



HSHS
St. John's
Hospital

Springfield, Illinois

CUMULATIVE ANTIMICROBIAL SUSCEPTIBILITY REPORT

January - December, 2018
(Includes Inpatients and Outpatients)

The Cumulative Antimicrobial Susceptibility Report should be considered a guide. Individual therapy should always be based on characteristics of the patient's infecting organism.

For questions, please call the Microbiology Laboratory at ext. 44135 or 814-4135.

CUMULATIVE ANTIBIOGRAM: ALL LOCATIONS AND AGES --- 2018

Gram Negative Organisms % Susceptible	# Isolates tested 2018	% Change in Isolates tested from 2017	Ampicillin	Ampicillin / sulbactam	Amoxicillin/ clavulanic acid	Piperacillin / tazobactam	Imipenem	Meropenem	Ertapenem	Aztreonam^	Cefazolin^	Cefotaxime/ Ceftriaxone 1,^	Ceftazidime^	Cefepime^	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Levofloxacin	Minocycline	Tetracycline	Trimethoprim/ Sulfamethoxazole	Nitrofurantoin ^	# Isolates tested with Nitrofurantoin^
<i>Acinetobacter species</i> ²	69	+17	-	93	-	71	83	-	-	-	-	-	83	84	90	90	86	81	81	-	75	80	-	-
<i>Citrobacter freundii</i>	82	+1	■	■	■	83	100	100	100	83	■	82	-	99	-	95	-	90	90	-	89	82	83	54
<i>Citrobacter koseri</i>	50	-14	■	-	100	100	100	100	100	100	98	100	-	100	-	100	-	100	100	-	100	100	97	34
<i>Enterobacter aerogenes</i> [^]	113	+16	■	■	■	73	78	97	98	77	■	76	-	93	-	96	-	95	93	-	96	95	16	62
<i>Enterobacter cloacae complex</i> [^]	219	+5	■	■	■	81	95	97	100	81	■	79	-	97	-	98	-	95	95	-	89	91	31	70
<i>E. coli</i> [^]	3049	+2	53	-	79	97	100	100	100	95	87	94	-	96	-	93	-	79	79	-	77	77	96	2695
<i>Klebsiella oxytoca</i> [^]	184	+59	0	-	72	90	100	100	100	92	44	92	-	95	-	99	-	99	98	-	96	97	89	71
<i>Klebsiella pneumoniae</i> [^]	672	0	■	-	93	94	99	99	100	95	89	96	-	97	-	97	-	95	95	-	82	89	43	505
<i>Morganella morganii</i>	61	+11	■	-	■	95	30	100	100	97	■	95	-	100	-	93	-	82	85	-	■	84	■	■
<i>Proteus mirabilis</i> [^]	369	+11	70	-	100	100	8	100	100	97	77	97	-	98	-	94	-	68	75	-	■	68	■	■
<i>Providencia rettgeri</i>	14	-36	■	-	■	93	50	93	64	100	■	93	-	100	-	100	-	100	100	-	■	79	■	■
<i>Pseudomonas aeruginosa</i>	602	+16	■	■	■	86	-	85	■	77	■	■	89	89	95	91	95	81	75	-	■	■	-	-
<i>Serratia marcescens</i>	111	+12	■	■	■	-	-	100	100	100	■	96	-	99	-	100	-	95	95	-	40	99	■	■
<i>Stenotrophomonas maltophilia</i>	120	+10	■	■	■	■	■	■	■	■	■	■	-	-	■	■	■	-	90	98	■	89	-	-

Haemophilus influenzae (includes non-type b isolates) Isolates tested- 86: (Percent Susceptible)
 Ampicillin (69); Cefotaxime (97); Ciprofloxacin (99); Tetracycline (81); Trimethoprim/sulfamethoxazole (72);
 Chloramphenicol (99); Cefaclor (85); Cefixime (99); Clarithromycin (72); Rifampin (99)

- (-) Drug not tested or drug not indicated.
 - Organism exhibits intrinsic resistance to this drug.
1. Enterobacteriaceae organisms susceptible to Cefotaxime are also susceptible to Ceftriaxone.
 2. Combination of all *Acinetobacter species*.
- ^See back cover for additional footnotes.

