

Management of Adults with Hospital-Acquired and Ventilator-Associated Pneumonia 2016

Type of Pneumonia	Classification	Empiric Therapy if NOT at Risk for MDR Pathogens	Empiric Therapy if at Risk for MDR Pathogens	Duration
Community-acquired (CAP)	Patients who do not meet criteria for HAP or VAP.	<p><u>Outpatient:</u></p> <ol style="list-style-type: none"> Previously healthy and no use of ABX in previous 3 months: <ol style="list-style-type: none"> Azithromycin OR Doxycycline Presence of comorbidities (heart, lung, liver, renal disease; DM, alcoholism, CA, asplenia; immunosuppressed) or use of ABX in previous 3 months: <ol style="list-style-type: none"> Levofloxacin OR <ol style="list-style-type: none"> A beta-lactam (high-dose amoxicillin; Augmentin; ceftriaxone; cefpodoxime; or cefuroxime) PLUS either azithromycin or doxycycline <p><u>Inpatient, Non-ICU:</u></p> <ol style="list-style-type: none"> A beta-lactam (ceftriaxone; ampicillin; cefotaxime; or meropenem for selected patients) PLUS either azithromycin or doxycycline OR Levofloxacin If aspiration suspected: Unasyn PLUS azithromycin If severe beta-lactam allergy: levofloxacin If severe beta-lactam allergy and suspicion for aspiration: levofloxacin PLUS clindamycin <p><u>Inpatient, ICU:</u></p> <ol style="list-style-type: none"> A beta-lactam (ceftriaxone; Unasyn; or cefotaxime) PLUS either azithromycin or levofloxacin If severe beta-lactam allergy: levofloxacin PLUS aztreonam 	<p><i>Pseudomonas:</i></p> <ol style="list-style-type: none"> Zosyn, cefepime, or meropenem PLUS either ciprofloxacin or levofloxacin OR Zosyn, cefepime or meropenem PLUS an aminoglycoside PLUS azithromycin OR Zosyn, cefepime or meropenem PLUS an aminoglycoside PLUS levofloxacin If severe beta-lactam allergy: substitute aztreonam for Zosyn, cefepime, or meropenem in the above regimens <p>CA-MRSA:</p> <ol style="list-style-type: none"> Add vancomycin or linezolid to regimen 	<p>Minimum of 5 days, should be afebrile for 48–72h, & have no more than 1 CAP-associated sign of clinical instability before therapy d/c.</p> <p>Criteria for clinical stability: -Temp ≤ 37.8C -HR ≤ 100bpm -RR ≤ 24 -SBP ≥ 90mmHg -O2 sat ≥ 90% -PO intake -Normal mental status</p>
Hospital-acquired (HAP)	Pneumonia not incubating at the time of hospital admission and occurring 48 hours or more after admission.	<p>One of the following agents is recommended first-line:</p> <ol style="list-style-type: none"> Zosyn Cefepime Levofloxacin Meropenem If severe beta-lactam allergy: aztreonam (and include MSSA coverage) <p>**Some alternative agents from these classes are listed in the guidelines if one of these is not preferred.</p>	<p>If at risk for MRSA, but NOT at a high risk of mortality:</p> <ol style="list-style-type: none"> Use one of the first-line agents listed or ciprofloxacin PLUS either vancomycin or linezolid <p>[Either aztreonam (if beta-lactam allergy) or Zosyn PLUS vancomycin as first-line combination]</p> <p>If received IV ABX in previous 90 days and a high risk of mortality, or if structural lung disease:</p> <ol style="list-style-type: none"> Use TWO of the first-line agents listed (ciprofloxacin and aminoglycoside are also options) PLUS either vancomycin or linezolid <p>[Either aztreonam (if beta-lactam allergy) or Zosyn PLUS ciprofloxacin PLUS vancomycin as first-line combination]</p>	7 days
Ventilator-associated (VAP)	Pneumonia occurring >48 hours after endotracheal intubation.	<p>One of the following agents is recommended first-line:</p> <ol style="list-style-type: none"> Zosyn Cefepime Ciprofloxacin or levofloxacin Meropenem If severe beta-lactam allergy: aztreonam <p>*All agents are active against <i>Pseudomonas</i> species **Some alternative agents from these classes are listed in the guidelines if one of these is not preferred.</p>	<p>If at risk for MRSA:</p> <ol style="list-style-type: none"> Vancomycin or Linezolid <p>Double cover for <i>Pseudomonas</i> if prior IV ABX use within 90 days or if >10% of gram-negative isolates are resistant to an agent being considered for monotherapy (Zosyn or aztreonam PLUS ciprofloxacin as first-line double-coverage)</p>	7 days
Risk Factors for MDR Pathogens	HAP	<ul style="list-style-type: none"> MDR Pathogens: Prior IV Abx use within 90 days MRSA: Prior IV Abx use within 90 days, need for ventilator support or septic shock MDR <i>Pseudomonas</i>: Prior IV Abx use within 90 days, bronchiectasis or cystic fibrosis, need for ventilator support or septic shock 	VAP	<ul style="list-style-type: none"> MDR Pathogens: Prior IV Abx use within 90 days, septic shock at time of VAP, ARDS preceding VAP, ≥ 5 days of hospitalization prior to VAP onset, acute renal replacement therapy prior to VAP onset MRSA: Prior IV Abx use within 90 days MDR <i>Pseudomonas</i>: Prior IV Abx use within 90 days, bronchiectasis or cystic fibrosis

***Newest guidelines suggest the choices for antimicrobial therapy should be tailored to the specific antibiogram for each hospital/unit.**

Key:	Increase of 5% or more	Decrease of 5% or more	Not enough data
	Restricted to ID service use	Non-Formulary	

IMH % Suscept Jan-Dec 2016		GRAM NEGATIVE - non urine				GRAM POSITIVE - non urine					
		E. Coli	Klebsiella pneumo	Proteus mirabilis	Pseudomonas aeruginosa	E. faecalis	Group B Strep	Staph aureus	MRSA	MSSA	Staph epidem.
Total Isolates		133	52	36	86	61	49	299	94	95	98
AMINO GLYCO SIDES	Amikacin	100%	96%	100%	100%						
	Gentamicin	90%	88%	94%	88%			97%	93%	99%	89%
	Tobramycin	86%	85%	97%	94%						
BETA-LACTAMS	Ampicillin	41%	0%	83%	0%	100%	100%				
	Amp/Sulbac	46%	73%	89%	1%						
	Cefazolin	86%	87%	86%	0%						
	Cefepime	88%	87%	89%	98%						
	Cefoxitin	89%	84%	89%	0%						
	Ceftriaxone	87%	87%	89%	1%						
	Ertapenem	100%	100%								
	Meropenem	99%	94%	89%	94%						
	Oxacillin							43%	0%	100%	27%
	Penicillin-G					100%	100%	10%	0%	19%	2%
QUINOLONES	Pip/tazo	96%	85%	89%	100%						
	Ciprofloxacin	69%	83%	72%	72%	100%		52%	17%	88%	44%
OTHER	Levofloxacin	69%	85%	72%	70%	100%	94%	53%	19%	89%	46%
	Clindamycin						35%	69%	51%	76%	58%
	Erythromycin					10%		31%	7%	59%	28%
	Linezolid					100%	100%	100%	100%	100%	100%
	Quinupr/Dalfopr					0%	100%	100%	100%	100%	100%
	Rifampin							100%	100%	99%	99%
	SMZ/TMP	67%	85%	89%	1%			98%	94%	87%	99%
	Tetracycline					0%	18%	93%	89%	93%	74%
	Tigecycline					100%	100%	100%	100%	100%	100%
	Vancomycin					98%	100%	100%	100%	100%	100%

IMH % Suscept Jan-Dec 2016		GRAM NEGATIVE - urine				GRAM POSITIVE - urine				
		E. Coli	Klebsiella pneumo	Proteus mirabilis	Pseudomonas aeruginosa	E. faecalis	E. faecium	Group B strep	Staph aureus	Staph epidem.
Total Isolates		712	185	97	57	98	30	51	32	31
AMINO GLYCO SIDES	Amikacin	100%	98%	100%	98%					
	Gentamicin	88%	94%	88%	88%				97%	87%
	Tobramycin	88%	94%	90%	89%					
BETA-LACTAMS	Ampicillin	45%	0%	78%	0%	96%	10%	100%		
	Amp/Sulbac	52%	83%	87%	0%					
	Cefazolin	88%	90%	90%	0%					
	Cefepime	92%	91%	91%	91%					
	Cefoxitin	100%		100%	0%					
	Ceftazidime				100%					
	Ceftriaxone	91%	92%	91%	0%					
	Ertapenem	100%	100%	100%	75%					
	Meropenem	100%		100%	89%					
	Oxacillin								50%	32%
QUINOLONES	Penicillin-G					96%	10%	100%	13%	6%
	Pip/tazo	95%	91%	97%	100%					
OTHER	Ciprofloxacin	67%	93%	47%	77%	53%	7%		47%	35%
	Levofloxacin	67%	95%	48%	70%	54%	7%	98%	50%	35%
	Clindamycin							0%	50%	50%
	Erythromycin					0%	0%		50%	0%
	Linezolid					100%	100%	100%	100%	100%
	Quinupr/Dalfopr					0%	97%	100%	100%	100%
	Rifampin								100%	97%
	SMZ/TMP	72%	87%	65%	0%			98%	94%	58%
	Tetracycline					12%	13%	18%	84%	81%
	Tigecycline					100%	100%	100%	100%	100%
Vancomycin					94%	23%	100%	100%	100%	