3
	Shiraz Central (MRI)	1	2
Wards	Intensive care unit	21	36.2
	Adult Medical	11	19
	Emergency	10	17.2
	NICU	7	12.1
	Pediatric medical	4	6.9
	Non-identified	5	8.6
Age groups	Adult	37	63.8
	Children	9	15.5
	Neonates	8	13.8
	Non-identified	4	6.9
Infection types	Hospital-acquired*	35	60.3
	Community-acquired or Health care associated#	16	27.6
	Health care associated\$	4	6.9
	Non-identified	3	5.2

* Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 25: Susceptibility Profiles of 44 *Acinetobacter* spp. Isolated from blood culture in Shiraz, March 2021- March 2022 (1400)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Tigecycline	44	43.2	31.8	25
Gentamicin	44	79.5	4.5	16
Tobramycin	43	86	0	14
Amikacin	43	86	2.3	11.7
Ampicillin/Sulbactam	44	90.9	0	9.1
Levofloxacin	44	90.9	0	9.1
Trimethoprim/Sulfamethoxazole	44	90.9	0	9.1
Imipenem	44	93.2	0	6.8
Piperacillin/Tazobactam	44	90.9	2.3	6.8
Ceftriaxone	43	88.4	7	4.6
Aztreonam	44	95.4	2.3	2.3
Chloramphenicol	44	93.2	4.5	2.3
Ciprofloxacin	44	93.2	4.5	2.3
Meropenem	44	97.7	0	2.3
Ampicillin	44	100	0	0
Ceftazidime	44	90.9	9.1	0
Cefotaxime	44	93.2	6.8	0
Tetracycline	44	95.5	4.5	0
Cephalexin	44	100	0	0
Amoxicillin/Clavulanic acid	43	97.7	2.3	0
Cefixime	43	97.7	2.3	0
Cefuroxime	42	95.2	4.8	0
Cefepime	41	100	0	0

**Acinetobacter* spp. include *Acinetobacter baumannii*, (35) *Acinetobacter lwoffii* (1), and *Acinetobacter* subsp (8).

The most effective antibiotics, in descending order: 1- Tigecycline, 2- Gentamicin, 3- Tobramycin.

The least effective antibiotics: 1-Ampicillin/Ceftazidime/ Cefotaxime/ Tetracycline/ Cephalexin/ Amoxicillin/Clavulanic acid/ Cefixime/ Cefuroxime/ Cefepime, 2- Meropenem/Aztreonam/Chloramphenicol/Ciprofloxacin, 3- Ceftriaxone.

Table 26: Demographic and clinical characteristics of 44 *Acinetobacter* spp. isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		13/31	30/70
Hospitals	Nemazee	41	93.2
	Shahid Dastgheib	2	4.5
	Non-identified	1	2.3
Wards	Emergency	14	31.8
	Adult Medical	8	18.2
	Intensive care unit	6	13.6
	Surgery	6	13.6
	Pediatric medical	5	11.4
	NICU	1	2.3
	Non-identified	4	9.1
Age groups	Adult	29	66
	Children	10	22.7
	Neonates	2	4.5
	Non-identified	3	6.8
Infection types	Hospital-acquired*	30	68.2
	Community-acquired or Health care associated#	8	18.2
	Health care associated\$	1	2.3
	Non-identified	5	11.3

* Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 27: Susceptibility Profiles of 59 *Pseudomonas* spp. isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Piperacillin/Tazobactam	54	14.8	7.4	77.8
Levofloxacin	57	24.6	0	75.4
Amikacin	53	26.4	1.9	71.7
Tobramycin	53	28.3	0	71.7
Ciprofloxacin	56	21.4	7.2	71.4
Ceftazidime	54	24	13	63
Gentamicin	54	31.5	5.5	63
Imipenem	55	27.3	12.7	60
Cefepime	52	32.7	11.5	55.8
Aztreonam	50	24	22	54
Meropenem	54	38.9	9.3	51.8
Tigecycline	54	88.9	0	11.1
Trimethoprim/Sulfamethoxazole	57	91.2	1.8	7
Cefotaxime	53	79.2	15.1	5.7
Amoxicillin/Clavulanic acid	54	94.4	0	5.6
Ampicillin/Sulbactam	56	92.8	1.8	5.4
Ampicillin	55	96.4	0	3.6
Chloramphenicol	55	90.9	5.5	3.6
Tetracycline	46	95.6	2.2	2.2
Ceftriaxone	56	91.1	8.9	0
Cefixime	56	98.2	1.8	0
Cephalexin	52	100	0	0
Cefuroxime	32	100	0	0

Pseudomonas spp. include *Pseudomonas aeruginosa* (45), *Pseudomonas* sp. (11), *Pseudomonas stutzeri* (2) and *Pseudomonas fluorescens* (1).

