The objective of this study was to assess the user’s opinions on the utility and acceptability of pMP (with home spirometry) app to the patient’s mobile phone/device and connected wirelessly to a spirometer to allow longitudinal collection of patient-measured FVC.

Rationale
Lidiodaphic pulmonary fibrosis (IPF) is associated with progressive dyspnea, worsening of pulmonary function (reflected as decline of forced vital capacity [FVC]) and severe limitation of physical activities with major impact on quality of life.

The patientMpower platform (pMP) is an electronic health journal developed for PF patients. It enables them to record medication adherence, activity, objective (e.g., FVC & subjective (e.g., dyspnea) measurements) & health outcomes, pMP is downloadable as an app to the patient’s mobile phone/device and connected wirelessly to a spirometer to allow longitudinal collection of patient-measured FVC.

Methods
Prospective, open-label, single-arm, observational survey (42 days).

Entry criteria:
Diagnosis of PF, owns a smartphone/tablet, e-mail address, internet access, written informed consent. No changes to usual healthcare.

Recruitment & onboarding:
Study conceal & description communicated to PF Warrior Support Group via social media (including video broadcasting).

Interested participants gave e-consent, all were supplied with a spirometer (Spirobank Smart, Medical International Research, Italy, www.spirometry.com). Instructions on installation of pMP and Bluetooth pairing with spirometer were emailed (YouTube clips) to participants who independently installed pMP.

Measurements:
FVC (litres, mean, range) 2.28 L (range 0.6-4.72).
PROM (range 6-106)
Time from diagnosis (years, mean, range) 6.2 (range 0.4-108).
Dyspnea confirmed by clinical expert (n, %) yes: 21 (75%), no: 6 (20%), not stated: 2 (7%).

On antifibrotics, therapy (n, %) yes: 18 (62%), no: 6 (20%), not stated: 10 (35%).

Disposition of subjects:
Fifty subjects expressed initial interest and 40 gave e-consent. Twenty-four (24; 100%) downloaded pMP and used it once prior to study commencement. 18 (75%) provided a response on utility and acceptability. 22 (92%) recorded FVC and 14 (58%) recorded dyspnea once.

Results
Baseline demographics:
Total subjects (n, %) 27 (100%)
Ethnicity (n, %) white: 22 (81%), other: 1 (4%), not stated: 4 (15%)
Gender (n, %) male: 12 (44%), female: 15 (56%), not stated: 0 (0%)
Age (years, mean, range) 62 (range 31-79).
FVC 1 (L, mean, range) 2.28 L (range 0.6-4.72).
PROM 1 (range 6-106).
Time from diagnosis (years, mean, range) 6.2 (range 0.4-108).
FVC 2 was recorded on median 26 days (range 1-34).
PROM was recorded on median of 4 occasions (range 2-6).

Some level of dyspnea (ie. mMRC score ≥1) reported by 12/14 subjects.

Usage metrics:
FVC used for median 24 days (range 1-42).
PROM was recorded on median 26 days (range 1-34).
PROM was recorded on median of 4 occasions (range 2-6).

CONCLUSIONS
People with PF are willing and able to use an electronic health record to record spirometry, symptom scores and outcomes in a real-world setting. Consideration should be given to additional prompts to improve the frequency of recording of certain outcomes (e.g. dyspnea).

Recording regular home spirometry and health outcomes was feasible and acceptable to this group of volunteers recruited through their patient support group via an e-consent process.

Implementation of studies using the patientMpower platform and associated sensors (e.g. spirometry) can be managed remotely and may be helpful for some patients with respiratory conditions. This approach may be useful to recruit subjects remotely to clinical studies and can capture data on long-term trends in patient-reported FVC and other outcomes in patients comfortable with technology.

The results suggest that the patientMpower platform is feasible and acceptable to patients with PF as an electronic health journal to record home spirometry and other relevant outcomes over a period of six weeks in a real-world setting.

We would like to thank all of the PF Warriors who took part in this study.

Commercial support is received from financial interests. Each co-author has been a shareholder in patientMpower Ltd. C. Edwards & E. Costello are employees and shareholders of patientMpower Ltd. B. Vick is an advisor to patientMpower Ltd. (reimbursed).

N.B. The current study is not a randomised controlled trial and has not been peer-reviewed.

Figure 1: Time pattern of spirometry recording per subject. Each cell represents a day on which spirometry is recorded.

Figure 2: Time pattern of PROM recording per subject. Each cell represents a day on which PROM is recorded.

Figure 3: Time pattern of symptom recording per subject. Each cell represents a day on which symptom is recorded.

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