CUMULATIVE ANTIBIOGRAM: ALL LOCATIONS AND AGES --- 2018

Gram Positive Organisms % Susceptible	# Isolates tested 2018	% Change in Isolates tested from 2017	Penicillin	Ampicillin	Oxacillin	Cefotaxime	Meropenem	Clindamycin	Erythromycin	Vancomycin	Linezolid	Ciprofloxacin	Levofloxacin	Moxifloxacin	Gentamicin	High Level (synergy) Gentamicin	High level (synergy) Streptomycin	Rifampin	Tetracycline	Tigecycline	Trimethoprim / sulfamethoxazole	Nitrofurantoin [^]	# Isolates tested with Nitrofurantoin [^]	
Staphylococcus																								
Staphylococcus aureus (MSSA)	948	+16	20	-	100	-	-	79	62	100	100	84	86	87	100	-	-	100	95	100	99	99	99	72
Staphylococcus aureus (MRSA) ³	789	+4	0	-	0	-	-	63	10	100	100	28	29	29	99	-	-	99	88	100	96	96	96	55
Staphylococcus coagulase negative (CONS)	1218	+31	12	-	48	-	-	53	32	100	100	68	68	67	91	-	-	99	83	100	68	100	297	
Staphylococcus lugdunensis	66	+40	35	-	83	-	-	66	64	100	100	94	94	92	98	-	-	98	95	100	100	100	10	
Streptococcus																								
Alpha hemolytic streptococcus not pneumococcus or enterococcus	104	+27	69	-	-	97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Streptococcus pneumoniae ⁴ ^ (blood/sterile sites by Etest)	8	-50	*	-	-	100	100	88	-	100	-	-	100	-	-	-	-	100	-	-	-	-	-	-
Streptococcus pneumoniae ⁴ ^ (other specimen types; non-sterile)	68	-13	*	-	-	96	57	88	38	100	100	-	99	-	-	-	-	99	76	-	69	-	-	-
Streptococcus pyogenes (Group A)	52	-13	100	-	-	97	-	73	65	100	100	-	90	100	-	-	-	-	-	100	-	-	-	-
Streptococcus agalactiae (Group B)	978	+38	100	-	-	99	-	36	24	100	100	-	97	99	-	-	-	-	-	100	-	-	-	-
Enterococcus																								
Enterococcus species (all species)	1147	+21	89	90	-	-	-	10	88	100	100	71	71	-	-	76	80	-	28	100	-	-	89	621
Enterococcus faecium	135	+1	19	22	-	-	-	4	39	100	100	15	15	-	-	76	50	-	36	-	-	-	20	80
Enterococcus faecalis	975	+24	99	99	-	-	-	10	96	100	100	79	80	-	-	75	85	-	27	100	-	-	100	531

(-) Drug not tested or drug not indicated

■ Organism exhibits intrinsic resistance to this drug.

3. 99% of MRSA had vancomycin MIC ≤ 1 ug/ml, 1% had MIC 1.5-2.0 ug/ml.

4. *Susceptibility of *Streptococcus pneumoniae* varies according to the type of therapy and infection site

- Meningitis with IV penicillin [≤ 0.06(S); ≥ 0.12ug/ml (R)]: No isolates from CSF were isolated in 2018.
- Non-meningitis IV penicillin [≤ 2(S); 4(I); ≥ 8ug/ml]: 88% of isolates from sterile sites were susceptible in 2018.
- Non-meningitis with oral penicillin [≤ 0.06(S); 0.12 to 1.0 (I); ≥ 2 ug/ml(R)]: 66% of isolates from non-sterile sites were susceptible in 2018. (MMWR 2008;57:1353 and Clinical Laboratory Standards Institute 2018, M100-ED28)

[^]See back cover for additional footnotes.

