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Abstract

TITLE: EXPLORING DIFFERENT METHODS TO DISPLAY CENTRE-LEVEL DATA IN THE UK CF REGISTRY ANNUAL REPORT
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ABSTRACT BODY:
Abstract Body: Background
Centre-level data for relevant health outcomes are summarised in the UK CF registry annual report as caterpillar plots and funnel plots with the aim of using data to drive quality improvement. These reports are publically available and are used to informally assess centre outcomes. However, a recent publication has questioned the usefulness of the current data display.[1]
Data display in the US CFF Patient Registry annual report is different from the UK. Median %FEV_1 for each adult centre is plotted against median BMI, then the plot is divided into four quadrants based on target %FEV_1 and BMI values. Centres in the top right quadrant (exceeded both target BMI and %FEV_1) can be inferred to have good outcomes instead of just having younger patients. This is because FEV_1 declines with age, but BMI increases with age among adults with CF.
The graphs in both the UK and the US annual reports do not adjust for case-mix, but there is significant between-centre age variation in the UK.[1] We hypothesised that without case-mix adjustment, the US-style plot will more accurately reflect the actual (case-mix adjusted) differences in outcomes between centres.

Aims
To compare UK adult CF centres with funnel plots and US-style plots, with unadjusted and adjusted %FEV_1

Methods
The 2014 UK CF registry data were used for this analysis.
Funnel plots[2] were produced using unadjusted %FEV_1, then using %FEV_1 adjusted for age & pancreatic status.
A plot of median unadjusted %FEV_1 vs median unadjusted BMI was produced, then a plot of age & pancreatic status adjusted %FEV_1 vs age, gender & pancreatic status adjusted BMI.

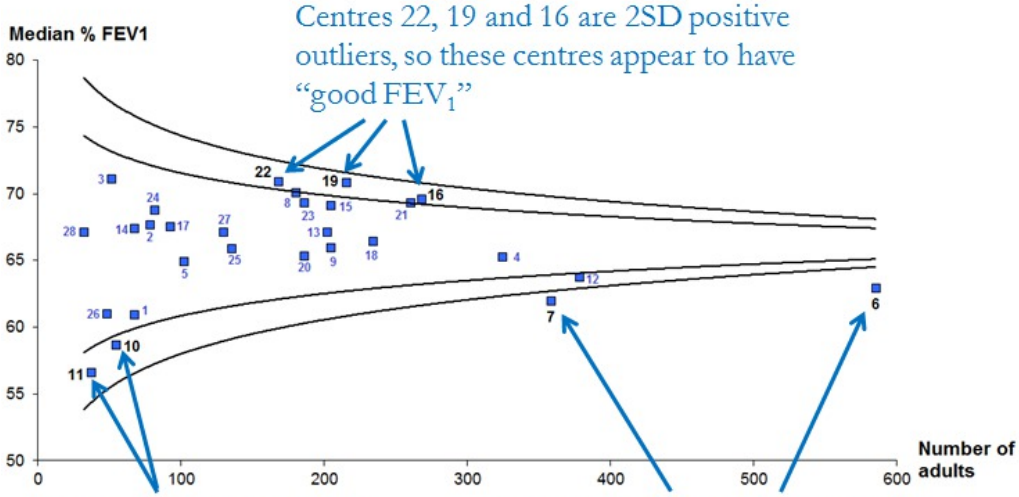
Results
Of the 28 adults centres in the UK, 3 centres were identified as positive outliers using a funnel plot with unadjusted FEV_1. With adjusted FEV_1, only 1 centre was identified as a positive outlier.
Only 1 centre exceeded the target FEV_1 and BMI using the unadjusted US-style plot. That centre remained in the top right quadrant even after adjustment for relevant case-mix factors.

Conclusions
The US-style plot could potentially identify centres with good performance even without case-mix adjustment, unlike funnel plots.

References

1. Nightingale JA, Osmond C. J Cyst Fibros 2017 [Epub ahead of print]
2. Spiegelhalter DJ. Stat Med 2005;24:1185–202
(no table selected)

Funnel plot using unadjusted % FEV1

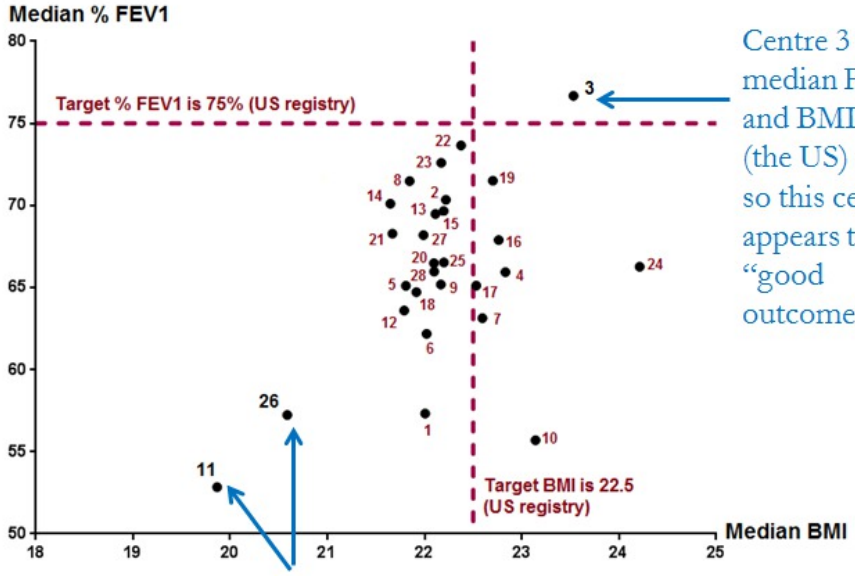


Centres 22, 19 and 16 are 2SD positive outliers, so these centres appear to have "good FEV_1"

Centres 10 and 11 are 2SD negative outliers, so these centres appear to have "poor FEV_1"

Centres 6 and 7 are 3SD negative outliers, so these centres could be perceived to have "poor FEV_1"

Plot of median % FEV1 vs median BMI (unadjusted)



Centre 3 has median FEV_1 and BMI above (the US) target, so this centre appears to have "good outcomes"

Centres 11 and 26 have median FEV_1 and BMI that appears to be very far off the rest of the other centres, suggesting these centres have "poor outcomes"

Caption: