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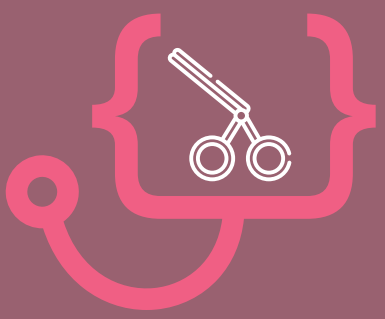

2019 Edition, Vol. I

STANDARD TREATMENT WORKFLOWS

of India

PARTNERS

national health authority

World Health Organization

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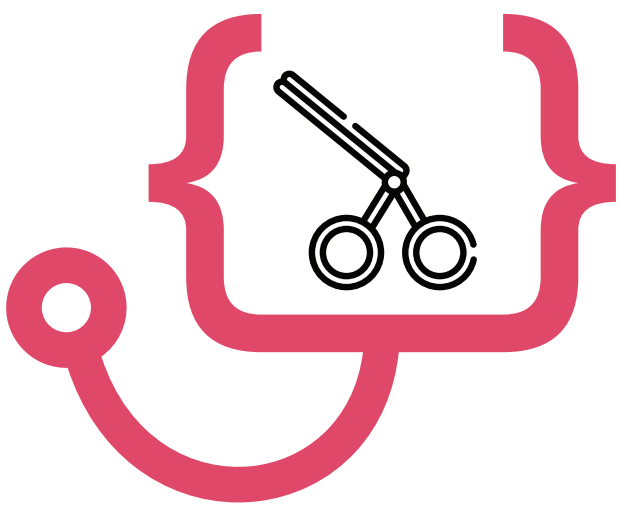

STANDARD TREATMENT WORKFLOWS of India

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INTRODUCTION

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GOAL

To empower the primary, secondary and tertiary care physicians/surgeons towards achieving the overall goal of Universal Health Coverage with disease management protocols and pre-defined referral mechanisms by decoding complex guidelines

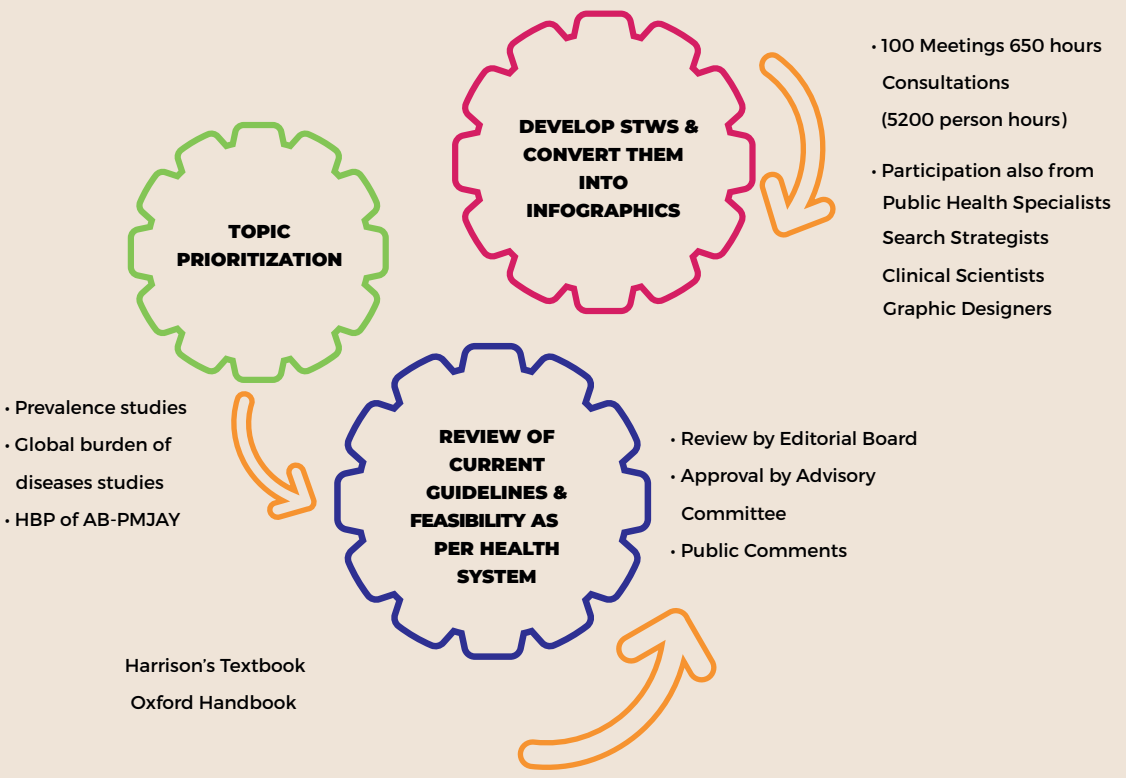
OBJECTIVES

Primary Objective:
To formulate clinical decision making protocols for common and serious medical/ surgical conditions for both OPD and IPD management at primary, secondary and tertiary levels of healthcare system for equitable access and delivery of health services which are locally contextual

