



mHealthSleep: Early detection, assessment, and personalised management of sleep disorders at home



CHALLENGE

In recent years, **sleep epidemiology** has become a rapidly growing field. **Obstructive sleep apnea** (OSA) is one of the most common sleep disorders, with a prevalence ranging from 9% to 38%, more prevalent in older adults. It causes intermittent hypoxia and microarousals, resulting in **sleep fragmentation**, **daytime fatigue** and **excessive sleepiness**. If undiagnosed and untreated, it increases the risk of cardiovascular and cerebrovascular morbidity and mortality and represents a major healthcare challenge.

Current diagnostic techniques leave most patients undiagnosed and therefore untreated. The diagnostic gold standard, polysomnography (PSG), is an overnight multi-signal recording technique that requires highly specialised equipment and patient hospitalisation. Its **high cost** and **complexity**, **patient discomfort**, and **reliance on a single night limit its use for screening**, in-parallel patient assessment and longitudinal monitoring. The relatively low cost, widespread availability, and **high quality of smartphone sensors** have led to their extensive use in mobile health (mHealth) applications, including sleep medicine.



MARKET

The **Remote Patient Monitoring (RPM) market** is experiencing strong growth, driven by population ageing, the increasing prevalence of chronic diseases, and the growing adoption of digital healthcare solutions. The **global sleep apnea devices market** was valued at **\$10.3 billion in 2025** and is projected to reach **\$22.9 billion by 2034**, reflecting the **increasing demand for diagnosis, monitoring, and treatment** solutions.

The integration of RPM technologies into healthcare systems has the potential to **generate significant societal benefits** through earlier diagnosis, continuous patient monitoring, and more **efficient use of healthcare resources**. Following the COVID-19 pandemic, patients have become more accustomed to remote monitoring systems, while healthcare providers increasingly recognise their value in **improving efficiency, accessibility, and cost reduction**.



ASSET

A new mHealth system for home diagnosis, monitoring and treatment of OSA and sleep disorders. The key strengths of our technology are:

- A **multimodal diagnostic algorithm** integrating acoustic signals, accelerometry, and pulse oximetry: through smartphones & simple wearable devices.
- A **personalised and high-resolution sleep position monitoring** system, capable of calculating the **sleep angle** and its **relationship with apnea events**: current methods typically consider only four classical positions.
- **Advanced signal analysis** enabling the generation of **individual-specific sleep apnea** signatures for improved diagnosis and continuous monitoring.
- **Positional therapy** based on the programmable **smartphone vibration** reducing obstructive events with minimal disturbance to the user.

ASSET VALUE

- OSA diagnosis and monitoring using smartphones and simple wearables.
- Accurate assessment of sleep positions and sleep angles.
- Personalised positional therapy to avoid apnea-inducing sleeping positions.
- Low-cost, scalable solution for home and clinical use.
- Applicable to OSA, other sleep disorders, and underserved and vulnerable patient populations.



3 Sensors: Biomedical Signals:

- | | | | |
|-------------------|---|---|---------------------------------------|
| 1. Microphone |  |  | 1. Audio (breathing & snoring sounds) |
| 2. Accelerometer |  |  | 2. Thoracic Movement & Sleep Position |
| 3. Pulse Oximeter |  |  | 3. Oxygen Saturation |

Team

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Stage of Development

TRL 6: The prototype has been proven to work in a relevant environment: a hospital sleep unit & at home.

- Validation database with simultaneous acquisitions with PSG (N=40 patients) or respiratory polygraphy (N=70) for the detection of apneas and hypopneas.
- Overnight use of the app for sleep position monitoring and treatment (>50 adults and >150 adolescents).
- Detection of sleep-disordered breathing in patients with spinal cord injury (19 patients) and stroke (56 patients).

Exploitation Plan

Spin-off creation, Technical co-development, Licensing.

Intellectual Property Status

PCT Filed in July 2023 by IBEC and UPC
Currently in National phases: CA, MX, BR, AU, JP, CN, EU

Patent granted by EPO: EP4561428B1

USES

Patients with Obstructive Sleep Apnea (OSA)

- At-home diagnosis and monitoring
- Personalised positional therapy

Patients with Stroke or Spinal Cord Injury (SCI) and sleep disorders:

- Early diagnosis and monitoring
- Longitudinal follow-up

Healthy subjects and individuals with snoring disorders:

- Sleep quality monitoring
- Early risk identification