Digitisation of Health: Evaluation of the IPF Electronic Health Platform

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patient M powe
empowering better outcomes

My disclosures

Chief Scientific Officer and shareholder of patientMpower Ltd

Founder of Merlin Consulting Ltd

consultancy services to pharma and digital health companies

mHealth app market - just 10 years old

> 350,000 health apps in 2017
>> > 78,000 new in last year

> 84,000 health app publishers

> 3.6bn health app downloads in 2017 (vs. 1.7bn in 2013)

Majority (55%) downloaded <5,000 times

Majority (64%) with < 1,000 monthly active users

Research to Guidance mHealth App Economics Report 2017

mHealth app market

Availability of apps in Android > Apple

Growth rate of app publishers > growth rate of app downloads

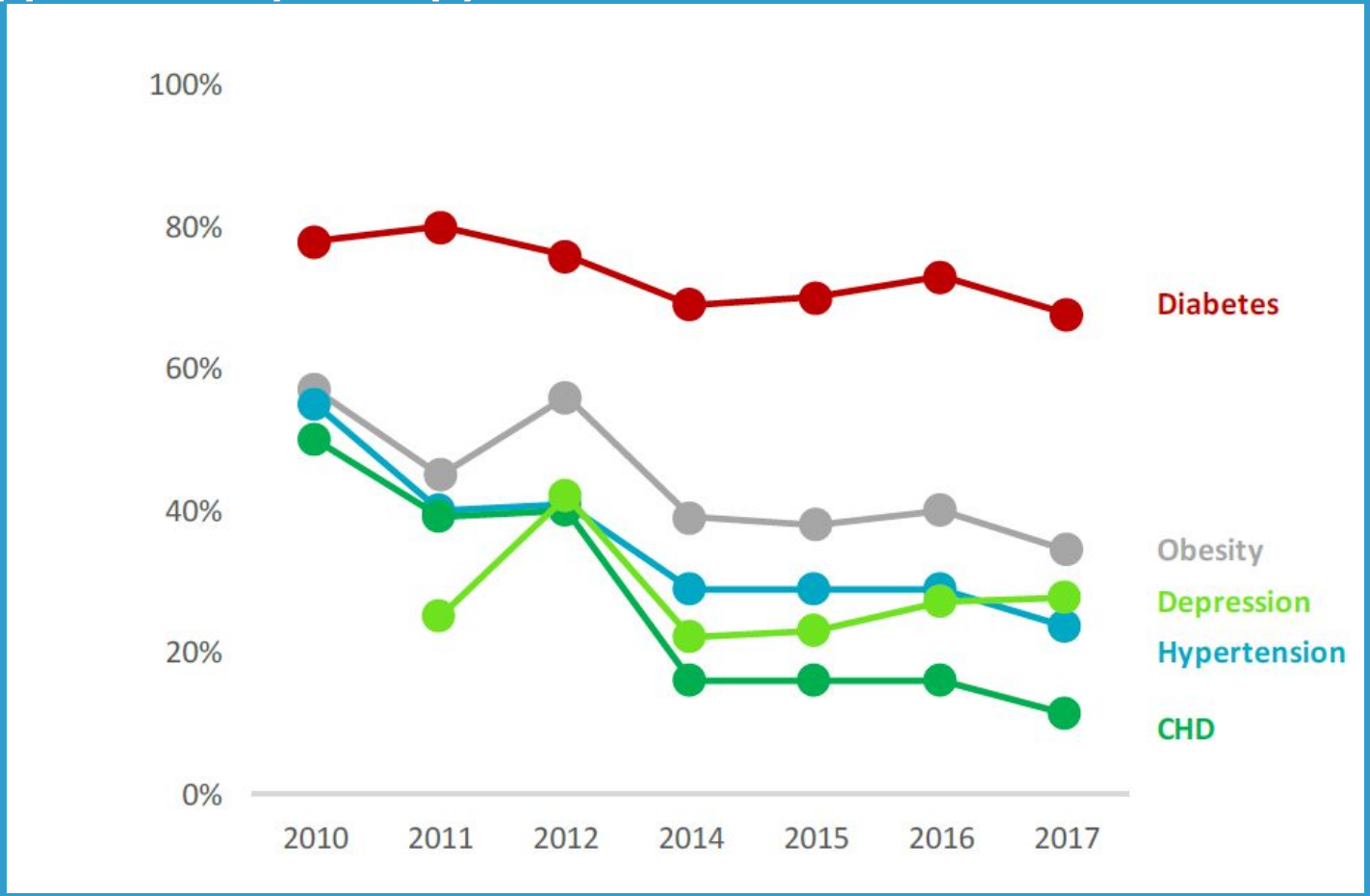
Regulatory environment uncertain - new approach by FDA

Artificial Intelligence

Internet of Things

Virtual Reality

mHealth app market by therapy area



Survey of mhealth company view of market attractiveness

FIRE POINT
FIRE BLANKET

About patientMpower

Empowering patients to achieve better outcomes

Provide patients, caregivers & healthcare professionals with actionable insights

Accelerate research & development of new treatments

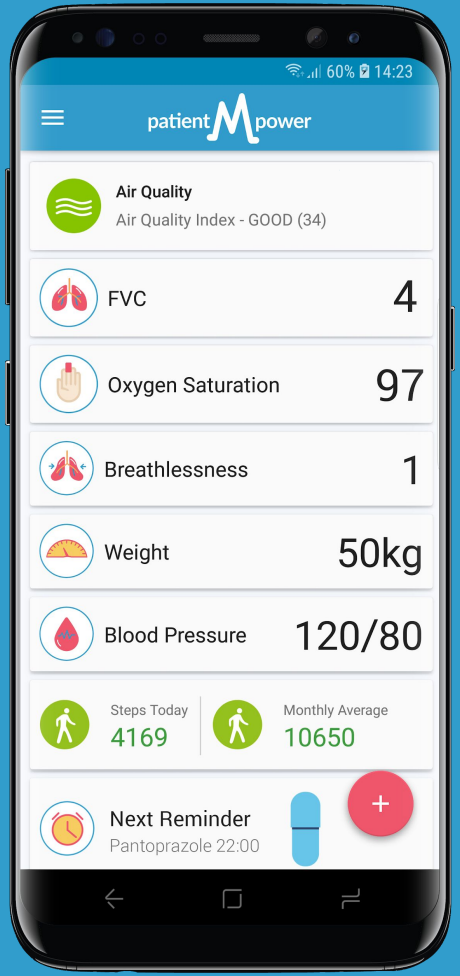
Faster, targeted recruitment of patients to clinical trials

patientMpower objectives

Create a tool for patients to help them live better with their condition.

Collect data to create a digital biobank™ generating insights to increase understanding of lung diseases and help research.

Develop a digital therapeutic to enable early identification of exacerbations.


60% 14:23
patientMpower
Air Quality
Air Quality Index - GOOD (34)
FVC 4
Oxygen Saturation 97
Breathlessness 1
Weight 50kg
Blood Pressure 120/80
Steps Today 4169
Monthly Average 10650
Next Reminder
Pantoprazole 22:00

SPIROBANK SMART

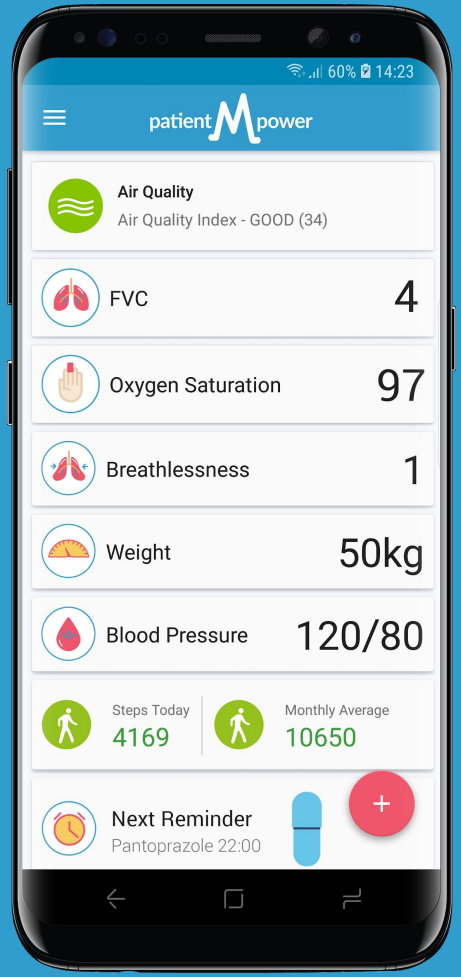
12:45
NOV 27
76

98 %
82
NONIN

A&D Medical
1
2
1 - 2cm
(0.5")
120 SYS. mmHg
78 DIA. mmHg
70 PUL. /min.
START
Bluetooth

patientMpower pulmonary applications

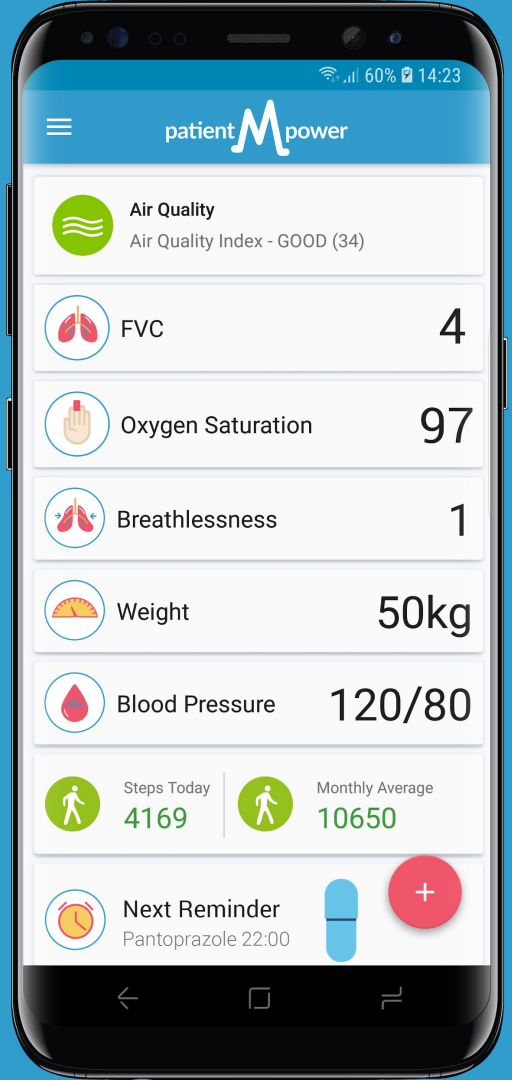
- Pulmonary Fibrosis & Lung transplantation follow-up
- App for carers & mentor to view data & support patients
- Patients can generate reports of their data prior to healthcare visits
- Portal access for healthcare providers to view patient-generated data in real time. Can integrate to electronic medical records (e.g. Epic)
- Clearance from FDA for our plans to ‘triage’ patients’ home spirometry data
- Pilots underway in Brigham and Women's, NYU Langone