Secondary Objective:
To facilitate PMJAY arm of Ayushman Bharat with secondary and tertiary level management of all surgical and medical conditions covered under the scheme.

METHODOLOGY

PROCESS OVERVIEW



PULMONOLOGY

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Standard Treatment Workflow (STW) for Management of
ACUTE RESPIRATORY INFECTION IN ADULTS
ICD-10-J09-J18; J00-06; J40

WHEN TO SUSPECT

SYMPTOMS
- Cough with yellow/rusty sputum
- Breathlessness
- Pleuritic chest pain
- Malaise, myalgia, arthralgia
- Extra pulmonary symptoms

PAST HISTORY
- TB
- Pneumonia
- Airway disease
-
- Diabetes
- Chronic steroid use

CLINICAL EXAMINATION

1. Vital parameters: Sensorium, Pulse, Blood pressure, Respiratory rate, Temperature, Oxygen saturation

Signs of respiratory failure: RR> 30/ min, Abdomin othoracic paradox, cyanosis, speaks in short sentences. Refer Respiratory Failure STW.

2. Systemic examination:
a. Upper respiratory tract: nose & paranasal sinuses (frontal and maxillary sinus tenderness), throat examination (pharynx and tonsils)
b. Lower respiratory tract: breath sounds (type, intensity), added sounds (crackles, wheeze, pleural rub)

Frank haemoptysis, may suggest Pulmonary TB or malignancy

PROCEED FOR FURTHER ASSESSMENT

- Fever, tachycardia, pharyngitis, suffusion of eyes, rhinitis, hoarse voice
- Respiratory system examination: Normal

- Fever, tachycardia
- Respiratory system exam: Wheeze
* Consider acute exacerbation of asthma/ COPD if there is a history of any of these 2 illnesses

- Fever, tachycardia, tachypnea
- Respiratory system exam: Crackles/ bronchial breath sounds
* Consider acute exacerbation of asthma/ COPD is there is a history of any of these 2 illnesses

PATHWAYS BASED ON INITIAL ASSESSMENT FINDINGS

PATHWAY 1: ACUTE URI (RESPIRATORY CATARRH)

LABORATORY INVESTIGATION:
- Total and differential count in suspected flu.

TREATMENT
- Symptomatic treatment for fever, myalgia (Paracetamol or other NSAID),
- Rest, Oral fluids (plenty)
- Oral antihistamines (Tab. CPM 4mg BD) for severe runny nose or sneezing
- Antibiotics in acute follicular tonsillitis: Amoxicillin/ Ampicillin 500mg tid X 5 days
  In penicillin sensitive individuals: Erythromycin estolate 250mg q 6 hrly X 5 days with food

Suspect epidemic flu
H/ o recent travel, symptoms of upper respiratory infection, diarrhoea, myalgia, breathlessness **Refer to higher centre for diagnosis, notif ication and treatment.**

PATHWAY 2: ACUTE BRONCHITIS

LABORATORY INVESTIGATION:
- Total and differential count if sputum is purulent,
- X-ray chest PA view

TREATMENT
- Symptomatic treatment for fever (Paracetamol or other NSAID), Oral fluids (plenty)
- Inhaled bronchodilators: Salbutamol nebulization (5mg/ 2.5ml) 6-8 hourly
- Antibiotics if there is purulent sputum and polymorphonuclear leukocytosis
  - Amoxicillin 500mg tidX 5 days
  - In penicillin sensitive individuals: Erythromycin estolate 250mg q 6 hrly X5 days with food
- If asthma is suspected refer to asthma STW

PATHWAY 3: COMMUNITY ACQUIRED PNEUMONIA

SEVERITY ASSESSMENT
- X-ray
- Use CRB-65* score for mortality risk assessment in primary care

CRB-65 SCORE

SCORE	RISK CLASS	SITE OF CARE
0	Low Risk	OP
1-2	Intermediate Risk	IP
3-4	High Risk	ICU

