# Community Acquired Pneumonia: 2016 Philippine Clinical Practice Guidelines

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**IM 251**

## Rationale

- **Community-acquired Pneumonia is the leading cause of death from an infectious etiology**, and sixth leading cause of death overall, worldwide
- New organisms have been discovered over time, with an increase in resistance among these pathogens
  - Misuse and abuse of antimicrobial drugs contribute to this rise in antimicrobial resistance
  - Previous CPG on CAP was published in 2010

## Rationale

- Thus, it is necessary to publish a new standardized approach based on best available evidences
  - Regional differences, causative agents, antibiotic resistance rates, drug licensing, healthcare structure and available resources are all considered in establishing the current guidelines

## Sample Case

### General Data

- CP
- 35/M
- Carpenter
- From Lemery, Batangas
- Chief complaint: cough

# Sample Case

History of Present Illness:

9 days PTC – had intermittent **fever** (low-grade, undocumented), with **cough and colds** productive of **whitish phlegm**. Took paracetamol for 2 days with relief of fever.

7 days PTC – fever and colds **abated** but **cough persisted**, still productive of whitish phlegm. Started taking unrecalled "cough syrup" with slight relief of cough

# Sample Case

History of Present Illness:

4 days PTC – **fever recurred** with temperatures ranging from 38–39°C. Self-medicated with paracetamol, with some relief. Noted **increase of yellowish-greenish phlegm**

1 day PTC – still with fever and cough, developed **chest pain on deep breathing**, and felt **dizziness on standing**. Went to PGH ER the next day

# Sample Case

Past Medical History: No known history of asthma, allergies, PTB, previous pneumonia, diabetes mellitus, hypertension, past hospitalizations

Personal and Social History: No history of travel abroad, has been **smoking** 4 sticks twice a week for the past 10 years **(12 pack-years)**, **drinks** 3 to 4 beers once or twice a week

Family Medical History: Father died from complications of stroke and hypertension 3 years ago at the age of 50

# Sample Case

Physical Examination

General Survey: alert, awake, oriented,  not in cardiorespiratory distress

Vital Signs: BP 90/60 mmHg**, HR 130 bpm, RR 28 cpm, T 40°C** BMI 20 O2Sat 97%

Head and Neck: pink palpebral conjunctivae, anicteric sclerae, no lymphadenopathies, no neck vein engorgement

# Sample Case

Physical Examination

Chest and Lungs: equal chest expansion, **(+) decreased vocal fremitus with dullness on percussion at left basal area, (+) coarse crackles on left mid-to-basal area with decreased breath sounds at the left basal area**

Heart: tachycardic, regular rhythm, good S1 and S2, no S3 and S4, no heaves, no thrills, no murmurs appreciated (due to coarse crackles), apex beat and PMI at 5th ICS LMCL

# Sample Case

Physical Examination

Abdomen: soft, flat, nontender abdomen, normoactive bowel sounds, no organomegaly or masses

Extremities: pink nail beds, full and equal pulses, no cyanosis, clubbing or edema

Neurological Exam: full sensorium, no focal neurological deficits

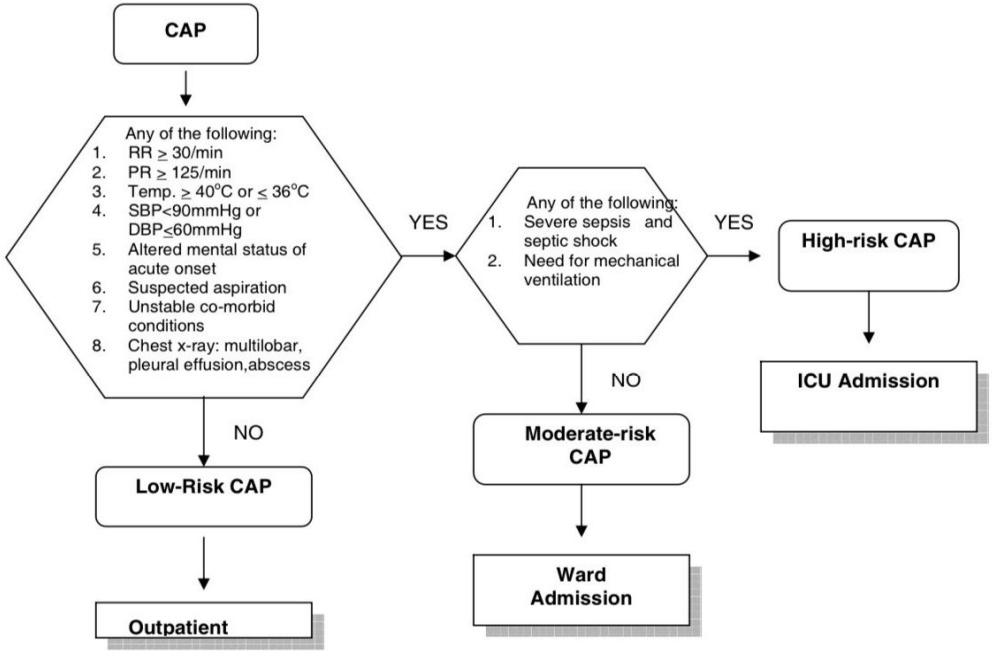
# Sample Case

Chest X-ray: **left lower zone is uniformly white, with a meniscus sign; left heart border and hemidiaphragm are obscured with blunting of left costophrenic angle**

Complete Blood Count: Hgb 12.5; Hct 0.38; **WBC 12,000 (increased; predominantly neutrophils)** (Seg=90, Lym=14); platelets 302

Chemistry: Creatinine 91 µmol/L; BUN 6.4 mmol/L

**Figure 1. Algorithm for the management-oriented risk stratification of CAP among immunocompetent adults**




*Algorithm for the diagnosis and disposition of CAP in adults.*

# Diagnostic Criteria - Low Risk CAP

- Stable Vital Signs:
  - RR < 30 cpm
  - PR < 125 bpm
  - SBP > 90 mmHg
  - DBP > 60 mmHg
  - Temp > 36 or < 40 C
- No acute decrease in sensorium
- No suspicion of aspiration
- No or stable comorbid conditions
- Chest X-ray shows localized infiltrates and no evidence of pleural effusion

## Diagnostic Criteria - Moderate Risk CAP

- Unstable Vital Signs, indicated by any of the following:
  - RR ≥ 30 cpm
  - PR ≥ 125 bpm
  - SBP ≤ 90 mmHg
  - DBP ≤ 60 mmHg
  - Temp ≤ 36 or ≥ 40 C
- Acute decrease in sensorium
- Suspicion of aspiration (must be indicated in diagnosis)
- Unstable or decompensated comorbid conditions
- Chest X ray shows multilobar infiltrates or pleural effusion

## Diagnostic Criteria - High Risk CAP

Any criteria for moderate risk CAP, plus any of the following:

- Severe sepsis
- Septic shock
- Need for mechanical ventilation

# Risk Stratification

| Classification | Rule In | Rule Out |
|---|---|---|
| Low Risk | RR 28 cpm, SBP 90 mmHg, T 38.8 deg C<br>No acute decrease in sensorium | Evidence of pleural effusion on CXR |
| Moderate Risk | HR 130 bpm, DBP 50 mmHg, evidence of pleural effusion on PE and CXR | No unstable comorbids |
| High Risk | Features of MR-CAP | No evidence of sepsis or septic shock, no need for mechanical ventilation |

# Primary Working Impression

**Moderate Risk Community-Acquired Pneumonia with no suspicion of aspiration**

The patient is classified at “Moderate risk CAP” because of at least 1 moderate risk feature, while having no high-risk feature.

***What is the best management plan?***

# Empiric Therapy

- Targets the most likely etiologic organisms based on clinical data
- Antibiotics should be started as soon as CAP is diagnosed; however, this should still be properly directed at the most likely etiologic organisms.
- The CAP CPG regimens concur with the National Antibiotic Guidelines, with some exceptions as noted.
- Both present several options of treatment regimens per risk stratification for CAP.

# Empiric Therapy - Low Risk CAP

| Potential Pathogens | Antibiotic Regimen |
| --- | --- |
| ❖ Streptococcus pneumoniae<br>❖ Haemophilus influenzae<br>❖ Chlamydophila pneumoniae<br>❖ Mycoplasma pneumoniae<br>❖ Moraxella catarrhalis<br>❖ Enteric Gram-negative bacilli (if with co-morbid illness) | Without comorbid illness, either of the following:<br>❖ Amoxicillin 1g PO TID<br>❖ Extended macrolides such as Clarithromycin 500mg PO BID<br>With stable comorbid illness:<br>❖ β-lactam/β-lactamase inhibitor combination (BLIC) (such as Co-amoxiclav 1 g BID or Sultamicillin 750 mg BID) OR 2nd generation oral cephalosporin (such as Cefuroxime axetil 500 mg BID)<br>❖ May add extended macrolides (such as Azithromycin 500 mg OD or Clarithromycin 500 mg BID) |