The most effective antibiotics, in descending order: 1- Piperacillin/Tazobactam, 2- Levofloxacin, 3- Amikacin.

The least effective antibiotics, in descending order: 1- Ceftriaxone/ Cefixime/ Cephalexin/ Cefuroxime, 2- Tetracycline 3- Chloramphenicol

Table 28: Demographic and clinical characteristics of 59 *Pseudomonas* spp. Isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

variables		Number	Percent
Female/Male		27/32	46/54
Hospitals	Nemazee	40	67.8
	Shahid Dastgheib	15	25.4
	Shiraz Central (MRI)	2	3.4
	Non-identified	2	3.4
Wards	Emergency	26	44.1
	Pediatric medical	10	16.9
	Adult Medical	8	13.5
	Intensive care unit	7	11.9
	Surgery	1	1.7
	Non-identified	7	11.9
Age groups	Children	27	45.8
	Adult	22	37.3
	Neonates	2	3.4
	Non-identified	8	13.5
Infection types	Community-acquired or Health care associated#	30	50.9
	Hospital-acquired*	12	20.3
	Health care associated\$	11	18.6
	Non-identified	6	10.2

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 29: Susceptibility Profiles of 46 *Pseudomonas* spp. isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Amikacin	46	13	0	87
Piperacillin/Tazobactam	46	17.4	2.2	80.4
Tobramycin	45	15.6	4.4	80
Gentamicin	46	15.2	6.5	78.3
Ciprofloxacin	45	20	4.4	75.6
Imipenem	45	20	4.4	75.6
Levofloxacin	46	21.7	10.9	67.4
Meropenem	45	28.9	4.4	66.7
Ceftazidime	46	23.9	15.2	60.9
Aztreonam	45	28.9	31.1	40
Cefepime	46	47.8	13	39.2
Trimethoprim/Sulfamethoxazole	45	77.8	0	22.2
Tigecycline	45	80	2.2	17.8
Ceftriaxone	45	66.7	24.4	8.9
Tetracycline	46	87	4.3	8.7
Ampicillin/Sulbactam	45	88.9	4.4	6.7
Cefotaxime	45	82.2	11.1	6.7
Amoxicillin/Clavulanic acid	46	89.1	6.5	4.4
Chloramphenicol	46	89.1	6.5	4.4
Cefuroxime	46	97.8	0	2.2
Cefixime	46	95.7	2.1	2.2
Cephalexin	46	97.8	0	2.2
Ampicillin	46	97.8	2.2	0

Pseudomonas spp. include *Pseudomonas aeruginosa* (34), *Pseudomonas* sp. (9), *Pseudomonas stutzeri* (2), and *Pseudomonas mendocina* (1).

The most effective antibiotics, in descending order: 1- Amikacin, 2- Piperacillin/Tazobactam, 3- Tobramycin.

The least effective antibiotics, in descending order: 1- Ampicillin, 2- Cephalexin/ Cefixime, / Cefuroxime

3- Chloramphenicol/Amoxicillin/Clavulanic acid.

Table 30: Demographic and clinical characteristics of 46 *Pseudomonas* spp. Isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		19/27	41.3/58.7
Hospitals	Nemazee	42	91.4
	Shahid Dastgheib	2	4.3
	Non-identified	2	4.3
Wards	Emergency	30	65.2
	Intensive care unit	5	10.9
	Adult Medical	5	10.9
	Pediatric medical	4	8.6
	Neonate	1	2.2
	Non-identified	1	2.2
Age groups	Adult	34	73.9
	Children	11	23.9
	Neonates	1	2.2
Infection types	Community-acquired or Health care associated#	25	54.3
	Hospital-acquired*	13	28.3
	Health care associated\$	4	8.7
	Non-identified	4	8.7

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 31: Susceptibility Profiles of 103 *Stenotrophomonas maltophilia* isolated from Blood culture in Shiraz, March 2020 – March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Trimethoprim/Sulfamethoxazole	103	1.9	0	98.1
Levofloxacin	103	1	1.9	97.1
Tigecycline	100	2	11	87
Piperacillin/Tazobactam	98	49	23.5	27.5
Ceftazidime	99	58.6	21.2	20.2
Chloramphenicol	98	35.7	53.1	11.2

The most effective antibiotics, in descending order: 1- Trimethoprim/Sulfamethoxazole, 2- Levofloxacin, 3- Tigecycline.

