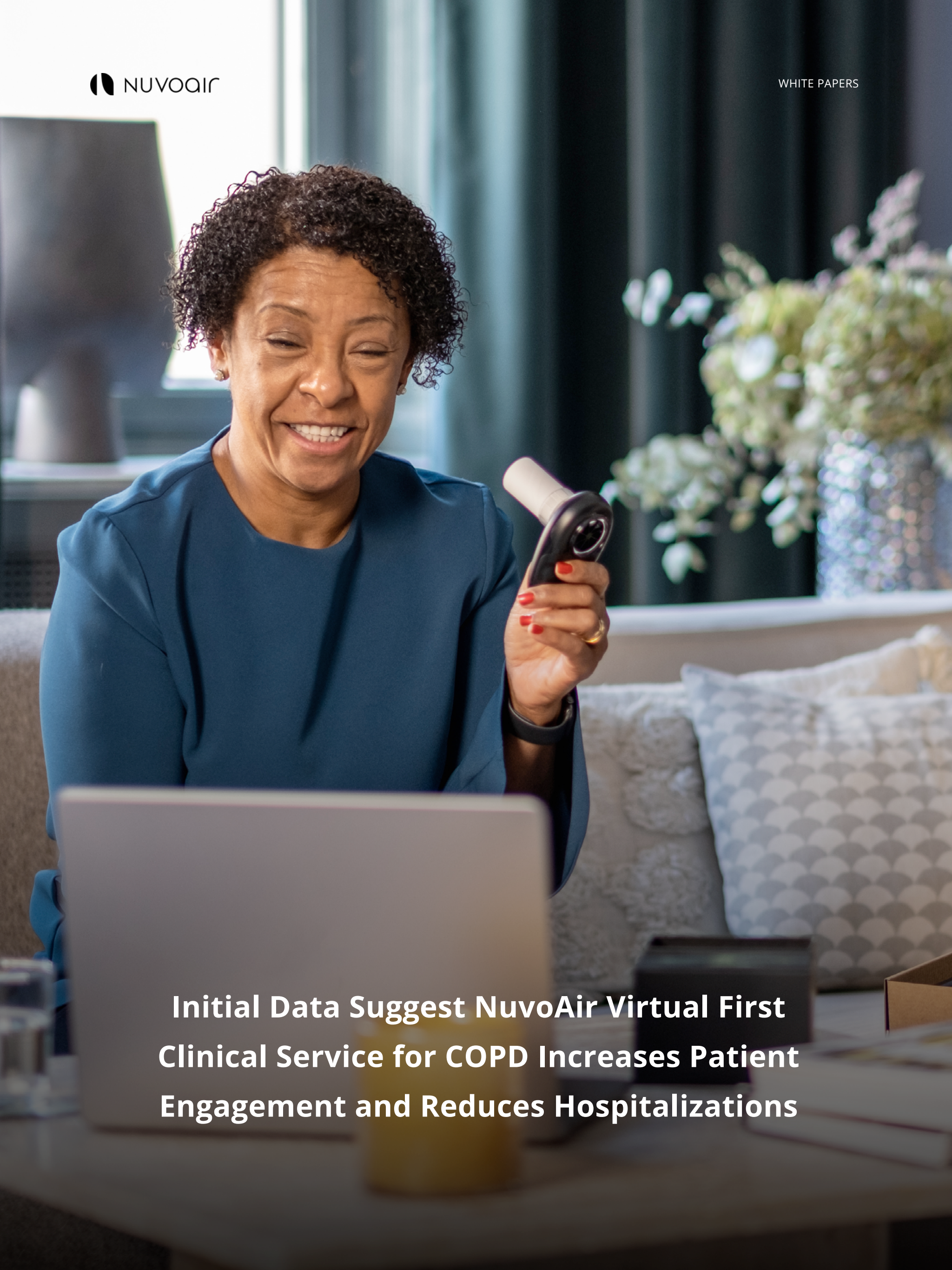

Initial Data Suggest NuvoAir Virtual First Clinical Service for COPD Increases Patient Engagement and Reduces Hospitalizations

NUVOAIR INC.
50 Milk St., 16th floor
Boston, MA 02109

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INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a major cause of morbidity and mortality, and the third most common cause of death and disability in the United States. The impact of this disease is devastating to both patient health and cost of care. Healthcare costs for U.S. COPD patients are projected to be nearly $50 billion/year.[1] As disease severity increases, so do care costs. The majority of COPD costs are generated by exacerbations leading to hospitalization.

The frequency of severe disease exacerbations reflects the difficulty in providing adequate treatment and support to these patients. Support for primary care teams to manage COPD in the United States is inadequate, and coordination of care between various clinicians and healthcare institutions is often poor.[2] As a result, COPD patients often go without appropriate preventive medications or are given medications that are inadequate for their stage of disease. Even when optimal medications are prescribed, high out-of-pocket expenses for patients lead to poor adherence. Lack of patient access to education supporting disease management and to coverage for self-management programs in the clinical setting compounds the challenges of this disease.

Increasing patient engagement in COPD care is critical to improve patient outcomes while reducing the cost of care. An analysis by the Lancet Respiratory Medicine Commission recommends improving COPD care management via a cost-effective care model that delivers evidence-based guidelines to individual patients in a fragmented healthcare system - and supports patient adherence to prescribed therapies.[2] Patient engagement data collected in a 2021-2022 U.S. NuvoAir pilot demonstrates the effectiveness of the NuvoAir care model to support patient engagement, reduce hospitalizations, and improve patient quality of life.

THE NUVOAIR CLINICAL SERVICE

NuvoAir provides a virtual first omni-channel clinical service experience for complex patients where COPD is the leading condition. The service is initiated with a blend of outreach channels such as interactive voice response (IVR) phone calls, live phone calls, SMS, and email.

For members comfortable using apps and technology, support is provided to onboard them to NuvoAir's mobile app, which becomes their hub for engagement. If a member doesn't have a smartphone or isn't comfortable using the app, alternative means are used to collect and monitor data - such as by video, phone, text, or email.

The NuvoAir Clinical Service begins with a data file of eligible patients shared by participating health plans or clinics. This file typically includes demographic information, contact information, and some clinical history, including comorbidities. NuvoAir uses these data files to stratify the patient member population by both risk and engagement method. The service configures omni-channel capabilities and content to send relevant outbound awareness campaigns to patient members and convert 'aware' members to 'activated' members by confirming their eligibility and their desire to engage in the service. 'Activated' members are then onboarded through initial self-reports on motivation, health status, and light assessments on their ability to self-manage with technology.

Collected data enables NuvoAir to tailor individual member service through the following determinations:

- Can this member use a kit of hardware to track biomarkers?
- Can this member engage with a mobile application?
- Is this member able to respond to digital channels for the purposes of capturing self-reports?
- Will this member need consistent management by a Care Coordinator?

Once onboarding is complete, NuvoAir begins patient management by matching a proven clinical protocol with a best-in-class engagement design. The engagement design delivers protocol management tailored to the individual's needs. When a red flag is detected in a patient's condition (such as a biomarker, trend of biomarkers, self-report, or medication adherence issue), the patient is quickly triaged to appropriate live clinician resources.

Tailored personalization of care is at the heart of the NuvoAir Clinical Service:

- Care is delivered in the comfort of the patient's home via a patient app, or other means, with connected devices, self-management content, and high-touch care coordination for high risk members
- A physician-led care team offers Care Coordinators who onboard patient members and help them use the technology seamlessly
- NuvoAir registered nurses assess and triage members at the first sign of exacerbations
- NuvoAir respiratory therapists educate members about COPD self-care and guide them back to health in the event of exacerbations

Connected data is collected from:

- A bluetooth-enabled spirometer to help stratify patients by severity of disease and to remotely monitor lung function changes over time
- A pulse oximeter to help detect acute declines
- A sensor that attaches to asthma and COPD inhalers to monitor inhaler use and technique
- A night-time cough monitoring app to help detect upcoming exacerbations
- An activity tracker
- Evidence-based questionnaires to detect and predict changes in health status

