Adult Community Acquired Pneumonia Pathway

Methods

- Existing guidelines from professional bodies, clinical resources, and intergovernmental resources for the management of pneumonia in resource-limited settings
- ATS/IDSA 2019 guidelines
- UpToDate
- Indian guidelines
    - Joint ICS/NCCP(I) recommendations 2012
- MSF
- Indian Council of Medical Research antimicrobial guidelines
- British Thoracic Society

This pathway is suitable for

- Adults presenting to CSA clinics

Initial assessment

- Assess stability
    - If unstable, resuscitate +/- transfer to higher level of care
- Consider differential diagnoses
- Obtain pulse oximetry

Radiography for CAP

- Routine chest radiography is not required for patients who have:
    - A clinical presentation consistent with CAP **AND**
    - Are candidates for outpatient management **AND**
    - No compelling differential diagnoses **AND**
    - No relevant co-morbidities **AND**
    - No hypoxia/evidence of severe disease **AND**
    - NB: our preference is for all patients to have CXR if possible. However, infrastructure limitations can prohibit this. In the case CXR is not available, careful clinical diagnosis can be considered. In outpatient settings globally, CAP is often diagnosed without CXR.
- Chest XR should be obtained for patients who are:
    - Unwell, clinically unstable, have evidence of severe disease, or hypoxic **OR**
    - If there are relevant co-morbidities **OR**
    - If there is diagnostic uncertainty

Lab tests for CAP

- All patients with suspected CAP should be screened for COVID-19
- During flu season, consider screening patients with suspected CAP for influenza A/B
- Patients suspected of tuberculosis should be investigated according to local protocols/CSA pathway (to be written)

Location of treatment

- Decision to manage patient as an outpatient or inpatient to be determined through risk stratification and clinical judgment
- CRB65, CURB65 and PSI can be used to stratify risk (Appendix 3)
    - CRB65 is the simplest tool and does not require blood tests
- Investigations such as arterial blood gas, full blood count, and biochemistry may aid in risk stratification (and are required by the PSI)

IF patient suitable for outpatient management of CAP

- i.e. clinically stable, low CRB65
- Initiate empiric therapy for CAP with first line oral agent (Appendix 1)
- Re-assess patient in 48-72 hours
- Outpatient CAP should be treated for 5 days
    - Ensure afebrile > 48 hours and clinically stable prior to stopping antibiotics

IF patient requires inpatient management of CAP

- Assess capacity to manage at CSA partner site
    - Arrange transfer if required
- Use the ATS/IDSA Major and Minor criteria to determine regular ward vs ICU level care (Appendix 4)
- Take sputum and blood cultures if possible (only in severe CAP, as defined in the appendix)
- Start IV empiric antibiotic therapy as soon as possible (Appendix 1)
    - If patient requires transfer, give first dose of antibiotics prior to transfer
    - If intravenous access not possible at CSA site, then IM ceftriaxone can be considered as a temporising measure
- Give antibiotics for at least 5 days
- Initial empiric therapy can be de-escalated as patient clinically improves
- If patient does not improve clinically on empiric therapy, re-assess patient and consider:
    - Resistant organisms (MRSA, Pseudomonas)
    - Complications of CAP (Parapneumonic effusion, Empyema)
    - Alternative diagnosis

In influenza positive

- If within 3 days of symptom onset, start oseltamivir 75mg BD for 5 days
- Cover with empirical antibiotics given the risk for bacterial superinfection/co-infection

If Covid positive

- As per CSA Covid pathway

Plan for discharge

- Follow-up should be arranged with patient prior to discharge
    - Arrange follow up in 48-72 hours to assess response and stability
    - Arrange an additional follow up in 4-6 weeks to if patient requires Covid/Influenza/Pneumococcal vaccine catch-up

- Checklist for discharge (Appendix 5)

Interventions to avoid

- The following tests do not need to be done routinely for suspected CAP suitable for outpatient management
    - Sputum culture
    - Blood culture
    - Urinary antigens
    - Inflammatory markers (CRP, procalcitonin)
    - These tests can be considered if severe CAP requiring inpatient management, or if patient has co-morbidities
- **Do not treat CAP empirically with carbapenems (e.g. meropenem, imipenem)**
    - Carbapenems have an unnecessarily broad spectrum of coverage for CAP
- **Do not treat CAP empirically with anti-MRSA or anti-pseudomonal agents**
    - Most CAP is not caused by MRSA or pseudomonas – these organisms do not need to be routinely covered
- **Do not prescribe steroids for CAP**
    - Multiple trials have failed to show a clinical benefit from corticosteroid administration in CAP
    - Exception_ Severe CAP (CAPECOD trial)

Appendix 1: Empiric Treatment of Pneumonia

	Outpatient first line (no risk factors)	Outpatient with comorbidities/recent antibiotic use	Inpatient, NOT severe	Inpatient, severe
CSA	Amoxicillin 1g three times daily **OR** Doxycycline 100mg twice daily **OR** Azithromycin 500mg first day then 250mg daily thereafter **OR** Clarithromycin 500mg twice daily	Amoxicillin/Clavulanate 875/125 twice daily **OR** cefuroxime 500mg twice daily **AND** Doxycycline 100mg twice daily **OR** Azithromycin 500mg first day then 250mg daily thereafter **OR** Clarithromycin 500mg twice daily	Ceftriaxone 1-2g daily **AND** Azithromycin 500mg daily OR Clarithromycin 500mg twice daily	Ceftriaxone 1-2g daily **AND** Azithromycin 500mg daily OR Clarithromycin 500mg twice daily

*Avoid respiratory fluroquinolones unless TB ruled out

If prior history of respiratory MRSA

- Add vancomycin (15mg/kg every 12 hours)
- Obtain cultures/PCR to guide ongoing therapy
- Vancomycin/MRSA cover should be stopped if MRSA is not identified on laboratory testing

If prior history of respiratory pseudomonas aeruginosa

- Initiate treatment with antipseudomonal cover (piperacillin/tazobactam 4.5g every 6 hours **or** cefepime 2g three times daily)
- Obtain cultures/PCR to guide ongoing therapy
- Pseudomonal cover should be stopped if pseudomonas is not identified on laboratory testing

If MRSA or pseudomonas is suspected based on patient (e.g. underlying structural lung disease) or epidemiological factors

- In non-severe disease, obtain cultures/PCR but withhold MRSA/pseudomonas cover unless confirmed on laboratory testing
- In severe disease, add MRSA or pseudomonas coverage, obtain cultures/PCR to guide ongoing need for MRSA/pseudomonas coverage

If influenza positive

- Add Oseltamivir 75mg twice daily

Appendix 2: Empiric treatment of CAP at CSA partner sites in patients with confirmed anaphylactic reaction to penicillins

	Outpatient first line (no risk factors)	Outpatient with comorbidities/recent antibiotic use	Inpatient, NOT severe	Inpatient, severe
CSA	Doxycycline 100mg twice daily **OR** Azithromycin 500mg first day then 250mg daily thereafter **OR** Clarithromycin 500mg twice daily	Doxycycline 100mg twice daily **OR** Azithromycin 500mg first day then 250mg daily thereafter **OR** Clarithromycin 500mg twice daily **OR** Levofloxacin 750mg daily **OR** Moxifloxacin 400mg daily*	Levofloxacin 750mg daily **OR** Moxifloxacin 400mg daily*	Aztreonam 2g every 8 hours **AND** Levofloxacin 750mg daily **OR** Moxifloxacin 400mg daily

*Sputum sample should be sent for TB testing in patients commencing on respiratory fluroquinolones

NOTES:

- Characteristics of penicillin allergy should be clarified prior to initiation of treatment
- While up to 10% of patients report penicillin allergies, greater than 90% of these patients do not have evidence of penicillin allergy on subsequent testing

Appendix 3 – Validated Severity Scales

CURB-65

Criteria	Points
Confusion	+1
Urea > 7 mmol/L	+1
Respiratory Rate ≥ 30	+1
Systolic BP < 90 mmHg or Diastolic BP ≤ 60 mmHg	+1
Age ≥ 65	+1
Total	

CURB-65 Score	Mortality Risk	Recommendation

0	0.6%	Low risk, consider outpatient treatment
1	2.7%	Low risk, consider outpatient treatment
2	6.8%	Short inpatient hospitalization or closely supervised outpatient treatment
3	14.0%	Severe pneumonia, inpatient management, consider ICU
4 or 5	27.8%	Severe pneumonia, inpatient management, consider ICU

CRB-65

Criteria	Points
Confusion	+1
Respiratory Rate ≥ 30	+1
Systolic BP < 90 mmHg or Diastolic BP ≤ 60 mmHg	+1
Age ≥ 65	+1
Total	

CRB-65 Interpretation

Score	Recommendation
0	Low risk, consider outpatient management
1	Increased risk, consider inpatient management
2	Increased risk, consider inpatient management
3-4	High risk, inpatient management

Appendix 4 – ATS/IDSA Major and Minor criteria for determining regular ward vs ICU disposition

Validated definition includes either one major criterion or three or more minor criteria

- If meeting this definition, patient should be managed in an intensive care setting

Major criteria

Septic shock with need for vasopressors
Respiratory failure requiring mechanical ventilation

Minor criteria

Respiratory rate ≥ 30 breaths/min
PaO2/FIO2 ratio ≤ 250
Multilobar infiltrates Confusion/disorientation
Uremia (blood urea nitrogen level ≥ 20 mg/dl)

Leukopenia* (white blood cell count < 4,000 cells/µl)
Thrombocytopenia (platelet count < 100,000/µl)
Hypothermia (core temperature < 36 C)
Hypotension requiring aggressive fluid
Resuscitation

*Due to infection alone (i.e. not chemotherapy related)

Appendix 5 – Checklist for discharge

Intervention	Outcome
Diagnosis	CAP vs DDx
COVID test	Pos/Neg
TB screen	Pos/Neg
CXR	Findings
Risk stratification (likely CRB-65)	Outpatient vs Inpatient vs Inpatient ICU
Antibiotics	Drug
Disposition	Home/Admit
Follow up	Planned