The least effective antibiotics, in descending order: 1- Chloramphenicol, 2- Ceftazidime, 3- Piperacillin/Tazobactam.

Table 32: Demographic and clinical characteristics of 103 *Stenotrophomonas maltophilia* isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

variables		Number	Percent
Female/Male		47/56	46/54
Hospitals	Nemazee	52	50.5
	Shahid Dastgheib	45	43.7
	Shefa	1	1
	Non-identified	5	4.8
Wards	Emergency	56	54.4
	Pediatric medical	19	18.4
	Intensive care unit	8	7.8
	Adult medical	8	7.8
	NICU	4	3.9
	Surgery	2	1.9
	Non-identified	6	5.8
Age groups	Children	65	63.1
	Adult	18	17.5
	Neonates	6	5.8
	Non-identified	14	13.6
Infection types	Community-acquired or Health care associated#	55	53.4
	Hospital-acquired*	21	20.4
	Health care associated\$	19	18.4
	Non-identified	8	7.8

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 33: Susceptibility Profiles of 34 *Stenotrophomonas maltophilia* isolated from Blood culture in Shiraz, March 2021 – March 2022 (1400)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Trimethoprim/Sulfamethoxazole	33	9.1	3	87.9
Levofloxacin	34	5.9	11.8	82.3
Tigecycline	31	3.2	22.6	74.2
Chloramphenicol	33	54.5	9.1	36.4
Piperacillin/Tazobactam	34	41.2	35.3	23.5
Ceftazidime	31	67.7	9.7	22.6

The most effective antibiotics, in descending order: 1- Trimethoprim/Sulfamethoxazole, 2- Levofloxacin, 3- Tigecycline.

The least effective antibiotics, in descending order: 1- Ceftazidime, 2- Piperacillin/Tazobactam, 3- Chloramphenicol.

Table 34: Demographic and clinical characteristics of 34 *Stenotrophomonas maltophilia* isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		8 / 26	24 / 76
Hospitals	Nemazee	26	76.5
	Shahid Dastgheib	8	23.5
Wards	Emergency	15	44.1
	Pediatric medical	6	17.6
	Intensive care unit	4	11.8
	Adult Medical	4	11.8
	Surgery	2	5.9
	Non-identified	3	8.8
Age groups	Children	19	55.9
	Adult	12	35.3
	Non-identified	3	8.8
Infection types	Community-acquired or Health care associated#	15	44.1
	Hospital-acquired*	14	41.2
	Health care associated\$	2	5.9
	Non-identified	3	8.8

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Section Four

susceptibility Profiles of Gram- positive bacteria isolated for blood culture march 2020-March 2022 (1399-1400) (alphabetical order)

- *Enterococcus spp.*
- *Staphylococcus aureus*
- *Streptococcus viridians*



Table 35: Susceptibility Profiles of 69 *Enterococcus spp.* Isolated from Blood by Bactec System in Shiraz, March 2020- March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Linezolid	69	0	0	100
Vancomycin	69	65.2	0	34.8
Ampicillin	64	65.6	0	34.4
Gentamicin-High	66	60.6	6.1	33.3
Teicoplanin	53	69.8	3.8	26.4
Imipenem	64	68.8	6.2	25
Trimethoprim/Sulfamethoxazole	66	72.7	4.5	22.8
Levofloxacin	50	78	2	20
Gentamicin	68	75	7.4	17.6
Penicillin G	67	83.6	0	16.4
Chloramphenicol	62	51.6	32.3	16.1
Doxycycline	66	86.4	7.6	6
Cefotaxime	61	93.4	1.6	5
Ceftriaxone	65	95.4	0	4.6
Rifampin	60	88.3	8.3	3.4
Erythromycin	67	94	4.5	1.5
Ciprofloxacin	66	94	4.5	1.5
Clindamycin	65	98.5	0	1.5
Oxacillin	65	100	0	0
Azithromycin	63	98.4	1.6	0
Cefoxitin	47	100	0	0
Cefepime	39	100	0	0
Cefixime	23	100	0	0