U.S. COPD PILOT

NuvoAir launched its digital health solutions in Europe in 2017. Today, NuvoAir is the market leader in the U.K. with several thousand respiratory patients currently under management and over 1,000,000 clinically relevant data points collected, which have shaped the design of its service. In 2021, NuvoAir initiated a small pilot introducing remote COPD clinical services in the United States. The patient profile for the pilot includes:

- Complex patients living in rural areas with COPD and multiple comorbidities. (Using the GOLD spirometric criteria for COPD severity, the pilot included 7 people whose condition was classified as Mild COPD, 12 classified as moderate COPD, 5 classified as severe COPD, and 4 classified as very severe COPD)

- Patients identified by clinicians from one pulmonary specialty clinic in Indiana and one primary care clinic in Kentucky

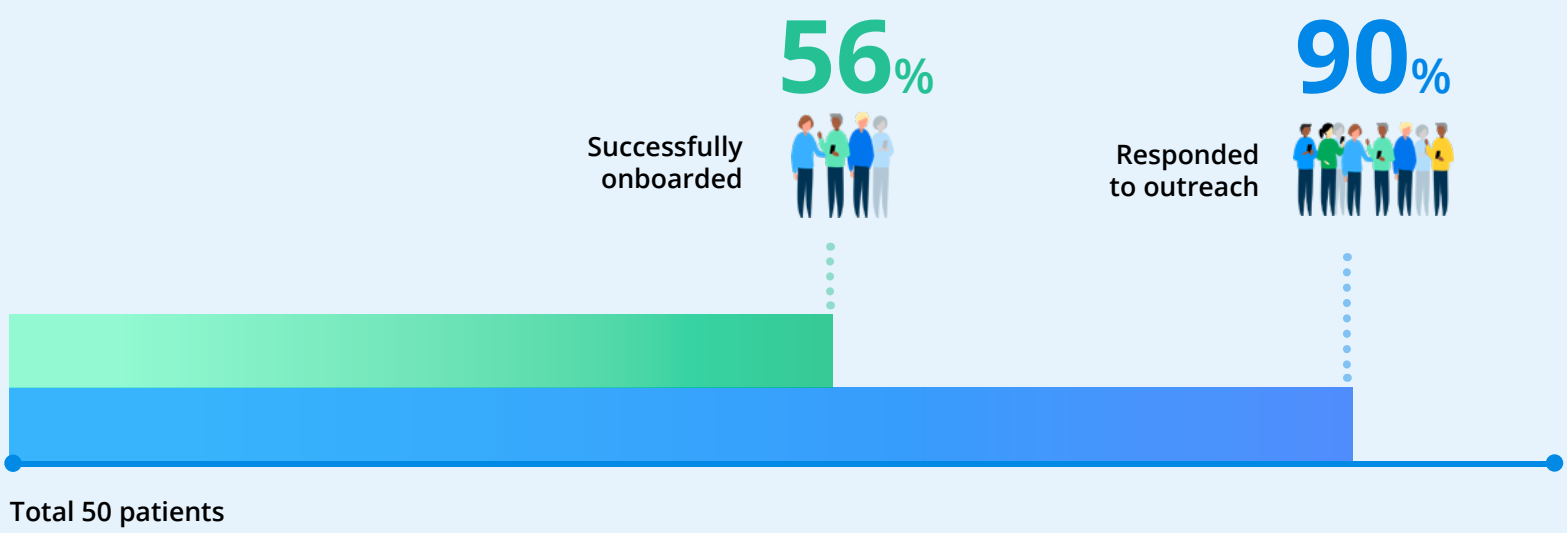
A data file of 50 referred patients was submitted to the pilot service. Given the small number of patients, automation in the onboarding process was not required. NuvoAir Care Coordinators contacted these individuals, shipped them a NuvoAir Home system with connected devices to monitor their condition, and provided them with individual support to set up and onboard them. Patients who completed setup and onboarding received ongoing NuvoAir Care Coordinator support to monitor their COPD using the NuvoAir Home system. Patients were asked to measure their blood oxygen level (SpO2) daily, spirometry twice per week, and complete a modified Medical Research Council (mMRC) dyspnea assessment weekly. Patient-reported measurements were monitored. The Care Coordinator contacted the individual patient and referring clinician under a pre-defined protocol based on certain SpO2 and spirometry thresholds and worsening of symptoms.