*65 in the scoring mnemonic refers to age> 65

Give 1 point for each of the following Prognostic features:
- Confusion
- Respiratory rate ≥30/ min
- Low BP (DBP ≤60 mm Hg or SBP ≤90 mm Hg)
- Age ≥65 years

OUT-PATIENT BASED CARE OF CAP (CRB-65 SCORE 0-1)

INVESTIGATIONS

Preliminary
Chest radiogram
Repeat if:
i. Patient is not improving/ worsening clinically
ii. Suspected underlying malignancy

Desirable
1. Pulse oximetry in outpatients
2. Sputum microbiology: In suspected PTB & non-response after 48 hours of antibiotics

TREATMENT

1. Targeted towards Streptococcus pneumoniae
2. Oral antibiotics after checking for comorbidities* (Diabetes, CVDs, CKD, CLD, Hepatic Pathology, Cancer, Alcohol Abuse, H/ o antibiotics within last 3 months.)
   a. Without comorbidities: Cap. Amoxicillin (500 mg TDS) / Tab. Erythromycin 250mg QID/ Tab. Doxycycline 100mg BD
   b. With comorbidities: Cap. Amoxicillin 500mg TDS + Tab.Azithromycin 500 mg OD
3. Duration: 5 days in (A); extend to a 7-10 days course if there is no response within 3 days of starting treatment and in (B).
4. **Do not give:**
   a. Corticosteroids: unless other medical indications present
   b. Fluoroquinolones: as they have anti-tubercular activity.

INPATIENT MANAGEMENT OF CAP

ANTIBIOTIC THERAPY IN THE HOSPITALIZED NON-ICU SETTING
a. Single agent IV β-lactam
b. If suspected atypical pathogens, other end organ disease, diabetes, malignancy, severe CAP, use of antibiotics in past 3 months: Combination of IV β-lactam (Cefotaxime 2 grams TID/ IV Ceftriaxone 1gram BD/ Amoxicillin–Clavulanic acid 1.2 grams TID) + ORAL macrolide (Tab Azithromycin 500 mg PO OD/ Tab Clarithromycin 500 mg PO BD)

ANTIBIOTIC THERAPY IN THE HOSPITALIZED ICU SETTING
i. Patients without risk factors for Pseudomonas aeruginosa: Manage as above
ii. Suspected P. aeruginosa (diabetes, chronic lung disease like bronchiectasis, chronic steroid therapy):
IV Cefepime (1G BD)/ IV Ceftazidime (2G TID)/ Piperacillin–tazobactam(4.5 G QID)/ IV Cefoperazone–sulbactam 1.5G IV TID/ IV Meropenem 1g TID;
Combination therapy : Aminoglycosides(IV Amikacin)/ Antipseudomonal fluoroquinolones(Levofloxacin/ Moxifloxacin)

ADJUNCTIVE THERAPIES FOR THE MANAGEMENT OF CAP
a. Steroids are not recommended for use in non-severe CAP
b. Non-invasive ventilation may be used in patients with CAP and acute respiratory failure

CONTRA INDICATIONS FOR NON-INVASIVE VENTILATION
a. Cardiorespiratory arrest
b. Presence of severe upper airway inflammation & edema
c. Severe haemodynamic instability - hypotension
d. Eu-capnic (normal $PaCO_2$) coma
e. Multiple organ dysfunction or severe psychomotor agitation

DISCHARGE CRITERIA
Accepting orally, Afebrile and Hemodynamically stable for a period of at least 48 h

REFERRAL TO A HIGHER CENTRE : CLINICAL CRITERIA
1. Frank hemoptysis and /or Signs of respiratory failure [listed under in the history and evaluation sections]
2. CRB-65 score > 1
3. Oxygen saturation by pulse oximetry ≤ 92% (patients ≤ 50 yrs) OR <90% (patients > 50 yrs)
4. Multi-lobar consolidation on chest X-ray
5. Confusion/disorientation
6. Hypothermia (core temperature<360C)

POINTS TO NOTE WHILE SHIFTING
1. If referring to a higher center, give the first dose of antibiotic (oral and if available, parenteral), secure an IV line and start 0.9% Normal saline and oxygen supplementation through face mask at 4-6 litres per minute during shift
2. If the patient is drowsy, has copious secretions, consider calling for help from the SUB-DISTRICT/ DISTRICT hospital for endotracheal intubation and shifting on a transport ventilator

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of ASTHMA

ICD-10-J45

SYMPTOMS

Classic symptoms
- Recurrent/ episodic wheezing
- Breathlessness
- Cough and/ or chest tightness

Supportive features
- History of atopy, family history of asthma, presence of triggers, presence of rhonchi on chest auscultation
- No alternative explanation for these symptoms

TRY AND RULE OUT
- Other obstructive airway disorders – see Table 1 for features that favour asthma over COPD
- Other mimics – presence of fever, constitutional symptoms, purulent sputum, hemoptysis, focal chest signs on physical examination, foreign body aspiration, abnormal chest radiograph, etc.

APPROACH TO DIAGNOSIS
- Clinical assessment is the mainstay
- Airway obstruction, and bronchodilator reversibility, on spirometry (if available) may support diagnosis
- Refer patients for further work-up if diagnosis is in doubt

INITIATION AND MODULATION OF ASTHMA PHARMACOTHERAPY

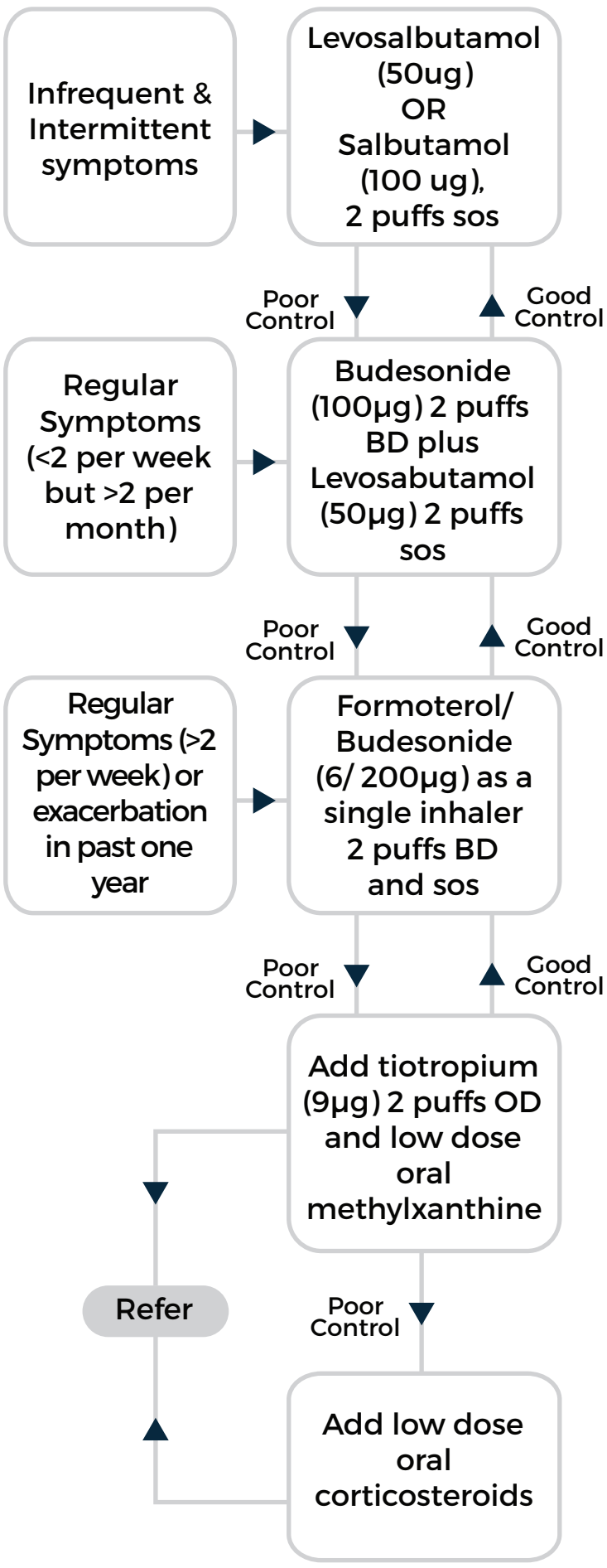

TABLE 1. DIFFERENTIATING BETWEEN ASTHMA AND CHRONIC OBSTRUCTIVE AIRWAY DISEASE (COPD)

	Asthma	COPD
Age of Onset	More often in childhood or early adulthood; variable	Usually later in life (4th or 5th decade)
Course	Episodic	Progressive
Smoking, other exposures	Uncommon	Common
Nasal Symptoms, Atopy	Common	Rare
Family History	Often	Uncommon
Triggers	Often Identified	None
Wheeze	Prominent and almost universal	May or may not be present

TABLE 2. LEVEL OF CURRENT ASTHMA CONTROL (OVER THE PRECEDING FOUR WEEKS)

Components	**Inadequately controlled** (any one)	**Adequately controlled** (all should be present)
Daytime symptoms or use of rescue medication	More than twice a week	Twice or less in a week
Night-time symptoms/ awakening	Any	None
Limitation of activities	Any	None
Pulmonary function (if available)	FEV1 <80% of predicted or PEF <80% of personal best	FEV1 >80% of predicted or PEF >80% of personal best

FEV1 Forced Expiratory Volume in first second, PEF Peak Expiratory Flow

GUIDING PRINCIPLES
- Mainstay of pharmacotherapy: Inhaled drugs
- Frequency of symptoms determine treatment initiation (see figure 1 for details)
- Reassess at 3-4 weeks – good response: in favour of asthma diagnosis
- Patient education for compliance, warning signs, triggers, inhaler technique, PEF monitoring
- Inhaler technique to be monitored
- Follow-up at 4-12 weeks, assess diseases control by clinical parameters (see Table 2)
- Step-up or step-down treatment as per level of asthma control (see figure 1)
- Follow up three-monthly and modulate treatment as needed
- Refer for further evaluation and management if asthma remains poorly controlled

DISEASE EXACERBATION

WHEN TO SUSPECT EXACERBATION
- Suspect if acute symptomatic worsening, or reduction in PEF to below 80% of personal best, while on continued treatment
- Take two additional puffs of the inhaler used if symptoms persist, and repeat if needed
- If no response after 24 hours, or symptomatic worsening, or further reduction in PEF, contact physician
- Physician to assess severity of exacerbation and manage accordingly

LIFE-THREATENING EXACERBATION
Altered sensorium, orthopnea, cyanosis, paradoxical breathing, hypotension, and/ or bradycardia (heart rate <60 bpm) – immediately refer to higher centre with ICU facility

SEVERE ACUTE ASTHMA (PATIENT TO BE ADMITTED)
- Inability to complete sentences, agitation, use of accessory muscles, respiratory rate >30/ min, heart rate >110/ min, pulsus paradoxus >25 mm Hg, silent chest, and/ or room air sPo2 <92%

- Oxygen supplementation to maintain spO2 92-95%
- Nebulized levosalbutamol/ ipratropium (1.25 mg/ 0.5 mg) three doses at 20-minute interval, then 4-6 hourly or as needed
- Injection hydrocortisone 200 mg intravenously, then oral prednisolone 0.5 mg/ kg daily for five days
- Refer if no improvement
- **Discharge** only when symptoms improve, wheezing absent or significantly reduced, heart rate <100 bpm, respiratory rate <30/ min, room air sPo2 >94%
- Schedule follow-up outpatient visit at one week

NON-SEVERE ACUTE ASTHMA
- If none of the above features present – manage on outpatient basis
  - Continue additional inhaler doses as needed
  - Oral prednisolone 0.5 mg/ kg daily for five days
  - Schedule follow-up outpatient visit at one week

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of
CHRONIC OBSTRUCTIVE PULMONARY DISEASE

ICD-10-J44.9

WHEN TO SUSPECT?

Symptoms – chronic cough, progressively worsening breathlessness

Risk factors – tobacco smoking, use of solid fuels for cooking, occupational exposures, Age - >35 years

Supportive features: Barrel shaped chest, hyperresonant note , diminished breath sounds and rhonchi on chest auscultation, forced expiratory time > 6 seconds, features of cor pulmonale (loud P2, elevated JVP, edema) in advanced cases

No other alternative explanation for these symptoms

TRY AND RULE OUT

Other obstructive airway disorders – Refer Asthma STW (Table 1) for features that favor COPD over asthma

Pulmonary tuberculosis – sputum AFB examination in case of cough (>2 weeks)

Consider alternative diagnosis/- complication– presence of fever, hemoptysis, orthopnea, chest pain, significant weight loss, focal chest signs on physical examination, abnormal chest radiograph, etc.