The most effective antibiotics, in descending order: 1- Linezolid, 2- Vancomycin, 3- Ampicillin

The least effective antibiotics: 1- Oxacillin/ Azithromycin/ Cefoxitin/ Cefepime/Cefixime, 2-Erythromycin/ Ciprofloxacin/ Clindamycin, and 3- Rifampin

Table 36: Demographic and clinical characteristics of 69 *Enterococcus* spp. isolated from blood culture in Shiraz, March 2020– March 2021 (1399)

variables		Number	Percent
Female/Male		36/33	52/48
Hospitals	Nemazee	54	78.3
	Dena	6	8.7
	Shiraz Central (MRI)	6	8.7
	Non-identified	3	4.3
Wards	Intensive care unit	16	23.2
	Adult Medical	16	23.2
	Emergency	14	20.3
	NICU	6	8.7
	Pediatric medical	4	5.8
	Surgery	4	5.8
	Non-identified	9	13
Age groups	Adult	50	72.5
	Children	6	8.7
	Neonates	5	7.2
	Non-identified	8	11.6
Infection types	Hospital-acquired*	37	53.6
	Community-acquired or Health care associated#	13	18.9
	Health care associated\$	10	14.5
	Non-identified	9	13

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 37: Susceptibility Profiles of 64 *Enterococcus* spp. isolated from blood by Bactec system in Shiraz, March 2021 – March 2022 (1400)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Linezolid	63	1.6	0	98.4
Gentamicin-High	62	46.8	0	53.2
Chloramphenicol	58	37.9	10.3	51.8
Vancomycin	62	59.7	0	40.3
Ampicillin	63	63.5	0	36.5
Teicoplanin	62	62.9	1.6	35.5
Imipenem	61	62.3	3.3	34.4
Doxycycline	63	61.9	15.9	22.2
Trimethoprim/Sulfamethoxazole	63	79.4	1.6	19
Levofloxacin	54	72.2	9.3	18.5
Penicillin G	60	86.7	0	13.3
Ceftriaxone	62	91.9	0	8.1
Gentamicin	63	82.5	9.5	8
Rifampin	61	88.5	4.9	6.6
Ciprofloxacin	63	81	15.8	3.2
Clindamycin	62	96.8	0	3.2
Cefoxitin	57	98.2	0	1.8
Cefepime	59	98.3	0	1.7
Cefotaxime	64	98.4	0	1.6
Erythromycin	63	98.4	0	1.6
Oxacillin	63	98.4	0	1.6
Azithromycin	63	95.2	3.2	1.6
Cefixime	20	100	0	0

The most effective antibiotics, in descending order: 1- Linezolid, 2- Gentamicin-High, 3- Chloramphenicol.

The least effective antibiotics: 1- Cefixime, 2- Azithromycin, 3- Oxacillin.

Table 38: Demographic and clinical characteristics of 64 *Enterococcus spp.* isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		20/44	32/68
Hospitals	Nemazee	61	95
	Al Zahra cardiac	3	5
Wards	Emergency	35	54.7
	Adult Medical	14	21.8
	Intensive care unit	9	14.1
	Surgery	1	1.6
	Pediatric	1	1.6
	Non-identified	4	6.2
Age groups	Adult	55	86
	pediatric	5	7.8
	Non-identified	4	6.2
Infection types	Hospital-acquired*	26	40.6
	Community-acquired or Health care associated#	26	40.6
	Health care associated\$	6	9.4
	Non-identified	6	9.4

* Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 39: Susceptibility Profiles of 118 *Staphylococcus aureus* isolated from blood by Bactec system in Shiraz, March 2020 – March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Vancomycin	117	0	0	100
Linezolid	117	0	0	100
Gentamicin	117	3.4	0.9	95.7
Rifampin	117	5.1	1.7	93.2
Trimethoprim/Sulfamethoxazole	112	6.2	1.8	92
Levofloxacin	116	15.5	15.5	69
Cefoxitin	116	31	0	69
Oxacillin	117	31.6	0	68.4
Clindamycin	115	38.3	0.9	60.8
Doxycycline	114	30.7	9.6	59.7
Ciprofloxacin	117	35.9	6	58.1
Erythromycin	117	48.7	0.9	50.4
Penicillin G	113	96.5	0	3.5

The most effective antibiotics, in descending order: 1- Vancomycin / linezolid, 2- Gentamicin, 3 -Rifampin.