INITIAL FINDINGS: PATIENT ENGAGEMENT

Data was collected through two patient surveys to evaluate patient engagement in the pilot. In addition, engagement in home monitoring behaviors was investigated through a review of data collected by participants.

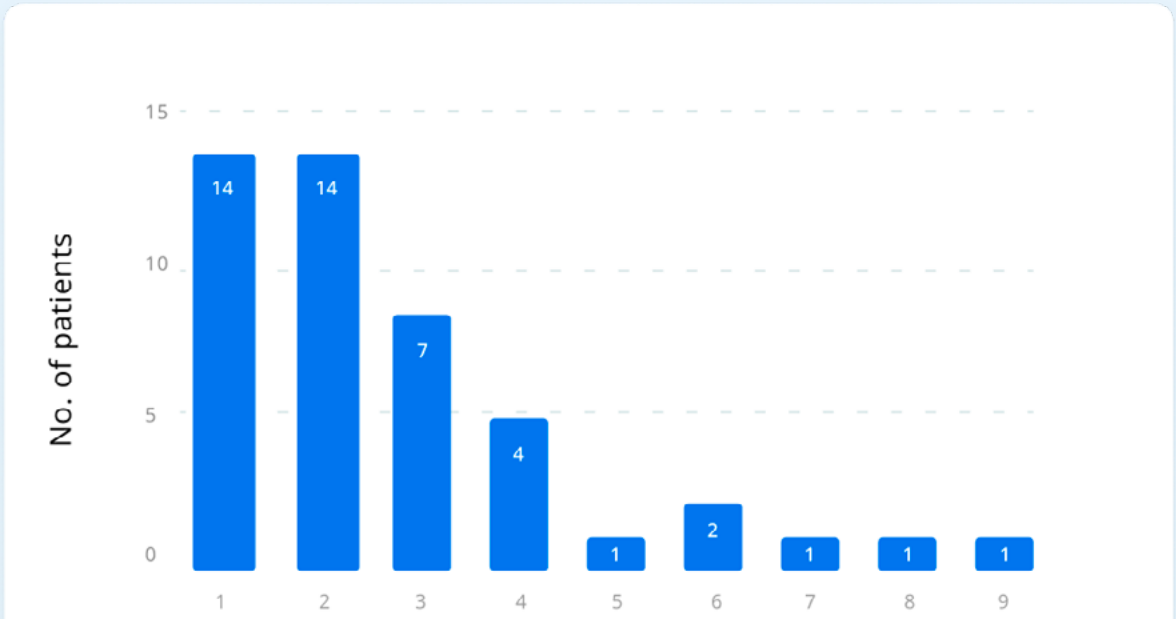
Onboarding Experience

Of the 50 referred patients, 45 (90%) responded to outreach by the NuvoAir Home Care Coordinator. Response took an average of 2.7 contacts over 9.4 days. Of responding patients, 37 (74%) moved to onboarding and 28 were successfully onboarded (56%). Of the 8 that responded to outreach but didn't move to onboarding, 5 people were not prepared to engage with remote monitoring with 2 citing technology as a barrier, 1 person denied consenting, 1 person wanted her son to represent her for Care Coordinator contacts but didn't provide power of attorney, and 1 person felt too unwell to participate. Of the 9 that moved to onboarding but were not successfully onboarded, 3 people did not show up for their scheduled onboarding appointments, 1 person died, 2 people had health issues that prevented their engagement, 1 person had technical issues, and 2 people withdrew.



Evaluation of contacts and time to first response showed that 62.2% of patients responded within two Care Coordinator contacts. Similarly, 64.4% responded within 4 days of the first Care Coordinator contact.

Distribution of number of contacts to first response



Length of Time in NuvoAir Clinical Service

As of the date of publication, the 28 successfully onboarded patients spent up to 316 days on the service, with a group average of 162 days. During that time, individual patients recorded an average 85 Sp02 readings (one every 2 days), 30 spirometry sessions (one every 9 days) and completed the mMRC an average 11 times (one every 15 days).

Reported Experience

Of the 28 individuals who successfully completed onboarding, 26 (93%) also completed a survey about their experience. The survey results included the following data:

Reasons for joining:

57%

initially chose to use NuvoAir to provide their physician with up-to-date information on their lung health and to better track and manage their lung health.

Digital literacy:

46%

rated their experience on smartphone apps as “limited” before joining the NuvoAir Clinical Service.

Personal goals:

Satisfaction results:

100%

found their interactions with the Care Coordinators useful; 64% found them extremely useful.

44%

found additional benefit in having the Care Coordinators help with performing spirometry.

72%

found that the support of the Care Coordinator made the NuvoAir set up processes easier.

100%

found the program text reminders and information useful.

87%

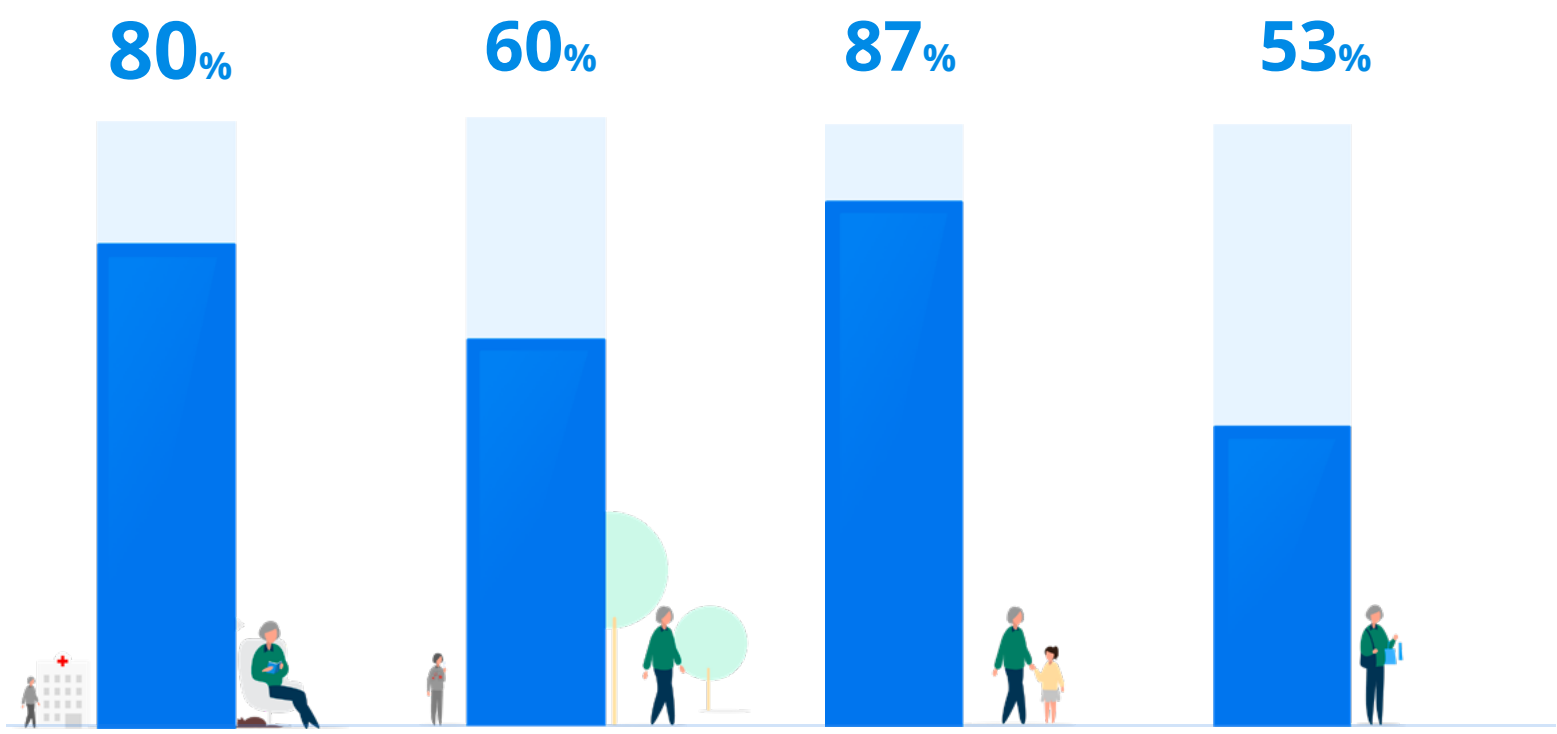
felt more confident about managing their COPD with the support of the NuvoAir Clinical Service.

NPS 60

The individuals surveyed gave the NuvoAir Clinical Service a net promoter score (NPS) of 60, reflecting an excellent customer experience.

Reported Patient Outcomes

A second survey was sent to the same individuals to evaluate self-reported outcomes. Fifteen responded (58%). Patients reported the following results since joining the NuvoAir Clinical Service:



Fewer COPD-related hospitalizations	Fewer flare-ups	Improved quality of life	Improved ability to take part in daily activities

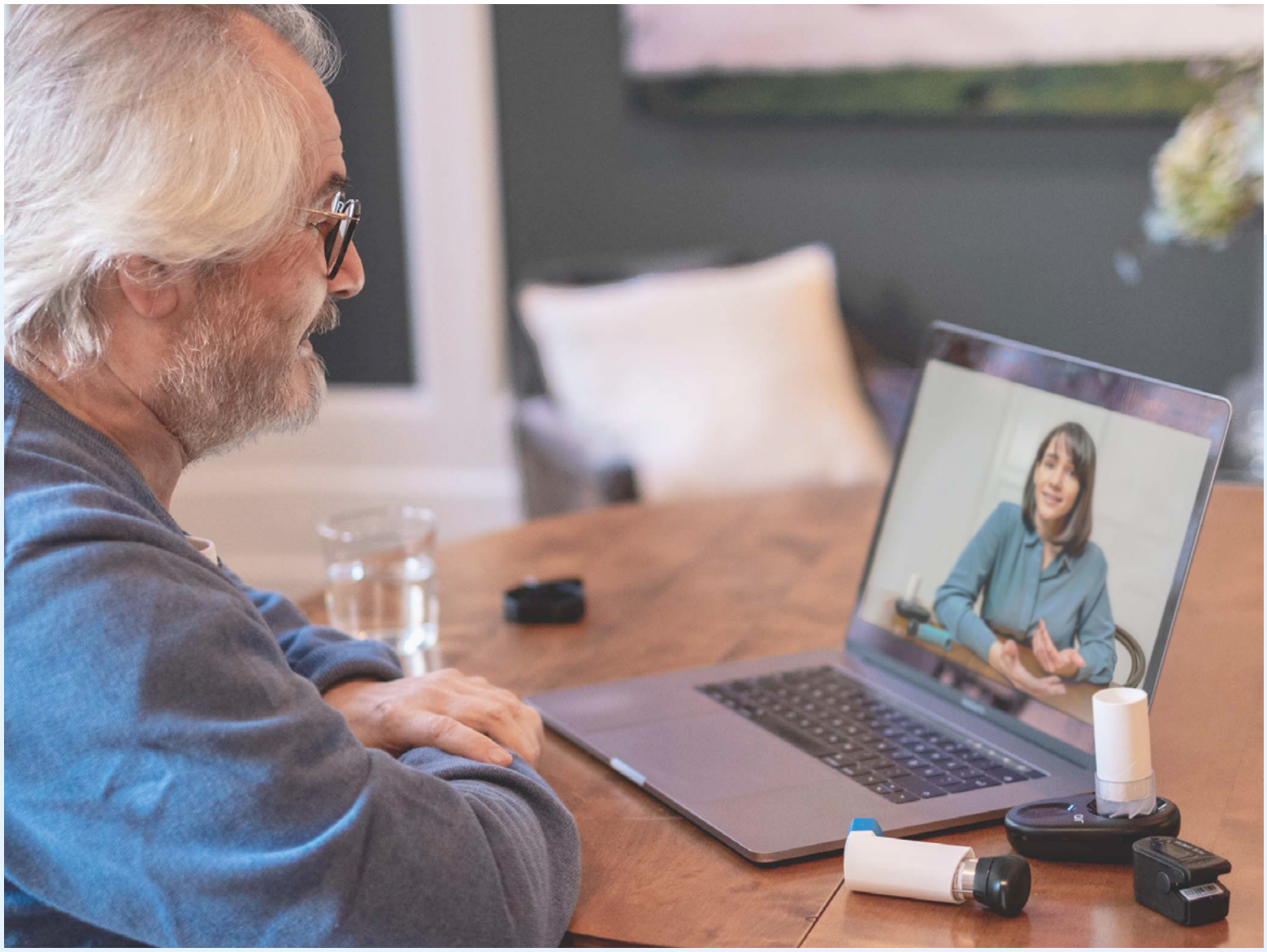
Bradley

Pilot Member

“The only way to have a positive outcome is to stay on top of your health.”

Effectiveness of Care Coordinators

NuvoAir Care Coordinators engaged 90% and onboarded 56% of the COPD patients referred to the NuvoAir Clinical Service. On average, onboarded patients completed an SpO2 reading every 2 days, performed spirometry every 9 days, and completed the mMRC every 15 days. Of surveyed patients, 100% found their interactions with the Care Coordinator useful; more than 70% indicating their support made onboarding easier. In terms of self-efficacy, 87% of patients felt more confident to manage their COPD as a result of being on the service. Overall, survey respondents gave the NuvoAir Clinical Service an NPS of 60.



Monitored Health Data

Data collected remotely and monitored by a NuvoAir Care Coordinator included Sp02, FEV1, FVC and FEV1/FVC and reported breathlessness via the mMRC questionnaire. During the study period, individual patients recorded an average 85 SpO2 readings, 30 spirometry sessions and 11 mMRC questionnaires. Sp02 recordings ranged from 91-97% with an average of 94.5%. The averages for lung function include FEV1 of 1.66, FVC of 3.08 and FEV1/FVC of 0.54.

N = 26

	Average	Range	Median	Mode
SpO_2 level	94.5%	91-97%	95%	95%
No. of recorded SpO_2	84.9	7-202	80	80

N = 28

	FEV1	FVC	FEV1/FVC
Average values	1.66	3.08	0.54
Mode	2.19	2.13	0.35