# Empiric Therapy - Low Risk CAP

- Unlike amoxicillin, extended macrolides can be dosed once a day and are safe for those allergic to β-lactam drugs
- Azithromycin may cause QT prolongation. Risk factors include existing QT prolongation, hypokalemia, hypomagnesemia, bradycardia, arrhythmias, arrhythmia treatments
- Azithromycin increases risk of death only for those with a high baseline risk (above risk factors or elderly)
- Unlike ampicillin, amoxicillin is more orally bioavailable, causes less diarrhea, and has a longer half-life.

# Empiric Therapy - Low Risk CAP

- Fluoroquinolones have the side effects of QT prolongation, tendinitis, tendon rupture, peripheral neuropathy, phototoxicity, and hypersensitivity.
- Fluoroquinolones are not the first-line treatment for low-risk CAP.
- If BLIC or cephalosporin with or without macrolides do not cause improvement, patient should be reassessed.
- Oral 3rd generation cephalosporin is recommended only as a step-down from IV 3rd generation cephalosporin.

# Empiric Therapy - Moderate Risk CAP

| Potential Pathogens | Antibiotic Regimen |
| --- | --- |
| ❖ Streptococcus pneumoniae<br>❖ Haemophilus influenzae<br>❖ Chlamydophila pneumoniae<br>❖ Mycoplasma pneumoniae<br>❖ Moraxella catarrhalis<br>❖ Enteric Gram-negative bacilli<br>❖ Legionella pneumophila<br>❖ Anaerobes (among those with risk of aspiration) | Without aspiration risk, both of the following:<br>❖ IV non-antipseudomonal BLIC (such as Ampicillin-Sulbactam 1.5 g q6h IV) OR Cephalosporin such as Cefuroxime 1.5 g q8h IV or Ceftriaxone 2 g OD)<br>❖ Extended macrolides (such as Azithromycin 500 mg OD PO or Clarithromycin 500 mg BID PO) OR Respiratory fluoroquinolones (such as Levofloxacin 500 mg OD PO or Moxifloxacin 400 mg OD PO) |

# Empiric Therapy - Moderate Risk CAP

| Potential Pathogens | Antibiotic Regimen |
| --- | --- |
| ❖ Streptococcus pneumoniae<br>❖ Haemophilus influenzae<br>❖ Chlamydophila pneumoniae<br>❖ Mycoplasma pneumoniae<br>❖ Moraxella catarrhalis<br>❖ Enteric Gram-negative bacilli<br>❖ Legionella pneumophila<br>❖ Anaerobes (among those with risk of aspiration) | With aspiration risk:<br>❖ Ampicillin-sulbactam (in a higher dose of 3g q6 IV) or Moxifloxacin (still at 400 mg OD PO) is enough if already part of the regimen<br>❖ Otherwise, may add Clindamycin 600 g q8 IV |

# Empiric Therapy - High Risk CAP

| Potential Pathogens | Antibiotic Regimen |
| --- | --- |
| ❖ Streptococcus pneumoniae<br>❖ Haemophilus influenzae<br>❖ Chlamydophila pneumoniae<br>❖ Mycoplasma pneumoniae<br>❖ Moraxella catarrhalis<br>❖ Enteric Gram-negative bacilli<br>❖ Legionella pneumophila<br>❖ Anaerobes (among those with risk of aspiration)<br>❖ Staphylococcus aureus<br>❖ Pseudomonas aeruginosa | Without risk of P. aeruginosa, both of the following:<br>❖ IV non-antipseudomonal β-lactam (such as Ceftriaxone 2 g OD or Ertapenem 1 g OD)<br>❖ IV extended macrolides (Azithromycin dihydrate 500 mg OD IV) or IV respiratory fluoroquinolones (such as Levofloxacin 500 mg OD IV or Moxifloxacin 400 mg OD IV) |

## Empiric Therapy - High Risk CAP

Risk factors for P. aeruginosa infection

- History of broad-spectrum antibiotic use for more than 7 days within the past month
- Severe underlying bronchopulmonary disease
- Malnutrition
- Chronic use of steroids > 15 mg/day for at least 2 weeks