DIAGNOSIS & SEVERITY ASSESSMENT

Airway obstruction should be documented on spirometry on all patients provisionally diagnosed as having COPD – refer if necessary, Post-bronchodilator FEV1/ FVC <0.70 defines airflow obstruction

Assess severity based on spirometry, severity of dyspnea (mMRC scale, Table 1), exacerbation frequency and presence of complications (see Table 2)

TREATMENT

- Advice smoking cessation and counsel for other risk factors
- Inhaled drugs are the mainstay
- Treatment based on severity assessment (See adjacent figure)
- Follow up: Mild to moderate disease - 3 to 6 Months; Severe disease - 1-3 months
- Ensure compliance and proper inhaler technique at each visit.
- If uncotrolled/ complications develop, refer to higher center

DISEASE EXACERBATION

Three cardinal symptoms:
- Increase in dyspnea
- Increase in sputum volume and/or
- Increse in sputum purulence

Classify As:
- Mild Exacerbation
- Severe Exacerbation

Features Of Severe Exacerbation:
- Cyanosis
- Respiratory rate >30/ min
- Heart rate >110/min
- Systolic blood pressure <90 mm Hg
- SpO2 <90%
- Paradoxical respiratory movements
- Altered sensorium
- Asterixis
- Presence of severe co-morbid conditions (e.g. heart failure, arrhythmia)

MILD EXACERBATION

- Increase dose and/ or frequency of levosalbutamol and/ or ipratropium inhalation, or nebulized levosalbutamol/ ipratropium (1.25 mg/ 0.5 mg), repeated as needed at 20-minute interval
- Amoxycillin 500 mg TDS/ Azithromycin 500 mg OD/ Doxycycline 100 mg OD (BD on day 1) X 5 Days
- Oral prednisolone 30 mg daily X 5 days

SEVERE EXACERBATION

Treatment as under Mild Exacerbation

+

Supplement oxygen with target spO2 of 92% (if spO2 monetoring available)

Disease progression

Mild COPD	Moderate COPD	Severe COPD
Levosalbutamol (50 µg) 2 puffs prn	Tiotropium (9 µg) 2 puffs OD plus Levosalbutamol (50 µg) 2 puffs prn	Formoterol/Budesonide (6/200 µg) as a single inhaler 2 puffs BD plus Levosalbutamol (50 µg) 2 puffs prn
Persistent Symptoms	Persistent Symptoms	Persistent Symptoms
Add Tiotropium (9 µg) 2 puffs OD	Add low dose methylxanthines	Add Tiotropium (9 µg) 2 puffs OD and/or low dose methylxanthines

Refer if inadequate response, onset of new complications, or suspicion of alternative diagnosis

TABLE 1. GRADING OF BREATHLESSNESS USING MODIFIED MEDICAL RESEARCH COUNCIL (MMRC) SCALE.

GRADE	DESCRIPTION OF BREATHLESSNESS
0	I only get breathless with strenuous exercise.
1	I get short of breath when hurrying on level ground or walking up a slight hill.
2	On level ground, I walk slower than people of the same age because of breathlessness or have to stop for breath when walking at my own pace.
3	I stop for breath after walking about 100 yards or after a few minutes on level ground.
4	I am too breathless to leave the house or I am breathless when dressing.

TABLE 2. SEVERITY CLASSIFICATION FOR COPD

SEVERITY	POSTBRONCHODILATOR FEV1 (% PREDICTED)	DYSPNEA (MMRC GRADE)	EXACERBATIONS IN LAST ONE YEAR	COMPLICATIONS*
MILD	≥ 80	<2	<2	NO
MODERATE	50-79	≥ 2	<2	NO
SEVERE	<50	≥ 2	≥ 2	YES

The category with the worst value should be used for severity classification
*Complications include respiratory failure, cor pulmonale, and secondary polycythemia

RED FLAG SIGNS FOR PEOPLE HAVING EXCERBATION

- Altered sensorium
- spO2 <88% despite therapy
- Heart rate >110 bpm
- Systolic blood pressure <90 mm Hg
- High risk comorbid conditions (arrhythmia, congestive cardiac failure, poorly controlled diabetes, renal or liver failure)

Refer to higher centre for further management, and ensure continued supplemental oxygen and nebulization during transfer

SCHEDULE FOLLOW UP VISIT ONE WEEK AFTER DISCHARGE

ADMISSION CRITERIA

1. Severe symptoms; sudden worsening of resting dyspnea,
2. Fall in oxygen saturation, cyanosis, confusion, drowsiness.
3. Failure of an exacerbation to respond to initial medical management.
4. Presence of serious comorbidities (heart failure, newly occurring arrhythmias, etc.)

