



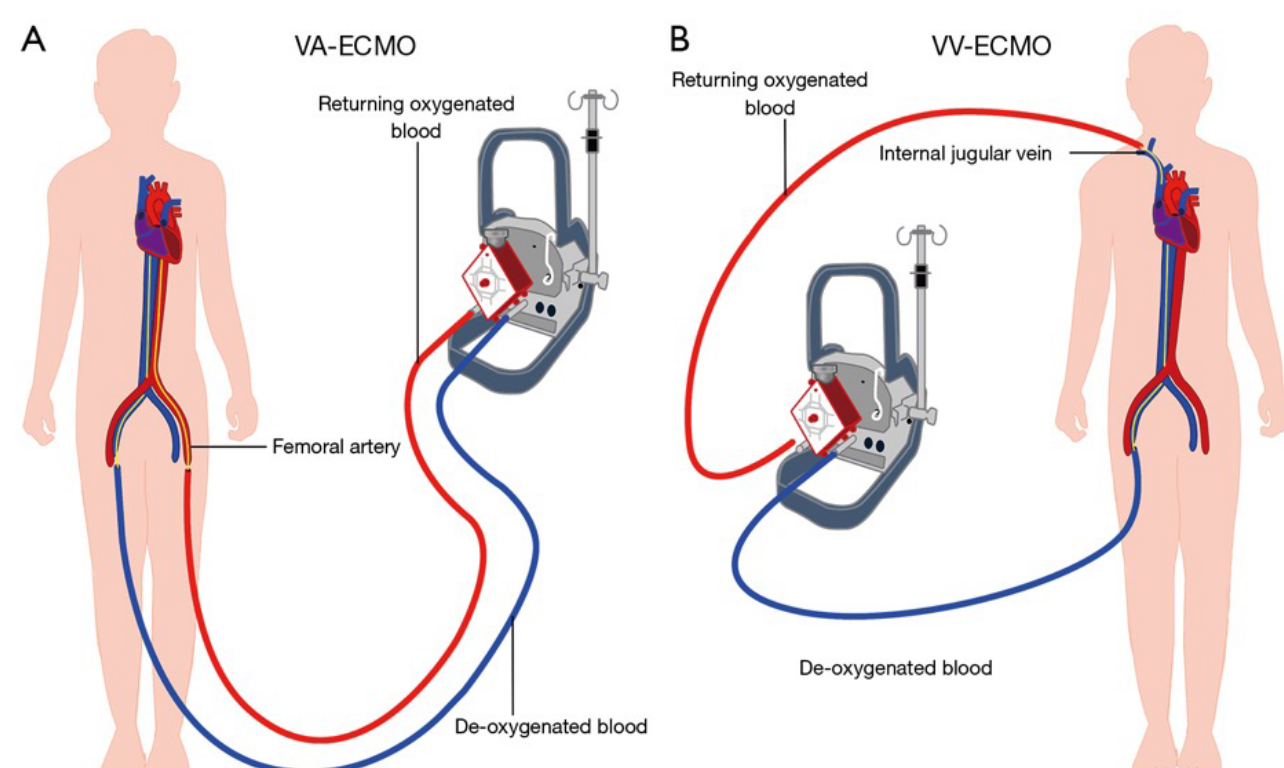
# Outcomes Associated with Asthma Exacerbations with Respiratory Failure Treated with Extracorporeal Membrane Oxygenation (ECMO)

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## INTRODUCTION

Asthma affects 25 million Americans and accounts for 1.6 million emergency department visits with over 500,000 admissions each year. Of those hospitalized, 10% require high levels of care in the intensive care unit (ICU) and 2-4% will require mechanical ventilation and 7% will die. These patients are considered to have near fatal asthma. These numbers are especially concerning considering that the underlying pathophysiology is reversible which has led to a desire to have improved treatment for these patients. This desire has led to increasing implementation of extracorporeal membrane oxygenation (ECMO) for near fatal asthma exacerbation patients experiencing severe respiratory distress. ECMO has been implemented to help actively remove excess carbon dioxide from these patients' blood.



While the implementation of ECMO has increased for asthma, the understanding of potential benefits or complications have not been well explored or understood.

## METHODS

We performed a retrospective cohort study on patients extracted from the Premier Database, a hospital dataset with over 700 hospitals in the United States including ICU level of care from 2010-2020

Patients were included if:

- Primary diagnosis of asthma or a primary diagnosis of respiratory failure with a secondary diagnosis of asthma
- Treated with invasive ventilation

Patients were excluded for:

- Age < 18y
- No ICU admission
- Chronic lung disease other than asthma,
- COVID-19
- Not treated with corticosteroids.

**Eligible Patients: N = 20,494**

- ECMO N= 130
- No ECMO N = 20,364

## Outcomes

Primary Outcome:

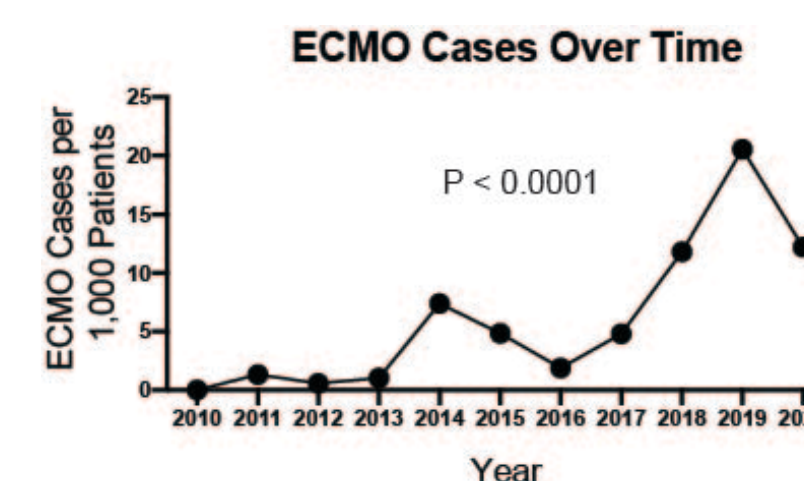
- Hospital Mortality

Key secondary outcomes:

- ICU length of stay (LOS)
- Hospital LOS
- Length of invasive ventilation
- Hospital Costs

Differences in outcomes were assessed using propensity score matching at a 1:2 ratio of ECMO *versus* no ECMO, and by covariate adjustment of the entire study group.

## RESULTS



Outcomes Associated with ECMO versus No ECMO for Near Fatal Asthma						
	Propensity-Matched Model N=309			Covariate Adjusted Model N=20,494		
	OR	95% CI	P Value	OR	95% CI	P Value
Mortality	0.43	0.22-0.85	0.016	0.38	0.21-0.68	0.001
Hospital Cost	Ratio	95% CI	P Value	Ratio	95% CI	P Value
	1.76	1.47-2.12	<0.0001	1.65	1.44-1.89	<0.0001
ICU LOS	1.20	0.96-1.49	0.12	1.14	0.98-1.34	0.09
Hospital LOS	1.15	0.91-1.44	0.24	1.08	0.92-1.26	0.34
Length of Invasive Ventilation	1.13	0.91-1.41	0.26	1.08	0.93-1.26	0.30

Abbreviations: ECMO = Extracorporeal Membrane Oxygenation, LOS = length of stay, OR = odds ratio, CI = confidence interval.

## CONCLUSIONS

Use of ECMO for near fatal asthma was associated with reduced mortality and increased cost in asthmatics requiring invasive ventilation. This suggests that there is potential benefit of ECMO to save thousands of lives for near fatal asthmatics. However, more studies need to be done.

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