CoughPro
powered by Hyfe

CASE STUDY

Learning About Real-World Coughers Through a Smartphone App

PARTNER	PROJECT TYPE
A leading global consumer healthcare company (OTC respiratory portfolio)	Prospective, observational feasibility study
SETTING	**THERAPEUTIC AREA**
UK community sample, no clinical sites, no site staff, no devices to ship	Acute and chronic cough

KEY OUTCOME

CoughPro, a consumer smartphone app, passively captured 23,445 hours of real-world cough data and 189,723 coughs from 206 coughers, layering on structured survey data, generating a more complete view than either data stream provides on its own.

23,445	189,723	206	5 wks
HOURS OF DATA	COUGHS	PARTICIPANTS	STUDY DURATION

CHALLENGE

The partner sells OTC cough products but, like most of the category, had only subjective, periodic, recall-based tools to understand how people actually cough in daily life. Patient-reported outcomes and symptom diaries capture what people think, feel, and believe about their cough, all important to how cough affects daily life and well-being; however, they say nothing reliable about what is objectively occurring as a biological finding. The partner wanted to know two things a consumer app might answer that surveys alone cannot: what does cough actually look like across a population of people with acute and chronic cough, and how well does what people report line up with what a device measures?

Crucially, the partner wanted this without the overhead of a clinical trial. The test was whether a familiar smartphone app, used by ordinary people in their own homes, could generate research-grade real-world insight at scale.

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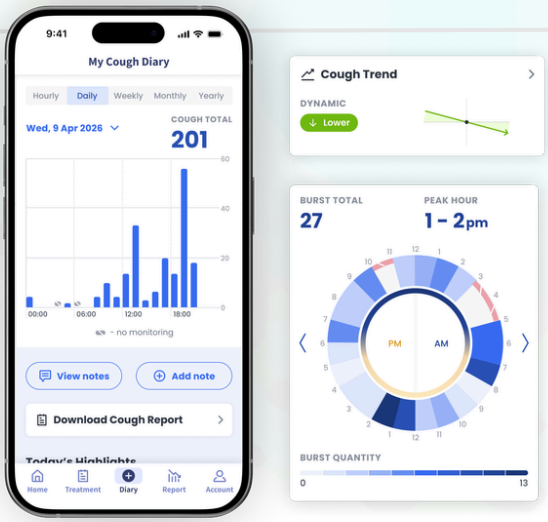
WHAT HYFE DEPLOYED



Hyfe supported the study remotely on the CoughPro wellness app. Participants were recruited from an online community panel across two clinically distinct groups: acute coughers and chronic coughers, installed the app themselves, and let it run day and night passively for a seven-day window. Two data streams ran in parallel through a single consumer app:

- Passive cough monitoring: CoughPro automatically detected and time-stamped individual coughs and every coughing bout, continuously, in the background, with all audio processing carried out on-device to ensure data privacy.
- A structured in-app diary: a Cough Severity Diary embedded directly in CoughPro, plus supplementary items capturing daily treatment use (home/herbal, OTC, prescription).

The footprint was deliberately light: an easy-to-use consumer app, quietly generating a real-world cough dataset, enriched with questionnaires designed to capture subjective experience of cough and texture to the passive monitoring data.

RESULTS

Metric	Result
Participants analyzed	206 (126 acute / 80 chronic)
Total hours monitored	23,455 hours
Individual coughs detected	189,723
Overall mean cough rate	8.1 coughs/hour
Participants averaging ≥16 h/day monitoring	48.50%
Participants averaging ≥12 h/day monitoring	65.50%
Median daily hours monitored	16
Monitoring vs survey adherence	monitoring exceeded survey completion on every study day
Objective difference, chronic vs acute	9.65 vs 6.64 coughs/hour (statistically significant)
Subjective–objective link (self-reported frequency vs measured cough)	Between-person frequency association significant ($p < 0.0001$) but moderate, Spearmon $\rho = 0.306$