Patient dashboard

Opening screen is dashboard - shows most recent values

- air quality
- spirometry
  - FVC for PF
  - FEV_1 & FEF_{25-75} for lungTx
- oxygen saturation
- weight
- blood pressure
- step count
- medication reminder



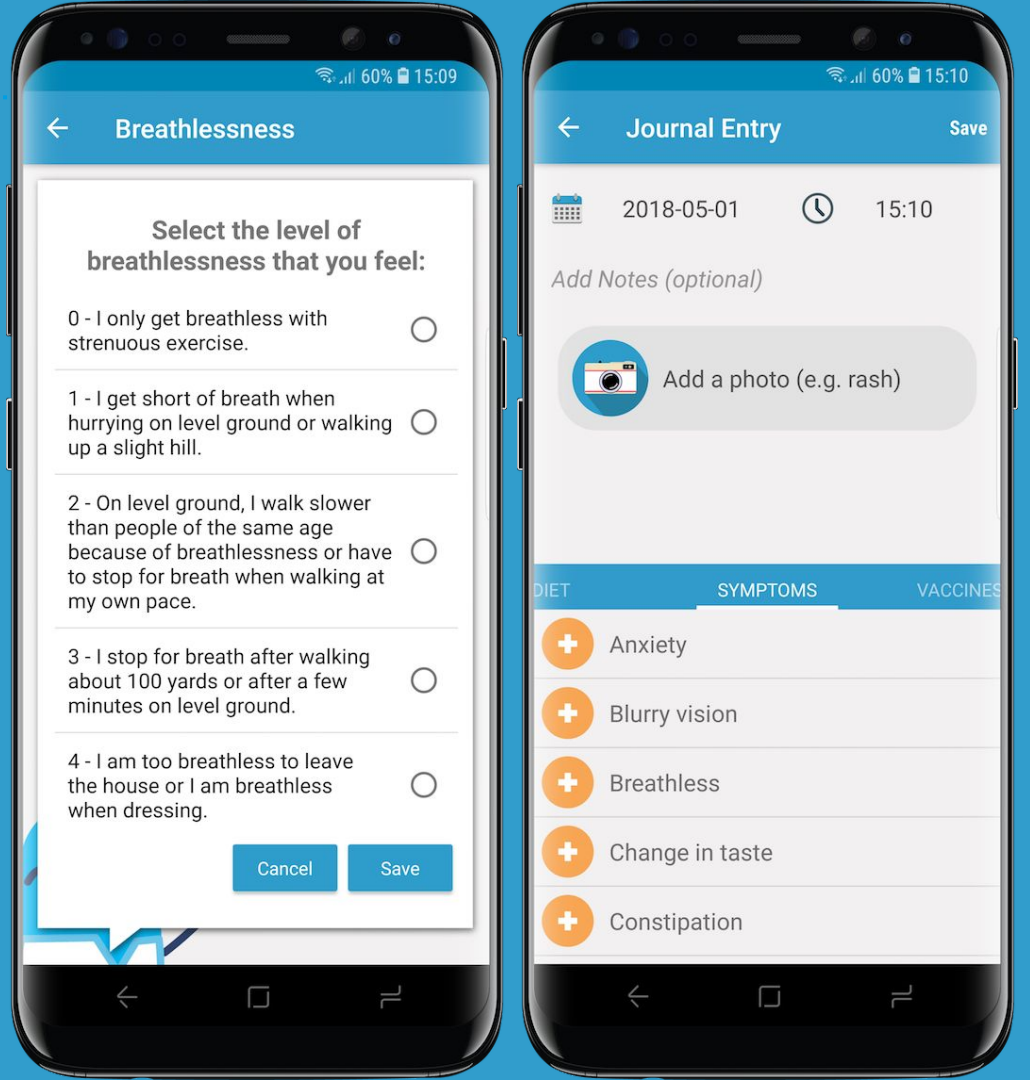
Health journals, PROMs

Health journal feature allows patients to catalog symptoms, vaccines & diet

Record questions and items they want to recall for healthcare appointments

