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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.
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:
