

A retrospective review of home-based spirometry quality in an adult lung transplant cohort

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INTRODUCTION

- ▶ Long-term survival after lung transplantation is affected by the number and severity of infection and rejection episodes. Routine surveillance is essential for the detection of allograft complications, and to facilitate prompt intervention.
- ▶ Home and hospital-based spirometry form part of routine surveillance. A decline in lung function is often the first sign of a complication, and can occur before the onset of symptoms. Home spirometry correlates strongly with hospital spirometry (Wijbenga et al, 2020) and good adherence to home spirometry is associated with better patient and lung allograft survival"
- ▶ Home spirometry, of sufficient quality, has the potential to support the identification of complications, guide clinical decision making, and allow patients to better manage their lung health. An understanding of the data quality is required to ensure results are reproducible and useful.
- ▶ In a cohort of lung transplant recipients, we introduced artificial intelligence-based software (ArtiQ.QC) to a remote monitoring program (patient-facing app; Bluetooth-connected spirometer) which allowed spirometry efforts to be assessed against international standards (Graham et al, 2019) and provided automated feedback to patients.

CONCLUSION

Good quality standards can be achieved through home-spirometry, with and without automated feedback, with appropriate support from trained respiratory physiologists. Automated quality control is useful for identifying patients struggling with home spirometry, who may benefit from intervention (e.g., video conferencing). This automated selection of patients requiring support reduces the burden of reviewing every patient unnecessarily. The impact of additional coaching for patients identified as producing a high percentage of poor-quality readings requires further investigation.

METHODS

- ▶ Lung transplant recipients, consenting to a remote monitoring program, were asked to perform spirometry measurements daily in year 1, reducing to twice weekly and weekly when deemed clinically appropriate.
- ▶ 65 patients provided home spirometry data from 1/10/2022 to 30/09/2023. From 1/4/2023 patients received automated feedback and spirometry was graded according to 2019 ATS/ERS criteria (Graham et al, 2019) via ArtiQ.QC. Data collected prior to 1/4/2023 was retrospectively graded using ArtiQ.QC.
- ▶ We retrospectively analysed the quality of spirometry sessions pre- and post- the introduction of ArtiQ.QC.

COMMERCIAL SUPPORT

R.Borton is an employee of patientMpower Ltd.

RESULTS

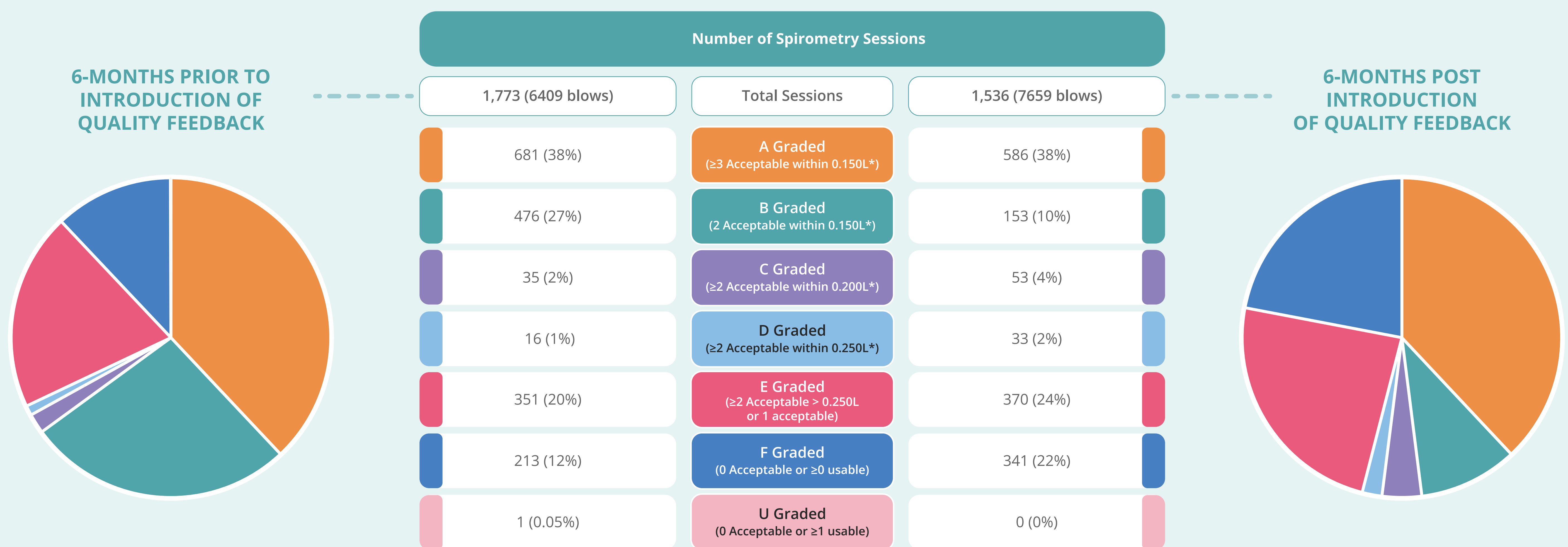


Figure 1: Sessions graded to ATS/ERS standards by ArtiQ.QC

There was no change in the percentage of A graded sessions in the 6 months post introduction of ArtiQ.QC, and an increase in the percentage of E and F graded sessions. Additional analysis highlighted 49% (352) of post ArtiQ.QC E and F graded sessions were recorded by only 2 patients.

REFERENCES

- ▶ Graham, B.L., Steenbruggen, I., Miller M.R., et al. Standardization of Spirometry 2019 Update. An official American Thoracic Society and European Respiratory Society Technical Statement. *Am J Respir Crit Care Med.* 2019; 200(8): e70-e8
- ▶ Odisho AY, Liu AW, Maiorano AR, et al. Design and implementation of a digital health home spirometry intervention for remote monitoring of lung transplant function [published online ahead of print, 2023 Feb 2]. *J Heart Lung Transplant.* 2023;S1053-2498(23)00030-X. doi:10.1016/j.healun.2023.01.010
- ▶ Wijbenga N, Hoek RAS, Mathot BJ, et al. Evaluation of a Home Monitoring Application for Follow Up after Lung Transplantation-A Pilot Study. *J Pers Med.* 2020;10(4):240. Published 2020 Nov 21. doi:10.3390/jpm10040240W