The least effective antibiotics, in descending order: 1-Penicillin G, 2- Erythromycin, 3- Ciprofloxacin.

Table 40: Demographic and clinical characteristics of 118 *Staphylococcus aureus* isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

variables		Number	Percent
Female/Male		53/65	45/55
Hospitals	Nemazee	109	92.4
	Al Zahra cardiac	2	1.7
	Kosar	1	0.8
	Non-identified	6	5.1
Wards	Emergency	40	34
	Adult Medical	37	31.3
	Pediatric medical	10	8.5
	Intensive care unit	8	6.8
	Surgery	5	4.2
	Neonate	1	0.8
	Non-identified	17	14.4
	Age groups	Adult	82
	Children	15	12.7
	Neonates	1	0.8
	Non-identified	20	17
Infection types	Community-acquired or Health care associated#	56	47.5
	Health care associated\$	23	19.5
	Hospital-acquired*	18	15.2
	Non-identified	21	17.8

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 41: Susceptibility Profiles of 95 *Staphylococcus aureus* isolated from blood by Bactec system in Shiraz, March 2021 – March 2022 (1400)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Linezolid	92	1.1	0	98.9
Vancomycin	83	1.1	0	98.9
Gentamicin	92	2.2	3.3	94.5
Rifampin	94	4.3	2.1	93.6
Trimethoprim/Sulfamethoxazole	94	12.8	6.4	80.8
Levofloxacin	91	35.2	3.3	61.5
Doxycycline	93	35.5	10.8	53.7
Clindamycin	94	45.7	4.3	50
Ciprofloxacin	92	40.2	14.1	45.7
Erythromycin	94	50	6.4	43.6
Cefoxitin	94	64.9	0	35.1
Oxacillin	94	64.9	2.1	33
Cephalexin	59	69.5	10.2	20.3
Cefepime	90	73.3	6.7	20
Penicillin G	92	94.6	0	5.4

The most effective antibiotics, in descending order: 1- Vancomycin and Linezolid, 2- Gentamicin, 3- Rifampin.

The least effective antibiotics, in descending order: 1-Penicillin G, 2- Cefepime, 3- Cephalexin.

Table 42: Demographic and clinical characteristics of 95 *Staphylococcus aureus* isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		34/61	36/64
Hospitals	Nemazee	91	96
	Dena	1	1
	Shiraz Central (MRI)	1	1
	Non-identified	2	2
Wards	Emergency	55	58
	Adult Medical	17	17.9
	Intensive care unit	6	6.3
	Pediatric medical	3	3.1
	Surgery	4	4.2
	NICU	2	2.1
	Non-identified	8	8.4
Age groups	Adult	82	86.3
	Children	8	8.4
	Neonates	2	2.1
	Non-identified	3	3.2
Infection types	Community-acquired or Health care associated#	52	54.7
	Hospital-acquired*	23	24.2
	Health care associated\$	11	11.6
	Non-identified	9	9.5

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 43: Susceptibility Profiles of 15 *Streptococcus* spp. isolated from blood culture in Shiraz, March 2020 – March 2021 (1399)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Vancomycin	15	0	0	100
Teicoplanin	13	0	0	100
Levofloxacin	12	0	0	100
Linezolid	12	0	0	100
Cefepime	5	0	0	100
Rifampin	12	8.3	0	91.7
Imipenem	13	0	15.4	84.6
Gentamicin-High	6	16.7	0	83.3
Chloramphenicol	9	11.1	22.2	66.7
Cefotaxime	9	33.3	11.1	55.6
Ampicillin	13	23.1	23.1	53.8
Doxycycline	12	50	0	50
Ceftriaxone	10	40	10	50
Penicillin G	10	40	10	50
Cefoxitin	13	53.8	0	46.2
Clindamycin	11	36.4	18.2	45.4
Gentamicin	12	16.7	41.7	41.6
Cephalexin	5	60	0	40
Trimethoprim/Sulfamethoxazole	14	57.1	14.3	28.6
Oxacillin	11	81.8	0	18.2
Ciprofloxacin	12	50	33.3	16.7
Erythromycin	12	66.7	25	8.3
Azithromycin	12	91.7	0	8.3

The most effective antibiotics, in descending order: 1- Vancomycin/ Teicoplanin/ Levofloxacin/ Linezolid/ Cefepime, 2- Rifampin, 3- Imipenem

The least effective antibiotics: 1- Azithromycin / Erythromycin, 2- Ciprofloxacin, 3- Oxacillin.

