

Impact of an AI-Enabled Home Ventilator Management Platform on Hospitalizations, Infections, and Healthcare Costs

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Rationale:

Home medical equipment (HME) providers are essential in managing chronically ventilated patients but often lack tools to monitor clinical risk proactively.¹ The Nexus Platform (Encore Healthcare, Livingston, TN) is an AI-based, algorithm-driven software system that integrates patient assessments, telemonitoring, predictive alerts, and data analytics to guide clinical decision-making for home ventilator patients.

Purpose:

This study evaluated the platform's impact on hospitalizations, respiratory infections, and healthcare costs among adult, non-COPD ventilator-dependent patients.

Methods

A retrospective analysis was conducted on a cohort of 3,939 adult home ventilator patients enrolled in the Nexus Program for an average of 29 months.

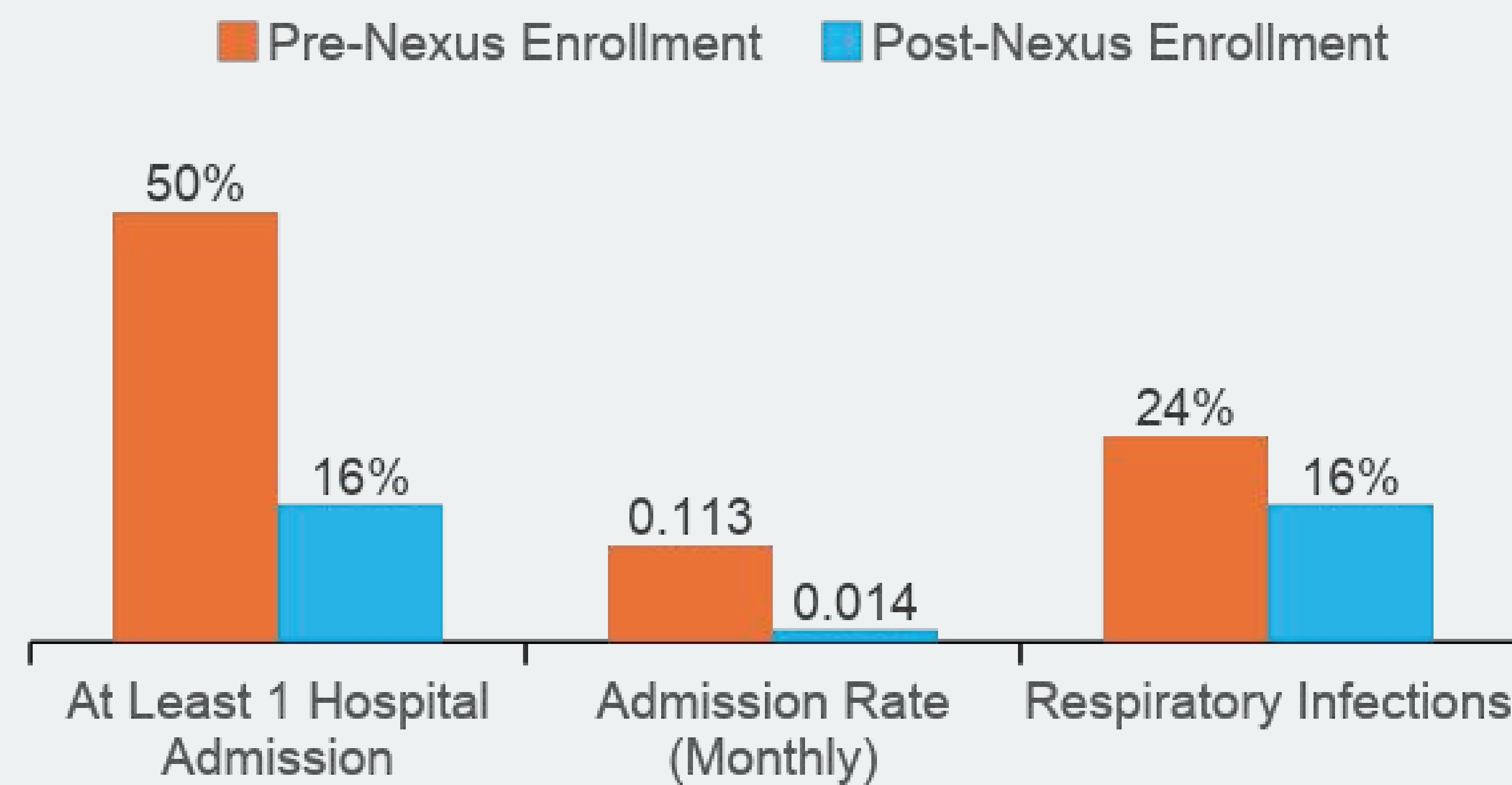
The population included patients with neuromuscular disease (NMD), interstitial lung disease (ILD), and non-COPD hypoventilation disorders; 20% were invasively ventilated and 80% non-invasively ventilated.