Range of PROMs & PREMs can also be delivered

Dyspnoea: mMRC score



Air quality

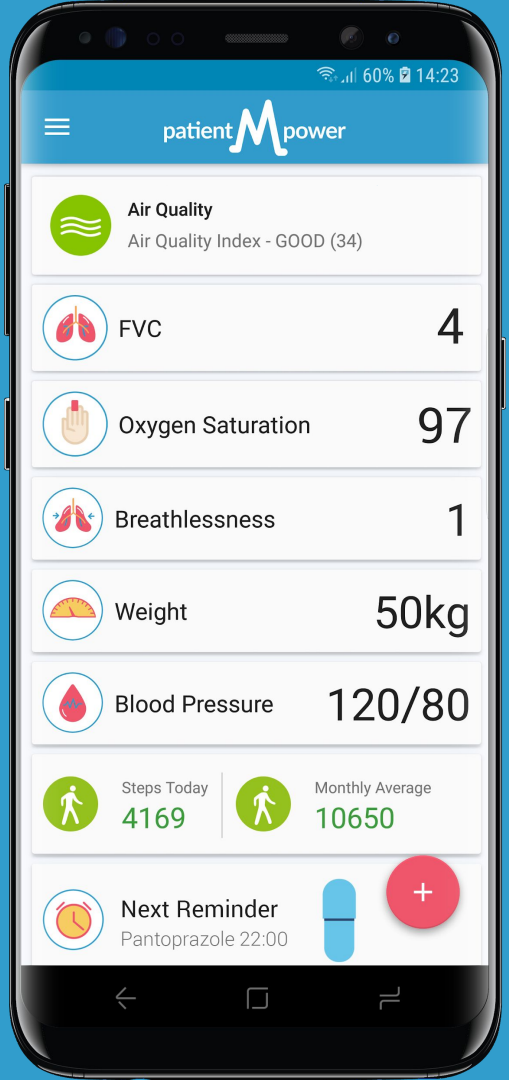
Displays air quality based on nearest sensor from airnow.gov

Helping patients

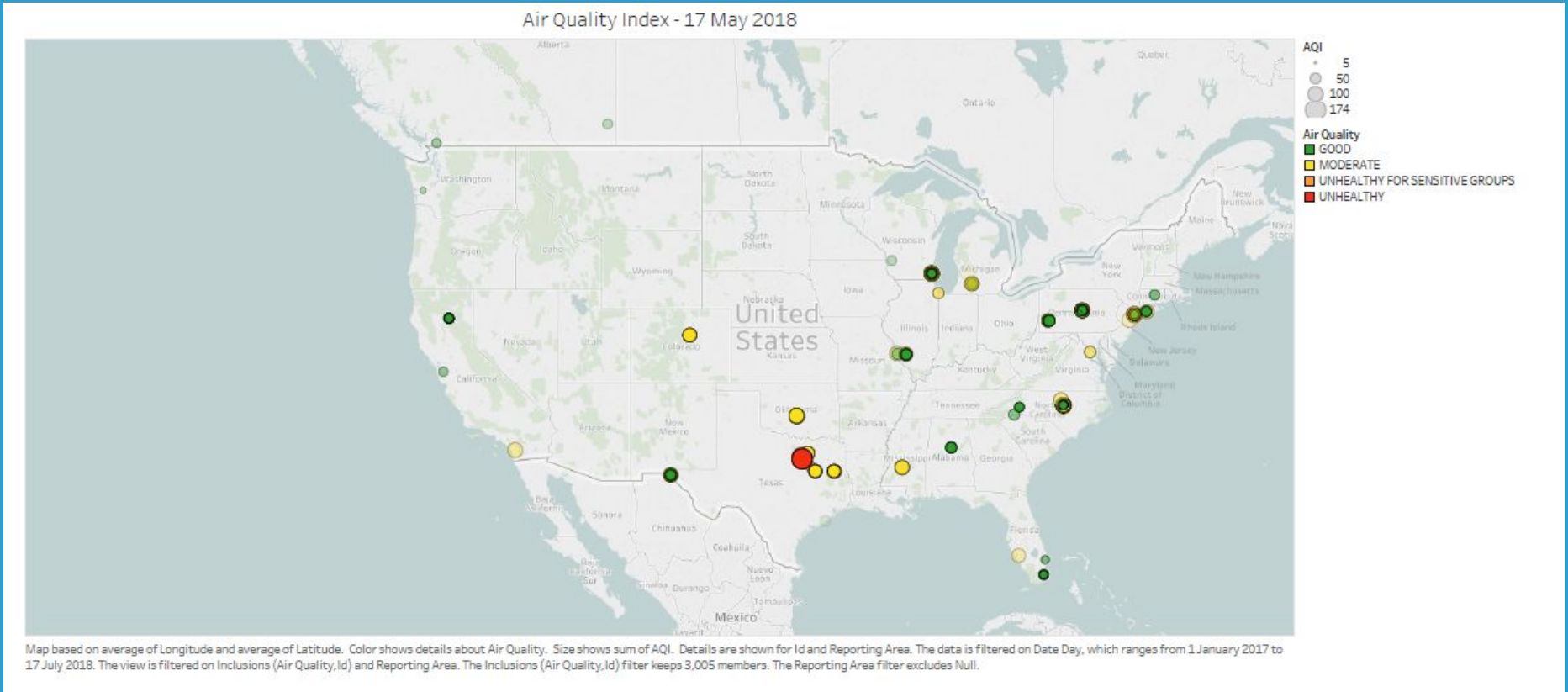
Avoid exposure to poor air quality

Helping researchers

Correlate disease exacerbations with patient generated data, environmental factors & notifiable diseases