# Empiric Therapy - High Risk CAP

| Potential Pathogens | Antibiotic Regimen |
|---|---|
| ❖ Streptococcus pneumoniae<br>❖ Haemophilus influenzae<br>❖ Chlamydophila pneumoniae<br>❖ Mycoplasma pneumoniae<br>❖ Moraxella catarrhalis<br>❖ Enteric Gram-negative bacilli<br>❖ Legionella pneumophila<br>❖ Anaerobes (among those with risk of aspiration)<br>❖ Staphylococcus aureus<br>❖ Pseudomonas aeruginosa | With risk of P. aeruginosa, all of the following:<br>❖ IV antipneumococcal antipseudomonal β-lactam such as BLIC (eg, Piperacillin-tazobactam 4.5 gm q6h), cephalosporin (eg, Cefepime 2 g q8h-12h), or carbapenem (Meropenem 1 g q8h)<br>❖ IV extended macrolides (such as Azithromycin dihydrate 500 mg OD IV) and Aminoglycoside (Gentamicin 3 mg/kg OD or Amikacin 15 mg/kg OD)<br>➢ This may be substituted by Levofloxacin 750 mg OD IV or Ciprofloxacin 400 mg q8-12h IV |

## Empiric Therapy - High Risk CAP

Criteria to warrant empiric MRSA treatment

- Intensive care admission is required
- Necrotizing or cavitary infiltrates
- Empyema

# Empiric Therapy - High Risk CAP

| Potential Pathogens | Antibiotic Regimen |
| --- | --- |
| ❖ Streptococcus pneumoniae<br>❖ Haemophilus influenzae<br>❖ Chlamydophila pneumoniae<br>❖ Mycoplasma pneumoniae<br>❖ Moraxella catarrhalis<br>❖ Enteric Gram-negative bacilli<br>❖ Legionella pneumophila<br>❖ Anaerobes (among those with risk of aspiration)<br>❖ Staphylococcus aureus<br>❖ Pseudomonas aeruginosa | With MRSA risk, any of the above PLUS:<br>❖ Vancomycin 15 mg/kg q8–12h<br>❖ Linezolid 600 mg q12h IV (National Antibiotic Guidelines do not recommend monotherapy)<br>❖ Clindamycin 600 mg q8h IV (disputed by National Antibiotic Guidelines) |

## Empiric Therapy - Moderate and High Risk CAP

- Sulbactam increases bioavailability of oral ampicillin, but has no effect on IV ampicillin.
- Carbapenems are best reserved when there is a risk of potentially resistant strains (eg, ESBL producing enterobacteriaceae), such as when there was prior use of 3rd gen cephalosporins and fluoroquinolones.
- Non-PNDF carbapenems that may be used include meropenem and imipenem.
- If there is active influenza or influenza within 2 weeks of CAP onset, additional Vancomycin 15 mg/kg q8-12h or Linezolid 600 mg q12h IV is administered.

# Course in the Wards

Given the patient's initial diagnosis, appropriate work-up was done; patient was started on an empiric therapy of **Ampicillin-sulbactam 1.5g IV q6 and Azithromycin 500 mg PO OD.**

***What is the next appropriate action to be taken?***

## Response to Initial Therapy

- **Response to therapy** is expected **within 24–72 hours of initiating treatment**. Failure to improve after 72 hours of treatment is an indication to repeat the chest radiograph.
- Temperature, respiratory rate, heart rate, blood pressure, sensorium, oxygen saturation and inspired oxygen concentration should be monitored to assess response to therapy.
- Follow-up cultures of blood and sputum are **not indicated** for patients who are responding to treatment.

## Response to Initial Therapy

- The lack of a response after 72 hours to seemingly appropriate treatment in a patient with CAP should lead to a **complete reappraisal**, rather than simply to selection of alternative antibiotics.
- The clinical history, physical examination and the results of all available investigations should be reviewed.
- Patients should be reassessed for possible resistance to the antibiotics being given or for the presence of other pathogens.
- Treatment should be **revised according to culture result.**

## Response to Initial Therapy

- **Follow-up chest radiograph** is recommended to investigate for other conditions such as **pneumothorax**, **cavitation and extension** to previously uninvolved lobes, **pleural effusion**, **pulmonary edema** and **ARDS**.
- For suspicion of an underlying **mass**, **bronchiectasis**, **loculation**, or **pulmonary abscesses**, a **CT scan** would provide more information.
- Obtaining additional specimens for microbiological testing should be considered.

