

High Frequency Chest Wall Oscillation (HFCWO) Responder Analysis in a Large Registry of Non-CF Bronchiectasis Patients

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ABSTRACT

The time-wise response of patients to High Frequency Chest Wall Oscillation (HFCWO) has never been explored in adult patients with non-cystic fibrosis bronchiectasis (NCFB). This study examines how the proportion of positive, neutral, and negative responders changes with time after initiation of HFCWO therapy.

12,344 records extracted from a registry of adult bronchiectasis patients using HFCWO therapy indicated the change in self-reported respiratory symptoms for periods of up to two years.

A large majority of adult patients with non-CF bronchiectasis respond quickly and positively to the initiation of HFCWO therapy. The strongest improvement is in the first month, with continued improvement shown for up to two years thereafter.

Objective

To measure the self-reported response of new patients starting on HFCWO therapy

Questions Asked

- How many patients respond to HFCWO therapy?
- How much time does it take for a full response?
- For how long is the response maintained?

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INTRODUCTION

High Frequency Chest Wall Oscillation (HFCWO) vests have been used effectively for airway clearance in patients with cystic fibrosis and other diseases. The time-wise response of patients to HFCWO in adult patients with non-cystic fibrosis bronchiectasis (NCFB) has not been definitively established. This study examined the change in the proportion of positive, neutral, and negative responders over time after initiation of HFCWO therapy.

METHODS

- 12,344 records from a registry of adult bronchiectasis patients (mean age 71 years) using HFCWO therapy (inCourage system, RespirTech, St. Paul, MN).
- Telephone surveys at initiation of therapy, and at 1, 3, 6, 12, and 24-months.
- Two quality of life questions were asked:
 - “How would you rate your overall respiratory health currently?”
 - “How would you rate your current ability to clear your lungs?”
- Both on a Likert scale: 1=Poor, 2=Fair, 3=Good, 4=Very Good, 5=Excellent
- Patients were designated “positive responders” if their Likert score improved, “neutral responders” if unchanged, and “negative responders” if their Likert score decreased.
- Results were compared to the distribution expected if responses were random
- All data were deidentified and informed consent was obtained from all patients.

