monaghan means it matters®

Breath-Actuated Nebulizers for Asthma and Chronic Obstructive Pulmonary Disease Exacerbation: A Monte Carlo Simulation Demonstrating National Cost Savings and Length of Stay Reduction

Luo AD, Baymon DE, Peters FA, Kosowsky JM, Nentwich LM, Baugh JJ, Baugh CW. Journal of the American College of Emergency Physicians Open (JACEP Open) 2025;6:100112.

The Monaghan Advantage

- Breath actuated technology for on-demand delivery
- 3–4 times lower environmental loss than other small volume nebulizers[1]
- High efficiency nebulizer with 78% in the respirable range
- 7 day disposable, ideal for short-term acute applications
- Optional filtered mouthpiece kit (K220145)
- Not made or manufactured with BPA, natural rubber latex, DEHP or lead

518.561.7330 **phone**
800.833.9653 **toll free**
518.561.5088 **fax**

Monaghan Medical Corporation
Plattsburgh, New York 12901

monaghanmed.com

JACEP OPEN
Journal of the American College of Emergency Physicians Open

Key Findings

The AEROECLIPSE® II BAN® Nebulizer decreases time to symptom resolution and potentially reduces disease transmission to hospital staff.

Use of the AEROECLIPSE® II BAN® Nebulizer in the Emergency Department can significantly reduce overall cost of care and improve throughput for asthma and COPD exacerbations.

- Even accounting for the marginal cost increase, the return on investment exceeded 100 times
- Reduced Length of Stay improves throughput ensuring resources, both staff and beds, are used most effectively
- Lower admission rates for pediatric and adult asthma exacerbations help reduce healthcare costs and enable patients to resume their daily activities more quickly

Substantial savings can be realized by preventing admissions for COPD exacerbations, which tend to incur significantly higher costs per stay.

BACKGROUND

Previous studies have demonstrated the AEROECLIPSE® II BAN® Nebulizer improve patient outcomes[2-4]

- Decreased time to symptom resolution
- Decreased in ED length of stay (LOS)
- Reduction in overall rate of hospitalizations after ED presentation
    - 45.6% reduction in COPD exacerbation admissions[4]
    - 72% reduction in adult asthma admissions[4]
    - 33.3% reduction in pediatric asthma admissions[5]

Frontline staff see ancillary benefits from lower fugitive aerosols released, reducing disease transmission to hospital staff[6]

Use can enhance patient comfort during treatment, especially for children, for faster symptom resolution[5]

Despite evidence of improved patient outcomes and reduced cost of care, the nebulizer's marginal cost increase may cause hesitancy.

OBJECTIVE

This study assessed the total cost and potential annual net savings achievable by adopting the AEROECLIPSE® II BAN® Nebulizer along with the associated reduction in ED Length of Stay and avoidable hospital admissions that may be achieved from widespread adoption in the ED. It also evaluated the potential cost savings and throughput impacts for EDs of various patient volumes to characterize these effects at the department level.

METHODS

The authors used a Monte Carlo Simulation model to estimate the impact of use of the AEROECLIPSE® II BAN® Nebulizer on marginal cost, ED LOS reduction, cost savings, and preventable admissions. This process uses repeated random sampling to simulate different scenarios based on data distributions from published sources. 1,000 simulations were run using 23 model inputs to uncover the potential impact and include a distribution, mean and standard deviation.

COST SAVINGS

COST/SAVINGS COMPARISON	30,000 VISITS/YEAR (Small ED)	80,000 VISITS/YEAR (Medium ED)	130,000 VISITS/YEAR (Large ED)
# OF NEBULIZERS/YEAR	290 ± 40	780 ± 100	1,260 ± 170
COST OF NEBULIZERS (MEAN $5.45)	$1,400 ± $260	$3,700 ± $680	$5,900 ± $1,100
ED LOS REDUCTION (BED-HRS)	40 ± 18	107 ± 43	174 ± 67
REDUCTION IN ADMISSIONS (VISITS/YEAR)			
Pediatric Asthma Exacerbation	9 ± 2	25 ± 6	40 ±9
Adult Asthma Exacerbation	5 ± 1	14 ± 3	22 ± 5
COPD/emphysema exacerbation	18 ± 4	48 ± 11	79 ± 18
COST SAVINGS FROM AVOIDED ADMISSIONS			
Pediatric asthma exacerbation	$48,500 ± $11,700	$129,400 ± $31900	$210,300 ± $53,500
Adult Asthma Exacerbation	$34,000 ± $8,800	$90,800 ± 22,300	$147,500 ± $36,400
COPD/emphysema exacerbation	$124,200 ± $30,800	$331,200 ± $81,500	$538,300 ±$137,000
TOTAL COST SAVINGS	**$205,300 ± $37,800**	**$547,700 ± $100,000**	**$890,200 ± $167,900**