DISCHARGE CRITERIA

1. Normalization of clinical and laboratory data to pre-admission levels
2. Patient able to follow maintenance therapy
3. Completion of acute medications
4. Adequate control of comorbidities

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

REFERENCES

1. *Gupta D, et al. Guidelines for diagnosis and management of chronic obstructive pulmonary disease: Joint ICS/ NCCP(I) recommendations. Lung India 2013;30:228-67*
2. *Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. 2019 report.*
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Standard Treatment Workflow (STW) for the Management of
RESPIRATORY FAILURE
ICD 10 : J96.0

SYMPTOMS: Cough; Shortness of breath; Wheezing; Chest tightness

SIGNS: Tachycardia; Restlessness; Anxiety; Confusion; Seizure; Cyanosis; Asterexis; Arrhythmia

Look for underlying causes in hypercapnia, headache, bounding pulse, tremor/flap, papilloedema, coma.

HYPOXIA (SPO2 <90%)

HEART FAILURE

SYMPTOMS
- Dyspnea or exertion or rest
- Chest Pain
- Wheezing
- Fatigue

SIGNS
- Tachycardia
- Pulsus Alterans
- Weak Rapid Thready Pulse
- Pink Frothy Sputum
- Cyanosis
- Pallor
- Distended Neck Veins

PNEUMONIA/ LRTI

SYMPTOMS
- Cough with or without Sputum
- Chest Pain
- Fever with Chills, Fatigue, Malaise

SIGNS
- Tachypnea
- Tachycardia
- Crackles and Rhonchi
- Hypoxemia
- Pleuritic Chest Pain

PULMONARY EMBOLISM

SYMPTOMS
- Sudden Shortness of Breath
- Chest Pain
- Calf Pain & or Swelling
- Hemoptysis

SIGNS
- Syncope
- Arrhythmia
- Tachycardia

AIRWAY DISEASE

ACUTE ASTHMA

SYMPTOMS
- Wheeze
- Shortness of Breath
- Chest Tightness
- Cough

SIGNS
- Tachypnea
- Tachycardia
- Fall in SPO2
- Use of Accessory Muscle

AE OF COPD

SYMPTOMS
- Worsening of Dyspnea
- Increase in Sputum Production
- Increased Cough

SIGNS
- Tachypnea
- Hypoxemia
- Hypercarbia
- Confusion
- Drowsy
- Peripheral Edema

BRONCHIOLITIS

SYMPTOMS
- Cough
- Shortness of Breath
- Wheezing

SIGNS
- Cyanosis
- Nasal Flares
- Tachypnea
- Paradoxical Breathing (children)
- Crackles and or Rattling sounds in Lung

INVESTIGATIONS

ABG, CRP, FBC, U&E	Chest Xray	Sputum culture, Blood culture (if febrile)	Spirometry(COPD, Neuromuscular disease

TREATMENT

	Heart failure	Acute Severe Asthma	AE COPD	ARI	Pneumonia LRTI	Pulmonary embolism
DIAGNOSIS						
OXYGEN	Start oxygen therapy at SpO2 < 90% Monitor SpO2 during oxygen therapy to titrate flow rate: target SpO2 < 96% Oxygen delivery usign Nasal cannulae/ Simple face mask/ Venturi mask/ Non re-breathing mask (Note: for patients with AECOPD, keep lower target SpO2 = 88-92%)					
BRONCHODILATORS	SOS	SABA ± SAMA (Salbutamol ± Ipratropium neb q20 min X 1 hr then prn)	SABA + SAMA (Salbutamol neb hourly + Ipratropium neb 4 hourly)	SABA + SAMA	SOS	SOS
DIURETICS	Yes (IV Furosemide 40 mg or Torsemide 20 mg)	SOS	SOS	SOS	SOS	SOS
ANTIBIOTICS	---	---	No risk factor Pseudomonas: Ceftriaxone or levofloxacin or moxifloxacin Pseudomonas risk factor: levofloxacin or piperacillin tazobactam or ceftazidime or cefepime Influenza suspect: Oseltamivir	---	Mild/ Mod cases: Amoxycillin PO/ IV or Ceftriaxone IV Severe Cases: Amoxycillin IV or Ceftriaxone IV Atypical pneumonia: Azithromycin IV/ PO or Doxycycline IV/ PO	---
STEROIDS	---	Yes (Methylpredniolone IV 40 to 60 mg or Prednisolone PO 60 mg)	Yes (Methylprednisolone IV 60 to 125 mg IV q6-12 hourly)	Yes	Severe CAP (fiO2 > 0.5 AND pH <7.3 OR lactate >4 mmolL-1 OR CRP > 150 mgL-1): Methylprednisolone IV 0.5 mg/ kg q12h	---
LMWH	Prophylactic, if indicated	Prophylactic, if indicated	Prophylactic, if indicated	Prophylactic, if indicated	Prophylactic, if indicated	If high suspicion with low risk of bleeding: UFH (if thrombolysis anticipated), OR LMWH
REFERRAL	No relief OR Need for mechanical ventilation OR life threatening features: Stabilize CAB, transfer to higher center					