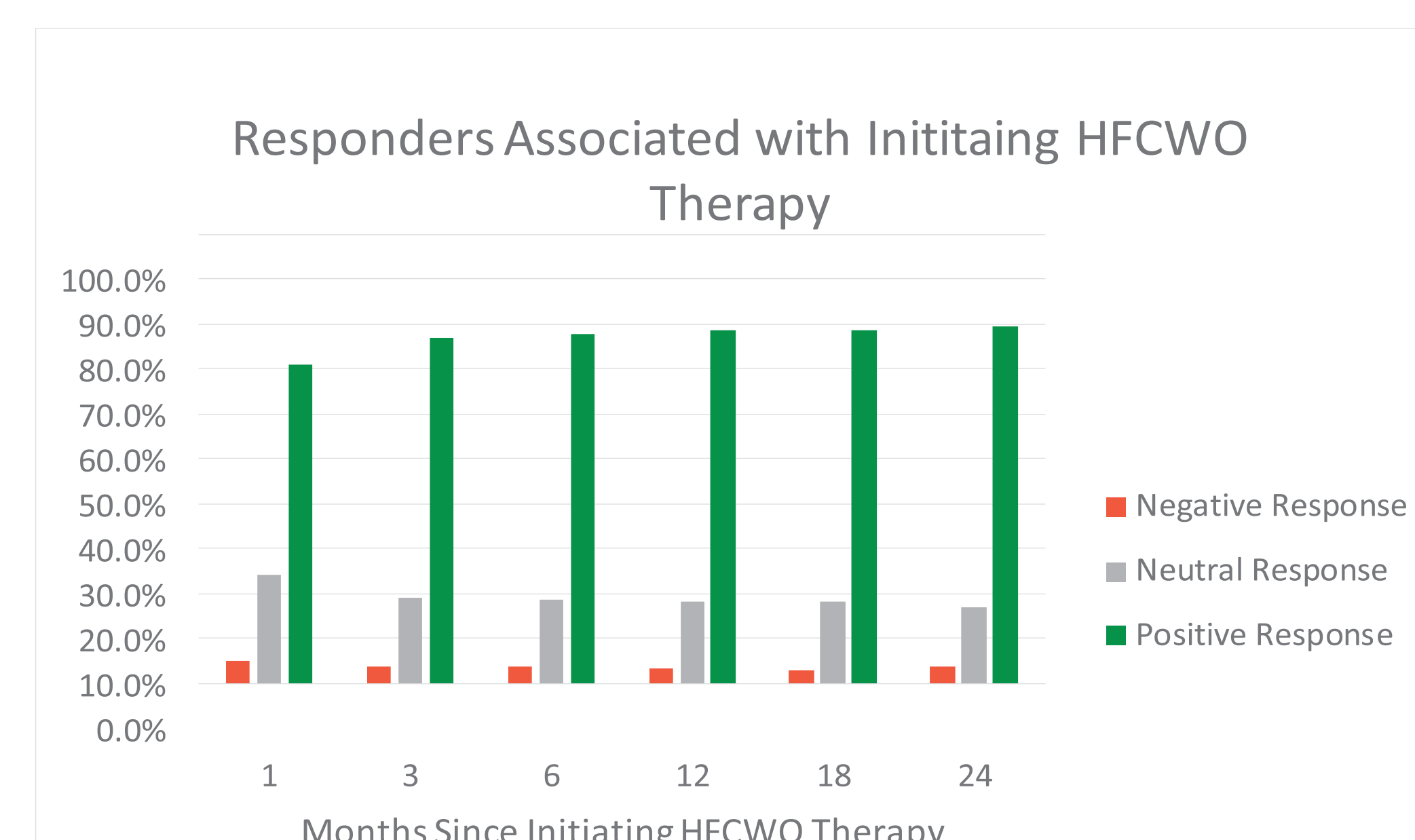


Figure 1. The proportion of patients in each responder group for “Respiratory Health” and “Ability to Clear Lungs” for two years after initiating HFCWO therapy. A negative response is defined as a lower Likert score at one year and two years compared to the baseline value; conversely, positive response is an improvement during these same time intervals. A neutral response is an unchanged Likert score.

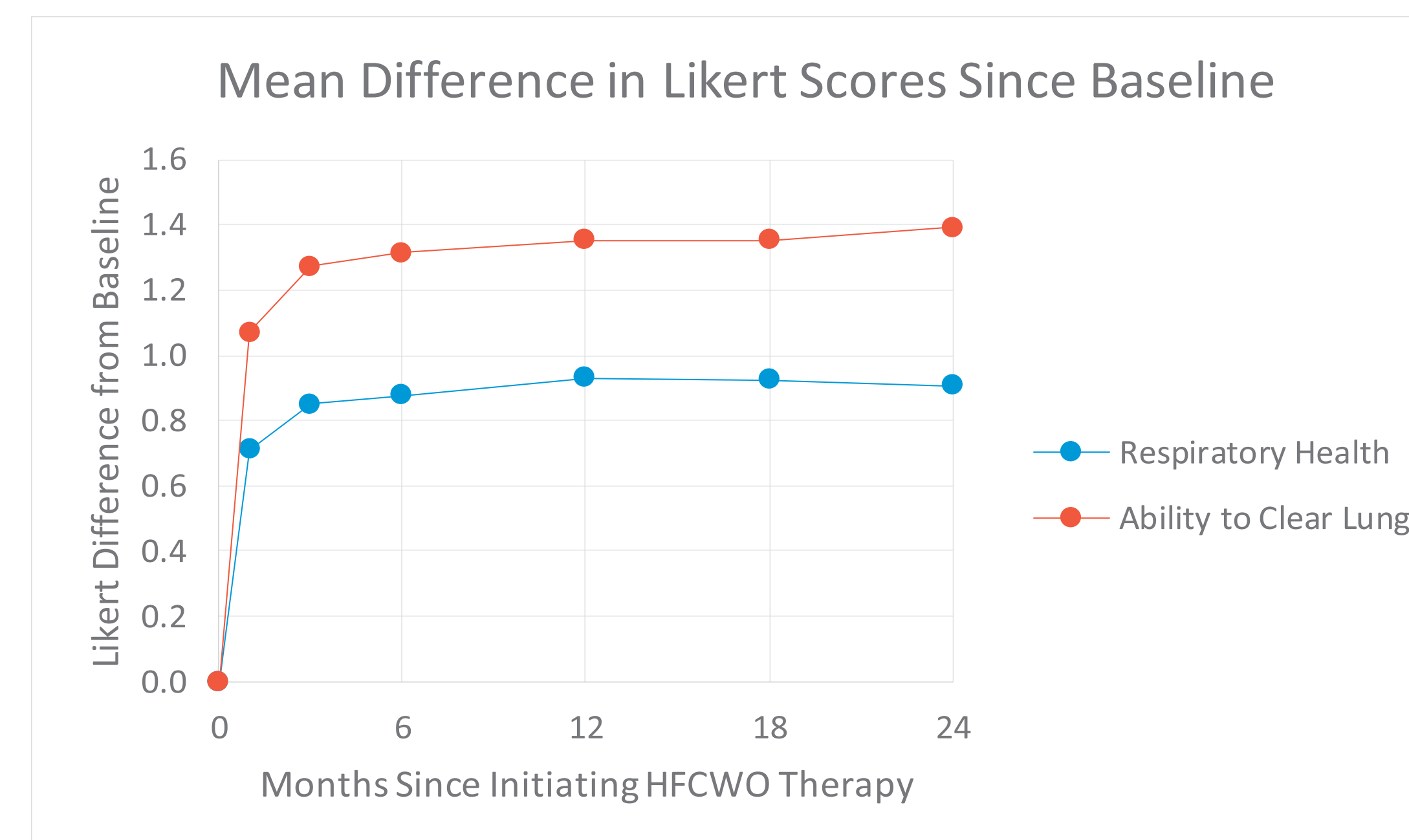


Figure 2. The Likert scores for the “Respiratory Health” and “Ability to Clear Lungs” metrics. Time zero is the initiation of HFCWO therapy.

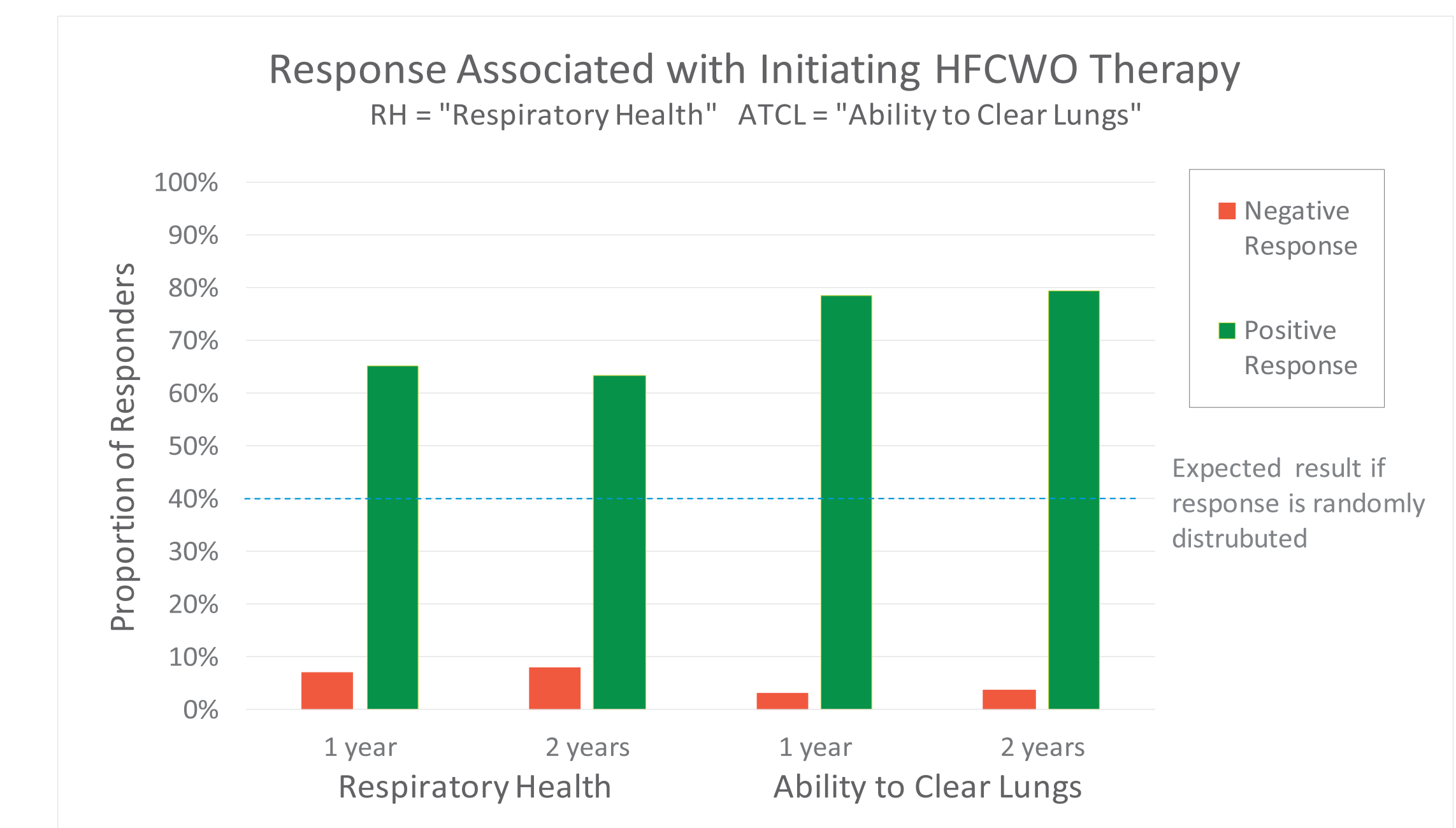


Figure 3. The proportion of patients in each responder group for “Respiratory Health” and “Ability to Clear Lungs” for two years after initiating HFCWO therapy. The blue line shows the expected result if the responses were randomly distributed.

RESULTS

“Respiratory Health”

	Expected	After one year	After two years
Negative Responders	40%	6.9%	7.8%
Neutral Responders	20%	27.8%	28.8%
Positive Responders	40%	65.3%	63.5%

“Ability to Clear Lungs”

	Expected	After one year	After two years
Negative Responders	40%	3.1%	3.7%
Neutral Responders	20%	18.3%	16.9%
Positive Responders	40%	78.6%	79.5%

About 66% of patients either completed the two-year duration of the survey or were still in process at the time of the data extract. Remaining patients either returned the unit (20%) or were lost to follow-up (14%). Removing the latter two groups improved the “Respiratory Health” score by 2.2%, and the “Ability to Clear Lungs” score by 0.1%.

DISCUSSION

- The majority of patients with NCFB respond positively to HFCWO therapy
- The degree of positive response was well above what would be expected if response was randomly distributed
- The positive response was sustained for up to two years
- Mean Likert scores increased rapidly for the first 6 months and more slowly thereafter until 12 months
- Possible mechanisms for the growing response to HFCWO therapy include improved adherence over time, steadily decreased bioburden in the lungs, or a delayed physiological or psychological response
- Removing dropouts slightly improved hospitalization and quality of life scores, suggesting that dropout groups were somewhat sicker, however this effect is small compared to the overall improvement
- This study has limitations common to registry studies and cannot definitively assign causality

CONCLUSIONS

This study shows that the great majority of NCFB patients respond to HFCWO therapy, but a full response may require several months to develop. Patients should be counseled to continue therapy for at least three months before deciding whether or not to continue HFCWO treatment.