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## Options for Patients Requiring Albuterol Nebulizer Solution

Access and availability of Albuterol 2.5mg/3mL nebulizer solution may be limited due to potential shortages related to supply chain issues. Albuterol is an essential medication for patients with asthma, COPD, severe infections, and other medical emergencies. The purpose of this document is to provide therapeutics options for patients in need until the albuterol 2.5mg/3mL product becomes available. Alternative options to albuterol 2.5mg/3ml are listed below. Order of considerations does not imply a recommendation of one option versus another.

### Considerations for Therapeutic Substitution

1. Consider Using Other Concentrations of Albuterol Solution
2. Consider Using Levalbuterol
3. Consider Using Albuterol Metered Dose Inhalers

### Use Other Concentrations of Albuterol Solution

Albuterol 2.5mg/3mL is a commonly used concentration because it provides the most prescribed dose with one nebulizer making it easy for clinicians and patients to provide the correct amount to the nebulizer. Additional concentrations are available and may be used; however, it is important to ensure the correct amount of medication is being administered. Ensure that clinical staff and patients are aware of any product changes and the correct dosage especially if it differs from previous dosing.

Although the type of nebulizer used with albuterol products is typically not an issue, please consult product information regarding appropriate selection of nebulizer prior to prescribing or dispensing a new concentration.

Table 1. Comparison of albuterol solutions for nebulizers to achieve a dose of 2.5mg

Concentration	mg/ml	Volume to add to nebulizer
0.021%	0.63mg / 3mL (0.75mg albuterol equivalent)	12mL
0.042%	1.25mg / 3mL (1.5mg albuterol equivalent)	6mL
0.083%	2.5mg / 3mL (3mg albuterol equivalent)	3mL
0.5%	2.5mg / 0.5mL (3mg albuterol equivalent)	0.5mL (dilute with normal saline)

### Use Levalbuterol

Levalbuterol is the pure R-isomer of racemic albuterol. Approximately 1.25mg of levalbuterol is equivalent to 2.5mg of albuterol.

Table 2. Comparison of levalbuterol solutions for nebulizers to achieve a dose of 1.25 mg (an approximate dose of albuterol 2.5mg)

mg/ml	Volume to add to nebulizer
0.31mg / 3mL	12mL
0.63mg / 3mL	6mL
1.25mg / 3mL	3mL

## Use Albuterol Metered Dose Inhalers

Although a metered-dose inhaler (MDI) may not be an option for all patients, the use of these products can lead to improved outcomes and provide an alternative to nebulizer therapy. Studies have demonstrated comparable outcomes among adult and pediatric patients when receiving albuterol through a nebulizer or an albuterol MDI.<sup>[1] [2] [3] [4]</sup> If the decision is made to use an albuterol MDI, consider the factors associated with administration by the healthcare provider or the patient and the use of a spacer or valved holding chamber is highly encouraged. Although an exact conversion between 2.5mg of nebulized albuterol and the amount delivered through a MDI is not known, a standard approach of administering 4 puffs has been used with titration based on patient response.

### References:

1. Hendeles L, Hatoon RC, Coons TJ, et al. [Automatic replacement of albuterol nebulizer therapy by metered-dose inhaler and valved holding chamber](#). Am J Health Syst Pharm. 2005;62(10):1053-106.
2. Salyer JW, DiBlasi RM, Crotwell DN, et al. [The conversion to metered-dose inhaler with valved holding chamber to administer inhaled albuterol: a pediatric hospital experience](#). Respir care. 2008; 53(3): 338-345.
3. Cates CJ, Welsh EJ, Rowe BH. [Holding chambers \(spacers\) versus nebulizers for beta-agonist treatment of acute asthma](#). Cochrane Database Syst Rev. 2013;9:CD000052.
4. Moriates C, et al. [Nebulized bronchodilators instead of metered-dose inhalers for obstructive pulmonary symptoms](#). J Hosp Med. 2015;10(10):691-693.