## Response to Initial Therapy

- Reasons for a lack of response to treatment include:
  - Correct organism but inappropriate antibiotic choice or dose
  - Resistance of organism to selected antibiotic
  - Wrong dose (e.g., in a patient who is morbidly obese or has fluid overload)
  - Antibiotics not administered
  - Correct organism and correct antibiotic but infection is loculated (e.g., most commonly empyema)

## Response to Initial Therapy

- Reasons for a lack of response to treatment include:
  - Obstruction (e.g., lung cancer, foreign body)
  - Incorrect identification of causative organism
  - No identification of causative organism and empirical therapy directed toward wrong organism
  - Non-infectious cause
  - Drug-induced fever
  - Presence of an unrecognized, concurrent infection

# Course in the Wards

**PE on D1 of antibiotics:**

General Survey: alert, awake, oriented,  not in cardiorespiratory distress

Vital Signs: BP 100/60 mmHg**, HR 110  bpm**, **RR 20 cpm, T 37.9 C** O2Sat 96%

Head and Neck: pink palpebral conjunctivae, anicteric sclerae, no lymphadenopathies, no neck vein engorgement

Chest and Lungs: equal chest expansion**, (+) less coarse crackles on left mid-to-basal area with improved breath sounds at the left basal area**

# Course in the Wards

**PE on D1 of antibiotics:**

Heart: tachycardic, regular rhythm, good S1 and S2, no S3 and S4, no heaves, no thrills, no murmurs appreciated (due to coarse crackles), apex beat and PMI at 5th ICS LMCL

Abdomen: soft, flat, nontender abdomen, normoactive bowel sounds, no organomegaly or masses

Extremities: pink nail beds, full and equal pulses, no cyanosis, clubbing or edema

Neurological Exam: full sensorium, no focal neurological deficits

# Course in the Wards

**Labs on D1 of antibiotics:**

Blood work up: Hgb 12.4; Hct 0.40; **WBC 10,500** (Seg=74, Lym = 21); platelets 298,
Chemistry: Creatinine 72 µmol/L; BUN 5.6 mmol/L
Sputum culture: **Positive for S. pneumoniae after 24 hours**

## De-escalation of Therapy

Once the patient is **clinically improving**, **hemodynamically stable** and has a **functioning gastrointestinal tract,** de-escalation of initial empiric broad-spectrum antibiotic or combination parenteral therapy to a single narrow spectrum parenteral or oral agent based on available laboratory data is recommended.

## De-escalation of Therapy

- Indications for de-escalation or streamlining include:
  - **Resolution of fever** for > 24 hours
  - Less cough and resolution of respiratory distress (**normalization of respiratory rate**)
  - **Improving white blood cell count**, no bacteremia
  - Etiologic agent is **not a high-risk (virulent/resistant) pathogen** e.g. Legionella, S. aureus or Gram negative enteric bacilli

## De-escalation of Therapy

- Indications for de-escalation or streamlining include:
  - **No unstable comorbid condition** or life-threatening complication such as myocardial infarction, congestive heart failure, complete heart block, new atrial fibrillation, supraventricular tachycardia, etc.
  - **No sign of organ dysfunction** such as hypotension, acute mental changes, BUN to creatinine ratio of >10:1, hypoxemia, and metabolic acidosis
  - Patient is **clinically hydrated**, taking oral fluids and is **able to take oral medications**

## De-escalation of Therapy

- The choice of oral antibiotics following initial parenteral therapy is based on **available culture results, antimicrobial spectrum, efficacy, safety and cost**.
- In general, when switching to oral antibiotics, either the **oral form of the parenteral antibiotic** or an antibiotic from the **same drug class** should be used.

# De-escalation of Therapy

Dosages for commonly used oral agents for streamlining:

| ANTIBIOTIC | DOSAGE |
|---|---|
| Amoxicillin-clavulanic acid | 625 mg TID or 1 g BID |
| Azithromycin | 500 mg OD |
| Cefixime | 200 mg BID |
| Cefuroxime axetil | 500 mg BID |

# De-escalation of Therapy

Dosages for commonly used oral agents for streamlining:

| ANTIBIOTIC | DOSAGE |
|---|---|
| Cefpodoxime proxetil | 200 mg BID |
| Levofloxacin | 500-750 mg OD |
| Moxifloxacin | 400 mg OD |
| Sultamicillin | 750 mg BID |

# Course in the Wards

After assessing the patient for a positive clinical response to initial treatment, the patient's therapy is de-escalated to **Azithromycin 500 mg PO OD** after 48 hours of empiric therapy.

