

# Home monitoring in pulmonary fibrosis

## Past, present, and future

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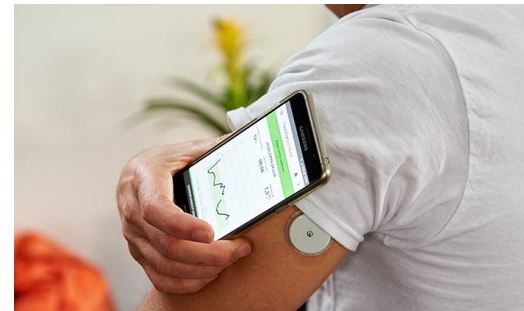




- Research grants and fees from Boehringer-Ingelheim, Hoffman- la Roche, Astra Zeneca and Daiichi Sankyo
- All grants and fees were paid to my institution



# THE “QUANTIFIED SELF” ERA



**Home monitoring** = “the use of IT and telecommunications to monitor the health of patients in their homes”



# HOME MONITORING IN LUNG DISEASE

**1**

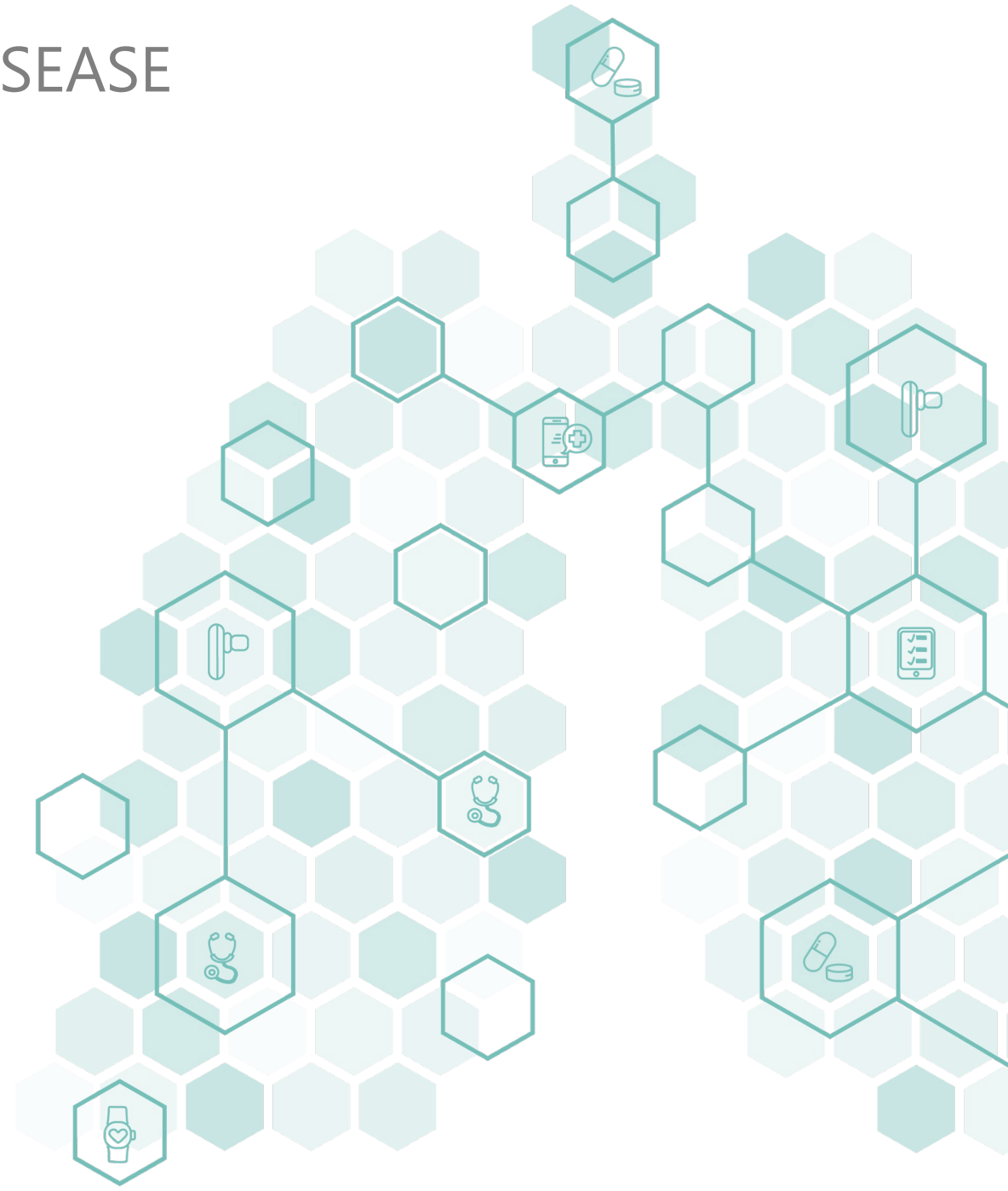
**Why do we want this?**

**2**

**Experiences**

**3**

**Future opportunities**





# POTENTIAL USE OF HOME MONITORING IN LUNG DISEASE

## Daily care



More insights  
into disease  
behaviour



Access to  
care



Symptom  
monitoring



Monitor side  
effects and  
adherence



Facilitate  
early  
diagnosis



Assess  
response to  
therapy



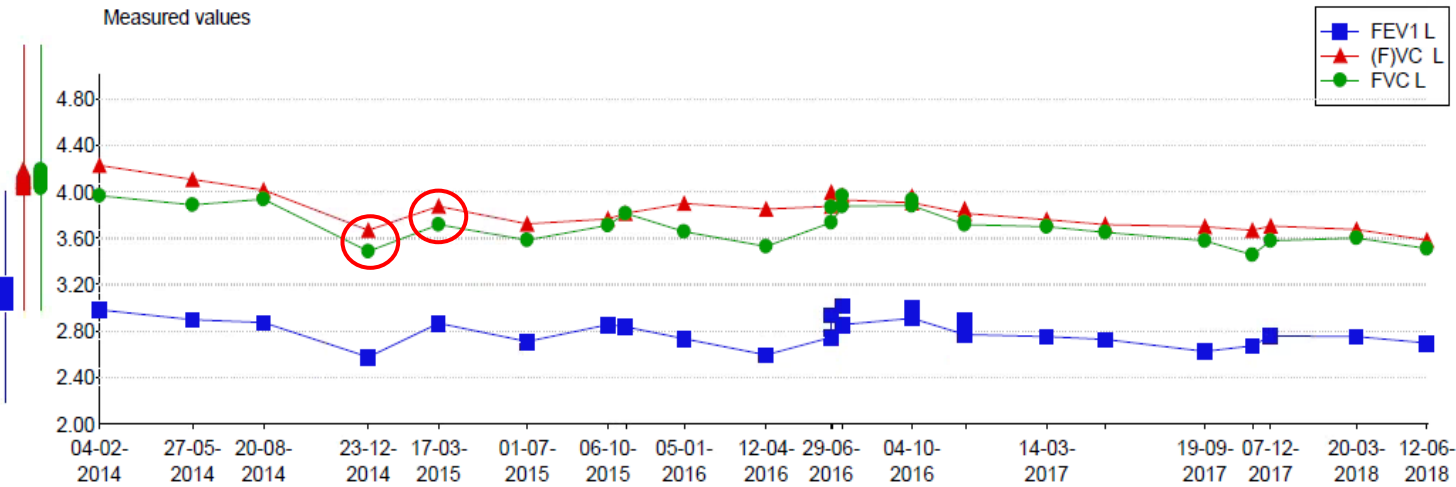
Patient  
engagement



Improve  
quality of  
care



# FREQUENT HOSPITAL VISITS ARE NEEDED



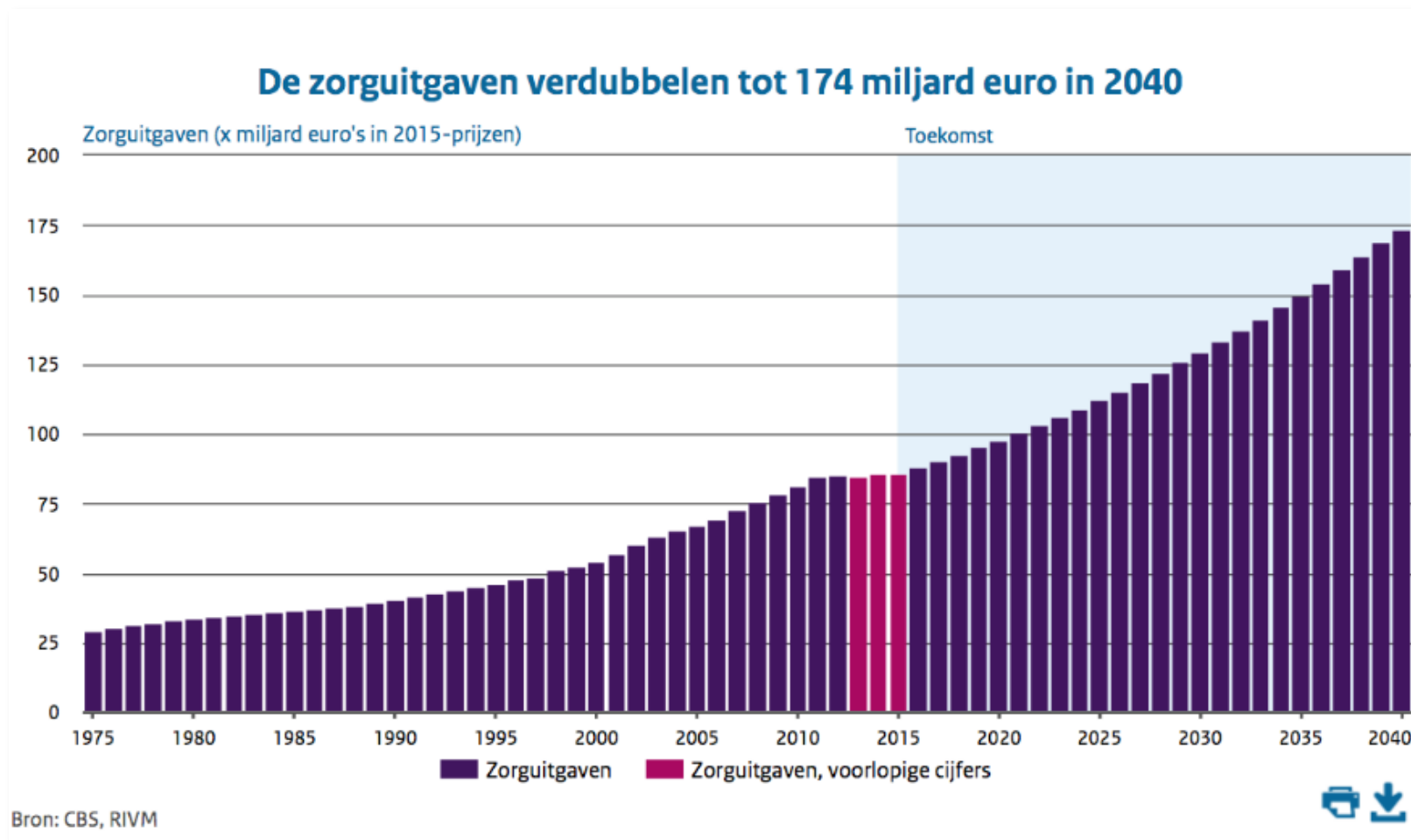


# HOSPITAL VISITS CAN BE A BURDEN FOR PATIENTS





# DUTCH DATA: MEDICAL COSTS KEEP RISING







# ENVIRONMENTAL BURDEN



2015 :

*Outpatient-visits 8,8M*

*Patient-movements  $8.8 \times 2 = 17,6M$*

*Mean distance nearest hospital -5,3 km*

*Total 91M KM /year*

*ONLY for 1st outpatient-visits*

*Lucian Engelen*



WHY WOULD WE **NOT** WANT HOME MONITORING?





# HOME MONITORING

**1**

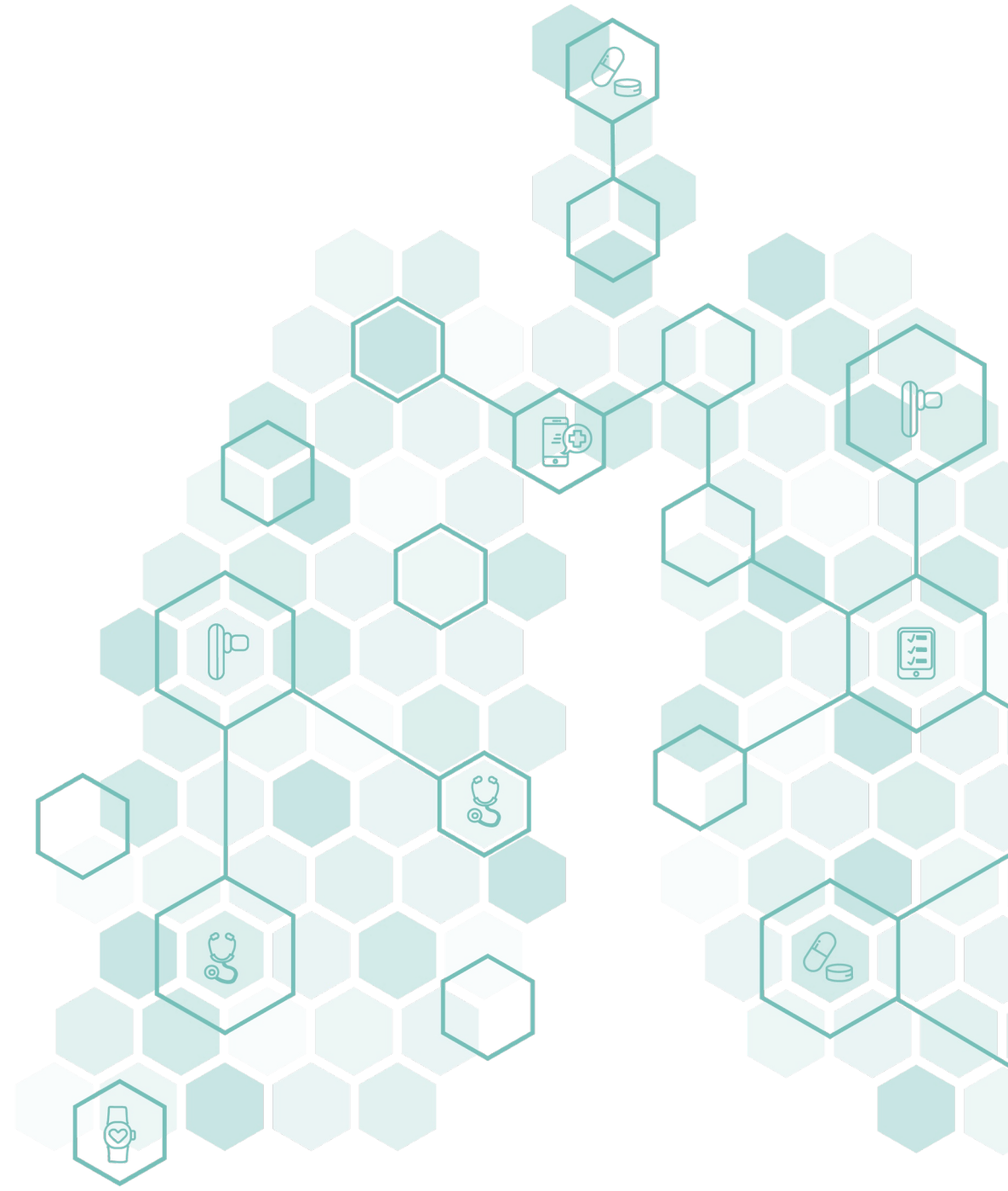
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**Experiences**

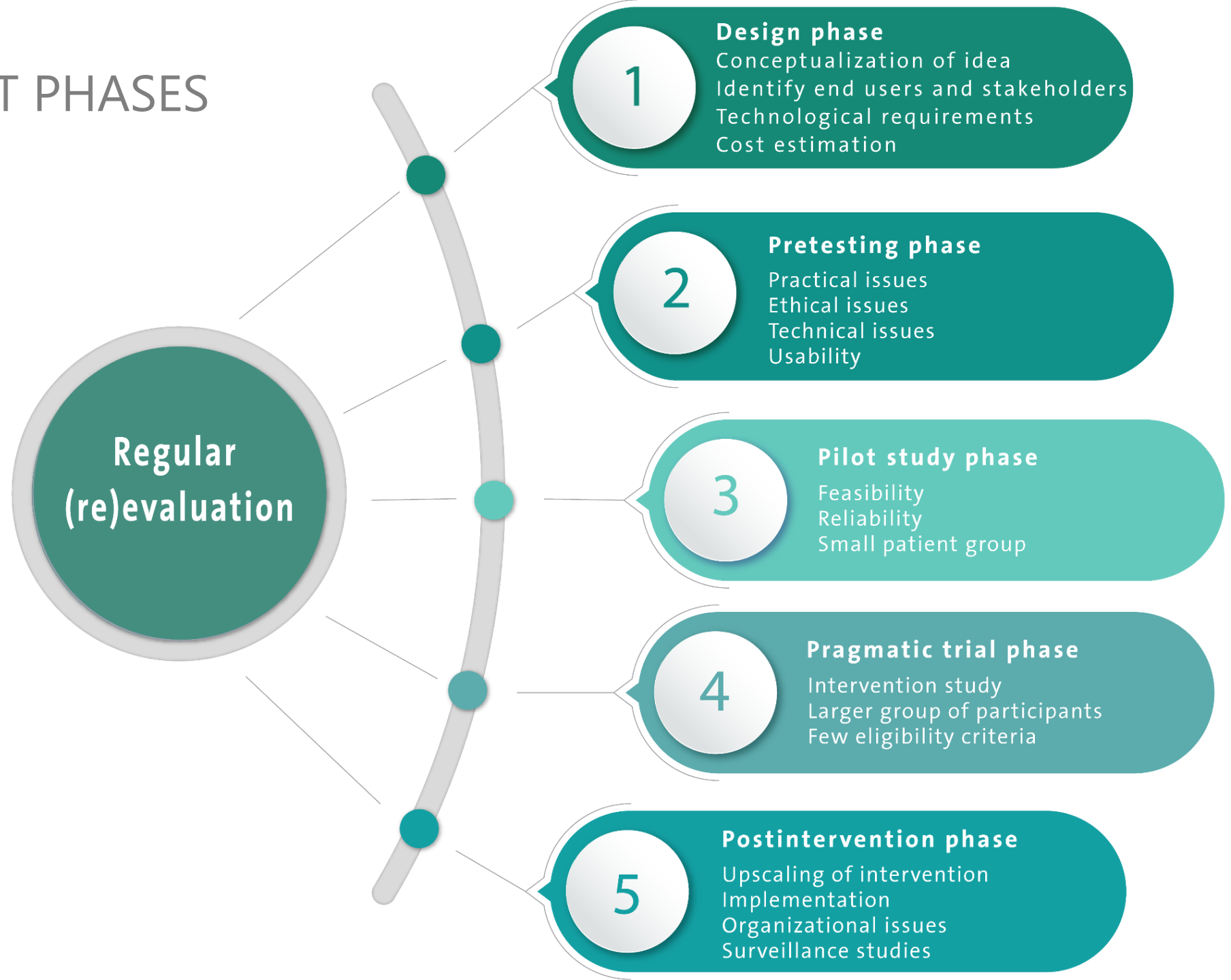
**3**

**Future opportunities**





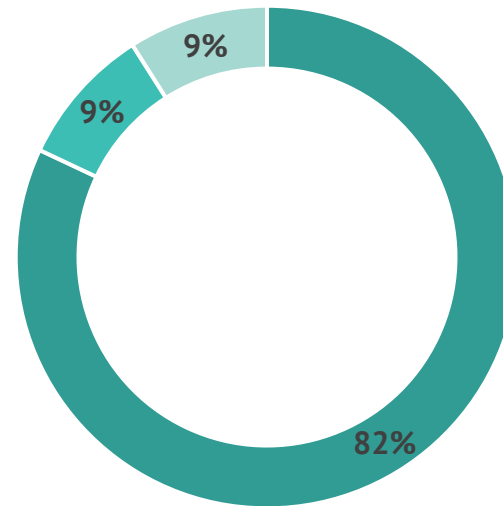
# DEVELOPMENT PHASES





# DO PATIENTS WISH TO MONITOR THEIR DISEASE AT HOME?

Would you be willing to measure health data online at home?



