

Remote Respiration Monitoring COPD

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In samenwerking met:

MedNet
Vergroot uw medische vakkennis



Disclosure

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Co-founder & CEO
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AMES BV
(spin-off University of Twente)

Associated Medical Engineers
AMES

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The Problem

COPD patients suffer from harmful and costly exacerbations

Doctors: 'if you can predict exacerbations, you can avoid most of them'

Observation:

Detecting a mild exacerbation means predicting a moderate exacerbation

Detecting a moderate exacerbation means predicting a severe exacerbation

Problem: no adequate method today to detect/predict exacerbations remotely

- RR (respiration rate): in the majority of cases *not* increased
- HR (heart rate): sometimes increased, sometimes not
- SaO₂ (saturation): if it's too low, it's also too *late*
- CRP (C-reactive protein): if it's too high, it's also too *late*
- FEV₁ (forced expiration): not part of the GOLD 2024 severity classification
- **dyspnea** (short of breath): **always increased**, but **subjective** observation

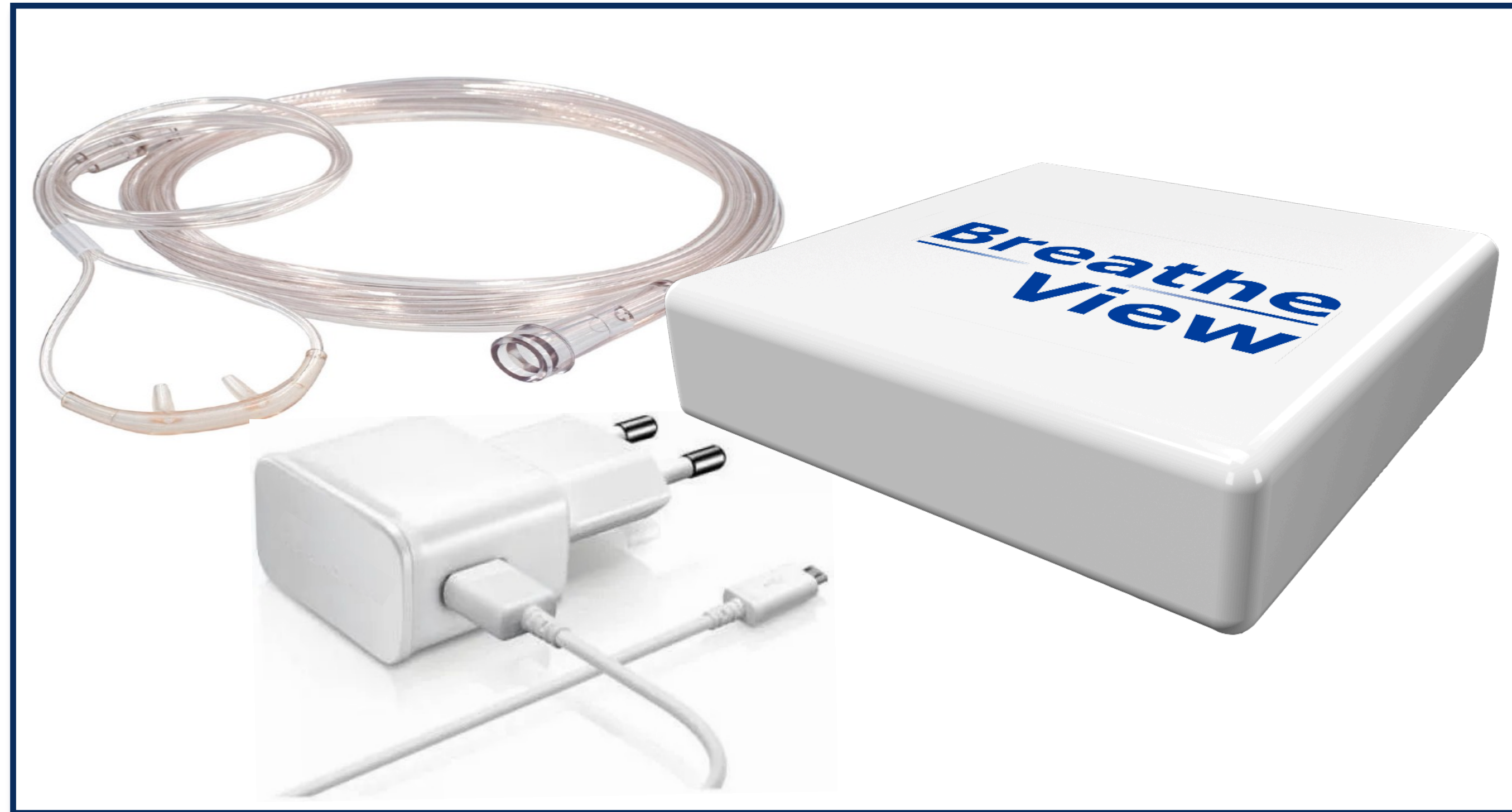
Idea: monitor the breathing pattern (flow-volume curve of **tidal** breathing)

Rationale: *objective* 'short-of-breath' observation

Problem: no adequate method available today

Solution: - measure the nasal pressure variation
- convert to flow and volume (aerodynamics)

Result: extremely accurate reconstruction of the flow-volume curve
- Hebbink & Hagmeijer Med. Eng. & Phys. (**97**) 2021
- Hebbink et al. Med. Eng. & Phys. (**124**) 2024

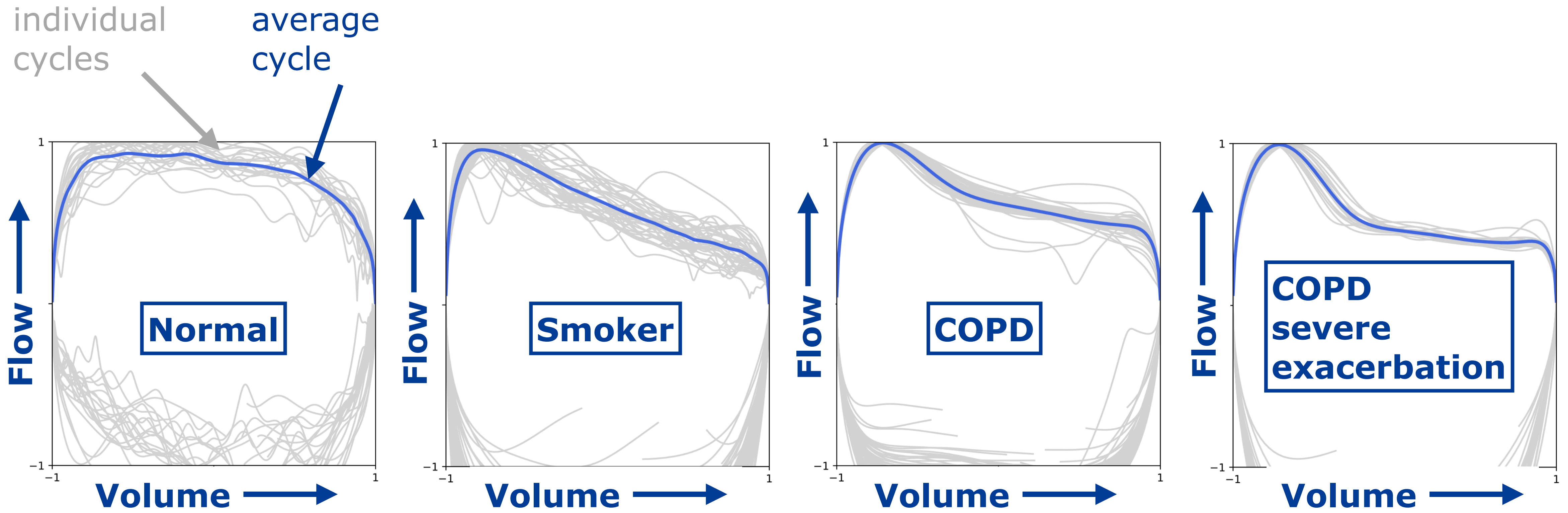


pressure recording with
standard nasal canula



2 minutes of
normal breathing,
twice a day

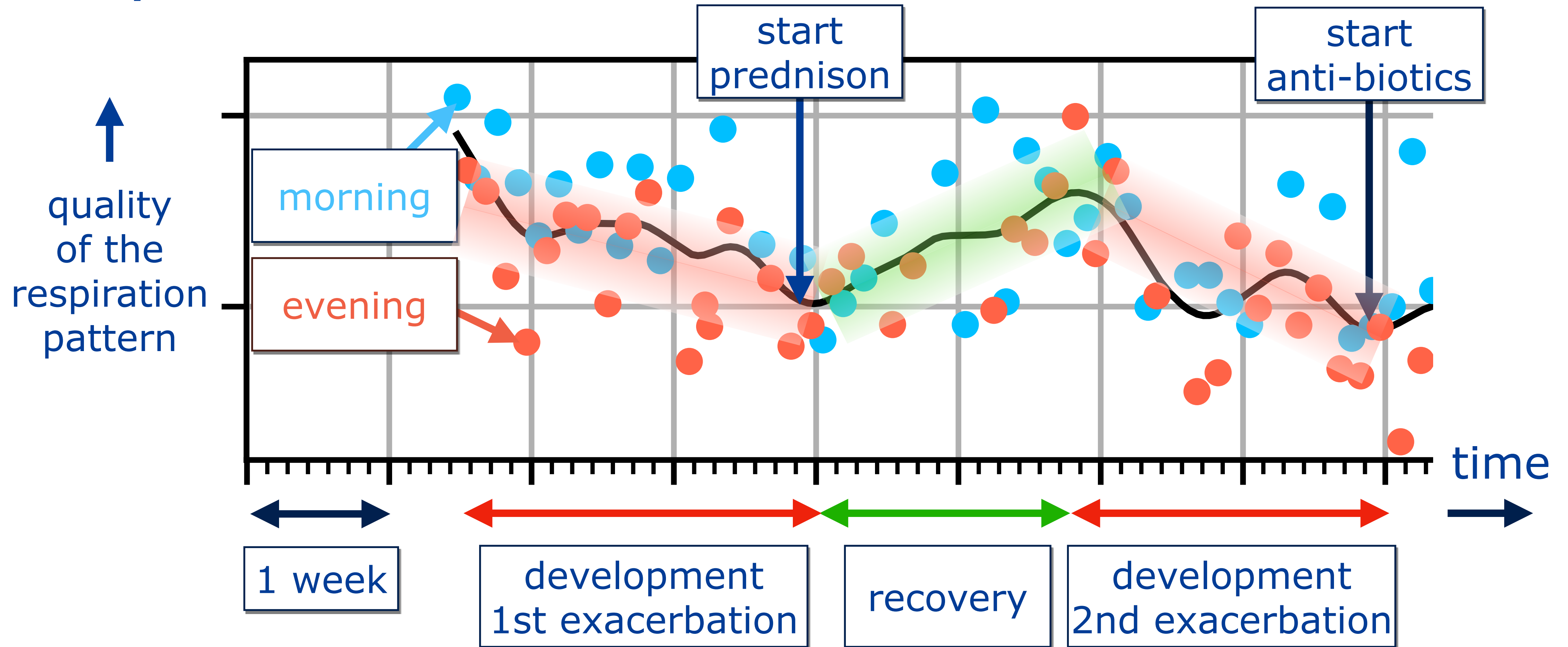
Result: *Tidal* Flow-Volume Curves



decreasing quality of the respiration pattern



Example result:



Clinical Study: Findings, Conclusions

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Approach is totally new, promising results

Statistics (15 exacerbations with sufficient data points):

- detected: 60% (9 events)
- not detected: 40% (6 events, but are they really moderate exacerbations?)
- detected recoveries after hospital discharge: 100% (9 events)

Present set of reliable data is too small

In preparation:

- 2nd clinical test (October 2024 - April 2025)
- Bluetooth device + instruction app, **81 patients**.

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new:



Ziekenhuisgroep Twente

We are looking for partners for further exploration:

doctors, hospitals, patient-platforms, health-insurance companies, ...

Thanks