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OPERATIONAL SNAPSHOT

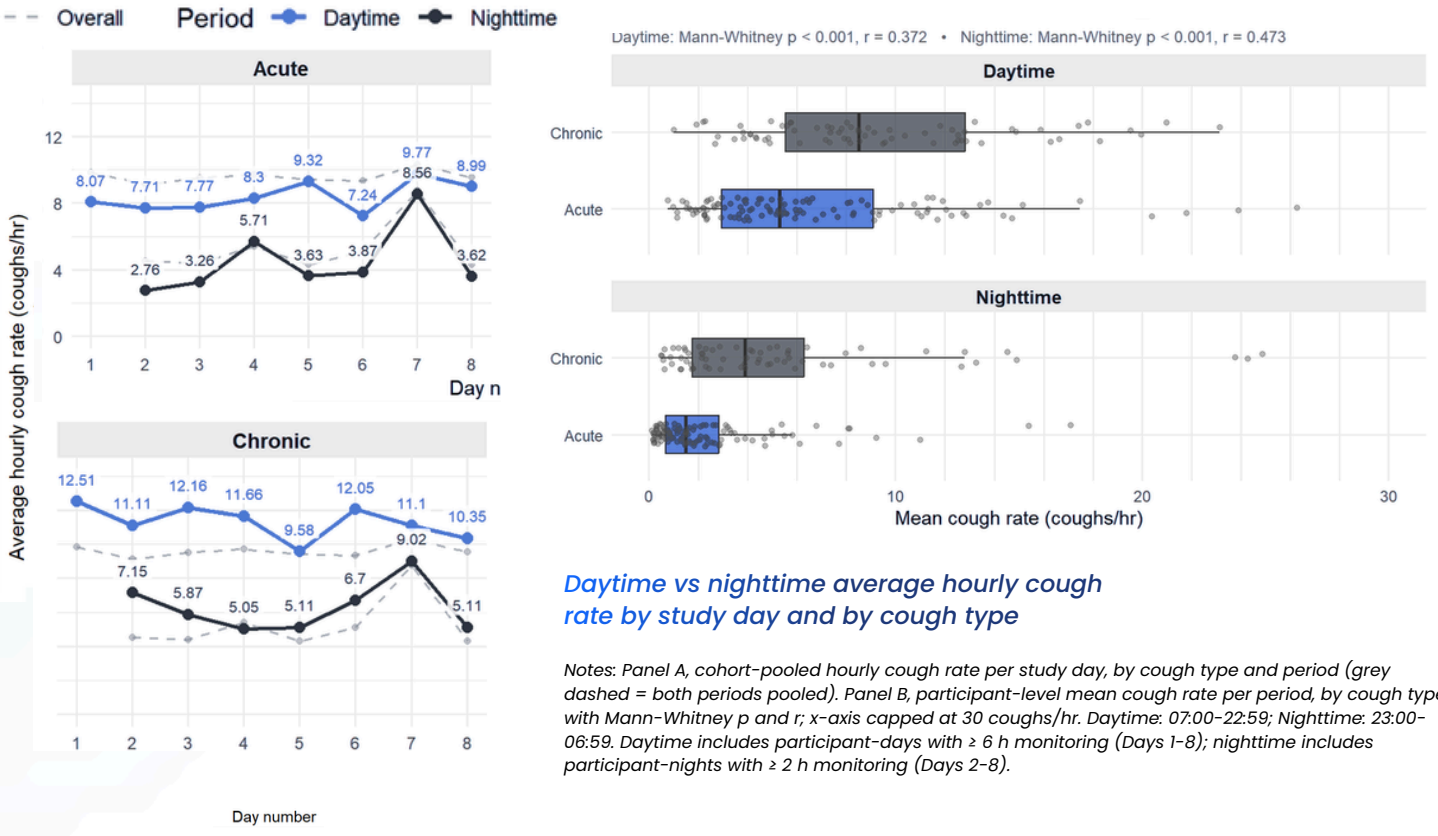
Recruited, onboarded, and monitored entirely **remotely**	**Two clinically distinct cohorts** (acute + chronic) captured in one deployment
Continuous 24/7 passive monitoring plus a daily in-app **diary**, running together	No clinical sites, no investigator training, no wearables shipped; a single consumer **smartphone app**
Privacy-preserving by design: audio processed on-device, only cough timestamps saved	**In-app surveys** captured demographics, baseline clinical characteristics, and daily treatment use.

Note on adherence

This was a feasibility study with no engagement tooling switched on. Even so, passive monitoring adherence held above 60% and beat survey completion rates throughout. Levers that typically lift that number (notifications, streaks, goal visualisations, onboarding guidance) are all capabilities within CoughPro that have been shown to achieve adherence of 95% of available hours in other Hyfe studies.

WHAT A PARTNER GETS FROM COUGHPRO

Objective cough data that surveys can't produce. From ordinary app use, CoughPro insights showed cough frequency day-by-day, split it into daytime and nighttime windows, and quantified coughing bouts, a continuous, real-world signal that no diary or once-daily symptom scale can collect.



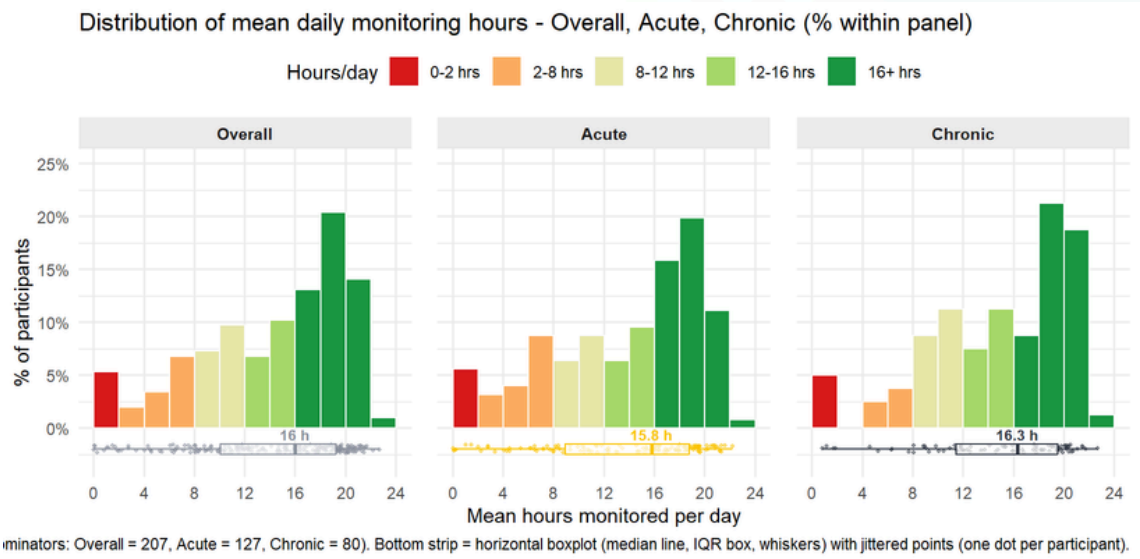
Daytime vs nighttime average hourly cough rate by study day and by cough type

Notes: Panel A, cohort-pooled hourly cough rate per study day, by cough type and period (grey dashed = both periods pooled). Panel B, participant-level mean cough rate per period, by cough type, with Mann-Whitney p and r; x-axis capped at 30 coughs/hr. Daytime: 07:00-22:59; Nighttime: 23:00-06:59. Daytime includes participant-days with ≥ 6 h monitoring (Days 1-8); nighttime includes participant-nights with ≥ 2 h monitoring (Days 2-8).

Granular breakdown of monitoring behavior. Ability to link adherence levels to other measures of interest, such as cough frequency, perceived burden, or health-seeking measures of interest, such as need states and intention to treat.

Distribution of mean daily monitoring hours per participant across the study period

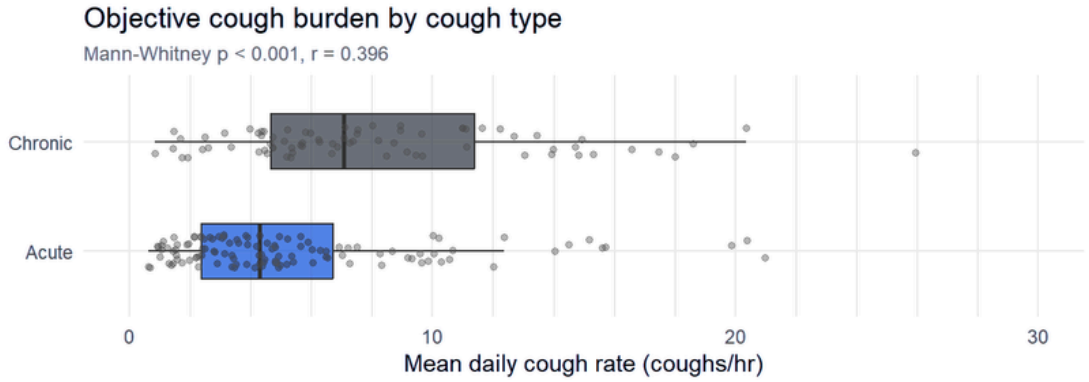
Notes: Each participant's mean daily monitoring time is calculated across all 8 study days (days with no monitoring counted as 0 h). Bars are binned in 2-hour intervals. N = 206 participants.



A population you can actually characterize and segment. Objective data cleanly separated chronic from acute coughers, and the dataset supported segmentation by phenotype, by demographics (age, smoking/vaping status), and by engagement level. That is the raw material for personas, archetypes, and targeted messaging, grounded in measured behavior.

Objective cough burden by cough type (mean daily cough rate, Days 1-8)

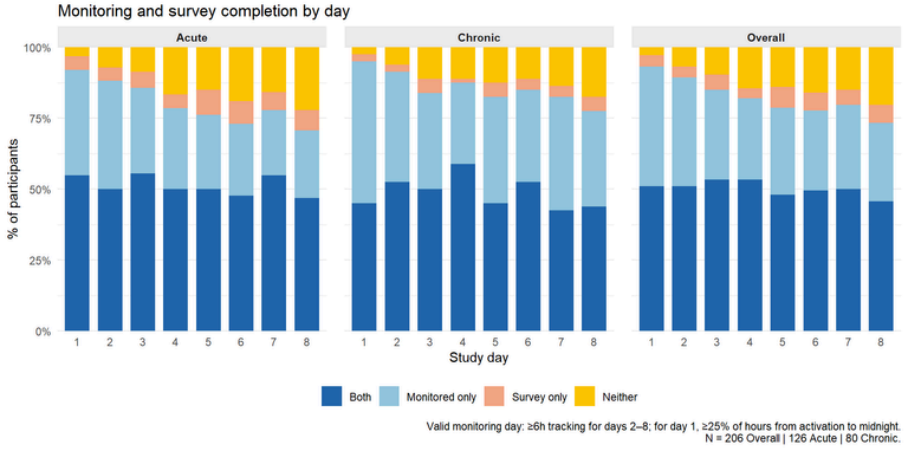
Notes: Each point = one participant's mean cough rate (mean of daily coughs/hr across days with ≥ 6 h monitoring, Days 1-8). Mann-Whitney U test, p < 0.001, effect size r = 0.396. X-axis capped at 30 coughs/hr for readability. N = 198.

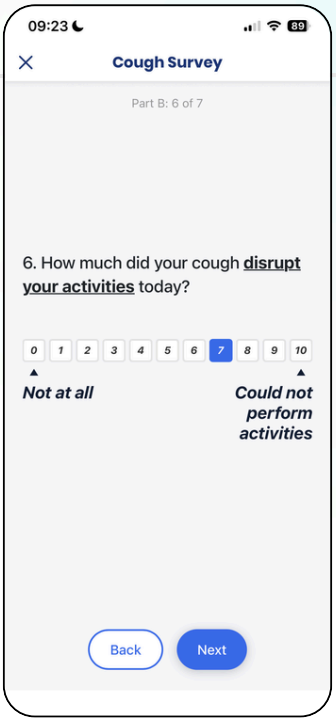


Engagement insight. Because monitoring is passive, the study revealed who sustains tracking and who drops off, how that varies by age and gender, and that passive monitoring help up better than active surveys on every single day. For any partner trying to understand which users are motivated and what keeps them engaged, that behavioral signal is built in.

Daily breakdown of participants by monitoring and survey completion status (Days 1-8), overall and by cough type

Notes: Bars stacked to 100% per day show four mutually exclusive categories: Both (≥6 h monitoring and completed survey; on Day 1, ≥25% of hours available from activation), Monitored only, Survey only, and Neither. N = 206 overall, 126 acute, 80 chronic.





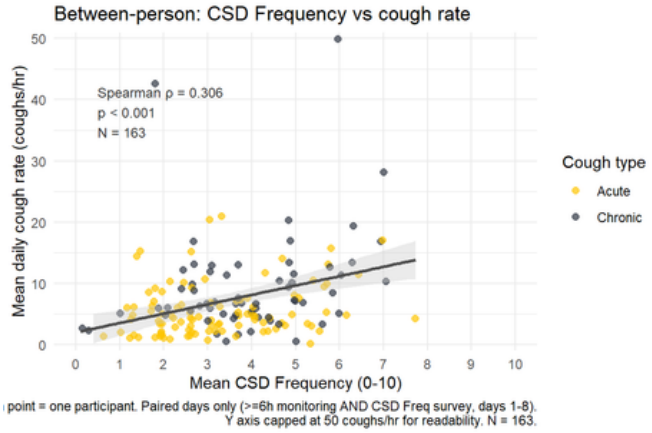
Structured context layered on top, on demand. Embedded questionnaires captured demographics, baseline clinical characteristics (smoking/vaping, phlegm), and daily treatment use. The same agile, flexible toolset can carry whatever a partner needs to learn about their users.

Audience insight, on demand. The same lightweight setup that captured objective cough data also builds a fast, flexible picture of who your audience is and how they experience their cough. With all data collected in weeks, it's useful groundwork for pre-launch planning and for shaping disease-awareness communications, without a complex study or waiting on a full market-research cycle.

Qualitative and quantitative, from the same users at the same time. Because CoughPro runs passive monitoring and the daily diary through one app, every participant generates both an objective record of what their cough actually did and a subjective record of how they experienced it, day by day, paired. Most approaches force a choice between the two, or collect them from different sources at different times. Here you get both, linked at the person-day level, so you can see not just how much someone coughed but how that lines up with how they felt, and where the two diverge.

Between-person association between mean CSD Frequency score and mean daily cough rate.

Notes: Each dot represents one participant. Line: linear trend with 95% CI. Y axis capped at 50 coughs/hr for readability. Spearman rank correlation; N = 163 participants with ≥ 1 paired day.



Within-person CSD1-cough-rate alignment bands: % of participants per band, by cough type