INTENSIVE CARE UNITS ANTIBIOGRAM: ICUA, ICUB, TSICU, ICUD, CVICU --- 2018

Gram Negative Organisms % Susceptible	# isolates tested 2018	% Change in Isolates tested from 2017																						
			Ampicillin	Ampicillin / sulbactam	Amoxicillin/ clavulanic acid	Piperacillin / tazobactam	Imipenem	Meropenem	Ertapenem	Aztreonam^	Cefazolin^	Cefotaxime/ Ceftriaxone ^{1,^}	Ceftazidime^	Cefepime^	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Levofloxacin	Minocycline	Tetracycline	Trimethoprim/ Sulfamethoxazole	Nitrofurantoin^	# Isolates tested with Nitrofurantoin^
Acinetobacter species ²	15	+67	-	73	-	47	53	-	-	-	-	53	60	73	73	73	53	53	-	53	77	-	-	
Enterobacter aerogenes	13	-28				77	100	100	100	77		69	-	85	-	100	-	100	100	-	92	100	-	-
Enterobacter cloacae complex^	19	-10				84	95	95	100	84		84	-	95	-	100	-	100	100	-	100	95	0	1
E. coli^	127	+22	32	-	60	88	100	100	100	90	67	89	-	90	-	95	-	56	56	-	66	60	95	56
Klebsiella oxytoca	21	+320	0	-	86	100	100	100	100	100	57	100	-	100	-	100	-	100	100	-	100	100	100	2
Klebsiella pneumoniae^	64	+49		-	77	86	95	94	98	78	63	80	-	86	-	95	-	86	86	-	67	75	40	15
Proteus mirabilis^	34	+6	53	-	100	100	3	97	100	88	47	88	-	88	-	91	-	26	53	-		47		
Pseudomonas aeruginosa	107	+32				73	-	70		60				79	76	88	78	88	63	55	-		-	-
Serratia marcescens	17	-15				-	-	100	100	100		94	-	100	-	100	-	100	100	-	59	94		
Stenotrophomonas maltophilia	35	106												-	-				86	100		91	-	-

Haemophilus influenzae (includes non-type b isolates) Isolates tested- 32: (Percent Susceptible)

Ampicillin (67); Cefotaxime (97); Ciprofloxacin (100); Tetracycline (84); Trimethoprim/sulfamethoxazole (67); Chloramphenicol (100); Cefaclor (84); Cefixime (100); Clarithromycin (69); Rifampin (100)

(-) Drug not tested or drug not indicated.

■ Organism exhibits intrinsic resistance to this drug.

1. Enterobacteriaceae organisms susceptible to Cefotaxime are also susceptible to Ceftriaxone.

2. Combination of all *Acinetobacter species*.

^See back cover for additional footnotes.

INTENSIVE CARE UNITS ANTIBIOGRAM: ICUA, ICUB, TSICU, ICUD, CVICU --- 2018

Gram Positive Organisms % Susceptible	# Isolates tested 2018	% Change in Isolates tested from 2017	Penicillin	Ampicillin	Oxacillin	Cefotaxime	Meropenem	Clindamycin	Erythromycin	Vancomycin	Linezolid	Ciprofloxacin	Levofloxacin	Moxifloxacin	Gentamicin	High Level (synergy) Gentamicin	High level (synergy) Streptomycin	Rifampin	Tetracycline	Tigecycline	Trimethoprim / sulfamethoxazole	Nitrofurantoin [^]	# Isolates tested with Nitrofurantoin [^]
Staphylococcus																							
Staphylococcus aureus (MSSA)	106	+18	21	-	100	-	-	83	61	100	100	90	90	89	100	-	-	100	100	100	99	100	1
Staphylococcus aureus (MRSA) ⁵	80	-10	0	-	0	-	-	61	10	100	100	26	29	26	100	-	-	100	94	100	94	100	1
Staphylococcus coagulase negative (CONS)	211	+99	8	-	31	-	-	50	26	100	100	50	51	51	76	-	-	99	85	100	56	100	12
Streptococcus																							
Alpha hemolytic streptococcus not pneumococcus or enterococcus	15	+36	64	-	-	93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Streptococcus pneumoniae ^{6,^} (blood/sterile sites by Etest)	0	-100	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Streptococcus pneumoniae ^{6,^} (other specimen types; non-sterile)	35	+52	*	-	-	100	33	91	43	100	100	-	97	-	-	-	-	100	80	-	83	-	-
Streptococcus agalactiae (Group B)	24	+20	100	-	-	100	-	48	33	100	100	-	92	100	-	-	-	-	-	100	-	-	-
Enterococcus																							
Enterococcus species(all species)	80	+4	75	76	-	-	-	-	7	74	100	50	50	-	-	61	66	-	27	100	-	85	26
Enterococcus faecium	21	-16	5	5	-	-	-	-	0	19	100	0	0	-	-	71	24	-	67	-	-	33	6
Enterococcus faecalis	58	+9	100	100	-	-	-	-	8	93	100	65	65	-	-	57	81	-	15	100	-	100	20

(-) Drug not tested or drug not indicated.

■ Organism exhibits intrinsic resistance to this drug.

5. 98% of MRSA had vancomycin MIC ≤ 1 ug/ml.