ABBREVIATIONS

- **LRTI :** Lower Respiratory Tract Infection
- **LMWH:** Low Molecular Weight Heparin
- **SABA :** Short Acting Beta Agonist
- **SAMA:** Short Acting Muscarinic Antagonist
- **CAP:** Community Acquired Pneumonia
- **UFH :** Unfractionated Heparin

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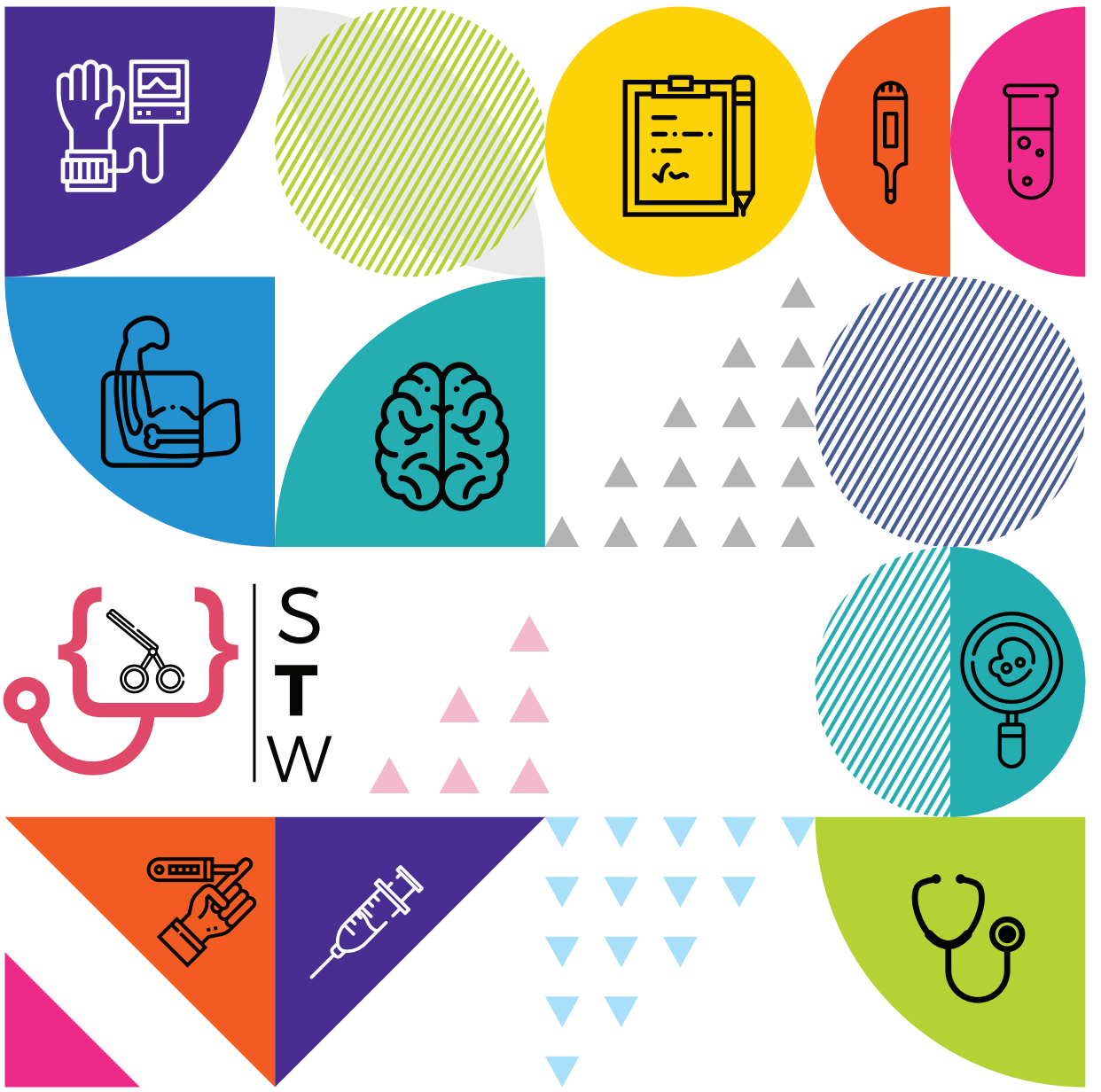

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