Mapping air quality to location of patientMpower users - future research

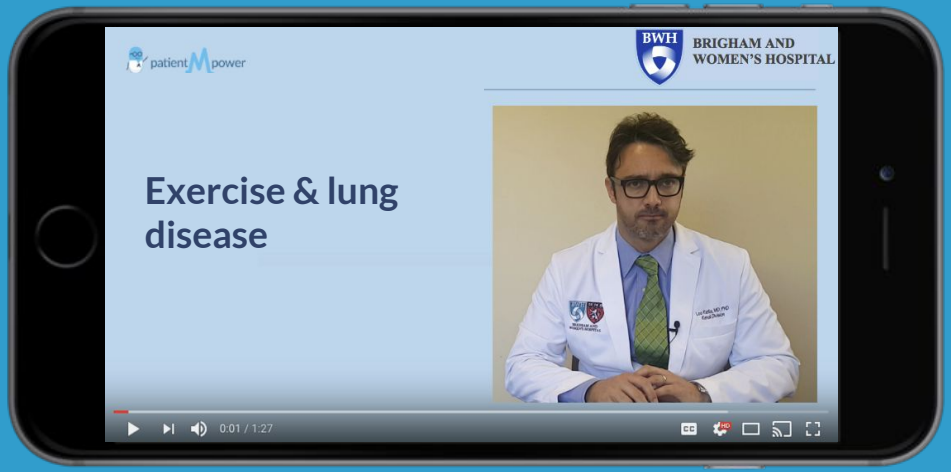


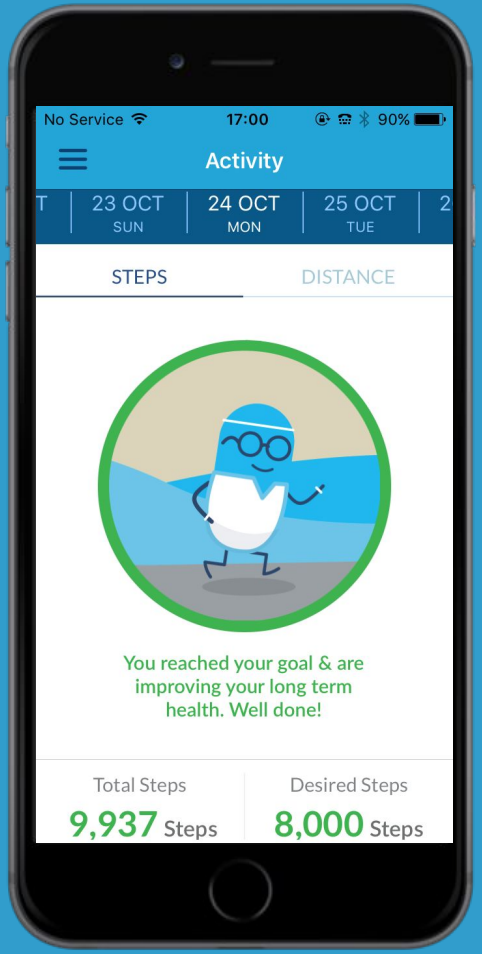
Video of air quality changes over time

Improving education & health literacy

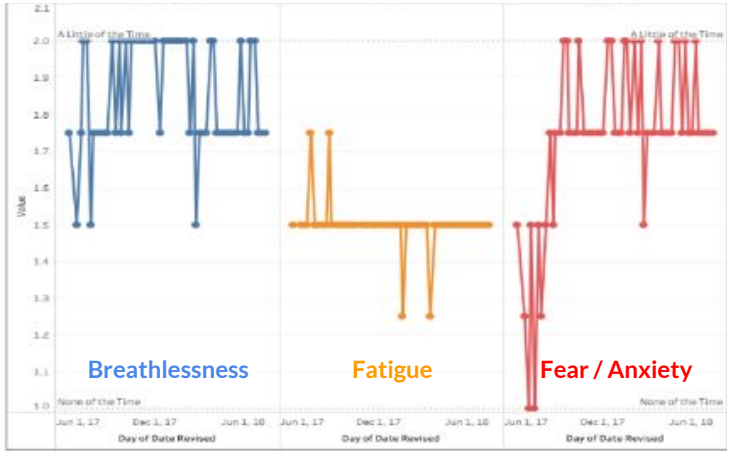
Transplant Foundations	Establishing Habits & Behaviors	Sustaining & reinforcing behavior

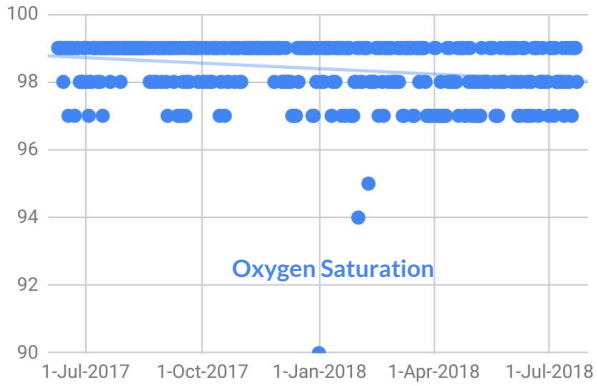
- Suite of educational content delivered in scheduled & intelligent / context aware situations
- Establishing & reinforcing behaviors to aid pulmonary rehabilitation

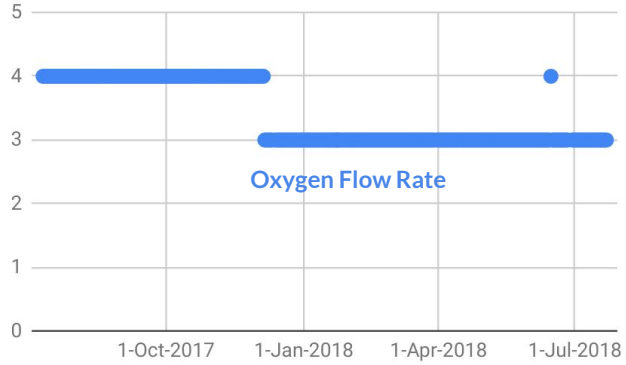




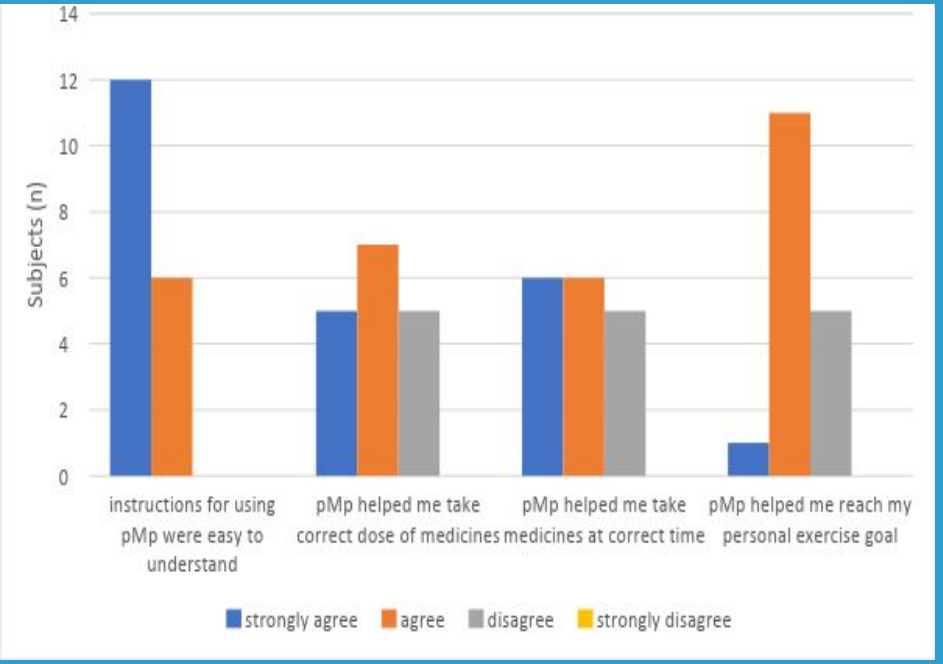
Objective & Subjective view of patients' health