6. *Susceptibility of *Streptococcus pneumoniae* varies according to the type of therapy and infection site.

a) Meningitis with IV penicillin [≤ 0.06(S); ≥ 0.12ug/ml (R)]: No isolates from CSF were isolated in 2018.

b) Non-meningitis IV penicillin [≤ 2(S); 4(I); ≥ 8ug/ml]: No isolates from sterile sites were isolated in 2018.

c) Non-meningitis with oral penicillin [≤ 0.06(S); 0.12 to 1.0 (I); ≥ 2 ug/ml(R)]: 80% of isolates from non-sterile sites were susceptible in 2018. (MMWR 2008:57:1353 and Clinical Laboratory Standards Institute 2018, M100-ED28)

[^]See back cover for additional footnotes.

PEDIATRIC ANTIBIOGRAM: NICU, PICU, Peds IMC, Peds --- 2017 - 2018

Gram Negative Organisms % Susceptible	# Isolates tested 2017 - 2018	% Change in Isolates tested from 2016 - 2017	Ampicillin	Ampicillin / sulbactam	Amoxicillin/ clavulanic acid	Piperacillin / tazobactam	Imipenem	Meropenem	Ertapenem	Aztreonam [^]	Cefazolin [^]	Cefotaxime/ Ceftriaxone ^{1,^}	Ceftazidime [^]	Cefepime [^]	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Levofloxacin	Minocycline	Tetracycline	Trimethoprim / Sulfamethoxazole	Nitrofurantoin [^]	# Isolates tested with Nitrofurantoin [^]
Acinetobacter species ²	9	+50	-	100	-	89	100	-	-	-	-	-	100	100	100	100	89	100	100	-	89	100	-	-
Enterobacter aerogenes [^]	9	+29	■	■	■	33	89	89	88	33	■	33	-	89	-	80	-	100	100	-	89	100	-	-
Enterobacter cloacae complex	32	+33	■	■	■	69	100	100	97	72	■	72	-	100	-	97	-	91	94	-	94	91	50	2
E. coli [^]	85	-1	41	-	76	98	100	100	100	96	82	95	-	96	-	92	-	80	82	-	81	78	98	44
Klebsiella oxytoca	13	+44	0	-	92	100	100	100	100	100	69	100	-	100	-	100	-	100	100	-	100	100	100	1
Klebsiella pneumoniae [^]	27	-4	■	-	96	96	100	100	100	96	77	96	-	96	-	96	-	100	100	-	85	96	60	5
Proteus mirabilis	11	0	91	-	100	100	9	100	100	100	91	100	-	100	-	100	-	100	100	-	100	■	■	■
Pseudomonas aeruginosa	66	+6	■	■	■	92	-	92	-	82	■	■	92	94	100	100	100	89	83	-	■	■	-	-
Serratia marcescens	28	+56	■	■	■	-	-	100	100	96	■	93	-	96	-	96	-	86	86	-	43	100	■	■
Stenotrophomonas maltophilia	33	+18	■	■	■	■	■	■	■	■	■	■	-	-	■	■	■	-	94	100	■	85	-	-

Haemophilus influenzae (includes non-type b isolates) Isolates tested- 24: (Percent Susceptible)

Ampicillin (65); Cefotaxime (96); Ciprofloxacin (100); Tetracycline (75); Trimethoprim/sulfamethoxazole (67); Chloramphenicol (100); Cefaclor (75); Cefixime (100); Clarithromycin (79); Rifampin (100)

(-) Drug not tested or drug not indicated.

■ Organism exhibits intrinsic resistance to this drug.

1. Enterobacteriaceae organisms susceptible to Cefotaxime are also susceptible to Ceftriaxone.
2. Combination of all *Acinetobacter* species.

[^]See back cover for additional footnotes.

PEDIATRIC ANTIBIOGRAM: NICU, PICU, Peds IMC, Peds --- 2017 - 2018

Gram Positive Organisms % Susceptible	# Isolates tested 2017 - 2018	% Change in Isolates tested from 2016 - 2017	Penicillin	Ampicillin	Oxacillin	Cefotaxime	Meropenem	Clindamycin	Erythromycin	Vancomycin	Linezolid	Ciprofloxacin	Levofloxacin	Moxifloxacin	Gentamicin	High Level (synergy) Gentamicin	High level (synergy) Streptomycin	Rifampin	Tetracycline	Tigecycline	Trimethoprim / Sulfamethoxazole	Nitrofurantoin [^]	# Isolates tested with Nitrofurantoin [^]
Staphylococcus																							
Staphylococcus aureus (MSSA)	134	-16	10	-	100	-	-	79	58	100	100	92	93	93	99	-	-	100	96	100	97	100	3
Staphylococcus aureus (MRSA) ⁷	84	-13	0	-	0	-	-	78	11	100	100	48	49	48	99	-	-	100	98	100	99	100	1
Staphylococcus coagulase negative (CONS)	101	+4	6	-	29	-	-	50	22	100	100	86	86	86	89	-	-	100	86	100	72	100	13
Streptococcus																							
Streptococcus pneumoniae ^{8,^} (blood/sterile sites by Etest)	0	-100	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Streptococcus pneumoniae ^{8,^} (other specimen types; non-sterile)	9	-42	*	-	-	60	60	89	44	100	100	-	100	-	-	-	-	100	67	-	56	-	-
Streptococcus pyogenes (Group A)	11	+38	100	-	-	100	-	91	100	100	100	-	90	100	-	-	-	-	-	100	-	-	-
Streptococcus agalactiae (Group B)	18	-40	100	-	-	100	-	47	17	100	100	-	100	100	-	-	-	-	-	100	-	-	-
Enterococcus																							
Enterococcus species (all species)	44	-20	93	87	-	-	-	10	98	100	93	100	-	-	89	95	-	35	100	-	-	94	16
Enterococcus faecium	3	+50	67	67	-	-	-	0	100	100	-	-	-	-	100	67	-	0	100	-	-	-	-
Enterococcus faecalis	39	-28	95	95	-	-	-	11	98	100	100	100	-	-	88	97	-	38	100	-	-	100	13

(-) Drug not tested or drug not indicated.

■ Organism exhibits intrinsic resistance to this drug.

7. 100% of MRSA had vancomycin MIC ≤ 1 ug/ml.

8. *Susceptibility of *Streptococcus pneumoniae* varies according to the type of therapy and infection site

a) Meningitis with IV penicillin [≤ 0.06(S); ≥ 0.12ug/ml (R)]: No isolates from CSF were isolated in 2017-2018.

b) Non-meningitis IV penicillin [≤ 2(S); 4(I); ≥ 8ug/ml]: No isolates from sterile sites were isolated in 2017-2018

c) Non-meningitis with oral penicillin [≤ 0.06(S); 0.12 to 1.0 (I); ≥ 2 ug/ml(R)]: 44% of isolates from non-sterile sites

were susceptible in 2017-2018. (MMWR 2008;57:1353 and Clinical Laboratory Standards Institute 2018, M100-ED28

[^]See back cover for additional footnotes.

^Additional Information (all locations & all ages)

ESBL Rates, n/N (%)

	All hospital	ICU	Pediatrics
E. coli	167/3049 (5.5)	15/127 (11.8)	3/85 (3.5)
K. oxytoca	12/184 (6.5)	-	-
K. pneumoniae	26/672 (3.9)	10/64 (15.6)	1/27 (3.7)
P. mirabilis	11/369 (3)	5/34 (14.7)	-

CRE Rates, n/N (%)

	All hospital	ICU	Pediatrics
E. aerogenes	2/113 (1.8)	-	1/9 (11)
E. cloacae	5/219 (2.3)	1/19 (5.3)	-
E. coli	3/3049 (0.1)	-	1/85 (1.2)
K. pneumoniae	4/672 (0.6)	3/64 (4.7)	-
P. mirabilis	1/369 (0.3)	1/34 (2.9)	-

Based on CDC definition of CRE (*Enterobacteriaceae* resistant to any carbapenem)

^Additional Footnotes:

- Breakpoints for cephalosporins and aztreonam for *Enterobacteriaceae* updated July 10, 2018
- Nitrofurantoin tested on urine isolates only
- For *Staphylococci* the susceptibility to oxacillin is the same as to 1st generation cephalosporins
- For *Streptococcus pneumoniae*:
 - Isolates susceptible to penicillin are considered susceptible to ertapenem, imipenem & meropenem.
 - Cefotaxime and meropenem were tested by Etest in penicillin non-susceptible isolates.
 - If penicillin S by disk diffusion, cefotaxime assumed S. If penicillin R by disk diffusion, cefotaxime tested by Etest.
 - CLSI has established two sets of *Streptococcus pneumoniae* breakpoints for cefotaxime or ceftriaxone.
 - Meningitis: [≤ 0.5 (S); 1.0 (I); ≥ 2 ug/ml (R)]
 - Non-meningitis: [≤ 1 (S); 2 (I); ≥ 4 ug/ml(R)]. (CLSI 2018, M100-ED28).

For questions, please call the Microbiology Laboratory at ext. 44135 or 814-4135.