THE MARGINAL COST OF SWITCHING IS UNDER $6,000 PER ED ANNUALLY, WITH A POTENTIAL RETURN ON INVESTMENT EXCEEDING 100 TIMES.[1]

$6 million
National adoption of BAN® Nebulizer would add an estimated $6 MILLION in supply costs

$744 million
But potentially save $744 MILLION from prevented hospitalizations

178,000 beds
And reduce Emergency Department bed hours by 178,000 Annually.

monaghan

monaghan means it matters®

IMPLEMENTING THE AEROECLIPSE® II BAN® NEBULIZER LEADS TO SAVINGS AND EFFICIENCY GAINS.

References:

1. Rau JL, *et al.* Respir Care 2004;49(2):174-179.)
2. Christensen Y, *et al.* Respir Care. 2001;46(10):1084.
3. Kloph S, *et al.* Respir Care. 2000;45(8):979.
4. Sabato K, *et al.* Respir Care. 2011;56(6):
5. Saunders D, *et al.* Respir Care. 2015;60(10):OF9.
6. Copelin D. Respir Care. 2018;63(10):3016143.
7. Luo, AD. *et al.* JACEP Open 2025;6(3):100112.
8. Hart, Mary *et al.* Resp Care 2009;54(11):1528.

COST SAVINGS RECOGNIZED WITH THE IMPLEMENTATION OF AEROECLIPSE® II BAN® NEBULIZER

- Enhance ED throughput[5,7]
- Decreased time to symptom resolution[4,6,8]
- Decrease in ED length of stay (LOS)[8]
- Reduction in the overall rate of hospitalizations after ED presentation[5,8]
- Reduce overall cost of care for asthma and COPD COPD patients[7]
- Reduced staff sick time due to decreased fugitive aerosol transmission[6]

ORDERING INFORMATION

PART #	NAME/DESCRIPTION	UNITS PER CASE
64594050	AEROECLIPSE® II BAN® NEBULIZER	cs/50
65050E	AEROECLIPSE® II BAN® NEBULIZER with Elbow Adapter	cs/50
69050	AEROECLIPSE® II BAN® NEBULIZER No Tubing	cs/50
69350	AEROECLIPSE® II BAN® NEBULIZER w/Universal Tubing	cs/50
60050	Filtered Mouthpiece for use with AEROECLIPSE® II BAN® NEBULIZER	cs/50
10550394010	Reusable COMFORTSEAL® Mask with Elbow – Small	cs/10
10550294010	Reusable COMFORTSEAL® Mask with Elbow – Medium	cs/10
10550494010	Reusable COMFORTSEAL® Mask with Elbow – Large	cs/10
65750	Disposable Aerosol Mask – Small	cs/50
65950	Disposable Aerosol Mask – Medium	cs/50
65850	Disposable Aerosol Mask – Large	cs/50
65005	Elbow Adapter, for use with the AEROECLIPSE® II BAN® NEBULIZER	cs/50

aarc ZENITH AWARD 2024

ISO 13485 MEDICAL DEVICES QUALITY MANAGEMENT SYSTEM

ISO 14001 ENVIRONMENTAL MANAGEMENT SYSTEM

P/N 74076-00, 05/2025

Monaghan Medical Corporation
153 Industrial Blvd.
Plattsburgh, NY 12901

518.561.7330 **phone**
800.833.9653 **toll free**
518.561.5088 **fax**

monaghanmed.com