2015 LOS ANGELES COUNTY
ACUTE CARE HOSPITAL ANTIBIOGRAM DATA

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Introduction

Antimicrobial resistance (AR) is a global public health concern. Facility-level antibiograms provide a summary (usually prepared annually) of the percentage of isolates susceptible to a variety of antimicrobial agents within a healthcare facility. The facility antibiogram is an important tool for the development of antimicrobial stewardship policies and protocols for empiric antibiotic selection. Facility antibiograms are often limited by relatively few organisms tested and limited geographic sampling.

Los Angeles County Department of Public Health (LAC DPH) analyzes data from facility-level antibiograms to develop an understanding of antimicrobial susceptibility and resistance among bacteria

recovered from clinical specimens in LA County[1]. Tracking susceptibility data will allow LAC DPH to better understand the problem of AR, and to better target interventions and prevention activities. LAC DPH will also use facility-level data to compile an annual **LA County Regional Antibiogram** that will be made available to healthcare facilities so they can compare their susceptibility rates to the county overall[2].

Regional antibiograms may be particularly useful to guide empiric therapy among: 1) small hospitals and skilled nursing facilities that do not encounter a wide variety of organisms; and 2) healthcare facilities outside LA County that receive patients from within LA County.

Although facility or regional antibiograms can assist healthcare professionals in guiding empiric therapies, clinicians should adjust antibiotic treatment to final microbiology results as soon as they are available[3].

The 2015 antibiogram data presented in this report were submitted voluntarily from 75 LAC acute care hospitals. Moving forward, all LA County hospitals and skilled nursing facilities are required to report antibiogram data in accordance with a Health Officer Order issued by LAC DPH in January 2017 beginning with data from 2016[4].

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[1] http://publichealth.lacounty.gov/acd/docs/AntibiogramInstructions.pdf
[2] http://publichealth.lacounty.gov/acd/docs/Antibiogram_HOO_FAQ.pdf
[3] Halstead DC, Gomez N, McCarter YS. Reality of Developing a Community-Wide Antibiogram. *Journal of Clinical Microbiology*. 2004;42(1):1-6. doi:10.1128/JCM.42.1.1-6.2004.
[4] http://publichealth.lacounty.gov/acd/docs/CREorder.pdf

Methodology Notes:

- Data included in the Regional Antibiogram was based on compilation of data from published facility-level antibiograms.
- Facility-level antibiograms that are used to guide empiric therapy of initial infections are generally prepared following CLSI M39 which recommends including data from the first isolate/patient /analysis period. These reports do not include data from subsequent isolates on a patient which may be more resistant than the first isolate. Therefore, % susceptibility data is likely overestimated in some cases.
- Facility-level antibiograms were generally compiled for the calendar year January 1 to December 31.
- Not all facilities reported results for all organism/drug combinations.
- Results are reported as presented by local microbiology labs. Inpatient isolates were used whenever possible, but this could not be determined in some facilities.
- Susceptibility was defined by local labs in all circumstances.
- At least 25% of laboratories submitting data were using outdated breakpoints (higher than currently recommended) for carbapenems in 2015 when testing the gram-negative bacteria listed here. Consequently, %S data for ertapenem and meropenem may be erroneously high.
- For fluoroquinolones, % susceptibility was obtained from both ciprofloxacin and levofloxacin for gram negative pathogens and levofloxacin and moxifloxacin for gram positive agents. The % susceptibility statistic presented is whichever of these two agents revealed the higher value.

Additional Antibiogram Information can be found in "CLSI. *Performance Standards for Antimicrobial Susceptibility Testing.* 28th ed. CLSI supplement M100. Wayne, PA: Clinical and Laboratory Standards Institute; 2018." And includes:

- Intrinsic resistance profiles of commonly encountered bacteria (Appendix B)
- Cumulative antimicrobial susceptibility report for anaerobic organisms (Appendix D)

Reference:

Clinical and Laboratory Standards Institute (CLSI). 2014. Analysis and Presentation of Cumulative Antimicrobial Susceptibility Test Data; M39-A4. CLSI, Wayne, PA

2015 LOS ANGELES COUNTY ACUTE CARE HOSPITAL ANTIBIOGRAM
Gram-Negative Organisms

Percent Susceptible (Number of isolates tested)	# of all isolates tested (# of hospitals reporting)	Penicillins		Cephalosporins			Carbapenems		Aminoglycosides			Quinolone	Other
		Ampicillin/ Sulbactam	Piperacillin/ Tazobactam	Ceftriaxone	Ceftazidime	Cefepime	Ertapenem	Meropenem	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin/ Levofloxaxin	Trimethoprim/ Sulfamethoxazole
Acinetobacter sp.	3189 (66)	-	33 (1,873)	11 (1,475)	30 (2,184)	34 (1,864)	R	53 (1,561)	43 (2,004)	41 (2,970)	46 (2,126)	33 (3,024)	49 (2,859)
Citrobacter freundii	1975 (43)	R	97 (1,823)	82 (1,869)	83 (1,503)	98 (1,713)	99 (1,156)	99 (1,142)	100 (1,536)	92 (1,924)	93 (1,138)	91 (1,975)	81 (1,939)
Citrobacter koseri	631 (23)	-	99 (631)	96 (631)	97 (427)	100 (456)	100 (223)	100 (184)	99 (389)	99 (631)	99 (428)	99 (631)	96 (601)
Enterobacter sp.	8122 (66)	R	82 (7,507)	80 (7,307)	82 (6,204)	96 (7,040)	96 (4,417)	99 (4,638)	100 (6,235)	97 (7,972)	96 (4,630)	96 (8,120)	92 (8,018)
Escherichia coli	139212 (73)	55 (25,534)	93 (115,257)	86 (105,020)	86 (95,157)	86 (90,175)	100 (78,427)	100 (84,318)	99 (104,151)	86 (129,487)	81 (67,956)	70 (129,130)	66 (123,819)
Klebsiella sp.	30655 (72)	-	84 (25,586)	86 (23,006)	86 (19,120)	85 (19,895)	98 (15,578)	97 (17,025)	94 (22,223)	91 (27,934)	82 (16,128)	86 (28,047)	82 (26,934)
Morganella sp.	2235 (52)	-	96 (2,233)	88 (2,055)	81 (1,811)	98 (1,921)	100 (1,148)	100 (1,127)	99 (1,913)	71 (2,234)	86 (1,358)	60 (2,231)	55 (2,154)
Proteus sp.	16908 (68)	-	98 (15,836)	90 (15,682)	92 (13,067)	92 (13,832)	99 (9,018)	99 (9,903)	99 (13,470)	83 (16,554)	84 (10,176)	68 (16,738)	68 (16,491)
Providencia sp.	1618 (36)	-	73 (1,542)	66 (1,404)	55 (1,315)	77 (1,285)	88 (228)	90 (553)	91 (1,442)	11 (1,259)	14 (960)	11 (1,512)	46 (1,513)
Pseudomonas aeruginosa	22804 (73)	R	83 (20,040)	R	82 (18,315)	84 (19,015)	R	82 (14,261)	95 (19,491)	83 (22,271)	91 (19,850)	69 (22,132)	R
Serratia sp.	2676 (58)	R	91 (2,098)	90 (2,403)	91 (2,188)	97 (2,203)	97 (1,414)	98 (1,579)	97 (2,188)	97 (2,757)	85 (1,677)	88 (2,646)	97 (2,544)
Stenotrophomonas maltophilia	1719 (50)	R	R	R	37 (848)	R	R	R	R	R	R	79 (1,052)	90 (1,548)

Data not collected denoted by "-".
R, intrinsic resistance

2015 Los Angeles County
Cumulative Antibiogram Data
Gram-Negatives

Methodology Notes for Gram-Negatives:

- At least 25% of laboratories submitting data were using outdated breakpoints (higher than currently recommended) for carbapenems in 2015 when testing the gram-negative bacteria listed here. Consequently, %S data for ertapenem and meropenem may be erroneously high.
- %S for carbapenems varies considerably among facilities
- Meropenem results should not be used to predict imipenem results for any species, nor imipenem used to predict meropenem results.
- Proteus, Providencia, and Morganella are intrinsically less susceptible to imipenem than to meropenem. Imipenem should not be used to classify Proteus, Providencia, or Morganella isolates as CRE.
- For fluoroquinolones, % susceptibility was obtained from both ciprofloxacin and levofloxacin data combined for each facility. The % susceptibility statistic presented is whichever of these two agents revealed the higher value at each facility.

Acinetobacter baumannii clonal complex (n=3,189 from 66 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin-Sulbactam	-	-	-
Piperacillin-Tazobactam	33.3% (0-81%)	1,873	41
Ceftriaxone	11.3% (0-61%)	1,475	29
Ceftazidime	30.2% (2-100%)	2,184	42
Cefepime	33.8% (3-82%)	1,864	35
Imipenem	-	-	-
Meropenem	52.9% (15-100%)	1,561	34
Amikacin	43.2% (0-80%)	2,004	36
Gentamicin	40.8% (10-100%)	2,970	62
Tobramycin	46.1% (14-100%)	2,126	46
Ciprofloxacin/Levofloxacin	32.7% (3-100%)	3,024	62
TMP-SMX	48.8% (18-84%)	2,859	59

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Insufficient data were available for ampicillin-sulbactam and minocycline which might be useful for some strains of *Acinetobacter baumannii*.

Citrobacter freundii (n=1,975 isolates from 43 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Piperacillin-Tazobactam	87.1% (63-100%)	1,823	44
Ceftriaxone	82.1% (56-100%)	1,869	46
Ceftazidime	83.2% (63-100%)	1,503	37
Cefepime	98.2% (90-100%)	1,713	39
Ertapenem	99.0% (90-100%)	1,156	24
Imipenem	-	-	-
Meropenem	98.5% (75-100%)	1,142	24
Amikacin	99.8% (85-100%)	1,536	38
Gentamicin	92.0% (72-100%)	1,924	48
Tobramycin	92.9% (69-100%)	1,138	33
Ciprofloxacin/Levofloxacin	91.0% (72-100%)	1,975	49
TMP/SMX	80.6% (54%-100%	1,939	48

Citrobacter koseri (n=631 isolates from 23 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin-Sulbactam	-	-	-
Piperacillin-Tazobactam	98.7% (89-100%)	631	23
Ceftriaxone	95.7% (21-100%)	631	23
Ceftazidime	96.7% (75-100%)	427	16
Cefepime	100% (100%)	456	18
Ertapenem	100% (100%)	223	9
Imipenem	-	-	-
Meropenem	100% (100%)	184	7
Amikacin	99.0% (89-100%)	389	15
Gentamicin	98.7% (93-100%)	631	23
Tobramycin	99.1% (94-100%)	428	16
Ciprofloxacin/Levofloxacin	98.9% (84-100%)	631	23
TMP/SMX	95.5% (74%-100%	601	22

Enterobacter spp. (n=8,122 from 66 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Piperacillin-Tazobactam	**82.3% (47-97%)**	7,507	63
Ceftriaxone	**80.2% (38-97%)**	7,307	57
Ceftazidime	**82.0% (38-97%)**	6,204	51
Cefepime	**95.9% (38-100%)**	7,040	51
Piperacillin-Tazobactam	**82.3% (47-97%)**	7,507	63
Ertapenem	**95.8% (54-100%)**	4,417	23
Imipenem	-	-	-
Meropenem	**98.7% (54-100%)**	4,638	33
Amikacin	**99.7% (77-100%)**	6,235	50
Gentamicin	96.8% (54-100%)	7,972	64
Tobramycin	**95.6% (54-100%)**	4,630	49
Ciprofloxacin/Levofloxacin	**96.1% (46-100%)**	8,120	66
TMP-SMX	**91.5% (54-100%)**	8,018	65

Escherichia coli (n=139,212 isolates from 73 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin-Sulbactam	54.6% (35%-68%)	25,534	19
Piperacillin-Tazobactam	93.2% (65-98%)	115,257	54
Ceftriaxone	85.6% (59-93%)	105,020	50
Ceftazidime	86.1% (57-94%)	95,157	45
Cefepime	85.7% (58-95%)	90,175	42
Ertapenem	99.7% (82-100%)	78,427	31
Imipenem	-	-	-
Meropenem	99.9% (99-100%)	84,318	29
Amikacin	98.7% (87-100%)	104,151	51
Gentamicin	85.6% (73-91%)	129,487	65
Tobramycin	81% (63-92%)	67,956	48
Ciprofloxacin/Levofloxacin	70.1% (30-88%)	129,130	65
TMP-SMX	65.6% (45-76%)	123,819	65

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Percent susceptible for oral agents for management of urinary tract infection, particularly trimethoprim-sulfamethoxazole and fluoroquinolones, is relatively low. Insufficient data were available for other oral agents which might be considered for urinary tract infections, such as nitrofurantoin, fosfomycin, amoxicillin-clavulanic acid and narrow-spectrum cephalosporins.

Klebsiella spp. (n=30,655 from 72 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin-Sulbactam	-	-	-
Piperacillin-Tazobactam	**83.9% (25-96%)**	25,586	57
Ceftriaxone	**85.5% (34-97%)**	23,006	52
Ceftazidime	**85.8% (34-97%)**	19,120	43
Cefepime	**84.8% (34-97%)**	19,895	43
Ertapenem	**97.6% (55-100%)**	15,578	29
Imipenem	-	-	-
Meropenem	**96.8% (55-100%)**	17,025	29
Amikacin	**93.7% (33-100%)**	22,223	49
Gentamicin	91.1% (57-98%)	27,934	63
Tobramycin	**81.5% (26-97%)**	16,128	47
Ciprofloxacin/Levofloxacin	**86.0% (28-97%)**	28,047	64
TMP-SMX	**81.8% (37-92%)**	26,934	63

Morganella spp. (n=2,235 isolates from 52 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin-Sulbactam	-	-	-
Piperacillin-Tazobactam	96.0% (43-100%)	2,233	52
Ceftriaxone	87.5% (63-100%)	2,055	47
Ceftazidime	81.1% (53-100%)	1,811	40
Cefepime	97.6% (81-100%)	1,921	42
Ertapenem	100% (100%)	1,148	24
Imipenem	67.5% (33-100%)	572	16
Meropenem	99.7% (88-100%)	1,127	23
Amikacin	98.5% (75-100%)	1,913	42
Gentamicin	70.7% (33-100%)	2,234	52
Tobramycin	85.7% (74-99%)	1,358	35
Ciprofloxacin/Levofloxacin	59.6% (15-86%)	2,231	52
TMP/SMX	54.5% (24%-80%	2,154	50

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Proteus, Providencia, and Morganella are intrinsically less susceptible to imipenem than to meropenem. Imipenem should not be used to classify Proteus / Providencia / Morganella isolates as CRE.

Clinicians should not use results of imipenem testing to infer activity of meropenem for any species.

Proteus spp. (n=16,908 from 68 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin-Sulbactam	-	-	-
Piperacillin-Tazobactam	97.5% (31-100%)	15,836	63
Ceftriaxone	90.4% (67-99%)	15,682	61
Ceftazidime	91.6% (63-100%)	13,067	49
Cefepime	91.7% (61-100%)	13,832	52
Ertapenem	98.9% (88-100%)	9,018	32
Imipenem	70.8% (11%-100%)	3,561	16
Meropenem	98.5% (63-100%)	9,903	32
Amikacin	98.7% (87-100%)	13,470	53
Gentamicin	82.9% (61-93%)	16,554	66
Tobramycin	84.1% (67-100%)	10,176	49
Ciprofloxacin/Levofloxacin	67.8% (27-97%)	16,738	67
TMP-SMX	67.6% (35-100%)	16,491	66

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Proteus, Providencia, and Morganella are intrinsically less susceptible to imipenem than to meropenem. Imipenem should not be used to classify Proteus / Providencia / Morganella isolates as CRE.

Clinicians should not use results of imipenem testing to infer activity of meropenem for any species.

Providencia spp. (n=1,618 isolates from 36 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin-Sulbactam	-	-	-
Piperacillin-Tazobactam	72.5% (45-97%)	1,542	35
Ceftriaxone	66.2% (30-100%)	1,404	32
Ceftazidime	55.2% (33-82%)	1,315	29
Cefepime	76.9% (58-97%)	1,285	28
Ertapenem	88.2% (68-100%)	228	8
Imipenem	73.5% (26-100%)	619	15
Meropenem	90.1% (55-100%)	553	14
Amikacin	91.3% (65-100%)	1,442	32
Gentamicin	11.7% (0-73%)	1,259	29
Tobramycin	14.4% (0-73%)	960	23
Ciprofloxacin/Levofloxacin	11.2% (0-40%)	1,512	34
TMP/SMX	46.0% (23-85%)	1,513	34

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Proteus, Providencia, and Morganella are intrinsically less susceptible to imipenem than to meropenem. Imipenem should not be used to classify Proteus / Providencia / Morganella isolates as CRE.

Clinicians should not use results of imipenem testing to infer activity of meropenem for any species.

Some *Providencia* spp. are known to have intrinsic resistance to gentamicin and tobramycin, but not amikacin. These data support this previously observed pattern.

Pseudomonas aeruginosa (n=22,804 from 73 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Piperacillin-Tazobactam	82.8% (62-100%)	20,040	66
Ceftazidime	81.7% (6-94%)	18,315	59
Cefepime	83.6% (65-98%)	19,015	59
Meropenem	81.7% (54-97%)	14,261	39
Imipenem	-	-	-
Amikacin	95.1% (74-100%)	19,491	62
Gentamicin	83.2% (48-95%)	22,271	70
Tobramycin	91.0% (77-97%)	19,850	61
Ciprofloxacin/Levofloxacin	68.7% (45-90%)	22,132	71

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Carbapenem resistance among *Pseudomonas* spp. is relatively common in Los Angeles County. These data are particularly relevant to the empiric management of sepsis, where microbiologically active therapy is crucial (Kolleff et al. *Chest*. 1999; Kumar et al. *Critical care Medicine*. 2006).

One potential approach to improve the probability of microbiologically active therapy is the inclusion of adjunctive therapy with a non-beta-lactam antibiotic. (IDSA HAP/VAP guidelines – Kalil et al. *Clinical Infectious Disease*, 2016; Gutierrez-Gutierrez et al. *Lancet Infectious Disease*. 2017) Fluoroquinolone susceptibility is relatively low, compared to aminoglycosides. This may be relevant to management of pneumonia and other hospital-acquired infections where *Pseudomonas* spp. infection is likely.

Serratia spp. (n=2,676 isolates from 58 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Piperacillin-Tazobactam	90.9% (55-100%)	2,098	42
Ceftriaxone	89.5% (55-100%)	2,403	51
Ceftazidime	91.2% (36-100%)	2,188	47
Cefepime	96.6% (67-100%)	2,203	45
Ertapenem	97.1% (63-100%)	1,414	29
Imipenem	-	-	-
Meropenem	98.3% (92-100%)	1,579	30
Amikacin	96.6% (29-100%)	2,188	47
Gentamicin	97.1% (73-100%)	2,757	57
Tobramycin	85.4% (29-100%)	1,677	39
Ciprofloxacin/Levofloxacin	88.1% (33-100%)	2,646	57
TMP/SMX	96.8% (33%-100%	2,544	56

Stenotrophomonas maltophilia (n=1719 isolates from 50 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ceftazidime	37.4% (0-60%)	848	18
Ciprofloxacin/Levofloxacin	78.8% (33-100%)	1,052	29
TMP/SMX	90.4% (0%-100%	1,548	43

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Clinicians should be aware that local laboratories reported susceptibility results for beta-lactam antibiotics to which *Stenotrophomonas maltophilia* are intrinsically resistant; Piperacillin-Tazobactam (n=3 hospitals), Ceftriaxone (n=4 hospitals), Cefepime (n=2 hospitals), Ertapenem (n=2 hospitals), and Meropenem (n=4 hospitals). (Sanchez et al, *Stenotrophomonas maltophilia drug resistance*, Future Microbiology, Vol 4, No 6, 2009; Sanford Guide Antimicrobial Therapy 2017; Brooke, JS. *Stenotrophomonas maltophilia: An Emerging Global Opportunistic Pathogen*, Clinical Microbiology Reviews, Vol 25, No 1, p.2-41, 2012).

We also note that the local antibiogram reports for Stenotrophomonas maltophilia include aminoglycoside antibiotics; Amikacin (n=3 hospitals), Gentamicin (n=3 hospitals), and Tobramycin (n=3 hospitals). Resistance testing to aminoglycosides can be complicated by multiple factors, including temperature at which the isolate is tested. (Brooke, JS. *Stenotrophomonas maltophilia: An Emerging Global Opportunistic Pathogen*, Clinical Microbiology Reviews, Vol 25, No 1, p.2-41, 2012) Clinicians should be aware that local testing may not be reliable and that aminoglycosides show poor activity against *Stenotrophomonas maltophilia.*

2015 LOS ANGELES COUNTY ACUTE CARE HOSPITAL ANTIBIOGRAM
Gram-Positive Organisms

Percent Susceptible (Number of isolates tested)	# of all isolates tested (# of hospitals reporting)	Penicillins			Cephalosporins	Quinolones	Tetracyclines	Aminoglycosides	Other							
		Ampicillin	Oxacillin	Penicillin	Ceftriaxone	Levofloxaxin/ Moxifloxacin	Doxycycline	Gentamicin	Clindamycin	Daptomycin	Erythromycin	Linezolid	Nitrofurantoin	Trimethoprim/ Sulfamethoxazole	Vancomycin
Enterococcus *	30855 (70)	84 (25,516)	R	-	R	-	25 (8,585)	-	R	-	-	-	80 (13,869)	R	82 (29,587)
Enterococcus faecalis	13784 (51)	98 (11,794)	R	-	R	-	20 (5,954)	-	R	-	-	-	-	R	-
Enterococcus faecium	4153 (49)	11 (2,824)	R	-	R	-	37 (1,809)	-	R	-	-	-	-	R	-
Staphylococcus aureus	51084 73	-	58 (38,790)	-	-	-	94 (32,098)	88 (19,553)	72 (46,580)	99 (6,828)	-	100 (23,436)	-	98 (47,712)	100 (49,905)
Methicillin-resistant *Staphylococcus aureus* (MRSA)	16210 (49)	-	0 (11,145)	-	R	-	93 (12,448)	78 (6,254)	63 (15,759)	99 (2,662)	-	100 (12,314)	-	97 (15,968)	100 (15,838)
Methicillin-susceptible *Staphylococcus aureus* (MSSA)	22238 (47)	-	100 (19,399)	-	-	-	95 (17,384)	96 (5,901)	83 (20,256)	100 (3,977)	-	100 (8,562)	-	98 (20,791)	100 (20,364)
Streptococcus agalactiae (Group B Streptococcus)	1009 (14)	-	.	100 (742)	-	-	14 (643)	-	21 (891)	-	58 (163)	-	-	100 (13)	-
Streptococcus pneumoniae	1182 (48)	-	.	88** (1,147)	96** (992)	93 (766)	75 (409)	-	-	-	69 (834)	-	-	-	-

* not identified to species level

**%S interpreted using non-meningitis (e.g., pneumonia) breakpoints; meningitis specific %S reported in detailed antibiogram tables

Data not collected denoted by "-".

R, intrinsic resistance

2015 Los Angeles County
Cumulative Antibiogram Data
Gram Positives

Methodology Notes for Gram Positives:

- For fluoroquinolones, % susceptibility was obtained from both levofloxacin and moxifloxacin for each facility. The % susceptibility statistic presented is whichever of these two agents revealed the higher value at each facility.

Enterococcus (n=30,855 isolates from 70 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin	**83.6% (47-100%)**	25,516	59
Doxycycline	24.9% (13-45%)	8,585	22
Vancomycin	82.1% (25-100%)	29,587	66
Nitrofurantoin	80.4% (41-100%)	13,869	37

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

This table includes data from Enterococcus isolates not identified to species level by the submitting laboratory and does do not include data from isolates listed as *E. faecalis or E. faecium.*

Nitrofurantoin data are useful for urine isolates only, but these data represent all sources.

Enterococcus faecalis (n=13,784 from 51 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin	97.7% (63-100%)	11,794	47
Doxycycline	20.0% (0-49%)	5,954	22

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Insufficient data are available to report vancomycin susceptibility.

Enterococcus faecium (n=4,153 from 49 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Ampicillin	**10.8% (0-40%)**	2,824	40
Doxycycline	37.1% (30-80%)	1,809	20

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Insufficient data are available to report vancomycin susceptibility.

Staphylococcus aureus (n=51,084 from 73 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Oxacillin	**58.5% (33-74%)**	36,790	53
Gentamicin	87.5% (63-98%)	19,553	38
Doxycycline	93.8% (63-99%)	32,098	42
Linezolid	**99.5% (83-100%)**	23,436	40
TMP-SMX	**97.6% (93-100%)**	47,712	66
Clindamycin	**71.54% (46-88%)**	46,580	68
Vancomycin	**99.9% (96-100%)**	49,905	71
Daptomycin	**99.3% (99-100%)**	6,828	11

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

More than 95% of staphylococci are resistant to ampicillin and penicillin.