■ Yes ■ No ■ Maybe

Design phase

Patients with pulmonary fibrosis at yearly information meeting



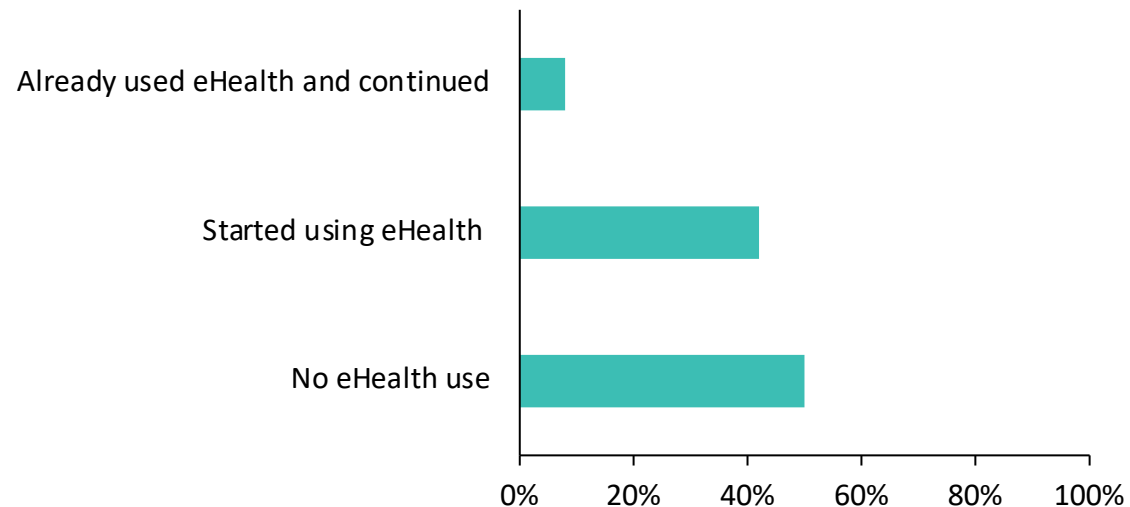


# SURVEY ON HOME MONITORING IN PULMONARY FIBROSIS

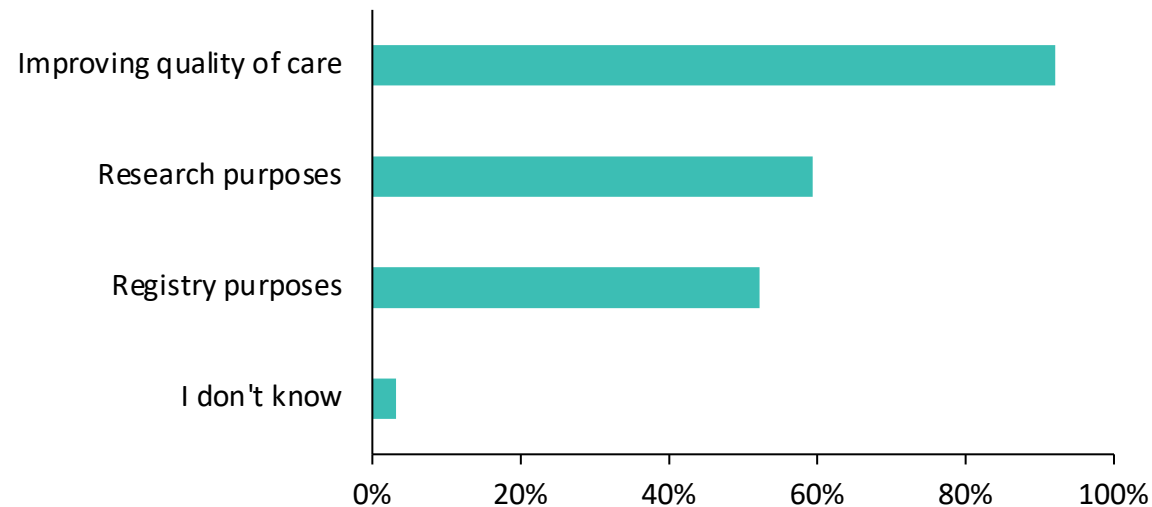
Design phase

**286** healthcare providers from **54** countries completed the survey

## Effect of the COVID-19 pandemic



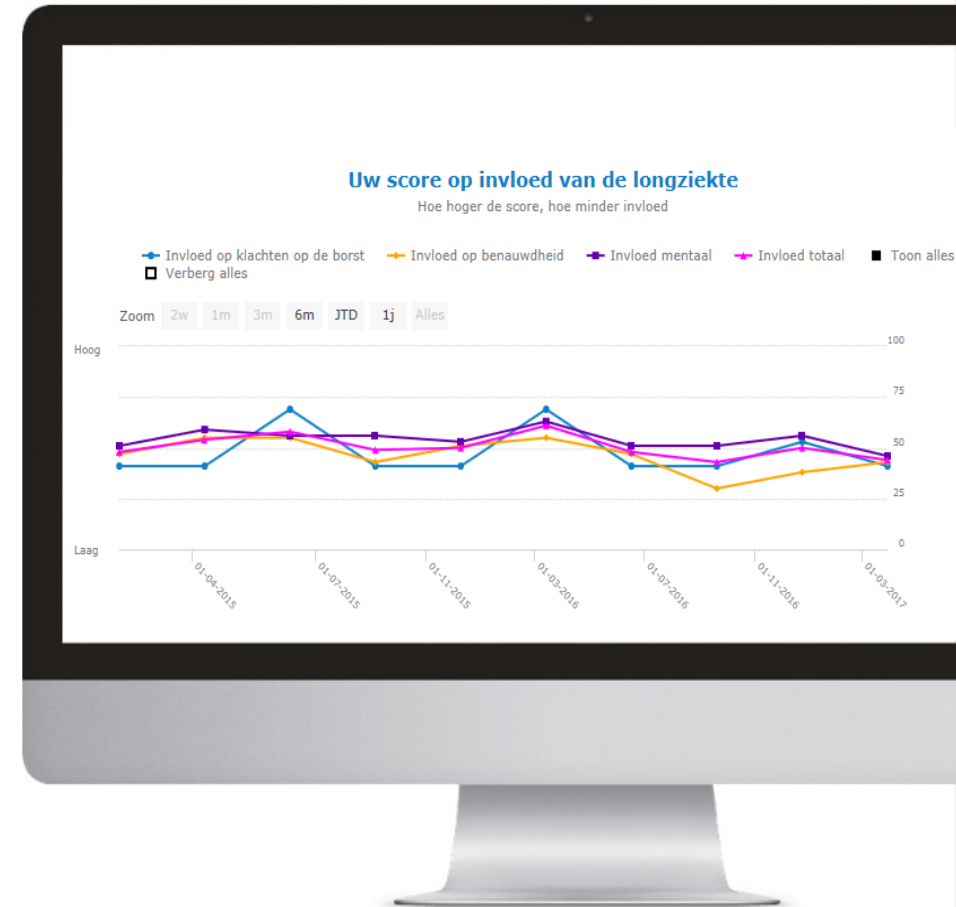
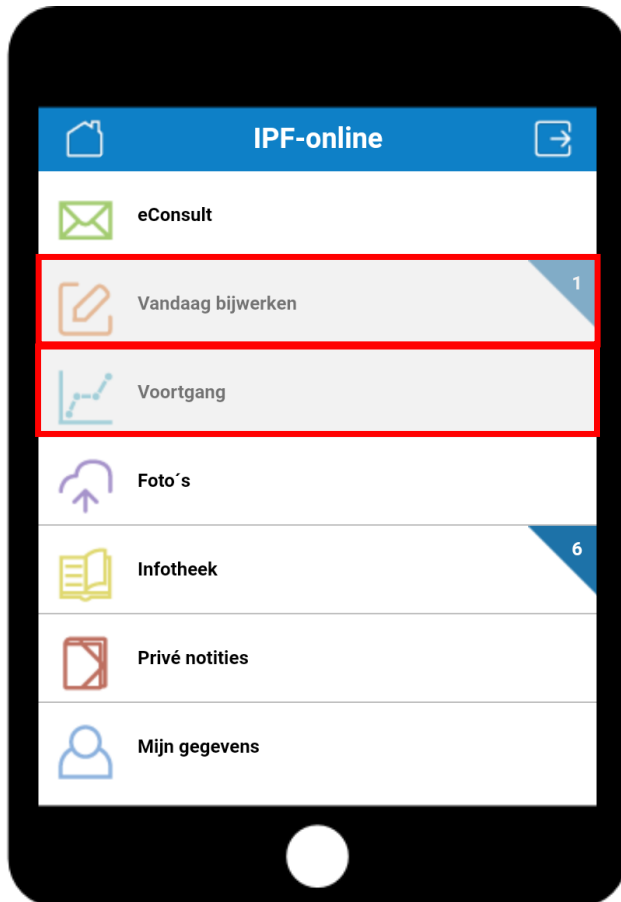
## 96.5% consider home monitoring to be of added value





