# Continuous Cough Monitoring For Early Detection Of COPD Exacerbations Using Hyfe: Interim Results From A Prospective Multi-center Cohort Study

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## Rationale

COPD exacerbations drive disease progression, hospitalization, mortality and drug development, yet detection remains limited and relies on subjective symptom reporting. Cough, a hallmark symptom of COPD, may provide an objective, continuous biomarker for exacerbations. However, longitudinal cough patterns in COPD have never been characterized using continuous 24/7 monitoring. We present interim findings from an ongoing prospective study evaluating passive cough monitoring using the Hyfe CoughMonitor, a validated AI-powered wearable system, to characterize cough variability in COPD and assess its potential for exacerbation detection.

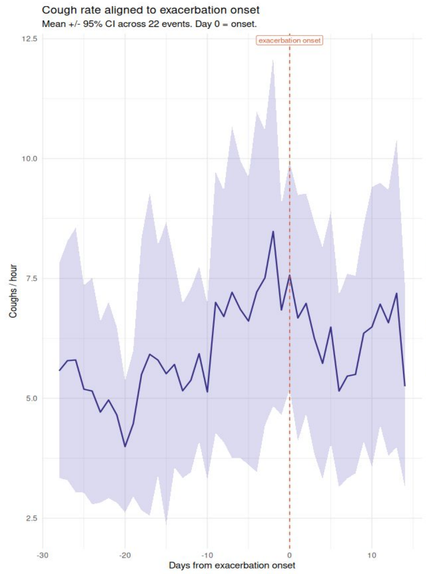
## Methods

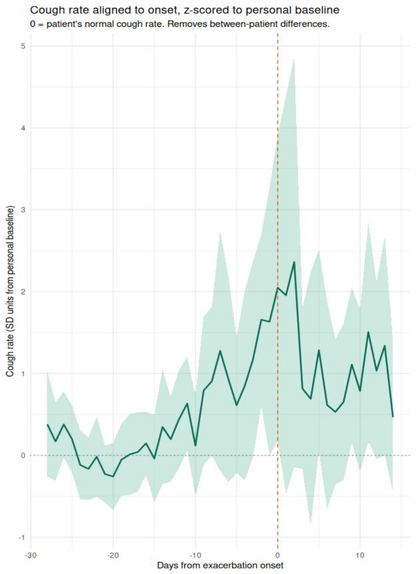
This **prospective, multi-center, observational cohort study** (NCT07212439) recruits COPD patients across clinical sites in Navarra, Spain. Participants wear the Hyfe CoughMonitor during waking hours and charge it bedside overnight, where it continues cough monitoring. **Weekly CAT questionnaires** and paraclinical data supplement cough monitoring. Clinicians and patients aren blind to cough rates and study-administered CAT scores; exacerbation diagnosis follows standard care using GOLD 2025 criteria. We report **interim analyses** of cough rate variability and temporal patterns surrounding clinically confirmed exacerbations.

## Results

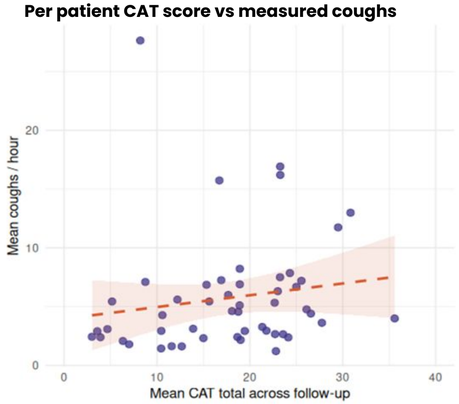
- Data as of May 2026, 50 participants, 110,000 patient-hours of monitoring encompassing over 610,00 coughs (average rate = 5.56 per monitored hour), 22 exacerbations
- There have been 22 exacerbations. There is a clear spike in the mean hourly cough rate in the 10 days preceding the exacerbations with up to 33% more coughs measured in the 3 days before the diagnosis
- A model of cough in the last 7 days (normalized to the person's baseline via z score) predict an exacerbation in the next 7 days with an AUC of 0.62
- There is a weak correlation between the overall CAT scores and the weekly cough rates as well as with the CAT question one (“How was your cough this week? 0 = I never cough , 5 = I cough all the time)

**50 participants, 110,000 patient-hours of monitoring encompassing over 610,00 coughs (average rate = 5.56 per monitored hour), 22 exacerbations.**

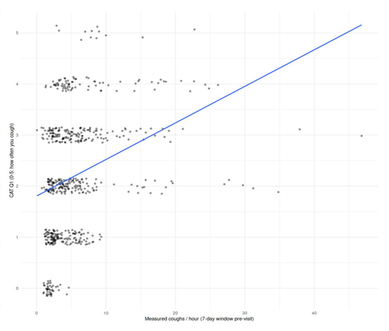



**Per patient CAT score vs measured coughs**




**Perceptio (CAT Q1) vs measurement**



## Conclusions

Continuous objective monitoring for 110,000 patient hours reveals **substantial cough variability** in COPD that frequently diverges from subjective patient perception and CAT scores. **Cough frequency notably increases during the 14-day period preceding exacerbations**. An individualized rolling seven-day baseline model shows potential for forecasting exacerbations. Continuous cough monitoring is a promising digital biomarker for the early detection of COPD exacerbations

## Take-Home Points

1. **COPD patients show excellent adherence to continuous cough monitoring and weekly CAT questionnaires**
2. **There is substantial variation in cough rates ranging from 0 to 1,451 coughs in one day**
3. **Cough rates spike in the 10 days leading to an exacerbation and the 7-day rolling average of cough rates can predict these events with an AUC of 0.62**
4. **CAT questionnaires and subjective cough perceptions are weekly correlated with actual cough rates**
5. **Monitoring may increase accuracy of exacerbations in clinical trials**

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Disclosures: PMS, MR, JB and MG are employees and own equity in Hyfe Inc. CCh owns equity from Hyfe Inc. Funding: Hyfe Inc."