Baseline hospitalization and respiratory infection rates from the 12 months before Nexus enrollment were compared with outcomes during program participation.

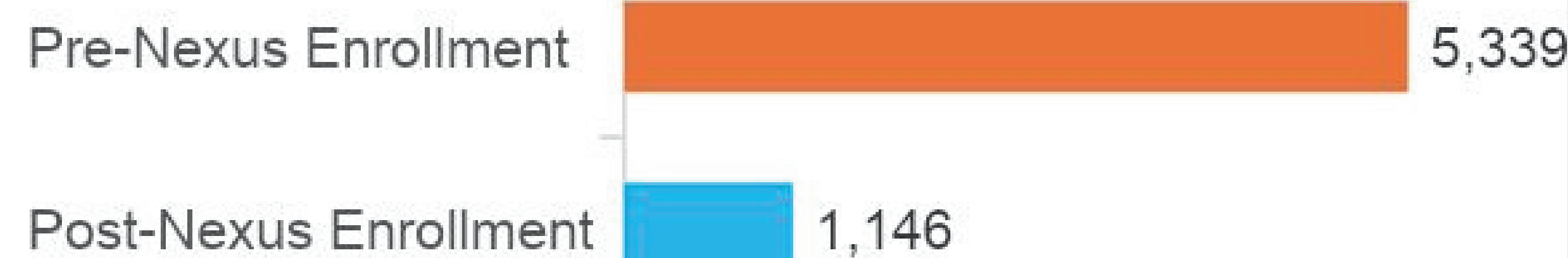
AI-driven alerts and predictive analytics within the platform guided timely interventions. Estimated healthcare cost savings were calculated based on avoided hospitalizations, using an **average hospitalization cost of approximately \$20,000 per stay**, based on prior estimates for mechanically ventilated adult patients.²

Nexus Program Graphics

Nexus Program Summary: Hospitalization & Respiratory Infection Outcomes



Hospital Admissions



Nexus Physician Report: Individualized Patient Reporting

encore TELERESPIRATORY

Name: John-NMD Young Adult ALS | DOB: 12/01/2000 | Member ID: 123456

General Dx: Neuromuscular (NMD) | Nexus Onboarded: 07/01/2024 | Program: Nexus Standard Ventilator

Primary DX: ALS (Lou Gehrig) | Rx Expiration: 11/01/2025 | Next RT Visit: 02/19/2025

Adv Directive: Patient does wish to be resuscitated | Last Encounter: 11/21/2024 | Branch: Clinic 123 [Encore Training account]

Patient Motivational Goal: Be able to participate in social activities

Days in Nexus Program	PHYSICIAN INFO	PATIENT SYMPTOM RESPONSES
254	Primary Care Physician: John Smith Referral Physician: Peter Moss Specialist: Peter Moss Next Scheduled Phys Follow Up: 02/03/2025	PI Reported Feeling? Better - I feel better than the last check in Most Recent Zone Color? Green Hypercapnia Symptoms No