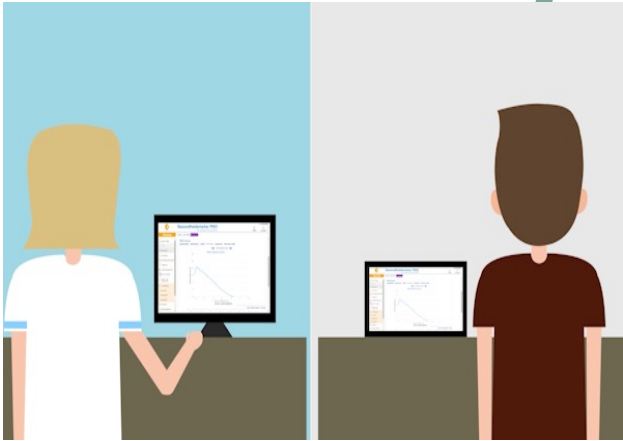
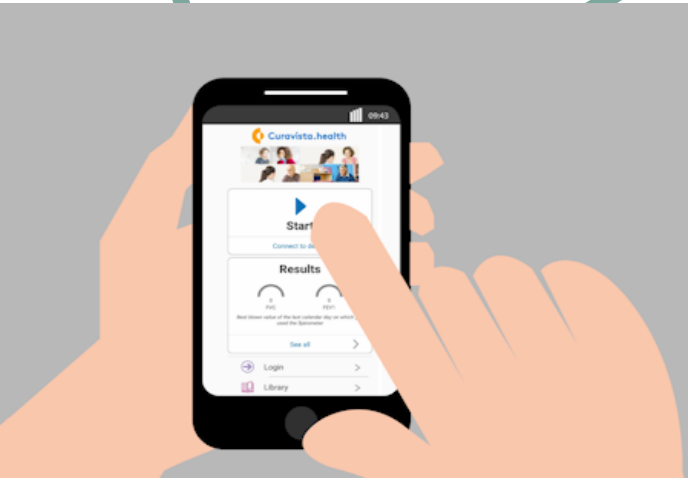
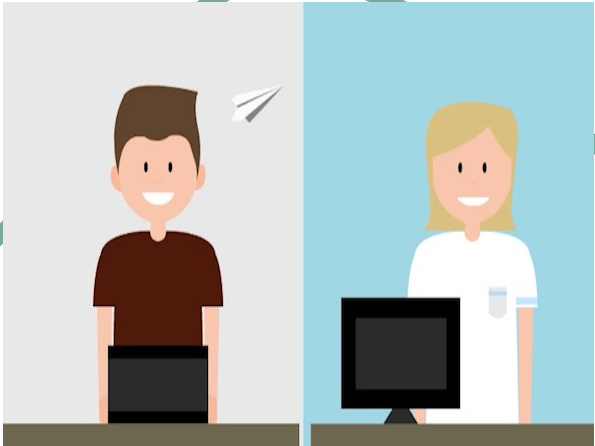
# IPF-ONLINE: HOME MONITORING PROGRAM

Pretesting phase





# ONLINE HOME SPIROMETRY

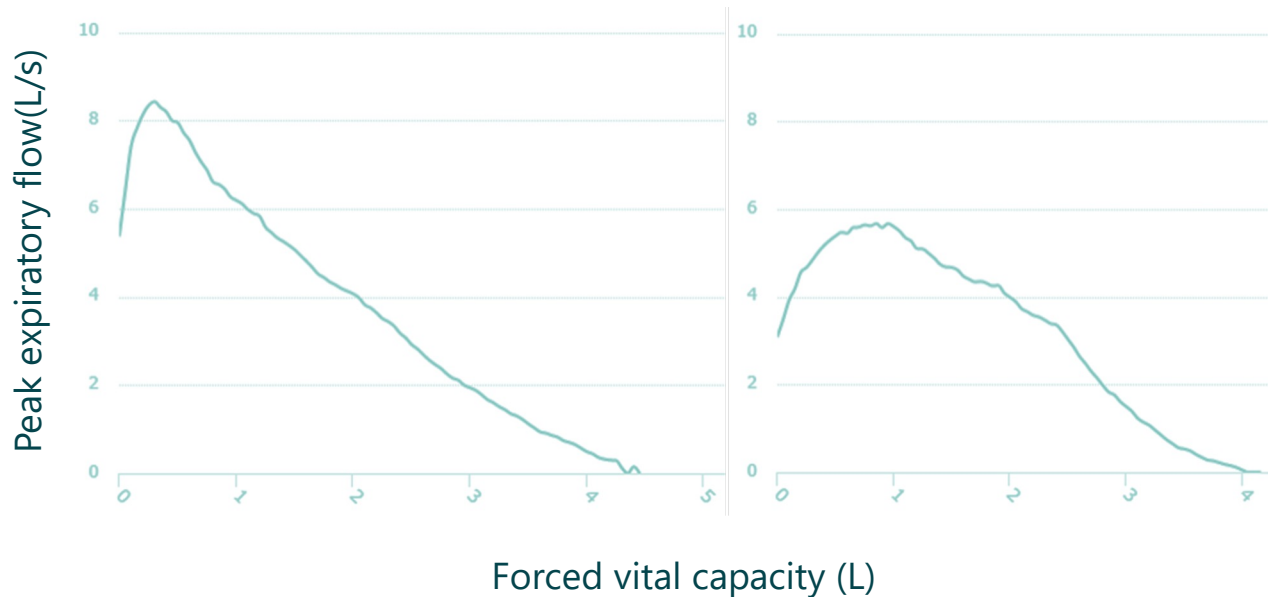






# DAILY HOME SPIROMETRY IS FEASIBLE AND RELIABLE

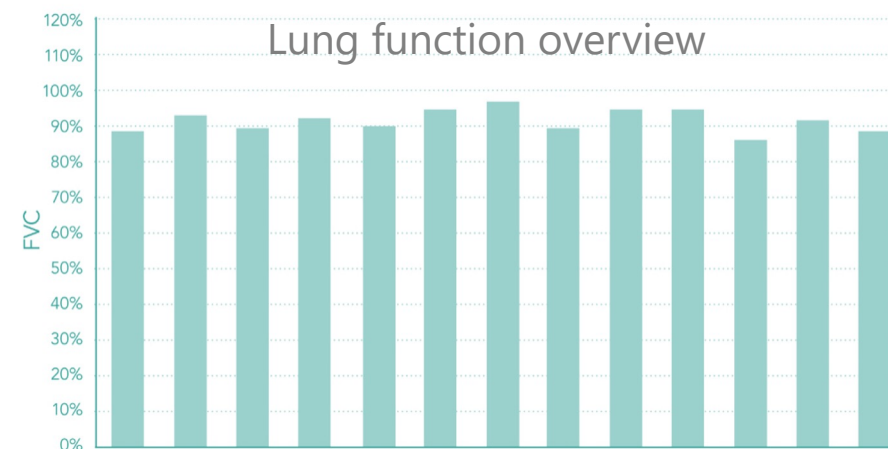
Results directly available for patient and doctor



Advice: good blow

Advice: blow out faster

Within patient variation: mean 3.8%



Pilot study phase

Experiences patients: useful, not burdensome, more insights in disease course

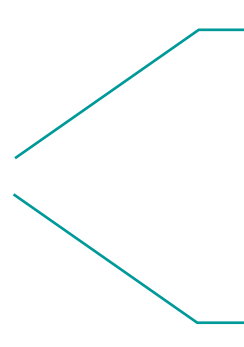


# CAN HOME MONITORING IMPROVE QUALITY OF LIFE AND OTHER OUTCOMES IN PULMONARY FIBROSIS?

Pragmatic trial phase

- 4 hospitals included 90 IPF patients about to start on medication

- Randomisation:



**Standard care +  
Home monitoring**

**Standard care alone**



- Duration: 24 weeks

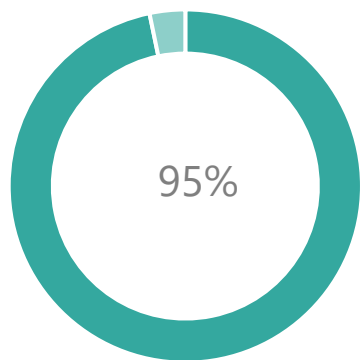


# PATIENT EXPERIENCES WERE POSITIVE

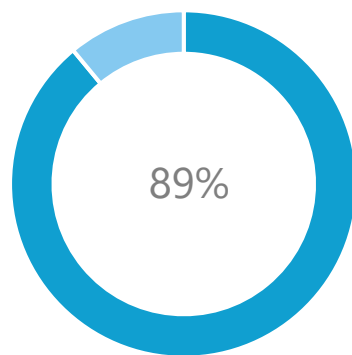
- **84%** of patients wanted to participate, **89%** completed the study
- Better psychological wellbeing in home monitoring group
- More medication adjustments

## PATIENT EXPERIENCES HOME MONITORING

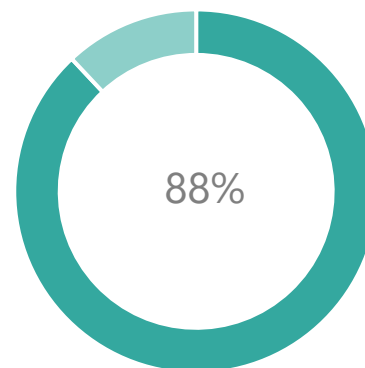
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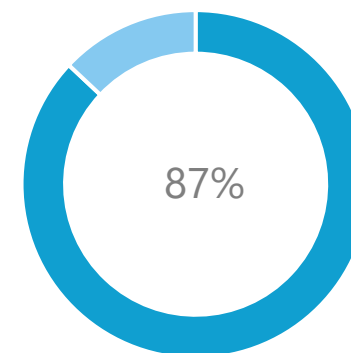
Recommend to others



Better insights disease course



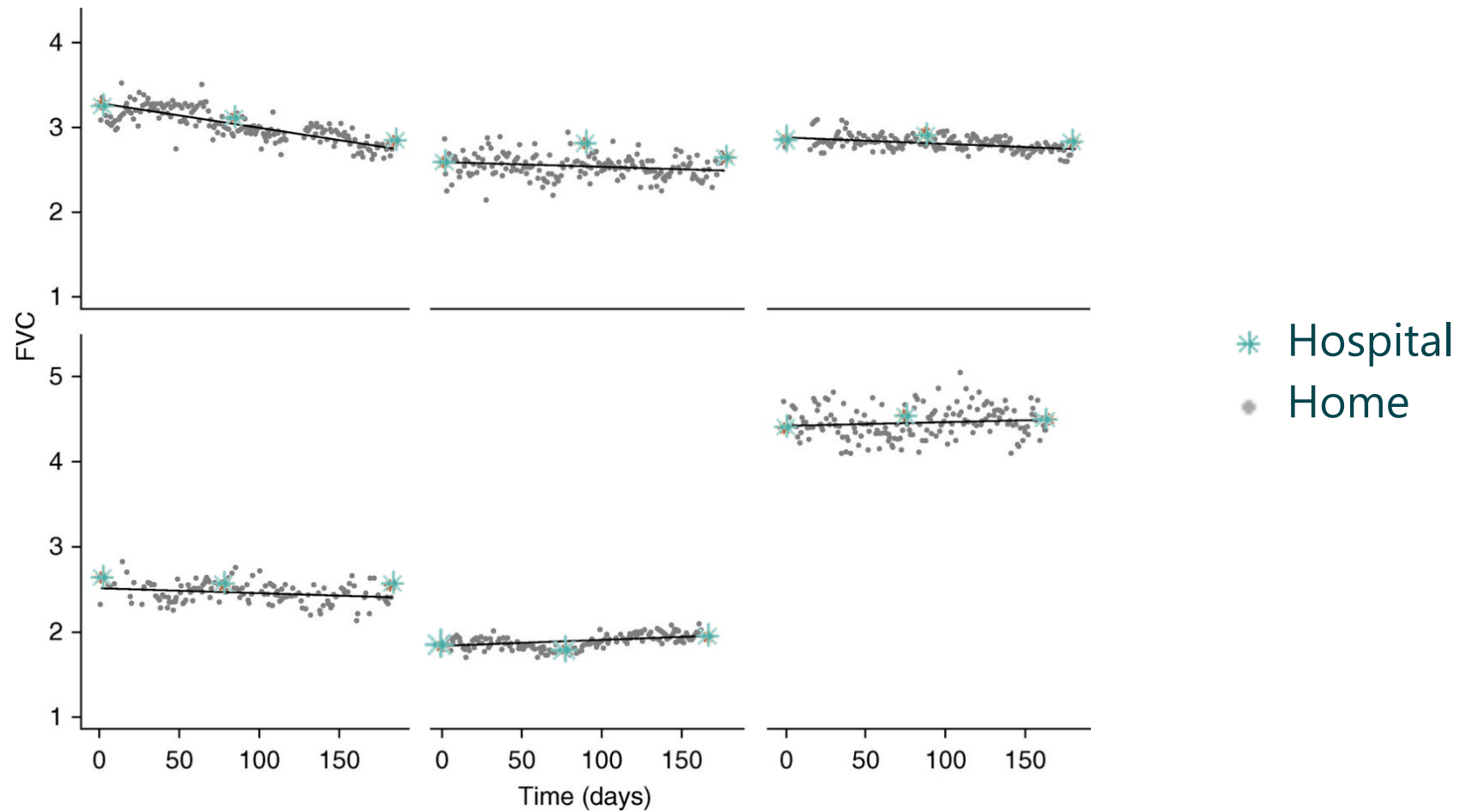
Feels more secure



Lower threshold  
communication



# RELIABLE HOME SPIROMETRY RESULTS OVER TIME





# CONTINUITY OF CARE DURING THE COVID-19 PANDEMIC

Postintervention phase

+/- 300 patients

Patients are satisfied:  
mean score 8.12, SD 1.33 (scale 0–10)

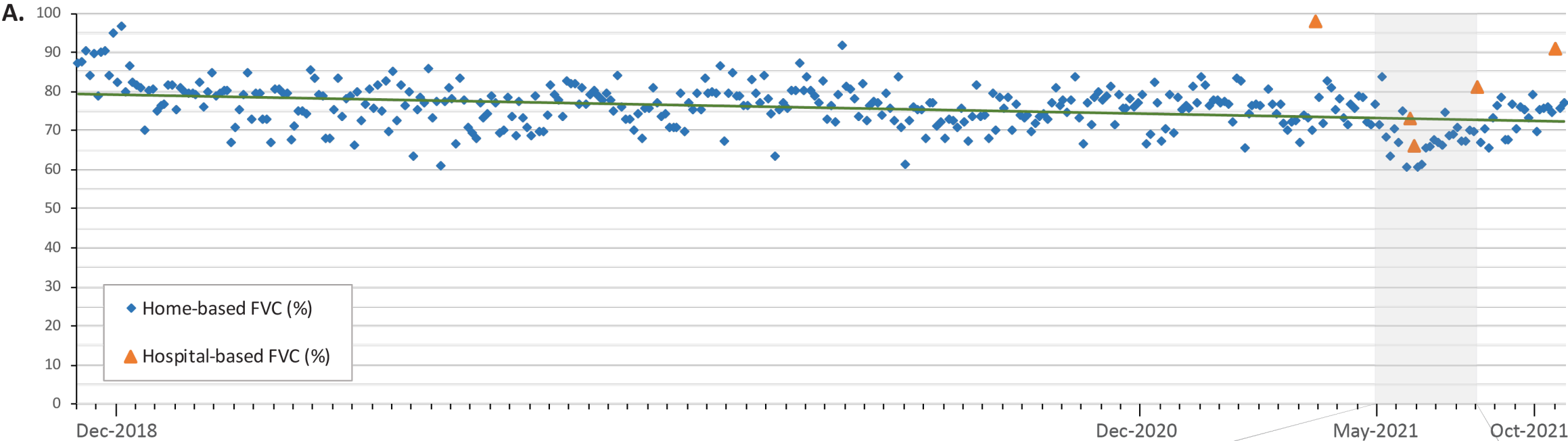
98.3% of patients want to continue using the app

50% of outpatient clinic visits replaced by home monitoring





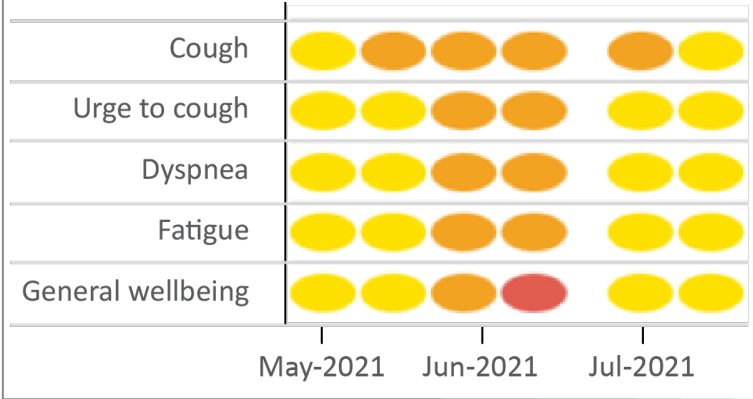
# AN EXAMPLE OF USE IN CLINICAL PRACTICE: A PATIENT WITH IPF



**A. FVC** home- and hospital-based  
(acute worsening June 2021)

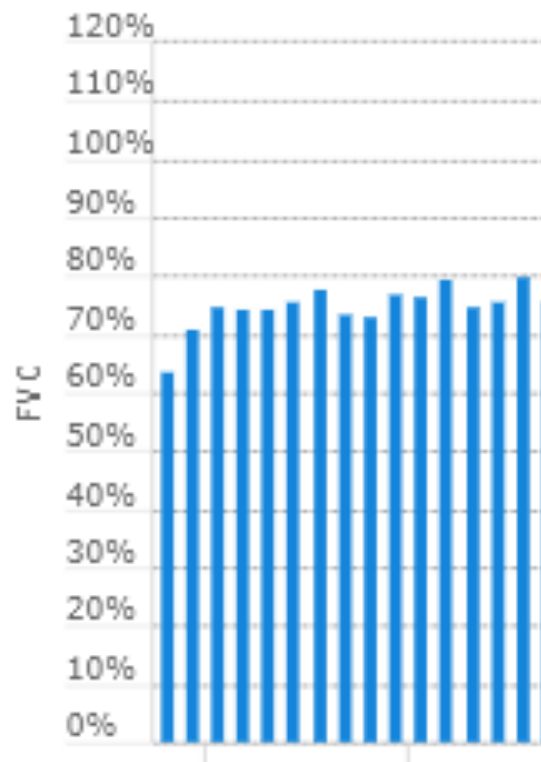
**B. Symptom VAS scores** patient-reported  
(yellow 5-6, orange 7-8, red 9-10)

**B.**





# EVALUATING TREATMENT RESPONSE IN SARCOIDOSIS



- 36 year old patient with pulmonary sarcoidosis
- Rapid improvement of lung function and symptoms after start prednisone