Median	1.47	2.72	0.56

The average score reported by 24 patients using the dyspnea assessment during participation in the service was 1.42; the mode score was 1, showing that breathlessness was reported to be at the lower end of the scale.

Over the course of enrollment, people were asked to complete the same mMRC survey once a week. They carried out the questionnaire on average 10.6 times. This ranged from once to 66 times.

CONCLUSION

As demonstrated in Europe, the first NuvoAir U.S. pilot shows that complex patients with COPD can be managed effectively. Although the data is based on a small number of patients, the pilot demonstrates that NuvoAir's virtual first clinical service can cost-effectively increase patient engagement, reduce hospitalization (based on reported outcomes), and improve patient quality of life.

The traditional approach to managing COPD patients focuses on changing behavior; NuvoAir Home focuses on shaping behavior.

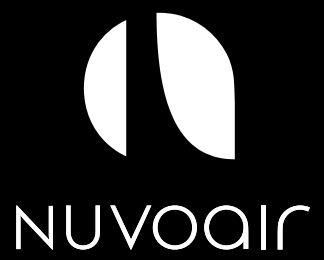
By setting small, achievable goals with patients, reinforcing the value of those goals, celebrating small wins, and building on successes, NuvoAir nurtures patient competence in managing their COPD condition.

The Lancet Respiratory Medicine Commission suggests that optimal patient-focused COPD care requires innovative collaborations, with success judged by improved patient satisfaction and outcomes.[2] NuvoAir has responded to the complex challenge of COPD management with a personal, collaborative support system focused on shaping patient behavior through small, positive steps that can make larger health goals attainable.

RESOURCES

1. Chronic Obstructive Pulmonary Disease (COPD), CDC.

2. Meeting the challenge of COPD care delivery in the USA: a multiprovider perspective. The Lancet Respiratory Medicine Commission, June 2016



NUVOAIR INC.

50 Milk St.

16th floor

Boston, MA 02109

USA

Contact

sales@nuvoair.com