Daptomycin, linezolid and/or vancomycin resistance was reported for several isolates *Staphylococcus aureus* in LA in 2015. When very uncommon types of resistance such as these is encountered, isolates should be sent to a referral laboratory for confirmation.

Methicillin-resistant Staphylococcus aureus (MRSA) (n=16,210 from 49 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Oxacillin	**0.00% (0-0%)**	11,145	31
Vancomycin	**99.9% (98-100%)**	15,838	48
Daptomycin	**98.6% (96-100%)**	2,662	10
Linezolid	**99.6% (95-100%)**	12,314	33
Gentamicin	77.9% (46-94%)	6,254	24
Doxycycline	93.4% (74-98%)	12,448	33
TMP-SMX	**96.5% (90-100%)**	15,968	47
Clindamycin	**63.0% (31-87%)**	15,759	47

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Clindamycin percent susceptible is relatively low. This may have relevance for skin and skin structure infections (SSTI).

MRSA are predictably resistant to ceftriaxone and other antistaphylococcal β-lactams except ceftaroline.

Methicillin-susceptible *Staphylococcus aureus* (MSSA) (n=22,238 from 47 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Oxacillin	**100% (97-100%)**	19,399	40
Gentamicin	96.0% (86-99%)	5,901	22
Doxycycline	95.1% (80-100%)	17,384	32
Linezolid	**99.6% (99-100%)**	8,562	23
TMP-SMX	**97.5% (90-100%)**	20,791	44
Clindamycin	**82.7% (48-100%)**	20,256	43
Vancomycin	**99.9% (98-100%)**	20,364	44
Daptomycin	**99.7% (99-100%)**	3,977	9

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

MSSA are predictably susceptible to ceftriaxone and other antistaphylococcal β-lactams.

Streptococcus agalactiae (Group B Streptococcus) (n=1,009 isolates from 14 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Penicillin	99.9% (97-100%)	742	8
Doxycycline	13.8% (7-27%)	643	7
Clindamycin	20.7% (0-88%)	891	9
Erythromycin	57.7% (41-67%)	163	3
TMP/SMX	100% (100%)	13	1

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

We note that the clindamycin susceptibility is extremely low for Group B streptococcus. Further investigation of Group B streptococcus is ongoing, but we note that recent publications from the Centers for Disease Control and Prevention (Metcalf et al. Clin Microbion Infect 2017) identified 41% of Group B Streptococcus were resistant to clindamycin largely due to 23S rRNA methylase gene (*ermB, ermTR* or *ermT*).

Furthermore, the CDC has issued specific guidance on the Prevention of Perinatal Group B Streptococcal Disease that includes susceptibility testing for patient with known allergy and particularly anaphylaxis to penicillin (MMWR Novemner 19, 2010, Vol. 59). These data should be discussed with local infectious disease specialists and microbiology experts.

All *Streptoccoccus agalactiae* reported to date worldwide have been sensitive to vancomycin, but clinicians should discuss the implications of these findings with infectious disease experts at their local institution.

Streptococcus pneumoniae (n=1,182 isolates from 48 Hospitals)			
	Susceptibility (Range)	Number of Isolates	Number of Hospitals
Penicillin	88.5% (40-100%)	1,147	44
Penicillin (meningitis)	66.4% (47-100%)	494	18
Ceftriaxone	96.1% (80-100%)	992	36
Ceftriaxone (meningitis)	91.7% (77-100%)	458	15
Doxycycline	74.8% (66-100%)	409	13
Levofloxacin/Moxifloxacin	92.7 %(0-100%)	766	26
Erythromycin	69.2% (43-100%)	834	31

Comments from LA County Healthcare-Associated Infection and Antibiotic Resistance Committee:

Ceftriaxone susceptibility at the meningitis breakpoint is 92% overall, but as low as 77% in at least one facility. These data support the use of vancomycin in the empiric treatment of suspected bacterial meningitis.

All *Streptoccoccus pneumoniae* reported to date worldwide have been susceptible to vancomycin.