Days Since Last Admit	HOSPITAL ADMISSIONS HISTORY	POST ONBOARDED HOSPITALIZATIONS
284	Admissions in Past Year: 2 Reason for Visit: Neurological Last Admission Date: 06/01/2024 Prior Resp Infections: 2	Hospital Admissions: 0 Reason for Visit: N/A Date of Last Admission: N/A Resp Infections Since Onboarded: 0

NEUROMUSCULAR CLINICAL ASSESSMENT RESULTS

SIGNS & SYMPTOMS EVALUATION FROM PREVIOUS VISIT

Change in Shortness of Breath	Activity or Mobility Change	Increased O2 Usage	Morning Headache	Cognitive Change	Cognitive Status Additional Comment	Daytime Fatigue
Yes, Same level of symptoms	Yes, Less symptoms than before	N/A	Yes, Less symptoms than before	No change	N/A	Yes, Less symptoms than before

ENERGY | ADL | SLEEP

Is the Patient Aware of Energy Conservation Skills	ADL Capabilities	Sleep Hours per Night	Quality of Sleep	Observed Apneas by Caregiver/other	Caregiver Observed Patient Snoring	Sleep Study in Med History
Yes	Patient is unable to perform ADLs	> 6 hrs/night	Restful sleep	No	No snoring	No

ALSFRS TOTAL SCORE BY DOMAIN [LOWER SCORE INDICATES DECLINE IN HEALTH]

Domain	Initial Score	Current Score
Bulbar	~10	~10
Fine Motor	~10	~10
Gross Motor	~10	~10
Respiratory	~10	~10

MOST RECENT ALSFRS ANSWERS [CURRENT]

Item	Score
Bulbar Speech	4
Bulbar Salivation	2
Bulbar Swallowing	2
Fine Motor Handwriting	4
Fine Motor Cutting Food	4
Fine Motor Dressing and Hygiene	4
Gross Motor Turning in Bed	4
Gross Motor Walking	4
Gross Motor Climbing Stairs	4
Respiratory Dyspnea	4
Respiratory Orthopnea	4
Respiratory Insufficiency	4

Results

Deployment of the AI-based platform was associated with a **68% reduction in hospitalizations** and a **33% reduction in respiratory infections** compared to the 12 months prior to enrollment. Across the cohort, this equated to **4,193 hospitalizations avoided** and an estimated **\$83 million in healthcare cost savings**. The algorithm-driven workflows enabled proactive monitoring and intervention, enhancing patient stability, supporting clinicians, and optimizing resource utilization in the home care setting.

Conclusion

The Nexus platform demonstrates that AI-enabled, algorithm-driven management of home ventilator patients can substantially reduce hospitalizations and respiratory infections while generating significant cost savings. By embedding predictive analytics, standardized clinical workflows, and patient engagement tools into HME operations, this approach supports proactive, data-driven care and aligns with value-based healthcare initiatives. Broader adoption of AI-assisted home ventilator management may improve quality of life and clinical outcomes and reduce the healthcare system's burden for complex respiratory populations.

Disclosures

Dr. Landon serves as Adjunct Sr. Medical Advisor for Encore Healthcare, a respiratory population health software developer and clinical outcomes provider
Ray Gregg – CRT, RPSGT is the VP of Clinical Sales for Adapt Health
Zach Gantt – RRT, FAARC is the Founder & CEO of Encore Healthcare

References

- Klingshirn, H., et al. How to improve the quality of care for people on home mechanical ventilation from the perspective of healthcare professionals: a qualitative study. *BMC Health Serv Res* 21, 774 (2021). <https://doi.org/10.1186/s12913-021-06743-3>
- Hayman J, et al. Cost comparison of mechanically ventilated patients across the age span. *Respir Care*. 2015;60(9):1287-1295.