Table 44: Demographic and clinical characteristics of 15 *Streptococcus* spp. isolated from blood culture in Shiraz, March 2020– March 2021 (1399)

variables		Number	Percent
Female/Male		6/9	42/58
Hospitals	Nemazee	8	53.4
	Al-zahra	2	13.3
	Dena	2	13.3
	Non-identified	3	20
Wards	Emergency	7	34
	Pediatric medical	2	29
	Surgery	1	8
	NICU	1	13
	Non-identified	4	8
Age groups	Children	7	55
	Adult	6	3
	Neonates	1	24
	Non-identified	1	18
Infection types	Community-acquired or Health care associated#	10	66.7
	Health care associated\$	2	13.3
	Hospital-acquired*	0	0
	Non-identified	3	20

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)

Table 45: Susceptibility Profiles of 11 *Streptococcus* spp. isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

Antibiotic name	Number	Susceptibility (%)		
		Resistance	Intermediate	Sensitive
Levofloxacin	10	0	0	100
Teicoplanin	10	0	0	100
Linezolid	9	0	0	100
Vancomycin	8	0	0	100
Gentamicin-High	8	0	0	100
Ceftriaxone	10	10	0	90
Cefotaxime	10	10	0	90
Chloramphenicol	10	10	0	90
Imipenem	10	10	0	90
Ampicillin	10	20	0	80
Ciprofloxacin	11	9.1	18.2	72.7
Doxycycline	11	9.1	18.2	72.7
Cefepime	10	20	10	70
Cefoxitin	11	36.4	0	63.6
Clindamycin	11	36.4	0	63.6
Erythromycin	11	27.3	9.1	63.6
Rifampin	10	40	0	60
Cephalexin	7	28.6	14.3	57.1
Penicillin G	9	33.3	22.2	44.5
Oxacillin	10	60	0	40
Trimethoprim/Sulfamethoxazole	11	54.5	9.1	36.4
Gentamicin	10	50	20	30
Azithromycin	10	50	20	30

The most effective antibiotics, in descending order: 1- Levofloxacin/ Teicoplanin/ Linezolid/ Vancomycin/ Gentamicin-High, 2- Ceftriaxone/ Cefotaxime/Chloramphenicol/Imipenem, 3- Ampicillin

The least effective antibiotics: 1- Gentamicin / Azithromycin, 2- Trimethoprim/Sulfamethoxazole, 3- Oxacillin

Table 46: Demographic and clinical characteristics of 11 *Streptococcus* spp. isolated from blood culture in Shiraz, March 2021 – March 2022 (1400)

variables		Number	Percent
Female/Male		8/3	73/27
Hospitals	Nemazee	9	82
	Dena	1	9
	Dastghaib	1	9
Wards	Emergency	6	54.5
	Intensive care unit	2	18.2
	NICU	2	18.2
	Adult Medical	1	9.1
Age groups	Adult	7	63.6
	Neonates	2	18.2
	Children	1	9.1
	Non-identified	1	9.1
Infection types	Community-acquired or Health care associated#	7	63.6
	Hospital-acquired*	4	36.4
	Health care associated\$	0	0

Hospital-acquired infections, also called “Nosocomial infections”, are the infections acquired during hospital care, which are not present or incubating at admission. We classified infections occurring more than 48 hours after admission as nosocomial.

\$ Based on available data, health care associated infection is defined as an infection present at hospital admission or within 48 hours of admission in patients who were hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days. (Friedman ND, K et al, Ann Intern Med. 2002)

We were not able to define other criteria that put patients in the health care associated infections category such as: patients who received intravenous therapy at home, wound care or specialized nursing care in the previous 30 days; attended a hospital or hemodialysis clinic or received intravenous chemotherapy in the previous 30 days; hospitalized in an acute care hospital for ≥ 2 days in the previous 90 days, and resided in a nursing home or long-term care facility. Therefore, we classified them under "community-acquired or health care associated infections". (Friedman ND, K et al, Ann Intern Med. 2002)



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