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Background. National surveillance for multidrug-resistant organisms (MDRO) are limited by narrow geographic sampling, few hospitals, and failure to account for local epidemiology. A Los Angeles County (LAC) regional antibiogram was created to inform public health interventions and provide a baseline for susceptibility patterns countywide. We present data to compare the 2015 and 2017 LAC regional antibiogram.

Methods. We conducted a cross-sectional survey of cumulative facility-level antibiograms from all hospitals in LAC; 83 hospitals (AH) and 9 Long-term Acute Care (LTAC). For 2015, submission was voluntary, 2017 data were collected by public health order. Non-respondents were contacted by phone and in person. Isolates from sterile sources were pooled. Countywide susceptibility was calculated by weighting each facility's isolate count by its reported susceptibility rate with minimum–maximim observed (2015) and Interquartile range (IQR) for 2017. Change from 2015 mean susceptibility is reported.

Results. Seventy-five (75) facilities submitted antibiograms for 2015 and 86 facilities for 2017. Among non-respondents in 2017, two facilities could not provide an adequate antibiogram and 4 were specialty hospitals with too few cultures to create an antibiogram. Regional summmary tables are presented in Tables 1–4. *Klebsiella pneumoniae* (n = 50 hospitals/19,382 isolates) % S to meropenem was 97% (IQR 94–100%), no change from 2015. *Pseudomonas aeruginosa* (PA) (n = 52 hospitals/17,770 isolates)% S to meropenem was 84% (IQR 74–93%), no change from 2015. Susceptibility to *Acinetobacter baumannii* (AB) was reported by 48 hospitals, including 1,4361 isolates,% S to meropenem was 39% (IQR 25–75%), 14% lower than 2015. *Streptococcus agalactiae* (n = 13 hospitals/647 isolates)% S to clindamycin was 43% (IQR 13–59%), a 22% increase from 2015.

Conclusion. LAC regional antibiograms identified stable patterns of antimicrobial resistance for most pathogens, but concerning results with *AB* and *PA*. Analysis of highly drug-resistant pathogens such as AB and PA would be improved with patient-level data to generate a combination antibiogram. We favor presenting IQR %S as done for 2017. Ongoing analysis will include multivariable analysis of observed changed S controlling for hospital characteristics.