***How long should antibiotics be given? When can the patient be discharged?***

## Duration of Therapy

- Depends on the CAP classification and the etiology:
  - Low-risk uncomplicated bacterial pneumonia
    - **5 to 7 days**
  - Moderate risk bacterial pneumonia
    - **7 to 14 days** if MSSA
    - **7 to 21 days** if MRSA
    - **14 to 21 days** if *P. aeruginosa*
  - Moderate-risk and high-risk CAP with bacteremia
    - **Up to 21 days** if MSSA
    - **Up to 28 days** if MRSA or *P. aeruginosa*

## Duration of Therapy

- Depends on the CAP classification and the etiology:
  - *Mycoplasma* and *Chlamydophila* pneumonia
    - **10 to 14 days**
  - *Legionella* pneumonia
    - **14 to 21 days**
- Newer agents like azalides have longer half-lives and higher tissue levels, so treatment can be shortened (e.g. 3-5 days for low-risk, 10 days for *Legionella*)
- Patients **should be afebrile for 48 to 72 hours** with no signs of clinical instability before **discontinuation of treatment.**

## Discharge Plan

- In the absence of any unstable coexisting illness or other life threatening complication, the patient may be **discharged once clinically stable and oral therapy is initiated**.

## Discharge Plan

- Recommended clinical criteria during the 24 hours prior to discharge:
  - Temperature of 36.5°C to 37.5°C
  - PR < 100 bpm
  - RR 16 to 24 cpm
  - SBP > 90 mmHg
  - O2 Sat > 90%
  - Functional gastrointestinal tract

## Discharge Plan

- A **repeat chest radiograph** prior to hospital discharge is **not needed** in a patient who is **clinically improving**.

- However, a **repeat chest radiograph is recommended** during a follow-up visit, approximately **4 to 6 weeks after hospital discharge** to establish a new radiographic baseline and to **exclude the possibility of malignancy associated with CAP**, particularly in older smokers.

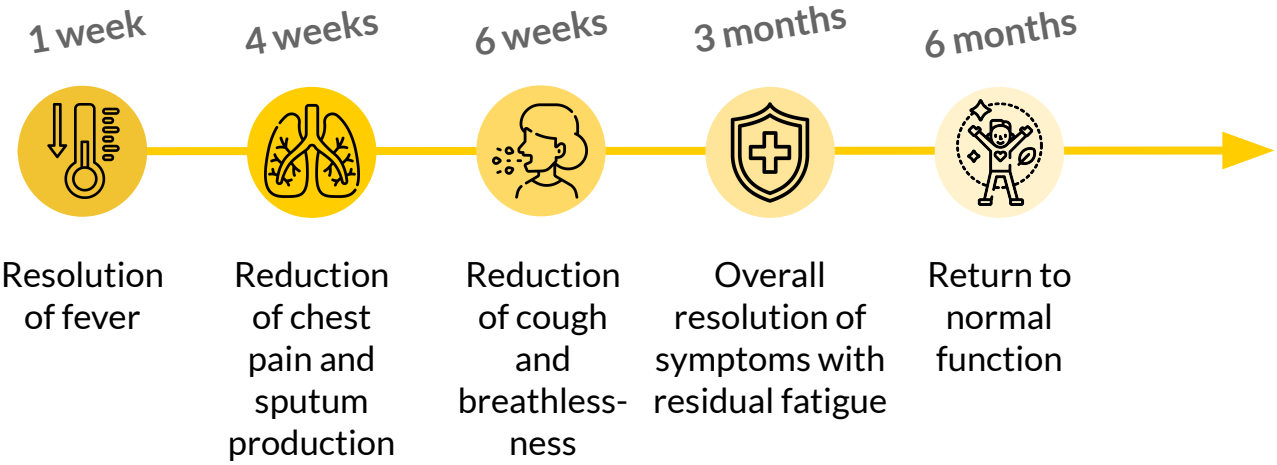
## Patient Education

- To improve adherence, patients should know what to expect in terms of diagnosis prognosis.

- Symptoms are expected to improve after starting treatment, but the rate of improvement varies with the **severity of pneumonia and adherence to the medical regimen**.

# Patient Education

- Patients should be made aware that the usual course of the disease is as follows:



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