

# Cystic Fibrosis Research News

## **Title:**

**QUANTIFYING FLUCTUATION IN GLUCOSE LEVELS TO IDENTIFY EARLY CHANGES IN GLUCOSE HOMEOSTASIS IN CYSTIC FIBROSIS**

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## **What was your research question?**

We wanted to know if we could use data from continuous glucose monitors to identify the early changes in blood glucose levels seen in cystic fibrosis-related diabetes (CFRD).

## **Why is this important?**

People with cystic fibrosis (CF) who develop CFRD are more likely to be unwell with lower lung function, decreased weight, and on average they die at a younger age than patients with CF who don't have diabetes. Current rates of CFRD are around 20% of teenagers and 40% of adults with CF. It is diagnosed by abnormally high glucose levels in the blood but that happens relatively late in the development of CFRD; we thought we would look at the variation in blood sugar levels instead – assuming that this was due to poor insulin control and therefore meant an early sign of developing CFRD.

## **What did you do?**

At the Royal Brompton (London, UK) we use continuous glucose monitors to measure glucose levels over a few days to examine the sugar readings for children and young people with CF. We took all the readings from these tests (around 250,000 data points) and looked at the variability in blood sugar by calculating the interquartile range – how wide the spread is across the middle 50% of the numbers measured. A bigger interquartile range means there's a wider spread of glucose values. We then compared the interquartile range for each person and compared them to their diagnosis.

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## What did you find?

We found that the interquartile range was higher in people with CFRD, and that when we looked at repeat glucose tests within a person it increased in those who developed CFRD during the study.

## What does this mean and reasons for caution?

If your CF centre is doing continuous glucose monitoring tests, then they can quickly measure the interquartile range of the data they're collecting (by downloading it into an Excel spreadsheet and using the quartiles function). They can then compare it to the ranges we have identified as normal, CF-related diabetes, or somewhere in-between, in order to help them decide if or when you need a repeat study.

We are not proposing that this approach replaces existing ways to diagnose CFRD but this information may add further information, or help identify people who we think may be developing early signs of CFRD, who present a raised interquartile range but not quite getting the high levels of blood sugars that put you in the CF-related diabetes category.

## What's next?

The way to decide if we use interquartile ranges from glucose monitors to diagnose CF-related diabetes (or to identify people who may benefit from starting insulin treatment sooner) is to do a randomised trial where we select a group of people to start insulin on the basis of the interquartile range, another group who don't, and then compare them after a set period of time. If we can show that this calculation will improve picking up people with CF-related diabetes early, then it could become part of that process going forward.

## Original manuscript citation in PubMed

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