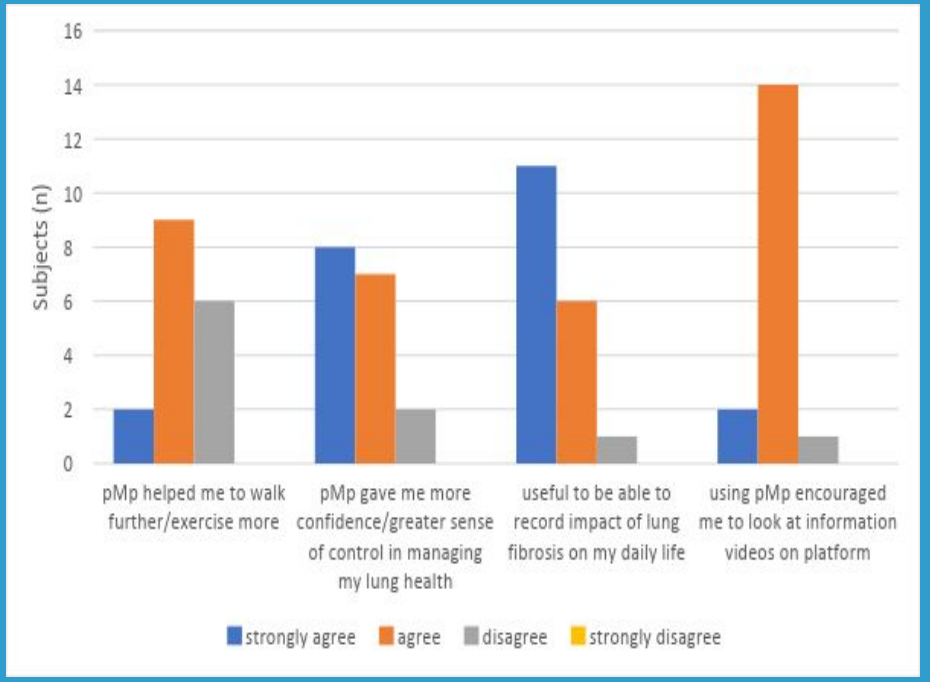




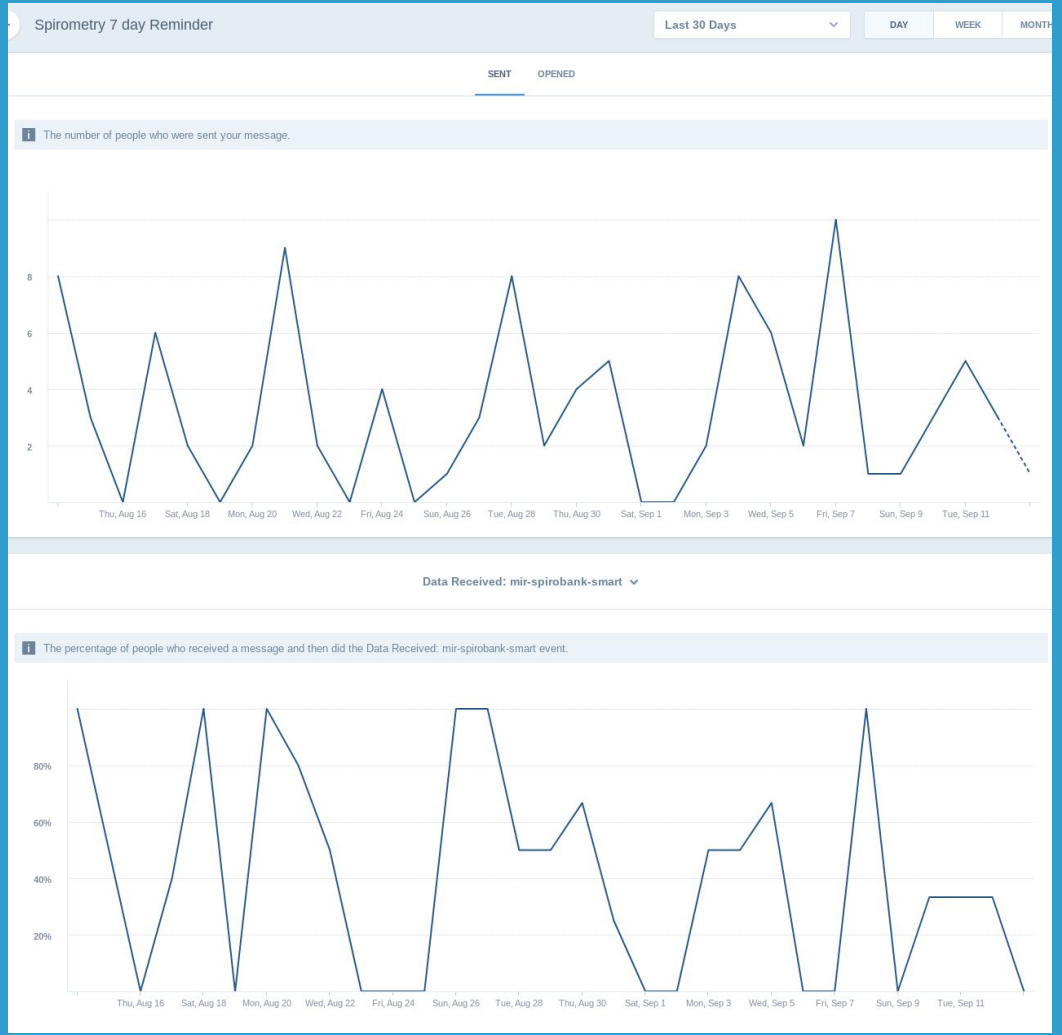


PF Warrior opinions





Behavioral analytics & notifications to improve engagement & adherence Example below measuring differing types of messaging to improve spirometry engagement



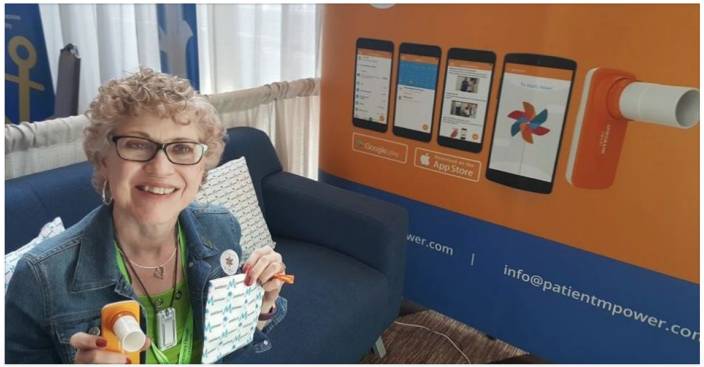
Highly engaged users sharing their stories on social media

Hi, my name is Nancy Suarez Lee from North Richland Hills, TX. I'm 59 years old and was diagnosed with pulmonary fibrosis (PF) in 1995 as I had a predisposition to PF due to a genetic condition called Hermansky Pudlak Syndrome. I was transplanted on September 23, 2011.

I first learned about patientMpower through Bill Vick, a fellow idiopathic pulmonary fibrosis (IPF) patient and support group leader in TX. I had the pleasure of meeting the patientMpower team in person at the PFF Summit in Nashville in November 2017.

The patientMpower app allows me to digitally store, track and share the daily vitals that I'm required to track post-transplant. I can ditch the paper log and the space it takes to store them! These are important especially for detecting any changes that could indicate rejection of my new lungs. I love the spirometer! The readings are consistent and accurate.

PF patients can download this FREE app from the App Store on Apple or on Google Play.



Conclusions from user experience surveys

- Most people use patientMpower on most days
- Many continue using patientMpower long-term (>1 year)
- Regular home recording of objective & subjective data is practical (and popular with patients)
    - enables long-term collection of multiple types of health data
- Prompting will improve frequency of data collection

Hospital portal for lung transplant centres

Details | Measurements | Stepcount | Medications | Surveys | Journal

Patient Measurements

weight	53	53	53	59.8	59.4	59.4	59.4	59.8	61.3	61.3	61.5	60.1			
blood pressure	118/78	120/80	120/80												
tacrolimus	2	2	2												
heart rate	85	85	85	85											
oxygen saturation	99	99	99												
temperature	36.7	36.4	37.1												
Breathlessness	0	0	0	0	0	0	0								
FVC	4	3.9	2.5	3.5	2.7	4	3.9	2.5	3.5	2.7	3.9	4.1	3.8	3.6	3.2
PEF	4.7	4.4	2.9	2.2	1.5	3.6	2.3	2.6	4.5	4.9	2.8	4.3	3.9	4.1	4.8
FEV1	2.4	1.9	1.7	1.1	2.5	2	1.9	2.1	3.9	4.1	3.7	2.9	2.1	2.3	2.4
FEV1/FVC	0.8	0.6	0.8	0.5	0.4	0.6	0.5	0.5	0.7	0.6	0.5	0.7	0.6	0.6	0.8
FEV6	4	3.9	2.5	3.5	2.1	3.9	4.1	3.7	2.9	3.6	2.1	3.9	4.1	3.7	2.9
FEF25/75	3.1	1.7	1.7	1.3	0.3	1.8	1.4	1.2	1.2	1.5	1.2	1.5	1.4	1.5	2

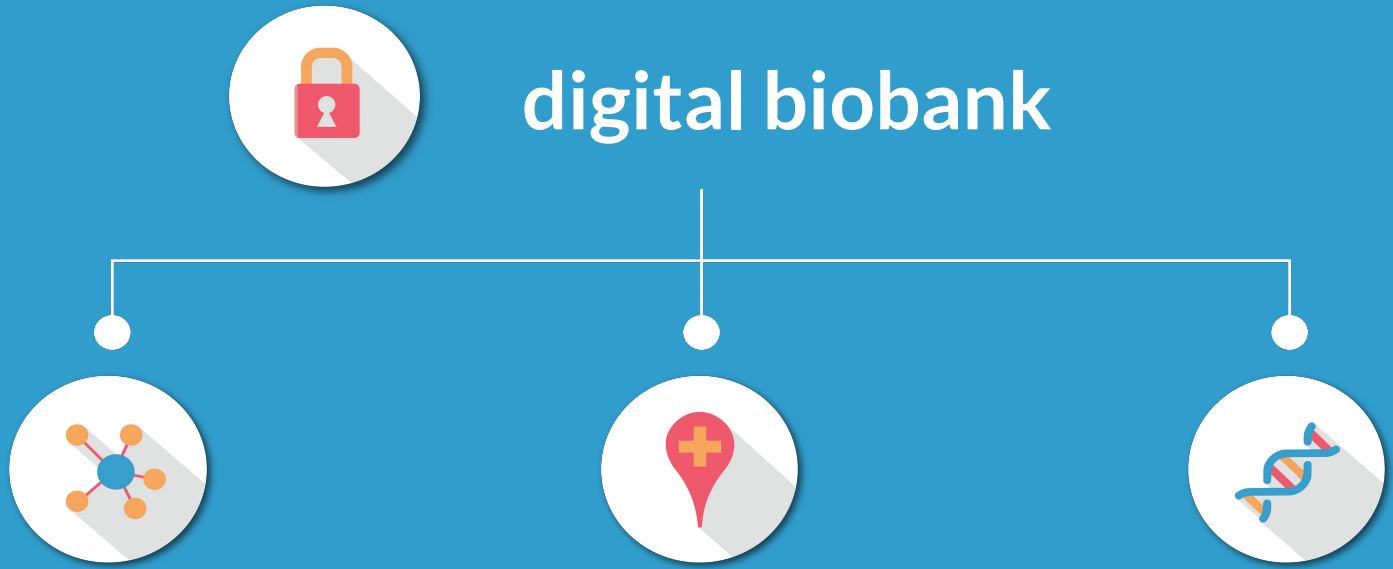
Lung transplantation follow-up

Automated detection of spirometry changes signalling BOS

Enabling telehealth follow-up visits (instead of in-clinic)

Long-term follow-up for distant patients

digital biobank



We’re collecting rich phenotypic, location and environmental data & collaborating with genomic researchers to unlock new insights into the data

We’re stratifying patients based on the data they are producing - identifying those at risk of exacerbation

Recording location and air quality data for future research

You can’t control the wind but you can adjust the sails

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