

Emergency (ED) Acute Exacerbation of Asthma (Adult & Pediatric) Order Set

Evidence-based, severity-guided support for managing acute asthma in adults and children, with recommendations on aerosol delivery, pharmacologic therapy, oxygen use, non-invasive support, and environmental impact.

PATIENT INFORMATION

Last Name (Legal)		First Name (Legal)	
Preferred Name Last First		DOB (dd-mm-yyyy)	
PHN	ULI Same as PHN		MRN
Administrative Gender	Male	Female	Non-binary
Prefer not to disclose		Unknown	

SEVERITY-BASED DECISION SUPPORT

Use one of the following validated asthma severity assessment tools, applying the appropriate scoring section based on patient age.

Asthma Exacerbation Severity (≥18yo)

MILD	MODERATE	SEVERE
<u>Signs and symptoms:</u> ☐ Speech: Speaks in sentences ☐ RR: 20-24 ☐ HR: 100-110 ☐ BS: ↓ and/or wheezing + ☐ Retractions: Mild ☐ Dyspnea: Mild with walking, can lay down ☐ Agitation: Minimal or PEF or FEV1 60 to 80%	<u>Signs and symptoms:</u> ☐ Speech: Speaks in short sentences ☐ RR: 25-30 ☐ HR: 110-120 ☐ BS: ↓↓ and/or wheezing ++ ☐ Retractions: Moderate ☐ Dyspnea: Moderate prefers to sit ☐ Agitation: Moderate or PEF or FEV1 60 to 80%	<u>Signs and symptoms:</u> ☐ Speech: Speaks in single words ☐ RR: > 30 ☐ HR: > 120 ☐ BS: ↓↓↓ and/or wheezing +++ ☐ Retractions: Generalized ☐ Dyspnea: Severe, seated leaning forward ☐ Agitation: Present or PEF or FEV1 60 to 80%

Severity:			
Assessed by (<i>print</i>)	Designation	Signature	Date/Time (dd/mm/yyyy hhmm)

PRAM (ages 2-17)

Parameter	0 points	1 point	2 points	3 points
Suprasternal retractions	Absent	Present	—	—
Scalene muscle contraction	Absent	Present	—	—
Air entry	Normal	Decreased at bases	Widespread decreased	Minimal/absent
Wheezing	Absent	Expiratory only	Inspiratory + expiratory	Absent (silent chest)
O ₂ saturation (%)	≥ 95	92–94	< 92	—

MILD	MODERATE	SEVERE
0-3	4-7	8-12

Score:			
Assessed by (<i>print</i>)	Designation	Signature	Date/Time (dd/mm/yyyy hhmm)

MONITORING / LABS

☐	Continuous SpO ₂
☐	Continuous HR
☐	Continuous BP (every 5-10 mins)
☐	Severity score assessment q__h
☐	CBC
☐	Extended Lytes – Ca, P, Mg
☐	Arterial Blood Gas
☐	Venous Blood Gas
☐	CXR (not generally recommended for Asthma)

PHARMACOLOGIC THERAPY

Acute Management Adult (first hour)

	MILD	MODERATE and/or SEVERE <i>not requiring HFNO/NIV</i>	SEVERE <i>Requiring HFNO/NIV</i>
Bronchodilators <i>(preferred option)</i>	☐ Salbutamol pMDI 100mcg/puff with spacer ____ Puffs x3 PRN Shortness of breath Consider: ☐ Ipratropium bromide 20mcg puffs x3	☐ Salbutamol via VMN + Aerosol Reservoir ____ mg q20min x3 PRN Shortness of breath ☐ Ipratropium Bromide via VMN + Aerosol Réservoir 0.5 mg Shortness of breath x1	☐ Salbutamol via VMN in-line via HFNO or NIV ____mg q20min PRN Shortness of breath X3 ☐ Ipratropium Bromide via VMN in-line via HFNO or NIV 0.5 mg Shortness of breath x1
Alternate medication delivery options	☐ Salbutamol ____mg q20min PRN X3 via VMN ☐ Ipratropium Bromide via VMN + Aerosol Réservoir 0.5 mg x1 <i>(for patients unable to coordinate breaths or those not receiving relief via pMDI)</i> ☐ Salbutamol via JN ____ mg q20min PRN Shortness of breath x3 ☐ Ipratropium Bromide via JN 0.5 mg Shortness of breath x3 <i>(for patients unable to coordinate breaths or those not receiving relief via pMDI and those without VMN)</i>	☐ Salbutamol pMDI 100mcg/puff with spacer ____ Puffs q20 min X3 PRN Shortness of breath ☐ Ipratropium pMDI 20mcg/puff with spacer ____ Puffs X3 ☐ Salbutamol via JN ____ mg q20min PRN Shortness of breath x3 ☐ Ipratropium Bromide via JN 0.5 mg Shortness of breath x3 <i>(For hospitals without access to VMN)</i>	☐ Salbutamol pMDI 100mcg/puff with Spacer ____ Puffs q20min x 3 PRN Shortness of breath ☐ Ipratropium pMDI 20mcg/puff with spacer ____ Puffs x3

Acute Management Pediatric (first hour)

	MILD	MODERATE and/or SEVERE not requiring HFNO/NIV	SEVERE Requiring HFNO/NIV
Bronchodilators <i>(preferred option)</i>	☐ Salbutamol pMDI 100mcg/puff with spacer ____ Puffs q20min X3 PRN Shortness of breath Consider: ☐ Ipratropium Bromide 20mcg/puff ____puffsX1	☐ Salbutamol via VMN + Aerosol Reservoir q20min X3: ☐ <20 kg: ____ mg ☐ ≥20 kg: ____ mg ☐ Ipratropium Bromide via VMN + Aerosol Reservoir ☐ <20 kg: 0.25 mg ☐ ≥20 kg: 0.5 mg	☐ Salbutamol via VMN in-line via HFNO or NIV ____mg q20min PRN shortness of breath X3 ☐ Ipratropium Bromide via VMN in-line via HFNO or NIV 0.5 mg Shortness of breath x1 Consider: Continuous salbutamol via VMN in-line ____ mg/hr titrated to symptom management
Alternate medication delivery options	☐ Salbutamol ____mg q20min PRN X3 via VMN ☐ Salbutamol ____mg q20min PRN X3 via JN Consider: ☐ Ipratropium Bromide via VMN + Aerosol Reservoir ☐ <20 kg: 0.25 mg ☐ ≥20 kg: 0.5 mg ☐ Ipratropium Bromide via JN ☐ <20 kg: 0.25 mg ☐ ≥20 kg: 0.5 mg <i>(for patients unable to coordinate breaths or those not receiving relief via pMDI)</i>	☐ Salbutamol pMDI 100mcg/puff with spacer ____ Puffs q20 min X3 PRN Shortness of breath ☐ Ipratropium pMDI 20mcg/puff with spacer ____ Puffs X1 ☐ Salbutamol ____mg q20min PRN X3 via JN ☐ Ipratropium Bromide via JN ☐ <20 kg: 0.25 mg ☐ ≥20 kg: 0.5 mg	☐ Salbutamol pMDI 100mcg/puff with Spacer ____ Puffs q20min X 3 PRN Shortness of breath ☐ Ipratropium pMDI 20mcg/puff with spacer ____ Puffs X1

Clinical Considerations

- If VMN is unavailable, standard JN may be substituted.
- HFA pMDIs have not been assessed for safety/efficacy in children <4 years and are not approved in that population [19,20].
- JN inferior to VMN (clinical outcomes & deposition), and not superior to pMDI → excluded as handheld option [4,7-10].
- Moderately ill patients: pMDI may be inadequate due to poor inspiratory flow → included as alternative [17].
- Severe patients (HFNO/NIV):
 - Best option: VMN inline [24].
 - Alternative: pMDI with spacer for NIV (JN not recommended — interrupts therapy, adds flow) [24].

Environmental Sustainability Considerations:

VMN + Ultra: Enables continuous delivery in-line with HFNO/BiPAP; reusable; less plastic waste than disposable jet nebulizers [6-10] [11,12]

pMDI + Spacer: Lower plastic waste and energy use vs disposable jet nebulizers; reusable spacers last months

Corticosteroids[2]	Route	Medication/dose	Select
	Oral / IV	Dexamethasone	☐ 0.6 mg/kg (max 16 mg) × 1–2 doses
	Oral	Prednisone/Prednisolone	☐ 1–2 mg/kg (max 60 mg) × 5 days
	IV	Methylprednisolone	☐ 1–2 mg/kg q6h (max 125 mg)

*Oral steroids are recommended if tolerated and for mild/moderate exacerbations[

Adjuncts	Route	Medication/dose	Select
	IV	Magnesium sulfate	☐ 25–75 mg/kg (max 2 g) over 20 min
	IV	Epinephrine IM (1 mg/mL)	☐ 0.01 mg/kg (max 0.5 mg) q20min ×3
	IV	Ketamine (infusion) <i>for refractory bronchospasm in ED/ICU setting</i>	☐ ___ 0.5–1 mg/kg IV bolus (start) ☐ ___ 0.5–1 mg/kg/hr

**Antibiotics are rarely indicated in the treatment of Acute Asthma Exacerbations[3]

Ordering Prescriber (<i>print</i>)	Designation	Signature	Date/Time (dd/mm/yyyy hhmm)

Reassessment / Maintenance (Post 1-hour)

☐ Rescore on chosen scoring tool

Score:			
Assessed by (<i>print</i>)	Designation	Signature	Date/Time (dd/mm/yyyy hhmm)

Considerations

- Clinicians should assess patients at least hourly to guide ongoing symptom management.
- With improvement, increase salbutamol dosing interval progressively: q1h → q2h → maintenance regimen.
- Once control is achieved, resume home controller medications, ensuring the patient can coordinate breathing and device puff.

Acute Management Adult (continuation)

	MILD	MODERATE and/or SEVERE <i>not requiring HFNO/NIV</i>	SEVERE <i>Requiring HFNO/ NIV</i>
Bronchodilators <i>(preferred option)</i>	☐ Salbutamol pMDI 100mcg/puff with spacer ____ Puffs Q____min/hr PRN Shortness of breath Consider: ☐ Ipratropium bromide 20mcg/puff ____puffs x1	☐ Salbutamol via VMN + Aerosol Reservoir ____ mg Q____min/hr PRN Shortness of breath ☐ Ipratropium Bromide via VMN + Aerosol Réservoir 0.5 mg Shortness of breath q6h	☐ Salbutamol via VMN in-line via HFNO or NIV ____mg Q____min/hr PRN shortness of breath x3 ☐ Ipratropium Bromide via VMN in-line via HFNO or NIV 0.5 mg Shortness of breath q6h
<i>Alternate medication delivery options</i>	☐ Salbutamol ____mg Q____min/hr PRN via VMN ☐ Salbutamol ____mg Q____min/hr PRN X3 via JN Consider: ☐ Ipratropium Bromide 0.5 mg Q6h via VMN + Aerosol Reservoir ☐ Ipratropium Bromide 0.5 mg q6h via JN <i>(for patients unable to coordinate breaths or those not receiving relief via pMDI)</i>	☐ Salbutamol pMDI 100mcg/puff with spacer ____ Puffs Q____min/hr PRN Shortness of breath ☐ Ipratropium pMDI 20mcg/puff with spacer ____ Puffs q6h ☐ Salbutamol ____mg Q____min/hr PRN X3 via JN ☐ Ipratropium Bromide 0.5mg q6h via JN	☐ Salbutamol pMDI 100mcg/puff with Spacer ____ Puffs Q____min/hr PRN Shortness of breath ☐ Ipratropium pMDI 20mcg/puff with spacer ____ Puffs q6h

Acute Management Pediatric (continuation)

	MILD	MODERATE and/or SEVERE <i>not requiring HFNO/NIV</i>	SEVERE Requiring HFNO/NIV
Bronchodilators <i>(preferred option)</i>	☐ Salbutamol pMDI 100mcg/puff with spacer ____ Puffs Q____min/hr X3 PRN Shortness of breath Consider: ☐ Ipratropium Bromide 20mcg/puff____puffsX1	☐ Salbutamol via via VMN + Aerosol Reservoir Q____min/hr X3: ☐ <20 kg: ____ mg ☐ ≥20 kg: ____ mg ☐ Ipratropium Bromide via VMN + Aerosol ☐ <20 kg: 0.25 mg ☐ ≥20 kg: 0.5 mg	☐ Salbutamol via VMN in-line via HFNO or NIV ____mg Q____min/hr PRN shortness of breath X3 ☐ Ipratropium Bromide via VMN in-line via HFNO or NIV 0.5 mg Shortness of breath q6h Consider: ☐ Continuous salbutamol via VMN in-line ____ mg/hr titrated to symptom management
<i>Alternate medication delivery options</i>	☐ Salbutamol ____mg q20min PRN Q____min/hr via VMN ☐ Salbutamol ____mg Q____min/hr PRN X3 via JN Consider: ☐ Ipratropium Bromide via VMN + Aerosol Reservoir Q6H ☐ <20 kg: 0.25 mg ☐ ≥20 kg: 0.5 mg ☐ Ipratropium Bromide via JN Q6h ☐ <20 kg: 0.25 mg ☐ ≥20 kg: 0.5 mg <i>(for patients unable to coordinate breaths or those not receiving relief via pMDI)</i>	☐ Salbutamol pMDI 100mcg/puff with spacer ____ Puffs q20 min X3 PRN Shortness of breath ☐ Ipratropium pMDI 20mcg/puff with spacer ____ Puffs Q6h ☐ Salbutamol ____mg q20min PRN q6h via JN ☐ Ipratropium Bromide via JN ☐ <20 kg: 0.25 mg ☐ ≥20 kg: 0.5 mg	☐ Salbutamol pMDI 100mcg/puff with Spacer ____ Puffs Q____min/hr PRN Shortness of breath ☐ Ipratropium pMDI 20mcg/puff with spacer ____ Puffs q6h

Ordering Prescriber (<i>print</i>)	Designation	Signature	Date/Time (dd/mm/yyyy hhmm)

RESPIRATORY SUPPORT / SUPPLEMENTAL OXYGEN

- ☐ Target SpO₂ ≥ 94% (peds) / ≥ 92% (adult)
- ☐ Room Air
- ☐ Nasal Cannula ____ L/min
- ☐ HFNC: ____ L/min (Peds: 1.5–2 L/kg/min; Adults: 30–60 L/min)
 - Inline Aerogen Ultra VMN for bronchodilator delivery
- ☐ NIV/BiPAP: IPAP ____ / EPAP ____
 - Inline Aerogen Ultra VMN via T-piece or mask adapter

Considerations

- HFNO with Cannula (Moderate)
 - In-line with Fisher&Paykel Airvo2 or 3 in combination with the Airvo Neb humidifier adaptor
 - In-line with the Vapotherm HVT 2.0 Aerosol Adapter
 - If High-flow Nasal Oxygen is being delivered via standalone humidification Aerogen should be on the Dry side of the humidifier at the inlet
 - Higher delivery occurs when the patients inspiratory flow is matched to or greater than flow from the HFNO device (consider reducing the flow of the highflow device)
- Optimal Placement for NIV (Severe)
 - Single Limb Circuit: Between a non-vented mask and the patient side of the leak port (non-vented masks not recommended).
 - Dual Limb Circuit: Optimal position would 15cm back from the Wye at the inspiratory limb or between the Wye and the patient, and pre-humidifier
- Reassessment
 - Response to NIV should be monitored at least hourly
 - Follow institutional guidelines for need of escalation

DISPOSITION

Adults

- ☐ Consider discharge in patients fitting into the mild category: Peak flow > 80% predicted O₂>95%, RR <20, no desaturation during walk test and able to use pMDIs at home.
- ☐ Admit to Ward
- ☐ Admit to ICU

Pediatrics

- ☐ Discharge if PRAM ≤ 3 ×2, stable on room air, and education complete.
- ☐ Admit to Ward
- ☐ Admit to ICU

DEFINITIONS

pMDI	Pressurized Metered Dose Inhaler
VMN	Aerogen Solo Vibrating Mesh Nebulizer
Ultra	Aerogen Ultra Aerosol Reservoir with aerosol mask or valved mouthpiece
HFNO	High-Flow Nasal Oxygen
NIV	Non-Invasive Ventilation
DECAF	Dyspnea, Eosinopenia, Consolidation on chest x-ray, Acidemia (pH<7.3), Atrial fibrillation
BiPAP	Bilevel Positive Airway Pressure
EPAP	Expiratory Positive Airway Pressure
FiO ₂	Fraction of inspired Oxygen

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