This is a repository copy of *Understanding FEV1 for the purpose of CF registry comparisons: Does bias in annual review FEV1 affect between-centre comparison within the UK?* .

White Rose Research Online URL for this paper:
http://eprints.whiterose.ac.uk/122491/

Version: Accepted Version

Proceedings Paper:
Hoo, Z. orcid.org/0000-0002-7067-3783, Curley, R., Campbell, M. et al. (2 more authors) (2017) Understanding FEV1 for the purpose of CF registry comparisons: Does bias in annual review FEV1 affect between-centre comparison within the UK? In: Pediatric Pulmonology. The 31st Annual North American Cystic Fibrosis Conference, November 2–4, 2017, Indiana Convention Center, Indianapolis, Indiana. Wiley , S412-S413.

https://doi.org/10.1002/ppul.23840

Reuse
Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk/

CONTROL ID: 2771151
CONTACT (NAME ONLY): R Curley
Abstract Details

PRESENTATION TYPE: Poster
CURRENT CATEGORY: EPIDEMIOLOGY & NEWBORN SCREENING
KEYWORDS: FEV1, Registry, epidemiology, quality improvement, care improvement.
AWARDS:
Abstract

TITLE: UNDERSTANDING FEV_1 FOR THE PURPOSE OF CF REGISTRY COMPARISONS: DOES BIAS IN ANNUAL REVIEW FEV_1 AFFECT BETWEEN-CENTRE COMPARISON WITHIN THE UK?
AUTHORS (LAST NAME, FIRST NAME): Hoo, ZH [2, 1]; Curley, R [1, 2]; Campbell, MJ [2]; Walters, SJ [2]; Wildman, MJ [1, 2]

INSTITUTIONS (ALL):
1. Sheffield Adult CF Centre, Northern General Hospital, Sheffield, S Yorkshire, United Kingdom.
2. ScHARR, University of Sheffield, Sheffield, S Yorkshire, United Kingdom.

ABSTRACT BODY:

Abstract Body: Background
Our earlier abstract using the 2014 UK CF registry data from adult centres showed that a funnel plot of annual review $\%FEV_1$ adjusted for case-mix factors identified 4 small centres & 2 large centres as negative outliers and 1 medium-sized centre as a positive outlier. The funnel plot also suggests that an inverted U-shape relationship exists between $\%FEV_1$ and centre size.
In another abstract, we showed that annual review $\%FEV_1$ under-estimated lung health of adults in comparison to $\%FEV_1$ captured during periods of clinical stability. This has clear implications when comparing against registries with encounter-based FEV_1, such as the US.
However, it is uncertain whether the bias in annual review $\%FEV_1$ also affects between-centre comparison within the UK.

Aim
To determine whether discrepancies between annual review FEV_1 and best annual FEV_1 vary according to centre size and thus affect the between-centre differences observed in a funnel plot analysis

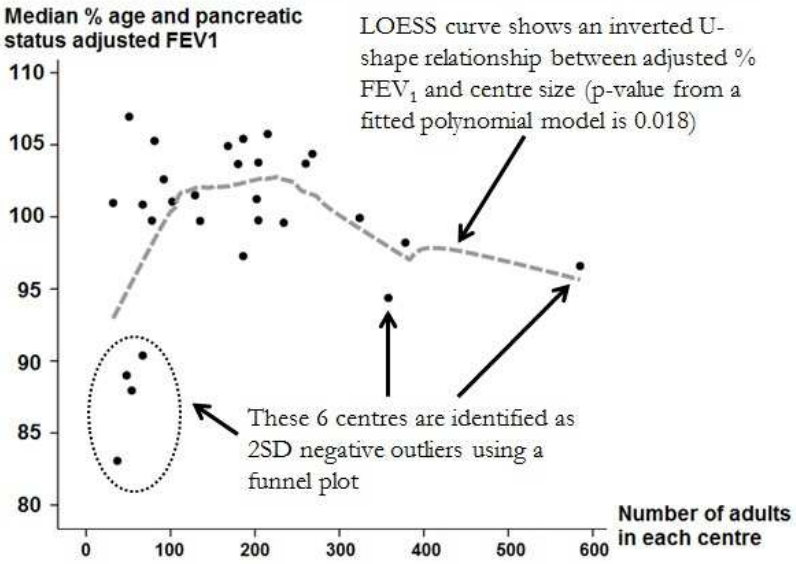
Methods
Adults who had lung transplantation were excluded. Adult CF centres in the UK with ≥80% completeness for best FEV_1 data in 2014 were included in this analysis.
Mean discrepancy between annual review and best annual $\%FEV_1$ were plotted against centre size. A Local Polynomial Regression (LOESS) curve was used to explore the relationship between the two variables. An appropriate model is fitted based on the LOESS curve to determine the strength of relationship between discrepancies in $\%FEV_1$ vs centre size.

Results
Of the 28 adult centres in the UK, 18 centres have ≥80% completeness for best FEV_1 data in 2014. There is an inverted U-shaped relationship between mean discrepancies in $\%FEV_1$ and centre size, which is statistically significant (p-value 0.048 with a fitted polynomial model).

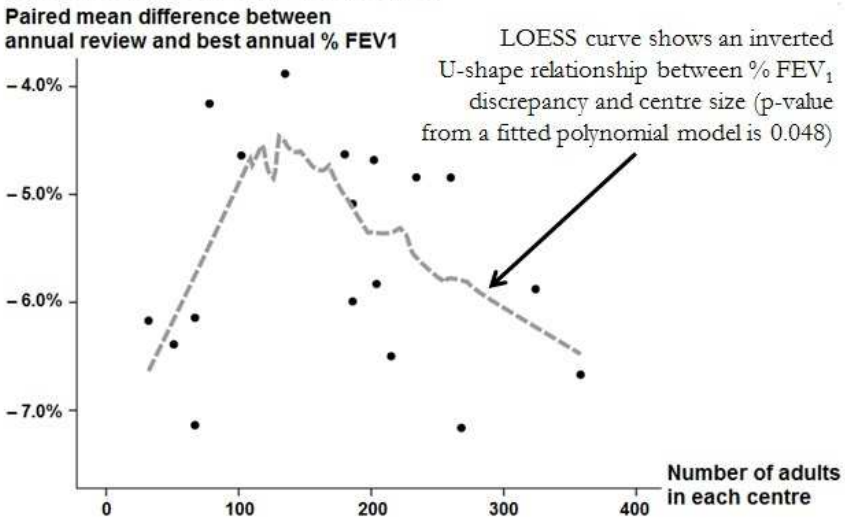
Conclusions
Annual review $\%FEV_1$ under-estimated lung health of adults from small and large centres in the UK to a greater extent compared to adults from medium-sized centres. This suggests that the between-centre differences observed in a funnel plot could be exaggerated by systematic bias in annual review $\%FEV_1$. As such, annual review $\%FEV_1$ is an unreliable metric to compare health outcomes of adult CF centres within the UK using a funnel plot.

(no table selected)

Graph of median case-mix adjusted FEV1 vs centre size



Graph of mean discrepancy between annual review and best annual FEV1 vs centre size



In a funnel plot, the outcome of interest is plotted against centre size.

The Local Polynomial Regression (LOESS) curve is a non-parametric method for fitting smooth curves to empirical data, to depict relationships between variables. For reference, see:

Cleveland WS, Devlin SJ. Locally weighted regression: an approach to regression analysis by local fitting. J Am Stat Assoc 1988; 83: 596–610.

Caption: