

The Impact of Handheld Wireless Home Spirometry on Mental Health and Health Literacy in Patients with Cystic Fibrosis

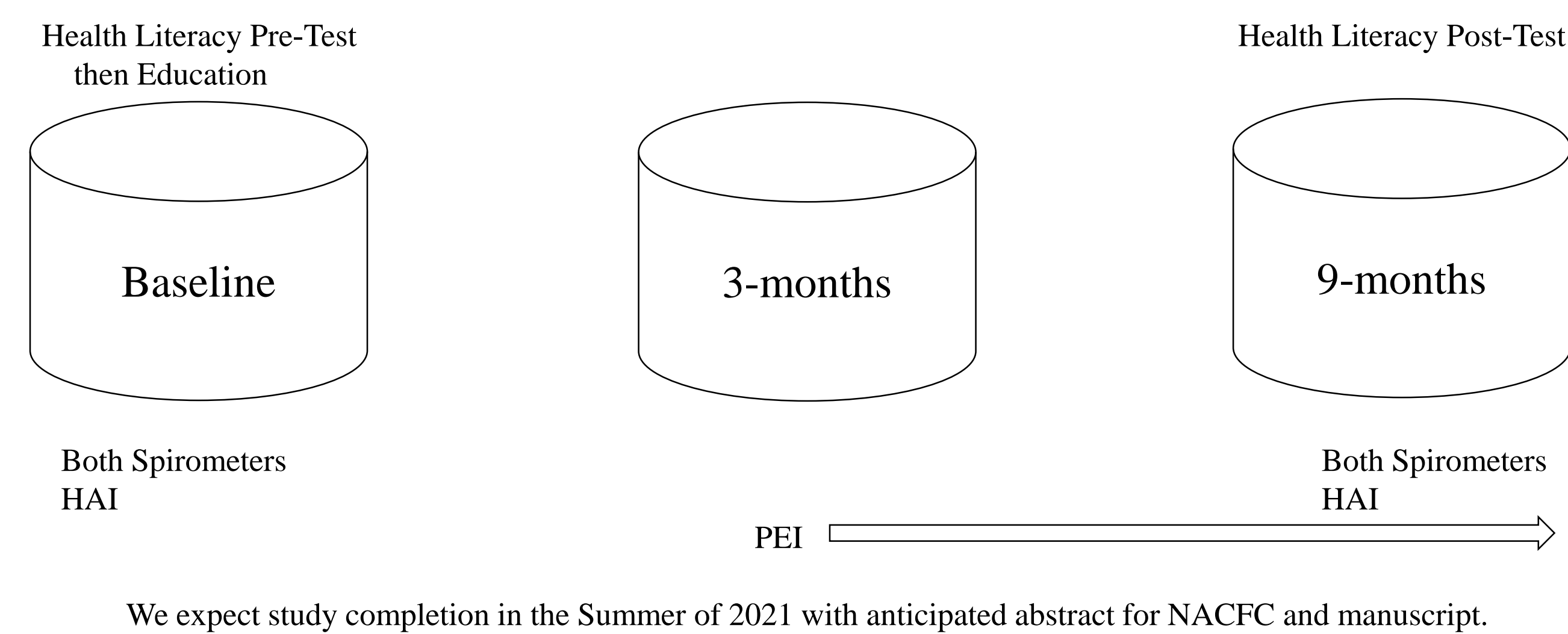
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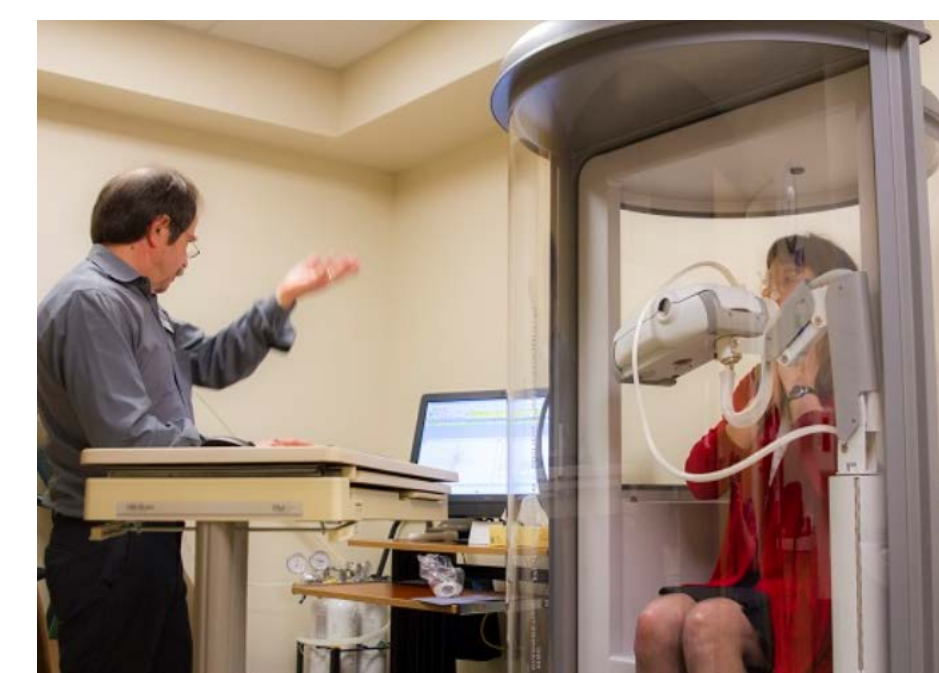
Introduction

- Cystic fibrosis (CF) is a progressive, autosomal recessive genetic disease.
- Persistent lung infections is the leading cause of morbidity and mortality in CF.
- Most CF patients are followed in CF dedicated care centers and are seen in clinic approximately every 3 months since birth.
- During times of crisis such as Hurricane Katrina and the current COVID-19 pandemic, CF patients are incentivized to stay home to minimize exposure risk.
- Decreased access to clinic can have a major impact on CF patients' disease progression and mental health.
- Handheld wireless spirometers can serve as a meaningful tool for healthcare providers.
- This study aims to investigate:
 - The impact of home spirometer use and education on aspects of mental health, specifically anxiety and patient sense of empowerment.
 - The impact of home spirometers and education on health literacy regarding basic spirometry and lung function.
- Additionally, we will confirm the non-inferiority of the ZephyRx home spirometer in providing accurate measurements of FEV1 and FVC as compared to the in-clinic desktop spirometer.

Study Timeline

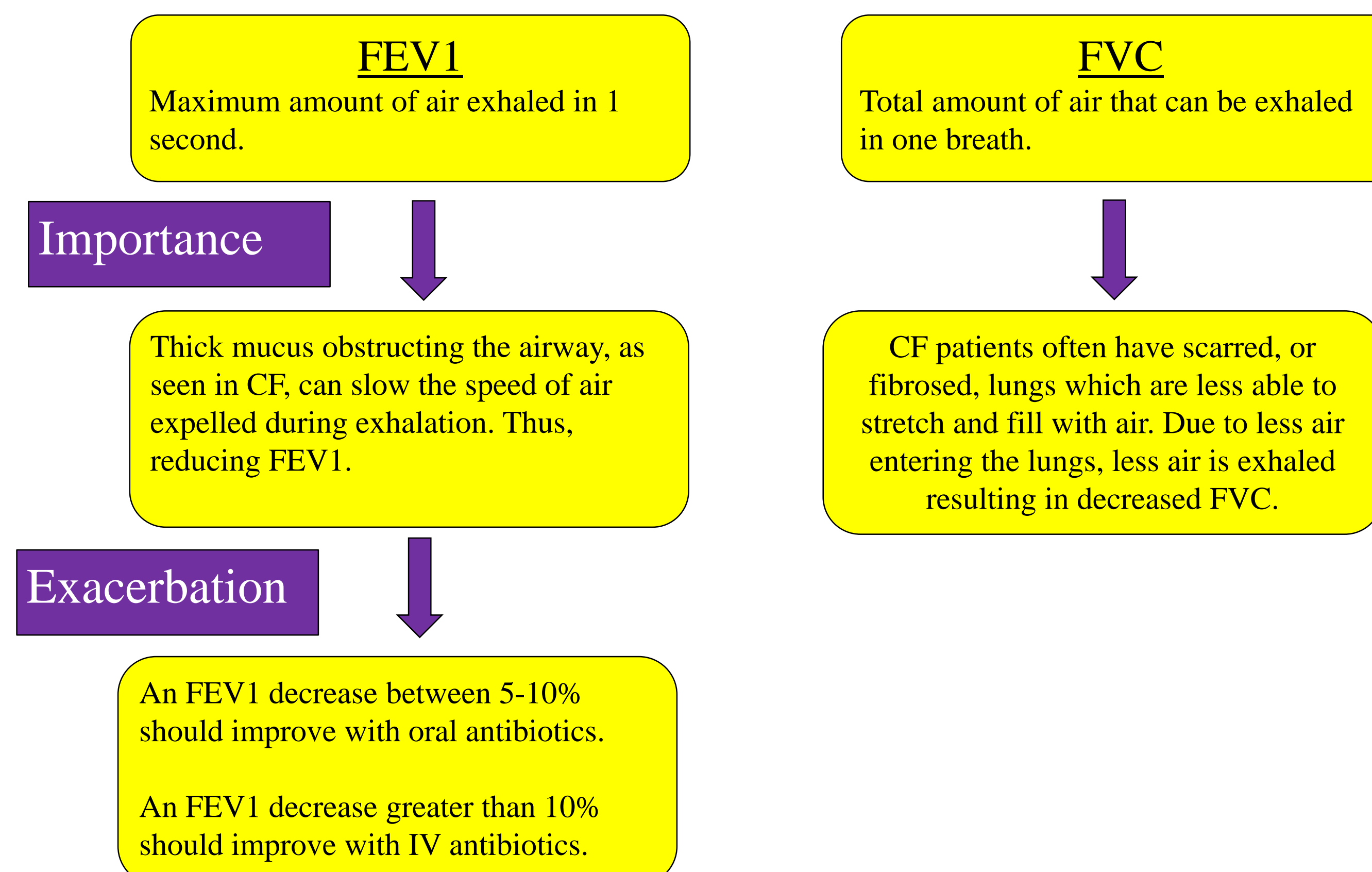


ZephyRx vs Desktop Spirometer



Spirometry Education

What values do Spirometers measure?



Mental Health & Education Survey

HAI: Select all that apply

- a.) Resisting thoughts of illness is never a problem
- b.) Most of the time I can resist thoughts of my illness
- c.) I try to resist thoughts of my illness but am often unable to do so
- d.) Thoughts of illness are so strong I no longer try to resist them

The Patient Enablement Instrument (PEI)

In the last 3 months, have you felt you are...	Much Better	Better	Same	Less
able to understand your illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
able to cope with your illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
able to keep yourself healthy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
able to cope with life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
confident about your health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
able to help yourself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Spirometry can detect exacerbations in patients with CF

- A. Up to ~ 2 weeks before symptoms develop.
- B. At the same time as symptoms develop.
- C. Within one week of symptom onset.
- D. Within ~ 2 weeks of symptom onset.

Methods

- 40 adult patients over the age of 18 seen in the Tulane Adult Cystic Fibrosis clinic will be enrolled in a 9-month longitudinal prospective study.
- During in-person visits, FEV1 and FVC measurements are obtained at baseline, 3 months (if possible) and 9 months with the ZephyRx and desktop spirometry to confirm reproducibility of results between both methods.
- Measurements of mental health and patient empowerment were obtained at baseline, 3 months and 9 months using the standardized questionnaires Health Anxiety Inventory (HAI)¹ and Patient Enablement Instrument (PEI)².
- Patients will complete a pre-test of 5 randomly generated questions before receiving dedicated education on spirometry. They will also complete a post-test at the end of the study period in order to measure the potential impact of education and home spirometry on health literacy.

Conclusions

- We anticipate that our results will support the feasibility of ZephyRx home spirometer in serving as a meaningful tool for providing objective information to healthcare providers when in-person assessments are not feasible.
- Furthermore, we anticipate that access and use of such devices, coupled with dedicated patient education, will support patient mental health and positively impact health literacy by empowering patients with cystic fibrosis to take a more active role in the monitoring of their chronic lung disease.