# HOME MONITORING

**1**

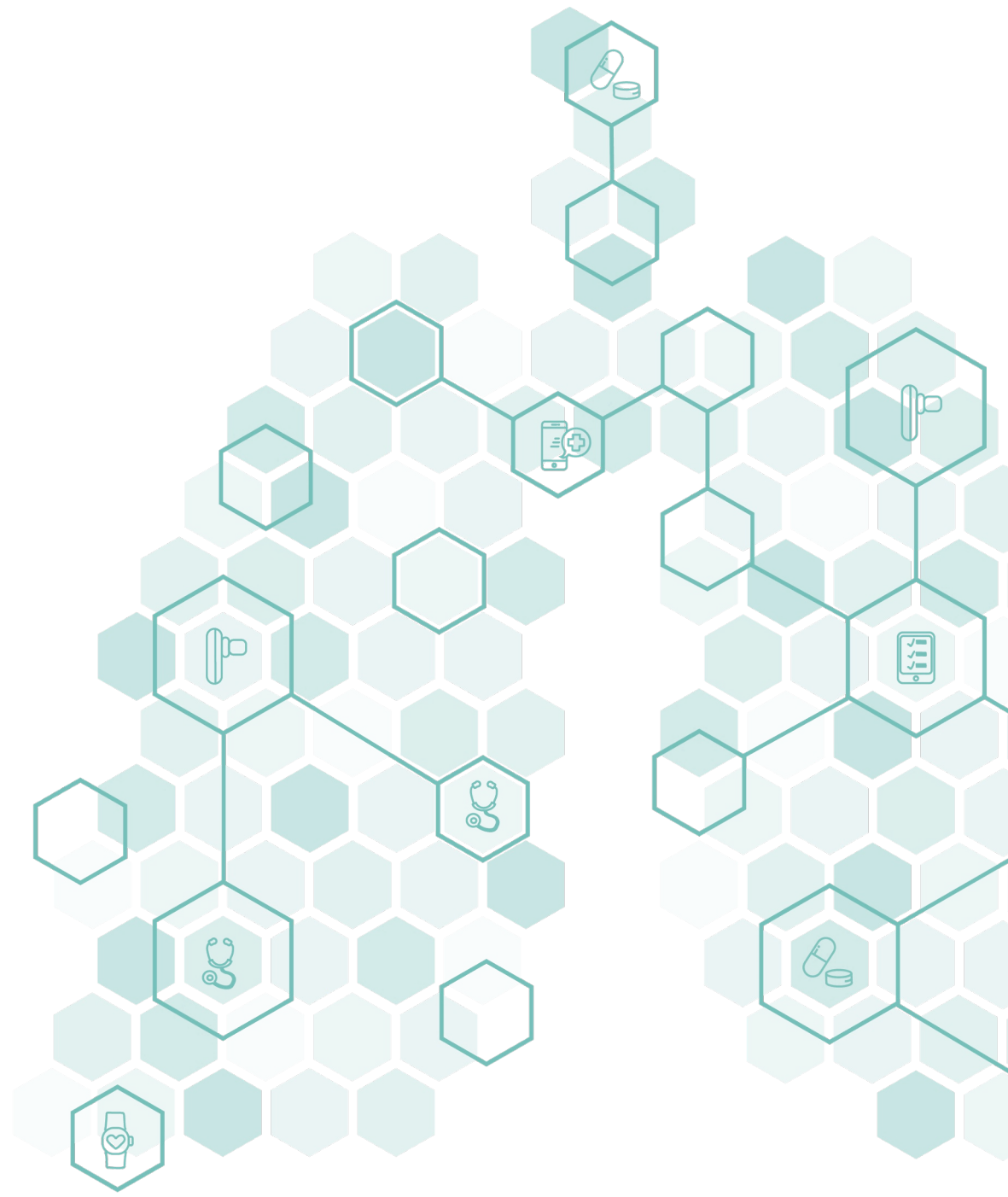
**Why do we want this?**

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# ISSUES TO CONSIDER BEFORE WIDESPREAD IMPLEMENTATION

**Reimbursement issues:** sustainable implementation

**Ethical implications:** enabling access to care, healthcare equity

**Technological infrastructure:** internet access, developing countries and rural areas

**Legislational issues:** data protection, data ownership

**Safety:** long-term effects on healthcare outcomes

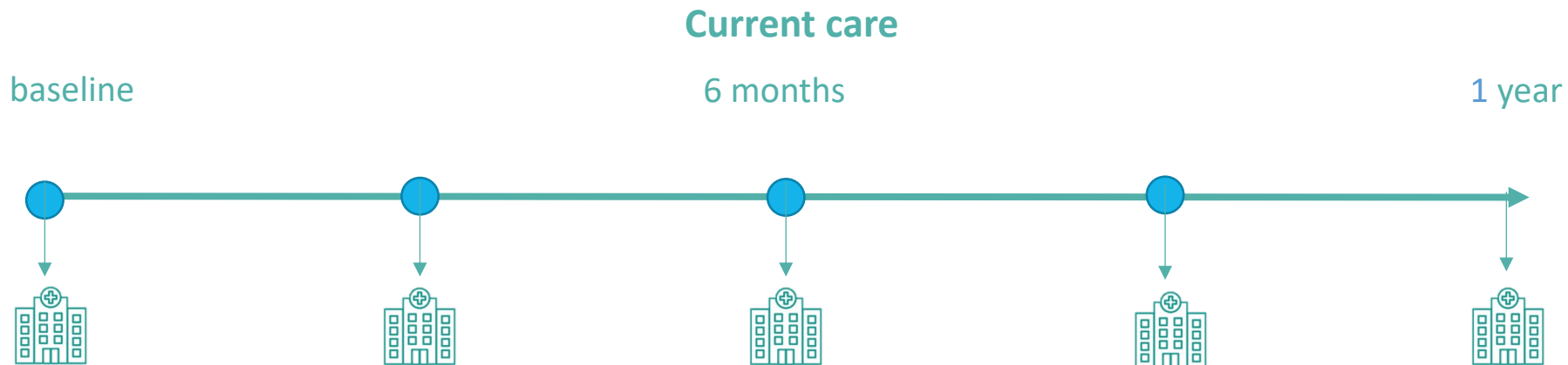


# THE FUTURE: HYBRID CARE

## Current daily care:

### Outpatient clinic (every 3 months)

- Pulmonary function test
- Evaluation symptoms and side-effects
- If applicable, radiology or lab

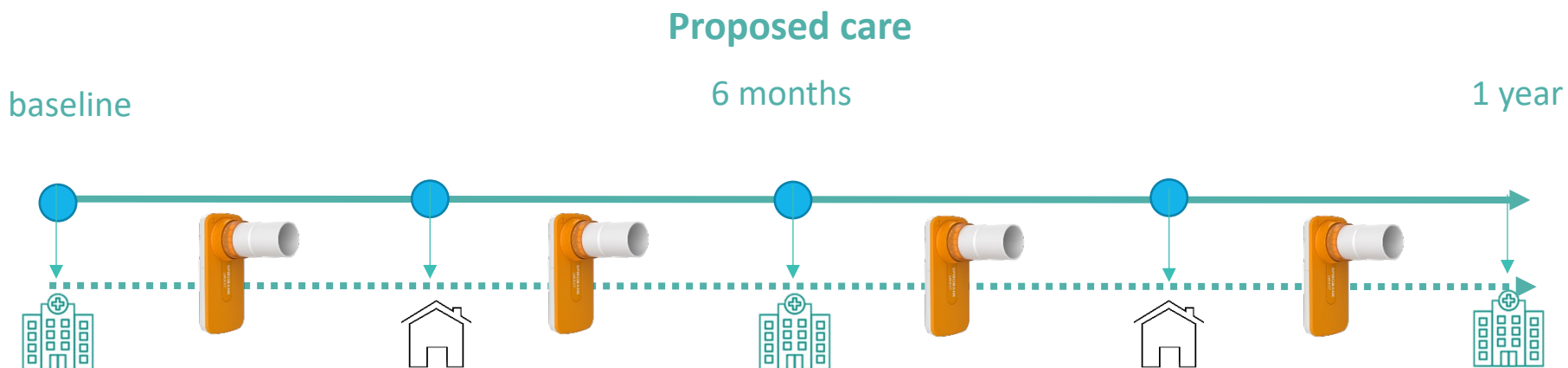


## Proposed care

### Home monitoring (weekly)

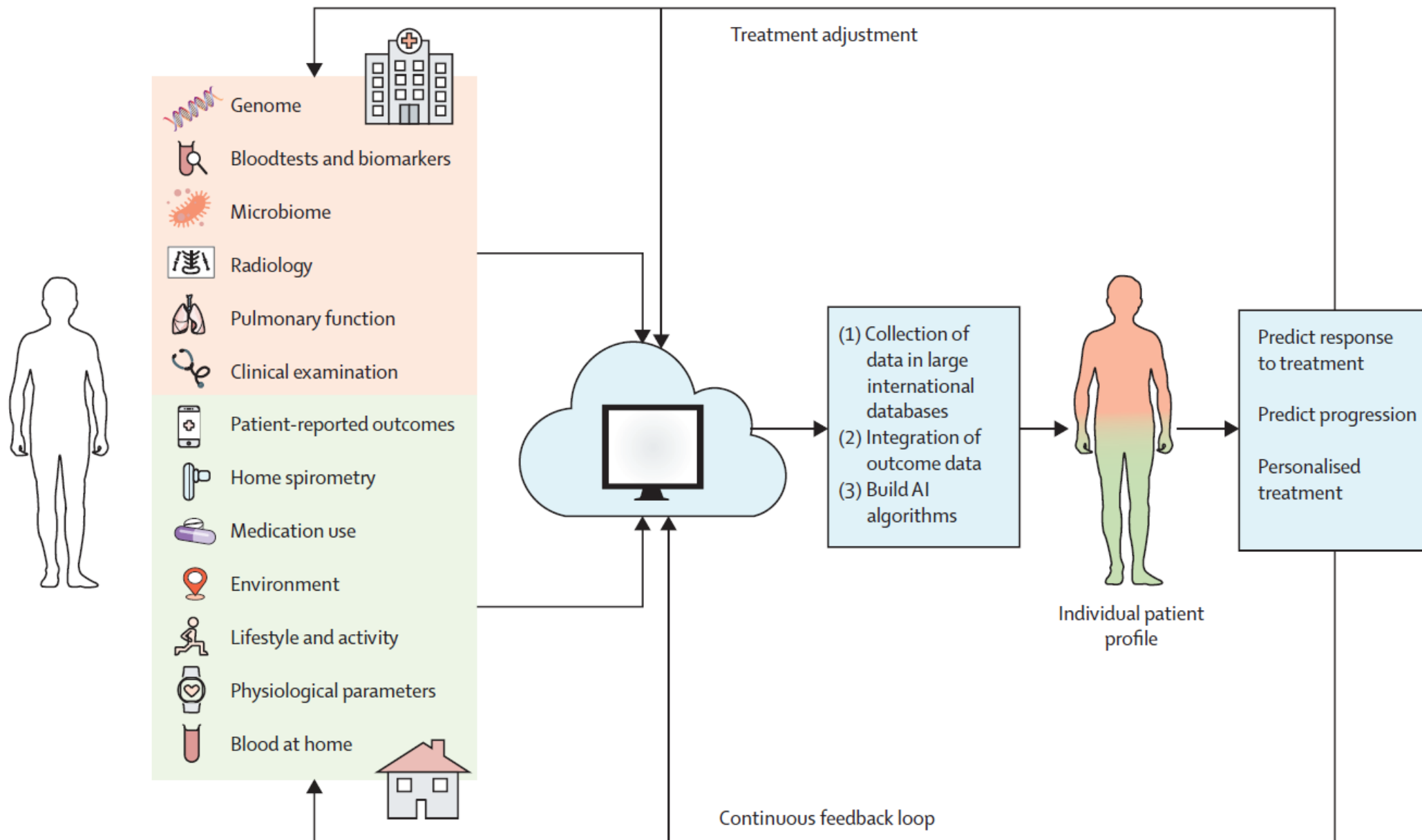
- Home spirometry
- Online tracking of symptoms and side-effects
- Medication coach
- Video consultations
- Information library

### Outpatient clinic (every 6 months)





# THE FUTURE: HYBRID CARE





# DIGITAL HEALTH IS THE FUTURE

- Home monitoring in pulmonary fibrosis is feasible and reliable
- Patient should be a partner in care
- Next steps:
  - *Broad implementation of hybrid care models*
  - *Long-term evaluation*