Table 1: LA County Regional Antibiogram 2017 Gram Negative Pathogens

Percent Susceptible (# of Isolates Tested)	# of all isolates tested (# of hospitals reporting)	Penicillins: Ampicillin	Penicillins: Ampicillin/ Sulbactam	Penicillins: Piperacillin/ Tazobactam	Cephalosporins: Ceftriaxone	Cephalosporins: Ceftazidime	Cephalosporins: Cefepime	Cephalosporins: Cefazolin	Carbapenems: Ertapenem	Carbapenems: Imipenem	Carbapenems: Meropenem	Aminoglycosides: Amikacin	Aminoglycosides: Gentamicin	Aminoglycosides: Tobramycin	Quinolones: Ciprofloxacin	Quinolones: Levofloxacin	Other: Trimethoprim/ Sulfamethoxazole	Other: Nitrofurantoin	Other: Minocycline	Other: Tigecycline
Acinetobacter baumanii	2,723 75	R	43 2,084	27 1,776	10 1,320	27 1,894	40 1,139	R	R	27 1,120	39 1,436	36 1,925	37 2,661	40 2,084	27 2,030	26 1,985	48 2,287	-	79 154	79 424
Citrobacter freundii	1,720 45	R	R	83 1,604	79 1,629	80 1,370	98 1,579	R	100 1,100	98 361	98 1,329	99 1,517	92 1,720	92 916	91 1,490	90 801	82 1,683	95 1,443	-	100 254
Citrobacter koseri	561 19	R	90 85	99 549	96 527	97 383	99 483	93 498	100 248	99 161	100 364	99 450	99 561	97 427	99 372	98 450	96 550	86 542	-	100 61
Enterobacter sp.	8,911 71	R	R	81 8508	79 7918	81 6816	96 8044	R	95 5333	94 2138	99 6770	99.5 7207	97 8818	97 5022	96 7331	95 4605	92 8510	35 5735	-	99 1650
Escherichia coli	143,153 82	38 15,318	50 59,750	94 135,592	87 136,184	89 118,505	89 128,176	83 123,386	100 89,252	100 27,115	100 11,374	99 123,826	88 142,208	83 67,642	73 122,656	67 69,750	67 141,267	96 129,730	-	100 8,523
Klebsiella oxytoca	3,248 49	R	66 1,693	93 2,844	93 2,842	96 2,448	97 2,772	53 2,604	100 1,890	100 717	100 2,408	100 2,679	96 2,948	94 1,692	95 2,588	95 1,358	91 2,780	85 2,046	-	100 479
Klebsiella pneumoniae	30,629 80	R	71 13,763	87 24,936	85 25,145	86 20,712	87 23,744	81 21,631	96 15,606	90 6,529	97 19,382	95 24,501	90 25,802	84 15,356	86 21,942	84 13,646	83 24,970	35 20,500	-	93 1,948
Morganella morganii	2,300 53	R	10 1,362	96 2,223	85 2,037	78 1,747	96 2,077	R	100 1,300	55* 439	99 1,599	99 2,119	73 2,240	85 1,325	63 1,876	54 1,401	56 2,178	R	-	R
Proteus mirabilis	19,503 80	70 17,791	77 9,969	97 17,599	87 17,582	91 14,857	92 16,487	74 16,657	99 10,454	69* 2,583	97 13,057	99 15,833	83 18,733	82 11,239	67 15,154	62 11,572	68 18,603	R	-	R
Pseudomonas aeruginosa	23,921 83	R	R	85 23,524	R	81 20,258	85 21,045	R	R	80 12,142	84 17,770	96 22,185	85 23,575	93 21,464	73 19,554	65 16,206	R	R	-	R
Serratia marcescens	2,668 58	R	R	94 1,876	90 2,376	92 2,047	95 2,401	R	99 1,462	96 555	97 1,987	96 2,417	97 2,663	79 1,707	87 2,330	86 1,581	98 2,256	R	-	99.6 550
Stenotrophomonas maltophilia	1,970 51	R	R	R	R	46 1,082	-	R	R	R	R	R	R	R	-	81 1,511	92 1,996	-	98 42	R

R: Intrinsically resistant
-: Not routinely tested or not applicable.

Table 2: LA County Regional Antibiogram 2017 Gram Positive Pathogens

Percent Susceptible (# of Isolates Tested)	# of all isolates tested (# of hospitals reporting)	Penicillins: Ampicillin	Penicillins: Oxacillin	Penicillins: Penicillin	Cephalosporins: Ceftriaxone	Cephalosporins: Ceftaroline	Quinolones: Levofloxacin	Tetracyclines: Doxycycline	Tetracyclines: Tetracycline	Aminoglycosides: Gentamicin	Aminoglycosides: Gentamicin Synergy	Aminoglycosides: Streptomycin Synergy	Other: Clindamycin	Other: Daptomycin	Other: Erythromycin	Other: Linezolid	Other: Nitrofurantoin	Other: Trimethoprim/ Sulfamethoxazole	Other: Vancomycin
Enterococcus species	16,551 37	88 15,860	R	87 6,016	R	-	68 2,926	44 1,209	23 3,705	-	76 3,096	67 2,450	R	99 2,705	-	99 13,119	90 11,520	R	89 16,131
Enterococcus faecalis	14,071 69	98 11,920	R	98 4,763	R	-	69 6,633	21 767	20 6,422	-	66 4,832	72 2,530	R	100 1,129	-	99 7,658	97 10,620	R	94 12,824
Enterococcus faecium	3,572 57	13 2,793	R	11 1,625	R	-	12 1,471	54 180	38 1,710	-	89 1,212	48 594	R	97 461	-	97 2,419	18 2,088	R	23 3,362
Staphylococcus aureus	35,074 58	0.4 1,481	64 32,481	6 17,372	-	-	52 2,275	96 5,658	93 25577	88 10,028	-	-	73 32,581	99 3,288	46 16,211	100 12,135	-	97 33,222	100 35,079
Methicillin-resistant Staphylococcus aureus (MRSA)	15,317 53	R	0 10,302	R	R	100 264	7 399	95 1,843	89 12,410	80 4,429	-	-	61 15,166	100 904	14 8,154	100 10,604	-	95 14,912	100 15,436
Methicillin-susceptible Staphylococcus aureus (MSSA)	19,898 41	1 110	98 17,513	13 13,804	-	100 430	85 5,551	99 1,326	95 16,799	94 3,178	-	-	81 18,004	100 1,844	67 8,135	100 7,290	-	98 18,697	100 18,772
Streptococcus agalactiae (Group B Streptococcus)	1,092 18	100 905	-	100 910	100 148	-	96 318	33 32	17 411	-	-	-	43 647	-	33 416	100 453	-	-	-
Streptococcus pneumoniae (non-meningitis)	1,708 47	95 19	-	90 919	97 793	-	97 679	79 100	81 375	-	-	-	81 486	-	66 826	100 176	-	74 827	-
Streptococcus pneumoniae (meningitis)			-	73 520	90 501	-				-		-		-			-		

R: Intrinsically resistant
-: Not routinely tested or not applicable.

Table 3: LA County Regional Antibiogram 2015 Gram Negative Pathogens

Percent Susceptible (Number of isolates tested)	# of all isolates tested (# of hospitals reporting)	Penicillins: Ampicillin/ Sulbactam	Penicillins: Piperacillin/ Tazobactam	Cephalosporins: Ceftriaxone	Cephalosporins: Ceftazidime	Cephalosporins: Cefepime	Carbapenems: Ertapenem	Carbapenems: Imipenem	Carbapenems: Meropenem	Quinolones: Ciprofloxacin/ Levofloxacin	Aminoglycosides: Amikacin	Aminoglycosides: Gentamicin	Aminoglycosides: Tobramycin	Other: Trimethoprim/ Sulfamethoxazole
Acinetobacter sp.	3189 (66)	-	33 (1,873)	11 (1,475)	30 (2,184)	34 (1,864)	R		53 (1,561)	33 (3,024)	43 (2,004)	41 (2,970)	46 (2,126)	49 (2,859)
Burkholderia sp.	33 (9)	-	0 (27)	4 (27)	45 (31)	4 (27)	0 (26)	-	37 (27)	26 (27)	0 (27)	0 (27)	0 (26)	61 (31)
Citrobacter freundii	1975 (43)	R	97 (1,823)	82 (1,869)	83 (1,503)	98 (1,713)	99 (1,156)	-	99 (1,142)	91 (1,975)	100 (1,536)	92 (1,924)	93 (1,138)	81 (1,939)
Citrobacter koseri	631 (23)	-	99 (631)	96 (631)	97 (427)	100 (456)	100 (223)	-	100 (184)	99 (631)	99 (389)	99 (631)	99 (428)	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)	96 (8,120)	100 (6,235)	97 (7,972)	96 (4,630)	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)	70 (129,130)	99 (104,151)	86 (129,487)	81 (67,956)	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)	86 (28,047)	94 (22,223)	91 (27,934)	82 (16,128)	82 (26,934)
Morganella sp.	2235 (52)	-	96 (2,233)	88 (2,055)	81 (1,811)	98 (1,921)	100 (1,148)	68 (572)	100 (1,127)	60 (2,231)	99 (1,913)	71 (2,234)	86 (1,358)	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)	68 (16,738)	99 (13,470)	83 (16,554)	84 (10,176)	68 (16,491)
Providencia sp.	1618 (36)	-	73 (1,542)	66 (1,404)	55 (1,315)	77 (1,285)	88 (228)	74 (619)	90 (553)	11 (1,512)	91 (1,442)	11 (1,259)	14 (960)	46 (1,513)
Pseudomonas sp.	22804 (73)	R	83 (20,040)	R	82 (18,315)	84 (19,015)	R	-	82 (14,261)	69 (22,132)	95 (19,491)	83 (22,271)	91 (19,850)	R
Serratia sp.	2676 (58)	R	91 (2,098)	90 (2,403)	91 (2,188)	97 (2,203)	97 (1,414)	-	98 (1,579)	88 (2,646)	97 (2,188)	97 (2,757)	85 (1,677)	97 (2,544)
Stenotrophomonas maltophilia	1719 (50)	R	R	R	37 (848)	R	R	-	R	79 (1,052)	R	R	R	90 (1,548)

R: Intrinsically resistant
-: Not routinely tested or not applicable.

Table 4: LA County Regional Antibiogram 2015 Gram Positive Pathogens

Percent Susceptible (Number of isolates tested)	# of all isolates tested (# of hospitals reporting)	Penicillins: Ampicillin	Penicillins: Oxacillin	Penicillins: Penicillin	Cephalosporins: Ceftriaxone	Quinolones: Levofloxacin/ Moxifloxacin	Tetracyclines: Doxycycline	Aminoglycosides: Gentamicin	Other: Clindamycin	Other: Daptomycin	Other: Erythromycin	Other: Linezolid	Other: Nitrofurantoin	Other: Trimethoprim/ Sulfamethoxazole	Other: 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	-	-	-	97 (9,826)	R	-
Enterococcus faecium	4153 (49)	11 (2,824)	R	-	R	-	37 (1,809)	-	R	-	-	-	16 (2,290)	R	-
Streptococcus agalactiae (Group B Strep)	1009 (14)	-	-	100 (742)	-	-	14 (643)	-	21 (891)	-	58 (163)	-	-	100 (13)	-
Methicillin-resistant *Staphylococcus aureus (MRSA)*	16210 (49)	-	0 (11,145)	-	-	-	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)
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)
Streptococcus pneumoniae	1182 (48)	-	-	88* (1,147)	96* (992)	93 (766)	75 (409)	-	-	-	69 (834)	-	-	-	-

*%S interpreted using non-meningitis (e.g., pneumonia) breakpoints; meningitis specific %S reported in detailed antibiogram tables
R: Intrinsically resistant
-: Not routinely tested or not applicable.

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543. Biocide Resistance Genes in *Klebsiella* spp. Infections from Trauma Patients in Iraq and Afghanistan

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Background. Biocides play an integral role in infection control. Paralleling concern about rising incidence of multidrug-resistant (MDR) organisms is a concern for resistance to biocides. In small studies, several genes involved in the production of efflux pump proteins have been identified as markers of biocide resistance in *Klebsiella* spp., namely *cepA*, *qacA*, *qacE*, *qacΔE*, and *acrA*. This study aimed to analyze the *Klebsiella* spp. isolates of a previously defined military trauma group with a high incidence of MDR organisms for the presence of these genes and their correlation with other resistance.

Methods. All infecting *K. pneumoniae, K. variicola*, and *K. quasipneumoniae* isolates archived by the Trauma Infectious Disease Outcomes Study (June 2009–December 2014) were selected. Additionally, all colonizing isolates linked with infecting isolates were included; the remainder to total 50 MDR and 46 non-MDR colonizing isolates were chosen randomly. Antimicrobial identification and susceptibilities were determined by CLSI criteria using the BD Phoenix Automated Microbiology System. PCR according to published methods for *cepA*, *qacA*, *qacE*, *qacΔE*, and *acrA* was accomplished in duplicate. MDR was defined as either resistance to ≥3 classes of aminoglycosides, β-lactams, carbapenems and/or fluoroquinolones or production of an ESBL or KPC.

Results. A total of 237 isolates (221 *K. pneumoniae*, 10 *K. variicola*, 6 *K. quasipneumoniae*) met inclusion criteria, of which 149 (63%) were MDR. All isolates had been exposed to antimicrobials prior to isolation. Of all isolates, 234 (98%) carried *cepA*: 218 (98%) *K. pneumoniae* carried *cepA*, 10 (100%) *K. variicola* carried *cepA,* and 6 (100%) of *K. quasipneumoniae* carried *cepA*. In addition, 148 (62%) isolates with *cepA* were MDR. One (10%) *K. variicola* isolate carried *qacE* along with *cepA*. This isolate was the only MDR *K. variicola*. None of the isolates carried *qacA, qacΔE,* or *acrA*.

Conclusion. We confirmed the near universal presence of the *cepA* biocide resistance gene in *Klebsiella* spp. isolated from trauma patients in Iraq and Afghanistan. In the largest evaluation of biocide resistance genes in *Klebsiella* spp. to our knowledge, the presence of *qacA*, *qacE*, *qacΔE*, and *acrA* was less common than has been reported elsewhere.

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544. Clonal Spread of Two Sequence Types of Carbapenem-Resistant *Acinetobacter baumannii* Blood Isolates at a Tertiary Care Hospital in South Korea Over 2.5 Years

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