COMMUNITY-ACQUIRED PNEUMONIA (CAP)

- Community-acquired pneumonia (CAP) – pneumonia in a patient who has not been hospitalized or in a long-term care facility for ≥ 14 days before symptom onset
- Consider bacterial versus viral pneumonia as well as aspiration pneumonia

Pathogens associated with CAP

- *S pneumoniae, H influenzae*, *Mycoplasma pneumoniae*, *Chlamydophila pneumoniae* , methicillin-sensitive *Staphylococcus aureus, Klebsiella pneumoniae*, other Gram-negative rods, Legionella sp., seasonal viruses (influenza, RSV, etc.)

Consider

- Nasopharyngeal swab (NPS) - place patients in droplet precautions until further results
- Sputum gram stain + culture and sensitivity
- Blood culture x 2
- Urine antigen for legionella

Antibiotic Therapy

- Consider empiric oseltamivir during influenza season
- Evaluate risk of resistant organisms
- Narrow regimen based on culture and susceptibility results if applicable
- Consider transition to po therapy if hemodynamically stable and functioning GI tract
- Duration: minimum of 5 days if clinical improvement and afebrile after 48-72 hours
- Longer treatment may be required if:
    1) initial treatment was not active against identified pathogen
    2) isolation of resistant pathogen
    3) extra-pulmonary infection or bacteremia present
    4) complicated pneumonia (e.g. empyema)

Requiring admission but NOT ICU:	
Co-morbidities (no risk factor for resistant organisms or neutropenia)	Ceftriaxone 2g IV q24h. Consider adding azithromycin 500mg PO on day 1 and 250mg daily x 4 days if concern of atypical pathogens OR Levofloxacin[1] 750mg once daily x 5 days ***(HHS only)*** OR Moxifloxacin 400mg once daily x 5 day ***(SJHH only)***
Admission to ICU:	
	Ceftriaxone 2g IV q24h hours **and one of** Levofloxacin 750mg IV / PO daily ***(HHS only)*** *OR* Moxifloxacin 400mg IV/PO daily ***(SJHH only)*** *OR* Azithromycin 500mg IV daily
Suspected *Pseudomonas* or resistant organisms or at high risk of *Pseudomonas* (e.g. neutropenic, CF patients, bronchiectasis) ***if documented Pseudomonas, tailor therapy based on susceptibilities*	Piperacillin/tazobactam 4.5g IV q6h **and** Levofloxacin 750mg IV/PO daily ***(HHS only)*** OR Ciprofloxacin 400mg IV bid/ 750mg po bid ***(SJHH only)*** OR Ceftazidime[1] 2g IV q8h **and** Levofloxacin[1] 750mg IV / PO daily ***(HHS only)*** OR Moxifloxacin 400mg IV/po daily ***(SJHH only)***
For known or suspected MRSA	Add vancomycin[1] 15mg/kg IV q12h

- Influenza and pneumococcal vaccines if appropriate
- Smoking cessation education if applicable

HOSPITAL-ACQUIRED PNEUMONIA (HAP) / VENTILATED-ACQUIRED PNEUMONIA (VAP)

- Hospital-acquired pneumonia (HAP) – pneumonia that occurs 48 hours or more after admission, which was not incubating at the time of admission
- Ventilated-associated pneumonia (VAP) – pneumonia that occurs more than 48 – 72 hours after endotracheal intubation
- Early onset HAP/VAP occurs within first 4 days of hospitalization
- Late onset HAP/VAP occurs five days or more of hospitalization

Pathogens associated with early onset HAP/VAP or no known risk factors for resistant pathogens:
Strep pneumoniae, H influenzae, MSSA, antibiotic-sensitive enteric gram negative rods

Treatment Options

- Ceftriaxone 2g IV once daily ***OR***
- Levofloxacin[1] 750mg IV once daily (in patients with serious beta lactam allergy) ***(HHS only) OR***
- Moxifloxacin 400mg IV/PO once daily (in patients with serious beta lactam allergy)***(SJHH only)***

* If known colonizer of MRSA, suggest add vancomycin[1] 15mg/kg IV q12h
* If known colonizer of ESBL, use ertapenem[1] 1g IV q24h or meropenem[1] 500mg IV q6h

Pathogens associated with late onset HAP/VAP or known risk factors for resistant pathogens (see below):
Strep pneumoniae, H influenzae, MSSA, MRSA, antibiotic-resistant enteric gram negative rods (e.g. ESBL *E.coli*), *Pseudomonas aeruginosa*, Acinetobacter, Legionella

Potential risk factors for resistant pathogens causing HAP:

- Prior antibiotics within 90 days
- Hospitalization for ≥ 2 days within past 90 days
- Nursing home or extended care facility residence
- Chronic dialysis
- Home wound care
- Family member with resistant pathogen
- Immunosuppressive disease +/- therapy

Treatment Options

- Piperacillin-tazobactam 4.5g IV q6h ***OR***
- Meropenem[1] 500mg IV q6h (serious beta lactam allergy, or known colonizer of resistant gram negatives)

* If known colonizer of MRSA, suggest add vancomycin[1] 15mg/kg IV q12h to the above regimen

Points to consider:

- Treatment duration: patients with a good initial clinical response (and without *Pseudomonas*) can be treated for as short as 7 days
- 7 days may not be sufficient for immunocompromised patients, or those infected with *S.aureus, Pseudomonas* or with delayed response

[1] Requires renal dosage adjustment